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SIMATIC PCS 7

SIMATIC PCS 7
Process Control System

Volume 1: System components

Catalog
ST PCS 7

Update
February
2019

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Related catalogs

Catalogs for Process Automation

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SIMATIC ST PCS 7 T
SIMATIC PCS 7 Process Control System
Vol. 2: Technology components

PDF (E86060-K4678-A141-A4-7600)



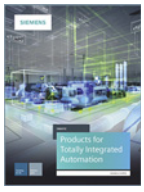
SIMATIC ST PCS 7 AO
SIMATIC PCS 7
Process Control System
Volume 3: Add-ons for SIMATIC PCS 7

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SIMATIC ST 70
Products for
Totally Integrated Automation

E86060-K4670-A101-B6-7600



SIMATIC HMI / PC-based Automation ST 80/ST PC
Human Machine Interface Systems
PC-based Automation

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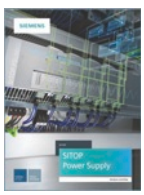
Industrial Communication IK PI
SIMATIC NET

E86060-K6710-A101-B8-7600



SITOP KT 10.1
SITOP
Power supply

E86060-K2410-A101-B3-7600



Process Automation FI 01
Field Instruments for
Process Automation

PDF (E86060-K6201-A101-C3-7600)



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Process Automation WT 10
Products for Weighing Technology

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SIMATIC PCS 7 V9.0 Process Control System

System components

SIMATIC PCS 7



Catalog ST PCS 7 · November 2017
PDF Update February 2019

Supersedes:
Catalog ST PCS 7 · 2016
Catalog ST PCS 7 · 2017 (Preliminary edition)

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:
www.siemens.com/ca01download

Please contact your local Siemens branch.

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Software Media and Logistics 1
PCS 7 Software Packages, Software Update Service

System Administration 2
SIMATIC PCS 7 Management Console

Industrial Workstation/IPC 3

Engineering System 4
New: SIMATIC PCS 7 Plant Automation Accelerator

Operator System 5

Process Data Archiving and Reporting 6
Process Historian, Information Server

Plant Device Management 7
SIMATIC PDM, SIMATIC PCS 7 Maintenance Station

Automation Systems 8
New: AS 410E

Compact systems 9
SIMATIC PCS 7 BOX

Industrial Communication 10

Process I/O 11
New: SIMATIC CFU, SIMATIC ET 200SP HA

Batch automation 12
SIMATIC BATCH

Route control 13
SIMATIC Route Control

Safety Integrated for Process Automation 14
New: SIMATIC SIS compact

Industrial Security 15

Update/Upgrade Packages 16

Services for SIMATIC PCS 7 17

Appendix 18

The products and systems described in this catalog are manufactured/distributed under application of a certified quality management system in accordance with DIN EN ISO 9001 (Certified Registration No. 000656 QM08). The certificate is recognized by all IQNet countries.

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Digital Enterprise

The building blocks that ensure everything works together perfectly in the digital enterprise

Digitalization is already changing all areas of life and existing business models. It is placing greater pressure on industry while at the same time creating new business opportunities. Today, thanks to scalable solutions from Siemens, companies can already become a digital enterprise and ensure their competitiveness.



Industry faces tremendous challenges

Reduce time-to-market

Today manufacturers have to bring products to market at an ever-increasing pace despite the growing complexity of these products. In the past, a major manufacturer would push aside a small one, but now it is a fast manufacturer that overtakes a slow one.

Boost flexibility

Consumers want customized products, but at a price they would pay for a mass-produced item. That only works if production is more flexible than ever before.

Improve quality

To ensure a high level of quality while meeting legal requirements, companies have to establish closed quality loops and enable the traceability of products.

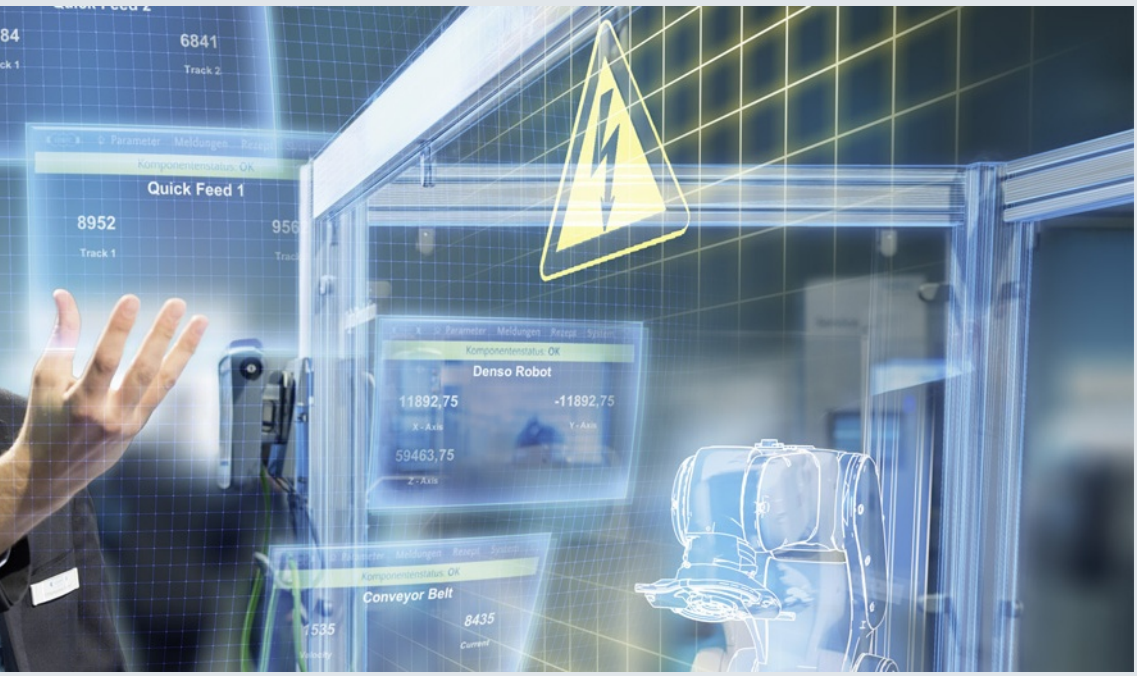
Boost efficiency

Today the product itself needs to be sustainable and environmentally friendly, while energy efficiency in production has become a competitive advantage.

Increase security

Increasing networking escalates the threat to production facilities of cyberattacks. Today more than ever, companies need suitable security measures.

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The digital enterprise has already become a reality

To fully benefit from all the advantages of digitalization, companies first have to achieve complete consistency of their data. Fully digitally integrated business processes, including those of suppliers, can help to create a digital representation of the entire value chain. This requires

- the integration of industrial software and automation,
- expansion of the communication networks,
- security in automation,
- and the use of business-specific industrial services.

MindSphere

The cloud-based open IoT operating system from Siemens

With MindSphere, Siemens offers a cost-effective and scalable cloud platform as a service (PaaS) for the development of applications. The platform, designed as an open operating system for the Internet of Things, makes it possible to improve the efficiency of plants by collecting and analyzing large volumes of production data.

Totally Integrated Automation (TIA)

Where digitalization becomes reality

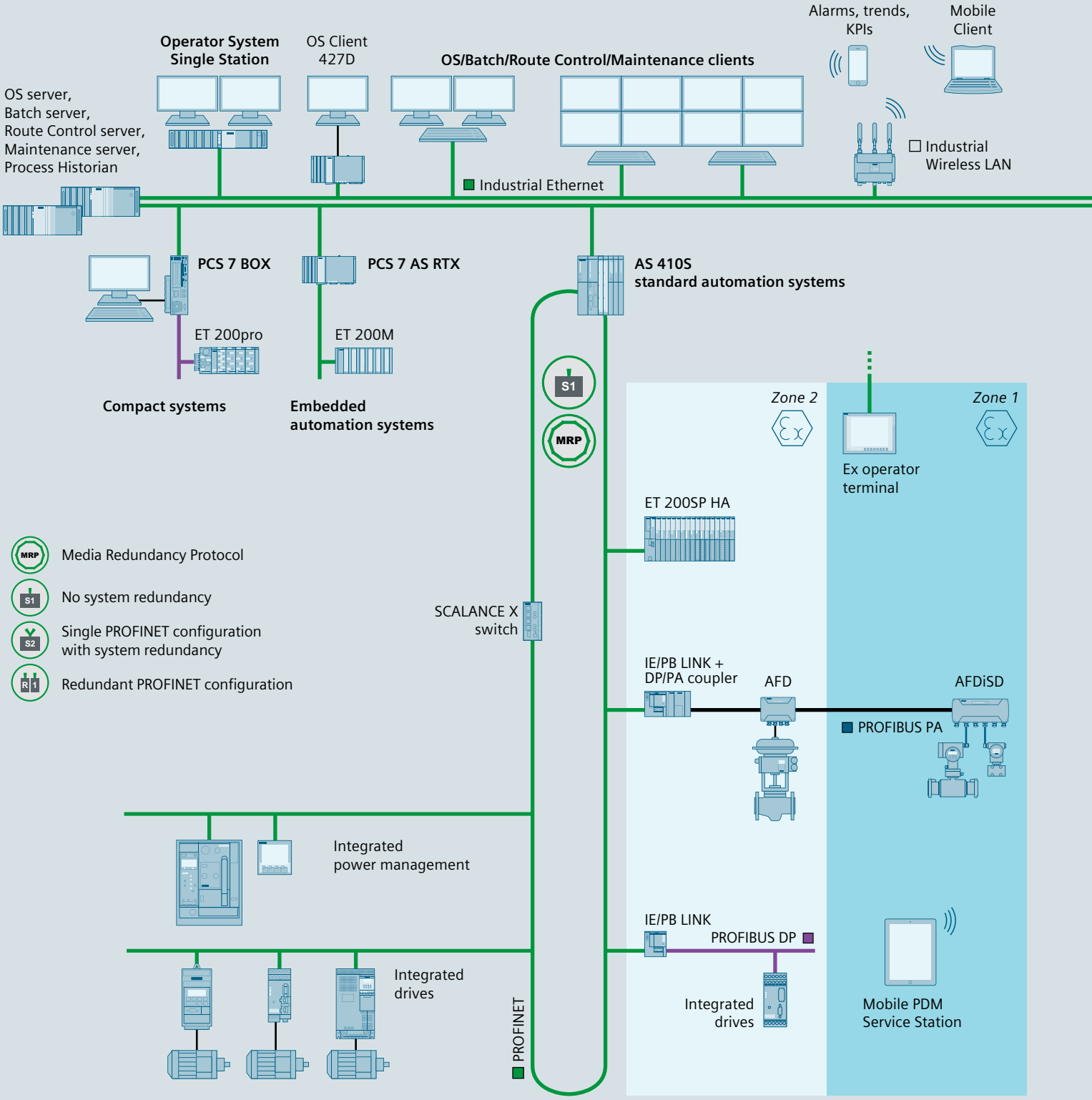
Totally Integrated Automation (TIA) ensures the seamless transition from the virtual to the real world. It already encompasses all the necessary conditions for transforming the benefits of digitalization into true added value. The data that will form the digital twin for actual production is generated from a common base.

Digital Plant
Learn more about the digital enterprise for the process industry
www.siemens.com/digitalplant

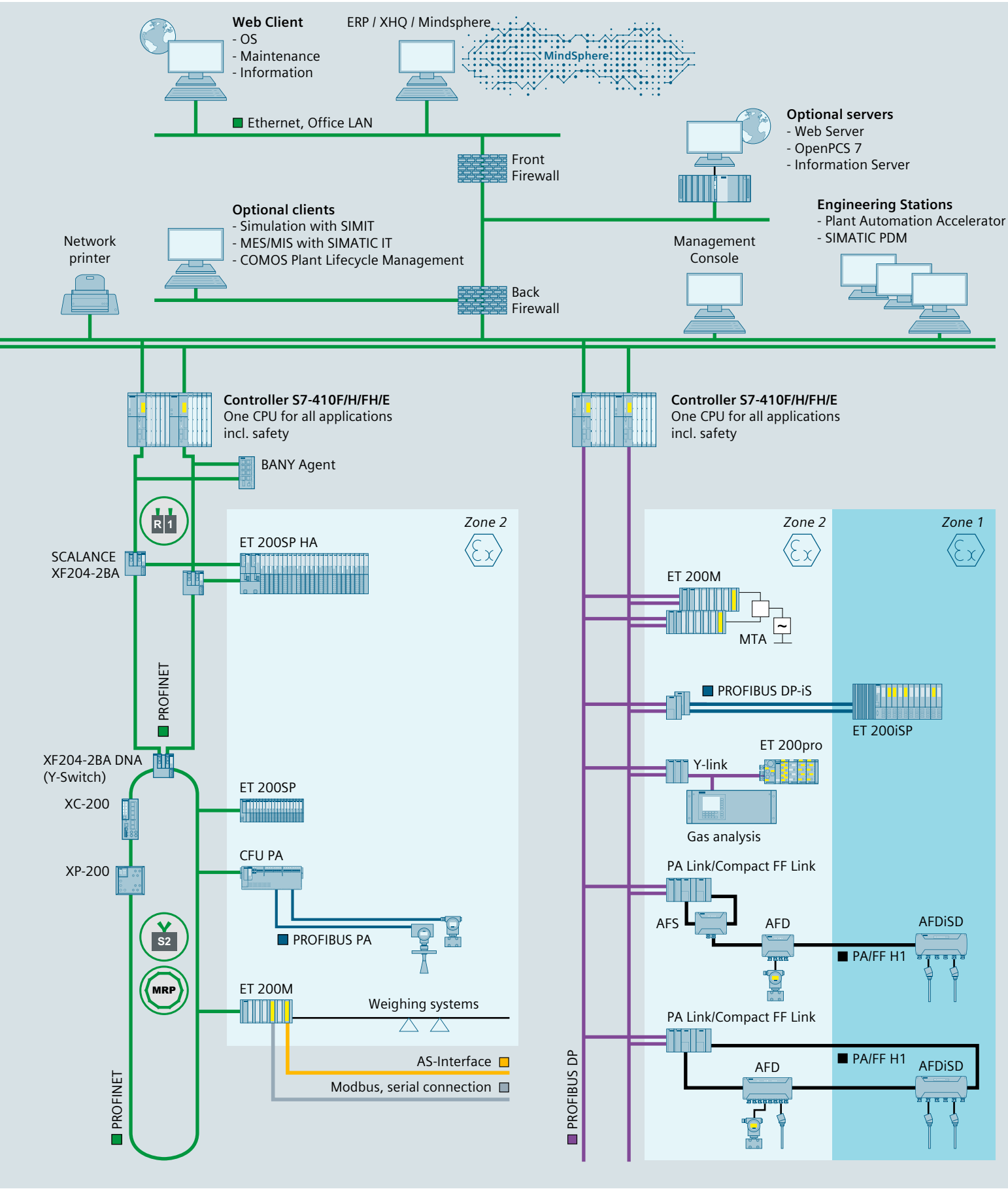
Digital Enterprise Suite
Learn more about the digital enterprise for the discrete industry
www.siemens.com/digital-enterprise-suite

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SIMATIC PCS 7
Room for new perspectives



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Room for new perspectives 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 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 integrate, customized automation in all sectors of the 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.



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More flexibility in process automation

In process 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 higher the performance of 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, SIMATIC PCS 7 offers powerful tools, functions and features for cost-effective and efficient plant operation through all phases of the plant life cycle.

Flexibility through integration

Integration is one of the special strengths of SIMATIC PCS 7. It has numerous 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.

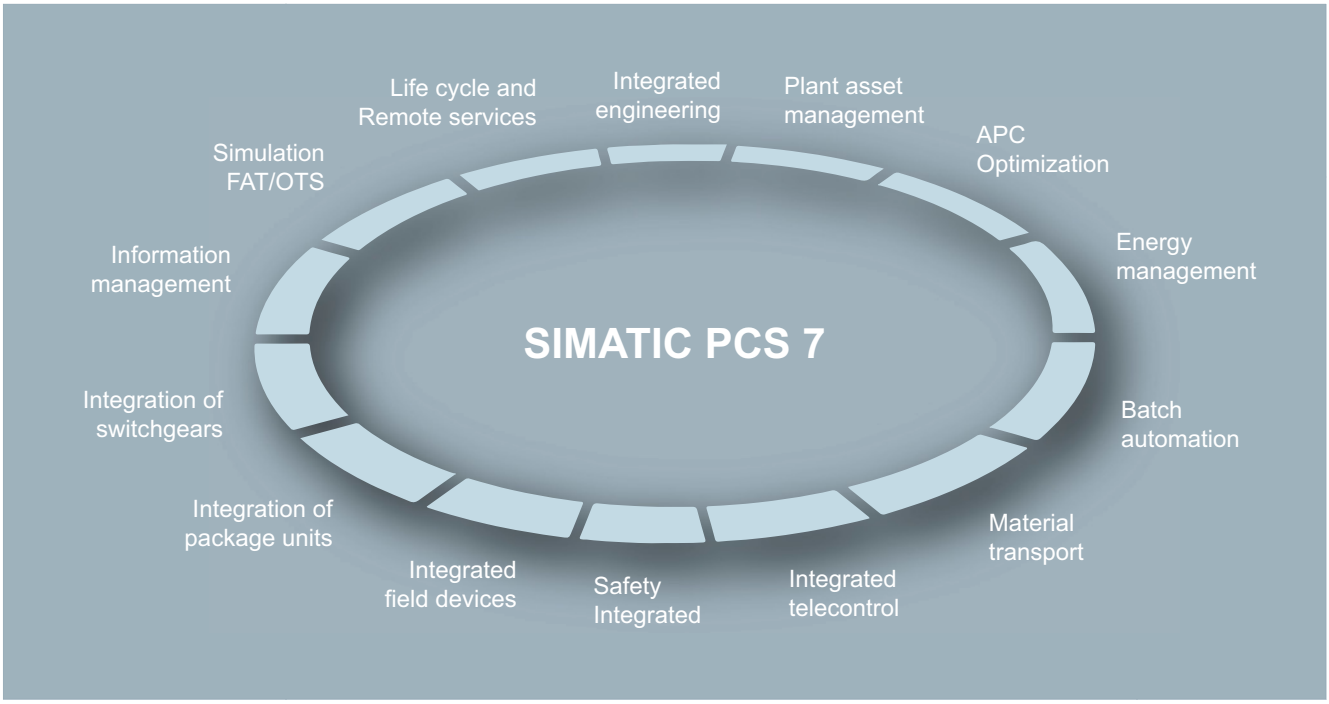
Horizontal integration

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 very much more: All ancillary facilities such as the electrical infrastructure in the form of low-voltage or medium-voltage switchgear or 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 ensures optimum interaction, and secures economic benefits such as ease of selection, reduced stock keeping, and global support.

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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

Impressive features of SIMATIC PCS 7 include 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 minimize the total cost of ownership (TCO) over the entire plant life cycle.

Functional diversity

Depending on the typical process automation or customized requirements, the SIMATIC PCS 7 functions can be expanded by 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 features, 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.

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Custom automation

Thanks to its unique scalable system architecture, SIMATIC PCS 7 provides the ideal basis for cost-effective implementation of individual automation solutions and economic operation of processes.

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!

Flexibility and performance in engineering

The workflow in engineering for process plants is and remains a challenge: Multiple participants, many different data formats and multiple interfaces frequently result in transmission errors and system discontinuity and thus to greater time input and costs. Information generally gets lost or needs to be corrected manually when data exchanged between multiple disciplines.

For the first time, a fully integrated solution is now available for planning and documenting plant projects: the SIMATIC PCS 7 Plant Automation Accelerator. Customers benefit in particular from consistent engineering without system discontinuities between automation planning and the control system.

The object-based approach of the SIMATIC PCS 7 Plant Automation Accelerator allows you to work on a central data platform, ensuring fully integrated planning – from plant engineering through to automation – based on an electronic workflow. This workflow ranges from planning to issuing offers, including bills of materials, the automatic generation of process control data for the SIMATIC PCS 7 process control system from electrical engineering, to controlled mass data engineering and direct as-in documentation of the plant.

This modular engineering approach increases overall project efficiency and minimizes risks. High standardization and simple configuration also save time and costs in engineering during the implementation phase. Simple synchronization between planning and engineering avoids duplicate input and interface losses and reduces project runtimes.

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Flexibility in operation

Process control is also becoming increasingly complex due to the multi-layer nature of automation engineering and 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 both optimization and user-friendly, safe control of the process. Monitoring of product quality and performance indicators additionally allows the process to be operated more economically. SIMATIC PCS 7 excels with its flexibility, plant availability, and investment security.

Process control and maintenance

The SIMATIC PCS 7 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 unscheduled plant standstill.

Process optimization

SIMATIC PCS 7 supports process optimization in many different ways, 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.

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SIMATIC PCS 7 V9.0

The new version of our established SIMATIC PCS 7 process control system is another building block for the digital enterprise.

SIMATIC PCS 7 V9.0 facilitates the route to digital transformation for the process industry – step by step. With its hardware and software innovations, the new version of our established process control system makes the step into digitalization even more secure and easier to plan.

SIMATIC PCS 7 is based wholly on PROFINET. The leading international Industrial Ethernet standard represents the high-performance real-time communication required in the era of big data, right into the field. Rapid, reliable, redundant and high-performance, PROFINET gives our customers new options for integrated diagnostics, monitoring and evaluation of their data. It also enables flexible and easily scalable network structures and enormous costs savings throughout the life cycle thanks to a huge reduction in cabling required.

These benefits are also reflected in the hardware innovations with SIMATIC PCS 7 V9.0:

The ultra-compact and high available new SIMATIC ET 200SP HA and SIMATIC CFU device lines support PROFINET – thus ensuring far greater freedom in plant planning and operation.

Of course, we all use digitization in our SIMATIC PCS 7 software innovations: our digital software portfolio and digital services for process automation therefore have and continue to be part an ongoing strategic development process, not least in the light of cloud applications.

The result: SIMATIC PCS 7 V9.0 offers our customers room for new perspectives – for greater flexibility in process automation.

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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 plant 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
- 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 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. The development and testing of SIMATIC PCS 7 technology components are dependent on the corresponding SIMATIC PCS 7 system components, so versioning and release is normally offset by approximately 3 to 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.

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Software Media and Logistics



1/2 PCS 7 Software Packages

1/4 Software Update Service

1/7 System documentation

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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 (Software Media Package)
  - 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.

The installation software (Software Media Packages) and product-specific software licenses for the following products are separate packages, which are not merged into a single delivery unit when supplied in package form.

- SIMATIC PCS 7 core products (installation software provided as SIMATIC PCS 7 Software Media Package or SIMATIC PCS 7 Software Media Package ASIA)
- SIMATIC PDM, S7 F Systems and SIMATIC Safety Matrix (linstallation software provided as product-specific software media package)

The installation software (Software Media Package) is provided once for each ordered item for these products. 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 software products as a single ordered item, you will receive only one software media package. However, if your order is divided into three ordered items, you will receive a software media package for each of the three software licenses.

Additional software media packages and volume licenses specified for the corresponding product can be ordered separately depending on the requirement.

The following table illustrates these 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 V9.0 incl. 100 OS runtime PO**	6ES7658-2AA58-0YA0	3	License key USB flash drive, 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 V9.0 incl. 100 OS runtime PO**	6ES7658-2AA58-0YA0	1	License key USB flash drive, certificate of license
				1	SIMATIC PCS 7 Software Media Package
020	**1**	**SIMATIC PCS 7 OS Software Single Station V9.0 incl. 100 OS runtime PO**	6ES7658-2AA58-0YA0	1	License key USB flash drive, certificate of license
				1	SIMATIC PCS 7 Software Media Package
030	**1**	**SIMATIC PCS 7 OS Software Single Station V9.0 incl. 100 OS runtime PO**	6ES7658-2AA58-0YA0	1	License key USB flash drive, certificate of license
				1	SIMATIC PCS 7 Software Media Package

These ordering and delivery logistics are not relevant for products that are typically supplied without a software media package. They include:

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

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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. This way 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 online 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.

Ordering data

	Article No.
SIMATIC PCS 7 Software Media Packages Runs with the following operating systems (see SIMATIC PCS 7 Readme and the project licenses for more details): • Windows 7 Ultimate 64-bit • Windows 10 Enterprise 2015 LTSB 64-bit • Windows Server 2012 R2 Standard Edition 64-bit • Windows Server 2016 Standard Edition 64-bit	
SIMATIC PCS 7 Software Media Package V9.0[1] Installation software and electronic documentation on DVD, incl. trial license for 14 days 5 languages (English, German, French, Italian, Spanish), software class A	
• Physical delivery Software DVDs, certificate of license	**6ES7658-4XX58-0YT8**
• Online delivery Software download, online certificate of license Note: Email address required!	**6ES7658-4XX58-0YG8**
SIMATIC PCS 7 Software Media Package ASIA V9.0[1] Installation software and electronic documentation on DVD, incl. trial license for 14 days 2 languages (English, Chinese), software class A	
• Physical delivery Software DVDs, certificate of license	**6ES7658-4XX58-0CT8**

[1] Permanent use of SIMATIC PCS 7 software requires valid software licenses.

More information

Regional product versions

All SIMATIC PCS 7 software products are designed for international use, in other words there is only one product version for worldwide use and this is offered in up to 6 languages: English, German, French, Italian, Spanish and Chinese. However, the number of supported languages is not standard; it can vary from product to product.

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 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.

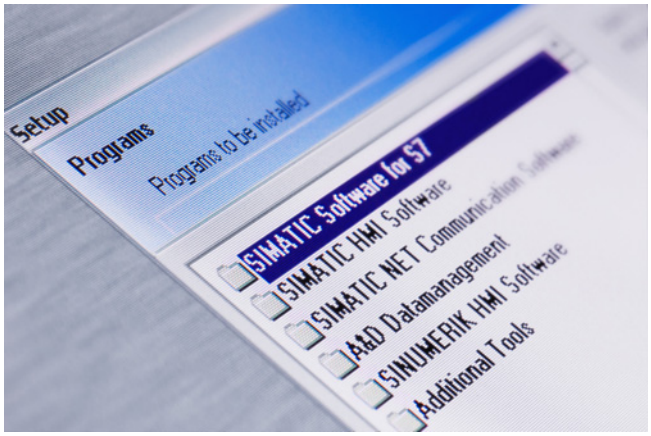
The following special points must be observed as a result of the definition of separate products for installation software and licenses. The SIMATIC PCS 7 installation software is available in the form of two data medium packages:

- 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.

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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** depend mainly on license aspects. A list element can represent a single software product or also be a synonym for several products of the same type, see page 1/5.

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 AS/OS Engineering Software 1 × PCS 7 AS Engineering Software	3 1	4	4
• 1 × Version Cross Manager	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 AS/OS Engineering Software" and "PCS 7 AS Engineering Software" for the first list element of the SUS Engineering AS/OS.

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 4 SUS Engineering AS/OS 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 package
- SUS Compact
- SUS Download

SUS package is the most comprehensive package form. If you order this package 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 flash drive with **one** license

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

If you order SUS Compact 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 flash drive with **n** licenses

SUS Compact 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

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

A recipient email address is required for delivery of SUS Download. An order item can only be assigned to a single email address. The consignee is informed by email 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).

SUS Manager

It is easy to manage SUS contracts, e.g. change the delivery form, with the SUS Manager:
www.siemens.com/susmanager

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Overview (continued)

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

Edition	SUS package	SUS Compact	SUS Download
Delivery form	Physical delivery	Physical delivery	Online delivery
Order	25 × SUS package in one order item	25 × SUS Compact in one order item	25 × SUS Download 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 email 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 flash drive with 1 license • 1 × Certificate of License (CoL)	1 packing unit with: • 1 × data carrier set • 1 × license key USB flash drive with 25 licenses • 25 × Certificate of License (CoL)	1 email message for • Software download • 1 × license key download for 25 licenses • 1 × Online certificate of license for 25 CoL (zip file)
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 the SUS for SIMATIC PCS 7 products used in a different context (CFC, SIMATIC PDM) within the scope of Totally Integrated Automation (TIA). The SIMATIC PDM packages SUS PDM Basic and SUS PDM Complete are identical for both cases.

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 AS/OS Engineering Software, PCS 7 AS Engineering Software • 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 1628
SUS Logic Matrix	• PCS 7 Logic Matrix Viewer
SUS PDM Basic[1]	• PDM Basic PDM Service PDM S7 PDM PCS 7 • PDM HART Server
SUS PDM Complete[1]	• PDM stand-alone server PDM PCS 7 server PDM PCS 7-FF • 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 1628
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 OpenPCS 7/OS Client • PCS 7 OpenPCS 7 • PCS 7 SFC Visualization • PCS 7 BCE • IE S7 license for communication via CP 1623/CP 1628
SUS Process Historian, Information Server (2 SUS packages are required for a redundant pair)	• 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
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 1628
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 1628

[1] Optional product components for SIMATIC PDM such as PDM Extended, PDM Integration in STEP 7/PCS 7, PDM Routing, PDM Server and PDM Communication FOUNDATION Fieldbus are each included in a product package listed in the SUS PDM Basic or SUS PDM Complete and are implicitly authorized to be updated via the corresponding license. You need to change from SUS PDM Basic to SUS PDM Complete to use the PDM Server or PDM Communication FOUNDATION Fieldbus product components.

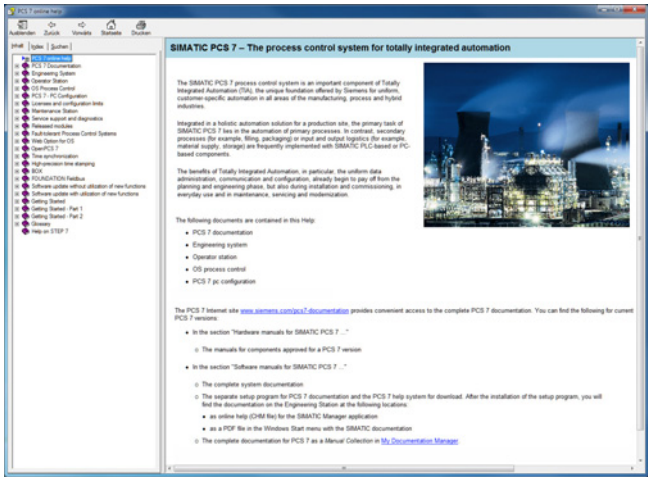
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Ordering data	Article No.
SUS package	
SIMATIC PCS 7 Software Update Service, package Subscription for 1 year with automatic extension; requirement: Current software version; physical delivery	
• PCS 7 Software Update Service for Engineering AS/OS	**6ES7658-1XX00-0YL8**
• PCS 7 Software Update Service Logic Matrix	**6ES7658-1JX00-0YL8**
• PCS 7 Software Update Service for OS Single Station	**6ES7658-2AX00-0YL8**
• PCS 7 Software Update Service for OS Server	**6ES7658-2BX00-0YL8**
• PCS7 Software Update Service Process Historian, Information Server	**6ES7652-7XX00-0YL8**
• 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, package (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	
• SIMATIC PDM Basic Software Update Service	**6ES7658-3XX01-0YL8**
• SIMATIC PDM Complete Software Update Service	**6ES7658-3XX02-0YL8**
• S7-PLCSIM Software Update Service	**6ES7841-0CA01-0YX2**

	Article No.
SUS Compact	
SIMATIC PCS 7 Software Update Service, Compact Subscription for 1 year with automatic extension; requirement: Current software version; physical delivery	
• 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	
SIMATIC PCS 7 Software Update Service, Download Subscription for 1 year with automatic extension; requirement: current software version; delivery form: online Note: Email address required!	
• 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**
• PCS7 Software Update Service Process Historian, Information Server	**6ES7652-7XX00-0YV8**
• 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 Basic Software Update Service	**6ES7658-3XX01-0YV8**
• SIMATIC PDM Complete Software Update Service	**6ES7658-3XX02-0YV8**

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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

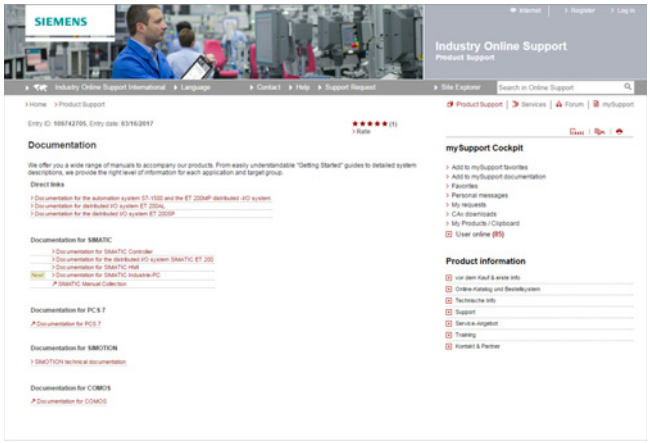
You can open the available SIMATIC PCS 7 manuals directly in the My Documentation Manager, or first start the My Documentation Manager and then select the desired documentation in the integrated Siemens library.

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.

Latest information on SIMATIC PCS 7 in the Readme file

The PCS 7 online Readme files can also be opened at the Internet address provided above. There you will find information on the approved operating systems for PCS 7 software, for example. On the "Technical Documentation SIMATIC PCS 7" page, select "Software Manuals SIMATIC PCS 7 V9.0". All PCS 7 Readme files in Siemens Industry Online Support can be opened on the following page.

More information



The "SIMATIC documentation" page site in Siemens Industry Online Support directs you straight to the complete range of technical documentation available for SIMATIC products and systems. You can select individual documents from this range for viewing or downloading.

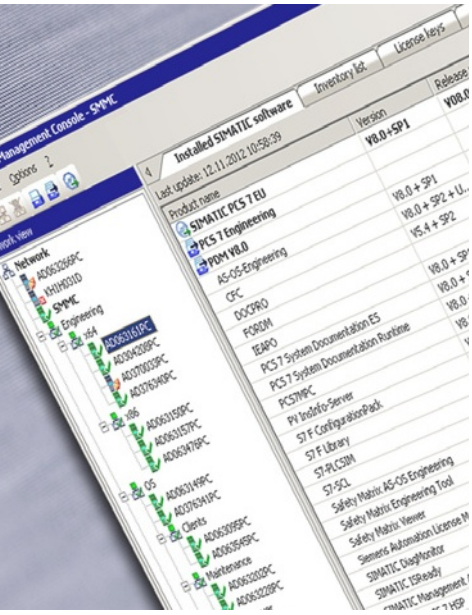
Additional information is available on the Internet at:

www.siemens.com/simatic-docu

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Notes

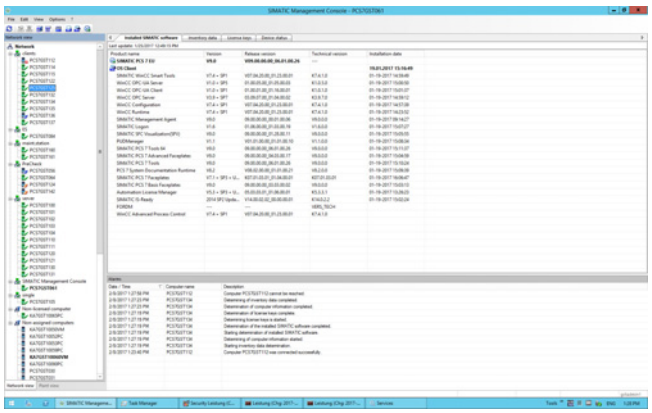
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2

Overview



SIMATIC Management Console: Overview of installed software status

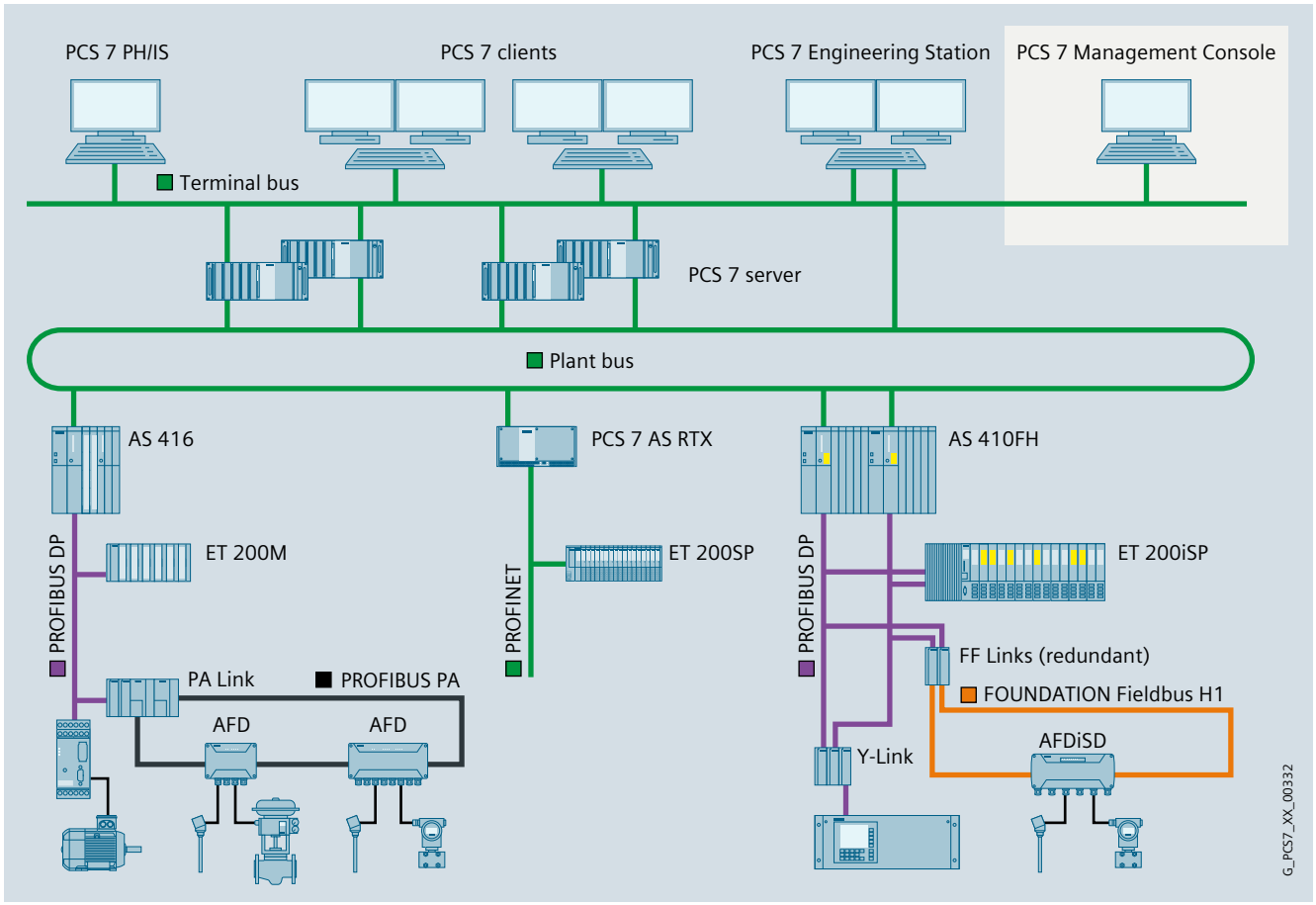
A process control system includes numerous heterogeneous components with specific parameters and settings. It is also subject to a dynamic change process due to updates, upgrades as well as modernization measures and expansion. As the plant gets older, it becomes more difficult for you to keep track 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

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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 with up to 25 workstations, 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 with a total of more than 25 workstations. For the single-station or server versions of SIMATIC PCS 7 Industrial Workstation that are suitable as the basic hardware for such an exclusive SIMATIC PCS 7 Management Console, see "Industrial Workstation/IPC".

The central SIMATIC PCS 7 Management Console communicates with "agents" on the relevant SIMATIC PCS 7 Industrial Workstations in a SIMATIC PCS 7 plant. These Management Console agents run local SIMATIC PCS 7 Management Console jobs and return the results.

Secure authentication of communication between the SIMATIC PCS 7 Management Console and the Management Console agents is ensured by the Kerberos protocol.

A License Management Console agent 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 of a SIMATIC PCS 7 system significantly reduces the administrative effort. SIMATIC PCS 7 installations, updates and service packs are subject to administration. In addition to the current SIMATIC PCS 7 software version, upgrades to the current software version are supported. The software can be installed on an individual target station or on multiple target stations in parallel using setup packages. 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 a 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)
- Display and editing of SIMATIC PCS 7 setups and setup packages for preparing for installation
- Rollout of pre-configured setup packages to target stations
  - Addition of software packages during installation
  - Editing of setups or setup packages

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

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2

Function (continued)

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 system (management level, control level, field level). It covers SIMATIC PCS 7 system components in the named levels, e.g. SIMATIC PCS 7 workstations, Industrial Ethernet switches, automation systems (controllers), remote I/Os, links, field devices, drives, etc. For the AS 410 automation systems configured in the SIMATIC PCS 7 system, the number of available and used process objects is also determined in the inventory

SIMATIC PCS 7 system inventory includes:

- 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
  - Combination of filter results with user-defined categories
  - Colored marking of filtered data
- Creation of a license certificate in the form of a list of installed software licenses and their use

Ordering data

	Article No.
SIMATIC PCS 7 Management Console V9.0	
5 languages (English, German, French, Italian, Spanish), software class A, runs with Windows Server 2012 R2 Standard Edition 64-bit and Windows Server 2016 Standard Edition 64-bit (see SIMATIC PCS 7 Readme[1] for the latest information), single license for 1 installation	
Without SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	**6ES7658-5BX58-2YB5**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7658-5BX58-2YH5**
Management Console Agents[2]	
Independent of language, software class A, floating license for 1 user	
No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	
- 10 agents	**6ES7658-5BA00-2YB5**
- 50 agents	**6ES7658-5BB00-2YB5**
- 100 agents	**6ES7658-5BC00-2YB5**
• Online delivery License key download, online certificate of license Note: Email address required!	
- 10 agents	**6ES7658-5BA00-2YH5**
- 50 agents	**6ES7658-5BB00-2YH5**
- 100 agents	**6ES7658-5BC00-2YH5**

1) See chapter "Software Media and Logistics", section "System documentation", see page 1/7.

2) An agent is required for each SIMATIC PCS 7 Industrial Workstation managed by the Management Console.

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3/2 Introduction

3/4 SIMATIC Rack PC
3/14 IPC547G
3/22 IPC647D
3/30 IPC847D

3/37 SIMATIC BOX PC
3/37 OS Client IPC627D/IPC677D

3/44 SIMATIC Microbox PC
3/46 OS Client IPC427D
3/48 OS Client IPC477D

3/50 Expansion components
3/50 Mouse and Keyboard
3/51 Input Tools
3/52 Smart Card Reader

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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 the type IPC547G, IPC647D or IPC 847D are optimized for use as single station, server or client, and can be expanded in line with the system.

As a supplement to these, the SIMATIC Microbox PC in the version SIMATIC PCS 7 OS Client IPC427/477 as well as the SIMATIC Box PC in the version SIMATIC PCS 7 BOX OS Client IPC627 (without/with panel front) provide low-cost client alternatives for operator control and monitoring and for batch automation.

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Application

Basic hardware for single station/server

SIMATIC PCS 7 Industrial Workstations of type IPC547G, IPC647D or IPC 847D, which are available for use as single station or server, vary in their performance, features, expansion spares, and in the 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 IPC427/477 and SIMATIC PCS 7 BOX OS Client IPC627 (without/with panel front), 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 IPC427/477 is their highly compact and rugged design which allows 24/7 maintenance-free operation without fans. These clients are particularly resistant to vibration and shock in the version with solid-state drive (SSD) because there are no rotating storage media. The SIMATIC PCS 7 OS Client IPC427 is a computing unit without monitor in a compact metal enclosure. The SIMATIC PCS 7 OS Client IPC477 was designed as integrated device with a 22" TFT Touch Panel and integrated computing unit. The expansion options for both devices are limited due to their design.

The compact and rugged SIMATIC PCS 7 BOX OS Client IPC627 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. It can also be ordered as a design version with panel front (22" TFT display with touch screen).

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.

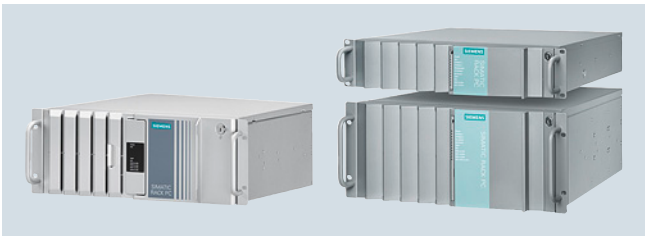
The licenses for plant bus communication via Industrial Ethernet, i.e. for Basic Communication Ethernet (BCE) and CP 1623/1628 communication (IE) are bound to the SIMATIC PCS 7 Industrial Workstations. Depending on the selected type of communication, the SIMATIC PCS 7 Industrial Workstations for single 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.

SIMATIC PCS 7 BCE V9.0 license

If you are using SIMATIC PCS 7 V9.0 on other computers (not SIMATIC PCS 7 Industrial Workstations), you also require a SIMATIC PCS 7 BCE V9.0 license (article number 6ES7650-1CD58-2YB5 for goods delivery; article number 6ES7650-1CD58-2YH5 for online delivery) for all single stations or servers that are connected to the plant bus via a standard network adapter and not via a CP 1623/CP 1628.

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Overview



Rack PC family IPC547, IPC647, IPC847

The SIMATIC PCS 7 Industrial Workstation IPC547G is an excellent platform for the configuration of single stations, servers and clients. With their all-round capabilities they are ideally equipped for numerous applications in process automation. You also have high-performance alternatives with workstation types IPC647D and IPC847D.

Because basic components such as chipset, processor and work memory are identical, many of their technical specifications 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. 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, IPC847D is not offered in this version.

Application

Features		SIMATIC PCS 7 Industrial Workstation		
		IPC547G	IPC647D	IPC847D
				
Available SIMATIC PCS 7 pre-installations	V9.0	●	●	●
Available versions	ES/OS single station	●	●	●
	OS server	●	●	●
	OS client	●	●	–
Height		4 U	2 U	4 U
ECC work memory		–	●	●
Onboard RAID controller	RAID 1 (SATA HDD)	●	●	●
	RAID 1 (SATA SSD)	●	●	●
Hardware RAID controller (PCI x8)	RAID 1 (SAS HDD)	–	●	●
	RAID 5 (SAS HDD)	–	–	●
Hard disks or solid state drives (SSD)	SATA/SAS HDD	●/–	●/●	●/●
	SATA SSD	●	●	●
No. of slots	PCIe x16	2	2 or 4	5
	PCIe x8	1	–	–
	PCIe x4	2	–	3
	PCIe x1	–	–	–
	PCI	2	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

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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 Restore DVD sets provided (for details, see "Restore DVD set" for the relevant workstation type).

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 1628	SIMATIC NET HARDNET-IE S7 communication software, licensed for up to four CP 1623/CP 1628 (4x license)	with up to 64 AS single stations (no AS redundancy stations)
	SIMATIC NET HARDNET-IE S7-REDCONNECT communication software, licensed for up to four CP 1623/CP 1628 (4x license)	with redundant automation systems (redundancy 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. See "Communication", "Industrial Ethernet, PCS 7 system connection", see page 10/59.

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 1623/1628 communication

OS single stations and OS servers with BCE communication can be retro-upgraded for communication with CP 1623/1628. Items required:

- Network card for connecting to Industrial Ethernet:
  - CP 1623 with PCI Express interface or
  - CP 1628 with PCIexpress interface and additional security functions
- S7 Communication Software for 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 "Communication" chapter, section "Industrial Ethernet, System Connection of PCS 7 systems", see page 10/59

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 (IPC547G and IPC847D only)
- Expansion components
  - Mouse and keyboard
  - Input aids (touch pens)
  - Multi-monitor mode
  - Smart card reader

Multi-monitor mode can be selected when configuring the SIMATIC PCS 7 Industrial Workstation with the selection table or configurator, but it can also be installed and expanded later. The number of process monitors that can be operated on a SIMATIC PCS 7 Workstation varies according to the workstation type and configuration. In the maximum configuration, multi-monitor mode with 4 process monitors is possible depending on the workstation type.

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Technical specifications

Comparison of workstation types for SIMATIC PCS 7 V9.0

Type	SIMATIC IPC547G	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; dismountable 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 C236 (GL82C236 PCH)	Intel C226 (DH82C226 PCH)	Intel C226 (DH82C226 PCH)
CPU			
Processor, clock	• Intel Xeon Processor E3-1275 v5 4C/8T, 3.6 (4.0) GHz, 8 MB cache, iAMT • Intel Core i7-6700 4C/8T, 3.4 (4.0) GHz, 8 MB cache, iAMT • Intel Core i5-6500 4C/4T, 3.2 (3.6) GHz, 6 MB cache, iAMT	• 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	DDR4-2133 SDRAM (PC4-2400T)	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 64 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 DDR4-2133 SDRAM (1 × 4 GB); single channel 8 GB DDR4-2133 SDRAM (2 × 4 GB); dual channel 16 GB DDR4-2133 SDRAM (2 × 8 GB); dual channel 32 GB DDR4-2133 SDRAM (2 × 16 GB); dual channel 64 GB DDR4-2133 SDRAM (4 × 16 GB); dual channel 8 GB or more can be selected for OS server or ES/OS single station 4 GB or more can be selected for OS client	4 GB DDR3 SDRAM (2 × 2 GB); dual channel 4 GB DDR3 SDRAM (1 × 4 GB); single channel, ECC 8 GB DDR3 SDRAM (2 × 4 GB); dual channel (without/with ECC) 16 GB DDR3 SDRAM (2 × 8 GB); dual channel (without/with ECC) 32 GB DDR3 SDRAM (4 × 8 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 GB); dual channel (without/with ECC) 16 GB DDR3 SDRAM (2 × 8 GB); dual channel (without/with ECC) 32 GB DDR3 SDRAM (4 × 8 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: • 2 × PCI 1 × PCIe x4 (1 lane, Gen 3.0) 1 × PCIe x4 (4 lanes, Gen 3.0) 1 × PCIe x8 (1 lane, Gen 3.0) 1 × PCIe x16 (4 lanes, Gen 3.0) 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

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Technical specifications (continued)

Type	SIMATIC IPC547G	SIMATIC IPC647D	SIMATIC IPC847D
Possible slots for SATA drives			
On the front	Alternative for HDD/SSD: 1 × 5.25" + 3 × slimline removable trays 3.5" or 4 × slimline removable trays 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 RAID controller	Intel PCH with Intel Rapid Storage Technology	Intel 8 series SATA RAID controller	Intel 8 series SATA RAID controller
• RAID 1 (SATA HDD)	Yes	Yes	Yes
• RAID 1 (SATA SSD)	Yes	Yes	Yes
Hardware RAID controller (PCI x8; 2 slots occupied)			
• RAID 1 (SAS HDD)	No	Yes	Yes
• RAID 5 (SAS HDD)	No	No	Yes
Drives			
Hard disk drive (HDD) 3.5", 6 Gbps, NCQ technology			
• ES/OS Single station or OS Server	1 TB; Enterprise type: 1 TB or 2 TB	500 GB SATA, 1 TB SATA or 1 TB SAS	500 GB SATA, 1 TB SATA or 1 TB SAS
• OS client	1 TB; Enterprise type: 1 TB or 2 TB	500 GB or 1 TB SATA	500 GB or 1 TB SATA
Solid State Drive (SSD) 2.5"			
• ES/OS Single station or OS Server	240 GB or 480 GB SATA (eMLC)	240 GB or 480 GB SATA (eMLC)	240 GB or 480 GB SATA (eMLC)
• OS client	240 GB or 480 GB SATA (eMLC)	240 GB or 480 GB SATA (eMLC)	–
DVD burner	DVD±R/RW 5.25" SATA Slimline Read: • DVD-ROM: single layer and dual layer 8x • DVD-R/+R 8x • DVD-RW/+RW 8x • DVD-RAM 8x • CD-ROM, CD-R 24x, CD-RW 24x Write: • DVD+R 8x, DVD+R DL 6x DVD+RW 8x, DVD-R 8x, DVD-R DL 6x DVD-RW 6x • DVD-RAM 5x • CD-R 10x, CD-RW 16x	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

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Technical specifications (continued)

Type	SIMATIC IPC547G	SIMATIC IPC647D	SIMATIC IPC847D
HDD/SSD configuration	HDD (single station, server or client) • 1 TB HDD SATA internal (optionally Enterprise type) 0.2 g vibration, 1 g shock • 1 TB HDD SATA in removable tray, at the front (optionally Enterprise type) • 1 TB RAID 1 internal; 0.2 g vibration, 1 g shock (2 × 1 TB HDD SATA, optionally Enterprise type, data mirroring) • 1 TB RAID 1 in removable trays; hot-swap; at the front (2 × 1 TB HDD SATA, optionally Enterprise type, data mirroring) • 2 TB RAID 1 in removable trays; hot-swap; at the front (2 × 2 TB HDD SATA, Enterprise type, data mirroring) • 2 TB RAID 1 (2 × 2 TB HDD SATA, data mirroring) plus 2 TB hot-spare HDD SATA; each Enterprise type; in removable trays; hot-swap; at the front SSD (single station, server or client) • 240 GB or 480 GB SSD SATA internal • 240 GB or 480 GB SSD SATA in removable tray; at the front • 240 or 480 GB RAID 1 (2 × 240/480 GB SSD SATA) in removable trays, hot-swap, at the front HDD+SSD (single station or server) • 2 TB RAID 1 (2 × 2 TB HDD SATA, Enterprise type, data mirroring), hot-swap, plus 480 GB SSD SATA; each in removable trays; 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 RAID 1 internal; 0.5 g vibration, 5 g shock (2 × 1 TB HDD SATA, data mirroring) • 1 TB RAID 1 in removable drive bay; for hot swapping; at the front, data mirroring (2 × 1 TB HDD SATA) HDD (single station or server) • 1 TB RAID 1 in removable drive bay; for hot swapping; at the front, data mirroring (2 × 1 TB HDD SAS) SSD (single station, server or client) • 240 GB or 480 GB SSD SATA internal • 240 GB or 480 GB SSD SATA in removable drive bay; at the front • RAID 1 SSD SATA in removable drive bay; for hot swapping; at the front, data mirroring; (single station or server) - 240 GB (2 × 240 GB) - 480 GB (2 × 480 GB) HDD+SSD (single station or server) • 1 TB RAID 1 internal; 0.5 g vibration, 5 g shock (2 × 1 TB HDD SATA, data mirroring) plus 240 GB SSD SATA, internal, in the DVD drive slot • 1 TB RAID1 in removable drive bay; for hot swapping; at the front, data mirroring (2 × 1 TB HDD SATA or 2 × 1 TB HDD SAS) plus 240 GB SSD SATA, 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 RAID 1 internal; 0.5 g vibration, 5 g shock (2 × 1 TB HDD SATA, data mirroring) • 1 TB RAID 1 in removable drive bay; for hot swapping; at the front, data mirroring (2 × 1 TB HDD SATA or 2 × 1 TB HDD SAS) • 1 TB RAID 1 (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 • 2 TB RAID 5 in removable drive bay; for hot swapping; at the front, (3 × 1 TB HDD SAS, striping with parity) • 2 TB RAID 5 (3 × 1 TB HDD SAS, striping with parity) plus 1 TB hot-spare HDD SAS; 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 • RAID 1 SSD SATA in removable drive bay; for hot swapping; at the front, data mirroring - 240 GB (2 × 240 GB) - 480 GB (2 × 480 GB) HDD+SSD (single station or server) • 1 TB RAID 1 internal; 0.5 g vibration, 5 g shock (2 × 1 TB HDD SATA, data mirroring) plus 240 GB SSD SATA, in removable drive bay, at the front • 1 TB RAID 1 (2 × 1 TB HDD SATA or 2 × 1 TB HDD SAS; data mirroring, for hot swapping) plus 240 GB SSD SATA, each in removable drive bay; at the front • 2 TB RAID 5 (3 × 1 TB HDD SAS, striping with parity, for hot swapping) plus 240 GB SSD SATA, each in removable drive bay; at the front
Graphics card	Onboard Intel graphics controller, integrated in processor; version depends on processor, either HD Graphics 530 (i7-6700 and i5-6500) or HD Graphics P530 (E3-1275 v5)	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			
• VGA connection	Up to 2 560 × 1 600 at 60 Hz, 32-bit color depth (DisplayPort to VGA via adapter cable)	Up to 2 560 × 1 600 at 120 Hz, 32-bit color depth (DVI-I to VGA or DisplayPort to VGA via adapter cable)	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 1920 × 1200 at 60 Hz, 32-bit color depth	Up to 2048 × 1152 at 60 Hz, 32-bit color depth	Up to 2048 × 1152 at 60 Hz, 32-bit color depth
• DisplayPort	Up to 4096 × 2304 at 60 Hz, 32-bit color depth	Up to 4096 × 2160 at 24 Hz, 32bit color depth	Up to 4096 × 2160 at 24 Hz, 32-bit color depth

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Technical specifications (continued)

Type	SIMATIC IPC547G	SIMATIC IPC647D	SIMATIC IPC847D
Interface modules, interfaces			
Terminal bus interface	2 × Ethernet port (RJ45) 10/100/1000 Mbps, teaming-capable, two independent controllers: Intel Jacksonville i219-LM and Intel Springville i210-AT	2 × Ethernet port (RJ45) 10/100/1000 Mbps, electrically isolated, teaming-capable, two independent controllers: Intel WGI217LM and Intel WGI210IT	2 × Ethernet port (RJ45) 10/100/1000 Mbps, electrically isolated, teaming-capable, two independent controllers: Intel WGI217LM and Intel WGI210IT
Plant bus interface module (single station/server), alternatives			
• BCE	Ethernet network adapter RJ45 10/100/1000 Mbps (PCIe x1)	Ethernet network adapter RJ45 10/100/1000 Mbps (PCIe x1)	Ethernet network adapter RJ45 10/100/1000 Mbps (PCIe x1)
• IE	CP 1623 communication module (PCIe x1)	CP 1623 communication module (PCIe x1)	CP 1623 communication module (PCIe x1)
USB 3.0	6 channels, 900 mA high current (≤ 3 A in total), super speed • 4 × 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	5 channels, 500 mA high current, high speed • 4 × 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 female connector	1 × COM1 (V.24), 9-pin sub-D male connector	1 × COM1 (V.24), 9-pin sub-D male connector
Audio	Realtek ALC671, 6-channel DAC support; 1 × Line In; 1 × Micro In; 1 × 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
DisplayPort	Yes, 2 ×	Yes, 2 ×	Yes, 2 ×
DVI	1 × DVI-D 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 or 2 × via DisplayPort 3 or 4 monitors: Onboard interfaces (2 × DisplayPort) + Dual Head PCIe x16 graphics card (2 × DisplayPort) combined, DVI via additional adapter cable	2 monitors: Integral interfaces: 1 × DVI and 1 × DVI via DisplayPort DVI adapter or 2 × via DisplayPort 3 or 4 monitors: Onboard interfaces (2 × DisplayPort) + Dual Head PCIe x16 graphics card (2 × DisplayPort) combined, DVI over additional adapter cable	2 monitors: Integral interfaces: 1 × DVI and 1 × DVI via DisplayPort DVI adapter or 2 × via DisplayPort 3 or 4 monitors: Onboard interfaces (2 × DisplayPort) + Dual Head PCIe x16 graphics card (2 × DisplayPort) combined, DVI over additional adapter cable
Keyboard	1 × PS/2	1 × PS/2	1 × PS/2
Mouse	1 × PS/2	1 × PS/2	1 × PS/2
Operating systems and diagnostics software			
ES/OS single station	Windows 10 IoT Enterprise LTSB 2015 64-bit, MUI (German, English, French, Italian, Spanish, Chinese)	Windows 10 IoT Enterprise LTSB 2015 64-bit, MU (German, English, French, Italian, Spanish, Chinese)	Windows 10 IoT Enterprise LTSB 2015 64-bit, MUI (German, English, French, Italian, Spanish, Chinese)
OS server	Windows Server 2016 Standard Edition 64-bit, including 16 core, 5 CAL, MUI (German, English, French, Italian, Spanish, Chinese)	Windows Server 2016 Standard Edition 64-bit, including 16 core, 5 CAL, MUI (German, English, French, Italian, Spanish, Chinese)	Windows Server 2016 Standard Edition 64-bit, including 16 core, 5 CAL, MUI (German, English, French, Italian, Spanish, Chinese)
OS client	Windows 10 IoT Enterprise LTSB 2015 64-bit, MUI (German, English, French, Italian, Spanish, Chinese)	Windows 10 IoT Enterprise LTSB 2015 64-bit, MUI (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

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Technical specifications (continued)

Type	SIMATIC IPC547G	SIMATIC IPC647D	SIMATIC IPC847D
Monitoring and diagnostics functions			
Watchdog	• 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	• Monitoring of program execution • Monitoring time adjustable in the software • Restart can be configured for faults
Temperature	High/low violation of permitted operating temperature	Violation of permissible operating temperature	Violation of permissible operating temperature
Fans	Speed monitoring for • Front fan • Processor fan • Fan on drive cage • Fan of single, non-redundant power supply	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 (operating state) • TEMP (temperature status) • FAN (fan status) • 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; 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	IEC 60950-1 EN 60950-1 UL 60950-1 CSA C22.2 No 60950-1-07
Noise emission			
Operation	< 45 dB(A) according to DIN 45635 (40 dB(A) at 20 °C and 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)
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; surge; 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; surge; 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)

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Technical specifications (continued)

Type	SIMATIC IPC547G	SIMATIC IPC647D	SIMATIC IPC847D
Immunity to radio frequency interference	1 V/m, 2 … 2.7 GHz, 80% AM (to IEC 61000-4-3) 3 V/m, 1.4 … 2 GHz, 80% AM (to IEC 61000-4-3) 10 V/m, 80 … 1 000 MHz, 80% AM (to IEC 61000-4-3) 10 V, 150 kHz … 80 MHz, 80% AM (to IEC 61000-4-6)	3 V/m, 2 … 2.7 GHz, 80 % AM (to IEC 61000-4-3) 10 V/m, 80 … 1 000 MHz and 1.4 … 2 GHz, 80 % AM (to IEC 6100-4-3) 10 V, 10 kHz ... 80 MHz, 80 % AM (to IEC 61000-4-6)	3 V/m, 2 … 2.7 GHz, 80 % AM (to IEC 61000-4-3) 10 V/m, 80 … 1 000 MHz and 1.4 … 2 GHz, 80 % AM (to IEC 6100-4-3) 10 V, 10 kHz ... 80 MHz, 80 % AM (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 (to IEC 61000-4-8)	100 A/m, 50 Hz/60 Hz (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) 0 to +40 °C (no DVD burner operation)[1] Gradient: ≤ 10 K/h, no condensation [1] Power dissipation of the expansion modules in total max. 80 W	+0 to +35 °C (without restriction) 0 to +40 °C (without hardware RAID controller)[1] 0 to +45 °C (without DVD burner, without hardware RAID controller)[1] 0 to +50 °C (without DVD burner, without hardware RAID controller, no HDD operation in removable drive bay) Gradient: max. 10 °C/h, no condensation [1] Power dissipation of the expansion modules in total max. 55 W	0 to +35 °C (with hardware RAID controller) 0 to +45 °C (without DVD burner) 0 to +50 °C (without DVD burner, max. 3 removable drive bays)[1] Gradient: max. 10 °C/h, no condensation [1] Power dissipation of the expansion modules in total max. 30 W
• Storage/transport	-20 … +60 °C Gradient: max. 2 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 ... 85% at 30 °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 ... 55 °C (no condensation) Gradient: ≤ 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 ... 689 hPa (corresponds to a height of -1 000 ... 3 000 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)
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) Note: No mechanical loads when using hard disks in removable trays and during DVD burning process.	10 … 58 Hz: Amplitude 0.0375 mm; 58 ... 500 Hz: 4.9 m/s² (approx. 0.5 g) Note: No mechanical loads when using hard disks in removable drive bay and during DVD burning process.	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. [1] With HDD mounting on side panel and assembly of device using telescopic rails max. 0.019 mm at 10 … 58 Hz; max. 3 m/s² at 58 … 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

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Technical specifications (continued)

Type	SIMATIC IPC547G	SIMATIC IPC647D	SIMATIC IPC847D
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 Note: No mechanical loads when using hard disks in removable trays and during DVD burning process.	Half sine: 50 m/s², 30 ms (approx. 5 g), 100 shocks per axis Note: No mechanical loads when using hard disks in removable drive bay and during DVD burning process.	Half sine: 50 m/s², 30 ms (approx. 5 g), 100 shocks per axis[1)] 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 … 58 Hz; max. 3 m/s² at 58 … 500 Hz
• Storage/transport	Half sine: 250 m/s², 6 ms, 1 000 shocks per axis	Half sine: 250 m/s², 6 ms, 1 000 shocks per axis	Half sine: 250 m/s², 6 ms, 1 000 shocks per axis
Approvals, standards			
CE in conformity with 2004/108/EC, 2006/95/EC	Yes	Yes	Yes
Industrial area of application			
• Interference emission	EN 61000-6-4:2007 + A1:2011	EN 61000-6-4:2007 + A1:2011	EN 61000-6-4:2007 + A1:2011
• Noise immunity	EN 61000-6-2:2005	EN 61000-6-2:2005	EN 61000-6-2:2005
Area of application: Residential, business, trade, small enterprise			
• Interference emission	EN 61000-6-3:2007 + A1:2011	EN 61000-6-3:2007 + A1:2011	EN 61000-6-3:2007 + A1:2011
• Noise immunity	EN 61000-6-1:2007	EN 61000-6-1:2007	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/New Zealand: EN 61000-6-3:2007	Yes	Yes	Yes
Korea: Korean Certification (KC Mark)	Yes	Yes	Yes
EAC (Eurasian Conformity)	Yes	Yes	Yes
Special features			
Quality assurance according to ISO 9001:2008	Yes	Yes	Yes

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Technical specifications (continued)

Type	SIMATIC IPC547G	SIMATIC IPC647D	SIMATIC IPC847D
Power supply			
Nominal supply voltage (U_N)	Single power supply unit: • 100 … 240 V AC (-15%, +10%) Redundant power supply unit: • 2 × 100 … 240 V AC (-15%, +10%)	Single power supply unit: • 100 … 240 V AC (-15%, +10%) Redundant power supply unit: • 2 × 100 … 240 V AC (-15%, +10%)	Single power supply unit: • 100 … 240 V AC (-15%, +10%) Redundant power supply unit: • 2 × 100 … 240 V AC (-15%, +10%)
Frequency	50 … 60 Hz (min. 47 Hz, max. 63 Hz, sinusoidal)	50 … 60 Hz (min. 47 Hz, max. 63 Hz, sinusoidal)	50 … 60 Hz (min. 47 Hz, max. 63 Hz, sinusoidal)
Short-term voltage dip	• 20 ms for 230 W (max. 10 events per hour; recovery time ≥ 1 s) with single power supply unit • 20 ms for 240 W (≤ 10 events per hour; recovery time ≥ 1 s) with redundant power supply unit	20 ms at 93 V (max. 10 events per hour; min. recovery time 1 s)	20 ms at 93 V (max. 10 events per hour; min. recovery time 1 s)
Power consumption at 230 W secondary (maximum configuration)	• 260 W max. at 90% efficiency with single power supply unit • 270 W max. at 85% efficiency with 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	Single power supply unit: • 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 Redundant power supply unit: • Continuous current up to 5 A at 100 V; up to 2.5 A at 240 V • Up to 210 A per module for 1.65 ms during startup	• 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)	Single power supply unit: • +5 V: 25 A; +3.3 V: 20 A (in total up to 190 W) • +12 V: 14 A; +12 V: 11 A • -12 V: 0.1 A • +5 V_{aux}: 2 A Redundant power supply unit: • +5 V: 20 A; +3.3 V: 20 A (in total up to 100 W) • +12 V: 16 A; +12 V: 16 A • -12 V: 0.5 A • +5 V_{aux}: 3 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 (depending on configuration)	15 … 23 kg	10 … 14 kg	16 … 23 kg

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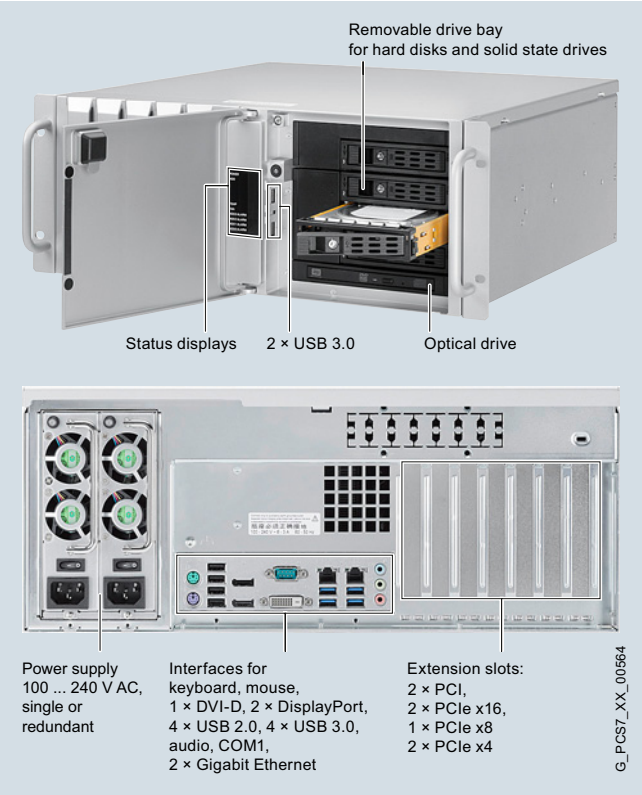
Overview



SIMATIC RackPC IPC547G

The SIMATIC PCS 7 Industrial Workstations based on a SIMATIC Rack PC of type IPC547G are UL-certified and have the CE mark for use in industry as well as residential, business and commercial environments. With its 19" design and innovative 6th generation Intel Core i technology, they offer high performance, availability and ease of service.

Design



SIMATIC IPC547G, front with open front door (top) and rear with redundant power supply

The SIMATIC PCS 7 Industrial Workstations of type IPC547G are suitable for reliable 24-hour continuous operation at ambient temperatures between 0 and 40 °C.

The corrosion-resistant 19" all-metal enclosure (4 U) is especially well-protected against dust by a filter and overpressure ventilation. It is service friendly and both mechanically and electromechanically rugged.

SIMATIC PCS 7 Industrial Workstations of type IPC547G are prepared for mounting on telescopic rails. They can be installed in vertical or horizontal position and in 500 mm deep 19" control cabinets, which saves space. Using an optional tower kit, the Rack PC can be converted into an industrial tower.

Further essential features

High-performance technology for demanding automation and visualization tasks

- Motherboard based on the Intel C236 chip set and Intel HD Graphics 530/P530 integrated in the processor.
- Powerful, energy-saving 6th generation Intel Core i processors with Turbo Boost 2.0, Hyper Threading and Virtualization technology
- Memory capacity with up to 64 GB DDR4-2133 SDRAM (support of dual channel technology)
- High data transfer rates, e.g. by serial ATA solid-state drive up to 480 GB, serial ATA hard disks up to 2 TB, Dual Gigabit Ethernet, PCI Express 3.0 technology
- Exceptional memory and graphics performance of graphics and memory controller integrated in the processor
- Optional graphics expansion (dual head graphics card PCI Express x16) for multi-monitor mode with up to 4 process monitors (up to 2 process monitors on the onboard graphics controller)

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Design (continued)

Expansion options and interfaces

- 2 × 10/100/1000 Mbps Ethernet RJ45 port integrated onboard
- Numerous slots for PCI/PCI Express expansion modules (all for modules up to 312 mm in length)
  - 2 × PCI
  - 1 × PCIe x4 (1 lane) Gen 3
  - 1 × PCIe x4 (4 lanes) Gen 3
  - 1 × PCIe x8 (1 lane) Gen 3
  - 1 × PCIe x16 Gen 3
  - 1 × PCIe x16 (4 lanes) Gen 3
- Total of 6 USB 3.0 ports
  - 4 on the rear of the device
  - 2 on the front
- Total of 5 USB 2.0 ports
  - 4 on the rear of the device
  - 1 internal, e.g. for software license dongle ASIA
- Further interfaces at the rear of the device:
  - 2 × PS/2 for mouse and keyboard
  - 1 × Serial COM interface (COM1)
  - 2 × DisplayPort V1.2, 1 × DVI-D
  - Audio (1 × Line In, 1 × Line Out, 1 × Micro In)
- Slots for drives (allocation depending on configured equipment):
  - 3 slots 5.25" (front), suitable for 4 removable trays
  - 1 5.25"slot for slimline drive (on the front)
  - 2 slots 3.5" (internal)
- Connections for SATA drives, allocation depending on preconfigured equipment with:
  - HDD/SSD 3.5"/2.5" in the removable tray, on the front (up to 4)
  - 1 slimline drive DVD±R/RW (on the front)
  - HDD/SSD 3.5"/2.5" on drive frame plate at left side wall (up to 2)

High system availability

- High-quality components with high MTBF values and quiet speed-controlled fans enable 24-hour continuous use in an industrial environment.
- RAID1 configuration for data mirroring on 2 HDD or SSD (also in hot-swap removable trays for replacement during operation)
- Faulty drive in a RAID configuration can be quickly identified via the HDD alarm LED
- RAID configuration optionally with hot-spare hard disk (reserve) for automatic takeover of the function of a defective drive
- Redundant 100 to 240 V AC power supply with hot-swap functionality as an equipment variant
- Lockable front door provides access protection for removable media, USB ports, operator controls (on/off button), front fan and air filter
- Efficient 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
- iAMT (Intel Active Management Technology) for remote access for purposes of remote maintenance

Integration in SIMATIC PCS 7 system diagnostics

- Using the SIMATIC IPC DiagMonitor diagnostics software, the operating hours counter as well as monitoring of program execution (watchdog), temperature, fan speed, hard disk status and system failure can be integrated into the system diagnostics with the SIMATIC PCS 7 Maintenance Station

Practical and service-friendly design for industrial use

- High electromagnetic compatibility (EMC)
- Degree of protection on the front: IP30 (with front door closed), on the rear: IP20
- Dust protection through fan-controlled overpressure ventilation across a filter
- Replacement of components, e.g. plug-in modules or hard disks, requires a single tool
- Replacement of front fan and dust filter without a tool
- Card retainers for securing modules, especially for protection against vibration and shock
- Fast replacement of hard disks by means of a hot-swap removable tray (equipment variant)
- Simple cabinet assembly possible using telescopic rails

High investment protection

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

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3

Design (continued)

Restore DVD Set

The operating system and the SIMATIC PCS 7 software are already pre-installed on the SIMATIC PCS 7 Industrial Workstations. A supplied Restore DVD enables quick restoration to the factory state or a new installation for a different application.

The following table shows you the contents of the supplied Restore DVD Set and the pre-installed software for each version of the SIMATIC PCS 7 Industrial Workstation.

SIMATIC PCS 7 V9.0 Industrial Workstation	Supplied Restore DVD Set	Pre-installed on delivery
Single station		
SIMATIC PCS 7 ES/OS IPC547G (IE or BCE)	Restore Image 1: Windows 10 IoT Enterprise LTSB 2015 64-bit operating system with default settings for optimal SIMATIC PCS 7 operation	–
	Restore Image 2: Windows 10 IoT Enterprise LTSB 2015 64-bit operating system plus software installation for operation as ES/OS single station	●
Server		
SIMATIC PCS 7 OS Server IPC547G (IE or BCE)	Restore Image 1: Windows Server 2016 Standard Edition 64-bit operating system with default settings for optimized SIMATIC PCS 7 operation	–
	Restore Image 2: Windows Server 2016 Standard Edition 64-bit operating system plus software installation for operation as OS server	●
Client		
SIMATIC PCS 7 OS Client IPC547G	Restore Image 1: Windows 10 IoT Enterprise LTSB 2015 64-bit operating system with default settings for optimal SIMATIC PCS 7 operation	–
	Restore Image 2: Windows 10 IoT Enterprise LTSB 2015 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 "Ordering data" section. An additional selection table enables you to order complete SIMATIC PCS 7 Industrial Workstations as a replacement part.

The "PCS 7 INDUSTRIAL WORKSTATION IPC547G" configurator in the Industry Mall allows you to interactively select and directly order the SIMATIC PCS 7 Industrial Workstation in the single station, server or client version - either 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 IPC547G are available under "Comparison of the workstation types" in the catalog section "SIMATIC Rack PC, Introduction". see page 3/6

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Ordering data

Individually configurable SIMATIC PCS 7 Industrial Workstations IPC547G

	Article No.
SIMATIC PCS 7 Industrial Workstation for ES/OS Single Station	**6ES7660-**
SIMATIC IPC547G Industrial PC	**7** ▢ ▢ ▢ ▢ **-** **3** **B** ▢ ▢
Windows 10 IoT Enterprise 2015 LTSB 64-bit operating system, MUI (English, German, French, Italian, Spanish, Chinese), and SIMATIC PCS 7 V9.0+SP1 pre-installed	
Processor and system type	
• Core i5-6500 (4C/4T, 3.2 (3.6) GHz, 6 MB cache); ES/OS single station	**A**
• Core i7-6700 (4C/8T, 3.4 (4.0) GHz, 8 MB cache); ES/OS single station	**D**
• Xeon E3-1275 v5 (4C/8T, 3.6 (4.0) GHz, 8 MB cache); ES/OS single station	**G**
Hard disks and solid-state drives	
With SATA hard disk (HDD)	
• 1 × 1 TB HDD SATA internal; 0.2 g vibration, 1 g shock	**A**
• 1 × 1 TB HDD SATA, Enterprise, internal; 0.2 g vibration, 1 g shock	**B**
• RAID 1, 1 TB (2 × 1 TB HDD SATA), internal; 0.2 g vibration, 1 g shock	**C**
• RAID 1, 1 TB (2 × 1 TB HDD SATA, Enterprise), internal; 0.2 g vibration, 1 g shock	**D**
• 1 × 1 TB HDD SATA in removable tray, on the front	**E**
• 1 × 1 TB HDD SATA, Enterprise, in removable tray, on the front	**F**
• RAID 1, 1 TB (2 × 1 TB HDD SATA), in removable trays, hot-swap; on the front	**G**
• RAID 1, 1 TB (2 × 1 TB HDD SATA, Enterprise), in removable trays, hot-swap; on the front	**H**
• RAID 1, 2 TB (2 × 2 TB HDD SATA, Enterprise), in removable trays, hot-swap; on the front	**J**
• RAID 1, 2 TB (2 × 2 TB HDD SATA, Enterprise), in removable trays, hot-swap + 1 × 2 TB HDD SATA, Enterprise, as hot spare in removable tray; on the front	**K**
HDD SATA + SSD	
• RAID 1, 2 TB (2 × 2 TB HDD SATA, Enterprise), in removable trays, hot-swap + 1 × 480 GB SSD (eMLC) SATA, in removable tray; on the front	**L**
SSD	
• 240 GB SSD (eMLC) SATA; internal	**M**
• 480 GB SSD (eMLC) SATA; internal	**N**
• 240 GB SSD (eMLC) SATA, in removable tray; on the front	**P**
• 480 GB SSD (eMLC) SATA, in removable tray; on the front	**Q**
• RAID 1, 240 GB (2 × 240 GB SSD (eMLC) SATA), in removable trays, hot-swap, on the front	**R**
• RAID 1, 480 GB (2 × 480 GB SSD (eMLC) SATA), in removable trays, hot-swap, on the front	**S**
Main memory	
• 8 GB DDR4 SDRAM (2 × 4 GB), dual channel	**1**
• 16 GB DDR4 SDRAM (2 × 8 GB), dual channel	**2**
• 32 GB DDR4 SDRAM (2 × 16 GB), dual channel	**3**
• 64 GB DDR4 SDRAM (4 × 16 GB), dual channel	**4**

	Article No.
SIMATIC PCS 7 Industrial Workstation for ES/OS Single Station	**6ES7660-**
SIMATIC IPC547G Industrial PC	**7** ▢ ▢ ▢ ▢ **-** **3** **B** ▢ ▢
Windows 10 IoT Enterprise 2015 LTSB 64-bit operating system, MUI (English, German, French, Italian, Spanish, Chinese), and SIMATIC PCS 7 V9.0+SP1 pre-installed	
Communication with plant bus	
• BCE	**0**
• Industrial Ethernet (CP 1623)	**1**
• Without additional communication modules	**8**
Enclosure type/removable media/ multi-monitor mode	
Blue chromated enclosure	
• Without optical drive	
- Incl. 1 × adapter cable (DisplayPort to DVI-D)	**A**
- Multi-monitor mode with 4 monitors: Onboard interfaces (2 × DisplayPort) + dual head PCIe x16 graphics card (2 × DisplayPort) combined incl. 1 × adapter cable DisplayPort to DVI-D and 1 × Dual DVI-I adapter	**B**
• With DVD±RW (slim)	
- Incl. 1 × adapter cable (DisplayPort to DVI-D)	**C**
- Multi-monitor mode with 4 monitors: Onboard interfaces (2 × DisplayPort) + dual head PCIe x16 graphics card (2 × DisplayPort) combined incl. 1 × adapter cable DisplayPort to DVI-D and 1 × Dual DVI-I adapter	**D**
Painted enclosure	
• Without optical drive	
- Incl. 1 × adapter cable (DisplayPort to DVI-D)	**E**
- Multi-monitor mode with 4 monitors: Onboard interfaces (2 × DisplayPort) + dual head PCIe x16 graphics card (2 × DisplayPort) combined incl. 1 × adapter cable DisplayPort to DVI-D and 1 × Dual DVI-I adapter	**F**
• With DVD±RW (slim)	
- Incl. 1 × adapter cable (DisplayPort to DVI-D)	**G**
- Multi-monitor mode with 4 monitors: Onboard interfaces (2 × DisplayPort) + dual head PCIe x16 graphics card (2 × DisplayPort) combined incl. 1 × adapter cable DisplayPort to DVI-D and 1 × Dual DVI-I adapter	**H**
Power supply unit, country-specific version	
• 100 ... 240 V AC industrial power supply acc. NAMUR	
- Without power supply cord	**0**
- Power supply cord for Europe	**1**
- Power supply cord for the USA	**2**
- Power supply cord for China	**3**
• 2 × 100 ... 240 V AC, redundant industrial power supply	
- Without power supply cord	**4**
- Power supply cord for Europe	**5**
- Power supply cord for the USA	**6**
- Power supply cord for China	**8**

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3

Ordering data (continued)

	Article No.
SIMATIC PCS 7 Industrial Workstation for OS Server	**6ES7660-**
SIMATIC IPC547G Industrial PC	**7** ■ ■ ■ ■ **-** **3** **G** ■ ■
Windows Server 2016 Standard Edition operating system, 64-bit, incl. 16 Core, 5 CAL, MUI (English, German, French, Italian, Spanish, Chinese), and SIMATIC PCS 7 V9.0+SP1 pre-installed	
Processor and system type	
• Core i5-6500 (4C/4T, 3.2 (3.6) GHz, 6 MB cache); OS server	**B**
• Core i7-6700 (4C/8T, 3.4 (4.0) GHz, 8 MB cache); OS server	**E**
• Xeon E3-1275 v5 (4C/8T, 3.6 (4.0) GHz, 8 MB cache); OS server	**H**
Hard disks and solid-state drives	
With SATA hard disk (HDD)	
• 1 × 1 TB HDD SATA internal; 0.2 g vibration, 1 g shock	**A**
• 1 × 1 TB HDD SATA, Enterprise, internal; 0.2 g vibration, 1 g shock	**B**
• RAID 1, 1 TB (2 × 1 TB HDD SATA), internal; 0.2 g vibration, 1 g shock	**C**
• RAID 1, 1 TB (2 × 1 TB HDD SATA, Enterprise), internal; 0.2 g vibration, 1 g shock	**D**
• 1 × 1 TB HDD SATA in removable tray, on the front	**E**
• 1 × 1 TB HDD SATA, Enterprise, in removable tray, on the front	**F**
• RAID 1, 1 TB (2 × 1 TB HDD SATA), in removable trays, hot-swap, on the front	**G**
• RAID 1, 1 TB (2 × 1 TB HDD SATA, Enterprise), in removable trays, hot-swap; on the front	**H**
• RAID 1, 2 TB (2 × 2 TB HDD SATA, Enterprise), in removable trays, hot-swap; on the front	**J**
• RAID 1, 2 TB (2 × 2 TB HDD SATA, Enterprise), in removable trays, hot-swap + 1 × 2 TB HDD SATA, Enterprise, as hot spare in removable tray; on the front	**K**
HDD SATA + SSD	
• RAID 1, 2 TB (2 × 2 TB HDD SATA, Enterprise), in removable trays, hot-swap + 1 × 480 GB SSD (eMLC) SATA, in removable tray; on the front	**L**
SSD	
• 240 GB SSD (eMLC) SATA; internal	**M**
• 480 GB SSD (eMLC) SATA; internal	**N**
• 240 GB SSD (eMLC) SATA, in removable tray; on the front	**P**
• 480 GB SSD (eMLC) SATA, in removable tray; on the front	**Q**
• RAID 1, 240 GB (2 × 240 GB SSD (eMLC) SATA), in removable trays, hot-swap, on the front	**R**
• RAID 1, 480 GB (2 × 480 GB SSD (eMLC) SATA), in removable trays, hot-swap, on the front	**S**
Main memory	
• 8 GB DDR4 SDRAM (2 × 4 GB), dual channel	**1**
• 16 GB DDR4 SDRAM (2 × 8 GB), dual channel	**2**
• 32 GB DDR4 SDRAM (2 × 16 GB), dual channel	**3**
• 64 GB DDR4 SDRAM (4 × 16 GB), dual channel	**4**

	Article No.
SIMATIC PCS 7 Industrial Workstation for OS Server	**6ES7660-**
SIMATIC IPC547G Industrial PC	**7** ■ ■ ■ ■ **-** **3** **G** ■ ■
Windows Server 2016 Standard Edition operating system, 64-bit, incl. 16 Core, 5 CAL, MUI (English, German, French, Italian, Spanish, Chinese), and SIMATIC PCS 7 V9.0+SP1 pre-installed	
Communication with plant bus	
• BCE	**0**
• Industrial Ethernet (CP 1623)	**1**
• Without additional communication modules	**8**
Enclosure type/removable media/ multi-monitor mode	
Blue chromated enclosure	
• Without optical drive	
- Incl. 1 × adapter cable (DisplayPort to DVI-D)	**A**
- Multi-monitor mode with 4 monitors: Onboard interfaces (2 × DisplayPort) + dual head PCIe x16 graphics card (2 × DisplayPort) combined incl. 1 × adapter cable DisplayPort to DVI-D and 1 × Dual DVI-I adapter	**B**
• With DVD±RW (slim)	
- Incl. 1 × adapter cable (DisplayPort to DVI-D)	**C**
- Multi-monitor mode with 4 monitors: Onboard interfaces (2 × DisplayPort) + dual head PCIe x16 graphics card (2 × DisplayPort) combined incl. 1 × adapter cable DisplayPort to DVI-D and 1 × Dual DVI-I adapter	**D**
Painted enclosure	
• Without optical drive	
- Incl. 1 × adapter cable (DisplayPort to DVI-D)	**E**
- Multi-monitor mode with 4 monitors: Onboard interfaces (2 × DisplayPort) + dual head PCIe x16 graphics card (2 × DisplayPort) combined incl. 1 × adapter cable DisplayPort to DVI-D and 1 × Dual DVI-I adapter	**F**
• With DVD±RW (slim)	
- Incl. 1 × adapter cable (DisplayPort to DVI-D)	**G**
- Multi-monitor mode with 4 monitors: Onboard interfaces (2 × DisplayPort) + dual head PCIe x16 graphics card (2 × DisplayPort) combined incl. 1 × adapter cable DisplayPort to DVI-D and 1 × Dual DVI-I adapter	**H**
Power supply unit, country-specific version	
• 100 ... 240 V AC industrial power supply acc. NAMUR	
- Without power supply cord	**0**
- Power supply cord for Europe	**1**
- Power supply cord for the USA	**2**
- Power supply cord for China	**3**
• 2 × 100 ... 240 V AC, redundant industrial power supply	
- Without power supply cord	**4**
- Power supply cord for Europe	**5**
- Power supply cord for the USA	**6**
- Power supply cord for China	**8**

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Ordering data (continued)

	Article No.
SIMATIC PCS 7 Industrial Workstation for OS Client	**6ES7660-**
SIMATIC IPC547G Industrial PC	**7** ■ ■ ■ ■ **-** **3** **B** ■ ■
Windows 10 IoT Enterprise 2015 LTSB 64-bit operating system, MUI (English, German, French, Italian, Spanish, Chinese), and SIMATIC PCS 7 V9.0+SP1 pre-installed	
Processor and system type	
• Core i5-6500 (4C/4T, 3.2 (3.6) GHz, 6 MB cache); OS client	**C**
• Core i7-6700 (4C/8T, 3.4 (4.0) GHz, 8 MB cache); OS client	**F**
• Xeon E3-1275 v5 (4C/8T, 3.6 (4.0) GHz, 8 MB cache); OS client	**J**
Hard disks and solid-state drives	
With SATA hard disk (HDD)	
• 1 × 1 TB HDD SATA internal; 0.2 g vibration, 1 g shock	**A**
• 1 × 1 TB HDD SATA, Enterprise, internal; 0.2 g vibration, 1 g shock	**B**
• RAID 1, 1 TB (2 × 1 TB HDD SATA), internal; 0.2 g vibration, 1 g shock	**C**
• RAID 1, 1 TB (2 × 1 TB HDD SATA, Enterprise), internal; 0.2 g vibration, 1 g shock	**D**
• 1 × 1 TB HDD SATA in removable tray, on the front	**E**
• 1 × 1 TB HDD SATA, Enterprise, in removable tray, on the front	**F**
• RAID 1, 1 TB (2 × 1 TB HDD SATA), in removable trays, hot-swap, on the front	**G**
• RAID 1, 1 TB (2 × 1 TB HDD SATA, Enterprise), in removable trays, hot-swap; on the front	**H**
• RAID 1, 2 TB (2 × 2 TB HDD SATA, Enterprise), in removable trays, hot-swap; on the front	**J**
• RAID 1, 2 TB (2 × 2 TB HDD SATA, Enterprise), in removable trays, hot-swap + 1 × 2 TB HDD SATA, Enterprise, as hot spare in removable tray; on the front	**K**
SSD	
• 240 GB SSD (eMLC) SATA; internal	**M**
• 480 GB SSD (eMLC) SATA; internal	**N**
• 240 GB SSD (eMLC) SATA, in removable tray; on the front	**P**
• 480 GB SSD (eMLC) SATA, in removable tray; on the front	**Q**
• RAID 1, 240 GB (2 × 240 GB SSD (eMLC) SATA), in removable trays, hot-swap, on the front	**R**
• RAID 1, 480 GB (2 × 480 GB SSD (eMLC) SATA), in removable trays, hot-swap, on the front	**S**
Main memory	
• 4 GB DDR4 SDRAM (1 × 4 GB)	**0**
• 8 GB DDR4 SDRAM (2 × 4 GB), dual channel	**1**
• 16 GB DDR4 SDRAM (2 × 8 GB), dual channel	**2**
• 32 GB DDR4 SDRAM (2 × 16 GB), dual channel	**3**
• 64 GB DDR4 SDRAM (4 × 16 GB), dual channel	**4**
Communication with plant bus	
• Without additional communication modules	**8**

	Article No.
SIMATIC PCS 7 Industrial Workstation for OS Client	**6ES7660-**
SIMATIC IPC547G Industrial PC	**7** ■ ■ ■ ■ **-** **3** **B** ■ ■
Windows 10 IoT Enterprise 2015 LTSB 64-bit operating system, MUI (English, German, French, Italian, Spanish, Chinese), and SIMATIC PCS 7 V9.0+SP1 pre-installed	
Enclosure type/removable media/ multi-monitor mode	
Blue chromated enclosure	
• Without optical drive	
- Incl. 1 × adapter cable (DisplayPort to DVI-D)	**A**
- Multi-monitor mode with 4 monitors: Onboard interfaces (2 × DisplayPort) + dual head PCIe x16 graphics card (2 × DisplayPort) combined incl. 1 × adapter cable DisplayPort to DVI-D and 1 × Dual DVI-I adapter	**B**
• With DVD±RW (slim)	
- Incl. 1 × adapter cable (DisplayPort to DVI-D)	**C**
- Multi-monitor mode with 4 monitors: Onboard interfaces (2 × DisplayPort) + dual head PCIe x16 graphics card (2 × DisplayPort) combined incl. 1 × adapter cable DisplayPort to DVI-D and 1 × Dual DVI-I adapter	**D**
Painted enclosure	
• Without optical drive	
- Incl. 1 × adapter cable (DisplayPort to DVI-D)	**E**
- Multi-monitor mode with 4 monitors: Onboard interfaces (2 × DisplayPort) + dual head PCIe x16 graphics card (2 × DisplayPort) combined incl. 1 × adapter cable DisplayPort to DVI-D and 1 × Dual DVI-I adapter	**F**
• With DVD±RW (slim)	
- Incl. 1 × adapter cable (DisplayPort to DVI-D)	**G**
- Multi-monitor mode with 4 monitors: Onboard interfaces (2 × DisplayPort) + dual head PCIe x16 graphics card (2 × DisplayPort) combined incl. 1 × adapter cable DisplayPort to DVI-D and 1 × Dual DVI-I adapter	**H**
Power supply unit, country-specific version	
• 100 ... 240 V AC industrial power supply acc. NAMUR	
- Without power supply cord	**0**
- Power supply cord for Europe	**1**
- Power supply cord for the USA	**2**
- Power supply cord for China	**3**
• 2 × 100 ... 240 V AC, redundant industrial power supply	
- Without power supply cord	**4**
- Power supply cord for Europe	**5**
- Power supply cord for the USA	**6**
- Power supply cord for China	**8**

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3

Ordering data (continued)

SIMATIC PCS 7 Industrial Workstation of type IPC547G 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 IPC547G

	Article No.
SIMATIC PCS 7 Industrial Workstation as replacement part	**6ES7660-**
SIMATIC IPC547G Industrial PC	**7** ■ ■ ■ ■ **-** **8** ■ ■ ■
Without SIMATIC PCS 7 Restore DVD sets, without pre-installation	
Processor and system type	
• Core i5-6500 (4C/4T, 3.2 (3.6) GHz, 6 MB cache); replacement part	**W**
• Core i7-6700 (4C/8T, 3.4 (4.0) GHz, 8 MB cache); replacement part	**X**
• Xeon E3-1275 v5 (4C/8T, 3.6 (4.0) GHz, 8 MB cache); replacement part	**Y**
Hard disks and solid-state drives	
With SATA hard disk (HDD)	
• 1 × 1 TB HDD SATA internal; 0.2 g vibration, 1 g shock	**A**
• 1 × 1 TB HDD SATA, Enterprise, internal; 0.2 g vibration, 1 g shock	**B**
• RAID 1, 1 TB (2 × 1 TB HDD SATA), internal; 0.2 g vibration, 1 g shock	**C**
• RAID 1, 1 TB (2 × 1 TB HDD SATA, Enterprise), internal; 0.2 g vibration, 1 g shock	**D**
• 1 × 1 TB HDD SATA in removable tray, on the front	**E**
• 1 × 1 TB HDD SATA, Enterprise, in removable tray, on the front	**F**
• RAID 1, 1 TB (2 × 1 TB HDD SATA), in removable trays, for hot swapping, on the front	**G**
• RAID 1, 1 TB (2 × 1 TB HDD SATA, Enterprise), in removable trays, for hot swapping; on the front	**H**
• RAID 1, 2 TB (2 × 2 TB HDD SATA, Enterprise), in removable trays, for hot swapping; on the front	**J**
• RAID 1, 2 TB (2 × 2 TB HDD SATA, Enterprise), in removable trays, for hot swapping + 1 × 2 TB HDD SATA, Enterprise, as hot spare in removable tray; on the front	**K**
HDD SATA + SSD	
• RAID 1, 2 TB (2 × 2 TB HDD SATA, Enterprise), in removable trays, for hot swapping + 1 × 480 GB SSD (eMLC) SATA, in removable tray; on the front	**L**
SSD	
• 240 GB SSD (eMLC) SATA; internal	**M**
• 480 GB SSD (eMLC) SATA; internal	**N**
• 240 GB SSD (eMLC) SATA, in removable tray; on the front	**P**
• 480 GB SSD (eMLC) SATA, in removable tray; on the front	**Q**
• RAID 1, 240 GB (2 × 240 GB SSD (eMLC) SATA), in removable trays, hot-swap, on the front	**R**
• RAID 1, 480 GB (2 × 480 GB SSD (eMLC) SATA), in removable trays, hot-swap, on the front	**S**
Main memory	
• 4 GB DDR4 SDRAM (1 × 4 GB)	**0**
• 8 GB DDR4 SDRAM (2 × 4 GB), dual channel	**1**
• 16 GB DDR4 SDRAM (2 × 8 GB), dual channel	**2**
• 32 GB DDR4 SDRAM (2 × 16 GB), dual channel	**3**
• 64 GB DDR4 SDRAM (4 × 1 GB), dual channel	**4**

	Article No.
SIMATIC PCS 7 Industrial Workstation as replacement part	**6ES7660-**
SIMATIC IPC547G Industrial PC	**7** ■ ■ ■ ■ **-** **8** ■ ■ ■
Without SIMATIC PCS 7 Restore DVD sets, without pre-installation	
Communication with plant bus	
• BCE	**0**
• Industrial Ethernet (CP 1623)	**1**
• Without additional communication modules	**8**
Operating system	
• Windows 7 Ultimate, 64-bit, MUI (English, German, French, Italian, Spanish, Chinese)	**A**
• Windows 10 IoT Enterprise 2015 LTSB 64-bit, MUI (English, German, French, Italian, Spanish, Chinese)	**B**
• Windows Server 2012 R2 Standard Edition, 64-bit, incl. 5 CAL, MUI (English, German, French, Italian, Spanish, Chinese)	**F**
• Windows Server 2016 Standard Edition, 64-bit, incl. 16 Core, 5 CAL, MUI (English, German, French, Italian, Spanish, Chinese)	**G**
• Without operating system	**X**
Enclosure type/removable media/ multi-monitor mode	
Blue chromated enclosure	
• Without optical drive	
- Incl. 1 × adapter cable (DisplayPort to DVI-D)	**A**
- Multi-monitor mode with 4 monitors: Onboard interfaces (2 × DisplayPort) + dual head PCIe x16 graphics card (2 × DisplayPort) combined incl. 1 × adapter cable DisplayPort to DVI-D and 1 × Dual DVI-I adapter	**B**
• With DVD±RW (slim)	
- Incl. 1 × adapter cable (DisplayPort to DVI-D)	**C**
- Multi-monitor mode with 4 monitors: Onboard interfaces (2 × DisplayPort) + dual head PCIe x16 graphics card (2 × DisplayPort) combined incl. 1 × adapter cable DisplayPort to DVI-D and 1 × Dual DVI-I adapter	**D**
Painted enclosure	
• Without optical drive	
- Incl. 1 × adapter cable (DisplayPort to DVI-D)	**E**
- Multi-monitor mode with 4 monitors: Onboard interfaces (2 × DisplayPort) + dual head PCIe x16 graphics card (2 × DisplayPort) combined incl. 1 × adapter cable DisplayPort to DVI-D and 1 × Dual DVI-I adapter	**F**
• With DVD±RW (slim)	
- Incl. 1 × adapter cable (DisplayPort to DVI-D)	**G**
- Multi-monitor mode with 4 monitors: Onboard interfaces (2 × DisplayPort) + dual head PCIe x16 graphics card (2 × DisplayPort) combined incl. 1 × adapter cable DisplayPort to DVI-D and 1 × Dual DVI-I adapter	**H**
Power supply unit, country-specific version	
• 100 ... 240 V AC industrial power supply acc. NAMUR	
- Without power supply cord	**0**
- Power supply cord for Europe	**1**
- Power supply cord for the USA	**2**
- Power supply cord for China	**3**
• 2 × 100 to 240 V AC, redundant industrial power supply	
- Without power supply cord	**4**
- Power supply cord for Europe	**5**
- Power supply cord for the USA	**6**
- Power supply cord for China	**8**

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Additional and expansion components

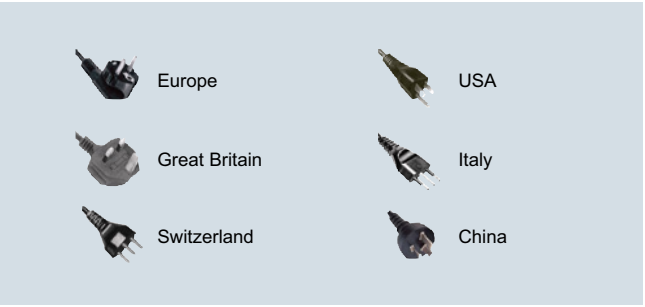
USB keyboard TKL-105 Color: black	
• Keyboard layout, German	**6AV6881-0AU14-0AA0**
• Keyboard layout, US International	**6AV6881-0AU14-1AA0**
SIMATIC HMI USB mouse Optical mouse with scroll wheel and USB connection, color anthracite	**6AV2181-8AT00-0AX0**
Memory expansion	
• 4 GB DDR4-2133 SDRAM (1 × 4 GB)	**6ES7648-2AL60-0PA0**
• 8 GB DDR4-2133 SDRAM (1 × 8 GB)	**6ES7648-2AL70-0PA0**
• 16 GB DDR4-2133 SDRAM (1 × 16 GB)	**6ES7648-2AL80-0PA0**
Tower Kit for SIMATIC IPC547G Tower Kit for conversion of a Rack PC into an industrial tower PC	**6ES7648-1AA01-0XC0**
Retainer For locking the internal USB port	**6ES7648-1AA00-0XK0**
Removable tray For 3.5" hard disk (SATA/SAS) or 2.5" SSD (SATA), without drive	**6ES7648-0EH00-1BA0**
Adapter cable	
• DisplayPort to DVI-D for onboard graphics	**6ES7648-3AF00-0XA0**
• DisplayPort to VGA for onboard graphics	**6ES7648-3AG00-0XA0**
Power supply cord, 3 m, for Rack PC	
• Europe (for Austria, Belgium, Finland, France, Germany, the Netherlands, Spain, Sweden)	**6ES7900-0AA00-0XA0**
• For the 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 high availability AS systems, see "Communication", "Industrial Ethernet – System connection PCS 7 systems", see page 10/59	

Accessories

Power supply cord for Rack PC

The power supply cords for the SIMATIC PCS 7 Industrial Workstation of type IPC547G are governed by country-specific particularities. The "Europe" power supply cord can be used in Germany, France, Spain, the Netherlands, Belgium, Sweden, Austria and Finland. Besides the "Europe" power supply cord, specific power supply cords for the USA and China can also be selected in the configurator. Other country-specific power supply cords for Great Britain, Italy and Switzerland can be ordered separately as accessories.

The following picture shows the design of some of the plugs for the power supply connection:



Country-specific power supply cords for Rack PC

Tower Kit for IPC547G

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 of type IPC547G.



SIMATIC IPC547G with Tower Kit

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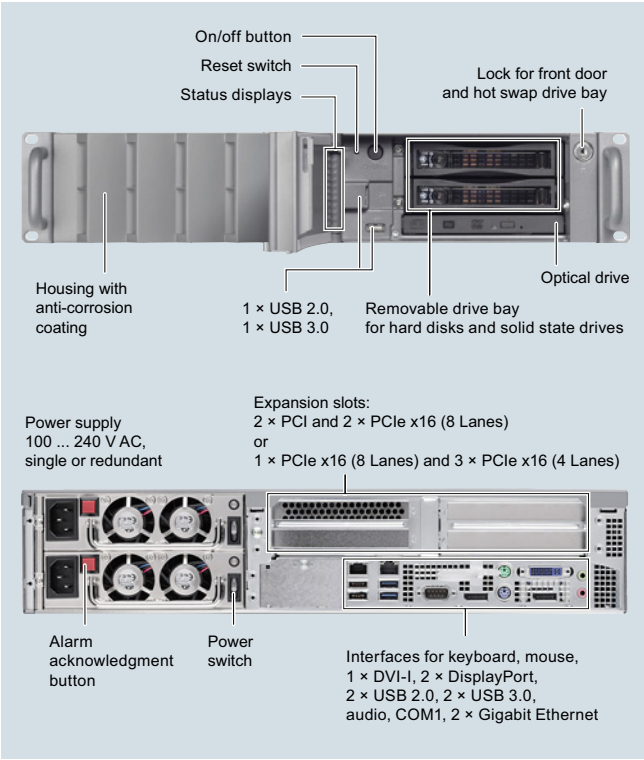
Overview



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 adapter to VGA 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

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Overview (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/SAS 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 configurations for data mirroring on 2 drives (also in hot swap removable drive bay for replacement of a hard disk during operation):
  - 2 SATA HDD or 2 SATA SSD on the onboard RAID controller
  - 2 SAS HDD on the hardware RAID controller
- 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 electromagnetic compatibility (EMC)
- Degree of protection on the 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)
- Certifications for worldwide marketing (cULus)
- Worldwide service and support

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3

Design (continued)

Restore DVD Set

The operating system and the SIMATIC PCS 7 software are already pre-installed on the SIMATIC PCS 7 Industrial Workstations. A supplied Restore DVD enables quick restoration to the factory state or a new installation for a different application.

The following table shows you the contents of the supplied Restore DVD Set and the pre-installed software for each version of the SIMATIC PCS 7 Industrial Workstation.

SIMATIC PCS 7 V9.0 Industrial Workstation	Supplied Restore DVD Set	Pre-installed on delivery
Single station		
SIMATIC PCS 7 ES/OS IPC647D (IE or BCE)	Restore Image 1: Windows 10 IoT Enterprise 2015 LTSB 64-bit operating system with default settings for optimal SIMATIC PCS 7 operation	–
	Restore Image 2: Windows 10 IoT Enterprise 2015 LTSB 64-bit operating system plus software installation for operation as ES/OS single station	●
Server		
SIMATIC PCS 7 OS Server IPC647D (IE or BCE)	Restore Image 1: Windows Server 2016 Standard Edition 64-bit operating system with default settings for optimized SIMATIC PCS 7 operation	–
	Restore Image 2:	
	• Windows Server 2016 Standard Edition 64-bit operating system plus software nstallation for operation as OS Server	●
	• Windows Server 2016 Standard Edition 64-bit operating system plus software installation for operation as Engineering Station	–
	• Windows Server 2016 Standard Edition 64-bit operating system plus software installation for operation as SIMATIC PCS 7 Web Server	–
Client		
SIMATIC PCS 7 OS Client IPC647D	Restore Image 1: Windows 10 IoT Enterprise 2015 LTSB 64-bit operating system with default settings for optimal SIMATIC PCS 7 operation	–
	Restore Image 2: Windows 10 IoT Enterprise 2015 LTSB 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 "Ordering data" section (paper catalog). An additional selection table enables you to order complete SIMATIC PCS 7 Industrial Workstations as a replacement part.

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 are available under "Comparison of the workstation types" in the catalog section "SIMATIC Rack PC, Introduction", see page 3/6.

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Ordering data

Individually configurable SIMATIC PCS 7 Industrial Workstations IPC647D

	Article No.
SIMATIC PCS 7 Industrial Workstation for ES/OS single station	**6ES7660-**
SIMATIC Industrial PC IPC647D	**5** ■ ■ ■ ■ **-** **3** **B** ■ ■
Operating system Windows 10 IoT Enterprise 2015 LTSB 64-bit, MUI (English, German, French, Italian, Spanish, Chinese), SIMATIC PCS 7 V9.0+SP1 preinstalled	
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**
• RAID 1, 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**
• RAID 1, 1 TB (2 × 1 TB HDD SATA, data mirroring); in removable drive bay, for hot swapping; at the front	**F**
HDD SATA + SSD	
• RAID 1, 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**
• RAID 1, 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**
• RAID 1, 240 GB (2 × 240 GB) SSD (eMLC), SATA, data mirroring; in removable drive bay; for hot swapping; at the front	**V**
• RAID 1, 480 GB (2 × 480 GB) SSD (eMLC), SATA, data mirroring; in removable drive bay; for hot swapping; at the front	**W**
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**

	Article No.
SIMATIC PCS 7 Industrial Workstation for ES/OS single station	**6ES7660-**
SIMATIC Industrial PC IPC647D	**5** ■ ■ ■ ■ **-** **3** **B** ■ ■
Operating system Windows 10 IoT Enterprise 2015 LTSB 64-bit, MUI (English, German, French, Italian, Spanish, Chinese), SIMATIC PCS 7 V9.0+SP1 preinstalled	
Bus module/removable 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 via onboard interfaces[2]	**B**
- Multi-monitor mode for 4 screens (combined, onboard interfaces (2 × DisplayPort) + Dual Head PCIe x16 card (2 × DisplayPort))[3]	**V**
• With DVD±RW (slim)[1]	
- Without multi-monitor mode[1]	**D**
- Multi-monitor mode for 2 screens via onboard interfaces[2]	**E**
- Multi-monitor mode for 4 screens (combined, onboard interfaces (2 × DisplayPort) + Dual Head PCIe x16 card (2 × DisplayPort))[3]	**W**
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 via onboard interfaces[2]	**H**
- Multi-monitor mode for 4 screens (combined, onboard interfaces (2 × DisplayPort) + Dual Head PCIe x16 card (2 × DisplayPort))[3]	**X**
• With DVD±RW (slim)[1]	
- Without multi-monitor mode[1]	**K**
- Multi-monitor mode for 2 screens via onboard interfaces[2]	**L**
- Multi-monitor mode for 4 screens (combined, onboard interfaces (2 × DisplayPort) + Dual Head PCIe x16 card (2 × DisplayPort))[3]	**Y**
Power supply unit, country-specific version	
• 100 ... 240 V AC industrial power supply to NAMUR	
- Power supply cord for Europe	**0**
- Power supply cord for the UK	**1**
- Power supply cord for Switzerland	**2**
- Power supply cord for the USA	**3**
- Power supply cord for Italy	**4**
- Power supply cord for China	**5**
• 2 × 100 ... 240 V AC, redundant power supply; without power supply cord	**6**
• 110/240 V AC industrial power supply with NAMUR; without power cable	**8**

[1] The RAID 1 with SSD drive option cannot be used together with a DVD drive as they use the same drive slot: selection criterion "Hard disks and solid state drives", item H, J, cannot be combined with selection criterion "Bus module/removable media/multi-monitor option", item D, E, W, K, L, Y

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

[3] Incl. 1 adapter cable (DisplayPort to DVI-D), incl. 1 × Dual DVI-I adapter for Dual Head PCIe x16 card

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3

Ordering data (continued)

	Article No.
SIMATIC PCS 7 Industrial Workstation for OS server	**6ES7660-**
SIMATIC Industrial PC IPC647D	5 ■ ■ ■ ■ - 3 F ■ ■
Windows Server 2016 Standard Edition operating system, 64-bit, incl. 16 Core, 5 CAL, MUI (English, German, French, Italian, Spanish, Chinese), and SIMATIC PCS 7 V9.0+SP1 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
• RAID 1, 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
• RAID 1, 1 TB (2 × 1 TB HDD SATA, data mirroring); in removable drive bay, for hot swapping; at the front	F
• RAID 1, 1 TB (2 × 1 TB HDD SAS, data mirroring); in removable drive bay, for hot swapping; at the front; with hardware RAID controller (PCIe x8; 2 slots occupied) incl. zero-maintenance cache protection (ZMCP) module[4]	G
HDD SATA + SSD	
• RAID 1, 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
• RAID 1, 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
• RAID 1, 1 TB (2 × 1 TB HDD SAS, data mirroring); in removable drive bay, hot-swap; at the front; with hardware RAID controller (PCIe x8; 2 slots occupied) incl. ZMCP module + 240 GB SSD (eMLC) SATA; internal in DVD drive slot[1)4)]	K
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
• RAID 1, 240 GB (2 × 240 GB) SSD (eMLC), SATA, data mirroring; in removable drive bay; for hot swapping; at the front	V
• RAID 1, 480 GB (2 × 480 GB) SSD (eMLC), SATA, data mirroring; in removable drive bay; for hot swapping; at the front	W
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

	Article No.
SIMATIC PCS 7 Industrial Workstation for OS server	**6ES7660-**
SIMATIC Industrial PC IPC647D	5 ■ ■ ■ ■ - 3 F ■ ■
Windows Server 2016 Standard Edition operating system, 64-bit, incl. 16 Core, 5 CAL, MUI (English, German, French, Italian, Spanish, Chinese), and SIMATIC PCS 7 V9.0+SP1 pre-installed	
Communication with plant bus	
• BCE	0
• Industrial Ethernet (CP 1623)	1
• Without additional communication modules	8
Bus module/removable media/ multi-monitor option	
Bus module with 2 × PCI, 2 × PCIe x16 (8 lanes)	
• Without optical drive	
- Without multi-monitor mode[4]	A
- Multi-monitor mode for 2 screens via onboard interfaces[2)4)]	B
- Multi-monitor mode for 4 screens (combined, onboard interfaces (2 × DisplayPort) + Dual Head PCIe x16 card (2 × DisplayPort))[3)4)]	V
• With DVD±RW (slim)[1]	
- Without multi-monitor mode[1)4)]	D
- Multi-monitor mode for 2 screens via onboard interfaces[1)2)4)]	E
- Multi-monitor mode for 4 screens (combined, onboard interfaces (2 × DisplayPort) + Dual Head PCIe x16 card (2 × DisplayPort))[1)3)4)]	W
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 via onboard interfaces[2)]	H
- Multi-monitor mode for 4 screens (combined, onboard interfaces (2 × DisplayPort) + Dual Head PCIe x16 card (2 × DisplayPort))[3)]	X
• With DVD±RW (slim)[1]	
- Without multi-monitor mode[1)]	K
- Multi-monitor mode for 2 screens via onboard interfaces[1)2)]	L
- Multi-monitor mode for 4 screens (combined, onboard interfaces (2 × DisplayPort) + Dual Head PCIe x16 card (2 × DisplayPort))[1)3)]	Y
Power supply unit, country-specific version	
• 100 ... 240 V AC industrial power supply to NAMUR	
- Power supply cord for Europe	0
- Power supply cord for the UK	1
- Power supply cord for Switzerland	2
- Power supply cord for the USA	3
- Power supply cord for Italy	4
- Power supply cord for China	5
• 2 × 100 ... 240 V AC, redundant power supply; without power supply cord	6
• 110/240 V AC industrial power supply with NAMUR; without power cable	8

1) The RAID 1 with SSD drive option cannot be used together with a DVD drive as they use the same drive slot: selection criterion "Hard disks and solid state drives", item H, J, K, cannot be combined with selection criterion "Bus module/removable media/multi-monitor option", item D, E, W, K, L, Y

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

3) Incl. 1 adapter cable (DisplayPort to DVI-D), incl. 1 × Dual DVI-I adapter for Dual Head PCIe x16 card

4) Selection criterion "Hard disks and solid state drives", item G, K, cannot be combined with selection criterion "Bus module/removable media/multi-monitor option", item A, B, V, D, E, W

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Ordering data (continued)

	Article No.
SIMATIC PCS 7 Industrial Workstation for OS client	**6ES7660-**
SIMATIC Industrial PC IPC647D	**5** ■ ■ ■ ■ **-** **3** **B** ■ ■
Operating system Windows 10 IoT Enterprise 2015 LTSB 64-bit, MUI (English, German, French, Italian, Spanish, Chinese), SIMATIC PCS 7 V9.0+SP1 preinstalled	
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**
• RAID 1, 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**
• RAID 1, 1 TB (2 × 1 TB HDD SATA, data mirroring); in removable drive bay, for hot swapping; at the front	**F**
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	
• 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**

	Article No.
SIMATIC PCS 7 Industrial Workstation for OS client	**6ES7660-**
SIMATIC Industrial PC IPC647D	**5** ■ ■ ■ ■ **-** **3** **B** ■ ■
Operating system Windows 10 IoT Enterprise 2015 LTSB 64-bit, MUI (English, German, French, Italian, Spanish, Chinese), SIMATIC PCS 7 V9.0+SP1 preinstalled	
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 via onboard interfaces[2]	**B**
- Multi-monitor mode for 4 screens (combined, onboard interfaces (2 × DisplayPort) + Dual Head PCIe x16 card (2 × DisplayPort))[3]	**V**
• With DVD±RW (slim)	
- Without multi-monitor mode	**D**
- Multi-monitor mode for 2 screens via onboard interfaces[2]	**E**
- Multi-monitor mode for 4 screens (combined, onboard interfaces (2 × DisplayPort) + Dual Head PCIe x16 card (2 × DisplayPort))[3]	**W**
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 via onboard interfaces[2]	**H**
- Multi-monitor mode for 4 screens (combined, onboard interfaces (2 × DisplayPort) + Dual Head PCIe x16 card (2 × DisplayPort))[3]	**X**
• With DVD±RW (slim)	
- Without multi-monitor mode	**K**
- Multi-monitor mode for 2 screens via onboard interfaces[2]	**L**
- Multi-monitor mode for 4 screens (combined, onboard interfaces (2 × DisplayPort) + Dual Head PCIe x16 card (2 × DisplayPort))[3]	**Y**
Power supply unit, country-specific version	
• 100 ... 240 V AC industrial power supply to NAMUR	
- Power supply cord for Europe	**0**
- Power supply cord for the UK	**1**
- Power supply cord for Switzerland	**2**
- Power supply cord for the USA	**3**
- Power supply cord for Italy	**4**
- Power supply cord for China	**5**
• 2 × 100 ... 240 V AC, redundant power supply; without power supply cord	**6**
• 110/240 V AC industrial power supply with NAMUR; without power cable	**8**

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

[3] Incl. 1 adapter cable (DisplayPort to DVI-D), incl. 1 × Dual DVI-I adapter for Dual Head PCIe x16 card

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3

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 DVD sets	**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**								
• RAID 1, 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**								
• RAID 1, 1 TB (2 × 1 TB HDD SATA, data mirroring); in removable drive bay, for hot swapping; at the front		**F**								
• RAID 1, 1 TB (2 × 1 TB HDD SAS, data mirroring); in removable drive bay, for hot swapping; at the front; with hardware RAID controller (PCIe x8; 2 slots occupied) incl. zero-maintenance cache protection (ZMCP) module[4)5)]		**G**								
HDD SATA + SSD										
• RAID 1, 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**								
• RAID 1, 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**								
• RAID 1, 1 TB (2 × 1 TB HDD SAS, data mirroring); in removable drive bay, for hot swapping; at the front; with hardware RAID controller (PCIe x8; 2 slots occupied) incl. ZMCP module + 240 GB SSD (eMLC) SATA; internal in DVD drive slot[1)4)5)]		**K**								
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**								
• RAID 1, 240 GB (2 × 240 GB) SSD (eMLC), SATA, data mirroring; in removable drive bay; for hot swapping; at the front		**V**								
• RAID 1, 480 GB (2 × 480 GB) SSD (eMLC), SATA, data mirroring; in removable drive bay; for hot swapping; at the front		**W**								
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 ch.			**5**							
• 16 GB DDR3 SDRAM (2 × 8 GB), ECC, dual ch.			**6**							
• 32 GB DDR3 SDRAM (4 × 8 GB), ECC, dual ch.			**7**							

	Article No.									
SIMATIC PCS 7 Industrial Workstation as replacement part	**6ES7660-**									
Industrial PC SIMATIC IPC647D without pre-installation, without SIMATIC PCS 7 Restore DVD sets	**5**	■	■	■	■	**-**	**8**	■	■	■
Communication with plant bus										
• BCE				**0**						
• Industrial Ethernet (CP 1623)				**1**						
• Without additional communication modules				**8**						
Operating system										
• Windows 7 Ultimate, 64-bit, MUI (English, German, French, Italian, Spanish, Chinese)							**A**			
• Windows 10 IoT Enterprise 2015 LTSB 64-bit, MUI (English, German, French, Italian, Spanish, Chinese)[5)]							**B**			
• Windows Server 2012 R2 Standard Edition, 64-bit, incl. 5 CAL, MUI (English, German, French, Italian, Spanish, Chinese)							**E**			
• Windows Server 2016 Standard Edition, 64-bit, incl. 16 Core, 5 CAL, MUI (English, German, French, Italian, Spanish, Chinese)							**F**			
• 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[4)]										**A**
- Multi-monitor mode for 2 screens via onboard interfaces[2)4)]										**B**
- Multi-monitor mode for 4 screens via PCIe x16 graphics card[4)]										**C**
- Multi-monitor mode for 4 screens (combined, onboard interfaces (2 × DisplayPort) + Dual Head PCIe x16 card (2 × DisplayPort))[3)4)]										**V**
• With DVD±RW (slim)[1)]										
- Without multi-monitor mode[1)4)]										**D**
- Multi-monitor mode for 2 screens via onboard interfaces[1)2)4)]										**E**
- Multi-monitor mode for 4 screens via PCIe x16 graphics card[1)4)]										**F**
- Multi-monitor mode for 4 screens (combined, onboard interfaces (2 × DisplayPort) + Dual Head PCIe x16 card (2 × DisplayPort))[1)3)4)]										**W**
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 via onboard interfaces[2)]										**H**
- Multi-monitor mode for 4 screens via PCIe x16 graphics card										**J**
- Multi-monitor mode for 4 screens (combined, onboard interfaces (2 × DisplayPort) + Dual Head PCIe x16 card (2 × DisplayPort))[3)]										**X**
• With DVD±RW (slim)[1)]										
- Without multi-monitor mode[1)]										**K**
- Multi-monitor mode for 2 screens via onboard interfaces[1)2)]										**L**
- Multi-monitor mode for 4 screens via PCIe x16 graphics card[1)]										**M**
- Multi-monitor mode for 4 screens (combined, onboard interfaces (2 × DisplayPort) + Dual Head PCIe x16 card (2 × DisplayPort))[1)3)]										**Y**

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Ordering data (continued)

	Article No.
SIMATIC PCS 7 Industrial Workstation as replacement part	**6ES7660-**
Industrial PC SIMATIC IPC647D without pre-installation, without SIMATIC PCS 7 Restore DVD sets	**5 ■ ■ ■ ■ - 8 ■ ■ ■**
Power supply unit, country-specific version	
• 100 ... 240 V AC industrial power supply to NAMUR	
- Power supply cord for Europe	**0**
- Power supply cord for the UK	**1**
- Power supply cord for Switzerland	**2**
- Power supply cord for the USA	**3**
- Power supply cord for Italy	**4**
- Power supply cord for China	**5**
• 2 × 100 ... 240 V AC, redundant power supply; without power supply cord	**6**
• 110/240 V AC industrial power supply with NAMUR; without power cable	**8**

1) The RAID 1 with SSD drive option cannot be used together with a DVD drive as they use the same drive slot: selection criterion "Hard disks and solid state drives", item H, J, K, cannot be combined with selection criterion "Bus module/removable media/multi-monitor option", item D, E, F, W, K, L, M, Y

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

3) Incl. 1 adapter cable (DisplayPort to DVI-D), incl. 1 × Dual DVI-I adapter for Dual Head PCIe x16 card

4) Selection criterion "Hard disks and solid state drives", item G, K, cannot be combined with selection criterion "Bus module/removable media/multi-monitor option", item A, B, C, V, D, E, F, W

5) Hard disk options with hardware RAID controller G and K not for Windows 10 IoT Enterprise 2015 LTSB operating system

Additional and expansion components

USB keyboard TKL-105 Color: black	
• Keyboard layout, German	**6AV6881-0AU14-0AA0**
• Keyboard layout, US-International	**6AV6881-0AU14-1AA0**
SIMATIC HMI USB mouse Optical mouse with scroll wheel and USB connection, color anthracite	**6AV2181-8AT00-0AX0**
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 the internal USB port	**6ES7648-1AA00-0XK0**
Rack unit for low-profile removable drive bay For 3.5" hard disk (SATA/SAS) or 2.5" SSD (SATA), without drive	**6ES7648-0EG01-1BA0**
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**
Power supply cord, 3 m, for Rack PC[1]	
• Europe (for Austria, Belgium, Finland, France, Germany, the Netherlands, Spain, Sweden)	**6ES7900-0AA00-0XA0**
• For the 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 high-availability AS systems, see "Communication", "Industrial Ethernet – System connection PCS 7 systems", see page 10/59	

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.

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Overview

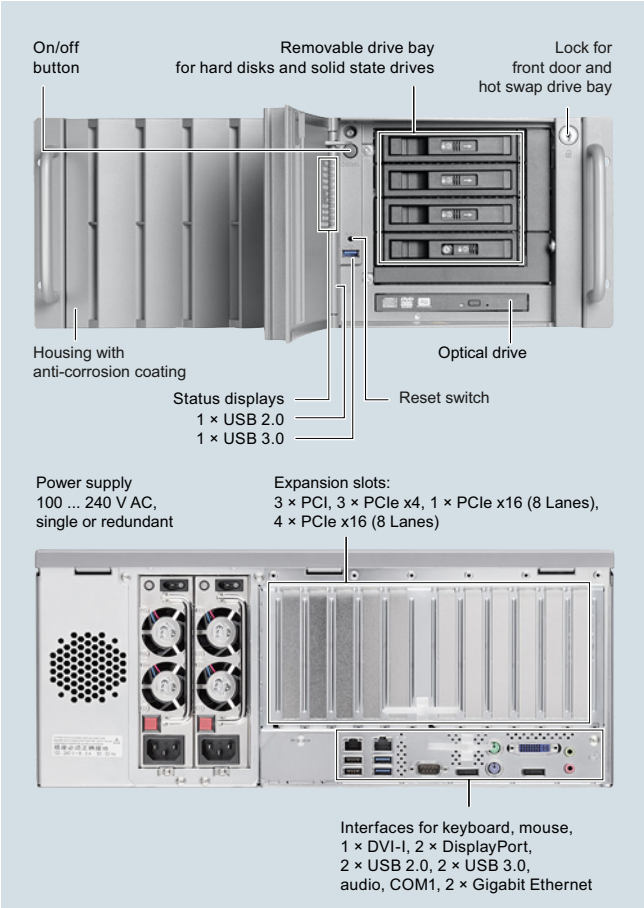


SIMATIC IPC847D

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 adapter to VGA 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

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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/SAS 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
- RAID1 configurations for data mirroring on 2 drives (also in hot swap removable drive bay for replacement of a hard disk during operation) with:
  - 2 SATA HDD or 2 SATA SSD on the onboard RAID controller
  - 2 SAS HDD on the hardware RAID controller
- RAID 5 configuration with 3 SAS HDD on the hardware RAID controller for striping with parity (in hot swap removable drive bay for replacement of a hard disk during operation)
- RAID configurations optionally with hot-spare hard disk (reserve) for automatically taking over the function of a faulty hard disk
- Faulty hard disk in a RAID configuration can be quickly identified via the HDD alarm LED
- 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 electromagnetic compatibility (EMC)
- Degree of protection on the 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)
- Certifications for worldwide marketing (cULus)
- Mounting-compatible across device generations
- Worldwide service and support

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3

Design (continued)

Restore DVD Set

The operating system and the SIMATIC PCS 7 software are already pre-installed on the SIMATIC PCS 7 Industrial Workstations. A supplied Restore DVD enables quick restoration to the factory state or a new installation for a different application.

The following table shows you the contents of the supplied Restore DVD Set and the pre-installed software for each version of the SIMATIC PCS 7 Industrial Workstation.

SIMATIC PCS 7 V9.0 Industrial Workstation	Supplied Restore DVD Set	Pre-installed on delivery
Single station		
SIMATIC PCS 7 ES/OS IPC847D (IE or BCE)	Restore Image 1: Windows 10 IoT Enterprise 2015 LTSB 64-bit operating system with default settings for optimal SIMATIC PCS 7 operation	–
	Restore Image 2: Windows 10 IoT Enterprise 2015 LTSB 64-bit operating system plus software installation for operation as ES/OS single station	●
Server		
SIMATIC PCS 7 OS Server IPC847D (IE or BCE)	Restore Image 1: Windows Server 2016 Standard Edition 64-bit operating system with default settings for optimized SIMATIC PCS 7 operation	–
	Restore Image 2:	
	• Windows Server 2016 Standard Edition 64-bit operating system plus software installation for operation as OS Server	●
	• Windows Server 2016 Standard Edition 64-bit operating system plus software installation for operation as Engineering Station	–
	• Windows Server 2016 Standard Edition 64-bit operating system plus software installation for operation as SIMATIC PCS 7 Web Server	–

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 "Ordering data" section. An additional selection table enables you to order complete SIMATIC PCS 7 Industrial Workstations as a replacement part.

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 are available under "Comparison of the workstation types" in the catalog section "SIMATIC Rack PC, Introduction", see page 3/6.

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Ordering data

Individually configurable SIMATIC PCS 7 Industrial Workstations IPC847D

	Article No.
SIMATIC PCS 7 Industrial Workstation for ES/OS single station	**6ES7660-**
SIMATIC IPC847D industrial PC	**6** ■ ■ ■ ■ **-** **3** **B** ■ ■
Windows 10 IoT Enterprise 64-bit operating system, MUI (English, German, French, Italian, Spanish, Chinese), SIMATIC PCS 7 V9.0+SP1 preinstalled	
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**
• RAID 1, 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**
• RAID 1, 1 TB (2 × 1 TB HDD SATA, data mirroring); in removable drive bay, for hot swapping; at the front	**F**
• RAID 1, 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	
• RAID 1, 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**
• RAID 1, 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**
• RAID 1, 240 GB (2 × 240 GB) SSD (eMLC), SATA, data mirroring; in removable drive bay; for hot swapping; at the front	**V**
• RAID 1, 480 GB (2 × 480 GB) SSD (eMLC), SATA, data mirroring; in removable drive bay; for hot swapping; at the front	**W**
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**

	Article No.
SIMATIC PCS 7 Industrial Workstation for ES/OS single station	**6ES7660-**
SIMATIC IPC847D industrial PC	**6** ■ ■ ■ ■ **-** **3** **B** ■ ■
Windows 10 IoT Enterprise 64-bit operating system, MUI (English, German, French, Italian, Spanish, Chinese), SIMATIC PCS 7 V9.0+SP1 preinstalled	
Communication with plant bus	
• BCE	**0**
• Industrial Ethernet (CP 1623)	**1**
• Without additional communication modules	**8**
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 via onboard interfaces[1]	**B**
- Multi-monitor mode for 4 screens (combined, onboard interfaces (2 × DisplayPort) + Dual Head PCIe x16 card (2 × DisplayPort))[2]	**X**
• With DVD±RW (slim)	
- Without multi-monitor mode	**D**
- Multi-monitor mode for 2 screens via onboard interfaces[1]	**E**
- Multi-monitor mode for 4 screens (combined, onboard interfaces (2 × DisplayPort) + Dual Head PCIe x16 card (2 × DisplayPort))[2]	**Y**
Power supply unit, country-specific version	
• 100 ... 240 V AC industrial power supply to NAMUR	
- Power supply cord for Europe	**0**
- Power supply cord for the UK	**1**
- Power supply cord for Switzerland	**2**
- Power supply cord for the USA	**3**
- Power supply cord for Italy	**4**
- Power supply cord for China	**5**
• 2 × 100 ... 240 V AC, redundant power supply; without power supply cord	**6**
• 110/240 V AC industrial power supply with NAMUR; without power cable	**8**

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

[2] Incl. 1 adapter cable (DisplayPort to DVI-D), incl. 1 × Dual DVI-I adapter for Dual Head PCIe x16 card

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3

Ordering data (continued)

	Article No.
SIMATIC PCS 7 Industrial Workstation For OS server	**6ES7660-**
SIMATIC IPC847D industrial PC Windows Server 2016 Standard Edition 64-bit operating system, incl. 16 Core, 5 CAL, MUI (English, German, French, Italian, Spanish, Chinese), and SIMATIC PCS 7 V9.0+SP1 pre-installed	6 ■ ■ ■ ■ - 3 F ■ ■
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
• RAID 1, 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
• RAID 1, 1 TB (2 × 1 TB HDD SATA, data mirroring); in removable drive bay, for hot swapping; at the front	F
• RAID 1, 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
• RAID 1, 1 TB (2 × 1 TB HDD SAS, data mirroring); in removable drive bay, for hot swapping; at the front; with hardware RAID controller (PCIe x8; 2 slots occupied) incl. zero-maintenance cache protection (ZMCP) module	H
• RAID 5, 2 TB (3 × 1 TB HDD SAS, striping with parity); in removable drive bay, for hot swapping; at the front; with hardware RAID controller (PCIe x8; 2 slots occupied) incl. ZMCP module	K
• RAID 5, 2 TB (3 × 1 TB HDD SAS, striping with parity) + 1 TB HDD SAS as hot spare; in removable drive bay, for hot swapping; at the front; with hardware RAID controller (PCIe x8; 2 slots occupied) incl. ZMCP module	L
HDD SATA + SSD	
• RAID 1, 1 TB (2 × 1 TB HDD SATA, data mirroring); 0.5 g vibration, 5 g shock, internal + 240 GB SSD SATA, internal	M
• RAID 1, 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
• RAID 1, 1 TB (2 × 1 TB HDD SAS, data mirroring); in removable drive bay, for hot swapping; at the front; with hardware RAID controller (PCIe x8; 2 slots occupied) incl. ZMCP module + 240 GB SSD (eMLC) SATA; in removable drive bay, at the front	P
• RAID 5, 2 TB (3 × 1 TB HDD SAS, striping with parity); in removable drive bay, for hot swapping; at the front; with hardware RAID controller (PCIe x8; 2 slots occupied) incl. ZMCP module + 240 GB SSD (eMLC) SATA; in removable drive bay, at the front	Q
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
• RAID 1, 240 GB (2 × 240 GB) SSD (eMLC), SATA, data mirroring; in removable drive bay; for hot swapping; at the front	V
• RAID 1, 480 GB (2 × 480 GB) SSD (eMLC), SATA, data mirroring; in removable drive bay; for hot swapping; at the front	W

	Article No.
SIMATIC PCS 7 Industrial Workstation For OS server	**6ES7660-**
SIMATIC IPC847D industrial PC Windows Server 2016 Standard Edition 64-bit operating system, incl. 16 Core, 5 CAL, MUI (English, German, French, Italian, Spanish, Chinese), and SIMATIC PCS 7 V9.0+SP1 pre-installed	6 ■ ■ ■ ■ - 3 F ■ ■
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
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 via onboard interfaces[1]	B
- Multi-monitor mode for 4 screens (combined, onboard interfaces (2 × DisplayPort) + Dual Head PCIe x16 card (2 × DisplayPort))[2]	X
• With DVD±RW (slim)	
- Without multi-monitor mode	D
- Multi-monitor mode for 2 screens via onboard interfaces[1]	E
- Multi-monitor mode for 4 screens (combined, onboard interfaces (2 × DisplayPort) + Dual Head PCIe x16 card (2 × DisplayPort))[2]	Y
Power supply unit, country-specific version	
• 100 ... 240 V AC industrial power supply to NAMUR	
- Power supply cord for Europe	0
- Power supply cord for the UK	1
- Power supply cord for Switzerland	2
- Power supply cord for the USA	3
- Power supply cord for Italy	4
- Power supply cord for China	5
• 2 × 100 ... 240 V AC, redundant power supply; without power supply cord	6
• 110/240 V AC industrial power supply with NAMUR; without power cable	8

[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 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

	Article No.
SIMATIC PCS 7 Industrial Workstation as replacement part	**6ES7660-**
Industrial PC SIMATIC IPC847D without pre-installation, without SIMATIC PCS 7 Restore DVD sets	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
• RAID 1, 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
• RAID 1, 1 TB (2 × 1 TB HDD SATA, data mirroring); in removable drive bay, for hot swapping; at the front	F
• RAID 1, 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
• RAID 1, 1 TB (2 × 1 TB HDD SAS, data mirroring); in removable drive bay, for hot swapping; at the front; with hardware RAID controller (PCIe x8; 2 slots occupied) incl. zero-maintenance cache protection (ZMCP) module[3]	H
• RAID 5, 2 TB (3 × 1 TB HDD SAS, striping with parity); in removable drive bay, for hot swapping; at the front; with hardware RAID controller (PCIe x8; 2 slots occupied) incl. ZMCP module[3]	K
• RAID 5, 2 TB (3 × 1 TB HDD SAS, striping with parity) + 1 TB HDD SAS as hot spare; in removable drive bay, for hot swapping; at the front; with hardware RAID controller (PCIe x8; 2 slots occupied) incl. ZMCP module[3]	L
HDD SATA + SSD	
• RAID 1, 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
• RAID 1, 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
• RAID 1, 1 TB (2 × 1 TB HDD SAS, data mirroring); in removable drive bay, for hot swapping; at the front; with hardware RAID controller (PCIe x8; 2 slots occupied) incl. ZMCP module + 240 GB SSD (eMLC) SATA; in removable drive bay, at the front[3]	P
• RAID 5, 2 TB (3 × 1 TB HDD SAS, striping with parity); in removable drive bay, for hot swapping; at the front; with hardware RAID controller (PCIe x8; 2 slots occupied) incl. ZMCP module + 240 GB SSD (eMLC) SATA; in removable drive bay, at the front[3]	Q
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
• RAID 1, 240 GB (2 × 240 GB) SSD (eMLC), SATA, data mirroring; in removable drive bay; for hot swapping; at the front	V
• RAID 1, 480 GB (2 × 480 GB) SSD (eMLC), SATA, data mirroring; in removable drive bay; for hot swapping; at the front	W

	Article No.
SIMATIC PCS 7 Industrial Workstation as replacement part	**6ES7660-**
Industrial PC SIMATIC IPC847D without pre-installation, without SIMATIC PCS 7 Restore DVD sets	6 ■ ■ ■ ■ - 8 ■ ■ ■
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
Operating system	
• Windows 7 Ultimate 64-bit, MUI (German, English, French, Italian, Spanish, Chinese)	A
• Windows 10 IoT Enterprise 2015 LTSB 64-bit, MUI (English, German, French, Italian, Spanish, Chinese)[3]	B
• Windows Server 2012 R2 Standard Edition 64-bit, incl. 5 CAL, MUI (English, German, French, Italian, Spanish, Chinese)	E
• Windows Server 2016 Standard Edition 64-bit, incl. 16 Core, 5 CAL, MUI (English, German, French, Italian, Spanish, Chinese)	F
• 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 via onboard interfaces[1]	B
- Multi-monitor mode for 4 screens via PCIe x16 graphics card	C
- Multi-monitor mode for 4 screens (combined, onboard interfaces (2 × DisplayPort) + Dual Head PCIe x16 card (2 × DisplayPort))[2]	X
• With DVD±RW (slim)	
- Without multi-monitor mode	D
- Multi-monitor mode for 2 screens via onboard interfaces[1]	E
- Multi-monitor mode for 4 screens via PCIe x16 graphics card	F
- Multi-monitor mode for 4 screens (combined, onboard interfaces (2 × DisplayPort) + Dual Head PCIe x16 card (2 × DisplayPort))[2]	Y
Power supply unit, country-specific version	
• 100 ... 240 V AC industrial power supply to NAMUR	
- Power supply cord for Europe	0
- Power supply cord for the UK	1
- Power supply cord for Switzerland	2
- Power supply cord for the USA	3
- Power supply cord for Italy	4
- Power supply cord for China	5
• 2 × 100 ... 240 V AC, redundant power supply; without power supply cord	6
• 110/240 V AC industrial power supply with NAMUR; without power cable	8

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

[2] Incl. 1 adapter cable (DisplayPort to DVI-D), incl. 1 × Dual DVI-I adapter for Dual Head PCIe x16 card

[3] Hard disk options with hardware RAID controller H, K, L, P and Q, not for Windows 10 IoT Enterprise 2015 LTSB operating system

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3

Additional and expansion components

USB keyboard TKL-105 Color: black	
• Keyboard layout, German	**6AV6881-0AU14-0AA0**
• Keyboard layout, US-International	**6AV6881-0AU14-1AA0**
SIMATIC HMI USB mouse Optical mouse with scroll wheel and USB connection, color anthracite	**6AV2181-8AT00-0AX0**
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**
Tower Kit for SIMATIC PCS 7 Industrial Workstations Tower Kit for conversion of a Rack PC into an industrial tower PC	**6ES7648-1AA00-0XD0**
Retainer For locking the internal USB port	**6ES7648-1AA00-0XK0**
Rack unit for low-profile removable drive bay For 3.5" hard disk (SATA/SAS) or 2.5" SSD (SATA), without drive	**6ES7648-0EG01-1BA0**
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**
Power supply cord, 3 m, for Rack PC[1]	
• Europe (for Austria, Belgium, Finland, France, Germany, the Netherlands, Spain, Sweden)	**6ES7900-0AA00-0XA0**
• For the 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 high-availability AS systems, see "Communication", "Industrial Ethernet – System connection PCS 7 systems", see page 10/59	

[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:



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

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Overview



The SIMATIC PCS 7 BOX OS Client IPC627D based on the SIMATIC Box PC of type SIMATIC IPC627D can be used within the SIMATIC PCS 7 process control system as OS Client or SIMATIC BATCH client. For these applications it is an alternative to clients based on a SIMATIC Microbox PC or SIMATIC Rack PC.

With its compact and sturdy metal enclosure, the SIMATIC PCS 7 BOX OS Client IPC627D 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.

Design

The SIMATIC IPC627D Industrial PC serves as platform for the SIMATIC PCS 7 BOX OS Client IPC627D. In accordance with its CE marking it can be used in industrial environments as well as in domestic, business and commercial environments.

The IPC627D based on Intel Core i3 or Xeon processor technology has the following particularly impressive properties and equipment features:

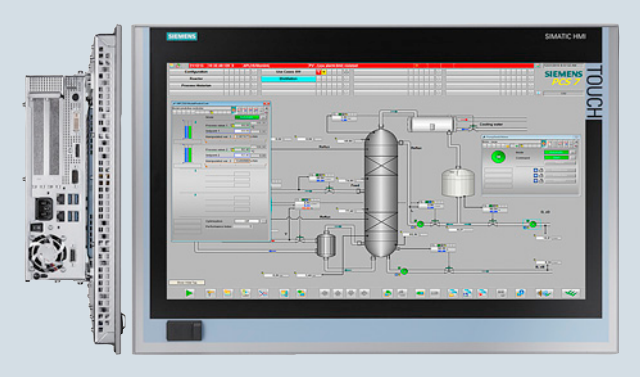
- Stable platform available for a period of about 5 years with embedded Intel components (spare parts supply and repairs for approx. 5 years)
- Rugged metal enclosure with IP20 degree of protection with high electromagnetic compatibility.
- Powerful and energy-saving Intel multi-core processors XEON E3 or Core i3
- Powerful Intel graphics controller HD Graphics 4600 onboard, integrated in the processor:
  - 2 digital interfaces DVI-I and DisplayPort (DVI-D via DisplayPort DVI adapter)
  - Analog VGA connection via DVI-I adapter to VGA or DisplayPort to VGA
- Support of multi-monitor mode with two process monitors via onboard graphics:
  - 1 × process monitor at DVI-I connection
  - 1 × process monitor at DisplayPort via DisplayPort to DVI-D adapter cable
- Alternative design version of panel front: SIMATIC PCS 7 BOX with fixed 22" TFT display with touch screen, resolution 1920 × 1080
- Flexible installation in various positions with mounting brackets or portrait installation kits
- High shock/vibration resistance in all possible mounting positions
- Variable power supply: 24 V DC or 110/230 V AC (100 to 240 V)
- Maximum processor performance up to an ambient temperature of 55 °C
- Integrated drives:
  - 1 × SATA 3.5" (HDD) hard disk or SATA 2.5" (SSD) solid-state drive
  - 1 × optical drive SATA DVD±R/RW
- Certification for worldwide marketing (cULus)
- Fast restoration of the delivery state with supplied restore DVD

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Design (continued)

Interfaces

- 4 × USB 3.0 (SuperSpeed) external
- 1 × USB 3.0 (SuperSpeed) external, on front (Panel Front design version only)
- 1 × USB 3.0 (SuperSpeed) internal, e.g. for ASIA license key, hardlock USB
- 1 × COM1 (RS 232)
- 1 × DVI-I interface (DVI/VGA combined; VGA via adapter cable)
- 1 × DisplayPort (DVI-D or VGA via adapter cable)
- 2 × Ethernet 10/100/1000 Mbps (RJ45)
- 1 × PCI-Express x16 (185 mm) and 1 × PCI (185 mm), vacant for expansions



SIMATIC PCS 7 BOX with Panel Front, side and front views

Design versions/expandability

The SIMATIC PCS 7 BOX in standard design is a compact computing unit with HMI devices (mouse, keyboard, process monitor) that can be ordered separately and are connected by means of integrated ports/interfaces.

The device is equipped with four USB 3.0 ports for mouse and keyboard as well as additional USB input/output devices, e.g. chip card reader USB.

Two process monitors can be controlled in multi-monitor mode via the integrated digital graphic interfaces DVI-I and DVI-D (via adapter cable at the DisplayPort). The selection of the process monitors depends on the technical data of the integrated graphics as well as the image formats and resolutions which can be adjusted in the project editor of the OS software (see section "Operator System, OS Software, Introduction"), see page 5/6.

As an alternative to the SIMATIC PCS 7 BOX in standard design, we are offering a built-in unit with Panel Front according to **SIMATIC IPC677D** which can be mounted in mounting cutouts of control cabinets, enclosures or consoles as well as on swivel arms.

With the built-in unit, a panel with 22" TFT display and touch screen is permanently connected with the computing unit. The 22" TFT display supports a resolution of 1920 × 1080 pixels. An additional USB 3.0 port for connection of external I/O devices is available on the panel front on the left below the display.

Using a touch pen as an input aid protects the touch screen and makes it easy to achieve pin-point accuracy when operating small input boxes or buttons – especially when working with gloves.



Touch pen

Diagnostics

- Integrated diagnostic displays (4 dual-color LEDs for status display of the operating state)
- Monitoring and diagnostics functions available in combination with the SIMATIC IPC DiagMonitor diagnostics software for:
  - Temperatures
  - Backup battery voltage
  - HDD/SSD status (S.M.A.R.T.)
  - System status (Watchdog)
  - Fan speed
  - Operating hours counter

Pre-installed software

The following software is pre-installed on the SIMATIC PCS 7 BOX OS Client IPC627D / IPC677D on delivery:

- Windows 10 IoT Enterprise 2015 LTSB 64-bit operating system, multi-language (English, German, French, Italian, Spanish, Chinese)
- SIMATIC PCS 7 OS Software Client
- SIMATIC IPC DiagMonitor diagnostics software

Note

The license for the SIMATIC PCS 7 OS software client for the SIMATIC PCS 7 BOX OS Clients is no longer included in the scope of delivery. As with the SIMATIC PCS 7 Industrial Workstations in rack version, it must be purchased separately.

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Technical specifications

	Standard design (OS Client IPC627D)	Panel front design (OS Client IPC677D)
Design and equipment features		
Design	Rack-mountable device with sturdy metal enclosure, suitable for wall and portrait mounting	Rack-mounted device with rugged metal enclosure and Panel Front, suitable for mounting in control cabinets, enclosures, consoles and on swivel arms; max. mounting angle ±20° from the vertical
Degree of protection	IP20	Computer unit and rear of panel IP20; panel front: IP65
Processor (alternatively)	• 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 i3-4330TE, 2 cores, 4 threads, 2.4 GHz, GT2, 4 MB cache, VT-x	
Chipset	Intel C226 (DH82C226 PCH)	
Main memory		
• Type	DDR3-1600 SDRAM (PC3-12800) DIMM	
• Maximum configuration	16 GB DDR3 SDRAM (2 sockets)	
• Standard configuration	8 GB DDR3 SDRAM	
Graphics		
• Graphic controller	Onboard Intel graphics controller HD Graphics P4600; 2-D and 3-D engine integrated in processor	
• Graphics memory	Dynamic Video Memory (uses up to 512 MB RAM)	
• Resolutions, frequencies, colors of the onboard graphics		
- DVI	1920 × 1200 at 60 Hz, 24-bit color depth	
- Display port	3840 × 2160 at 130 Hz, 30-bit color depth	
• Color display (panel front)	–	22" TFT display with touch screen
- Resolution (W × H in pixels)	–	1920 × 1080
- Luminance (cd/m²), up to	–	400
- Horizontal/vertical viewing angle	–	170°/170°
- MTBF LED backlight	–	80 000 h
Free expansion slots	1 × PCI (185 mm) 1 × PCI Express x16 (185 mm)	
Drives		
• Hard disk (HDD)/Solid State Drive (SSD)	1 × HDD 3.5" SATA, 250 GB or 1 × SSD 2.5" SATA, 240 GB	
• Optical drive	1 × Slimline SATA DVD±R/RW	
Interfaces		
Ethernet	2 × 10/100/1000 Mbps (RJ45), Intel WGI217LM (AMT interface) and Intel WGI210IT	
USB		
• External	4 × USB 3.0 (max. 2 high-current ports at the same time)	4 × USB 3.0 (max. 2 high-current ports at the same time) 1 x USB 3.0 high-current port on the front panel
• Internal	1 × USB 3.0 high-current for internal USB flash drive/dongle	
Serial	1 × COM1 (V.24), 9-pin sub-D connector	
Parallel	–	
Graphics connection	• 1 × DVI-I (DVI/VGA combined) • 1 × DisplayPort	
Keyboard, mouse	Connectable via USB (keyboard and mouse not included in scope of delivery)	
Operating system and diagnostics software		
Operating system	Windows 10 IoT Enterprise 2015 LTSB 64-bit operating system, multi-language (English, German, French, Italian, Spanish, Chinese), pre-installed on hard disk and enclosed on Restore DVD set, no activation required	
System-tested SIMATIC industrial software	SIMATIC IPC DiagMonitor	
Monitoring and diagnostics functions		
Display elements	4 × dual-color LEDs for status display of the operating state: PC ON/WD (watchdog), RUN/STOP, ERROR, MAINT	
SIMATIC IPC DiagMonitor diagnostics software		
• Temperature (overtemperature/undertemperature)	• Processor temperature • Temperature close to the RAM chips • Temperature of the basic module	
• Battery voltage	Backup battery	
• Storage media	Monitoring of HDD/SSD with S.M.A.R.T. functionality	
• Watchdog	System monitoring; possible reactions: Hardware or software reset	
• Fans	Monitoring of the fan speed	
• Operating hours counter	Information about the total runtime	

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3

Technical specifications (continued)

	Standard design (OS Client IPC627D)	Panel front design (OS Client IPC677D)
Safety		
Protection class	Protection class I compliant with IEC 61140	
Safety directives	EN 60950-1; UL60950-1 CAN/CSA C22.2 No 60950-1-07 UL508 CSA C22.2 No 142	EN 60950-1 UL508 CSA C22.2 No 142
Noise emission		
Operation	< 55 dB(A) according to EN ISO 7779	
Electromagnetic compatibility (EMC)		
Interference emission	EN 61000-6-3 EN 61000-6-4 CISPR22 Class B FCC Class A	EN 61000-6-3 EN 61000-6-4 CISPR22 Class A 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 ... 1 000 MHz and 1.4 ... 2 GHz, 80 % AM (to IEC 61000-4-3) 3 V/m, 2 ... 2.7 GHz, 80 % AM (to IEC 61000-4-3) 10 V/m, 10 kHz ... 80 MHz, 80 % AM (to IEC 61000-4-6)	
Immunity to magnetic fields	100 A/m, 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	
• Operation	• +5 ... +45 °C (with DVD writer, only up to +40 °C) • +5 ... +50 °C (power USB and PCI/PCIe expansions max. 20 W) • +5 ... +55 °C (power USB and PCI/PCIe expansions max. 10 W)	• Horizontal, vertical installation: +5 ... +45 °C (with DVD writer, only up to +40 °C) • Horizontal, angled installation: +5 ... +40 °C (power USB and PCI/PCIe expansions max. 30 W; no DVD operation) • Vertical, vertical installation: +5 ... +45 °C (power USB and PCI/PCIe expansions max. 30 W; no DVD operation)
• Storage/transport	-20 … +60 °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)	
Atmospheric pressure		
• Operation	1 080 to 795 hPa (corresponds to an altitude of -1 000 to 2 000 m)	
• Storage/transport	1 080 to 660 hPa (corresponds to an altitude of -1 000 to 3 500 m)	
Mechanical environmental conditions		
Vibrations	Tested according to IEC 60068-2-6	
• Operation	10 … 58 Hz: 0.075 mm, 58 to 500 Hz: 9.8 m/s^2	
- Limitation with DVD writer	10 … 58 Hz: 0.019 mm, 58 to 500 Hz: 2.5 m/s^2	
- Limitation with portrait assembly	10 … 58 Hz: 0.0375 mm, 58 to 500 Hz: 4.9 m/s^2	–
• Storage/transport	5 … 9 Hz: 3.5 mm, 9 to 500 Hz: 9.8 m/s^2	
Shock resistance	Tested according to IEC 60068-2-27, IEC 60068-2-29	
• Operation	50 m/s^2, 30 ms	
- Limitation with portrait assembly	25 m/s^2, 30 ms	–
• Storage/transport	250 m/s^2, 6 ms	

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Technical specifications (continued)

	Standard design (OS Client IPC627D)	Panel front design (OS Client IPC677D)
Standards, specifications		
CE - Residential, business and commercial operations, and small businesses		
• Interference emission	EN 61000-6-3: 2007 +A1:2011	–
• Noise immunity	EN 61000-6-1: 2007	–
CE industrial environment		
• Interference emission	EN 61000-6-4: 2007 +A1:2011	EN 61000-6-4: 2007
• Noise immunity	EN 61000-6-2: 2005	EN 61000-6-2: 2005
Certificates and approvals		
Quality assurance system according to ISO 9001:2008	According to DQS certificate 001323 QM08	
cULus	Underwriters Laboratories (UL) complying with standard UL 60950-1, CAN/CSA-C22.2 No. 60950-1 (I.T.E), UL 508 and CAN/CSA-C22.2 No. 142 (IND.CONT.EQ)	Underwriters Laboratories (UL) complying with standard UL 508 and CAN/CSA-C22.2 No. 142 (IND.CONT.EQ)
FCC USA	FCC Rules, Part 15, Class A	
Canada	ICES-003, Class B; NMB-003, Class B	ICES-003, Class A; NMB-003, Class A
Australia/New Zealand	EN 61000-6-3:2007	EN 61000-6-4:2007
Korea	Korean Certification (KC Mark)	
Power supply		
Supply voltage (AC)	Nominal 100 … 240 V AC (-15 %/+10 %), wide range	
Supply voltage (DC)	Nominal 24 V DC (-20 %/+20 %), SELV, isolated	
AC input current	Continuous current up to 1.7 A (up to 50 A for 1 ms at startup)	
DC input current	Continuous current up to 7.1 A (up to 14 A for 30 ms at startup)	
Brief voltage interruption according to NAMUR	Max. 20 ms (at 0.85 rated voltage) (max. 10 events per hour; recovery time of at least 1 s)	
Max. power consumption		
• Active power (AC/DC)	176 W	
• Apparent power (AC)	190 VA	
Max. current output (+12 V DC)	12.5 A	
Dimensions and weights		
External dimensions including DVD writer (W × H × D in mm)	312 × 267 × 105	560 × 380 × 139 (148 incl. front USB port)
Mounting cutout (W × H in mm)	–	541 × 362
Mounting depth including DVD writer (D in mm)	–	133
Weight	Approx. 7 kg	Approx. 16 kg
System software and licenses (included in product package)		
Restore DVD sets/preinstallation		
• Restore DVD set 1	Windows 10 IoT Enterprise 2015 LTSB 64-bit operating system with default settings for optimal SIMATIC PCS 7 operation	
• Restore DVD set 2	Windows 10 IoT Enterprise 2015 LTSB 64-bit operating system plus software installation for SIMATIC PCS 7 BOX operation (corresponds to preinstallation)	

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3

Ordering data

SIMATIC PCS 7 BOX OS Client IPC627D/IPC677D

	Article No.								
SIMATIC PCS 7 BOX OS Client System	**6ES7650-**								
Type: SIMATIC IPC627D, equipped with 2 × 10/100/1000 Mbps Ethernet RJ45; graphics onboard, 4 × USB 3.0; 1 × serial (COM1); 1 × PCI, 1 × PCIe (X16)	**4**	**B**	■	**8**	**2**	**-**	**3**	**V**	■	■
SIMATIC PCS 7 software V9.0+SP1 pre-installed										
Windows 10 IoT Enterprise 2015 LTSB 64-bit operating system, MUI (English, German, French, Italian, Spanish, Chinese)										
Without additional communications interfaces										
Processor and storage media										
• Intel Core i3-4330TE processor (2 cores/ 4 threads, 2.4 GHz, 4 MB cache, VT-x); main memory 8 GB, DDR3 1600, DIMM; 250 GB SATA; DVD±R/RW			**A**							
• Xeon E3-1268Lv3 processor (4 cores/8 threads, 2.3 (3.3) GHz, 8 MB cache, VT-d, AMT); main memory 8 GB DDR3 1600, DIMM; 240 GB SSD; DVD±R/RW			**B**							
Panel Front										
• without panel								**A**		
• 22" Single Touch, 1920 × 1080 pixels								**B**		
Power supply, country-specific power supply cord										
• 110/230 V AC industrial power supply to NAMUR;										
- Power supply cord for Europe										**0**
- Power supply cord for the UK										**1**
- Power supply cord for Switzerland										**2**
- Power supply cord for the USA										**3**
- Power supply cord for Italy										**4**
- Power supply cord for China										**5**
• 24 V DC industrial power supply										**6**

SIMATIC PCS 7 BOX IPC627D/IPC677D as a spare part

The configuration table below for replacement part systems is not only intended for the SIMATIC PCS 7 BOX OS Client IPC627D/IPC677D, but for all system variants of the SIMATIC PCS 7 BOX IPC627D/IPC677D.

	Article No.									
SIMATIC PCS 7 BOX System as a spare part	**6ES7650-**									
Type: SIMATIC IPC627D without pre-installation, without SIMATIC PCS 7 restore DVDs, equipped with 2 × 10/100/1000 Mbps Ethernet RJ45; graphics onboard, 4 × USB 3.0; 1 × serial (COM1); 1 × PCI, 1 × PCIe (X16)	**4**	**B**	■	■	■	**-**	**8**	**X**	■	■
Processor and storage media										
• Intel Core i3-4330TE processor (2 cores/ 4 threads, 2.4 GHz, 4 MB cache, VT-x); main memory 8 GB, DDR3 1600, DIMM; 250 GB SATA; DVD±R/RW		**A**								
• Xeon E3-1268Lv3 processor (4 cores/8 threads, 2.3 (3.3) GHz, 8 MB cache, VT-d, AMT); main memory 8 GB DDR3 1600, DIMM; 240 GB SSD; DVD±R/RW		**B**								
• Xeon E3-1268Lv3 processor (4 cores/8 threads, 2.3 (3.3) GHz, 8 MB cache, VT-d, AMT); main memory 8 GB DDR3 1600, DIMM, ECC; RAID1, 2 × 320 GB SATA (2.5"); DVD±R/RW		**C**								
Communication interfaces										
• PROFIBUS onboard (CP 5622 compatible)				**0**						
• PROFINET onboard (CP 1616 compatible)				**1**						
• Without additional communication modules				**8**						
Operating system										
• Windows 7 Ultimate 32-bit, MUI (English, German, French, Italian, Spanish, Chinese)					**0**					
• Windows 7 Ultimate 64-bit, MUI (English, German, French, Italian, Spanish, Chinese)					**1**					
• Windows 10 IoT Enterprise 2015 LTSB 64-bit, MUI (English, German, French, Italian, Spanish, Chinese)					**2**					
• Without operating system					**8**					
Panel Front										
• without panel									**A**	
• 22" Single Touch, 1920 × 1080 pixels									**B**	
Power supply, country-specific power supply cord										
• 110/230 V AC industrial power supply to NAMUR,										
- Power supply cord for Europe										**0**
- Power supply cord for the UK										**1**
- Power supply cord for Switzerland										**2**
- Power supply cord for the USA										**3**
- Power supply cord for Italy										**4**
- Power supply cord for China										**5**
• 24 V DC industrial power supply										**6**

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Ordering data (continued)

Additional and expansion components

USB keyboard TKL-105 Color: black	
• Keyboard layout, German	**6AV6881-0AU14-0AA0**
• Keyboard layout, US-International	**6AV6881-0AU14-1AA0**
SIMATIC HMI USB mouse Optical mouse with scroll wheel and USB connection, color anthracite	**6AV2181-8AT00-0AX0**
Touch pen, thick, resistive technology For resistive touch screen, optimized for operation with gloves, including screw-on wall-mounting bracket	**6AV7672-1JB00-0AA0**
Memory expansion	
• 2 GB DDR3 1600 SDRAM, DIMM	**6ES7648-2AJ50-0MA0**
• 4 GB DDR3 1600 SDRAM, DIMM	**6ES7648-2AJ60-0MA0**
• 8 GB DDR3 1600 SDRAM, DIMM	**6ES7648-2AJ70-0MA0**
• 8 GB DDR3 1600 SDRAM, DIMM, ECC	**6ES7648-2AJ70-1MA0**
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**
SIMATIC IPC power supply cord For Box PC and Panel PC, 230 V AC, angled, 3 m	
• For Germany, France, Spain, the Netherlands, Belgium, Sweden, Austria, Finland	**6ES7900-1AA00-0XA0**
• For the UK	**6ES7900-1BA00-0XA0**
• For Switzerland	**6ES7900-1CA00-0XA0**
• For the USA	**6ES7900-1DA00-0XA0**
• For Italy	**6ES7900-1EA00-0XA0**
• For China	**6ES7900-1FA00-0XA0**

Accessories

Portrait mounting kit	
• Kit 1: Interfaces to the front	**6ES7648-1AA10-1YB0**
• Kit 2: Interfaces point up/down	**6ES7648-1AA10-1YA0**

Accessories

Portrait installation kit

As an alternative to installation with mounting brackets, the portrait assembly kit allows for space-saving installation of the SIMATIC PCS 7 BOX OS Client (standard design without Panel Front). The portrait assembly kit is available in two versions:

- Kit 1: Portrait assembly with interfaces to the front
- Kit 2: Portrait assembly with interfaces on top or bottom

Together with the kit, the SIMATIC PCS 7 BOX OS Client occupies a mounting depth of 365 mm (Kit 1) or 279 mm (Kit 2) in the standard design. The limitations associated with portrait assembly regarding vibration and shock resistance are relatively small.

Since all interfaces are accessible from the front when using Kit 1, this type of assembly is particularly suitable for commissioning and servicing.

Please observe the information on operation planning and device installation in the manual of the SIMATIC IPC627D in conjunction with the use of portrait assembly kits.

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Overview



SIMATIC IPC427E and SIMATIC IPC477E family

Clients based on the rugged SIMATIC Microbox PC can be used within the SIMATIC PCS 7 process control system in the operator system and in SIMATIC BATCH. With their compact design, they are a space-saving alternative to clients based on a SIMATIC BOX PC or SIMATIC Rack PC for these applications. However, the numbers of expansion options and interfaces are comparatively lower.

Two designs are available:

- SIMATIC PCS 7 OS client IPC427E
  computing unit (without monitor) in compact metal enclosure, suitable for mounting rail and wall mounting, optional installation with portrait mounting kit
- SIMATIC PCS 7 OS client IC477E
  built-in unit, consisting of 22" TFT Touch Panel with integrated computing unit, suitable for installation in mounting cutouts, for example in consoles or cabinets

Both designs are available with hard disk as well as solid state drive. Due to their exceptional physical properties, both versions are suitable for maintenance-free 24/7 operation without the support of a fan.

For the SIMATIC PCS 7 OS client IPC427E, visualization of a project/subproject can be distributed to two process monitors connected to the onboard interfaces in multi-monitor mode. For the SIMATIC PCS 7 OS client IPC477E, process control is primarily via the integrated 22" display.

Technical specifications

Comparison of SIMATIC PCS 7 OS Clients IPC427D and IPC477D

SIMATIC PCS 7 OS clients based on the Microbox		
Types	**SIMATIC PCS 7 OS client IPC427E**	**SIMATIC PCS 7 OS client IPC477E**
Design and equipment features		
Design	• Compact Microbox PC without panel • DIN rail or wall mounting; horizontal (preferred) or vertical • Portrait mounting; vertical	• Compact Panel PC, consisting of 22" TFT Touch Panel with integrated computing unit • Built-in unit for installation in mounting cutouts, for example in consoles or cabinets; in landscape format (vertical or max. ± 45° vertical incline) • Fastening with mounting clips or mounting brackets
Degree of protection in accordance with IEC 60529	IP20	IP65 front; IP20 rear (enclosure)
CPU	Intel Core i5-6442EQ, 4C/4T, 1.9 (2.7) GHz, 6 MB cache, iAMT	Intel Core i5-6442EQ, 4C/4T, 1.9 (2.7) GHz, 6 MB cache, iAMT
Main memory	4 GB DDR4 SO-DIMM max. 16 GB	4 GB DDR4 SO-DIMM max. 16 GB
Graphic controller	Intel HD graphics controller	Intel HD graphics controller
Storage media, alternative		
• Hard disk	2.5" SATA-HDD 320 GB	2.5" SATA-HDD 320 GB
• Solid State Drive	2.5" SATA-SSD 240 GB	2.5" SATA-SSD 240 GB
Storage media, additive		
• CD-ROM/DVD-RW/diskette	Connectable via USB (not included in scope of delivery)	Connectable via USB (not included in scope of delivery)
Interfaces		
• Ethernet	3 Ethernet ports (RJ45); 10/100/1000 Mbps, isolated, with teaming capability	3 Ethernet ports (RJ45); 10/100/1000 Mbps, isolated, with teaming capability
• USB	4 high-speed USB 3.0 ports	4 high-speed USB 3.0 ports
• Graphics connection	2 × DisplayPort	2 × DisplayPort
• Keyboard, mouse	Connectable via USB (keyboard and mouse not included in scope of delivery)	Connectable via USB (keyboard and mouse not included in scope of delivery)
Monitoring functions		
• Temperature monitoring	Yes	–
• Watchdog	Yes	Yes
• Status LEDs	Yes	–
• Fan	No	–
Monitoring function via the network	Optional	–

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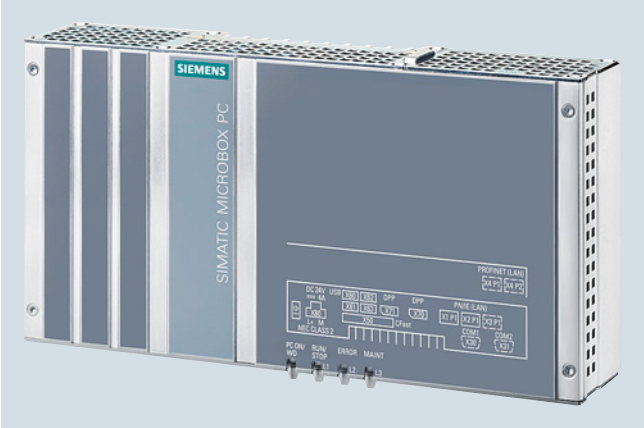
Technical specifications (continued)

SIMATIC PCS 7 OS clients based on the Microbox		
Types	**SIMATIC PCS 7 OS client IPC427E**	**SIMATIC PCS 7 OS client IPC477E**
Operating system, basic software		
Operating system	Windows 10 Enterprise 2015 LTSB, 64-bit	Windows 10 Enterprise 2015 LTSB, 64-bit
System-tested SIMATIC industrial software	SIMATIC IPC DiagMonitor integrated in pre-installation	SIMATIC IPC DiagMonitor integrated in pre-installation
Electromagnetic compatibility (EMC)		
Interference emission over mains/AC power supply	EN 61000-6-3, EN 61000-6-4, CISPR 22 class B, FCC class A	EN 61000-6-3, EN 61000-6-4, CISPR 22 class B, FCC class A
Immunity to conducted interference on the supply cables	±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)	±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)
Noise immunity on signal cables	±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)	±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 in accordance with IEC 61000-4-2	±6 kV contact discharge ±8 kV air discharge	± 6 kV contact discharge ±8 kV air discharge
Immunity to radio frequency interference	10 V/m for 80 to 1 000 MHz and 1.4 to 2 GHz, 80% AM in accordance with IEC 61000-4-3 3 V/m for 2 to 2.7 GHz, 80% AM in accordance with IEC 61000-4-3 10 V for 10 kHz to 80 MHz, 80% AM in accordance with IEC 61000-4-6	10 V/m for 80 to 1 000 MHz and 1.4 to 2 GHz, 80% AM in accordance with IEC 61000-4-3 3 V/m for 2 to 2.7 GHz, 80% AM in accordance with IEC 61000-4-3 10 V for 10 kHz to 80 MHz, 80% AM in accordance with IEC 61000-4-6
Immunity to magnetic fields at 50 Hz	100 A/m in accordance with IEC 61000-4-8	100 A/m in accordance with IEC 61000-4-8
Climatic conditions		
Ambient temperature in operation	0 to +50 °C	0 to +45 °C
Relative humidity • Operation • Storage	Tested according to IEC 60068-2-78, IEC 60068-2-30 5 ... 80 % at 25 °C (no condensation) 5 ... 95 % at 25 °C (no condensation)	Tested according to IEC 60068-2-78, IEC 60068-2-30 5 to 80% at 25 °C (no condensation)
Mechanical environmental conditions		
Vibration load • Operation	Tested according to IEC 60068-2-6 10 … 58 Hz: 0.075 mm 58 to 200 Hz: 9.8 m/s² (1 g)	Tested according to IEC 60068-2-6 5 … 9 Hz: 3.5 mm, 9 to 500 Hz: 9.8 m/s² (with SSD); 10 to 58 Hz 0.0375 mm; 58 to 200 Hz: 4.9 m/s² (hard drisk)
Shock load • Operation	Tested according to IEC 60068-2-29 50 m/s² (5 g), 30 ms, 100 shocks	Tested according to IEC 60068-2-27 50 m/s², 30 ms (with hard disk) 150 m/s², 11 ms (without hard disk)
Standards, approvals and certificates		
CE mark	Yes	Yes
CSA approval		Yes
UL approval • UL 508	Yes Yes	Yes Yes
cUlus	Yes	Yes
RCM (formerly C-TICK)	Yes	Yes
KC certification	Yes	Yes
FCC	Yes	Yes
EMC • EN 61000-6-2	CE, EN 55022A, EN 61000-6-4, EN 61000-6-2 Yes	CE, EN 61000-6-4; CISPR 22:2004 class A; FCC class A
Dimensions		
Width × height × depth (in mm)	262 × 139.7 × 55.5	542 × 362 × 83 (central configuration, no optical drive)
Mounting cutout/device depth (W × H × D in mm)	--	396 × 291 × 76
Operator panel (width × height in mm)	--	560 × 380

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OS Client IPC427E

Overview



SIMATIC PCS 7 OS Client IPC427E

The SIMATIC PCS 7 OS Client IPC427E is available in two versions.

- SIMATIC PCS 7 OS Client IPC427E (HDD) with a hard disk, 2.5" SATA-HDD, 320 GB
- SIMATIC PCS 7 OS Client IPC427E (SSD) with a solid state drive, 2.5" SATA-SSD, 240 GB

Design

Both versions of the SIMATIC PCS 7 OS Client IPC427E are designed for 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 IPC427E (HDD/SSD) and the flexible mounting options (standard mounting rail, wall or portrait mounting) either horizontally or vertically facilitate space-saving installation.

Expansions/interfaces

The SIMATIC PCS 7 OS Client IPC427E (HDD/SSD) has:

- 4 high-speed USB 3.0 ports
- 2 DisplayPorts (DVI with DPP-to-DVI adapter); can be used for multi-monitor mode with two monitors
- 3 Gigabit Ethernet ports (IE/PN)

The integrated Ethernet ports are suitable for connection to a redundant terminal bus over IE-RNA (for details on implementation, refer to the function manual "High-availability process control systems", "Redundant, high availability terminal bus").

The SIMATIC PCS 7 OS Client IPC427E (HDD/SSD) is supplied without input/output devices. In addition to mouse and keyboard, two other input/output devices can be externally connected via the provided USB ports, e.g. an optical drive (DVD-ROM/DVD±RW) or smart card reader.

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 IPC427E (HDD/SSD) on delivery:

- Windows 10 Enterprise 2015 LTSB, 64-bit operating system
- SIMATIC PCS 7 OS Software Client
- SIMATIC IPC DiagMonitor diagnostics software

Technical specifications

For detailed technical specifications for the SIMATIC PCS 7 OS Client IPC427E, see "Comparison of SIMATIC PCS 7 OS Clients IPC427E and IPC477E" in the catalog section "SIMATIC Microbox PC". see page 3/44

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Ordering data

	Article No.
SIMATIC PCS 7 OS Client IPC427E based on SIMATIC IPC427E SIMATIC IPC427E for use as SIMATIC PCS 7 OS Client/Batch Client Intel Core i5-6442EQ (up to 2.7 GHz, 6 MB cache); 4 GB RAM; 3 × Gigabit Ethernet (IE/PN); 4 × high-speed USB 3.0; 24 V DC power supply SIMATIC IPC DiagMonitor diagnostics software and Restore DVD sets; SIMATIC PCS 7 OS Software Client V9.0 pre-installed Note: Product package without optical drive, mouse, keyboard or monitor Windows 10 Enterprise 2015 LTSB, 64-bit operating system	
• **SIMATIC PCS 7 OS Client IPC427E (HDD)** version with 320 GB hard disk, HDD SATA	**6ES7650-0VG58-0YX0**
• **SIMATIC PCS 7 OS Client IPC427E (SSD)** version with 240 GB solid state drive, SSD SATA	**6ES7650-0VG58-0YX1**

Additional and expansion components

SIMATIC IPC, graphics adapter cable, DVI-I to VGA Length 250 mm	**6ES7648-3AB00-0XA0**
SIMATIC IPC, graphics adapter DPP to DVI Converts DisplayPort to DVI-D	**6ES7648-3AF00-0XA0**
Keyboard/mouse	
USB keyboard TKL-105 Color: black	
• Keyboard layout, German	**6AV6881-0AU14-0AA0**
• Keyboard layout, US-International	**6AV6881-0AU14-1AA0**
SIMATIC HMI USB mouse Optical mouse with scroll wheel and USB connection, color anthracite	**6AV2181-8AT00-0AX0**

Accessories

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

Accessories

Portrait assembly kit

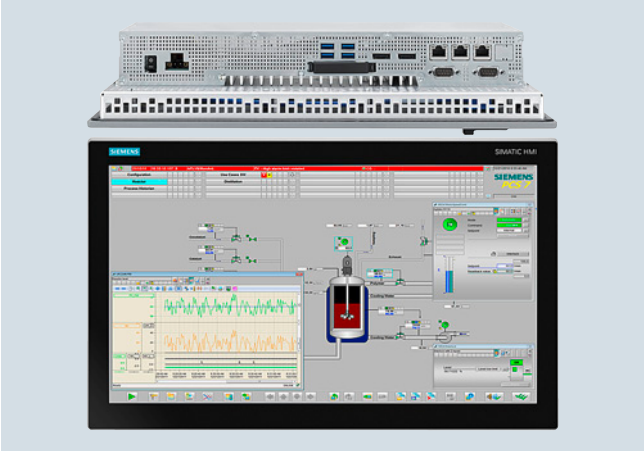
The portrait assembly kit allows space-saving installation of the SIMATIC Microbox PC in the control cabinet. The technical specifications of the SIMATIC Microbox PC correspond in this design form to those with a vertical DIN rail assembly.

Portrait mounting reduces the mounting area required (W × H in mm) from 262 × 133 to 61.5 × 315. Together with the kit, the SIMATIC Microbox PC occupies an installation 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 note the information on operation planning and device installation in the "SIMATIC IPC427E industrial PC" manual.

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Overview



SIMATIC PCS 7 OS client IPC477E, from above and from the front

The SIMATIC PCS 7 OS client IPC477E consists of a 22" TFT Touch Panel with integrated computing unit. It is available in two versions.

- SIMATIC PCS 7 OS client IPC477E (HDD) with a hard disk, 2.5" SATA HDD, 320 GB
- SIMATIC PCS 7 OS client IPC477E (SSD) with a solid state drive, 2.5" SATA SSD, 240 GB

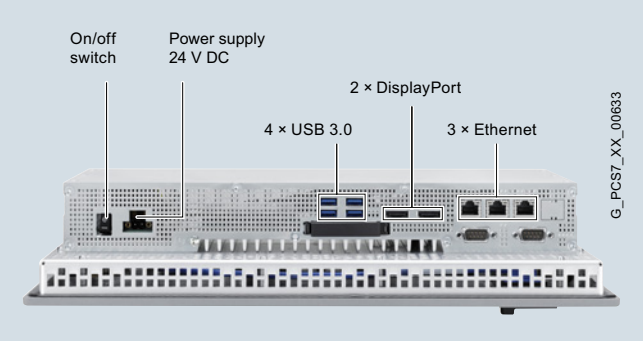
Design

The design of the SIMATIC PCS 7 OS client IPC477E has been optimized for installation in the mounting cutouts of cabinets, enclosures and consoles.

Both versions of the SIMATIC PCS 7 OS client IPC477E are suitable for maintenance-free 24/7 operation without the support of a fan.

The more rugged SIMATIC PCS 7 OS client IPC477E with SSD can bear greater mechanical loads. With vertical installation in landscape format, the SIMATIC PCS 7 OS Client IPC477E is approved for operating temperatures of 0 to +45 °C.

Using a touch pen as an input aid protects the touch screen and makes it easy to achieve pin-point accuracy when operating small input boxes or buttons – especially when working with gloves.



IPC477E, 22-inch, for SIMATIC PCS 7, with connections

Expansions/interfaces

The SIMATIC PCS 7 OS client IPC477E (HDD/SSD) has:

- 4 high-speed USB 3.0 ports at the back
- 1 USB port on the front
- 2 DisplayPort interfaces
- 3 Gigabit Ethernet ports (IE/PN)

The integrated Ethernet ports are suitable for connection to a redundant terminal bus (for details on implementation, refer to the function manual "High-availability process control systems", "Redundant, high availability terminal bus").

The SIMATIC PCS 7 OS client IPC477E (HDD/SSD) is supplied without input/output devices. In addition to mouse and keyboard, two other input/output devices can be externally connected via the provided USB ports, e.g. an optical drive (DVD-ROM/DVD±RW) or smart card reader.

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

Pre-installed software

The following software is pre-installed on the SIMATIC PCS 7 OS client IPC477E (HDD/SSD) on delivery:

- Windows 10 Enterprise 2015 LTSB, 64-bit operating system
- SIMATIC PCS 7 OS software client
- SIMATIC IPC DiagMonitor diagnostics software

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Technical specifications

For detailed technical specifications for the SIMATIC PCS 7 OS client IPC477E, see "Comparison of SIMATIC PCS 7 OS clients IPC427E and IPC477E" in the catalog section "SIMATIC Microbox PC". see page 3/44

Ordering data

	Article No.
SIMATIC PCS 7 OS client IPC477E based on SIMATIC IPC477E SIMATIC IPC477E for use as SIMATIC PCS 7 OS client/Batch client Intel Core i5-6442EQ (up to 2.7 GHz, 6 MB cache); 4 GB RAM; 3 × Gigabit Ethernet (IE/PN); 4 × high-speed USB 3.0; 1 × USB 2.0; 24 V DC power supply SIMATIC IPC DiagMonitor diagnostics software and Restore DVDs; SIMATIC PCS 7 OS software client V9.0 pre-installed Note: Product package without optical drive, mouse or keyboard Windows 10 Enterprise 2015 LTSB, 64-bit operating system	
• **SIMATIC PCS 7 OS Client IPC477E (HDD)** version with 320 GB hard disk, HDD SATA	**6ES7650-0VG58-1YX0**
• **SIMATIC PCS 7OS Client IPC477E (SSD)** version with 240 GB solid state drive, SSD SATA	**6ES7650-0VG58-1YX1**

Additional and expansion components

USB keyboard TKL-105 Color: black	
• Keyboard layout, German	**6AV6881-0AU14-0AA0**
• Keyboard layout, US-International	**6AV6881-0AU14-1AA0**
SIMATIC HMI USB mouse Optical mouse with scroll wheel and USB connection, color anthracite	**6AV2181-8AT00-0AX0**
Touch pen, thick, resistive technology For resistive touch screen, optimized for operation with gloves, including screw-on wall-mounting bracket	**6AV7672-1JB00-0AA0**

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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 HMI USB mouse is recommended as the input device for the operator-controlled stations of a SIMATIC PCS 7 system.

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.

An example of a keyboard without additional special functions that is suitable for process operation with SIMATIC PCS 7 is the USB keyboard TKL-105.

The USB keyboard TKL-105 is a very rugged keyboard that is suitable even for harsh environments. Thanks to its IP68 degree of protection, the keyboard can even be washed (dishwasher-proof). The new black color fits optimally into all environments. The housing is made of ABS with anti-microbial coating. The long-travel keys ensure excellent tactile feel and fatigue-free typing.

Technical specifications

Mouse	
SIMATIC HMI USB Mouse	
Color	Anthracite
Interfaces	USB
Dimensions (L x W x H) in mm	116 × 67.9 × 42,3
Weight, approx.	131 g
Connecting cable, cable length	1930 mm
Ambient temperature	
• Operation	0 …40 °C
• Storage/transport	-40 … +60 °C
Supply voltage, rated value	5 V DC; via USB
Current consumption	100 mA; USB-compatible
Standards, approvals, certificates	• CE mark; WEEE (European Union) available • KC • cUlus; ICES 003 (Canada) available
Keyboard	
USB keyboard TKL-105	
Layout	Keyboard with long-travel keys, 105 keys
Color	Black
Degree of protection	IP68
Type of connection	USB 2.0 Type A
Dimensions (W × H × D) in mm	459 × 35 × 174
Weight, approx.	0.8 kg
Temperature	
• Operation	0 ... +70 °C
• Storage/transport	-20 ... +60 °C
Approvals	CE, RoHS

Ordering data

	Article No.
SIMATIC HMI USB mouse Optical mouse with scroll wheel and USB connection, color anthracite	**6AV2181-8AT00-0AX0**
USB keyboard TKL-105 Color: black	
• Keyboard layout, German	**6AV6881-0AU14-0AA0**
• Keyboard layout, US-International	**6AV6881-0AU14-1AA0**

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Overview



Touch pen, thick, incl. wall bracket for screw mounting

Touch pens are effective input tools for operating the touch screen, which are especially helpful when working with gloves or under extreme environmental conditions.

You can use the touch pen to operate small buttons and input boxes with pint-point accuracy and also avoid scratches and soiling.

The thick touch pen for resistive touch screens offered here is suitable for all SIMATIC PCS 7 OS clients and SIMATIC PCS 7 compact systems with TFT touch panels:

- PCS 7 OS Client 477D
- PCS 7 OS Client 627D
- SIMATIC PCS 7 BOX in Design Version with Panel Front

Technical specifications

Article number	**6AV7672-1JB00-0AA0** TOUCH PEN, THICK, RESISTIVE TECHNOLOGY
General information	
Product type designation	Touch pen, thick, resistive technology
Frame size/design	
• Standard	Yes; For industrial applications
• Ergonomic	Yes; With holder
Installation type/mounting	
Wall mounting/direct mounting	Yes; Screw-on clamping holder and elastic attachment cord
Standards, approvals, certificates	
RoHS conformity	Yes
Ambient conditions	
Ambient temperature during operation	
• min.	-40 °C; At temperatures below 10 °C and above 30 °C, the use of suitable gloves is recommended.
• max.	80 °C
Relative humidity	
• Operation, max.	90 %

Article number	**6AV7672-1JB00-0AA0** TOUCH PEN, THICK, RESISTIVE TECHNOLOGY
Mechanics/material	
Material	
• Plastic	Yes; Touch pen SIMATIC HMI
• Sheet steel	Yes; Mounting
Screw type	
• Torx	Yes
Dimensions	
Height	155 mm; Length
Thickness	20 mm; Diameter
Scope of supply	
Delivery quantity in pieces	1; Optional for Extension Units of the PRO devices
Other	
Target devices	for resistive touch screens, optimized for operating while wearing gloves

Ordering data

	Article No.
Touch pen, thick, resistive technology For resistive touch screen, optimized for operation with gloves, including screw-on wall-mounting bracket	**6AV7672-1JB00-0AA0**

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Smart Card Reader

Overview



A smart card reader can be used to check operator privileges on a single station or client. The smart card reader works with SIMATIC Logon, the user administration and access control function integrated in SIMATIC PCS 7 (see section "Industrial Security", "SIMATIC Logon"), see page 15/8.

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 chipcard 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 (L × W × D in mm)	80 × 67 × 28
Weight without foot	110 g
Weight with foot	141 g
Ambient conditions 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**

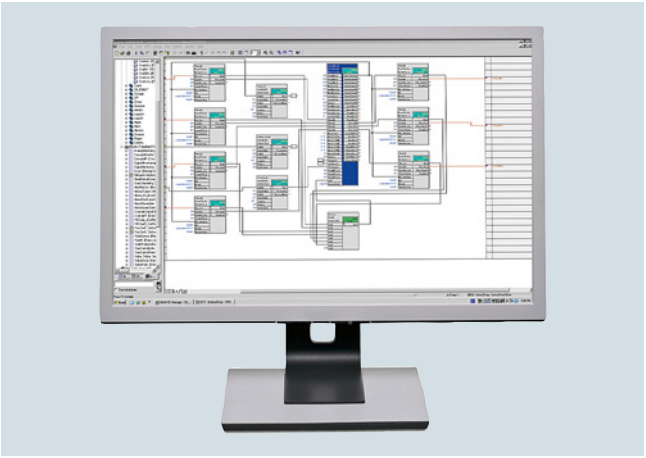
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4/2	**Introduction**
4/3	**ES Software**
4/4	Standard Engineering Software
4/12	SIMATIC PCS 7 Logic Matrix
4/13	SIMATIC Version Cross Manager
4/14	Version Trail
4/15	SIMATIC PCS 7 Plant Automation Accelerator
4/18	Import/Export Assistant
4/19	**Simulation**
4/19	Simulation with S7-PLCSIM

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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 for ES/OS single station**. This is based on a SIMATIC IPC of Rack PC design which is prepared for installation in 19" rack systems. Two versions are available for communication connection to the Industrial Ethernet plant bus:

- Communication over BCE
  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 (no redundancy stations)
- Communication over Industrial Ethernet
  Connection to plant bus with CP 1623/1628 communication module for communication with up to 64 automation systems

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

The Microsoft Windows 10 operating system and the SIMATIC PCS 7 engineering software for AS/OS are preinstalled 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 over 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.

In this architecture, it is sensible to install the project server on a **SIMATIC PCS 7 Industrial Workstation for OS servers.** The Microsoft Windows Server operating system and the SIMATIC PCS 7 OS software server are preinstalled on this (adaptation/expansion of SIMATIC PCS 7 installation required).

Two versions are also available for the communication connection to the Industrial Ethernet plant bus with the SIMATIC PCS 7 Industrial Workstation for OS servers:

- Communication over BCE
  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 (no redundancy stations)
- Communication over Industrial Ethernet
  Connection to plant bus with CP 1623/1628 communication module for communication with up to 64 automation systems

With the SIMATIC PCS 7 Industrial Workstation for ES/OS single stations, 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.

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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 PCS 7 Logic Matrix
- SIMATIC Version Cross Manager
- SIMATIC Version Trail
- SIMATIC PCS 7 Plant Automation Accelerator
- SIMATIC PCS 7 Import/Export Assistant
- SIMATIC PDM Process Device Manager for SIMATIC PCS 7 (see section 7 "Plant device management")
- Engineering Process Safety (see section 14 "Safety Integrated for Process Automation")
- SIMATIC PCS 7 Maintenance Station Engineering (see section 7 "Plant Device Management")
- SIMATIC Route Control Engineering (see section 13 "Route Control")
- SIMATIC PCS 7 TeleControl OS Engineering (see Technology components, "Telecontrol technology" in the ST PCS 7 T catalog)
- SIMATIC PCS 7 PowerControl OS Engineering (see Technology components, "Switchgear automation" in the ST PCS 7 T catalog)
- S7-PLCSIM for the functional testing of CFC/SFC programs

Design

SIMATIC PCS 7 engineering system									
Versions		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									
Industrial Workstation for ES/OS single station	BCE communication[1]	–	–	●	–	●	–	●	–
	IE communication	–	–	–	●	–	●	–	●
Industrial Workstation for OS server	BCE communication[1]	●	–	–	–	–	–	–	–
	IE communication	–	●	–	–	–	–	–	–
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)

- SIMATIC PCS 7 Logic Matrix
- Version Cross Manager
- Version Trail
- SIMATIC PCS 7 Plant Access Accelerator
- 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] Basic Communication Ethernet (BCE) for up to 8 automation systems (no redundant systems)

[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.

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Overview

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

- Automation systems
- Process I/O
- Field devices
- Communication networks
- Operator systems
- Maintenance station
- SIMATIC BATCH
- SIMATIC Route Control
- SIMATIC PCS 7 TeleControl
- SIMATIC PCS 7 PowerControl

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 "Automation systems", "Modular AS 410-5H and AS 410E systems", see page 8/4.
- SIMATIC PCS 7 OS Runtime license for 100, 1 000 or 5 000 POs, see "Operator System", "OS software" under "OS standard software for single station/server/client", see 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 allows a complex project to be divided into multiple subprojects in accordance with technological criteria so that several different teams can 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.

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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 possibilities 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
- 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 CFCs and SFCs 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.

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. The SIMATIC PCS 7 Logic Matrix can be used for fast and easy creation of the interlock logic between various Control Modules/Equipment Modules.

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.

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.

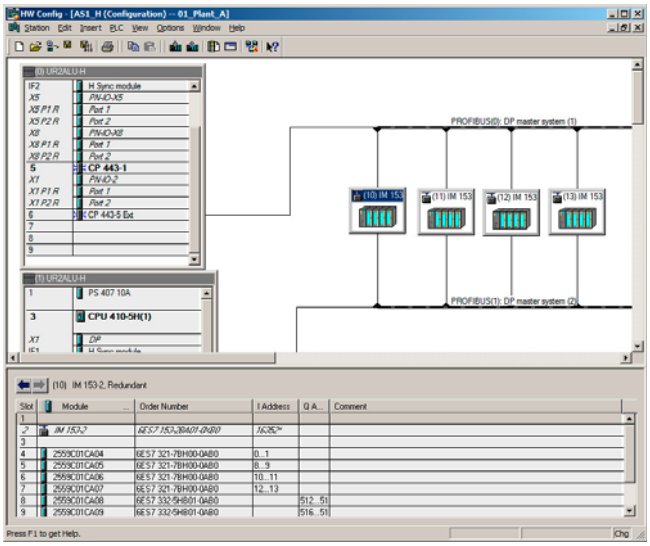
In the case of blocks being executed on the AS 410 automation system, it is even possible to change types during runtime by means of seamless copying (TCiR).

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4

Function (continued)

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

Project views

The various tasks for creating a plant project are supported by the following project views:

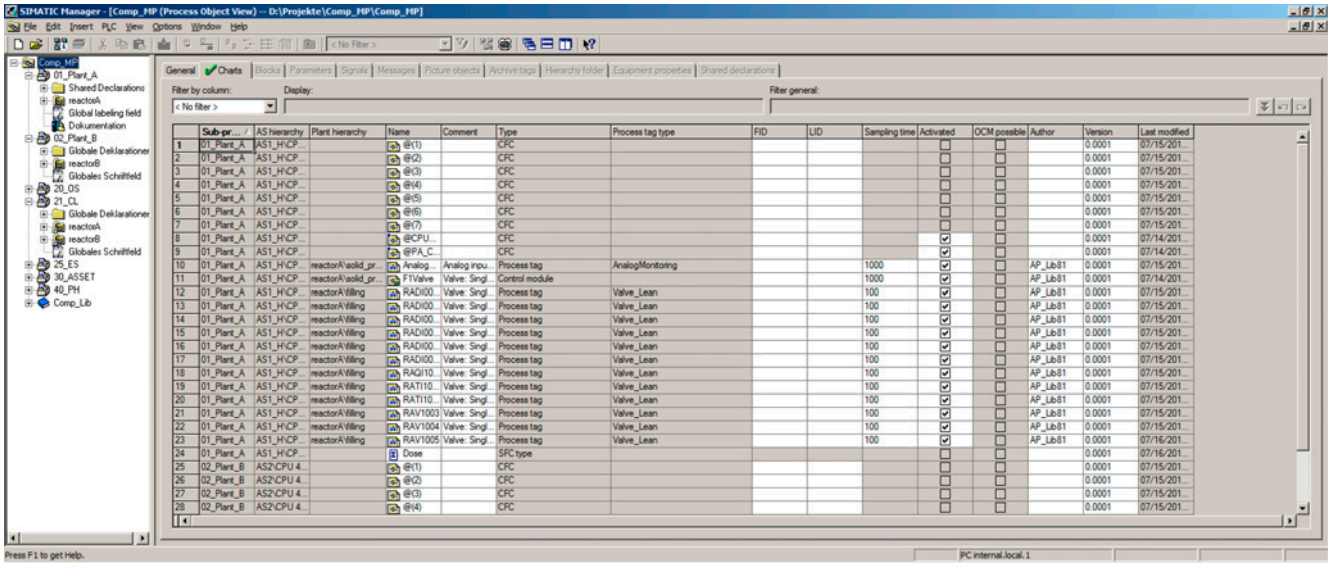
- **Component view (HW-Config)**
  for configuration of hardware such as automation systems, bus components or process I/O
- **Process object view**
  as the central development environment for all aspects of process tags/objects

The process object view supports the work carried out by a process engineer by providing a universal view of the process tag. It shows the plant hierarchy represented in tree form in combination with a tabular view of all aspects of the process tag/object (general, charts, blocks, parameters, signals, messages, picture 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.



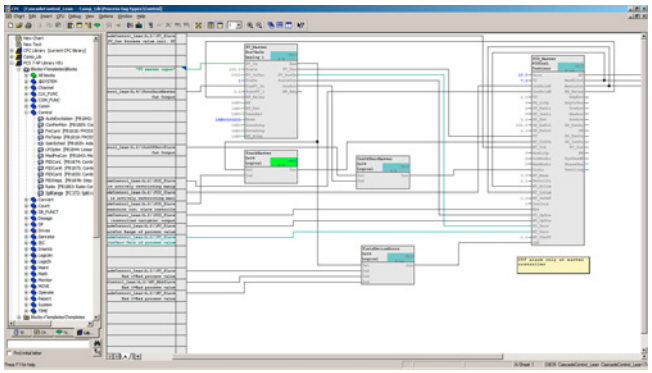
Process tags in the process object view

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Function (continued)

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 beconfigured. 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.
- **Control module type**
  The control module type (CMT) marks a new type of standardized software module that 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: As the function "Control module adjustment" is based on a basic functionality of the Version Cross Manager (VXM), you need a VXM license to use this function, see page 4/13. In the absence of a license, a message appears telling you to install Version Cross Manager. This is not actually necessary, all you need to install is a valid VXM license that will enable the relevant functionality on the engineering station.

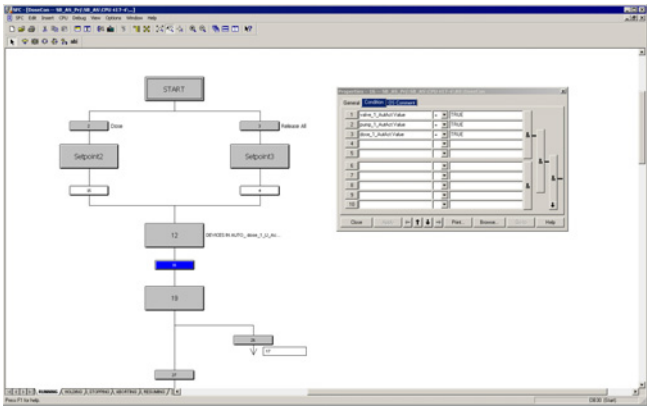
Note:

The CFC is not just a component in the standard engineering software of the SIMATIC PCS 7 process control 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 CFC is a component from catalog ST 70, "SIMATIC Software" (article number of the current SIMATIC CFC V9.0, goods delivery: 6ES7658-1EX58-0YA5; online delivery: 6ES7658-1EX58-0YH5).

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4

Function (continued)



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. An integrated graphical formula editor for arithmetic operations, Boolean algebra and mathematical functions enables calculations within the SFC.

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 process control libraries are integrated in the standard engineering software of SIMATIC PCS 7:

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

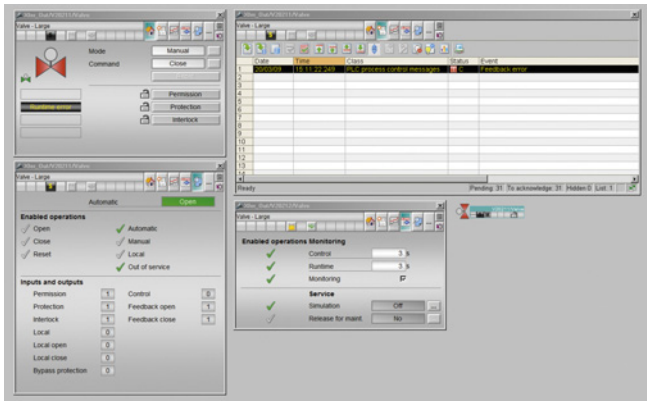
Pre-configured and tested blocks, faceplates and symbols are organized in these libraries and form the basic elements for the graphic configuration of automation solutions.

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.

This is advantageous for adaptation of the user software following a system upgrade so that multiple versions of a library can exist side by side.



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.

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Function (continued)

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
- Browser for the tag selection by status
- Customized online trends for display
- Reduced operator workload and faster operator control with tag groups assembled online for standard situations
  Note:
  SIMATIC PCS 7 Advanced Process Graphics from catalog ST PCS 7 T (SIMATIC PCS 7 technology components) is required.

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 in APL design.

The Industry Library contains blocks for:

- Building automation (heating, ventilation, air conditioning)
- Operator control and monitoring using SIMATIC HMI Comfort Panels
- Integration of SIMATIC S7 Package Units and RTUs based on S7-300
- Interfacing of external Advanced Process Control systems
- Hierarchical multi-control room operation
- 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)
- Detection of steady states of a dynamic process or steady state of a signal.

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.

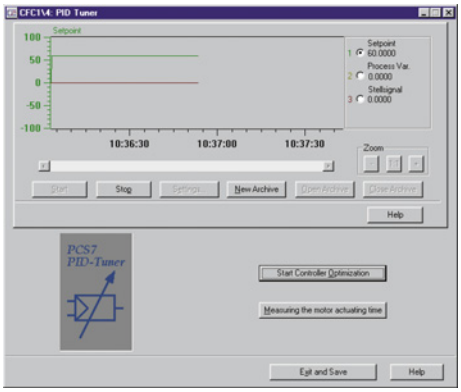
Lead-lag/feed-forward control

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.

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4

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.

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Ordering data	Article No.
Standard engineering software	
Runs with the following operating systems (see SIMATIC PCS 7 Readme[1] for latest information):	
• Windows 7 Ultimate 64-bit	
• Windows 10 Enterprise 2015 LTSB 64-bit	
• Windows Server 2012 R2 Standard Edition 64-bit	
• Windows Server 2016 Standard Edition 64-bit	
Software for a classic, dedicated engineering station without quantity limitation (not suitable for productive operation as an operator station)	
SIMATIC PCS 7 AS/OS Engineering Software V9.0 Unlimited POs, activated for 2-hour OS test mode	
5 languages (English, German, French, Italian, Spanish), software class A, 'floating license for 1 user	
With SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license, bundled with 1 × SIMATIC PCS 7 Software Media Package per order item	**6ES7658-5AX58-0YA5**
• Online delivery License key download and online certificate of license, combined with SIMATIC PCS 7 Software Media Package (software download and online certificate of license) Note: Email address required!	**6ES7658-5AX58-0YH5**
SIMATIC PCS 7 AS/OS Engineering Software ASIA V9.0 2 languages (English, Chinese), software class A, floating license for 1 user	
With SIMATIC PCS 7 Software Media Package ASIA	
• Physical delivery ASIA license key on USB hardlock and certificate of license, bundled with 1 × SIMATIC PCS 7 Software Media Package ASIA per order item	**6ES7658-5AX58-0CA5**
SIMATIC PCS 7 AS Engineering Software V9.0 Unlimited POs	
6 languages (English, German, French, Italian, Spanish, Chinese), software class A	
No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	
- Floating license for 1 user	**6ES7658-1AX58-0YB5**
- Rental license for 30 days (time billing independent of use)	**6ES7658-1AX58-0YA6**
- Rental License for 50 hours (time billing dependent on use)	**6ES7658-1AX58-0YB6**
• Online delivery License key download, online certificate of license Note: Email address required!	
- Floating License for 1 user	**6ES7658-1AX58-0YH5**
- Rental license for 30 days (time billing independent of use)	**6ES7658-1AX58-0YH6**

Ordering data	Article No.
Software for a combined engineering/operator station for small applications (suitable for productive operation as an operator station)	
SIMATIC PCS 7 ES single station V9.0 Including 250 AS/OS Runtime POs	
5 languages (English, German, French, Italian, Spanish), software class A, single license for 1 installation	
With SIMATIC PCS 7 Software Media Package	
- Physical delivery License key on USB flash drive, certificate of license, bundled with 1 × SIMATIC PCS 7 Software Media Package per order item	**6ES7651-5AA58-0YA0**
- Online delivery License key download and online certificate of license, combined with SIMATIC PCS 7 Software Media Package (software download and online certificate of license) Note: Email address required!	**6ES7651-5AA58-0YH0**
SIMATIC PCS 7 ES Single Station ASIA V9.0 Incl. 250 AS/OS Runtime POs	
2 languages (English, Chinese), software class A, single license for 1 installation	
With SIMATIC PCS 7 Software Media Package ASIA	
Physical delivery ASIA license key on USB hardlock, certificate of license, bundled with 1 × SIMATIC PCS 7 Software Media Package ASIA per order item	
• ASIA	**6ES7651-5AA58-0CA0**
• SN ASIA (including SOFTNET REDCONNECT)	**6ES7651-5AA58-6CA0**

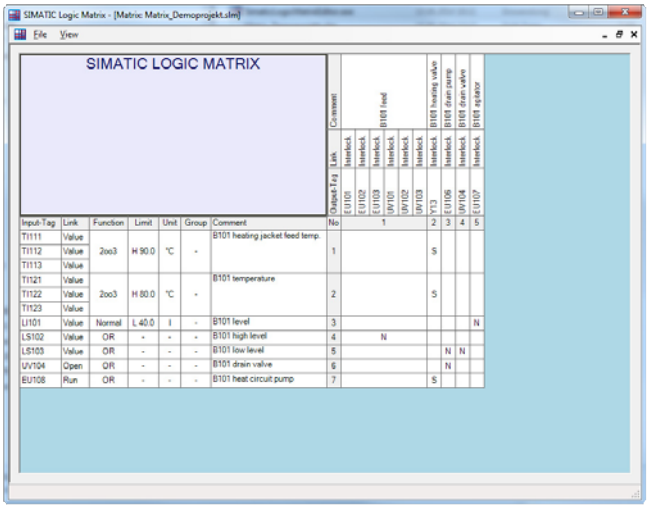
[1] See chapter "Software Media and Logistics", section "System documentation", see page 1/7.

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

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Overview



Logic Matrix Editor within the SIMATIC PCS 7 Engineering System

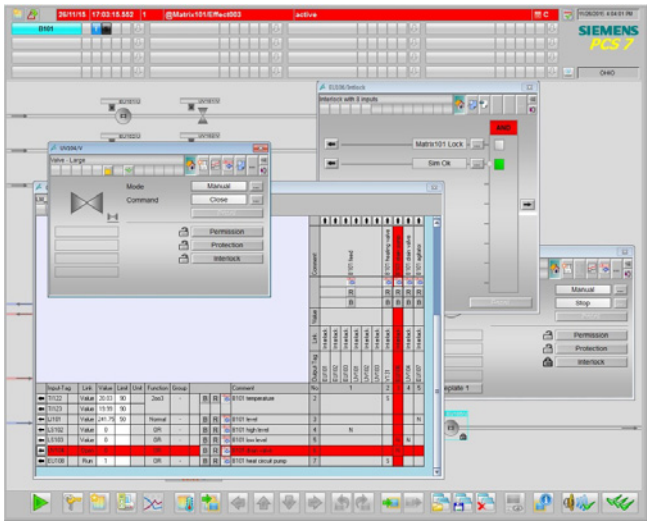
The SIMATIC PCS 7 Logic Matrix is based on the principle of logic creation with a cause and effect matrix - similar to the SIMATIC Safety Matrix for safety-related applications that has been established for years. It enables easy creation of the interlock logic between technological functions (e.g. control modules or equipment modules) of the automation project. There is no time-consuming configuring of the interlock logic in the CFC.

The SIMATIC PCS 7 Logic Matrix Tool, which can be opened from SIMATIC Manager, is used to create and edit the Logic Matrix oriented to one controller in each case and then to integrate the created matrix data at the chart level in the CFC project. The APL-based process tag types of the Control Module are linked with the cause or effect blocks of the Logic Matrix by templates created with the Link Type Editor of the Logic Matrix (Link Types).

The matrix table is comparable to a spreadsheet program. The configuration engineer first enters the possible events (inputs) in the horizontal lines, and then configures their type and number, logic operations, timings, alarms and possible bypass functions. He then defines possible actions (outputs) to these events in the vertical columns. The events and reactions are linked by simply clicking the cell at the intersection of the row and column.

The SIMATIC PCS 7 Safety Matrix Viewer enables operator control and monitoring of the Logic Matrix on the operator station (OS Single Station and OS Client). The Logic Matrix faceplate can also be opened via the faceplates of the technology objects which have been linked together via the cause and effect matrix.

Based on this causal chain, jumps from the Effect faceplate to the Cause faceplate and vice versa are possible via the Logic Matrix faceplate.



Faceplates of the Logic Matrix and the linked Control Module in the Logic Matrix Viewer of the SIMATIC PCS 7 Operator Station

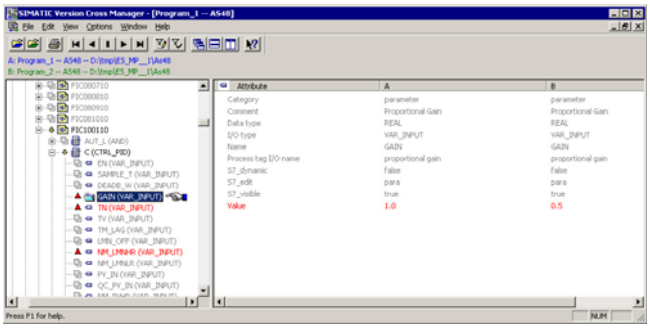
Ordering data

	Article No.
SIMATIC PCS 7 Logic Matrix	
SIMATIC PCS 7 **Logic Matrix Viewer V9.0** Operator control and monitoring of the SIMATIC PCS 7 Logic Matrix via OS single station/OS client Runtime software, 2 languages (English, German), software class A Runs with the following operating systems (see SIMATIC PCS 7 Readme [1] for latest information): • Windows 7 Ultimate 64-bit • Windows 10 Enterprise 2015 LTSB 64-bit • Windows Server 2012 R2 Standard Edition 64-bit • Windows Server 2016 Standard Edition 64-bit Single license for 1 installation, without SIMATIC PCS 7 Software Media Package Goods delivery License key on USB flash drive and certificate of license	**6ES7658-1JB58-2YA0**

[1] See chapter "Software Media and Logistics", section "System documentation", see page 1/7.

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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

Note:

As the function "Control module adjustment" is based on a basic functionality of the Version Cross Manager (VXM), you need a VXM license to use this function. In the absence of a license, a message appears telling you to install Version Cross Manager. This is not actually necessary, all you need to install is a valid VXM license that will enable the relevant functionality on the engineering station.

More information

Upgrade

You can upgrade SIMATIC PCS 7 engineering systems with engineering software V8.x to version 9.0 with SIMATIC PCS 7 Engineering Upgrade Packages AS/OS. The further developed SIMATIC Version Cross Manager V9.0 is available for use in SIMATIC PCS 7 V9.0. The upgrade to SIMATIC Version Cross Manager V9.0 is a component of the Engineering Upgrade Package AS/OS V8.x to V9.0.

For more information, see catalog ST PCS 7, "Update/Upgrade Packages", see page 16/2.

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).

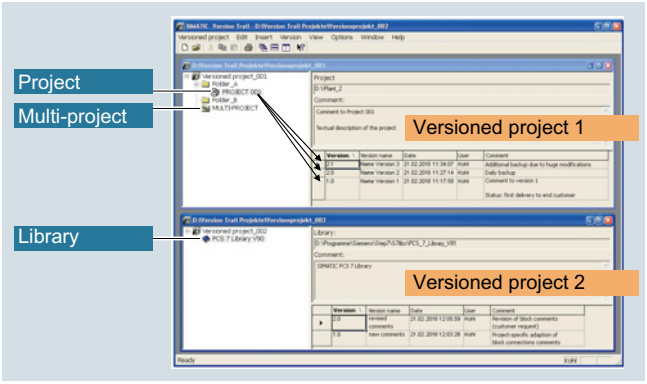
Ordering data

	Article No.
SIMATIC Version Cross Manager V9.0 6 languages (English, German, French, Italian, Spanish, Chinese), software class A Runs with the following operating systems (see VXM readme file at Siemens Industry Online Support for the latest information): • Windows 7 Ultimate 64-bit • Windows 10 Enterprise 2015 LTSB 64-bit • Windows Server 2012 R2 Standard Edition 64-bit • Windows Server 2016 Standard Edition 64-bit Floating license for 1 user, without SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive and certificate of license and TIA Engineering Toolset CD	**6ES7658-1CX58-2YA5**
• Online delivery License key download, online certificate of license and TIA Engineering Toolset (software download) Note: Email address required!	**6ES7658-1CX58-2YH5**
Upgrade package (only for TIA applications)	
SIMATIC Version Cross Manager upgrade from V7.1/V8.2 to V9.0 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, for operating systems see above Floating license for 1 user, without SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license and TIA Engineering Toolset CD	**6ES7658-1CX58-2YE5**
• Online delivery License key download, online certificate of license and TIA Engineering Toolset (software download) Note: Email address required!	**6ES7658-1CX58-2YK5**

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4

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 V9.0 6 languages (English, German, French, Italian, Spanish, Chinese), software class A Runs with the following operating systems (see VT readme file at Siemens Industry Online Support for the latest information): • Windows 7 Ultimate 64-bit • Windows 10 Enterprise 2015 LTSB 64-bit • Windows Server 2012 R2 Standard Edition 64-bit • Windows Server 2016 Standard Edition 64-bit Floating license for 1 user, without SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license and TIA Engineering Toolset CD	**6ES7658-1FX58-2YA5**
• Online delivery License key download, online certificate of license and TIA Engineering Toolset (software download) Note: Email address required!	**6ES7658-1FX58-2YH5**
Upgrade package (only for TIA applications)	
SIMATIC Version Trail upgrade from V8.x to V9.0 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, for operating systems see above Floating license for 1 user, without SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	**6ES7658-1FX58-2YE5**
• Online delivery License key download, online certificate of license and TIA Engineering Toolset (software download) Note: Email address required!	**6ES7658-1FX58-2YK5**

More information

Upgrade

You can upgrade SIMATIC PCS 7 engineering systems with engineering software V8.x to version 9.0 with SIMATIC PCS 7 Engineering Upgrade Packages AS/OS. These upgrade packages include the upgrade for SIMATIC Version Trail from V8.x to V9.0.

For more information, see section "Update/upgrade packages".

TIA applications

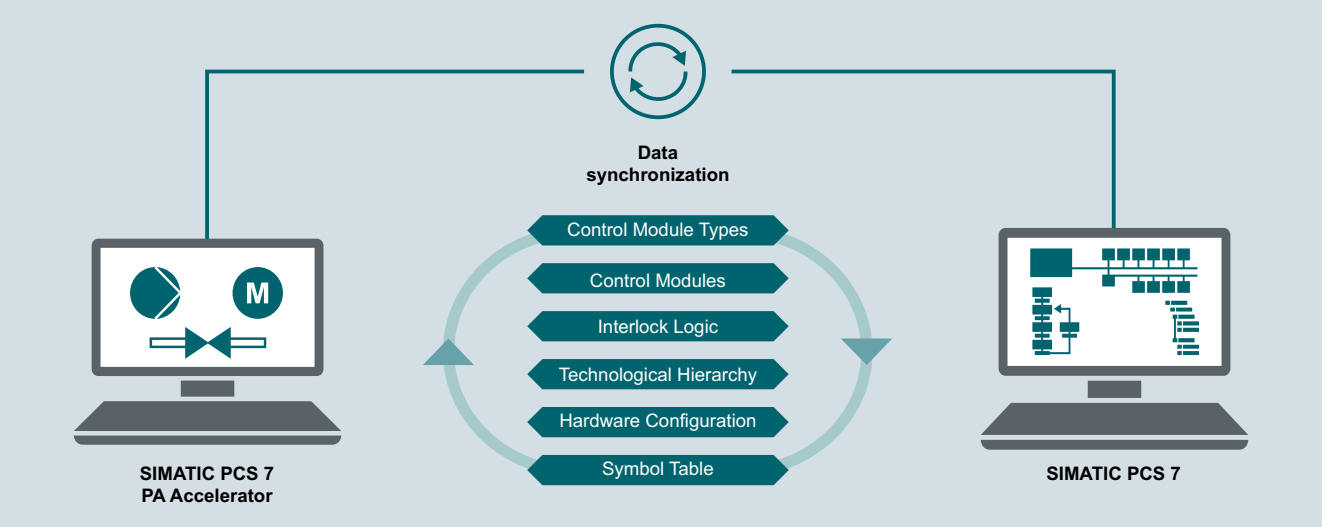
SIMATIC Version Trail is not only a software component of the SIMATIC PCS 7 Engineering System. It is also a separate product which can be used in the context of Totally Integrated Automation (TIA) together with other SIMATIC products.

Note:

Please note that Version Trail cannot be used as a stand-alone application; it only runs together with SIMATIC Logon (see page 15/8).

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Overview



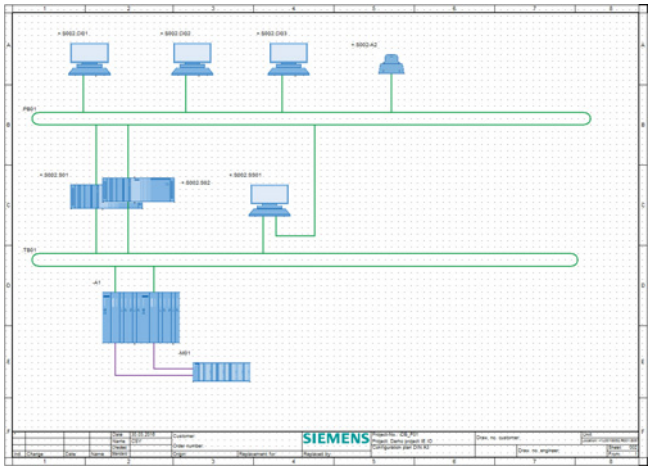
Data exchange between SIMATIC PCS 7 Plant Automation Accelerator and SIMATIC PCS 7

Performance in engineering

With regard to planning and engineering, performance can be equated with minimizing time and costs. "Integrated Engineering" offers an unique approach here: an integrated planning workflow from the description of the process to the automation program.

Using the SIMATIC PCS 7 Plant Automation Accelerator (PAA), both engineers and planning offices and end customers can significantly reduce their configuration and commissioning costs while simultaneously improving the quality of engineering.

PAA expands the functionality for plant configuration and documentation. To improve efficiency in plant engineering, the PAA provides support generating offesr with a plant topology plan and the bills of materials to the automatic generation of SIMATIC PCS 7 data from electrical and function plans.



Plant topology plan

SIEMENS — Bill of material - without bundles — Cabinet

Project	Demo project IE IO		
Project-No.	iDB_P01		
Building	+0L001		
P&ID no.			
TAG-No.			
Location	+0L001G001.R001.S001	Unit	

	Name	Article description	MLFB
2	0	Rack, UR2	6ES7 400-1JA01-0AA0
3	1	Rack, UR2	6ES7 400-1JA01-0AA0
4	0	Profile rail, 483mm	6ES7 195-1GA00-0XA0
5	0	Profile rail, 483mm	6ES7 195-1GA00-0XA0
6	0	Profile rail, 483mm	6ES7 195-1GA00-0XA0
7	0	Profile rail, 483mm	6ES7 195-1GA00-0XA0
8	0	Profile rail, 483mm	6ES7 195-1GA00-0XA0
9	1	PS 405, 10A, DC 24/48/60V, DC 5V/10A	6ES7 405-0KA02-0AA0
10	3	CPU 410-5H	6ES7 410-5HX08-0AB0
11	5	CP 443-5 Ext	6GK7 443-5DX05-0XE0
12	1	PS 405, 10A, DC 24/48/60V, DC 5V/10A	6ES7 405-0KA02-0AA0
13	3	CPU 410-5H	6ES7 410-5HX08-0AB0
14	5	CP 443-5 Ext	6GK7 443-5DX05-0XE0
15	0	PS 307 AC 120/230V, DC 24V/2A	6ES7 307-1BA01-0AA0
16	2	IM 153-2 HF	6ES7 153-2BA02-0XB0
17	01	Bus unit, 2x40mm	6ES7 195-7HB00-0XA0
18	02	Bus unit, 2x40mm	6ES7 195-7HB00-0XA0
19	03	Bus unit, 2x40mm	6ES7 195-7HB00-0XA0
20	04	Bus unit, 2x40mm	6ES7 195-7HB00-0XA0
21	0	PS 307 AC 120/230V, DC 24V/2A	6ES7 307-1BA01-0AA0
22	2	IM 153-2 HF	6ES7 153-2BA02-0XB0
23	01	Bus unit, 2x40mm	6ES7 195-7HB00-0XA0
24	02	Bus unit, 2x40mm	6ES7 195-7HB00-0XA0
25	03	Bus unit, 2x40mm	6ES7 195-7HB00-0XA0
26	04	Bus unit, 2x40mm	6ES7 195-7HB00-0XA0
27	0	PS 307 AC 120/230V, DC 24V/2A	6ES7 307-1BA01-0AA0
28	2	IM 153-2 HF	6ES7 153-2BA02-0XB0
29	01	Bus unit, 2x40mm	6ES7 195-7HB00-0XA0
30	02	Bus unit, 2x40mm	6ES7 195-7HB00-0XA0
31	03	Bus unit, 2x40mm	6ES7 195-7HB00-0XA0
32	04	Bus unit, 2x40mm	6ES7 195-7HB00-0XA0
33	0	PS 307 AC 120/230V, DC 24V/2A	6ES7 307-1BA01-0AA0
34	2	IM 153-2 HF	6ES7 153-2BA02-0XB0
35	01	Bus unit, 2x40mm	6ES7 195-7HB00-0XA0
36	02	Bus unit, 2x40mm	6ES7 195-7HB00-0XA0
37	03	Bus unit, 2x40mm	6ES7 195-7HB00-0XA0
38	04	Bus unit, 2x40mm	6ES7 195-7HB00-0XA0
39	0	PS 307 AC 120/230V, DC 24V/2A	6ES7 307-1BA01-0AA0
40	2	IM 153-2 HF	6ES7 153-2BA02-0XB0
41	01	Bus unit, 2x40mm	6ES7 195-7HB00-0XA0
42	02	Bus unit, 2x40mm	6ES7 195-7HB00-0XA0
43	03	Bus unit, 2x40mm	6ES7 195-7HB00-0XA0
44	04	Bus unit, 2x40mm	6ES7 195-7HB00-0XA0
45	03	Synchronization module up to 10m	6ES7 960-1AA06-0XA0
46	04	Synchronization module up to 10m	6ES7 960-1AA06-0XA0

*				Draw. no. customer			
				Status			
				Sheet	1	From	3
Ind.	Change	Date	Name	Date	18.04.2017	Name	@SETUP

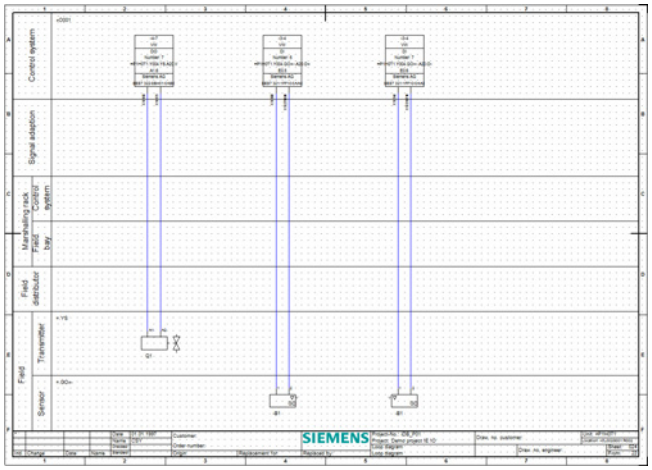
Protection note

Bills of materials

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4

Overview (continued)



Electrical planning

If electrical planning has been carried out with planning tools from other providers, this data can be imported in Microsoft Excel format using signal or process tag lists – as in the previous product, Advanced Engineering System (AdvES).

The PAA is thus the new extended product to replace the PCS 7 Advanced Engineering System. It provides the same functions but can also operate as a project processing and documentation tool.

Benefits

- Reduced customizing and planning time with integrated processes for engineering, automation and operation
- Shorter project terms with consistent and simple data synchronization between engineering and automation
- Increased plant availability with error-free data transfer and system documentation that is always up-to-date
- Increased engineering efficiency and cost reductions with optimized change management

Function

Data changes can be undertaken at both ends and exchanged bidirectionally. If the user triggers data exchange, all changes are listed in a comparison and the user can select which changes are to be applied.

The automation hardware, the automation software and their interconnections are generated automatically when signal lists are exported from an external plan.

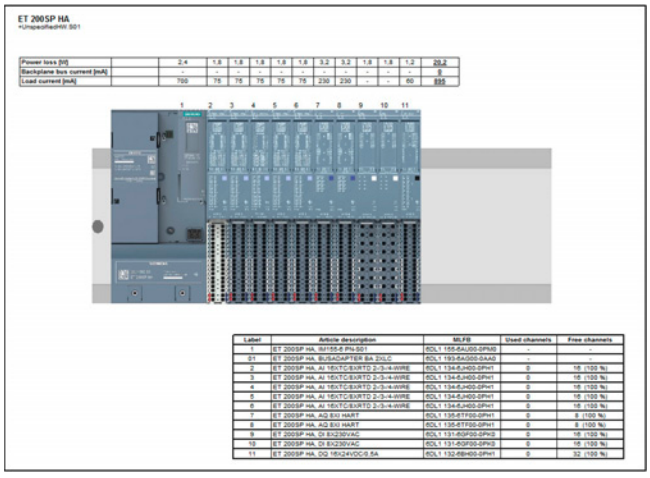


Engineering wizard

Engineering wizards efficiently support hardware engineering. The PAA uses the complete basic functional scope of COMOS products with

- User administration
- Change management with working layers
- Scalability

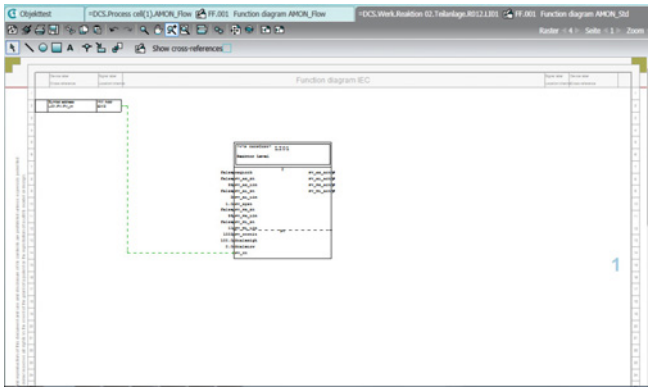
The PAA automatically generates hardware and software documents for redocumentation of existing SIMATIC PCS 7 projects.



Assembly plan

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Function (continued)



Function diagram

The PAA is thus the first product to offer the direct connection of a DCS system (SIMATIC PCS 7) to an automation-neutral tool for plant engineering (COMOS) and thus represents a significant step towards the digital plant.

More information

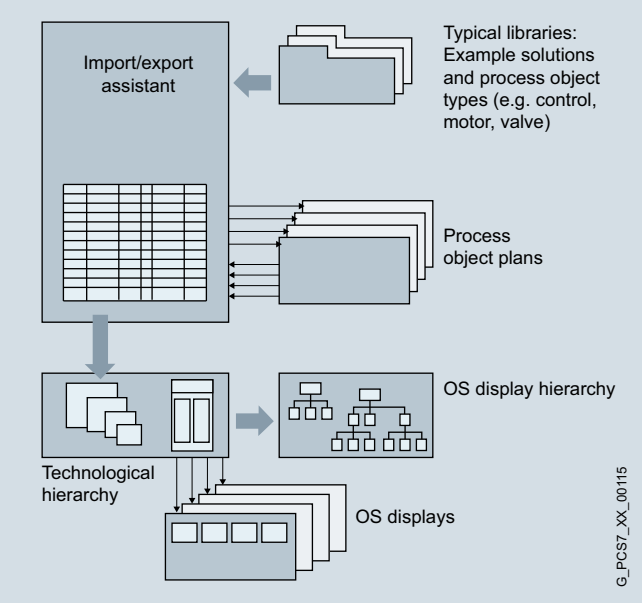
Ordering information

The SIMATIC PCS 7 Plant Automation Accelerator (PAA) cannot be ordered through this catalog or the Industry Mall. Please get in touch with your regional contact.

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4

Overview



Efficient processing of mass data

The Import/Export Assistant (IEA) can be used for the 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 V9.0 6 languages (English, German, French, Italian, Spanish, Chinese), software class A	
Runs with the following operating systems (see SIMATIC PCS 7 Readme[1] for latest information):	
• Windows 7 Ultimate 64-bit	
• Windows 10 Enterprise 2015 LTSB 64-bit	
• Windows Server 2012 R2 Standard Edition 64-bit	
• Windows Server 2016 Standard Edition 64-bit	
Floating license for 1 user, without SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	**6ES7658-1DX58-2YB5**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7658-1DX58-2YH5**

[1] See chapter "Software Media and Logistics", section "System documentation", see page 1/7.

More information

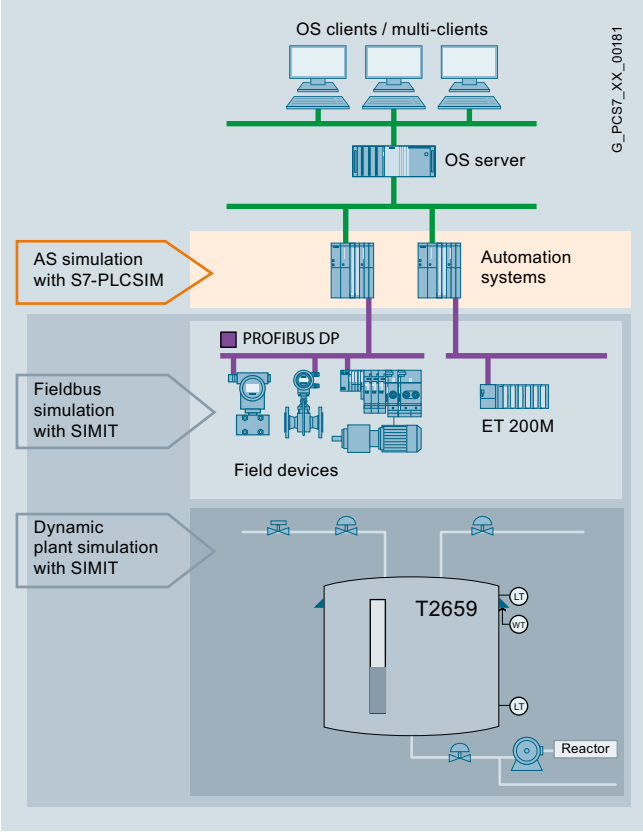
Upgrade

You can upgrade SIMATIC PCS 7 Engineering Systems with Engineering Software V8.x to Version 9.0 with SIMATIC PCS 7 Engineering Upgrade Packages AS/OS. The upgrade for upgrading the SIMATIC PCS 7 Import/Export Assistant from V8.x to V9.0 is also part of these upgrade packages.

For more information, see section "Update/upgrade packages".

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Overview



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:

S7?PLCSIM as of V5.4+SP8 is compatible with SIMATIC PCS 7 V9.0.

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

Ordering data	Article No.
S7-PLCSIM V5.4 (including SP) Functional testing on PC/PG of programs created with CFC/SFC 5 languages (English, German, French, Italian, Spanish) Runs with the following operating systems: • Windows 7 Ultimate 64-bit • Windows 10 Enterprise 2015 LTSB 64-bit • Windows Server 2012 R2 Standard 64-bit Floating license for 1 user, without SIMATIC PCS 7 Software Media Package Physical delivery Software and electronic documentation on CD, license key on USB flash drive, certificate of license	**6ES7841-0CC05-0YA5**

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 "Update/upgrade packages", "Updates/upgrades asynchronous to the PCS 7 version" – "S7-PLCSIM simulation software upgrades", see page 16/39.

Further test and simulation programs

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

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Notes

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5/2 **Introduction**

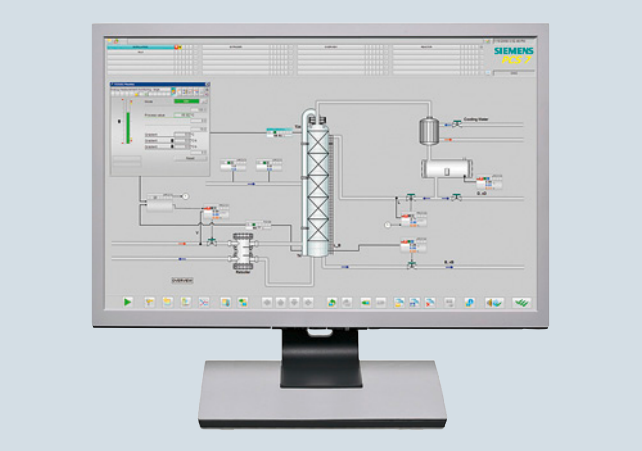
5/5 **OS Software**
5/6 OS Standard Software for Single Station/Server/Client
5/11 SFC Visualization

5/12 **Redundant operator systems**
5/12 OS Redundancy

5/18 **Operator control and monitoring via Web**
5/18 SIMATIC PCS 7 Web Server

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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 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 the following configuration limits:

- 8 500 POs per OS Single Station
- 12 000 POs per OS Server (with client/server architecture)

Benefits

- High-performance operator stations based on versatile, rugged SIMATIC PCS 7 Industrial Workstations, optimized for use in industrial environments
- Flexible, modular architecture with scalable hardware and software components for
  - Single-user system (OS single station) with up to 8 500 process objects
  - Flat system configurations based on a redundant OS Single Station pair, expandable with reference stations to up to 8 OS Single Stations.
  - Client/server multi-user systems with up to 18 OS servers/ pairs of servers for every 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 of 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)

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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 suitable for use in harsh industrial environments and are characterized by powerful industrial PC technology combined with a Windows Desktop operating system (Windows 7 or Windows 10) or a Windows Server operating system (Windows Server 2012) from Microsoft. 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, you can equip an OS Single Station, OS Server or OS Client with optional hardware components, such as:

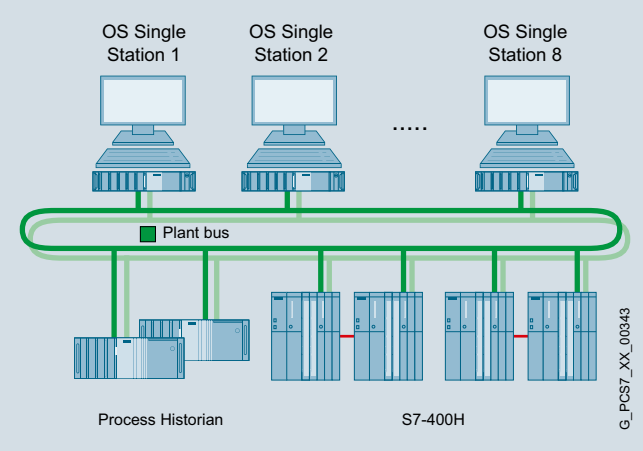
- Hardware and software components for redundant operation
- Signal module for audible and visual signaling of messages
- Smart card reader for access protection
- Multi-monitor graphics card for operation of up to 4 process monitors
- Process monitors for office and industrial environments

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 (SIMATIC PCS 7 Single Station Redundancy) and their expansion with reference stations into a flat system configuration with up to 8 OS Single Stations is also possible.



Example of a flat system architecture

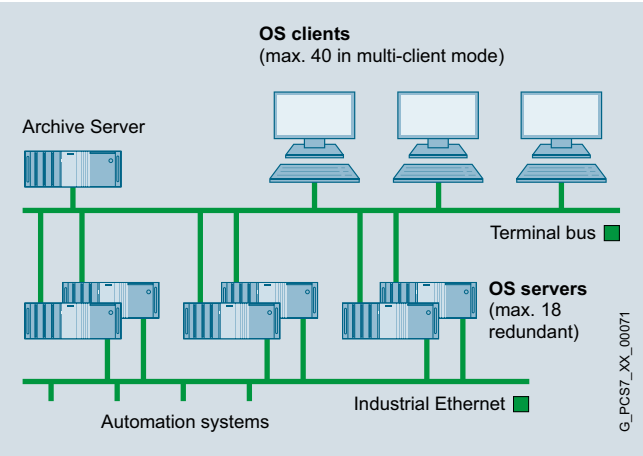
Depending on the version (IE or BCE), the OS single station can be connected to the Industrial Ethernet plant bus via one of the following network components:

- IE: CP 1623 communications module (pre-installed in SIMATIC PCS 7 Industrial Workstation) or CP 1628 communications module for communication with max. 64 automation systems
- BCE: Standard Ethernet network adapter (10/100/1000 Mbps) and Basic Communication Ethernet for communication with up to 8 automation systems (no 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



Example of multi-user system

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).

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Design (continued)

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.

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).

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 communications module (pre-installed in SIMATIC PCS 7 Industrial Workstation) or CP 1628 communications module for communication with max. 64 automation systems
- BCE: Standard Ethernet network adapter (10/100/1000 Mbps) and Basic Communication Ethernet for communication with up to 8 automation systems (no 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 section "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, for example on a NAS drive.

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 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 configurable messages per server	200 000
Max. number of configurable process objects	Approx. 216 000
Max. number of configurable process tags	Approx. 128 000 [2]
Integral high-performance archive system (circular buffer), based on Microsoft SQL server, for:	
• Process value archiving (per OS server/single station)	Approx. 1 500/s
• Alarm logging (per OS server/single station)	Permanent load approx. 10/s Message burst approx. 3 000 / 4 s

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

[2] Approx. 300 000 I/O

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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.

You can equip OS Single Stations and OS Clients, for example, with SIMATIC PCS 7 SFC Visualization and Safety Matrix Viewers.

Redundant system configurations are also possible with OS single stations and OS servers. See "OS redundancy" under "Operator System" for details see page 5/12.

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	**Redundancy**	
With Windows 7 Ultimate 64-bit or Windows 10 Enterprise 2015 LTSB 64-bit operating system	**without**	**with**
SIMATIC PCS 7 Industrial Workstation for ES/OS single station		
• With BCE communication for up to 8 automation systems (no redundancy stations)	1	2
• With Industrial Ethernet (IE) communication	1	2
Additional IE communication software for industrial workstations with IE communication		
SIMATIC NET HARDNET IE S7 REDCONNECT PowerPack	1	2
OS standard software		
SIMATIC PCS 7 OS Software Single Station	1	–
SIMATIC PCS 7 Single Station Redundancy	–	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	1	2
SIMATIC Safety Matrix Viewer	1	2

Multi-user system with client/server architecture		
OS server	**Redundancy**	
With Windows Server 2008 R2 Standard 64-bit or Windows Server 2012 R2 Standard 64-bit operating system	**without**	**with**
SIMATIC PCS 7 Industrial Workstation for OS server		
• With BCE communication for up to 8 automation systems (no redundancy stations)	1	2
• With industrial Ethernet communication	1	2
Additional IE communication software for industrial workstations with IE communication		
SIMATIC NET HARDNET IE S7 REDCONNECT PowerPack	1	2
OS standard software		
SIMATIC PCS 7 OS Software Server	1	–
SIMATIC PCS 7 OS Software Server Redundancy	–	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 64-bit or Windows 10 Enterprise 2015 LTSB 64-bit operating system; connection for terminal bus onboard		
SIMATIC PCS 7 Industrial Workstation for OS Client		
• SIMATIC PCS 7 Industrial Workstation for OS Client, with onboard standard graphics or with multi-monitor graphics card	1	
• SIMATIC PCS 7 BOX OS Client 627D, with or without Panel	1	
• SIMATIC PCS 7 OS Client 427D/477D (Microbox)	1	
OS standard software		
SIMATIC PCS 7 OS Software Client (software license for PCS 7 BOX OS Client 627D in scope of supply)	1 or 0 (for PCS 7 OS client 627D)	
Supplementary OS software (optional)		
SIMATIC PCS 7 SFC Visualization	1	
SIMATIC Safety Matrix Viewer	1	
SIMATIC PCS 7 Logic Matrix Viewer (see "Engineering", "SIMATIC PCS 7 Logic Matrix" section)	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.

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OS Standard Software for Single Station/Server/Client

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

- 8 500 POs per OS Single Station
- 12 000 POs per OS Server

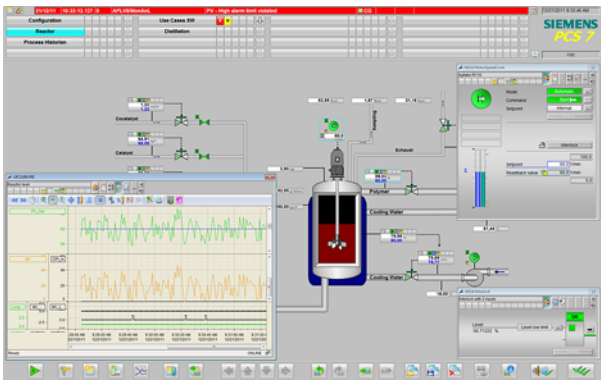
The high-performance circular buffer archiving system integrated in the OS standard software for OS single station and OS server for temporary archiving can be expanded up to the maximum limit of 10 000 tags with cumulative SIMATIC PCS 7 OS volume licenses.

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 OS Software Server Redundancy or SIMATIC PCS 7 OS Software Single Station Redundancy). See "OS redundancy" for details. see page 5/12

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

It frequently happens in practice 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.

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.

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 functional display of the 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.

The design is also defined using a wide range of attractive elements provided by the Graphics Designer during configuration in the engineering system.

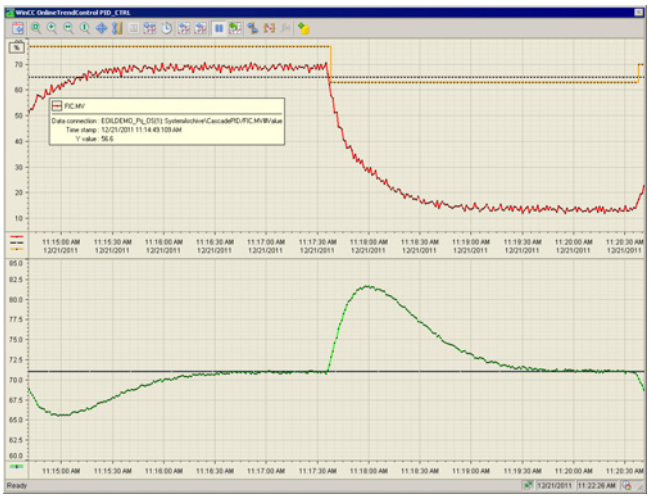
Process tag browser

The SIMATIC PCS 7 process tag browser enables status information from APL-based process tags to be displayed, filtered and sorted. Process tags that have a certain status can then be quickly identified and selected. The faceplate of a process tag can be selected directly in the process image via the Loop In function. The query results of the process tag browser can be saved and printed out.

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Function (continued)

TrendControls function for table displays and curve displays



Trend window on the operator station

With TrendControls the operator can display archived values:

- Archive tags from the process value archive
- Online values of process tags from tag management

The display is 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.

APL Operator Trend Control

The APL Operator Trend Control coordinated with the Advanced Process Library offers another option to the operator for flexible online compilation of trends. The values for the trend display are selected with a simple mouse click, in which case the value range and unit are adopted automatically by the process tag. The selection made can be subsequently adjusted by adding and removing values. In addition, messages corresponding to the trend selection can be called.

AlarmControl function for message display and processing

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

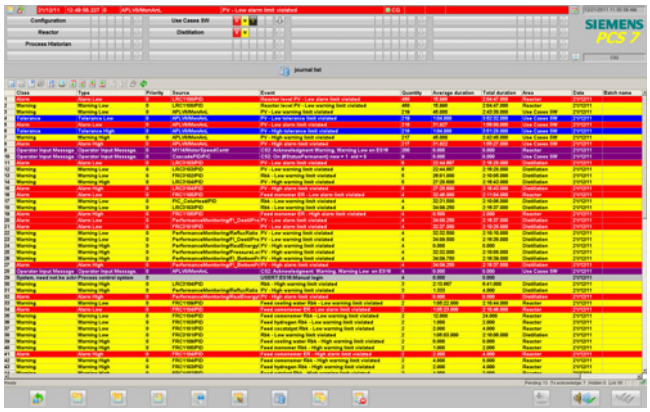
- Predefined system messages, triggered by a system event
- Individual or group messages, initiated by a change in process states
- Operator input messages, resulting from the manual operation of objects

The message system integrated in the Operator System records these process messages and local events, saves them in message archives, and displays them using freely configurable message lists.

Flexible setting options for audio output support message signaling with a sound card or by controlling external horns via a signal module.

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.



Operator station message list

Reporting and logging system

The project created during configuring is documented with the reporting system. The logging system allows an easy-to-read printout of data acquired during operation. 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.

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Function (continued)

Data archiving

The high-performance archiving system, configurable at runtime, in the OS standard software of 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 more information on SIMATIC Logon and ordering data for an optional smart card reader, see "Expansion components, smart card reader" in "Industrial Workstation/IPC", see page 3/52.

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Ordering data	Article No.
OS Software Single Station	
Runs with the following operating systems (see SIMATIC PCS 7 Readme[1] for latest information):	
• Windows 7 Ultimate 64-bit	
• Windows 10 Enterprise 2015 LTSB 64-bit	
SIMATIC PCS 7 OS Software Single Station V9.0 incl. 100 OS Runtime PO 5 languages (English, German, French, Italian, Spanish), software class A, single license for 1 installation	
With SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license, bundled with 1 × SIMATIC PCS 7 Software Media Package per order item	**6ES7658-2AA58-0YA0**
• Online delivery License key download and online certificate of license, combined with SIMATIC PCS 7 Software Media Package (software download and online certificate of license) Note: Email address required!	**6ES7658-2AA58-0YH0**
SIMATIC PCS 7 OS Software Single Station ASIA V9.0 incl. 100 OS Runtime PO 2 languages (English, Chinese), software class A, single license for 1 installation	
With SIMATIC PCS 7 Software Media Package ASIA	
Physical delivery ASIA license key on USB hardlock and certificate of license, bundled with 1 × SIMATIC PCS 7 Software Media Package ASIA per order item	
• ASIA	**6ES7658-2AA58-0CA0**
• SN ASIA (including SOFTNET REDCONNECT)	**6ES7658-2AA58-6CA0**
OS Software Server	
Runs with the following operating systems (see SIMATIC PCS 7 Readme[1] for the latest information):	
• Windows Server 2012 R2 Standard Edition 64-bit	
• Windows Server 2016 Standard Edition 64-bit	
SIMATIC PCS 7 OS Software Server V9.0 incl. 100 OS Runtime PO 5 languages (English, German, French, Italian, Spanish), software class A, single license for 1 installation	
With SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license, bundled with 1 × SIMATIC PCS 7 Software Media Package per order item	**6ES7658-2BA58-0YA0**
• Online delivery License key download and online certificate of license, combined with SIMATIC PCS 7 Software Media Package (software download and online certificate of license) Note: Email address required!	**6ES7658-2BA58-0YH0**

Ordering data	Article No.
SIMATIC PCS 7 OS Software Server ASIA V9.0 incl. 100 OS Runtime PO 2 languages (English, Chinese), software class A, single license for 1 installation	
With SIMATIC PCS 7 Software Media Package ASIA	
Physical delivery ASIA license key on USB hardlock and certificate of license, bundled with 1 × SIMATIC PCS 7 Software Media Package ASIA per order item	
• ASIA	**6ES7658-2BA58-0CA0**
• SN ASIA (including SOFTNET REDCONNECT)	**6ES7658-2BA58-6CA0**
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	
Language-neutral, software class A, single license for 1 installation	
No SIMATIC PCS 7 Software Media Package	
• Goods delivery License key on USB flash drive and certificate of license	
- 100 POs	**6ES7658-2XA00-0XB0**
- 1 000 POs	**6ES7658-2XB00-0XB0**
- 5 000 POs	**6ES7658-2XC00-0XB0**
• Online delivery License key download and online certificate of license Note: Email 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	
No SIMATIC PCS 7 Software Media Package	
• Goods delivery License key on USB flash drive and certificate of license	
- 1 500 tags	**6ES7658-2EA00-2YB0**
- 5 000 tags	**6ES7658-2EB00-2YB0**
- 10 000 tags	**6ES7658-2EC00-2YB0**
- 30 000 tags	**6ES7658-2ED00-2YB0**
• Online delivery License key download and online certificate of license Note: Email address required!	
- 1 500 tags	**6ES7658-2EA00-2YH0**
- 5 000 tags	**6ES7658-2EB00-2YH0**
- 10 000 tags	**6ES7658-2EC00-2YH0**
- 30 000 tags	**6ES7658-2ED00-2YH0**

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OS Standard Software for Single Station/Server/Client

Ordering data	Article No.
OS Software Client	
Runs with the following operating systems (see SIMATIC PCS 7 Readme[1] for latest information): • Windows 7 Ultimate 64-bit • Windows 10 Enterprise 2015 LTSB 64-bit	
SIMATIC PCS 7 **OS Software Client V9.0** 5 languages (English, German, French, Italian, Spanish), software class A, floating license for 1 user	
No SIMATIC PCS 7 Software Media Package	
• Goods delivery License key on USB flash drive and certificate of license	**6ES7658-2CX58-0YB5**
• Online delivery License key download and online certificate of license Note: Email address required!	**6ES7658-2CX58-0YH5**
SIMATIC PCS 7 **OS Software Client ASIA V9.0** 2 languages (English, Chinese), software class A, floating license for 1 user	
No SIMATIC PCS 7 Software Media Package ASIA	
• Physical delivery ASIA license key on USB hardlock, certificate of license	**6ES7658-2CX58-0CB5**

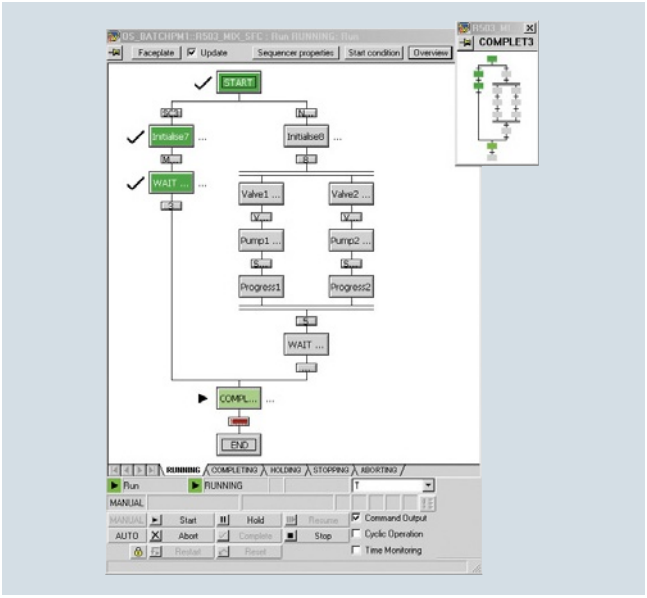
	Article No.
Conversion of the software license from OS Single Station to OS Server	
Runs with the following operating systems (see SIMATIC PCS 7 Readme[1] for latest information): • Windows Server 2012 R2 Standard Edition 64-bit • Windows Server 2016 Standard Edition 64-bit	
SIMATIC PCS 7 **OS Conversion Pack** **Single Station to Server V9.0**	
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, single license for 1 installation	
No SIMATIC PCS 7 Software Media Package	
• Goods delivery License key on USB flash drive and certificate of license	**6ES7658-2BA58-0YD0**
• Online delivery License key download and online certificate of license Note: Email address required!	**6ES7658-2BA58-0YJ0**

[1] See chapter "Software Media and Logistics", section "System documentation", see page 1/7.

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

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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.

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 V9.0** For displaying and operating SFC sequence controls on an operator station 6 languages (English, German, French, Italian, Spanish, Chinese), software class A Runs with the following operating systems (see SIMATIC PCS 7 Readme[1] for latest information): • Windows 7 Ultimate 64-bit • Windows 10 Enterprise 2015 LTSB 64-bit • Windows Server 2012 R2 Standard Edition 64-bit • Windows Server 2016 Standard Edition 64-bit Floating license for 1 user, without SIMATIC PCS 7 Software Media Package	
• Goods delivery License key on USB flash drive and certificate of license	**6ES7652-0XD58-2YB5**
• Online delivery License key download and online certificate of license Note: Email address required!	**6ES7652-0XD58-2YH5**

[1] See chapter "Software Media and Logistics", section "System documentation", see page 1/7.

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5

Overview

OS single stations and OS servers can have a redundant design if necessary. The following program packages are available:

- SIMATIC PCS 7 Single Station Redundancy for setup of redundant OS Single Stations
- SIMATIC PCS 7 Server Redundancy for setup of redundant OS servers.

For optimizing internal communication, connect the two stations of the redundant OS Single Station/OS Server pair to each other either via an RS 232 connecting cable or via an Ethernet cable, e.g. cross-over network cable with RJ45 connectors (up to 100 m). The cable material is to be ordered separately in each case:

Depending on the environmental conditions and the distance involved, the Ethernet connection between the two redundant stations can be implemented either as an electrical or optical connection. For more information, refer to the "SIMATIC PCS 7 High-availability Process Control Systems" manual; 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

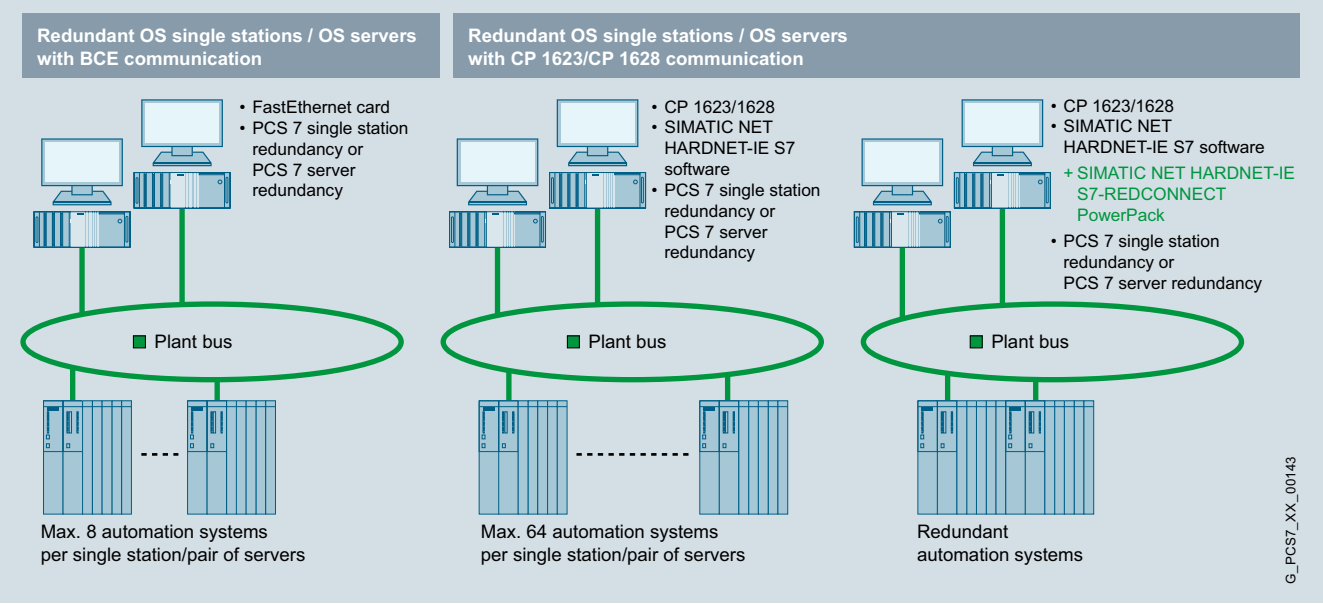
The following table provides an overview of which components are required for a redundant OS single station or OS pair of servers depending on certain criteria:

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, ES/OS Single Station or OS Server version				
• Incl. Ethernet network adapter 10/100/1000 Mbps and BCE communication		2	–	–
• Incl. CP 1623/CP 1628 and SIMATIC NET HARDNET-IE S7		2 (alternative to BCE)	2	2
Software				
SIMATIC PCS 7 Single Station/Server Redundancy		1	1	1
SIMATIC NET HARDNET-IE S7-REDCONNECT PowerPack		–	–	2
Connection to redundant plant bus (2 rings)				
• BCE	Desktop adapter network card	2	–	–
• 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

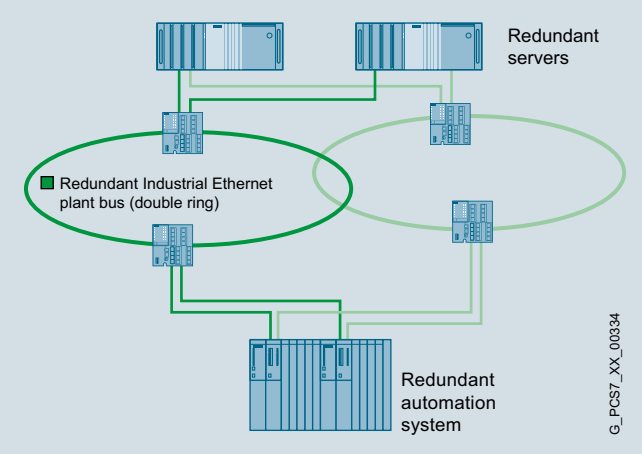
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Design (continued)

Connection to plant bus



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 with the 10/100/1000 Mbps Ethernet card is generally sufficient even for redundant operator stations. This allows the connection of up to 8 automation systems per server pair (AS single stations only, not AS redundancy 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 (pre-installed in the IE version of the SIMATIC PCS 7 Industrial Workstation) or CP 1628 (with extra security functions) is required in the following cases:
  - The number of automation systems per OS is larger than 8.
  - Redundant automation systems (AS redundancy 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 (4x license). If lower-level AS redundancy stations are to be connected, however, SIMATIC NET HARDNET-IE S7-REDCONNECT is required. 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 AS redundancy stations, a CP 1623 or CP 1628 communication module is required in addition to the SIMATIC NET HARDNET-IE S7-REDCONNECT (4x license).
- If the plant bus is to be designed as a redundant dual ring, you require two interface modules (2 x Ethernet network adapters 10/100/1000 Mbps or 2 x CP 1623/CP 1628) per OS single station or OS server.

The communication software for CP 1623 or CP 1628 is always supplied with the SIMATIC PCS 7 software and installed in line with the operating system.

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

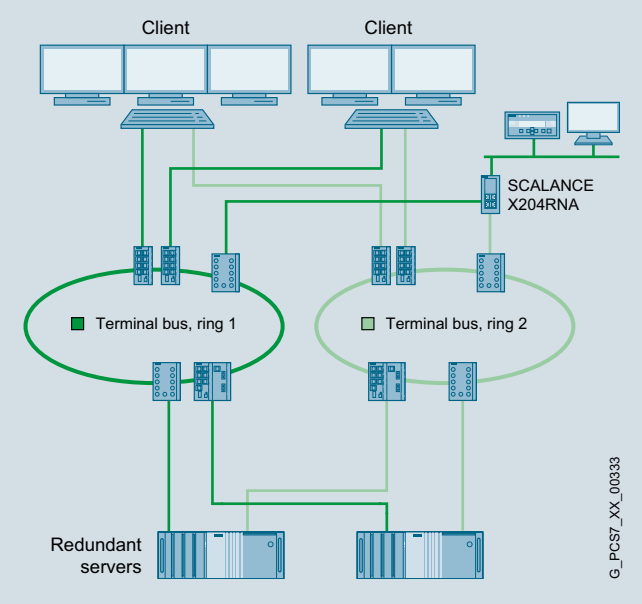
- SIMATIC NET HARDNET-IE S7,
- SIMATIC NET HARDNET-IE S7-REDCONNECT or
- SIMATIC NET HARDNET-IE S7 REDCONNECT PowerPack communication products.

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5

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, 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.

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".

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

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Ordering data	Article No.
Setup of redundant OS Single Stations	
SIMATIC PCS 7 OS Software Single Station Redundancy V9.0, incl. 100 OS Runtime PO 5 languages (English, German, French, Italian, Spanish), software class A, runs with Windows 7 Ultimate 64-bit or Windows 10 Enterprise 2015 LTSB 64-bit (see SIMATIC PCS 7 Readme[1] for the latest information), single license for 2 installations	
With SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license, bundled with 1 × SIMATIC PCS 7 Software Media Package per order item	**6ES7652-3AA58-2YA0**
• Online delivery License key download and online certificate of license, combined with SIMATIC PCS 7 Software Media Package (software download and online certificate of license) Note: Email address required!	**6ES7652-3AA58-2YH0**
SIMATIC PCS 7 OS Software Single Station Redundancy ASIA V9.0, incl. 100 OS Runtime PO 2 languages (English, Chinese), software class A, runs with Windows 7 Ultimate 64-bit or Windows 10 Enterprise 2015 LTSB 64-bit (see SIMATIC PCS 7 Readme[1] for the latest information), single license for 2 installations	
Physical delivery 2 × ASIA license key on USB hardlock and certificate of license, bundled with 1 × SIMATIC PCS 7 Software Media Package ASIA per order item	
• ASIA	**6ES7652-3AA58-2CA0**
• SN ASIA (includingSOFTNET REDCONNECT)	**6ES7652-3AA58-6CA0**
Design of redundant OS servers	
SIMATIC PCS 7 OS Software Server Redundancy V9.0, incl. 100 OS Runtime PO 5 languages (English, German, French, Italian, Spanish), software class A, runs with Windows Server 2012 R2 Standard Edition 64-bit and Windows Server 2016 Standard Edition 64-bit (see SIMATIC PCS 7 Readme[1] for the latest information), single license for 2 installations	
With SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license, bundled with 1 × SIMATIC PCS 7 Software Media Package per order item	**6ES7652-3BA58-2YA0**
• Online delivery License key download and online certificate of license, combined with SIMATIC PCS 7 Software Media Package (software download and online certificate of license) Note: Email address required!	**6ES7652-3BA58-2YH0**
SIMATIC PCS 7 OS Software Server Redundancy ASIA V9.0, incl. 100 OS Runtime PO 2 languages (English, Chinese), software class A, runs with Windows Server 2012 R2 Standard Edition 64-bit and Windows Server 2016 Standard Edition 64-bit (see SIMATIC PCS 7 Readme[1] for the latest information), single license for 2 installations	
With SIMATIC PCS 7 Software Media Package ASIA	
Physical delivery 2 × ASIA license key on USB hardlock and certificate of license, bundled with 1 × SIMATIC PCS 7 Software Media Package ASIA per order item	
• ASIA	**6ES7652-3BA58-2CA0**
• SN ASIA (including SOFTNET REDCONNECT)	**6ES7652-3BA58-6CA0**
Volume licenses (quantity options)	
Runtime licenses for PO expansion for SIMATIC PCS 7 OS Single Station/OS Server (cumulative); 2 required for each	
SIMATIC PCS 7 OS Runtime License For extending the OS Runtime POs, cumulative	
Language-neutral, software class A, single license for 1 installation	
No SIMATIC PCS 7 Software Media Package	
• Goods delivery License key on USB flash drive and certificate of license	
- 100 POs	**6ES7658-2XA00-0XB0**
- 1 000 POs	**6ES7658-2XB00-0XB0**
- 5 000 POs	**6ES7658-2XC00-0XB0**
• Online delivery License key download and online certificate of license Note: Email 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	
No SIMATIC PCS 7 Software Media Package	
• Goods delivery License key on USB flash drive and certificate of license	
- 1 500 tags	**6ES7658-2EA00-2YB0**
- 5 000 tags	**6ES7658-2EB00-2YB0**
- 10 000 tags	**6ES7658-2EC00-2YB0**
- 30 000 tags	**6ES7658-2ED00-2YB0**
• Online delivery License key download and online certificate of license Note: Email address required!	
- 1 500 tags	**6ES7658-2EA00-2YH0**
- 5 000 tags	**6ES7658-2EB00-2YH0**
- 10 000 tags	**6ES7658-2EC00-2YH0**
- 30 000 tags	**6ES7658-2ED00-2YH0**

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5

Ordering data	Article No.
Conversion of two OS single stations to redundant OS single stations	
SIMATIC PCS 7 OS Software Conversion Pack 2x Single Station to Single Station Redundancy V9.0 For conversion of two OS single stations to OS single station redundancy Supports all languages of the OS Software Single Station, software class A, runs with Windows 7 Ultimate 64-bit or Windows 10 Enterprise 2015 LTSB 64-bit (see SIMATIC PCS 7 Readme[1]) for the latest information), single license for 2 installations No SIMATIC PCS 7 Software Media Package	
• Goods delivery License key on USB flash drive and certificate of license	**6ES7652-3AA58-2YD0**
• Online delivery License key download and online certificate of license Note: Email address required!	**6ES7652-3AA58-2YJ0**
Conversion of two redundant OS single stations to redundant OS servers	
SIMATIC PCS 7 OS Software Conversion Pack Single Station Redundancy to Server Redundancy V9.0 For the conversion of two redundant OS single stations from OS single station redundancy to OS server redundancy Supports all languages of the OS Software Single Station Redundancy, software class A, runs with Windows Server 2012 R2 Standard Edition 64-bit and Windows Server 2016 Standard Edition 64-bit (see SIMATIC PCS 7 Readme[1]) for the latest information), single license for 2 installations No SIMATIC PCS 7 Software Media Package	
• Goods delivery License key on USB flash drive and certificate of license	**6ES7652-3BA58-2YC0**
• Online delivery License key download and online certificate of license Note: Email address required!	**6ES7652-3BA58-1YJ0**

	Article No.
Conversion of two OS servers to redundant OS servers	
SIMATIC PCS 7 OS Software ConversionPack 2x Server to Server Redundancy V9.0 For the conversion of two OS servers to OS server redundancy Supports all languages of the OS Software Server, software class A, runs with Windows Server 2012 R2 Standard Edition 64-bit and Windows Server 2016 Standard Edition 64-bit (see SIMATIC PCS 7 Readme[1]) for the latest information), single license for 2 installations No SIMATIC PCS 7 Software Media Package	
• Goods delivery License key on USB flash drive and certificate of license	**6ES7652-3BA58-2YD0**
• Online delivery License key download and online certificate of license Note: Email address required!	**6ES7652-3BA58-2YJ0**
Individual components	
RS 232 connecting cable, 10 m For redundant OS single stations / OS servers	**6ES7902-1AC00-0AA0**
Add-on components for OS single stations and OS servers For connection to redundant plant bus (BCE or CP 1623/1628), for upgrading from BCE to CP 1623/1628 including communication with redundant AS	
Desktop adapter network card for BCE and as spare part for redundant terminal bus INTEL PCI network adapter for connection to Industrial Ethernet (10/100/1000 Mbps), with RJ45 connection and PCI express interface Note: License for the BCE communication with SIMATIC PCS 7 Industrial Workstations with BCE communication already included	**A5E02639550**
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**

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Ordering data	Article No.
Licenses may be required for activating the functionality of the CP 1623 or CP 1628 (Communications software is part of the SIMATIC PCS 7 software)	
Activation license if no redundant AS are used	
SIMATIC NET HARDNET-IE S7 V14 Runtime software, 2 languages (German/English), software class A	
License for up to 4 Industrial Ethernet CPs, floating license for 1 user	
No SIMATIC PCS 7 Software Media Package	
• Goods delivery Software and electronic manual on DVD, license key USB flash drive	**6GK1716-1CB14-0AA0**
• Online delivery Software, manual and license key download Note: Email address required!	**6GK1716-1CB14-0AK0**
Activation licenses when using redundant AS	
Alternative license for SIMATIC NET HARDNET-IE S7:	
SIMATIC NET HARDNET-IE S7-REDCONNECT V14 Runtime software, 2 languages (English, German), software class A	
License for up to 4 Industrial Ethernet CPs, floating license for 1 user	
No SIMATIC PCS 7 Software Media Package	
• Goods delivery Software and electronic manual on DVD, license key USB flash drive	**6GK1716-0HB14-0AA0**
• Online delivery Software, manual and license key download Note: Email address required!	**6GK1716-0HB14-0AK0**
Additive license for SIMATIC NET HARDNET-IE S7:	
SIMATIC NET HARDNET-IE S7-REDCONNECT PowerPack V14 Runtime software, 2 languages (English, German), software class A	
License for up to 4 Industrial Ethernet CPs, floating license for 1 user	
No SIMATIC PCS 7 Software Media Package	
• Goods delivery License key USB flash drive	**6GK1716-0HB14-0AC0**
• Online delivery License key download Note: Email address required!	**6GK1716-0HB14-0AK1**

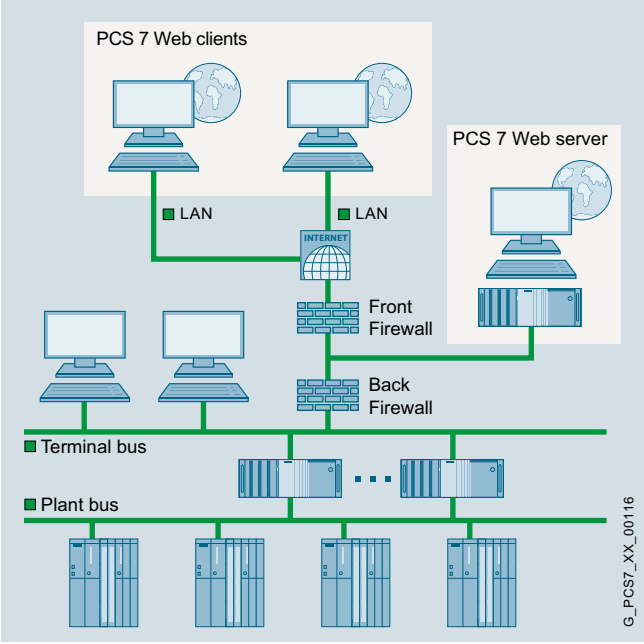
	Article No.
Components for connecting SIMATIC PCS 7 stations to a redundant terminal bus with PRP protocol	
SOFTNET-IE RNA V14 Software for linking of SIMATIC PCS 7 stations to PRP-enabled networks with integrated SNMP	**6GK1711-1EW14-0AA0**
Runtime software, 2 languages (German, English), software class A, runs with Windows 7 Ultimate 32/64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2012 R2 Standard Edition 64-bit and Windows Server 2016 Standard Edition 64-bit, floating license for 1 user	
No SIMATIC PCS 7 Software Media Package	
Goods delivery Software and electronic manual on DVD, license key USB flash drive	
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

[1] See chapter "Software Media and Logistics", section "System documentation", see page 1/7.

For more information on the Software Media Package, see the section "Software Media and Logistics", "PCS 7 Software Packages".

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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 100 PCS 7 Web clients access the data of **one** PCS 7 Web server over the 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.

Function



A plant can be operated and monitored via PCS 7 Web clients in the same manner as via the OS clients.

The process pictures are displayed on the PCS 7 Web clients with Internet Explorer. The PCS 7 Web clients access the project data provided by the PCS 7 Web server via an intranet or the Internet.

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Ordering data

	Article No.
"Standard" application	
SIMATIC PCS 7 **Web Server Basic V9.0** 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows Server 2012 R2 Standard Edition 64-bit and Windows Server 2016 Standard Edition 64-bit (see SIMATIC PCS 7 Readme[1] for latest information), single license for 1 installation	
No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	**6ES7658-2GX58-2YB0**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7658-2GX58-2YH0**
SIMATIC PCS 7 **Web Server license (cumulative)** Language-neutral, software class A, single license for 1 installation	
No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	
- 1 client	**6ES7658-2GE00-0XB0**
- 5 clients	**6ES7658-2GF00-0XB0**
- 10 clients	**6ES7658-2GG00-0XB0**
• Online delivery License key download, online certificate of license Note: Email address required!	
- 1 client	**6ES7658-2GE00-0XH0**
- 5 clients	**6ES7658-2GF00-0XH0**
- 10 clients	**6ES7658-2GG00-0XH0**
"Diagnostics" application	
SIMATIC PCS 7 **Web Diagnostics Server V9.0** 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows Server 2012 R2 Standard Edition 64-bit and Windows Server 2016 Standard Edition 64-bit (see SIMATIC PCS 7 Readme[1] for latest information), single license for 1 installation	
No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	**6ES7658-2HX58-2YB0**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7658-2HX58-2YH0**
SIMATIC PCS 7 **Web Diagnostics Client V9.0** 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit and Windows 10 Enterprise 2015 LTSB 64-bit (see SIMATIC PCS 7 Readme[1] for the latest information), single license for 1 installation	
No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	**6ES7658-2JX58-2YB0**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7658-2JX58-2YH0**
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 V9.0**[2] 5 languages (English, German, French, Italian, Spanish), software class A, runs with Windows 7 Ultimate 64-bit or Windows 10 Enterprise 2015 LTSB 64-bit (see SIMATIC PCS 7 Readme[1] for the latest information), floating license for 1 user	
No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	**6ES7658-2CX58-0YB5**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7658-2CX58-0YH5**
SIMATIC PCS 7 **OS Software Client ASIA V9.0**[1] 2 languages (English, Chinese), software class A, runs with Windows 7 Ultimate 64-bit or Windows 10 Enterprise 2015 LTSB 64-bit (see SIMATIC PCS 7 Readme[1] for the latest information), floating license for 1 user	
No SIMATIC PCS 7 Software Media Package ASIA	
• Physical delivery ASIA license key on USB hardlock, certificate of license	**6ES7658-2CX58-0CB5**

[1] See chapter "Software Media and Logistics", section "System documentation", see page 1/7.

[2] 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 systems Windows Server 2012 R2 Standard Edition 64-bit and Windows Server 2016 Standard Edition 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). You can find more information on the topic of Industrial Security on the Internet at
www.siemens.com/industrialsecurity

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Notes

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Process Data Archiving and Reporting

6

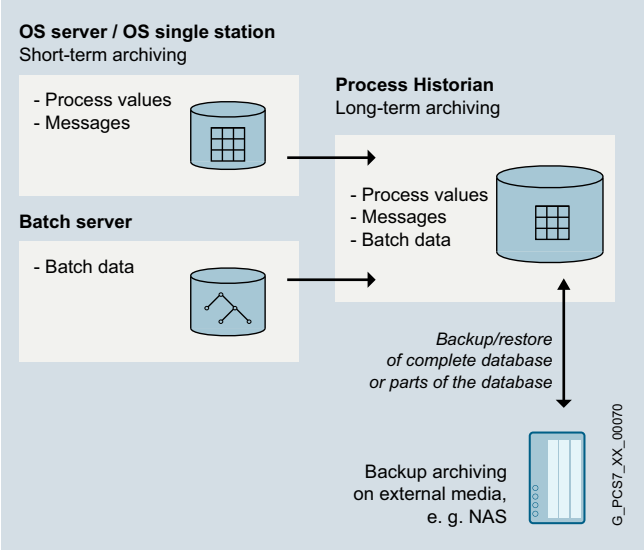


6/2 **Introduction**

6/3 **Process Historian and Information Server**

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Overview



Short-term and long-term 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 (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 backed up on external storage media such as an NAS. This requires additional hardware and software that the utilized operating system supports.

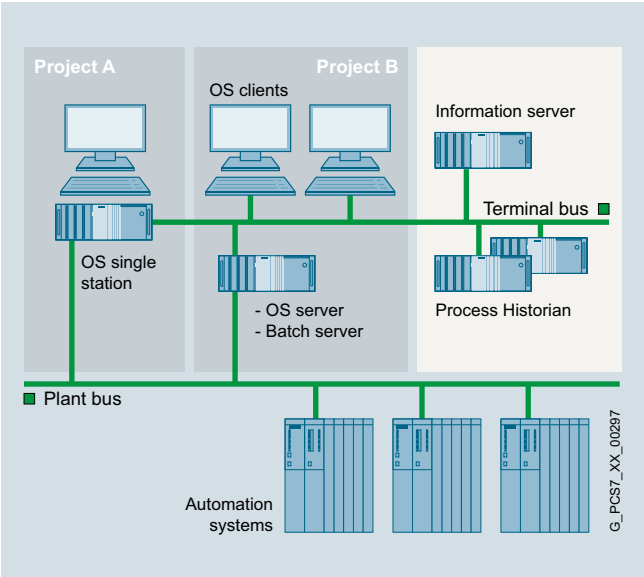
Benefits

Process Historian

- Scalable high-performance archiving system in SIMATIC PCS 7
- 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

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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

Individual consultation on project-specific hardware configurations is recommended. The **PH-HW Advisor** tool is provided to determine the suitable hardware for the Process Historian:

https://support.industry.siemens.com/cs/de/en/view/109740115

If high online availability is required, a redundant Process Historian can be configured with a 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, separation of the Information Server is mandatory.

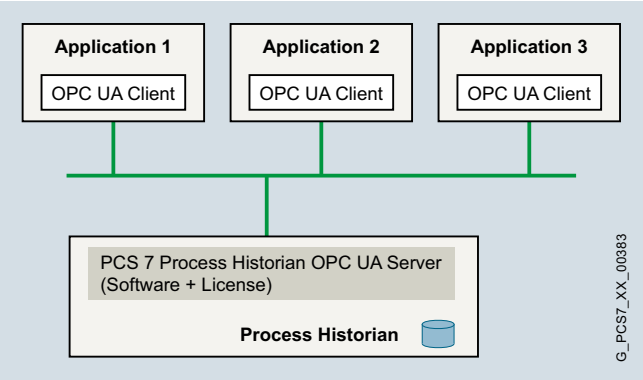
Process Historian and Information Server run with the Windows Server 2012 and 2016 operating system, the Information Server can also run on separate hardware with Windows 7 or Windows 10.

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



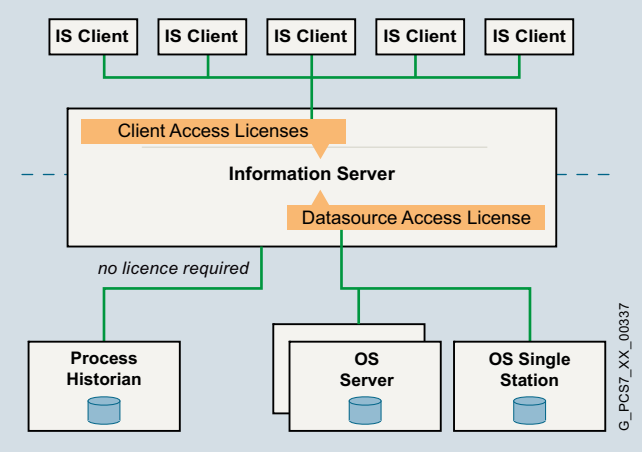
Reading of Process Historian data via OPC UA

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).

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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 operator stations (OS single station, OS server). Unlike when you access the Process Historian, you need cumulative licenses for SIMATIC PCS 7 Information Server Data Source Access to read data from OS single stations and OS servers. 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
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.

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 can subsequently be upgraded to V9.0 (for further information, see "Update/upgrade packages, Upgrades from SIMATIC PCS 7 V8.x to V 9.0, Upgrades for Process Historian and Information Server").

Migration of CAS database

The migration wizard of the Process Historian V8.2 supports the migration of CAS databases of SIMATIC PCS 7 V7.0 and higher.

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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 alarms managed in the database of the Process Historian on the OS clients and OS single stations can be visualized in a clear and user-friendly 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 further 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 external storage media (Backup/Restore). This requires additional hardware and software suitable for the operating system of the Process Historian, for example NAS.

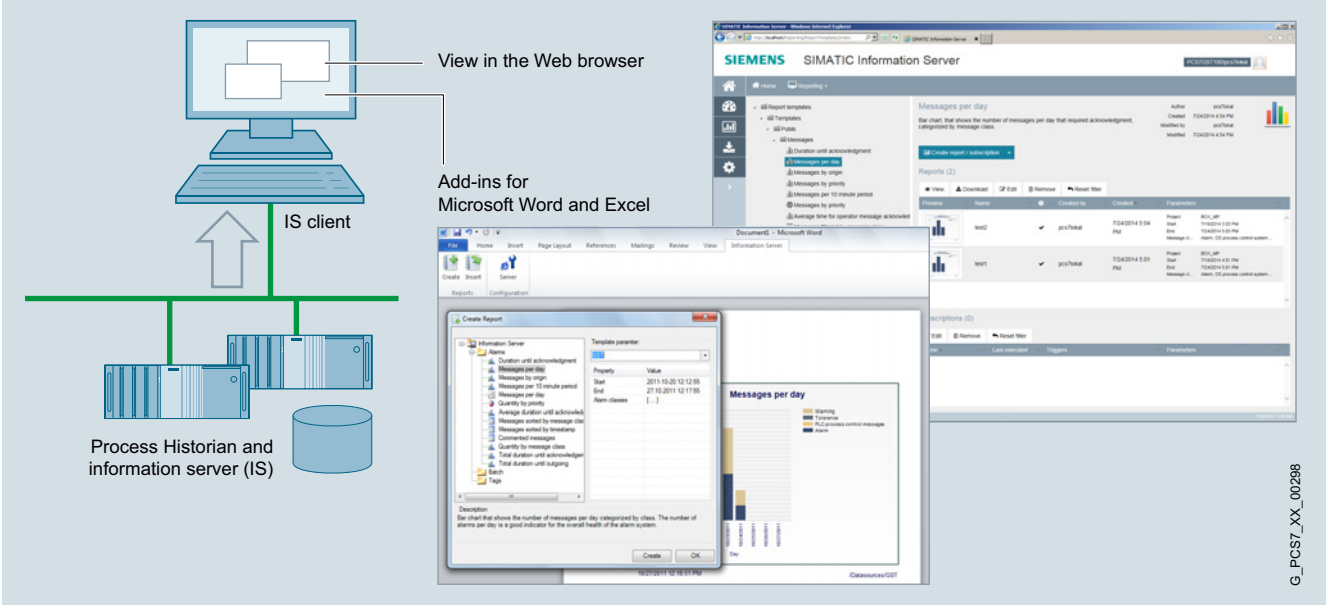
The Process Historian also supports backup and restoring of the complete database – both manually and automatically.

Archiving and visualization functions

- Real-time archiving of process values and messages from SIMATIC PCS 7 Operator Systems (OS single stations and OS servers)
- Real-time archiving for the batch data of SIMATIC BATCH
- Conversion of runtime segments in archive segments:
  - Loss-free data compression
  - Reduction of segment size 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 terms of performance and quantity structure
- Export 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
  - Visualization of a batch overview (selecting the detailed log of a batch from the batch overview is possible)

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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.

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 email 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 Microsoft Excel report templates

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Ordering data	Article No.
Process Historian and Information Server on shared hardware	
SIMATIC PCS 7 Process Historian and Information Server Basic Package V9.0 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 2012 R2 Standard Edition 64-bit and Windows Server 2016 Standard Edition 64-bit (see SIMATIC PCS 7 Readme[1] for latest information), single license for 1 installation No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	**6ES7652-7AX58-2YB0**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7652-7AX58-2YH0**
Process Historian and Information Server on separate hardware	
SIMATIC PCS 7 Information Server Basic Package V9.0 For installation of the Information Server on a single station or server version of the Industrial Workstation, separate from the Process Historian 5 languages (English, German, French, Italian, Spanish), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64 Bit, Windows Server 2012 R2 Standard Edition 64-bit and Windows Server 2016 Standard Edition 64-bit (see SIMATIC PCS 7 Readme[1] for the latest information), single license for 1 installation No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	**6ES7652-7EX58-2YB0**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7652-7EX58-2YH0**
SIMATIC PCS 7 Process Historian Basic Package V9.0 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 2012 R2 Standard Edition 64-bit and Windows Server 2016 Standard Edition 64-bit (see SIMATIC PCS 7 Readme[1] for latest information), single license for 1 installation No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	**6ES7652-7BX58-2YB0**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7652-7BX58-2YH0**
SIMATIC PCS 7 Process Historian Server Redundancy V9.0 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 2012 R2 Standard Edition 64-bit and Windows Server 2016 Standard Edition 64-bit (see SIMATIC PCS 7 Readme[1] for latest information), single license for 2 installations No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	**6ES7652-7CX58-2YB0**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7652-7CX58-2YH0**

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Ordering data	Article No.
Functional options for Process Historian	
SIMATIC PCS 7 Process Historian Archive BATCH V9.0 5 languages (English, German, French, Italian, Spanish), software class A, runs with Windows Server 2012 R2 Standard Edition 64-bit and Windows Server 2016 Standard Edition 64-bit (see SIMATIC PCS 7 Readme[1] for latest information), single license for 1 installation	
No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	**6ES7652-7DX58-2YB0**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7652-7DX58-2YH0**
SIMATIC PCS 7 Process Historian OPC UA Server V9.0 for connection to third-party system	
5 languages (English, German, French, Italian, Spanish), software class A, runs with Windows Server 2012 R2 Standard Edition 64-bit and Windows Server 2016 Standard Edition 64-bit (see SIMATIC PCS 7 Readme[1] for latest information), single license for 1 installation	
No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	**6ES7652-7FX58-2YB0**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7652-7FX58-2YH0**
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	
No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	
- 1 client	**6ES7652-7YA00-2YB0**
- 3 clients	**6ES7652-7YB00-2YB0**
- 5 clients	**6ES7652-7YC00-2YB0**
- 10 clients	**6ES7652-7YD00-2YB0**
• Online delivery License key download, online certificate of license Note: Email address required!	
- 1 client	**6ES7652-7YA00-2YH0**
- 3 clients	**6ES7652-7YB00-2YH0**
- 5 clients	**6ES7652-7YC00-2YH0**
- 10 clients	**6ES7652-7YD00-2YH0**

	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	
No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	
- 1 source	**6ES7652-7YE00-2YB0**
- 3 sources	**6ES7652-7YF00-2YB0**
• Online delivery License key download, online certificate of license Note: Email address required!	
- 1 source	**6ES7652-7YE00-2YH0**
- 3 sources	**6ES7652-7YF00-2YH0**
Conversion of two Process Historian servers to redundant Process Historian servers	
SIMATIC PCS 7 Process Historian Conversion Pack 2x Server to Server Redundancy V9.0 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 2012 R2 Standard Edition 64-bit and Windows Server 2016 Standard Edition 64-bit (see SIMATIC PCS 7 Readme[1] for latest information), single license for 2 installations	
No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	**6ES7652-7CX58-2YD0**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7652-7CX58-2YJ0**

[1] See chapter "Software Media and Logistics", section "System documentation", see page 1/7.

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Plant Device Management



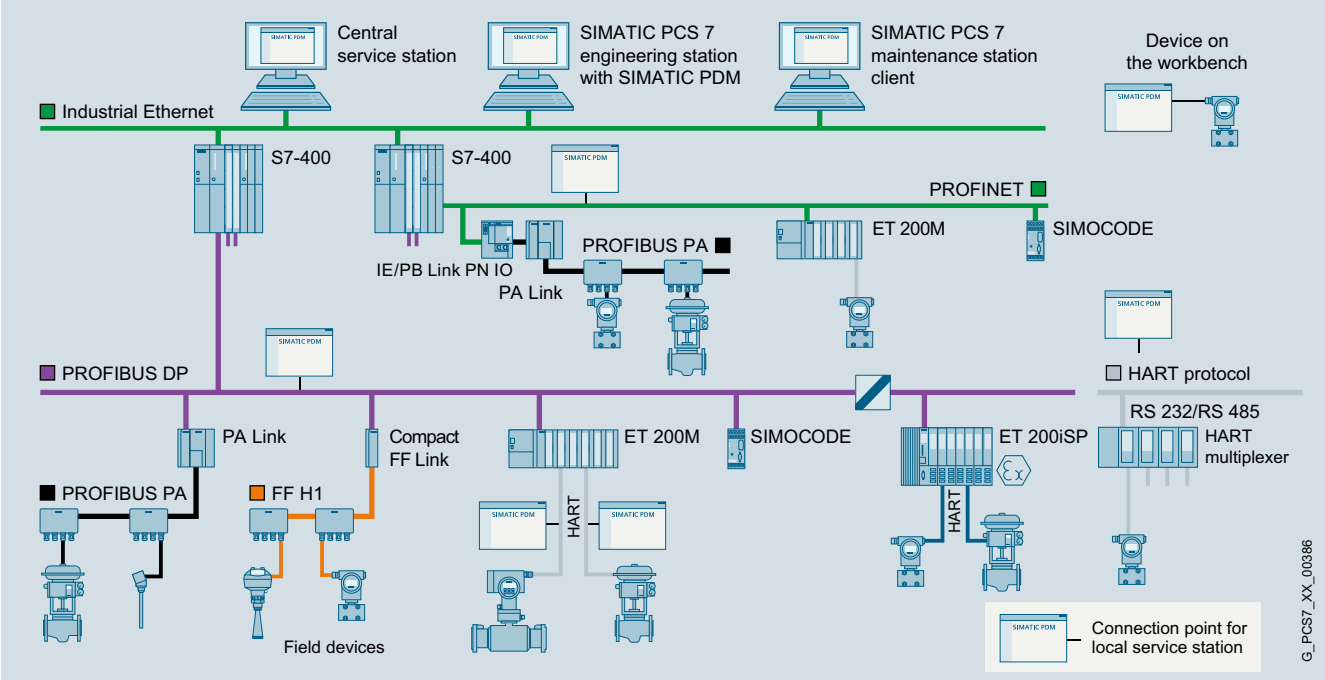
7/2 **SIMATIC PDM**

7/14 **SIMATIC PCS 7 Maintenance Station**

7/19 **SIMATIC PDM Maintenance Station**

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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.

With *one* software product, SIMATIC PDM enables users to work with over 3 500 devices and device variants of Siemens and over 200 other manufacturers worldwide on a *single* 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 process device manager on the global market. Devices not previously supported can be integrated in SIMATIC PDM by importing their device description packages (either EDD or FDI). 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
- Quantity options for
  - Transfer of parameters between devices
  - Transfer of parameter sets to the devices
  - Export and import functions
  - Diagnostics update

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Overview (continued)

SIMATIC PDM can be used extremely flexiblly and tailored to a specific task for field device service:

- Single-point station for point-to-point connection to field devices
- Local service and parameter assignment station with connection to fieldbus segments
- Central service and parameter assignment station with connection to plant bus
- Central HART service and parameter assignment station for HART multiplexers and WirelessHART field devices
- Integrated into the SIMATIC PDM stand-alone maintenance station
- Integrated into the SIMATIC PCS 7 process control system

Maintenance personnel can assign field device parameters at mobile and stationary workstations with SIMATIC PDM. Practically every workstation integrated in the production plant can be used for configuration. Service personnel are thus able to work directly at the location of the field device, while data is stored centrally in the engineering station or maintenance station. This leads to a significant shortening of maintenance and travel times. Additional device-independent system functions support higher-level maintenance stations for creating progress lists for work and servicing.

When a maintenance station is configured in the SIMATIC PCS 7 process control system, SIMATIC PDM is integrated into it and transmits parameter data, diagnostic information and processing information. You can switch directly to the SIMATIC PDM views from the diagnostics faceplates in the maintenance station to perform diagnostics and work on the device in more detail.

A SIMATIC PDM user administration system based on SIMATIC Logon is used to assign various roles with defined function privileges to users. These function privileges refer to SIMATIC PDM system functions, e.g. writing to the device.

For all devices integrated with device description packages, SIMATIC PDM provides a range of information for display and further processing on the maintenance station, for example:

- 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 (for example local configuration changes), device test completed
- Information on changes (audit trail report)
- Parameter information

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Design

Components	Product packages							
	SIMATIC PDM Stand alone				SIMATIC PDM system-integrated			
	Minimum configuration	Basic configuration	Service and parameter assignment station		in the configuration environment			
			local	central	SIMATIC S7	SIMATIC PCS 7		
	PDM Single Point	**PDM Basic**	**PDM Service**	**PDM Stand alone Server**	**PDM S7**	**PDM PCS 7**	**PDM PCS 7 Server**	**PDM PCS 7 FF**
SIMATIC PDM TAGs[1] in product package	1	4	4 + 50	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	o
SIMATIC PDM Basic		●	●	●	●	●	●	●
SIMATIC PDM Extended		o	o	●	●	●	●	●
SIMATIC PDM integration in STEP 7/ PCS 7		o	o	o	●	●	●	●
SIMATIC PDM Routing[2]		o	o	o	o	●	●	●
SIMATIC PDM Server		o	o	●	o	o	●	o
SIMATIC PDM 1 Client[3]		o	o	● (2 ×)	o	o	o	o
SIMATIC PDM Communication FOUNDATION Fieldbus		–	–	–	o	o	o	●
SIMATIC PDM HART server		o	o	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"
2) In combination with SIMATIC PDM Integration in STEP 7/PCS 7
3) In combination with SIMATIC PDM Server

Customer-oriented product structure

The customer-oriented product structure of SIMATIC PDM provides optimal support for the named main use cases and enables you to adapt the scope of functions and performance to your individual requirements. The product range is organized as follows:

SIMATIC PDM Stand alone product packages

- SIMATIC PDM Single Point, a minimum configuration for single device handling
- SIMATIC PDM Basic for local service and parameter assignment stations as well as basic configuration for individual product package with optional product components
- SIMATIC PDM Service for local service and parameter assignment stations
- SIMATIC PDM Stand alone Server for central service and parameter assignment stations, e.g. for various plant units

SIMATIC PDM system-integrated product packages

- SIMATIC PDM S7 for local SIMATIC S7 engineering and service stations
- Various configurations for central SIMATIC PCS 7 engineering and service stations:
  - SIMATIC PDM PCS 7
  - SIMATIC PDM PCS 7 Server (enables device parameter assignment and diagnostics on clients of the PCS 7 engineering station and PCS 7 Maintenance Station)
  - SIMATIC PDM PCS 7-FF (supports the FOUNDATION Fieldbus H1)

In some circumstances, the product packages can be expanded with optional product components.

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Design (continued)

Product range	SIMATIC PDM V9.1							
	Single Point	Basic	Service	Stand alone Server	S7	PCS 7	PCS 7 Server	PCS 7-FF
TAGs contained	**1**	**4**	**4 + 50**	**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	o	●	●	●	●
Project: Utilization of SIMATIC PDM options	–	●	●	●	●	●	●	●
Project: Integration in STEP 7/PCS 7	–	o	o	o	●	●	●	●
Group operations	–	o	o	●	o	●	●	●
Setting device IDs	–	o	o	●	o	●	●	●
Communication: HART modem	●	●	●	●	●	–	–	–
Communication: HART interface	●	●	●	●	●	–	–	–
Communication: PROFIBUS DP/PA	●	●	●	●	●	●	●	●
Communication: HART over PROFIBUS DP	●	●	●	●	●	●	●	●
Communication: FF H1	–	–	–	–	o	o	o	●
Communication: Modbus	●	●	●	●	●	●	●	●
Communication: Ethernet	●	●	●	●	●	●	●	●
Communication: PROFINET	●	●	●	●	●	●	●	●
Communication: HART over PROFINET	●	●	●	●	●	●	●	●
Devices: Export/import parameters	–	o	o	●	●	●	●	●
Devices: Comparison of parameter values	–	o	o	●	●	●	●	●
Devices: Saving parameters	●	●	●	●	●	●	●	●
Devices: Change log (Audit Trail)	–	o	o	●	●	●	●	●
Devices: Calibration report	–	o	o	●	●	●	●	●
Devices: Print function	●	o	o	●	●	●	●	●
Devices: Document manager	–	o	o	●	●	●	●	●
Lifelist: Basic functionality	●	●	●	●	●	●	●	●
Lifelist: Expanded functionality (scan range, diagnostics, export, addressing)	–	o	o	●	●	●	●	●
Communication: Data record routing	–	o	o	o	o	●	●	●
Communication: HART multiplexer	–	o	o	o	o	–	–	–
Communication: Wireless HART	–	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	●	o
Function: Device parameter assignment on SIMATIC PDM clients	–	o	o	● (2 ×)	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

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Design (continued)

SIMATIC PDM Stand alone product packages

SIMATIC PDM Single Point V9.1

This minimum configuration with handheld functionality is intended for handling exactly *one* field device via point-to-point coupling. It cannot be expanded with functions or with SIMATIC PDM TAG or SIMATIC PDM 1 Client licenses. Upgrading to a different product variant, e.g. SIMATIC PDM Basic, or a different product version is also not possible.

Supported communication types:

- PROFIBUS DP/PA
- HART communication (modem, RS 232 and via PROFIBUS/ PROFINET)
- Modbus
- Ethernet
- PROFINET

The functionality is matched accordingly. The device functions are supported as defined in the device description, for example:

- Managing the device library and unlimited device selection
- Parameter assignment and diagnostics according to the device description
- Exporting and importing of parameter data
- Device identification
- Lifelist
- Printing the parameter list

SIMATIC PDM Basic V9.1

SIMATIC PDM Basic is for local service and parameter assignment stations on any computers (IPC/notebook) with local connection to bus segments or direct connection to the device.

Supported communication types:

- PROFIBUS DP/PA
- HART communication (modem, RS 232 and via PROFIBUS/ PROFINET)
- Modbus
- Ethernet
- PROFINET

SIMATIC PDM Basic is equipped with all basic functions required for operation and parameter assignment of devices. That is, compared to SIMATIC PDM Single Point, it has the following additional functions:

- EDD-based diagnostics in the lifelist
- Memory function (only exporting and importing of parameter data)
- Report function
- Communication with HART field devices via remote I/Os

As a basic block for an individual configuration, SIMATIC PDM Basic can be expanded with all functional SIMATIC PDM options (PDM Routing only in combination with PDM Integration in STEP 7/PCS 7 required) 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 1 Client licenses (sets of 1) can also be added in combination with the SIMATIC PDM Server option.

The SIMATIC PDM Extended option allows the activation of additional SIMATIC PDM system functions (for details, see SIMATIC PDM Extended V9.1 under "Optional product components").

SIMATIC PDM Service V9.1

With this product package for extended service, local service and parameter assignment stations can be realized on any type of 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)
- 50 SIMATIC PDM TAGs

Like SIMATIC PDM Basic, SIMATIC PDM Service can be expanded with all functional SIMATIC PDM options (PDM Routing only in combination with PDM Integration in STEP 7/PCS 7 required) as well as with cumulative SIMATIC PDM TAGs (sets of 10, 100 or 1 000) (see "Optional product components"). SIMATIC PDM 1 Client licenses (sets of 1) can also be added in combination with the SIMATIC PDM Server option. It is permitted to upgrade to another product version.

Note: For use of gateways and for PROFINET or Ethernet communication with field devices, SIMATIC PDM TAG licenses are charged for according to the objects configured in the process device plant view as follows:

- 10 SIMATIC PDM TAGs per S7 DSGW (data record gateway) with one PROFIBUS subnet
- 20 SIMATIC PDM TAGs per S7 DSGW with more than one PROFIBUS subnet
- 10 TAGs per IE/PB Link
- 1 TAG per field device (except in the case of special specifications)

SIMATIC PDM stand-alone server V9.1

With the SIMATIC PDM Stand alone Server product package, you can establish central service and parameter assignment stations that operate according to the client/server principle. Portals opened on licensed SIMATIC PDM clients (SIMATIC PDM sessions) enable handling of production plant field devices via the SIMATIC PDM server on the plant bus assigned via registration. The product package can be used multiple times within a plant, e.g. for various plant units. It comprises:

- SIMATIC PDM Basic (incl. 4 SIMATIC PDM TAGs)
- SIMATIC PDM Extended
- SIMATIC PDM Server
- 2 × SIMATIC PDM 1 Client
- 100 SIMATIC PDM TAGs

SIMATIC PDM Stand alone Server can be expanded with all functional SIMATIC PDM options (PDM Routing only in combination with PDM Integration in STEP 7/PCS 7 required) as well as with cumulative sets of 10, 100 or 1 000 SIMATIC PDM TAGs and SIMATIC PDM 1-client licenses (see "Optional product components"). The portals opened on these clients (SIMATIC PDM sessions) must also be licensed with the SIMATIC PDM 1-client licenses (besides the SIMATIC PDM clients). For details about this, refer to "SIMATIC PDM 1 Client" under "Optional product components". For user management of the SIMATIC PDM clients, the SIMATIC Logon product is also required. It is possible to upgrade to another product version.

Note: For use of gateways and for PROFINET or Ethernet communication with field devices, SIMATIC PDM TAG licenses are charged according to the objects configured in the process device plant view (for details, see corresponding note under SIMATIC PDM Service V9.1).

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Design (continued)

SIMATIC PDM system-integrated product packages

SIMATIC PDM S7 V9.1

The SIMATIC PDM S7 product package designed for use in a SIMATIC S7 configuration environment is intended for setup of a local SIMATIC S7 engineering and service station. It requires the installation of STEP 7 V5.5+SP4. It includes:

- 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 SIMATIC PDM TAGs (sets of 10, 100 or 1 000) (see "Optional product components"). SIMATIC PDM 1 Client licenses (sets of 1) can also be added in combination with the SIMATIC PDM Server option.

SIMATIC PDM PCS 7 V9.1

The SIMATIC PDM PCS 7 product package suitable for use in a SIMATIC PCS 7 configuration environment is intended for use in a central SIMATIC PCS 7 engineering and service station. 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 and SIMATIC PDM Server as well as with cumulative SIMATIC PDM TAGs (sets of 10, 100 or 1 000) (see "Optional product components"). SIMATIC PDM 1 Client licenses (sets of 1) can also be added in combination with the SIMATIC PDM Server option.

SIMATIC PDM PCS 7 Server V9.1

Instead of SIMATIC PDM PCS 7, the SIMATIC PDM PCS 7 Server product package expanded with the SIMATIC PDM Server option can also be used for a central SIMATIC PCS 7 engineering and service station. Field devices integrated using an Electronic Device Description (EDD) can then be assigned parameters on any client of the SIMATIC PCS 7 Maintenance Station as well as on local SIMATIC PDM clients. The following are components of SIMATIC PDM PCS 7 Server:

- SIMATIC PDM Basic (incl. 4 SIMATIC PDM TAGs)
- SIMATIC PDM Extended
- SIMATIC PDM integration in STEP 7/PCS 7
- SIMATIC PDM Routing
- SIMATIC PDM Server
- 100 SIMATIC PDM TAGs

SIMATIC PDM PCS 7 Server can be expanded with the functional option SIMATIC PDM Communication FOUNDATION Fieldbus as well as with cumulative sets of 10, 100 or 1 000 SIMATIC PDM TAGs and SIMATIC PDM 1-Client licenses (see "Optional product components"). The portals opened on these clients (SIMATIC PDM sessions) must also be licensed with the SIMATIC PDM 1-client licenses (besides the SIMATIC PDM clients). For details about this, refer to "SIMATIC PDM 1 Client" under "Optional product components".

SIMATIC PDM PCS 7-FF V9.1

Instead of SIMATIC PDM PCS 7, the SIMATIC PDM PCS 7-FF product package expanded with the SIMATIC PDM Communication FOUNDATION Fieldbus option can also be used for a central SIMATIC PCS 7 engineering and service station. This additionally supports parameter assignment of field devices on FOUNDATION Fieldbus H1. Components of SIMATIC PDM PCS 7-FF are:

- SIMATIC PDM Basic (incl. 4 SIMATIC PDM TAGs)
- SIMATIC PDM Extended
- SIMATIC PDM integration in STEP 7/PCS 7
- SIMATIC PDM Routing
- SIMATIC PDM Communication FOUNDATION Fieldbus
- 100 SIMATIC PDM TAGs

SIMATIC PDM PCS 7-FF V9.1 can be expanded with the functional option SIMATIC PDM Server as well as with cumulative sets of 10, 100 or 1 000 SIMATIC PDM TAGs (see "Optional product components"). SIMATIC PDM 1 Client licenses (sets of 1) can also be added in combination with the SIMATIC PDM Server option.

Optional product components

SIMATIC PDM Extended V9.1 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
- Group operations
- Setting device IDs

This functionality is already integrated in the following product packages: SIMATIC PDM Stand alone Server, 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 V9.1

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).

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Design (continued)

SIMATIC PDM Routing V9.1 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 can be used in combination with SIMATIC PDM Integration in STEP 7/SIMATIC PCS 7.

Routing is already integrated in SIMATIC PDM PCS 7, SIMATIC PDM PCS 7 Server, and SIMATIC PDM PCS 7-FF. SIMATIC PDM Routing can be additionally installed as an option on a local SIMATIC S7 engineering and service station with SIMATIC PDM S7.

SIMATIC PDM Server V9.1 option

The server functionality can be activated in a local or central service station with this option. It enables parameter assignment of selected field devices on any client of the SIMATIC PCS 7 Maintenance Station as well as on local SIMATIC PDM clients. This functionality is already integrated in the SIMATIC PDM Stand alone Server and SIMATIC PDM PCS 7 Server. The SIMATIC PDM clients as well as the portals opened on these clients (SIMATIC PDM sessions) must be licensed with SIMATIC PDM 1 client licenses. For details about this, refer to "SIMATIC PDM 1 Client" under "Optional product components".

SIMATIC PDM Communication FOUNDATION Fieldbus V9.1 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 V9.1 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 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 that represents the individual field devices or field 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 1 Client (version-independent)

SIMATIC PDM 1 Client is a cumulative single-client license for SIMATIC PDM configurations with SIMATIC PDM server, for example SIMATIC PDM stand-alone server or SIMATIC PDM PCS 7 server. The license is used to activate registered SIMATIC PDM clients and SIMATIC PDM sessions (opened portals) on these clients.

Each "SIMATIC PDM 1 Client" license activates one SIMATIC PDM client with one SIMATIC PDM session. A SIMATIC PDM session is defined as one opened portal together with the parameter views of the field devices opened from the portal. Each additional simultaneously opened SIMATIC PDM session on this client requires its own "SIMATIC PDM 1 Client" license. For larger projects, up to 30 registered SIMATIC PDM Clients are possible.

The "SIMATIC PDM 1 Client" license must be transferred to the computer with the SIMATIC PDM Server. The SIMATIC PDM Standalone Server product package comes with 2 "SIMATIC PDM 1 Client" licenses.

SIMATIC PDM Software Media Package V9.1

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, when supplied via physical delivery (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 mode
- Storage functions disabled
- Export and import functions disabled
- Expanded functionality disabled
- Communication functions restricted

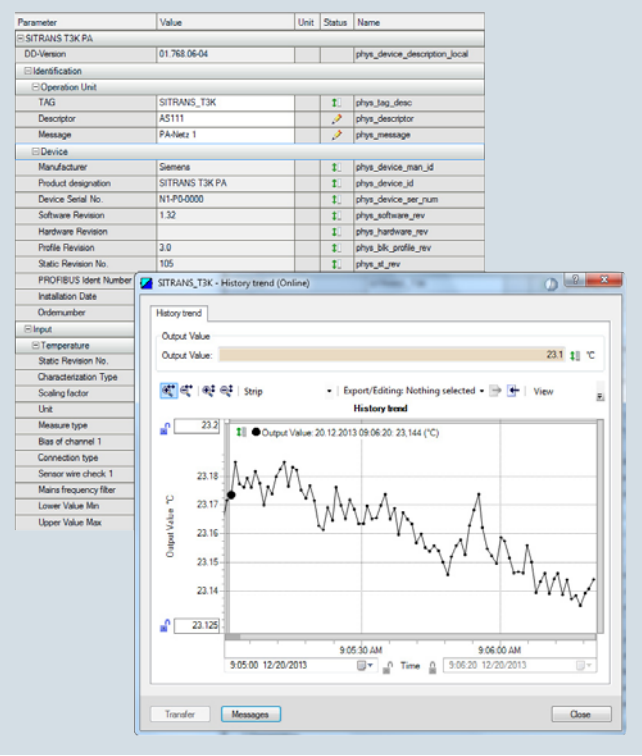
Information on ordering and delivery

SIMATIC PDM is among the products for which the installation software is provided in the form of a software media package. Software media packages and product-specific software licenses are separate packages, which are not merged into a single delivery unit for a physical delivery.

The number of delivered software media packages can be determined by the number of ordered items. You can find more information under "Delivery form package" in the "Software Media and Logistics", "PCS 7 Software Packages" section of the ST PCS 7 catalog, see page 1/2.

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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 defined by the Electronic Device Description (EDD) and devices described by Field Device Integration Technology (FDI Technology V1.2). 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 (FCG: Field Communication Group)
- Foundation Fieldbus (FCG: Field Communication Group)

The devices are integrated directly in SIMATIC PDM through a company-specific EDD or through the libraries of the FCG. To achieve improved transparency, they can be managed in project-specific device libraries.

Field devices are described in the EDD or FDI device description packages 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. By simply importing the manufacturer's device-specific device description packages, you can update existing devices and integrate further devices in SIMATIC PDM.

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 V9.1	
Hardware	• PG/PC/notebook with processor corresponding to operating system requirements
Operating system (alternatives)	• Windows 7 Professional/Ultimate/ Enterprise SP1, 32-bit/64-bit • Windows 10 Enterprise 2015 LTSB 64-bit • Windows Server 2012 R2 Standard Edition, 64-bit
Integration in STEP 7/PCS 7	• SIMATIC PCS 7 V8.0+SP2/V8.1/V8.2 (without Communication FOUNDATION Fieldbus) • SIMATIC PCS 7 V9.0 • STEP 7 V5.5+SP4/V5.6
SIMATIC PDM Client	• Microsoft Internet Explorer 10 or 11 • Google Chrome

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Ordering data	Article No.
SIMATIC PDM Stand alone product packages	
Minimum configuration	
SIMATIC PDM Single Point V9.1 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 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit or Windows Server 2012 R2 Standard Edition 64-bit (see SIMATIC PDM V9.1 Readme for latest information), floating license for 1 user	
Without SIMATIC PCS 7 Software Media Package	
• Goods delivery License key on USB flash drive and certificate of license, bundled with 1 × SIMATIC PDM Software Media Package per order item	**6ES7658-3HA68-0YA5**
• Online delivery License key download and online certificate of license combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download) Note: Email address required!	**6ES7658-3HA68-0YH5**
Basic configuration for individual product package as well as local service and parameter assignment stations	
SIMATIC PDM Basic V9.1 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 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit or Windows Server 2012 R2 Standard Edition 64-bit (see SIMATIC PDM V9.1 Readme for latest information), floating license for 1 user	
Without SIMATIC PCS 7 Software Media Package	
• Goods delivery License key on USB flash drive and certificate of license, bundled with 1 × SIMATIC PDM Software Media Package per order item	**6ES7658-3AB68-0YA5**
• Online delivery License key download and online certificate of license combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download) Note: Email address required!	**6ES7658-3AB68-0YH5**
Configuration for local service and parameter assignment station	
SIMATIC PDM Service V9.1 Product package for service and measuring circuit tests on a local service station, with • SIMATIC PDM Basic incl. 4 TAGs • 50 TAGs	
6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit or Windows Server 2012 R2 Standard Edition 64-bit (see SIMATIC PDM V9.1 Readme for latest information), floating license for 1 user	
Without SIMATIC PCS 7 Software Media Package	
• Goods delivery License key on USB flash drive and certificate of license, bundled with 1 × SIMATIC PDM Software Media Package per order item	**6ES7658-3JD68-0YA5**
• Online delivery License key download and online certificate of license combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download) Note: Email address required!	**6ES7658-3JD68-0YH5**
Configuration for central service and parameter assignment station	
SIMATIC PDM stand-alone server V9.1 Product package for service and device management in plant units, with - SIMATIC PDM Basic incl. 4 TAGs - SIMATIC PDM Extended - SIMATIC PDM Server - 2 × SIMATIC PDM 1 Client - 100 TAGs	
6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit or Windows Server 2012 R2 Standard Edition 64-bit (see SIMATIC PDM V9.1 Readme for latest information), single license for 1 installation	
Without SIMATIC PCS 7 Software Media Package	
• Goods delivery License key on USB flash drive and certificate of license, bundled with 1 × SIMATIC PDM Software Media Package per order item	**6ES7658-3TX68-0YA5**
• Online delivery License key download and online certificate of license combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download) Note: Email address required!	**6ES7658-3TX68-0YH5**

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Ordering data	Article No.
SIMATIC PDM system-integrated product packages	
Configuration for local SIMATIC S7 engineering and service station	
SIMATIC PDM S7 V9.1 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 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit or Windows Server 2012 R2 Standard Edition 64-bit (see SIMATIC PDM V9.1 Readme for latest information), floating license for 1 user Without SIMATIC PCS 7 Software Media Package	
• Goods delivery License key on USB flash drive and certificate of license, bundled with 1 × SIMATIC PDM Software Media Package per order item	**6ES7658-3KD68-0YA5**
• Online delivery License key download and online certificate of license combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download) Note: Email address required!	**6ES7658-3KD68-0YH5**
Configuration for central SIMATIC PCS 7 engineering and service stations	
SIMATIC PDM PCS 7 V9.1 Product package for use in a SIMATIC PCS 7 configuration environment 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit or Windows Server 2012 R2 Standard Edition 64-bit (see SIMATIC PDM V9.1 Readme for latest information) 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 Without SIMATIC PCS 7 Software Media Package	
• Goods delivery License key on USB flash drive and certificate of license, bundled with 1 × SIMATIC PDM Software Media Package per order item	**6ES7658-3LD68-0YA5**
• Online delivery License key download and online certificate of license combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download) Note: Email address required!	**6ES7658-3LD68-0YH5**
SIMATIC PDM PCS 7-FF V9.1 Product package for use in a SIMATIC PCS 7 configuration environment, including FOUNDATION Fieldbus H1 communication 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit or Windows Server 2012 R2 Standard Edition 64-bit (see SIMATIC PDM V9.1 Readme for latest information) 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 Without SIMATIC PCS 7 Software Media Package	
• Goods delivery License key on USB flash drive and certificate of license, bundled with 1 × SIMATIC PDM Software Media Package per order item	**6ES7658-3MD68-0YA5**
• Online delivery License key download and online certificate of license combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download) Note: Email address required!	**6ES7658-3MD68-0YH5**
SIMATIC PDM PCS 7 Server V9.1 Product package for use in a SIMATIC PCS 7 configuration environment, including server functionality 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit or Windows Server 2012 R2 Standard Edition 64-bit (see SIMATIC PDM V9.1 Readme for latest information) Single license for 1 installation, 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 Without SIMATIC PCS 7 Software Media Package	
• Goods delivery License key on USB flash drive and certificate of license, bundled with 1 × SIMATIC PDM Software Media Package per order item	**6ES7658-3TD68-0YA5**
• Online delivery License key download and online certificate of license combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download) Note: Email address required!	**6ES7658-3TD68-0YH5**

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Ordering data	Article No.
Optional product components for SIMATIC PDM	
SIMATIC PDM Extended V9.1 For enabling additional system functions	
6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit or Windows Server 2012 R2 Standard Edition 64-bit (see SIMATIC PDM V9.1 Readme for latest information), floating license for 1 user	
Without SIMATIC PCS 7/SIMATIC PDM Software Media Package	
• Goods delivery License key on USB flash drive and certificate of license	**6ES7658-3NX68-2YB5**
• Online delivery (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license Note: Email address required!	**6ES7658-3NX68-2YH5**
SIMATIC PDM Integration in STEP 7/SIMATIC PCS 7 V9.1 For integration in a SIMATIC S7/ SIMATIC PCS 7 configuration environment	
6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit or Windows Server 2012 R2 Standard Edition 64-bit (see SIMATIC PDM V9.1 Readme for latest information), floating license for 1 user	
Without SIMATIC PCS 7/SIMATIC PDM Software Media Package	
• Goods delivery License key on USB flash drive and certificate of license	**6ES7658-3BX68-2YB5**
• Online delivery License key download and online certificate of license Note: Email address required!	**6ES7658-3BX68-2YH5**
SIMATIC PDM Routing V9.1 For plant-wide navigation to field devices	
6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit or Windows Server 2012 R2 Standard Edition 64-bit (see SIMATIC PDM V9.1 Readme for latest information), floating license for 1 user	
Without SIMATIC PCS 7/SIMATIC PDM Software Media Package	
• Goods delivery License key on USB flash drive and certificate of license	**6ES7658-3CX68-2YB5**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7658-3CX68-2YH5**
SIMATIC PDM Server V9.1 For activating the server functionality	
6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit or Windows Server 2012 R2 Standard Edition 64-bit (see SIMATIC PDM V9.1 Readme for latest information), single license for 1 installation	
Without SIMATIC PCS 7/SIMATIC PDM Software Media Package	
• Goods delivery License key on USB flash drive, certificate of license	**6ES7658-3TX68-2YB5**
• Online delivery License key download and online certificate of license Note: Email address required!	**6ES7658-3TX68-2YH5**
SIMATIC PDM Communication FOUNDATION Fieldbus V9.1 For communication with field devices on FOUNDATION Fieldbus H1	
6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit or Windows Server 2012 R2 Standard Edition 64-bit (see SIMATIC PDM V9.1 Readme for latest information), floating license for 1 user	
Without SIMATIC PCS 7/SIMATIC PDM Software Media Package	
• Goods delivery License key on USB flash drive and certificate of license	**6ES7658-3QX68-2YB5**
• Online delivery License key download and online certificate of license Note: Email address required!	**6ES7658-3QX68-2YH5**
SIMATIC PDM HART Server V9.1 For using HART multiplexers as well as for configuration of wireless HART field devices	
6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit or Windows Server 2012 R2 Standard Edition 64-bit (see SIMATIC PDM V9.1 Readme for latest information), floating license for 1 user	
Without SIMATIC PCS 7/SIMATIC PDM Software Media Package	
• Goods delivery License key on USB flash drive and certificate of license	**6ES7658-3EX68-2YB5**
• Online delivery License key download and online certificate of license Note: Email address required!	**6ES7658-3EX68-2YH5**

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Ordering data

	Article No.
SIMATIC PDM 1 Client Cumulative client license for SIMATIC PDM configurations with SIMATIC PDM Server, software class A, single license for 1 installation	
• Goods delivery License key on USB flash drive and certificate of license	**6ES7658-3UA00-2YB5**
• Online delivery License key download and online certificate of license Note: Email address required!	**6ES7658-3UA00-2YH5**
SIMATIC PDM TAGs TAG licenses for expanding the available TAG volume, cumulative, software class A, floating license for 1 user	
• Goods delivery License key on USB flash drive and certificate of license	
- 10 TAGs	**6ES7658-3XC00-2YB5**
- 100 TAGs	**6ES7658-3XD00-2YB5**
- 1 000 TAGs	**6ES7658-3XE00-2YB5**
• Online delivery License key download and online certificate of license Note: Email 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 V9.1** Installation software without license, 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit or Windows Server 2012 R2 Standard Edition 64-bit (see SIMATIC PDM V9.1 Readme for latest information)	
Without SIMATIC PCS 7 Software Media Package	
Note: Can only be used in conjunction with a valid license or in demo mode!	
• Goods delivery SIMATIC PDM and device library software on DVD	**6ES7658-3GX68-0YT8**
• Online delivery SIMATIC PDM and device library software download Note: Email address required!	**6ES7658-3GX68-0YG8**

More information

Update/Upgrade

Existing installations based on SIMATIC PDM V6.x or V8.x/V9.0 (including SP in each case) can be upgraded straight to V9.1 with upgrade packages.

Projects with SIMATIC PDM V7.0 can only be upgraded to version 9.1 by first upgrading to version 8.0. Two upgrade packages are offered for SIMATIC PDM V8.x/V9.0:

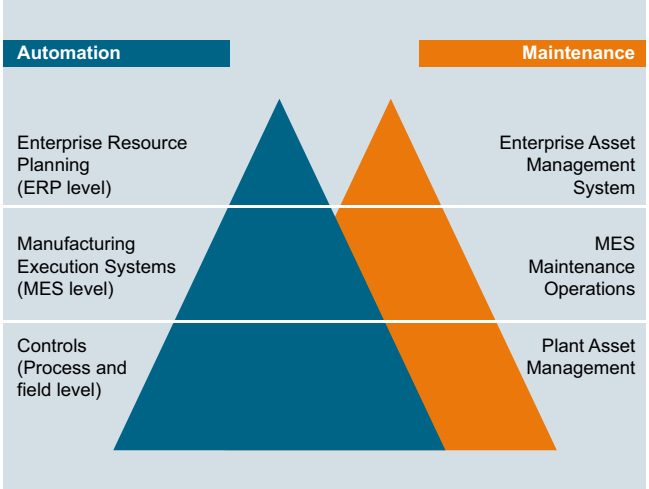
- SIMATIC PDM Upgrade Package Basic[1)] (with/without SIMATIC PDM HART Server in each case) for configurations based on:
  - SIMATIC PDM Basic
  - SIMATIC PDM Service
  - SIMATIC PDM S7
  - SIMATIC PDM PCS 7
- SIMATIC PDM Upgrade Package Complete[1)] for configurations based on:
  - SIMATIC PDM PCS 7 Server
  - SIMATIC PDM PCS 7-FF

[1)] Optional product components for SIMATIC PDM such as PDM Extended, PDM Integration in STEP 7/PCS 7, PDM Routing, PDM Server and PDM Communication FOUNDATION Fieldbus are each included in a product package listed in the SIMATIC PDM Upgrade Package Basic or SIMATIC PDM Upgrade Package Complete and are implicitly authorized to be updated via the corresponding license. The SIMATIC PDM Upgrade Package Complete is required for use of the product components PDM Server or PDM Communication FOUNDATION Fieldbus.

For more information, see the section "Update/upgrade packages", "Updates/upgrades asynchronous to the PCS 7 version" - "Upgrades SIMATIC PDM".

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Overview



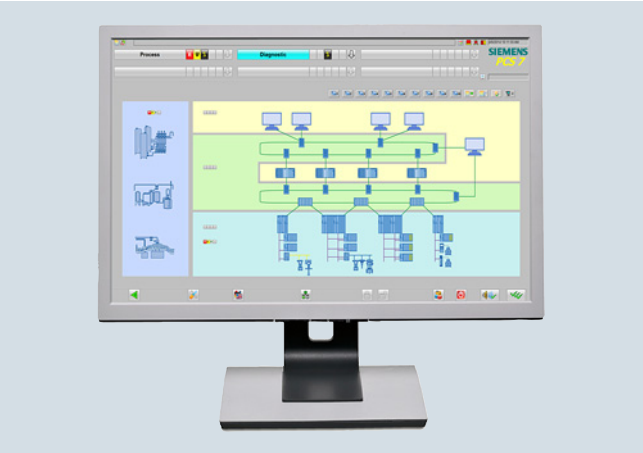
The maintenance station is specialized for plant asset management (also known as plant-floor asset management), i.e. the management of company assets that are used as fixed assets for production. Its tasks include efficient administration and management of equipment in technological systems, in particular 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 diagnostics 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 makes additional hardware or software components for plant asset management superfluous. Fully integrated in SIMATIC PCS 7, it supplements the process control system with a valuable instrument for minimizing the total cost of ownership over the complete life cycle of the plant.

Parallel to process control, the SIMATIC PCS 7 Maintenance Station provides consistent maintenance information and functions 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 maintenance 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.

Plant operators and service personnel are thus able to constantly act the following, for example:

- Service requests
- Service approvals
- Placing an asset in "In Service" status
- Information regarding a completed service measure

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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 ES 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).

SIMATIC PCS 7 Maintenance Station as	Single-user system	Single-user system	Multi-user system (client-server combination)		
Required SIMATIC PCS 7 hardware/software	**PCS 7 BOX**	**PCS 7 ES Single Station**	**PCS 7 MS/ES Client**	**PCS 7 MS Server**	**PCS 7 ES Server or Single Station**
Basic hardware					
SIMATIC PCS 7 BOX RTX ES/OS system or SIMATIC PCS 7 BOX ES/OS system	●	–	–	–	–
SIMATIC PCS 7 Industrial Workstation for ES/OS single system	–	●	●	–	● (Single Station)
SIMATIC PCS 7 Industrial Workstation for OS server	–	–	–	●	● (Server)
Required SIMATIC PCS 7 software corresponding to operating system of basic hardware (without taking into account the quantity frameworks)					
SIMATIC PCS 7 Engineering Software AS/OS	–	●	●	–	●
Optional[1]: SIMATIC PDM PCS 7 server[2]; optionally also SIMATIC PDM-FF[3]	●	●	–	–	●
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) Only when you use intelligent field devices or the AssetMon functionality

2) Allows SIMATIC PDM to be started on every MS client

3) SIMATIC PDM-FF required for plants with FOUNDATION Fieldbus H1

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 functionality.

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.

The SIMATIC PCS 7 Maintenance Station uses the optional product package SIMATIC PDM PCS 7 Server for parameter assignment and diagnostics of the devices integrated via an Electronic Device Description (EDD). The optional product component SIMATIC PDM-FF is required for plants with FOUNDATION Fieldbus H1.

For editing the devices, the user receives the functional rights corresponding to their role following identification. User management and access control for the SIMATIC PCS 7 Maintenance Station is handled by SIMATIC Logon integrated in SIMATIC PCS 7.

SIMATIC PDM supplies comprehensive device information for display and further processing on the maintenance station and can be called from any SIMATIC PCS 7 Maintenance Station Client (MS Client). The display of diagnostics displays structured according to the plant hierarchy with the operating states of the SIMATIC PCS 7 components is possible both on purely MS clients and combined MS/OS clients. The faceplates of these stations can also display the enhanced diagnostics information determined by SIMATIC PDM. A device-specific call of SIMATIC PDM is also possible. However, enhanced online diagnostics functions in conjunction with HW Config can only be called on stations that are both an MS client and engineering station for SIMATIC PCS 7 at the same time.

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

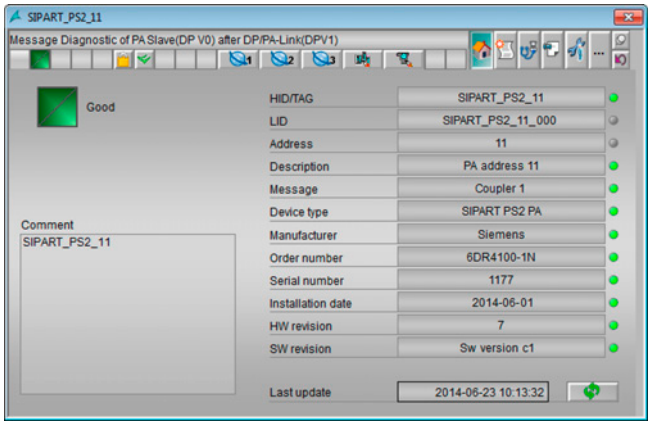
Plant asset management with the SIMATIC PCS 7 Maintenance Station conforms to international standards, specifications, and recommendations. It is based on the NAMUR requirements (process control standards committee in the chemical and pharmaceutical industries) defined for systems for plant asset management and for status messages from field devices:

- NAMUR recommendation NE129 (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

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Function (continued)

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:

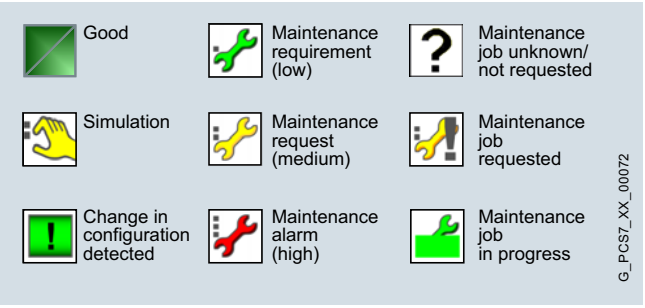
- Individual diagnostics structures
- Project-specific diagnostics rules
- Condition monitoring functions

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.

In line with their signficance, the components described with a device description package in SIMATIC PDM can be marked as follows and also directly filtered using these features:

- Normal
- Important
- Safety Instrumented Function (SIF)
- Device checked
- Project-specific write protection

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.

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Ordering data

	Article No.
SIMATIC PCS 7 Maintenance Station Runtime Basic Package V9.0 including SNMP OPC server license and 100 asset TAGs	
6 languages (English, German, French, Italian, Spanish, Chinese), software class A	
Runs with the following operating systems (see SIMATIC PCS 7 V9.0 Readme for latest information):	
• Windows 7 Ultimate 64-bit	
• Windows 10 Enterprise 2015 LTSB 64-bit	
• Windows Server 2012 R2 Standard Edition 64-bit	
Single license for 1 installation, without SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	**6ES7658-7GB58-0YB0**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7658-7GB58-0YH0**
SIMATIC PCS 7 Maintenance Station Runtime Asset TAGs for adding asset TAGs, cumulative	
Language-neutral, software class A, single license for 1 installation	
No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	
- 100 asset TAGs	**6ES7658-7GB00-2YB0**
- 1 000 asset TAGs	**6ES7658-7GC00-2YB0**
• Online delivery License key download, online certificate of license Note: Email address required!	
- 100 asset TAGs	**6ES7658-7GB00-2YH0**
- 1 000 asset TAGs	**6ES7658-7GC00-2YH0**

	Article No.
Maintenance Station Engineering	
SIMATIC PCS 7 Maintenance Station Engineering V9.0	
6 languages (English, German, French, Italian, Spanish, Chinese), software class A	
Runs with the following operating systems (see SIMATIC PCS 7 V9.0 Readme for latest information):	
• Windows 7 Ultimate 64-bit	
• Windows 10 Enterprise 2015 LTSB 64-bit	
• Windows Server 2012 R2 Standard Edition 64-bit	
Floating license for 1 user, without SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	**6ES7658-7GX58-0YB5**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7658-7GX58-0YH5**

Asset TAGs

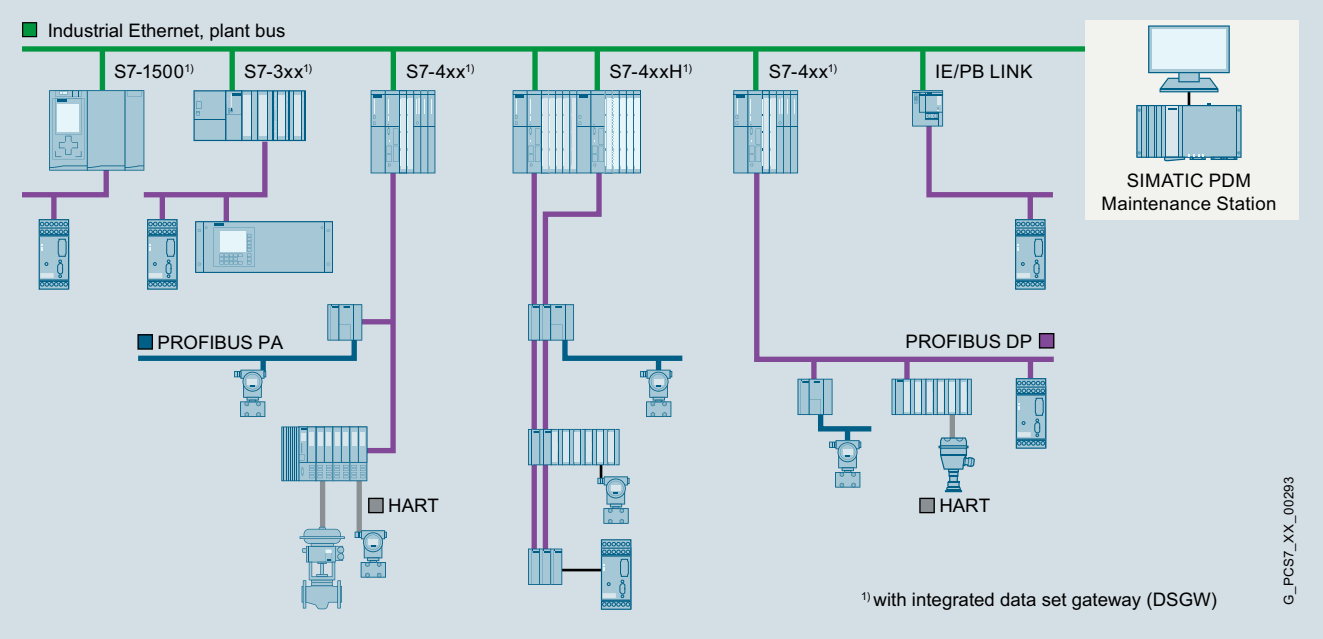
Asset TAGs license the number of asset objects that are monitored with the SIMATIC PCS 7 Maintenance Station. An asset object represents individual hardware components within a SIMATIC PCS 7 project, e.g.

- 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).

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Overview



Integration of the system-independent SIMATIC PDM Maintenance Station in SIMATIC and SIMATIC PCS 7 with connection to the plant bus

In contrast to SIMATIC PCS 7 Maintenance Station, which is seamlessly integrated into the SIMATIC PCS 7 process control system, SIMATIC PDM Maintenance Station operates on separate hardware, independent of the automation projects and the employed automation systems (controllers). It integrates field devices and components via their Electronic Device Description and uses the communication paths of SIMATIC PDM to exchange information.

Note:

SIMATIC PDM Maintenance Station V2.0 is based on system components from SIMATIC PCS 7 V8.2.

Application

The SIMATIC PDM Maintenance Station is generally suitable for all projects which use communication modes supported by SIMATIC PDM as well as field devices described by an Electronic Device Description (EDD).

It is especially predestined for the following tasks:

- Implementation of a Maintenance Station for small to medium-sized service projects
- Configuring of multiple maintenance stations in an automation project
- Configuration of unit-granular maintenance stations or island solutions
- Maintenance station retrofitting in SIMATIC S7/SIMATIC PCS 7 projects independent of the project version
- Implementation of maintenance stations in SIMATIC S7/ SIMATIC PCS 7 projects without "Plant-wide data record routing" functionality
- Isolation between a technological project and service project
- Implementation of maintenance stations in projects without SIMATIC S7/SIMATIC PCS 7 automation systems (controllers)

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Design



SIMATIC PDM Maintenance Station is based on the hardware of the Microbox SIMATIC IPC427E, equipped with a 240 GB SSD as a data storage medium. Due to its exceptional physical properties, it is suited for 24-hour continuous operation at temperatures from 0 to 50 °C.

Expansions/interfaces

SIMATIC PDM Maintenance Station provides the following:

- 4 USB interfaces (3.0, high current)
- 2 COM interfaces (RS 232/RS 485/RS 422, selectable)
- 2 DisplayPort graphics interfaces
- 3 Ethernet interfaces 10/100/1000 Mbps (RJ45)

It is supplied without input/output devices. In addition to mouse and keyboard, two other input/output devices can be externally connected via the provided USB ports, e.g. an optical drive (DVD-ROM/DVD±RW) or smart card reader USB.

Pre-installed software

The following software is factory installed on the SIMATIC PDM Maintenance Station:

- Operating system Windows 7 Ultimate 32-bit, MUI (English, German, French, Italian, Spanish, Chinese)
- SIMATIC IPC DiagMonitor diagnostics software
- Maintenance Station software:
  - SIMATIC PCS 7 V8.2 Software Selection
  - SIMATIC PDM V9.0.1 for stand-alone mode (Basic + 128 TAGs + Routing)
  - EDD device description library (Device Library) 01#2016
  - WinAC RTX 2010

Function

The functionality of the SIMATIC PDM Maintenance Station is largely based on the SIMATIC PCS 7 Maintenance Station and the SIMATIC PDM Process Device Manager for stand-alone operation. The operator interfaces are comparable with those of the SIMATIC PCS 7 Maintenance Station configured as single station. SIMATIC PDM integrates the intelligent field devices (sensors/actuators) and field components (remote I/Os, multiplexers, control room devices, compact controllers, etc.) via their Electronic Device Description (EDD).

For communication with field devices/components, SIMATIC PDM Maintenance Station uses the SIMATIC PDM communication paths over following communication interfaces:

- Industrial Ethernet
- PROFIBUS DP
- PROFIBUS PA
- HART on PROFIBUS
- HART multiplexer
- Wireless HART
- Modbus

The diagnostic information is determined over a cyclic polling algorithm. The minimum polling cycle of the SIMATIC PDM Maintenance Station is 24 hours. Approx. 4 000 field devices can be theoretically diagnosed in this cycle.

Ordering data	Article No.
SIMATIC PDM Maintenance Station V2.0 Based on SIMATIC IPC427E (Microbox) Xeon E3-1505L processor, 4.0 GB DDR4 2400 SDRAM (SO-DIMM module); 1 × 240 GB SDD SATA, internal; 3 × Ethernet IE/PN 10/100/1000 Mbps; 4 × USB 3.0, high current, standard rail mounting without 3.5" floppy drive, optical drive, mouse, keyboard and monitor Windows 7 Ultimate 32-bit, MUI (English, German, French, Italian, Spanish, Chinese), SIMATIC IPC DiagMonitor diagnostics software and Maintenance Station software pre-installed With SIMATIC PDM Device Library 01/2016, licensing terms up to 500 objects, without SIMATIC PDM TAG licenses Goods delivery Microbox, license key USB flash drive, certificate of license	**6ES7650-0RJ02-0YX0**

Additional and expansion components

SIMATIC PDM TAGs TAG licenses for expanding the available TAG volume, cumulative, software class A, floating license for 1 user	
• Goods delivery License key on USB flash drive and certificate of license	
- 10 TAGs	**6ES7658-3XC00-2YB5**
- 100 TAGs	**6ES7658-3XD00-2YB5**
- 1 000 TAGs	**6ES7658-3XE00-2YB5**
• Online delivery 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**
Keyboard/mouse	
USB keyboard TKL-105 Color: black	
• Keyboard layout, German	**6AV6881-0AU14-0AA0**
• Keyboard layout, US International	**6AV6881-0AU14-1AA0**
SIMATIC HMI USB mouse Optical mouse with scroll wheel and USB connection, color anthracite	**6AV2181-8AT00-0AX0**

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8/2	**Introduction**
8/4	**Modular AS 410-5H and AS 410E systems**
8/10	Standard automation systems
8/15	High availability automation systems
8/21	Safety-related automation systems
8/29	**Complementary S7-400 systems**
8/31	Standard automation systems
8/35	High availability automation systems
8/41	Safety-related automation systems
8/46	**SIPLUS Automation Systems**
8/47	**Embedded systems**
8/47	Microbox Automation System

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Overview



SIMATIC PCS 7 automation systems in various designs: Modular S7-400 systems plus Microbox system

Automation systems are available in 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 410-5H/AS 410E automation systems
  - Complementary S7-400 systems
- Embedded systems with software controller
  - Microbox automation system SIMATIC PCS 7 RTX in product versions SIMATIC PCS 7 AS RTX PROFIBUS and SIMATIC PCS 7 AS RTX PROFINET

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 410 with CPU 410-5H										
	AS 410E[1]										
Analog value measurements	10	150	150	100	300	500	500	400	800	600	300
Digital value measurements	20	300	300	250	600	1 000	1 000	800	1 400	1 000	600
PID controls	5	50	50	50	100	200	200	150	250	200	200
Motors	7	75	75	75	150	250	250	200	450	400	150
Valves	7	75	75	75	150	250	250	200	450	400	250
SFC	0	15	15	15	60	100	100	100	200	200	100
Steps	0	150	150	150	700	1 000	1 000	1 000	2 000	2 000	800
Dosing	0	5	5	3	20	25	25	25	50	50	50
Digital inputs DI	30	450	450	300	900	1 500	1 500	1 200	2 200	1 800	1 200
Digital outputs DO	10	150	150	110	300	500	500	400	750	650	400
Analog inputs AI	15	225	225	150	450	750	750	600	1 100	900	600
Analog outputs AO	5	75	75	50	150	250	250	200	350	350	200
Process objects (PO)	30	450	450	350	900	1 500	1 500	1 200	2 200	2 000	1 200

Typical mixed configuration limits for SIMATIC PCS 7 automation systems, based on the SIMATIC PCS 7 Advanced Process Library (APL)

[1] up to 200 process objects

Note:

The values quoted here are not AS-specific maximum values for the particular item. Instead, they represent a typical distribution of the available total capacity of the AS during mixed operation of all the items of a contiguous block.

The number of process objects is not an absolute value, but depends on the library used as well as on the number and type of blocks used in the application.

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Application (continued)

Modular automation systems of the S7-400 range

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 and CPU 410E	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 416-3 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 and CPU 410E (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 410-5H/AS 410E automation systems**
  - Preferred systems for new plants with SIMATIC PCS 7
  - Suitable for SIMATIC PCS 7 as of V8.0+SP1[1)] or as of V9.0 (AS 410E)
  - Standard systems, fault-tolerant systems, and safety-related systems are based on the very same CPU
  - Performance of the general-purpose CPU 410-5H is scalable and expandable 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
  - Redundant PROFINET configurations and configuration changes during operation for PROFINET in singular and redundant applications
- **Complementary S7-400 systems**
  - Can be used in plants with SIMATIC PCS 7 V8/V7
  - As an alternative to AS 410-5H/AS 410E, 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.

S7-400 automation systems can be integrated via a PROFINET interface into the CPU in PROFINET IO, some types via communication module CP 443-1 as well.

1) An additional Hardware Upgrade Package (HUP CPU 410-5H) is required for SIMATIC PCS 7 V8.0+SP1

Embedded automation systems

The embedded automation system SIMATIC PCS 7 AS RTX is a low-priced compact Microbox system with excellent physical properties. It is especially well-suited for plant-level use in the low to medium performance range or as an OEM product, e.g. in Package Units. Depending on the selected product variant, it is possible to connect the process I/O via a routing-capable PROFIBUS DP interface (SIMATIC PCS 7 AS RTX PROFIBUS) or a PROFINET interface (SIMATIC PCS 7 AS RTX PROFINET).

More information

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 are available 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

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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.

The rugged AS 410 is a modern, future-oriented, all-round system for the process industry. Its versatility means it can be used in all areas – as a standard AS 410S system, as a high-availability AS 410H or as safety-related AS 410F/FH. More and more innovative functions are being exclusively combined with this automation system, for example redundant PROFINET configurations and configuration changes during operation for PROFINET in singular and redundant applications

With its high-performance hardware and optimized firmware, the innovative **CPU 410-5H Process Automation** of the AS 410 covers the entire performance range of conventional AS 412 to AS 417 automation systems. Its automation performance can be scaled with system expansion cards based on the number of SIMATIC PCS 7 process objects (POs) as follows:

- 100 POs
- 500 POs
- 1 000 POs
- 1 600 POs
- ≥ 2 000 POs (PO 2k+)

The type reduction to a single CPU offers numerous advantages. It significantly simplifies selection and configuration of the automation system as well as spare part inventory and plant expansion.

The AS 410E automation system with **CPU 410E Process Automation** is a cost-saving alternative for small applications. Based on CPU 410-5H hardware, it offers the same benefits for applications with up to 200 PO.

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)

The AS bundles come furnished with the SIMATIC PCS 7 Runtime license 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, there are also two online configurators 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 or redundant power supply modules (in 4 A and 10 A versions), communication modules and sync modules of the SIMATIC PCS 7 AS 410 bundles have an additional coating (conformal coating).

AS 410 bundles for operating temperatures up to 70 °C

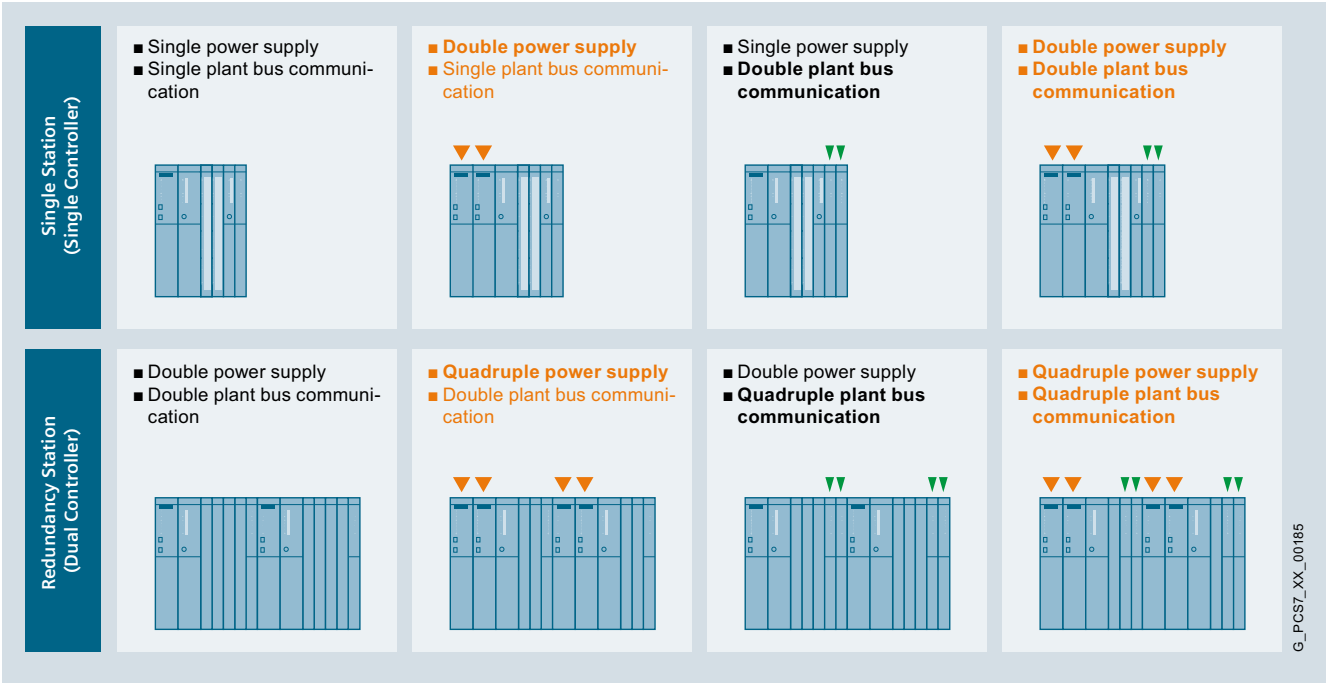
The AS 410 bundles are usually designed for operating temperatures up to 60 °C. Additional designs are available for extreme conditions; these are permitted for operating temperatures up to 70 °C. Their components mainly carry the designation "XTR" (extended temperature range) in their names. All components of the "AS 410 bundles for the extended temperature range (XTR)" also have an additional coating (conformal coating).

The Article No.'s of the AS 410 bundles for the extended temperature range (XTR) can be defined in the sections "Standard automation systems", "High availability automation systems" and "Safety-related automation systems" by means of an individual configuration table.

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Design (continued)

Flexible and scalable availability



A particular characteristic of the modular S7-400 systems is the flexible and scalable availability of various components.

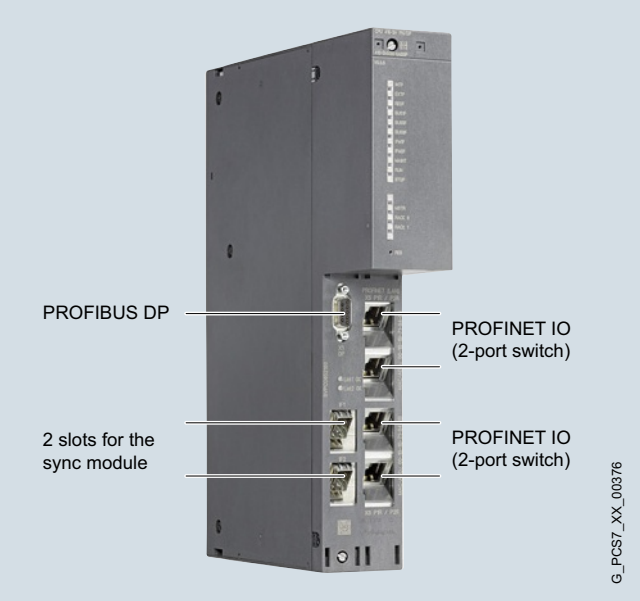
For a SIMATIC PCS 7 AS Single Station of the AS 410 type, you have the option of specifically increasing the availability by implementing a redundant configuration of the power supply or the Industrial Ethernet communications module, and combining these measures.

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.

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Design (continued)

CPU 410-5H Process Automation: the "all-rounder" for process automation



CPU 410-5H Process Automation

The CPU 410-5H Process Automation is at the heart of the standard automation systems as well as the high-availability and safety-related AS 410 automation systems. With expansion cards for 100 PO, 500 PO, 1 000 PO, 1 600 PO and ≥ 2 000 PO (PO 2k+), you can define your performance for your specific application with up to around 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 32 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)
- Expanded temperature range during operation up to 70 °C (as of product version 2)
- 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



CPU 410E for small applications

The cost-saving CPU 410E is available for small applications, for which it offers the same benefits as the CPU 410-5H in terms of

- Flexibility
  - Standard, high-availability and fail-safe applications
  - Identical hardware as with CPU 410-5H
- Ruggedness
  - Conformal coating
  - Extended temperature range up to 70 °C
- Secure investment
  - 1 PROFIBUS and 2 PROFINET interfaces
  - Innovations in firmware updates

Restrictions compared to CPU 410-5H relate to the number of POs, RAM and I/O data. The following table shows the main differences between and features common to the two CPUs.

	CPU 410E	**CPU 410-5H**
RAM (for program and data)	4 MB	32 MB
Load memory (integrated, non-volatile)	48 MB	48 MB
CPU processing times for bit operations, typ.	7.5 ns	7.5 ns
I/O data	1536 bytes inputs/outputs	16 KB inputs/outputs
Number of process objects	Up to 200	100 to 2 k+

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Accessories (continued)

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, see the "Industrial Communication" chapter, "PROFIBUS DP", "PROFIBUS PA" and "FOUNDATION Fieldbus H1" sections.

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", "High-availability 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

It is easy to 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 HA I/O stations (see also section "Industrial Communication" chapter, "PROFINET" section). PROFINET IO interfaces made available by additive communication modules of type CP 443-1 cannot be used.

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 or 6ES7971-0BA02).

The following backup batteries are required depending on the configuration of the AS bundles:

- SIMATIC PCS 7 AS Single Station with
  - 1 power supply module: 2 units
  - 2 redundant power supply modules: 4 units
- SIMATIC PCS 7 AS Redundancy Station with
  - 2 power supply modules: 4 units
  - 2 x 2 redundant power supply modules: 8 units

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Technical specifications

Article number	**6ES7410-5HX08-0AB0** PCS 7 CPU410-5H F. S7-400/S7-400H/F/FH	**6ES7410-5HM08-0AB0** PCS 7 CPU 410E F. S7-400/S7-400H/F/FH
General information		
Product type designation	CPU 410-5H Process Automation	CPU 410E Process Automation
Design of PLC basic unit	With Conformal Coating (ISA-S71.04 severity level G1; G2; G3) and operating temperature to 70 °C	With Conformal Coating (ISA-S71.04 severity level G1; G2; G3) and operating temperature to 70 °C
Product function		
• SysLog	Yes; via TCP; up to 4 receivers can be parameterized; buffer capacity max. 3 200 entries	Yes; via TCP; up to 4 receivers can be parameterized; buffer capacity max. 3 200 entries
• Field interface security	Yes	Yes
Engineering with		
• Programming package	SIMATIC PCS 7 V9.0 or higher	SIMATIC PCS 7 V9.0 or higher
Power loss		
Power loss, typ.	10 W	10 W
Memory		
PCS 7 process objects	100 ... approx. 2 600, adjustable with System Expansion Card	200; Max.; with PO200M System Expansion Card
CPU processing times		
CPU speed	450 MHz; Multi-processor system	450 MHz; Multi-processor system
average processing time of PCS 7 typicals	110 µs; with APL typicals	110 µs; with APL typicals
Process tasks, max.	9; Individually adjustable from 10 ms to 5 s	9; Individually adjustable from 10 ms to 5 s
Counters, timers and their retentivity		
S7 counter		
• Number	2 048	2 048
S7 times		
• Number	2 048	2 048
Data areas and their retentivity		
retentive data area in total	Total working and load memory (with backup battery)	Total working and load memory (with backup battery)
Address area		
I/O address area		
• Inputs	16 kbyte; max., dependent on the System Expansion Card used	2 048 byte; max. 1 536 byte usable for input and output data
• Outputs	16 kbyte; max., dependent on the System Expansion Card used	2 048 byte; max. 1 536 byte usable for input and output data
Digital channels		
• Inputs	131 072; max., dependent on the System Expansion Card used	16 384; max., dependent on the System Expansion Card used
• Outputs	131 072; max., dependent on the System Expansion Card used	16 384; max., dependent on the System Expansion Card used
Analog channels		
• Inputs	8 192; max., dependent on the System Expansion Card used	1 024; max., dependent on the System Expansion Card used
• Outputs	8 192; max., dependent on the System Expansion Card used	1 024; max., dependent on the System Expansion Card used

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Technical specifications (continued)

Article number	**6ES7410-5HX08-0AB0** PCS 7 CPU410-5H F. S7-400/S7-400H/F/FH	**6ES7410-5HM08-0AB0** PCS 7 CPU 410E F. S7-400/S7-400H/F/FH
Interfaces		
Number of PROFINET interfaces	2	2
Number of RS 485 interfaces	1; PROFIBUS DP	1; PROFIBUS DP
Number of other interfaces	2; 2x synchronization	2; 2x synchronization
1. Interface		
Interface type	Integrated	Integrated
DP master		
• Transmission rate, max.	12 Mbit/s	12 Mbit/s
• Number of DP slaves, max.	96	96
• Number of slots per interface, max.	1 632	1 632
2. Interface		
Interface type	PROFINET	PROFINET
Isolated	Yes	Yes
Autonegotiation	Yes	Yes
Autocrossing	Yes	Yes
System redundancy	Yes	Yes
Interface types		
• Number of ports	2	2
• integrated switch	Yes	Yes
PROFINET IO Controller		
• Transmission rate, max.	100 Mbit/s	100 Mbit/s
3. Interface		
Interface type	PROFINET	PROFINET
PROFINET IO Controller		
• Transmission rate, max.	100 Mbit/s	100 Mbit/s
4. Interface		
Interface type	Pluggable synchronization submodule (FO)	Pluggable synchronization submodule (FO)
Plug-in interface modules	Synchronization module 6ES7960-1AA06-0XA0, 6ES7960-1AB06-0XA0 or 6ES7960-1AA08-0XA0	Synchronization module 6ES7960-1AA06-0XA0, 6ES7960-1AB06-0XA0 or 6ES7960-1AA08-0XA0
5. Interface		
Interface type	Pluggable synchronization submodule (FO)	Pluggable synchronization submodule (FO)
Plug-in interface modules	Synchronization module 6ES7960-1AA06-0XA0, 6ES7960-1AB06-0XA0 or 6ES7960-1AA08-0XA0	Synchronization module 6ES7960-1AA06-0XA0, 6ES7960-1AB06-0XA0 or 6ES7960-1AA08-0XA0
Protocols		
Supports protocol for PROFINET IO	Yes	Yes
PROFINET CBA	No	No
PROFIsafe	Yes	Yes
PROFIBUS	Yes	Yes
AS-Interface	Yes; Via add-on	Yes; Via add-on
Protocols (Ethernet)		
• TCP/IP	Yes	Yes
Further protocols		
• Foundation Fieldbus	Yes; via DP/FF Link	Yes; via DP/FF Link
• MODBUS	Yes; Via add-on	Yes; Via add-on
Standards, approvals, certificates		
Use in hazardous areas		
• ATEX	ATEX II 3G Ex nA IIC T4 Gc	ATEX II 3G Ex nA IIC T4 Gc
Ambient conditions		
Ambient temperature during operation		
• min.	0 °C	0 °C
• max.	70 °C	70 °C
Dimensions		
Width	50 mm	50 mm
Height	290 mm	290 mm
Depth	219 mm	219 mm
Weights		
Weight, approx.	1.1 kg	1.1 kg

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Overview



Standard AS 410S automation system

The AS 410S modular standard automation systems are suitable for general use. These are always your first choice if high availability through redundancy and safety-related functions are not relevant for the application.

In the range from 100 to approx. 2 600 POs, their performance can be customized to meet the task at hand using system expansion cards.

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 the tables in section "Ordering data" of the paper catalog. 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.

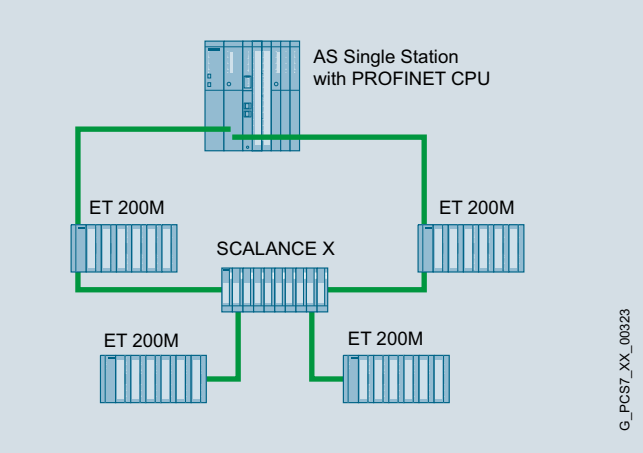
I/O connection via PROFIBUS DP

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. Up to four additional PROFIBUS DP interfaces can be configured using additive PROFIBUS DP interface modules CP 443-5.

I/O connection via PROFINET IO

Standard AS 410S automation systems can only be connected to remote I/O stations via the two PROFINET interfaces (each with 2-port switch) integrated in the CPU 410-5H Process Automation, for example to remote ET 200M/ET 200SP HA I/O stations (see also "Industrial Communication" chapter, "PROFINET" section).

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

The AS bundles come furnished with the SIMATIC PCS 7 Runtime license for 100 POs. 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 is irrelevant with regard to the implementable quantity framework.

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Ordering data

Standard automation systems with CPU 410-5H

	Article No.								
AS 410S CPU 410-5H with PROFIBUS DP and PROFINET IO interface 32 MB RAM (16 MB each for program and data) with SIMATIC PCS 7 AS Runtime license for 100 POs	**6ES7654-**	■	**C**	■	**0**	■	-	■	■	**F**	■
Type of delivery											
• Individual components, unassembled	**5**										
• Pre-assembled and tested	**6**										
System expansion card											
• System expansion card 100 POs			**J**								
• System expansion card 500 POs			**L**								
• System expansion card 1 000 POs			**N**								
• System expansion card 1 600 POs			**P**								
• System expansion card PO 2k+ (≥ 2 000)			**Q**								
• System expansion card 0 PO (blank)			**R**								
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**					
• CR3 (4 slots), aluminum[2][3]						**7**					
Power supply (without backup batteries)											
• 1 × PS 407, 4 A for 120/230 V UC[2][4]							**A**				
• 1 × PS 407, 10 A for 120/230 V UC							**B**				
• 1 × PS 407, 10 A for 120/230 V UC, optional redundancy[2]							**C**				
• 1 × PS 407, 20 A for 120/230 V UC							**D**				
• 2 × PS 407, 10 A for 120/230 V UC, redundant[2]							**E**				
• 1 × PS 405, 4 A for 24 V DC[2][4]							**F**				
• 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
3) Only in conjunction with 4 A power supplies
4) Only in conjunction with CR3 rack

Standard automation systems with CPU 410-5H for the expanded temperature range (XTR)

	Article No.								
AS 410S CPU 410-5H with PROFIBUS DP and PROFINET IO interface 32 MB RAM (16 MB each for program and data) with SIMATIC PCS 7 AS Runtime license for 100 POs	**6ES7654-**	■	**C**	■	**0**	■	-	■	■	**F**	■
Type of delivery											
• Individual components, unassembled	**5**										
• Pre-assembled and tested	**6**										
System expansion card											
• System expansion card 100 POs			**J**								
• System expansion card 500 POs			**L**								
• System expansion card 1 000 POs			**N**								
• System expansion card 1 600 POs			**P**								
• System expansion card PO 2k+ (≥ 2 000)			**Q**								
• System expansion card 0 PO (blank)			**R**								
Additive Industrial Ethernet interfaces											
• Without CP 443-1					**0**						
Racks											
• UR2 XTR (9 slots), aluminum[1]						**3**					
• CR3 XTR, 4 slots, aluminum[2]						**7**					
Power supply (without backup batteries)											
• 1 × PS 407, 4 A XTR for 120/230 V UC[3]							**A**				
• 1 × PS 407, 10 A XTR for 120/230 V UC, optional redundancy							**C**				
• 2 × PS 407, 10 A XTR for 120/230 V UC, redundant							**E**				
• 1 × PS 405, 4 A XTR for 24 V DC[3]							**F**				
• 1 × PS 405, 10 A XTR for 24 V DC, optional redundancy							**H**				
• 2 × PS 405, 10 A XTR for 24 V DC, redundant							**K**				
Additive PROFIBUS DP interfaces											
• Without CP 443-5 Extended											**0**

1) Only in conjunction with 10 A power supplies
2) Only in conjunction with 4 A power supplies
3) Only in conjunction with CR3 rack

8

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Ordering data (continued)

Standard automation systems with CPU 410E

	Article no.								
AS 410SE CPU 410E with PROFIBUS DP and PROFINET IO interface 4 MB RAM (2 MB each for program and data) with SIMATIC PCS 7 AS Runtime license for 100 POs and PO 200M system expansion card	**6ES7654-**								
	■	**E**	**K**	**0**	■	**-**	■	■	**F**	■
Type of delivery										
• Individual components, unassembled	**5**									
• Pre-assembled and tested	**6**									
Additive Industrial Ethernet ports[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**			
• CR3 (4 slots), aluminum[2][3]							**7**			
Power supply (without backup batteries)										
• 1 × PS 407, 4 A for 120/230 V UC[2][4]								**A**		
• 1 × PS 407, 10 A for 120/230 V UC								**B**		
• 1 × PS 407, 10 A for 120/230 V UC, optional redundancy[2]								**C**		
• 2 × PS 407, 10 A for 120/230 V UC, redundant[2]								**E**		
• 1 × PS 405, 4 A for 24 V DC[2][4]								**F**		
• 1 × PS 405, 10 A for 24 V DC								**G**		
• 1 × PS 405, 10 A for 24 V DC, optional redundancy[2]								**H**		
• 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

[3] Only in conjunction with 4 A power supplies

[4] Only in conjunction with CR3 rack

Standard automation systems with CPU 410E for the expanded temperature range (XTR)

	Article no.								
AS 410SE CPU 410E with PROFIBUS DP and PROFINET IO interface 4 MB RAM (2 MB each for program and data) with SIMATIC PCS 7 AS Runtime license for 100 POs and PO 200M system expansion card	**6ES7654-**								
	■	**E**	**K**	**0**	■	**-**	■	■	**F**	■
Type of delivery										
• Individual components, unassembled	**5**									
• Pre-assembled and tested	**6**									
Additive Industrial Ethernet ports										
• Without CP 443-1					**0**					
Racks										
• UR2 XTR (9 slots), aluminum[1]							**3**			
• CR3 XTR, 4 slots, aluminum[2]							**7**			
Power supply (without backup batteries)										
• 1 × PS 407, 4 A XTR for 120/230 V UC[3]								**A**		
• 1 × PS 407, 10 A XTR for 120/230 V UC, optional redundancy								**C**		
• 2 × PS 407, 10 A XTR for 120/230 V UC, redundant								**E**		
• 1 × PS 405, 4 A XTR for 24 V DC[3]								**F**		
• 1 × PS 405, 10 A XTR for 24 V DC, optional redundancy								**H**		
• 2 × PS 405, 10 A XTR for 24 V DC, redundant								**K**		
Additive PROFIBUS DP interfaces										
• Without CP 443-5 Extended										**0**

[1] Only in conjunction with 10 A power supplies

[2] Only in conjunction with 4 A power supplies

[3] Only in conjunction with CR3 rack

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Ordering data

Individual components

	Article No.
Individual components for AS 410S standard automation systems	
CPU 410-5H Process Automation as spare part Conformal coating; for operating temperature up to 70 °C 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 PCS 7 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 PCS 7 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 PCS 7 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 PCS 7 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 PCS 7 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 No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	
- 100 POs	**6ES7653-2CA00-0XE0**
- 500 POs	**6ES7653-2CC00-0XE0**
• Online delivery License key download, online certificate of license Note: Email address required!	
- 100 POs	**6ES7653-2CA00-0XK0**
- 500 POs	**6ES7653-2CC00-0XK0**

	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 Mbps; 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 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	
• **4 A XTR** (conformal coating; for operating temperature up to 70 °C) 120/230 V UC; 5 V DC/4 A, 24 V DC/0.5 A	**6ES7407-0DA02-0AA1**
• **10 A** 120/230 V UC; 5 V DC/10 A, 24 V DC/1 A	**6ES7407-0KA02-0AA0**
• **10 A XTR, optional redundancy** (conformal coating; for operating temperature up to 70 °C) 120/230 V UC/; 5 V DC/10 A, 24 V DC/1 A	**6ES7407-0KR02-0AA1**
• **20 A** 120/230 V UC; 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	
• **4 A XTR** (conformal coating; for operating temperature up to 70 °C) 24/48/60 V DC; 5 V DC/4 A, 24 V DC/0.5 A	**6ES7405-0DA02-0AA1**
• **10 A** 24/48/60 V DC; 5 V DC/10 A, 24 V DC/1 A	**6ES7405-0KA02-0AA0**
• **10 A XTR, optional redundancy** (conformal coating; for operating temperature up to 70 °C) 24/48/60 V DC/; 5 V DC/10 A, 24 V DC/1 A	**6ES7405-0KR02-0AA1**
• **20 A** 24/48/60 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**

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Standard automation systems

Ordering data	Article No.
Backup battery for PS 405/407, type AA, 3.6 V, 2.3 Ah	**6ES7971-0BA00**
XTR backup battery for PS 405/407, type AA, 3.6 V, 2.3 Ah; for operating temperature up to 70 °C	**6ES7971-0BA02**
Aluminum rack	
• UR1, 18 slots	**6ES7400-1TA11-0AA0**
• UR2 XTR, 9 slots (conformal coating; for operating temperature up to 70 °C)	**6ES7400-1JA11-0AA1**
• CR3 XTR, 4 slots (conformal coating; for operating temperature up to 70 °C)	**6ES7401-1DA01-0AA1**
Steel rack	
• UR1, 18 slots	**6ES7400-1TA01-0AA0**
• UR2, 9 slots	**6ES7400-1JA01-0AA0**
Individual components for AS 410E standard automation systems	
CPU 410E Process Automation as spare part Conformal coating; for operating temperatures up to 70 °C 4 MB RAM integrated (2 MB each for program and data); module occupies 2 slots	**6ES7410-5HM08-0AB0**
System expansion card PO 200M	**6ES7653-2CB00-0XB0**

	Article No.
Runtime licenses for SIMATIC PCS 7 automation systems (can be added to existing licenses)	
SIMATIC PCS 7 AS Runtime license Language-neutral, floating license for 1 user	
No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	
- 100 POs	**6ES7653-2BA00-0XB5**
- 1 000 POs	**6ES7653-2BB00-0XB5**
- 10 000 POs	**6ES7653-2BC00-0XB5**
• Online delivery License key download, online certificate of license Note: Email address required!	
- 100 POs	**6ES7653-2BA00-0XH5**
- 1 000 POs	**6ES7653-2BB00-0XH5**
- 10 000 POs	**6ES7653-2BC00-0XH5**

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Overview



Redundancy Station AS 410H

High availability automation systems are used to reduce the risk of production failures. The higher investment costs for high availability 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 high availability system.

High availability SIMATIC PCS 7 automation systems can be used in a system configuration on their own 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 the tables in section "Ordering data" of the paper catalog. 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 also 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. Up to four more PROFIBUS DP interfaces with add-on CP 443-5 PROFIBUS DP interfaces (conformal coating) can be configured for each redundant subsystem.

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 a redundant Compact FF Link pair
- Non-redundant PROFIBUS DP devices, e.g. ET 200S or ET 200pro remote I/O stations per Y-Link

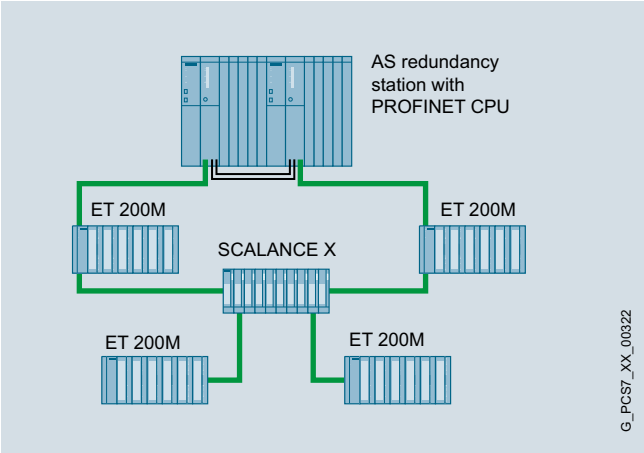
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Design (continued)

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

The automation systems come furnished with the SIMATIC PCS 7 AS Runtime license 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.

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Ordering data

High-availability automation systems with CPU 410-5H

	Article No.								
AS 410H (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 POs	**6ES7656-**								
	■	**C**	■	■	■	**-**	■	■	**F**	■
Type of delivery										
• Individual components, unassembled	**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**							
• 2 × System Expansion Card 0 PO (blank)			**R**							
Sync modules and cables										
• 2 × 2 sync modules[2] for distances up to 10 m and 2 × FO sync cable, 1 m				**3**						
• 2 × 2 sync modules 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**				
• 2 × CR3 (4 slots), aluminum[2][3]						**7**				
Power supply (without backup batteries)										
• 2 × PS 407, 4 A for 120/230 V AC/DC[2][4]							**A**			
• 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, 4 A for 24 V DC[2][4]							**F**			
• 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 per subsystem, or up to 3 CPs per subsystem with a redundant power supply.

[2] Conformal coating

[3] Only in conjunction with 4 A power supplies

[4] Only in conjunction with CR3 rack

High-availability automation systems with CPU 410-5H for the expanded temperature range (XTR)

	Article No.								
AS 410H (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 POs	**6ES7656-**								
	■	**C**	■	■	■	**-**	■	■	**F**	■
Type of delivery										
• Individual components, unassembled	**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**							
• 2 × System Expansion Card 0 PO (blank)			**R**							
Sync modules and cables										
• 2 × 2 sync modules V8 XTR for distances up to 10 m and 2 × FO sync cable, 1 m				**3**						
Additive Industrial Ethernet interfaces										
• Without CP 443-1					**0**					
Racks										
• 1 × UR2-H XTR (2 × 9 slots), aluminum[1]						**1**				
• 2 × UR2 XTR (9 slots), aluminum[1]						**3**				
• 2 x CR3 XTR, 4 slots, aluminum[2]						**7**				
Power supply (without backup batteries)										
• 2 × PS 407, 4 A XTR for UC 120/230 V[3]							**A**			
• 2 × PS 407, 10 A XTR for 120/230 V AC/DC, optional redundancy							**C**			
• 2 × 2 PS 407, 10 A XTR for 120/230 V AC/DC, redundant							**E**			
• 2 × PS 405, 4 A XTR for 24 V DC[3]							**F**			
• 2 × PS 405, 10 A XTR for 24 V DC, optional redundancy							**H**			
• 2 × 2 PS 405, 10 A XTR for 24 V DC, redundant							**K**			
Additive PROFIBUS DP interfaces										
• Without CP 443-5 Extended										**0**

[1] Only in conjunction with 10 A power supplies

[2] Only in conjunction with 4 A power supplies

[3] Only in conjunction with CR3 rack

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Ordering data (continued)

High-availability automation systems with CPU 410E

	Article no.								
AS 410HE (Redundancy Station) 2 × CPU 410E with PROFIBUS DP and PROFINET IO interface 4 MB RAM (2 MB each for program and data) with SIMATIC PCS 7 AS Runtime license for 100 POs and PO 200M system expansion card	**6ES7656-**								
	■	**E**	**K**	■	■	**-**	■	■	**F**	■
Type of delivery										
• Individual components, unassembled	**5**									
• Pre-assembled and tested	**6**									
Sync modules and cables										
• 2 × 2 sync modules[2] for distances up to 10 m and 2 × FO sync cable, 1 m				**3**						
• 2 × 2 sync modules for up to 10 km and 2 × FO sync cable, 1 m, for testing				**4**						
Additive Industrial Ethernet ports[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**				
• 2 × CR3 (4 slots), aluminum[2)3)]						**7**				
Power supply (without backup batteries)										
• 2 × PS 407, 4 A for 120/230 V UC[2)4)]							**A**			
• 2 × PS 407, 10 A for 120/230 V UC							**B**			
• 2 × PS 407, 10 A for 120/230 V UC, optional redundancy[2)]							**C**			
• 2 × 2 PS 407, 10 A for 120/230 V UC, redundant[2)]							**E**			
• 2 × PS 405, 4 A for 24 V DC[2)4)]							**F**			
• 2 × PS 405, 10 A for 24 V DC							**G**			
• 2 × PS 405, 10 A for 24 V DC, optional redundancy[2)]							**H**			
• 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 per subsystem, or up to 3 CPs per subsystem with a redundant power supply.

2) Conformal coating

3) Only in conjunction with 4 A power supplies

4) Only in conjunction with CR3 rack

High-availability automation systems with CPU 410E for the expanded temperature range (XTR)

	Article no.								
AS 410HE (Redundancy Station) 2 × CPU 410E with PROFIBUS DP and PROFINET IO interface 4 MB RAM (2 MB each for program and data) with SIMATIC PCS 7 AS Runtime license for 100 POs and PO 200M system expansion card	**6ES7656-**								
	■	**E**	**K**	■	■	**-**	■	■	**F**	■
Type of delivery										
• Individual components, unassembled	**5**									
• Pre-assembled and tested	**6**									
Sync modules and cables										
• 2 × 2 sync modules V8 XTR for distances up to 10 m and 2 × FO sync cable, 1 m				**3**						
Additive Industrial Ethernet ports										
• Without CP 443-1					**0**					
Racks										
• 1 × UR2-H XTR (2 × 9 slots), aluminum[1)]							**1**			
• 2 × UR2 XTR (9 slots), aluminum[1)]							**3**			
• 2 x CR3 XTR, 4 slots, aluminum[2)]							**7**			
Power supply (without backup batteries)										
• 2 × PS 407, 4 A XTR for 120/230 V UC[3)]								**A**		
• 2 × PS 407, 10 A XTR for 120/230 V UC, optional redundancy								**C**		
• 2 × 2 PS 407, 10 A XTR for 120/230 V UC, redundant								**E**		
• 2 × PS 405, 4 A XTR for 24 V DC[3)]								**F**		
• 2 × PS 405, 10 A XTR for 24 V DC, optional redundancy								**H**		
• 2 × 2 PS 405, 10 A XTR for 24 V DC, redundant								**K**		
Additive PROFIBUS DP interfaces										
• Without CP 443-5 Extended										**0**

1) Only in conjunction with 10 A power supplies

2) Only in conjunction with 4 A power supplies

3) Only in conjunction with CR3 rack

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Ordering data

Individual components

	Article No.
Individual components of the fault-tolerant SIMATIC PCS 7 AS 410H automation systems	
CPU 410-5H Process Automation as spare part Conformal coating; for operating temperature up to 70 °C 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 PCS 7 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 PCS 7 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 PCS 7 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 PCS 7 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 PCS 7 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 independent of language, no SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	
- 100 POs, license for upgrading of 1 CPU	**6ES7653-2CA00-0XE0**
- 500 POs, license for upgrading of 1 CPU	**6ES7653-2CC00-0XE0**
- PN RED for use of redundant PROFINET (R1), with 2 licenses for upgrading of an H System	**6ES7653-2CX01-0XE0**
• Online delivery License key download, online certificate of license Note: Email address required!	
- 100 POs, license for upgrading of 1 CPU	**6ES7653-2CA00-0XK0**
- 500 POs, license for upgrading of 1 CPU	**6ES7653-2CC00-0XK0**
- PN RED for use of redundant PROFINET (R1), with 2 licenses for upgrading of an H System	**6ES7653-2CX01-0XK0**

	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 CPUs; 2 modules required for each CPU; for distances up to	
• 10 m	**6ES7960-1AA06-0XA0**
• 10 km	**6ES7960-1AB06-0XA0**
Sync module V8 XTR (Conformal coating; for operating temperature up to 70 °C) For coupling two redundant CPUs; 2 modules required for each CPU; for distances up to 10 m	**6ES7960-1AA08-0XA0**
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**

8

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Ordering data

	Article No.
PS 407 power supply module with battery compartment for 2 backup batteries, module occupies 2 slots	
• **4 A XTR** (conformal coating; for operating temperature up to 70 °C) 120/230 V UC; 5 V DC/4 A, 24 V DC/0.5 A	**6ES7407-0DA02-0AA1**
• **10 A** 120/230 V AC/DC; 5 V DC/10 A, 24 V DC/1 A	**6ES7407-0KA02-0AA0**
• **10 A XTR, optional redundancy** (conformal coating; for operating temperature up to 70 °C) 120/230 V UC/; 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	
• **4 A XTR** (conformal coating; for operating temperature up to 70 °C) 24/48/60 V DC; 5 V DC/4 A, 24 V DC/0.5 A	**6ES7405-0DA02-0AA1**
• **10 A** 24/48/60 V DC; 5 V DC/10 A, 24 V DC/1 A	**6ES7405-0KA02-0AA0**
• **10 A XTR, optional redundancy** (conformal coating; for operating temperature up to 70 °C) 24/48/60 V DC/; 5 V DC/10 A, 24 V DC/1 A	**6ES7405-0KR02-0AA1**
• **20 A** 24/48/60 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 for PS 405/407, type AA, 3.6 V, 2.3 Ah	**6ES7971-0BA00**
XTR backup battery for PS 405/407, type AA, 3.6 V, 2.3 Ah; for operating temperature up to 70 °C	**6ES7971-0BA02**
Aluminum rack	
• UR1, 18 slots	**6ES7400-1TA11-0AA0**
• UR2 XTR, 9 slots (conformal coating; for operating temperature up to 70 °C)	**6ES7400-1JA11-0AA1**
• UR2-H XTR, for divided central controllers; 2 × 9 slots (conformal coating; for operating temperature up to 70 °C)	**6ES7400-2JA10-0AA1**
• CR3 XTR, 4 slots (conformal coating; for operating temperature up to 70 °C)	**6ES7401-1DA01-0AA1**
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.
Individual components for AS 410HE high-availability automation systems	
CPU 410E Process Automation as spare part Conformal coating; for operating temperatures up to 70 °C 4 MB RAM integrated (2 MB each for program and data); module occupies 2 slots	**6ES7410-5HM08-0AB0**
System expansion card PO 200M	**6ES7653-2CB00-0XB0**
Runtime licenses for SIMATIC PCS 7 automation systems (can be added to existing licenses)	
SIMATIC PCS 7 A S Runtime license Language-neutral, floating license for 1 user No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	
- 100 POs	**6ES7653-2BA00-0XB5**
- 1 000 POs	**6ES7653-2BB00-0XB5**
- 10 000 POs	**6ES7653-2BC00-0XB5**
• Online delivery License key download, online certificate of license Note: Email address required!	
- 100 POs	**6ES7653-2BA00-0XH5**
- 1 000 POs	**6ES7653-2BB00-0XH5**
- 10 000 POs	**6ES7653-2BC00-0XH5**
Y-Link	
Y-Link For connection of devices with only 1 PROFIBUS DP interface to a redundant automation system	**6ES7197-1LA12-0XA0**

Options

Y-Link

- Bus coupler for transition from a redundant PROFIBUS DP master system to a single-channel PROFIBUS DP master system
- For connection of devices with only one PROFIBUS DP interface to the redundant PROFIBUS DP master system

The Y-link comprises:

- 2 IM 153-2 High Feature Outdoor high feature interface modules
- One Y coupler including RS 485 repeater
- One BM IM/IM bus module for two IM 153-2 High Feature Outdoor modules
- One BM Y coupler bus module

Evaluation of the Y-Link diagnostics (and hence indirectly of the connected DP standard slaves) is supported by driver blocks.

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Overview



AS Single Station AS 410F

Safety-related automation systems are used for critical applications where a fault could endanger life or result in damage to the plant or the environment. These F/FH systems also referred to as "fail-safe automation systems" detect both faults in the process and their own internal faults in association with the safety-related F modules of the ET 200 distributed I/O systems or fail-safe transmitters connected directly via the fieldbus. They automatically transfer the plant to a safe state in the event of a fault.

Design

The PROFIsafe profile allows safety-related communication between the automation system (controller) and the process I/O via both PROFIBUS and PROFINET. The decision for choosing either PROFINET IO or the PROFIBUS DP/PA fieldbuses has a significant influence on the architecture of the safety-related system.

For information on the safety-related design versions with PROFIBUS DP/PA and PROFINET IO, refer to the section "Safety Integrated for Process Automation", "Introduction".

The safety-related SIMATIC PCS 7 automation systems are based either on the hardware of the AS 410S standard automation system (F systems) or the hardware of the AS 410H high availability automation system (FH systems), which have been supplemented with safety functions using S7 F systems.

In accordance with the design variant, they are categorized as:

- **AS Single Station AS 410F** with only one CPU (safety-related)
- **AS Redundancy Station AS 410FH** with two redundant CPUs (safety-related and high availability)

The availability can be flexibly increased with a redundant design for the power supply or the Industrial Ethernet communications module (for details, see the section "Modular S7-400 systems" under "Flexible and scalable availability").

All AS 410F/FH systems are TÜV-certified and comply with the safety requirements up to SIL 3 according to IEC 61508.

In these systems with multitasking capability, several programs can be executed simultaneously in one CPU – basic process control (BPCS) applications or also safety-related applications. The programs are reaction-free, i.e. faults in BPCS applications have no effect on safety-related applications, and vice versa. Special tasks with very short response times can also be implemented.

The redundant FH systems operating according to the 1-out-of-2 principle consist of two subsystems of identical design. These are electrically isolated from each other to achieve optimum EMC, and are synchronized with each other via fiber-optic cables. In case of an error, there is a bumpless switchover from the active subsystem to the reserve system. The two subsystems can be present in the same rack or separated by up to 10 km. The spatial separation provides additional security in the case of extreme influences in the environment of the active subsystem, e.g. resulting from a fire.

The redundancy of the FH systems is only used to increase the availability. It is not relevant to processing of the safety functions and the associated fault detection.

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Design (continued)

Individual configuration of AS bundles

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 "Ordering data" section. 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 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 switches) integrated in the CPU can be used for this on the automation system. You can find more information in the section "Safety Integrated for Process Automation", "Introduction".

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

Safety-related automation systems come furnished with the SIMATIC PCS 7 AS Runtime license for 100 process objects (PO) 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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Ordering data

Safety-related automation systems with CPU 410-5H

	Article No.								
AS 410F (Single Station) CPU 410-5H with PROFIBUS DP and PROFINET IO interface 32 MB RAM (16 MB each for program and data) with SIMATIC PCS 7 AS Runtime license for 100 POs	**6ES7654-**	■	**C**	■	**0**	■	-	■	■	**F**	■
Type of delivery											
• Individual components, unassembled	**5**										
• Pre-assembled and tested	**6**										
System expansion card											
• System expansion card 100 POs including S7 F Systems Runtime License			**A**								
• System expansion card 500 POs including S7 F Systems Runtime License			**C**								
• System expansion card 1 000 POs including S7 F Systems Runtime License			**E**								
• System expansion card 1 600 POs including S7 F Systems Runtime license			**F**								
• System expansion card PO 2k+ (≥ 2 000) including S7 F Systems Runtime License			**G**								
• System expansion card 0 PO (blank) including S7 F Systems Runtime license			**H**								
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**					
• CR3 (4 slots), aluminum[2][3]						**7**					
Power supply (without backup batteries)											
• 1 × PS 407, 4 A for 120/230 V UC[2][4]							**A**				
• 1 × PS 407, 10 A for 120/230 V UC							**B**				
• 1 × PS 407, 10 A for 120/230 V UC, optional redundancy[2]							**C**				
• 1 × PS 407, 20 A for 120/230 V UC							**D**				
• 2 × PS 407, 10 A for 120/230 V UC, redundant[2]							**E**				
• 1 × PS 405, 4 A for 24 V DC[2][4]							**F**				
• 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

[3] Only in conjunction with 4 A power supplies

[4] Only in conjunction with CR3 rack

	Article No.								
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 POs	**6ES7656-**	■	**C**	■	■	-	■	■	**F**	■
Type of delivery										
• Individual components, unassembled	**5**									
• Pre-assembled and tested	**6**									
System expansion card										
• 2 × System expansion card 100 POs including S7 F Systems Runtime License			**A**							
• 2 × system expansion card 500 POs including S7 F Systems Runtime License			**C**							
• 2 × system expansion card 1 000 POs including S7 F Systems Runtime license			**E**							
• 2 × System expansion card 1 600 POs including S7 F Systems Runtime License			**F**							
• 2 × System expansion card PO 2k+ (≥ 2 000) including S7 F Systems Runtime license			**G**							
• 2 × System expansion card 0 PO (blank) including S7 F Systems Runtime license			**H**							
Sync modules and cables										
• 2 × 2 sync modules[2] for distances up to 10 m and 2 × FO sync cable, 1 m				**3**						
• 2 × 2 sync modules 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**				
• 2 x CR3 (4 slots), aluminum[2][3]						**7**				
Power supply (without backup batteries)										
• 2 × PS 407, 4 A for 120/230 V UC[2][4]							**A**			
• 2 × PS 407, 10 A for 120/230 V UC							**B**			
• 2 × PS 407, 10 A for 120/230 V UC, optional redundancy[2]							**C**			
• 2 × PS 407, 20 A for 120/230 V UC							**D**			
• 2 × 2 PS 407, 10 A for 120/230 V UC, redundant[2]							**E**			
• 2 × PS 405, 4 A for 24 V DC[2][4]							**F**			
• 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 per subsystem, or up to 3 CPs per subsystem with a redundant power supply.

[2] Conformal coating

[3] Only in conjunction with 4 A power supplies

[4] Only in conjunction with CR3 rack

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Ordering data (continued)

Safety-related automation systems with CPU 410-5H for the expanded temperature range (XTR)

	Article No.
AS 410F (Single Station) CPU 410-5H with PROFIBUS DP and PROFINET IO interface 32 MB RAM (16 MB each for program and data) with SIMATIC PCS 7 AS Runtime license for 100 POs	**6ES7654-** ■ **C** ■ **0** ■ **-** ■ ■ **F** ■
Type of delivery	
• Individual components, unassembled	**5**
• Pre-assembled and tested	**6**
System expansion card	
• System expansion card 100 POs including S7 F Systems Runtime License	**A**
• System expansion card 500 POs including S7 F Systems Runtime License	**C**
• System expansion card 1 000 POs including S7 F Systems Runtime License	**E**
• System expansion card 1 600 POs including S7 F Systems Runtime license	**F**
• System expansion card PO 2k+ (≥ 2 000) including S7 F Systems Runtime License	**G**
• System expansion card 0 PO (blank) including S7 F Systems Runtime license	**H**
Additive Industrial Ethernet interfaces	
• Without CP 443-1	**0**
Racks	
• UR2 XTR (9 slots), aluminum[1]	**3**
• CR3 XTR, 4 slots, aluminum[2]	**7**
Power supply (without backup batteries)	
• 1 × PS 407, 4 A XTR for 120/230 V UC[3]	**A**
• 1 × PS 407, 10 A XTR for 120/230 V UC, optional redundancy	**C**
• 2 × PS 407, 10 A XTR for 120/230 V UC, redundant	**E**
• 1 × PS 405, 4 A XTR for 24 V DC[3]	**F**
• 1 × PS 405, 10 A XTR for 24 V DC, optional redundancy	**H**
• 2 × PS 405, 10 A XTR for 24 V DC, redundant	**K**
Additive PROFIBUS DP interfaces	
• Without CP 443-5 Extended	**0**

[1] Only in conjunction with 10 A power supplies
[2] Only in conjunction with 4 A power supplies
[3] Only in conjunction with CR3 rack

	Article No.
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 POs	**6ES7656-** ■ **C** ■ ■ ■ **-** ■ ■ **F** ■
Type of delivery	
• Individual components, unassembled	**5**
• Pre-assembled and tested	**6**
System expansion card	
• 2 × System expansion card 100 POs including S7 F Systems Runtime License	**A**
• 2 × system expansion card 500 POs including S7 F Systems Runtime License	**C**
• 2 × system expansion card 1 000 POs including S7 F Systems Runtime license	**E**
• 2 × System expansion card 1 600 POs including S7 F Systems Runtime License	**F**
• 2 × System expansion card PO 2k+ (≥ 2 000) including S7 F Systems Runtime license	**G**
• 2 × System expansion card 0 PO (blank) including S7 F Systems Runtime license	**H**
Sync modules and cables	
• 2 × 2 sync modules V8 XTR for distances up to 10 m and 2 × FO sync cable, 1 m	**3**
Additive Industrial Ethernet interfaces	
• Without CP 443-1	**0**
Racks	
• 1 × UR2-H XTR (2 × 9 slots), aluminum[1]	**1**
• 2 × UR2 XTR (9 slots), aluminum[1]	**3**
• 2 × CR3 XTR, 4 slots, aluminum[2]	**7**
Power supply (without backup batteries)	
• 2 × PS 407, 4 A XTR for 120/230 V UC[3]	**A**
• 2 × PS 407, 10 A XTR for 120/230 V UC, optional redundancy	**C**
• 2 × 2 PS 407, 10 A XTR for 120/230 V UC, redundant	**E**
• 2 × PS 405, 4 A XTR for 24 V DC[3]	**F**
• 2 × PS 405, 10 A XTR for 24 V DC, optional redundancy	**H**
• 2 × 2 PS 405, 10 A XTR for 24 V DC, redundant	**K**
Additive PROFIBUS DP interfaces	
• Without CP 443-5 Extended	**0**

[1] Only in conjunction with 10 A power supplies
[2] Only in conjunction with 4 A power supplies
[3] Only in conjunction with CR3 rack

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Ordering data (continued)

Safety-related automation systems with CPU 410E

	Article no.								
AS 410FE (Single Station) CPU 410E with PROFIBUS DP and PROFINET IO interface 4 MB RAM (2 MB each for program and data) with SIMATIC PCS 7 AS Runtime license for 100 POs and PO 200M system expansion card	**6ES7654-**								
	■	**E**	**B**	**0**	■	-	■	■	**F**	■
Type of delivery										
• Individual components, unassembled	**5**									
• Pre-assembled and tested	**6**									
Additive Industrial Ethernet ports[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**			
• CR3 (4 slots), aluminum[2][3]							**7**			
Power supply (without backup batteries)										
• 1 × PS 407, 4 A for 120/230 V UC[2][4]								**A**		
• 1 × PS 407, 10 A for 120/230 V UC								**B**		
• 1 × PS 407, 10 A for 120/230 V UC, optional redundancy[2]								**C**		
• 2 × PS 407, 10 A for 120/230 V UC, redundant[2]								**E**		
• 1 × PS 405, 4 A for 24 V DC[2][4]								**F**		
• 1 × PS 405, 10 A for 24 V DC								**G**		
• 1 × PS 405, 10 A for 24 V DC, optional redundancy[2]								**H**		
• 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

[3] Only in conjunction with 4 A power supplies

[4] Only in conjunction with CR3 rack

	Article no.								
AS 410FHE (Redundancy Station) 2 × CPU 410E with PROFIBUS DP and PROFINET IO interface 4 MB RAM (2 MB each for program and data) with SIMATIC PCS 7 AS Runtime license for 100 POs and PO 200M system expansion card	**6ES7656-**								
	■	**E**	**B**	■	■	-	■	■	**F**	■
Type of delivery										
• Individual components, unassembled	**5**									
• Pre-assembled and tested	**6**									
Sync modules and cables										
• 2 × 2 sync modules[2] for distances up to 10 m and 2 × FO sync cable, 1 m				**3**						
• 2 × 2 sync modules for up to 10 km and 2 × FO sync cable, 1 m, for testing				**4**						
Additive Industrial Ethernet ports[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**			
• 2 x CR3 (4 slots), aluminum[2][3]							**7**			
Power supply (without backup batteries)										
• 2 × PS 407, 4 A for 120/230 V UC[2][4]								**A**		
• 2 × PS 407, 10 A for 120/230 V UC								**B**		
• 2 × PS 407, 10 A for 120/230 V UC, optional redundancy[2]								**C**		
• 2 × PS 407, 20 A for 120/230 V UC								**D**		
• 2 × 2 PS 407, 10 A for 120/230 V UC, redundant[2]								**E**		
• 2 × PS 405, 4 A for 24 V DC[2][4]								**F**		
• 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 per subsystem, or up to 3 CPs per subsystem with a redundant power supply.

[2] Conformal coating

[3] Only in conjunction with 4 A power supplies

[4] Only in conjunction with CR3 rack

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Ordering data (continued)

Safety-related automation systems with CPU 410E for the expanded temperature range (XTR)

	Article no.								
AS 410FE (Single Station) CPU 410E with PROFIBUS DP and PROFINET IO interface 4 MB RAM (2 MB each for program and data) with SIMATIC PCS 7 AS Runtime license for 100 POs and PO 200M system expansion card	**6ES7654-**								
	■	**E**	**B**	**0**	■	-	■	■	**F**	■
Type of delivery										
• Individual components, unassembled	**5**									
• Pre-assembled and tested	**6**									
Additive Industrial Ethernet ports										
• Without CP 443-1				**0**						
Racks										
• UR2 XTR (9 slots), aluminum[1]							**3**			
• CR3 XTR, 4 slots, aluminum[2]							**7**			
Power supply (without backup batteries)										
• 1 × PS 407, 4 A XTR for 120/230 V UC[3]								**A**		
• 1 × PS 407, 10 A XTR for 120/230 V UC, optional redundancy								**C**		
• 2 × PS 407, 10 A XTR for 120/230 V UC, redundant								**E**		
• 1 × PS 405, 4 A XTR for 24 V DC[3]								**F**		
• 1 × PS 405, 10 A XTR for 24 V DC, optional redundancy								**H**		
• 2 × PS 405, 10 A XTR for 24 V DC, redundant								**K**		
Additive PROFIBUS DP interfaces										
• Without CP 443-5 Extended										**0**

[1] Only in conjunction with 10 A power supplies
[2] Only in conjunction with 4 A power supplies
[3] Only in conjunction with CR3 rack

	Article no.								
AS 410FHE (Redundancy Station) 2 × CPU 410E with PROFIBUS DP and PROFINET IO interface 4 MB RAM (2 MB each for program and data) with SIMATIC PCS 7 AS Runtime license for 100 POs and PO 200M system expansion card	**6ES7656-**								
	■	**E**	**B**	■	■	-	■	■	**F**	■
Type of delivery										
• Individual components, unassembled	**5**									
• Pre-assembled and tested	**6**									
Sync modules and cables										
• 2 × 2 sync modules V8 XTR for distances up to 10 m and 2 × FO sync cable, 1 m				**3**						
Additive Industrial Ethernet ports										
• Without CP 443-1					**0**					
Racks										
• 1 × UR2-H XTR (2 × 9 slots), aluminum[1]							**1**			
• 2 × UR2 XTR (9 slots), aluminum[1]							**3**			
• 2 × CR3 XTR, 4 slots, aluminum[2]							**7**			
Power supply (without backup batteries)										
• 2 × PS 407, 4 A XTR for 120/230 V UC[3]								**A**		
• 2 × PS 407, 10 A XTR for 120/230 V UC, optional redundancy								**C**		
• 2 × 2 PS 407, 10 A XTR for 120/230 V UC, redundant								**E**		
• 2 × PS 405, 4 A XTR for 24 V DC[3]								**F**		
• 2 × PS 405, 10 A XTR for 24 V DC, optional redundancy								**H**		
• 2 × 2 PS 405, 10 A XTR for 24 V DC, redundant								**K**		
Additive PROFIBUS DP interfaces										
• Without CP 443-5 Extended										**0**

[1] Only in conjunction with 10 A power supplies
[2] Only in conjunction with 4 A power supplies
[3] Only in conjunction with CR3 rack

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Ordering data

Individual components

	Article No.
Individual components of the safety-related SIMATIC PCS 7 AS 410F and AS 410FH automation systems	
S7 F Systems RT License For processing safety-related user programs, for one AS 410F/FH system each	**6ES7833-1CC00-6YX0**
CPU 410-5H Process Automation as spare part Conformal coating; for operating temperature up to 70 °C 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 PCS 7 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 PCS 7 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 PCS 7 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 PCS 7 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 PCS 7 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 independent of language, no SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	
- 100 POs, license for upgrading of 1 CPU	**6ES7653-2CA00-0XE0**
- 500 POs, license for upgrading of 1 CPU	**6ES7653-2CC00-0XE0**
- PN RED for use of redundant PROFINET (R1), with 2 licenses for upgrading of an H System	**6ES7653-2CX01-0XE0**
• Online delivery License key download, online certificate of license Note: Email address required!	
- 100 POs, license for upgrading of 1 CPU	**6ES7653-2CA00-0XK0**
- 500 POs, license for upgrading of 1 CPU	**6ES7653-2CC00-0XK0**
- PN RED for use of redundant PROFINET (R1), with 2 licenses for upgrading of an H System	**6ES7653-2CX01-0XK0**

	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 CPUs; 2 modules required for each CPU, for distances up to	
• 10 m	**6ES7960-1AA06-0XA0**
• 10 km	**6ES7960-1AB06-0XA0**
Sync module V8 XTR (Conformal coating; for operating temperature up to 70 °C) For coupling two redundant CPUs; 2 modules required for each CPU; for distances up to 10 m	**6ES7960-1AA08-0XA0**
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 Mbps; 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**

8

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Ordering data	Article No.
PS 407 power supply module with battery compartment for 2 backup batteries, module occupies 2 slots	
• **4 A XTR** (conformal coating; for operating temperature up to 70 °C) 120/230 V UC; 5 V DC/4 A, 24 V DC/0.5 A	**6ES7407-0DA02-0AA1**
• **10 A** 120/230 V UC; 5 V DC/10 A, 24 V DC/1 A	**6ES7407-0KA02-0AA0**
• **10 A XTR, optional redundancy** (conformal coating; for operating temperature up to 70 °C) 120/230 V UC/; 5 V DC/10 A, 24 V DC/1 A	**6ES7407-0KR02-0AA1**
• **20 A** 120/230 V UC; 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	
• **4 A XTR** (conformal coating; for operating temperature up to 70 °C) 24/48/60 V DC; 5 V DC/4 A, 24 V DC/0.5 A	**6ES7405-0DA02-0AA1**
• **10 A** 24/48/60 V DC; 5 V DC/10 A, 24 V DC/1 A	**6ES7405-0KA02-0AA0**
• **10 A XTR, optional redundancy** (conformal coating; for operating temperature up to 70 °C) 24/48/60 V DC/; 5 V DC/10 A, 24 V DC/1 A	**6ES7405-0KR02-0AA1**
• **20 A** 24/48/60 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 for PS 405/407, type AA, 3.6 V, 2.3 Ah	**6ES7971-0BA00**
XTR backup battery for PS 405/407, type AA, 3.6 V, 2.3 Ah; for operating temperature up to 70 °C	**6ES7971-0BA02**
Aluminum rack	
• UR1, 18 slots	**6ES7400-1TA11-0AA0**
• UR2 XTR, 9 slots (conformal coating; for operating temperature up to 70 °C)	**6ES7400-1JA11-0AA1**
• UR2-H XTR, for divided central controllers; 2 × 9 slots (conformal coating; for operating temperature up to 70 °C)	**6ES7400-2JA10-0AA1**
• CR3 XTR, 4 slots (conformal coating; for operating temperature up to 70 °C)	**6ES7401-1DA01-0AA1**
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.
Individual components for safety-related AS 410FE automation systems	
CPU 410E Process Automation as spare part Conformal coating; for operating temperatures up to 70 °C 4 MB RAM integrated (2 MB each for program and data); module occupies 2 slots	**6ES7410-5HM08-0AB0**
System expansion card PO 200M	**6ES7653-2CB00-0XB0**
Runtime licenses for SIMATIC PCS 7 automation systems (can be added to existing licenses)	
SIMATIC PCS 7 AS Runtime license Language-neutral, floating license for 1 user No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	
- 100 POs	**6ES7653-2BA00-0XB5**
- 1 000 POs	**6ES7653-2BB00-0XB5**
- 10 000 POs	**6ES7653-2BC00-0XB5**
• Online delivery License key download, online certificate of license Note: Email 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	
Y-Link	
Y-Link For connection of devices with only one PROFIBUS DP interface to a redundant automation system	**6ES7197-1LA12-0XA0**

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Overview

With the S7-400 automation systems, which are scalable via different types of CPU, you have an alternative to AS 410 automation systems. The systems that can be used in plants with SIMATIC PCS 7 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. This allows for a low-cost starter solution with a modular and scalable system based on the S7-400 controller range. Larger quantity frameworks can be implemented with the AS 416-2, AS416-3/416-3IE and AS 417-4 automation systems. These systems are preferred for medium and large-sized plants.

High availability automation systems

The aim in using high availability automation systems is to minimize the risk of a production outage. In accordance with their basic design, these systems are categorized as:

- AS Single Stations: AS 412-5-1H, AS 414-5-1H, AS 416-5-1H, and AS 417-5-1H with only one CPU, e.g. for the following applications:
  - Subsequent expansion to a redundant system
  - Redundant configuration on UR1 racks, comprising 2 single stations, 4 sync modules, and 2 sync fiber-optic cables
- AS Redundancy Stations: AS 412-5-2H, AS 414-5-2H, AS 416-5-2H and AS 417-5-2H with two redundant CPUs, mounted on one common rack (UR2-H) or two separate racks (UR2)

Safety-related automation systems

Safety-related automation systems (F/FH systems) are available for safety-relevant applications in which an incident can result in danger to persons, plant damage or environmental pollution. These are based on the hardware of the high availability automation systems, which is expanded by safety functions with S7 F systems.

In accordance with the design variant, they are categorized as:

- **AS Single Stations**
  AS 412F, AS 414F, AS 416F, and AS 417F with only one CPU (safety-related)
- **AS Redundancy Stations**
  AS 412FH, AS 414FH, AS 416FH, and AS 417FH with two redundant CPUs (safety-related and high availability)

The safety-related F/FH systems collaborate with safety-related F modules of the ET 200 distributed I/O systems or fail-safe transmitters connected directly via the fieldbus to detect not only faults in the process, but also their own, internal faults. They automatically transfer the plant to a safe state in the event of a fault. The redundancy of the FH systems is only used to increase the availability. It is not relevant to processing of the safety functions and the associated fault detection.

All F/FH systems are TÜV-certified and comply with the safety requirements up to SIL 3 according to IEC 61508.

Design

Racks

Automation systems based on only one CPU (AS Single Station) can be mounted on a UR1 rack (18 slots) or UR2 rack (9 slots).

The automation systems (AS Redundancy Station) consisting of two electrically isolated redundant subsystems can be mounted on a UR2-H compact rack with divided backplane bus or on two separate racks (UR1 or UR2). The design with two racks allows physical separation of the redundant subsystems, e.g. by a fireproof partition and over a distance of up to 10 km. As a result of the galvanic isolation, the system is insensitive to electromagnetic interferences.

Redundant power supply

If you have two separate power supply networks for 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 interfaces integrated in the CPUs of the high availability and safety-related automation systems are not used for PROFINET IO, they can then also be used 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/O 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.

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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 CP 443-5 Extended PROFIBUS DP interface

8

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 comes furnished with the SIMATIC PCS 7 AS Runtime license for 100 process objects (PO). Safety-related automation systems are additionally furnished 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 "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 information

- 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).

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 (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
  - With 2 redundant power supply modules: 4 units
- SIMATIC PCS 7 AS Redundancy Station:
  - With 2 power supply modules: 4 units
  - With 2 x 2 redundant power supply modules: 8 units

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Ordering data

Configuration tables for standard automation systems

	Article No.								
AS 414-3 with SIMATIC PCS 7 AS Runtime license for 100 POs CPU with 3 interfaces (MPI/DP and slot for IF module) 4 MB RAM (2 MB each for program and data)	**6ES7654-**				-			G	
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 (up to approx. 450 POs)			**C**						
Additive IF 964-DP interface module									
• Without additive IF 964-DP				**0**					
• 1 × IF 964-DP				**1**					
Interface to Industrial Ethernet/PROFINET plant bus									
• 1 × CP 443-1EX30					**3**				
• 2 × CP 443-1EX30					**4**				
Racks									
• UR2 (9 slots), aluminum						**3**			
• UR2 (9 slots), steel						**4**			
• UR1 (18 slots), aluminum						**5**			
• UR1 (18 slots), steel						**6**			
Power supply (without backup batteries)									
• 1 × PS 407, 10 A for 120/230 V UC							**B**		
• 1 × PS 407, 10 A for 120/230 V UC, optional redundancy							**C**		
• 1 × PS 407, 20 A for 120/230 V UC							**D**		
• 2 × PS 407, 10 A for 120/230 V UC, optional redundancy							**E**		
• 1 × PS 405, 10 A for 24 V DC							**G**		
• 1 × PS 405, 10 A for 24 V DC, optional redundancy							**H**		
• 1 × PS 405, 20 A for 24 V DC							**J**		
• 2 × PS 405, 10 A for 24 V DC, optional redundancy							**K**		
Additive PROFIBUS DP interfaces									
• Without CP 443-5 Extended									**0**
• 1 × CP 443-5 Extended									**1**
• 2 × CP 443-5 Extended									**2**
• 3 × CP 443-5 Extended[1)]									**3**
• 4 × 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.

	Article No.								
AS 416-2 with SIMATIC PCS 7 AS Runtime license for 100 POs CPU with 2 interfaces (MPI/DP and DP) 8 MB RAM (4 MB each for program and data)	**6ES7654-**				-			G	
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. 3 000 POs)		**E**							
CPU type									
• CPU 416-2 (up to approx. 900 POs)			**G**						
Additive IF 964-DP interface module									
• Without additive IF 964-DP				**0**					
Interface to Industrial Ethernet/PROFINET plant bus									
• 1 × CP 443-1EX30					**3**				
• 2 × CP 443-1EX30					**4**				
Racks									
• UR2 (9 slots), aluminum						**3**			
• UR2 (9 slots), steel						**4**			
• UR1 (18 slots), aluminum						**5**			
• UR1 (18 slots), steel						**6**			
Power supply (without backup batteries)									
• 1 × PS 407, 10 A for 120/230 V UC							**B**		
• 1 × PS 407, 10 A for 120/230 V UC, optional redundancy							**C**		
• 1 × PS 407, 20 A for 120/230 V UC							**D**		
• 2 × PS 407, 10 A for 120/230 V UC, optional redundancy							**E**		
• 1 × PS 405, 10 A for 24 V DC							**G**		
• 1 × PS 405, 10 A for 24 V DC, optional redundancy							**H**		
• 1 × PS 405, 20 A for 24 V DC							**J**		
• 2 × PS 405, 10 A for 24 V DC, optional redundancy							**K**		
Additive PROFIBUS DP interfaces									
• Without CP 443-5 Extended									**0**
• 1 × CP 443-5 Extended									**1**
• 2 × CP 443-5 Extended									**2**
• 3 × CP 443-5 Extended									**3**
• 4 × CP 443-5 Extended[1)]									**4**

[1)] With the UR2 rack in combination with a redundant power supply, the number of additive CP 443-5 Extended is limited to 3.

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Ordering data (continued)

	Article No.
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) 16 MB RAM (8 MB each for program and data)	**6ES7654-** ■ ■ ■ ■ ■ - ■ ■ G ■
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. 1 500 POs)	H
Additive IF 964-DP interface module	
• Without additive IF 964-DP	0
• 1 × IF 964-DP	1
Interface to Industrial Ethernet/PROFINET plant bus	
• 1 × CP 443-1EX30	3
• 2 × CP 443-1EX30	4
Racks	
• UR2 (9 slots), aluminum	3
• UR2 (9 slots), steel	4
• UR1 (18 slots), aluminum	5
• UR1 (18 slots), steel	6
Power supply (without backup batteries)	
• 1 × PS 407, 10 A for 120/230 V UC	B
• 1 × PS 407, 10 A for 120/230 V UC, optional redundancy	C
• 1 × PS 407, 20 A for 120/230 V UC	D
• 2 × PS 407, 10 A for 120/230 V UC, optional redundancy	E
• 1 × PS 405, 10 A for 24 V DC	G
• 1 × PS 405, 10 A for 24 V DC, optional redundancy	H
• 1 × PS 405, 20 A for 24 V DC	J
• 2 × PS 405, 10 A for 24 V DC, optional redundancy	K
Additive PROFIBUS DP interfaces	
• Without CP 443-5 Extended	0
• 1 × CP 443-5 Extended	1
• 2 × CP 443-5 Extended	2
• 3 × CP 443-5 Extended[1)]	3
• 4 × 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.

	Article No.
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)	**6ES7654-** ■ ■ ■ ■ ■ - ■ ■ G ■
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. 2 200 POs)	K
Additive IF 964-DP interface module	
• Without additive IF 964-DP	0
• 1 × IF 964-DP	1
• 2 × IF 964-DP	2
Interface to Industrial Ethernet/PROFINET plant bus	
• 1 × CP 443-1EX30	3
• 2 × CP 443-1EX30	4
Racks	
• UR2 (9 slots), aluminum	3
• UR2 (9 slots), steel	4
• UR1 (18 slots), aluminum	5
• UR1 (18 slots), steel	6
Power supply (without backup batteries)	
• 1 × PS 407, 10 A for 120/230 V UC	B
• 1 × PS 407, 10 A for 120/230 V UC, optional redundancy	C
• 1 × PS 407, 20 A for 120/230 V UC	D
• 2 × PS 407, 10 A for 120/230 V UC, optional redundancy	E
• 1 × PS 405, 10 A for 24 V DC	G
• 1 × PS 405, 10 A for 24 V DC, optional redundancy	H
• 1 × PS 405, 20 A for 24 V DC	J
• 2 × PS 405, 10 A for 24 V DC, optional redundancy	K
Additive PROFIBUS DP interfaces	
• Without CP 443-5 Extended	0
• 1 × CP 443-5 Extended	1
• 2 × CP 443-5 Extended	2
• 3 × CP 443-5 Extended[1)]	3
• 4 × 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.

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Ordering data (continued)

	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-** ■ ■ ■ ■ ■ - ■ ■ G ■
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. 450 POs)	D
Additive IF 964-DP interface module	
• Without additive IF 964-DP	0
• 1 × IF 964-DP	1
Interface to Industrial Ethernet/PROFINET plant bus	
• Integrated, without CP 443-1	0
• 1 × CP 443-1EX30	3
• 2 × CP 443-1EX30	4
Racks	
• UR2 (9 slots), aluminum	3
• UR2 (9 slots), steel	4
• UR1 (18 slots), aluminum	5
• UR1 (18 slots), steel	6
Power supply (without backup batteries)	
• 1 × PS 407, 10 A for 120/230 V UC	B
• 1 × PS 407, 10 A for 120/230 V UC, optional redundancy	C
• 1 × PS 407, 20 A for 120/230 V UC	D
• 2 × PS 407, 10 A for 120/230 V UC, optional redundancy	E
• 1 × PS 405, 10 A for 24 V DC	G
• 1 × PS 405, 10 A for 24 V DC, optional redundancy	H
• 1 × PS 405, 20 A for 24 V DC	J
• 2 × PS 405, 10 A for 24 V DC, optional redundancy	K
Additive PROFIBUS DP interfaces	
• Without CP 443-5 Extended	0
• 1 × CP 443-5 Extended	1
• 2 × CP 443-5 Extended	2
• 3 × CP 443-5 Extended	3
• 4 × 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.

	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-** ■ ■ ■ ■ ■ - ■ ■ G ■
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. 1 500 POs)	J
Additive IF 964-DP interface module	
• Without additive IF 964-DP	0
• 1 × IF 964-DP	1
Interface to Industrial Ethernet/PROFINET plant bus	
• Integrated, without CP 443-1	0
• 1 × CP 443-1EX30	3
• 2 × CP 443-1EX30	4
Racks	
• UR2 (9 slots), aluminum	3
• UR2 (9 slots), steel	4
• UR1 (18 slots), aluminum	5
• UR1 (18 slots), steel	6
Power supply (without backup batteries)	
• 1 × PS 407, 10 A for 120/230 V UC	B
• 1 × PS 407, 10 A for 120/230 V UC, optional redundancy	C
• 1 × PS 407, 20 A for 120/230 V UC	D
• 2 × PS 407, 10 A for 120/230 V UC, optional redundancy	E
• 1 × PS 405, 10 A for 24 V DC	G
• 1 × PS 405, 10 A for 24 V DC, optional redundancy	H
• 1 × PS 405, 20 A for 24 V DC	J
• 2 × PS 405, 10 A for 24 V DC, optional redundancy	K
Additive PROFIBUS DP interfaces	
• Without CP 443-5 Extended	0
• 1 × CP 443-5 Extended	1
• 2 × CP 443-5 Extended	2
• 3 × CP 443-5 Extended	3
• 4 × 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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8

Ordering data

Individual components of standard automation systems

	Article No.
CPU 414-3 RAM 4 MB (2 MB each for program and data); module occupies 2 slots	**6ES7414-3XM07-0AB0**
CPU 416-2 RAM 8 MB (4 MB each for program and data); module occupies 1 slot	**6ES7416-2XP07-0AB0**
CPU 416-3 RAM 16 MB (8 MB each for program and data); module occupies 2 slots	**6ES7416-3XS07-0AB0**
CPU 417-4 32 MB RAM integrated (16 MB each for program and data); module occupies 2 slots	**6ES7417-4XT07-0AB0**
CPU 414-3 PN/DP RAM 4 MB (2 MB each for program and data); module occupies 2 slots	**6ES7414-3EM07-0AB0**
CPU 416-3 PN/DP RAM 16 MB (8 MB each for program and data); module occupies 2 slots	**6ES7416-3ES07-0AB0**
Memory card RAM	
• 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	
• 16 MB	**6ES7952-1KS00-0AA0**
CP 443-1 Communication module for connecting SIMATIC S7-400 to Industrial Ethernet via 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 via IP access list, initialization via LAN 10/100 Mbps; 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 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**

	Article No.
PS 407 power supply module; 10 A 120/230 V UC; 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 UC; 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 UC; 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**
Aluminum UR1 rack 18 slots	**6ES7400-1TA11-0AA0**
Aluminum UR2 rack 9 slots	**6ES7400-1JA11-0AA0**
Steel UR1 rack 18 slots	**6ES7400-1TA01-0AA0**
Steel UR2 rack 9 slots	**6ES7400-1JA01-0AA0**
Runtime licenses for SIMATIC PCS 7 automation systems (can be added to existing licenses)	
SIMATIC PCS 7 AS Runtime license Language-neutral, floating license for 1 user	
No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	
- 100 POs	**6ES7653-2BA00-0XB5**
- 1 000 POs	**6ES7653-2BB00-0XB5**
- 10 000 POs	**6ES7653-2BC00-0XB5**
• Online delivery License key download, online certificate of license Note: Email address required!	
- 100 POs	**6ES7653-2BA00-0XH5**
- 1 000 POs	**6ES7653-2BB00-0XH5**
- 10 000 POs	**6ES7653-2BC00-0XH5**

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Ordering data

Configuration tables for high availability automation systems

	Article No.								
AS 412-5-1H (Single Station) with SIMATIC PCS 7 AS Runtime license for 100 POs CPU with 2 PROFIBUS interfaces (MPI/DP master and DP master) and 1 PN/IE interface (2 port switch) 1 MB RAM (512 KB each for program and data)	**6ES7654-**				-			G	
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 × CP 443-1EX30[1)]					**3**				
• 2 × CP 443-1EX30 for redundant interface[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 × PS 407, 10 A for 120/230 V AC/DC							**B**		
• 1 × PS 407, 10 A for 120/230 V AC/DC, optional redundancy							**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)							**E**		
• 1 × PS 405, 10 A for 24 V DC							**G**		
• 1 × PS 405, 10 A for 24 V DC, optional redundancy							**H**		
• 1 × PS 405, 20 A for 24 V DC							**J**		
• 2 × PS 405, 10 A for 24 V DC (redundant)							**K**		
Additive PROFIBUS DP interfaces									
• Without CP 443-5 Extended									**0**
• 1 × CP 443-5 Extended									**1**
• 2 × CP 443-5 Extended[1)]									**2**
• 3 × CP 443-5 Extended[1)]									**3**
• 4 × CP 443-5 Extended[1)]									**4**

[1)] Up to 5 CPs can be plugged into the UR2 rack with a single power supply or up to 3 with a redundant power supply.

	Article No.								
AS 414-5-1H (Single Station) with SIMATIC PCS 7 AS Runtime license for 100 POs CPU with 2 PROFIBUS interfaces (MPI/DP master and DP master) and 1 PN/IE interface (2 port switch) 4 MB RAM (2 MB each for program and data)	**6ES7654-**					-		G	
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 × CP 443-1EX30[1)]					**3**				
• 2 × CP 443-1EX30 for redundant interface[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 × PS 407, 10 A for 120/230 V AC/DC								**B**	
• 1 × PS 407, 10 A for 120/230 V AC/DC, optional redundancy								**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)								**E**	
• 1 × PS 405, 10 A for 24 V DC								**G**	
• 1 × PS 405, 10 A for 24 V DC, optional redundancy								**H**	
• 1 × PS 405, 20 A for 24 V DC								**J**	
• 2 × PS 405, 10 A for 24 V DC (redundant)								**K**	
Additive PROFIBUS DP interfaces									
• Without CP 443-5 Extended									**0**
• 1 × CP 443-5 Extended									**1**
• 2 × CP 443-5 Extended[1)]									**2**
• 3 × CP 443-5 Extended[1)]									**3**
• 4 × CP 443-5 Extended[1)]									**4**

[1)] Up to 5 CPs can be plugged into the UR2 rack with a single power supply or up to 3 with a redundant power supply.

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Ordering data (continued)

	Article No.
AS 416-5-1H (Single Station) with SIMATIC PCS 7 AS Runtime license for 100 POs CPU with 2 PROFIBUS interfaces (MPI/DP master and DP master) and 1 PN/IE interface (2 port switch) 16 MB RAM (6 MB for program and 10 MB for data)	**6ES7654-** ■ ■ ■ ■ ■ - ■ ■ G ■
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 × CP 443-1EX30[1]	3
• 2 × CP 443-1EX30 for redundant interface[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 × PS 407, 10 A for 120/230 V AC/DC	B
• 1 × PS 407, 10 A for 120/230 V AC/DC, optional redundancy	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)	E
• 1 × PS 405, 10 A for 24 V DC	G
• 1 × PS 405, 10 A for 24 V DC, optional redundancy	H
• 1 × PS 405, 20 A for 24 V DC	J
• 2 × PS 405, 10 A for 24 V DC (redundant)	K
Additive PROFIBUS DP interfaces	
• Without CP 443-5 Extended	0
• 1 × CP 443-5 Extended	1
• 2 × CP 443-5 Extended[1]	2
• 3 × CP 443-5 Extended[1]	3
• 4 × CP 443-5 Extended[1]	4

[1] Up to 5 CPs can be plugged into the UR2 rack with a single power supply or up to 3 with a redundant power supply.

	Article No.
AS 417-5-1H (Single Station) with SIMATIC PCS 7 AS Runtime license for 100 POs CPU with 2 PROFIBUS interfaces (MPI/DP master and DP master) and 1 PN/IE interface (2 port switch) 32 MB RAM (16 MB each for program and data)	**6ES7654-** ■ ■ ■ ■ ■ - ■ ■ G ■
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
• Memory card 64 MB RAM	G
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 × CP 443-1EX30[1]	3
• 2 × CP 443-1EX30 for redundant interface[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 × PS 407, 10 A for 120/230 V AC/DC	B
• 1 × PS 407, 10 A for 120/230 V AC/DC, optional redundancy	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)	E
• 1 × PS 405, 10 A for 24 V DC	G
• 1 × PS 405, 10 A for 24 V DC, optional redundancy	H
• 1 × PS 405, 20 A for 24 V DC	J
• 2 × PS 405, 10 A for 24 V DC (redundant)	K
Additive PROFIBUS DP interfaces	
• Without CP 443-5 Extended	0
• 1 × CP 443-5 Extended	1
• 2 × CP 443-5 Extended[1]	2
• 3 × CP 443-5 Extended[1]	3
• 4 × CP 443-5 Extended[1]	4

[1] Up to 5 CPs can be plugged into the UR2 rack with a single power supply or up to 3 with a redundant power supply.

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Ordering data (continued)

	Article No.
AS 412-5-2H (Redundancy Station) with SIMATIC PCS 7 AS Runtime license for 100 POs	6ES7656-
2 × CPU each with 2 PROFIBUS interfaces (MPI/DP master and DP master) and 1 PN/IE interface (2-port switch)	
2 × 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 × Memory Card 1 MB RAM (up to approx. 30 POs)	A
• 2 × Memory Card 2 MB RAM (up to approx. 100 POs)	B
CPU type	
• 2 × CPU 412-5H (up to approx. 30 POs)	A
Sync modules and cables	
• 2 × 2 sync modules for distances up to 10 m and 2 × FO sync cable, 1 m	3
Interface to Industrial Ethernet plant bus	
• Without interface module	0
• 2 × CP 443-1EX30 for redundant interface[1)]	3
• 2 × 2 CP 443-1EX30 for 4-way connection[1)]	4
Racks	
• 1 × UR2-H (2 × 9 slots), aluminum	1
• 1 × UR2-H (2 × 9 slots), steel	2
• 2 × UR2 (9 slots), aluminum	3
• 2 × UR2 (9 slots), steel	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	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)	E
• 2 × PS 405, 10 A for 24 V DC	G
• 2 × PS 405, 10 A for 24 V DC, optional redundancy	H
• 2 × PS 405, 20 A for 24 V DC	J
• 2 × 2 PS 405, 10 A for 24 V DC (redundant)	K
Additive PROFIBUS DP interfaces	
• Without CP 443-5 Extended	0
• 2 × CP 443-5 Extended	1
• 2 × 2 CP 443-5 Extended[1)]	2
• 2 × 3 CP 443-5 Extended[1)]	3
• 2 × 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 × CPU each with 2 PROFIBUS interfaces (MPI/DP master and DP master) and 1 PN/IE interface (2-port switch)	
2 × 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 × Memory Card 2 MB RAM (up to approx. 100 POs)	B
• 2 × Memory Card 4 MB RAM (up to approx. 210 POs)	C
CPU type	
• 2 × CPU 414-5H (up to approx. 350 POs)	E
Sync modules and cables	
• 2 × 2 sync modules for distances up to 10 m and 2 × FO sync cable, 1 m	3
• 2 × 2 sync modules for up to 10 km and 2 × FO sync cable, 1 m, for testing	4
Interface to Industrial Ethernet plant bus	
• Without interface module	0
• 2 × CP 443-1EX30 for redundant interface[1)]	3
• 2 × 2 CP 443-1EX30 for 4-way connection[1)]	4
Racks	
• 1 × UR2-H (2 × 9 slots), aluminum	1
• 1 × UR2-H (2 × 9 slots), steel	2
• 2 × UR2 (9 slots), aluminum	3
• 2 × UR2 (9 slots), steel	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	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)	E
• 2 × PS 405, 10 A for 24 V DC	G
• 2 × PS 405, 10 A for 24 V DC, optional redundancy	H
• 2 × PS 405, 20 A for 24 V DC	J
• 2 × 2 PS 405, 10 A for 24 V DC (redundant)	K
Additive PROFIBUS DP interfaces	
• Without CP 443-5 Extended	0
• 2 × CP 443-5 Extended	1
• 2 × 2 CP 443-5 Extended[1)]	2
• 2 × 3 CP 443-5 Extended[1)]	3
• 2 × 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

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Ordering data (continued)

	Article No.
AS 416-5-2H (Redundancy Station) with SIMATIC PCS 7 AS Runtime license for 100 POs 2 × CPU each with 2 PROFIBUS interfaces (MPI/DP master and DP master) and 1 PN/IE interface (2-port switch) 2 × 16 MB RAM (6 MB each for program and 10 MB each for data)	**6ES7656-** ■ ■ ■ ■ ■ - ■ ■ **F** ■
Type of delivery	
• Individual components, not pre-assembled	**7**
• Pre-assembled and tested	**8**
Memory card	
• 2 × Memory Card 4 MB RAM (up to approx. 210 POs)	**C**
• 2 × Memory Card 8 MB RAM (up to approx. 800 POs)	**D**
• 2 × Memory Card 16 MB RAM (up to approx. 2 100 POs)	**E**
CPU type	
• 2 × CPU 416-5H (up to approx. 1 200 POs)	**P**
Sync modules and cables	
• 2 × 2 sync modules for distances up to 10 m and 2 × FO sync cable, 1 m	**3**
• 2 × 2 sync modules for up to 10 km and 2 × FO sync cable, 1 m, for testing	**4**
Interface to Industrial Ethernet plant bus	
• Without interface module	**0**
• 2 × CP 443-1EX30 for redundant interface[1)]	**3**
• 2 × 2 CP 443-1EX30 for 4-way connection[1)]	**4**
Racks	
• 1 × UR2-H (2 × 9 slots), aluminum	**1**
• 1 × UR2-H (2 × 9 slots), steel	**2**
• 2 × UR2 (9 slots), aluminum	**3**
• 2 × UR2 (9 slots), steel	**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	**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)	**E**
• 2 × PS 405, 10 A for 24 V DC	**G**
• 2 × PS 405, 10 A for 24 V DC, optional redundancy	**H**
• 2 × PS 405, 20 A for 24 V DC	**J**
• 2 × 2 PS 405, 10 A for 24 V DC (redundant)	**K**
Additive PROFIBUS DP interfaces	
• Without CP 443-5 Extended	**0**
• 2 × CP 443-5 Extended	**1**
• 2 × 2 CP 443-5 Extended[1)]	**2**
• 2 × 3 CP 443-5 Extended[1)]	**3**
• 2 × 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 2 × CPU each with 2 PROFIBUS interfaces (MPI/DP master and DP master) and 1 PN/IE interface (2-port switch) 2 × 32 MB RAM (16 MB each for program and data)	**6ES7656-** ■ ■ ■ ■ ■ - ■ ■ **F** ■
Type of delivery	
• Individual components, not pre-assembled	**7**
• Pre-assembled and tested	**8**
Memory card	
• 2 × Memory Card 4 MB RAM (up to approx. 210 POs)	**C**
• 2 × Memory Card 8 MB RAM (up to approx. 800 POs)	**D**
• 2 × Memory Card 16 MB RAM (up to approx. 2 100 POs)	**E**
CPU type	
• 2 × CPU 417-5H (up to approx. 2 000 POs)	**M**
Sync modules and cables	
• 2 × 2 sync modules for distances up to 10 m and 2 × FO sync cable, 1 m	**3**
• 2 × 2 sync modules for up to 10 km and 2 × FO sync cable, 1 m, for testing	**4**
Interface to Industrial Ethernet plant bus	
• Without interface module	**0**
• 2 × CP 443-1EX30 for redundant interface[1)]	**3**
• 2 × 2 CP 443-1EX30 for 4-way connection[1)]	**4**
Racks	
• 1 × UR2-H (2 × 9 slots), aluminum	**1**
• 1 × UR2-H (2 × 9 slots), steel	**2**
• 2 × UR2 (9 slots), aluminum	**3**
• 2 × UR2 (9 slots), steel	**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	**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)	**E**
• 2 × PS 405, 10 A for 24 V DC	**G**
• 2 × PS 405, 10 A for 24 V DC, optional redundancy	**H**
• 2 × PS 405, 20 A for 24 V DC	**J**
• 2 × 2 PS 405, 10 A for 24 V DC (redundant)	**K**
Additive PROFIBUS DP interfaces	
• Without CP 443-5 Extended	**0**
• 2 × CP 443-5 Extended	**1**
• 2 × 2 CP 443-5 Extended[1)]	**2**
• 2 × 3 CP 443-5 Extended[1)]	**3**
• 2 × 4 CP 443-5 Extended[1)]	**4**

[1)] Up to 5 CPs can be plugged in per subsystem with a single power supply or up to 3 with a redundant power supply.

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Ordering data

Individual components of high availability automation systems

	Article No.
Individual components of the high availability SIMATIC PCS 7 automation systems	
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/DPfev 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

	Article No.
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 via 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 via IP access list, initialization via 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 stamping, electronic manual on CD; module occupies 1 slot	**6GK7443-5DX05-0XE0**

8

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Ordering data	Article No.
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**

	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 × 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 × 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"

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Ordering data

Configuration tables for safety-related automation systems

	Article No.								
AS 412F (Single Station) with SIMATIC PCS 7 AS Runtime license for 100 POs	**6ES7654-**								
CPU with 2 PROFIBUS interfaces (MPI/DP master and DP master) and 1 PN/IE interface (2 port switch)					-			G	
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 × CP 443-1EX30[1)]					**3**				
• 2 × CP 443-1EX30 for redundant interface[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 × PS 407, 10 A for 120/230 V AC/DC							**B**		
• 1 × PS 407, 10 A for 120/230 V AC/DC, optional redundancy							**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)							**E**		
• 1 × PS 405, 10 A for 24 V DC							**G**		
• 1 × PS 405, 10 A for 24 V DC, optional redundancy							**H**		
• 1 × PS 405, 20 A for 24 V DC							**J**		
• 2 × PS 405, 10 A for 24 V DC (redundant)							**K**		
Additive PROFIBUS DP interfaces									
• Without CP 443-5 Extended									**0**
• 1 × CP 443-5 Extended									**1**
• 2 × CP 443-5 Extended[1)]									**2**
• 3 × CP 443-5 Extended[1)]									**3**
• 4 × CP 443-5 Extended[1)]									**4**

[1)] Up to 5 CPs can be plugged into the UR2 rack with a single power supply or up to 3 with a redundant power supply.

	Article No.								
AS 414F (Single Station) with SIMATIC PCS 7 AS Runtime license for 100 POs	**6ES7654-**								
CPU with 2 PROFIBUS interfaces (MPI/DP master and DP master) and 1 PN/IE interface (2 port switch)					-			G	
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 × CP 443-1EX30[1)]					**3**				
• 2 × CP 443-1EX30 for redundant interface[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 × PS 407, 10 A for 120/230 V AC/DC							**B**		
• 1 × PS 407, 10 A for 120/230 V AC/DC, optional redundancy							**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)							**E**		
• 1 × PS 405, 10 A for 24 V DC							**G**		
• 1 × PS 405, 10 A for 24 V DC, optional redundancy							**H**		
• 1 × PS 405, 20 A for 24 V DC							**J**		
• 2 × PS 405, 10 A for 24 V DC (redundant)							**K**		
Additive PROFIBUS DP interfaces									
• Without CP 443-5 Extended									**0**
• 1 × CP 443-5 Extended									**1**
• 2 × CP 443-5 Extended[1)]									**2**
• 3 × CP 443-5 Extended[1)]									**3**
• 4 × CP 443-5 Extended[1)]									**4**

[1)] Up to 5 CPs can be plugged into the UR2 rack with a single power supply or up to 3 with a redundant power supply.

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Ordering data (continued)

	Article No.									
AS 416F (Single Station) with SIMATIC PCS 7 AS Runtime license for 100 POs	**6ES7654-**									
	■	■	■	■	■	-	■	■	G	■
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 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 × CP 443-1EX30[1]					**3**					
• 2 × CP 443-1EX30 for redundant interface[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 × PS 407, 10 A for 120/230 V AC/DC							**B**			
• 1 × PS 407, 10 A for 120/230 V AC/DC, optional redundancy							**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)							**E**			
• 1 × PS 405, 10 A for 24 V DC							**G**			
• 1 × PS 405, 10 A for 24 V DC, optional redundancy							**H**			
• 1 × PS 405, 20 A for 24 V DC							**J**			
• 2 × PS 405, 10 A for 24 V DC (redundant)							**K**			
Additive PROFIBUS DP interfaces										
• Without CP 443-5 Extended										**0**
• 1 × CP 443-5 Extended										**1**
• 2 × CP 443-5 Extended[1]										**2**
• 3 × CP 443-5 Extended[1]										**3**
• 4 × CP 443-5 Extended[1]										**4**

[1] Up to 5 CPs can be plugged into the UR2 rack with a single power supply or up to 3 with a redundant power supply.

	Article No.									
AS 417F (Single Station) with SIMATIC PCS 7 AS Runtime license for 100 POs	**6ES7654-**									
	■	■	■	■	■	-	■	■	G	■
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 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 × CP 443-1EX30[1]					**3**					
• 2 × CP 443-1EX30 for redundant interface[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 × PS 407, 10 A for 120/230 V AC/DC							**B**			
• 1 × PS 407, 10 A for 120/230 V AC/DC, optional redundancy							**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)							**E**			
• 1 × PS 405, 10 A for 24 V DC							**G**			
• 1 × PS 405, 10 A for 24 V DC, optional redundancy							**H**			
• 1 × PS 405, 20 A for 24 V DC							**J**			
• 2 × PS 405, 10 A for 24 V DC (redundant)							**K**			
Additive PROFIBUS DP interfaces										
• Without CP 443-5 Extended										**0**
• 1 × CP 443-5 Extended										**1**
• 2 × CP 443-5 Extended[1]										**2**
• 3 × CP 443-5 Extended[1]										**3**
• 4 × CP 443-5 Extended[1]										**4**

[1] Up to 5 CPs can be plugged into the UR2 rack with a single power supply or up to 3 with a redundant power supply.

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Ordering data (continued)

	Article No.
AS 412FH (Redundant Station) with SIMATIC PCS 7 AS Runtime license for 100 POs	6ES7656-
2 × CPU each with 2 PROFIBUS interfaces (MPI/DP master and DP master) and 1 PN/IE interface (2-port switch)	
2 × 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 × Memory Card 1 MB RAM (up to approx. 30 POs)	A
• 2 × Memory Card 2 MB RAM (up to approx. 100 POs)	B
CPU type	
• 2 × CPU 412-5H with S7 F Systems RT license (up to approx. 30 POs)	B
Sync modules and cables	
• 2 × 2 sync modules for distances up to 10 m and 2 × FO sync cable, 1 m	3
Interface to Industrial Ethernet plant bus	
• Without interface module	0
• 2 × CP 443-1EX30 for redundant interface[1)]	3
• 2 × 2 CP 443-1EX30 for 4-way connection[1)]	4
Racks	
• 1 × UR2-H (2 × 9 slots), aluminum	1
• 1 × UR2-H (2 × 9 slots), steel	2
• 2 × UR2 (9 slots), aluminum	3
• 2 × UR2 (9 slots), steel	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	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)	E
• 2 × PS 405, 10 A for 24 V DC	G
• 2 × PS 405, 10 A for 24 V DC, optional redundancy	H
• 2 × PS 405, 20 A for 24 V DC	J
• 2 × 2 PS 405, 10 A for 24 V DC (redundant)	K
Additive PROFIBUS DP interfaces	
• Without CP 443-5 Extended	0
• 2 × CP 443-5 Extended	1
• 2 × 2 CP 443-5 Extended[1)]	2
• 2 × 3 CP 443-5 Extended[1)]	3
• 2 × 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 414FH (Redundant Station) with SIMATIC PCS 7 AS Runtime license for 100 POs	6ES7656-
2 × CPU each with 2 PROFIBUS interfaces (MPI/DP master and DP master) and 1 PN/IE interface (2-port switch)	
2 × 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 × Memory Card 2 MB RAM (up to approx. 100 POs)	B
• 2 × Memory Card 4 MB RAM (up to approx. 210 POs)	C
CPU type	
• 2 × CPU 414-5H with S7 F Systems RT license (up to approx. 350 POs)	F
Sync modules and cables	
• 2 × 2 sync modules for distances up to 10 m and 2 × FO sync cable, 1 m	3
• 2 × 2 sync modules for up to 10 km and 2 × FO sync cable, 1 m, for testing	4
Interface to Industrial Ethernet plant bus	
• Without interface module	0
• 2 × CP 443-1EX30 for redundant interface[1)]	3
• 2 × 2 CP 443-1EX30 for 4-way connection[1)]	4
Racks	
• 1 × UR2-H (2 × 9 slots), aluminum	1
• 1 × UR2-H (2 × 9 slots), steel	2
• 2 × UR2 (9 slots), aluminum	3
• 2 × UR2 (9 slots), steel	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	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)	E
• 2 × PS 405, 10 A for 24 V DC	G
• 2 × PS 405, 10 A for 24 V DC, optional redundancy	H
• 2 × PS 405, 20 A for 24 V DC	J
• 2 × 2 PS 405, 10 A for 24 V DC (redundant)	K
Additive PROFIBUS DP interfaces	
• Without CP 443-5 Extended	0
• 2 × CP 443-5 Extended	1
• 2 × 2 CP 443-5 Extended[1)]	2
• 2 × 3 CP 443-5 Extended[1)]	3
• 2 × 4 CP 443-5 Extended[1)]	4

[1)] Up to 5 CPs can be plugged in per subsystem with a single power supply or up to 3 with a redundant power supply.

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Ordering data (continued)

	Article No.									
AS 416FH (Redundancy Station) with SIMATIC PCS 7 AS Runtime license for 100 POs 2 × CPU each with 2 PROFIBUS interfaces (MPI/DP master and DP master) and 1 PN/IE interface (2-port switch) 2 × 16 MB RAM (6 MB each for program and 10 MB each for data)	**6ES7656-**					-			F	
Type of delivery										
• Individual components, not pre-assembled	**7**									
• Pre-assembled and tested	**8**									
Memory card										
• 2 × Memory Card 4 MB RAM (up to approx. 210 POs)		**C**								
• 2 × Memory Card 8 MB RAM (up to approx. 800 POs)		**D**								
• 2 × Memory Card 16 MB RAM (up to approx. 2 100 POs)		**E**								
CPU type										
• 2 × CPU 416-5H with S7 F Systems RT license (up to approx. 1 200 POs)			**Q**							
Sync modules and cables										
• 2 × 2 sync modules for distances up to 10 m and 2 × FO sync cable, 1 m				**3**						
• 2 × 2 sync modules for up to 10 km and 2 × FO sync cable, 1 m, for testing				**4**						
Interface to Industrial Ethernet plant bus										
• Without interface module					**0**					
• 2 × CP 443-1EX30 for redundant interface[1)]					**3**					
• 2 × 2 CP 443-1EX30 for 4-way connection[1)]					**4**					
Racks										
• 1 × UR2-H (2 × 9 slots), aluminum						**1**				
• 1 × UR2-H (2 × 9 slots), steel						**2**				
• 2 × UR2 (9 slots), aluminum						**3**				
• 2 × UR2 (9 slots), steel						**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							**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)							**E**			
• 2 × PS 405, 10 A for 24 V DC							**G**			
• 2 × PS 405, 10 A for 24 V DC, optional redundancy							**H**			
• 2 × PS 405, 20 A for 24 V DC							**J**			
• 2 × 2 PS 405, 10 A for 24 V DC (redundant)							**K**			
Additive PROFIBUS DP interfaces										
• Without CP 443-5 Extended										**0**
• 2 × CP 443-5 Extended										**1**
• 2 × 2 CP 443-5 Extended[1)]										**2**
• 2 × 3 CP 443-5 Extended[1)]										**3**
• 2 × 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 2 × CPU each with 2 PROFIBUS interfaces (MPI/DP master and DP master) and 1 PN/IE interface (2-port switch) 2 × 32 MB RAM (16 MB each for program and data)	**6ES7656-**					-			F	
Type of delivery										
• Individual components, not pre-assembled	**7**									
• Pre-assembled and tested	**8**									
Memory card										
• 2 × Memory Card 4 MB RAM (up to approx. 210 POs)		**C**								
• 2 × Memory Card 8 MB RAM (up to approx. 800 POs)		**D**								
• 2 × Memory Card 16 MB RAM • (up to approx. 2 100 POs)		**E**								
CPU type										
• 2 × CPU 417-5H with S7 F Systems RT license (up to approx. 2 000 POs)			**N**							
Sync modules and cables										
• 2 × 2 sync modules for distances up to 10 m and 2 × FO sync cable, 1 m				**3**						
• 2 × 2 sync modules for up to 10 km and 2 × FO sync cable, 1 m, for testing				**4**						
Interface to Industrial Ethernet plant bus										
• Without interface module					**0**					
• 2 × CP 443-1EX30 for redundant interface[1)]					**3**					
• 2 × 2 CP 443-1EX30 for 4-way connection[1)]					**4**					
Racks										
• 1 × UR2-H (2 × 9 slots), aluminum						**1**				
• 1 × UR2-H (2 × 9 slots), steel						**2**				
• 2 × UR2 (9 slots), aluminum						**3**				
• 2 × UR2 (9 slots), steel						**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							**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)							**E**			
• 2 × PS 405, 10 A for 24 V DC							**G**			
• 2 × PS 405, 10 A for 24 V DC, optional redundancy							**H**			
• 2 × PS 405, 20 A for 24 V DC							**J**			
• 2 × 2 PS 405, 10 A for 24 V DC (redundant)							**K**			
Additive PROFIBUS DP interfaces[1)]										
• Without CP 443-5 Extended										**0**
• 2 × CP 443-5 Extended										**1**
• 2 × 2 CP 443-5 Extended[1)]										**2**
• 2 × 3 CP 443-5 Extended[1)]										**3**
• 2 × 4 CP 443-5 Extended[1)]										**4**

[1)] Up to 5 CPs can be plugged in per subsystem with a single power supply or up to 3 with a redundant power supply.

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Ordering data

Individual components of safety-related automation systems

	Article No.
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 connection of the two CPU 412-5H, 414-5H, 416-5H or 417-5H; 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 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**

	Article No.
CP 443-1 Communication module for connecting SIMATIC S7-400 to Industrial Ethernet via 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 via IP access list, initialization via 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 stamping, 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 × 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 × 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"

8

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Overview



The SIMATIC PCS 7 automation systems are extremely rugged, both electrically and mechanically. For extreme ambient conditions, hardened and refined SIPLUS extreme products are another alternative, especially in the case of:

- High humidity
- Condensation
- Chemically, mechanically or biologically active materials

You can find an overview of the complete SIPLUS extreme product range online at:

www.siemens.com/siplus

Under "Devices for extreme requirements > Controllers > Advanced Controllers", you will find conversion tools that display the SIPLUS S7-400 articles for the corresponding SIMATIC S7-400 articles.

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Overview



SIMATIC PCS 7 AS RTX with DIN rail, front view

SIMATIC PCS 7 AS RTX

SIMATIC PCS 7 AS RTX is an excellent alternative to S7-400 design standard automation systems, especially for small applications, due to the following characteristics:

- Resistant to vibration and shock thanks to:
  - Compact and robust design
  - Complete absence of fans and rotating storage media
- Maintenance-free, 24-hour continuous operation at operating temperatures from 0 to 50 °C in an RAL environment (RAL = restricted access location), for example, in a lockable control cabinet

Depending on the preferred communication in the field, the following design versions are available:

- SIMATIC PCS 7 AS RTX PROFIBUS for connecting PROFIBUS DP
- SIMATIC PCS 7 AS RTX PROFINET for connecting PROFINET IO

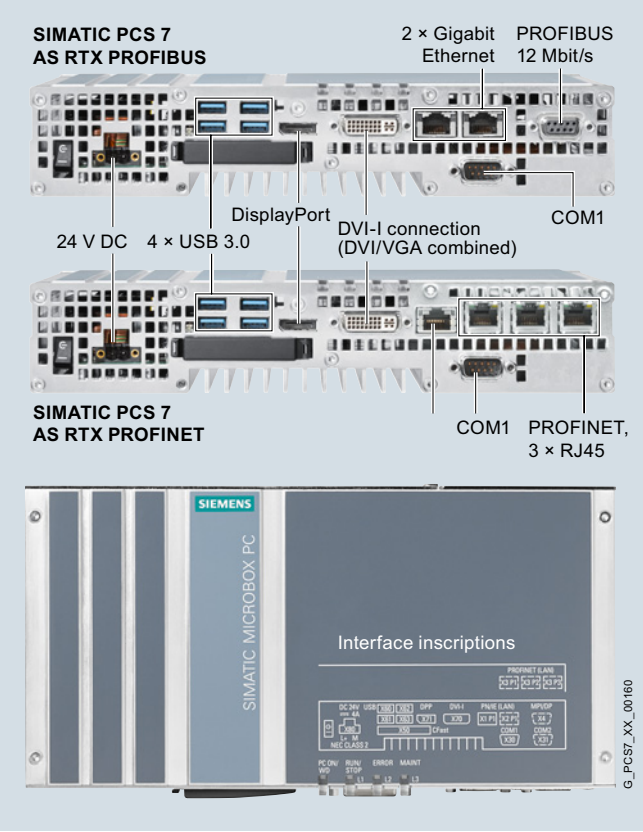
Application

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 two versions of the SIMATIC PCS 7 AS RTX Microbox automation system, (PROFIBUS/PROFINET), are based on a SIMATIC IPC427D with a system-specific configuration.

The compact design and flexible installation options of the SIMATIC IPC427D (DIN rail, wall or portrait mounting in horizontal or vertical orientation) support space-saving designs of SIMATIC PCS 7 plants. A DIN rail and bracket for wall mounting are supplied with SIMATIC PCS 7 AS RTX (PROFIBUS/PROFINET).

The following are pre-installed on the built-in solid state disk (SATA SSD 80 GB, eMLC):

- Windows 7 Ultimate 32-bit operating system, multi-language (English, German, French, Italian, Spanish, Chinese)
- WinAC RTX 2010 controller software
- SIMATIC IPC DiagMonitor diagnostics software

The pre-installed software is also supplied on a Restore DVD.

The SIMATIC PCS 7 AS RTX has an integral power supply with electrical isolation.

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Design (continued)

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.

One (SIMATIC PCS 7 AS RTX PROFINET) or two (SIMATIC PCS 7 AS RTX PROFIBUS) Ethernet interfaces 10/100/1000 Mbps (RJ45) are available for the plant bus communication with the engineering station, operator stations, maintenance station and other SIMATIC PCS 7 system components.

ET 200M, ET 200iSP, ET 200S and ET 200pro remote I/O stations can be linked to a comprehensive range of low-cost signal/function modules as well as intelligent field/process devices on the PROFIBUS PA via the PROFIBUS DP interface integrated in SIMATIC PCS 7 AS RTX PROFIBUS. With this CP 5622-compatible interface, the SIMATIC PCS 7 AS RTX also supports routing from the engineering system up to the field devices connected via PROFIBUS.

With SIMATIC PCS 7 AS RTX PROFINET, the PROFIBUS interface is replaced by a PROFINET interface with 3 ports that are based on CP 1616. Sensors/actuators can thus be integrated in remote ET 200M or ET 200SP I/O stations via PROFINET IO.

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.

8

Technical specifications

SIMATIC PCS 7 AS RTX (Microbox), based on SIMATIC IPC427D	
Design and equipment features	
Design versions	• SIMATIC PCS 7 AS RTX PROFIBUS • SIMATIC PCS 7 AS RTX PROFINET
Design	• Compact Microbox PC without panel • DIN rail or wall mounting; horizontal (preferred) or vertical • Portrait assembly; vertical
Degree of protection according to EN 60529 (front/rear)	IP20
CPU	
• Processor	Intel Core i7-3517UE 1.7 GHz
• Second Level Cache	4 MB
Main memory	4 GB DDR3-SDRAM 1066 (1 SO-DIMM module without ECC)
Graphics	
• Graphics controller	Intel HD4000 integrated in the chipset
• Graphics memory	32 ... 512 MB shared memory
• Resolutions, color-depth, frequencies	
- DVI-I	Up to 1920 × 1200, 60 Hz
- Display port (DPP)	Up to 1920 × 1200, 60 Hz
Storage media	
• Solid state drive	1 × 2.5" SATA-SSD 80 GB (eMLC)
• CD-ROM / DVD-RW, diskette	Connectable via USB (not included in scope of delivery)

Interfaces	
• PROFIBUS/MPI (SIMATIC PCS 7 AS RTX PROFIBUS only)	CP 5622 onboard, 1 × 9-pin sub D socket. 12 Mbit/s (electrically isolated)
• PROFINET (SIMATIC PCS 7 AS RTX PROFINET only)	CP 1616 onboard, 3 × RJ45 socket; integrated 3-port real-time switch
• Ethernet	
- PCS 7 AS RTX PROFIBUS	2 × Ethernet ports (RJ45) Intel 82579LM and Intel 82574L; 10/100/1000 Mbit/s, electrically isolated, teaming-capable
- PCS 7 AS RTX PROFINET	1 × Ethernet port (RJ45); 10/100/1000 Mbit/s, isolated
• USB	4 × USB 3.0, max. 2 can be simultaneously operated as high current
• Serial	1 × COM1 RS 232, 115 Kbps max., 9-pin sub D connector
• Parallel	-
• Graphics connection	1 × DVI-I (DVI/VGA combined) 1 × DisplayPort (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
Software (pre-installed and on Restore DVD)	
Operating system	Windows 7 Ultimate SP1, 32-bit, multi-language (English, German, French, Italian, Spanish, Chinese)
Controller software	WinAC RTX 2010
System-tested SIMATIC industrial software	SIMATIC IPC DiagMonitor

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Technical specifications (continued)

Monitoring and diagnostic functions	
Watchdog	• Monitoring of program execution • Restart can be parameterized following faults • Monitoring time adjustable in the software
Temperature	• Processor • Basic module • Close to RAM (via SIMATIC IPC DiagMonitor and SIMATIC PCS 7 Asset Management)
Storage media	S.M.A.R.T. functionality
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)
Noise emission	
Operation	< 40 dB (A) to DIN 45635-1
Electromagnetic compatibility (EMC)	
Emitted interference	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 ± 8 kV air discharge
Immunity to high-frequency irradiation	10 V/m, 80 ... 1 000 MHz and 1.4 ... 2 GHz, 80 % AM according to IEC 61000-4-3 1 V/m, 2 ... 2.7 GHz, 80 % AM according to IEC 61000-4-3 10 V, 10 kHz ... 80 MHz, 80 % AM according to IEC 61000-4-6
Immunity to magnetic fields	100 A/m; 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
• During operation, horizontal installation (preferred position)	
- Operation with SSD and max. 2 expansion modules (max. load 10 W)	0 ... +40 °C[1]
- Operation with SSD in RAL[2] and max. 2 expansion modules (max. load 10 W)	0 ... +50 °C[1]
• During operation, vertical/portrait mounting	
- Operation with SSD (without expansion module)	0 ... +40 °C[1]
- Operation with SSD in RAL[2] and max. 2 expansion modules (max. load 10 W)	0 ... +45 °C[1]
• Storage/transport (with SSD)	-40 ... +70 °C
• Gradient	
- During operation	Max. 10 °C/h
- Storage/transport	20 °C/h; no condensation
Relative humidity	Tested according to IEC 60068-2-78, IEC 60068-2-30
• During operation	5 ... 80 % at 25 °C (no condensation)
• Storage/transport	5 ... 95 % at 25 °C (no condensation)
Atmospheric pressure	Tested according to IEC 60068-2-78, IEC 60068-2-30
• During operation	1080 ... 795 hPa, corresponds to a elevation of -1 000 ... 2 000 m
• Storage/transport	1080 ... 660 hPa, corresponds to an elevation of -1 000 ... 3 500 m
Mechanical environmental conditions	
Vibrations	Tested according to IEC 60068-2-6
• During operation with SSD	5 ... 9 Hz: 3.5 mm 9 ... 500 Hz: 9.8 m/s²
• Storage/transport	5 ... 9 Hz: 3.5 mm, 9 ... 500 Hz: 9.8 m/s²
Shock	Tested according to IEC 60068-2-27
• During operation with SSD	150 m/s², 11 ms
• Storage/transport	250 m/s², 6 ms
Standards, specifications, approvals	
Protection class	Protection class I according to IEC 61140
CE in conformity with 2004/108/EC, 2006/95/EC	Yes
Area of application: Industry	
• Interference emission	EN 61000-6-4: 2007
• Noise immunity	EN 61000-6-2: 2005
Area of application: Residential, business, trade, small enterprise	
• Emitted interference	EN 61000-6-3: 2007
• Noise immunity	EN 61000-6-1: 2007
cULus	Underwriters Laboratories (UL) according to Standard UL 60950-1 and UL 508 as well as Canadian National Standard CAN/CSA-C22.2 No. 60950-1 (I.T.E) and CAN/CSA-C22.2 No. 142 (IND.CONT.EQ)
USA: FCC Rules, Part 15, Class A	Yes
Canada: ICES-003, Class A; NMB-003, Class A	Yes
Australia/New Zealand: EN 61000-6-4:2007	Yes
Korea: Korean Certification (KC Mark)	Yes
Special features	
Quality assurance	according to ISO 9001
Power supply (electrically isolated)	
Power supply	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. 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

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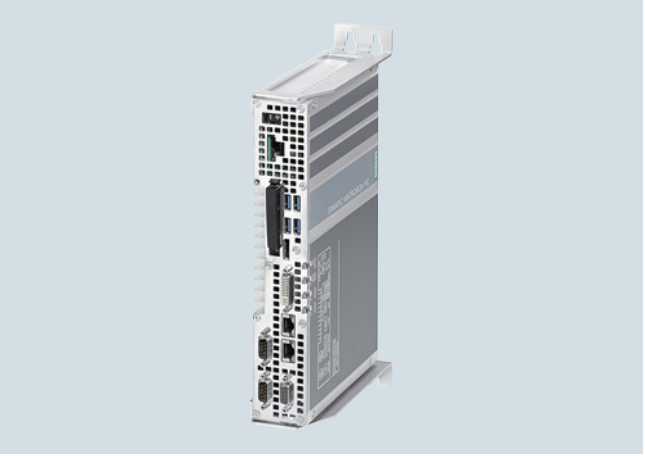
Ordering data

	Article No.
SIMATIC PCS 7 AS RTX PROFIBUS Assembled and pre-installed SIMATIC PCS 7 automation system based on SIMATIC IPC427D, prepared for connection of the process I/O via PROFIBUS DP; with: • Intel Core I7-3517UE, 2 × 1.7 GHz, 4 MB Second Level Cache; 4.0 GB DDR3 SDRAM 1066 (1 SO-DIMM module); SSD SATA, 80 GB, 2 × Ethernet 10/100/1000 Mbps (RJ45) onboard, 1 × CP 5622 onboard; 4 × USB 3.0 (high current); 24 V DC power supply • Windows 7 Ultimate 32-bit operating system, multi-language (English, German, French, Italian, Spanish, Chinese), WinAC RTX 2010 controller software and SIMATIC IPC DiagMonitor diagnostic software, pre-installed on SSD 80 GB and restore DVD • Mounting hardware: DIN rail and bracket for wall mounting • SIMATIC PCS 7 AS Runtime license for 100 PO	**6ES7654-0UE23-0XX1**
SIMATIC PCS 7 AS RTX PROFINET Assembled and pre-installed SIMATIC PCS 7 automation system based on SIMATIC IPC427D, prepared for connection of the process I/O via PROFINET IO; with: • Intel Core I7-3517UE, 2 × 1.7 GHz, 4 MB second level cache; 4.0 GB DDR3 SDRAM 1066 (1 SO-DIMM module); SSD SATA, 80 GB, 1 × Ethernet 10/100/1000 Mbps (RJ45) onboard, 1 × CP 1616 onboard (3 ports); 4 × USB 3.0 (high current); 24 V DC power supply • Windows 7 Ultimate 32-bit operating system, multi-language (English, German, French, Italian, Spanish, Chinese), WinAC RTX 2010 controller software and SIMATIC IPC DiagMonitor diagnostic software, pre-installed on SSD 80 GB and restore DVD • Mounting hardware: DIN rail and bracket for wall mounting • SIMATIC PCS 7 AS Runtime license for 100 PO	**6ES7654-0UE23-0XX2**

	Article No.
Additional and expansion components	
SIMATIC PCS 7 AS Runtime license (can be added to existing licenses) Language-neutral, floating license for 1 user No SIMATIC PCS 7 Software Media Package • Physical delivery License key on USB flash drive, certificate of license	
- 100 POs	**6ES7653-2BA00-0XB5**
- 1 000 POs	**6ES7653-2BB00-0XB5**
• Online delivery License key download, online certificate of license Note: E-mail address required!	
- 100 POs	**6ES7653-2BA00-0XH5**
- 1 000 POs	**6ES7653-2BB00-0XH5**
Portrait mounting	
Portrait assembly kit For space-saving installation of the SIMATIC PCS 7 AS RTX based on SIMATIC IPC427D (ports at front)	**6ES7648-1AA20-0YP0**

Accessories

Portrait assembly kit



SIMATIC PCS 7 AS RTX with portrait assembly kit, interfaces at front

The portrait mounting kit allows space-saving installation of the SIMATIC PCS 7 AS RTX in the control cabinet. The technical specifications correspond in this design form to those with a vertical standard rail mounting.

Portrait mounting reduces the mounting area required (W × H in mm) from 262 × 133 to 61.5 × 315. Together with the kit, the SIMATIC PCS 7 AS RTX requires a mounting depth of 149.7 mm in the control cabinet. Since all ports of the SIMATIC PCS 7 AS RTX are accessible from the front, this type of mounting is very convenient for commissioning.

When using the portrait mounting kit for the SIMATIC PCS 7 AS RTX, read also the information on operation planning and device installation in the "SIMATIC IPC427D Industrial PC" manual.

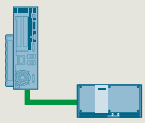
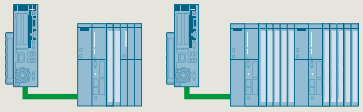
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9/2 SIMATIC PCS 7 BOX

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Overview

		PCS 7 BOX RTX		PCS 7 BOX	
		ES/OS system	OS Runtime	ES/OS system	OS Runtime
System functionality		ES + OS + AS	OS + AS	ES + OS	OS
Possible controller combinations	WinAC RTX controller integrated				
	PCS 7 AS RTX PROFIBUS or PCS 7 AS RTX PROFINET as additional controller				
	Modular AS 41x, AS 41xH or AS 41xF (AS Single or AS Redundancy Station) as additional controller				

System overview of SIMATIC PCS 7 BOX compact systems



SIMATIC PCS 7 BOX are space-saving and at the same time very rugged industrial PC systems for economical entry into process automation with SIMATIC PCS 7. They are available as compact systems with SIMATIC PCS 7 functionality for engineering (ES), automation (AS), operator control and monitoring (OS), and also as OS Runtime systems without an engineering component.

SIMATIC PCS 7 BOX for operation as a client in an operator system or in SIMATIC BATCH can be found in the section "Industrial Workstation/IPC" under "SIMATIC BOX PC", see page 3/37

Product versions

The first criterion for choosing the offered SIMATIC PCS 7 BOX product versions is the decision between integrated or swapped-out automation functionality (AS):

- **AS integrated**:
  SIMATIC PCS 7 BOX RTX with internal WinAC RTX software controller and Windows 7 Ultimate SP1 (32-bit) operating system; optionally with integrated PROFIBUS or PROFINET interface
- **AS separate**:
  SIMATIC PCS 7 BOX with Windows 10 IoT Enterprise 2015 LTSB (64-bit) operating system and external controller:
  - Microbox automation system as SIMATIC PCS 7 AS RTX PROFIBUS or SIMATIC PCS 7 AS RTX PROFINET
  - Modular automation system of the S7-400 series, including PROFIBUS and PROFINET interface, as AS Single Station or AS Redundancy Station

This selection is associated with the decision for a specific controller type. It depends on the price/performance ratio as well as on the hardware and software functions that are possible with the various controller combinations (see table in the "Function" section).

Depending on the integration of the engineering component (ES) in the system functionality, there is then a further differentiation within the preselection:

- ES/OS system:
  - SIMATIC PCS 7 BOX RTX with ES + OS + AS functionality
  - SIMATIC PCS 7 BOX with ES + OS functionality
- OS Runtime system:
  - SIMATIC PCS 7 BOX RTX with OS + AS functionality
  - SIMATIC PCS 7 BOX with OS functionality

A complete process control system for small applications can be implemented by expanding further with process I/O:

- Distributed process I/O at PROFIBUS: Sensors/actuators on ET 200M, ET 200iSP and ET 200pro remote I/O stations, as well as directly connected field devices/process devices (with WinAC RTX and in combination with PCS 7 AS RTX PROFIBUS or AS S7-400)
- Field devices/process devices at FOUNDATION Fieldbus (in combination with AS S7-400)
- Distributed process I/O at PROFINET: Sensors/actuators on ET 200M and ET 200SP remote I/O stations, as well as directly connected field devices/process devices (with WinAC RTX as well as in combination with AS S7-400 or PCS 7 AS RTX PROFINET)

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Application

The SIMATIC PCS 7 BOX compact systems are ideally suitable for use at process level, especially for:

- Small production applications
- Enclosed subprocesses (package units)
- Automation of a laboratory or test center

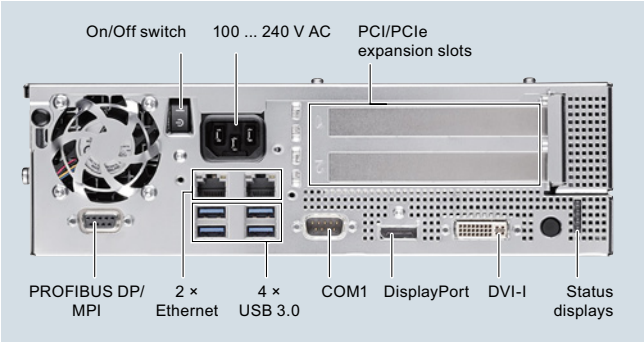
As fully-fledged members of the SIMATIC PCS 7 family, SIMATIC PCS 7 BOX systems work with the PCS 7 standard system software; they are scalable and can be extended without a break in compatibility.

The application is limited to 2 000 POs (process objects) in accordance with the Engineering and OS Runtime licenses. The max. number of POs of the AS Runtime licenses depends on the type of controller (for more information on this, see below under "Design", software and licenses).

As an ES/OS system, expanded by software licenses that can be ordered separately for SIMATIC PDM and SIMATIC PCS 7 Maintenance Station, SIMATIC PCS 7 BOX can also be operated as a maintenance station. For additional information on this, please refer to the chapter "Plant Device Management".

SIMATIC PCS 7 BOX systems with a separate, external controller are also suitable for SIMATIC BATCH (up to 10 units) or as a Web server for up to two Web clients.

Design



SIMATIC PCS 7 BOX RTX design

System platform for all offered SIMATIC PCS 7 BOX product versions is the sturdy industrial SIMATIC IPC627D which can be used in accordance with its CE marking in industrial environments as well as in domestic, business and commercial environments.

Special properties and equipment features

The SIMATIC Box PC, based on Intel Core i3 or Xeon processor technology combines high performance with compact design. Additionally, it has the following features:

- Stable platform available for a period of about 5 years with embedded Intel components (spare parts supply and repairs for approx. 5 years)
- Rugged metal enclosure with IP20 degree of protection with high electromagnetic compatibility.
- Powerful and energy-saving Intel multi-core processors XEON E3 or Core i3
- Powerful Intel graphics controller HD Graphics 4600 onboard, integrated in the processor:
  - 2 digital interfaces DVI-I and DisplayPort (DVI-D via DisplayPort DVI adapter)
  - Analog VGA connection via DVI-I adapter to VGA or DisplayPort to VGA
- Support of multi-monitor mode with two process monitors via onboard graphics:
  - 1 × Process monitor at DVI-I connection
  - 1 × Process monitor at DisplayPort via DisplayPort to DVI-D adapter cable
- Alternative design version of panel front: SIMATIC PCS 7 BOX with fixed 22" TFT display with touch screen, resolution 1920 × 1080
- Flexible installation in various positions with mounting brackets or portrait installation kits
- High shock/vibration resistance in all possible mounting positions
- Variable power supply: 24 V DC or 110/230 V AC (100 ... 240 V)
- Maximum processor performance up to an ambient temperature of 55 °C
- Integrated drives:
  - 1 × Optical drive SATA DVD±R/RW
    or as alternative:
  - 1 × Hard disk SATA 3.5" (HDD), 250 GB
  - 1 × Solid State Drive SATA 2.5" (SSD), 240 GB
  - 1 × RAID 1, 320 GB (2 × 320 GB HDD, mirror disks)
- Numerous high-performance interfaces:
  - 4 × USB 3.0 (SuperSpeed), external
  - 1 × USB 3.0 (SuperSpeed), internal, e.g. for ASIA license key, hardlock USB
  - 1 × USB 3.0 (SuperSpeed) external, on front (Panel Front design version only)
  - 1 × Serial (COM1)
  - 1 × DVI-I interface (DVI/VGA combined; VGA via adapter cable)
  - 1 × DisplayPort (DVI-D or VGA via adapter cable)
  - 2 × Ethernet 10/100/1000 Mbps (RJ45)
  - 1 x PROFIBUS DP (CP 5622-compatible)
  - 1 × PROFINET IO (CP 1616-compatible; alternative to PROFIBUS DP)
  - 1 × PCI-Express x16 (185 mm) and 1 × PCI (185 mm), vacant for expansions
- Integrated diagnostic displays (4 dual-color LEDs for status display of the operating state)
- Monitoring and diagnostics functions available in combination with the SIMATIC IPC DiagMonitor diagnostics software for:
  - Temperatures
  - Backup battery voltage
  - HDD/SSD status (S.M.A.R.T.)
  - System status (Watchdog)
  - Fan speed
  - Operating hours counter
- Certifications for worldwide marketing (cULus)
- Fast restoration of the factory state with supplied Restore DVD

Product version SIMATIC PCS 7 BOX RTX

A WinAC RTX 2010 software controller is already integrated in the SIMATIC PCS 7 BOX RTX. The SIMATIC PCS 7 BOX product version with integrated controller is characterized by an exceptionally good price/performance ratio and very fast program execution. The controller generates only a low base load, and shows its strengths particularly with applications that involve real-time requirements and deterministic dynamic response.

In a direct comparison, product versions with external controllers offer slightly more functionality, resulting in additional application possibilities (see table in the section "Function").

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Design (continued)

Design versions/expandability

The SIMATIC PCS 7 BOX in standard design is a compact computing unit with HMI devices (mouse, keyboard, process monitor) that can be ordered separately and are connected by means of integrated ports/interfaces.

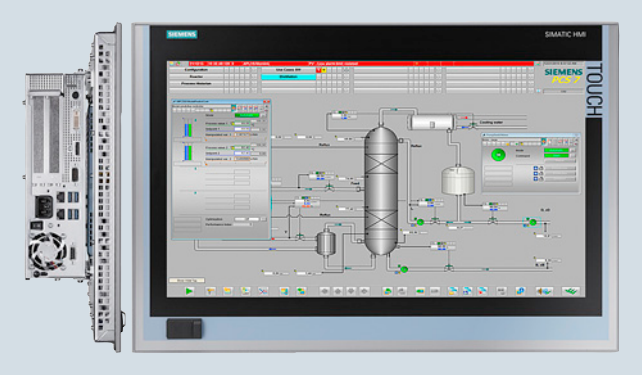
The device is equipped with four USB 3.0 ports for mouse and keyboard as well as additional USB input/output devices, e.g. chip card reader USB.

Two process monitors can be controlled in multi-monitor mode via the integrated digital graphic interfaces DVI-I and DVI-D (via adapter cable at the DisplayPort). The selection of the process monitors depends on the technical data of the integrated graphics as well as the image formats and resolutions which can be adjusted in the project editor of the OS software (see section: Operator System, OS Software, Introduction).

As an alternative to the SIMATIC PCS 7 BOX in standard design, we are offering a built-in unit with Panel Front according to SIMATIC IPC677D which can be mounted in mounting cutouts of control cabinets, enclosures or consoles as well as on swivel arms.

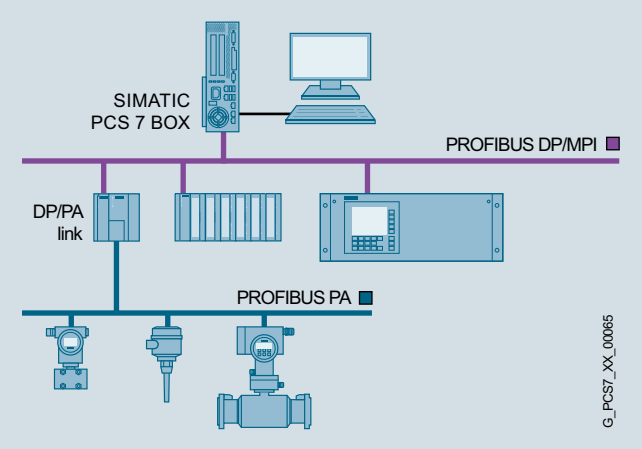
With the built-in unit, a panel with 22" TFT display and touch screen is permanently connected with the computing unit. The 22" TFT display has a resolution of 1920 × 1080 pixels. An additional USB 3.0 port for connection of external I/O devices is available on the panel front on the left below the display.

Using a touch pen as an input aid protects the touch screen and makes it easy to achieve pin-point accuracy when operating small input boxes or buttons – especially when working with gloves.



SIMATIC PCS 7 BOX with Panel Front, side and front views

Stand-alone operation/plant network

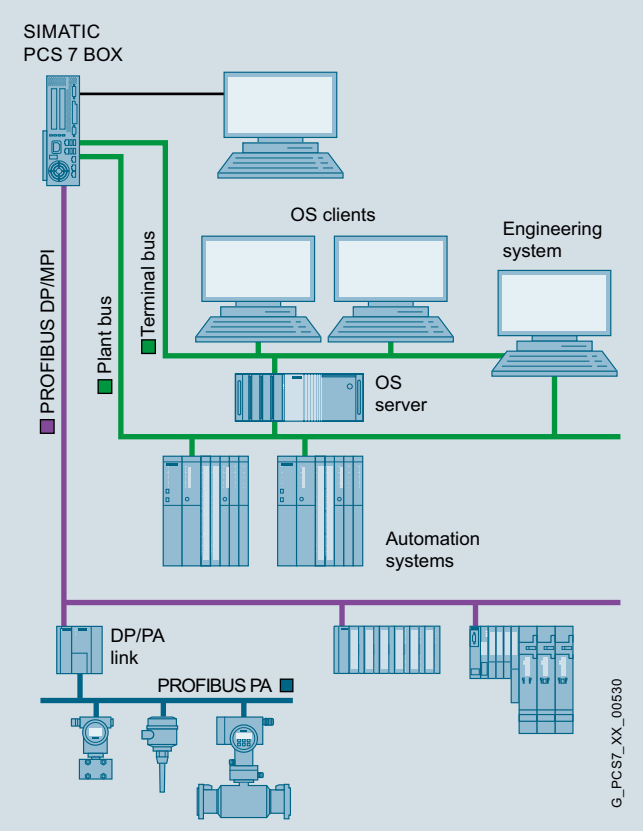


SIMATIC PCS 7 BOX in stand-alone mode

SIMATIC PCS 7 BOX systems can be operated in stand-alone mode and also in the system network with other SIMATIC PCS 7 system components.

A system produced with the SIMATIC PCS 7 BOX can be expanded at any time with additional SIMATIC PCS 7 hardware and software components. It is just as easy to integrate SIMATIC PCS 7 BOX into existing SIMATIC PCS 7 systems. The connections to the plant bus and terminal bus are usually made via the integrated Ethernet interfaces.

In association with the redundant AS 41xH modular controllers, however, an additional CP 1623 or CP 1628 communication module with appropriate communications software is required for the Industrial Ethernet plant bus (see section Industrial Communication, Industrial Ethernet, System connection of PCS 7), see page 10/59



Example of SIMATIC PCS 7 BOX integration in a SIMATIC PCS 7 plant network

Engineering

The SIMATIC PCS 7 BOX can be configured by using either the engineering software integrated in the system or a central engineering system. OS-specific configuration changes can be loaded online, i.e. terminated without the OS process mode.

Individual product configuration

By selecting predefined equipment features, you can individually configure the SIMATIC PCS 7 BOX with the desired article numbers. To do so, selection tables are available in the "Ordering data" section of the PDF and in the printed edition of the catalog.

A configurator in the Industry Mall allows you to interactively select and order SIMATIC PCS 7 BOX compact systems.

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Design (continued)

Software and licenses

	PCS 7 BOX RTX		PCS 7 BOX		
	ES/OS system	OS Runtime	ES/OS system	OS Runtime	PC spare part
Article No.	6ES7650-4B..0-3**R**..	6ES7650-4B..0-3**S**..	6ES7650-4B.82-3**T**..	6ES7650-4B.82-3**U**..	6ES7650-4B…-8**X**..
System functionality	ES + OS + AS	OS + AS	ES + OS	OS	None (without PCS 7 software/licenses)
Supplied PCS 7 software/licenses (incl. SP)					
SIMATIC PCS 7 Runtime license RTX, Article No. 6ES7650-1CL00-2XB5	●	●			
SIMATIC WinAC RTX 2010, Article No. 6ES7671-0RC08-0YA0	●	●			
SIMATIC PCS 7 ES Single Station V9.0, with 250 AS/OS Runtime POs, article no. 6ES7651-5AA58-0YA0	●		●		
SIMATIC PCS 7 OS Software Single Station V9.0 (250 OS Runtime POs), as for article no. 6ES7658-2AA58-0YA0 but with 250 OS Runtime POs		●		●	
SIMATIC PCS 7 AS Runtime license for 250 AS RT POs		●			
SIMATIC PCS 7 BCE V9.0 Runtime license, article no. 6ES7650-1CD58-2YB5			●	●	
SIMATIC PCS 7 V9.0 Software Media Package, article no. 6ES7658-4XX58-0YT8	●	●	●	●	
Software types of delivery					
Pre-installation on system hard disk corresponds to content of Restore DVD Set 1	●	●			
Pre-installation on system hard disk corresponds to content of Restore DVD Set 2			●	●	
Restore DVD Set 1[1]: Windows 7 Ultimate SP1, 32-bit operating system with default settings for optimized PCS 7 operation including PCS 7 software installation for SIMATIC PCS 7 BOX RTX operation	●	●			
Restore DVD Set 2[1]: Windows 10 IoT Enterprise 2015 LTSB 64-bit operating system with default settings for optimized PCS 7 operation including PCS 7 software installation for SIMATIC PCS 7 BOX operation			●	●	
With Windows 7 Ultimate 32-bit/64-bit or Windows 10 IoT Enterprise 2015 LTSB 64-bit operating system recovery CD					●

[1] Within the Restore DVD Sets, you also have the option of installing purely the operating system including drivers and default settings for optimized PCS 7 operation, but without PCS 7 software.

Software and licenses of the SIMATIC PCS 7 BOX product versions

On delivery, the individual SIMATIC PCS 7 BOX product versions are equipped as follows with process objects for process mode:

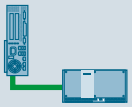
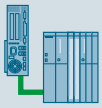
Product version	**Engineering POs**	**Runtime POs**	
	AS and OS	**AS**	**OS**
SIMATIC PCS 7 BOX RTX ES/OS system	unlimited	250	250
SIMATIC PCS 7 BOX RTX OS Runtime	unlimited	250	250
SIMATIC PCS 7 BOX ES/OS System	unlimited	250	250
SIMATIC PCS 7 BOX OS Runtime	unlimited	–	250
SIMATIC PCS 7 BOX spare part (without licenses, without pre-installation)	–	–	–

The OS Runtime licenses of the SIMATIC PCS 7 BOX product versions are limited according to the envisaged field of application to 2 000 POs (process objects). The limit for the AS Runtime PO is defined by the type of controller. Type-specific limit data can be found in the table "Typical mixed configuration limits" in "Automation systems" chapter, "Introduction" section, in the selection tables of the AS ordering data, and in the SIMATIC PCS 7 AS Single Station and SIMATIC PCS 7 AS Redundancy Station configuration wizards. The engineering license for AS and OS is always unlimited.

The supplied OS Runtime POs can be extended by cumulative OS Runtime licenses for 100 and 1 000 POs up to the upper limit of 2 000 POs. Analogous to this, SIMATIC PCS 7 BOX product versions with integrated or separate automation functionality of the upper limit of the controller can be expanded by cumulative AS Runtime licenses for 100 and 1 000 POs.

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Function

System configuration	PCS 7 BOX RTX			
				
	WinAC RTX controller integrated	**PCS 7 AS RTX PROFIBUS/ PROFINET (Microbox) as separate controller**	**Modular AS 41x (AS Single Station) as separate controller**	**Modular AS 41xH or AS 41xF (AS Single Station or AS Redundancy Station) as separate controller**
Supported functions and limits:				
Software				
AS/OS Engineering	●	●	●	●
OS Runtime Single Station up to 2 000 OS Runtime PO	●	●	●	●
PCS 7 APL	●	●	●	●
SIMATIC PDM PCS 7	●	●	●	●
SIMATIC PCS 7 Maintenance Station	●	●	●	●
SIMATIC BATCH up to 10 units		●	●	●
Web server, for up to 2 Web clients		●	●	●
OS Single Station Redundancy		●	●	●
S7 F Systems				●
SIMATIC Safety Matrix				●
Hardware				
Controller (AS) independent of the BOX PC system		●	●	●
AS-to-AS communication	●	●	●	●
Routing	●[1)]	●[1)2)]	●	●
PROFIBUS DP/PA	●	● (PCS 7 AS RTX PROFIBUS)	●	●
FOUNDATION Fieldbus (FF)			●	●
PROFINET IO	●	● (PCS 7 AS RTX PROFINET)	●	●
Configuration in RUN (CiR)			●	●
High-precision time stamps			●	●
S7 Block Privacy			●	●
Block type change in Run (TCiR)			● (AS 410)	● (AS 410)
Retentive AS data	● (Only with UPS)	● (Only with UPS)	●	●
Max. AS quantity structure[3)]	WinAC RTX 2010 up to 1 200 AS Runtime PO	WinAC RTX 2010 up to 1 200 AS Runtime PO	Depending on the type of the AS 41x, up to 2 000 AS Runtime PO	Depending on the type of the AS 41xH or AS 41xF, up to 2 000 AS Runtime PO

1) The PROFIBUS routing functionality of the WinAC RTX 2010 can only be used with the onboard CP 5622 of the SIMATIC IPC627D (PCS 7 BOX RTX) and IPC427D (PCS 7 AS RTX PROFIBUS).

2) The PROFINET routing functionality of the WinAC RTX 2010 can only be used with the onboard CP 1616 of the SIMATIC IPC427D (PCS 7 BOX RTX PROFINET).

3) Typical mixed quantity structures based on the SIMATIC PCS 7 Advanced Process Library (APL)

Supported hardware and software functionality depending on the system configuration

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Technical specifications

SIMATIC PCS 7 BOX basic hardware: SIMATIC IPC627D	Standard design	Panel front design
Design and equipment features		
Design	Rack-mountable device with sturdy metal enclosure, suitable for wall and portrait mounting	Rack-mounted device with rugged metal enclosure and Panel Front, suitable for mounting in control cabinets, enclosures, consoles and on swivel arms; max. mounting angle ±20° from the vertical
Degree of protection	IP20	Computer unit and rear of panel IP20; panel front IP65
Processor	• 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 i3-4330TE, 2 cores, 4 threads, 2.4 GHz, GT2, 4 MB cache, VT-x	
Chipset	Intel C226 (DH82C226 PCH)	
Main memory		
• Type	DDR3-1600 SDRAM (PC3-12800) DIMM	
• Maximum configuration	16 GB DDR3 SDRAM (2 sockets)	
• Standard configuration	Alternatives: • 8 GB DDR3 SDRAM without ECC • 8 GB DDR3 SDRAM with ECC	
Graphics		
• Graphic controller	Onboard Intel graphics controller HD Graphics P4600; 2-D and 3-D engine integrated in processor	
• Graphics memory	Dynamic Video Memory (uses up to 512 MB RAM)	
• Resolutions, frequencies, colors of the onboard graphics		
- DVI	1920 × 1200 at 60 Hz, 24-bit color depth	
- Display port	3840 × 2160 at 130 Hz, 30-bit color depth	
• Color display (panel front)	–	22" TFT display with touch screen
- Resolution (W × H in pixels)	–	1920 × 1080
- Luminance (cd/m²), up to	–	400
- Horizontal/vertical viewing angle	–	170°/170°
- MTBF LED backlight	–	80 000 h
Free expansion slots	1 × PCI (185 mm) 1 × PCI Express x16 (185 mm)	
RAID controller	Intel PCH RAID controller onboard with Intel Rapid Storage Technology	
Drives		
• Hard disk (HDD)/ Solid State Drive (SSD), alternatives	• 1 × 3.5" HDD SATA, 250 GB • 1 × 2.5" SSD SATA, 240 GB • 320 GB RAID 1 (2 × 320 GB HDD SATA, data mirroring)	
• Optical drive	1 × Slimline SATA DVD±R/RW	
• Floppy disk drive	No (can be connected with USB; not included in the scope of delivery)	
Interfaces		
PROFIBUS/MPI, isolated		
• Version	1 × 9-pin sub D socket, CP 5622-compatible	
• Transmission rate	9.6 kbps to 12 Mbps	
PROFINET, isolated (alternative to PROFIBUS/MPI)	3 × 10/100 Mbps, (RJ45), CP 1616-compatible	
Ethernet	2 × 10/100/1000 Mbps (RJ45), Intel WGI217LM (AMT interface) and Intel WGI210IT	
USB		
• External	4 × USB 3.0 (max. 2 high-current at the same time)	4 × USB 3.0 (max. 2 high-current at the same time) 1 × USB 3.0 high-current on Panel Front
• Internal	1 × USB 3.0 high-current for internal USB flash drive/dongle	
Serial	1 × COM1 (V.24), 9-pin sub-D connector	
Parallel	–	
Graphics connection	• 1 × DVI-I (DVI/VGA combined) • 1 × DisplayPort	
Keyboard, mouse	Connectable via USB (keyboard and mouse not included in scope of delivery)	

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Technical specifications (continued)

SIMATIC PCS 7 BOX basic hardware: SIMATIC IPC627D	Standard design	Panel front design
Operating system and diagnostics software		
Operating system • SIMATIC PCS 7 BOX RTX • SIMATIC PCS 7 BOX	Windows 7 Ultimate SP1 (32-bit), multi-language (English, German, French, Italian, Spanish, Chinese), pre-installed on hard disk and enclosed on Restore DVD set, no activation required Windows 10 IoT Enterprise 2015 LTSB (64-bit) operating system, multi-language (English, German, French, Italian, Spanish, Chinese), pre-installed on hard disk and enclosed on Restore DVD set, no activation required	
System-tested SIMATIC industrial software	SIMATIC IPC DiagMonitor	
Monitoring and diagnostics functions		
Display elements	4 × dual-color LEDs for status display of the operating state: • PC ON/WD (Watchdog) • RUN/STOP • ERROR • MAINT	
SIMATIC IPC DiagMonitor diagnostics software • Temperature (overtemperature/undertemperature) • Battery voltage • Storage media • Watchdog	 • Processor temperature • Temperature close to the RAM chips • Temperature of the basic module Backup battery Monitoring of HDD/SSD with S.M.A.R.T. functionality System monitoring; possible reactions: Hardware or software reset	
Fans	Monitoring of the fan speed	
Operating hours counter	Information about the total runtime	
Safety		
Protection class	Protection class I according to IEC 61140	
Safety directives	EN 60950-1; UL60950-1 CAN/CSA C22.2 No 60950-1-07 UL508 CSA C22.2 No. 142	EN 60950-1 UL508 CSA C22.2 No. 142
Noise emission		
Operation	< 55 dB(A) according to EN ISO 7779	
Electromagnetic compatibility (EMC)		
Interference emission	EN 61000-6-3 EN 61000-6-4 CISPR22 class B FCC class A	EN 61000-6-3 EN 61000-6-4 CISPR22 class A 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 radio frequency interference	10 V/m, 80 ... 1 000 MHz and 1.4 ... 2 GHz, 80 % AM (to IEC 61000-4-3) 3 V/m, 2 ... 2.7 GHz, 80 % AM (to IEC 61000-4-3) 10 V/m, 10 kHz ... 80 MHz, 80 % AM (to IEC 61000-4-6)	
Immunity to magnetic fields	100 A/m, 50/60 Hz (according to IEC 61000-4-8)	

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Technical specifications (continued)

SIMATIC PCS 7 BOX basic hardware: SIMATIC IPC627D	Standard design	Panel front design
Climatic conditions		
Temperature	Tested according to IEC 60068-2-1, IEC 60068-2-2, IEC 60068-2-14	
• Operation	• +5 ... +45 °C (with DVD writer, only up to +40 °C) • +5 ... +50 °C (power USB and PCI/PCIe expansions max. 20 W) • +5 ... +55 °C (power USB and PCI/PCIe expansions max. 10 W)	• Horizontal, vertical installation: +5 ... +45 °C (with DVD writer, only up to +40 °C) • Horizontal, angled installation: +5 ... +40 °C (power USB and PCI/PCIe expansions max. 30 W; no DVD operation) • Vertical, vertical installation: +5 ... +45 °C (power USB and PCI/PCIe expansions max. 30 W; no DVD operation)
• Operation, with cabinet installation		
- External temperature 40 °C	–	• Internal temperature max. +50 °C (max. power of all slots 15 W)
- External temperature 45 °C	–	• Internal temperature max. +45°C with maximum configuration (power of all slots 30 W)
• Storage/transport	-20 … +60 °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)	
Atmospheric pressure		
• Operation	1 080 to 795 hPa (corresponds to an altitude of 1 000 to 2 000 m)	
• Storage/transport	1 080 to 660 hPa (corresponds to an altitude of 1 000 to 3 500 m)	
Mechanical environmental conditions		
Vibrations	Tested according to IEC 60068-2-6	
• Operation	10 … 58 Hz: 0.075 mm / 58 … 500 Hz: 9.8 m/s²	
- Limitation with DVD writer	10 … 58 Hz: 0.019 mm / 58 … 500 Hz: 2.5 m/s²	
- Limitation with portrait assembly	10 … 58 Hz: 0.0375 mm / 58 … 500 Hz: 4.9 m/s²	–
• 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, IEC 60068-2-29	
• Operation	50 m/s², 30 ms	
- Limitation with portrait assembly	25 m/s², 30 ms	–
• Storage/transport	250 m/s², 6 ms	
Standards, specifications, approvals		
CE - Residential, business and commercial operations, and small businesses		
• Interference emission	EN 61000-6-3: 2007 +A1:2011	–
• Noise immunity	EN 61000-6-1: 2007	–
CE industrial environment		
• Interference emission	EN 61000-6-4: 2007 +A1:2011	EN 61000-6-4: 2007
• Noise immunity	EN 61000-6-2: 2005	EN 61000-6-2: 2005
Certificates and approvals		
Quality assurance system according to ISO 9001:2008	According to DQS certificate 001323 QM08	
cULus	Underwriters Laboratories (UL) complying with standard UL 60950-1, CAN/CSA-C22.2 No. 60950-1 (I.T.E), UL 508 and CAN/CSA-C22.2 No. 142 (IND.CONT.EQ)	Underwriters Laboratories (UL) complying with standard UL 508 and CAN/CSA-C22.2 No. 142 (IND.CONT.EQ)
FCC USA	FCC Rules, Part 15, Class A	
Canada	ICES-003, Class B; NMB-003, Class B	ICES-003, Class A; NMB-003, Class A
Australia/New Zealand	EN 61000-6-3:2007	EN 61000-6-4:2007
Korea	Korean Certification (KC Mark)	

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Technical specifications (continued)

SIMATIC PCS 7 BOX basic hardware: SIMATIC IPC627D	Standard design	Panel front design
Power supply		
Supply voltage (AC)	Nominal 100 ... 240 V AC (-15 %/+10 %), wide range	
Supply voltage (DC)	Nominal 24 V DC (-20 %/+20 %), SELV, isolated	
AC input current	Continuous current up to 1.7 A (up to 50 A for 1 ms at startup)	
DC input current	Continuous current up to 7.1 A (up to 14 A for 30 ms at startup)	
Brief voltage interruption according to NAMUR	max. 20 ms (at 0.85 rated voltage) (max. 10 events per hour; recovery time of at least 1 s)	
Max. power consumption • Active power (AC/DC) • Apparent power (AC)	 176 W 190 VA	
Max. current output (+12 V DC)	12.5 A	
Dimensions and weights		
External dimensions including DVD writer (W × H × D in mm)	312 × 267 × 105	560 × 380 × 139 (148 incl. front USB port)
Mounting cutout (W × H in mm)	–	541 × 362
Mounting depth including DVD writer (D in mm)	–	133
Weight	Approx. 7 kg	Approx. 16 kg
System software and licenses (incl. SP)		
SIMATIC PCS 7 BOX RTX ES/OS system (WinAC RTX 2010 integrated)	• SIMATIC PCS 7 ES Single Station V9.0 with 250 AS/OS Runtime POs • WinAC RTX 2010 and PCS 7 RTX license on USB flash drive	
PCS 7 BOX RTX OS Runtime (WinAC RTX 2010 integrated)	• SIMATIC PCS 7 OS Software Single Station V9.0 (250 OS Runtime POs) • SIMATIC PCS 7 AS Runtime license for 250 AS Runtime POs • WinAC RTX 2010 and PCS 7 RTX license on USB flash drive	
SIMATIC PCS 7 BOX ES/OS System	• SIMATIC PCS 7 ES Single Station V9.0 with 250 AS/OS Runtime POs • SIMATIC PCS 7 BCE V9.0 Runtime license	
SIMATIC PCS 7 BOX OS Runtime	• SIMATIC PCS 7 OS Software Single Station V9.0 (250 OS Runtime POs) • SIMATIC PCS 7 BCE V9.0 Runtime license	
Restore DVDs/preinstallation • Restore DVD Set 1 for SIMATIC PCS 7 BOX RTX	 Windows 7 Ultimate SP1 operating system (32-bit), multi-language (English, German, French, Italian, Spanish, Chinese), with default settings for optimized SIMATIC PCS 7 operation including PCS 7 software installation for SIMATIC PCS 7 BOX TRX	
• Restore DVD Set 2 for SIMATIC PCS 7 BOX	Windows 10 IoT Enterprise 2015 LTSB operating system (64-bit), multi-language (English, German, French, Italian, Spanish, Chinese), with default settings for optimized SIMATIC PCS 7 operation including PCS 7 software installation for SIMATIC PCS 7 BOX	

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Ordering data

SIMATIC PCS 7 BOX RTX (AS integrated)

	Article No.									
SIMATIC PCS 7 BOX System	**6ES7650-**									
PC type: SIMATIC IPC627D	**4**	**B**	■	■	**0**	**-**	**3**	■	■	■
2 × 10/100/1000 Mbps Ethernet RJ45; graphics onboard, 4 × USB 3.0; 1 × serial (COM1); 1 × PCI, 1 × PCIe (X16)										
SIMATIC PCS 7 software version V9.0 pre-installed										
Windows 7 Ultimate 32-bit operating system, multi-language (English, German, French, Italian, Spanish, Chinese)										
Processor and storage media										
• Intel Core i3-4330TE processor (2 cores/ 4 threads, 2.4 GHz, 4 MB cache, VT-x); main memory 8 GB, DDR3 1600, DIMM; 250 GB HDD SATA; DVD±R/RW			**A**							
• Xeon E3-1268Lv3 processor (4 cores/8 threads, 2.3 (3.3) GHz, 8 MB cache, VT-d, AMT); main memory 8 GB DDR3 1600, DIMM; 240 GB SSD; DVD±R/RW			**B**							
• Xeon E3-1268Lv3 processor (4 cores/8 threads, 2.3 (3.3) GHz, 8 MB cache, VT-d, AMT); main memory 8 GB DDR3 1600, DIMM, ECC; RAID1, 2 × 320 GB SATA (2.5"); DVD±R/RW			**C**							
Communication interfaces										
• PROFIBUS onboard (CP 5622 compatible)				**0**						
• PROFINET onboard (CP 1616 compatible)				**1**						
System type										
• PCS 7 V9.0 BOX RTX ES/OS system (WinAC RTX 2010)								**R**		
• PCS 7 V9.0 BOX RTX OS Runtime (WinAC RTX 2010)								**S**		
Panel front										
• Without panel									**A**	
• 22" Single Touch, 1920 × 1080 pixels									**B**	
Power supply, country-specific power supply cord										
• 110/230 V AC industrial power supply to NAMUR;										
- Power supply cord for Europe										**0**
- Power supply cord for the UK										**1**
- Power supply cord for Switzerland										**2**
- Power supply cord for the USA										**3**
- Power supply cord for Italy										**4**
- Power supply cord for China										**5**
• 24 V DC industrial power supply										**6**

SIMATIC PCS 7 BOX without WinAC RTX (AS separate)

	Article No.									
SIMATIC PCS 7 BOX System	**6ES7650-**									
PC type: SIMATIC IPC627D	**4**	**B**	■	**8**	**2**	**-**	**3**	■	■	■
2 × 10/100/1000 Mbps Ethernet RJ45; graphics onboard, 4 × USB 3.0; 1 × serial (COM1); 1 × PCI, 1 × PCIe (X16)										
SIMATIC PCS 7 software version V9.0 pre-installed										
Windows 10 IoT Enterprise 2015 LTSB 64-bit operating system, multi-language (English, German, French, Italian, Spanish, Chinese)										
Without additional communications interfaces										
Processor and storage media										
• Intel Core i3-4330TE processor (2 cores/ 4 threads, 2.4 GHz, 4 MB cache, VT-x); main memory 8 GB, DDR3 1600, DIMM; 250 GB SATA; DVD±R/RW			**A**							
• Xeon E3-1268Lv3 processor (4 cores/8 threads, 2.3 (3.3) GHz, 8 MB cache, VT-d, AMT); main memory 8 GB DDR3 1600, DIMM; 240 GB SSD; DVD±R/RW			**B**							
• Xeon E3-1268Lv3 processor (4 cores/8 threads, 2.3 (3.3) GHz, 8 MB cache, VT-d, AMT); main memory 8 GB DDR3 1600, DIMM, ECC; RAID1, 2 × 320 GB SATA (2.5"); DVD±R/RW			**C**							
System type										
• PCS 7 V9.0 BOX ES/OS system							**T**			
• PCS 7 V9.0 BOX OS Runtime							**U**			
Panel front										
• Without panel									**A**	
• 22" Single Touch, 1920 × 1080 pixels									**B**	
Power supply, country-specific power supply cord										
• 110/230 V AC industrial power supply to NAMUR;										
- Power supply cord for Europe										**0**
- Power supply cord for the UK										**1**
- Power supply cord for Switzerland										**2**
- Power supply cord for the USA										**3**
- Power supply cord for Italy										**4**
- Power supply cord for China										**5**
• 24 V DC industrial power supply										**6**

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Ordering data (continued)

SIMATIC PCS 7 BOX System as a spare part

	Article No.								
SIMATIC PCS 7 BOX PC spare part PC type: SIMATIC IPC627D 2 × 10/100/1000 Mbps Ethernet RJ45; graphics onboard, 4 × USB 3.0; 1 × serial (COM1); 1 × PCI, 1 × PCIe (X16) Without pre-installation, without SIMATIC PCS 7 Restore DVD sets	**6ES7650-**								
	4	**B**	■	■	■	**-**	**8**	**X**	■	■
Processor and storage media										
• Intel Core i3-4330TE processor (2 cores/ 4 threads, 2.4 GHz, 4 MB cache, VT-x); main memory 8 GB, DDR3 1600, DIMM; 250 GB SATA; DVD±R/RW			**A**							
• Xeon E3-1268Lv3 processor (4 cores/8 threads, 2.3 (3.3) GHz, 8 MB cache, VT-d, AMT); main memory 8 GB DDR3 1600, DIMM; 240 GB SSD; DVD±R/RW			**B**							
• Xeon E3-1268Lv3 processor (4 cores/8 threads, 2.3 (3.3) GHz, 8 MB cache, VT-d, AMT); main memory 8 GB DDR3 1600, DIMM, ECC; RAID1, 2 × 320 GB SATA (2.5"); DVD±R/RW			**C**							
Communication interfaces										
• PROFIBUS onboard (CP 5622 compatible)				**0**						
• PROFINET onboard (CP 1616 compatible)				**1**						
• Without additional communication modules				**8**						
Operating system										
• Windows 7 Ultimate 32-bit, multi-language (English, German, French, Italian, Spanish, Chinese)					**0**					
• Windows 7 Ultimate 64-bit, multi-language (English, German, French, Italian, Spanish, Chinese)					**1**					
• Windows 10 IoT Enterprise 2015 LTSB 64-bit, multi-language (English, German, French, Italian, Spanish, Chinese)					**2**					
• Without operating system					**8**					
Panel front										
• Without panel								**A**		
• 22" Single Touch, 1920 × 1080 pixels								**B**		
Power supply, country-specific power supply cord										
• 110/230 V AC industrial power supply to NAMUR;										
- Power supply cord for Europe										**0**
- Power supply cord for the UK										**1**
- Power supply cord for Switzerland										**2**
- Power supply cord for the USA										**3**
- Power supply cord for Italy										**4**
- Power supply cord for China										**5**
• 24 V DC industrial power supply										**6**

Additional and expansion components

Additional and expansion components	
Runtime licenses for PO expansion	
SIMATIC PCS 7 OS Runtime license (cumulative) For extending the OS Runtime POs	
Language-neutral, software class A, single license for 1 installation	
Without SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	
- 100 POs	**6ES7658-2XA00-0XB0**
- 1 000 POs	**6ES7658-2XB00-0XB0**
• Online delivery License key download, online certificate of license Note: Email address required!	
- 100 POs	**6ES7658-2XA00-0XH0**
- 1 000 POs	**6ES7658-2XB00-0XH0**
SIMATIC PCS 7 AS Runtime license (cumulative) Language-neutral, floating license for 1 user	
Without SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	
- 100 POs	**6ES7653-2BA00-0XB5**
- 1 000 POs	**6ES7653-2BB00-0XB5**
• Online delivery License key download, online certificate of license Note: Email address required!	
- 100 POs	**6ES7653-2BA00-0XH5**
- 1 000 POs	**6ES7653-2BB00-0XH5**
Further SIMATIC PCS 7 system software	
SIMATIC PDM and SIMATIC PCS 7 Maintenance Station see "Plant Device Management" section	

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Ordering data

	Article No.
Keyboard, mouse, input aids, miscellaneous	
USB keyboard TKL-105 Color: black	
• Keyboard layout, German	**6AV6881-0AU14-0AA0**
• Keyboard layout, US-International	**6AV6881-0AU14-1AA0**
SIMATIC HMI USB mouse Optical mouse with scroll wheel and USB connection, color anthracite	**6AV2181-8AT00-0AX0**
Touch pen, thick, resistive technology For resistive touch screen, optimized for operation with gloves, including screw-on wall-mounting bracket	**6AV7672-1JB00-0AA0**
Memory expansion	
• 2 GB DDR3 1600 SDRAM, DIMM	**6ES7648-2AJ50-0MA0**
• 4 GB DDR3 1600 SDRAM, DIMM	**6ES7648-2AJ60-0MA0**
• 8 GB DDR3 1600 SDRAM, DIMM	**6ES7648-2AJ70-0MA0**
• 8 GB DDR3 1600 SDRAM, DIMM, ECC	**6ES7648-2AJ70-1MA0**
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**
SIMATIC IPC power cable For Box PC and Panel PC, 230 V AC, angled, 3 m	
• For Germany, France, Spain, the Netherlands, Belgium, Sweden, Austria, Finland	**6ES7900-1AA00-0XA0**
• For the UK	**6ES7900-1BA00-0XA0**
• For Switzerland	**6ES7900-1CA00-0XA0**
• For the USA	**6ES7900-1DA00-0XA0**
• For Italy	**6ES7900-1EA00-0XA0**
• For China	**6ES7900-1FA00-0XA0**
Fieldbus connection	
PROFIBUS FastConnect bus connector RS 485 Plug 180 With 180° cable outlet, insulation displacement	**6GK1500-0FC10**

Accessories

	Article No.
Portrait mounting kit	
• Kit 1: Interfaces to the front	**6ES7648-1AA10-1YB0**
• Kit 2: Interfaces point up/down	**6ES7648-1AA10-1YA0**

Accessories

Portrait assembly kit

As an alternative to installation with mounting brackets, the portrait mounting kit allows for space-saving installation of the SIMATIC PCS 7 BOX (standard design without Panel Front). It is available in two models:

- Kit 1: Portrait assembly with interfaces to the front
- Kit 2: Portrait assembly with interfaces on top or bottom

Together with the kit, the SIMATIC PCS 7 BOX occupies a mounting depth of 365 mm (Kit 1) or 279 mm (Kit 2) in the control cabinet. The limitations associated with portrait assembly regarding vibration and shock resistance are relatively small (see technical specifications).

Since all interfaces are accessible from the front when using Kit 1, this type of assembly is particularly suitable for commissioning and servicing.

Please observe the information on operation planning and device installation in the manual of the SIMATIC IPC627D in conjunction with the use of portrait mounting kits for SIMATIC PCS 7 BOX.

Uninterruptible DC power supply (DC UPS)

You can bypass power failures by using a SITOP DC UPS uninterruptible power supply. For information and suitable products see the chapter "Process I/O", section "Power supplies" as well as catalog KT 10.1.

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Notes

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10/2	**Introduction**
10/5	**Industrial Ethernet**
10/8	SCALANCE X Switches Product Overview
10/10	SCALANCE X-000 Switches
10/13	SCALANCE X-100 Switches
10/15	SCALANCE XR-100WG Switches
10/16	SCALANCE XB-200 Switches
10/18	SCALANCE XC-200 Switches managed
10/21	SCALANCE XP-200 Switches managed
10/24	SCALANCE X-200RNA Switches
10/26	SCALANCE XF-200BA Switches
10/28	SCALANCE XR-300 Switches
10/31	Media Modules for SCALANCE X-300/XR-300
10/36	SCALANCE XR-300 WG Switches
10/39	SCALANCE XM-400 Switches
10/45	SCALANCE X-500 Switches
10/51	Industrial Ethernet Media Converter
10/52	Passive network components
10/52	- FastConnect
10/56	- ITP Cables and Connectors
10/57	- Fiber-Optic Cables
10/59	System Connection PCS 7 Systems
10/63	Industrial Wireless LAN
10/72	**PROFINET**
10/74	Architecture
10/75	PROFINET Switches
10/76	SCALANCE XF-200BA DNA Switches ("Y-Switch")
10/78	IE/PB LINK
10/79	PROFINET Bus Analyzer (BANY)
10/82	**PROFIBUS**
10/83	**PROFIBUS DP**
10/84	Electrical Networks
10/86	Optical Networks
10/88	AS Connection
10/89	Y-Link
10/90	**PROFIBUS PA**
10/94	PA Routers
10/98	Active Field Distributors for PA components
10/104	Passive PA Components
10/105	**FOUNDATION Fieldbus H1**
10/107	FF Routers
10/110	Active Field Distributors for FF components
10/116	Passive FF Components
10/117	**OpenPCS 7**
10/119	**Other communication**
10/119	AS Interface
10/121	Modbus

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Overview



With the SIMATIC NET network components based on globally established standards, SIMATIC PCS 7 possesses a powerful and rugged range of products for implementing totally integrated communication networks for reliable data exchange between all system components and levels in 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 meet the highest industrial demands, especially in areas subject to extreme influences, such as

- Extended temperature range
- Vibration
- 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 Manufacturing Execution System (MES).

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 portfolio ensures fast and reliable communication between the individual systems/applications of the SIMATIC PCS 7 process control system 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.

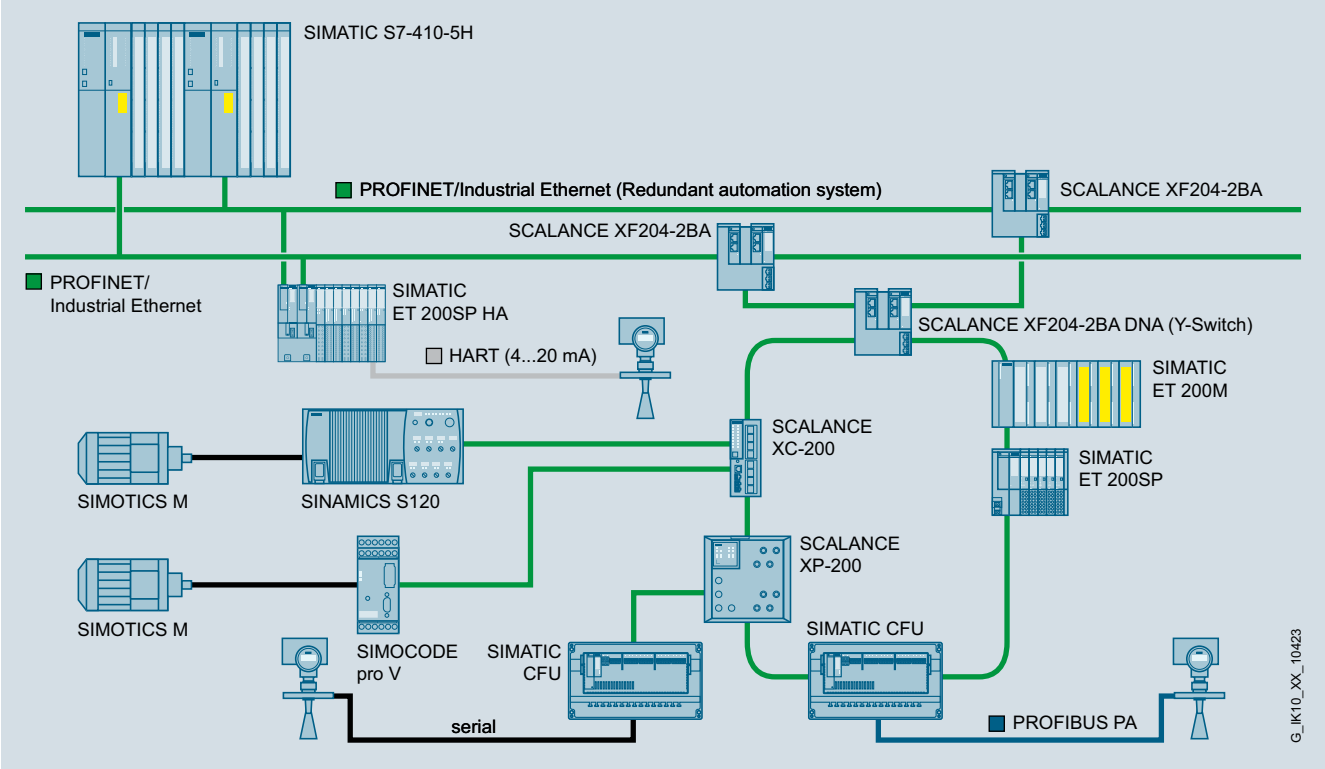
In medium and large plants with high requirements, SIMATIC PCS 7 applies modern FastEthernet and Gigabit technology that combines the high availability provided by redundant electrical and optical rings with the scalable performance provided by switching technology and high transmission rates of up to 10 Gbps.

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.

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Design (continued)

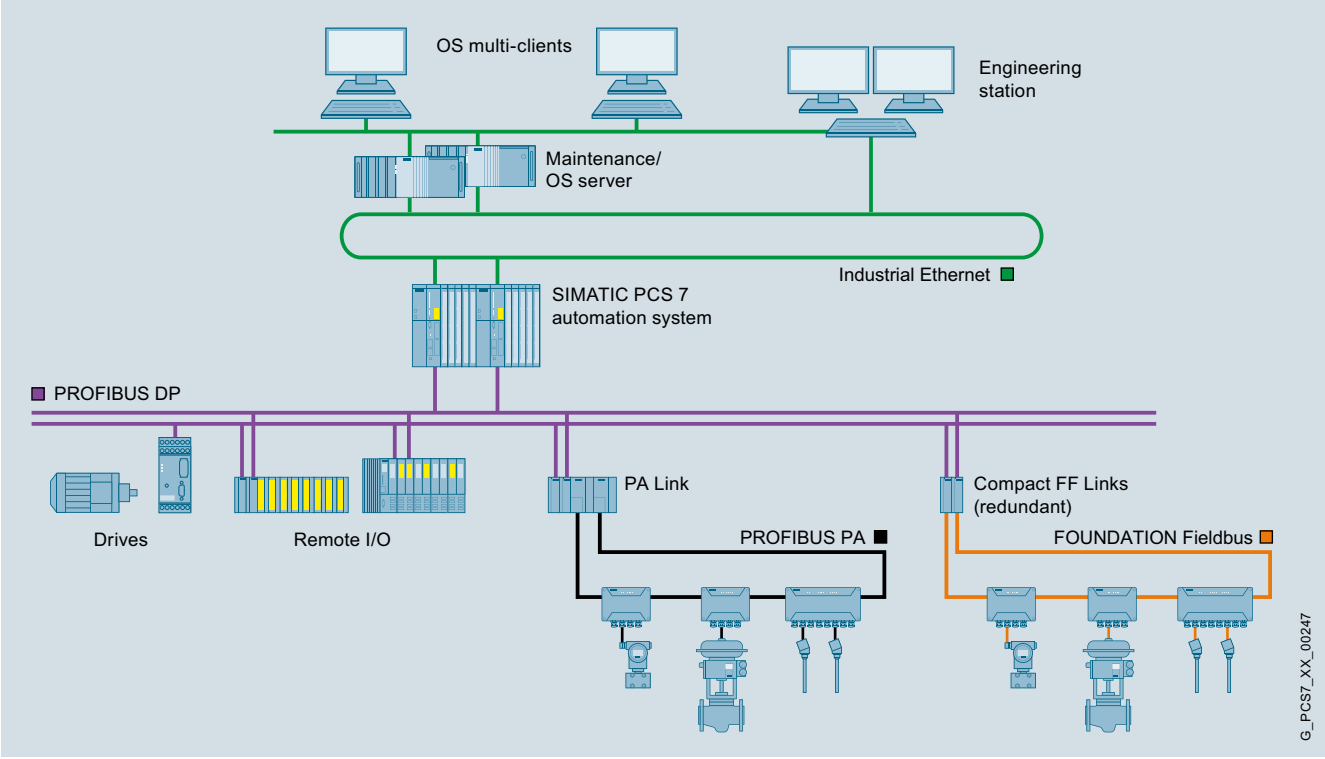


Example of PROFINET communication in the SIMATIC PCS 7 process control system

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.

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Design (continued)



Integration of PROFIBUS PA and FOUNDATION Fieldbus H1

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.

PROFIBUS DP

PROFIBUS DP is both a system bus and an open communication system, and is designed for moderate 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 SIMATIC ET 200M, SIMATIC ET 200iSP and SIMATIC ET 200pro remote I/O stations
- Transmitters and actuators on a seamlessly integrated PROFIBUS PA fieldbus or FOUNDATION Fieldbus H1

As 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.

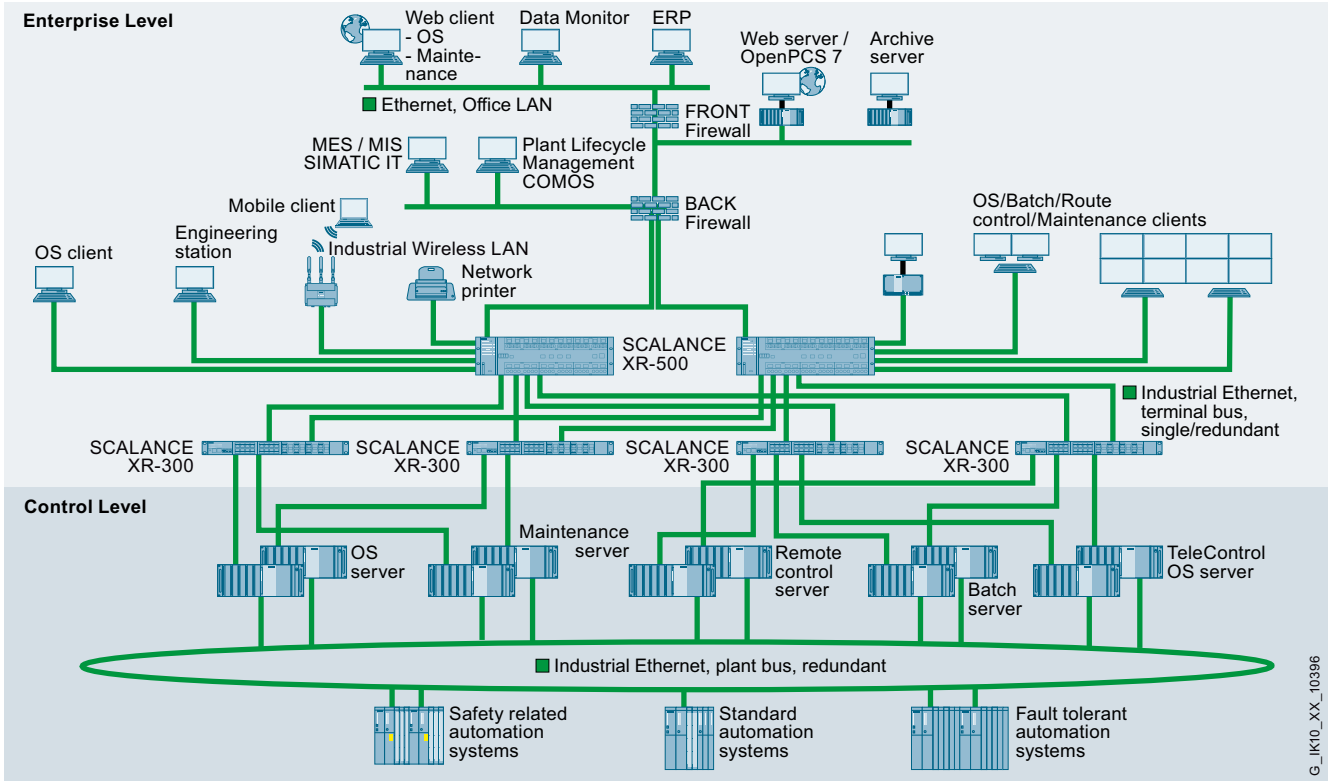
Both the PROFIBUS PA fieldbus and the FOUNDATION Fieldbus H1 meet these requirements. Both are optimally suitable for directly integrating actuators and sensors in operating environments up to Ex zone 1/21 or 0/20 into the process system.

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.

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Overview



Typical configuration example for redundant plant bus

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 with high requirements, SIMATIC PCS 7 applies modern FastEthernet and Gigabit technology. This combines the high reliability of optical rings with the scalable performance of switching technology and high transmission rates of up to 10 Gbps.

Benefits

Ethernet is now the number one network technology in the global LAN environment. 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 Ethernet technology with future-proof network components with special features and capabilities for use in industrial environments, for example:

- Rugged design, suitable for harsh industrial environments
- Fast local assembly using the FastConnect cabling system
- High fault tolerance through redundancy and fast switchover to redundant system
- Continuous monitoring of network components with a simple yet effective signaling concept, and centrally with network management softwre

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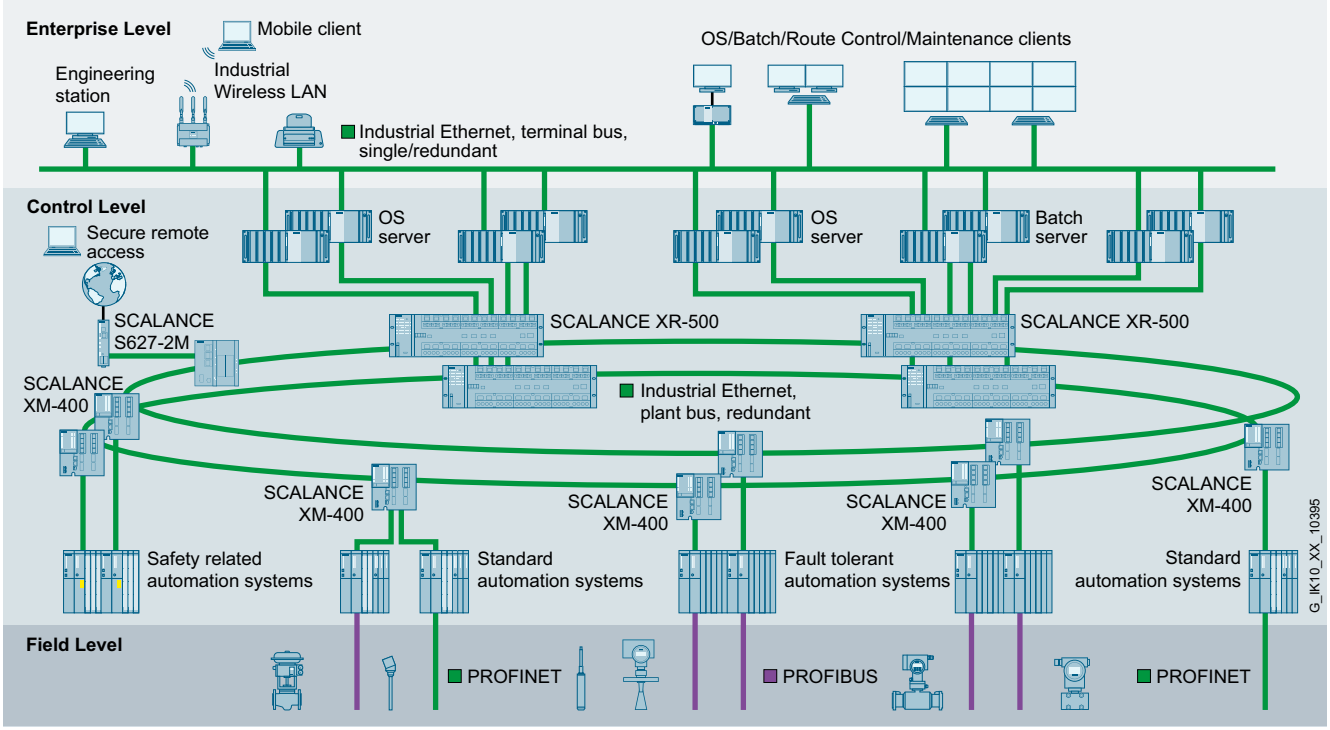
Design

The following Ethernet communications interfaces are used in the various SIMATIC PCS 7 subsystems (ES, OS, AS etc.):

- Interfaces integrated onboard
- Simple network adapters
- Special communication modules, for example CP 1623 and 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", see page 10/59

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.



Configuration example for plant and terminal bus

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 Industrial Ethernet switches, onboard interfaces, network adapters, communications processors (CP), cabling, 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 ports on each 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, 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 if an error occurs.

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Design (continued)

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 configured in a similar way to the terminal bus, using SIMATIC NET standard components such as Industrial Ethernet switches, network adapters, communication modules (CP), cabling, etc. For small plants with up to eight standard automation systems per Operator System, single stations and servers can be efficiently operated on the plant bus using "Basic Communication Ethernet" (BCE) and a FastEthernet network adapter. The CP 1623/CP 1628 communication module is always required if more than eight 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-500, X-400, X-300 and X-200 product lines can act as 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".

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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. A graded portfolio of Industrial Ethernet switches in different designs and performance classes enables optimum solutions for all types of switching tasks – not only in harsh industrial environments.

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-300
- SCALANCE X-400
- SCALANCE X-500

The higher the number, the greater the functional scope:

- Unmanaged: X-000, X-100
- Managed L2: X-200, X-300
- Managed L2/L3: X-400, X-500

The switches also vary in design:

- Box design for XB-000, XB-200
- Compact design for XC-100, XC-200, XP-200, X-300
- Flat design for XF-200
- Modular design for XM-400
- Rack for XR-100WG, XR-300, XR-500

		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	•	•	•						
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

G_PCS7_XX_00347

Industrial Ethernet Switches SCALANCE X: Areas of application

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Design (continued)

	Layer 3 / Routing	19" design	Modular through media modules	Support of Gigabit Ethernet	PROFINET	EtherNet/IP	Office features (VLAN)	Diagnostic functions	Isochronous Real-Time (IRT)	Power-over-Ethernet	Can be used under enhanced ambient conditions	Time synchronization to IEEE 1588	Additional interface for SIMATIC S7-300/ ET 200M, S7-1200 or LOGO!
X-500	•	•	•	•	•	•	•	•		•			
X-400	•		•	•	•	•	•	•		•			
X-300		•	•	•	•		•	•		•	•	•	
X-200				•	•	•	•	•	•		•		
X-100										•			
X-000				•							•		
CSM													•

• applies to selected versions

G_IK10_XX_10302

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".

Selection tools

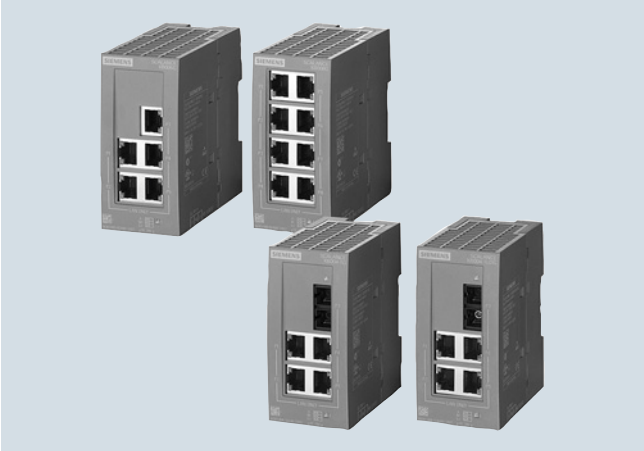
To assist in selecting the right Industrial Ethernet switches and with the configuration of modular variants, the SIMATIC NET Selection Tool and the TIA Selection Tool Cloud are available at:

www.siemens.com/snst-standalone

www.siemens.com/tstcloud

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Overview



SCALANCE XB-000

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.

The unmanaged Industrial Ethernet switches of the SCALANCE XB-000 line are optimized for installing Industrial Ethernet networks in a line and star topology.

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

Product versions

- **SCALANCE XB005 and SCALANCE XB008**
  5 or 8 × 10/100 Mbps RJ45 ports, electrical
- **SCALANCE XB005G and SCALANCE XB008G (Gigabit)**
  5 or 8 × 10/100/1000 Mbps RJ45 ports, electrical
- **SCALANCE XB004-1**
  4 × 10/100 Mbps RJ45 ports, electrical
  1 × 100 Mbps SC port, optical (multimode, glass), up to 5 km
- **SCALANCE XB004-2**
  4 × 10/100 Mbps RJ45 ports, electrical
  2 × 100 Mbps SC port, optical (multimode, glass), up to 5 km
- **SCALANCE XB004-1LD (long-distance)**
  4 x 10/100 Mbps RJ45 ports, electrical
  1 × 100 Mbps SC port, optical (single-mode, glass), up to 26 km
- **SCALANCE XB004-1G (Gigabit)**
  4 x 10/100/1000 Mbps RJ45 ports, electrical
  1 × 1000 Mbps SC port, optical (multimode, glass), up to 750 m
- **SCALANCE XB004-1LDG (long-distance)**
  4 × 10/100/1000 Mbps RJ45 ports, electrical
  1 × 1000 Mbps SC port, optical (single-mode, glass), up to 10 km

Design

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

The SCALANCE XB-000 switches have:

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

The following port types are available:

- 10/100 BaseTX electrical RJ45 ports or 10/100/1000 BaseTX electrical RJ45 ports:
  automatic data transmission rate detection (10 or 100 Mbps), with autosensing and autocrossing function for connecting IE TP cables up to 100 m.
- 100 BaseFX, optical SC port:
  for direct connection to Industrial Ethernet FO cables.
  Multimode fiber-optic cable up to 5 km
- 100 BaseFX, optical SC port:
  for direct connection to Industrial Ethernet FO cables.
  Single mode fiber-optic cable up to 26 km
- 1000 BaseSX, optical SC port:
  for direct connection to Industrial Ethernet FO cables.
  Multimode fiber-optic cable up to 750 m
- 1000 BaseLX, optical SC port:
  for direct connection to Industrial Ethernet FO cables.
  Single mode fiber-optic cable up to 10 km

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

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Ordering data	Article No.
SCALANCE XB-000 Industrial Ethernet switches	
Unmanaged Industrial Ethernet switches for 10/100/1000 Mbps, LED diagnostics, manual available as download	
• **SCALANCE XB005** 5 × 10/100 Mbps RJ45 ports, electrical	**6GK5005-0BA00-1AB2**
• **SCALANCE XB008** 8 × 10/100 Mbps RJ45 ports, electrical	**6GK5008-0BA00-1AB2**
• **SCALANCE XB004-1** 4 × 10/100 Mbps RJ45 ports, electrical 1 × 100 Mbps SC port, optical (multimode, glass), up to 5 km	**6GK5004-1BD00-1AB2**
• **SCALANCE XB004-2** 4 × 10/100 Mbps RJ45 ports, electrical 2 × 100 Mbps SC port, optical (multimode, glass), up to 5 km	**6GK5004-2BD00-1AB2**
• **SCALANCE XB004-1LD** 4 × 10/100 Mbps RJ45 ports, electrical 1 × 100 Mbps BFOC port, optical (single-mode, glass), up to 26 km	**6GK5004-1BF00-1AB2**
• **SCALANCE XB005G** 5 × 10/100/1000 Mbps RJ45 ports, electrical	**6GK5005-0GA10-1AB2**
• **SCALANCE XB008G** 8 × 10/100/1000 Mbps RJ45 ports, electrical	**6GK5008-0GA10-1AB2**
• **SCALANCE XB004-1G** 4 × 10/100/1000 Mbps RJ45 ports, electrical 1 × 1000 Mbps SC port, optical (multimode, glass), up to 0.75 m	**6GK5004-1GL10-1AB2**
• **SCALANCE XB004-1LDG** 4 × 10/100/1000 Mbps RJ45 ports, electrical 1 × 1000 Mbps SC port, optical (single-mode, glass), up to 10 km	**6GK5004-1GM10-1AB2**

Accessories	Article No.
SITOP compact 24 V/0.6 A Single-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 0.6 A, slim design	**6EP1331-5BA00**
IE FC stripping tool Pre-adjusted stripping tool for fast stripping of Industrial Ethernet FC cables	**6GK1901-1GA00**
IE FC RJ45 plug 180 2×2 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet port; 1 pack = 1 unit	**6GK1901-1BB10-2AA0**
SCALANCE XB-000 3-pin screw-type terminal block 3-pin screw-type terminal block for power supply; 24 V AC/DC for SCALANCE XB-000; 1 pack = 5 units; spare part	**6GK5980-1CB00-0BA5**
SCALANCE XB-000 3-pin push-in terminal block 3-pin push-in terminals; for power supply; 24 V AC/DC for SCALANCE XB-000; 1 pack = 5 units; spare part	**6GK5980-1CB10-0BA5**
IE FC TP standard cable GP 2×2 (type A) 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/IE FC RJ45 plug; PROFINET-compliant; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1840-2AH10**
IE FC RJ45 plug 4×2 RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbps) with a robust 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 port	
• 1 pack = 1 unit	**6GK1901-1BB11-2AA0**

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Ordering data	Article No.
IE FC TP standard cable GP 4×2 8-wire, shielded TP installation cable for universal applications; with UL approval; sold by the meter; max. length 1000 m, minimum order 20 m	
• AWG 24, for connection to IE FC RJ45 plug 4×2, IE FC M12 plug PRO 4×2	**6XV1878-2A**
IE connecting cable IE FC RJ45 plug 180/IE FC RJ45 plug 180 Preassembled IE FC TP trailing cable GP 2×2 (PROFINET type C) with two IE FC RJ45 plug 180, IP20 degree of protection	
Length:	
• 1.0 m	**6XV1871-5BH10**
• 5.0 m	**6XV1871-5BH50**
• 10.0 m	**6XV1871-5BN10**
IE TP Cord RJ45/RJ45 TP cable 4×2 with 2 RJ45 connectors	
• 1 m	**6XV1870-3QH10**
• 6 m	**6XV1870-3QH60**
• 10 m	**6XV1870-3QN10**
FC FO termination kit Assembly case for on-site assembly of FC SC and FC BFOC connectors on FC FO standard cable; comprising a stripping tool, Kevlar cutters, fiber breaking tool and microscope	**6GK1900-1GL00-0AA0**
FC SC plug Screw connector for on-site assembly on FC FOC; (1 pack = 10 duplex plugs + cleaning cloths)	**6GK1900-1LB00-0AC0**
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**
Multimode FO SC duplex connector set For FO standard cable (50/125/1400), FO ground cable (50/125/1400), flexible FO trailing cable, INDOOR FO cable (62.5/125/900), 10 units	**6GK1901-0LB10-2AA0**
FO standard cable GP 50/125/1400[1) 2)] Multimode cable, sold by the meter; max. length 1 000 m; minimum order 20 m	**6XV1873-2A**
SCALANCE TAP104 Test access port for the reaction-free extraction of Ethernet data frames (10/100 Mbps) from both transmission directions; extracts complete data traffic (including incomplete diagrams) for further diagnostics.	**6GK5104-0BA00-1SA2**

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 XC-100

The unmanaged Industrial Ethernet switches of the SCALANCE XC-100 product line are optimized for installing Industrial Ethernet networks at transmission rates of 10/100 Mbps in a line and star topology for machine-level applications:

- Connection to stations or networks in accordance with the port type of the devices (electrical with RJ45 port, or optical with ST/BFOC port or SC port)
- Space-saving cubicle installation on standard mounting rail, SIMATIC S7-300/S7-1500 mounting rail, or wall mounting
- Rugged station connections with RJ45 connectors for industrial use that offer additional strain and bending strain relief thanks to latching on the enclosure (retaining collar)
- Redundant power supply
- Clear diagnostics display on the device with LEDs (power, link status, data traffic)
- Error signaling contact with easy adjustment using the SET button

Product versions

- Construction of electrical and optical Industrial Ethernet line or star topologies:
  - **SCALANCE XC106-2**
    with 6 electrical ports (RJ45 with retaining collar) and 2 optical ports (ST/BFOC)
  - **SCALANCE XC106-2**
    with 6 electrical (RJ45 with retaining collar) and 2 optical ports (SC)
  - **SCALANCE XC108**
    with 8 electrical ports (RJ45 with retaining collar)
  - **SCALANCE XC116**
    with 16 electrical ports (RJ45 with retaining collar)
  - **SCALANCE XC124**
    with 24 electrical ports (RJ45 with retaining collar)
- Diagnostics on the device with LEDs (power, link status, data traffic) and signaling contact (alarm screen form can be set using a button on the device)
- The RJ45 ports are suitable for industrial use and have additional retaining collars: optimized for connecting the IE FC RJ45 plug 180

Design

The SCALANCE Industrial Ethernet switches with enclosure back sections of metal are optimized for mounting on a standard mounting rail and a SIMATIC S7-1500 mounting rail. Direct wall mounting in various mounting positions is also possible. Due to the enclosure dimensions that correspond to those of the SIMATIC S7-1500, the devices are ideally suited for integration into automation solutions and mounting on the SIMATIC S7-1500 mounting rail. Mounting on a SIMATIC S7-300 mounting rail is also possible.

The SCALANCE XC-100 switches have:

- 4-pin terminal block for connecting the redundant supply voltage (2 x 24 V DC)
- Raised row of LEDs for displaying status information (power, link status, data traffic, signaling contact)
- 2-pin terminal block for connecting the isolated signaling contact
- SET key for on-site configuration of the signaling contact

The following port types are available:

- 10/100BaseTX, RJ45 port;
  automatic detection of the data rate (10 or 100 Mbps), with autosensing and autocrossover function for connecting IE FC cables with IE FC RJ45 plug 180 over distances up to 100 m
- 100BaseFX, ST/BFOC port;
  for direct connection to the Industrial Ethernet glass FOC up to 5 km
- 100BaseFX, SC port;
  for direct connection to the Industrial Ethernet glass FOC up to 5 km

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Ordering data	Article No.
SCALANCE XC-100 Industrial Ethernet switches	
Unmanaged Industrial Ethernet switches for 10/100 Mbps, manual available as download	
• **SCALANCE XC106-2** 6 × 10/100 Mbps RJ45 ports, electrical 2 × ST/BFOC ports, optical (multi-mode BFOC, glass) up to 5 km	**6GK5106-2BB00-2AC2**
• **SCALANCE XC106-2** 6 × 10/100 Mbps RJ45 ports, electrical 2 × ST/SC ports, optical (multi-mode SC, glass)	**6GK5106-2BD00-2AC2**
• **SCALANCE XC108** 8 × 10/100 Mbps RJ45 ports, electrical	**6GK5108-0BA00-2AC2**
• **SCALANCE XC116** 16 × 10/100 Mbps RJ45 ports, electrical	**6GK5116-0BA00-2AC2**
• **SCALANCE XC124** 24 × 10/100 Mbps RJ45 ports, electrical	**6GK5124-0BA00-2AC2**
Accessories	
S7-1500 PM 1507 power supply SIMATIC PM 1507 24 V/3 A regulated power supply for SIMATIC S7-1500 Input: 120/230 V AC Output 24 V DC/3 A	**6EP1332-4BA00**
S7-1500 PM 1507 power supply 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**
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 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet port	
• 1 pack = 1 unit	**6GK1901-1BB10-2AA0**
IE FC RJ45 plug 90 RJ-45 plug data connector (10/100 Mbps), for connection to IE FC TP cables 2×2, with rugged metal enclosure and FastConnect connection technology, 90 ° cable outlet	**6GK1901-1BB20-2AA0**
IE FC RJ45 plug 145 RJ-45 plug data connector (10/100 Mbps), for connection to IE FC TP cables 2x2, with rugged metal enclosure and FastConnect connection technology, 145 ° cable outlet	**6GK1901-1BB30-0AA0**
IE FC RJ45 plug 4×2 RJ-45 plug data connector (10/100/1000 Mbps), for connection to IE FC TP cables 4×2, with rugged metal enclosure and FastConnect connection technology	**6GK1901-1BB11-2AA0**
5 x FC SC duplex plugs FC FO SC plug for on-site mounting on FC FO cables (62.5/200/230)	**6GK1900-1LB00-0AC0**
IE FC TP standard cable GP 2x2 (type A) 4-wire, 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**
FC FO termination kit Assembly case for on-site assembly of FC SC and FC BFOC connectors on FC FO standard cable, comprising a stripping tool, Kevlar cutters, fiber breaking tool and microscope	**6GK1900-1GL00-0AA0**
FC ST/BFOC plug Screw connector for on-site assembly on FC fiber-optic cable; (1 pack = 10 units + cleaning cloths)	**6GK1900-1GB00-0AC0**
FC FO standard cable GP 62.5/200/230 FC FO standard cable (62.5/200/230) for field assembly, cUL approval, standard cable can be split	**6XV1847-2A**
FO standard cable GP 50/125/1400 [1) 2)] Multimode cable sold by the meter; max. length 1 000 m; minimum order 20 m	**6XV1873-2A**
IE FC TP standard cable GP 4x2 Shielded TP installation cable capable of 1000 Mbps, for connection to FC RJ45 modular outlet, 8-wire, AWG22, with rigid cores for final assembly	**6XV1870-2E**
Screw-type terminal block	
For SCALANCE X/W/S	
• 2-pin for signaling contact (24 V DC) 1 pack = 5 units	**6GK5980-0BB00-0AA5**
• 4-pin for power supply (24 V DC) 1 pack = 5 units	**6GK5980-1DB00-0AA5**
Fixing screw	
For SCALANCE X/W	
• Screw for mounting on an S7-1500 and S7-300 mounting rail 1 pack = 5 units	**6GK5980-4AA00-0AA5**

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Overview



SCALANCE XR-100WG

The SCALANCE XR-100WG product line (work group) is unmanaged Industrial Ethernet switches for industry-related applications such as control rooms and applications in the industry-related sector. They enable the configuration of electrical line and star topologies with transmission rates of 10/100 Mbps (Fast Ethernet) and are designed for installation in 19" control cabinets.

- Up to 24 electrical interfaces (10/100 Mbps) with RJ45 connection
- Versions with 24 V DC and 100-240 V AC
- Redundant power supply for the 24 V DC versions

Product versions

SCALANCE XR124WG

- With 24 × 10/100 Mbps ports and redundant 24 V DC power supply
- With 24 × 10/100 Mbps ports and 100-240 V AC power supply

Design

The SCALANCE XR-100WG Industrial Ethernet switches with rugged metal enclosure with IP30 degree of protection are optimized for installation in the 19" control cabinet. 24 V DC and 100-240 V AC versions are available in just one height, 19".

The switches have:

- 2 × 2-pin terminal block for redundant power supply for protection against power failure in the 24 V DC version
- 3-pin inlet connector port for non-heating apparatus for voltage feed in the 100-240 V AC version
- Status information at the port for local diagnostics (link status, data traffic)

The SCALANCE XR-100WG switches are available with the following port types:

- Electrical RJ45 interfaces that support 10/100 Mbps

Ordering data

	Article No.
SCALANCE XR-100WG Industrial Ethernet switches	
19" Industrial Ethernet switches for designing electrical and/or optical Industrial Ethernet networks; ports support 10/100 Mbps	
SCALANCE XR124WG	
• 24 × 10/100 Mbps ports and redundant 24 V DC power supply	**6GK5124-0BA00-2AR3**
• 24 × 10/100 Mbps ports and 100 to 240 V AC power supply	**6GK5124-0BA00-3AR3**
Accessories	
Power supply unit	
SITOP compact 24 V/0.6 A Single-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 0.6 A, slim design	**6EP1331-5BA00**
Cabling system	
IE TP Cord RJ45/RJ45 TP cable 4×2 with 2 RJ45 connectors	
Length:	
• 0.5 m	**6XV1870-3QE50**
• 1 m	**6XV1870-3QH10**
• 2 m	**6XV1870-3QH20**
• 3 m	**6XV1870-3QH30**
• 4 m	**6XV1870-3QH40**
• 6 m	**6XV1870-3QH60**
• 10 m	**6XV1870-3QN10**
• 15 m	**6XV1870-3QN15**
• 20 m	**6XV1870-3QN20**
• 25 m	**6XV1870-3QN25**
• 30 m	**6XV1870-3QN30**
• 35 m	**6XV1870-3QN35**
• 40 m	**6XV1870-3QN40**
• 45 m	**6XV1870-3QN45**
Spring-type terminal block	
For SCALANCE X/W/S/M	
• 2-pin for power supply (24 V DC) 1 pack = 5 units	**6GK5980-0BB10-0AA5**
FC RJ 45 port lock Mechanical locking of unused RJ45 ports at network components and terminal devices. For use on devices with and without retaining collar	**6GK1901-1BB50-0AA0**

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Overview



SCALANCE XB-200 family

The managed SCALANCE XB-200 switches are optimized for setting up 10/100 Mbps Industrial Ethernets in a line, star or ring topology (RM integrated)

- Electrical and optical nodes or network connections can be implemented using 8 or 16 RJ45 ports (10/100 Mbps) or 3 fiber-optic ports (100 Mbps)
- Rugged plastic enclosure
- Diagnostics on the device with LEDs (power, link status, data traffic)
- The devices feature SNMP access, integral Web server remote diagnostics and signaling over the network
- Diagnostics and parameter assignment via Web page or console port
- Support of the two industrial protocols, PROFINET and EtherNet/IP, in the same device (software-switchable)
- All device versions available with default setting for both PROFINET and EtherNet/IP

Product versions

- Switches with electrical ports:
  - **SCALANCE XB208**
    8 × 10/100 Mbps RJ45 port, electrical
  - **SCALANCE XB216**
    16 × 10/100 Mbps RJ45 port, electrical
- Switches with electrical and optical ports:
  - **SCALANCE XB205-3**
    5 × 10/100 Mbps RJ45 port, electrical
    3 × 100 Mbps BFOC port, optical
  - **SCALANCE XB205-3**
    5 × 10/100 Mbps RJ45 port, electrical
    3 × 100 Mbps SC port, optical
  - **SCALANCE XB205-3 LD**
    5 × 10/100 Mbps RJ45 port, electrical
    3 × 100 Mbps SC port, optical
  - **SCALANCE XB213-3**
    13 × 10/100 Mbps RJ45 port, electrical
    3 × 100 Mbps BFOC port, optical
  - **SCALANCE XB213-3**
    13 × 10/100 Mbps RJ45 port, electrical
    3 × 100 Mbps SC port, optical
  - **SCALANCE XB213-3 LD**
    13 × 10/100 Mbps RJ45 port, electrical
    3 × 100 Mbps SC port, optical

Design

The SCALANCE XB-200 Industrial Ethernet switches in their rugged plastic enclosure are optimized for mounting on standard mounting rails.

The devices are designed with IP20 degree of protection.

The switches have a 6-pin terminal block for connecting the redundant supply voltage (24 V DC) and the grounding. The port LEDs provide information on the status (power, link status, data traffic).

Ethernet ports:

- **10/100BaseTX, RJ45 connection;**
  8/6 or 16/13 × RJ45 socket, automatic data transmission rate detection, with autosensing and autocrossover function
- **100 Mbps, SC-FO connection;**
  3 × SC-FO sockets (multimode)
- **100 Mbps, SC-LD-FO connection;**
  3 × SC-LD-FO sockets (single-mode)

Other interfaces:

- 6-pin terminal block for redundant power supply (24 V DC) and grounding
- 1 × RJ11 as connection for the serial interface

The port LEDs provide information on the status (power, link status, data traffic).

Remote diagnosis is possible over SNMP, Web browser and CLI.

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Ordering data	Article No.
Industrial Ethernet Switches SCALANCE XB-200 for 10/100 Mbit/s, including operating instructions on DVD	
SCALANCE XB208 8 × 10/100 Mbit/s RJ45 ports electrical	**6GK5208-0BA00-2AB2**
SCALANCE XB216 16 × 10/100 Mbit/s RJ45 ports electrical	**6GK5216-0BA00-2AB2**
SCALANCE XB205-3 5 × 10/100 Mbit/s RJ45 ports electrical, 3 × 100 Mbit/s BFOC port optical (multimode, glass), up to max. 5 km	**6GK5205-3BB00-2AB2**
SCALANCE XB205-3 5 × 10/100 Mbit/s RJ45 ports electrical, 3 × 100 Mbit/s SC port optical (multimode, glass), up to max. 5 km	**6GK5205-3BD00-2AB2**
SCALANCE XB205-3LD 5 × 10/100 Mbit/s RJ45 ports electrical, 3 × 100 Mbit/s BFOC port optical (single-mode, glass), up to max. 26 km	**6GK5205-3BF00-2AB2**
SCALANCE XB213-3 13 × 10/100 Mbit/s RJ45 ports electrical, 3 × 100 Mbit/s BFOC port optical (multimode, glass), up to max. 5 km	**6GK5213-3BB00-2AB2**
SCALANCE XB213-3 13 × 10/100 Mbit/s RJ45 ports electrical, 3 × 100 Mbit/s SC port optical (multimode, glass), up to max. 5 km	**6GK5213-3BD00-2AB2**
SCALANCE XB213-3LD 13 × 10/100 Mbit/s RJ45 ports electrical, 3 × 100 Mbit/s BFOC port optical (single-mode, glass), up to max. 26 km	**6GK5213-3BF00-2AB2**

Accessories	Article No.
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**
FO Standard Cable GP 50/125/14001[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 2×2 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 port	
• 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 FO 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 kit 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 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] Special fiber-optic cables, lengths and accessories available on request

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

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Overview



SCALANCE XC-200

The managed Industrial Ethernet switches of the SCALANCE XC-200 product line are optimized for setting up Industrial Ethernet networks with data transfer rates of 10/100 Mbps in a line, star or ring topology. High-performance optical structures with up to 1 000 Mbps can also be set up with the SCALANCE XC206-2SFP.

- Rugged enclosure in SIMATIC S7-1500 format, for mounting on standard mounting rails and SIMATIC S7-300 and SIMATIC S7-1500 mounting rails, or for direct wall mounting
- Electrical or optical connection to stations or networks according to port characteristics of the devices
- Version with SFP plug-in transceivers for transmission rates up to 1 000 Mbps
- Rugged station connections with industry-standard RJ45 connectors that offer additional strain and bending strain relief thanks to latching on the enclosure
- Redundant power supply
- Console port for direct access to device
- Display of comprehensive operating mode and status information via LEDs and selection pushbuttons
- Signaling contact for connecting to an error signaling system
- Slot for optional C-PLUG removable data storage medium for easy device replacement without additional equipment such as a field PG
- Grounding screw for external ground connection
- Flexible use in the automation environment with switchover between the two industry protocols PROFINET and EtherNet/IP in the device
- Comprehensive diagnostic options: Full integration into PROFINET and EtherNet/IP diagnostics, SNMP access, integrated Web server and automatic e-mail transmission function for remote diagnostics and signaling via the network
- Virtual LANs (VLAN) for easy structuring of large networks into smaller, logical subnetworks. Reasons for the subdivision into logical subnetworks include separation of the Ethernet networks to reduce the broadcast load, separation of sensitive areas from the main network, and subdivision of the network into logical working groups
- By learning the multicast sources and destinations (Internet Group Management Protocol (IGMP) Snooping), SCALANCE XC-200 switches can also filter multicast data traffic and thus limit the load on the network
- Integrated security functions offer protection against unauthorized network access and configuration (for example authentication via IEEE 802.1X)

Product versions

- Switches with electrical ports:
  - **SCALANCE XC208**
    with 8 × RJ45 ports 10/100 Mbps for mounting in the control cabinet
  - **SCALANCE XC216**
    with 16 × RJ45 ports 10/100 Mbps for mounting in the control cabinet
  - **SCALANCE XC224**
    with 24 × RJ45 ports 10/100 Mbps for mounting in the control cabinet
- Switches with electrical and optical ports
  - **SCALANCE XC206-2**
    with 6 × RJ45 ports 10/100 Mbps and 2 × ST/BFOC ports 100 Mbps
  - **SCALANCE XC206-2**
    with 6 × RJ45 ports 10/100 Mbps and 2 × SC ports 100 Mbps
  - **SCALANCE XC206-2SFP**
    with 6 × RJ45 ports 10/100 Mbps and 2 × SFP plug-in transceivers with 100 or 1 000 Mbps

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Ordering data	Article No.
SCALANCE XC-200 Industrial Ethernet switches	
Industrial Ethernet switches with integrated SNMP access, Web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; with integrated redundancy manager; incl. operating instructions, Industrial Ethernet network manual and configuration software on CD	
• **SCALANCE XC206-2 (ST/BFOC)** with six RJ45 ports 10/100 Mbps and two ST/BFOC ports 100 Mbps	**6GK5206-2BB00-2AC2**
• **SCALANCE XC206-2 (SC)** with six RJ45 ports 10/100 Mbps and two SC ports 100 Mbps	**6GK5206-2BD00-2AC2**
• **SCALANCE XC206-2SFP** with six RJ45 ports 10/100 Mbps and two SFP slots for SFPs with 100 or 1 000 Mbps	**6GK5206-2BS00-2AC2**
• **SCALANCE XC208** with eight RJ45 ports 10/100 Mbps	**6GK5208-0BA00-2AC2**
• **SCALANCE XC216** with 16 RJ45 ports 10/100 Mbps	**6GK5216-0BA00-2AC2**
• **SCALANCE XC224** with 24 RJ45 ports 10/100 Mbps	**6GK5224-0BA00-2AC2**
Accessories	
S7-1500 PM 1507 power supply SIMATIC PM 1507 24 V/3 A Regulated power supply for SIMATIC S7-1500 Input: 120/230 V AC Output 24 V DC/3 A	**6EP1332-4BA00**
S7-1500 PM 1507 power supply 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**
FC RJ 45 port lock Mechanical locking of unused RJ45 ports at network components and terminal devices. For use on devices with and without retaining collar[2)]	**6GK1901-1BB50-0AA0**
C-PLUG Removable data storage 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 1 pack = 1 unit	**6GK1901-1BB10-2AA0**
Push-in terminal block	
For SCALANCE X/W/S	
• 2-pin for signaling contact (24 V DC) 1 pack = 5 units	**6GK5980-0BB10-0AA5**
• 4-pin for power supply (24 V DC) 1 pack = 5 units	**6GK5980-1DB10-0AA5**
Screw-type terminal block	
For SCALANCE X/W/S	
• 2-pin for signaling contact (24 V DC) 1 pack = 5 units	**6GK5980-0BB00-0AA5**
• 4-pin for power supply (24 V DC) 1 pack = 5 units	**6GK5980-1DB00-0AA5**

	Article No.
Fixing screw	
For SCALANCE X/W	
Screw for mounting on an S7-1500 and S7-300 mounting rail 1 pack = 5 units	**6GK5980-4AA00-0AA5**
SFP plug-in transceiver	
See "Plug-in transceivers for SCALANCE XR-500" / "Media modules for modular SCALANCE X-500"	
IE FC RJ45 PLUG 180 2×2 Industrial Ethernet FastConnect RJ45 plug 180 2×2, RJ45 connector (10/100 Mbps) with rugged metal enclosure and FC connection technology, for IE FC cable 2×2 180 ° cable outlet 1 pack = 1 unit	**6GK1901-1BB10-2AA0**
IE FC RJ45 plug 4×2 RJ-45 plug data connector (10/100/1000 Mbps), for connection to IE FC TP cables 4×2, with rugged metal enclosure and FastConnect connection technology	**6GK1901-1BB11-2AA0**
IE FC TP standard cable GP 2×2 (type A) 4-wire, 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 TP installation cable Cat 6 for connection to IE FC RJ45 plug 4x2, AWG24, sold by the meter; max. length 1 000 m, minimum order quantity 20 m	**6XV1878-2A**
IE FC TP standard cable GP 4×2 Shielded TP installation cable capable of 1 000 Mbps, for connection to FC RJ45 modular outlet, 8-wire, AWG22, with rigid cores for final assembly	**6XV1870-2E**
IE connecting cable IE FC RJ45 plug 180 / IE FC RJ45 plug 180 IE FC trailing cable GP, preassembled with 2 × IE FC RJ45 plugs 180	
Length:	
• 1.0 m	**6XV1871-5BH10**
• 5.0 m	**6XV1871-5BH50**
• 10.0 m	**6XV1871-5BN10**
FastConnect stripping tool Industrial Ethernet FastConnect stripping tool, for fast stripping of the Industrial Ethernet FastConnect cable	**6GK1901-1GA00**
FC FO standard cable GP 62.5/200/230 [1) 2)] FC FO standard cable (62.5/200/230) for field assembly, cUL approval, standard cable can be split	**6XV1847-2A**
FO standard cable GP 50/125/1400 [1) 2)] Multimode cable, sold by the meter; max. length 1 000 m; minimum order 20 m	**6XV1873-2A**

10

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Ordering data	Article No.
MM FO cord LC/LC 50/125; preassembled with 2 × 2 LC duplex connectors; length 1.0 m	**6XV1843-5EH10-0AA0**
MM FO cord SC/LC 50/125; preassembled with 1 × SC duplex connector and 1 × LC duplex connector; length 1.0 m	**6XV1843-5EH10-0CA0**
MM FO cord SC/BFOC 50/125; preassembled with 1 × SC duplex connector and 1 × BFOC connector; length 1.0 m	**6XV1843-5EH10-0CB0**
MM FO cord SC/SC 50/125; preassembled with 2 × SC duplex connectors; length 1.0 m	**6XV1843-5EH10-0CC0**
MM FO cord LC/LC 9/125; preassembled with 2 × 2 LC duplex connectors; length 1.0 m	**6XV1843-5FH10-0AA0**
MM FO cord SC/LC 9/125; preassembled with 1 × SC duplex connector and 1 × LC duplex connector; length 1.0 m	**6XV1843-5FH10-0CA0**
MM FO cord SC/BFOC 9/125; preassembled with 1 × SC duplex connector and 1 × BFOC connector; length 1.0 m	**6XV1843-5FH10-0CB0**
MM FO cord SC/SC 9/125; preassembled with 2 × 2 SC duplex connectors; length 1.0 m	**6XV1843-5FH10-0CC0**
MM FO robust cable GP FO robust cable GP 50/125, preassembled with 2 x LC duplex connectors	
Length:	
• 1.0 m	**6XV1873-5RH10**
• 2.0 m	**6XV1873-5RH20**
• 3.0 m	**6XV1873-5RH30**
• 10.0 m	**6XV1873-5RN10**
• 30.0 m	**6XV1873-5RN30**
• 50.0 m	**6XV1873-5RN50**
• 100.0 m	**6XV1873-5RT10**
• 150.0 m	**6XV1873-5RT15**

	Article No.
5 x FC SC duplex plugs FC FO SC plug for on-site mounting on FC FO cables (62.5/200/230)	**6GK1900-1LB00-0AC0**
MM FO SC connector set 10 duplex connectors for FO cable; standard, trailing, indoor and marine cable; Note: Special tools and skilled personnel are required for assembly; adhesive bonding and polishing technology	**6GK1901-0LB10-2AA0**
MM FO LC duplex plug 10 units for MM FO robust cable GP (2G50/125); Note: Special tools and skilled personnel are required for assembly; adhesive bonding and polishing technology	**6GK1901-0RB10-2AB0**
FC FO termination kit Assembly kit 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**
FC ST/BFOC plug Screw connector for on-site assembly on FC fiber-optic cable; (1 pack = 10 units + cleaning cloths)	**6GK1900-1GB00-0AC0**
Serial cable RJ11/RS232 Preassembled serial cable with RJ11 and RS232 connectors; length 3 m; 1 pack = 1 unit	**6GK5980-3BB00-0AA5**
SCALANCE TAP104 Test access port for the reaction-free extraction of Ethernet data frames (10/100 Mbps) from both transmission directions; extracts complete data traffic (including incomplete diagrams) for further diagnostics.	**6GK5104-0BA00-1SA2**

[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 XP-200

The managed Industrial Ethernet switches of the SCALANCE XP-200 product line with 8 or 16 Ethernet ports are ideally suited to setting up cabinet-free Industrial Ethernet network automation concepts with transmission rates of 10/100/1000 Mbps in a line, star or ring topology.

- Integrated redundancy manager for configuring high-availability networks in ring topologies
- Electrical device or network connection
- Rugged metal enclosure with mounting options on SIMATIC ET 200pro rack or ITEM rail mounting or for direct wall mounting
- Rugged device connections with industrial-strength M12 plug connectors, M12 D-coded for FastEthernet (10/100 Mbps) interfaces, M12 X-coded for Gigabit (1000 Mbps) interfaces, PROFINET and EtherNet/IP-compliant M12 connection technology (M12 D-coded, M12 X-coded)
- Redundant power supply (M12 A-coded)
- Console port (M12 D-coded)
- Diagnostics on the device using prominent LED display with integrated SELECT/SET button (power, link status, data traffic, display mode)
- Error signaling contact with easy adjustment using SELECT/SET button. Configuration storage using C-PLUG removable data storage medium
- Grounding screw for external ground connection

New, additional software functions compared to SCALANCE X208PRO:

- Virtual Local Area Network (VLAN) port-based, protocol-based and IP-based
- IGMP snooping und query (use in EtherNet/IP networks)
- Access Control List (ACL) MAC-based and IP-based
- Link aggregation
- Standby observer for HRP
- IEEE 802.1X (for example RADIUS)
- Rapid Spanning Tree Protocol / Multi Spanning Tree Protocol (RSTP/MSTP)
- Remote Network Monitoring (RMON)
- Configuration in the TIA Portal and in Web Based Management (WBM)

Product versions

Device versions with a corresponding default setting for the relevant automation system are available for use in PROFINET and EtherNet/IP automation systems. A device with a PROFINET or EtherNet/IP default setting can be used in the other network at any time if you change the configuration.

- Switches with PROFINET delivery state
  - **SCALANCE XP208**
    with 8 electrical ports (10/100 Mbps, M12 D-coded) for mounting outside the control cabinet (IP65)
  - **SCALANCE XP208EEC**
    with 8 electrical ports (10/100 Mbps, M12 D-coded) for mounting outside the control cabinet (IP65). Fitted with conformal coating PCBs for use with increased environmental requirements, for example rail applications (EN 50155/45545)
  - **SCALANCE XP208PoE EEC**
    with 4 electrical ports (10/100 Mbps, M12 D-coded) and 4 electrical PoE ports (10/100 Mbps M12 D-coded) in accordance with IEEE 802.3at type 2 for mounting outside the control cabinet (IP65). Fitted with conformal coating PCBs for use with increased environmental requirements, for example rail applications (EN 50155/45545)
  - **SCALANCE XP216**
    with 12 electrical ports (10/100 Mbps, M12 D-coded) and 4 electrical ports (10/100/1000 Mbps, M12 X-coded) for mounting outside the control cabinet (IP65)
  - **SCALANCE XP216EEC**
    with 12 electrical ports (10/100 Mbps, M12 D-coded) and 4 electrical ports (10/100/1000 Mbps, M12 X-coded) for mounting outside the control cabinet (IP65). Fitted with conformal coating PCBs for use with increased environmental requirements, for example rail applications (EN 50155/45545)
  - **SCALANCE XP216PoE EEC**
    with 8 electrical ports (10/100 Mbps, M12 D-coded), 6 electrical PoE ports (10/100 Mbps, M12 D-coded) in accordance with IEEE 802.3at type 2, and 2 electrical PoE ports (10/100/1000 Mbps, M12 X-coded) in accordance with IEEE 802.3at type 2. The switch can also be operated with only 2 PoE ports (10/100 Mbps, M12 D-coded) in accordance with IEEE 802.3at type 2 and 2 PoE ports (10/100/1000 Mbps, M12 X-coded) in accordance with IEEE 802.3at type 2. The switch is for mounting outside the control cabinet (IP65) and is fitted with conformal coating PCBs for use with increased environmental requirements, for example rail applications (EN 50155/45545)
- Switches with EtherNet/IP delivery state
  - **SCALANCE XP208**
    with 8 electrical ports (10/100 Mbps, M12 D-coded) for mounting outside the control cabinet (IP65)
  - **SCALANCE XP216**
    with 12 electrical ports (10/100 Mbps, M12 D-coded) and 4 electrical ports (10/100/1000 Mbps, M12 X-coded) for mounting outside the control cabinet (IP65)

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Ordering data	Article No.
SCALANCE XP-200 Industrial Ethernet switches	
Industrial Ethernet switches with integrated SNMP access, Web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring electrical line, star and ring topologies; with integrated redundancy manager; incl. operating instructions, Industrial Ethernet network manual and configuration software on CD	
With electrical ports and PROFINET basic setting	
• **SCALANCE XP208** With eight 10/100 Mbps M12 ports (D-coded)	**6GK5208-0HA00-2AS6**
• **SCALANCE XP208EEC** With eight 10/100 Mbps M12 ports (D-coded) with rail approval EN 50155/45545	**6GK5208-0HA00-2ES6**
• **SCALANCE XP208PoE EEC** With four 10/100 Mbps M12 ports (D-coded) and four 100/100 Mbps M12 PoE ports (D-coded) with rail approval EN 50155/45545	**6GK5208-0UA00-5ES6**
• **SCALANCE XP216** With twelve 10/100 Mbps M12 ports (D-coded) and four 10/100/1000 Mbps M12 ports (X-coded)	**6GK5216-0HA00-2AS6**
• **SCALANCE XP216EEC** With twelve 10/100 Mbps M12 ports (D-coded) and four 10/100/1000 Mbps M12 ports (X-coded) with rail approval EN 50155/45545	**6GK5216-0HA00-2ES6**
• **SCALANCE XP216PoE EEC** With twelve 10/100 Mbps RJ45 ports and two fiber-optic cable ports	**6GK5216-0UA00-5ES6**
With electrical ports and EtherNet/IP basic setting	
• **SCALANCE XP208** With eight 10/100 Mbps M12 ports (D-coded)	**6GK5208-0HA00-2TS6**
• **SCALANCE XP216** With twelve 10/100 Mbps M12 ports (D-coded) and four 10/100/1000 Mbps M12 ports (X-coded)	**6GK5216-0HA00-2TS6**
Accessories	
IE FC stripping tool Pre-adjusted stripping tool for fast stripping of Industrial Ethernet FC cables	**6GK1901-1GA00**
ET 200pro rack SCALANCE XP-200 mounting using ET 200pro rack	**6ES7194-4GA00-0AA0**
SITOP PSU100P IP67 Stabilized power supply Input: 120/230 V AC Output: 24 V DC/5 A	**6EP1333-7CA00**
SITOP PSU100P IP67 Stabilized power supply Input: 120/230 V AC Output: 24 V DC/8 A	**6EP1334-7CA00**
C-PLUG Removable data storage 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**
C-PLUG with conformal coating Removable data storage 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	**6GK1900-0AQ00**
IE FC M12 plug PRO 2×2 M12 plug connector with rugged metal enclosure and FC connection technology, with axial cable outlet, D-coded, for SCALANCE XP-200 and ET 200pro and ET 200eco PN	
• 1 pack = 1 unit	**6GK1901-0DB20-6AA0**
• 1 pack = 8 units	**6GK1901-0DB20-6AA8**
IE FC M12 plug PRO 4×2 M12 plug connector with rugged metal enclosure and FC connection technology, with axial cable outlet, X-coded, for SCALANCE W and XP-200	
• 1 pack = 1 unit	**6GK1901-0DB30-6AA0**
• 1 pack = 8 units	**6GK1901-0DB30-6AA8**
IE FC M12 cable connector PRO 4×2 Field-assembled M12 plug connector with metal enclosure and FC connection technology, female contact insert, X-coded, 8-pin	
• 1 pack = 1 unit	**6GK1901-0DB40-6AA0**
• 1 pack = 8 units	**6GK1901-0DB40-6AA8**
IE M12 Panel Feedthrough Control cabinet bushing for transition from M12 (D-coded) connection technology (IP65) to RJ45 connection technology (IP20), 5 units	**6GK1901-0DM20-2AA5**
IE M12 Panel Feedthrough PRO Control cabinet bushing for transition from M12 (D-coded) connection technology (IP65) to M12 (D-coded) connection technology (IP65), 5 units	**6GK1901-0DM30-2AA5**
IE M12 Panel Feedthrough 4 x 2 M12 control cabinet bushing for transition from M12 connection technology (X-coded, IP65/67) to RJ45 connection technology (X-coded, IP20), 5 units	**6GK1901-0DM40-2AA5**
Signaling contact M12 cable connector PRO Connection socket for connection of SCALANCE X208PRO for signaling contact with assembly instructions, 5-pin, B-coded, 3 units	**6GK1908-0DC10-6AA3**
M12 Power T-Tap T-function for looping through the energy supply if a redundant supply is not needed (24 V DC), 5 units	**6GK1907-0DC00-6AA5**
M12 power plug PRO Plug connector for connection to PS791-1PRO power supply for 24 V DC supply voltage with assembly instructions; 4-pin, A-coded, 3 units	**6GK1907-0DB10-6AA3**
Serial cable M12/RS232 Serial connection cable (M12/Sub-D) for direct configuration of switch using notebook	**6GK5980-3BC00-0AA5**

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Ordering data	Article No.
IE FC TP standard cable GP 2x2 (type A) Shielded TP installation cable (4-core), for connection to IE FC outlet RJ45/IE FC RJ45 plug, PROFINET-compatible, with UL approval; sold by the meter; max. length 1000 m, minimum order quantity 20 m	**6XV1840-2AH10**
IE connecting cable M12-180/M12-180 Flexible plug-in cable (4-core), pre-assembled with 4-pin M12 connectors (D-coded), 180 °cable outlet, for connection of IE devices such as SCALANCE XP-200, ET 200pro and ET 200eco PN, IP65/67	
Length:	
• 0.3 m	**6XV1870-8AE30**
• 0.5 m	**6XV1870-8AE50**
• 1 m	**6XV1870-8AH10**
• 1.5 m	**6XV1870-8AH15**
• 2 m	**6XV1870-8AH20**
• 3 m	**6XV1870-8AH30**
• 5 m	**6XV1870-8AH50**
• 10 m	**6XV1870-8AN10**
• 15 m	**6XV1870-8AN15**
IE connecting cable M12-90/M12-90 Flexible plug-in cable (4-core), pre-assembled with 4-pin M12 connectors (D-coded), 90 °cable outlet, for connection of IE devices such as SCALANCE XP-200, ET 200pro and ET 200eco PN, IP65/67	
Length:	
• 0.3 m	**6XV1870-8GE30**
• 0.5 m	**6XV1870-8GE50**
• 1 m	**6XV1870-8GH10**
• 1.5 m	**6XV1870-8GH15**
• 2 m	**6XV1870-8GH20**
• 3 m	**6XV1870-8GH30**
• 5 m	**6XV1870-8GH50**
• 10 m	**6XV1870-8GN10**
• 15 m	**6XV1870-8GN15**
IE robust connecting cable M12-180/M12-180 Flexible plug-in cable (4-core), pre-assembled with 4-pin M12 connectors (D-coded), 180 °cable outlet, for connection of IE devices such as SCALANCE XP-200, ET 200pro and ET 200eco PN, IP69	
Length:	
• 1 m	**6XV1881-5AH10**
• 2 m	**6XV1881-5AH20**
• 3 m	**6XV1881-5AH30**
• 5 m	**6XV1881-5AH50**

	Article No.
IE TP Cord M12-180/M12-180 Flexible plug-in cable (8-core), pre-assembled with 8-pin M12 connectors (X-coded), 180 °cable outlet, for connection of IE devices such as SCALANCE XP-200, SCALANCE W	
Length:	
• 0.3 m	**6XV1878-5HE30**
• 0.5 m	**6XV1878-5HE50**
• 1 m	**6XV1878-5HH10**
• 1.5 m	**6XV1878-5HH15**
• 2 m	**6XV1878-5HH20**
• 3 m	**6XV1878-5HH30**
• 5 m	**6XV1878-5HH50**
• 10 m	**6XV1878-5HN10**
• 15 m	**6XV1878-5HN15**
Power connecting cable M12-180/M12-180 Flexible power cable (4-core), pre-assembled with M12 male connector and M12 female connector (A-coded), 180° cable outlet, for supplying SCALANCE XP-200, ET 200pro and ET 200eco PN, IP65/67	
Length:	
• 0.3 m	**6XV1801-5DE30**
• 0.5 m	**6XV1801-5DE50**
• 1 m	**6XV1801-5DH10**
• 1.5 m	**6XV1801-5DH15**
• 2 m	**6XV1801-5DH20**
• 3 m	**6XV1801-5DH30**
• 5 m	**6XV1801-5DH50**
• 10 m	**6XV1801-5DN10**
• 15 m	**6XV1801-5DN15**
Power connecting cable M12-90/M12-90 Flexible power cable (4-core), pre-assembled with M12 male connector and M12 female connector (A-coded), 90° cable outlet, for supplying SCALANCE XP-200, ET 200pro and ET 200eco PN, IP65/67	
Length:	
• 0.3 m	**6XV1801-5GE30**
• 0.5 m	**6XV1801-5GE50**
• 1 m	**6XV1801-5GH10**
• 1.5 m	**6XV1801-5GH15**
• 2 m	**6XV1801-5GH20**
• 3 m	**6XV1801-5GH30**
• 5 m	**6XV1801-5GH50**
• 10 m	**6XV1801-5GN10**
• 15 m	**6XV1801-5GN15**
Robust power connecting cable M12-180/M12-180 Rugged power cable (4-core), pre-assembled with M12 male connector and M12 female connector (A-coded), 180° cable outlet, for supplying SCALANCE XP-200, ET 200pro and ET 200eco PN, IP69	
Length:	
• 1 m	**6XV1801-5AH10**
• 2 m	**6XV1801-5AH20**
• 3 m	**6XV1801-5AH30**
• 5 m	**6XV1801-5AH50**
SCALANCE TAP104 Test access port for the reaction-free extraction of Ethernet data frames (10/100 Mbps) from both transmission directions; extracts complete data traffic (including incomplete diagrams) for further diagnostics.	**6GK5104-0BA00-1SA2**

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Overview



SCALANCE X-204RNA for HSR and PRP

HSR (High-availability Seamless Redundancy Protocol to IEC 62439-3)

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

- Media redundancy thanks to duplicate transmission of frames in ring-shaped networks
- High plant availability as frames are sent simultaneously over two routes in the ring
- No reconfiguration times of the ring-shaped network are required in the event of an error thanks to duplicate transmission of frames in the ring
- Simple and redundant connection of HSR and PRP network structures

PRP (Parallel Redundancy Protocol, to IEC 62439-3)

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

- Media redundancy thanks to duplicate transmission of frames in two parallel, separate networks
- High system availability as frames are sent simultaneously over two separate networks
- Reconfiguration times in a subnetwork do not affect the propagation time because the frames are transmitted via two separate networks (bumpless redundancy)

Product versions

- Network access point in plastic enclosure with electrical ports
  - **SCALANCE X204RNA for HSR or PRP networks**
    For connecting up to two non-HSR- or PRP-enabled terminal devices to ring-shaped networks with four electrical ports
- Network access point in metal enclosure with electrical and optical ports, as well as a wide-range power supply unit for use in enhanced environmental ambient conditions
  - **SCALANCE X204RNA EEC for HSR or PRP networks**
    For connecting up to two non-HSR- or PRP-enabled terminal devices to ring-shaped networks with two electrical terminal device ports and two optical/electrical combo ports for network connection
  - **SCALANCE X204RNA EEC for PRP or HSR networks**
    For connecting up to two non-PRP-enabled or non-HSR-enabled terminal devices to redundant networks with two electrical terminal device ports and two optical/electrical combo ports for network connection. PRP or HSR function can be defined by the user when they start the device
- Redundant 24 V DC voltage infeed or wide-range power supply unit in line with device version
- SNMP access, integrated Web server and automatic e-mail transmission function for remote diagnostics and signaling via the network

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Ordering data	Article No.
SCALANCE X-200RNA managed Industrial Ethernet network access points	
Industrial Ethernet network access points with integrated SNMP access, Web diagnostics and PROFINET diagnostics; incl. operating instructions, Industrial Ethernet network manual and configuration software on CD; With electrical and optical ports for glass multimode fiber optic cables up to 5 km	
HSR; For connecting non-HSR-enabled terminal devices to ring-shaped HSR networks	
• **SCALANCE X204RNA** With four 100 Mbps RJ45 ports	**6GK5204-0BA00-2MB2**
• **SCALANCE X204RNA EEC** With two 100 Mbps RJ45 ports and two RJ45/SFP combo ports	**6GK5204-0BS00-2NA3**
• **SCALANCE X204RNA EEC** With two 100 Mbps RJ45 ports and two RJ45/SFP combo ports with PRP or HSR support	**6GK5204-0BS00-3PA3**
PRP; For connection of non-PRP-enabled terminal equipment to PRP networks	
• **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**
• **SCALANCE X204RNA EEC** With two 100 Mbps RJ45 ports and two RJ45/SFP combo ports with PRP and HSR support	**6GK5204-0BS00-3PA3**
SIMATIC NET CP 443-1 RNA communications processor S7 integration into bumpless, redundant network structures on the basis of the Parallel Redundancy Protocol (PRP)	**6GK7443-1RX00-0XE0**
SOFTNET-IE RNA	
Software for connecting PCs to PRP-enabled networks with integrated SNMP, runtime software, software and electronic manual on CD, license key on USB flash drive, Class A	
SOFTNET-IE RNA V12 For 32/64-bit Windows 7 Professional/Ultimate; for Windows 2008 Server R2; for 32/64-bit Windows 8 Professional/Enterprise; for Windows Server 2012; German/English	
• Single license for one installation	**6GK1711-1EW12-0AA0**
SOFTNET-IE RNA V8.1 For 32-bit Windows XP; German/English	
• Single license for one installation	**6GK1711-1EW08-1AA0**
Software Update Service For one year with automatic extension; Requirement: Current software version	**6GK1711-1EW00-3AL0**

	Article No.
Accessories	
SITOP compact 24 V/0.6 A Single-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 0.6 A, slim design	**6EP1331-5BA00**
C-PLUG Removable data storage 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**
LC plug MM[2]	**6GK1901-0RB10-2AB0**
LC plug SM[2]	**6GK1901-0SB10-2AB0**
IE FC RJ45 plug 180 2×2 RJ45 plug connector for Industrial Ethernet with 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 port	
• 1 pack = 1 unit	**6GK1901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1901-1BB10-2AE0**
SFP plug-in transceiver	
• SFP991-1 (multimode, glass, up to 3 km)	**6GK5991-1AD00-8AA0**
• SFP991-1LH+ (single-mode, glass, up to 70 km, LH+)	**6GK5991-1AE00-8AA0**
• SFP991-1LD (single-mode, glass, up to 26 km)	**6GK5991-1AF00-8AA0**
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-compatible; with UL approval; sold by the meter; max. quantity 1000 m, minimum order 20 m	**6XV1840-2AH10**
FO robust cable GP 4×9/125/900[1]	**6XV1843-2R**
FO robust cable GP 50/125/900[1]	**6XV1873-2R**
SCALANCE TAP104 Test access port for the reaction-free extraction of Ethernet data frames (10/100 Mbps) from both transmission directions; extracts complete data traffic (including incomplete diagrams) for further diagnostics.	**6GK5104-0BA00-1SA2**

[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 XF204-2BA

The SCALANCE XF204-2BA from Siemens is a new compact switch in ET 200SP design for factory automation and process automation. It follows the recommendations of NAMUR NE 21 and is therefore suitable for use in process automation. The flexible use of various BusAdapters allows users to set up electrical and optical line, star and ring topologies.

- Connection of up to two modular BusAdapters (2 ports each) supported
- Enclosure in SIMATIC ET 200SP design (slim design, 100 mm wide) for space-saving use in small control boxes
- Integrated redundancy manager for constructing Fast Ethernet ring topologies with fast media redundancy
- Integrated system diagnostics with PROFINET, SNMP access, integrated Web server and automatic e-mail transmission function for remote diagnostics and signaling via the network

Product version

SCALANCE XF204-2BA

The flexible use of various BusAdapters allows users to set up electrical and optical line, star and ring topologies with the SCALANCE XF204-2BA.

Application

You can configure networks in both factory and process automation with the SCALANCE XF204-2BA.

The extended temperature range, conformal coating PCBs and compliance with NAMUR NE 21 recommendations make this switch suitable for universal applications in both these sectors.

Features:

- Device diagnostics with LED (voltage, errors, redundancy)
- Remote diagnostics are possible with the signaling contact (signal mask can be set locally using buttons), PROFINET, SNMP, and Web browser
- Automatic email send function
- Interfaces for mounting BusAdapters from the SIMATIC ET 200SP HA product range

Note:

Please note that when SCALANCE XF-200BA is used, at present the diagnostics can only be carried out by one CPU in the H System and configuration changes during operation (CiR function) are not supported (FW update under development).

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Ordering data	Article No.
SCALANCE XF-204-2BA Industrial Ethernet switches	
SCALANCE XF-204-2BA Managed switch with 2 BusAdapter interfaces (without fitted BusAdapters), 24 V DC redundant power supply, PN device, extended temperature range, conformal coating Configuration software on CD	**6GK5204-2AA00-2GF2**
Accessories	
SIMATIC ET 200SP HA, BusAdapter BA 2×RJ45, 2 RJ45 sockets PROFINET bus adapter with Ethernet socket for standard RJ45 connector, with conformal coating PCBs	**6DL1193-6AR00-0AA0**
SIMATIC ET 200SP HA, BusAdapter BA 2×FC, 2 FastConnect connections PROFINET bus adapter with FastConnect Ethernet connection for direct bus cable connection, with conformal coating PCBs	**6DL1193-6AF00-0AA0**
SIMATIC ET 200SP, BusAdapter BA 2×SCRJ, 2 SCRJ FO connections PROFINET bus adapter with fiber-optic connection POF/PCF	**6ES7193-6AP00-0AA0**
SITOP compact 24 V/0.6 A Single-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 0.6 A, slim design	**6EP1331-5BA00**

	Article No.
C-PLUG Removable data storage medium for easy replacement of devices in the event of a fault; for storing configuration and application data; can be used in SIMATIC NET products with C-PLUG slot	**6GK1900-0AB00**
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 180° cable outlet; for network components and CPs/ CPUs with Industrial Ethernet port	
• 1 pack = 1 unit	**6GK1901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1901-1BB10-2AE0**
IE FC stripping tool Pre-adjusted stripping tool for fast stripping of Industrial Ethernet FC cables	**6GK1901-1GA00**
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 Sold by the meter; max. delivery length 1 000 m, minimum ordering length 20 m	**6XV1840-2AH10**

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Overview



Switches in the SCALANCE XR-300 product line

The SCALANCE XR-300 Industrial Ethernet switches are fully or partially modular, high-performance, switches for industrial use for the setup of electrical and optical line, ring and star topologies with transmission rates of 10/100/1000 Mbps, designed for installation in 19" control cabinets.

- Up to 24 electrical and/or optical interfaces (10/100/1000 Mbit/s);
  up to twelve electrical and/or optical 2-port media modules can be inserted at any position in the basic unit
- High-speed media redundancy through the integral redundancy manager both for Gigabit Ethernet (with SCALANCE X-300, X-400) and Fast Ethernet (for example in combination with SCALANCE X-200 switches)
- Seamless integration of automation networks in existing corporate networks as a large number of IT standard functions are supported (VLANs, IGMP Snooping/Querier, STP/RSTP, Link Aggregation, Quality of Service)
- Redundant integration in higher-level networks as standardized redundancy procedures are supported (Spanning Tree Protocol/Rapid Reconfiguration Spanning Tree Protocol/MRP)
- Remote diagnosis over PROFINET, Web browser, CLI or SNMP.

Design

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

The switches have:

- 4-pin terminal block for redundant power supply for protection against power failure in 24 V DC version
- 3-pin terminal block for voltage feed in 230 V AC version
- 2-pin terminal block for connecting the isolated signaling contact for simple display of faults
- Row of LEDs for indicating status information (power, link status, data traffic, power supply, signaling contact)
- SELECT/SET pushbutton for easy setting of the fault signaling contact on the device
- Slot for optional C-PLUG removable data storage medium on the side of the device for easy replacement in the event of a fault
- Console port (serial interface) for on-site parameter assignment/diagnostics (RJ11 cable to RS232 (9-pin) included in scope of delivery)

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

- 12 slots for electrical or optical 2-port media modules for multimode or single-mode connections; the optical media modules are available in various connection technologies
- The RJ45 sockets are designed to be industry-compatible with additional retaining collars, for connection of the Industrial Ethernet FC RJ45 plug 180.
- All electrical Ethernet ports support 10/100/1000 Mbps, all optical Ethernet ports support 100 or 1000 Mbps
- The SCALANCE XR-300 switches support Gigabit Ethernet (1000 Mbps) at all ports. The 24 ports are divided into three groups of eight ports each (Gigabit Ethernet blocking). Gigabit Ethernet is supported with full wire speed within each group, but not between the groups.

Product versions

SCALANCE XR324-12M (12 media module slots)

Versions are available with

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

All versions have twelve media module slots and

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

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

A version is available with

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

The SCALANCE XR324-12M TS has twelve media module slots and

- 1 × 24 V DC power supply

SCALANCE XR324-4M PoE (4 media module slots)

Versions are available with

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

All versions have twelve media module slots and

- 1 × 24 V DC power supply
- 1 × 100 - 240 V AC power supply

SCALANCE XR324-4M PoE TS (4 media module slots)

A version is available with

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

All versions have four media module slots and

- 1 × 24 V DC power supply

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Ordering data	Article No.
SCALANCE XR324 Industrial Ethernet switches	
Fully modular 19" Industrial Ethernet switches for setting up electrical and/or optical Industrial Ethernet networks; all ports can be equipped with optical or electrical 2-port media modules; All ports support Gigabit Ethernet (blocking), integrated redundancy manager, RSTP, RMON, IGMP Snooping/Querier, network management via SNMP, PROFINET, and Web server 12 × 10/100/1000 Mbps slots for 2-port media modules, electrical or optical	
SCALANCE XR324-12M	
24 V DC power supply	
• Data cable outlet at front	**6GK5324-0GG10-1AR2**
• Data cable outlet at rear	**6GK5324-0GG00-1HR2**
110 to 230 V AC power supply	
• Data cable outlet at front	**6GK5324-0GG10-3AR2**
• Data cable outlet at rear	**6GK5324-0GG00-3HR2**
SCALANCE XR324-12M TS For railway applications (approval in accordance with EN 50155); 24 V DC power supply	
• Data cable outlet at front	**6GK5324-0GG00-1CR2**
SCALANCE XR324-4M PoE Industrial Ethernet switches	
Partly modular 19" Industrial Ethernet switches for setting up electrical and optical Industrial Ethernet networks; eight PoE-compatible ports can be equipped with optical or electrical 2-port media modules; All ports support Gigabit Ethernet (blocking), integrated redundancy manager, RSTP, RMON, IGMP Snooping/Querier, network management via SNMP, PROFINET, and Web server 16 × 10/100/1000 Mbps RJ45 ports, eight of which support PoE; 4 × 10/100/1000 Mbps slots for 2-port media modules, electrical or optical	
SCALANCE XR324-4M PoE	
24 V DC power supply	
• Data cable outlet at front	**6GK5324-4QG10-1AR2**
• Data cable outlet at rear	**6GK5324-4QG00-1HR2**
100 to 240 V AC power supply	
• Data cable outlet at front	**6GK5324-4QG00-3AR2**
• Data cable outlet at rear	**6GK5324-4QG00-3HR2**
SCALANCE XR324-4M PoE TS For railway applications (approval in accordance with EN 50155); 24 V DC power supply	
• Data cable outlet at front	**6GK5324-4QG00-1CR2**
Media modules	See "Media modules for modular SCALANCE X-300 managed"

	Article No.
Accessories	
SITOP compact 24 V/0.6 A Single-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 0.6 A, slim design	**6EP1331-5BA00**
IE FC stripping tool Pre-adjusted stripping tool for fast stripping of Industrial Ethernet FC cables	**6GK1901-1GA00**
IE FC RJ45 plug 180 2×2 RJ45 plug connector for Industrial Ethernet with 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 port	
• 1 pack = 1 unit	**6GK1901-1BB10-2AA0**
IE FC TP standard cable GP 2×2 (type A) 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/IE FC RJ45 plug; PROFINET-compliant; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1840-2AH10**
IE FC RJ45 plug 4×2 RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbps) with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet port, 1 pack = 1 unit	**6GK1901-1BB12-2AA0**
IE FC M12 plug PRO 4×2 M12 plug connector suitable for on-site assembly (X-coded, IP65/IP67), metal enclosure, insulation/displacement fast connection method, for SCALANCE W, 1 unit	**6GK1901-0DB30-6AA0**
IE M12 panel feedthrough 4×2 Cabinet feedthrough for converting from the M12 connection system (X-coded, IP65/IP67) to the RJ45 connection system (IP20), 1 pack = 5 units.	**6GK1901-0DM40-2AA5**
IE FC M12 cable connector PRO 4×2 M12 plug connector (X-coded, IP65/IP67, female contact insert) that can be assembled in the field, metal enclosure, insulation displacement fast connection method, 1 unit	**6GK1901-0DB40-6AA0**
IE FC TP standard cable GP 4×2 8-wire, shielded TP installation cable for universal applications; with UL approval; sold by the meter; max. length 1000 m, minimum order 20 m	
• AWG 24, for connection to IE FC RJ45 plug 4×2, IE FC M12 plug PRO 4×2	**6XV1878-2A**

10

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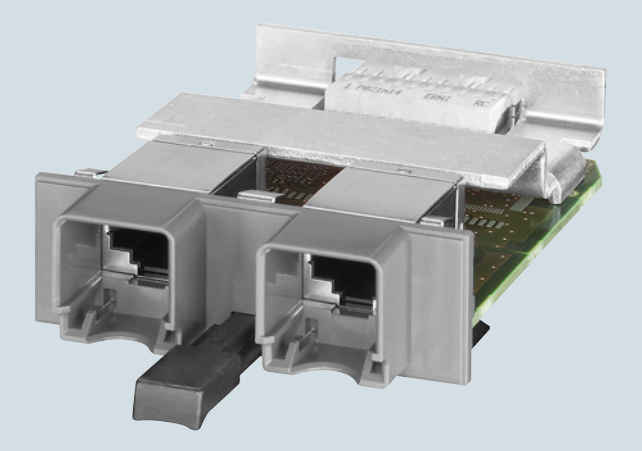
Ordering data	Article No.
IE connecting cable IE FC RJ45 plug 180/ IE FC RJ45 plug 180 Preassembled IE FC TP trailing cable GP 2×2 (PROFINET type C) with two IE FC RJ45 plug 180, IP20 degree of protection;	
Length:	
• 1.0 m	**6XV1871-5BH10**
• 5.0 m	**6XV1871-5BH50**
• 10.0 m	**6XV1871-5BN10**
IE TP Cord RJ45/RJ45 TP cable 4×2 with 2 RJ45 connectors	
Length:	
• 1 m	**6XV1870-3QH10**
• 6 m	**6XV1870-3QH60**
• 10 m	**6XV1870-3QN10**
IE SCRJ POF plug Screw connector for local assembly on POF FOC (1 pack = 20 units)	**6GK1900-0MB00-0AC0**
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**
IE SCRJ PCF plug (1 pack = 10 units)	**6GK1900-0NB00-0AC0**
PCF standard cable GP 200/230 Standard cable, may be split, sold by the meter; max. quantity 2 000 m; minimum order 20 m	**6XV1861-2A**
FC FO termination kit Assembly case for local assembly of FC SC and FC BFOC connectors to FC FO standard cable; comprising a stripping tool, Kevlar cutters, fiber breaking tool and microscope	**6GK1900-1GL00-0AA0**
FC 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 FOC; (1 pack = 10 duplex plugs + cleaning cloths)	**6GK1900-1LB00-0AC0**
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**
Multimode FO BFOC connector set For FO standard cable (50/125/1400), FO ground cable (50/125/1400), flexible FO trailing cable, INDOOR FO cable (62.5/125/900), 20 units	**6GK1901-0DA20-0AA0**
Multimode FO SC duplex connector set For FO standard cable (50/125/1400), FO ground cable (50/125/1400), flexible FO trailing cable, INDOOR FO cable (62.5/125/900), 10 units	**6GK1901-0LB10-2AA0**
LC plug MM[2]	**6GK1901-0RB10-2AB0**
FO standard cable GP 50/125/1400[1) 2)] Multimode cable, sold by the meter; max. length 1 000 m; minimum order 20 m	**6XV1873-2A**
Pre-assembled FO patch cables	
Multimode	
MM FO cord SC/LC With one SC duplex connector and one LC duplex connector, 1 m	**6XV1843-5EH10-0CA0**
MM FO cord SC/BFOC With one SC duplex connector and two BFOC connectors, 1 m	**6XV1843-5EH10-0CB0**
MM FO cord SC/SC With two SC duplex connectors, 1 m	**6XV1843-5EH10-0CC0**
Single-mode	
SM FO cord SC/LC With one SC duplex connector and one LC duplex connector, 1 m	**6XV1843-5FH10-0CA0**
SM FO cord SC/BFOC With one SC duplex connector and two BFOC connectors, 1 m	**6XV1843-5FH10-0CB0**
SM FO cord SC/SC With two SC duplex connectors, 1 m	**6XV1843-5FH10-0CC0**
Screw-type terminal block	
For SCALANCE X/W/S/M	
• 2-pin for signaling contact (24 V DC) 1 pack = 5 units	**6GK5980-0BB00-0AA5**
• 2-pin for power supply (230 V AC) 1 pack = 5 units	**6GK5980-1BC00-0AA5**
• 4-pin for power supply (24 V DC) 1 pack = 5 units	**6GK5980-1DB00-0AA5**
C-PLUG Removable data storage 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**
SCALANCE TAP104 Test access port for the reaction-free extraction of Ethernet data frames (10/100 Mbps) from both transmission directions; extracts complete data traffic (including incomplete diagrams) for further diagnostics.	**6GK5104-0BA00-1SA2**

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



MM992-2CUC media module with RJ45 ports, with retaining collar

- 2-port media modules for flexible, 2-port equipping of partly and fully modular versions of SCALANCE X-300 switches (for example SCALANCE X308-2M, SCALANCE XR324-12M) and SCALANCE S627-2M
- Electrical versions with RJ45 ports are available as are optical versions with ST/BFOC, SC and SC RJ ports for the use of POF/PCF, multimode and single-mode fiber-optic cables

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 system (for example switch from copper to fiber-optic cables, or from multimode to single-mode FOC)

Product versions of media modules and SFP plug-in transceivers

Electrical media modules with 2 × 10/100/1000 Mbps RJ45 ports

- MM992-2CUC with retaining collar
- MM992-2CUC with retaining collar and coated PCBs (conformal coating)
- MM992-2CU without retaining collar

Electrical media modules with 2 × 1/10/100/1000 Mbps RJ45 ports

- MM992-2VD with retaining collar and additional two-wire transmission function (variable distance) for establishing Ethernet connections via non-Ethernet-compliant cables as well. Bridgeable distance, depending on the quality of the cable

Electrical media modules with 2 × 10/100/1000 Mbps M12 ports

- MM992-2 with M12 interface (x-coded) and coated PCBs

Optical media modules with 2 × 100 Mbps BFOC ports

- MM991-2
  Multimode, glass, up to 5 km
- MM991-2FM
  Multimode, glass, up to 5 km with fiber-optic cable diagnostics (fiber monitoring)
- MM991-2LD
  Single-mode, glass, up to 26 km

Optical media modules with 2 × 100 Mbps SC ports

- MM991-2
  Multimode, glass, up to 5 km
- MM991-2LD
  Single-mode, glass, up to 26 km
- MM991-2LH+
  Single-mode, glass, up to 70 km
- Optical media modules with 2 × 100 Mbps SCRJ ports
- MM991-2P
  POF fiber-optic cable up to 50 m, PCF fiber-optic cable up to 100 m

Optical media modules with 2 × 1000 Mbps SC ports

- MM992-2
  Multimode, glass, up to 750 m
- MM992-2
  Multimode, glass, up to 750 m, coated PCBs (conformal coating)
- MM992-2LD
  Single-mode, glass, up to 10 km
- MM992-2LH
  Single-mode, glass, up to 40 km
- MM992-2LH+
  Single-mode, glass, up to 70 km
- MM992-2ELH
  Single-mode, glass, up to 120 km

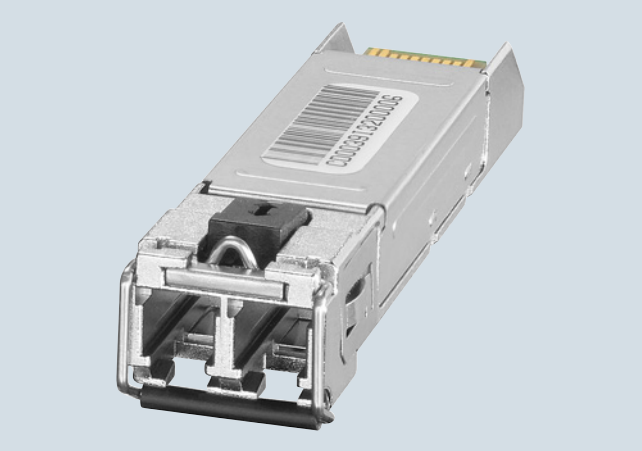
Optical media modules with 2 × 100/1000 Mbps for SFP plug-in transceiver

- MM992-2SFP
  For SFP plug-in transceivers with 1 × 100 Mbps or 1 × 1000 Mbps multimode or single-mode, glass

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Design

Plug-in transceiver for SCALANCE X-300 managed

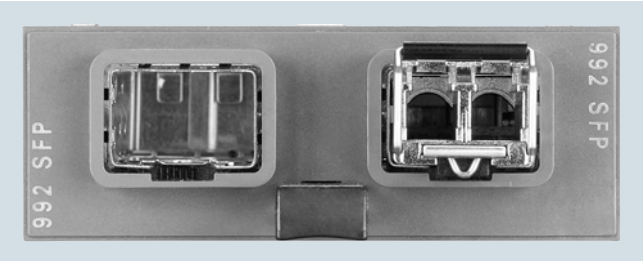


SCALANCE XR-300 plug-in transceiver

- Plug-in transceivers offer the capability of flexibly equipping the modular SCALANCE X-300 Industrial Ethernet switches for optical connections
- With an operating temperature range range of -40 °C to +70 °C, the plug-in transceivers are particularly suited to use in demanding environments
- All specified plug-in transceivers are tested for use with SCALANCE devices
- There are different versions that differ depending on suitable fiber types, range, and bandwidth

Product versions

SFP (small form-factor pluggable) transceivers can only be used together with the MM992-2SFP media module in the modular SCALANCE X-300 Industrial Ethernet switches.



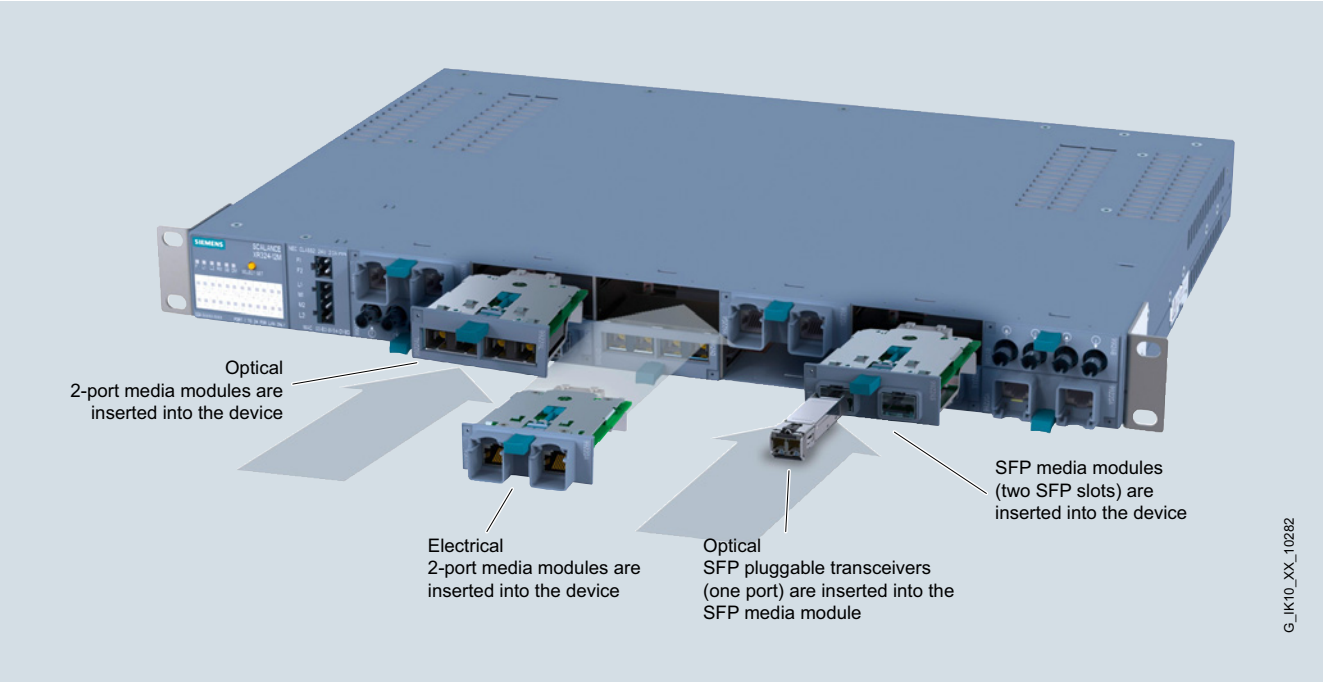
MM992-2SFP media module with SFP plug-in transceiver

Optical SFP plug-in transceivers with 1 × 100 Mbps LC port

- SFP991-1, multimode, 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 × 1000 Mbps LC port

- SFP992-1 multimode, 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



Connection of media modules in switch media module slot

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Design (continued)

	Type and quantity of ports						
	Gigabit Ethernet			Fast Ethernet			Max. distance
	10 / 100 / 1000 Mbit/s	1000 Mbit/s		100 Mbit/s			
	Electrical	Optical		Optical			
Type of module	Twisted Pair	Multimode	Singlemode	Multimode	Singlemode	POF/PCF	
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
MM991-2FM				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
MM991-2P						2x SCRJ	50 m / 100 m
MM992-2		2x SC					750 m
MM992-2 (C)		2x SC					750 m
MM992-2LD			2x SC				10 km
MM992-2LH			2x SC				40 km
MM992-2LH+			2x SC				70 km
MM992-2ELH			2x SC				120 km
MM992-2SFP		2x LC2)	2x LC 2)	2x LC 2)	2x LC 2)		
SFP modules 3)							
SFP991-1				1x LC			5 km
SFP991-1LD					1x LC		26 km
SFP991-1LH+					1x LC		70 km
SFP991-1ELH200					1x LC		200 km
SFP992-1		1x LC					750 m
SFP992-1LD			1x LC				10 km
SFP992-1LH			1x LC				40 km
SFP992-1LH+			1x LC				70 km
SFP992-1ELH			1x LC				120 km

1) with retaining collars
2) The MM392-2SFP SFP slot module can accommodate up to two 1-port SFP modules
3) Can only be plugged into an MM392-2SFP slot module
4) M12 X-coded

(C) Conformal Coating
* see media modules manual

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Overview of media modules and SFP plug-in transceivers for SCALANCE X-300

10

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Ordering data	Article No.
Electrical media modules	
With 2 × 10/100/1000 Mbps RJ45 ports, electric	
• MM992-2CUC with retaining collar	**6GK5992-2GA00-8AA0**
• MM992-2CUC with retaining collar and coated PCBs (conformal coating)	**6GK5992-2GA00-8FA0**
• MM992-2CU without retaining collar	**6GK5992-2SA00-8AA0**
With 2 × 10/100/1000 Mbps M12 ports, electrical	
• MM992-2 M12 interface (x-coded) and coated PCBs (conformal coating)	**6GK5992-2HA00-0AA0**
With 2 × 1/10/100/1000 Mbps RJ45 ports, electrical	
• MM992-2VD	**6GK5992-2VA00-8AA0**
Optical media modules	
With 2 × 100 Mbps BFOC ports, optical	
• MM991-2 Multimode, glass, up to 5 km	**6GK5991-2AB00-8AA0**
• MM991-2LD Single-mode, glass, up to 26 km	**6GK5991-2AC00-8AA0**
• MM991-2FM Multimode, glass, up to 5 km with fiber-optic cable diagnostics	**6GK5991-2AB01-8AA0**
With 2 × 100 Mbps SC ports, optical	
• MM991-2 Multimode, glass, up to 5 km	**6GK5991-2AD00-8AA0**
• MM991-2LD Single-mode, glass, up to 26 km	**6GK5991-2AF00-8AA0**
• MM991-2LH+ Single-mode, glass, up to 70 km	**6GK5991-2AE00-8AA0**
With 2 × 100 Mbps SCRJ ports, optical	
• MM991-2P PO fiber-optic cable up to 50 m	**6GK5991-2AH00-8AA0**
With 2 × 1000 Mbps SC ports, optical	
• MM992-2 Multimode, glass, up to 750 m	**6GK5992-2AL00-8AA0**
• MM992-2 Multimode, glass, up to 750 m, coated PCBs (conformal coating)	**6GK5992-2AL00-8FA0**
• MM992-2LD Single-mode, glass, up to 10 km	**6GK5992-2AM00-8AA0**
• MM992-2LH Single-mode, glass, up to 40 km	**6GK5992-2AN00-8AA0**
• MM992-2LH+ Single-mode, glass, up to 70 km	**6GK5992-2AP00-8AA0**
• MM992-2ELH Single-mode, glass, up to 120 km	**6GK5992-2AQ00-8AA0**
With 2 × 100/1000 Mbps for SFP plug-in transceiver, optical	
• MM992-2SFP For SFP plug-in transceivers with 1 × 100 Mbps or 1 × 1000 Mbps multimode or single-mode, glass	**6GK5992-2AS00-8AA0**

	Article No.
Accessories	
IE FC stripping tool Pre-adjusted stripping tool for fast stripping of Industrial Ethernet FC cables	**6GK1901-1GA00**
IE FC RJ45 plug 180 2×2 RJ45 plug connector for Industrial Ethernet with 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 port 1 pack = 1 unit	**6GK1901-1BB10-2AA0**
IE FC TP standard cable GP 2×2 (type A) 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/IE FC RJ45 plug; PROFINET-compliant; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1840-2AH10**
IE FC RJ45 plug 4×2 RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbps) with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet port 1 pack = 1 unit	**6GK1901-1BB12-2AA0**
IE FC M12 plug PRO 4×2 M12 plug connector suitable for on-site assembly (X-coded, IP65/IP67), metal enclosure, insulation displacement fast connection method, for SCALANCE W 1 unit	**6GK1901-0DB30-6AA0**
IE M12 panel feedthrough 4×2 Control cabinet feedthrough for conversion from M12 connection method (X-coded, IP65/IP67) to RJ45 connection method (IP20) 1 pack = 5 units	**6GK1901-0DM40-2AA5**

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Ordering data	Article No.
IE FC M12 cable connector PRO 4×2 M12 plug connector (X-coded, IP65/IP67, female contact insert) that can be assembled in the field, metal enclosure, insulation displacement fast connection method 1 unit	**6GK1901-0DB40-6AA0**
IE FC TP standard cable GP 4×2 8-wire, shielded TP installation cable for universal applications; with UL approval; sold by the meter; max. length 1000 m, minimum order 20 m	**6XV1878-2A**
IE connecting cable IE FC RJ45 plug 180/IE FC RJ45 plug 180 Preassembled IE FC TP trailing cable GP 2×2 (PROFINET type C) with two IE FC RJ45 plug 180, IP20 degree of protection; Length:	
• 1.0 m	**6XV1871-5BH10**
• 5.0 m	**6XV1871-5BH50**
• 10.0 m	**6XV1871-5BN10**
IE TP Cord RJ45/RJ45 TP cable 4×2 with two RJ45 connectors Length:	
• 1 m	**6XV1870-3QH10**
• 6 m	**6XV1870-3QH60**
• 10 m	**6XV1870-3QN10**
IE SCRJ POF plug Screw connector for local assembly on POF FOC (1 pack = 20 units)	**6GK1900-0MB00-0AC0**
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**
IE SCRJ PCF plug Screw connector for local assembly on PCF FOC (1 pack = 10 units)	**6GK1900-0NB00-0AC0**
PCF standard cable GP 200/230 Standard cable, may be split, sold by the meter; max. quantity 2 000 m; minimum order 20 m	**6XV1861-2A**
FC FO termination kit Assembly case for local assembly of FC SC and FC BFOC connectors to FC FO standard cable; comprising a stripping tool, Kevlar cutters, fiber breaking tool and microscope	**6GK1900-1GL00-0AA0**
FC BFOC plug Screw connector for on-site assembly on FC FOC; (1 pack = 20 units + cleaning cloths)	**6GK1900-1GB00-0AC0**
FC SC plug Screw connector for on-site assembly on FC FOC; (1 pack = 10 duplex plugs + cleaning cloths)	**6GK1900-1LB00-0AC0**
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**

	Article No.
Multimode FO BFOC connector set For FO standard cable (50/125/1400), FO ground cable (50/125/1400), flexible FO trailing cable, INDOOR FO cable (62.5/125/900), 20 units	**6GK1901-0DA20-0AA0**
Multimode FO SC duplex connector set For FO standard cable (50/125/1400), FO ground cable (50/125/1400), flexible FO trailing cable, INDOOR FO cable (62.5/125/900), 10 units	**6GK1901-0LB10-2AA0**
FO standard cable GP 50/125/1400 [1] [2] Multimode cable, sold by the meter; max. length 1 000 m; minimum order 20 m	**6XV1873-2A**
SFP plug-in transceivers together with the MM992-2SFP media module in the modular SCALANCE X-300 Industrial Ethernet switches	
With 1 × 100 Mbps LC port, optical	
• SFP991-1 multimode, 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	**6GK5991-1AE30-8AA0**
With 1 × 1000 Mbps LC port, optical	
• SFP992-1 multimode, 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**

[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

10

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Overview



The SCALANCE XR-300WG product line (work group switches) are Industrial Ethernet switches for industry-related applications such as control rooms and applications in the industry-related sector. They enable the configuration of electrical and optical line, star and ring topologies with transmission rates of 10/100/1000 Mbps and are designed for installation in 19" control cabinets.

- Up to 28 × electrical interfaces (10/100/1000 Mbps) with RJ45 connections;
  of which 4 × combo ports for the connection of optical interfaces (1000 Mbps) with SFPs
- High-speed media redundancy with integrated redundancy manager both for Gigabit Ethernet (with SCALANCE X-300, X-400) and Fast Ethernet (for example in combination with SCALANCE X-200 switches)
- Seamless integration of automation networks in existing corporate networks as a large number of IT standard functions are supported (VLANs, IGMP Snooping/Querier, STP/RSTP, Quality of Service)
- Redundant integration in higher-level networks as standardized redundancy procedures are supported (Spanning Tree Protocol/Rapid Reconfiguration Spanning Tree Protocol/MRP)
- Remote diagnostics with integrated system diagnostics over PROFINET, Web browser, CLI or SNMP.

Product versions

- **SCALANCE XR324WG**
  With 24 × 10/100 Mbps ports and redundant 24 V DC power supply
- **SCALANCE XR324WG**
  24 × 10/100 Mbps ports and 100 to 240 V AC power supply
- **SCALANCE XR328-4C WG**
  With 24 × 10/100 Mbps ports, 4 × combo ports and redundant 24 V DC power supply
- **SCALANCE XR328-4C WG**
  With 24 × 10/100 Mbps ports, 4 × combo ports and 100 to 240 V AC power supply
- **SCALANCE XR328-4C WG**
  With 24 × 10/100 Mbps ports, 4 × combo ports and redundant 24 V DC power supply
  Reduced number of approvals (no UL/FM approval)
- **SCALANCE XR328-4C WG**
  With 24 × 10/100 Mbps ports, 4 × combo ports and 100 to 240 V AC power supply
  Reduced number of approvals (no UL/FM approval)
- **SCALANCE XR328-4C WG**
  With 24 × 10/100/1000 Mbps ports, 4 × combo ports and redundant 24 V DC power supply
- **SCALANCE XR328-4C WG**
  With 24 × 10/100/1000 Mbps ports, 4 × combo ports and 100 to 240 V AC power supply

Design

The SCALANCE XR-300WG Industrial Ethernet switches with rugged metal enclosures with IP30 degree of protection are optimized for installation in the 19" control cabinet. 24 V DC and 100-240 V AC versions are available in just one height, 19".

The switches have:

- 2 × 2-pin terminal block for redundant power supply for protection against power failure in the 24 V DC version
- 3-pin inlet connector port for non-heating apparatus for power supply for the 100-240 V AC version
- Status information at the port for local diagnostics (link status, data traffic)
- RESET button for resetting the device
- Console port (serial port) for on-site parameter assignment/ diagnostics (RJ11 cable to RS232 not included in scope of delivery)

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

- Electrical RJ45 interfaces that support 10/100 Mbps or 10/100/1000 Mbps depending on the device version
- Optical SFP interfaces that can be used for multimode or single-mode SFPs for transmission of 1000 Mbps (combo ports)

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Ordering data	Article No.
SCALANCE XR-300WG Industrial Ethernet switches	
Fully modular 19" Industrial Ethernet switches for setting up electrical and/or optical Industrial Ethernet networks; ports support, depending on device version, 10/100 Mbps or 10/100/1000 Mbps Ethernet (non-blocking), integrated redundancy manager, RSTP, RMON, IGMP Snooping/Querier, network management via SNMP, PROFINET, and Web server	
SCALANCE XR324WG	
• With 24 × 10/100 Mbps ports and redundant 24 V DC power supply	**6GK5324-0BA00-2AR3**
• With 24 × 10/100 Mbps ports and 230 V AC power supply	**6GK5324-0BA00-3AR3**
SCALANCE XR328-4C WG	
• With 24 × 10/100 Mbps ports, 4 × combo ports and redundant 24 V DC power supply	**6GK5328-4FS00-2AR3**
• With 24 × 10/100 Mbps ports, 4 × combo ports and 230 V AC power supply	**6GK5328-4FS00-3AR3**
SCALANCE XR328-4C WG	
• With 24 × 10/100 Mbps ports, 4 × combo ports and redundant 24 V DC power supply Reduced number of approvals (no UL/FM approval)	**6GK5328-4FS00-2RR3**
• With 24 × 10/100 Mbps ports, 4 × combo ports and 230 V AC power supply Reduced number of approvals (no UL/FM approval)	**6GK5328-4FS00-3RR3**
SCALANCE XR328-4C WG	
• With 24 × 10/100/1000 Mbps ports, 4 × combo ports and redundant 24 V DC power supply	**6GK5328-4SS00-2AR3**
• With 24 × 10/100/1000 Mbps ports, 4 × combo ports and 230 V AC power supply	**6GK5328-4SS00-3AR3**
Accessories	
Suitable SFPs	
• SFP992-1 1 × 1000 Mbps optical LC port (multimode, glass), up to 750 m	**6GK5992-1AL00-8AA0**
• SFP992-1LD 1 x 1000 Mbps optical LC port (single-mode, glass), up to 10 km	**6GK5992-1AM00-8AA0**
• SFP992-1LH 1 x 1000 Mbps optical LC port (single-mode, glass), up to 40 km	**6GK5992-1AN00-8AA0**
• SFP992-1LH 1 x 1000 Mbps optical LC port (single-mode, glass), up to 70 km	**6GK5992-1AP00-8AA0**
• SFP992-1ELH 1 x 1000 Mbps optical LC port (single-mode, glass), up to 120 km	**6GK5992-1AQ00-8AA0**

	Article No.
Non-heating apparatus cable	
• For Germany, France, Spain, the Netherlands, Belgium, Sweden, Austria, Finland	
- Straight cable outlet	**6ES7900-0AA00-0XA0**
- Angled cable outlet	**6ES7900-1AA00-0XA0**
• For the UK	
- Straight cable outlet	**6ES7900-0BA00-0XA0**
- Angled cable outlet	**6ES7900-1BA00-0XA0**
• For Switzerland	
- Straight cable outlet	**6ES7900-0CA00-0XA0**
- Angled cable outlet	**6ES7900-1CA00-0XA0**
• For America	
- Straight cable outlet	**6ES7900-0DA00-0XA0**
- Angled cable outlet	**6ES7900-1DA00-0XA0**
• For Italy	
- Straight cable outlet	**6ES7900-0EA00-0XA0**
- Angled cable outlet	**6ES7900-1EA00-0XA0**
• For China	
- Straight cable outlet	**6ES7900-0FA00-0XA0**
- Angled cable outlet	**6ES7900-1FA00-0XA0**
Power supply unit	
SITOP compact 24 V/0.6 A Single-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 0.6 A, slim design	**6EP1331-5BA00**
Cabling system	
IE TP Cord RJ45/RJ45 TP cable 4×2 with 2 RJ45 connectors	
Length:	
• 0.5 m	**6XV1870-3QE50**
• 1 m	**6XV1870-3QH10**
• 2 m	**6XV1870-3QH20**
• 3 m	**6XV1870-3QH30**
• 4 m	**6XV1870-3QH40**
• 6 m	**6XV1870-3QH60**
• 10 m	**6XV1870-3QN10**
• 15 m	**6XV1870-3QN15**
• 20 m	**6XV1870-3QN20**
• 25 m	**6XV1870-3QN25**
• 30 m	**6XV1870-3QN30**
• 35 m	**6XV1870-3QN35**
• 40 m	**6XV1870-3QN40**
• 45 m	**6XV1870-3QN45**
• 50 m	**6XV1870-3QN50**
Pre-assembled FO installation cables	
FO robust cable GP 50/125/900 (OM2) Glass fiber-optic cable, waterproof cable (lengthwise and sideways) with non-metallic protection against rodents for use indoors and outdoors as well as for direct routing underground, sold by the meter	
Length:	
• 1 m	**6XV1873-5RH10**
• 2 m	**6XV1873-5RH20**
• 3 m	**6XV1873-5RH30**
• 10 m	**6XV1873-5RN10**
• 30 m	**6XV1873-5RN30**
• 50 m	**6XV1873-5RN50**
• 100 m	**6XV1873-5RT10**
• 150 m	**6XV1873-5RT15**

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Ordering data	Article No.
Pre-assembled FO patch cables	
Multimode	
MM FO cord SC/LC With one SC duplex connector and one LC duplex connector, 1 m	**6XV1843-5EH10-0CA0**
MM FO cord BFOC/LC With one BFOC duplex connector and one LC duplex connector, 1 m	**6XV1843-5EH10-0AB0**
MM FO cord LC/LC With two LC duplex connectors, 1 m	**6XV1843-5EH10-0AA0**
Single-mode	
SM FO cord SC/LC With one SC duplex connector and one LC duplex connector, 1 m	**6XV1843-5FH10-0CA0**
SM FO cord BFOC/LC With one SC duplex connector and one LC duplex connector, 1 m	**6XV1843-5FH10-0AB0**
SM FO cord LC/LC With two LC duplex connectors, 1 m	**6XV1843-5FH10-0AA0**
FO cables and plug connectors that can be assembled in the field	
FC FO termination kit (LC) FC LC PLUG assembly case for on-site assembly of FC LC connectors on FC fiber optic cables	**6GK1900-0RL00-0AA0**
FC FO LC plug For on-site assembly on FC fiber-optic cables (62.5/200/230) (duplex plugs + cleaning cloths)	**6GK1900-1RB00-2AB0**
FC FO standard cable GP 62.5/200/230 (OM1) Glass fiber optic cable for assembly in the field, for fixed installation in cable ducts and pipes, UL approval, sold by the meter, max. delivery unit 1000 m, minimum order quantity 20 m	**6XV1847-2A**
FC FO trailing cable GP 62.5/200/230 (OM1) Flexible glass fiber optic cable for assembly in the field, for high mechanical load, for use in cable carriers indoors and outdoors, sold by the meter, max. delivery unit 1000 m, minimum order quantity 20 m	**6XV1847-2C**
LC plug MM[2]	**6GK1901-0RB10-2AB0**
LC plug SM[2]	**6GK1901-0SB10-2AB0**
FO standard cable GP 50/125/1400 (OM2)[1] [2] Standard FO multimode cable, sold by the meter; max. length 1 000 m; minimum order 20 m	**6XV1873-2A**
Spring-type terminal block For SCALANCE X/W/S/M • 2-pin for power supply (24 V DC) 1 pack = 5 units	**6GK5980-0BB10-0AA5**
FC RJ 45 port lock Mechanical locking of unused RJ45 ports at network components and terminal devices. For use on devices with and without retaining collar	**6GK1901-1BB50-0AA0**
Serial console cable Preassembled serial cable with RJ11 and RS232 connectors; length: 3 m	**6GK5980-3BB00-0AA5**
Energy cable 2 × 0.75 Power cable (2-core), sold by the meter, unassembled; connection of 24 V power supply to SCALANCE XR-00WG; max. delivery unit 1 000 m, minimum ordering quantity 20 m.	**6XV1812-8A**
SCALANCE TAP104 Test access port for the reaction-free extraction of Ethernet data frames (10/100 Mbps) from both transmission directions; extracts complete data traffic (including incomplete diagrams) for further diagnostics.	**6GK5104-0BA00-1SA2**

[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 XM408-8C Industrial Ethernet switch

The switches in 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). The network topology and number and type of ports can be easily adapted to the structure of the system.

Product range for SIMATIC PCS 7

- Basic devices with integrated Gigabit Ethernet twisted pair interfaces (10/100/1000 Mbit/s)
  - **SCALANCE XM416-4C** with 16 ports (including 4 combo ports)
  - **SCALANCE XM408-8C** with 8 combo ports
  - **SCALANCE XM408-4C** with 8 ports (including 4 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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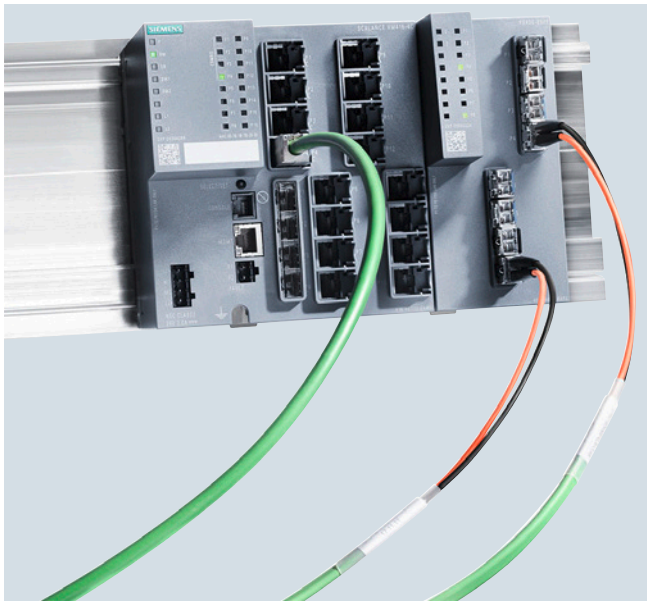
Overview (continued)

Special features

| SCALANCE X-400 | Type of device | Hardware | | |

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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 industrial enclosure with IP20 protection is suitable for mounting on standard mounting rails and SIMATIC S7-1500 mounting 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

XM400 Bus Analyzer Agent functional extender

The XM400 Bus Analyzer Agent is a functional extender for connection to SCALANCE XM-400

Hardware with integrated TAP (2-channel), for PROFINET diagnostics of up to 2 fieldbus segments or mirroring SCALANCE XM-400 port communication

2-channel, integrated TAP, Ethernet 4-channel, Functional Extender Interface, 4 × SFP slots, signal generator

For additional information, please see "PROFINET Bus Analyzer (BANY)". Additional information see page 10/79

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

Constraints 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 Mbps with IE FC TP cable 2×2 and IE FC plug 180
  - Max. 90 m at 1 Gbps with IE FC TP cable 4×2, IE FC RJ45 modular outlet and patch cable (10 m)
  - 100 m at 1 Gbps with IE FC TP cable 4×2 and IE FC plug 4×2

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Ordering data	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, etc.), PROFINET IO device, network management via SNMP and Web server; with 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**
Functional extender for SCALANCE XM-400	
XM-400 Bus Analyzer Agent Hardware with integrated TAP (2-channel), for PROFINET diagnostics of up to 2 fieldbus segments or mirroring SCALANCE XM-400 port communication	**9AE4140-2AA00**
2-channel, integrated TAP, Ethernet 4-channel, Functional Extender Interface, 4 × SFP slots, signal generator	

	Article No.
Plug-in transceiver	
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**
SCALANCE power supplies for Power-over-Ethernet Power supplies with an output voltage of 54 V DC, which is specifically required for PoE (Power-over-Ethernet) in accordance with IEEE 802.3at, for installation on a standard mounting rail, IP20 degree of protection; NEC Class 2	
SCALANCE PS924 PoE Input: 24 V DC Output: 54 V DC/1.6 A	**6GK5924-0PS00-1AA2**
SCALANCE PS9230 PoE Input: 120/230 V AC Output: 54 V DC/1.6 A	**6GK5923-0PS00-3AA2**

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Ordering data	Article No.
Accessories	
SIMATIC PM 1507 24 V Regulated power supply for SIMATIC S7-1500	
• S7-1500 PM1507 power supply 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**
• S7-1500 PM1507 power supply 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**
IE FC stripping tool Pre-adjusted stripping tool for fast stripping of Industrial Ethernet FC cables	**6GK1901-1GA00**
IE FC RJ45 plug 180 2×2 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet port 1 pack = 1 unit	**6GK1901-1BB10-2AA0**
IE FC TP standard cable GP 2×2 (type A) 4-wire, shielded TP installation cable for connection to IE FC outlet RJ45/IE FC RJ45 plug; PROFINET-compliant; with UL approval; sold by the meter, max. length 1 000 m, minimum order 20 m	**6XV1840-2AH10**
IE FC RJ45 plug 4×2 IE FC RJ45 plug 180 4×2; RJ45 connector; Cat6A; (10/100/1000/10000 Mbps) with rugged metal enclosure; FC connection technology; for IE FC cable 4×2 (AWG24); 180° cable outlet 1 pack = 1 unit	**6GK1901-1BB12-2AA0**
IE FC TP standard cable GP 4×2 8-wire, shielded TP installation cable for universal applications; with UL approval; sold by the meter; max. length 1000 m, minimum order 20 m	
• AWG 24, for connection to IE FC RJ45 plug 4×2, IE FC M12 plug PRO 4×2	**6XV1878-2A**
IE connecting cable IE FC RJ45 plug 180/ IE FC RJ45 plug 180 Preassembled IE FC TP trailing cable GP 2×2 (PROFINET type C) with two IE FC RJ45 plug 180, IP20 degree of protection	
Length:	
• 1.0 m	**6XV1871-5BH10**
• 5.0 m	**6XV1871-5BH50**
• 10.0 m	**6XV1871-5BN10**

	Article No.
FC FO termination kit Assembly kit 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**
FC BFOC plug Screw connector for on-site assembly on FC FOC; (1 pack = 20 units + cleaning cloths)	**6GK1900-1GB00-0AC0**
FC SC plug Screw connector for on-site assembly on FC FOC; (1 pack = 10 duplex plugs + cleaning cloths)	**6GK1900-1LB00-0AC0**
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**
Multimode FO BFOC connector set For FO standard cable (50/125/1400), FO ground cable (50/125/1400), flexible FO trailing cable, INDOOR FO cable (62.5/125/900), 20 units	**6GK1901-0DA20-0AA0**
Multimode FO SC duplex connector set For FO standard cable (50/125/1400), FO ground cable (50/125/1400), flexible FO trailing cable, INDOOR FO cable (62.5/125/900), 10 units	**6GK1901-0LB10-2AA0**
LC plug MM[2]	**6GK1901-0RB10-2AB0**
FO standard cable GP 50/125/1400[1) 2)] Multimode cable, sold by the meter; max. length 1 000 m; minimum order 20 m	**6XV1873-2A**

10

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Ordering data	Article No.
Pre-assembled FO patch cables	
Multimode	
MM FO cord SC/LC With one SC duplex connector and one LC duplex connector, 1 m	**6XV1843-5EH10-0CA0**
MM FO cord SC/BFOC With one SC duplex connector and two BFOC connectors, 1 m	**6XV1843-5EH10-0CB0**
MM FO cord SC/SC With two SC duplex connectors, 1 m	**6XV1843-5EH10-0CC0**
Single-mode	
SM FO cord SC/LC With one SC duplex connector and one LC duplex connector, 1 m	**6XV1843-5FH10-0CA0**
SM FO cord SC/BFOC With one SC duplex connector and two BFOC connectors, 1 m	**6XV1843-5FH10-0CB0**
SM FO cord SC/SC With two SC duplex connectors, 1 m	**6XV1843-5FH10-0CC0**
C-PLUG Removable data storage medium for easy replacement of devices in the event of a fault; for storing configuration and application data; can be used in SIMATIC NET products with C-PLUG slot	**6GK1900-0AB00**

	Article No.
Other accessories	
Spring-type terminal block Spring-type terminal block for SCALANCE X/W/S/M; 1 pack = 5 units	
• 2-pin for signaling contact (24 V DC)	**6GK5980-0BB10-0AA5**
• 4-pin for power supply (24 V DC)	**6GK5980-1DB10-0AA5**
Connecting cable (RJ11/RS232) Preassembled serial cable with RJ11 and RS232 connectors; length: 5 m; 1 unit per pack	**6GK5980-3BB00-0AA5**
Screw for fixing to S7-1500 and S7-300 rail Mounting screw for SCALANCE X/W/S/M; 1 pack = 5 units	**6GK5980-4AA00-0AA5**
SCALANCE TAP104 Test access port for the reaction-free extraction of Ethernet data frames (10/100 Mbps) from both transmission directions; extracts complete data traffic (including incomplete diagrams) for further diagnostics.	**6GK5104-0BA00-1SA2**

[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 XR524-8C and SCALANCE XR552-12M

SCALANCE X-500

| Type of device | Hardware | | |

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Overview (continued)

The high-performance, fully/partially modular 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.

To increase network availability, as many as 50 X-200, X-300, X-400 or X-500 switches cascaded in line can be connected in 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 with 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)
  fully modular; 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)
  fully modular; 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
- SCALANCE XR526-8C
  partially modular; 26 ports in total: 16 electrical ports 10/100/1000 Mbps (RJ45) and 8 combo ports 10/100/1000 Mbps (optical with SFP plug-in transceiver or electrical with RJ45); 2 electrical ports 10/100/1000/10 000 Mbps (optical with SFP plug-in transceiver or electrical with RJ45); built-in power unit (versions: 230 V AC, 230 V AC redundant or 24 V DC redundant)
- SCALANCE XR524-8C
  partially modular; 24 ports in total: 16 electrical ports 10/100/1000 Mbps (RJ45) and 8 combo ports 10/100/1000 Mbps (optical with SFP plug-in transceiver or electrical);
  built-in power unit (versions: 230 V AC, 230 V AC redundant or 24 V DC redundant)

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.

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Design

Summary of interfaces

	Type and quantity of ports							
	10 Gigabit Ethernet		Gigabit Ethernet			Fast Ethernet		Max. distance
	10000 Mbit/s		10 / 100 / 1000 Mbit/s	1000 Mbit/s		100 Mbit/s		
	Optical		Electrical	Optical		Optical		
Type of module	Multimode	Singlemode	Twisted Pair	Multimode	Singlemode	Multimode	Singlemode	
Media modules								
MM992-4CUC			4x RJ45[1)]					100 m
MM992-4CU			4x RJ45					100 m
MM992-4PoEC			4x RJ45[1)]					100 km
MM992-4PoE			4x RJ45					100 km
MM991-4						4x BFOC		5 km
MM991-4LD							4x BFOC	26 km
MM992-4				4x SC				5 km
MM992-4LD					4x SC			10 km
MM992-4SFP				4x LC[2)]	4x LC[2)]	4x LC[2)]	4x LC[2)]	
SFP-Module								
SFP991-1[3)]						1x LC		5 km
SFP991-1LD[3)]							1x LC	26 km
SFP991-1LH+[3)]							1x LC	70 km
SFP991-1ELH200[3)]							1x LC	200 km
SFP992-1[3) 4)]				1x LC				750 m
SFP992-1LD[3) 4)]					1x LC			10 km
SFP992-1LH[3) 4)]					1x LC			40 km
SFP992-1LH+[3) 4)]					1x LC			70 km
SFP992-1ELH[3) 4)]					1x LC			120 km
SFPplus-Module[4)]								
SFP993-1	1x LC							300 m
SFP993-1LD		1x LC						10 km
SFP993-1LH		1x LC						40 km

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

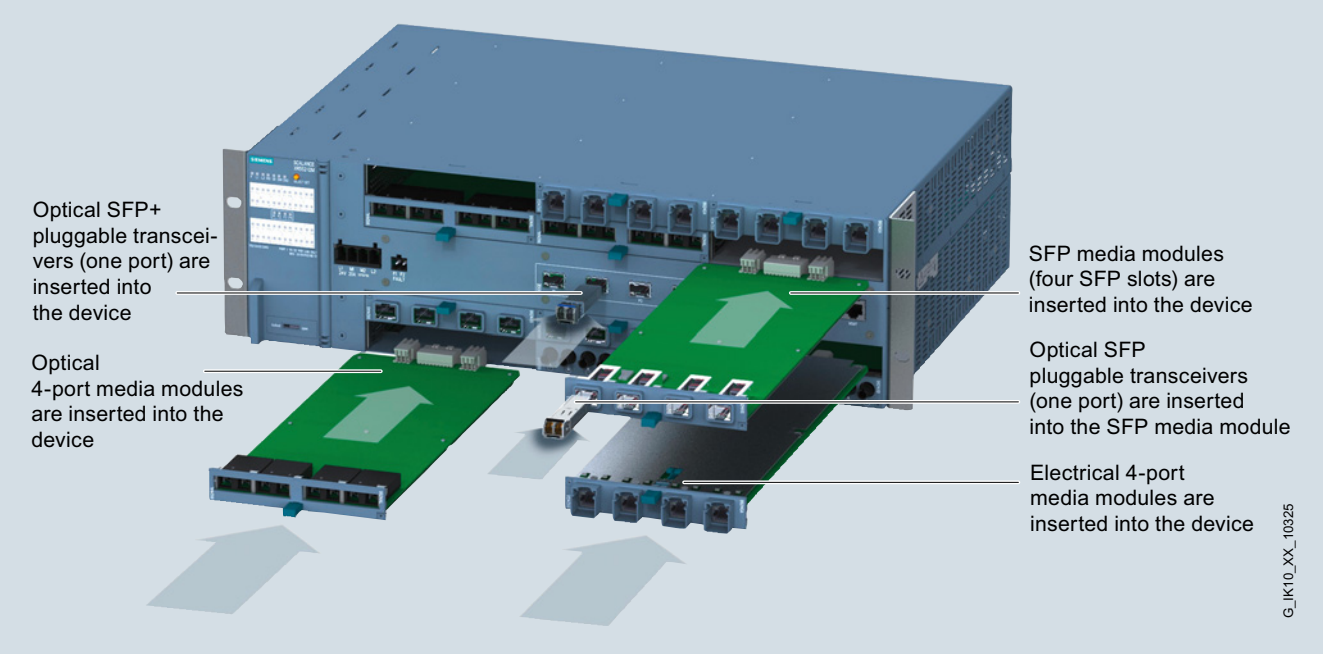
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Comply with the following constraints when configuring the network:

- 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

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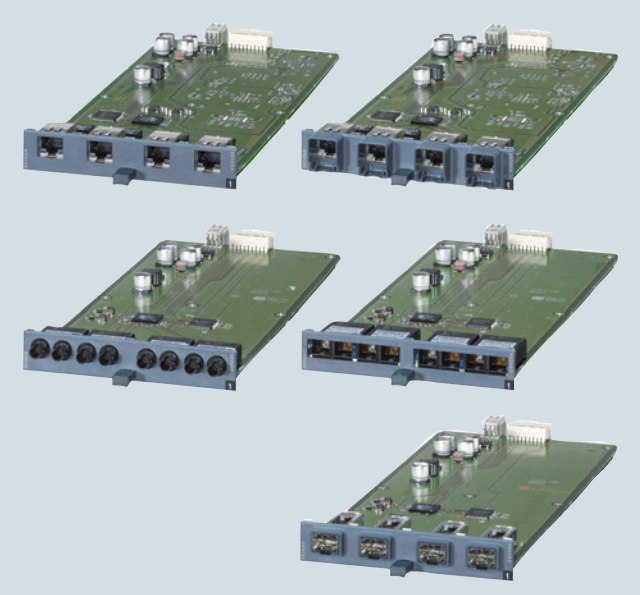
Design (continued)



4-port media modules plugged into media module slot and SFP/SFP+ plug-in transceivers in SFP+ slots

10

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

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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**
SCALANCE XR526-8C 2 × 10 Gbps 24 × 10/100/1000 Mbps, including 8 × RJ45/SFP combo ports; maximum 24 × 1000 Mbps can be used	
Layer 2, upgrade to Layer 3 possible	
• Redundant 24 V DC voltage supply	**6GK5526-8GS00-2AR2**
• 230 V AC supply voltage	**6GK5526-8GS00-3AR2**
• Redundant 230 V AC voltage supply	**6GK5526-8GS00-4AR2**
Layer 3	
• Redundant 24 V DC voltage supply	**6GK5526-8GR00-2AR2**
• 230 V AC supply voltage	**6GK5526-8GR00-3AR2**
• Redundant 230 V AC voltage supply	**6GK5526-8GR00-4AR2**
SCALANCE XR524-8C 24 × 10/100/1000 Mbit/s, of which 8 × RJ45/SFP combo ports; maximum 24 × 1000 Mbit/s usable	
• Layer 2, upgrade to Layer 3 possible	
- Power supply 24 V DC redundant	**6GK5524-8GS00-2AR2**
- Power supply 230 V AC	**6GK5524-8GS00-3AR2**
- Power supply 230 V AC redundant	**6GK5524-8GS00-4AR2**
• Layer 3	
- Power supply 24 V DC redundant	**6GK5524-8GR00-2AR2**
- Power supply 230 V AC	**6GK5524-8GR00-3AR2**
- Power supply 230 V AC redundant	**6GK5524-8GR00-4AR2**
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 transceiver with 1 × 100 or 1 × 1000 Mbit/s multi-mode or single-mode, glass	**6GK5992-4AS00-8AA0**

10

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Ordering data	Article No.
Plug-in transceiver	
SFP plug-in transceiver	
• 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	**6GK5991-1AE30-8AA0**
• with 1 × 1 Gbit/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**
SFP+ plug-in transceiver	
• with 1 × 10 Gbit/s LC port, optical	
- SFP993-1; multi-mode, glass, up to 300 m	**6GK5993-1AT00-8AA0**
- SFP993-1LD; single-mode, glass, up to 10 km	**6GK5993-1AU00-8AA0**
- SFP993-1LH; single-mode, glass, up to 40 km	**6GK5993-1AV00-8AA0**
Accessories	
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**
Non-heating apparatus cable	
• Grounded Continental European plug, Region: D, F, NL, E, 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**
• Grounded Italian plug; Region: Italy	**6ES7900-0EA00-0XA0**
• Grounded Chinese plug; Region: China	**6ES7900-0FA00-0XA0**
FAN597-1 Replacement fan slide-in unit for SCALANCE XR552-12M	**6GK5597-1AA00-8AA0**
FAN597-2 Replacement fan slide-in unit for SCALANCE XR528-6M	**6GK5597-2AA00-8AA0**
KEY-PLUG X-500 Swap medium for expansion of the device functions with IP routing (Layer 3), for integration of configuration data and for easy replacement of SCALANCE X-500 in the event of a fault	**6GK5905-0PA00**

	Article No.
IE connecting cable SFP+/SFP+, electrical, 10 Gbit/s Twinax copper cables	
Length:	
• 1 m	**6GK5980-3CB00-0AA1**
• 2 m	**6GK5980-3CB00-0AA2**
• 7 m	**6GK5980-3CB00-0AA7**
IE FC RJ45 Modular Outlet FastConnect RJ45 Outlet for Industrial Ethernet with interface for insertion of a replaceable insert	
• with insert 2FE; replaceable insert for 2 × 100 Mbit/s interface	**6GK1901-1BE00-0AA1**
• with 1GE insert; replaceable insert for 1 × 1000 Mbit/s interface	**6GK1901-1BE00-0AA2**
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 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. length 1 000 m, minimum order 20 m	**6XV1870-2E**
IE TP Cord RJ45/RJ45 TP cable 4×2 with two RJ45 connectors	
Length:	
• 0.5 m	**6XV1870-3QE50**
• 1 m	**6XV1870-3QH10**
• 2 m	**6XV1870-3QH20**
• 6 m	**6XV1870-3QH60**
• 10 m	**6XV1870-3QN10**
IE FC RJ45 Plug 180 RJ45 plug connector for Industrial Ethernet with a robust 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 Industrial Ethernet FastConnect RJ45 plug 180 4×2, RJ45 connector; CAT6A; (10/100/1000/10000 Mbps) with rugged metal enclosure and FC connection technology, for IE FC cable 4×2 (AWG24); 180 ° cable outlet, Ethernet port	
• 1 pack = 1 unit	**6GK1901-1BB12-2AA0**
• 1 pack = 10 units	**6GK1901-1BB12-2AB0**
• 1 pack = 50 units	**6GK1901-1BB12-2AE0**

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Overview



SCALANCE X101-1 Industrial Ethernet media converter

The SCALANCE X101-1 Industrial Ethernet media converters are used for converting various transmission media in Industrial Ethernet networks with 10/100 Mbps in line and star 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 x 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

	Electrical interface	Optical interface
SCALANCE X101-1	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	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		100BaseFX port type (100 Mbit/s with BFOC connection technology), for connection to single mode glass fiber-optic cables up to 26 km

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 × 10/100 Mbit/s RJ45 port and 1 × 100 Mbit/s multimode BFOC; redundant 24 V DC supply and signal contact	**6GK5101-1BB00-2AA3**
SCALANCE X101-1LD Industrial Ethernet Media Converter For conversion from RJ45 TP to single mode fiber optic cable (BFOC) with 100 Mbit/s; 1 × 10/100 Mbit/s RJ45 port and 1 × 100 Mbit/s single mode BFOC; redundant 24 V DC supply and signal contact	**6GK5101-1BC00-2AA3**

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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

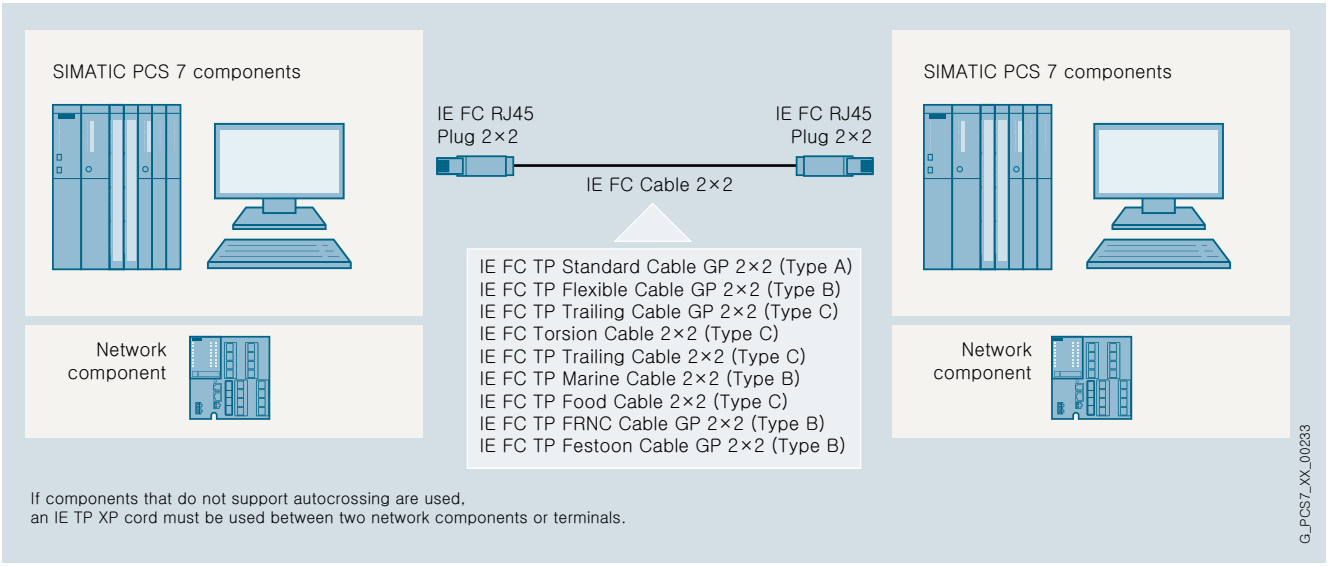
Linking elements

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 (2x2) IE FC cables
- IE FC RJ45 Modular Outlet (10/100/1000 Mbit/s) with 8-core (4x2) 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



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

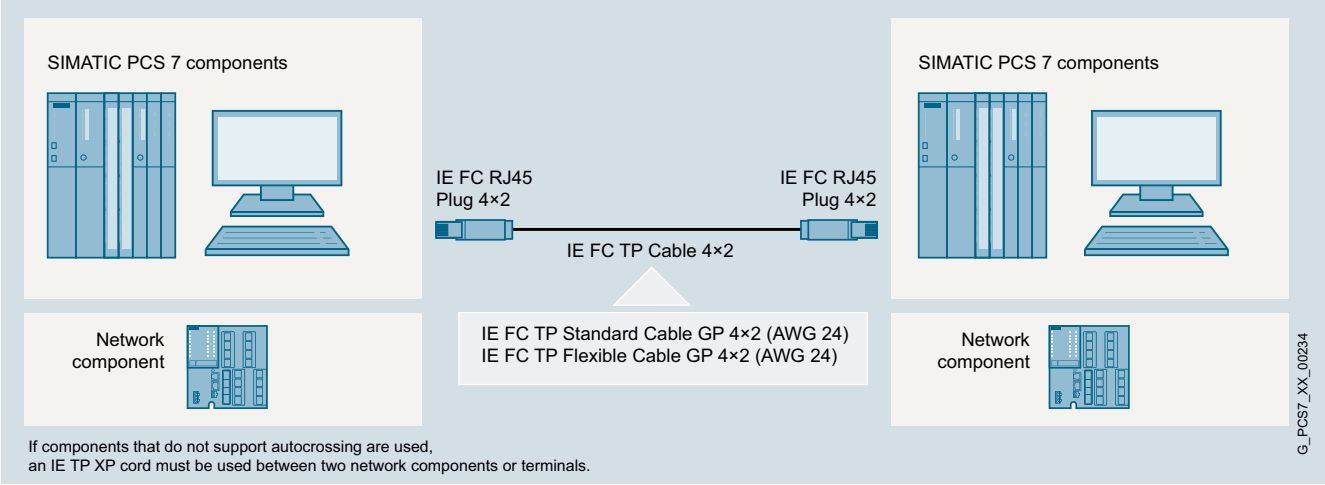
IE FC RJ45 Plug 2×2

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 devices/network components over distances of 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".

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Application (continued)



Use of FastConnect cables 4×2 with IE FC RJ45 Plug 4×2

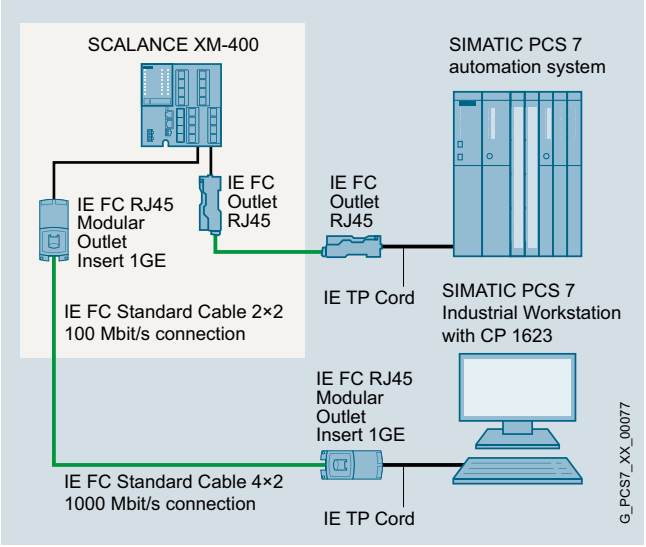
IE FC RJ45 Plug 4×2

The compact, rugged design of the Cat6A plug connector enables the FC RJ45 plug to be used in both industrial environments and office environments.

The Industrial Ethernet FastConnect RJ45 plug 4×2 permits quick and easy installation of the Industrial Ethernet FastConnect installation cables 4×2 (8-core twisted pair AWG24 cables) in the field.

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

The new plug connector allows point-to-point links (10/100/1000 Mbps) to be implemented for Industrial Ethernet between two terminal devices/network components up to 100 m apart without the need for patches (for details, see IK PI capital, "Industrial Ethernet", "Cabling systems").



Configuration example with IE FC RJ45 Modular Outlet and IE FC Outlet RJ45

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 also required for each outlet that connects this to the network component or terminal device.

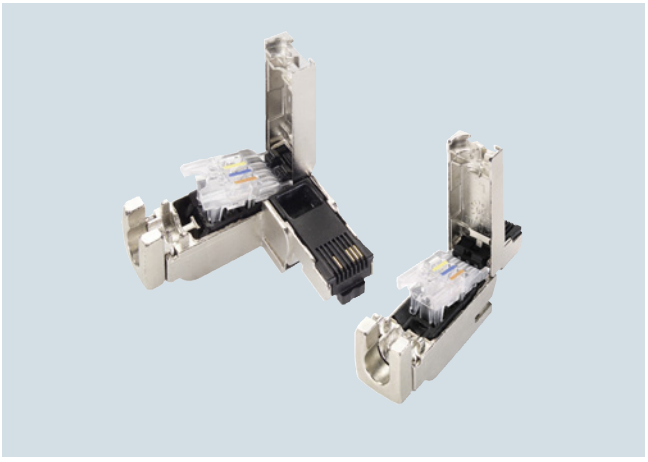
Detailed information on the FastConnect Outlets and the available TP cords can be found in Catalog IK PI and in the Industry Mall or in CA 01 under "Industrial Communication".

Additional information on network structures is provided in the manual for TP and fiber-optic networks.

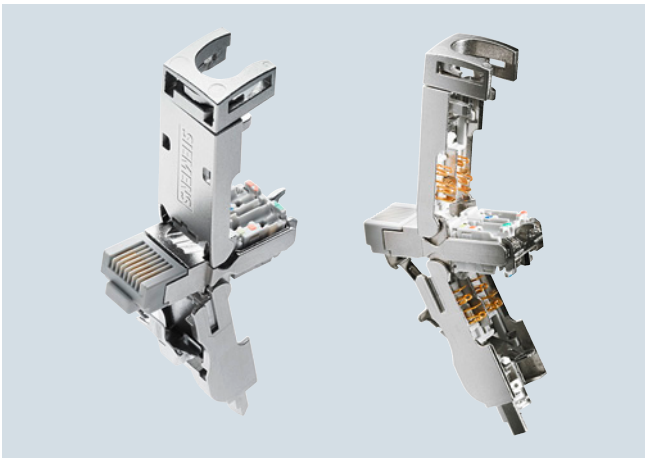
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Design

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")

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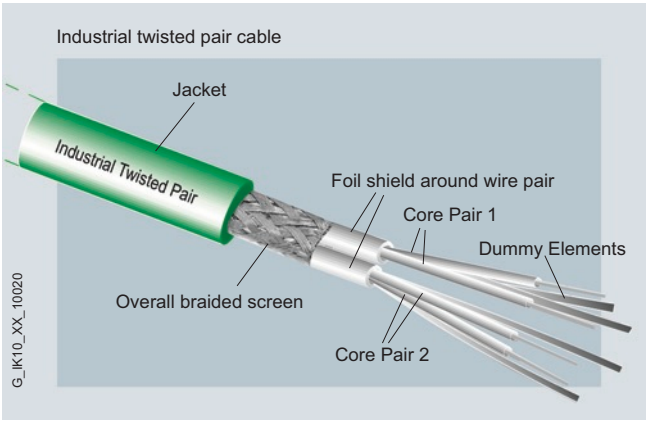
Ordering data	Article No.
Industrial Ethernet FC Standard Cable GP 2×2 For universal use, for connection to IE FC Outlet RJ45 or IE FC RJ45, 4-core (2×2), shielded	
• Sold by the meter; max. length 1 000 m; minimum order 20 m	**6XV1840-2AH10**
• Preferred length 1 000 m	**6XV1840-2AU10**
Industrial Ethernet 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	
• AWG 22, for connection to IE FC RJ45 Modular Outlet	**6XV1870-2E**
• AWG 24, for connection to IE FC RJ45 Plug 4×2	**6XV1878-2A**
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 TP Robust Standard Cable GP 2×2 (PROFINET Type B) 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	**6XV1841-2B**
Industrial Ethernet FC Stripping Tool Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables	**6GK1901-1GA00**
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**

	Article No.
IE FC RJ45 Plug 2×2 180 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 port	
• 1 pack = 1 unit	**6GK1901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1901-1BB10-2AE0**
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	
• 1 pack = 1 unit	**6GK1901-1BB20-2AA0**
• 1 pack = 10 units	**6GK1901-1BB20-2AB0**
• 1 pack = 50 units	**6GK1901-1BB20-2AE0**
Industrial Ethernet FC RJ45 Plug 4×2 180 Industrial Ethernet FastConnect RJ45 plug 180 4×2, RJ45 connector; CAT6A; (10/100/1000/ 10000 Mbps) with rugged metal enclosure and FC connection technology, for IE FC cable 4×2 (AWG24); 180 ° cable outlet	
• 1 pack = 1 unit	**6GK1901-1BB12-2AA0**
• 1 pack = 10 units	**6GK1901-1BB12-2AB0**
• 1 pack = 50 units	**6GK1901-1BB12-2AE0**
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**
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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Overview

Electrical transmission media



Terminals can be connected through industrial twisted pairs (ITPs). The preassembled ITP standard cable with Sub-D connectors is available for connection between nodes 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

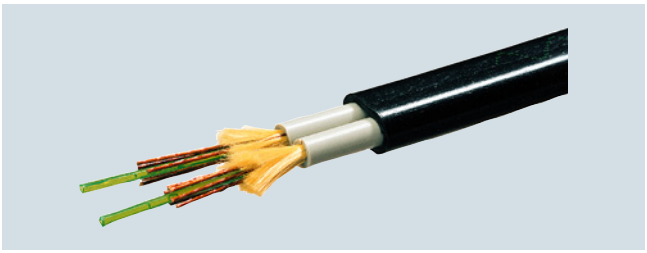
Alternatively, the terminals can also be connected to twisted pair (TP cord) cables. Detailed information on the TP cords can be found in Catalog IK PI, in the Industry Mall, or in Catalog CA 01 under "Industrial Communication".

Ordering data

	Article No.
ITP Standard Cable for Industrial Ethernet Unassembled, cut-to-length	
2×2-wire, without connector For connection of a terminal; for do-it-yourself assembly of connectors or for connecting 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, preassembled with 2 × 2 BFOC connectors, 2 × 2 SC connectors or 2×2 LC connectors

The FO standard cable with 2 x 2 SC connectors is required for optical networking in the Gigabit range.

Note:

You can order components supplementary to the SIMATIC NET cabling range from your local contact person. For technical advice contact:
Siemens AG
SPG Industrial Network and Components, Fürth, Germany
J. Hertlein
Tel.: +49 911 750-4465
Email: juergen.hertlein@siemens.com

Specifications, other cable lengths and other fiber-optic cables can be found in catalog IK PI.

More information on assembly is provided in the manual for TP and fiber-optic networks.

Selection tools

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

www.siemens.com/snst-standalone

www.siemens.com/tstcloud

Ordering data

	Article No.
FO Standard Cable 50/125 [1]	
Preferred lengths, pre-assembled with 2x2 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 2x2 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.

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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	
ST/BFOC connection = ST (stick and twist)	ST/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.	
LC connection	FC FO LC PLUG for on site assembly on FC fiber-optic cables (62.5/200/230) (Duplex plugs + cleaning cloths)	
SC-RJ connection	SCRJ is the smallest SC duplex plug connection.	

For more information and an overview of the connectors for connection of fiber-optic cables to the optical interface of network components and terminal equipment see the Industry Online Support:

https://support.industry.siemens.com/cs/ww/de/view/35146578

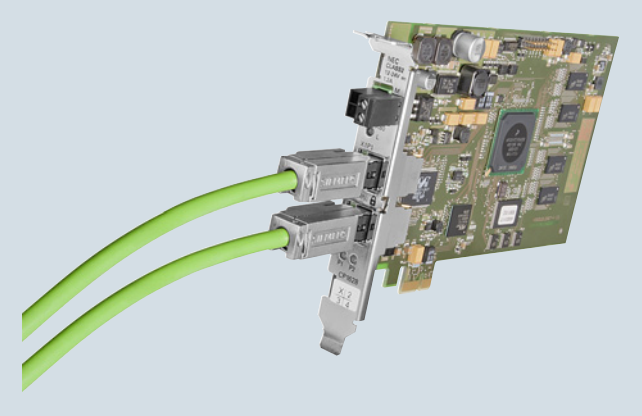
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Design

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 configuration. Depending on their task and the associated integration into the overall 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 and 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 with a Ethernet network adapter (10/100/1000 Mbps) and BCE license or with a CP 1623/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 1628 (4 × license).

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.

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 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 1628 can communicate with redundant automation systems (redundancy stations). You require for this purpose SIMATIC NET HARDNET-IE S7-REDCONNECT (4x license) communication software instead of the SIMATIC NET HARDNET-IE S7 communication software. SIMATIC NET HARDNET-IE S7-REDCONNECT PowerPack (4x license) can be used to upgrade the communications software.

Single stations and servers with BCE can be retro-upgraded to CP 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 or CP 1628 communication module.

The communication software for CP 1623 or CP 1628 is always 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.

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Design (continued)

Connecting non-PRP-enabled devices

Up to 2 non-PRP-enabled devices that have only one Industrial Ethernet port, 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
  Network access point in plastic enclosure with 4 electrical ports for connecting up to 2 non-PRP-enabled devices to redundant networks
- SCALANCE X204RNA EEC
  Network access point in metal enclosure 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 (single-mode)

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 4431, CP 4431 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).

10

Ordering data

	Article No.
System connection of single stations, servers and clients	
Desktop adapter network adapter 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 and PCI express interface	**A5E02639550**
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**

	Article No.
Licenses required in some cases for activating the functionality of the CP 1623 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 V14 Software for S7, open communication, OPC, PG/OP communication Configuration software; up to 120 connections; floating license Runtime software, software and electronics manual on DVD; license key, 2 languages (German, English) for 32/64-bit: Windows 7 SP1 Professional/Ultimate, 64-bit: Windows 8.1 Professional, Windows 10, Server 2008 R2 SP1, Server 2012 R2 For max. 4 CP 1623, CP 1628	
• Goods delivery Software and electronic manual on CD, license key on USB flash drive	**6GK1716-1CB14-0AA0**
• Online delivery Software and license key download Note: Email address required!	**6GK1716-1CB14-0AK0**

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Ordering data	Article No.
Activation licenses when using redundant AS	
• Alternative license for SIMATIC NET HARDNET-IE S7:	
SIMATIC NET HARDNET-IE S7-REDCONNECT V14 S7 communication software for fail-safe S7 communication over redundant networks with license for up to 4 Industrial Ethernet CPs Runtime software, 2 languages (English, German); for 32/64-bit: Windows 7 SP1 Professional/Ultimate, 64-bit: Windows 8.1 Professional; Windows 10, Server 2008 R2 SP1, Server 2012 R2 For max. 4 CP 1623, CP 1628	
• Goods delivery Software and electronic manual on CD, license key on USB flash drive	**6GK1716-0HB14-0AA0**
• Online delivery Software and license key download Note: Email address required!	**6GK1716-0HB14-0AK0**
• Additive license for SIMATIC NET HARDNET-IE S7	
SIMATIC NET HARDNET-IE S7-REDCONNECT PowerPack V14 For expansion of HARDNET-IE S7 communication software to HARDNET-IE S7-REDCONNECT, with license for up to 4 Industrial Ethernet CPs 2 languages (English, German) for 32/64-bit: Windows 7 SP1 Professional/Ultimate, 64-bit: Windows 8.1 Professional, Windows 10, Server 2008 R2 SP1, Server 2012 R2 For max. 4 CP 1623, CP 1628	
• Goods delivery Software and electronic manual on CD, license key on USB flash drive	**6GK1716-0HB14-0AC0**
• Online delivery Software and license key download Note: Email address required!	**6GK1716-0HB14-0AK1**

	Article No.
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 V9.0 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 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, or Windows Server 2012 R2 Standard 64-bit, floating license for 1 user Without SIMATIC PCS 7 Software Media Package	
• Goods delivery License key on USB flash drive, certificate of license	**6ES7650-1CD58-2YB5**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7650-1CD58-2YH5**
Components for connecting SIMATIC PCS 7 stations to a redundant terminal bus with PRP	
SIMATIC NET SOFTNET-IE RNA V14 Software for connecting PCS 7 stations to PRP-enabled networks with integrated SNMP Runtime software, 2 languages (English, German), software class A, for 32/64-bit: Windows 7 SP1 Professional/Ultimate, 64-bit: Windows 8.1 Professional; Windows 10, Server 2008 R2 SP1, Server 2012 R2 Single license for 1 installation Without SIMATIC PCS 7 Software Media Package Goods delivery Software and electronic manual on CD, license key on USB flash drive	**6GK1711-1EW14-0AA0**
Industrial Ethernet SCALANCE X204RNA router With integrated SNMP access, Web diagnostics and PROFINET diagnostics, for connecting non-PRP-enabled terminal devices to 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**

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Ordering data	Article No.
Accessories for Industrial Ethernet SCALANCE X-204RNA network access	
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-compatible; 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 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 port	
• 1 pack = 1 unit	**6GK1901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1901-1BB10-2AE0**
SFP plug-in transceiver	
• SFP991-1 (multi-mode, glass, up to 3 km)	**6GK5991-1AD00-8AA0**
• SFP991-1LH+ (single-mode, glass, up to 70 km, LH+)	**6GK5991-1AE00-8AA0**
• SFP991-1LD (single-mode, glass, up to 26 km)	**6GK5991-1AF00-8AA0**
LC Plug MM[2]	**6GK1901-0RB10-2AB0**
LC Plug SM[2]	**6GK1901-0SB10-2AB0**
FO Robust Cable GP 50/125/900[1]	**6XV1873-2R**
FO Robust Cable GP 4x9/125/900[1]	**6XV1843-2R**
SITOP compact 24 V/0.6 A Single-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**
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**

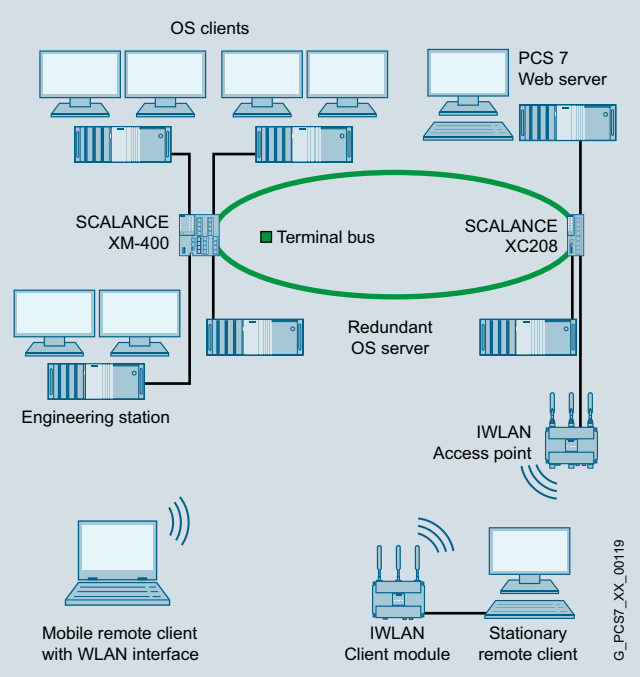
	Article No.
System connection of automation systems	
SIMATIC NET CP 443-1 (conformal coating) for use in AS 410 Communications module for connecting SIMATIC S7-400 to Industrial Ethernet via TCP/IP, ISO and UDP; PROFINET IO controller, MRP; integrated real-time switch ERTEC with two ports; 2 × RJ45 interface; S7 communication, open communication (SEND/RECEIVE) with FETCH/WRITE, with or without RFC 1006, DHCP, SNMP V2, diagnostics, multicast, access protection via IP access list, initialization via LAN 10/100 Mbps; with electronic manual on DVD	**6GK7443-1EX30-0XE1**
SIMATIC NET CP 443-1 Communications 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**
SIMATIC NET CP 443-1 Advanced With security functionality (firewall and VPN) Communications 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	**6GK7443-1GX30-0XE0**

[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



SIMATIC PCS 7 provides the option of integrating mobile or stationary remote clients into the terminal bus via an Industrial Wireless LAN (IWLAN) access point of the SCALANCE W-760, W-770 or W-780 product lines.

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 desktop/tower housing (SIMATIC PCS 7 Industrial Workstations) require an IWLAN client module of the SCALANCE W-720, W-730 or W-740 product line 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

All IWLAN access points can also be configured as IWLAN client modules.

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. A total of three KEY-PLUGs are available:

- KEY-PLUG W780 iFeatures
- KEY-PLUG W740 iFeatures
- KEY-PLUG W700 Security

Note:

Note that Industrial Wireless LAN is not approved as terminal bus or plant bus of SIMATIC PCS 7.



SCALANCE W access points and clients portfolio according to IEEE 802.11n

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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, SCALANCE W722-1 RJ45



- A wireless card permanently installed in the device
- Compact SIMATIC ET 200SP 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
- W722-1RJ45 only: Suitable for establishing wireless connections with iFeatures, for example cyclic real-time data traffic and very fast roaming with iPCF, iPCF-MC and iPRP

IWLAN client modules for control cabinets

SCALANCE W734-1 RJ45



- A wireless card permanently installed in the device
- Low-profile, compact aluminum enclosure in SIMATIC S7-1500 design, 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, SIMATIC S7-1500 and SIMATIC S7-300 rail, or 35 mm standard rail
- Suitable for establishing wireless connections with iFeatures, for example cyclic real-time data traffic and very fast roaming with iPCF, iPCF-MC and iPRP with KEY-PLUG W740 iFeatures

SCALANCE W748-1 RJ45



- A wireless card permanently installed in the device
- 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 ... +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, SIMATIC S7-1500 and SIMATIC S7-300 rail, or 35 mm standard rail
- Suitable for establishing wireless connections with iFeatures, for example cyclic real-time data traffic and very fast roaming with iPCF, iPCF-MC and iPRP with KEY-PLUG W740 iFeatures

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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 SIMATIC ET 200SP 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

SCALANCE W774-1 RJ45



- A wireless card permanently installed in the device
- Low-profile, compact aluminum enclosure in SIMATIC S7-1500 design, 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, SIMATIC S7-1500 and SIMATIC S7-300 rail, or 35 mm standard rail
- Suitable for establishing wireless connections with iFeatures, for example cyclic real-time data traffic and very fast roaming with iPCF and iPRP with KEY-PLUG W780 iFeatures
- Activation of security features such as Inter AP Blocking with KEY-PLUG W700 Security or KEY-PLUG W780 iFeatures

SCALANCE W774-1 M12 EEC for enhanced environmental conditions

Main features such as SCALANCE W774-1 RJ45.
Deviating or additional features:
- For use at ambient temperatures from -30 to +65 °C
- 2 × N-Connect sockets for the connection of directly mountable and remote antennas
- Special coating on the printed circuit boards (conformal coating)
- Resistant to condensation
- Railroad approval in accordance with EN 50155
- E1 approval

IWLAN access points for control cabinets

SCALANCE W788 RJ45



- Two product versions:
  - 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 ... +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, SIMATIC S7-1500 and SIMATIC S7-300 rail, or 35 mm standard rail
- Suitable for establishing wireless connections with iFeatures, for example cyclic real-time data traffic and very fast roaming with iPCF, iPCF-MC and iPRP with KEY-PLUG W780 iFeatures
- Activation of security features such as Inter AP Blocking with KEY-PLUG W700 Security or KEY-PLUG W780 iFeatures

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Design (continued)

IWLAN client modules for indoor use

SCALANCE W738-1 M12



- A wireless card permanently installed in the device
- 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 300 Mbps
- 2 × N-Connect sockets for the connection of directly mountable and remote antennas
- 1 × M12 connector for 10/100 Mbps with Power-over-Ethernet in accordance with IEEE 802.3at
- 2 × 24 V DC connection for redundant power infeed
- 1 × PLUG slot for KEY-PLUG/C-PLUG
- Function LEDs for optical signaling of faults and operating states
- Digital input for signal infeed (for example 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, SIMATIC S7-1500 and SIMATIC S7-300 rail, or 35 mm standard rail
- Suitable for establishing wireless connections with iFeatures, for example cyclic real-time data traffic and very fast roaming with iPCF, iPCF-MC and iPRP with KEY-PLUG W740 iFeatures

SCALANCE W748-1 M12



- A wireless card permanently installed in the device
- 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 ... +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 supply (24 V DC)
- 1 × PLUG compartment (KEY-PLUG/C-PLUG)
- Function LEDs for optical signaling of faults and operating states
- Mounting on wall, SIMATIC S7-1500 and SIMATIC S7-300 rail, or 35 mm standard rail
- Suitable for establishing wireless connections with iFeatures, for example cyclic real-time data traffic and very fast roaming with iPCF, iPCF-MC and iPRP with KEY-PLUG W740 iFeatures

IWLAN access points for indoor use

SCALANCE W778-1 M12



- A wireless card permanently installed in the device
- 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 300 Mbps
- 2 × N-Connect sockets for the connection of directly mountable and remote antennas
- 1 × M12 connector for 10/100 Mbps with Power-over-Ethernet in accordance with IEEE 802.3at
- 2 × 24 V DC connection for redundant power infeed
- 1 × PLUG slot for KEY-PLUG/C-PLUG
- Function LEDs for optical signaling of faults and operating states
- Digital input for signal infeed (for example 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, SIMATIC S7-1500 and SIMATIC S7-300 rail, or 35 mm standard rail
- Suitable for establishing wireless connections with iFeatures, for example cyclic real-time data traffic and very fast roaming with iPCF and iPRP with KEY-PLUG W780 iFeatures
- Activation of security features such as Inter AP Blocking with KEY-PLUG W700 Security or KEY-PLUG W780 iFeatures

SCALANCEW778-1 M12 EEC for enhanced environmental conditions

Main features such as SCALANCE W778-1 M12. Deviating or additional features:

- For use at ambient temperatures from -30 to +70 °C
- Special coating on the printed circuit boards (conformal coating)
- Resistant to condensation
- Railroad approval in accordance with EN 50155 and EN 45545

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Design (continued)

IWLAN access points for indoor use

SCALANCE W788 M12



- Two product versions:
  - 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 ... +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, SIMATIC S7-1500 and SIMATIC S7-300 rail, or 35 mm standard rail
- Suitable for establishing wireless connections with iFeatures, for example cyclic real-time data traffic and very fast roaming with iPCF, iPCF-MC and iPRP with KEY-PLUG W780 iFeatures
- Activation of security features such as Inter AP Blocking with KEY-PLUG W700 Security or KEY-PLUG W780 iFeatures

SCALANCE W788-2 M12 EEC for enhanced environmental conditions

Main features such as SCALANCE W788-2 M12. Deviating or additional features:

- For use at ambient temperatures from -40 ... +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, W768-2SFP



- Three product versions:
  - 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 ... +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 SIMATIC S7-300 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
- Suitable for establishing wireless connections with iFeatures, for example cyclic real-time data traffic and very fast roaming with iPCF, iPCF-MC and iPRP with KEY-PLUG W780 iFeatures
- Activation of security features such as Inter AP Blocking with KEY-PLUG W700 Security or KEY-PLUG W780 iFeatures

SCALANCE W786-2 SFP

Main features such as SCALANCE W786-2 RJ45. Deviating or additional features:

- Two slots for SFP plug-in transceivers (optical 2-port switch)
- For use at ambient temperatures from -40 °C ... +60 °C (depending on the SFP plug-in transceiver used)

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Ordering data	Article No.
IWLAN products for control cabinets	
Client modules for control cabinets	
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 Mbps; WPA2/AES; IP20 degree of protection (0 to +55 °C) Product package: Mounting hardware, 3-pin screw terminal for 24 V DC; manual on CD; English/German For administration of the wireless connection of one device with Industrial Ethernet connection	
• National approvals for operation outside the U.S.	**6GK5721-1FC00-0AA0**
• National approvals for operation within the U.S.[1)]	**6GK5721-1FC00-0AB0**
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 Mbps; WPA2/AES; IP20 degree of protection (0 to +55 °C) Product package: Mounting hardware, 3-pin screw terminal for 24 V DC; manual on CD; English/German For administration of the wireless connection of one device with Industrial Ethernet connection; with iFeatures	
• National approvals for operation outside the U.S.	**6GK5722-1FC00-0AA0**
• 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 Mbps; WPA2/AES; integrated 2-port switch; Power over Ethernet (PoE), IP30 degree of protection (-20 to +60 °C) Product package: Mounting hardware, 4-pin screw terminal for 24 V DC; manual on CD; English/German For managing the wireless connection of up to eight linked devices with Industrial Ethernet connection;	
• National approvals for operation outside the U.S.	**6GK5734-1FX00-0AA0**
• National approvals for operation within the U.S.[1)]	**6GK5734-1FX00-0AB0**
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 Mbps; 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 For administration of the radio link of up to eight devices with Industrial Ethernet connection; IP30 degree of protection	
• National approvals for operation outside the U.S.	**6GK5748-1FC00-0AA0**
• National approvals for operation within the U.S.[1)]	**6GK5748-1FC00-0AB0**
Access points for control cabinets	
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 Mbps; WPA2/AES; IP20 degree of protection (0 to +55 °C) 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**
• National approvals for operation within the U.S.[1)]	**6GK5761-1FC00-0AB0**
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 Mbps; WPA2/AES; integrated 2-port switch; Power over Ethernet (PoE), IP30 degree of protection (-20 to +60 °C) 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**
• National approvals for operation within the U.S.[1)]	**6GK5774-1FX00-0AB0**
SCALANCE W774-1 M12 EEC 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 Mbps; WPA2/AES; 2 N-CON antenna connection, integrated 2-port switch; Power over Ethernet (PoE), IP30 degree of protection (-30 to +65 °C), conformal coating EN 50155 Product package: manuals on CD, German/English; M12 sealing caps	
• National approvals for operation outside the U.S.	**6GK5774-1FY00-0TA0**
• National approvals for operation within the U.S.[1)]	**6GK5774-1FY00-0TB0**

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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 Mbps; 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 W738-1 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 300 Mbps; WPA2/AES; Power over Ethernet (PoE), IP65 degree of protection (-30 to +65 °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.	**6GK5738-1GY00-0AA0**
• National approvals for operation within the U.S.[1]	**6GK5738-1GY00-0AB0**
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 Mbps; WPA2/AES; Power over Ethernet (PoE), IP65 degree of protection (-30 to +65 °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**

	Article No.
Access points for indoor use	
SCALANCE W778-1 M12 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 Mbps; WPA2/AES; integrated 2-port switch; Power over Ethernet (PoE), IP65 degree of protection (-20 to +60 °C)	
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.	**6GK5778-1GY00-0AA0**
• National approvals for operation within the U.S.[1]	**6GK5778-1GY00-0AB0**
SCALANCE W778-1 M12 EEC 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 Mbps; WPA2/AES; 2 N-CON antenna connection, integrated 2-port switch; Power over Ethernet (PoE), IP65 degree of protection (-30 to +70 °C), conformal coating EN 50155, EN 45545	
Product package: Manuals on CD, German/English; M12 sealing caps	
• National approvals for operation outside the U.S.	**6GK5778-1GY00-0TA0**
• National approvals for operation within the U.S.[1]	**6GK5778-1GY00-0TB0**
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 Mbps; WPA2/AES; Power over Ethernet (PoE), IP65 degree of protection (-20 to +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**
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**

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Ordering data	Article No.
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 Mbps; 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**

	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**
KEY-PLUG W700 Security Removable data storage medium for enabling security features for SCALANCE W700 access points, for simple device replacement if a fault occurs, and for storing configuration data.	**6GK5907-0PA00**
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**
Standard mounting rail mounting adapter Standard mounting rail mounting adapter for SCALANCE W788 M12 and SCALANCE W788 RJ45; screw fixing for mounting on a 35 mm standard mounting rail in accordance with EN 50022 Product package: 3 units per pack	**6GK5798-8ML00-0AB3**
Standard mounting rail angled adapter 90° angled adapter for standard mounting rail mounting, only for use with SCALANCE W778/W778EEC/W738; and standard mounting rail mounting adapter for 35 mm standard mounting rail Product package: Fixing screws	**6GK5798-8MA00-0AA1**
Standard mounting rail mounting adapter Standard mounting rail mounting adapter, only for use in combination with SCALANCE W778/W778EEC/W738 Product package: Fixing screws	**6GK5798-8MF00-0AA1**
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**

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Ordering data

	Article No.
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	**6GK5992-1AL00-8AA0**
• SFP992-1LD Gigabit, singlemode, 10 km	**6GK5992-1AM00-8AA0**
• SFP992-1LH Gigabit, singlemode, 40 km	**6GK5992-1AN00-8AA0**
• SFP992-1LH+ Gigabit, singlemode, 70 km	**6GK5992-1AP00-8AA0**
Fiber-optic cables	See Catalog IK PI, Industrial Ethernet, cabling systems, glass fiber-optic cables
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	**6GK1901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
• 1 pack = 50 units	**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**

	Article No.
IE FC RJ45 Plug 4×2 Industrial Ethernet FastConnect RJ45 plug 180 4×2, RJ45 connector; CAT6A; (10/100/1000/10000 Mbps) with rugged metal enclosure and FC connection technology, for IE FC cable 4×2 (AWG24); 180 ° cable outlet	
• 1 pack = 1 unit	**6GK1901-1BB12-2AA0**
• 1 pack = 10 units	**6GK1901-1BB12-2AB0**
• 1 pack = 50 units	**6GK1901-1BB12-2AE0**
IE FC M12 Plug PRO 4×2 M12 plug connector suitable for on-site assembly (X-coded, IP65/IP67), metal enclosure, insulation/displacement fast connection method, for SCALANCE W	
• 1 unit	**6GK1901-0DB30-6AA0**
• 8 units	**6GK1901-0DB30-6AA8**
IE 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 SIMATIC NET Selection Tool and the TIA Selection Tool are available to assist in selecting the right IWLAN components:

- www.siemens.com/snst-standalone
- www.siemens.com/tia-selection-tool-standalone
- www.siemens.com/tstcloud

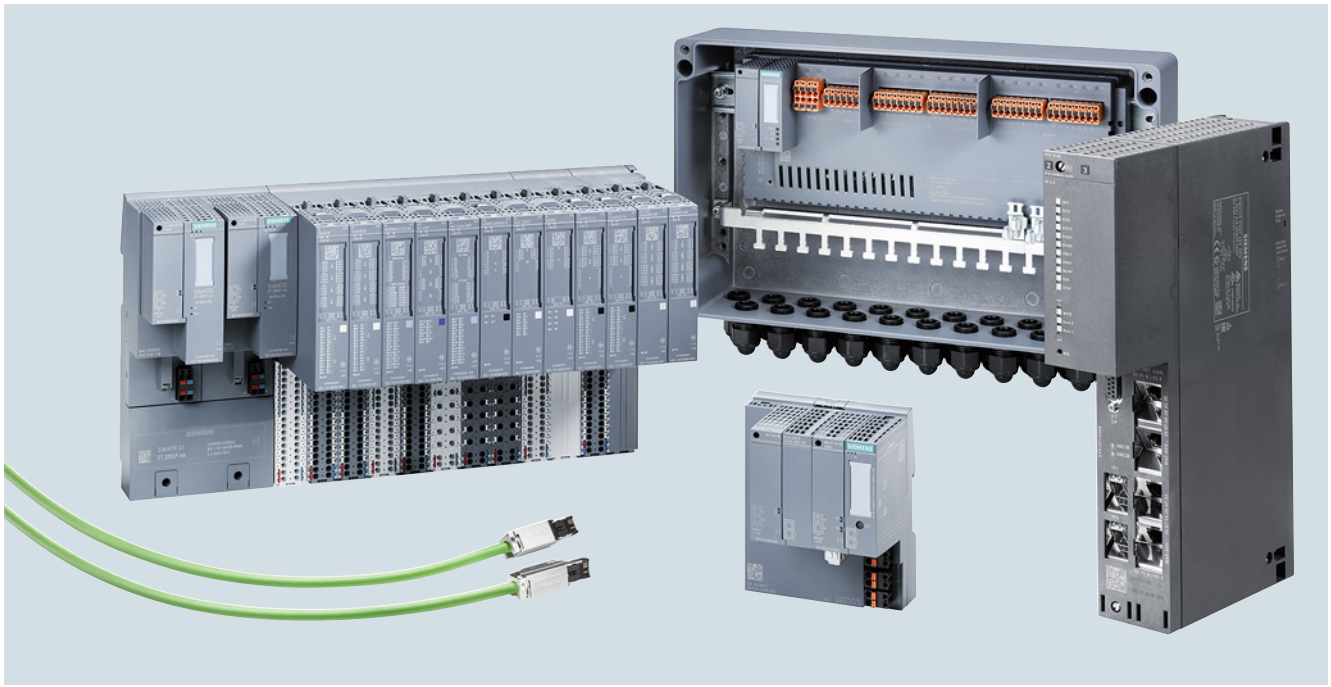
Radio approvals

Current approvals can be found on the Internet:

- www.siemens.com/wireless-approvals

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Overview



PROFINET in the process industry

PROFINET combines the benefits of PROFIBUS, the most widely distributed bus system worldwide, with the latest Ethernet technology. PROFINET supports easy setup of flexible communication networks and ensures integrated, reliable and secure communication throughout the plant – in real time!

Greater flexibility, efficiency and performance in industrial communication – PROFINET has been established for many years in the manufacturing and machine environment and is the preeminent global standard in automation.

PROFINET more than meets the special requirements of the process industry regarding availability, flexibility, real-time capability and ruggedness. At the same time, the Ethernet-based technology provides easy handling.

With version 9.0 of SIMATIC PCS 7, the process industry can now also benefit from the latest communication technology; the conditions for this are now in place:

- Scalable system redundancy
- Changes possible in runtime ("Configuration in Run")
- High-precision time-of-day synchronization for sequence of events ("SoE")

To hardware portfolio has been thoroughly updated to enable full use to be made of the new PROFINET options:

- CPU 410-5H V8.2
- SIMATIC ET 200SP HA
- SIMATIC CFU PA
- SCALANCE XF204-2BA DNA ("Y-switch")

Benefits

- Ethernet at the field level
  - Integrated vertical and horizontal communication
  - Transmission of large amounts of data in real time
- Maximum availability if required
  - Changes in runtime
  - Freely scalable redundancy enables large cost reductions thanks to optimised custom solutions
- More flexibility
  - One shared plant network ensures free assignment of the devices to the controllers and makes it easy to expand the plant
  - Topologies are based on requirements and plant specification, which can result in savings of 60% and more in cabling!
  - "One cable for all purposes" means better cost efficiency
- User-friendly
  - Simple device integration and fast device replacement during operation
  - Installation wizards and integrated device/network diagnostics
  - Implementation of secure communication layer in accordance with IEC 61784-3-3 (PROFIsafe)
- Investment protection
  - Integration of existing structures and technologies
  - Gradual transition from PROFIBUS DP to PROFINET

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Application

PROFINET completely adheres to the Ethernet standard in accordance with IEEE 802.3, which makes it the reliable future-proof standard that paves the way for digitalization in the process environment.

Combine investment protection with security for the future: on the one hand, the open Industrial Ethernet standard supports the integration of existing plant parts and technologies. This can be accomplished with corresponding solutions and products available now, such as the IE/PB LINK for the integration of PROFIBUS DP and the SIMATIC CFU PA for the integration of PROFIBUS PA. On the other hand, worldwide standardization in accordance with IEC 61158/61784 and consistent ongoing development ensure the use of PROFINET over the entire life cycle of the plant and beyond. Even wireless communication technologies such as WLAN in accordance with IEEE 802.11 and mobile communications can be reliably integrated.

Wired communication is also easier and more cost-effective with PROFINET: the motto "One cable for all purposes" supports parallel operation of profiles such as PROFIsafe, PROFIdrive and other TCP/IP protocols without impacting basic plant communication.

There is also greater convenience: the PROFINET diagnostics available by default simplify installation and provide support for plant servicing. Network problems and device conflicts are reliably detected and can be quickly remedied. This also forms the basis for preventive maintenance. These benefits are worth the investment over the service life of the plant.

Customized to your requirements

PROFINET allows you to freely scale the availability of your plant based on your requirements. In addition to media redundancy (MRP), two forms of system redundancy are also available:

- Simple system redundancy (S2)
- Modular system redundancy (R1)

"Configuration in Run" allows you to implement plant changes during runtime without affecting process engineering.

Flexible architectures can potentially allow significant savings in wiring – a fact confirmed by reference projects. In one case, 27 km of wiring (with PROFIBUS DP) could be reduced to 9 km through the use of PROFINET. Flexible architectures also support easier plant expansion without the need for spares.

The new hardware components use the BusAdapter technology, which supports simple and flexible connection to the PROFINET network either with copper cables (RJ45 or FastConnect) or fiber-optic cables.

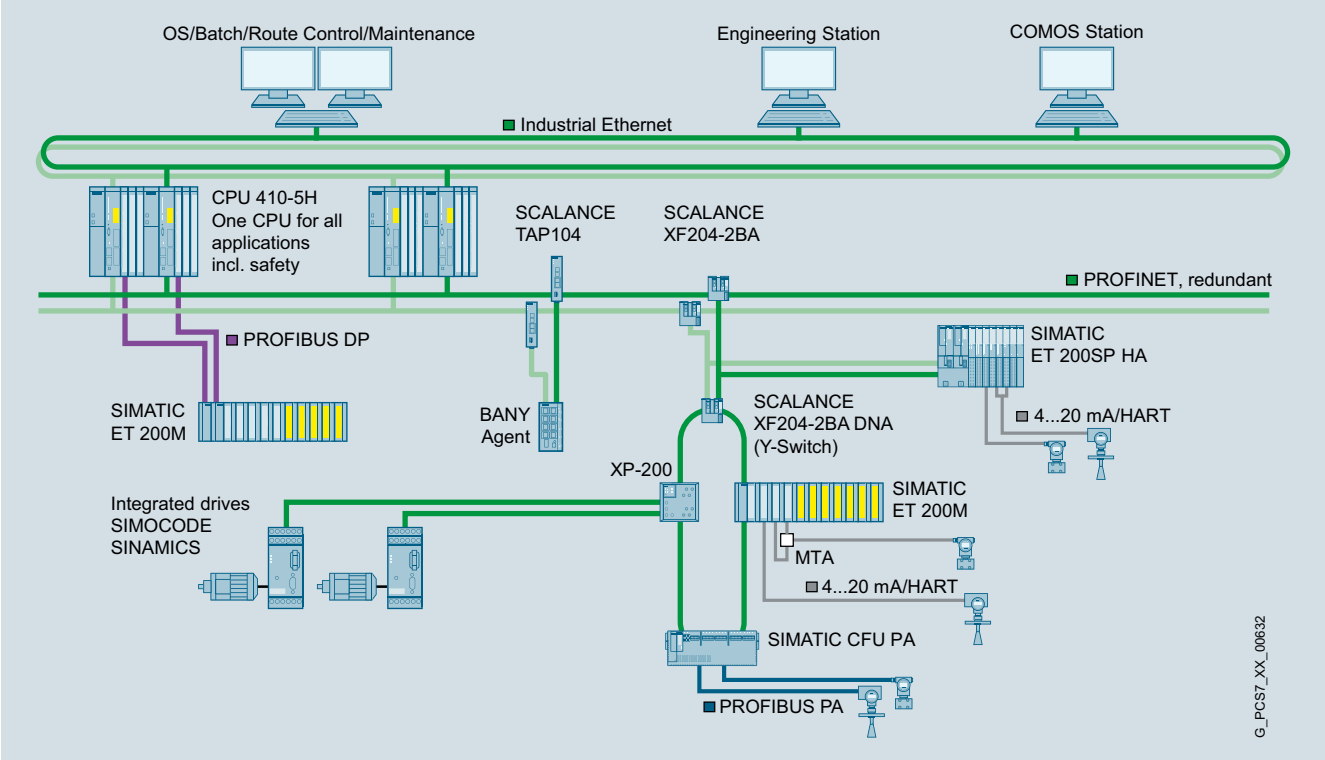
Function

Digitalization in the process industry significantly increases the amount of data (big data), requires continuous communication all the way to the field and needs flexible and secure communication networks. PROFINET is the answer:

- The best of both worlds
  - Compatible with PROFIBUS
  - Integrated device/network diagnostics
  - High data rates for more data, digital and in real time
  - Fail-safe communication is possible without special network components
- Standardization
  - Based on Ethernet standard in accordance with IEEE 802.3
  - Pre-eminent open field bus standard worldwide
  - Supports IT services, for example TCP/IP
- Straightforward handling
  - Support during planning, operation and commissioning with automatic addressing and name assignment
  - Easy device replacement without additional tools with automatic neighborhood detection
  - Clear and simple installation guidelines

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Overview



PROFINET in the process industry

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.

System components of SIMATIC PCS 7 with PROFINET capability

The SIMATIC PCS 7 system components suitable for PROFINET IO communication include:

- Automation systems (AS single stations and AS redundancy stations) with CPU 410-5H (firmware version V8.2) for complete PROFINET functionality
- SIMATIC PCS 7 AS RTX PROFINET and SIMATIC PCS 7 BOX RTX with PROFINET interface onboard
- SIMATIC ET 200SP HA with IM 155-6 PN interface module and BusAdapter
- SIMATIC CFU PA with BusAdapter
- SIMATIC ET 200M with IM 153-4 PN High Feature interface module
- SIMATIC ET 200SP with BusAdapter

In addition to specific PROFINET products, Industrial Ethernet products can also be used as network components, for example SCALANCE X switches and media converters, FastConnect connection elements, as well as electrical and optical transmission media (see "Communication", "Industrial Ethernet", or "PROFINET/Industrial Ethernet" in the IK PI catalog).

Add-on products for SIMATIC PCS 7

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
- Block library LIBRARY PAC/3WL/3VA SIMATIC PCS 7 for integration of 3VA power switches and the 7KM PAC3200/4200 measuring devices
- 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

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Overview

Industrial Ethernet/PROFINET switches specially designed for use in the process industry

To ensure full PROFINET functionality, special SCALANCE X switches, FastConnect connection elements and electrical and optical transmission media are available as network components for the connection of devices with PROFINET capabaility to the automation systems (AS single stations and AS redundancy stations) with CPU 410-5H (firmware version V8.2).

The following switches are recommended for use with SIMATIC PCS 7 with PROFINET at the field level. These devices support the relevant functions to enable full use of the new PROFINET options:

	SCALANCE XF204-2BA **SCALANCE XF204-2BA DNA**	**SCALANCE XC-200**	**SCALANCE XP-200**
			
Installation	Control cabinet	Control cabinet	Outside control cabinet
Degree of protection	IP20	IP20	IP65
ATEX zone 2	Yes	Yes	Yes
Interfaces	Electrical/optical with BusAdapter	Electrical/optical/SFPs	Electrical
Number of ports	4 (2 BA)	Max. 24, of which 2 GBit ports (SFP)	Max. 16, of which 4 GBit ports
Port characteristics	depending on the type of BusAdapter (BA)	Max. 24 RJ45 Max. 2 SFP	8 × M12 D-coded or 12 × M12 D-/ 4 × M12 X-coded
SFPs	No	Yes	No
Use of BusAdapter (BA)	Yes	No	No
Temperature range	-40 to +70 °C	-40 to +70 °C	-40 to +70 °C
Conformal coating PCBs	Yes	No	Yes, for EEC versions
Dimensions W × H × D (in mm)	100 × 117 × 74	60/120 × 147 × 125	200/280 × 200 × 49

A description of the components specified can be found in the "Industrial Ethernet" section or under "PROFINET/Industrial Ethernet" in catalog IK PI).

SCALANCE XF204-2BA: see page 10/26.

SCALANCE XF204-2BA DNA (Y-switch): see page 10/76.

SCALANCE XC-200: see page 10/18.

SCALANCE XP-200: see page 10/21.

Service bridge based on SCALANCE XC-200

The SCALANCE XC-200 has a particular role in architecture with PROFINET: it can be specially configured as a "service bridge".

An example of SCALANCE XC208 configuration as a service bridge can be found in the Siemens Industry Online Support.

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SCALANCE XF-200BA DNA Switches ("Y-Switch")

Overview



SCALANCE XF204-2BA DNA

The SCALANCE XF204-2BA DNA from Siemens is a compact new switch specially designed for use with redundant S7-400H systems in process automation. It follows the recommendations of NAMUR NE 21 and is therefore suitable for use in process automation. The switch with dual network access functionality (DNA or indeed Y-switch functionality) combines a redundant PROFINET ring consisting of S2 devices (field) with a high-availability PROFINET system (R1 system).

- Connection of up to two modular BusAdapters (2 ports each) supported
- Enclosure in SIMATIC ET 200SP design (slim design, 100 mm wide) for space-saving use in small control boxes
- Integrated redundancy manager for constructing Fast Ethernet ring topologies with fast media redundancy at the device end
- Integrated system diagnostics with PROFINET, SNMP access, integrated Web server and automatic e-mail transmission function for remote diagnostics and signaling via the network

Product version

SCALANCE XF204-2BA DNA

PROFINET S2 devices are switched to a high-availability R1 system with the SCALANCE XF204-2BA DNA (DNA = Dual Network Access).

Application

PROFINET S2 devices are switched to a high-availability R1 system with SCALANCE XF204-2BA DNA ("Y-switch"), which was previously only possible with PROFIBUS systems.

- The Y-switch combines a redundant PROFINET ring consisting of S2 devices (field) with a high-availability PROFINET system (R1 system)
- This links the S2 devices to an H-system, further reducing the failure of field device communication with the CPU and thus significantly increasing the availability of the network as a whole.

Features:

- Device diagnostics with LED (voltage, errors, redundancy)
- Remote diagnostics are possible with the signaling contact (signal mask can be set locally using buttons), PROFINET, SNMP, and Web browser
- Automatic email send function
- Interface for mounting BusAdapters from the SIMATIC ET 200SP HA product range

Y-switch functionality

The SCALANCE XF204-2BA DNA offers Y-switch functionality for connecting S2 devices to a high-availability R1 system. As well as the two Y-switch ports, two other switch ports are also available at the device end. These can for example be used to operate an MRP ring.

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Ordering data

	Article No.
SCALANCE XF-204-2BA DNA Industrial Ethernet switch	
SCALANCE XF-204-2BA DNA Managed Y-switch for connecting S2 devices to an S7-400H with 2 BusAdapter interfaces, 24 V DC redundant power supply, PN device, extended temperature range, conformal coating Configuration software on CD	
• **SCALANCE XF204-2BA DNA** 2 BusAdapter interfaces (without preassembled BusAdapter)	**6GK5204-2AA00-2YF2**
Accessories	
SIMATIC ET 200SP HA, BusAdapter BA 2×RJ45, 2 RJ45 sockets PROFINET bus adapter with Ethernet socket for standard RJ45 connector, with conformal coating PCBs	**6DL1193-6AR00-0AA0**
SIMATIC ET 200SP HA, BusAdapter BA 2×FC, 2 FastConnect connections PROFINET bus adapter with FastConnect Ethernet connection for direct bus cable connection, with conformal coating PCBs	**6DL1193-6AF00-0AA0**
SIMATIC ET 200SP, BusAdapter BA 2×SCRJ, 2 SCRJ FO connections PROFINET bus adapter with fiber-optic connection POF/PCF	**6ES7193-6AP00-0AA0**

	Article No.
SITOP compact 24 V/0.6 A Single-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 0.6 A, slim design	**6EP1331-5BA00**
C-PLUG Removable data storage medium for easy replacement of devices in the event of a fault; for storing configuration and application data; can be used in SIMATIC NET products with C-PLUG slot	**6GK1900-0AB00**
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 180° cable outlet; for network components and CPs/ CPUs with Industrial Ethernet port	
• 1 pack = 1 unit	**6GK1901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1901-1BB10-2AE0**
IE FC stripping tool Pre-adjusted stripping tool for fast stripping of Industrial Ethernet FC cables	**6GK1901-1GA00**
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 Sold by the meter; max. delivery length 1 000 m, minimum ordering length 20 m	**6XV1840-2AH10**

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Overview



- Compact network transition between PROFINET and PROFIBUS
  - Connection to Industrial Ethernet via integrated 2-port real-time switch with 100 Mbps full duplex connection with autosensing for automatic switchover
  - For replacement parts: Connection to PROFINET also with 10 Mbps half duplex
  - Connection to PROFIBUS with 9.6 Kbps to 12 Mbps
- PROFINET IO proxy;
  Connection of PROFIBUS DP slaves to PROFINET IO controller in accordance with PROFINET standard:
  From the viewpoint of the IO controller, all DP slaves are handled like I/O devices with PROFINET interface, i.e. the IE/PB LINK is their proxy
- Cross-network PG/OP communication by means of S7 routing
- Cross-network access to data of S7 stations for visualization with S7 OPC Server and S7 routing; via the IE/PB LINK, access is possible from the Industrial Ethernet (for example for HMI applications with OPC Client interface) to data of the S7 stations on the PROFIBUS using the S7 OPC Server.
- High plant availability thanks to support of the Media Redundancy Protocol (MRP)
- Device replacement without the need for a programming device, using the C-PLUG removable data storage medium for backing up the configuration data
- Use in networks that support an exchange of devices without PG on the basis of the Link Layer Discovery Protocol (LLDP)
- SIMATIC ET 200SP design: Use of the BusAdapter (BA) of the SIMATIC ET 200SP system for freely selecting the connection technology and physical characteristics for the PROFINET side

Design

The IE/PB Link has all the advantages of SIMATIC ET 200SP design:

- Compact construction
  The rugged plastic enclosure has the following on the front:
  - Two RJ45 ports for connecting to Industrial Ethernet; the connection is via the IE FC RJ45 plug 90 with 90° cable outlet or via a standard patch cable
  - 9-pin sub-D socket for connection to PROFIBUS
  - 4-pin terminal strip for connecting the external redundant supply voltage of 24 V DC (two infeeds)
  - Diagnostics LEDs
- Optional connection for Industrial Ethernet via BusAdapter (BA) of the SIMATIC ET 200SP system at the front
- Simple installation
  The IE/PB LINK is mounted on a DIN rail
- Can be operated without a fan
- Fast device replacement in the event of a fault using the optional C-PLUG removable data storage medium (not included in scope of supply)

Ordering data

Ordering data	Article No.
Gateway	
IE/PB LINK Network transition between Industrial Ethernet and PROFIBUS with PROFINET IO functionality, S7 routing and data record routing, 10/100 Mbps Fast Ethernet, MRP, 9.6 to 12 Mbps PROFIBUS, NTP	**6GK1411-5AB10**
Accessories	
IE FC TP standard cable GP 2×2 (type A) 4-wire, 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**
SIMATIC ET 200SP, bus adapter	
• BA 2×FC 2 × FastConnect connection for PROFINET	**6ES7193-6AF00-0AA0**
• BA 2×LC 2 × LC glass fiber-optic connections for PROFINET	**6ES7193-6AG00-0AA0**
• BA LC/RJ45, glass fiber-optic/CU cable media converter 1 × LC FO connection and 1 × RJ45 connection for PROFINET	**6ES7193-6AG20-0AA0**
• BA LC/FC, glass fiber-optic/CU cable media converter 1 × LC FO connection and 1 × FastConnect (FC) connection for PROFINET	**6ES7193-6AG40-0AA0**
• BA 2×SCRJ 2 × SCRJ FO connections, for PROFINET	**6ES7193-6AP00-0AA0**
• BA SCRJ/RJ45, glass fiber-optic cable/CU media converter 1 × SCRJ FO connection and 1 × RJ45 connection for PROFINET	**6ES7193-6AP20-0AA0**
• BA SCRJ/FC, glass fiber-optic cable/CU media converter 1 × SCRJ FO connection and 1 × FastConnect (FC) connection for PROFINET	**6ES7193-6AP40-0AA0**
• BA 2×RJ45 2 × RJ45 sockets for PROFINET	**6ES7193-6AR00-0AA0**

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Overview



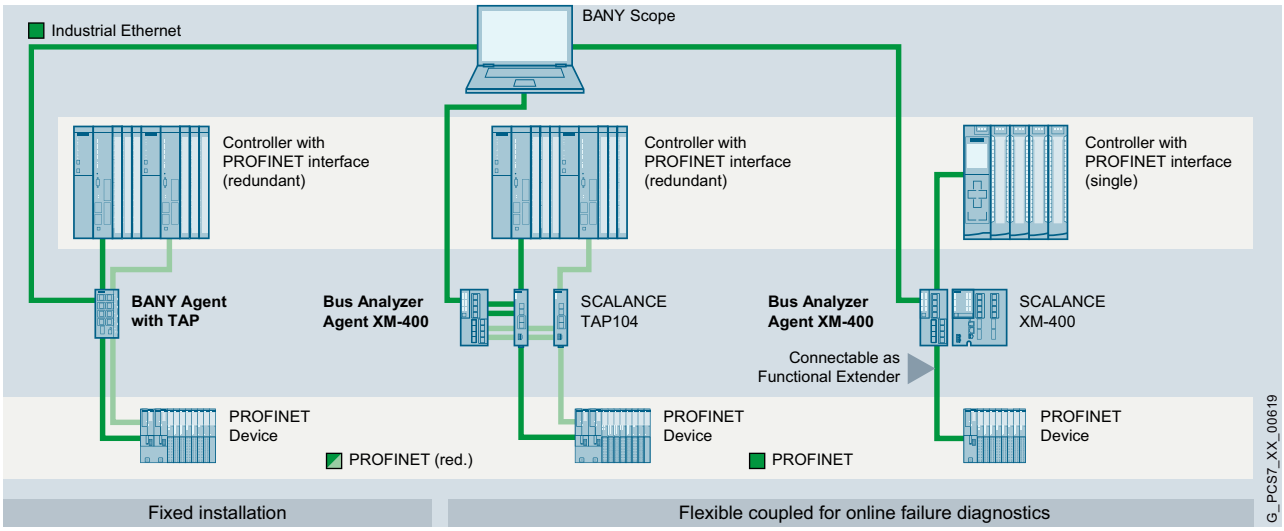
BANY Agents without TAP/with TAP, BANY Bus Analyzer Agent XM-400

PROFINET offers the manufacturing and process industry new ways to set up flexible and high-performance plant networks to meet stricter increased security requirements. To ensure that these functions are reliable and secure from the outset, and can be easily checked and optimised over the course of the plant life cycle, Siemens provides high-performance products for the validation, analysis and continuous diagnosis of simple and high-availability PROFINET networks. The PROFINET Bus Analyzer (BANY) detects critical states in your network before an overload occurs or indeed a section of the network fails.

Benefits

- Permanent network monitoring for preventive maintenance and avoiding faults
- Online analysis of network quality in real time
- Rapid fault analysis and performance improvements during plant operation
- Clear status and event display of all devices installed in the network
- Simulation of PROFINET communication with various different loads
- Checking configured cycle time on the basis of the frame deviation (jitter) measured
- Validation of network including logging

Design



PROFINET Bus Analyzer (BANY)

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Design (continued)

BANY Agent

The BANY Agent hardware can be permanently integrated into the network for permanent plant monitoring. In the event of a fault, it can even be installed retroactively via a SCALANCE TAP104 or as a functional extender (Bus Analyzer Agent XM-400 only) on SCALANCE XM-400 switches for diagnosis during plant operation. Disconnection or interruption of the network in question is thus avoided and errors are rapidy analyzed so there are no long reproduction attempts.

BANY Agent enables the reaction-free extraction and evaluation of all frame communication online in real time. Thanks to two integrated TAPs (Test Access Points), redundant PROFINET networks can also be evaluated.

BANY Scope

BANY Scope software enables access to multiple BANY Agents in the plant. This makes it possible to rapidly identify and eliminate error sources in the PROFINET networks in any part of the plant. The quality of the network can be quickly determined at any time on the basis of key data (network load, frame error, jitter, etc.).

For the validation of PROFINET networks, validation protocols are automatically created in accordance with the PROFINET planning and commissioning guidelines. Stress tests with differently simulated network loads can be carried out with the signal generator. This allows potential weak points to be identified and eliminated before the productive phase to ensure that plant availability meets strict requirements from the outset.

Validation is rounded off with the free PRONETA software, which automatically scans and clearly documents the topology, configuration and performance parameters of a PROFINET network. This allows qualified installation and efficient approval.

Function

- Frame recording in internal memory or on external memory media (USB) with exact time stamping (resolution 10 ns):
  - Comprehensive trigger functions for filtering the recorded data
  - Interface to Wireshark and other export functions for detailed frame analysis
- Real-time PROFINET analysis for automatic calculation of all relevant bus parameters (frame number, frame error, network load, cycle time, jitter, etc.) in tables and diagrams
- Signal generator for performing offline and online stress tests (measurement of the frame run time, analysis of PROFINET RT and IRT with different network loads)
- Device lists for displaying device names, IP addresses, MAC addresses, device status, events, interruptions, and failures
- Online value monitoring in real time without affecting actual communication performance
- Control interface using script or TCP commands

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Technical specifications

Article no.	9AE4140-1BA01	9AE4140-1BA00	9AE4140-2AA00
	BANY Agent with TAP	**BANY Agent without TAP**	**BANY Bus Analyzer Agent XM-400**
Mounting options	• DIN standard mounting rail 35 mm[1)] • SIMATIC S7-300 mounting rail • Wall	• DIN standard mounting rail 35 mm[1)] • SIMATIC S7-300 mounting rail • Wall	• DIN standard mounting rail 35 mm[1)] • SIMATIC S7-300 mounting rail • SIMATIC S7-1500 mounting rail
Degree of protection	IP20	IP20	IP20
Connectors for terminal devices or network components			
• Electrical (over twisted pair)	7 x RJ45 sockets with MDI-X assignment 10/100/1000 Mbps (half/full duplex)	3 x RJ45 sockets with MDI-X assignment 10/100/1000 Mbps (half/full duplex)	5 x RJ45 ports with MDI-X assignment 10/100/1000 Mbps (half/full duplex) 4 x RJ45 ports with MDI-X assignment 10/100 Mbps (half/full duplex)
• Electrical	1 × USB	1 × USB	USB 1.1 and USB 2.0, max. 500 mA
Electrical specifications			
Supply voltage	24 V DC	24 V DC	24 V DC (20.4 to 28.8 V DC)
• Redundant power supply unit	No	No	No
• Redundant power supply possible	No	No	No
Overcurrent protection of the power supply	2 A / 32 V	2 A / 32 V	2 A / 32 V
Voltage over digital input/output	24 V DC	24 V DC	24 V DC
• Switching capacity (resistive load)	50 mA	50 mA	50 mA
Voltage at USB port	5 V DC	5 V DC	
• Output current, max.	500 mA	500 mA	
Current consumption	0.5 mA	0.3 mA	1 A
• Power loss	12 W	7.2 W	24 W
Permissible ambient conditions			
Storage/transport temperature	-40 to +70 °C	-40 to +70 °C	-40 to +85 °C
Operating temperature			
• Horizontal installation	-40 to +70 °C	-40 to +70 °C	-40 to +50 °C (stand-alone mode) -40 to +60 °C (XM400 function extender mode)
• Vertical installation	-40 to +50 °C	-40 to +50 °C	--
Max. ambient temperature at operating altitude			
• Horizontal installation from 2 000 m	65 °C	65 °C	50 °C (stand-alone mode) 60 °C (XM400 function extender mode)
• Horizontal installation from 3 000 m	60 °C	60 °C	50 °C
• Vertical installation from 2 000 m	45 °C	45 °C	--
• Vertical installation from 3 000 m	40 °C	40 °C	--
Max. relative humidity during operation at 25 °C	< 95% (no condensation)	< 95% (no condensation)	< 95% (no condensation)
Dimensions and weight			
Dimensions W x H x D in mm	60 × 125 × 125	40 × 125 × 125	70 × 150 × 125
Weight	1400 g	1100 g	750 g

[1)] Not for use in shipbuilding

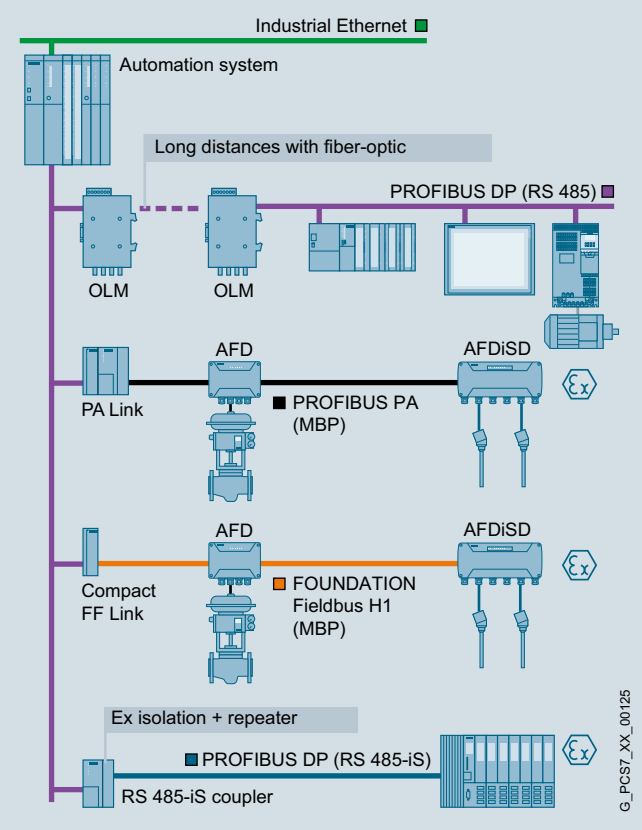
Ordering data

	Article No.
BANY Agent without TAP Ethernet 2-channel, without TAP (Test Access Point), signal generator	**9AE4140-1BA00**
BANY Agent with TAP 2-channel integrated TAP (Test Access Point), Ethernet 2-channel	**9AE4140-1BA01**

	Article No.
BANY Bus Analyzer Agent XM-400 2-channel integrated TAP, Ethernet 4-channel, Functional Extender Interface, 4 × SFP slots, signal generator	**9AE4140-2AA00**
SCALANCE TAP104 Test Access Port for frame export, 2 × RJ45 ports, 10/100 Mbps, LED diagnostics, 24 V DC power supply, manual	**6GK5104-0BA00-1SA2**

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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.

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Application



The PROFIBUS DP fieldbus enables the SIMATIC PCS 7 automation 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

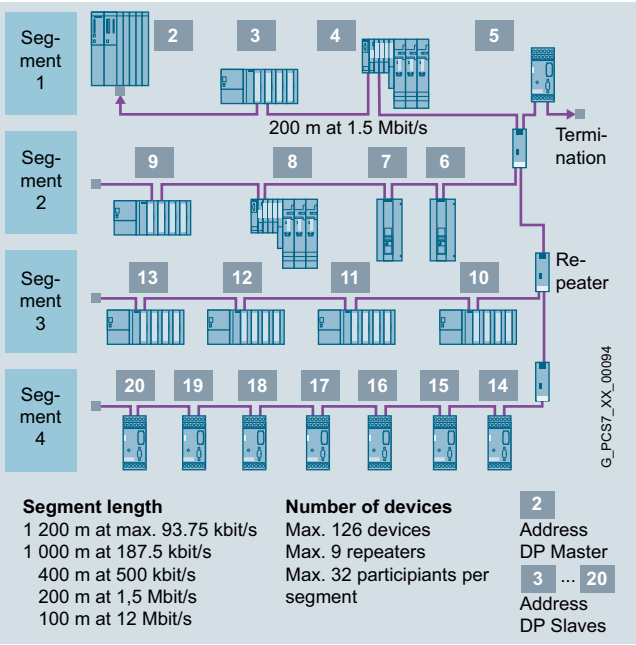
[1)] According to PROFIBUS installation guideline 2.262

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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

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.

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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, article no. 6ES7972-0DA60-0XA0.

Ordering data

	Article No.
PROFIBUS FastConnect Standard Cable, violet Standard type with special design for fast mounting, 2-core, shielded, cut-to-length Specify length in m Max. delivery unit 1 000 m, minimum order quantity 20 m	**6XV1830-0EH10**
Preferred lengths	
- 20 m	**6XV1830-0EN20**
- 50 m	**6XV1830-0EN50**
- 100 m	**6XV1830-0ET10**
- 200 m	**6XV1830-0ET20**
- 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 Specify length in m Max. delivery unit 1 000 m, minimum order quantity 20 m	**6XV1831-2A**
Further PROFIBUS cables with associated specifications	See Catalog IK PI
PROFIBUS FastConnect Stripping Tool Preadjusted stripping tool for fast stripping of PROFIBUS FastConnect bus cables	**6GK1905-6AA00**
PROFIBUS FastConnect Blade Cassettes Spare blade cassettes for PROFIBUS FastConnect stripping tool, 5 units	**6GK1905-6AB00**
PROFIBUS FastConnect bus connector RS 485 with 90° cable outlet With insulation displacement 15.8 × 59 × 35.6 mm (W × H × D) max. Data transfer rate 12 Mbps	
• 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 Other bus connectors See Catalog IK PI	**6GK1500-0FC10**

	Article No.
RS 485 Repeater for PROFIBUS Data transfer rate max. 12 Mbit/s, 24 V DC, IP 20 enclosure	**6ES7972-0AA02-0XA0**
RS 485 Diagnostic Repeater For connection of 1 or 2 segments to PROFIBUS DP; with online diagnostics functions for monitoring the bus lines	**6ES7972-0AB01-0XA0**
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**
RS 485-IS Coupler Isolating transformer for connection of PROFIBUS DP segments with RS 485 and RS 485-iS transmission technologies Operating temperature -40 …+70 °C	**6ES7972-0AC80-0XA0**
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**

Note:

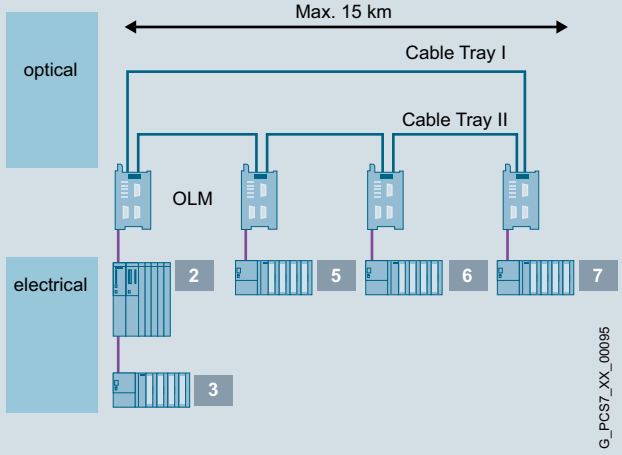
For more information on electrical PROFIBUS networks as well as components and accessories, particularly cable material for special applications, refer to Catalog IK PI, Chapter "PROFIBUS", Section "Network components for PROFIBUS – electrical networks".

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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
Plastic: 80 m
PCF: 400 m
Glass: up to 3 km
(singlemode: 15 km)
Max. 12 Mbit/s

Number of devices
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".

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Ordering data

	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 V4.1 Optical Link Module with one RS 485 port and one plastic FOC port (2 BFOC sockets), with signaling contact and measuring output	**6GK1503-2CA01**
PROFIBUS OLM/P12 V4.1 Optical Link Module with one RS 485 port and two plastic FOC ports (4 BFOC sockets), with signaling contact and measuring output	**6GK1503-3CA01**
PROFIBUS OLM/G11 V4.0 Optical Link Module with one RS 485 and one glass FOC interface (2 BFOC sockets), for standard distances up to 3 km, with signaling contact and measuring output	**6GK1503-2CB00**
PROFIBUS OLM/G12 V4.0 Optical Link Module with one RS 485 port and two glass FOC ports (4 BFOC sockets), for standard distances up to 3 km, with signaling contact and measuring output	**6GK1503-3CB00**
PROFIBUS OLM/G22 V4.0 Optical Link Module with two RS 485 ports and two glass FOC ports (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 port and two glass FOC ports (4 BFOC sockets), for standard distances up to 3 km, suitable for extended temperature range from -25 to +60 °C, with signaling contact and measuring output	**6GK1503-3CD00**
PROFIBUS OLM/G11-1300 V4.0 Optical Link Module with one RS 485 port and one glass FOC port (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 port and two glass FOC ports (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 cable product range can be ordered from your local representative. For technical advice, contact: Siemens AG, SPG Industrial Network and Components, Fürth, Germany. J. Hertlein Tel.: +49 911 750-4465 E-mail: juergen.hertlein@siemens.com

10

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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**

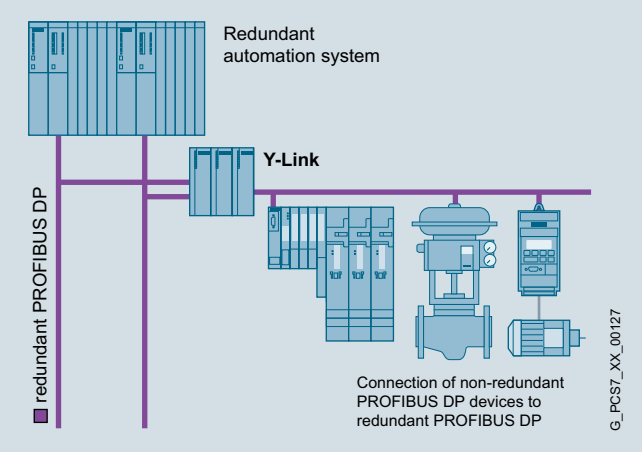
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Overview



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



The Y-link comprises:

- Two IM 153-2 High Feature Outdoor interface modules
- One Y-coupler incl. RS 485 repeater
- One BM IM/IM bus module for two IM 153-2 High Feature Outdoor modules
- 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.

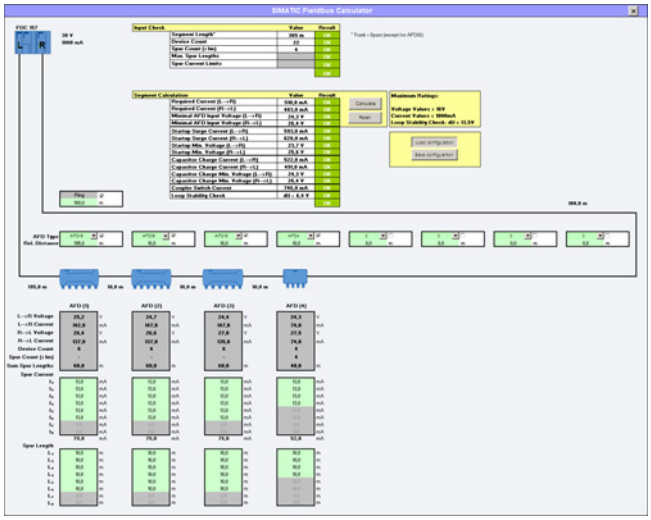
It is recommendable to have a redundant -24 V DC supply for the Y-Link, e.g. with two PS 307/PS 305 load power supplies.

Ordering data

	Article No.
Y-Link For connection of devices with only one PROFIBUS DP interface to a redundant automation system, comprising: • 2 IM 153-2 High Feature Outdoor interface modules • 1 Y-coupler • 1 BM IM/IM bus module • 1 BM Y-coupler bus module	**6ES7197-1LA12-0XA0**
PS 307 load current 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 current 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 multivendor 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 amount of data (small quantity framework) and low timing requirements, the DP/PA coupler can also be operated in standalone mode as a router.

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

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Design

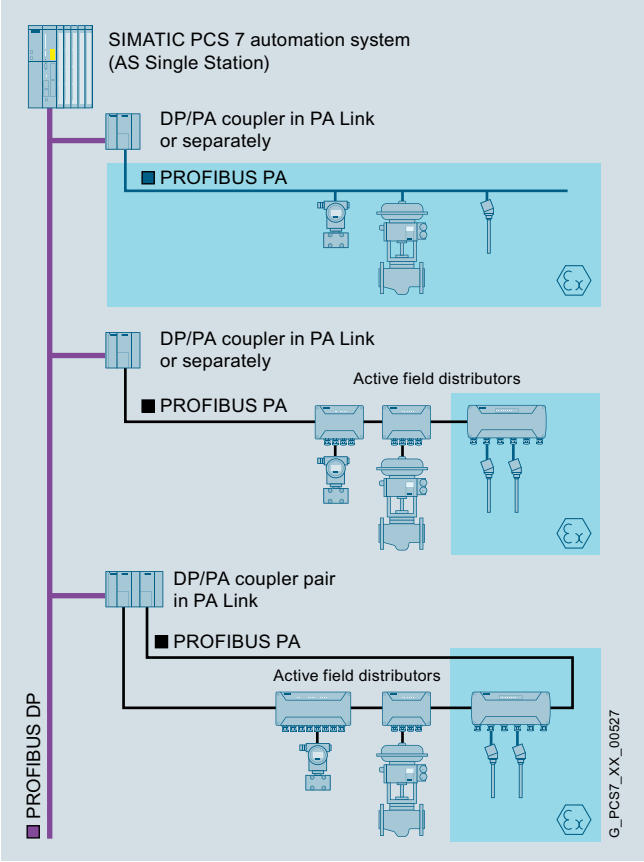
Examples of PROFIBUS PA architectures

The following graphical representations illustrate possible PROFIBUS PA configuration variants with DP/PA coupler and PA Link routers on the:

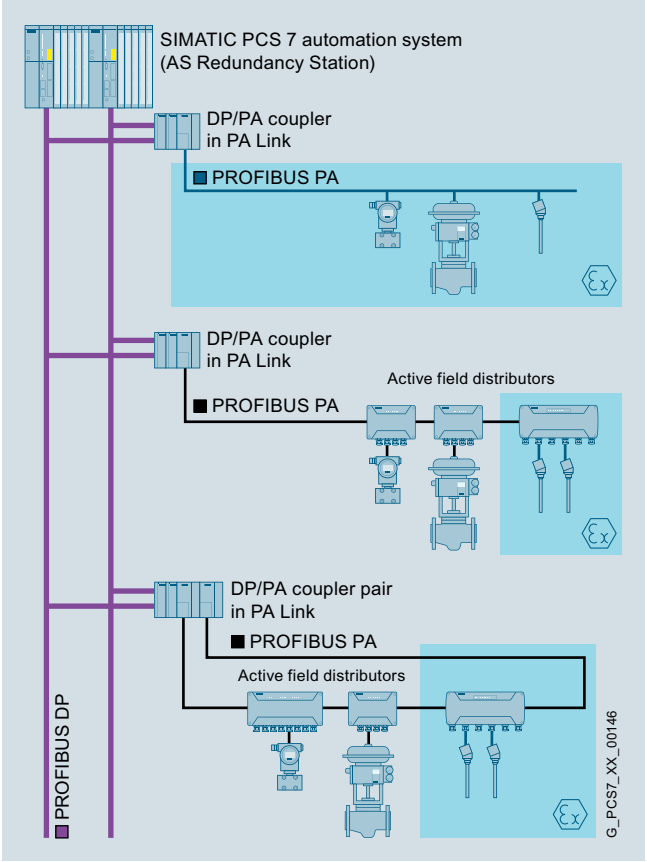
- PROFIBUS DP master, simple design (AS Single Station)
- PROFIBUS DP master, redundant design (AS Redundancy Station)

If the DP/PA coupler is operated independently as a PA router, then the connection is then directly on the coupler instead of via the interface module.

The number of PROFIBUS PA devices is limited according to the specifications in the "Technical specifications" section.



PROFIBUS PA on an AS Single Station as PROFIBUS DP master



PROFIBUS PA on an AS Redundancy Station as PROFIBUS DP master

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Design (continued)

Line architecture with single coupler

In the line architecture with individual couplers, each line segment is connected to one DP/PA coupler each.

If the PA router is an independent DP/PA coupler, then a PROFIBUS PA line (line segment) can be connected. A maximum of 5 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.

The PA router can be connected to a single or redundant PROFIBUS DP, depending on the version (see figures).

The FDC 157-0 is the first choice as the DP/PA coupler. When using this coupler, the PA-devices can be integrated into the line segment via AFD active field distributors, e.g. AFD4, AFD4 RAILMOUNT, AFD4 FM and AFD8 (approval for Ex zone 2/22) and AFDiSD (approval for Ex zone 1/21). The PA devices are connected to these field distributors via short-circuit-proof spur lines.

Alternatively, it is possible to operate up to 8 AFD field distributors, up to 5 AFDiSD field distributors or any combination of up to 5 AFDiSD and AFD field distributors in a line segment. With mixed AFDiSD/AFD operation, however, extended fieldbus diagnostics of the AFDiSD in the PROFIBUS PA is not possible. 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 preferably integrated into a bus segment by means of AFDiSD active field distributors. For PA devices in Ex zone 1/21, connection via a line segment on the DP/PA coupler Ex [i] (in the PA Link or independently) is a possible alternative. The devices are integrated separately into the line segment using 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.

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. 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 AFD or AFDiSD field distributors whose number is limited as with the line architectures (up to 8 AFD, up to 5 AFDiSD or up to 5 AFDiSD and AFD combined; for mixed AFDiSD and AFD operation, extended fieldbus diagnostics for the AFDiSD is not possible). These field distributors have galvanically isolated, 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 FDC 157-0 DP/PA couplers and the AFD and AFDiSD active field distributors 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

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Design (continued)

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 AFD active field distributors are used, both 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 AFDiSD 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 120 m in accordance with IEC 60079-27 (FISCO)

With AFD active field distributors, these maximum values may be reduced depending on the number of spur lines of the bus segment (for details, see the "Technical specifications" section). With AFDiSD active field distributors, this reduction is canceled by the integrated repeater function.

The **SIMATIC Fieldbus Calculator** provides help in calculating and designing fieldbus segments:
https://support.industry.siemens.com/cs/ww/en/view/53842953

Intrinsically-safe PA devices in hazardous areas are preferably integrated into a bus segment by means of AFDiSD active field distributors. For PA devices in Ex zone 1/21, 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 (for architectures with AFD or AFDiSD active field distributors) or with the passive terminating element for PROFIBUS PA (SpliTConnect terminator).

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	
• AFD	8
• AFDiSD or combinations of AFDiSD and AFD	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	
• Standard	1 900 m
• EEx(ib)	1 900 m
• EEx(ia)	1 000 m
Bus segments with AFD Max. spur line length in relation 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 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	120 m

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Overview



PA link, consisting here of IM 153-2 High Feature Outdoor 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 "Ring" and "Line with coupler redundancy" redundant architectures.

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:

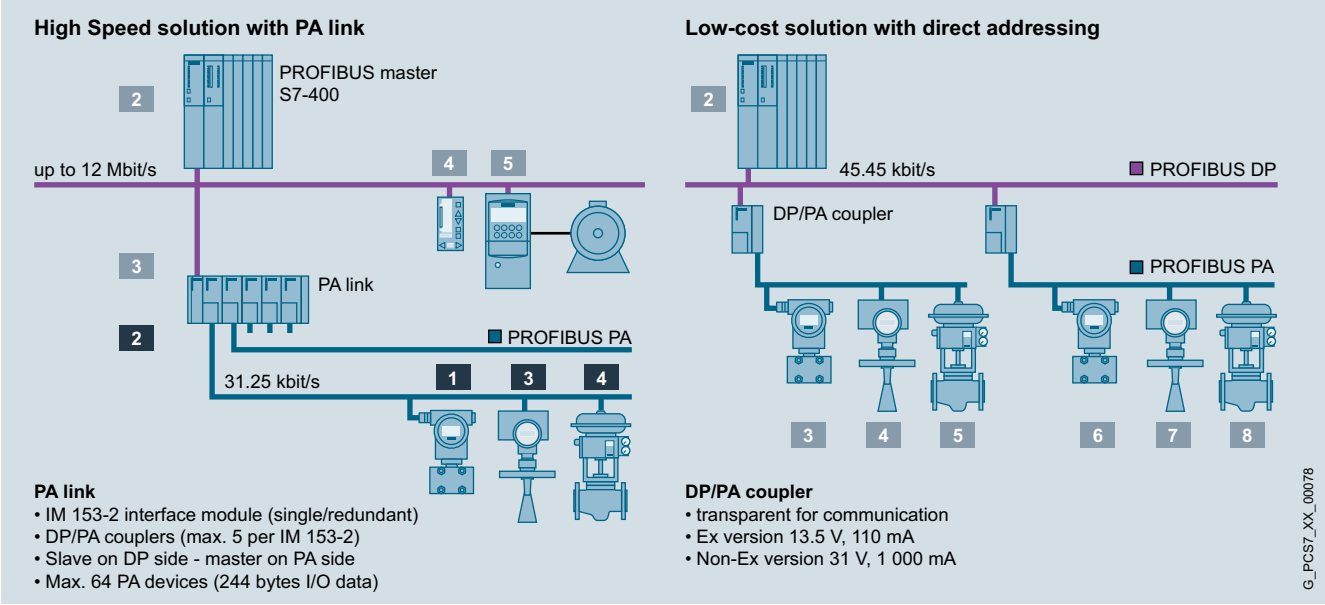
- I&M (Identification & Maintenance) data
- Current and voltage values on the main cable
- Redundancy status
- Wire breakage
- Short-circuit
- Signal level

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 available for use in operating 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.

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Design



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 Outdoor 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. Use of active bus modules on the backplane allows hot swapping of individual modules and redundancy of the IM 153-2 High Feature Outdoor PROFIBUS DP interface modules and the FDC 157-0 DP/PA couplers. 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 Outdoor PROFIBUS DP interface module, a redundant 24 V DC supply is also recommended, e.g. using two PS 307/PS 305 load current 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 Outdoor interface module
- 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 Outdoor module
  - BM IM/IM for 2 IM 153-2 High Feature Outdoor modules, for redundant and non-redundant configuration
  - BM FDC for 1 DP/PA coupler Ex [i] or FDC 157-0 (up to 5 DP/PA couplers possible per PA link)
  - BM FDC/FDC for 2 DP/PA couplers FDC 157-0

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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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
• 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 Outdoor	
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
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

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Ordering data	Article No.
DP/PA coupler For transition from RS 485 to MBP	
• 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; permissible operating temperature -25 ... +60 °C	**6ES7157-0AD82-0XA0**
• DP/PA coupler FDC 157-0 Fieldbus coupler between PROFIBUS DP and PROFIBUS PA, redundancy capable; integrated PROFIBUS diagnostics slave; max. output current 1 A; IP20 degree of protection; permissible operating temperature -25 ... +60 °C	**6ES7157-0AC85-0XA0**
IM 153-2 High Feature Outdoor Interface module for PROFIBUS DP for ET 200M, PA Link and Y-Link; redundancy capable; conformal coating, IP20 degree of protection; permissible operating temperature -25 ... +60 °C	**6ES7153-2BA70-0XB0**
Accessories	
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**
Standard profile rails (without hot swapping function)	
• 482 mm wide (19 inches)	**6ES7390-1AE80-0AA0**
• 530 mm wide	**6ES7390-1AF30-0AA0**

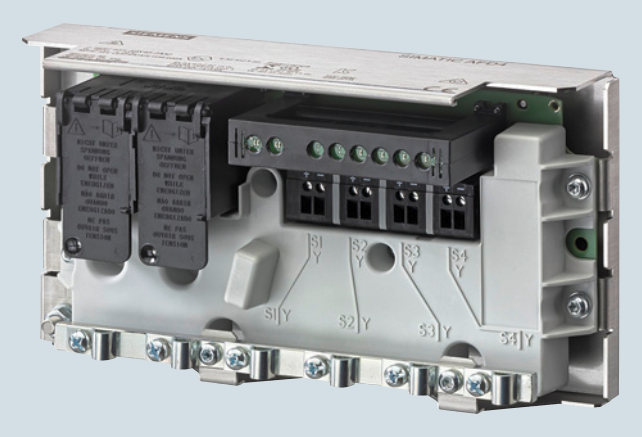
	Article No.
Components for hot swap and for redundant configuration	
Active bus modules for hot swapping	
• BM PS/IM SIPLUS extreme for 1 load current supply and 1 IM 153-2 High Feature module; for hot swap function, permissible operating temperature -25 ... +70 °C	**6AG1195-7HA00-2XA0**
• BM IM/IM for 2 IM 153-2 High Feature modules, for redundant and non-redundant configuration, for hot swap function, permissible operating temperature -25 ... +60 °C	**6ES7195-7HD80-0XA0**
• BM FDC for 1 DP/PA coupler Ex [i] or FDC 157-0, for hot swap function, permissible operating temperature -25 ... +60 °C	**6ES7195-7HF80-0XA0**
• BM FDC/FDC for 2 DP/PA couplers FDC 157-0, for hot swap function, permissible operating temperature -25 ... +60 °C	**6ES7195-7HG80-0XA0**
Mounting rail for hot swapping For max. 5 active bus modules	
• 482 mm wide (19 inches)	**6ES7195-1GA00-0XA0**
• 530 mm wide	**6ES7195-1GF30-0XA0**
• 620 mm wide	**6ES7195-1GG30-0XA0**
Covers 4 backplane bus covers and 1 cover for active bus module	**6ES7195-1JA00-0XA0**
Bundles	
I/O subsystem for PA Link or ET 200M For PA Link or for ET 200M stations with up to 8 I/O modules, suitable for hot swapping, consisting of: • DIN rail for active bus modules, 482 mm long (19 inches) • PS/IM bus module • PROFIBUS DP interface IM 153-2 High Feature Outdoor	**6ES7654-0XX10-1XA0**
I/O subsystem extended for PA Link or ET 200M For PA Link or for ET 200M stations with up to12 I/O modules, suitable for hot swapping, consisting of: • DIN rail for active bus modules, 620 mm long • PS/IM bus module • PROFIBUS DP interface IM 153-2 High Feature Outdoor	**6ES7654-0XX10-1XB0**
RED I/O subsystem for PA Link or ET 200M For operation of a PA Link or an ET 200M station on a redundant automation system of the S7-400 series, suitable for hot swapping, consisting of: • 2 PROFIBUS DP interfaces IM 153-2 High Feature Outdoor • 1 active bus module IM/IM Outdoor	**6ES7654-0XX20-0XA0**

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Overview



Active Field Distributor AFD4



Active Field Distributor AFD4 RAILMOUNT



Active Field Distributor AFD8

Active Field Distributor AFD

Active field distributors (AFD) can be operated in environments in accordance with Division 2, Zone 2 or Zone 22. It is offered with the following models:

- AFD4, AFD4 RAILMOUNT and AFD4 FM with 4 spur line connections for 1 field device each
- AFD8 with 8 spur line connections for 1 field device each

An AFD4, AFD4 RAILMOUNT and AFD4 FM can therefore connect up to 4 field devices, and an AFD8 can connect up to 8 standard-compliant PROFIBUS PA-field devices, via short-circuit proof spur line connections to a PA-fieldbus segment (line/ring) with automatic bus termination.

The PA fieldbus segment can be connected to a single or redundant PROFIBUS DP via a PA router and can thus be seamlessly integrated into the SIMATIC PCS 7 process control system.

Up to 8 active field distributors AFD with a total of up to 31 connected field devices can be operated for each 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 Distributor AFD8, open

Based on the AFD4, two product versions with different intentions were developed with the AFD4 RAILMOUNT and the AFD4 FM:

Specific product features of the AFD4 RAILMOUNT

The AFD4 RAILMOUNT is supplied without die-cast aluminum enclosure; it is a product model of the AFD4 active field distributor with flexible installation options. It can be installed on a DIN mounting rail into an enclosure of choice, for example, an enclosure made of stainless steel, die-cast aluminum or plastics.

Specific product features of the AFD4 FM

The AFD4 FM with cFMus approval is adapted to the special requirements for product models of the AFD4 active field distributor in the USA and Canada. The AFD4 FM features threaded plugs ex factory, because the cable glands of the AFD4 do not conform to the requirements of cFMus.

The threaded plugs for connecting the main and spur lines must be replaced by the cable glands and cables listed by UL or CSA. This must conform to the US National Electrical Code (NEC) and Canadian Electrical Code (CEC). The user is responsible for the selection and ordering.

Available suppliers for suitable cable glands:

- Cooper Capri SAS
- CMP products

Due to the larger bushing for the main line (M20 instead of M16), sheathed main line cables can also be used for AFD4 FM.

The relevant requirements of the US National Electrical Code (ANSI/NFPA-70 NEC) must be met for the installation of the AFD4 FM.

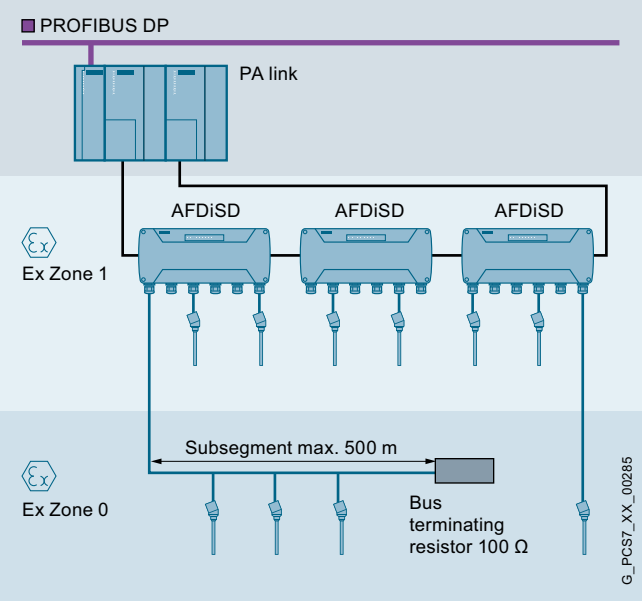
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Overview (continued)

AFDiSD active field distributor



AFDiSD active field distributor



The AFDiSD (Active Field Distributor intrinsically Safe with optional extended PROFIBUS PA diagnostics) PROFIBUS PA field distributor can be operated in environments in accordance with Ex zone 1/21 and 2/22. It is a compatible replacement for AFDiS.

AFDiSDs can integrate up to 6 intrinsically-safe PA field devices in a PA 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. The spur lines with Ex [ia] type of protection as well as the subsegment can be routed into Zone 0/20.

Up to 5 AFDiSD active field distributors with a total of up to 31 field devices can be operated in a fieldbus segment. A limitation of 5 active field distributors is also mandatory for mixed operation of AFD and AFDiSD (extended PA fieldbus diagnostics in mixed operation).

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 its integrated repeater function, AFDiSDs 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

In environments in accordance with Ex zone 2/22 or in non-hazardous areas, an AFDiSD 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.

Enhanced fieldbus diagnostics with AFDiSD in PROFIBUS PA

AFDiSD diagnostics are limited to short-circuits, loss of redundancy, detection of chatter, and failure of field devices. In addition, the extended fieldbus diagnostics, which can be activated per mode selector, enables 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 extended 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
- IM 153-2 High Feature Outdoor interface module, 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 predecessor type.

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Technical specifications

Article number	**6ES7157-0AG81-0XA0** ACTIVE FIELD DISTRIBUTOR AFD4	**6ES7655-5DX40-2AA0** ACTIVE FIELD DISTRIBUTOR AFD4 RAILMOUNT	**6ES7655-5DX40-1AA1** ACTIVE FIELD DISTRIBUTOR AFD4 FM	**6ES7157-0AG82-0XA0** ACTIVE FIELD DISTRIBUTOR AFD8
General information				
Product type designation	Active field distributor	Active field distributor	Active field distributor	Active field distributor
Product description			AFD4 FM	
Product function				
• Repeater function	No	No	No	No
Supply voltage				
permissible range, lower limit (DC)	16 V	16 V	16 V	16 V
permissible range, upper limit (DC)	32 V	32 V	32 V	32 V
Reverse polarity protection	Yes; only in conjunction with FDC 157			Yes; only in conjunction with FDC 157
Overvoltage protection	No			No
Input current				
Current consumption (in no-load operation), typ.	24 mA; 54 mA at the end of the cable	24 mA; 54 mA at the end of the cable	24 mA; 54 mA at the end of the cable	34 mA; 64 mA at the end of the cable
Current consumption, max.	264 mA			514 mA
Power loss				
Power loss, typ.	384 mW	384 mW	384 mW	544 mW
Power loss, max.	3.2 W	3.2 W	3.2 W	4.1 W
Interfaces				
PROFIBUS PA				
• Transmission rate, max.	31.25 kbit/s	31.25 kbit/s	31.25 kbit/s	31.25 kbit/s
• Number of connectable PA field devices	4	4	4	8
• Current output to PA field devices, max.	240 mA	240 mA	240 mA	480 mA
• permissible current per spur line	60 mA	60 mA	60 mA	60 mA
Protocols				
PROFIBUS DP	No		No	No
PROFIBUS PA	Yes	Yes	Yes	Yes
AS-Interface	No		No	No
FOUNDATION Fieldbus H1	Yes	Yes	Yes	Yes
Interrupts/diagnostics/ status information				
Status indicator	Yes	Yes	Yes	Yes
Alarms	No	No	No	No
Diagnostic functions	Yes	Yes	Yes	Yes
Diagnostics indication LED				
• Main line status	Yes	Yes	Yes	Yes
• Main line failure	Yes			Yes
• Spur line status/fault	Yes	Yes	Yes	Yes
• automatic bus termination	Yes	Yes	Yes	Yes
Potential separation				
between main line and spur lines	No	No	No	No
Degree and class of protection				
Degree of protection acc. to EN 60529				
• IP66	Yes	No	Yes	Yes
Standards, approvals, certificates				
Use in hazardous areas				
• ATEX Zone 1	No	No	No	No
• ATEX Zone 21	No	No	No	No
• ATEX Zone 2	Yes	Yes	Yes	Yes
• ATEX Zone 22	Yes	Yes	Yes	Yes
• FM Class I Zone 1	No	No	No	No
• FM Class I Zone 2, Division 2	Yes	Yes	Yes	Yes

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Technical specifications (continued)

Article number	6ES7157-0AG81-0XA0 ACTIVE FIELD DISTRIBUTOR AFD4	6ES7655-5DX40-2AA0 ACTIVE FIELD DISTRIBUTOR AFD4 RAILMOUNT	6ES7655-5DX40-1AA1 ACTIVE FIELD DISTRIBUTOR AFD4 FM	6ES7157-0AG82-0XA0 ACTIVE FIELD DISTRIBUTOR AFD8
Ambient conditions				
Ambient temperature during operation				
• min.	-40 °C	-40 °C	-40 °C	-40 °C
• max.	70 °C	70 °C	70 °C	70 °C
Ambient temperature during storage/ transportation				
• min.	-40 °C	-40 °C	-40 °C	-40 °C
• max.	85 °C	70 °C	85 °C	85 °C
Relative humidity				
• Operation, max.	95 %			95 %
Connection method				
Main line				
• Number of main lines	2	2	2	2
• Design of terminals	Screw terminal block	Screw terminal block	Screw terminal block	Screw terminal block
• Type of connection (enclosure cable gland)	M16		M20	M16
• Type of cable	Type A	Type A	Type A	Type A
• Cable diameter, min.	4 mm		6 mm	4 mm
• Cable diameter, max.	9 mm		13 mm	9 mm
• Conductor cross-section, min.	0.2 mm^2	0.2 mm^2	0.2 mm^2	0.2 mm^2
• Conductor cross-section, max.	2.5 mm^2	2.5 mm^2	2.5 mm^2	2.5 mm^2
• automatic bus termination	Yes	Yes	Yes	Yes
• permissible main line current	1 A	1 A	1 A	1 A
Spur line				
• Number of spur lines	4	4	4	8
• Design of terminals	Screw terminal block		Screw terminal block	Screw terminal block
• Type of connection (enclosure cable gland)	M16		M16	M16
• Type of cable	Type A	Type A	Type A	Type A
• Cable diameter, min.	4 mm		4 mm	4 mm
• Cable diameter, max.	9 mm		9 mm	9 mm
• Conductor cross-section, min.	0.2 mm^2	0.2 mm^2	0.2 mm^2	0.2 mm^2
• Conductor cross-section, max.	2.5 mm^2	2.5 mm^2	2.5 mm^2	2.5 mm^2
• total current output to field devices, max.	240 mA	240 mA	240 mA	480 mA
• Number of connectable field devices	4	4	4	8
• Current limitation per field device, max.	60 mA	60 mA	60 mA	60 mA
• No-load voltage, max.	30 V		30 V	
• Short-circuit current (test current); max.	6 mA	6 mA	6 mA	6 mA
• intrinsically safe according to FISCO model	No	No	No	No
• Debounce logic	Yes	Yes	Yes	Yes
Dimensions				
Width	220 mm	220 mm	220 mm	360 mm
Height	120 mm; without screw glands	120 mm	120 mm	120 mm; without screw glands
Depth	83 mm	83 mm	83 mm	83 mm
Weights				
Weight, approx.	2 000 g	1 000 g	2 000 g	3 000 g

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Technical specifications (continued)

Article number	6ES7655-5DX60-1BB0 ACTIVE FIELD DISTRIBUTOR AFDISD
General information	
Product type designation	Active field distributor
Product description	Active field distributor with diagnostics
Product function	
• Repeater function	Yes
Supply voltage	
Design of the power supply	via fieldbus
permissible range, lower limit (DC)	16 V
permissible range, upper limit (DC)	32 V
Reverse polarity protection	Yes; only in conjunction with FDC 157
Overvoltage protection	Yes; only in conjunction with FDC 157
Input current	
Current consumption, max.	400 mA; at 20 V input voltage
Current consumption in the case of short-circuit at all spur lines	100 mA; at 24 V input voltage
Power loss	
Power loss, typ.	1.4 W; minimum - typ. specification not possible because load-dependent
Power loss, max.	5.9 W
Interfaces	
PROFIBUS PA	
• Transmission rate, max.	31.25 kbit/s
• Number of connectable PA field devices	6
• Current output to PA field devices, max.	260 mA; max. 180 mA total current of all field devices for operation in the permissible operating voltage range from 16 V to 32 V
• permissible current per spur line	40 mA; first spur line 60 mA
Protocols	
PROFIBUS DP	No
PROFIBUS PA	Yes
AS-Interface	No
FOUNDATION Fieldbus H1	Yes
Interrupts/diagnostics/ status information	
Status indicator	Yes
Alarms	No
Diagnostic functions	Yes
Diagnostics indication LED	
• Main line status	Yes
• Main line failure	Yes
• Spur line status/fault	Yes
• automatic bus termination	Yes
Potential separation	
between main line and spur lines	Yes
Isolation	
Isolation tested with	2 550 V DC
Degree and class of protection	
Degree of protection acc. to EN 60529	
• IP66	Yes

Article number	6ES7655-5DX60-1BB0 ACTIVE FIELD DISTRIBUTOR AFDISD
Standards, approvals, certificates	
Use in hazardous areas	
• ATEX Zone 1	Yes
• ATEX Zone 21	Yes
• ATEX Zone 2	Yes
• ATEX Zone 22	Yes
• FM Class I Zone 1	Yes
• FM Class I Zone 2, Division 2	Yes
• Type of protection acc. to KEMA	14 ATEX 0044
• Test number KEMA	14 ATEX 0044
Ambient conditions	
Ambient temperature during operation	
• min.	-40 °C
• max.	70 °C
Ambient temperature during storage/transportation	
• min.	-40 °C
• max.	70 °C
Relative humidity	
• Operation, max.	95 %
Connection method	
Main line	
• Number of main lines	2
• Design of terminals	Screw terminal block
• Type of connection (enclosure cable gland)	M20
• Type of cable	Type A
• Cable diameter, min.	6 mm
• Cable diameter, max.	13 mm
• Conductor cross-section, min.	0.2 mm^2
• Conductor cross-section, max.	2.5 mm^2
• automatic bus termination	Yes
• permissible main line current	1 A
Spur line	
• Number of spur lines	6
• Design of terminals	Screw terminal block
• Type of connection (enclosure cable gland)	M16
• Type of cable	Type A
• Cable diameter, min.	4 mm
• Cable diameter, max.	9 mm
• Conductor cross-section, min.	0.2 mm^2
• Conductor cross-section, max.	2.5 mm^2
• total current output to field devices, max.	260 mA; max. 180 mA total current of all field devices for operation in the permissible operating voltage range from 16 V to 32 V
• Number of connectable field devices	6
• Current limitation per field device, max.	40 mA; 60 mA on S1
• No-load voltage, max.	15.3 V
• short-circuit proof	Yes
• Short-circuit current (test current); max.	6 mA
• intrinsically safe according to FISCO model	Yes
• Debounce logic	Yes
Dimensions	
Width	380 mm
Height	85 mm
Depth	170 mm
Weights	
Weight, approx.	4 500 g

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Ordering data	Article No.
Active Field Distributor (AFD) For integration of standard-compliant PA or FF field devices	
4 short-circuit-proof spur line connections for 1 field device each	
• AFD4 with cable glands	**6ES7157-0AG81-0XA0**
• AFD4 RAILMOUNT (without enclosure) for mounting on a DIN mounting rail in a suitable enclosure	**6ES7655-5DX40-2AA0**
• AFD4 FM with threaded plugs; cFMus approvals for USA and Canada Note: Cable glands must be ordered separately!	**6ES7655-5DX40-1AA1**
8 short-circuit-proof spur line connections for 1 field device each	
• AFD8 with cable glands	**6ES7157-0AG82-0XA0**
AFDiSD (Active Field Distributor intrinsically Safe with optional extended PROFIBUS PA diagnostics) With 6 short-circuit proof spur line connections for the integration of standard-compliant intrinsically-safe PA or FF field devices	**6ES7655-5DX60-1BB0**

	Article No.
Accessories	
Sealing plugs For unused connections on the AFD and AFDiSD, 10 units	**6ES7157-0AG80-1XA1**
Additional components required for extended fieldbus diagnostics with AFDiSD	
IM 153-2 High Feature Outdoor Interface module for PROFIBUS DP for ET 200M, PA Link and Y-Link; redundancy capable; conformal coating, IP20 degree of protection; permissible operating temperature -25 ... +60 °C	**6ES7153-2BA70-0XB0**
DP/PA coupler FDC 157	**6ES7157-0AC85-0XA0**

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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

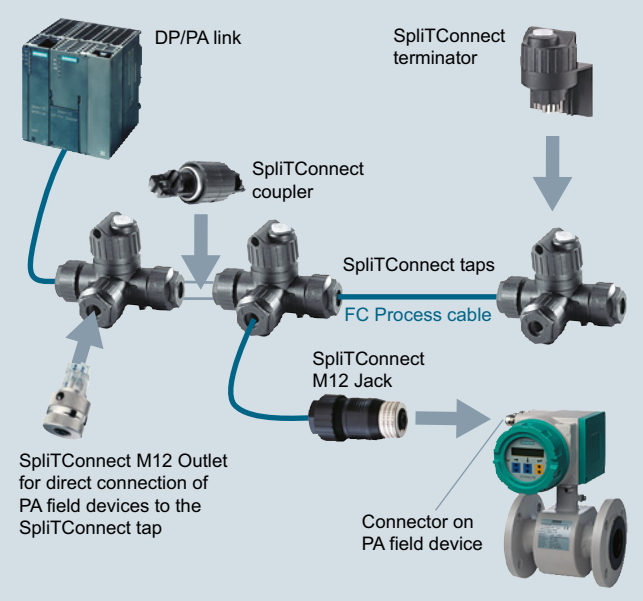


- PROFIBUS FC Process Cable, 2-wire, shielded, blue sheath: for applications in intrinsically safe areas



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**
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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Overview

Depending on operator 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.

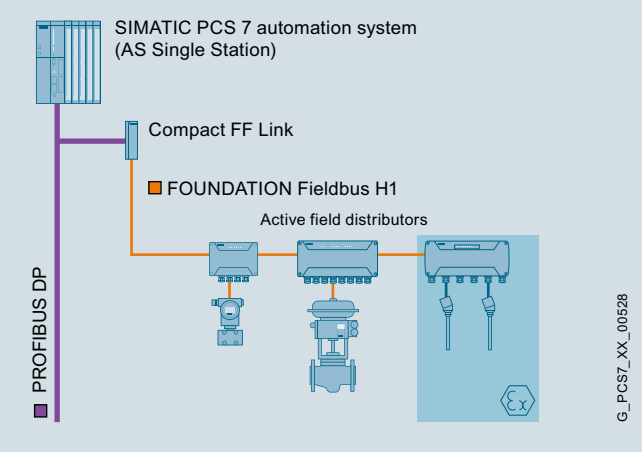
Design

Examples of FOUNDATION Fieldbus H1 architectures

When FOUNDATION Fieldbus H1 is integrated in the SIMATIC PCS 7 process control system, PROFIBUS DP acts as a link. The following graphical representations show possible FOUNDATION Fieldbus H1 architectures with:

- PROFIBUS DP master in non-redundant design (AS Single Station)
- PROFIBUS DP master in redundant design (AS Redundancy Station)

Depending on the configured PROFIBUS DP master, the gateway between PROFIBUS DP and FOUNDATION Fieldbus H1 is formed by a single Compact FF Link (AS Single Station) or a redundant Compact FF Link pair (AS Redundancy Station) (for details, see graphics). One FF fieldbus segment can be operated on each gateway.

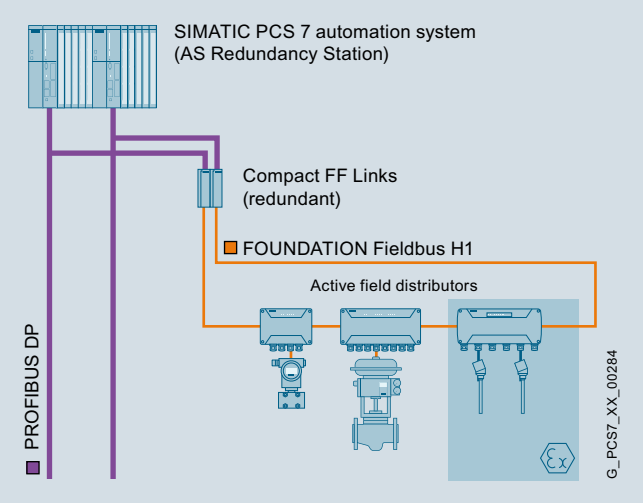


FOUNDATION Fieldbus H1 on an AS Single Station as PROFIBUS DP master

Line architecture with single Compact FF Link

A line segment can be connected to an individual PROFIBUS DP line via a Compact FF Link. The FF-field devices can be integrated into the line segment via AFD active field distributors, e.g. AFD4, AFD4 RAILMOUNT, AFD4 FM and AFD8 (approval for Ex zone 2/22) and AFDiSD (approval for Ex zone 1/21). The FF-field devices are connected to these field distributors using short-circuit-proof spur lines.

Alternatively, it is possible to operate up to 8 AFD field distributors, up to 5 AFDiSD field distributors or any combination of up to 5 AFDiSD and AFD field distributors in a line segment. The last field distributor at the end of the line farthest away from the Compact FF Link automatically activates its bus terminating resistor.



FOUNDATION Fieldbus H1 on an AS Redundancy Station as PROFIBUS DP master

Ring architecture with redundant Compact FF Links

The highest availability can be achieved with a FOUNDATION Fieldbus H1 ring segment, which can be connected to a redundant PROFIBUS DP via a redundant Compact FF Link pair.

The FF field devices are integrated into the ring segment using the short-circuit-proof spur lines of the AFD or AFDiS active field distributors. The number of field distributors is limited as with the line architectures (up to 8 AFD, up to 5 AFDiS or any combination of up to 5 AFDiS and AFD).

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 Compact FF Link during operation is possible.

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Function

Properties of FOUNDATION Fieldbus H1

Like PROFIBUS PA, the FOUNDATION Fieldbus H1 is based on IEC 61158-2. With MBP (Manchester coded Bus Powered) transmission technology, digital data is transmitted and power is supplied to the bus nodes on a shielded two-wire cable. The constant transmission rate is 31.25 Kbps.

Up to 32 bus nodes (Compact FF Link + field devices) can be operated on one fieldbus segment (typically 8 to 12 devices). The field devices are integrated into the fieldbus segment via AFD (approval for Ex zone 2/22) or AFDiS (approval for Ex zone 1/21) active field distributors. Intrinsically-safe FF devices connected via AFDiS active field distributors 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 AFDs (active field distributors) are used, both 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 AFDiSD 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 120 m in accordance with IEC 60079-27 (FISCO)

With AFD active field distributors, the maximum values are reduced if necessary, depending on the number of spur lines of the bus segment (for details, see the "Technical specifications" section). With AFDiSD active field distributors, 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. The gateway between PROFIBUS DP and FOUNDATION Fieldbus H1 is realized with Compact FF Links. Either a single Compact FF Link or a redundant pair is used based on the selected bus architecture (see "Design" section).

Engineering of the FOUNDATION Fieldbus H1 segments is implemented as for PROFIBUS PA. Diagnostic information and configured maintenance information for Compact FF Links and FF devices are available via the SIMATIC PCS 7 Maintenance Station. SIMATIC PCS 7 generates the diagnostics screens automatically.

System requirements

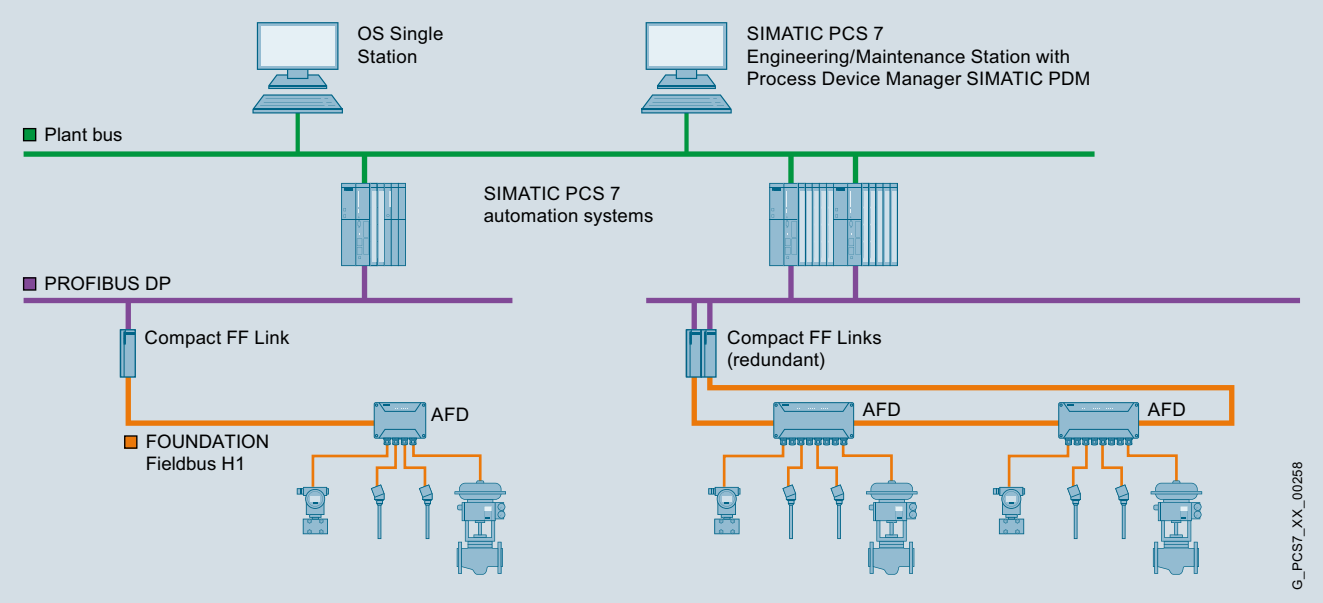
- System software SIMATIC PCS 7 V8.1+ SP1 or higher
- SIMATIC PDM V8.2+SP1 or higher with SIMATIC PDM Communication FOUNDATION Fieldbus

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	
• AFD	8
• AFDiSD or combinations of AFDiSD and AFD	5
Max. total current consumption of all FF field devices	0.5 A
Cable length per segment	1 900 m
Bus segments with AFD	
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 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	120 m

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Overview



Examples of DP/FF gateways with Compact FF Link

A gateway based on the Compact FF Link between PROFIBUS DP and FOUNDATION Fieldbus H1 (FF) enables integration of a fieldbus segment with up to 31 standard-compliant FF-H1 field devices in the SIMATIC PCS 7 process control system. If the PROFIBUS DP master and PROFIBUS DP are implemented without redundancy, the gateway can be realized with a single Compact FF Link. With redundant implementation of the PROFIBUS DP maser and PROFIBUS DP, a redundant Compact FF Link pair is required for the gateway.

The Compact FF Link is simultaneously a slave on PROFIBUS DP and the master on FOUNDATION Fieldbus H1. It decouples the hardware, communication protocols, and time response of the two bus systems.

A PROFIBUS address from 1 to 125 must be assigned for the Compact FF Link. In the case of redundant architecture, identical PROFIBUS addresses must be set for both Compact FF Links.

As the FF Link master, the Compact FF Link controls the distributed communication of the FOUNDATION Fieldbus H1 segment deterministically using LAS (Link Active Scheduler). If the Compact FF Link fails, a redundant partner module or a field device with the "Backup Link Master" property takes over the communication control. FF field devices in an FF segment are thus able to execute closed-loop control functions (Control in the Field) even independent of the higher-level controller.

Design



Compact FF Link

The Compact FF Link is a S7-300 format device, consisting of a PROFIBUS DP interface (DPV1 slave) and a field device coupler for a subordinate FF bus segment. It can operated individually or redundantly in a pair.

The following architectures are thus possible (also refer to "FOUNDATION Fieldbus H1" section under "Design"):

- Single PROFIBUS DP interface (1 × Compact FF Link)
  - Line architecture with single Compact FF Link
- Redundant PROFIBUS DP interface (2 × Compact FF Link)
  - Ring architecture with redundant Compact FF Link pair (link and media redundancy)

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Design (continued)

Compact FF Link in non-redundant operation

If the FF segment is connected to PROFIBUS DP via a single Compact FF Link, the Compact FF Link can be mounted directly on a standard mounting rail.

If the 24 V DC incoming supply is not from a central power supply of the plant, a PS 307 or PS 305 load power supply can be used.

Compact FF Links in redundant operation

In a redundant configuration, the BM Compact FF Link bus module is first mounted on a mounting rail for "hot swapping". The two redundant Compact FF Links are then inserted. This enables a Compact FF Link to be replaced during operation.

In the case of a redundant Compact FF Link pair, a redundant 24 V DC supply is also recommended, e.g. with two PS 307/ PS 305 load power supplies.

Technical specifications

Compact FF Link	
Design and equipment features	
Function	Bus link of PROFIBUS DP (slave functionality) and FOUNDATION Fieldbus H1 (link master functionality) with support of the "Configuration in Run" functionality
Installation type/mounting	Front mounting, preferably on mounting rail
Degree of protection according to EN 60529	IP20
Voltages, currents, potentials	
Rated supply voltage	24 V DC (20.4 V ... 28.8 V)
Input current, max. current consumption	1.3 A
External fusing of power supply lines (recommended)	min. 4 A
Rated output voltage for FF H1	31 V DC ± 1 V
• Overvoltage monitoring	U > 35 V; latching shutdown
• Voltage failure bridging	5 ms
Output current for FF H1 (for supply of all FF field devices)	0.5 A
Power loss	8 W
Galvanic isolation	
• FF H1 to PROFIBUS DP	Yes
• DP master system to FF H1	Yes
• FF H1/24 VDC supply/ PROFIBUS DP	Yes
• All electric circuits/functional grounding	Yes
Frame length	
• Input/output data	244 bytes/244 bytes
• Configuration frame	Max. 244 bytes
• Diagnostics frame	Max. 244 bytes
• Parameter assignment frame	Max. 244 bytes
Interfaces	
Interface hardware	RS 485 - yes; FOC - no
PROFIBUS DP	
• Permissible device addresses	1 to 125
• Transmission rate (automatic detection)	max. 12 Mbps
• Bus protocol/transmission protocol	PROFIBUS DP
• Transmission mode	RS 485
• Connection	9-pin Sub-D plug
FOUNDATION Fieldbus H1	
• Transmission rate	31.25 Kbps
• Bus protocol/transmission protocol	FOUNDATION Fieldbus H1
• Transmission mode	MBP
• Connection	2-pin screw terminal

Status, interrupts, diagnostics	
Status displays	
• Group error	Red LED "SF"
• Bus error on higher level DP master system	Red "BF DP" LED
• Bus error on subordinate FF H1	Red "BF FF" LED
• Active PROFIBUS DP channel	Yellow "ACT DP" LED
• Active FF H1 channel	Yellow "ACT FF" LED
• 24 V DC power supply monitoring	Green "ON" LED
Climatic conditions	
Ambient temperature in operation	
• Horizontal installation	-40 to +70 °C
• Vertical installation	-40 to +50 °C
Permissible storage/transport temperature	-40 to +85 °C
Relative humidity during operation	max. 95%, without condensation
Approvals for potentially explosive atmospheres	
• Gas	ATEX II 3 G Ex nA II T4
• Dust	No
• Equipment Ex ia/Ex ib	No/No
Standards, specifications, approvals	
CE mark according to 2004/108/EC, 94/9/EC	Yes
UL approval	Yes
RCM (formerly C-Tick)	Yes
KC certification	Yes
EAC (formerly Gost-R)	Yes
PROFIBUS standard	IEC 61784-1 CP 3/1
FOUNDATION Fieldbus guideline	IEC 61158-2
Dimensions and weight	
Dimensions (W × H × D) in mm	40 × 125 × 130
Weight	approx. 350 g

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Ordering data	Article No.
Compact FF Link DP/FF gateway, 40 mm wide, FOUNDATION Fieldbus link master, with redundancy capability; physical interface to the FOUNDATION Fieldbus H1 with integrated bus power supply up to 0.5 A and integrated diagnostics; degree of protection IP20; for extended temperature range, permissible operating temperature -40 to +70 °C	**6ES7655-5BA00-0AB0**
Accessories	
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**

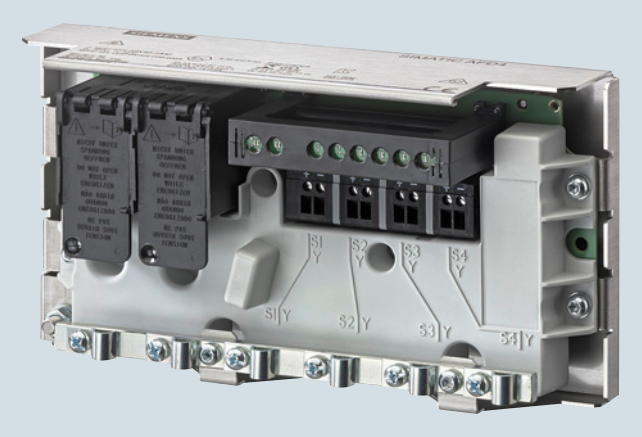
	Article No.
Components for stand-alone operation	
Standard profile rails (without hot swapping function)	
• 482 mm wide (19 inches)	**6ES7390-1AE80-0AA0**
• 530 mm wide	**6ES7390-1AF30-0AA0**
Components for redundant operation	
BM Compact FF Link Bus module for 2 Compact FF Links; for redundant operation	**6ES7655-5EF00-0AA0**
Mounting rail for hot swapping	
• 482 mm wide (19 inches)	**6ES7195-1GA00-0XA0**
• 530 mm wide	**6ES7195-1GF30-0XA0**
• 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 AFD4 RAILMOUNT



Active Field Distributor AFD8

Active Field Distributor AFD

Active field distributors (AFD) can be operated in environments in accordance with Division 2, Zone 2 or Zone 22. It is offered with the following models:

- AFD4, AFD4 RAILMOUNT or AFD4 FM with 4 spur line connections for 1 field device each
- AFD8 with 8 spur line connections for 1 field device each

An AFD4/AFD4 RAILMOUNT/AFD4 FM can therefore integrate up to 4, and an AFD8 up to 8 standard-compliant FF (FOUNDATION Fieldbus H1) field devices via short-circuit proof spur line connections to a fieldbus segment (line/ring) with automatic bus termination.

The FF fieldbus segment can be connected to a single or redundant PROFIBUS DP via an FF gateway and can thus be seamlessly integrated into the SIMATIC PCS 7 process control system.

Up to 8 active field distributors AFD with a total of up to 31 connected field devices can be operated for each 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 0.5 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.

Based on the AFD4, two product versions with different intentions were developed with the AFD4 RAILMOUNT and the AFD4 FM:

Specific product features of the AFD4 RAILMOUNT

The AFD4 RAILMOUNT is supplied without die-cast aluminum enclosure; it is a product model of the AFD4 active field distributor with flexible installation options. It can be installed on a DIN mounting rail into an enclosure of choice, for example, an enclosure made of stainless steel, die-cast aluminum or plastics.

Specific product features of the AFD4 FM

The AFD4 FM with cFMus approval is adapted to the special requirements for product models of the AFD4 active field distributor in the USA and Canada. The AFD4 FM features threaded plugs ex factory, because the cable glands of the AFD4 do not conform to the requirements of cFMus.

The threaded plugs for connecting the main and spur lines must be replaced by the cable glands and cables listed by UL or CSA. This must conform to the US National Electrical Code (NEC) and Canadian Electrical Code (CEC). The user is responsible for the selection and ordering.

Available suppliers for suitable cable glands:

- Cooper Capri SAS
- CMP products

Due to the larger bushing for the main line (M20 instead of M16), sheathed main line cables can also be used for AFD4 FM.

The relevant requirements of the US National Electrical Code (ANSI/NFPA-70 NEC) must be met for the installation of the AFD4 FM.

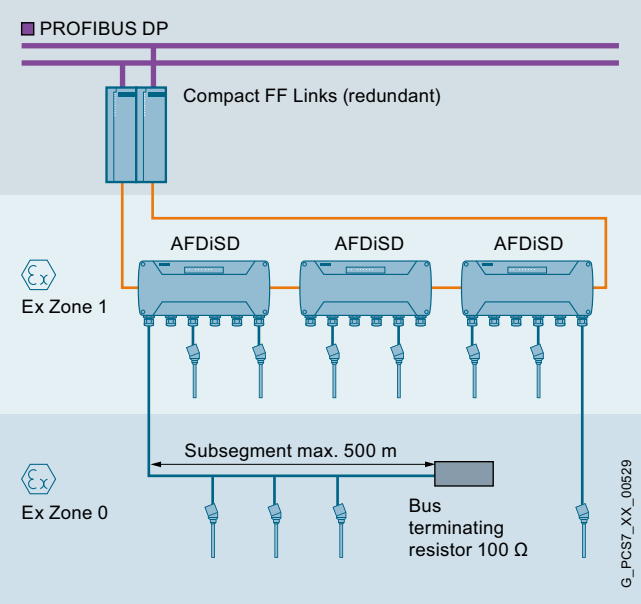
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Overview (continued)

AFDiSD active field distributor



AFDiSD active field distributor



The AFDiS (Active Field Distributor intrinsically Safe) is an active field distributor for operating environments in accordance with Ex zones 1/21 and 2/22. It can integrate up to 6 intrinsically-safe FF field devices into an FF 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.

Up to 5 AFDiS field distributors 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 0.5 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.

In environments in accordance with Ex zone 2/22 or in non-hazardous areas, an AFDiSD 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.

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Technical specifications

Article number	**6ES7157-0AG81-0XA0** ACTIVE FIELD DISTRIBUTOR AFD4	**6ES7655-5DX40-2AA0** ACTIVE FIELD DISTRIBUTOR AFD4 RAILMOUNT	**6ES7655-5DX40-1AA1** ACTIVE FIELD DISTRIBUTOR AFD4 FM	**6ES7157-0AG82-0XA0** ACTIVE FIELD DISTRIBUTOR AFD8
General information				
Product type designation	Active field distributor	Active field distributor	Active field distributor	Active field distributor
Product description			AFD4 FM	
Product function				
• Repeater function	No	No	No	No
Supply voltage				
permissible range, lower limit (DC)	16 V	16 V	16 V	16 V
permissible range, upper limit (DC)	32 V	32 V	32 V	32 V
Reverse polarity protection	Yes; only in conjunction with FDC 157			Yes; only in conjunction with FDC 157
Overvoltage protection	No			No
Input current				
Current consumption (in no-load operation), typ.	24 mA; 54 mA at the end of the cable	24 mA; 54 mA at the end of the cable	24 mA; 54 mA at the end of the cable	34 mA; 64 mA at the end of the cable
Current consumption, max.	264 mA			514 mA
Power loss				
Power loss, typ.	384 mW	384 mW	384 mW	544 mW
Power loss, max.	3.2 W	3.2 W	3.2 W	4.1 W
Interfaces				
PROFIBUS PA				
• Transmission rate, max.	31.25 kbit/s	31.25 kbit/s	31.25 kbit/s	31.25 kbit/s
• Number of connectable PA field devices	4	4	4	8
• Current output to PA field devices, max.	240 mA	240 mA	240 mA	480 mA
• permissible current per spur line	60 mA	60 mA	60 mA	60 mA
Protocols				
PROFIBUS DP	No		No	No
PROFIBUS PA	Yes	Yes	Yes	Yes
AS-Interface	No		No	No
FOUNDATION Fieldbus H1	Yes	Yes	Yes	Yes
Interrupts/diagnostics/status information				
Status indicator	Yes	Yes	Yes	Yes
Alarms	No	No	No	No
Diagnostic functions	Yes	Yes	Yes	Yes
Diagnostics indication LED				
• Main line status	Yes	Yes	Yes	Yes
• Main line failure	Yes			Yes
• Spur line status/fault	Yes	Yes	Yes	Yes
• automatic bus termination	Yes	Yes	Yes	Yes
Potential separation				
between main line and spur lines	No	No	No	No
Degree and class of protection				
Degree of protection acc. to EN 60529				
• IP66	Yes	No	Yes	Yes
Standards, approvals, certificates				
Use in hazardous areas				
• ATEX Zone 1	No	No	No	No
• ATEX Zone 21	No	No	No	No
• ATEX Zone 2	Yes	Yes	Yes	Yes
• ATEX Zone 22	Yes	Yes	Yes	Yes
• FM Class I Zone 1	No	No	No	No
• FM Class I Zone 2, Division 2	Yes	Yes	Yes	Yes

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Technical specifications (continued)

Article number	**6ES7157-0AG81-0XA0** ACTIVE FIELD DISTRIBUTOR AFD4	**6ES7655-5DX40-2AA0** ACTIVE FIELD DISTRIBUTOR AFD4 RAILMOUNT	**6ES7655-5DX40-1AA1** ACTIVE FIELD DISTRIBUTOR AFD4 FM	**6ES7157-0AG82-0XA0** ACTIVE FIELD DISTRIBUTOR AFD8
Ambient conditions				
Ambient temperature during operation				
• min.	-40 °C	-40 °C	-40 °C	-40 °C
• max.	70 °C	70 °C	70 °C	70 °C
Ambient temperature during storage/ transportation				
• min.	-40 °C	-40 °C	-40 °C	-40 °C
• max.	85 °C	70 °C	85 °C	85 °C
Relative humidity				
• Operation, max.	95 %			95 %
Connection method				
Main line				
• Number of main lines	2	2	2	2
• Design of terminals	Screw terminal block	Screw terminal block	Screw terminal block	Screw terminal block
• Type of connection (enclosure cable gland)	M16		M20	M16
• Type of cable	Type A	Type A	Type A	Type A
• Cable diameter, min.	4 mm		6 mm	4 mm
• Cable diameter, max.	9 mm		13 mm	9 mm
• Conductor cross-section, min.	0.2 mm^2	0.2 mm^2	0.2 mm^2	0.2 mm^2
• Conductor cross-section, max.	2.5 mm^2	2.5 mm^2	2.5 mm^2	2.5 mm^2
• automatic bus termination	Yes	Yes	Yes	Yes
• permissible main line current	1 A	1 A	1 A	1 A
Spur line				
• Number of spur lines	4	4	4	8
• Design of terminals	Screw terminal block		Screw terminal block	Screw terminal block
• Type of connection (enclosure cable gland)	M16		M16	M16
• Type of cable	Type A	Type A	Type A	Type A
• Cable diameter, min.	4 mm		4 mm	4 mm
• Cable diameter, max.	9 mm		9 mm	9 mm
• Conductor cross-section, min.	0.2 mm^2	0.2 mm^2	0.2 mm^2	0.2 mm^2
• Conductor cross-section, max.	2.5 mm^2	2.5 mm^2	2.5 mm^2	2.5 mm^2
• total current output to field devices, max.	240 mA	240 mA	240 mA	480 mA
• Number of connectable field devices	4	4	4	8
• Current limitation per field device, max.	60 mA	60 mA	60 mA	60 mA
• No-load voltage, max.	30 V		30 V	
• Short-circuit current (test current); max.	6 mA	6 mA	6 mA	6 mA
• intrinsically safe according to FISCO model	No	No	No	No
• Debounce logic	Yes	Yes	Yes	Yes
Dimensions				
Width	220 mm	220 mm	220 mm	360 mm
Height	120 mm; without screw glands	120 mm	120 mm	120 mm; without screw glands
Depth	83 mm	83 mm	83 mm	83 mm
Weights				
Weight, approx.	2 000 g	1 000 g	2 000 g	3 000 g

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Technical specifications (continued)

Article number	6ES7655-5DX60-1BB0 ACTIVE FIELD DISTRIBUTOR AFDISD
General information	
Product type designation	Active field distributor
Product description	Active field distributor with diagnostics
Product function	
• Repeater function	Yes
Supply voltage	
Design of the power supply	via fieldbus
permissible range, lower limit (DC)	16 V
permissible range, upper limit (DC)	32 V
Reverse polarity protection	Yes; only in conjunction with FDC 157
Overvoltage protection	Yes; only in conjunction with FDC 157
Input current	
Current consumption, max.	400 mA; at 20 V input voltage
Current consumption in the case of short-circuit at all spur lines	100 mA; at 24 V input voltage
Power loss	
Power loss, typ.	1.4 W; minimum - typ. specification not possible because load-dependent
Power loss, max.	5.9 W
Interfaces	
PROFIBUS PA	
• Transmission rate, max.	31.25 kbit/s
• Number of connectable PA field devices	6
• Current output to PA field devices, max.	260 mA; max. 180 mA total current of all field devices for operation in the permissible operating voltage range from 16 V to 32 V
• permissible current per spur line	40 mA; first spur line 60 mA
Protocols	
PROFIBUS DP	No
PROFIBUS PA	Yes
AS-Interface	No
FOUNDATION Fieldbus H1	Yes
Interrupts/diagnostics/status information	
Status indicator	Yes
Alarms	No
Diagnostic functions	Yes
Diagnostics indication LED	
• Main line status	Yes
• Main line failure	Yes
• Spur line status/fault	Yes
• automatic bus termination	Yes
Potential separation	
between main line and spur lines	Yes
Isolation	
Isolation tested with	2 550 V DC
Degree and class of protection	
Degree of protection acc. to EN 60529	
• IP66	Yes

Article number	6ES7655-5DX60-1BB0 ACTIVE FIELD DISTRIBUTOR AFDISD
Standards, approvals, certificates	
Use in hazardous areas	
• ATEX Zone 1	Yes
• ATEX Zone 21	Yes
• ATEX Zone 2	Yes
• ATEX Zone 22	Yes
• FM Class I Zone 1	Yes
• FM Class I Zone 2, Division 2	Yes
• Type of protection acc. to KEMA	14 ATEX 0044
• Test number KEMA	14 ATEX 0044
Ambient conditions	
Ambient temperature during operation	
• min.	-40 °C
• max.	70 °C
Ambient temperature during storage/transportation	
• min.	-40 °C
• max.	70 °C
Relative humidity	
• Operation, max.	95 %
Connection method	
Main line	
• Number of main lines	2
• Design of terminals	Screw terminal block
• Type of connection (enclosure cable gland)	M20
• Type of cable	Type A
• Cable diameter, min.	6 mm
• Cable diameter, max.	13 mm
• Conductor cross-section, min.	0.2 mm^2
• Conductor cross-section, max.	2.5 mm^2
• automatic bus termination	Yes
• permissible main line current	1 A
Spur line	
• Number of spur lines	6
• Design of terminals	Screw terminal block
• Type of connection (enclosure cable gland)	M16
• Type of cable	Type A
• Cable diameter, min.	4 mm
• Cable diameter, max.	9 mm
• Conductor cross-section, min.	0.2 mm^2
• Conductor cross-section, max.	2.5 mm^2
• total current output to field devices, max.	260 mA; max. 180 mA total current of all field devices for operation in the permissible operating voltage range from 16 V to 32 V
• Number of connectable field devices	6
• Current limitation per field device, max.	40 mA; 60 mA on S1
• No-load voltage, max.	15.3 V
• short-circuit proof	Yes
• Short-circuit current (test current); max.	6 mA
• intrinsically safe according to FISCO model	Yes
• Debounce logic	Yes
Dimensions	
Width	380 mm
Height	85 mm
Depth	170 mm
Weights	
Weight, approx.	4 500 g

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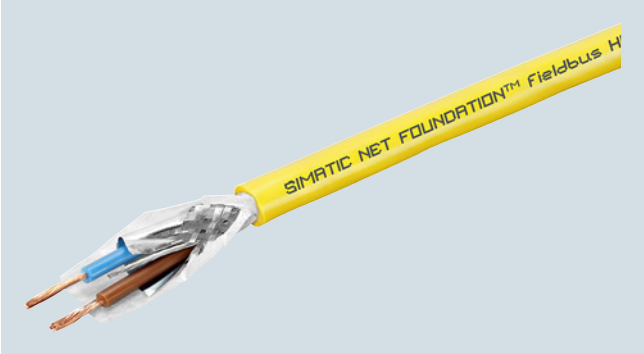
Ordering data	Article No.
Active Field Distributor (AFD) For integration of standard-compliant PA or FF field devices	
4 short-circuit-proof spur line connections for 1 field device each	
• AFD4 with cable glands	**6ES7157-0AG81-0XA0**
• AFD4 RAILMOUNT (without enclosure) for mounting on a DIN mounting rail in a suitable enclosure	**6ES7655-5DX40-2AA0**
• AFD4 FM with threaded plugs; cFMus approvals for USA and Canada Note: Cable glands must be ordered separately!	**6ES7655-5DX40-1AA1**
8 short-circuit-proof spur line connections for 1 field device each	
• AFD8 with cable glands	**6ES7157-0AG82-0XA0**
AFDiSD (Active Field Distributor intrinsically Safe with optional extended PROFIBUS PA diagnostics) with 6 short-circuit proof spur line connections for the integration of standard-compliant intrinsically-safe PA or FF field devices	**6ES7655-5DX60-1BB0**
Accessories	
Sealing plugs For unused connections on the AFD and AFDiSD, 10 units	**6ES7157-0AG80-1XA1**

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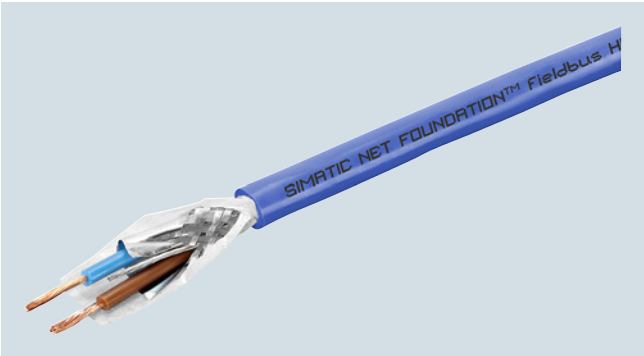
Overview

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

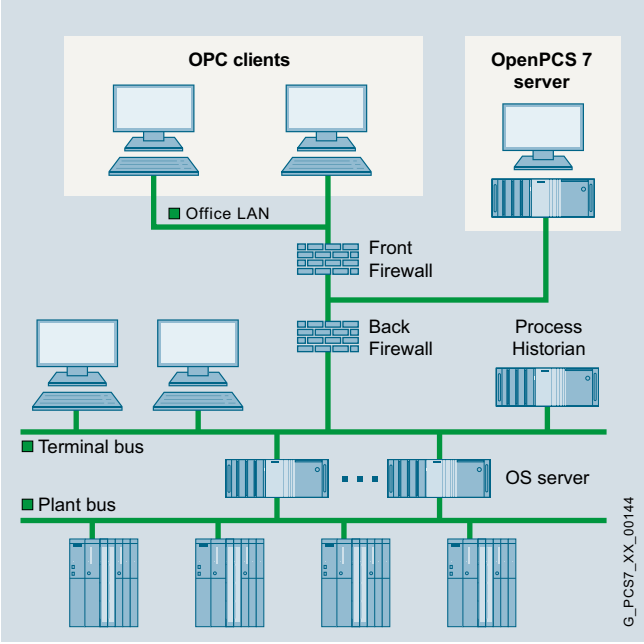


Ordering data

	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	

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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

- time period (OS1/OS2/…)
- 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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Ordering data

	Article No.
Multi-functional OpenPCS 7 Server/OS Client	
SIMATIC PCS 7 OpenPCS 7/ OS Client V9.0 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 10 Enterprise 2015 LTSB 64-bit (see SIMATIC PCS 7 V9.0 Readme for the latest information), single license for 1 installation No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	**6ES7658-0GX58-2YB0**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7658-0GX58-2YH0**

	Article No.
Autonomous OpenPCS 7 server	
SIMATIC PCS 7 OpenPCS 7 V9.0 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 10 Enterprise 2015 LTSB 64-bit (see SIMATIC PCS 7 V9.0 Readme for the latest information), single license for 1 installation No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	**6ES7658-0HX58-2YB0**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7658-0HX58-2YH0**

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



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.

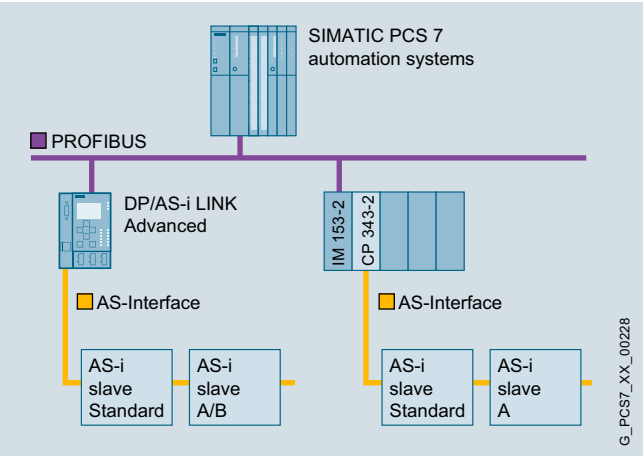
Design



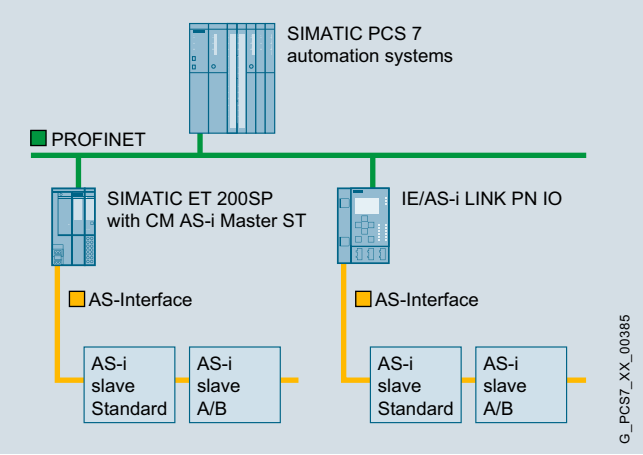
IE/AS-i LINK PN IO (single master and double master)

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

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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.

Note:

The CP 343-2 and CP 343-2P AS-i masters transfer I/O data from AS-i slaves with a B address via data records and not via the cyclic process image (partition). To prevent delays in the communication process of the driver blocks for B slaves, it is recommended to avoid using AS-i slaves with B addresses for SIMATIC PCS 7 configurations with CP 343-2 or CP 343-2P.

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) interface	**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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Notes

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11/2 Introduction

11/6 Central I/O for SIMATIC PCS 7
11/6 Central I/O Modules
11/7 Expansion Units for Central I/O

11/8 Power Supplies
11/9 Single-Phase Power Supplies, 24 V DC
11/10 Single and 2-Phase Power Supplies 24 V DC
11/11 3-phase modular power supplies, 24 V DC
11/12 3-phase power supply system, 24 V DC
11/14 Expansion Modules
11/16 SITOP DC UPS Uninterruptible Power Supplies

11/19 SIMATIC CFU
11/21 Basic Device
11/26 Bundles
11/27 Accessories

11/29 SIMATIC ET 200SP HA
11/32 Interface Module
11/34 Digital I/O Modules
11/42 Analog I/O Modules
11/48 Digital/Analog Module
11/51 Carrier Modules
11/54 Terminal Blocks
11/56 BusAdapter

11/57 SIMATIC ET 200iSP
11/59 Power Supply Unit
11/61 Interface Module
11/64 Digital Electronics Modules
11/72 Analog Electronics Modules
11/79 Safety-related electronics modules
11/84 Watchdog module
11/85 RS 485-iS Coupler
11/87 Stainless Steel Wall Enclosure

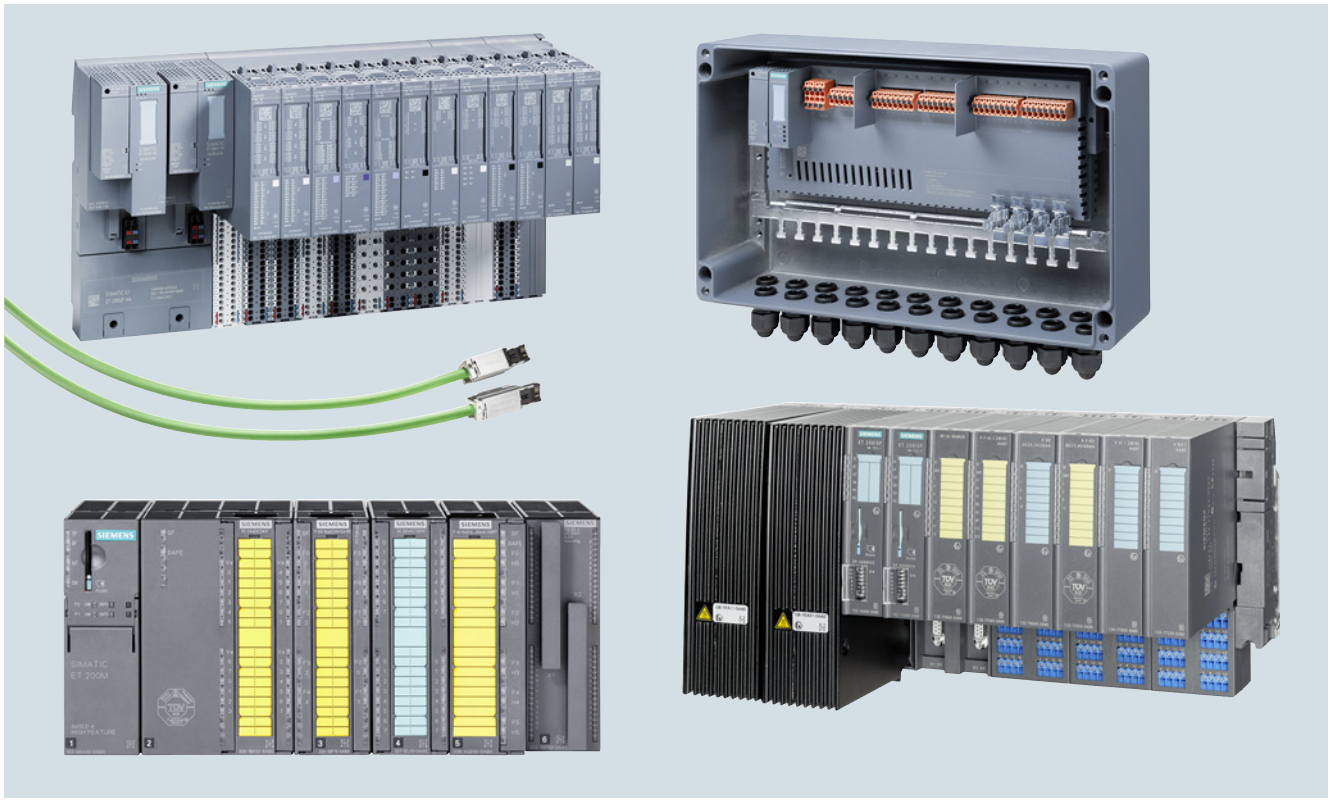
11/89 SIMATIC ET 200M for SIMATIC PCS 7
11/90 Power Supply
11/91 Interface Modules
11/92 Accessories
11/94 Bundles
11/95 Digital Modules
11/100 Analog Modules
11/103 Analog Modules with HART
11/110 Ex Digital/Analog Modules
11/116 F Digital/Analog Modules
11/118 Control Modules
11/120 Counter Modules
11/121 MTA Terminal Modules

11/125 SIMATIC ET 200SP for SIMATIC PCS 7
11/128 Interface modules and BusAdapters
11/130 BaseUnits and I/O modules
11/132 Digital I/O modules
11/134 Analog I/O modules

11/136 SIMATIC ET 200pro for SIMATIC PCS 7
11/138 IM 154-2 DP High Feature Interface Module
11/139 Digital Electronics Modules EM 141, EM 142
11/140 Analog Electronics Modules EM 144, EM 145
11/142 Safety-related Electronics Modules
11/143 Power Module PM-E
11/144 Power Supply for ET 200pro

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Overview



SIMATIC ET 200 remote I/O stations for SIMATIC PCS 7 (main SIMATIC ET 200SP HA, SIMATIC CFU PA, SIMATIC ET 200M and SIMATIC ET 200iSP series)

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 200pro)
  - PROFINET IO (ET 200SP HA, SIMATIC CFU, ET 200M, ET 200SP)
- 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

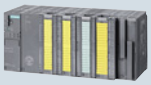
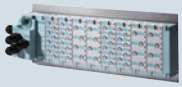
Especially convincing arguments for distributed process I/O include:

- 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

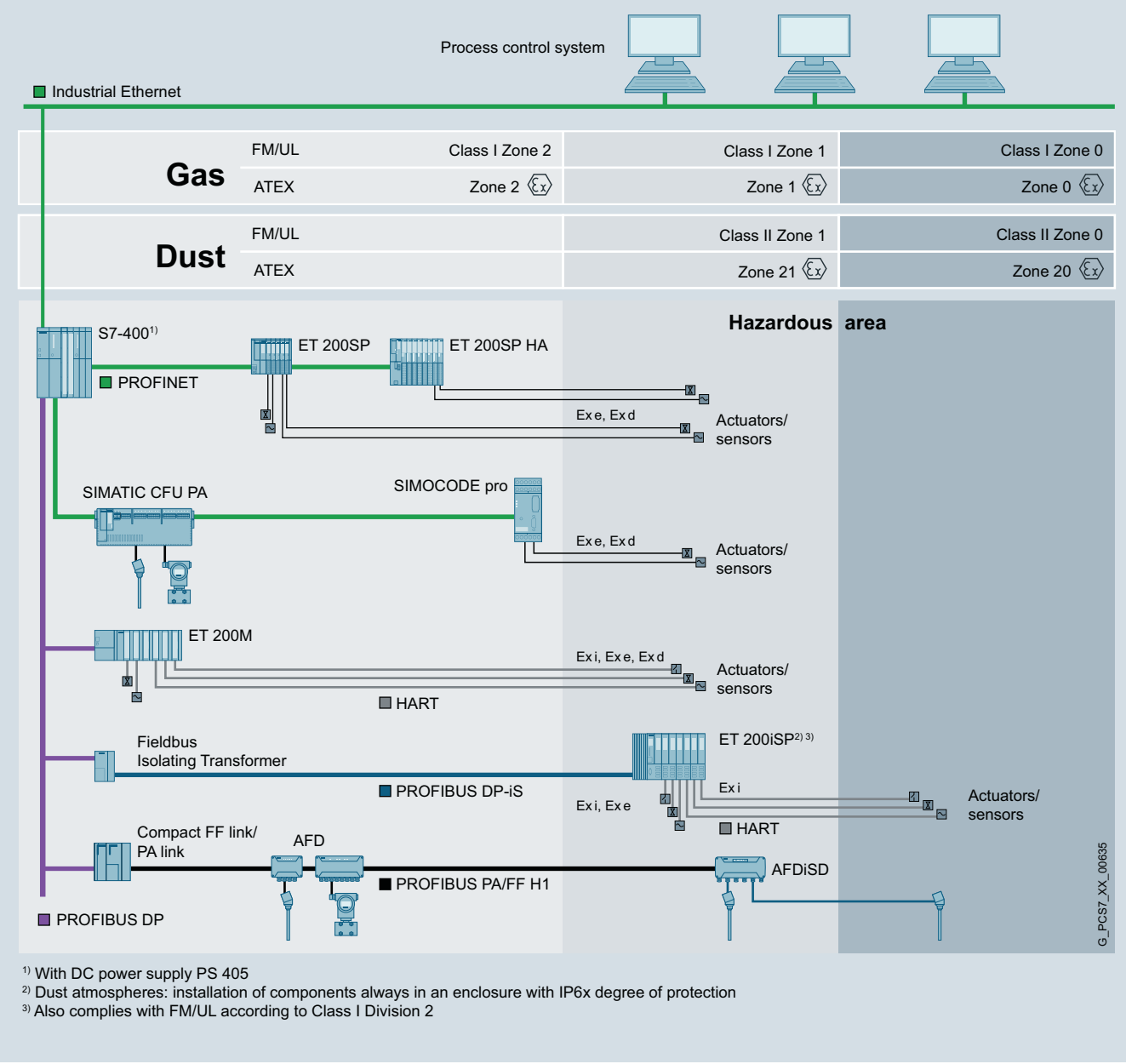
I/O system	SIMATIC CFU	ET 200SP HA	ET 200iSP	ET 200M	ET 200SP	ET 200pro
						
Design						
Degree of protection	IP20	IP20	IP30	IP20	IP20	IP65/IP66/IP67
Design	Compact	Modular	Modular	Modular	Discretely scalable	Modular
Assembly	Mounting rail	Mounting rail	Mounting rail	Mounting rail	Standard mounting rail	Mounting rail
Connection system for sensors/actuators	Multi-wire connection screw-type connections	Multi-wire connection Push-in terminals	Multi-wire connection Spring-loaded/ screw-type connections	Single-wire connection Spring-loaded/ screw-type connections, FastConnect, TopConnect	Single/multi-conductor connection Push-in terminals	M8, M12, M23
Special applications						
Safety engineering	–	–	●	●	–	●
For use in hazardous areas	Zones 2, 22	Zone 2	Zones 1, 21	Zone 2	Zone 2	–
Increased availability	Redundant	Switched, redundant	Switched, redundant	Switched, redundant	–	–
Temperature range	-40 to +70 °C (horizontal)	-40 to +70 °C (horizontal)	-20 … +70 °C (horizontal)	0 … +60 °C[1] (horizontal))	0 … +60 °C[1)] (horizontal)	-25 … +55 °C (horizontal)
Vibration resistance (continuous)	1 g	1 *g*	1 *g*	1 *g*	Up to 5 *g*	5 *g* (module-dependent)
Communication						
PROFIBUS (Cu/FO)	– / –	– / –	● / – (1.5 Mbps)	● / – (12 Mbps)	● / –	● / ● (12 Mbps)
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	Channel-discrete
Functions						
Digital channels	●	●	●	●	●	●
Analog channels	●	●	●	●	●	●
incl. HART	PROFIBUS PA	●	●	●	●	–
Motor starter	–	Available soon	–	–	–	–
Pneumatic interface	–	Available soon	●	–	–	–
Technological functions	Available soon	Available soon	Counting, frequency measuring	Counting/measuring, controlling, weighing	–	–

[1)] Also available as a SIPLUS component for extended temperature range -25/-40 … +60/+70 °C and corrosive atmosphere/condensation (see details at www.siemens.com/siplus)

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Design (continued)

Integration of process I/O in the hazardous area



1) With DC power supply PS 405
2) Dust atmospheres: installation of components always in an enclosure with IP6x degree of protection
3) Also complies with FM/UL according to Class I Division 2

Process I/O in explosive gas and dust atmospheres

The figure shows the possible applications for the SIMATIC PCS 7 process I/O with consideration of different environmental conditions.

Field devices on the PROFIBUS PA or FOUNDATION Fieldbus H1

Field devices 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 AFDiSD is required for field devices in Ex zones 0, 1, 20 or 21.

ET 200iSP distributed I/O

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 200SP HA distributed I/O

ET 200M, ET 200SP and ET 200SP HA remote I/O stations can be used in Ex zone 2 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.

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Design (continued)

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		
Remote I/O	**PROFIBUS DP**	**PROFINET**
SIMATIC ET 200SP HA		• Adding ET 200SP HA stations • Adding I/O modules to the station • Changing the parameter settings of I/O modules • Configuration of connected HART field devices with SIMATIC PDM
SIMATIC CFU		• Adding CFU • Adding field devices to CFU • Changing the parameter settings of the CFU and connected PROFIBUS PA field devices over SIMATIC PDM
SIMATIC 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	
SIMATIC 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	
SIMATIC 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.

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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:

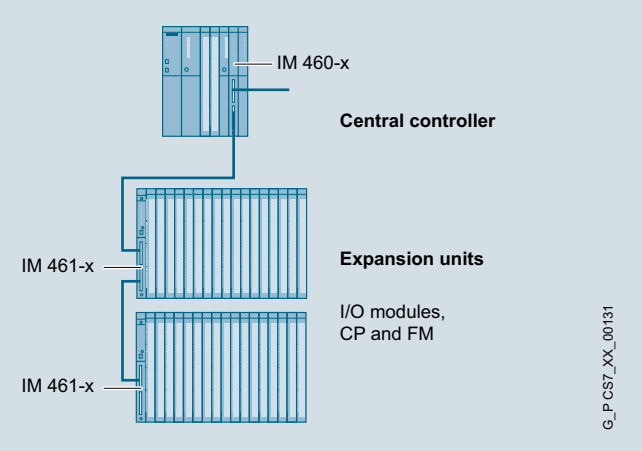
- Catalog ST 70 or
- Industry Mall/CA 01 under "Automation technology – Automation systems – SIMATIC industrial automation systems – Controllers – Advanced Controller – S7-400/S7-400H/ S7-400F/FH"

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



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 • 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	**6ES7460-0AA01-0AB0**
IM 461-0 Interface Module Corresponding receiver module for the expansion unit	**6ES7461-0AA01-0AA0**
IM 460-1 Interface Module • 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	**6ES7460-1BA01-0AB0**
IM 461-1 Interface Module Corresponding receiver module for the expansion unit	**6ES7461-1BA01-0AA0**
IM 460-3 Interface Module • 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	**6ES7460-3AA01-0AB0**
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**

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Overview



SITOP modular



SITOP add-on modules and UPS1600

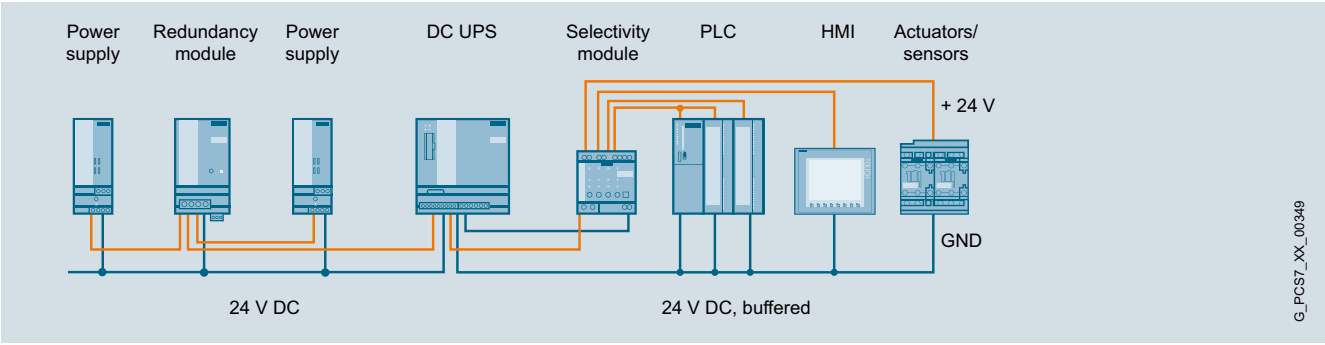
A reliable 24-V power supply is a basic condition for every plant operation. With MTBF ratings of up to 1 million hours at full load in continuous operation, SITOP power supplies meet the particularly stringent requirements for process automation.

For world-wide use, the 1, 2 or 3-phase DIN rails provide a wide ambient temperature range of -25 … +70 °C as well as comprehensive international approvals such as ATEX, Class I Div2, IECex or GL.

The innovative SITOP PSU8600 power supply system can be fully integrated in the plant via PROFINET and thereby offers completely new configuration and diagnostic capabilities. It is thus possible to individually adjust and monitor the voltage and current of each output. For the first time, users have access to information about the control circuit including energy flow data.

24-V power units with output capacities up to 1000 W can be individually adapted to the plant configuration and plant expansion and combined with redundancy, selectivity or DC USP modules. This means that you can expand the system to even include complete all-round protection.

The SITOP library is available with blocks and faceplates for direct integration into SIMATIC PCS 7. This means that PCS 7 users automatically receive information about operating states, maintenance requirements (e.g. battery replacement) and faults (e.g. power failure, short-circuit or overload in 24V circuits).



24 V DC power supply with add-on modules and DC UPS

More information

You can find detailed information and technical specifications for the 1-phase, 2-phase and 3-phase SITOP modular power supplies, for the SITOP PSU8600 power supply system, for the redundancy, buffer and selectivity modules, as well as for corresponding 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 power supply and DC UPS for your specific application easily and quickly:
www.siemens.com/sitop-selection-tool

SITOP library for SIMATIC PCS 7

SIMATIC PCS 7 V8.0 with SP2, V8.1, V8.1 with SP1, V8.2 are supported.
https://support.industry.siemens.com/cs/ww/en/view/109476154

SIMATIC PCS 7 Standard Architectures manual (chapter 18, 24 V DC supply concepts)

https://support.industry.siemens.com/cs/ww/en/view/109739629

Application example: Integration of a SITOP 24V power supply in SIMATIC PCS 7

https://support.industry.siemens.com/cs/ww/de/view/109481908

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Overview

- 24 V DC/5 A, 10 A, 20 A and 40 A
- Single-phase wide-range input allows connection to any supply system and ensures safety in the case of voltage supply deviations
- Extremely slim design – no lateral installation clearances required
- Power Boost with 3 times the rated current (for 25 ms) for tripping protective devices
- Extra power with 1.5 times the rated current (5 s/min) for brief, operational overload
- Optional short-circuit behavior between constant current and restart
- Optional symmetrical load distribution for parallel operation
- Operating status display on 3 LEDs
- Extremely high efficiency up to 94%
- Large temperature range from -25 °C to +70 °C
- Comprehensive certifications, such as cULus, ATEX, IECex or GL
- Direct integration in SIMATIC PCS 7 via SITOP library

Design

Product overview

Modules		Versions	Input	Output
Power supplies				
	SITOP modular, 1-phase, 24 V DC	PSU8200, 5 A	120/230 V AC	24 V DC, 5 A
		PSU8200, 10 A	120/230 V AC	24 V DC, 10 A
	SITOP modular, 1-phase, 24 V DC	PSU8200, 20 A	120 ... 230 V AC/DC	24 V DC, 20 A
		PSU8200, 40 A	120/230 V AC	24 V DC, 40 A

Ordering data

	Article No.
SITOP modular power supplies, 1-phase, 24 V DC	
SITOP PSU8200, 1-phase, 24 V DC, 5 A Stabilized power supply Input: 120/230 V AC Output: 24 V DC/5 A	**6EP3333-8SB00-0AY0**
SITOP PSU8200, 1-phase, 24 V DC, 10 A Stabilized power supply Input: 120/230 V AC Output: 24 V DC/10 A	**6EP3334-8SB00-0AY0**
SITOP PSU8200, 1-phase, 24 V DC, 20 A Stabilized power supply Input: 120 … 230 V AC / 110 … 220 V DC Output: 24 V DC/20 A	**6EP1336-3BA10**
SITOP PSU8200, 1-phase, 24 V DC, 40 A Stabilized power supply Input: 120/230 V AC Output: 24 V DC/40 A	**6EP3337-8SB00-0AY0**

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Single and 2-Phase Power Supplies 24 V DC

Overview

- 24 V DC/5 A and 10 A, also available as version with PCB with protective coating.
- 1-phase and 2-phase ultra-wide input range
- Extremely slim design – no lateral installation clearances required
- Power Boost with 3 times the rated current (for 25 ms) for tripping protective devices
- Extra power with 1.5 times the rated current (5 s/min) for brief, operational overload
- Optional short-circuit behavior between constant current and restart
- Optional symmetrical load distribution for parallel operation
- Operating status display on 3 LEDs
- High degree of efficiency of up to 91%
- Large temperature range from -25 °C to +70 °C
- Comprehensive certifications, such as cULus, ATEX, IECex or GL
- Direct integration in SIMATIC PCS 7 via SITOP library

Design

Product overview

Modules		Versions	Input	Output
Power supplies				
	SITOP modular, 1-phase and 2-phase, 24 V DC	PSU200M, 5 A	120/230 ... 500 V AC	24 V DC, 5 A
		PSU200M, 10 A	120/230 ... 500 V AC	24 V DC, 10 A
	SITOP modular PLUS, 1-phase and 2-phase, 24 V DC, with protective coating	PSU200M, 5 A	120/230 ... 500 V AC	24 V DC, 5 A
		PSU200M, 10 A	120/230 ... 500 V AC	24 V DC, 10 A

Ordering data

	Article No.
SITOP modular power supplies, 1-phase and 2-phase, 24 V DC	
SITOP PSU200M, 1-phase and 2-phase, 24 V DC, 5 A Stabilized power supply Input: 120 … 230 V / 230 … 500 V AC Output: 24 V DC/5 A	**6EP1333-3BA10**
SITOP PSU200M PLUS, 1-phase and 2-phase, 24 V DC, 5 A Stabilized power supply Input: 120 … 230 V / 230 … 500 V AC Output: 24 V DC/5 A Version with protective coating	**6EP1333-3BA10-8AC0**
SITOP PSU200M, 1-phase and 2-phase, 24 V DC, 10 A Stabilized power supply Input: 120 … 230 V / 230 … 500 V AC Output: 24 V DC/10 A	**6EP1334-3BA10**
SITOP PSU200M PLUS, 1-phase and 2-phase, 24 V DC, 10 A Stabilized power supply Input: 120 … 230 V / 230 … 500 V AC Output: 24 V DC/10 A Version with protective coating	**6EP1334-3BA10-8AB0**

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Overview

- 24 V DC/20 A and 40 A
- 3-phase wide-range input from 320 to 575 V AC for global use
- Extremely slim design – no lateral installation clearances required
- Power Boost with 3 times the rated current (for 25 ms) for tripping protective devices
- Extra power with 1.5 times the rated current (5 s/min) for brief, operational overload
- Optional short-circuit behavior between constant current and restart
- Optional symmetrical load distribution for parallel operation
- Operating status display on 3 LEDs
- Extremely high efficiency up to 94%
- Large temperature range from -25 °C to +70 °C
- Comprehensive certifications, such as cULus, ATEX, IECex and GL
- Direct integration in SIMATIC PCS 7 via SITOP library

Design

Product overview

Modules		Versions	Input	Output
Power supplies				
	SITOP modular, 3-phase, 24 V DC	PSU8200, 20 A	3 AC 400 ... 500 V	24 V DC, 20 A
		PSU8200, 40 A	3 AC 400 ... 500 V	24 V DC, 40 A

Ordering data

	Article No.
SITOP modular power supplies, 3-phase, 24 V DC	
SITOP PSU8200, 3-phase, 24 V DC, 20 A Stabilized power supply Input: 3 AC 400 … 500 V Output: 24 V DC/20 A	**6EP3436-8SB00-0AY0**
SITOP PSU8200, 3-phase, 24 V DC, 40 A Stabilized power supply Input: 3 AC 400 … 500 V Output: 24 V DC/40 A	**6EP1437-3BA10**

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3-phase power supply system, 24 V DC

Overview



The unique SITOP PSU8600 power supply system sets new standards for industrial power supplies. Voltage and current response thresholds can be set individually for each output of this power supply system. Selective monitoring of each output for overload also enables fast fault location. Depending on requirements, additional modules from the modular system can be added without wiring overhead, for example, to buffer against transient power failures.

Comprehensive diagnostic and maintenance information is available via PROFINET and can be evaluated and visualized directly in SIMATIC PCS 7. Optimal support is also provided for energy management of a plant: From the acquisition of energy data from individual outputs, the specific activation and deactivation of outputs via PROFIenergy, to direct integration in power management systems.

Special features

- Reduced space requirement and costs due to multiple integrated outputs with selective monitoring
- Individually configurable outputs (voltage from 5 V to 28 V, power response threshold value from 0.5 A to 5 A or 10 A)
- Compensation for power losses can be set separately for each output
- Narrow width without lateral installation clearances
- Low temperature rise in the control cabinet due to very high efficiency
- Two integrated Ethernet/PROFINET ports (no external switch required)
- OPC UA Server functionality for parameter assignment and data communication
- Can be added without wiring overhead (more outputs, buffer module for bridging transient power failures)
- Preventive maintenance reduces downtimes
- Energy savings during breaks through targeted switching of outputs (via STEP 7 program or PROFIenergy profile)
- SIMATIC S7 function blocks for easy integration in STEP 7 user programs and faceplates for operator control and monitoring.
- Direct integration in SIMATIC PCS 7 via SITOP library

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Design

Product overview

Modules		Versions	Input	Output
PSU8600 basic units				
	SITOP power supply system, 3-phase, 24 V DC	PSU8600, 20 A	3 AC 400 to 500 V	24 V DC, 20 A
		PSU8600, 40 A	3 AC 400 to 500 V	24 V DC, 40 A
		PSU8600, 20 A/5 × 4 A	3 AC 400 to 500 V	24 V DC, 20 A/4 × 5 A
		PSU8600, 40 A/5 × 10 A	3 AC 400 to 500 V	24 V DC, 40 A/4 × 10 A
CNX8600 for expanding outputs				
	SITOP CNX8600 4 × 5 A expansion module	CNX8600, 4 × 5 A	24 V DC	24 V DC, 4 × 5 A
	SITOP CNX8600 4 × 10 A expansion module	CNX8600, 4 × 10 A	24 V DC	24 V DC, 4 × 10 A
BUF8600 buffer				
	SITOP BUF8600 buffer module	BUF8600, 100 ms/40 A BUF8600, 300 ms/40 A BUF8600, 4 s/40 A BUF8600, 10 s/40 A	24 V DC	24 V DC, 40 A

Ordering data

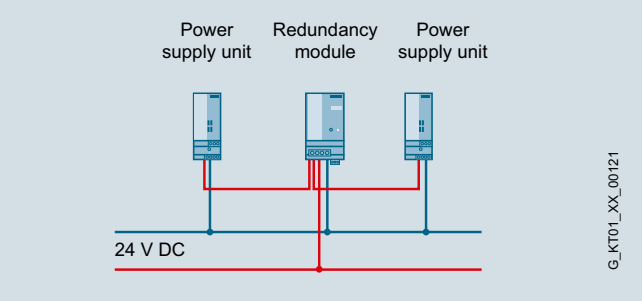
	Article No.
SITOP PSU8600 3-phase, 24 V DC/20 A with PN/IE connection Stabilized power supply Input: 3 AC 400 … 500 V Output: 24 V DC/20 A	**6EP3436-8SB00-2AY0**
SITOP PSU8600 3-phase, 24 V DC/40 A with PN/IE connection Stabilized power supply Input: 3 AC 400 … 500 V Output: 24 V DC/40 A	**6EP3437-8SB00-2AY0**
SITOP PSU8600 3-phase, 24 V DC/20 A/4 × 5 A with PN/IE connection Stabilized power supply Input: 3 AC 400 … 500 V Output: 24 V DC/20 A	**6EP3436-8MB00-2CY0**
SITOP PSU8600 3-phase, 24 V DC/40 A/4 × 10 A with PN/IE connection Stabilized power supply Input: 3 AC 400 … 500 V Output: 24 V DC / 40 A/4 × 10 A	**6EP3437-8MB00-2CY0**

	Article No.
SITOP CNX8600 4 × 5 A expansion module For SITOP PSU8600 Output: 24 V DC / 4 × 5 A	**6EP4436-8XB00-0CY0**
SITOP CNX8600 4 × 10 A expansion module For SITOP PSU8600 Output: 24 V DC / 4 × 10 A	**6EP4437-8XB00-0CY0**
SITOP BUF8600 100 ms buffer module For SITOP PSU8600 Buffer capacity 100 ms/40 A	**6EP4297-8HB00-0XY0**
SITOP BUF8600 300 ms buffer module For SITOP PSU8600 Buffer capacity 300 ms/40 A	**6EP4297-8HB10-0XY0**
SITOP BUF8600 4 s buffer module For SITOP PSU8600 Buffer capacity 4 s/40 A	**6EP4293-8HB00-0XY0**
SITOP BUF8600 10 s buffer module For SITOP PSU8600 Buffer capacity 10 s/40 A	**6EP4295-8HB00-0XY0**
Device labeling plates	**3RT1900-1SB20**

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Overview

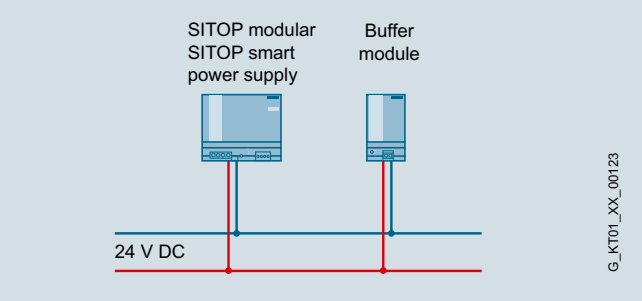
Redundancy modules



SITOP redundancy modules

- High availability of the 24 V DC supply thanks to redundant configuration
- Decoupling of two power supplies of the same type in parallel operation via diodes
- 24 V DC power supply is maintained in the event of a power failure
- Compact redundancy modules for power supply units up to 40 A
- Diagnostic signal via LED and signaling contacts
- Adjustable switching threshold for LED and signaling contacts
- Direct integration in SIMATIC PCS 7 via SITOP library

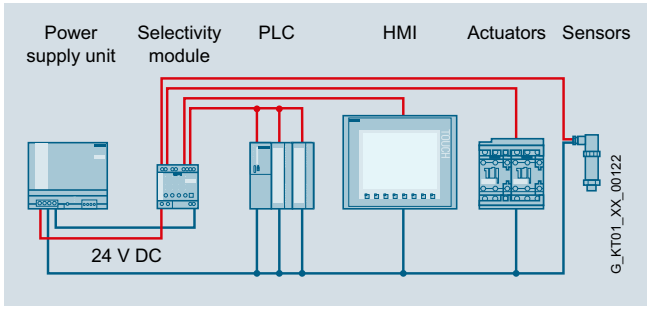
Buffer module



SITOP buffer module

- Buffering the load current during brief power interruptions
- Maintenance-free capacitors with short charging times as energy storage units
- Wiring parallel to the output of the power supply
- Parallel switching of several buffer modules possible
- A supply voltage > 20.5 V is signaled by an LED on the device.
- Buffer time up to: 200 ms at 40 A, 400 ms at 20 A, 800 ms at 10 A, 1.6 s at 5 A load current

Selectivity modules



SITOP selectivity modules

- Distribution of the load current over up to 4 current circuits with individually adjustable maximum current
- Monitoring of individual partial currents
- Reliable tripping regardless of cable lengths and cross-sections
- Selective cutoff of current circuits at overload or short-circuit
- Simple commissioning thanks to manual switch on/off of outputs
- Sequential connection delay of feeders reduces total inrush current
- Sealable transparent cover over adjusters for currents and times protect against maladjustment
- Remote reset possible from a central location
- Signaling via LEDs (channel-by-channel) and remote diagnostics via common signaling contact or single-channel signaling
- Evaluation of the status of 4 current circuits of selectivity modules with single-channel signaling via SIMATIC S7 function blocks.
- Direct integration in SIMATIC PCS 7 via SITOP library

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Design

Product overview

Modules		Versions	Input	Output
Redundancy modules				
	SITOP redundancy module PSE202U	24 V DC, 40 A	24 V DC	U_e – approx. 0.5 V
		24 V DC, 10 A	24 V DC	U_e – approx. 0.5 V
Buffer module				
	SITOP buffer module	--	24 V DC	Ue - approx. 1 V
Selectivity modules				
	SITOP selectivity module PSE200U, 3 A, 4-channel, 4 × 3 A Adjustable output current: 0.5 ... 3 A	With common signal contact	24 V DC	Ue - approx. 0.2 V
		NEC Class 2 with common signal contact		
		With single-channel signaling		
		NEC Class 2 with single-channel signaling		
	SITOP selectivity module PSE200U, 10 A, 4-channel, 4 × 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		

Ordering data

	Article No.
Add-on modules for SITOP modular power supplies	
Redundancy modules	
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**
Redundancy module SITOP PSE202U, 24 V DC/10 A Suitable for decoupling two SITOP power supplies each with a maximum of 5 A output current Input: 24 V DC Output: Ue - approx. 0.5 V	**6EP1964-2BA00**
Buffer module	
SITOP PSE201U buffer module For SITOP modular and SITOP smart buffer time 100 ms to 10 s, depending on load current Input: 24 V DC Output: Ue - approx. 1 V	**6EP1961-3BA01**

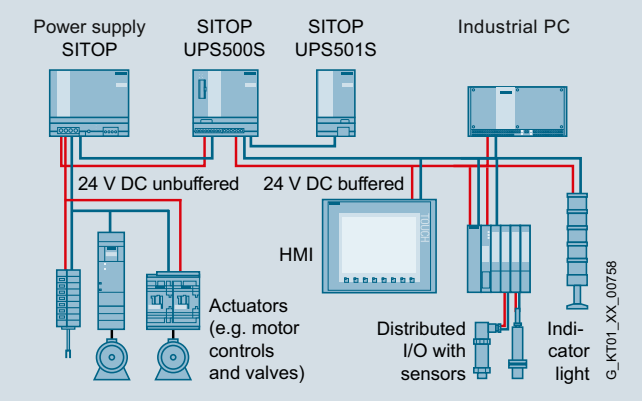
	Article No.
Selectivity modules	
SITOP PSE200U selectivity module, 3 A 4-channel (4 × 3 A) Input: 24 V DC Output: Ue – approx. 0.2 V Adjustable output current 0.5 to 3 A	
• With common signal contact	**6EP1961-2BA11**
• NEC Class 2 with common signal contact	**6EP1961-2BA51**
• With single-channel signaling	**6EP1961-2BA31**
• NEC Class 2 with single-channel signaling	**6EP1961-2BA61**
SITOP PSE200U selectivity module, 10 A 4-channel (4 × 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)	**6EP1961-2BA21**
• With single-channel signaling	**6EP1961-2BA41**

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SITOP DC UPS Uninterruptible Power Supplies

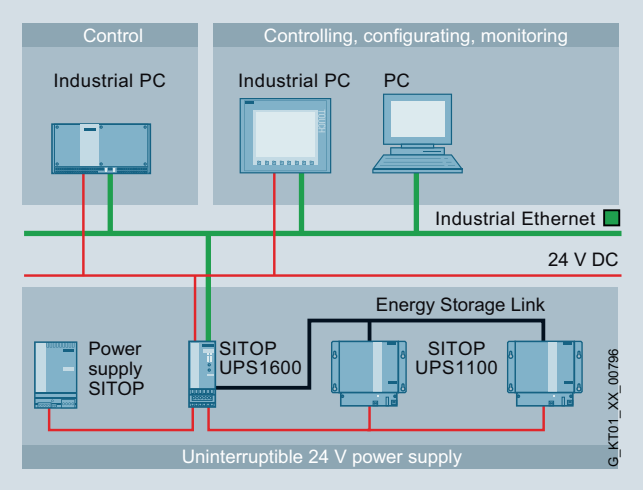
Overview

SITOP DC UPS with capacitors



- Buffering of 24 V DC up to 15 A
- Buffering of power failures for up to several minutes enables data backup and controlled shutdown
- Ambient temperatures up to +60 °C
- Short charging times
- Maintenance-free operation and long lifetime, also at high temperatures
- Status messages via LEDs and floating signaling contacts
- Communication with controller/IPC via USB
- Extension of the buffer time with up to 3 expansion modules

SITOP UPS1600 DC UPS modules with UPS1100 battery modules



- High-performance DC UPS modules in space-saving, slim design
- 24 V DC buffering for a few hours for the purpose of continuing processes
- High overload capability for mains and buffer mode
- Starting from the battery module supports stand-alone mode, e.g. for starting generators
- Open communication via USB or two Ethernet/ PROFINET ports; OPC UA Server functionality for parameter assignment and data communication
- Easy configuration thanks to automatic detection of battery modules
- High reliability and availability due to monitoring of the operational readiness, battery feed, aging and charging status
- Battery-saving charging due to temperature-specific charging characteristic
- Defined shutdown of several IPCs or controllers on one UPS (versions with Ethernet/PROFINET)
- Remote monitoring via integrated web server (versions with Ethernet/PROFINET)
- SIMATIC S7 function blocks for easy integration in STEP 7 user programs and faceplates for operator control and monitoring.
- Direct integration in SIMATIC PCS 7 via SITOP library

The intelligent UPS1600 battery management charges the UPS1100 with the optimal, temperature-controlled charging characteristics and monitors the status (operating data and diagnostic information) of the connected battery modules via the energy storage link. For longer backup times, up to six same type battery modules can be connected in parallel.

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Design

Product overview

Modules		Versions	Input	Output
Uninterruptible 24 V DC power supplies				
SITOP DC UPS with capacitors				
	SITOP DC UPS basic device UPS500S, 15 A, IP20, can be expanded with SITOP UPS501S	Power 2.5 KW	24 V DC (22 ... 29 V)	24 V DC (23.3 ... 24.7 V DC or 24 V ± 3 %)
		Power 5 KW		
	SITOP DC UPS expansion module UPS501S, 7 A	Power 5 KW	24 V DC	24 V DC
	SITOP DC UPS basic device UPS500P, 7 A, IP65, cannot be expanded	Power 5 KW	24 V DC (22.5 ... 29 V DC)	24 V DC (23.3 ... 24.7 V DC or 24 V ± 3 %)
		Power 10 KW		
SITOP DC UPS with battery modules				
SITOP UPS1600 DC UPS, can be combined with SITOP UPS1100 battery modules				
	SITOP UPS1600 24 V/10 A	Without communications interface	24 V DC (21 … 29 V)	Normal mode: U_e – approx. 0.01 × I Buffer mode: 27 V DC (no load); 24 V (50% battery rated current); 22 V (100% battery rated current); 18.5 V (exhaustive discharge protection)
		USB interface		
		2 Ethernet/PROFINET interfaces		
	SITOP UPS1600 24 V/20 A	Without communications interface		
		USB interface		
		2 Ethernet/PROFINET interfaces		
	SITOP UPS1600 24 V/40 A	Without communications interface		
		USB interface		
		2 Ethernet/PROFINET interfaces		
SITOP UPS1100 battery modules for SITOP UPS1600 DC UPS modules				
	SITOP UPS1100 battery module for SITOP UPS1600, 10 A	24 V DC, 1.2 Ah	--	24 V DC, 22 ... 27.0 V DC (no load)
		24 V DC, 2.5 Ah, high temperature		
	SITOP UPS1100 battery module for SITOP UPS1600, 10 A and 20 A	24 V DC, 3.2 Ah	--	24 V DC, 22 ... 27.0 V DC (no load)
		24 V DC, 7 Ah		
		24 V DC, 5 Ah LIFePo		24 V DC, 22 ... 28.8 V DC (no load)
	SITOP UPS1100 battery module for SITOP UPS1600, 20 A and 40 A	24 V DC, 12 Ah	--	24 V DC, 22 ... 27.0 V DC (no load)

SITOP Selection Tool

The SITOP Selection Tool offers detailed selection guidance according to criteria such as the required backup time, nominal current, peak current and battery connection threshold:
www.siemens.com/sitop-selection-tool

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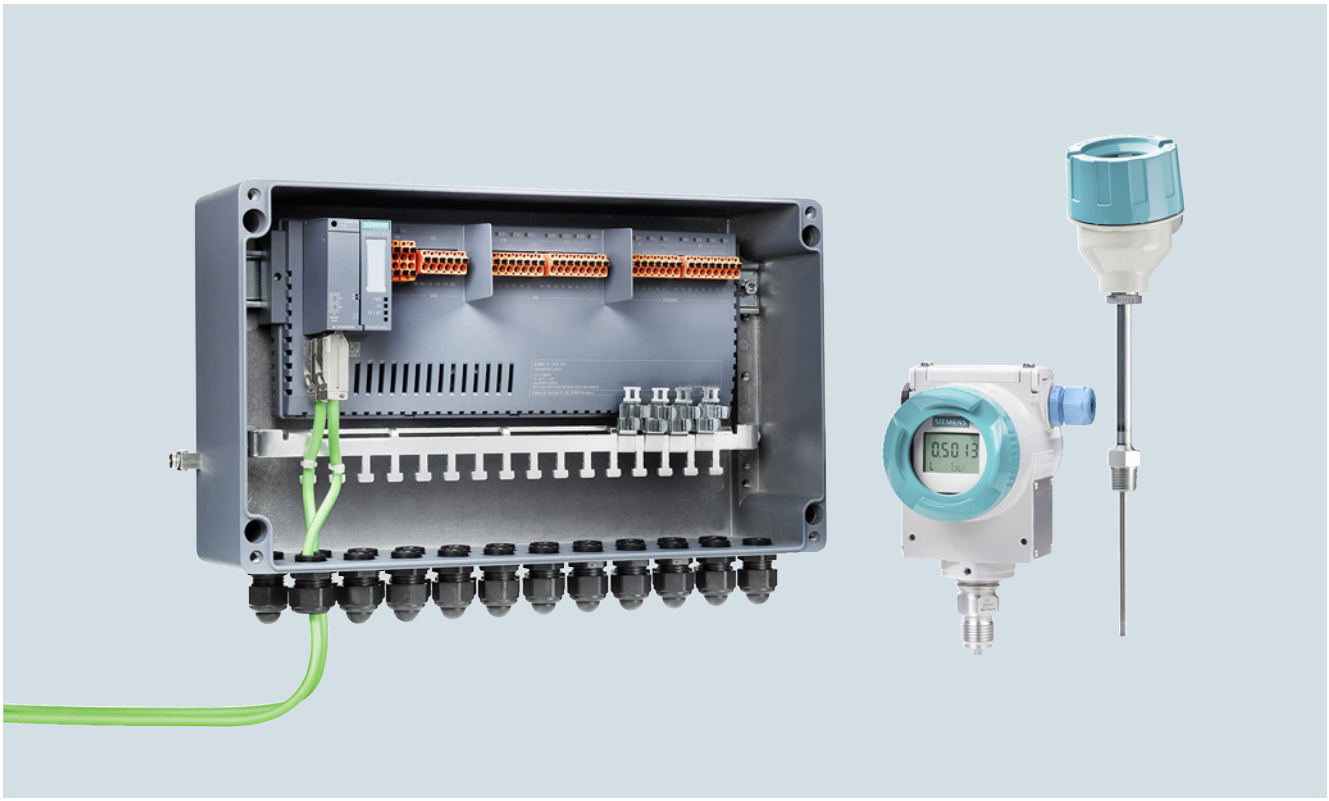
SITOP DC UPS Uninterruptible Power Supplies

Ordering data	Article No.
Uninterruptible 24 V DC power supplies	
DC UPS with capacitors	
DC UPS basic device SITOP UPS500S, 15 A Degree of protection IP20, input: 24 V DC; Output: 24 V DC; USB port; can be expanded with SITOP UPS501S	
• Power 2.5 KW	**6EP1933-2EC41**
• Power 5 KW	**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 basic device SITOP UPS500P, 7 A Degree of protection IP65, input: 24 V DC; Output: 24 V DC; USB port; cannot be expanded	
• Power 5 KW	**6EP1933-2NC01**
• Power 10 KW	**6EP1933-2NC11**
SITOP UPS1600 DC UPS can be combined with SITOP UPS1100 battery module	
DC UPS module SITOP UPS1600, 24 V/10 A Input: 24 V DC; Output: 24 V DC	
• Without communications interface	**6EP4134-3AB00-0AY0**
• With USB interface	**6EP4134-3AB00-1AY0**
• With 2 Ethernet/PROFINET interfaces	**6EP4134-3AB00-2AY0**
DC UPS module SITOP UPS1600, 24 V/20 A Input: 24 V DC; Output: 24 V DC	
• Without communications interface	**6EP4136-3AB00-0AY0**
• With USB interface	**6EP4136-3AB00-1AY0**
• With 2 Ethernet/PROFINET interfaces	**6EP4136-3AB00-2AY0**
DC UPS module SITOP UPS1600, 24 V/40 A Input: 24 V DC; Output: 24 V DC	
• Without communications interface	**6EP4137-3AB00-0AY0**
• With USB interface	**6EP4137-3AB00-1AY0**
• With 2 Ethernet/PROFINET interfaces	**6EP4137-3AB00-2AY0**

	Article No.
SITOP UPS1100 battery module for DC UPS module SITOP UPS1600	
Battery module SITOP UPS1100 24 V/1.2 Ah With maintenance-free, sealed rechargeable lead batteries for DC UPS module SITOP UPS1600, 10 A	**6EP4131-0GB00-0AY0**
Battery module SITOP UPS1100 24 V/3.2 Ah With maintenance-free, sealed rechargeable lead batteries for DC UPS module SITOP UPS1600, 10 A and 20 A	**6EP4133-0GB00-0AY0**
Battery module SITOP UPS1100 24 V/7 Ah With maintenance-free, sealed rechargeable lead batteries for DC UPS module SITOP UPS1600, 10 A and 20 A	**6EP4134-0GB00-0AY0**
Battery module SITOP UPS1100 24 V/5 Ah With maintenance-free, sealed lithium-ion rechargeable batteries for DC UPS module SITOP UPS1600, 10 A and 20 A	**6EP4133-0JB00-0AY0**
Battery module SITOP UPS1100 24 V/12 Ah With maintenance-free, sealed rechargeable lead batteries for DC UPS module SITOP UPS1600, 20 A and 40 A	**6EP4135-0GB00-0AY0**
SITOP UPS 1100 battery module 2.5 Ah, high temperature With maintenance-free, sealed rechargeable pure-lead batteries for DC UPS module SITOP UPS1600, 10 A	**6EP4132-0GB00-0AY0**

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Overview



The SIMATIC Compact Field Unit (SIMATIC CFU) is a smart field distributor for use as an IO device on the PROFINET IO network of an automation system. SIMATIC CFU has the following interfaces:

- Fieldbus connections for PROFIBUS PA field devices
- Freely configurable channels (digital inputs/outputs for sensors and actuators)

The SIMATIC CFU is a real game-changer in field device connection and offers you entirely new prospects regarding simplicity and flexibility. This compact field distributor is installed at the process level and is connected via PROFINET directly to the controller to form the foundation for digitalization in the field. Utilization of digital fieldbus communication simplifies device interfacing considerably compared to conventional 4 to 20-mA engineering.

Plug-and-produce simplicity

Digitalization requires a digital infrastructure facilitating integrated digital communication right down to the sensors and actuators. This can be built up using the tried and tested, standard PROFIBUS PA which has been incorporated into the PA Edition of the SIMATIC CFU, thus combining ruggedness and simplified handling with all the advantages of the PROFINET standard based on Industrial Ethernet. Connected devices are addressed automatically, and integration is simple via standardized communication profiles.

This innovative new implementation of the PROFIBUS PA concept makes it possible to combine the simplicity of a point-to-point wiring system with the scalability of digital PROFIBUS PA fieldbus communication.

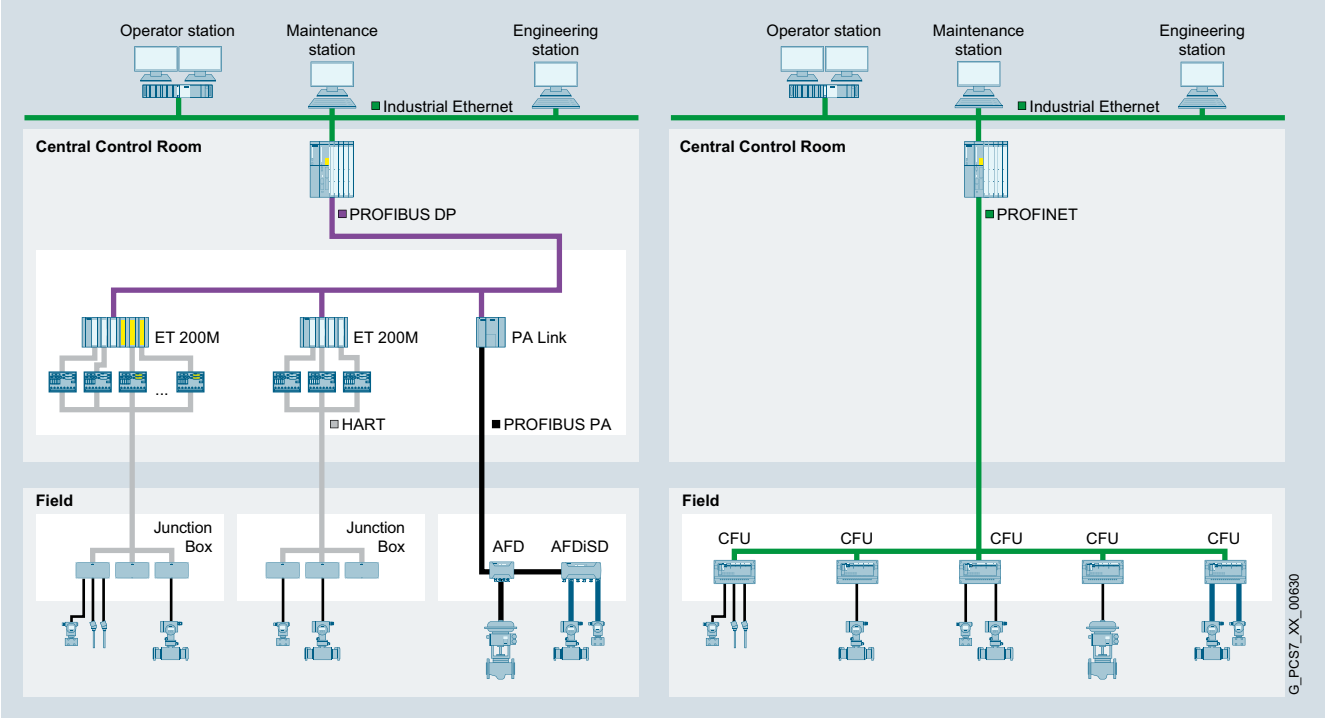
As with digital field devices, it is not necessary to know prior to connection whether the discrete field device is a sensor or actuator – this can be easily configured afterwards with software.

Greater flexibility thanks to consistent decentralization

Thanks to the distributed installation of the SIMATIC CFU, classic control cabinets are no longer required and you can make considerable savings in cabling and the number of terminal points as well as reduce planning and documentation overheads. The high granularity (16 I/O per SIMATIC CFU) enables flexible assignment to the higher-level controllers.

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Overview (continued)



Field device connection with previous technology (left) and with SIMATIC CFU (right)

Main functions

System interfacing over the Industrial Ethernet standard

- Redundant PROFINET connection (S2) for maximum availability
- Connection versatility with PROFINET BusAdapter (for example electrical, optical or mixed)

Combination of digital fieldbus and discrete I/O

- 8 × digital fieldbus (PROFIBUS PA)
- 8 × digital inputs/outputs, freely configurable

Ready for distributed use

- For installation in hazardous areas up to zone 2-22
- Extended temperature range of -40 to +70 °C
- Conformal coating
- Can be used at altitudes of up to 4 000 meters
- Enhanced interference immunity in accordance with NAMUR recommendation NE21

Easy to use

- Automatic addressing of PROFIBUS PA field devices
- System-supported detection and integration of PROFIBUS PA field devices into the process control system with the use of standardized PA profiles and commissioning, device replacement and service wizards
- Implementation of diagnostic messages in accordance with NAMUR recommendation NE107
- 35-mm standard mounting rail mounting

Configuration with SIMATIC PCS 7 and third-party systems

See information in the Siemens Industry Online Support

https://support.industry.siemens.com/cs/ww/en/view/109749357

Benefits

Highlights at a glance

Plug-and-produce simplicity

- Fast, fail-safe device integration
- Safe and simple device replacement without work in the engineering system

This makes device integration easy and fail-safe, and the time required is reduced from half an hour or more to just a few minutes.

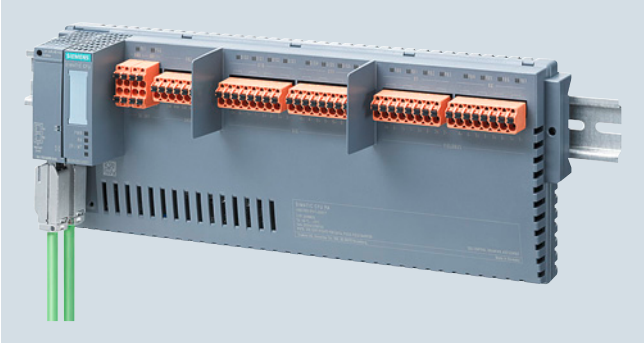
Greater flexibility thanks to consistent decentralization

- No more individualized control cabinets
- Reduction in marshalling and cabling costs
- Lower planning and documentation costs
- Standardized design – no hardware FAT required
- Parallelization of project processes
- Flexible plant expansion without the need to stock spares
- Reduced complexity and lower installation and maintenance costs

This means up to 70% fewer terminal points required and cabling reduced by 30% or more.

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Overview



SIMATIC CFU PA, in this case with BusAdapter and PROFINET bus cable

SIMATIC CFU PA

The SIMATIC CFU PA basic device has 16 digital interfaces:

- 8 fieldbus connections for PROFIBUS PA, each for 1 PROFIBUS PA field device
- 8 freely configurable digital inputs/outputs (DI/DQ), each for 1 sensor or actuator

PROFIBUS PA field devices are automatically addressed. SIMATIC CFU implements system-supported detection and integration of the PA field devices into the process control system using standardized PA profiles (issued by the PROFIBUS&PROFINET user association).

SIMATIC CFU also provides standardized detailed diagnostics (NE107) for the preventive maintenance of PROFIBUS PA field devices.

In the event of physical faults (for example wire breaks or short circuits), defective connections are automatically disabled. The bus terminator is implemented automatically. Repairs and expansions to the individual connections are possible during runtime.



SIMATIC CFU aluminum field enclosure, open



SIMATIC CFU aluminum field enclosure, closed

Aluminum field enclosure

The die-cast aluminum enclosure is suitable for use in zone 2/22 hazardous areas. The following are included in the enclosure's scope of delivery:

- 22 × M20 plastic cable glands (incl. blanking plugs)
- 35 mm standard mounting rail
- Rail for strain relief and shield support

The enclosure has a window for LED diagnostics.

If FM approval is required, a separate version of the enclosure for FM can be purchased.

Note:
The SIMATIC CFU aluminum field housing and SIMATIC CFU FM aluminum field housing are currently not yet available for delivery!

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Technical specifications

Article number	**6ES7655-5PX11-0XX0** SIMATIC CFU PA
General information	
HW functional status	E01
Firmware version	V1.0
• FW update possible	Yes
Vendor identification (VendorID)	002AH
Device identifier (DeviceID)	060DH
Number of channels	16
Product function	
• I&M data	Yes; I&M0 to I&M4
• The user can configure digital channels as input/output as required	Yes
• Digital channels can be parameterized	Yes
Engineering with	
• STEP 7 TIA Portal configurable/integrated as of version	- / -
• STEP 7 configurable/integrated as of version	From STEP 7 V5.6 HF1 and higher
• PCS 7 configurable/integrated as of version	V9.0
• PROFIBUS as of GSD version/GSD revision	- / -
Installation type/mounting	
Mounting	on 35 mm DIN rail, 2 spacing units wide
Mounting position	Horizontal, vertical
Supply voltage	
Type of supply voltage	24 V DC
Rated value (DC)	24 V
permissible range, lower limit (DC)	19.2 V
permissible range, upper limit (DC)	28.8 V
Reverse polarity protection	Yes
Short-circuit protection	Yes
Redundant power supply	Yes
Mains buffering	
• Mains/voltage failure stored energy time	5 ms; Bridging for field devices and communication
Input current	
Current consumption (rated value)	2.5 A
Current consumption, max.	2.55 A
Inrush current, max.	8 A
I^2t	0.3 $A^2 \cdot s$
Encoder supply	
Number of outputs	8
Output voltage encoder supply, min.	18.2 V
Short-circuit protection	Yes; Electronic
Output current	
• up to 60 °C, max.	2 A
• up to 70 °C, max.	1 A
Power loss	
Power loss, typ.	8.2 W; Depending on the type of BusAdapter used (typ. RJ45)
Address space per station	
• Address space per station, max.	1 440 byte; Dependent on configuration

Article number	**6ES7655-5PX11-0XX0** SIMATIC CFU PA
Digital inputs	
Number of digital inputs	8
Source/sink input	Yes; P-reading
Input characteristic curve in accordance with IEC 61131, type 1	Yes
Input characteristic curve in accordance with IEC 61131, type 2	No
Input characteristic curve in accordance with IEC 61131, type 3	Yes
Pulse extension	No
Number of simultaneously controllable inputs	
horizontal installation	
- up to 60 °C, max.	8; Total current must be observed, see DQ
- up to 70 °C, max.	8; Total current must be observed, see DQ
vertical installation	
- up to 60 °C, max.	8; Total current must be observed, see DQ
Input voltage	
• Rated value (DC)	24 V
• for signal "0"	-30 to +5V
• for signal "1"	+11 to +30V
Input current	
• for signal "1", typ.	2.5 mA; Typical
Input delay (for rated value of input voltage)	
for standard inputs	
- parameterizable	No
- at "0" to "1", max.	3.2 ms
- at "1" to "0", max.	3.2 ms
Cable length	
• shielded, max.	1 000 m
• unshielded, max.	600 m

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Technical specifications (continued)

Article number	**6ES7655-5PX11-0XX0**
	SIMATIC CFU PA
Digital outputs	
Type of digital output	Transistor
Number of digital outputs	8
Current-sinking	No
Current-sourcing	Yes
Short-circuit protection	Yes
• Response threshold, typ.	0.7 to 1.3 A
Limitation of inductive shutdown voltage to	Typ. L+ (-50 V)
Controlling a digital input	Yes
Switching capacity of the outputs	
• on lamp load, max.	5 W
Load resistance range	
• lower limit	48 Ω
• upper limit	12 kΩ
Output voltage	
• Type of output voltage	DC
• for signal "1", min.	Ue minus 1 V
Output current	
• for signal "1" rated value	0.5 A
• for signal "0" residual current, max.	0.1 mA
Output delay with resistive load	
• "0" to "1", max.	50 µs
• "1" to "0", max.	100 µs
Parallel switching of two outputs	
• for uprating	No
• for redundant control of a load	No
Switching frequency	
• with resistive load, max.	100 Hz
• with inductive load, max.	2 Hz
• on lamp load, max.	10 Hz
Total current of the outputs	
• Current per channel, max.	0.5 A
horizontal installation	
- up to 70 °C, max.	1 A
vertical installation	
- up to 60 °C, max.	2 A
Cable length	
• shielded, max.	1 000 m
• unshielded, max.	600 m
Encoder	
Connectable encoders	
• 2-wire sensor	Yes
- permissible quiescent current (2-wire sensor), max.	1.5 mA

Article number	**6ES7655-5PX11-0XX0**
	SIMATIC CFU PA
Interfaces	
Number of PROFINET interfaces	1
Number of PROFIBUS interfaces	0
PROFIBUS PA	
• Transmission rate, max.	31.25 kbit/s
• Number of connectable PA field devices	8; Electrically isolated from other interfaces, isolation tested at 2 500 V DC
• Current output to PA field devices, max.	320 mA
• permissible current per spur line	40 mA
• Automatic addressing	Yes
• System-supported integration of field devices via PA profiles	Yes
• Extended fieldbus diagnostics	Yes
1. Interface	
Interface type	PROFINET
Isolated	Yes
Interface types	
• Number of ports	2
• integrated switch	Yes
• BusAdapter (PROFINET)	Yes
Functionality	
• PROFINET IO Device	Yes
• PROFIBUS DP slave	No
Interface types	
RJ 45 (Ethernet)	
• 100 Mbps	Yes
• Autonegotiation	Yes
• Autocrossing	Yes
Protocols	
Supports protocol for PROFINET IO	Yes
PROFINET IO Device	
Services	
- MRP	Yes
- PROFINET system redundancy	Yes; Type S2
Open IE communication	
• LLDP	Yes
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	No
Interrupts/diagnostics/ status information	
Status indicator	Yes
Alarms	Yes
Diagnostic functions	Yes
Diagnostic messages	
• Monitoring of encoder power supply	Yes
• Wire-break	Yes
• Short-circuit	Yes
Diagnostics indication LED	
• RUN LED	Yes; Green LED
• ERROR LED	Yes; Red LED
• MAINT LED	Yes; yellow LED
• Monitoring of the supply voltage (PWR-LED)	Yes
• Digital input status indicator	Yes
• Digital output status indicator	Yes
• Spur line status/fault	Yes

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Technical specifications (continued)

Article number	**6ES7655-5PX11-0XX0** SIMATIC CFU PA
Potential separation	
between the channels and PROFINET	Yes
Potential separation digital inputs	
• between the channels	No
• between the channels and the power supply of the electronics	No
Potential separation digital outputs	
• between the channels	No
• between the channels and the power supply of the electronics	No
Isolation	
Isolation tested with	1 500 V AC between PROFINET and electronics
Degree and class of protection	
Degree of protection acc. to EN 60529	IP20
Ambient conditions	
Ambient temperature during operation	
• min.	-40 °C
• max.	70 °C
• horizontal installation, min.	-40 °C
• horizontal installation, max.	70 °C; Observe derating
• vertical installation, min.	-40 °C
• vertical installation, max.	60 °C; Observe derating
Ambient temperature during storage/transportation	
• min.	-40 °C
• max.	85 °C
Relative humidity	
• Operation, max.	95 %

Article number	**6ES7655-5PX11-0XX0** SIMATIC CFU PA
Connection method	
Design of electrical connection	Connection plug
Spur line	
• Number of spur lines	8
• Type of cable	Type A
• Cable diameter, min.	6 mm
• Cable diameter, max.	12 mm
• Conductor cross-section, min.	0.2 mm^2
• Conductor cross-section, max.	2.5 mm^2
• Cable length, max.	120 m
• total current output to field devices, max.	320 mA
• Number of connectable field devices	8
• Current limitation per field device, max.	40 mA
• No-load voltage, max.	15.3 V
• short-circuit proof	Yes
• Short-circuit current (test current); max.	8 mA
• intrinsically safe according to FISCO model	Yes
• Debounce logic	Yes
Dimensions	
Width	300 mm; 329 mm
Height	115 mm; 123 mm
Depth	40 mm; 74 mm
Weights	
Weight, approx.	580 g

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Ordering data

	Article No.
SIMATIC CFU PA SIMATIC Compact Field Unit PA Edition, for 16 digital field devices, PROFINET interface V2.3 (RT), use of PROFINET BusAdapter, media redundancy (MRP), PROFINET system redundancy (S2), configuration in run (CiR) Process interfaces: • 8 × PROFIBUS PA (with plug-and-produce) • 8 × freely configurable DIQ Installation up to Ex zone 2, temperature range -40 to +70 °C, conformal coating, installation on 32 mm standard mounting rail	**6ES7655-5PX11-0XX0**

	Article No.
SIMATIC CFU aluminum field enclosure Die-cast aluminum enclosure for SIMATIC CFU, enclosure for field installation 22 × M20 plastic cable glands (incl. blanking plugs), 35 mm standard mounting rail, rail for strain relief and shield support, display window for LED diagnostics, IP65 protection class	**not yet deliverable**
SIMATIC CFU FM aluminum field housing Die-cast aluminum housing for SIMATIC CFU, with FM approval, enclosure for field installation 22 × M20 plastic cable glands (incl. blanking plugs), 35 mm standard mounting rail, rail for strain relief and shield support, display window for LED diagnostics, IP65 protection class	**not yet deliverable**

Note:

For use of the SIMATIC CFU PA, accessories are needed (connection technology). See section "Accessories".

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Bundles

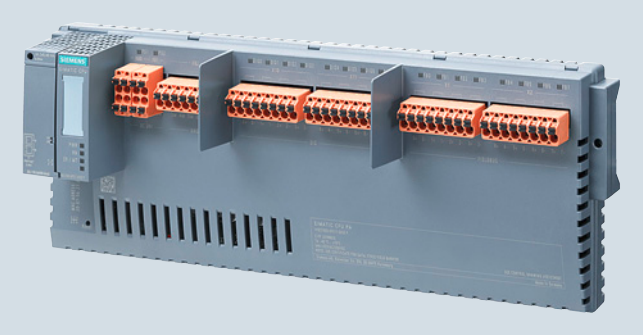
Overview

For SIMATIC CFU PA, preinstalled bundles are offered, each with SIMATIC CFU PA basic device and SIMATIC CFU push-in terminals.

SIMATIC CFU PA bundle

Comprising:

- SIMATIC CFU PA,
  Article No. 6ES7655-5PX11-0XX0
- SIMATIC CFU push-in terminals,
  Article No. 6ES7655-5PX00-1XX0



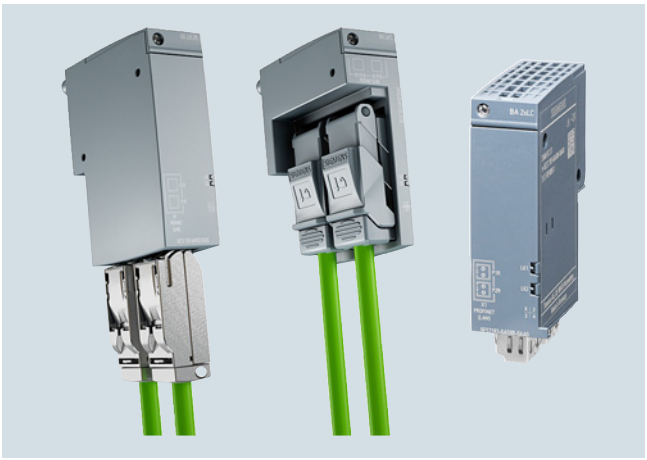
SIMATIC CFU PA bundle

Ordering data

	Article No.
SIMATIC CFU PA bundle Comprising: • SIMATIC CFU PA, Article No. 6ES7655-5PX11-0XX0 • SIMATIC CFU push-in terminals, Article No. 6ES7655-5PX00-1XX0 Pre-assembled and tested	**6ES7655-5PX11-1XX0**

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Overview



BusAdapter BA 2×RJ45, 2×FC and 2×LC

BusAdapter

A BusAdapter as a separate component allows a free choice of SIMATIC CFU connection to PROFINET:

- BA 2×RJ45:
  2 electrical connections for bus cable with standard RJ45 connector
- BA 2×FC:
  2 electrical connections for direct connection of FastConnect bus cable
- BA 2×LC:
  2 optical ports for fiber-optic cables

Technical specifications

Article number	**6DL1193-6AR00-0AA0** ET 200SP HA, BUSADAPTER BA 2XRJ45	**6DL1193-6AF00-0AA0** ET 200SP HA, BUSADAPTER BA 2XFC	**6DL1193-6AG00-0AA0** ET 200SP HA, BUSADAPTER BA 2XLC
General information			
Product type designation	SIMATIC BusAdapter BA 2x RJ45	SIMATIC BusAdapter BA 2x FC	SIMATIC BusAdapter BA 2x LC
Interfaces			
Number of PROFINET interfaces	1; 2 ports (switch) RJ45	1; 2 ports (switch) FC	1; 2 ports (switch) LC Multimode Glass Fibre
PROFINET IO			
• RJ 45	Yes; 2x RJ45		
• FC (FastConnect)		Yes; 2 x	
• Number of LC ports			2
Cable length			
- Cu conductors	100 m	100 m	
- Multimode graded-index fiber 50/125 µm			3 km
- Multimode graded-index fiber 62.5/125 µm			3 km
Ambient conditions			
Ambient temperature during operation			
• min.	-40 °C	-40 °C	-40 °C
• max.	70 °C	70 °C	65 °C; Redundant design (2x 6DL1155-6AU00-0PM0): max. 60 °C horizontal, max. 50 °C vertical. When using different I/O devices, the derating specified there must be observed.
Dimensions			
Width	20 mm	20 mm	20 mm
Height	69.5 mm	69.5 mm	75 mm; Without protective caps (approx. 8 mm)
Depth	59 mm	59 mm	59 mm
Weights			
Weight, approx.	46 g	53 g	60 g

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Accessories

Ordering data	Article No.
BusAdapter	
BusAdapter 2×RJ45 2 × RJ45 connections for PROFINET (standard Ethernet socket)	**6DL1193-6AR00-0AA0**
BusAdapter 2×FC 2 × FastConnect (FC) connections for PROFINET	**6DL1193-6AF00-0AA0**
BusAdapter 2×LC 2 × glass fiber-optic connections	**6DL1193-6AG00-0AA0**

	Article No.
Shield terminals for aluminum field enclosure	
SIMATIC CFU shield terminals 4 shield terminals as an optional accessory for SIMATIC CFU aluminum field enclosure, for simple and secure shielding of up to 8 PROFIBUS PA field devices	**not yet deliverable**
Connection technology	
SIMATIC CFU screw-type terminals Complete set of screw-type terminals for SIMATIC CFU: two-tier 2×2 (24 V), single-tier 1×6 (GND) and single-tier 4×8 (IO)	**6ES7655-5PX00-2XX0**
SIMATIC CFU push-in terminals Complete set of push-in terminals for SIMATIC CFU: two-tier 2×2 (24 V), single-tier 1×6 (GND) and single-tier 4×8 (IO)	**6ES7655-5PX00-1XX0**

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Overview



ET 200SP HA, station with 2 redundant interface modules

Compact design, flexible connection possibilities and high system availability with redundant PROFINET connections: the SIMATIC ET 200SP HA distributed I/O system is perfectly suited to the requirements of the process industry. The new design allows up to 56 I/O modules per station. An impressively high concentration of up to 32 channels on a module that is only 22.5 mm wide allows for maximum economy in the control cabinet.

Redundant PROFINET connections allow the connection of high-availability controllers via two independent networks, with a choice of copper or fiber-optic cables. The system can be scaled and extended in small steps using a variety of available modules, for example with digital and analog I/Os as well as NAMUR, HART, and other protocols. All 24 V standard signals are connected via an identical terminal block type, which allows a high degree of standardization for the control cabinets.

The SIMATIC ET 200SP HA is designed for use in the control cabinet as well as for hazardous areas up to zone 2. The extended temperature range from -40 to +70 °C and the conformal coating of all components allow direct installation in the field.

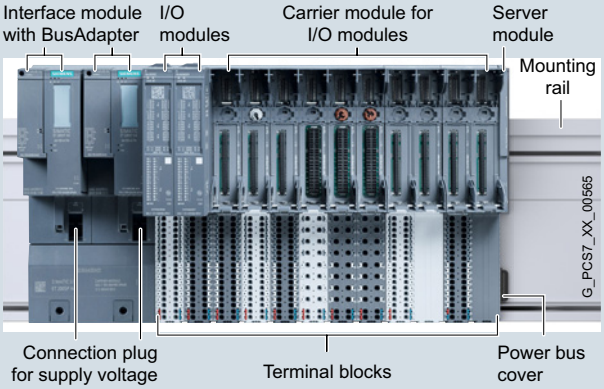
You also benefits in engineering from seamless integration in SIMATIC PCS 7. The SIMATIC ET 200SP HA in combination with the Advanced Process Library also offers flexible and simple online parameter assignment and selection of up to four HART variables per channel.

Benefits

Highlights at a glance

- Availability
  - Redundancy at the PROFINET interface (S2 or R1)
  - Terminal block with integrated I/O redundancy
  - Hot swapping during runtime
  - Station expansion possible during runtime
- Easy to use
  - Compact modules with permanent wiring
  - One terminal block for all 24 V standard signals
  - Tool-free connection system with push-in terminals
- Compact design
  - Compact with up to 56 I/O modules per station
  - High concentration of up to 32 channels on a module that is only 22.5 mm wide
  - System-integrated power bus
- Seamless integration in SIMATIC PCS 7
- PROFINET IO communication standard

Design



ET 200SP HA for SIMATIC PCS 7, design

Easy handling and high availability

The SIMATIC ET 200SP HA impresses with its particularly simple installation and assembly. The new terminal layout and push-in technology make tool-free wiring possible. Control cabinet configuration is particularly flexible, as the separation of mechanical and electronic components allows the station to be pre-wired without I/O modules. Empty modules can be inserted in the integrated terminal blocks and easily replaced at any time. Station extension during operation offers additional advantages for plant flexibility and availability.

In addition to the option of operating the SIMATIC ET 200SP HA station redundantly over the PROFINET interface, you can also operate the I/O modules redundantly. This option is implemented using a terminal block for integrated I/O redundancy, which is very cost-effective and saves a lot of space. The new design with standardized terminal blocks makes redundant wiring as simple as single operation.

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Design (continued)

Main components of the SIMATIC ET 200SP HA distributed I/O system

The SIMATIC ET 200SP HA distributed I/O system consists of the following components:

Mounting rail

The mounting rail is required for fitting an ET 200SP HA station in the control cabinet. The carrier modules for interface modules, the carrier modules for the I/O modules, and the server module are attached to the mounting rail.

Carrier module for IM interface module

Two versions of the IM carrier modules are available:

- IM single carrier module for 1 interface module, for single connection to PROFINET
- IM redundant carrier module for 2 interface modules, for redundant connection to PROFINET

IM 155-6 PN interface module and BusAdapter

The interface module ensures communication between the ET 200SP HA station and the SIMATIC PCS 7 automation system (controller) over PROFINET. A BusAdapter as a separate component allows a free choice of connection technology:

- BA 2×RJ45: 2 electrical connections for bus cable with standard RJ45 connector
- BA 2×FC: 2 electrical connections for direct connection of FastConnect bus cable
- BA 2×LC: 2 optical ports for fiber-optic cables

Carrier module and terminal blocks for I/O modules

The slots for the I/O modules are created by connecting carrier modules and terminal blocks. The carrier modules provide the electrical and mechanical connections for the individual modules; the terminal blocks contain the process terminals for connecting sensors, actuators and other devices.

Two versions of the carrier modules are available, one with 2 slots and one with 8 slots for I/O modules.

The selection of available terminal blocks determines the following properties:

- Type of load voltage supply
- Formation of potential groups
- Type of required I/O module
- Redundant configuration of I/O modules

I/O modules

Modules with 8 or 16 digital channels (DI, DQ) and with 8 or 16 analog channels (AI, AQ) are available as I/O modules. A relay module (RQ) and a universal analog/digital module (AI-DI/DQ) can also be supplied.

All I/O modules with a signal voltage of up to 24 V DC can also be used redundantly.

Slot covers can be attached if I/O modules are not to be inserted in slots or slots are to be reserved for later expansion. You can insert a label strip for the planned I/O module on the front of the slot cover.

Server module and power bus cover

The server module and power bus cover complete the configuration of the ET 200SP HA station. The power bus cover protects the power bus contacts.

Function

Main functions

Compact I/O modules

- Up to 32 channels on a module that is 22.5 mm wide
- Up to 56 modules per station

Perfectly suited for applications in the field

- For installation in hazardous areas up to zone 2
- Extended temperature range: -40 to +70 °C
- Enhanced interference immunity in accordance with NAMUR recommendation NE21
- Conformal coating on all components
- Can be used at altitudes of up to 4 000 meters

Wide range of supported module types

- 16×AI/8×AO HART, 16×DI, 16×DO etc.

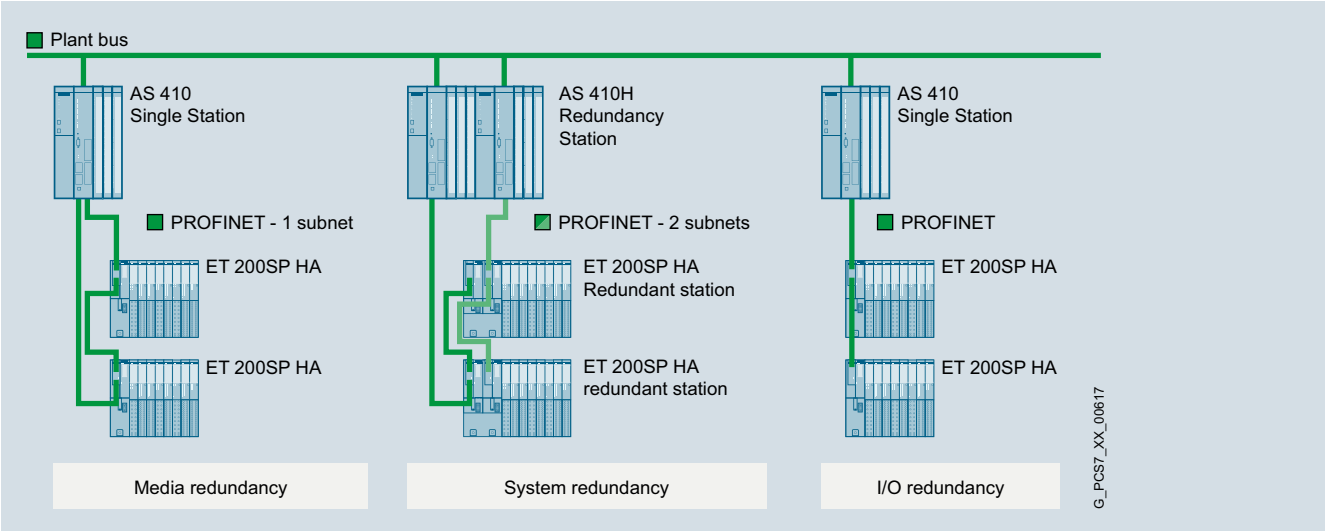
Standard I/O terminal block

- For all 24 V signals AI, AO, DI, DO

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Function (continued)

Redundant configurations



SIMATIC ET 200SP HA, basic redundant configurations

The availability of the ET 200SP HA distributed I/O can if necessary be increased with redundant configurations. A number of different configurations are possible (the individual redundant configurations can also be combined):

Media redundancy

ET 200SP HA stations with 1 interface module each are connected to an automation system in a ring topology. At least one device in the ring takes on the role of the redundancy manager; the other devices in the rin are redundancy clients. The automation system is configured as MRP manager.

If the ring topology is interrupted, the ET 200SP HA stations in the system remain available.

One of the following functions is possible in runtime:

- Connecting and removing ET 200SP HA stations
- Replacing PROFINET cables

System redundancy

ET 200SP HA stations are connected to a redundant automation system. All components used redundantly are in continuous operation. If a redundancy partner fails, the function is maintained by transferring the master role or selecting a different communication path.

The ET 200SP HA stations remain available in the PROFINET IO system if a CPU or a PROFINET cable fails.

One of the following functions is possible in runtime:

- Connecting and removing ET 200SP HA stations
- Replacing PROFINET cables
- Replacing a CPU

I/O redundancy

To configure I/O redundancy, 2 I/O modules of the same type are inserted beside each other in a terminal block for redundant configuration (width: 45 mm). This terminal block connects the process signals of the two modules to a common process terminal. The advantages are:

- There is less wiring work than for connecting separate I/O modules, as interconnection of the process signals is integrated in the system.
- Redundant signal processing of the sensors and actuators at a module level increases the availability of the system.

The following applies if an I/O module or a channel of one of the two I/O modules fails:

- Error-free inputs remain available in the system.
- Error-free outputs continue to be controlled in the system.

One of the following functions is possible for an I/O module in a module pair in error-free operation:

- Firmware update
- Replacing a module

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Overview



IM 155-6 PN HA

IM 155-6 PN HA interface module

The IM 155 6 PN HA together with the subrack and the BusAdapter forms the interface of the ET 200SP HA. The interface is used for communication between the CPU and the connected ET 200SP HA I/O modules over PROFINET.

Function

Properties of the ET 200SP HA interface

The ET 200SP HA interface has the following technical features:

- 1L+ 24 V DC supply voltage (SELV/PELV). The supply voltage is provided through the carrier module. The connector is included in the scope of delivery of the interface module.
- PROFINET connection over BusAdapter

The interface supports the following functions:

- Firmware update
- I&M identification data
- Adding/removing modules in RUN
- Value status QI
- I/O redundancy
- Time stamping
- Multi hot swap (removing/plugging in multiple I/O modules during operation)
- Save service data
- Recording the value status of the I/O modules
- Reference temperature distribution

The interface can be configured with HW Config.

PROFINET functions

The ET 200SP HA interface supports the following PROFINET functions:

- Integrated BusAdapter with 2 ports
- Ethernet services supported: ping, arp, network diagnostics (SNMP)/MIB-2, LLDP-MIB and MRP-MIB
- Port diagnostics
- Disabling ports
- Minimum update time 250 µs
- Device replacement without programming device
- Reset to factory settings using PROFINET IO
- System redundancy S2
- System redundancy R1
- Media redundancy (MRP)
- Support for submodules on suitable I/O modules

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Technical specifications

Article number	**6DL1155-6AU00-0PM0** ET 200SP HA, IM155-6 PN
General information	
Product type designation	IM 155-6 PN
Product function	
• I&M data	Yes; I&M0 to I&M3
Engineering with	
• PCS 7 configurable/integrated as of version	V9.0
Supply voltage	
Type of supply voltage	DC
Rated value (DC)	24 V
Reverse polarity protection	Yes
Short-circuit protection	Yes
Mains buffering	
• Mains/voltage failure stored energy time	10 ms
Hardware configuration	
Integrated power supply	Yes; 24 V DC
Rack	
• Modules per rack, max.	56; 56 slots for I/O modules + server module (width without IM ≤ 1.3 m)
Time stamping	
Accuracy	1 ms; In compliance with the supplementary conditions described in the Equipment Manual
Interfaces	
Number of PROFINET interfaces	1; 2 ports (switch)
1. Interface	
Interface types	
• Number of ports	2; via BusAdapter
• integrated switch	Yes
• BusAdapter (PROFINET)	Yes; Compatible BusAdapters: BA 2x RJ45, BA 2x FC, BA 2x LC
Functionality	
• PROFINET IO Device	Yes
• Open IE communication	Yes
• Media redundancy	Yes; as MRP client
Interface types	
RJ 45 (Ethernet)	
• Transmission procedure	PROFINET with 100 Mbit/s full duplex (100BASE-TX)
• 100 Mbps	Yes; PROFINET with 100 Mbit/s full duplex (100BASE-TX)
• Autonegotiation	Yes
• Autocrossing	Yes
PROFINET IO Device	
Services	
- Open IE communication	Yes
- MRP	Yes
- PROFINET system redundancy	Yes; S2, R1
Open IE communication	
• TCP/IP	Yes
• SNMP	Yes
• LLDP	Yes

Article number	**6DL1155-6AU00-0PM0** ET 200SP HA, IM155-6 PN
Interrupts/diagnostics/status information	
Status indicator	Yes
Alarms	Yes
Diagnostic functions	Yes
Diagnostics indication LED	
• RUN LED	Yes; Green LED
• ERROR LED	Yes; Red LED
• MAINT LED	Yes; yellow LED
• ACTIVE-LED (active IM in redundant configuration)	Yes; Green LED
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED
• Connection display LINK TX/RX	Yes; 2x green link LEDs on BusAdapter
Isolation	
Isolation tested with	1 500 V DC/1 min, type test
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-40 °C
• horizontal installation, max.	70 °C
• vertical installation, min.	-40 °C
• vertical installation, max.	60 °C
Dimensions	
Width	50 mm
Height	138 mm
Depth	89 mm
Weights	
Weight, approx.	192 g; without BusAdapter

Ordering data

	Article No.
Interface module	
PROFINET IM 155-6 PN interface module Max. 56 I/O modules, multi hot swap, no server module	**6DL1155-6AU00-0PM0**
Accessories	
IM cover Slot cover for interface module slots, to protect vacant slots Width 50 mm, 5 units	**6DL1133-6CV50-0AM0**

11

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Overview



- DI 16×24 V DC HA digital input module
  Sixteen 24 V DC digital inputs
- DI 32×24 V DC HA digital input module
  Thirty-two 24 V DC digital inputs
- DI 16×NAMUR HA digital input module
  Sixteen NAMUR digital inputs
- DI 8×24 to 125 V DC HA digital input module
  Eight 24 to 125 V DC digital inputs
- DI 8×230 V AC HA digital input module
  Eight 230 V AC digital inputs
- DQ 16×24 V DC/0.5A HA digital output module
  Sixteen 24 V DC digital outputs, 0.5 A
- DQ 32×24 V DC/0.5A HA digital output module
  Thirty-two 24 V DC digital outputs, 0.5 A
- RQ 4×120 V DC-230 V AC/5 A CO HA digital output module
  Four 24 to 120 V DC, 24 to 230 V AC relay outputs, 5 A

Design

The ET 200SP HA digital I/O modules have the following technical features:

Digital input modules

DI 16×24 V DC HA	DI 32×24 V DC HA	DI 16×NAMUR HA	DI 8×24 to 125 V DC HA	DI 8×230 V AC HA
				
• 16 digital inputs with the following features configurable per channel: - Pulse stretching - Diagnostics - Input delay - Hardware interrupts for positive and negative edges • Sink input (PNP, P-reading) • Diagnostics configurable per module: no supply voltage L+ • Suitable for connecting switches and 2-wire sensors in accordance with IEC 61131-2, type 1 and 3	• Thirty-two digital inputs with the following features configurable per channel: - Pulse stretching - Diagnostics - Input delay - Hardware interrupts for positive and negative edges • Sink input (PNP, P-reading) • Diagnostics configurable per module: no supply voltage L+ • Suitable for connecting switches and 2-wire sensors in accordance with IEC 61131-2, type 1 and 3	• 16 digital inputs with the following features configurable per channel: - Pulse stretching - Hardware interrupts for positive and negative edges - Flutter monitoring • Diagnostics for changeover contact sensor types • Diagnostics configurable per channel, even in changeover contact operation • Diagnostics configurable per module: no supply voltage L+	• Eight digital inputs isolated from the backplane bus and supply voltage L+/ M grouping 8 • Rated input voltage range 24 V to 125 V DC • Diagnostics configurable per module: no supply voltage L+ • Suitable for connecting switches and 2-/3-/4-wire sensors in accordance with IEC 61131, type 1 and 3 • Digital inputs with the following features configurable per channel: - Diagnostics - Input delay - Hardware interrupts for positive and negative edges • Rated input voltage range 24 V to 125 V DC • Diagnostics configurable per module: no supply voltage L+ • Suitable for connecting switches and 2-/3-/4-wire sensors in accordance with IEC 61131, type 1 and 3	• 8 isolated digital inputs in four groups (A to D) of two channels • Suitable for connecting switches and 2-wire sensors in accordance with IEC 61131, type 3

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Design (continued)

Digital output modules

DQ 16×24 V DC/0.5 A HA	DQ 32×24 V DC/0.5 A HA	RQ 4×120 V DC-230 V AC/5 A CO HA
		
• 16 digital outputs with the following features configurable per channel: - Configurable diagnostics - Programmable substitute values • Source output (PNP, P-switching) • Diagnostics configurable per module: no supply voltage L+ • Output current per channel 0.5 A • Suitable for solenoid valves, DC contactors and indicator lights	• Thirty-two digital outputs with the following features configurable per channel: - Configurable diagnostics - Programmable substitute values • Source output (PNP, P-switching) • Diagnostics configurable per module: no supply voltage L+ • Output current per channel 0.5 A • Suitable for solenoid valves, DC contactors and indicator lights	• 4 isolated relay outputs • Changeover contact (CO: changeover) • Suitable for solenoid valves, DC contactors and indicator lights • Substitute value configurable per channel • Diagnostics configurable per module: no supply voltage L+ • Output current per output 5 A

Technical specifications

Article number	6DL1131-6BH00-0PH1 ET 200SP HA, DI 16X24VDC	6DL1131-6BL00-0PH1 ET 200SP HA, DI 32X24VDC	6DL1131-6TH00-0PH1 ET 200SP HA, DI 16XNAMUR	6DL1131-6DF00-0PK0 ET 200SP HA, DI 8X24 ... 125VDC	6DL1131-6GF00-0PK0 ET 200SP HA, DI 8X230VAC
General information					
Product type designation	DI 16x24VDC HA	DI 32x24VDC HA	DI 16xNAMUR HA	DI 8x24 ... 125 V DC HA	DI 8x230VAC HA
Engineering with					
• PCS 7 configurable/integrated as of version	V9.0	V9.0	V9.0	V9.0	V9.0
Operating mode					
• DI	Yes	Yes	Yes	Yes	Yes
• Counter	No	No	No	No	
• Oversampling	No	No		No	
• MSI	No	No		No	
Supply voltage					
Rated value (DC)	24 V	24 V	24 V	24 V	
Rated value (AC)					230 V
Reverse polarity protection	Yes	Yes	Yes	Yes	
Encoder supply					
Number of outputs	16	32; When terminal block with encoder supply is used (type P0)	16		
Short-circuit protection	Yes; Electronic (response threshold 0.7 A to 1.3 A; for IO redundancy up to 2.6 A) Ensure sufficient low-resistance cable routing to the sensor/actuator in order to attain the response threshold. Depending on the cable cross-section used, there may be constraints regarding the usable length of cable.	Yes; When using TB type P0	Yes		

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Technical specifications (continued)

Article number	6DL1131-6BH00-0PH1	6DL1131-6BL00-0PH1	6DL1131-6TH00-0PH1	6DL1131-6DF00-0PK0	6DL1131-6GF00-0PK0
	ET 200SP HA, DI 16X24VDC	ET 200SP HA, DI 32X24VDC	ET 200SP HA, DI 16XNAMUR	ET 200SP HA, DI 8X24 ... 125VDC	ET 200SP HA, DI 8X230VAC
Output current					
• up to 60 °C, max.	2 A; 1 A when mounted vertically; see derating information in Equipment Manual				
• up to 70 °C, max.	1 A; See derating information in Equipment Manual				
24 V encoder supply					
• 24 V	Yes				
• Short-circuit protection	Yes; Electronic (response threshold 0.7 A to 1.3 A; for IO redundancy up to 2.6 A) Ensure sufficient low-resistance cable routing to the sensor/actuator in order to attain the response threshold. Depending on the cable cross-section used, there may be constraints regarding the usable length of cable.				
• Output current per channel, max.	0.5 A				
• Output current per module, max.	2 A				
Digital inputs					
Number of digital inputs	16	32	16; NAMUR	8	8; Isolated
Digital inputs, parameterizable	Yes	Yes	Yes		
Source/sink input	Yes; P-reading	Yes; P-reading		Yes; P-reading	
Input characteristic curve in accordance with IEC 61131, type 1	Yes	Yes		Yes	
Input characteristic curve in accordance with IEC 61131, type 2	No	No			
Input characteristic curve in accordance with IEC 61131, type 3	Yes	Yes		Yes	Yes
Pulse extension	Yes	No	Yes; 0.5 s, 1 s, 2 s		
• Length	Off, 50 ms, 100 ms, 200 ms, 500 ms, 1 s, 2 s				
Time stamping	Yes; Resolution 10 ms		Yes	Yes; Resolution 10 ms	
Time stamp (with precision of 1 ms)	Yes; Resolution 1ms		No	Yes; Resolution 1ms	
Edge evaluation	Yes; rising edge, falling edge, edge change	Yes; rising edge, falling edge, edge change	Yes; rising edge, falling edge, edge change		
Signal change flutter			Yes; 2 to 32 signal changes		
Flutter observation window			Yes; 0.5 s, 1 s to 100 s in 1-s steps		
Input voltage					
• Rated value (DC)	24 V	24 V	8.2 V		
• Rated value (AC)					230 V
• for signal "0"	-30 to +5V	-30 to +5V		-125 ... +5 V	0V AC to 40V AC
• for signal "1"	+11 to +30V	+11 to +30V		+11 ... +125 V	74 V AC to 264 V AC
Input current					
• for signal "1", typ.	2.5 mA	2.5 mA		3.1 mA	10.8 mA
for 10 k switched contact					
- for signal "0"			0.35 to 1.2 mA		
- for signal "1"			2.1 ... 6.4 mA		
for unswitched contact					
- for signal "0", max. (permissible quiescent current)			0.5 mA		
- for signal "1"			typ. 8 mA		

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Technical specifications (continued)

Article number	6DL1131-6BH00-0PH1	6DL1131-6BL00-0PH1	6DL1131-6TH00-0PH1	6DL1131-6DF00-0PK0	6DL1131-6GF00-0PK0
	ET 200SP HA, DI 16X24VDC	ET 200SP HA, DI 32X24VDC	ET 200SP HA, DI 16XNAMUR	ET 200SP HA, DI 8X24 ... 125VDC	ET 200SP HA, DI 8X230VAC
for NAMUR encoders					
- for signal "0"			0.35 to 1.2 mA		
- for signal "1"			2.1 ... 6.4 mA		
Input delay (for rated value of input voltage)					
• tolerated changeover time for changeover contacts			300 ms		
for standard inputs					
- parameterizable	Yes; none / 0.05 / 0.1 / 0.4 / 0.8 / 1.6 / 3.2 / 12.8 / 20 ms	No		Yes; 0.05 / 0.1 / 0.4 / 0.8 / 1.6 / 3.2 / 12.8 / 20 ms (in each case + delay of 30 to 500 µs, depending on line length)	
Encoder					
Connectable encoders					
• NAMUR encoder/changeover contact according to EN 60947			Yes		
• Single contact / changeover contact unconnected			Yes		
• Single contact / changeover contact connected with 10 kΩ			Yes		
• 2-wire sensor	Yes	Yes	Yes; Acc. to NAMUR	Yes	Yes
- permissible quiescent current (2-wire sensor), max.	1.5 mA	1.5 mA	1.2 mA	1.5 mA	
Interrupts/diagnostics/ status information					
Diagnostics function	Yes	Yes			
Alarms					
• Diagnostic alarm	Yes; channel by channel	Yes; channel by channel	Yes; channel by channel	Yes	Yes
• Hardware interrupt	Yes; channel by channel	Yes; channel by channel	Yes; Parameterizable, channels 0 to 15, rising/falling edge	Yes; Parameterizable, channels 0 to 7, rising/falling edge	
Diagnostic messages					
• Diagnostic information readable	Yes	Yes	Yes	Yes	Yes
• Monitoring the supply voltage	Yes; Module-wise	Yes; Module-wise	Yes	Yes	
- parameterizable	Yes	Yes	Yes		
• Monitoring of encoder power supply	Yes		Yes		
• Wire-break	Yes; Channel-by-channel, optional protective circuit for preventing wire-break diagnostics in the case of simple encoder contacts: 15 kOhm to 18 kOhm	Yes; Channel-by-channel, optional protective circuit for preventing wire-break diagnostics in the case of simple encoder contacts: 15 kOhm to 18 kOhm	Yes	Yes; channel by channel	
• Short-circuit		No	Yes		
• Short-circuit to M	Yes; Encoder supply to M, channel by channel				
• Group error			Yes	Yes	
• Changeover contact error			Yes		
Diagnostics indication LED					
• MAINT LED	Yes; yellow LED	Yes; yellow LED	Yes; yellow LED	Yes; yellow LED	Yes; yellow LED
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED	Yes; green PWR LED	Yes; green PWR LED	Yes; green PWR LED	
• Channel status display	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED	Yes; Green LED
• for channel diagnostics	Yes; Red LED	No	Yes; Red LED	Yes; Red LED	
• for module diagnostics	Yes; Green/red LED	Yes; green/red DIAG LED	Yes; green/red DIAG LED	Yes; green/red DIAG LED	Yes; green/red DIAG LED
Potential separation					
Potential separation channels					
• between the channels and backplane bus	Yes	Yes	Yes	Yes	Yes
• Between the channels and load voltage L+			Yes		

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Technical specifications (continued)

Article number	6DL1131-6BH00-0PH1	6DL1131-6BL00-0PH1	6DL1131-6TH00-0PH1	6DL1131-6DF00-0PK0	6DL1131-6GF00-0PK0
	ET 200SP HA, DI 16X24VDC	ET 200SP HA, DI 32X24VDC	ET 200SP HA, DI 16XNAMUR	ET 200SP HA, DI 8X24 ... 125VDC	ET 200SP HA, DI 8X230VAC
Ambient conditions					
Ambient temperature during operation					
• horizontal installation, min.	-40 °C	-40 °C	-40 °C	-40 °C	-40 °C
• horizontal installation, max.	70 °C	70 °C	70 °C	70 °C	70 °C
• vertical installation, min.	-40 °C	-40 °C	-40 °C	-40 °C	-40 °C
• vertical installation, max.	60 °C	60 °C	60 °C	60 °C	60 °C
Dimensions					
Width	22.5 mm	22.5 mm	22.5 mm	22.5 mm	22.5 mm
Height	115 mm	115 mm	115 mm	115 mm	115 mm
Depth	138 mm	138 mm	138 mm	138 mm	138 mm
Weights					
Weight, approx.	135 g	150 g	153 g	165 g	148 g

Article number	6DL1132-6BH00-0PH1	6DL1132-6BL00-0PH1	6DL1132-6HD50-0PK0
	ET 200SP HA, DQ 16X24VDC/0,5A	ET 200SP HA, DQ 32X24VDC/0,5A	ET 200SP HA, RQ 4X120VDC-230VAC/5A CO
General information			
Product type designation	DQ 16x24VDC/0.5A HA	DQ 32x24VDC/0.5A HA	RQ 4x120 V UC ... 230 V AC/5 A CO HA
Engineering with			
• PCS 7 configurable/integrated as of version	V9.0	V9.0	V9.0
Operating mode			
• DQ	Yes	Yes	
• DQ with energy-saving function	No	No	
• PWM	No	No	
• Oversampling	No	No	
• MSO	No		
Supply voltage			
Rated value (DC)	24 V	24 V	24 V
Reverse polarity protection	Yes	Yes	Yes
Digital outputs			
Number of digital outputs	16	32	4
Current-sinking	No	No	
Current-sourcing	Yes	Yes	
Digital outputs, parameterizable	Yes	Yes	
Short-circuit protection	Yes; Ensure sufficient low-resistance cable routing to the sensor/actuator in order to attain the response threshold. Depending on the cable cross-section used, there may be constraints regarding the usable length of cable.	Yes; Clocked electronically	
Open-circuit detection	Yes; 0.7 mA test current for wire-break diagnostics; this value is doubled in the case of IO redundancy	No	
Overload protection	Yes	Yes	
Limitation of inductive shutdown voltage to	L+ -(37 to 41V)	Typ. L+ (-53 V)	
Controlling a digital input	Yes	Yes	
Switching capacity of the outputs			
• with resistive load, max.	0.5 A	0.5 A	
• on lamp load, max.	5 W	5 W	
Load resistance range			
• lower limit	48 Ω	48 Ω	
• upper limit	12 kΩ	4 kΩ	
Output current			
• for signal "1" rated value	0.5 A	0.5 A	
• for signal "0" residual current, max.	0.7 mA; Test current for wire-break diagnostics; this value is doubled in the case of IO redundancy	0.1 mA	

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Technical specifications (continued)

Article number	**6DL1132-6BH00-0PH1** ET 200SP HA, DQ 16X24VDC/0,5A	**6DL1132-6BL00-0PH1** ET 200SP HA, DQ 32X24VDC/0,5A	**6DL1132-6HD50-0PK0** ET 200SP HA, RQ 4X120VDC-230VAC/5A CO
Output delay with resistive load			
• "0" to "1", typ.	50 µs	54 µs	
• "1" to "0", typ.	100 µs	48 µs	
Parallel switching of two outputs			
• for uprating	No	No	
• for redundant control of a load	Yes	Yes; only outputs of the same group	
Switching frequency			
• with resistive load, max.	100 Hz	100 Hz	2 Hz
• with inductive load, max.	2 Hz	2 Hz	0.5 Hz
• on lamp load, max.	10 Hz	10 Hz	2 Hz
Total current of the outputs			
• Current per channel, max.	0.5 A	0.5 A	5 A
• Current per module, max.	8 A	10 A	20 A
Total current of the outputs (per module)			
horizontal installation			
- up to 30 °C, max.	8 A		
- up to 40 °C, max.	8 A		
- up to 50 °C, max.	8 A		
- up to 60 °C, max.	5.5 A		
- up to 70 °C, max.	3 A	10 A	20 A
vertical installation			
- up to 30 °C, max.	8 A		
- up to 40 °C, max.	6.33 A		
- up to 50 °C, max.	4.67 A		
- up to 60 °C, max.	3 A	10 A	20 A
Relay outputs			
• Number of relay outputs			4
• external protection for relay outputs			yes; 6 A, see data in manual
Switching capacity of contacts			
- with inductive load, max.			2 A; 2 A (24 V DC), 0.5 A (60 V DC), 0.1 A (120 V DC)
- with resistive load, max.			5 A; 5 A (30 V DC), 5 A (230 V AC)
- Switching current, min.			8 mA
- Rated switching voltage (DC)			24 V; 24 V DC to 120 V DC
- Rated switching voltage (AC)			230 V; 24V AC to 230V AC
Cable length			
• shielded, max.	1 000 m	1 000 m	1 000 m
• unshielded, max.	600 m	600 m	200 m
Interrupts/diagnostics/ status information			
Diagnostics function	Yes	Yes	Yes
Substitute values connectable	Yes	Yes	Yes
Alarms			
• Diagnostic alarm	Yes	Yes	Yes
Diagnostic messages			
• Monitoring the supply voltage	Yes	Yes	Yes
- parameterizable		Yes	Yes
• Wire-break	Yes; channel by channel	No	
• Short-circuit		Yes	
• Short-circuit to M	Yes; channel by channel	Yes; channel by channel	
• Short-circuit to L+	Yes; channel by channel	No	
• Group error	Yes	Yes	
Diagnostics indication LED			
• MAINT LED	Yes; yellow LED	Yes; yellow LED	Yes; yellow LED
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED	Yes; green PWR LED	Yes; green PWR LED
• Channel status display	Yes; Green LED	Yes; Green LED	Yes; Green LED
• for channel diagnostics	Yes; Red LED	No	
• for module diagnostics	Yes; green/red DIAG LED	Yes; green/red DIAG LED	Yes; green/red DIAG LED

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Digital I/O modules

Article number	**6DL1132-6BH00-0PH1** ET 200SP HA, DQ 16X24VDC/0,5A	**6DL1132-6BL00-0PH1** ET 200SP HA, DQ 32X24VDC/0,5A	**6DL1132-6HD50-0PK0** ET 200SP HA, RQ 4X120VDC-230VAC/5A CO
Potential separation			
Potential separation channels			
• between the channels and back-plane bus	Yes	Yes	Yes
Ambient conditions			
Ambient temperature during operation			
• horizontal installation, min.	-40 °C	-40 °C	-40 °C; No icing
• horizontal installation, max.	70 °C	70 °C	70 °C
• vertical installation, min.	-40 °C	-40 °C	-40 °C; No icing
• vertical installation, max.	60 °C	60 °C	60 °C
Altitude during operation relating to sea level			
• Ambient air temperature-barometric pressure-altitude			3 000 m due to converter type used
Dimensions			
Width	22.5 mm	22.5 mm	22.5 mm
Height	115 mm	115 mm	115 mm
Depth	138 mm	138 mm	138 mm
Weights			
Weight, approx.	137 g	150 g	162 g

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Ordering data	Article No.
DI 16×24 V DC HA **digital input module** Sixteen 24 V DC digital inputs, color code CC01, for terminal block type H1 and M1, channel diagnostics	**6DL1131-6BH00-0PH1**
Digital input module **DI 32×24 V DC HA** Thirty-two 24 V DC digital inputs, color code CC00, for terminal block type P0 and H1, channel diagnostics	**6DL1131-6BL00-0PH1**
DI 16×NAMUR HA **digital input module** Sixteen NAMUR digital inputs, color code CC01, for terminal block type H1 and M1, channel diagnostics	**6DL1131-6TH00-0PH1**
DI 8×24 to 125 V DC HA **digital input module** Eight 24 to 125 V DC digital inputs, color code CC42, for terminal block type K0, channel diagnostics	**6DL1131-6DF00-0PK0**
DI 8×230 V AC HA **digital input module** Eight 230 V AC digital inputs, color code CC42, for terminal block type K0, module diagnostics	**6DL1131-6GF00-0PK0**
DQ 16×24 V DC/0.5A HA **digital output module** Sixteen 24 V DC digital outputs, 0.5 A, color code CC02, for terminal block type H1 and M1, channel diagnostics	**6DL1132-6BH00-0PH1**
Digital output module **DQ 32×24 V DC/0.5 A HA** Thirty-two 24 V DC digital outputs, 0.5 A, color code CC00, for terminal block type N0 and H1, channel diagnostics	**6DL1132-6BL00-0PH1**
RQ 4×120 V DC **230 V AC/5A CO HA** **digital output module** Four 24 to 120 V DC, 24 to 230 V AC relay outputs, 5 A, color code CC40, for terminal block type K0, module diagnostics	**6DL1132-6HD50-0PK0**
Accessories	
Labeling strips For labeling the I/O modules	
• Roll, light gray (with a total of 500 labeling strips), 1 unit	**6DL1193-6LR00-0AA0**
• A4 sheets, light gray (with a total of 1 000 labeling strips), 10 units	**6DL1193-6LA00-0AA0**
Color-coding labels For push-in terminals	
• Color code CC01, 10 units gray (terminals 1 to 16), red (terminals 17 to 32)	**6DL1193-6CP01-2HH1**
• Color code CC02, 10 units gray (terminals 1 to 16), blue (terminals 17 to 32)	**6DL1193-6CP02-2HH1**
• Color code CC40, 10 units gray (terminals 1 to 16)	**6DL1193-6CP40-2HK0**
• Color code CC42, 10 units gray (terminals 1 to 8), blue (terminals 9 to 16)	**6DL1193-6CP42-2HK0**
Equipment labeling plates 10 sheets with 16 plates each	**6ES7193-6LF30-0AW0**
PM cover Slot cover for I/O modules, to protect vacant I/O slots Width 22.5 mm, 5 units	**6DL1133-6CV22-0AM0**

Accessories

Slot cover, labeling strips

A slot cover is inserted in a terminal block:

- When slots do not contain I/O modules
- If slots are reserved for future expansion (empty)

You can insert a labeling strip for the planned I/O module in the front of the slot cover. The labeling strips can be ordered as accessories:

- For thermal transfer printers on a roll
- For laser printers as A4 sheets

Color-coding system

Color-coded labels facilitate cable assignment and identification of the potentials of an I/O module. A color code (for example CC01) is printed on each color coding label and I/O module. The color code can be read straight off the I/O module to determine which color-coded label you need for the terminal block.

The reference identification labels in accordance with EN 81346 can be attached to interface modules, BusAdapters and I/O modules. With the standard markings for printing, the reference identification label is suitable for automatic labeling with E-CAD systems.

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Overview



- AI 16×I 2-wire HART HA analog input module
  16 analog inputs
  Measuring range 0 to 20 mA, 0 to 10 mA, 4 to 20 mA, 4 to 20 mA with HART
- AI 16×TC/8×RTD 2-/3-/4-wire HA analog input module
  16 analog inputs for thermocouples; alternatively 8 analog inputs for thermistors
- AQ 8×I HART HA analog output module
  8 analog outputs
  Power output in the output ranges 0 to 10 mA, 0 to 20 mA, 4 to 20 mA and 4 to 20 mA HART

Design

The ET 200SP HA analog I/O modules have the following technical features:

Analog input modules

AI 16×I 2-wire HART HA	**AI 16×TC/8×RTD 2-/3-/4-wire HA**
	
• 16 analog inputs • 16 outputs as encoder supply for 2-wire measuring transducer • Diagnostics configurable per channel • Diagnostics configurable per module: no supply voltage L+ • Hardware interrupt • The digital inputs have the following features, configurable per channel: - Current measurement type for 2-wire HART measuring transducer - Measuring range 0 to 20 mA, 0 to 10 mA, 4 to 20 mA and 4 to 20 mA with HART - Resolution depends on measuring range and interference frequency suppression; minimum of 15 bits including sign, maximum of 16 bits including sign - Smoothing - Interference frequency suppression 10 Hz, 50 Hz and 60 Hz • Diagnostics configurable per channel • Diagnostics configurable per module: no supply voltage L+ • Hardware interrupt	• 16 analog inputs for connecting thermocouples (TC) • Alternatively 8 analog inputs for connecting thermistors (RTD) • Diagnostics configurable per channel • Diagnostics configurable per module: no supply voltage L+ • Permissible common-mode voltage between channels: 75 V DC / 60 V AC • The digital inputs have the following features, configurable per channel: • Temperature compensation: - Resolution: 16 bits including sign - "Voltage" measurement type - "Resistance" measurement type, 2-/3-/4-wire connection - "Thermistor" (RTD) measurement type, 2-/3-/4-wire connection - "Thermocouple" (TC) measurement type can be set per channel - Smoothing - Interference frequency suppression 16.6 Hz, 50 Hz or 60 Hz • Diagnostics configurable per channel • Diagnostics configurable per module: no supply voltage L+ • Permissible common-mode voltage between channels: 75 V DC / 60 V AC • Temperature compensation: - Reference channel of the module - Internal reference junction - Fixed temperature (0 °C) • Conversion time depends on interference frequency suppression of 16.6/50/60 Hz at 180/60/50 ms that can be set by channel. (With 3-wire measuring transducers, the time is twice as long as 2 measurements are required per channel). • Max. cable length RTD, TC: 600 m • Hardware interrupt upon limit violation per channel (two high and two low limits per channel) • Automatic compensation of line resistances with 3-wire connections

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Design (continued)

Analog output modules

AQ 8xI HART HA



- Analog output module with 8 outputs (8 D/A converters operating in parallel)
- Current output in output ranges 0 to 10 mA, 0 to 20 mA, 4 to 20 mA and 4 to 20 mA HART
- Resolution 16 bits including sign
- Rated supply voltage 24 V DC
- Load max. 750 Ω, max. 10 mH
- Diagnostics configurable per channel
- Diagnostics configurable per module: no supply voltage L+

Technical specifications

Article number	**6DL1134-6JH00-0PH1** ET 200SP HA, AI 16XTC/8XRTD 2-/3-/4-WIRE	**6DL1134-6TH00-0PH1** ET 200SP HA, AI 16XI 2-WIRE HART
General information		
Product type designation	AI 16 x TC/8 x RTD 2/3/4-wire HA	AI 16 x I 2-wire mA HART
Product function		
• I&M data	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3
Engineering with		
• PCS 7 configurable/integrated as of version	V9.0	V9.0
CiR – Configuration in RUN		
Reparameterization possible in RUN	Yes	Yes
Supply voltage		
Type of supply voltage	DC	DC
Rated value (DC)	24 V	24 V
Reverse polarity protection	Yes	Yes
Analog inputs		
Number of analog inputs		16
• For voltage measurement	16	
• For resistance/resistance thermometer measurement	8	
• For thermocouple measurement	16	
permissible input voltage for voltage input (destruction limit), max.	5 V	
permissible input current for current input (destruction limit), max.		30 mA
Constant measurement current for resistance-type transmitter, typ.	2 mA	
Cycle time (all channels), min.	125 ms; Sum of the basic conversion times and additional processing times (depending on the parameterization of the active channels); for line compensation in case of a three-wire connection, an additional cycle is necessary	
Technical unit for temperature measurement adjustable	Yes; °C/°F/K	
Input ranges (rated values), voltages		
• -1 V to +1 V	Yes; 16 bit incl. sign	
• -250 mV to +250 mV	Yes; 16 bit incl. sign	
• -50 mV to +50 mV	Yes; 16 bit incl. sign	
• -80 mV to +80 mV	Yes; 16 bit incl. sign	
Input ranges (rated values), currents		
• 0 to 20 mA		Yes; 16 bit incl. sign
• 4 mA to 20 mA		Yes; 16 bit incl. sign

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Technical specifications (continued)

Article number	6DL1134-6JH00-0PH1 ET 200SP HA, AI 16XTC/8XRTD 2-/3-/4-WIRE	6DL1134-6TH00-0PH1 ET 200SP HA, AI 16XI 2-WIRE HART
Input ranges (rated values), thermocouples		
• Type B	Yes; 16 bit incl. sign	
• Type C	Yes; 16 bit incl. sign	
• Type E	Yes; 16 bit incl. sign	
• Type J	Yes; 16 bit incl. sign	
• Type K	Yes; 16 bit incl. sign	
• Type L	Yes; 16 bit incl. sign	
• Type N	Yes; 16 bit incl. sign	
• Type R	Yes; 16 bit incl. sign	
• Type S	Yes; 16 bit incl. sign	
• Type T	Yes; 16 bit incl. sign	
• Type U	Yes; 16 bit incl. sign	
• Type TXK/TXK(L) to GOST	Yes; 16 bit incl. sign	
Input ranges (rated values), resistance thermometer		
• Cu 10	Yes; 16 bit incl. sign	
• Ni 100	Yes; 16 bit incl. sign	
• Ni 1000	Yes; 16 bit incl. sign	
• LG-Ni 1000	Yes; 16 bit incl. sign	
• Ni 120	Yes; 16 bit incl. sign	
• Ni 200	Yes; 16 bit incl. sign	
• Ni 500	Yes; 16 bit incl. sign	
• Pt 100	Yes; 16 bit incl. sign	
• Pt 1000	Yes; 16 bit incl. sign	
• Pt 200	Yes; 16 bit incl. sign	
• Pt 500	Yes; 16 bit incl. sign	
Input ranges (rated values), resistors		
• 0 to 150 ohms	Yes; 15 bit	
• 0 to 300 ohms	Yes; 15 bit	
• 0 to 600 ohms	Yes; 15 bit	
• 0 to 3000 ohms	Yes; 15 bit	
• 0 to 6000 ohms	Yes; 15 bit	
• PTC	Yes; 15 bit	
Thermocouple (TC)		
Temperature compensation		
- parameterizable	Yes	
Cable length		
• shielded, max.	200 m; Measurement ranges for thermocouples / voltages: shielded cable length max. 600 m, loop resistance max 8 kOhm; measuring ranges RTD: shielded cable length max. 600 m, cable resistance (single) max. 75 ohms	800 m; Shielded
Analog value generation for the inputs		
Integration and conversion time/ resolution per channel		
• Resolution with overrange (bit including sign), max.	16 bit	16 bit; 14 bit at 60 Hz (0 ... 10 mA), 16 bit at 10 Hz, 15 bit at 50 Hz and 15 bit at 60 Hz interference suppression
• Integration time, parameterizable	Yes; Channel-by-channel, results from the selected interference frequency suppression	Yes; channel by channel
• Basic conversion time, including integration time (ms)		
- additional processing time for wire-break check	2 ms; In the ranges resistance thermometers, resistors and thermocouples	
- additional power line wire-break check	2 ms; for 3/4 wire transducer (resistance thermometer and resistor)	
• Interference voltage suppression for interference frequency f1 in Hz	16.6 / 50 / 60 Hz, channel-by-channel	
• Conversion time (per channel)	60 ms; 180 / 50 ms, results from the selected interference frequency suppression	
Smoothing of measured values		
• parameterizable	Yes; none, weak, medium, strong, channel-by-channel	Yes; none, weak, medium, strong, channel-by-channel

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Technical specifications (continued)

Article number	6DL1134-6JH00-0PH1 ET 200SP HA, AI 16XTC/8XRTD 2-/3-/4-WIRE	6DL1134-6TH00-0PH1 ET 200SP HA, AI 16XI 2-WIRE HART
Encoder		
Connection of signal encoders		
• for current measurement as 2-wire transducer		Yes
Errors/accuracies		
Basic error limit (operational limit at 25 °C)		
• Voltage, relative to input range, (±)	0.05 %	
• Current, relative to input range, (±)		0.1 %
• Resistance, relative to input range, (±)	0.05 %	
Interference voltage suppression for f = n x (f1 ± 1 %), f1 = interference frequency		
• Series mode interference (peak value of interference < rated value of input range), min.	70 dB	
• Common mode voltage, max.	60 V	
• Common mode interference, min.	90 dB	
Interrupts/diagnostics/ status information		
Diagnostics function	Yes	Yes
Alarms		
• Diagnostic alarm	Yes	Yes
• Limit value alarm	Yes; two upper and two lower limit values in each case	Yes; two upper and two lower limit values in each case
Diagnostic messages		
• Monitoring the supply voltage	Yes	Yes
• Wire-break	Yes; channel by channel	Yes; channel by channel
• Short-circuit		Yes; Channel-by-channel, short-circuit of the encoder supply to ground or of an input to the encoder supply
• Overflow/underflow	Yes; channel by channel	Yes; channel by channel
Diagnostics indication LED		
• MAINT LED	Yes; yellow LED	Yes; yellow LED
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED	Yes; green PWR LED
• Channel status display	Yes; Green LED	Yes; Green LED
• for channel diagnostics	Yes; Red LED	Yes; Red LED
• for module diagnostics	Yes; green/red DIAG LED	Yes; green/red DIAG LED
Potential separation		
Potential separation channels		
• between the channels and backplane bus	Yes	Yes
Isolation		
Isolation tested with	1 500 V DC/1 min, type test	1 500 V DC/1 min, type test
Ambient conditions		
Ambient temperature during operation		
• horizontal installation, min.	-40 °C	-40 °C
• horizontal installation, max.	70 °C	70 °C; Observe derating
• vertical installation, min.	-40 °C	-40 °C
• vertical installation, max.	60 °C	60 °C; Observe derating
Dimensions		
Width	22.5 mm	22.5 mm
Height	115 mm	115 mm
Depth	138 mm	138 mm
Weights		
Weight, approx.	150 g	148 g

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Technical specifications (continued)

Article number	6DL1135-6TF00-0PH1 ET 200SP HA, AQ 8XI HART
General information	
Product type designation	AQ 8 x I HART HA
Product function	
• I&M data	Yes; I&M0 to I&M3
Engineering with	
• PCS 7 configurable/integrated as of version	V9.0
CiR – Configuration in RUN	
Reparameterization possible in RUN	Yes
Supply voltage	
Type of supply voltage	DC
Rated value (DC)	24 V
Reverse polarity protection	Yes
Analog outputs	
Number of analog outputs	8
Output ranges, current	
• 0 to 10 mA	Yes; 14 bit
• 0 to 20 mA	Yes; 15 bit
• -20 mA to +20 mA	No
• 4 mA to 20 mA	Yes; 16 bit incl. sign
Connection of actuators	
• for current output two-wire connection	Yes
Load impedance (in rated range of output)	
• with current outputs, max.	750 Ω
• with current outputs, inductive load, max.	10 mH
Cable length	
• shielded, max.	1 000 m
Settling time	
• for resistive load	1.2 ms; 750 ohm
• for inductive load	1.2 ms
Errors/accuracies	
Basic error limit (operational limit at 25 °C)	
• Current, relative to output range, (±)	0.1 %

Article number	6DL1135-6TF00-0PH1 ET 200SP HA, AQ 8XI HART
Interrupts/diagnostics/ status information	
Diagnostics function	Yes
Substitute values connectable	Yes
Alarms	
• Diagnostic alarm	Yes
Diagnostic messages	
• Monitoring the supply voltage	Yes
• Wire-break	Yes; channel by channel
• Short-circuit	Yes; channel by channel
• Overflow/underflow	Yes; channel by channel
Diagnostics indication LED	
• MAINT LED	Yes; yellow LED
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED
• Channel status display	Yes; Green LED
• for channel diagnostics	Yes; Red LED
• for module diagnostics	Yes; green/red DIAG LED
Potential separation	
Potential separation channels	
• between the channels and backplane bus	Yes
Isolation	
Isolation tested with	1 500 V DC/1 min, type test
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-40 °C
• horizontal installation, max.	70 °C
• vertical installation, min.	-40 °C
• vertical installation, max.	60 °C
Dimensions	
Width	22.5 mm
Height	115 mm
Depth	138 mm
Weights	
Weight, approx.	160 g

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Ordering data	Article No.
AI 16×I 2-wire HART HA analog input module 16 analog inputs Measuring range 0 to 20 mA, 0 to 10 mA, 4 to 20 mA, 4 to 20 mA with HART Color code CC01, for terminal block type H1 and M1, channel diagnostics, 16-bit	**6DL1134-6TH00-0PH1**
AI 16×TC/8×RTD 2-/3-/4-wire HA analog input module 16 analog inputs for thermocouples; alternatively 8 analog inputs for thermistors Color code CC00, for terminal block type H1 and M1, channel diagnostics, 16-bit	**6DL1134-6JH00-0PH1**
AQ 8×I HART HA analog output module 8 analog outputs Power output in the output ranges 0 to 10 mA, 0 to 20 mA, 4 to 20 mA and 4 to 20 mA HART Color code CC00, for terminal block type H1 and M1, channel diagnostics, 16-bit	**6DL1135-6TF00-0PH1**

	Article No.
Accessories	
Labeling strips For labeling the I/O modules	
• Roll, light gray (with a total of 500 labeling strips), 1 unit	**6DL1193-6LR00-0AA0**
• A4 sheets, light gray (with a total of 1 000 labeling strips), 10 units	**6DL1193-6LA00-0AA0**
Color-coding labels For push-in terminals	
• Color code CC00, 10 units gray (terminals 1 to 32)	**6DL1193-6CP00-2HH1**
• Color code CC01, 10 units gray (terminals 1 to 16), red (terminals 17 to 32)	**6DL1193-6CP01-2HH1**
Reference identification labels 10 sheets with 16 strips each	**6ES7193-6LF30-0AW0**
PM cover Slot cover for I/O modules, to protect vacant I/O slots Width 22.5 mm, 5 units	**6DL1133-6CV22-0AM0**

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Overview



The I/O module AI-DI 16/DQ16×24VDC HART HA is available in the following versions:

- DI 16/DQ16x24VDC HA in digital-only mode
- AI-DI 16/DQ 16x24VDC HART HA as digital/analog module in mixed mode

Time stamping is available with configuration in mixed mode. High-precision time stamping (SoE: Sequence of Events) with a precision of 1 ms is available with configuration in digital-only mode.

In mixed mode, the 16 inputs can also be set channel by channel as either digital inputs or analog inputs with or without HART. HART is only available in mixed mode and with configuration in a measuring range of 4 to 20 mA.

Design

The AI-DI 16/DQ16×24 V DC HART HA analog/digital module has the following technical features:

- 16 inputs configurable as digital or analog inputs
- Digital inputs with the following features configurable per channel:
  - Pulse stretching
  - Time stamping in mixed mode
  - Time stamping with a precision of 1 ms in digital-only mode
  - Hardware interrupts for positive and negative edges
  - Input delay
- Analog inputs with the following features configurable per channel:
  - Current measurement type for 2-wire measuring transducer
  - Measuring ranges 0 to 20 mA, 0 to 10 mA, 4 to 20 mA or 4 to 20 mA with HART
  - Resolution depends on measuring range and interference frequency suppression; minimum of 15 bits, maximum of 16 bits including sign
  - Hardware interrupts for monitoring configurable limits
  - Smoothing
  - Interference frequency suppression 10 Hz, 50 Hz or 60 Hz
  - Configurable wire break limit
- 16 outputs configurable as digital outputs or as sensor supplies for analog current measurement
  - Substitute value configurable per channel for the digital outputs
- Diagnostics configurable per channel
- Diagnostics configurable per module: no supply voltage L+

11

Technical specifications

Article number	**6DL1133-6EW00-0PH1** ET 200SP HA, AI-DI16/DQ16X24VDC HART
General information	
Product type designation	AI-DI 16/DQ 16x24VDC HART HA
Product function	
• I&M data	Yes; I&M0 to I&M3
Engineering with	
• PCS 7 configurable/integrated as of version	V9.0
Operating mode	
• DI	Yes
• Counter	No
• DQ	Yes
• DQ with energy-saving function	No
• PWM	No
• Oversampling	No
• MSI	No
• MSO	No
CiR – Configuration in RUN	
Reparameterization possible in RUN	Yes
Supply voltage	
Type of supply voltage	DC
Rated value (DC)	24 V
Reverse polarity protection	Yes

Article number	**6DL1133-6EW00-0PH1** ET 200SP HA, AI-DI16/DQ16X24VDC HART
Encoder supply	
Number of outputs	16
Output voltage encoder supply, min.	18.2 V
Short-circuit protection	Yes; per channel, electronic
24 V encoder supply	
• 24 V	Yes
• Short-circuit protection	Yes; Electronic (response threshold 0.7 A to 1.5 A)
Digital inputs	
Number of digital inputs	16
Digital inputs, parameterizable	Yes
Source/sink input	Yes; P-reading
Input characteristic curve in accordance with IEC 61131, type 1	Yes
Input characteristic curve in accordance with IEC 61131, type 2	No
Input characteristic curve in accordance with IEC 61131, type 3	Yes
Pulse extension	Yes
• Length	Off, 50 ms, 100 ms, 200 ms, 500 ms, 1 s, 2 s
Time stamping	Yes; Resolution 10 ms
Time stamp (with precision of 1 ms)	Yes; Resolution 1ms
Edge evaluation	Yes; rising edge, falling edge, edge change

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Technical specifications (continued)

Article number	**6DL1133-6EW00-0PH1** ET 200SP HA, AI-DI16/DQ16X24VDC HART
Input voltage	
• Type of input voltage	DC
• Rated value (DC)	24 V
• for signal "0"	-30 to +5V
• for signal "1"	+11 to +30V
Input current	
• for signal "1", typ.	2.5 mA
Input delay (for rated value of input voltage)	
for standard inputs	
- parameterizable	Yes; 0.05 / 0.1 / 0.4 / 0.8 / 1.6 / 3.2 / 12.8 / 20 ms (in each case + delay of 30 to 500 µs, depending on line length)
Cable length	
• shielded, max.	1 000 m
• unshielded, max.	600 m
Digital outputs	
Number of digital outputs	16
Current-sinking	No
Current-sourcing	Yes
Digital outputs, parameterizable	Yes
Short-circuit protection	Yes
Open-circuit detection	Yes
Overload protection	Yes
Limitation of inductive shutdown voltage to	L+ -(37 to 41V)
Controlling a digital input	Yes
Switching capacity of the outputs	
• with resistive load, max.	0.5 A
• on lamp load, max.	5 W
Load resistance range	
• lower limit	48 Ω
• upper limit	12 kΩ
Output current	
• for signal "1" rated value	0.5 A
• for signal "0" residual current, max.	0.7 mA
Output delay with resistive load	
• "0" to "1", typ.	50 µs
• "1" to "0", typ.	100 µs
Parallel switching of two outputs	
• for uprating	No
• for redundant control of a load	Yes
Switching frequency	
• with resistive load, max.	100 Hz
• with inductive load, max.	2 Hz
• on lamp load, max.	10 Hz
Total current of the outputs	
• Current per channel, max.	0.5 A
• Current per module, max.	2 A
Cable length	
• shielded, max.	1 000 m
• unshielded, max.	600 m

Article number	**6DL1133-6EW00-0PH1** ET 200SP HA, AI-DI16/DQ16X24VDC HART
Analog inputs	
Number of analog inputs	16
permissible input current for current input (destruction limit), max.	30 mA
Input ranges (rated values), currents	
• 0 to 20 mA	Yes; 16 bit incl. sign
• 4 mA to 20 mA	Yes; 16 bit incl. sign
Analog value generation for the inputs	
Integration and conversion time/ resolution per channel	
• Resolution with overrange (bit including sign), max.	16 bit; Resolution with overrange (bit including sign), max. 16 bits, exception: 15 bits at 60 Hz interference suppression and 0 to 10 mA
• Integration time, parameterizable	Yes; channel by channel
Smoothing of measured values	
• parameterizable	Yes; none, weak, medium, strong, channel-by-channel
Encoder	
Connection of signal encoders	
• for current measurement as 2-wire transducer	Yes
Connectable encoders	
• 2-wire sensor	Yes
- permissible quiescent current (2-wire sensor), max.	1.5 mA
Errors/accuracies	
Basic error limit (operational limit at 25 °C)	
• Current, relative to input range, (±)	0.1 %
Interrupts/diagnostics/ status information	
Diagnostics function	Yes
Substitute values connectable	Yes
Alarms	
• Diagnostic alarm	Yes
• Limit value alarm	Yes; two upper and two lower limit values in each case
Diagnostic messages	
• Monitoring the supply voltage	Yes
• Wire-break	Yes; channel by channel
• Short-circuit to M	Yes; Encoder supply to M, channel by channel
• Group error	Yes
• Overflow/underflow	Yes; channel by channel
Diagnostics indication LED	
• MAINT LED	Yes; yellow LED
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED
• Channel status display	No
• for channel diagnostics	No
• for module diagnostics	Yes; green/red DIAG LED

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Digital/Analog Module

Article number	**6DL1133-6EW00-0PH1** ET 200SP HA, AI-DI16/DQ16X24VDC HART
Potential separation	
Potential separation channels	
• between the channels and backplane bus	Yes
Isolation	
Isolation tested with	1 500 V DC/1 min, type test
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-40 °C
• horizontal installation, max.	70 °C; Observe derating
• vertical installation, min.	-40 °C
• vertical installation, max.	60 °C; Observe derating
Dimensions	
Width	22.5 mm
Height	115 mm
Depth	138 mm
Weights	
Weight, approx.	150 g

Ordering data

	Article No.
AI-DI 16/DQ16×24VDC HART HA input/output module 16 channels, each with digital output and digital/analog input Color code CC01, for terminal block type H1 and M1	**6DL1133-6EW00-0PH1**
Accessories	
Labeling strips For labeling the I/O modules	
• Roll, light gray (with a total of 500 labeling strips), 1 unit	**6DL1193-6LR00-0AA0**
• A4 sheets, light gray (with a total of 1 000 labeling strips), 10 units	**6DL1193-6LA00-0AA0**
Color-coding labels For push-in terminals	
• Color code CC01, 10 units gray (terminals 1 to 16), red (terminals 17 to 32)	**6DL1193-6CP01-2HH1**
Reference identification labels 10 sheets with 16 strips each	**6ES7193-6LF30-0AW0**
Slot cover for I/O modules 22.5 mm wide	**6DL1133-6CV22-0AM0**

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Overview

Mounting rails

The mounting rail is required for fitting an ET 200SP HA station in the control cabinet. The carrier modules for interface modules, the carrier modules for the I/O modules, and the server module are attached to the mounting rail.

The mounting rails are available in lengths of 482 mm (for installation in a 19-inch rack) and 1 500 mm (for maximum configuration and vertical installation in a cabinet).



IM single carrier module



IM redundant carrier module

Carrier modules for IM interface module

Two versions of the carrier modules for IM interface modules are available:

- IM single carrier module for 1 interface module, for single connection to PROFINET
- IM redundant carrier module for 2 interface modules, for redundant connection to PROFINET

The carrier modules connect the interface module to the backplane bus. They enable data exchange with the I/O modules.



Carrier modules for I/O modules, 8-slot



Carrier modules for I/O modules, 2-slot

Carrier modules for I/O modules

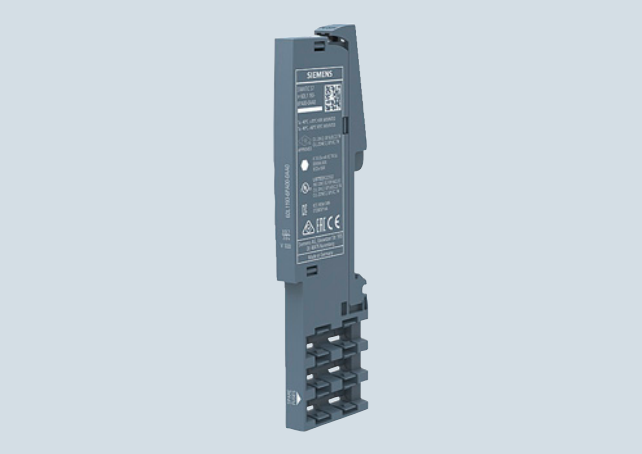
The slots for the I/O modules are created by the connection of these carrier modules to the terminal blocks.

Carrier modules for I/O modules are available in the following versions:

- Carrier module, 2-slot, with 2 slots for I/O modules
- Carrier module, 8-slot, with 8 slots for I/O modules

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Overview (continued)



ET 200SP HA, server module

Server module

Server module and power bus cover complete configuration of the ET200SP HA. A server module and a power bus cover are supplied with each carrier module for the interface module.

Technical specifications

Article number	**6DL1193-6BH00-0SM0** CARRIER MODULE IM SINGLE	**6DL1193-6BH00-0RM0** CARRIER MODULE IM REDUNDANT
General information		
Product type designation	Carrier module IM single	Carrier module IM redundant
Product function		
• I&M data	Yes; Asset data	Yes; Asset data
Ambient conditions		
Ambient temperature during operation		
• horizontal installation, min.	-40 °C	-40 °C
• horizontal installation, max.	70 °C	70 °C
• vertical installation, min.	-40 °C	-40 °C
• vertical installation, max.	60 °C	60 °C
Dimensions		
Width	100 mm	100 mm
Height	204 mm	204 mm
Depth	52 mm	52 mm
Weights		
Weight, approx.	250 g	224 g

Article number	**6DL1193-6GA00-0NN0** CARRIER MODULE TWOFOLD	**6DL1193-6GC00-0NN0** CARRIER MODULE EIGHTFOLD
General information		
Product type designation	Carrier module 2 times	Carrier module 8 times
Product function		
• I&M data	Yes; Asset data	Yes; Asset data
Ambient conditions		
Ambient temperature during operation		
• horizontal installation, min.	-40 °C	-40 °C
• horizontal installation, max.	70 °C	70 °C
• vertical installation, min.	-40 °C	-40 °C
• vertical installation, max.	60 °C	60 °C
Dimensions		
Width	52.5 mm; 45 mm when installed	187.5 mm; 180 mm when installed
Height	203 mm	203 mm
Depth	79 mm	79 mm
Weights		
Weight, approx.	111 g	450 g

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Ordering data	Article No.
Mounting rails for ET 200SP HA	
482 mm (ca. 19 inch) mounting rail Including grounding screw and integrated standard mounting rail for fitting small components such as clamps, fuses and relays	**6DL1193-6MC00-0AA0**
1500 mm (ca. 59 inch) mounting rail Including grounding screw and integrated standard mounting rail for fitting small components such as clamps, fuses and relays	**6DL1193-6MD00-0AA0**
Grounding screw For connecting PE to the mounting rail; essential for 1 500 mm mounting rail 20 units per packing unit	**6ES7590-5AA00-0AA0**
IM carrier modules for interface modules Note: A server module and a power bus cover are supplied with each carrier module for the interface module.	
IM single carrier module Rack for 1 SIMATIC ET 200SP HA interface module for single connection to PROFINET	**6DL1193-6BH00-0SM0**
IM redundant carrier module Rack for 2 SIMATIC ET 200SP HA interface modules for redundant connection to PROFINET	**6DL1193-6BH00-0RM0**

	Article No.
Carrier modules for I/O modules	
Carrier module, 2 slots Rack for 2 SIMATIC ET 200SP HA I/O modules	**6DL1193-6GA00-0NN0**
Carrier module 8x Rack for 8 SIMATIC ET 200SP HA I/O modules	**6DL1193-6GC00-0NN0**
Spare parts	
Server module (spare part) for ET 200SP HA	**6DL1193-6PA00-0AA0**

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Overview



Terminal block, type K0 light



Terminal block, type M1 light



Terminal block, type H1 dark

The slots for the I/O modules are created by connecting carrier modules and terminal blocks. The terminal blocks contain the process terminals for connecting sensors, actuators and other devices.

Select the terminal block for the slot of an I/O module based on the following dependencies:

- Definition of I/O modules associated with a potential group
- Requirement for configuring redundant I/O modules
- Parameters of the I/O module required (number of process terminals, temperature detection)

The following table contains selection criteria for the terminal blocks available:

Signal voltage	Potential group	Redundant design	Width	Process terminals	Temperature detection	Terminal block type	Article number
Up to 24 V DC	Start again	No	22.5 mm	16	No	K0 bright	6DL1193-6TP00-0DK0
		No	22.5 mm	32	Yes	H1 bright	6DL1193-6TP00-0DH1
		Yes[1)]	45 mm	32	Yes	M1 light	6DL1193-6TP00-0DM1
	Forward	No	22.5 mm	16	No	K0 dark	6DL1193-6TP00-0BK0
		No	22.5 mm	32	Yes	H1 dark	6DL1193-6TP00-0BH1
		Yes[1)]	45 mm	32	Yes	M1 dark	6DL1193-6TP00-0BM1
Up to 125 V DC/230 V AC	Start again	No	22.5 mm	16	No	K0 bright	6DL1193-6TP00-0DK0
	Forward	No	22.5 mm	16	No	K0 dark	6DL1193-6TP00-0BK0

[1)] The 45 mm wide terminal blocks are to be used exclusively for operating the I/O modules in I/O redundancy or slot covers. The process terminals run in parallel to the contacts of the two I/O modules.

Potential groups/color type of the terminal blocks

To help you distinguish between potential groups on an ET 200SP HA station, they come in both a light and a dark version:

- Each light-colored terminal block that is fitted in the station starts a new potential group. The first terminal block fitted (on the first carrier module immediately to the right of the interface module) is therefore light-colored.
- Each dark-colored terminal block passes the supply voltage connected at the light-colored terminal block to the I/O modules and to the dark terminal block positioned to the right of it.

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Technical specifications

Article number	6DL1193-6TP00-0DK0	6DL1193-6TP00-0DH1	6DL1193-6TP00-0DM1	6DL1193-6TP00-0BK0	6DL1193-6TP00-0BH1	6DL1193-6TP00-0BM1
	TERMINAL BLOCK, TYPE K0, LIGHT COLORED	TERMINAL BLOCK, TYPE H1, LIGHT COLORED	TERMINAL BLOCK, TYPE M1, LIGHT COLORED	TERMINAL BLOCK, TYPE K0, DARK-COLORED	TERMINAL BLOCK, TYPE H1, DARK-COLORED	TERMINAL BLOCK, TYPE M1, DARK-COLORED
General information						
Product type designation	Type K0	Type H1	Type M1	Type K0	Type H1	Type M1
Product function						
• I&M data	Yes; Asset data	Yes; Asset data	Yes; Asset data	Yes; Asset data	Yes; Asset data	Yes; Asset data
Ambient conditions						
Ambient temperature during operation						
• horizontal installation, min.	-40 °C	-40 °C	-40 °C	-40 °C	-40 °C	-40 °C
• horizontal installation, max.	70 °C	70 °C	70 °C	70 °C	70 °C	70 °C
• vertical installation, min.	-40 °C	-40 °C	-40 °C	-40 °C	-40 °C	-40 °C
• vertical installation, max.	60 °C	60 °C	60 °C	60 °C	60 °C	60 °C
Dimensions						
Width	22.5 mm	22.5 mm	45 mm	22.5 mm	22.5 mm	45 mm
Height	175 mm	175 mm	175 mm	175 mm	175 mm	175 mm
Depth	77 mm	77 mm	77 mm	77 mm	77 mm	77 mm
Weights						
Weight, approx.	78 g	80 g	155 g	78 g	80 g	155 g

Ordering data

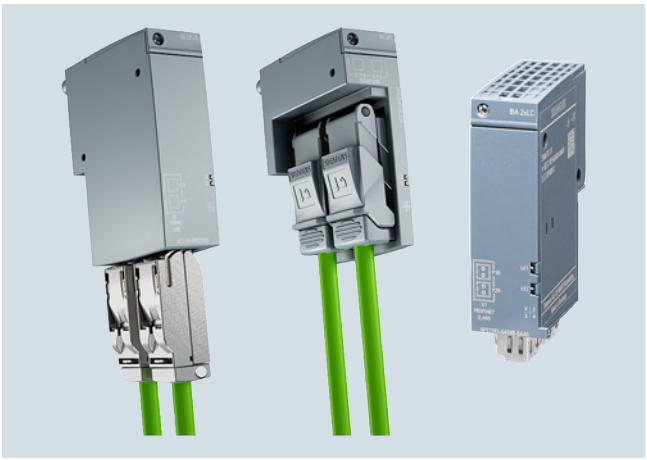
	Article No.
Terminal blocks	
For signal voltages up to 24 V DC	
Terminal block type K0 light For starting a new potential group, with 16 push-in terminals, width 22.5 mm	**6DL1193-6TP00-0DK0**
Terminal block type H1 light For starting a new potential group, with 32 push-in terminals, width 22.5 mm, with temperature detection	**6DL1193-6TP00-0DH1**
Terminal block type M1 light For starting a new potential group, with 32 push-in terminals, width 45 mm, for redundant configuration, with temperature detection	**6DL1193-6TP00-0DM1**
Terminal block type K0 dark For forwarding in a potential group, with 16 push-in terminals, width 22.5 mm	**6DL1193-6TP00-0BK0**
Terminal block type H1 dark For forwarding in a potential group, with 32 push-in terminals, width 22.5 mm, with temperature detection	**6DL1193-6TP00-0BH1**
Terminal block type M1 dark For forwarding in a potential group, with 32 push-in terminals, width 45 mm, for redundant configuration, with temperature detection	**6DL1193-6TP00-0BM1**

	Article No.
For signal voltages up to 125 V DC/230 V AC	
Terminal block type K0 light For starting a new potential group, with 16 push-in terminals, width 22.5 mm	**6DL1193-6TP00-0DK0**
Terminal block type K0 dark For forwarding in a potential group, with 16 push-in terminals, width 22.5 mm	**6DL1193-6TP00-0BK0**
Accessories	
Shield connection for terminal block 5 shield supports and 5 shield terminals, for direct connection	**6ES7193-6SC00-1AM0**

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BusAdapter

Overview



BusAdapter BA 2×RJ45, 2×FC and 2×LC

BusAdapter

A BusAdapter as a separate component allows a free choice of connection technology:

- BA 2×RJ45: 2 electrical connections for bus cable with standard RJ45 connector
- BA 2×FC: 2 electrical connections for direct connection of FastConnect bus cable
- BA 2×LC: 2 optical ports for fiber-optic cables

Technical specifications

Article number	**6DL1193-6AR00-0AA0** ET 200SP HA, BUSADAPTER BA 2XRJ45	**6DL1193-6AF00-0AA0** ET 200SP HA, BUSADAPTER BA 2XFC	**6DL1193-6AG00-0AA0** ET 200SP HA, BUSADAPTER BA 2XLC
General information			
Product type designation	SIMATIC BusAdapter BA 2x RJ45	SIMATIC BusAdapter BA 2x FC	SIMATIC BusAdapter BA 2x LC
Interfaces			
Number of PROFINET interfaces	1; 2 ports (switch) RJ45	1; 2 ports (switch) FC	1; 2 ports (switch) LC Multimode Glass Fibre
PROFINET IO			
• RJ 45	Yes; 2x RJ45		
• FC (FastConnect)		Yes; 2 x	
• Number of LC ports			2
Cable length			
- Cu conductors	100 m	100 m	
- Multimode graded-index fiber 50/125 µm			3 km
- Multimode graded-index fiber 62.5/125 µm			3 km
Ambient conditions			
Ambient temperature during operation			
• min.	-40 °C	-40 °C	-40 °C
• max.	70 °C	70 °C	65 °C; Redundant design (2x 6DL1155-6AU00-0PM0): max. 60 °C horizontal, max. 50 °C vertical. When using different I/O devices, the derating specified there must be observed.
Dimensions			
Width	20 mm	20 mm	20 mm
Height	69.5 mm	69.5 mm	75 mm; Without protective caps (approx. 8 mm)
Depth	59 mm	59 mm	59 mm
Weights			
Weight, approx.	46 g	53 g	60 g

Ordering data

	Article No.
BusAdapter	
BusAdapter 2×RJ45 2 × RJ45 sockets for PROFINET (standard Ethernet socket)	**6DL1193-6AR00-0AA0**
BusAdapter 2×FC 2 × FastConnect (FC) connections for PROFINET	**6DL1193-6AF00-0AA0**
BusAdapter 2×LC 2 × glass fiber-optic connections for PROFINET	**6DL1193-6AG00-0AA0**

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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. It is optimized for use with SIMATIC PCS 7 and SIMATIC S7, but can also be integrated in other systems such as SIMATIC S5 per GSD file.

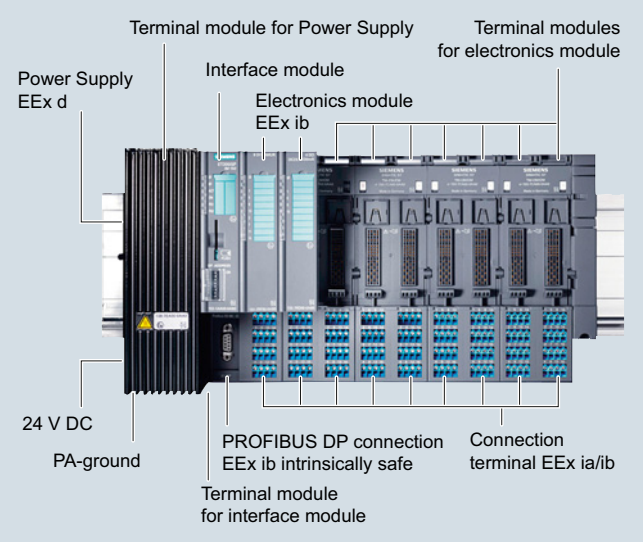
In accordance with ATEX directive 94/9/EC, the ET 200iSP remote I/Os stations can be installed directly in the Ex zones 1, 2, 21 or 22 as well as in non-hazardous areas. The intrinsically-safe sensors, actuators and HART field devices can also be located in zone 0 or 20 if necessary.

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 hardwiring and automatic slot coding supports prewiring without the electronics modules, simple and reliable hot swapping of individual modules without a fire certificate as well as configuration in run (CiR).

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. Comprehensive diagnostic options facilitate commissioning and troubleshooting.

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

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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 remote I/O stations are connected to the automation systems (controllers) via the PROFIBUS DP, which can be routed intrinsically-safe into Ex-zone 1 using an isolating transformer (RS 485-iS coupler) as barrier. Data transfer rates of up to 1.5 Mbps are possible. The ET 200iSP remote I/O stations can be connected to the controller as DP V0 slave or DP V1 slave.

The ET 200iSP remote I/O stations are integrated into the SIMATIC PCS 7 process control system using standard driver blocks.

The existing standard diagnostics drivers process 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 SIMATIC PCS 7 maintenance station.

Vendor-specific information and maintenance data are saved powerfail-proof on the electronics modules.

Configuration

The ET 200iSP stations can be configured and parameterized per HW Config in a SIMATIC S7/SIMATIC PCS 7 environment. Parameters of the ET 200iSP stations and the HART field devices can also be set using the process device manager, SIMATIC PDM. Routing via PROFIBUS DP enables direct access to the HART field devices on the ET 200iSP with SIMATIC PDM.

The system function CiR (Configuration in Run) is also supported for the configuration of SIMATIC PCS 7 and permits the following changes to be made to the configuration during runtime:

- Adding of ET 200iSP stations
- Adding modules to the ET 200iSP station
- Re-configuration of modules
- Parameterization of connected HART field devices with SIMATIC PDM

Software minimum requirements

- SIMATIC PCS 7 environment: SIMATIC PCS 7 Version 6.1
- SIMATIC S7 environment: SIMATIC STEP 7 Version 5.3+SP1 including Hardware Support Package (HSP) or SIMATIC STEP 7 (TIA Portal)
- The latest SIMATIC PDM version is used to configure the HART field devices.

Configuration with third-party systems and old SIMATIC PCS 7/STEP 7 versions

The station design (configuration) should be published over the PROFIBUS DP network per GSD file.

Process Device Manager SIMATIC PDM is required for the configuration. It can be used to define, for example, alarm limits for analog modules, signal encoders for digital modules as well as settings for outputting analog values and HART commands for analog HART modules.

Technical specifications

ET 200iSP – general		
Degree of protection	IP30	
Ambient temperature		
• Horizontal mounting position	-20 … +70 °C	
• Other mounting positions	-20 … +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
	Class I	Zone 1, AEx de [ia/ib] IIC T4
• cULus	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 2014/34/EC, 2014/30/EC and 2014/35/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)	

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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 × PS on TM-PS-A UC
- Redundancy: 1 × PS on TM-PS-A UC (left) plus 1 × PS on TM-PS-B UC (right)

Power supply modules are available for supplies of 24 V DC and 120/230 V AC.

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
  - Powerbus (for supplying the electronics modules)
  - Backplane bus (logic)
  - 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) must be installed in the safe area. It is connected to the terminal module of the power supply unit via EEX e terminals. The power source may only be connected or disconnected in a safe operating environment and not in hazardous areas.

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.

Technical specifications

Article number	**6ES7138-7EA01-0AA0** ET200ISP, POWER SUPPLY MODULE	**6ES7138-7EC00-0AA0** ET200ISP, POWER SUPPLY MOD. AC120/230V
Supply voltage		
Rated value (DC)	24 V	
Rated value (AC)		230 V; 120/230V AC
Reverse polarity protection	Yes	
Line frequency		
• permissible range, lower limit		47 Hz
• permissible range, upper limit		63 Hz
Input current		
from supply voltage L+, max.	4 A	
from supply voltage L1, max.		1.04 A; at rated voltage 230 VAC:0.45A at rated voltage 120 VAC:0.75A
Power loss		
Power loss, typ.	20 W	5 W; 5 W + 1.2 x total power loss of the electronics modules
Power loss, max.		21.3 W
Interrupts/diagnostics/ status information		
Status indicator	Yes	Yes
Alarms	No	No
Diagnostic messages		
• Diagnostic information readable	Yes; via IM 152	Yes; via IM 152
Diagnostics indication LED		
• Group error SF (red)	No	No

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Power Supply Unit

Article number	**6ES7138-7EA01-0AA0** ET200ISP, POWER SUPPLY MODULE	**6ES7138-7EC00-0AA0** ET200ISP, POWER SUPPLY MOD. AC120/230V
Ex(i) characteristics		
Maximum values of input circuits (per channel)		
• Um (fault voltage), max.	250 V; DC	264 V; AC/DC
Potential separation		
primary/secondary	Yes	Yes
between supply voltage and electronics	Yes	No
Standards, approvals, certificates		
CE mark	Yes	Yes
Use in hazardous areas		
• Type of protection acc. to EN 50020 (CENELEC)	Ex de [ib]IIC T4	Ex de [ib]IIC T4
• Type of protection acc. to KEMA	04 ATEX 2263	09 ATEX 0156
Dimensions		
Width	60 mm	60 mm
Height	190 mm	190 mm
Depth	136.5 mm	136.5 mm
Weights		
Weight, approx.	2 700 g	2 700 g

Article number	**6ES7193-7DA20-0AA0** ET200ISP, TERM.-MOD. TM-PS-A UC	**6ES7193-7DB20-0AA0** ET200ISP, TERM.-MOD. TM-PS-B UC
Standards, approvals, certificates		
CE mark	Yes	Yes
Use in hazardous areas		
• Type of protection acc. to EN 50020 (CENELEC)	see ET200iSP system	see ET200iSP system
• Test number KEMA	04 ATEX 2242	04 ATEX 2242
Dimensions		
Width	60 mm	60 mm
Height	190 mm	190 mm
Depth	52 mm	52 mm
Weights		
Weight, approx.	230 g	230 g

Ordering data

	Article No.
PS 24 V DC power supply module for ET 200iSP	**6ES7138-7EA01-0AA0**
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**

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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 of up to 1.5 Mbps. 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.

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Technical specifications

Article number	**6ES7152-1AA00-0AB0** ET200ISP, IM152-1 INTERFACE MODULE
Input current	
from supply voltage L+, max.	30 mA
Power loss	
Power loss, typ.	0.5 W
Time stamping	
Description	for each digital input, digital input module, total ET 200iS
Accuracy	20 ms
Number of stampable digital inputs, max.	64; for accuracy class 20 ms
Time format	RFC 1119 Internet (ISP)
Time resolution	1 ms
Time interval for transmitting the message buffer if a message is present	1 000 ms
Time stamp on signal change	rising / falling edge as signal entering or exiting
Interfaces	
Interface physics, RS 485	Yes; intrinsically safe
PROFIBUS DP	
• Transmission rate, max.	1.5 Mbit/s; 9,6 / 19,2 / 45,45 / 93,75 / 187,5 / 500 kbit/s
• SYNC capability	Yes
• FREEZE capability	Yes
• Direct data exchange (slave-to-slave communication)	Yes; Slave to slave as publisher
Protocols	
PROFIBUS DP	Yes
Protocols (Ethernet)	
• TCP/IP	No

Article number	**6ES7152-1AA00-0AB0** ET200ISP, IM152-1 INTERFACE MODULE
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	No
Interrupts/diagnostics/ status information	
Alarms	Yes
Diagnostic functions	Yes
Alarms	
• acyclic function, interrupts	Yes
• acyclic function, parameters	Yes
Diagnostics indication LED	
• Bus fault BF (red)	Yes
• Group error SF (red)	Yes
• Monitoring 24 V voltage supply ON (green)	Yes
Potential separation	
between supply voltage and electronics	Yes
Standards, approvals, certificates	
CE mark	Yes
Use in hazardous areas	
• Type of protection acc. to EN 50020 (CENELEC)	II2 G Ex ib IIC T4 and I M2 Ex ib I
• Type of protection acc. to KEMA	04 ATEX 1243
Dimensions	
Width	30 mm
Height	129 mm
Depth	136.5 mm
Weights	
Weight, approx.	245 g

Article number	**6ES7193-7AA00-0AA0** ET200ISP, TERM.-MOD. TM-IM/EM60S, SCREW	**6ES7193-7AA10-0AA0** ET200ISP, TERM.-MOD. TM-IM/EM60C ,SPRING	**6ES7193-7AA20-0AA0** ET200ISP, TERM.-MOD. TM-IM/EM60S	**6ES7193-7AB00-0AA0** ET200ISP, TERM.-MOD. TM-IM/IM F. TWO IM
Standards, approvals, certificates				
CE mark	Yes	Yes	Yes	Yes
Use in hazardous areas				
• Type of protection acc. to EN 50020 (CENELEC)	see ET200iSP system	see ET200iSP system	No	see ET200iSP system
• Test number KEMA	04 ATEX 2242	04 ATEX 2242		04 ATEX 2242
Dimensions				
Width	60 mm	60 mm	60 mm	60 mm
Height	190 mm	190 mm	190 mm	190 mm
Depth	52 mm	52 mm	52 mm	52 mm
Weights				
Weight, approx.	235 g	235 g	235 g	195 g

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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 electronics 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**

	Article No.
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**
Labeling sheet DIN A4, perforated, each consisting of 10 sheets of 30 strips each for electronics modules and 20 strips each for IM 152	
• petrol	**6ES7193-7BH00-0AA0**
• yellow	**6ES7193-7BB00-0AA0**
Labels, inscribed For slot numbering, label size H × W (in mm): 5 × 7	
• 204 labels, for slots 1 to 20	**8WA8361-0AB**
• 204 labels, for slots 1 to 40	**8WA8361-0AC**
• 136 labels, inscription in plain text	**8WA8348-0XA**
Labels, blank 136 labels for slot numbering, label size H × W (in mm): 5 × 7	**8WA8348-2AY**
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**

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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 UC 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 shutdown function of the 4 DO EEx i modules

The 4 DO EEx i modules are equipped with a shutdown 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)
  - 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.

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Technical specifications

Article number	**6ES7131-7RF00-0AB0** ET200ISP, EL-MOD., 8DI, NAMUR
Digital inputs	
Number of digital inputs	8
Number of NAMUR inputs	8
Input voltage	
• Type of input voltage	DC
Input delay (for rated value of input voltage)	
for standard inputs	
- at "0" to "1", min.	2.8 ms
- at "0" to "1", max.	3.5 ms
- at "1" to "0", min.	2.8 ms
- at "1" to "0", max.	3.5 ms
Cable length	
• shielded, max.	500 m
Encoder	
Number of connectable encoders, max.	8
Connectable encoders	
• NAMUR encoder	Yes
NAMUR encoder	
• Input current for signal "0", max.	1.2 mA
• Input current for signal "1", min.	2.1 mA
Interrupts/diagnostics/ status information	
Diagnostic functions	Yes
Alarms	
• Diagnostic alarm	Yes; Parameterizable
• Hardware interrupt	No
Diagnostic messages	
• Diagnostic information readable	Yes
• Short-circuit	Yes; R load < 150 ohms with NAMUR sensor/sensor and NAMUR changeover contact/sensor to DIN 19234

Article number	**6ES7131-7RF00-0AB0** ET200ISP, EL-MOD., 8DI, NAMUR
Diagnostics indication LED	
• Group error SF (red)	Yes
• Status indicator digital input (green)	Yes
Integrated Functions	
Frequency measurement	Yes; (Gate time) 50 ms; 200 ms; 1 s
Number of frequency meters	2
Counter	
Number of counter inputs	2; normal and periodic count function
Input frequency, max.	5 kHz; with a cable length of 20 m: 5 kHz; with a cable length of 100 m: 1 kHz; with a cable length of 200 m: 500 Hz
Potential separation	
Potential separation digital inputs	
• between the channels	No
• between the channels and backplane bus	Yes
Permissible potential difference	
between different circuits	60 V DC/30 V AC
Standards, approvals, certificates	
CE mark	Yes
Use in hazardous areas	
• Type of protection acc. to EN 50020 (CENELEC)	II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I
• Type of protection acc. to KEMA	04 ATEX 1248
Dimensions	
Width	30 mm
Height	129 mm
Depth	136.5 mm
Weights	
Weight, approx.	255 g

Article number	**6ES7132-7RD01-0AB0** ET200ISP, EL-MOD., 4DO, DC 23,1V, 20MA	**6ES7132-7RD11-0AB0** ET200ISP, EL-MOD., 4DO, DC 17,4V, 27MA	**6ES7132-7RD22-0AB0** ET200ISP, EL-MOD., 4DO, DC 17.4V, 40MA
Input current			
from load voltage L+ (without load), max.	340 mA; with actuator supply	300 mA	400 mA
from backplane bus 3.3 V DC, max.	10 mA	10 mA	
Power loss			
Power loss, typ.	2.5 W	2.1 W	2.8 W
Address area			
Address space per module			
• without packing	2 byte	2 byte	2 byte
Digital outputs			
Number of digital outputs	4; additionally 1 intrinsically-safe input for H shutdown	4; additionally 1 intrinsically-safe input for H shutdown	4; additionally 1 intrinsically-safe input for H shutdown
Short-circuit protection	Yes	Yes	Yes
No-load voltage Uao (DC)	23.1 V	17.4 V	17.4 V
Internal resistor Ri	275 Ω	150 Ω	167 Ω
Trend key points E			
• Voltage Ue (DC)	17.6 V	13.3 V	10.7 V
• Current Ie	20 mA	27 mA	40 mA; 80 mA when outputs connected in parallel

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Technical specifications (continued)

Article number	6ES7132-7RD01-0AB0 ET200ISP, EL-MOD., 4DO, DC 23,1V, 20MA	6ES7132-7RD11-0AB0 ET200ISP, EL-MOD., 4DO, DC 17,4V, 27MA	6ES7132-7RD22-0AB0 ET200ISP, EL-MOD., 4DO, DC 17.4V, 40MA
Output current			
• for signal "1" rated value	0.02 A	0.027 A	0.04 A
Output delay with resistive load			
• "0" to "1", max.	2 ms	2 ms	2 ms
• "1" to "0", max.	1.5 ms	1.5 ms	1.5 ms
Parallel switching of two outputs			
• for uprating	No; for Ex reasons not possible; nor for predecessor	Yes	Yes
Switching frequency			
• with resistive load, max.	100 Hz	100 Hz	100 Hz
• with inductive load, max.	2 Hz	2 Hz	2 Hz
Cable length			
• shielded, max.	500 m	500 m	500 m
• unshielded, max.	500 m	500 m	500 m
Interrupts/diagnostics/ status information			
Status indicator	Yes	Yes	Yes
Alarms		No	
Diagnostic functions	Yes	Yes	
Alarms			
• Diagnostic alarm	Yes; Parameterizable	Yes; Parameterizable	Yes; Parameterizable
Diagnostic messages			
• Diagnostic information readable	Yes	Yes	Yes
• Wire-break	Yes; R > 10 kohms, I < 100 µA	Yes	Yes; R > 10 kohms, I < 100 µA
• Short-circuit	Yes; R< 800 ohms (one output), R< 40 ohms (outputs connected in parallel)	Yes	Yes; R< 80 Ohm (one output), R< 40 Ohm (outputs connected in parallel)
Diagnostics indication LED			
• Group error SF (red)	Yes	Yes	Yes
• Status indicator digital output (green)	Yes	Yes	Yes; Per channel
Parameter			
Remark		14 byte	
Diagnostics wire break	Yes	Yes	Yes
Diagnostics short-circuit	Yes	Yes	Yes
Response to CPU/master STOP	Substitute a value/keep last value	Substitute a value/keep last value	Substitute a value/keep last value
Ex(i) characteristics			
Maximum values of output circuits (per channel)			
• Co (permissible external capacity), max.			241 nF; For IIC, 1507 nF for IIB
• Io (short-circuit current), max.			118 mA
• Lo (permissible external inductivity), max.			1.7 mH; For IIC, 10.4 mH for IIB
• Po (power of load), max.			572 mW
• Uo (output no-load voltage), max.			19.4 V
• Ta (permissible ambient temperature), max.	70 °C	70 °C	
Potential separation			
Potential separation digital outputs			
• between the channels	No	No	No
• between the channels and backplane bus	Yes	Yes	Yes
• Between the channels and load voltage L+	Yes	Yes	Yes

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Technical specifications (continued)

Article number	6ES7132-7RD01-0AB0 ET200ISP, EL-MOD., 4DO, DC 23,1V, 20MA	6ES7132-7RD11-0AB0 ET200ISP, EL-MOD., 4DO, DC 17,4V, 27MA	6ES7132-7RD22-0AB0 ET200ISP, EL-MOD., 4DO, DC 17.4V, 40MA
Permissible potential difference			
between different circuits			60 V DC/30 V AC
Standards, approvals, certificates			
CE mark			Yes
Highest safety class achievable in safety mode			
• SIL acc. to IEC 61508	No		No
Use in hazardous areas			
• Type of protection acc. to EN 50020 (CENELEC)	II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I	II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I	II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I
• Type of protection acc. to KEMA	04 ATEX 1249	04 ATEX 1249	04 ATEX 1249
Dimensions			
Width	30 mm	30 mm	30 mm
Height	129 mm	129 mm	129 mm
Depth	136.5 mm	136.5 mm	136.5 mm
Weights			
Weight, approx.	255 g	255 g	255 g

Article number	6ES7132-7GD00-0AB0 ET200ISP, EL-MOD., 4DO, DC 23,1V, 20MA	6ES7132-7GD10-0AB0 ET200ISP, EL-MOD., 4DO, DC 17,4V, 27MA	6ES7132-7GD21-0AB0 ET200ISP, EL-MOD., 4DO, DC 17,4V, 40MA	6ES7132-7GD30-0AB0 ET200ISP, EL-MOD., 4DO, DC 25.5V, 22MA
Input current				
from load voltage L+ (without load), max.	340 mA; with actuator supply	300 mA; with actuator supply	400 mA	400 mA
from backplane bus 3.3 V DC, max.	10 mA	10 mA		
Power loss				
Power loss, typ.	2.5 W	2.1 W	2.8 W	2.8 W
Address area				
Address space per module				
• without packing	2 byte	2 byte	2 byte	2 byte
Digital outputs				
Number of digital outputs	4; additionally 1 intrinsically-safe input for L shutdown	4; additionally 1 intrinsically-safe input for L shutdown	4; additionally 1 intrinsically-safe input for L shutdown	4; additionally 1 intrinsically-safe input for L shutdown
Short-circuit protection	Yes	Yes	Yes	Yes
No-load voltage Uao (DC)	23.1 V	17.4 V	17.4 V	25.5 V
Internal resistor Ri	275 Ω	150 Ω	167 Ω	260 Ω
Trend key points E				
• Voltage Ue (DC)	17.6 V	13.3 V	10.7 V	19.8 V
• Current Ie	20 mA	27 mA; 54 mA when outputs connected in parallel	40 mA	22 mA
Output current				
• for signal "1" rated value	0.02 A	0.027 A	0.04 A	0.022 A
Output delay with resistive load				
• "0" to "1", max.	2 ms	2 ms	2 ms	2 ms
• "1" to "0", max.	1.5 ms	1.5 ms	1.5 ms	1.5 ms
Parallel switching of two outputs				
• for uprating	No; for Ex reasons not possible; nor for predecessor	Yes	Yes	No
Switching frequency				
• with resistive load, max.	100 Hz	100 Hz	100 Hz	100 Hz
• with inductive load, max.	2 Hz	2 Hz	2 Hz	2 Hz
Cable length				
• shielded, max.	500 m	500 m	500 m	500 m
• unshielded, max.	500 m	500 m	500 m	500 m

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Technical specifications (continued)

Article number	6ES7132-7GD00-0AB0	6ES7132-7GD10-0AB0	6ES7132-7GD21-0AB0	6ES7132-7GD30-0AB0
	ET200ISP, EL-MOD., 4DO, DC 23,1V, 20MA	ET200ISP, EL-MOD., 4DO, DC 17,4V, 27MA	ET200ISP, EL-MOD., 4DO, DC 17,4V, 40MA	ET200ISP, EL-MOD., 4DO, DC 25.5V, 22MA
Interrupts/diagnostics/ status information				
Status indicator	Yes	Yes	Yes	Yes
Diagnostic functions	Yes	Yes	Yes	Yes
Alarms				
• Diagnostic alarm	Yes; Parameterizable	Yes; Parameterizable	Yes; Parameterizable	Yes; Parameterizable
Diagnostic messages				
• Diagnostic information readable	Yes	Yes	Yes	Yes
• Wire-break	Yes; R > 10 kohms, I < 100 µA	Yes; R > 10 kohms, I < 100 µA	Yes; R > 10 kohms, I < 100 µA	Yes; R > 10 kohms, I < 100 µA
• Short-circuit	Yes; R< 80 Ohm (one output), R< 40 Ohm (outputs connected in parallel)	Yes; R< 800 ohms (one output), R< 40 ohms (outputs connected in parallel)	Yes; R< 80 Ohm (one output), R< 40 Ohm (outputs connected in parallel)	Yes; R < 80 ohms
Diagnostics indication LED				
• Group error SF (red)	Yes	Yes	Yes	Yes
• Status indicator digital output (green)	Yes	Yes	Yes; Per channel	Yes; Per channel
Parameter				
Remark	14 byte	14 byte		
Diagnostics wire break	Yes	Yes	Yes	Yes
Diagnostics short-circuit	Yes	Yes	Yes	Yes
Response to CPU/master STOP	Substitute a value/keep last value	Substitute a value/keep last value	Substitute a value/keep last value	Substitute a value/keep last value
Ex(i) characteristics				
Maximum values of output circuits (per channel)				
• Co (permissible external capacity), max.			241 nF; For IIC, 1507 nF for IIB	81 nF; For IIC, 651 nF for IIB
• Io (short-circuit current), max.			118 mA	110 mA
• Lo (permissible external inductivity), max.			1.7 mH; For IIC, 10.4 mH for IIB	1.7 mH; For IIC, 11.5 mH for IIB
• Po (power of load), max.			572 mW	764 mW
• Uo (output no-load voltage), max.			19.4 V	27.9 V
• Ta (permissible ambient temperature), max.	70 °C	70 °C		
Potential separation				
Potential separation digital outputs				
• between the channels	No	No	No	No
• between the channels and backplane bus	Yes	Yes	Yes	Yes
• Between the channels and load voltage L+	Yes	Yes	Yes	Yes
Permissible potential difference				
between different circuits			60 V DC/30 V AC	60 V DC/30 V AC
Standards, approvals, certificates				
CE mark	Yes	Yes	Yes	Yes
Highest safety class achievable in safety mode				
• SIL acc. to IEC 61508	No	No	No	No
Use in hazardous areas				
• Type of protection acc. to EN 50020 (CENELEC)	II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I	II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I	II 2 G (1) GD and I M2 Ex ib[ia][iaD] IIC T4; Ex ib [ia] I	II 2 G (1) GD and I M2 Ex ib[ia][iaD] IIC T4; Ex ib [ia] I
• Type of protection acc. to KEMA	04 ATEX 1249	04 ATEX 1249	04 ATEX 1249	04 ATEX 1249
Dimensions				
Width	30 mm	30 mm	30 mm	30 mm
Height	129 mm	129 mm	129 mm	129 mm
Depth	136.5 mm	136.5 mm	136.5 mm	136.5 mm
Weights				
Weight, approx.	255 g	255 g	255 g	255 g

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Technical specifications (continued)

Article number	**6ES7132-7HB00-0AB0** ET200ISP, RELAY-MOD., 2DO, UC60V, 2A
Input current	
from load voltage L+ (without load), max.	120 mA
Power loss	
Power loss, typ.	1.1 W
Digital outputs	
Number of digital outputs	2
Short-circuit protection	No
Output current	
• for signal "1" rated value	2 A
Output delay with resistive load	
• "0" to "1", max.	8 ms
• "1" to "0", max.	3 ms
Parallel switching of two outputs	
• for uprating	No
• for redundant control of a load	No
Switching frequency	
• with resistive load, max.	0.5 Hz; See data in manual
• with inductive load, max.	0.2 Hz; See data in manual
Relay outputs	
Switching capacity of contacts	
- with resistive load, up to 60 °C, max.	2 A; See data in manual
- Thermal continuous current, max.	2 A; See data in manual
Cable length	
• shielded, max.	500 m
• unshielded, max.	500 m

Article number	**6ES7132-7HB00-0AB0** ET200ISP, RELAY-MOD., 2DO, UC60V, 2A
Interrupts/diagnostics/ status information	
Status indicator	Yes
Alarms	No
Substitute values connectable	Yes
Alarms	
• Diagnostic alarm	Yes
• Hardware interrupt	No
Diagnostic messages	
• Diagnostic information readable	Yes
• Wire-break	No; Cannot be determined in contact power circuit
• Short-circuit	No; Cannot be determined in contact power circuit
Diagnostics indication LED	
• Group error SF (red)	Yes
• Status indicator digital output (green)	Yes; Per channel
Ex(i) characteristics	
Maximum values of output circuits (per channel)	
• Uo (output no-load voltage), max.	60 V
• Um (fault voltage), max.	250 V
• Ta (permissible ambient temperature), max.	70 °C
Potential separation	
Potential separation digital outputs	
• between the channels	Yes
• between the channels and backplane bus	Yes
• Between the channels and load voltage L+	Yes; Channels and power bus
Standards, approvals, certificates	
CE mark	Yes
Highest safety class achievable in safety mode	
• SIL acc. to IEC 61508	No
Use in hazardous areas	
• Type of protection acc. to EN 50020 (CENELEC)	II 2 G and I M2 Ex eibmb IIC T4; Ex eibmb I
• Type of protection acc. to KEMA	07 ATEX 0180
Dimensions	
Width	30 mm
Height	129 mm
Depth	136.5 mm
Weights	
Weight, approx.	255 g

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Technical specifications (continued)

Article number	6ES7193-7CA00-0AA0	6ES7193-7CA10-0AA0	6ES7193-7CA20-0AA0	6ES7193-7CB00-0AA0
	ET200ISP, TERM.-MOD. TM-EM/EM60S F. EM	ET200ISP, TERM.-MOD. TM-EM/EM60C F. EM	ET200ISP, TERM.-MOD. TM-EM/EM60S F. EM	ET200ISP, TERM.-MOD. TM-RM/RM
Standards, approvals, certificates				
CE mark	Yes	Yes	Yes	Yes
Use in hazardous areas				
• Type of protection acc. to EN 50020 (CENELEC)	see ET200iSP system	see ET200iSP system	No	see ET200iSP system
• Test number KEMA	04 ATEX 2242	04 ATEX 2242		07 ATEX 0205
Dimensions				
Width	60 mm	60 mm	60 mm	60 mm
Height	190 mm	190 mm	190 mm	190 mm
Depth	52 mm	52 mm	52 mm	52 mm
Weights				
Weight, approx.	275 g	275 g	235 g	340 g

Article number	6ES7138-7AA00-0AA0
	ET200ISP, RESERVE MODULE
Digital inputs	
Number of digital inputs	0
Standards, approvals, certificates	
CE mark	Yes
Use in hazardous areas	
• Type of protection acc. to EN 50020 (CENELEC)	II2 G EEx ib IIC T4
• Test number KEMA	04 ATEX 1251
Dimensions	
Width	30 mm
Height	129 mm
Depth	136.5 mm
Weights	
Weight, approx.	180 g

Ordering data

	Article No.
Digital input modules	
Digital input modules EEx i	
8 DI NAMUR For evaluation of NAMUR sensors, connected/non-connected contacts, as well as for recording counter pulses or measuring frequencies • 8 × NAMUR (NAMUR sensor on/off, NAMUR changeover contact) or connected/non-connected inputs (single/changeover contact) • 2 channels optionally usable as counters (max. 5 kHz) or frequency meters (1 Hz ... 5 kHz) • Time tagging 20 ms, rising or falling edge • Wire break monitoring • Short-circuit monitoring • Sensor power supply monitoring • Flutter monitoring	**6ES7131-7RF00-0AB0**

	Article No.
Digital output modules	
Digital output modules EEx i with H-switch-off (external actuator switch-off via H-signal); for switching of solenoid valves, DC relays, signal lamps, actuators	
4 DO DC 23.1 V/20 mA • 4 channels with 20 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	**6ES7132-7RD01-0AB0**
4 DO DC 17.4 V/27 mA • 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	**6ES7132-7RD11-0AB0**

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Ordering data	Article No.
4 DO DC 17.4 V/40 mA • 4 channels with 40 mA each or • 2 outputs connected in parallel with 80 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 Digital output modules EEx i with L-switch-off (external actuator switch-off via L-signal); for switching of solenoid valves, DC relays, signal lamps, actuators	**6ES7132-7RD22-0AB0**
4 DO DC 23.1 V/20 mA • 4 channels with 20 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	**6ES7132-7GD00-0AB0**
4 DO DC 17.4 V/27 mA • 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	**6ES7132-7GD10-0AB0**
4 DO DC 17.4 V/40 mA • 4 channels with 40 mA each or • 2 outputs connected in parallel with 80 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	**6ES7132-7GD21-0AB0**
4 DO DC 25.5 V/22 mA[1] • 4 channels with 22 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 Digital output modules EEx e For switching of solenoid valves, DC contactors or indicator lights	**6ES7132-7GD30-0AB0**
2 DO Relay, 60 V UC, 2 A • Can be plugged onto TM-RM/RM terminal module • Output current up to 2 A with 60 V UC for each of the two relay outputs • Installation up to Ex zone 1 • Configurable connection of substitute value in the event of CPU failure	**6ES7132-7HB00-0AB0**

	Article No.
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**
ET 200iSP terminal module TM-RM/RM 60 For two modules (electronics module 2 DO Relay and reserve module can be plugged-in) • TM-RM/RM60S (screw-type terminals)	**6ES7193-7CB00-0AA0**
Accessories	
Reserve module For any electronics module	**6ES7138-7AA00-0AA0**
Labeling sheet DIN A4, perforated, each consisting of 10 sheets of 30 strips each for electronics modules and 20 strips each for IM 151	
• petrol	**6ES7193-7BH00-0AA0**
• yellow	**6ES7193-7BB00-0AA0**
Labels, inscribed For slot numbering, label size H × W (in mm): 5 × 7	
• 204 labels, for slots 1 to 20	**8WA8361-0AB**
• 204 labels, for slots 1 to 40	**8WA8361-0AC**
Labels, blank 136 labels for slot numbering, label size H × W (in mm): 5 × 7	**8WA8348-2AY**
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**

[1] Can be used with SIMATIC PCS 7 V7.1+SP2 or higher

11

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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, 3, 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)
  - 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 mm^2 to max. 2.5 mm^2) depending on the type of module.

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Technical specifications

Article number	**6ES7134-7SD00-0AB0** ET200ISP, EL-MOD., 4 AI TC	**6ES7134-7SD51-0AB0** ET200ISP, EL-MOD., 4 AI RTD, PT100/NI100	**6ES7134-7TD00-0AB0** ET200ISP, EL-MOD., 4 AI, HART, 2-WIRE	**6ES7134-7TD50-0AB0** ET200ISP, EL-MOD., 4 AI, HART, 4-WIRE
Input current				
from supply voltage L+, max.	30 mA	22 mA	320 mA	30 mA
Output voltage				
Power supply to the transmitters				
• short-circuit proof			Yes	
• Supply current, max.			23 mA; per channel	
Power loss				
Power loss, typ.	0.4 W	0.4 W	2.7 W	0.4 W
Analog inputs				
Number of analog inputs	4	4	4	4
permissible input current for current input (destruction limit), max.			90 mA	50 mA
Cycle time (all channels) max.	320 ms; 66 ms basic conversion time x 4 channels with interference frequency suppression 60 Hz, 80 ms basic conversion time x 4 channels with interference frequency suppression 50 Hz	320 ms; 66 ms basic conversion time x 4 channels with interference frequency suppression 60 Hz, 80 ms basic conversion time x 4 channels with interference frequency suppression 50 Hz	120 ms; 30 ms basic conversion time x 4 channels with 60 Hz, 50 Hz interference frequency suppression	120 ms; 30 ms basic conversion time x 4 channels with 60 Hz, 50 Hz interference frequency suppression
Technical unit for temperature measurement adjustable	Yes	Yes	Yes	Yes
Input ranges				
• Voltage	Yes	No	No	No
• Current	No	No	Yes	Yes
• Thermocouple	Yes	No	No	No
• Resistance thermometer	No	Yes	No	No
• Resistance	No	Yes	No	No
Input ranges (rated values), voltages				
• -80 mV to +80 mV	Yes			
• Input resistance (-80 mV to +80 mV)	1 000 kΩ			
Input ranges (rated values), currents				
• 4 mA to 20 mA			Yes	Yes
• Input resistance (4 mA to 20 mA)				295 Ω
Input ranges (rated values), thermocouples				
• Type B	Yes			
• Input resistance (Type B)	1 000 kΩ			
• Type C	Yes			
• Input resistance (Type C)	1 000 kΩ			
• Type E	Yes			
• Input resistance (Type E)	1 000 kΩ			
• Type J	Yes			
• Input resistance (type J)	1 000 kΩ			
• Type K	Yes			
• Input resistance (Type K)	1 000 kΩ			
• Type L	Yes			
• Input resistance (Type L)	1 000 kΩ			
• Type N	Yes			
• Input resistance (Type N)	1 000 kΩ			
• Type R	Yes			
• Input resistance (Type R)	1 000 kΩ			
• Type S	Yes			
• Input resistance (Type S)	1 000 kΩ			
• Type T	Yes			
• Input resistance (Type T)	1 000 kΩ			
• Type U	Yes			
• Input resistance (Type U)	1 000 kΩ			

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Technical specifications (continued)

Article number	6ES7134-7SD00-0AB0 ET200ISP, EL-MOD., 4 AI TC	6ES7134-7SD51-0AB0 ET200ISP, EL-MOD., 4 AI RTD, PT100/NI100	6ES7134-7TD00-0AB0 ET200ISP, EL-MOD., 4 AI, HART, 2-WIRE	6ES7134-7TD50-0AB0 ET200ISP, EL-MOD., 4 AI, HART, 4-WIRE
Input ranges (rated values), resistance thermometer				
• Ni 100		Yes		
• Input resistance (Ni 100)		2 000 kΩ		
• Pt 100		Yes		
• Input resistance (Pt 100)		2 000 kΩ		
Input ranges (rated values), resistors				
• 0 to 600 ohms		Yes; Also 1000 ohms		
• Input resistance (0 to 600 ohms)		1 000 kΩ		
Thermocouple (TC)				
Temperature compensation				
- internal temperature compensation	Yes; via supplied TC sensor module			
- external temperature compensation with compensations socket	Yes; via temperature value, acquired by an analog module of the same ET 200iSP station			
Characteristic linearization				
• parameterizable	Yes	Yes		
- for thermocouples	Yes			
- for resistance thermometer		Yes		
Cable length				
• shielded, max.	50 m	500 m	500 m	500 m
Analog value generation for the inputs				
Measurement principle	integrating (Sigma-Delta)	integrating (Sigma-Delta)	integrating (Sigma-Delta)	integrating (Sigma-Delta)
Integration and conversion time/ resolution per channel				
• Resolution with overrange (bit including sign), max.	16 bit	16 bit	13 bit	12 bit; + sign
• Integration time, parameterizable	Yes	Yes	No	Yes
• Basic conversion time, including integration time (ms)	80 ms at 50 Hz; 66 ms at 60 Hz	80 ms at 50 Hz; 66 ms at 60 Hz		30 ms
- additional conversion time for wire-break monitoring	5 ms	5 ms		
• Interference voltage suppression for interference frequency f1 in Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Smoothing of measured values				
• parameterizable	Yes; in 4 stages	Yes; in 4 stages	Yes; in 4 stages	Yes; in 4 stages
• Step: None	Yes; 1 x cycle time	Yes; 1 x cycle time	Yes; 1 x cycle time	Yes; 1 x cycle time
• Step: low	Yes; 4 x cycle time	Yes; 4 x cycle time	Yes; 4 x cycle time	Yes; 4 x cycle time
• Step: Medium	Yes; 32 x cycle time	Yes; 32 x cycle time	Yes; 32 x cycle time	Yes; 32 x cycle time
• Step: High	Yes; 64 x cycle time	Yes; 64 x cycle time	Yes; 64 x cycle time	Yes; 64 x cycle time
Encoder				
Connection of signal encoders				
• for current measurement as 2-wire transducer			Yes	
- Burden of 2-wire transmitter, max.			750 Ω	
• for current measurement as 4-wire transducer				Yes
• for resistance measurement with two-wire connection		Yes		
• for resistance measurement with three-wire connection		Yes		
• for resistance measurement with four-wire connection		Yes		

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Technical specifications (continued)

Article number	6ES7134-7SD00-0AB0 ET200ISP, EL-MOD., 4 AI TC	6ES7134-7SD51-0AB0 ET200ISP, EL-MOD., 4 AI RTD, PT100/NI100	6ES7134-7TD00-0AB0 ET200ISP, EL-MOD., 4 AI, HART, 2-WIRE	6ES7134-7TD50-0AB0 ET200ISP, EL-MOD., 4 AI, HART, 4-WIRE
Errors/accuracies				
Linearity error (relative to input range), (±)	0.015 %	0.015 %	0.015 %	0.015 %
Temperature error (relative to input range), (±)	0.02 %/K	0.02 %/K	0.005 %/K	0.005 %/K
Crosstalk between the inputs, min.	-50 dB	-50 dB	-50 dB	-50 dB
Repeat accuracy in steady state at 25 °C (relative to input range), (±)	0.01 %	0.01 %	0.01 %	0.01 %
Operational error limit in overall temperature range				
• Voltage, relative to input range, (±)	0.15 %			
• Current, relative to input range, (±)			0.15 %	0.15 %
• Resistance thermometer, relative to input range, (±)		0.15 %; Applies to resistances standard ±0.8 K, climatic ±0.3 K		
Basic error limit (operational limit at 25 °C)				
• Voltage, relative to input range, (±)	0.1 %			
• Current, relative to input range, (±)			0.1 %	0.1 %
• Resistance thermometer, relative to input range, (±)		0.1 %; Applies to resistances standard ±0.5 K, climatic ±0.2 K		
Interference voltage suppression for f = n x (f1 ± 1 %), f1 = interference frequency				
• Series mode interference (peak value of interference < rated value of input range), min.	70 dB	70 dB	70 dB	70 dB
• Common mode interference, min.	90 dB	90 dB		
Interrupts/diagnostics/ status information				
Alarms				
• Diagnostic alarm	Yes; Parameterizable	Yes	Yes; Parameterizable	Yes; Parameterizable
• Limit value alarm	Yes; Parameterizable	Yes	Yes; Parameterizable	Yes; Parameterizable
Diagnostic messages				
• Diagnostic information readable	Yes	Yes	Yes	Yes
• Wire-break		Yes	Yes	Yes
• Short-circuit		Yes	Yes	
• Group error		Yes		
Diagnostics indication LED				
• Group error SF (red)	Yes	Yes	Yes	Yes
Potential separation				
Potential separation analog inputs				
• between the channels	Yes; Functional	No	No	No
• between the channels and backplane bus	Yes	Yes	Yes	Yes
• Between the channels and load voltage L+		Yes; Channels and power bus		

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Technical specifications (continued)

Article number	**6ES7134-7SD00-0AB0** ET200ISP, EL-MOD., 4 AI TC	**6ES7134-7SD51-0AB0** ET200ISP, EL-MOD., 4 AI RTD, PT100/NI100	**6ES7134-7TD00-0AB0** ET200ISP, EL-MOD., 4 AI, HART, 2-WIRE	**6ES7134-7TD50-0AB0** ET200ISP, EL-MOD., 4 AI, HART, 4-WIRE
Standards, approvals, certificates				
CE mark	Yes	Yes	Yes	Yes
Highest safety class achievable in safety mode				
• Performance level according to ISO 13849-1	none	none	none	none
• SIL acc. to IEC 61508	No	No	No	No
Use in hazardous areas				
• Type of protection acc. to EN 50020 (CENELEC)	II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I	II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I	II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I	II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I
• Type of protection acc. to KEMA	04 ATEX 1246	04 ATEX 1247	04 ATEX 1244	04 ATEX 1245
Dimensions				
Width	30 mm	30 mm	30 mm	30 mm
Height	129 mm	129 mm	129 mm	129 mm
Depth	136.5 mm	136.5 mm	136.5 mm	136.5 mm
Weights				
Weight, approx.	230 g	230 g	230 g	230 g

Article number	**6ES7135-7TD00-0AB0** ET200ISP, EL-MOD., 4 AO, 4-20MA, HART
Input current	
from load voltage L+ (without load), max.	330 mA
Power loss	
Power loss, typ.	2.7 W
Analog outputs	
Number of analog outputs	4
Cycle time (all channels) max.	3.6 ms
Output ranges, current	
• 0 to 20 mA	Yes
• 4 mA to 20 mA	Yes
Connection of actuators	
• for current output two-wire connection	Yes
Load impedance (in rated range of output)	
• with current outputs, max.	750 Ω
Cable length	
• shielded, max.	500 m
Analog value generation for the outputs	
Integration and conversion time/ resolution per channel	
• Resolution with overrange (bit including sign), max.	14 bit
Settling time	
• for resistive load	4 ms
• for capacitive load	40 ms
• for inductive load	40 ms
Errors/accuracies	
Linearity error (relative to output range), (±)	0.015 %
Temperature error (relative to output range), (±)	0.005 %/K
Crosstalk between the outputs, min.	-50 dB
Repeat accuracy in steady state at 25 °C (relative to output range), (±)	0.01 %

Article number	**6ES7135-7TD00-0AB0** ET200ISP, EL-MOD., 4 AO, 4-20MA, HART
Operational error limit in overall temperature range	
• Current, relative to output range, (±)	0.15 %
Basic error limit (operational limit at 25 °C)	
• Current, relative to output range, (±	0.1 %
Interrupts/diagnostics/ status information	
Substitute values connectable	Yes
Alarms	
• Diagnostic alarm	Yes
Diagnostic messages	
• Diagnostic information readable	Yes
• Wire-break	Yes
• Short-circuit	Yes
Diagnostics indication LED	
• Group error SF (red)	Yes
Potential separation	
Potential separation analog outputs	
• between the channels	No
• between the channels and backplane bus	Yes
Standards, approvals, certificates	
CE mark	Yes
Use in hazardous areas	
• Type of protection acc. to EN 50020 (CENELEC)	II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I
• Type of protection acc. to KEMA	04 ATEX 1250
Dimensions	
Width	30 mm
Height	129 mm
Depth	136.5 mm
Weights	
Weight, approx.	265 g

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Technical specifications (continued)

Article number	**6ES7193-7CA00-0AA0** ET200ISP, TERM.-MOD. TM-EM/EM60S F. EM	**6ES7193-7CA10-0AA0** ET200ISP, TERM.-MOD. TM-EM/EM60C F. EM	**6ES7193-7CA20-0AA0** ET200ISP, TERM.-MOD. TM-EM/EM60S F. EM	**6ES7193-7CB00-0AA0** ET200ISP, TERM.-MOD. TM-RM/RM
Standards, approvals, certificates				
CE mark	Yes	Yes	Yes	Yes
Use in hazardous areas				
• Type of protection acc. to EN 50020 (CENELEC)	see ET200iSP system	see ET200iSP system	No	see ET200iSP system
• Test number KEMA	04 ATEX 2242	04 ATEX 2242		07 ATEX 0205
Dimensions				
Width	60 mm	60 mm	60 mm	60 mm
Height	190 mm	190 mm	190 mm	190 mm
Depth	52 mm	52 mm	52 mm	52 mm
Weights				
Weight, approx.	275 g	275 g	235 g	340 g

Article number	**6ES7138-7AA00-0AA0** ET200ISP, RESERVE MODULE
Digital inputs	
Number of digital inputs	0
Standards, approvals, certificates	
CE mark	Yes
Use in hazardous areas	
• Type of protection acc. to EN 50020 (CENELEC)	II2 G EEx ib IIC T4
• Test number KEMA	04 ATEX 1251
Dimensions	
Width	30 mm
Height	129 mm
Depth	136.5 mm
Weights	
Weight, approx.	180 g

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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 × 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 × 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 × 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 × 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 × 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**
Labeling sheet DIN A4, perforated, each consisting of 10 sheets of 30 strips each for electronics modules and 20 strips each for IM 151	
• petrol	**6ES7193-7BH00-0AA0**
• yellow	**6ES7193-7BB00-0AA0**
Labels, inscribed For slot numbering, label size H × W (in mm): 5 × 7	
• 204 labels, for slots 1 to 20	**8WA8361-0AB**
• 204 labels, for slots 1 to 40	**8WA8361-0AC**
Labels, blank 136 labels for slot numbering, label size H × W (in mm): 5 × 7	**8WA8348-2AY**
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**

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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 (controllers) for the implementation of safety applications. The input modules record the process signals, evaluate them, and prepare them for additional 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
  - SIL3/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
  - Supports 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
  - SIL3/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
  - SIL3/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 mounted on terminal modules that are ordered separately:
  - TM-IM/EM60 terminal modules for one interface module and one watchdog, reserve or electronics module (for versions, see section "Interface module")
  - 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.

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Technical specifications

Article number	**6ES7138-7FN00-0AB0** ET200ISP, 8F-DI NAMUR EX, FAILSAFE
Input current	
from supply voltage L+, max.	150 mA; int. Powerbus
Encoder supply	
Number of outputs	8
Type of output voltage	8 V DC
Power loss	
Power loss, typ.	1.4 W
Address area	
Occupied address area	
• Inputs	6 byte
• Outputs	4 byte
Digital inputs	
Number of digital inputs	8
Number of NAMUR inputs	8
Input voltage	
• Type of input voltage	DC
Input current	
• for signal "1", typ.	9.5 mA
Input delay (for rated value of input voltage)	
for standard inputs	
- at "0" to "1", min.	0.7 ms
- at "0" to "1", max.	16 ms; Parameterizable
- at "1" to "0", min.	0.7 ms
- at "1" to "0", max.	16 ms; Parameterizable
Cable length	
• shielded, max.	500 m
• unshielded, max.	200 m
Encoder	
Number of connectable encoders, max.	8
Connectable encoders	
• NAMUR encoder	Yes
NAMUR encoder	
• Input current for signal "0", max.	1.2 mA
• Input current for signal "1", min.	2.1 mA
Interrupts/diagnostics/ status information	
Status indicator	Yes
Diagnostic functions	Yes
Alarms	
• Diagnostic alarm	Yes; Parameterizable
• Hardware interrupt	No
Diagnostic messages	
• Diagnostic information readable	Yes
• Wire-break	Yes; NAMUR encoders or single contact with 10 kOhm parallel resistor
• Short-circuit	Yes; R load < 150 ohms with NAMUR sensor/sensor and NAMUR changeover contact/sensor to DIN 19234
Diagnostics indication LED	
• Group error SF (red)	Yes

Article number	**6ES7138-7FN00-0AB0** ET200ISP, 8F-DI NAMUR EX, FAILSAFE
Parameter	
Diagnostics wire break	channel by channel
Diagnostics short-circuit	channel by channel
Potential separation	
Potential separation digital inputs	
• between the channels	No
• between the channels and backplane bus	Yes
Permissible potential difference	
between different circuits	60 V DC/30 V AC
Isolation	
Isolation tested with	350 V AC/1 min between the shield and backplane bus connection 350 V AC/1 min between the shield and I/O 2830 V AC/1 min between backplane bus connection and I/O
Standards, approvals, certificates	
CE mark	Yes
Highest safety class achievable in safety mode	
• Performance level according to ISO 13849-1	PLe
• SIL acc. to IEC 61508	SIL 3
Use in hazardous areas	
• Type of protection acc. to EN 50020 (CENELEC)	II 2 G (1) GD Ex ib[ia Ga][ia IIIC Da] IIC T4 GB and I M2 Ex ib[ia Ma] I Mb
• Type of protection acc. to KEMA	10 ATEX 0056
Dimensions	
Width	30 mm
Height	129 mm
Depth	136.5 mm
Weights	
Weight, approx.	288 g

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Technical specifications (continued)

Article number	**6ES7138-7FD00-0AB0** ET200ISP, 4F-DO 40MA EX, FAILSAFE
Input current	
from load voltage L+ (without load), max.	510 mA; int. Powerbus
Power loss	
Power loss, typ.	5.3 W; max.
Digital outputs	
Number of digital outputs	4
Short-circuit protection	Yes
• Response threshold, typ.	Depending on the "short-circuit level" parameter
Controlling a digital input	No
No-load voltage Uao (DC)	17.4 V
Internal resistor Ri	167 Ω
Load resistance range	
• lower limit	270 Ω
• upper limit	18 kΩ
Trend key points E	
• Voltage Ue (DC)	10.7 V
• Current Ie	40 mA
Output voltage	
• for signal "1", min.	max. 17.4 V
Output current	
• for signal "0" residual current, max.	10 µA
Parallel switching of two outputs	
• for uprating	Yes
• for redundant control of a load	No
Switching frequency	
• with resistive load, max.	30 Hz
• with inductive load, max.	2 Hz
Cable length	
• shielded, max.	500 m
• unshielded, max.	500 m
Interrupts/diagnostics/ status information	
Status indicator	Yes
Substitute values connectable	Yes
Alarms	
• Diagnostic alarm	Yes; Parameterizable
Diagnostic messages	
• Diagnostic information readable	Yes
• Wire-break	Yes
• Short-circuit	Yes
Diagnostics indication LED	
• Group error SF (red)	Yes
• Status indicator digital output (green)	Yes

Article number	**6ES7138-7FD00-0AB0** ET200ISP, 4F-DO 40MA EX, FAILSAFE
Parameter	
Diagnostics wire break	Yes
Diagnostics short-circuit	Yes
Potential separation	
Potential separation digital outputs	
• between the channels	No
• between the channels and backplane bus	Yes
• Between the channels and load voltage L+	Yes
Permissible potential difference	
between different circuits	60 V DC/30 V AC
Standards, approvals, certificates	
CE mark	Yes
Highest safety class achievable in safety mode	
• Performance level according to ISO 13849-1	PLe
• SIL acc. to IEC 61508	SIL 3
Use in hazardous areas	
• Type of protection acc. to EN 50020 (CENELEC)	II 2 G (1) GD Ex ib[ia Ga][ia IIIC Da] IIC T4 GB and I M2 Ex ib[ia Ma] I Mb
• Type of protection acc. to KEMA	10 ATEX 0057
Dimensions	
Width	30 mm
Height	129 mm
Depth	136.5 mm
Weights	
Weight, approx.	285 g

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Technical specifications (continued)

Article number	**6ES7138-7FA00-0AB0**
	ET200ISP, 4F-AI HART EX, FAILSAFE
Input current	
from supply voltage L+, max.	490 mA; int. Powerbus
Output voltage	
Power supply to the transmitters	
• short-circuit proof	Yes
• Supply current, max.	25 mA; Plus 4 mA per channel
Power loss	
Power loss, max.	5.4 W
Address area	
Address space per module	
• Address space per module, max.	16 byte; 12 bytes in the I area / 4 bytes in the O area
Analog inputs	
Number of analog inputs	4
Cycle time (all channels) max.	See data in manual
Input ranges	
• Voltage	No
• Current	Yes
• Thermocouple	No
• Resistance thermometer	No
• Resistance	No
Input ranges (rated values), currents	
• 0 to 20 mA	Yes
• 4 mA to 20 mA	Yes
Cable length	
• shielded, max.	500 m
Analog value generation for the inputs	
Measurement principle	integrating (Sigma-Delta)
Integration and conversion time/ resolution per channel	
• Resolution with overrange (bit including sign), max.	16 bit
• Integration time, parameterizable	Yes
• Interference voltage suppression for interference frequency f1 in Hz	50 / 60 Hz
Smoothing of measured values	
• parameterizable	Yes; in 4 stages
• Step: None	Yes; 1 x cycle time
• Step: low	Yes; 4 x cycle time
• Step: Medium	Yes; 16 x cycle time
• Step: High	Yes; 64 x cycle time
Encoder	
Connection of signal encoders	
• for current measurement as 2-wire transducer	Yes
- Burden of 2-wire transmitter, max.	750 Ω
Errors/accuracies	
Linearity error (relative to input range), (±)	0.015 %
Temperature error (relative to input range), (±)	0.005 %/K
Crosstalk between the inputs, min.	-50 dB
Repeat accuracy in steady state at 25 °C (relative to input range), (±)	0.015 %

Article number	**6ES7138-7FA00-0AB0**
	ET200ISP, 4F-AI HART EX, FAILSAFE
Operational error limit in overall temperature range	
• Current, relative to input range, (±)	0.35 %
Basic error limit (operational limit at 25 °C)	
• Current, relative to input range, (±)	0.1 %
Interference voltage suppression for f = n x (f1 ± 1 %), f1 = interference frequency	
• Series mode interference (peak value of interference < rated value of input range), min.	40 dB
• Common mode interference, min.	50 dB
Interrupts/diagnostics/ status information	
Alarms	
• Diagnostic alarm	Yes; Parameterizable
Diagnostic messages	
• Diagnostic information readable	Yes
• Wire-break	Yes
• Short-circuit	Yes
Diagnostics indication LED	
• Group error SF (red)	Yes
Potential separation	
Potential separation analog inputs	
• between the channels	No
• between the channels and backplane bus	Yes
• Between the channels and load voltage L+	Yes; Power bus
Permissible potential difference	
between different circuits	60 V DC/30 V AC
Standards, approvals, certificates	
CE mark	Yes
Highest safety class achievable in safety mode	
• Performance level according to ISO 13849-1	PLe
• SIL acc. to IEC 61508	SIL 3
Use in hazardous areas	
• Type of protection acc. to EN 50020 (CENELEC)	II 2 G (1) GD Ex ib[ia Ga][ia IIIC Da] IIC T4 GB and I M2 Ex ib[ia Ma] I Mb
• Type of protection acc. to KEMA	10 ATEX 0058
Dimensions	
Width	30 mm
Height	129 mm
Depth	136.5 mm
Weights	
Weight, approx.	299 g

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Technical specifications (continued)

Article number	**6ES7138-7AA00-0AA0** ET200ISP, RESERVE MODULE
Digital inputs	
Number of digital inputs	0
Standards, approvals, certificates	
CE mark	Yes
Use in hazardous areas	
• Type of protection acc. to EN 50020 (CENELEC)	II2 G EEx ib IIC T4
• Test number KEMA	04 ATEX 1251
Dimensions	
Width	30 mm
Height	129 mm
Depth	136.5 mm
Weights	
Weight, approx.	180 g

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 • SIL3/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 • SIL3/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**

	Article No.
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**
Labeling sheet DIN A4, perforated, each consisting of 10 sheets of 30 strips each for electronics modules and 20 strips each for IM 151	
• petrol	**6ES7193-7BH00-0AA0**
• yellow	**6ES7193-7BB00-0AA0**
Labels, inscribed For slot numbering, label size H × W (in mm): 5 × 7	
• 204 labels, for slots 1 to 20	**8WA8361-0AB**
• 204 labels, for slots 1 to 40	**8WA8361-0AC**
Labels, blank 136 labels for slot numbering, label size H × W (in mm): 5 × 7	**8WA8348-2AY**
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**

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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 Interface module section)
- 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.

Technical specifications

Article number	**6ES7138-7BB00-0AB0**
	ET 200ISP, WATCHDOG MOD.
Digital inputs	
Number of digital inputs	0
Dimensions	
Width	30 mm
Height	129 mm
Depth	136.5 mm

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**
Accessories	
Labeling sheet DIN A4, perforated, each consisting of 10 sheets of 30 strips each for electronics modules and 20 strips each for IM 151	
• petrol	**6ES7193-7BH00-0AA0**
• yellow	**6ES7193-7BB00-0AA0**
Labels, inscribed for slot numbering, label size H × W (in mm): 5 × 7	
• 204 labels, for slots 1 to 20	**8WA8361-0AB**
• 204 labels, for slots 1 to 40	**8WA8361-0AC**
Labels, blank 136 labels for slot numbering, label size H × W (in mm): 5 × 7	**8WA8348-2AY**

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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 Mbps
- Required to connect intrinsically-safe PROFIBUS DP stations, e.g. ET 200iSP or devices from other vendors with Ex i DP connection
- Acts 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 enclosures, 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 enclosure 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 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, article number 6ES7972-0DA60-0XA0.

Technical specifications

Technical data RS 485-IS coupler	
Dimensions and weight	
Dimensions W x H x D (mm)	80 x 125 x 130
Weight	Approx. 500 g
Technical data - General	
Degree of protection	IP20
Ambient temperature	- 20 °C to + 60 °C
Standards and approvals	
• PROFIBUS	IEC 61784-1:2002 Ed1 CP 3/1
• EU directive	94/9/EG (ATEX 100a)
• CENELEC	II 3 (2) G EEx nA[ib] IIC T4
• UL and CSA	Class I, Division2, Group A, B, C, D T4 Class I Zone 2, Group IIC T4 AIS Class I, Divison 1, Group A, B, C, D [Aexib] IIC, Class I, Zone1, 2, Group IIC
• FM	Class I, Division2, Group A, B, C, D T4 Class I Zone 2, Group IIC T4 AIS Class I, Divison 1, Group A, B, C, D [Aexib] IIC, Class I, Zone1, 2, Group IIC
• IEC	IEC61131-2, Part 2
• CE	Conforming with 89/336/EWG Conforming with 73/23/EWG
• Ship-building certification	Classification companies • ABS (American Bureau of Shipping) • BV (Bureau Veritas) • DNV (Det Norske Veritas) • GL (Germanischer Lloyd) • LRD (Lloyds Register of Shipping) • Class NK (Nippon Kaiji Kyokai)

Technical data RS 485-IS coupler	
Module-Specific Specifications	
Transfer rate on PROFIBUS DP, PROFIBUS RS 485-IS	9.6; 19.2; 45.45; 93.75; 187.5; 500 kbit/s 1.5 Mbps
Bus-Protocol	PROFIBUS DP
Voltages, Currents, Potentials	
Nominal supply voltage for RS 485-IS coupler	24 V DC (20.4 to 28.8 V)
• Polarity reversal protection	Yes
• Voltage drop bypass	Min. 5 ms
Potential isolation for 24 V power supply	
• to PROFIBUS DP	Yes
- tested with	500 V DC
• to PROFIBUS RS 485-IS	Yes
- tested with	AC 500 V
Current consumption RS 485-IS coupler (24 V DC), max.	150 mA
Power loss of the module, typically	3 Watts

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Technical specifications (continued)

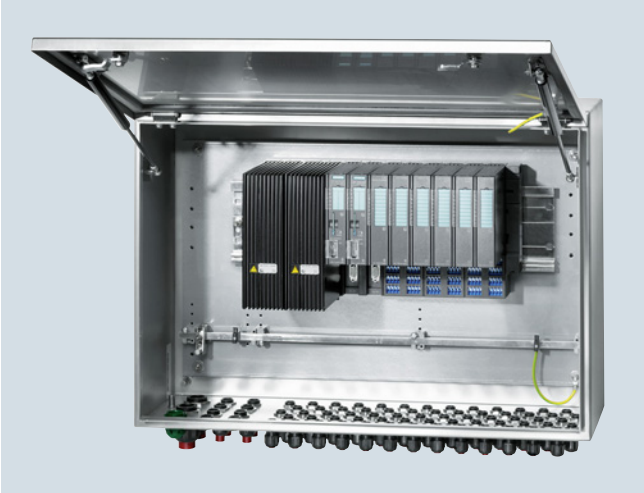
Technical data RS 485-IS coupler		
Status, alarms, diagnostics		
Status display	no	
Alarms	None	
Diagnostic functions	Yes	
• Bus monitoring PROFIBUS DP (primary)	Yellow LED "DP1"	
• Bus monitoring PROFIBUS RS 485-IS (secondary)	Yellow LED "DP2"	
• Monitoring 24 V power supply	Green LED "ON"	
Technical safety notice		
V_{DC}	±4.2 V	
I_{SC}	±93 mA	
P_0	0.1 Watts	
V_{max}	±4.2 V	
L_I	0	
C_i	0	
U_m	AC 250 V	
T_a	–25 ... +60 °C	
RS 485-IS segment		
permitted cable length on a single line	RS 485–IS	DP Ex i
• 9.6 to 187.5 Kbps	1,000 m	200 m
• 500 kbit/s	400 m	200 m
• 1.5 Mbps	200 m	200 m
Number of PROFIBUS DP nodes that can be connected, max.	31	16
PROFIBUS RS 485-IS bus termination switch	integrated, can be added	

Ordering data

	Article No.
RS 485-iS coupler Isolating transformer for connection of PROFIBUS DP segments with RS 485 and RS 485-iS transmission systems	**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 FastConnect Standard Cable, violet Standard type with special design for fast mounting, 2-wire, shielded, cut-to-length Specify length in m Max. delivery unit 1 000 m, minimum order quantity 20 m	**6XV1830-0EH10**
Preferred lengths	
- 20 m	**6XV1830-0EN20**
- 50 m	**6XV1830-0EN50**
- 100 m	**6XV1830-0ET10**
- 200 m	**6XV1830-0ET20**
- 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-wire, shielded, cut-to-length Specify length in m Max. delivery unit 1 000 m, minimum order quantity 20 m	**6XV1831-2A**

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Design



ET 200iSP modules can also be installed in stainless steel wall enclosures 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 or including components, depending on the order.

Send your request to:

Siemens AG
PD PA AE SO
(please insert project name here)
Östl. Rheinbrückenstr. 50
76187 Karlsruhe, Germany

E-mail: cabinets.industry@siemens.com

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Ordering data

	Article no.
Stainless steel enclosure IP65 for SIMATIC ET 200iSP	6DL2804-
I/O enclosure	
Surface casing in stainless steel, max. IP66, with mounting plate and equipotential bonding rail, empty enclosure for installation of ET 200iSP components[1]	0
I/O device consisting of surface casing with installed ET 200iSP components[2]	1
I/O device consisting of surface casing with installed ET 200iSP and pneumatic components[2]	2
I/O device consisting of surface casing with installed ET 200iSP and additional components for zone 2[3]	3
I/O device consisting of surface casing with installed ET 200iSP with pneumatic and additional components for zone 2[3]	4
Device group	
Device group II, up to zone 1 (including zone 2)	A
Device group II, up to zone 2 (not zone 1 and not zone 21)	B
Device group II, up to zone 21 (including zone 22)	D
Device group I M2 (max. degree of protection IP55), for use in mining	M
Enclosure dimensions W × H × D (in mm)	
650 × 450 × 230, for 15 ET 200iSP modules in non-redundant configuration	D
950 × 450 × 230, for 25 ET 200iSP modules in non-redundant configuration	E
800 × 800 × 300, for 2 rows with max. 30 ET 200iSP modules	K
800 × 1000 × 300, for 2 rows with max. 30 ET 200iSP modules	M
1000 × 1000 × 300, for 2 rows with max. 42 ET 200iSP modules	U
1000 × 1200 × 300, for 2 rows with max. 42 ET 200iSP modules	V
Cable entries/number	
6 × M25 for infeed, 6 or 9 × M32 (1 row) for signal lines[9]	1
6 × M25 for infeed, 12 or 18 × M32 (2 rows) for signal lines[9]	2
M16 cable entries for signals, 3 rows, 39 or 66 pcs.[4], 2 × M32 for power supply, 4 × M20 for bus cables[5]	3
M20 cable entries for signals, 3 rows, 36 or 57 pcs.[4], 2 × M32 for power supply, 4 × M20 for bus cables[5]	4
M16 cable entries for signals, 5 rows, 65 or 110 pcs.[4], 2 × M32 for power supply, 4 × M20 for bus cables[5]	5
M20 cable entries for signals, 3 rows, 60 or 95 pcs.[4], 2 × M32 for power supply, 4 × M20 for bus cables[5]	6
Icotek cable entry strip IP65, for up to 45 or 90 signals[4], 2 × M32 for power supply, 4 × M20 for bus cables[6]	7

	Article no.
Stainless steel enclosure IP65 for SIMATIC ET 200iSP	6DL2804-
Cable entries/material	
Cable entry in **plastic, black** Ambient operating temperatures: • Surface casing -20…+70 °C • I/O device -20 … +xx °C[5][7]	0
Cable entry in **metal (nickel-plated brass)** Ambient operating temperatures: • Surface casing -40…+70 °C • I/O device -30 … +xx °C[5][7][8]	1
Cable entry in **plastic, blue** Ambient operating temperatures: • Surface casing -20…+70 °C • I/O device -20 … +xx °C[5][7]	2
Icotek cable entry in plastic, gray HN-24 frame Ambient operating temperatures: • Surface casing -40…+70 °C • I/O device -40 … +xx °C[5][7][8]	3
Cable glands for use in mining	6

1) The supplied certificate it only valid for the empty enclosure.
2) The included certificate is valid for the supplied enclosure including the installed components.
3) The included manufacturer's declaration is valid for the supplied enclosure including the installed components.
4) Number of cable entries / signals depending on the enclosure dimensions
5) Not for device group I M2
6) Installing these components reduces the degree of protection for the enclosure to IP65
7) The maximum temperature depends on the installed components.
8) Only in conjunction with an installed heater. This takes up 2 slots for ET 200iSP modules. The heater (6DL9910-8AA) must be ordered separately.
9) Only for device group I M2, number of signal lines depends on enclosure dimensions

Note:

Depending on the cables used, other types and sizes of cable entries can be fitted (on request).

Options

Special configurations

For special configurations which differ from the standard configurations we will be pleased to provide you with a customized offer to suit your individual needs.

Please send your requests to
cabinets.industry@siemens.com

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Overview



Within the SIMATIC ET 200 range, ET 200M represents one of 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, Chapter "IO Systems" or
- Industry Mall/CA 01 under "Automation technology - Automation systems - SIMATIC industrial automation systems - IO systems - SIMATIC ET 200 systems for control cabinets" – SIMATIC ET 200M"

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.

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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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Overview



Interface module IM 153-2 High Feature Outdoor for PROFIBUS connection

Interface module for the PROFIBUS connection

The IM 153-2 High Feature and IM 153-2 High Feature Outdoor (electrical PROFIBUS DP transmission mode) interface modules are 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 and IM 153-2 High Feature Outdoor

The IM 153-2 High Feature and IM 153-2 High Feature Outdoor support 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 swap function, use of the active bus module and the mounting rail for hot swap is necessary (see under the following section "Accessories").

Ordering data

	Article No.
Interface module for the PROFIBUS connection	
IM 153-2 High Feature Outdoor Interface module for PROFIBUS DP for ET 200M, PA Link and Y Link; redundancy capable; conformal coating, IP20 degree of protection; permissible operating temperature -25 … +60 °C	**6ES7153-2BA70-0XB0**
IM 153-2 High Feature Interface module for PROFIBUS DP for ET 200M; redundancy capable; permissible operating temperature 0 ... +60 °C	**6ES7153-2BA10-0XB0**
Interface module for the 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
- DM 370 dummy module
- LK 393 cable guide



Ex partition for ET 200M

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.

Note:

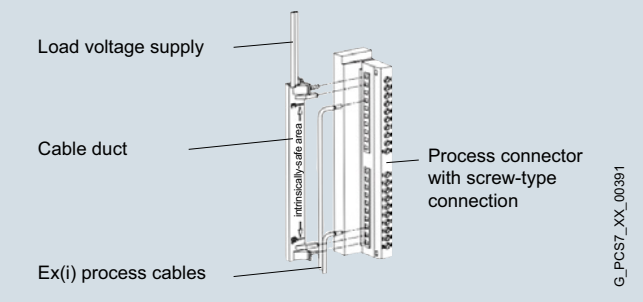
The Ex partition must be used in connection with bus modules with active backplane bus. If no bus modules with active backplane bus are being used, the DM 370 dummy module can be used instead.



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

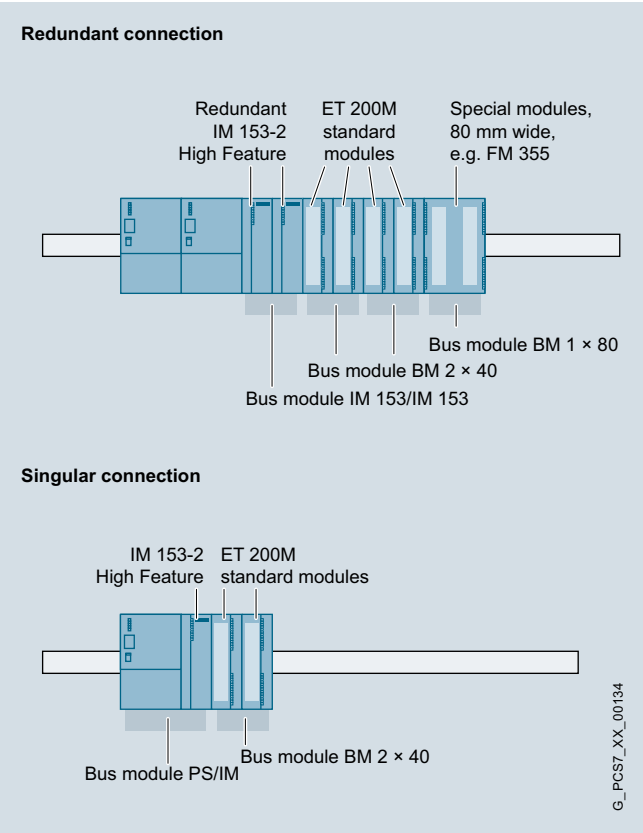


LK 393 cable guide

LK 393 cable guide

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+.

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.

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Ordering data	Article No.
Bus modules for hot swapping	
• BM PS/IM for load current supply and IM 153, including 1 bus module cover	**6ES7195-7HA00-0XA0**
• BM 2 × 40 for 2 modules, width 40 mm	**6ES7195-7HB00-0XA0**
• BM 1 × 80 for 1 module, width 80 mm	**6ES7195-7HC00-0XA0**
• BM IM/IM Outdoor for 2 IM 153-2 for configuring redundant systems	**6ES7195-7HD80-0XA0**
• BM IM/IM for 2 IM 153-2/-2 FO for configuring 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 Package with 4 backplane bus covers and 1 bus module cover	**6ES7195-1JA00-0XA0**

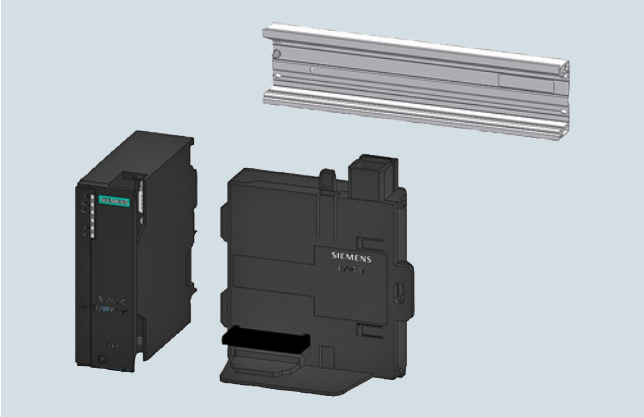
	Article No.
Front connector (1 unit)	
• 20-pin, with screw contacts	**6ES7392-1AJ00-0AA0**
• 20-pin, with spring contacts	**6ES7392-1BJ00-0AA0**
• 40-pin, with screw contacts	**6ES7392-1AM00-0AA0**
• 40-pin, with spring contacts	**6ES7392-1BM01-0AA0**
Front connector for Ex analog input module 6ES7331-7SF00-0AB0 (1 unit) • 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 "internal compensation" measuring mode at ambient temperatures of 0 to 60 °C	**6ES7392-1AJ20-0AA0**
Ex partition for ET 200M[1)] • 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 hot swapping function in connection with IM 153-2	**6ES7195-1KA00-0XA0**
DM 370 dummy module[1)] Including bus connector, labeling strips	**6ES7370-0AA01-0AA0**
LK 393 cable duct [EEx ib] IIC-conform routing of load voltage cable in front plug, 5 units	**6ES7393-4AA00-0AA0**

1) The Ex partition must be used in connection with bus modules with active backplane bus. If no bus modules with active backplane bus are being used, the DM 370 dummy module can be used instead.

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Bundles

Overview



I/O subsystem for ET 200M

The following bundles are available for ET 200M:

- I/O subsystem for PA Link or ET 200M stations with up to 8 I/O modules suitable for hot swapping, consisting of:
  - DIN rail for active bus modules, 482 mm long (19 inches)
  - PS/IM bus module
  - PROFIBUS DP interface IM 153-2 High Feature Outdoor
- I/O subsystem extended for PA Link or ET 200M stations with up to 12 I/O modules suitable for hot swapping, consisting of:
  - DIN rail for active bus modules, 620 mm long
  - PS/IM bus module
  - PROFIBUS DP interface IM 153-2 High Feature Outdoor
- RED I/O subsystem for operation of a PA Link or an ET 200M station on a redundant automation system of the S7-400 series, suitable for hot swapping, consisting of:
  - 2 PROFIBUS DP interface modules IM 153-2 High Feature Outdoor
  - 1 active bus module IM/IM Outdoor

Ordering data

	Article No.
I/O subsystem for PA Link or ET 200M For PA Link or for ET 200M stations with up to 8 I/O modules, suitable for hot swapping, consisting of: • DIN rail for active bus modules, 482 mm long (19 inches) • PS/IM bus module • PROFIBUS DP interface IM 153-2 High Feature Outdoor	**6ES7654-0XX10-1XA0**
I/O subsystem extended for PA Link or ET 200M For PA Link or for ET 200M stations with up to12 I/O modules, suitable for hot swapping, consisting of: • DIN rail for active bus modules, 620 mm long • PS/IM bus module • PROFIBUS DP interface IM 153-2 High Feature Outdoor	**6ES7654-0XX10-1XB0**
RED I/O subsystem for PA Link or ET 200M For operation of a PA Link or an ET 200M station on a redundant automation system of the S7-400 series, suitable for hot swapping, consisting of: • 2 PROFIBUS DP interfaces IM 153-2 High Feature Outdoor • 1 active bus module IM/IM Outdoor	**6ES7654-0XX20-0XA0**

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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

Technical specifications

Article number	**6ES7321-7TH00-0AB0** SM321, 16 DI, 24V DC, DIAGNOSTICS	**6ES7321-7EH00-0AB0** SM 321; 16DI, DC 24/125 V
Supply voltage		
Load voltage L+		
• Rated value (DC)	24 V	24 V
Input current		
from load voltage L+ (without load), max.	100 mA	
from backplane bus 5 V DC, max.	100 mA	90 mA
Power loss		
Power loss, typ.	11 W	2 W; V_in = 24 V DC
Time stamping		
Accuracy	1 ms	0.1 ms; Use shielded cables and parameterize an input delay of 0.1 ms.
Digital inputs		
Number of digital inputs	16	16
Input characteristic curve in accordance with IEC 61131, type 1	No	Yes
Input characteristic curve in accordance with IEC 61131, type 2	Yes	
Number of simultaneously controllable inputs		
horizontal installation		
- up to 60 °C, max.	16	16; V_in = 100 V DC
vertical installation		
- up to 40 °C, max.	16	16; V_in = 100 V DC
Input voltage		
• Type of input voltage	DC	
• Rated value (DC)	8.2 V; 8.2V/18V	24 V; 24 V DC to 125 V DC
• for signal "0"		-146 to 5V
• for signal "1"		15 to 146V
Input current		
• for signal "1", typ.	10 mA; for NAMUR: 2.1 to 7 mA, for 10k ohm/47k ohm contact: typical 10mA, for 4 wire BEROs: typical 10 mA	3.5 mA
Input delay (for rated value of input voltage)		
for standard inputs		
- parameterizable		Yes; 0.1 / 0.5 / 3 / 15 / 20 ms
- at "0" to "1", min.	2.5 ms	
- at "0" to "1", max.	3.5 ms	
Cable length		
• shielded, max.	400 m; max. 200m with 8.2 V sensor, max. 400m with 18 V sensor	1 000 m
• unshielded, max.	Not permitted	600 m

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Technical specifications (continued)

Article number	**6ES7321-7TH00-0AB0** SM321, 16 DI, 24V DC, DIAGNOSTICS	**6ES7321-7EH00-0AB0** SM 321; 16DI, DC 24/125 V
Encoder		
Connectable encoders		
• 2-wire sensor		Yes
- permissible quiescent current (2-wire sensor), max.		1 mA
Isochronous mode		
Isochronous operation (application synchronized up to terminal)		No
Interrupts/diagnostics/status information		
Diagnostic functions	Yes	Yes; Parameterizable
Alarms		
• Diagnostic alarm	Yes	Yes; Parameterizable
• Hardware interrupt	Yes	Yes; Parameterizable
Potential separation		
Potential separation digital inputs		
• between the channels	Yes	No
• between the channels, in groups of	8	16
• between the channels and backplane bus	Yes	Yes; Optocoupler
Isolation		
Isolation tested with	600 V DC	3 500 V DC
Ambient conditions		
Ambient temperature during operation		
• min.	0 °C	0 °C
• max.	60 °C	60 °C
Extended ambient conditions		
• At cold restart, min.	0 °C	
Connection method		
required front connector	1x 40-pin	1x 40-pin
Dimensions		
Width	40 mm	40 mm
Height	125 mm	125 mm
Depth	120 mm	120 mm
Weights		
Weight, approx.		200 g

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Technical specifications (continued)

Article number	**6ES7322-8BH10-0AB0** SM322, 16DO, 24V DC, 0,5A
General information	
Product type designation	SM 322, DO 16x24 V DC / 0.5 A
Supply voltage	
Load voltage L+	
• Rated value (DC)	24 V
Input current	
from load voltage L+ (without load), max.	100 mA
from backplane bus 5 V DC, max.	100 mA
Power loss	
Power loss, typ.	6 W
Digital outputs	
Number of digital outputs	16
Limitation of inductive shutdown voltage to	L+ (-68 V)
Switching capacity of the outputs	
• on lamp load, max.	5 W
Load resistance range	
• lower limit	48 Ω
• upper limit	4 kΩ
Output voltage	
• for signal "1", min.	L+ (-0.7 V)
Output current	
• for signal "1" rated value	0.5 A
• for signal "1" permissible range, min.	5 mA
• for signal "1" permissible range, max.	0.6 A
• for signal "0" residual current, max.	0.7 mA
Switching frequency	
• with resistive load, max.	100 Hz
• on lamp load, max.	10 Hz

Article number	**6ES7322-8BH10-0AB0** SM322, 16DO, 24V DC, 0,5A
Total current of the outputs (per group)	
horizontal installation	
- up to 60 °C, max.	2 A
vertical installation	
- up to 40 °C, max.	2 A
Cable length	
• shielded, max.	1 000 m
• unshielded, max.	600 m
Interrupts/diagnostics/ status information	
Diagnostic functions	Yes
Alarms	
• Diagnostic alarm	Yes
Potential separation	
Potential separation digital outputs	
• between the channels	No
• between the channels, in groups of	4
• between the channels and backplane bus	Yes
Isolation	
Isolation tested with	500 V DC
Connection method	
required front connector	1x 40-pin
Dimensions	
Width	40 mm
Height	125 mm
Depth	120 mm
Weights	
Weight, approx.	350 g

11

Ordering data — Article No.

Digital input modules

SM 321 for floating contacts (supply with DC 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 V DC • Isolated in groups of 16; active low • Front connector required: 20-pin	**6ES7321-1BH50-0AA0**
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, 24 V DC **Redundancy optional** (module-granular redundancy) • Isolated in groups of 16 • Front connector required: 40-pin	**6ES7321-1BL00-0AA0**
16 inputs, 48 ... 125 V DC • Isolated in groups of 8 • Front connector required: 20-pin	**6ES7321-1CH20-0AA0**
64 inputs, 24 V DC • Isolated in groups of 16; active high/low Note: 2 connection cables 6ES7392-4B..0-0AA0 and 2 terminal blocks 6ES7392-1.N00-0AA0 required per module.	**6ES7321-1BP00-0AA0**
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**
SM 321 for floating contacts (supply with DC/AC voltage)	
16 inputs, 24...48 V AC/DC • Isolated in groups of 1 • Front connector required: 40-pin	**6ES7321-1CH00-0AA0**

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Ordering data	Article No.
SM 321 for floating contacts (supply with AC voltage)	
32 inputs, 120 V AC • Isolated in groups of 8 • Front connector required: 40-pin	**6ES7321-1EL00-0AA0**
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, 120/230 V AC • Isolated in groups of 4 • Front connector required: 20-pin	**6ES7321-1FH00-0AA0**
SM 321 for non-floating contacts (supply with AC voltage)	
8 inputs, 120/230 V AC • Isolated in groups of 1 • Front connector required: 40-pin	**6ES7321-1FF10-0AA0**
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**

	Article No.
Digital output modules	
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	**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**
SM 322 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**
16 outputs, 120/230 V AC, 1 A • Isolated in groups of 8 • Front connector required: 20-pin	**6ES7322-1FH00-0AA0**
32 outputs, 120/230 V AC, 1 A • Isolated in groups of 8 • Front connector required: 2 x 20-pin	**6ES7322-1FL00-0AA0**

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Ordering data	Article No.
SM 322 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, 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	
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**
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**

	Article No.
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 • 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, 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**
For relay output Suitable for AC/DC solenoid valves, contactors, motor starters, small-power motors and indicator lights	
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**
Digital input/output modules	
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**

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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

Analog input modules

	Article No.
SM 331 modules for current, voltage and temperature measurements	
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, 3 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
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

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Ordering data	Article No.
SM 331 modules for current and voltage measurements	
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 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 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**

	Article No.
SM 331 modules for temperature measurement	
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 • 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**
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

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**
8 outputs trin 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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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 6ES7331-7TF01-0AB0 and 6ES7332-8TF01-0AB0 HART analog modules:

- 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).

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Technical specifications

Article number	**6ES7331-7TF01-0AB0** SM331, 8AI, 0/4-20MA HART	**6ES7331-7TB10-0AB0** SIMATIC DP, HART ANALOG INPUT M
Supply voltage		
Load voltage L+		
• Rated value (DC)	24 V	24 V
• Reverse polarity protection	Yes	Yes
Input current		
from load voltage L+ (without load), max.	20 mA	180 mA
from backplane bus 5 V DC, max.	120 mA	100 mA
Output voltage		
Power supply to the transmitters		
• present	Yes	Yes
• Rated value (DC)	24 V	15 V; at 22 mA
• short-circuit proof	Yes	Yes; approx. 30 mA
• No-load voltage (DC)		29.6 V
Power loss		
Power loss, typ.	1.5 W	4.5 W
Analog inputs		
Number of analog inputs	8	2
permissible input current for current input (destruction limit), max.	40 mA	40 mA
Input ranges		
• Current	Yes	Yes
Input ranges (rated values), currents		
• 0 to 20 mA	Yes	Yes
• Input resistance (0 to 20 mA)	140 Ω	50 Ω
• Input resistance (-20 mA to +20 mA)	140 Ω	
• 4 mA to 20 mA		Yes
• Input resistance (4 mA to 20 mA)	140 Ω	50 Ω
Cable length		
• shielded, max.	800 m	400 m
Analog value generation for the inputs		
Measurement principle	Sigma Delta	Sigma Delta
Integration and conversion time/ resolution per channel		
• Resolution with overrange (bit including sign), max.	16 bit	16 bit; 10 bit to 15 bit + sign
• Integration time, parameterizable	Yes	Yes
• Integration time (ms)	20 ms at 50 Hz; 16.6 ms at 60 Hz; 100 ms at 100 Hz	2,5 / 16,67 / 20 / 100 ms
• Basic conversion time, including integration time (ms)	55 ms @ 60 Hz, 65 ms @ 50 Hz, 305 ms @ 100 Hz	2.5 / 16.67 / 20 / 100 (1 channel enabled); 7.5 / 50 / 60 / 300 (2 channels enabled)
• Interference voltage suppression for interference frequency f1 in Hz	10 / 50 / 60 Hz	10 / 50 / 60 / 400 Hz
Encoder		
Connection of signal encoders		
• for current measurement as 2-wire transducer	Yes	Yes
• for current measurement as 4-wire transducer	Yes	Yes

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Technical specifications (continued)

Article number	**6ES7331-7TF01-0AB0** SM331, 8AI, 0/4-20MA HART	**6ES7331-7TB10-0AB0** SIMATIC DP, HART ANALOG INPUT M
Errors/accuracies		
Linearity error (relative to input range), (±)	0.01 %	0.01 %
Temperature error (relative to input range), (±)	0.001 %/K	0.01 %/K
Crosstalk between the inputs, min.	70 dB	130 dB
Repeat accuracy in steady state at 25 °C (relative to input range), (±)	0.1 %	0.05 %
Operational error limit in overall temperature range		
• Current, relative to input range, (±)	0.15 %	0.45 %; From 0/4 to 20 mA
Basic error limit (operational limit at 25 °C)		
• Current, relative to input range, (±)	0.1 %	0.1 %; From 0/4 to 20 mA
Interference voltage suppression for f = n x (f1 ± 1 %), f1 = interference frequency		
• Series mode interference (peak value of interference < rated value of input range), min.	40 dB	60 dB
• Common mode interference, min.	100 dB	130 dB
Isochronous mode		
Isochronous operation (application synchronized up to terminal)	No	
Interrupts/diagnostics/ status information		
Diagnostic functions	Yes	Yes; Parameterizable
Alarms		
• Diagnostic alarm	Yes	Yes; Parameterizable
• Limit value alarm	Yes	Yes; Parameterizable, channels 0 and 1
Diagnostic messages		
• Diagnostic information readable	Yes	Yes; possible
• Overrange		Yes; Red LED, signal
• Wire-break in signal transmitter cable		Yes; Red LED, signal
• Short-circuit of the signal encoder cable		Yes; Red LED, signal
• HART communication active		Yes; green LED (H)
Diagnostics indication LED		
• Group error SF (red)	Yes	Yes
• Channel fault indicator F (red)	Yes	Yes
Ex(i) characteristics		
Module for Ex(i) protection		Yes
Maximum values of input circuits (per channel)		
• Co (permissible external capacity), max.		62 nF
• Io (short-circuit current), max.		96.1 mA
• Lo (permissible external inductivity), max.		3 mH
• Po (power of load), max.		511 mW
• Uo (output no-load voltage), max.		26 V
• Um (fault voltage), max.		250 V; DC
• Ta (permissible ambient temperature), max.		60 °C

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Technical specifications (continued)

Article number	6ES7331-7TF01-0AB0 SM331, 8AI, 0/4-20MA HART	6ES7331-7TB10-0AB0 SIMATIC DP, HART ANALOG INPUT M
Potential separation		
Potential separation analog inputs		
• between the channels	No	Yes
• between the channels and backplane bus	Yes	Yes
Permissible potential difference		
between the inputs (UCM)		60 V DC/30 V AC permitted potential difference (Viso) of signals from hazardous areas
Isolation		
Isolation tested with	500 V DC	
tested with		
• Channels against backplane bus and load voltage L+		2500 V DC
• Channels among one another		2500 V DC
• Load voltage L+ against backplane bus		500 V DC
Standards, approvals, certificates		
CE mark		Yes
UL approval		Yes
FM approval		Yes
RCM (formerly C-TICK)		Yes
KC approval		Yes
EAC (formerly Gost-R)		Yes
Use in hazardous areas		
• Type of protection acc. to FM		Class I, Division 2, Group A, B, C, D T4; Class I, Zone 2, Group IIC T4
• Type of protection acc. to KEMA		II 3 G (2) GD Ex nA [ib Gb] [ib IIIC Db] IIC T4 Gc
• Test number KEMA		DEKRA 14 ATEX 0052X
Ambient conditions		
Ambient temperature during operation		
• min.		0 °C
• max.		60 °C
Connection method		
required front connector	20-pin	1x 20-pin
Dimensions		
Width	40 mm	40 mm
Height	125 mm	125 mm
Depth	117 mm	120 mm
Weights		
Weight, approx.	205 g	260 g

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Technical specifications (continued)

Article number	**6ES7332-8TF01-0AB0** SM332, 8AO, 0/4 - 20MA HART	**6ES7332-5TB10-0AB0** SIMATIC DP, HART ANALOG OUTPUT
Supply voltage		
Load voltage L+		
• Rated value (DC)	24 V	24 V
• Reverse polarity protection	Yes	Yes
Input current		
from load voltage L+ (without load), max.	350 mA	150 mA
from backplane bus 5 V DC, max.	110 mA	100 mA
Power loss		
Power loss, typ.	6 W	3.5 W
Analog outputs		
Number of analog outputs	8	2
Current output, no-load voltage, max.	24 V	19 V
Cycle time (all channels) max.		5 ms
Output ranges, current		
• 0 to 20 mA	Yes	Yes
• -20 mA to +20 mA	No	No
• 4 mA to 20 mA	Yes	Yes
Connection of actuators		
• for current output two-wire connection	Yes	Yes
Load impedance (in rated range of output)		
• with current outputs, max.	750 Ω	650 Ω
• with current outputs, inductive load, max.	10 mH	7.5 mH
Destruction limits against externally applied voltages and currents		
• Voltages at the outputs towards MANA	+60/-0.5 V	max. 17 V / -0.5 V
• Current, max.		60 mA / -1 A
Cable length		
• shielded, max.	800 m	400 m
Analog value generation for the outputs		
Integration and conversion time/ resolution per channel		
• Resolution with overrange (bit including sign), max.	16 bit	12 bit; + sign
• Conversion time (per channel)		40 ms
Settling time		
• for resistive load	0.1 ms	2.5 ms
• for capacitive load		4 ms
• for inductive load	0.5 ms	2.5 ms
Errors/accuracies		
Output ripple (relative to output range, bandwidth 0 to 50 kHz), (±)	0.02 %	0.02 %
Linearity error (relative to output range), (±)	0.01 %	0.03 %
Temperature error (relative to output range), (±)	0.002 %/K	0.01 %/K
Crosstalk between the outputs, min.	70 dB	130 dB
Repeat accuracy in steady state at 25 °C (relative to output range), (±)	0.05 %	0.005 %
Operational error limit in overall temperature range		
• Current, relative to output range, (±)	0.2 %	0.55 %
Basic error limit (operational limit at 25 °C)		
• Current, relative to output range, (±)	0.1 %	0.15 %

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Technical specifications (continued)

Article number	6ES7332-8TF01-0AB0 SM332, 8AO, 0/4 - 20MA HART	6ES7332-5TB10-0AB0 SIMATIC DP, HART ANALOG OUTPUT
Isochronous mode		
Isochronous operation (application synchronized up to terminal)	No	
Interrupts/diagnostics/ status information		
Diagnostic functions	Yes	Yes; Parameterizable
Substitute values connectable	Yes	Yes; Parameterizable
Alarms		
• Diagnostic alarm	Yes	Yes; Parameterizable
Diagnostic messages		
• Diagnostic information readable	Yes	Yes; possible
• Overrange		Yes
• Wire-break		Yes; as of output value > 0.5 mA
• HART communication active		Yes; green LED (H)
Diagnostics indication LED		
• Group error SF (red)	Yes	Yes; Red LED
• Channel fault indicator F (red)		Yes; per channel
Ex(i) characteristics		
Module for Ex(i) protection		Yes
Maximum values of output circuits (per channel)		
• Co (permissible external capacity), max.		230 nF
• Io (short-circuit current), max.		66 mA
• Lo (permissible external inductivity), max.		7.5 mH
• Po (power of load), max.		506 mW
• Uo (output no-load voltage), max.		19 V
• Um (fault voltage), max.		60 V; DC
• Ta (permissible ambient temperature), max.		60 °C
Potential separation		
Potential separation analog outputs		
• between the channels	No	Yes
• between the channels and backplane bus	Yes	Yes
• Between the channels and load voltage L+	Yes	Yes
Permissible potential difference		
between the outputs (UCM)		60 V DC/30 V AC permitted potential difference (Viso) of signals from hazardous areas
Isolation		
Isolation tested with	500 V DC	
tested with		
• Channels against backplane bus and load voltage L+		2500 V DC
• Channels among one another		2500 V DC
• Load voltage L+ against backplane bus		500 V DC

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Technical specifications (continued)

Article number	**6ES7332-8TF01-0AB0**	**6ES7332-5TB10-0AB0**
	SM332, 8AO, 0/4 - 20MA HART	SIMATIC DP, HART ANALOG OUTPUT
Standards, approvals, certificates		
FM approval		Yes
Use in hazardous areas		
• Type of protection acc. to FM		Class I, Division 2, Group A, B, C, D T4; Class I, Zone 2, Group IIC T4
• Type of protection acc. to KEMA		II 3 G (2) GD Ex nA [ib Gb] [ib IIIC Db] IIC T4 Gc
• Test number KEMA		DEKRA 14 ATEX 0053X
Connection method		
required front connector	20-pin	20-pin
Dimensions		
Width	40 mm	40 mm
Height	125 mm	125 mm
Depth	117 mm	120 mm
Weights		
Weight, approx.	220 g	290 g

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**
SM 331 HART Ex analog input module [EEx ib] 2 inputs, 0/4 … 20 mA in 2 channel groups, as of HART revision 5.0 • 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	**6ES7331-7TB10-0AB0**
SM 332 HART Ex analog output module [EEx ib] 2 outputs, 0/4 … 20 mA in 2 channel groups, as of HART revision 5.0 • Individual electrically isolated channels • Resolution: 12 bit + sign • For 2-wire actuators • Wire break monitoring • HART • Front connector required: 20-pin	**6ES7332-5TB10-0AB0**
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"

11

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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" (6ES7 321-7RD00-0AB0, 6ES7 322-5SD00-0AB0, 6ES7 331-7RD00-0AB0, 6ES7 332-5RD00-0AB0) can also be configured redundant when used in non-hazardous plants.

Technical specifications

Article number	**6ES7321-7RD00-0AB0** SM321, 4DI, DC24V, HAZARDOUS AREAS
Supply voltage	
Load voltage L+	
• Rated value (DC)	24 V
Input current	
from load voltage L+ (without load), max.	50 mA
from backplane bus 5 V DC, max.	80 mA
Encoder supply	
Type of output voltage	via the inputs
Power loss	
Power loss, typ.	1.1 W
Digital inputs	
Number of NAMUR inputs	4
Input voltage	
• Rated value (DC)	8.2 V; from internal power circuit supply
Input current	
• on wire-break, max.	0.1 mA
• on short-circuit, max.	8.5 mA
for NAMUR encoders	
- for signal "0"	0.35 to 1.2 mA
- for signal "1"	2.1 to 7 mA
Input delay (for rated value of input voltage)	
• Input frequency (with a time delay of 0.1 ms), max.	2 kHz
for NAMUR inputs	
- Parameterizable	Yes; 0.1 / 0.5 / 3 / 15 / 20 ms (plus 0.25 ms preparation time)
Cable length	
• unshielded, max.	200 m
Encoder	
Connectable encoders	
• NAMUR encoder	Yes; Two-wire connection

Article number	**6ES7321-7RD00-0AB0** SM321, 4DI, DC24V, HAZARDOUS AREAS
Interrupts/diagnostics/ status information	
Diagnostic messages	
• Diagnostic information readable	Yes
Ex(i) characteristics	
Maximum values of input circuits (per channel)	
• Co (permissible external capacity), max.	3 µF
• Io (short-circuit current), max.	14.1 mA
• Lo (permissible external inductivity), max.	100 mH
• Po (power of load), max.	33.7 mW
• Uo (output no-load voltage), max.	10 V
Potential separation	
Potential separation digital inputs	
• Potential separation digital inputs	Yes
• between the channels, in groups of	1
Standards, approvals, certificates	
Use in hazardous areas	
• Type of protection acc. to EN 50020 (CENELEC)	[EEx ib] IIC
• Type of protection acc. to FM	Class II, Division 2, Group A, B, C, D T4
• Test number PTB	Ex-96.D.2094X
Ambient conditions	
Ambient temperature during operation	
• max.	60 °C
Connection method	
required front connector	20-pin
Weights	
Weight, approx.	230 g

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Technical specifications (continued)

Article number	**6ES7322-5SD00-0AB0** SM322, 4DO, 15V DC,10MA, HAZARDOUS AREAS	**6ES7322-5RD00-0AB0** SM322, 4DO, 15V DC,20MA, HAZARDOUS AREAS
Supply voltage		
Load voltage L+		
• Rated value (DC)	24 V	24 V
Input current		
from load voltage L+ (without load), max.	160 mA	160 mA
from backplane bus 5 V DC, max.	85 mA	85 mA
Power loss		
Power loss, typ.	3 W	3 W
Digital outputs		
Number of digital outputs	4	4
Short-circuit protection	Yes; Electronic	Yes; Electronic
• Response threshold, typ.	Output current with short-circuit protection, min. 10 mA + 10 %	Output current with short-circuit protection, min. 20.5 mA + 10 %
Load resistance range		
• upper limit	390 Ω; Two-wire connection	200 Ω; Two-wire connection
Output voltage		
• Rated value (DC)	24 V	15 V
Output current		
• for signal "1" permissible range for 0 to 60 °C, max.	10 mA; +/-10 %	20 mA; +/-10 %
Switching frequency		
• with resistive load, max.	100 Hz	100 Hz
Cable length		
• unshielded, max.	200 m	200 m
Interrupts/diagnostics/ status information		
Diagnostic messages		
• Diagnostic information readable	Yes	Yes
• Short-circuit	Yes	Yes
Ex(i) characteristics		
Maximum values of output circuits (per channel)		
• Co (permissible external capacity), max.	90 nF	500 nF
• Io (short-circuit current), max.	70 mA	85 mA
• Lo (permissible external inductivity), max.	6.7 mH	5 mH
• Po (power of load), max.	440 mW	335 mW
• Uo (output no-load voltage), max.	25.2 V	15.75 V
Potential separation		
Potential separation digital outputs		
• Potential separation digital outputs	Yes	Yes
• between the channels, in groups of	1	1
Standards, approvals, certificates		
Use in hazardous areas		
• Type of protection acc. to EN 50020 (CENELEC)	[EEx ib] IIC	[EEx ib] IIC
• Type of protection acc. to FM	Class I, Division 2, Group A, B, C, D T4	AIS CL.1, DIV 1, GP A, B, C, D; CL.I, DIV 2, GP A, B, C, D T4
• Test number PTB	Ex-96.D.2093X	Ex-96.D.2102X
Ambient conditions		
Ambient temperature during operation		
• max.	60 °C	60 °C
Connection method		
required front connector	20-pin	20-pin
Weights		
Weight, approx.	230 g	230 g

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Technical specifications (continued)

Article number	6ES7331-7RD00-0AB0 SIMATIC S7, SM 331 ANALOG INPUT	6ES7331-7SF00-0AB0 SIMATIC S7, SM 331 ANALOG INPUT
Supply voltage		
Load voltage L+		
• Rated value (DC)	24 V	24 V
Input current		
from load voltage L+ (without load), max.	250 mA	
from backplane bus 5 V DC, max.	60 mA	120 mA
Output voltage		
Power supply to the transmitters		
• Rated value (DC)	13 V; at 22 mA	
• No-load voltage (DC)	25.2 V	
Power loss		
Power loss, typ.	3 W	0.6 W
Analog inputs		
Number of analog inputs	4	8; 8x thermocouples; 4x RTD thermoresistors
permissible input current for current input (destruction limit), max.	40 mA	
Input ranges (rated values), currents		
• 0 to 20 mA	Yes	
• 4 mA to 20 mA	Yes	
Input ranges (rated values), thermocouples		
• Type B		Yes
• Type E		Yes
• Type J		Yes
• Type K		Yes
• Type L		Yes
• Type N		Yes
• Type R		Yes
• Type S		Yes
• Type T		Yes
• Type U		Yes
Input ranges (rated values), resistance thermometer		
• Ni 100		Yes
• Pt 100		Yes
• Pt 200		Yes
Cable length		
• shielded, max.	200 m	200 m; TC: 50 m
Analog value generation for the inputs		
Measurement principle	Sigma Delta	Sigma Delta
Integration and conversion time/ resolution per channel		
• Resolution with overrange (bit including sign), max.	16 bit; 10 bit to 15 bit + sign	16 bit; 10 bit to 15 bit + sign
• Integration time, parameterizable	Yes; 2.5 to 100 ms	Yes; 2.5 to 100 ms
• Interference voltage suppression for interference frequency f1 in Hz	10 to 400 Hz	10 to 400 Hz
Encoder		
Connection of signal encoders		
• for current measurement as 2-wire transducer	Yes	Yes
• for current measurement as 4-wire transducer	Yes	Yes

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Technical specifications (continued)

Article number	**6ES7331-7RD00-0AB0** SIMATIC S7, SM 331 ANALOG INPUT	**6ES7331-7SF00-0AB0** SIMATIC S7, SM 331 ANALOG INPUT
Errors/accuracies		
Temperature error (relative to input range), (±)		0.001 %/K; Temperature error: 0.001 to 0.002 %/K
Operational error limit in overall temperature range		
• Current, relative to input range, (±)	0.45 %	
• Resistance thermometer, relative to input range, (±)		0.04 %; 0.09 to 0.04%
Basic error limit (operational limit at 25 °C)		
• Current, relative to input range, (±)	0.1 %	
• Resistance thermometer, relative to input range, (±)		0.008 %; 0.018 ... 0.008%
Interference voltage suppression for f = n x (f1 ± 1 %), f1 = interference frequency		
• Series mode interference (peak value of interference < rated value of input range), min.	60 dB	60 dB
• Common mode interference, min.	130 dB	130 dB
Interrupts/diagnostics/ status information		
Diagnostic messages		
• Diagnostic information readable	Yes	Yes
• Overrange	Yes	Yes
• Wire-break in signal transmitter cable	Yes	Yes
• Short-circuit of the signal encoder cable	Yes	Yes
Ex(i) characteristics		
Maximum values of input circuits (per channel)		
• Co (permissible external capacity), max.	90 nF	43 µF
• Io (short-circuit current), max.	68.5 mA	28.8 mA
• Lo (permissible external inductivity), max.	7.5 mH	40 mH
• Po (power of load), max.	431 mW	41.4 mW
• Ri, max.	50 Ω	
• Uo (output no-load voltage), max.	25.2 V	5.9 V
Potential separation		
Potential separation analog inputs		
• Potential separation analog inputs	Yes	Yes
Permissible potential difference		
between the inputs (UCM)	60 V DC/30 V AC when used in the hazardous area; 400 V DC/250 V AC when used in NON-hazardous area	60 V DC/30 V AC when used in the hazardous area; 400 V DC/250 V AC when used in NON-hazardous area
Between the inputs and MANA (UCM)	60 V DC/30 V AC when used in the hazardous area; 400 V DC/250 V AC when used in NON-hazardous area	60 V DC/30 V AC when used in the hazardous area; 400 V DC/250 V AC when used in NON-hazardous area
Use in hazardous areas		
• Type of protection acc. to EN 50020 (CENELEC)	[EEx ib] IIC	[EEx ib] IIC
• Type of protection acc. to FM	Class I, Division 2, Group A, B, C, D T4	Class I, Division 2, Group A, B, C, D T4
• Test number PTB	Ex-96.D.2092X	Ex-96.D.2108X
Ambient conditions		
Ambient temperature during operation		
• max.	60 °C	60 °C
Connection method		
required front connector	20-pin	20-pin
Weights		
Weight, approx.	290 g	210 g

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Technical specifications (continued)

Article number	**6ES7332-5RD00-0AB0** SIMATIC S7, SM 332 ANALOG OUTPUT
Supply voltage	
Load voltage L+	
• Rated value (DC)	24 V
Input current	
from load voltage L+ (without load), max.	200 mA
from backplane bus 5 V DC, max.	80 mA
Power loss	
Power loss, typ.	4 W
Analog outputs	
Number of analog outputs	4
Voltage output, short-circuit protection	Yes
Voltage output, short-circuit current, max.	70 mA
Current output, no-load voltage, max.	14 V
Output ranges, current	
• 0 to 20 mA	Yes
• 4 mA to 20 mA	Yes
Connection of actuators	
• for current output two-wire connection	Yes
Load impedance (in rated range of output)	
• with current outputs, max.	500 Ω
Cable length	
• shielded, max.	200 m
Analog value generation for the outputs	
Integration and conversion time/ resolution per channel	
• Resolution with overrange (bit including sign), max.	15 bit
• Basic conversion time (ms)	2.5 ms
Errors/accuracies	
Operational error limit in overall temperature range	
• Current, relative to output range, (±)	0.55 %
Basic error limit (operational limit at 25 °C)	
• Current, relative to output range, (±)	0.2 %
Interrupts/diagnostics/ status information	
Diagnostic messages	
• Diagnostic information readable	Yes
• Overrange	Yes
• Wire-break in actuator cable	Yes
Ex(i) characteristics	
Maximum values of output circuits (per channel)	
• Co (permissible external capacity), max.	850 nF
• Io (short-circuit current), max.	70 mA
• Lo (permissible external inductivity), max.	6.6 mH
• Po (power of load), max.	440 mW
• Uo (output no-load voltage), max.	14 V

Article number	**6ES7332-5RD00-0AB0** SIMATIC S7, SM 332 ANALOG OUTPUT
Potential separation	
Potential separation analog outputs	
• Potential separation analog outputs	Yes
Permissible potential difference	
between the outputs (UCM)	60 V DC/30 V AC when used in the hazardous area; 400 V DC/250 V AC when used in NON-hazardous area
Between the outputs and MANA (UCM)	60 V DC/30 V AC when used in the hazardous area; 400 V DC/250 V AC when used in NON-hazardous area
Standards, approvals, certificates	
Use in hazardous areas	
• Type of protection acc. to EN 50020 (CENELEC)	[EEx ib] IIC
• Type of protection acc. to FM	Class I, Division 2, Group A, B, C, D T4
• Test number PTB	Ex-96.D.2026X
Ambient conditions	
Ambient temperature during operation	
• max.	60 °C
Connection method	
required front connector	20-pin
Weights	
Weight, approx.	280 g

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Ordering data

	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**

	Article No.
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 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").	**6ES7331-7SF00-0AB0**
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.

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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 digital input module, Article No. 6ES7326-1RF01-0AB0, does not support PROFINET.

Design

SM 336 F-AI HART analog input module

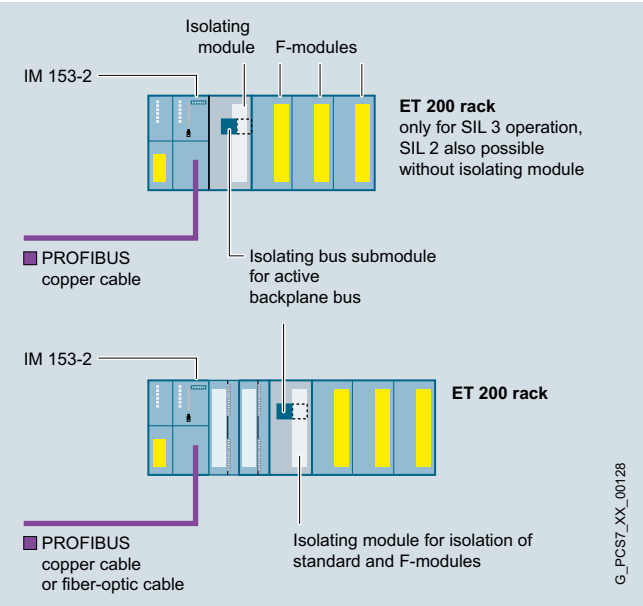
The safety-related SM 336 F-AI HART analog input module has 6 inputs for current measurements in the range from 0 to 20 mA or 4 to 20 mA, all of which are designed for SIL 3. The compact width of 40 mm means that a relatively high packing density can be achieved for F modules, allowing a design which 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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Ordering data	Article No.
SM 326 F-DI safety-related digital input module for floating contacts	
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**
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**
Safety-related digital output module SM 326 F-DO Suitable for solenoid valves, DC contactors and indicator lights	
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**
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**
SM 336 FA-I HART safety-related analog input module	
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**
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**
Isolating bus module 80 mm wide, for isolating module, when using an active backplane bus	**6ES7195-7HG00-0XA0**

[1] The SM 326 F-DI NAMUR module does not support PROFINET

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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

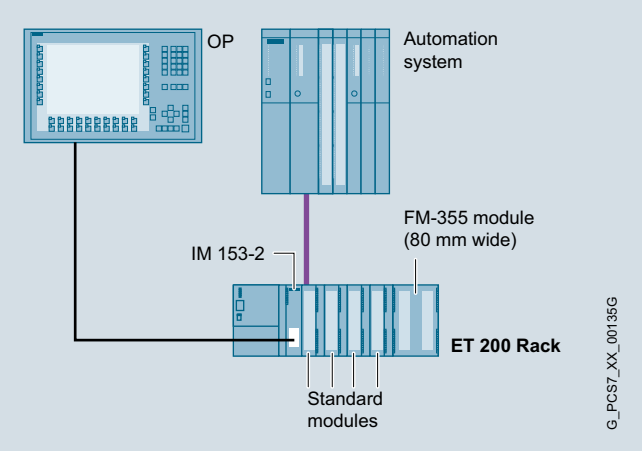
Function

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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Integration



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

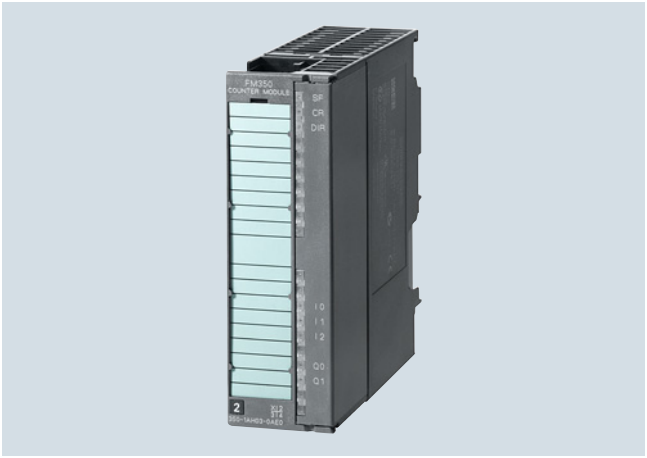
	Article No.
FM 355 C controller module With 4 analog outputs for 4 continuous-action controllers Front connector required: 2 x 20-pin Incl. multi-lingual configuration package, manual and Getting Started (English, German, French, Italian) on CD	**6ES7355-0VH10-0AE0**
FM 355 S controller module With 8 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	**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	**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	**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

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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.

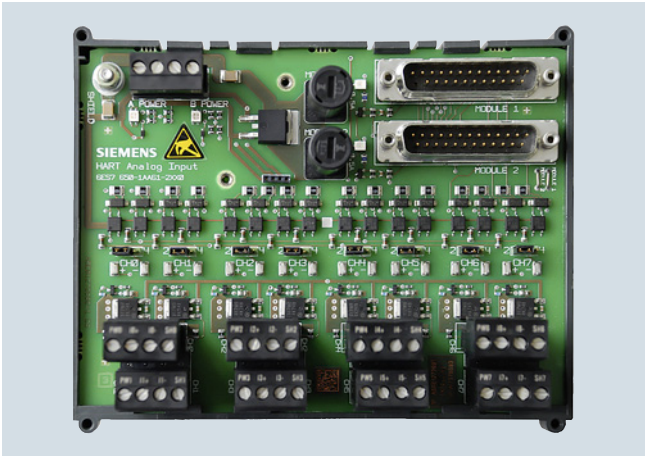
The FM 350-2 counter module is an eight-channel intelligent counter module for universal counting and measuring tasks, as well as for simple positioning jobs (max. 4 axes).

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**

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Overview



MTA AI HART terminal module, 8-channel

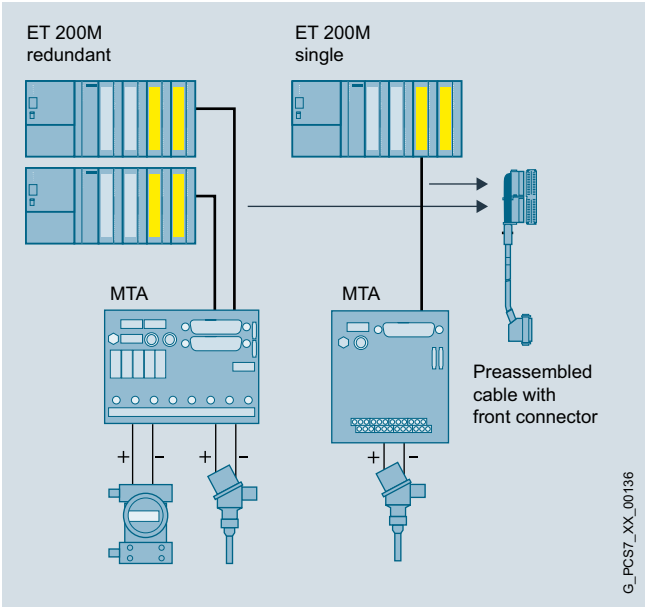
MTA terminal modules (Marshalled Termination Assemblies) can be used to connect field devices, sensors and actuators to the I/O modules of the ET 200M remote I/O stations simply, rapidly and reliably. They can be used to significantly reduce the costs and required work for cabling and commissioning, 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). 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 Power Supply 24 V DC terminal module comes with 16 24 V DC, 0.5 A outputs protected against short-circuit for redundant power supply of field devices that are no longer supplied by means of signal lines by some of the newer MTAS, for example, 4-wire transmitter. 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)

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Design (continued)

Product overview with information on combinable ET 200M modules and connection cables

MTA type	Input/output area	Order No. of MTA and accessories	Order No. of ET 200M module	Order 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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Ordering data	Article No.
MTA terminal modules for SIMATIC PCS 7	
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 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 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 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 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 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**
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 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 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 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, 2 A	**6ES7650-1AL11-6XX0**
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 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**

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MTA Terminal Modules

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	**6ES7922-3BD00-0AS0**
• 8 m	**6ES7922-3BJ00-0AS0**
Connecting cable with 40-pin front connector for ET 200M and 25-pin Sub-D socket for MTA Lengths:	
• 3 m	**6ES7922-3BD00-0BA0**
• 8 m	**6ES7922-3BJ00-0BA0**
Connecting cable with 40-pin front connector for ET 200M and 25-pin Sub-D socket for MTA Lengths:	
• 3 m	**6ES7922-3BD00-0BB0**
• 8 m	**6ES7922-3BJ00-0BB0**
Connecting cable with 40-pin front connector for ET 200M and 25-pin Sub-D plug for MTA Lengths:	
• 3 m	**6ES7922-3BD00-0AT0**
• 8 m	**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	**6ES7922-3BD00-0AN0**
• 8 m	**6ES7922-3BJ00-0AN0**
Connecting cable with 20-pin front connector for ET 200M and 25-pin Sub-D socket for MTA Lengths:	
• 3 m	**6ES7922-3BD01-0AM0**
• 8 m	**6ES7922-3BJ01-0AM0**
Connecting cable with 20-pin front connector for ET 200M and 50-pin Sub-D socket for MTA Lengths:	
• 3 m	**6ES7922-3BD00-0AU0**
• 8 m	**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".

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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 or PROFIBUS DP. Designed for installation in enclosures or control cabinets, it convinces with a particularly compact design, exceptional usability, and impressive performance.

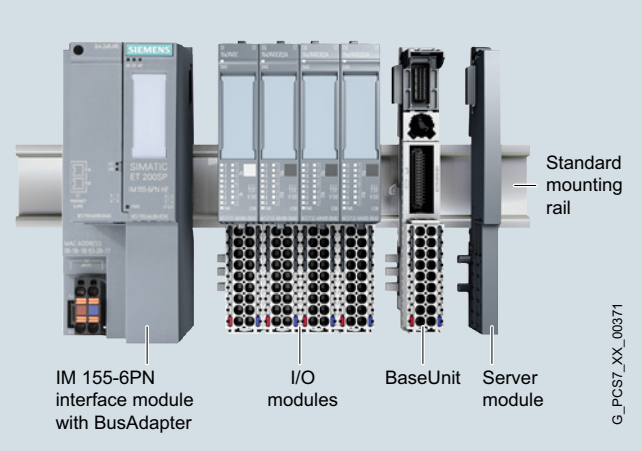
The comprehensive, channel-specific and easy-to-program diagnostics with plain text messages means that faults can be located and eliminated in an extremely short time.

Summary of main features

- Remote I/O stations with IP20 protection, can be networked via PROFINET IO and PROFIBUS DP
- Free selection of PROFINET connection system and hardware using BusAdapter (BA 2×RJ45, BA 2×FC, BA 2×SCRJ, BA SCRJ/RJ45 or BA SCRJ/FC)
- System redundancy S2: ET 200SP station can establish communication to each of the two CPUs of an AS redundancy station via an interface module
- Up to 64 I/O modules (digital/analog); full data volume up to 1 440 bytes (with S2 system redundancy to 1 000 bytes)
- 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

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Design



ET 200SP for SIMATIC PCS 7, design

Main components of the SIMATIC ET 200SP distributed I/O system

- PROFINET interface module IM 155-6PN High Feature with BusAdapter (separate component for establishing the connection system) for communication with the SIMATIC PCS 7 automation system (controller) via PROFINET IO
- PROFIBUS interface module IM 155-6DP High Feature is used as DP slave on the PROFIBUS DP and connects the ET 200SP with the DP master
- I/O modules
  4, 8 or 16 digital channels (DI, DQ, RQ) and 2 or 4 analog channels (AI, AQ); up to 64 I/O modules can be plugged into passive BaseUnits in any combination
- 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 2×RJ45: 2 electrical connections for bus cable with standard RJ45 connectors (Cu)
- BA 2×FC: 2 electrical connections for direct connection of FastConnect bus cable (Cu; full-surface shielded connection, increased mechanical strength)
- BA 2×SCRJ: 2 optical connections for fiber-optic cables with SC RJ connectors (POF, PCF, increased mechanical strength)
- BA SCRJ/RJ45: 1 optical connection (port 1) for fiber-optic cables with SC RJ connector (POF, PCF, increased mechanical strength) and 1 electrical connection (port 2) for bus cable with standard RJ45 connector (Cu)
- BA SCRJ/FC: 1 optical connection (port 1) for fiber-optic cables with SC RJ connector (POF, PCF, increased mechanical strength) and 1 electrical connection (port 2) for direct connection of FastConnect bus cable (Cu; full-surface shielded connection, increased mechanical strength)

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 (foil on rolls for thermal transfer printers or pre-perforated A4 size paper for laser printers)
- Color-coded labels for cable assignment and identification of the potentials of an I/O module
- Reference identification labels for interface module, BusAdapter, BaseUnits and I/O modules for identifying 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 (35 x 15 x 7.5 mm or 35 x 15 x 15 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 in an enclosure or control cabinet. The preferred position is horizontal.

Configuration limits and guidelines

- PROFINET IO: up to 64 I/O modules (digital/analog); full data volume up to 1 440 bytes (with S2 system redundancy to 1 000 bytes)
- PROFIBUS DP: up to 32 I/O modules; up to 244 bytes of user data
- The thermal continuous current for the load or encoder supply can be a maximum of 10 A per potential group.

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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 (can be operated on the redundant automation system using system redundancy S2)
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
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	Yes
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 (-40 ... +70 °C) and corrosive atmosphere/condensation (for details, see www.siemens.com/siplus and Catalog ST 70).

For detailed technical specifications, especially on individual components such as interface modules, BaseUnits or I/O modules, see:

- Catalog ST 70, section "IO Systems"
- Industry Mall under "Automation technology – Automation systems - SIMATIC industrial automation systems – IO systems – SIMATIC ET 200 systems for control cabinets" – SIMATIC ET 200iSP"
- SIMATIC ET 200SP Manual Collection: https://support.industry.siemens.com/cs/ww/en/view/84133942

More information

General information

www.siemens.com/et200sp

TIA Selection Tool

Note:

When working with the TIA Selection Tool in the context of SIMATIC PCS 7, please note the specified limitations for the ET 200SP in the "SIMATIC ET 200SP for SIMATIC PCS 7" section with regard to area of application and product range.

www.siemens.com/tia-selection-tool

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Overview



IM 155-6PN High Feature PROFINET interface module, with reference ID label

IM 155-6PN High Feature PROFINET interface module

- 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
- BusAdapter with integrated 2-port switch for individual selection of the PROFINET IO connection system can be ordered separately

IM 155-6DP High Feature PROFIBUS interface module

- Max. 32 I/O modules, also PROFIsafe modules with complete diagnostic support
- Max. 244 bytes in each case for input and output data per module and per station
- Data update time: typ. 5 ms
- PROFIBUS connection via 9-pin sub D socket
- Bundle with interface module, server module and PROFIBUS plug



BusAdapter BA 2×RJ45

BusAdapter (BA)

A BusAdapter can be used to adapt the universal PROFINET IO interface of the interface module to the specific requirements of the environment of use. If a connection socket is faulty or when changing the connection system at a later stage, it is only necessary to replace the BusAdapter.

The following bus adapters are available:

- **BA 2×RJ45**
  With two sockets for commercially available RJ45 plugs; suitable for standard applications with moderate mechanical strength and EMI resistance
- **BA 2×FC**
  With two FastConnect terminals for direct connection of the bus cables; suitable for applications with higher mechanical strength and/or EMI resistance (5x higher resistance against vibrations and EMI)
- **BA 2×SCRJ**
  With two optical PROFINET interfaces for connection of optical-fiber cables via SC RJ connectors (5x higher resistance against vibrations and EMI; PROFINET cable lengths between two stations up to 300 m)
- **BA SCRJ/RJ45**
  With two PROFINET interfaces:
  - 1 × optical, for connection of fiber-optic cables via SC RJ connectors (port 1)
  - 1 × electric, for connection of bus cable with standard RJ45 connectors (port 2)
- **BA SCRJ/FC**
  With two PROFINET interfaces (5x higher resistance against vibrations and EMI):
  - 1 × optical, for connection of fiber-optic cables via SC RJ connectors (port 1)
  - 1 × electric, for direct placement of the FastConnect bus cable (port 2)

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Design

The IM 155-6PN High Feature interface module is snapped directly onto the standard mounting rail.

Device features:

- Diagnostics displays for errors (ERROR), Maintenance (MAINT), operation (RUN) and power supply (PWR) as well as one link LED per port
- Optional inscription with labeling strips (light gray), available as:
  - Roll for thermal transfer continuous feed printer with 500 strips each
  - Paper sheets for laser printer, A4 format, with 100 strips each
- 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 PROFINET interface module Including server module, without BusAdapter	**6ES7155-6AU00-0CN0**
IM 155-6DP High Feature PROFIBUS interface module Bundle with interface module, server module and PROFIBUS plug	**6ES7155-6BA00-0CN0**
Accessories	
BusAdapter BA 2×RJ45 2 × RJ45 connection for PROFINET	**6ES7193-6AR00-0AA0**
BusAdapter BA 2×FC 2 × FastConnect (FC) connector for PROFINET	**6ES7193-6AF00-0AA0**
BusAdapter BA 2×SCRJ 2 × SCRJ FO connection for PROFINET	**6ES7193-6AP00-0AA0**
BusAdapter BA SCRJ/RJ45 With media converter FOC-Cu; 1 × SCRJ FO and 1 × RJ45 connector for PROFINET	**6ES7193-6AP20-0AA0**
BusAdapter BA SCRJ/FC With media converter FOC-Cu; 1 × SCRJ FO and 1 × FastConnect connection for PROFINET	**6ES7193-6AP40-0AA0**
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, A4 format, light gray	**6ES7193-6LA10-0AA0**
DIN rail 35 mm	
• Length: 483 mm for 19" cabinets	**6ES5710-8MA11**
• Length: 530 mm for 600 mm cabinets	**6ES5710-8MA21**
• Length: 830 mm for 900 mm cabinets	**6ES5710-8MA31**
• Length 2 m	**6ES5710-8MA41**
Spare parts	
Server module (spare part)	**6ES7193-6PA00-0AA0**
Power supply connector interface module (spare part) 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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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 × 5 internally jumpered add-on terminals
  - Terminal box dark
  - Terminal box dark, with 2 × 5 internally jumpered add-on 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, 2 or 4-channel
  - Analog output modules, 2 or 4-channel

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 into BaseUnits (BU). BaseUnit versions suitable for this are those which correspond to the BU type (A0/A1/B0/D0) 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. This automatically codes the I/O module type when it is inserted for the first time, and prevents any different type of module from being inserted.

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.

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 for thermocouples. These BaseUnits are also available with 2 × 5 add-on 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:

- Roll for thermal transfer roll printer with 500 labeling strips each
- Paper sheets for laser printer, A4 format, with 100 labeling strips each

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 are easy to insert 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 × 5 add-on 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 supplied as a package containing 5 shield connection elements and 5 shield terminals.

Ordering data

Refer to the I/O modules for Ordering data of the BaseUnits

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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
  - DI 8x24 V DC NAMUR High Feature for BU type A0, color code CC01

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	**6ES7131-6BF01-0BA0**
• DI 16x24 V DC Standard, BU type A0, color code CC00	**6ES7131-6BH01-0BA0**
• DI 8x24 V DC High Feature, BU type A0, color code CC01	**6ES7131-6BF00-0CA0**
• DI 8x24 V DC NAMUR High Feature, for BU type A0, color code CC01	**6ES7131-6TF00-0CA0**
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 on paper sheet in A4 format, 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-coded labels, 15 mm wide	
• Color code CC01, module-specific, for 16 push-in terminals; for BaseUnit types 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	**6ES7132-6BF01-0BA0**
• 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 NO, RQ 4 × 120 V DC - 230 V AC / 5 A standard, normally open, for BU type B0 or B1, module diagnostics, color code CC00	**6ES7132-6HD01-0BB1**
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**
BU20-P12+A4+0B 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	**6ES7193-6BP20-0BB0**

	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 on paper sheet in A4 format, 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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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

- 2, 4 or 8-channels
- 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 2xU/I 2/4-wire High Feature for BU type A0 or A1, color code CC05
  - AI 4xI 2-wire HART High Feature for BU type A0 or A1, color code CC03
  - AI 4xRTD/TC 2-, 3-, 4-wire High Feature for BU type A0 or A1, color code CC00
  - AI 8xRTD/TC 2-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

- 2 or 4 channels
- Color coding of the module type AQ: Dark blue
- Usable types:
  - AQ 4xU/I Standard for BU type A0 or A1, color code CC00
  - AQ 2xU/I High Feature 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 2xU/I 2/4-wire High Feature, BU type A0 or A1, color code CC05, 16-bit, ± 0.1 %	**6ES7134-6HB00-0CA1**
• AI 4xI 2-wire HART High Feature, BU type A0 or A1, color code CC03, 16-bit, ± 0.3 %	**6ES7134-6TD00-0CA1**
• 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 8xRTD/TC 2-wire High Feature BU type A0 or A1, color code CC00, 16 bit, ± 0.1%	**6ES7134-6JF00-0CA1**
• AI Energy Meter Standard, 400 V AC, BU type D0	**6ES7134-6PA01-0BD0**
• AI Energy Meter Standard, 480 V AC, BU type D0	**6ES7134-6PA20-0BD0**
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 × 5 internally jumpered add-on 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 × 5 internally jumpered add-on terminals (1B to 5B and 1C to 5C); for continuing the load group	**6ES7193-6BP40-0BA1**

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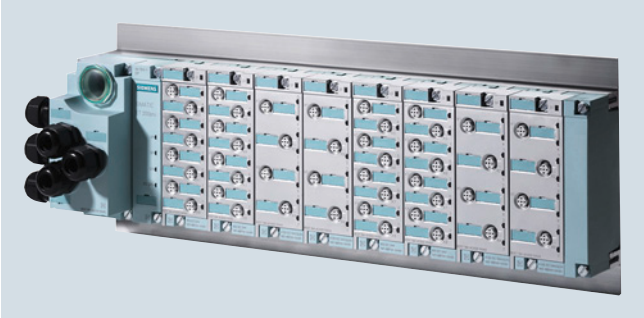
Ordering data	Article No.
Usable type D0 BaseUnits	
BU20-P12+A0+0B BU type D0; BaseUnit with 12 push-in terminals, without AUX terminals, bridged to the left	**6ES7193-6BP00-0BD0**
Accessories	
Reference ID labels 10 sheets with 16 strips each	**6ES7193-6LF30-0AW0**
Labeling strips	
• 500 labeling strips on roll, light gray	**6ES7193-6LR10-0AA0**
• 1 000 labeling strips on paper sheet in A4 format, 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-coded labels, 15 mm wide	
• Color code CC03, module-specific, for 16 push-in terminals; for BU types A0, A1; 10 units	**6ES7193-6CP03-2MA0**
• Color code CC05, module-specific, for 16 push-in terminals; for BU type A0, A1; 10 units	**6ES7193-6CP05-2MA0**
• 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**
• Color code CC74, for 2 × 5 add-on terminals, 5 × red, 5 × blue, for BU type A1, with push-in terminals; 10 units	**6ES7193-6CP74-2AA0**

Analog output modules

Analog output modules	
• AQ 4xU/I Standard, BU type A0 or A1, color code CC00, 16 bit, ± 0.3%	**6ES7135-6HD00-0BA1**
• AQ 2xU/I High Feature, BU type A0 or A1, color code CC00, 16 bit, ± 0.1 %	**6ES7135-6HB00-0CA1**
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 × 5 internally jumpered add-on 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 × 5 internally jumpered add-on 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 on paper sheet in A4 format, 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 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**
• Color code CC74, for 2 × 5 add-on terminals, 5 × red, 5 × blue; for BU-type A1, with push-in terminals; 10 units	**6ES7193-6CP74-2AA0**

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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 remote I/O 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.

A ET 200pro remote I/O station consists of:

- 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 electronic modules
- Safety-related electronic modules
- I/O connection modules
  - CM IO 4 × M12 for digital or analog electronics modules
  - CM IO 8 × M12 for digital electronics modules
  - CM IO 12 × M12 for 4/8 F-DI/4 F-DO
  - CM IO 16 × 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 supports are available for mounting the ET 200pro:

- Narrow module support
  With two mounting flanges, the ET 200pro remote I/O station can be completely pre-installed on this module support on the workbench.



- 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 station
- Load voltage supply 2L+ max. 10 A per potential group
- Maximum address range of a station: 244 bytes for inputs and 244 bytes for outputs

ET 200pro configuration

The TIA Selection Tool can be used to assemble an ET 200pro remote I/O station quickly and easily. The tool is familiar with the configuration rules and supports users in the selection of all components and associated accessories in interactive mode.

www.siemens.com/tia-selection-tool

Note:

Please note when working with the TIA Selection Tool that the applications and product range of ET 200pro are limited in the context of SIMATIC PCS 7!

Integration

The distributed ET 200pro remote I/O stations are connected to SIMATIC PCS 7 automation systems (controllers) via PROFIBUS DP. Data transfer rates of up to 12 Mbit/s are possible.

The SIMATIC ET 200pro is integrated into SIMATIC PCS 7 using standard driver blocks. You can therefore configure and parameterize the ET 200pro remote I/O stations in the SIMATIC Manager of the engineering system very simply using HW Config.

Technical specifications

Technical specifications - General	
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 in accordance with IEC 60068 Part 2-6 (sine) • 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 modules, power modules and electronic modules, see Catalog ST 70, Chapter "IO systems" or Industry Mall under “Automation technology - Automation systems - SIMATIC industrial automation systems - IO systems - SIMATIC ET 200 systems without control cabinets" – SIMATIC ET 200pro".

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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; supports PROFIsafe	**6ES7154-2AA01-0AB0**
Connection modules 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 connectors	**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 × M12 and 2 × 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, Chapter "IO systems" or Industry Mall under "Automation technology – Automation systems – SIMATIC industrial automation systems – IO systems – SIMATIC ET 200 systems without control cabinets – SIMATIC ET 200pro"	
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.

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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

	Article No.
Digital electronic 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 × M12 4 M12 sockets for connecting digital or analog sensors/actuators to ET 200pro	**6ES7194-4CA00-0AA0**
Connection module CM IO 8 × 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	
Connectors, cables and further accessories, see Catalog ST 70, section "IO systems" or Industry Mall under "Automation engineering – Automation systems – SIMATIC industrial automation systems – IO systems – SIMATIC ET 200 systems without control cabinets – SIMATIC ET 200pro"	

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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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

Ordering data	Article No.
Analog electronic 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, including 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 × 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	
Connectors, cables and further accessories, see Catalog ST 70, section "IO systems" or Industry Mall under "Automation engineering – Automation systems – SIMATIC industrial automation systems – IO systems – SIMATIC ET 200 systems without control cabinets – SIMATIC ET 200pro"	

Accessories

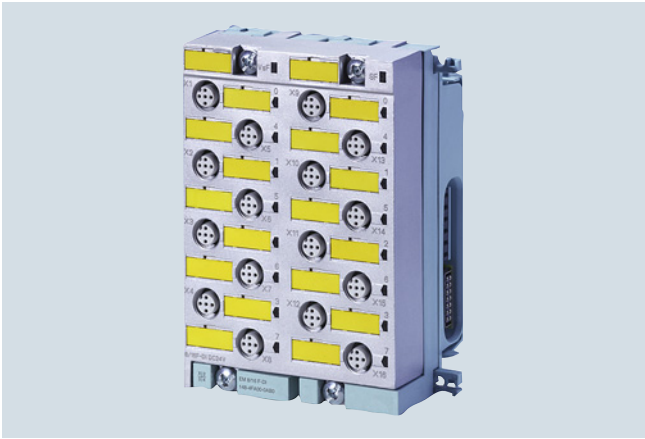
Connection modules

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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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 × M12 for the electronics module 8/16 F-DI, 24 V DC/2 A	**6ES7194-4DD00-0AA0**
• CM IO 12 × M12 for the electronics module 4/8 F-DI4 F-DO, 24 V DC/2 A	**6ES7194-4DC00-0AA0**
Further accessories	
Connectors, cables and further accessories, see Catalog ST 70, section "IO systems" or Industry Mall under "Automation engineering – Automation systems – SIMATIC industrial automation systems – IO systems – SIMATIC ET 200 systems without control cabinets – SIMATIC ET 200pro"	

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 installed in the ET 200pro remote I/O station interrupts the load voltage busbar and opens a new potential group (common potential) for the 2L+ load voltage supply. 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

Ordering data	Article No.
Power module	
Power module PM-E DC 24 V For generating 24 V DC load voltage groups for electronic 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 connector	**6ES7194-4BA00-0AA0**
• Connection module CM PM-E direct for supply of 24 V DC load voltage, one or 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 connectors, cables and further accessories, see Catalog ST 70 or Industry Mall under "Automation technology – Automation systems – SIMATIC industrial automation systems – I/O systems – SIMATIC ET 200 systems without control cabinet – SIMATIC ET 200pro".	

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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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 Input: 3 400 ... 480 V AC Output: 24 V DC, 8 A	**6ES7148-4PC00-0HA0**
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

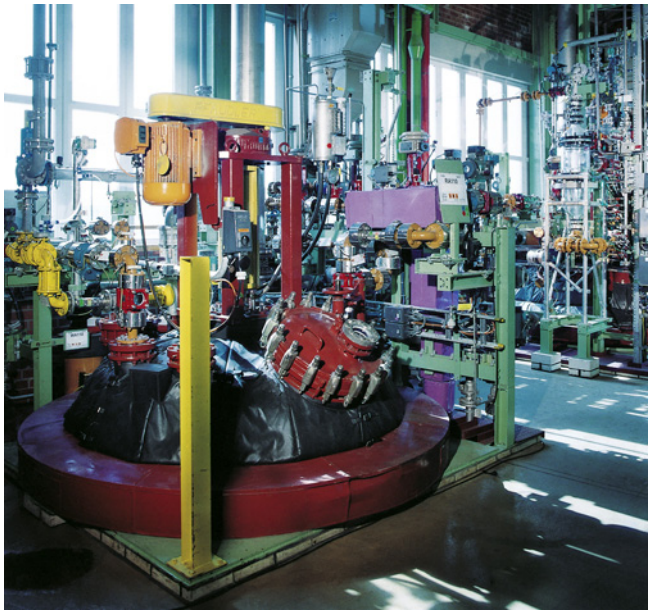
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12/2 **SIMATIC BATCH**
12/5 SIMATIC BATCH Software

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Overview



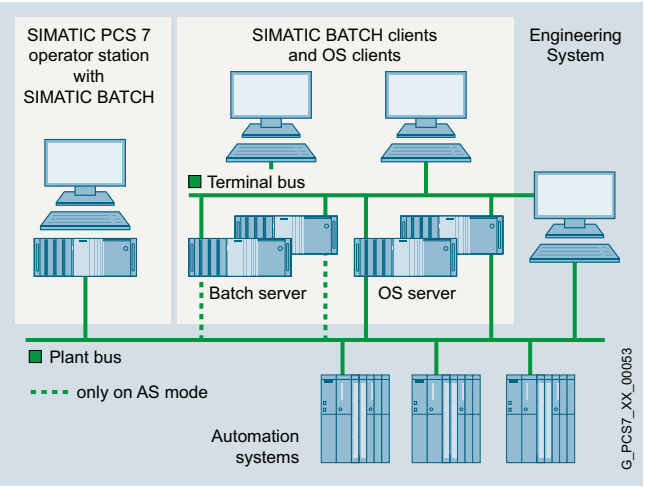
In the process industry, discontinuous processes – so-called batch processes – are of great significance. Permanently shorter product lifecycles as well as the versatility required by consumers are two of the reasons for this.

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.

Client/server configuration

However, a characteristic feature of the automation of batch processes using SIMATIC BATCH is client/server architectures in which one Batch server and multiple Batch clients together process a plant project. The Batch server in such a configuration can also be configured with redundancy in order to increase availability.

SIMATIC 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 Box OS Clients 627D and SIMATIC PCS 7 OS Clients 427E/477E are also suitable 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 communication module or via a simple FastEthernet 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. SIMATIC NET HARDNET-IE S7-REDCONNECT PowerPack can be used to upgrade the communications software.
See "Communication", "Industrial Ethernet, system connection for PCS 7 systems", see page 10/59

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 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, for example up to 100 m per crossover network cable (RJ45 connectors). For details, refer to the "High-availability process control systems" manual; for appropriate cable material and further accessories, refer to Catalog IK PI.

Note:

Licenses for the server, API and UNITs must be installed on both servers for the redundant version.

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 set.

Expansion options

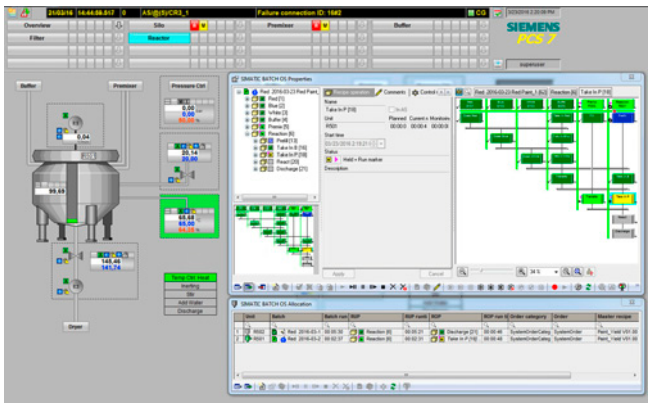
OS/batch single station and batch client can be optionally expanded for multi-monitor mode with up to 4 monitors. Using multi-monitor mode, the visualization of a plant/unit can be divided among 2 to 4 process monitors per operator station using different views. These plant sections can all be operated 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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Integration



Process display with integrated OS Control

Integration in SIMATIC PCS 7

SIMATIC BATCH is completely integrated in SIMATIC PCS 7. 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 in the engineering system are available 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). With SIMATIC PCS 7 V9.0, operation is also possible using OS controls configured on a Web client.

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", see page 3/52.

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.

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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).

SIMATIC BATCH Server Expansion Pack

With highly complex process cells that can process a high volume of batches, the total amount of main memory required by all batches together can exceed the level of 1.5 GB. No additional batches can be released or started. This can be avoided by additionally installing **Server Expansion Packs**, each of which provides an additional 500 MB of main memory.

Software products/licenses	Batch single station	Batch server	Redundant Batch server pair		Batch client
			Server A	Server B	
Basic software					
SIMATIC BATCH Single Station Package	●	–	–	–	–
SIMATIC BATCH Basic[1]	–	●	●	●	–
SIMATIC BATCH Server[1]	–	●	●	●	–
SIMATIC BATCH Client[2]	–	o	o	o	●
SIMATIC BATCH Recipe System	–	o	o	o	o[3]
SIMATIC BATCH API	o	o	o	o	–
Quantity options: Cumulative objects					
• SIMATIC BATCH UNITs[4]					
- 1 UNIT	o	o	o	o	–
- 10 UNITs	o	o	o	o	–
- 50 UNITs	o	o	o	o	–
• SIMATIC BATCH OS Control Web Client					
- 1 Web client	o	o	o	o	–
- 5 Web clients	o	o	o	o	–
• Server Expansion Pack					
- 500 MB	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 SIMATIC BATCH Client license is needed for the Batch Control Center (BatchCC) and for the Batch OS Controls. If both BatchCC and the Batch OS Control are being used on a PC, only 1 SIMATIC BATCH Client license has to be installed.

3) A client/server system is required on at least one client.

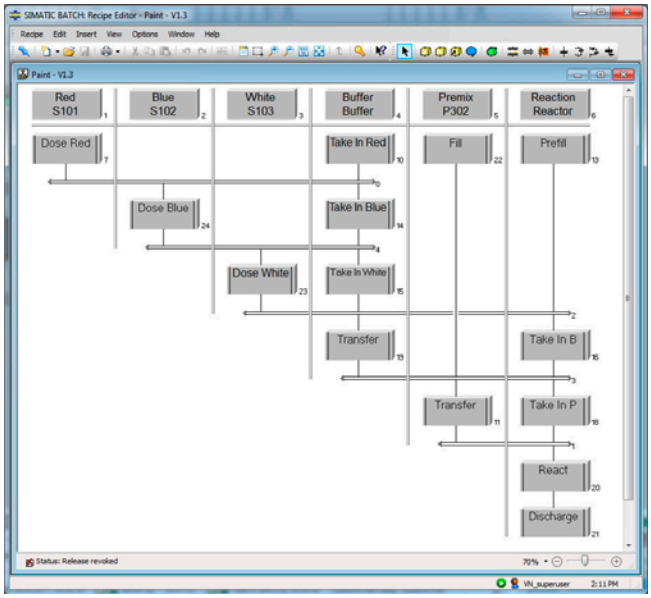
4) Instances of units; at least one SIMATIC BATCH UNIT license is required per project.

● Software product/license required
o Software product/license optional
– Software product/license not required or not available

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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.

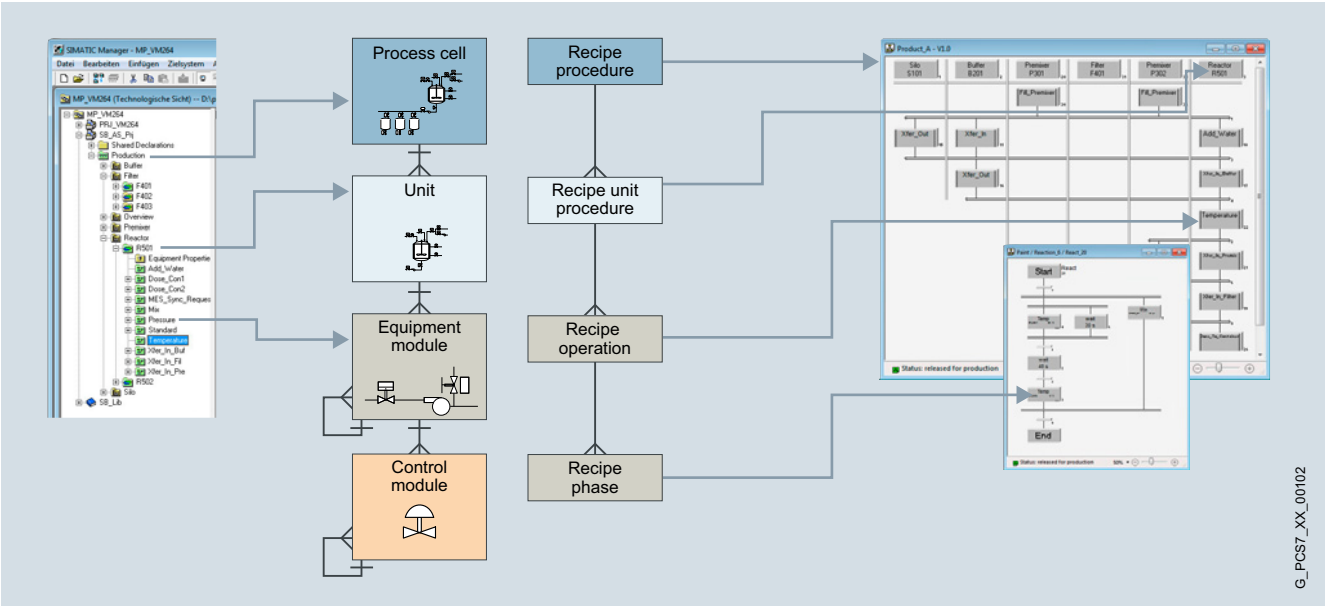
It is used for easy, intuitive creation and modification of master recipes and library operations. The basis for recipe creation are the batch objects created from the plant configuration using the SIMATIC PCS 7 Engineering System, e.g. units and equipment phases.

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

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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

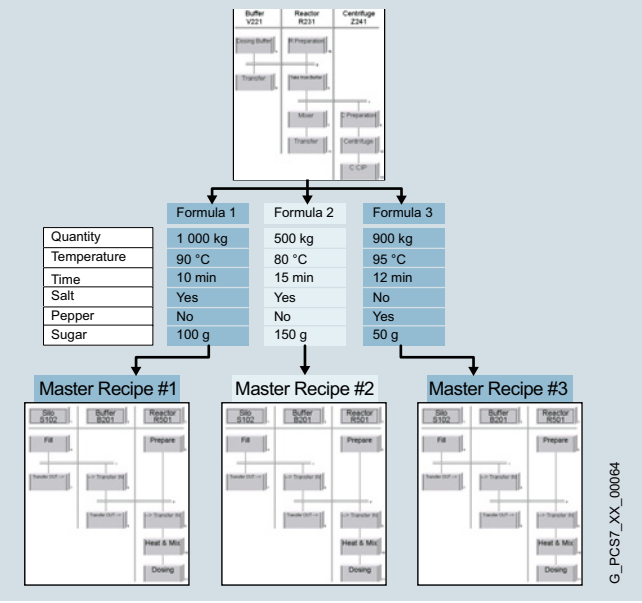
Monitoring of process states is possible during runtime by marking freely selectable recipe sections. It is then possible to automatically react to evaluated events or faults using a command block or jump function in a special container.

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.

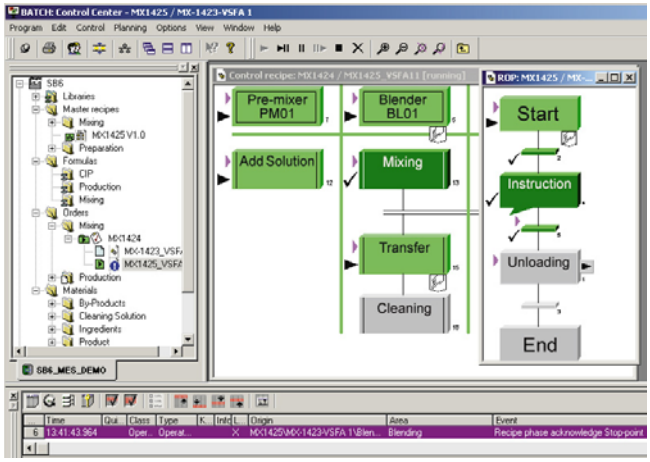
This reduces the effort for engineering and validation. If the reference link is broken, the recipe operation becomes a fixed component of the recipe procedure, and is thus independent of further central modifications.

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 1 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.

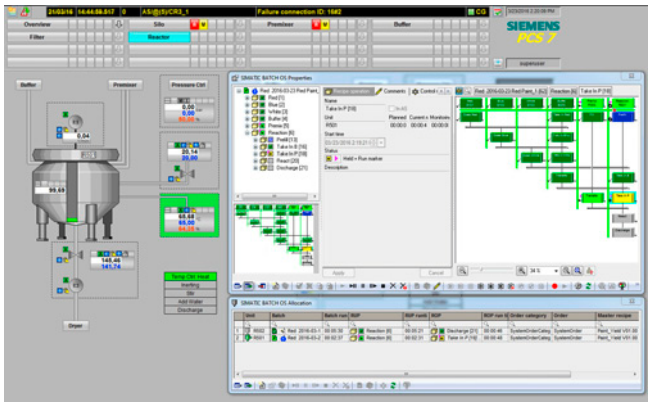
BatchCC offers powerful functions for the following tasks:

- Import and update of basic automation plant data
- 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
- 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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Function (continued)

Batch OS Control



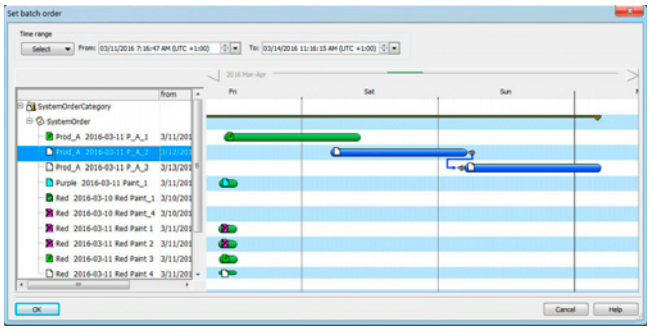
Batch OS Control

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.

The following OS controls are available:

- Unit overview
- ROP overview
- Batch creation
- Job and batch overview
- Batch operation and monitoring

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
- 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.
Basic software for Batch Single Station, Batch Server and Batch Client	
Runs with the following operating systems (see SIMATIC PCS 7 V9.0 Readme [1] for latest information):	
• Windows 7 Ultimate 64-bit	
• Windows 10 Enterprise 2015 LTSB 64-bit	
• Windows Server 2012 R2 Standard Edition 64-bit	
• Windows Server 2016 Standard Edition 64-bit	
SIMATIC BATCH Single Station Package V9.0	
6 languages (English, German, French, Italian, Spanish, Chinese), software class A, single license for 1 installation	
No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	**6ES7657-0UX58-0YB0**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7657-0UX58-0YH0**
SIMATIC BATCH Basic V9.0	
Batch server software with reduced functionality	
6 languages (English, German, French, Italian, Spanish, Chinese), software class A, single license for 1 installation	
No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	**6ES7657-0YX58-0YB0**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7657-0YX58-0YH0**
SIMATIC BATCH Server V9.0	
6 languages (English, German, French, Italian, Spanish, Chinese), software class A, single license for 1 installation	
No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	**6ES7657-0TX58-0YB0**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7657-0TX58-0YH0**
SIMATIC BATCH Client V9.0	
6 languages (English, German, French, Italian, Spanish, Chinese), software class A, floating license for 1 user	
No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	**6ES7657-0VX58-0YB5**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7657-0VX58-0YH5**

Ordering data	Article No.
Functional add-on components	
Runs with the following operating systems (see SIMATIC PCS 7 V9.0 Readme [1] for latest information):	
• Windows 7 Ultimate 64-bit	
• Windows 10 Enterprise 2015 LTSB 64-bit	
• Windows Server 2012 R2 Standard 64-bit	
SIMATIC BATCH Recipe System V9.0	
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, floating license for 1 user	
No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	**6ES7657-0AX58-0YB5**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7657-0AX58-0YH5**
SIMATIC BATCH API V9.0	
1 language (English), software class A, single license for 1 installation	
No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	**6ES7657-0MX58-2YB0**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7657-0MX58-2YH0**

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SIMATIC BATCH Software

Ordering data	Article No.
Quantity options for Batch Single Station and Batch Server (cumulative)	
SIMATIC BATCH UNITs[2]	
For SIMATIC BATCH Single Station Package/SIMATIC BATCH Server software	
Language-neutral, software class A, single license for 1 installation	
No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	
- 1 UNIT	**6ES7657-0XA00-0YB0**
- 10 UNITs	**6ES7657-0XB00-0YB0**
- 50 UNITs	**6ES7657-0XC00-0YB0**
• Online delivery License key download, online certificate of license Note: Email address required!	
- 1 UNIT	**6ES7657-0XA00-0YH0**
- 10 UNITs	**6ES7657-0XB00-0YH0**
- 50 UNITs	**6ES7657-0XC00-0YH0**
SIMATIC BATCH OS Control Web Client	
For SIMATIC BATCH Single Station Package/SIMATIC BATCH Server software	
Language-neutral, software class A, single license for 1 installation	
Without SIMATIC PCS 7 Software Media Package	
• Goods delivery License key on USB flash drive, certificate of license	
- 1 Web client	**6ES7657-0XF00-0YB0**
- 5 Web clients	**6ES7657-0XG00-0YB0**
• Online delivery License key download, online certificate of license Note: Email address required!	
- 1 Web client	**6ES7657-0XF00-0YH0**
- 5 Web clients	**6ES7657-0XG00-0YH0**

Ordering data	Article No.
SIMATIC BATCH Server Expansion Pack (500 MB) V9.0	
6 languages (English, German, French, Italian, Spanish, Chinese), software class A, single license for 1 installation	
Without SIMATIC PCS 7 Software Media Package	
• Goods delivery License key on USB flash drive, certificate of license	**6ES7657-0QX58-2YB0**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7657-0QX58-2YH0**

[1] See chapter "Software Media and Logistics", section "System documentation", see page 1/7.

[2] Instances of plant units

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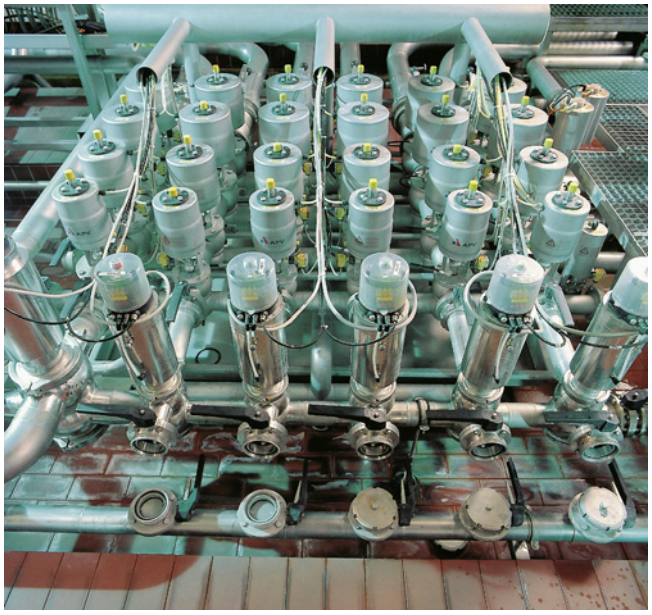
Route control



13/2 **SIMATIC Route Control**
13/5 Route Control Runtime Software
13/7 Route Control Engineering Software

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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

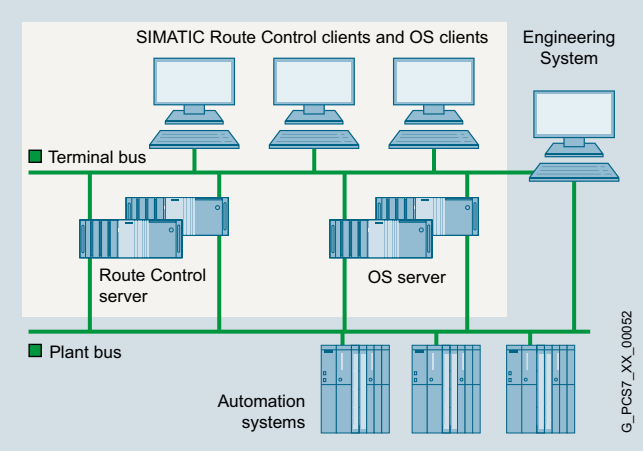
The possible applications of SIMATIC Route Control extend from small plants with simple/static lines up to plants in the medium and upper performance range which have an extensive network of routes/pipes.

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 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 for each multi-user system.

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)

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.

Expansion options

OS/RC single stations and RC clients can be optionally expanded for multi-monitor mode with up to 4 monitors. Using multi-monitor mode, the visualization of a plant/unit can be divided among 2 to 4 process monitors per operator station using different views. These plant sections can all be operated using just one keyboard and one mouse.

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 417-4 and CPU 417-4H (up to 300 simultaneous material transports)
- CPU 410-5H (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

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
● Software product/license optional
– Software product/license not required or not available

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.

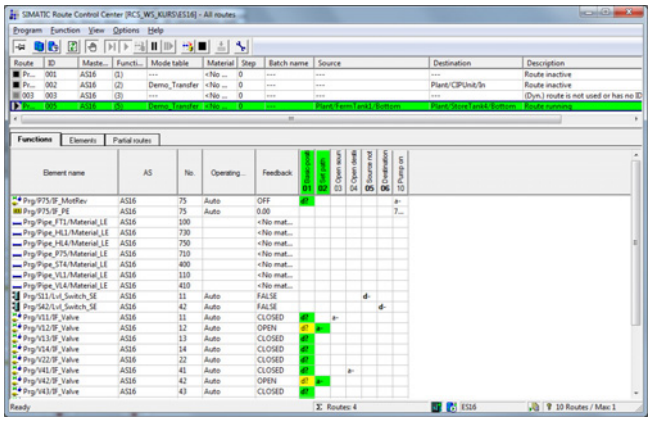
The Route Control Center (RCC) can be installed on an OS client, a batch client, or on separate RC client hardware.

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 Runtime Software

Ordering data

	Article No.
SIMATIC Route Control Server V9.0 for single station or client/server configuration 6 languages (English, German, French, Italian, Spanish, Chinese), software class A Runs with the following operating systems (see SIMATIC PCS 7 V9.0 Readme for latest information): • Windows 7 Ultimate 64-bit • Windows 10 Enterprise 2015 LTSB 64-bit • Windows Server 2012 R2 Standard Edition 64-bit • Windows Server 2016 Standard Edition 64-bit Single license for 1 installation, without SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	**6ES7658-7FX58-0YB0**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7658-7FX58-0YH0**

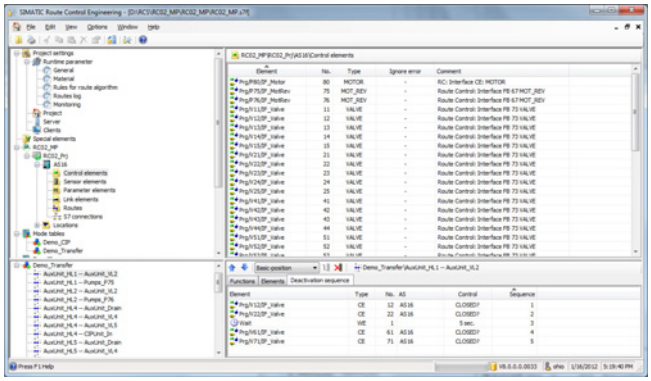
	Article No.
Quantity options for single station/ server (cumulative)	
SIMATIC Route Control Routes[2] For expansion of the SIMATIC Route Control Server software for single station or client/server configuration, cumulative Language-neutral, software class A, single license for 1 installation No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	
- 10 routes[2]	**6ES7658-7FF00-0XB0**
- 50 routes[2]	**6ES7658-7FG00-0XB0**
• Online delivery License key download, online certificate of license Note: Email address required!	
- 10 routes[2]	**6ES7658-7FF00-0XH0**
- 50 routes[2]	**6ES7658-7FG00-0XH0**
SIMATIC Route Control Center V9.0 6 languages (English, German, French, Italian, Spanish, Chinese), software class A Runs with the following operating systems (see SIMATIC PCS 7 V9.0 Readme for latest information): • Windows 7 Ultimate 64-bit • Windows 10 Enterprise 2015 LTSB 64-bit • Windows Server 2012 R2 Standard Edition 64-bit • Windows Server 2016 Standard Edition 64-bit Floating license for 1 user, without SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	**6ES7658-7EX58-0YB5**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7658-7EX58-0YH5**

[1] See chapter "Software Media and Logistics", section "System documentation", see page 1/7.

[2] Number of simultaneous material transports; total project limit: 300 routes

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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)
- WAIT elements

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:

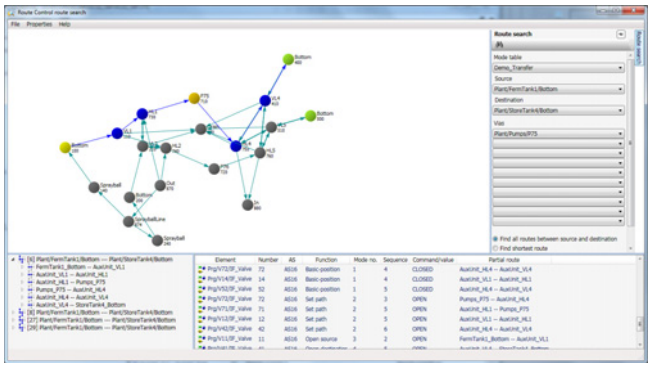
- Partial routes:
  division of the transport paths into partial routes is used to increase the flexibility and minimize the configuring overhead by means of repeated application. Relevant partial route parameters: "bidirectional" and "priority" (lowest total of partial route priorities is decisive when 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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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 V9.0 6 languages (English, German, French, Italian, Spanish, Chinese), software class A Runs with the following operating systems (see SIMATIC PCS 7 V9.0 Readme [1] for latest information): • Windows 7 Ultimate 64-bit • Windows 10 Enterprise 2015 LTSB 64-bit • Windows Server 2012 R2 Standard Edition 64-bit • Windows Server 2016 Standard Edition 64-bit Floating license for 1 user, without SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	**6ES7658-7DX58-0YB5**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7658-7DX58-0YH5**

[1] See chapter "Software Media and Logistics", section "System documentation", see page 1/7.

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Safety Integrated for Process Automation



14/2 Introduction

14/5 SIMATIC Safety Integrated
14/5 S7 F Systems
14/7 SIMATIC Safety Matrix
14/11 SIMATIC SIS compact

14/15 Functional Safety Services

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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 11 "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

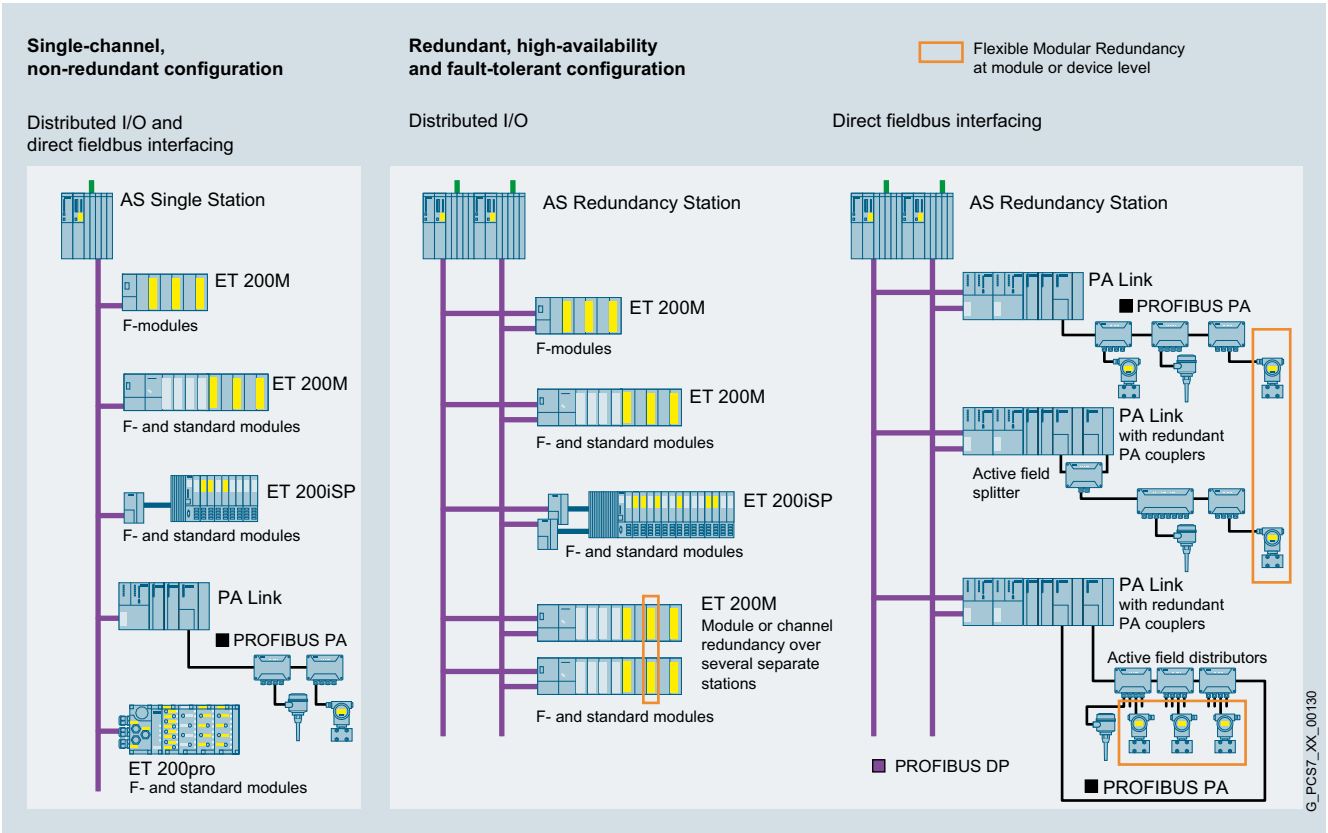
The PROFIsafe profile allows safety-related communication between the automation system (controller) and the process I/O via either PROFIBUS or PROFINET. The decision for choosing either PROFINET IO or the PROFIBUS DP/PA fieldbuses has a significant influence on the architecture of the safety-related 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

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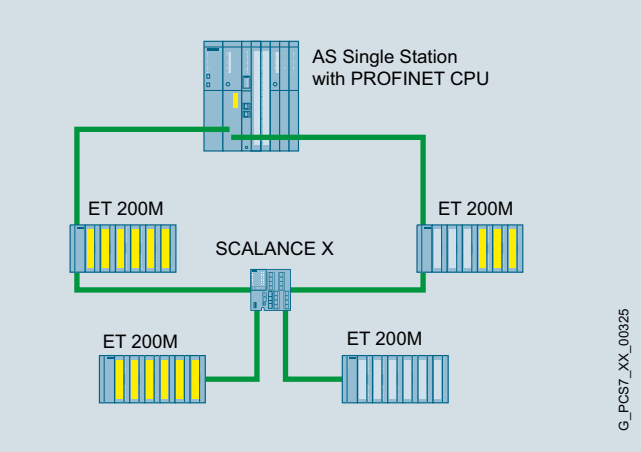
Design (continued)

At the individual architectural levels (controller, fieldbus, I/O), you have the configuration alternatives shown in the figure in line with the I/O used (ET 200M, ET 200iSP, ET 200pro remote I/O stations or PROFIBUS PA devices with PA profile 3.0 or higher).

Safety-related design versions with PROFINET

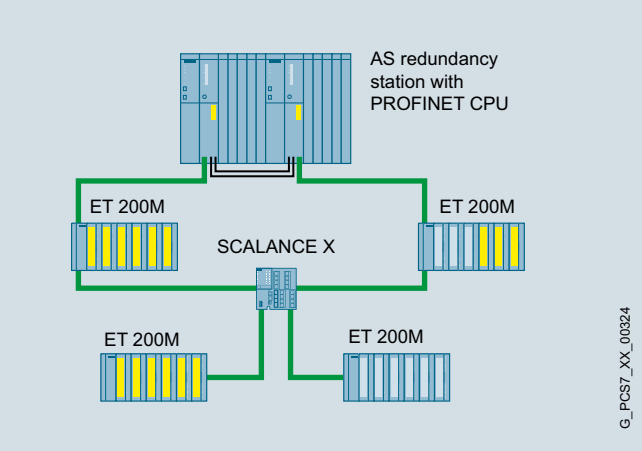
Safety-related AS single stations (F systems) and AS redundancy stations (FH systems) from the S7-400 range can be networked simply and effectively with ET 200M remote I/O stations via PROFINET IO. The PN/IE interface integrated in the CPU is available for this on the side of the automation systems, 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.



Safety-related PROFINET IO communication with media redundancy

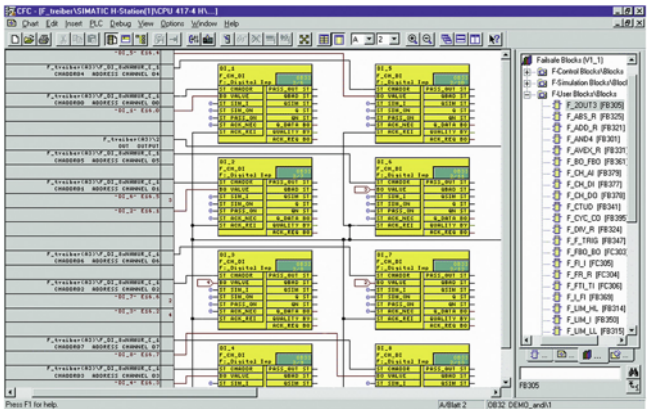
The maximum availability with minimum error handling times is achieved by the AS Redundancy Station (FH system) in conjunction with the system redundancy of the I/O devices. System redundancy refers to a type of PROFINET IO communication where each I/O device establishes a communication connection to 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

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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. S7 F Systems are based on pre-configured and inspectorate-approved blocks. The following functions are then available:

- Parameterization of CPU and F signal modules
- Creation of safety-related applications in the CFC

Design

Information on ordering and delivery

S7 F Systems is among the products for which the installation software is provided in the form of a software media package. Software media packages and product-specific software licenses are separate packages. They are not merged into a single delivery unit when supplied in package form.

The number of delivered software media packages can be determined by the number of ordered items. You can find additional information under "Delivery form package" in the "Software Media and Logistics", "PCS 7 Software Packages" section of the ST PCS 7 catalog.

Configuration

S7 F Systems supports configuration using 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 following operating systems:
  - On the engineering station under Windows 7 SP1 64-bit (Professional, Enterprise, Ultimate) or Windows Server 2008 R2 SP1 Standard 64-bit
  - On the operator station (S7 F Systems HMI) under Windows 7 SP1 32-bit (Enterprise, Ultimate), Windows 7 SP1 64-bit (Professional, Enterprise, Ultimate), Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2008 R2 SP1 Standard 64-bit or Windows Server 2012 R2 Standard 64-bit
- The 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" and under "Complementary S7-400 systems".

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Ordering data

	Article No.
S7 F Systems	
S7 F Systems V6.2 Programming and configuration environment for creating and using safety-related STEP 7 programs 2 languages (English, German), software class A Runs with the following operating systems (see S7 F Systems V6.2 Readme for the latest information): • On the engineering station with Windows 7 SP1 64-bit (Professional, Enterprise, Ultimate) or Windows Server 2008 R2 SP1 Standard 64-bit • On the operator station also with Windows 7 SP1 32-bit (Enterprise, Ultimate), Windows 10 Enterprise 2015 LTSB 64-bit or Windows Server 2012 R2 Standard 64-bit Floating license for 1 user, without SIMATIC PCS 7 Software Media Package	
• Package License key on USB flash drive and certificate of license, bundled with 1 × S7 F Systems Software Media Package per order item	**6ES7833-1CC26-0YA5**
• Online delivery License key download and online certificate of license combined with S7 F Systems Software Media Package (software download and online certificate of license) Note: Email address required	**6ES7833-1CC26-0YH5**

	Article No.
S7 F Systems Software Media Package	
S7 F Systems Software Media Package V6.2 Installation software without license 2 languages (English, German), software class A Runs with the following operating systems (see S7 F Systems V6.2 Readme for the latest information): • On the engineering station with Windows 7 SP1 64-bit (Professional, Enterprise, Ultimate) or Windows Server 2008 R2 SP1 Standard 64-bit • On the operator station also with Windows 7 SP1 32-bit (Enterprise, Ultimate), Windows 10 Enterprise 2015 LTSB 64-bit or Windows Server 2012 R2 Standard 64-bit Without SIMATIC PCS 7 Software Media Package Note: Can only be used in conjunction with a valid license.	
• Package Software on DVD and certificate of license	**6ES7833-4CC26-0YT8**
• Online delivery Software download and online certificate of license Note: Email address required!	**6ES7833-4CC26-0YG8**
Upgrades for S7 F Systems See "Upgrades for Safety Integrated for Process Automation" in section "Update/upgrade packages", "Updates/upgrades asynchronous to the PCS 7 version". Note: With a S7 F Systems Upgrade from V5.x to V6.x, the type of S7 F Systems license changes from single license to floating license.	

Options

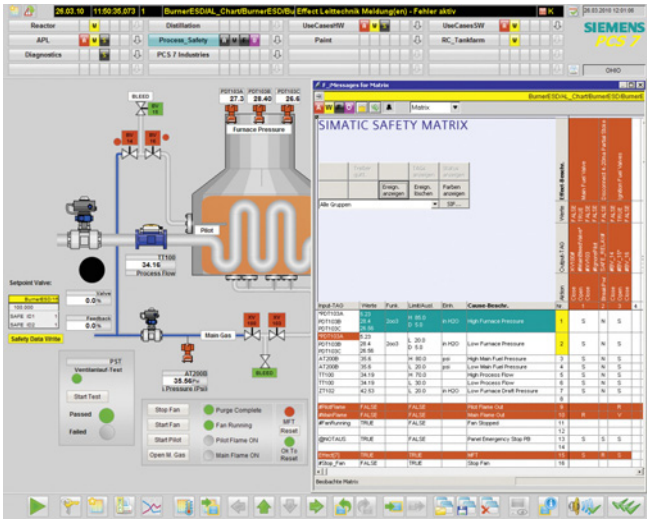
S7 F ConfigurationPack

For the use of safety-related I/O modules of the ET 200 range, an S7 F ConfigurationPack is required for engineering. This is included in S7 F systems and is also available on the Internet for download:

https://support.industry.siemens.com/cs/ww/en/view/15208817

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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 states require specific safety reactions.

The SIMATIC Safety Matrix means that programming of the safety logic is not only significantly simpler and more convenient, but also much faster than conventional processes. During the risk analysis of a plant, the configuration engineer can assign precisely defined reactions (effects) to events (causes) which may occur during a process.

Benefits

Advantages of the SIMATIC Safety Matrix in the implementation and operation phase

Implementation phase

- Direct further processing of safety specification possible
- Simple programming with the cause & effect method
- No programming knowledge required
- Preprocessing of input values
- Alarm generation and provision of diagnostic information for each individual cause & 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 expression of the 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 lifecycle management
- Integral maintenance functions such as bypass and simulation
- Display of all relevant process values, also during maintenance
- 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:

SIMATIC Safety Matrix Tool

For the SIMATIC PCS 7 engineering system; for creating, configuring 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 analysis through implementation up to operation and maintenance.

SIMATIC 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 SIMATIC 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 engineering system of the SIMATIC PCS 7 process control system.

However, generation of the safety-related CFC program, compilation and downloading to the automation system and procedural testing are only possible with the SIMATIC Safety Matrix Tool on the SIMATIC PCS 7 Engineering System.

SIMATIC Safety Matrix Viewer

For the SIMATIC PCS 7 Operator System; for operator control and monitoring of the SIMATIC Safety Matrix in the operating phase.

With the SIMATIC 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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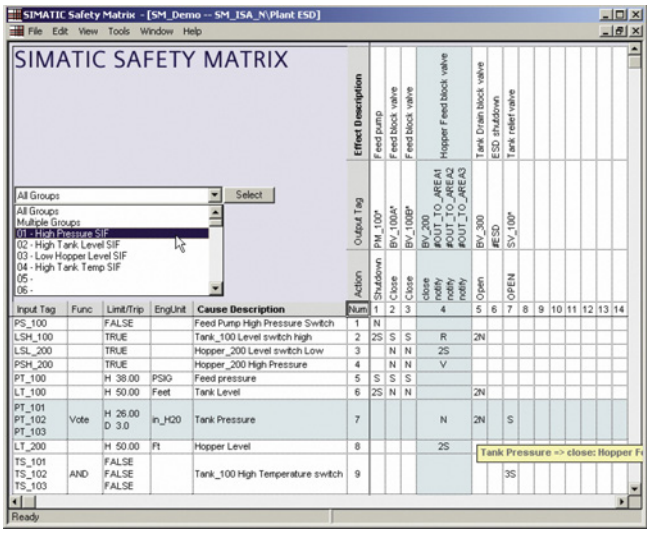
Design (continued)

Information on ordering and delivery

The SIMATIC Safety Matrix is among the products for which the installation software is provided in the form of a software media package. Software media packages and product-specific software licenses are separate packages, which are not merged into a single delivery unit when supplied in package form.

The number of delivered software media packages can be determined by the number of ordered items. You can find additional information under "Delivery form package" in the "Software Media and Logistics", "PCS 7 Software Packages" section of the ST PCS 7 catalog, see page 1/2.

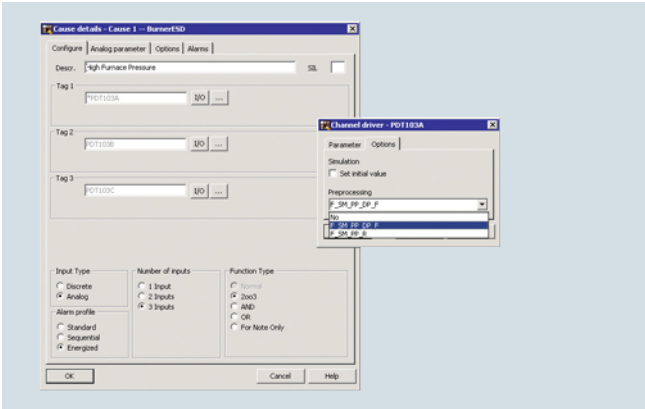
Function



Safety Matrix: intersections define the linking of causes and effects

The matrix table is comparable with a spreadsheet program, and the project 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. The project engineer requires no special programming skills and can completely concentrate on the safety requirements of the plant.



Input window for configuration of analog "causes" with process value preprocessing

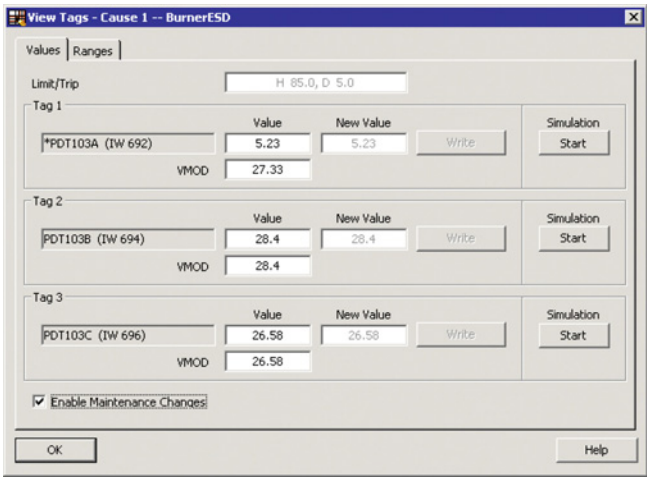
Each input value can be combined with a freely configurable preprocessing if necessary without giving up the simulation option.

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 SIMATIC 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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Technical specifications

	Safety lifecycle support	Operating modes	Hardware requirements	Software requirements
Safety Matrix Tool V6.2	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	• Microsoft Windows operating system (in line with the software requirements of the SIMATIC PCS 7 version) • For offline testing: S7-PLCSIM or SIMIT • S7 F systems as of V5.2 SP1
Safety Matrix Editor V6.2	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 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 V6.2	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	Microsoft Windows operating system (in line with the software requirements of the SIMATIC PCS 7 version)

System requirements for SIMATIC Safety Matrix

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Ordering data	Article No.
SIMATIC Safety Matrix	
Runs with the following operating systems (see SIMATIC Safety Matrix V6.2 Readme for the latest information):	
• On the engineering station with Windows 7 SP1 64-bit (Professional, Enterprise, Ultimate) or Windows Server 2008 R2 SP1 Standard 64-bit	
• On the operator station also with Windows 7 SP1 32-bit (Enterprise, Ultimate), Windows 10 Enterprise 2015 LTSB 64-bit or Windows Server 2012 R2 Standard 64-bit	
SIMATIC **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, floating license for 1 user	
Without SIMATIC PCS 7 Software Media Package	
• Goods delivery License key on USB flash drive and certificate of license, bundled with 1 × SIMATIC Safety Matrix Software Media Package per order item	**6ES7833-1SM02-0YA5**
• Online delivery License key download and online certificate of license, combined with SIMATIC Safety Matrix Software Media Package (software download and online certificate of license) Note: Email address required; installation software also available separately as SIMATIC Safety Matrix Software Media Package.	**6ES7833-1SM02-0YH5**
SIMATIC **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, single license for 1 installation	
Without SIMATIC PCS 7 Software Media Package	
• Goods delivery License key on USB flash drive and certificate of license, bundled with 1 × SIMATIC Safety Matrix Software Media Package per order item	**6ES7833-1SM42-0YA5**
• Online delivery License key download and online certificate of license, combined with SIMATIC Safety Matrix Software Media Package (software download and online certificate of license) Note: Email address required; installation software also available separately as SIMATIC Safety Matrix Software Media Package.	**6ES7833-1SM42-0YH5**

Ordering data	Article No.
SIMATIC **Safety Matrix Viewer V6.2** For operator control and monitoring of the SIMATIC Safety Matrix via OS single station/OS client	
Runtime software, 2 languages (German, English), software class A, floating license for 1 user	
Without SIMATIC PCS 7 Software Media Package	
• Goods delivery License key on USB flash drive and certificate of license, bundled with 1 × SIMATIC Safety Matrix Software Media Package per order item	**6ES7833-1SM62-0YA5**
• Online delivery License key download and online certificate of license, combined with SIMATIC Safety Matrix Software Media Package (software download and online certificate of license) Note: Email address required; installation software also available separately as SIMATIC Safety Matrix Software Media Package.	**6ES7833-1SM62-0YH5**
SIMATIC Safety Matrix Software Media Package	
SIMATIC Safety Matrix Software Media Package V6.2 (incl. SP) Installation software without license, 2 languages (German, English), software class A	
Without SIMATIC PCS 7 Software Media Package	
Note: Can only be used in conjunction with a valid license.	
• Goods delivery Software on DVD and certificate of license	**6ES7833-4SM26-0YT8**
• Online delivery Software download and online certificate of license Note: Email address required!	**6ES7833-4SM26-0YG8**
Upgrades for Safety Matrix Tool and Safety Matrix Viewer See "Upgrades for Safety Integrated for Process Automation", "Update/ upgrade packages", "Updates/ upgrades asynchronous to the PCS 7 version"	

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Overview

SIMATIC SIS compact was designed as a dedicate safety controller for a Safety Instrumented System (SIS) based on the SIMATIC product portfolio.

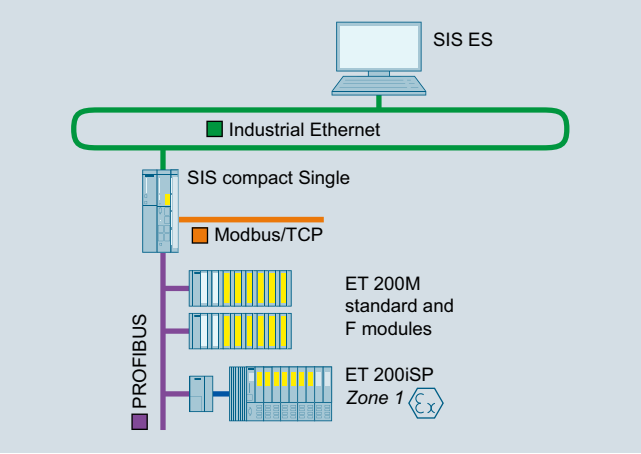
The functionality and price structure of SIMATIC SIS compact was adapted to the requirements of a market for small to medium-sized safety applications, e.g. for

- Burner Management Systems (BMS)
- Emergency Shutdown Systems (ESD)
- Fire&Gas (F&G) applications
- High Integrity Pressure Protection Systems (HIPPS)

Design

SIMATIC SIS compact Bundles

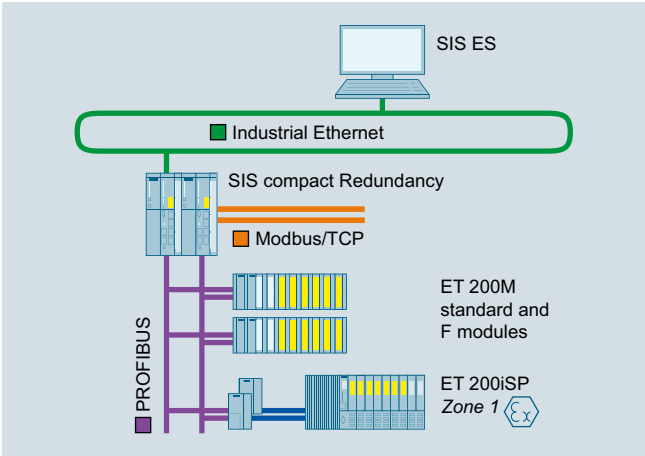
SIMATIC SIS compact is available in four different bundles. The "Basic Package" versions are tailored to the controller level, including the Modbus integration in other automation systems. The "Extended Package" version, in contrast, covers the controller and HMI level.



Configuration example: SIMATIC SIS compact Basic Package Single

SIMATIC SIS compact Basic Package Single consisting of:

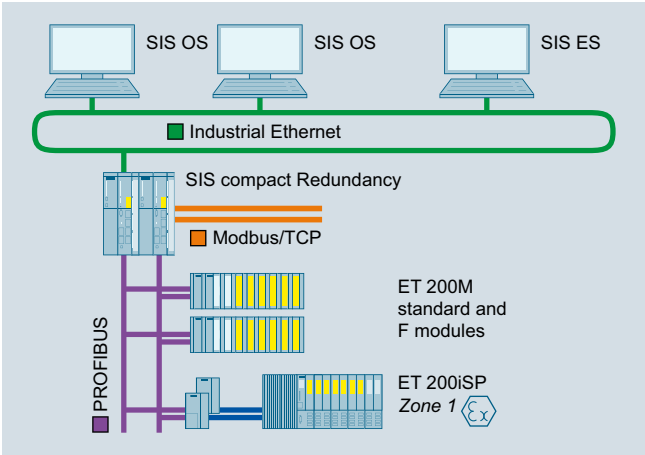
- CPU 410SIS Bundle Single
  (see next section "CPU 410SIS Bundles")
- AS Engineering Package SIS V9.0
- S7 F Systems V6.2
- PCS 7 Runtime License AS (PO 100)
- SIMATIC Modbus/TCP PN-CPU



Configuration example:
SIMATIC SIS compact Basic Package Redundancy

SIMATIC SIS compact Basic Package Redundancy consisting of:

- CPU 410SIS Bundle Redundancy
  (see next section "CPU 410SIS Bundles")
- AS Engineering Package SIS V9.0
- S7 F Systems V6.2
- PCS 7 Runtime License AS (PO 100)
- SIMATIC Modbus/TCP PN Red for S7-400 PN-(H) systems



Configuration example:
SIMATIC SIS compact Extended Package Redundancy

SIMATIC SIS compact Extended Package Single and **SIMATIC SIS compact Extended Package Redundancy** consisting of:

- CPU 410SIS Bundle (Single or Redundancy)
  (see next section "CPU 410SIS Bundles")
- ES Single Station SIS V9.0 (AS/OS: 250 POs)
- S7 F Systems V6.2
- SIMATIC Safety Matrix Tool and Safety Matrix Viewer V6.2
- Optional:
  - SIS compact OS Software Single Station V9.0 (PO 250)
    for extension with additional single stations
  - SIS compact OS Software Single Station Redundancy V9.0 (PO 250)
    for extension with redundant single stations

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Design (continued)

CPU 410SIS



CPU 410SIS

The basic hardware for SIMATIC SIS compact is CPU 410SIS, which is based on CPU 410. It has 4 MB main memory and no limitation for the cycle times. CPU 410SIS can only be operated with a system expansion card SEC E4MB.

CPU 410SIS Bundles

CPU 410SIS Bundles can also be obtained separately to expand an existing SIS system. The bundles are available in two versions, Single and Redundancy, consisting of:

CPU 410SIS Bundle – Single	**6ES7654-6FD00-7AF0**
• 1 × CPU 410SIS	6ES7410-5FM08-0AB0
• 1 × Aluminum rack CR3 XTR	6ES7401-1DA01-0AA1
• 1 × Power supply module PS 405 4 A XTR	6ES7407-0DA02-0AA1
• 1 × System expansion card E4MB	only available in bundles, cannot be ordered singly
• 1 × S7 F Systems Runtime License	6ES7833-1CC00-6YX0

CPU 410SIS Bundle – Redundancy	**6ES7656-6FD30-7AF0**
• 2 × CPU 410SIS	6ES7410-5FM08-0AB0
• 2 × Aluminum rack CR3 XTR	6ES7401-1DA01-0AA1
• 2 × Power supply module PS 405 4 A XTR	6ES7407-0DA02-0AA1
• 2 × System expansion card E4MB	only available in bundles, cannot be ordered singly
• 4 × Sync module V8 XTR	6ES7960-1AA08-0XA0
• 2 × Sync cable, length 1 m	6ES7960-1AA04-5AA0
• 1 × S7 F Systems Runtime License	6ES7833-1CC00-6YX0

Technical specifications

Article number	**6ES7410-5FM08-0AB0** S7 CPU 410SIS F. S7-400F/FH
General information	
Product type designation	CPU 410SIS
Design of PLC basic unit	With Conformal Coating (ISA-S71.04 severity level G1; G2; G3) and operating temperature to 70 °C
Product function	
• SysLog	Yes; via TCP; up to 4 receivers can be parameterized; buffer capacity max. 3 200 entries
• Field interface security	Yes
Engineering with	
• Programming package	SIMATIC SIS COMPACT V9.0 or higher
Power loss	
Power loss, typ.	10 W
Processor	
CPU speed	450 MHz; Multi-processor system
Memory	
Work memory	
• integrated	4 Mbyte
• integrated (for program)	2 Mbyte
• integrated (for data)	2 Mbyte
• expandable	No
CPU processing times	
Process tasks, max.	9; Individually adjustable from 10 ms to 5 s

Article number	**6ES7410-5FM08-0AB0** S7 CPU 410SIS F. S7-400F/FH
Counters, timers and their retentivity	
S7 counter	
• Number	2 048
S7 times	
• Number	2 048
IEC timer	
• present	Yes
Data areas and their retentivity	
retentive data area in total	Total working and load memory (with backup battery)
Flag	
• Number, max.	16 384 byte
Address area	
I/O address area	
• Inputs	2 048 byte
• Outputs	2 048 byte
Time of day	
Clock	
• Hardware clock (real-time)	Yes
Operating hours counter	
• Number	16

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Technical specifications (continued)

Article number	**6ES7410-5FM08-0AB0**
	S7 CPU 410SIS F. S7-400F/FH
Interfaces	
Number of industrial Ethernet interfaces	2
Number of PROFINET interfaces	0
Number of RS 485 interfaces	1; PROFIBUS DP
Number of other interfaces	2; 2x synchronization
1. Interface	
Interface type	Integrated
Physics	RS 485 / PROFIBUS
Functionality	
• PROFIBUS DP master	Yes
• PROFIBUS DP slave	No
DP master	
• Number of DP slaves, max.	96
• Number of slots per interface, max.	1 632
2. Interface	
Interface type	Integrated Ethernet interface
Physics	Ethernet RJ45
Interface types	
• Number of ports	2
Functionality	
• PROFINET IO Controller	No
• PROFINET IO Device	No
• PROFINET CBA	No
3. Interface	
Interface type	Integrated Ethernet interface
Physics	Ethernet RJ45
Functionality	
• PROFINET IO Controller	No
• PROFINET IO Device	No
• PROFINET CBA	No
4. Interface	
Interface type	Pluggable synchronization submodule (FO)
Plug-in interface modules	Synchronization module 6ES7960-1AA06-0XA0, 6ES7960-1AB06-0XA0 or 6ES7960-1AA08-0XA0
5. Interface	
Interface type	Pluggable synchronization submodule (FO)
Plug-in interface modules	Synchronization module 6ES7960-1AA06-0XA0, 6ES7960-1AB06-0XA0 or 6ES7960-1AA08-0XA0

Article number	**6ES7410-5FM08-0AB0**
	S7 CPU 410SIS F. S7-400F/FH
Protocols	
Supports protocol for PROFINET IO	No
PROFINET CBA	No
PROFIsafe	Yes
PROFIBUS	Yes
AS-Interface	Yes; Via add-on
Protocols (Ethernet)	
• TCP/IP	Yes
Further protocols	
• MODBUS	Yes; Via add-on
Communication functions	
PG/OP communication	Yes
Data record routing	Yes
S7 communication	
• supported	Yes
Number of connections	
• overall	120
Standards, approvals, certificates	
Use in hazardous areas	
• ATEX	ATEX II 3G Ex nA IIC T4 Gc
Ambient conditions	
Ambient temperature during operation	
• min.	0 °C
• max.	70 °C
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	2 000 m
Configuration	
Know-how protection	
• User program protection/ password protection	Yes
• Block encryption	Yes; With S7 block Privacy
Dimensions	
Width	50 mm
Height	290 mm
Depth	219 mm
Weights	
Weight, approx.	1.1 kg

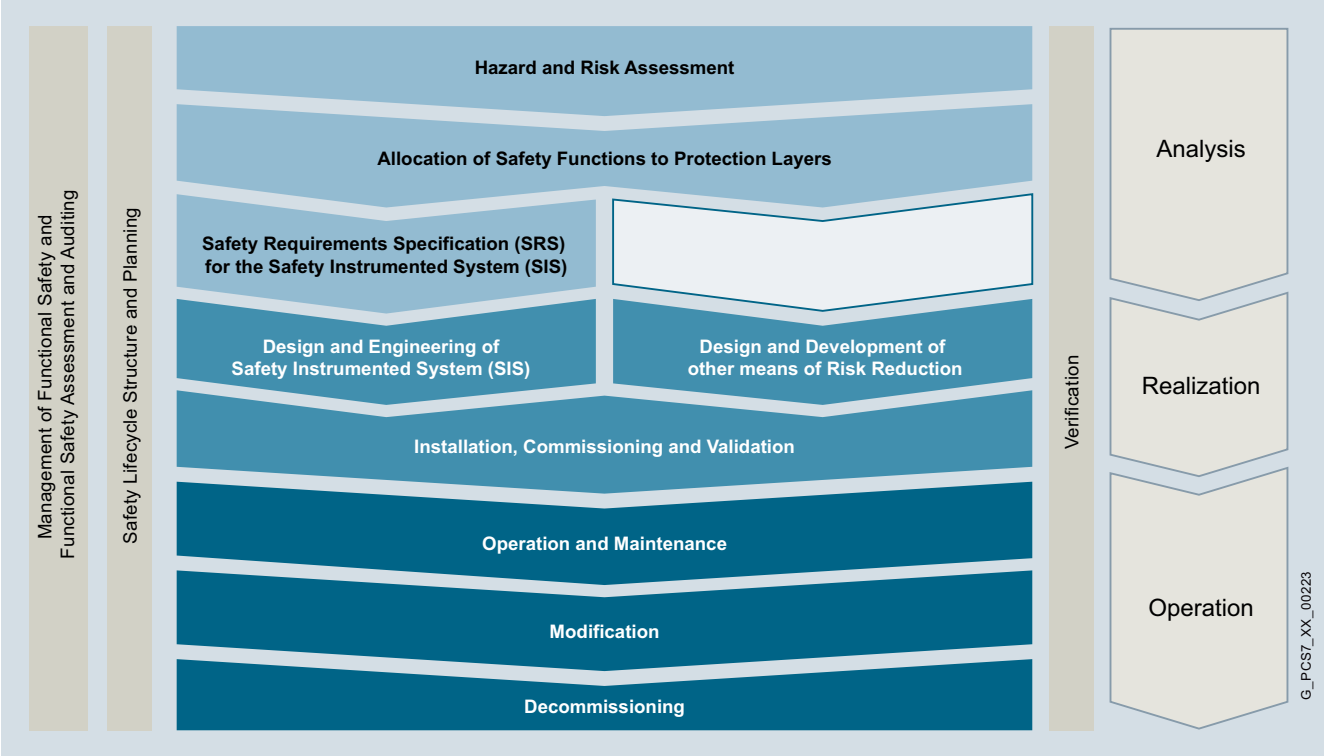
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Ordering data	Article No.
SIMATIC SIS compact Bundles	
SIMATIC SIS compact Basic Package Single V9.0 Comprising: • SIMATIC SIS compact AS Engineering Package V9.0 • S7 F Systems V6.2 • SIMATIC S7 CPU 410SIS Bundle - Single • SIMATIC PCS 7 AS Runtime License 100 PO • License SIMATIC Modbus/TCP PN-CPU Single	**6ES7650-3AX58-0XX0**
SIMATIC SIS compact Basic Package Redundancy V9.0 Comprising: • SIMATIC SIS compact AS Engineering Package V9.0 • S7 F Systems V6.2 • SIMATIC S7 CPU 410SIS Bundle - Redundancy • SIMATIC PCS 7 AS Runtime License 100 PO • License SIMATIC Modbus/TCP PN Red for S7-400 PN H Systems	**6ES7650-3AX58-0XX1**
SIMATIC SIS compact Extended Package Single V9.0 Comprising: • SIMATIC SIS compact ES Single Station V9.0 (AS/OS: 250 POs) • S7 F Systems V6.2 • SIMATIC Safety Matrix Tool V6.2 • SIMATIC Safety Matrix Viewer V6.2 • SIMATIC S7 CPU 410SIS Bundle - Single	**6ES7650-3BX58-0XX0**
SIMATIC SIS compact Extended Package Redundancy V9.0 Comprising: • SIMATIC SIS compact ES Single Station V9.0 (AS/OS: 250 POs) • S7 F Systems V6.2 • SIMATIC Safety Matrix Tool V6.2 • SIMATIC Safety Matrix Viewer V6.2 • SIMATIC S7 CPU 410SIS Bundle - Redundancy	**6ES7650-3BX58-0XX1**

	Article No.
Individual components	
SIMATIC SIS compact V9.0 OS Software Single Station (PO 250) 2 languages (English, Chinese), software class A, runs with Windows 7 Ultimate 64-bit or Windows 10 Enterprise 2015 LTSB 64-bit, single license for 1 installation Goods delivery, license key, USB flash drive	**6ES7658-2AA58-7YA0**
SIMATIC SIS compact V9.0 OS Software Single Station Redundancy (PO 250) 2 languages (English, Chinese), software class A, runs with Windows 7 Ultimate 64-bit or Windows 10 Enterprise 2015 LTSB 64-bit, single license for 2 installations Goods delivery, license key, USB flash drive	**6ES7652-3AA58-7YA0**
SIMATIC S7 CPU 410SIS Bundle - Single Comprising • 1 × CPU 410SIS • 1 × Aluminum rack CR3 XTR, 4 slots, conformal coating; for operating temperature up to 70 °C • 1 × Power supply module PS 405 4 A XTR, conformal coating; for operating temperature up to 70 °C, 24/48/60 V DC; 5 V DC/4 A, 24 V DC/1 A • 1 × System expansion card E4MB • 1 × S7 F Systems Runtime License	**6ES7654-6FD00-7AF0**
SIMATIC S7 CPU 410SIS Bundle - Redundancy Comprising • 2 × CPU 410SIS • 2 × Aluminum rack CR3 XTR, 4 slots (conformal coating; for operating temperature up to 70 °C) • 2 × Power supply module PS 405 4 A XTR, conformal coating; for operating temperature up to 70 °C, 24/48/60 V DC; 5 V DC/4 A, 24 V DC/1 A • 2 × System expansion card E4MB • 4 × Sync module V8 XTR • 2 × Sync cable, length 1 m • 1 × S7 F Systems Runtime License	**6ES7656-6FD30-7AF0**
SIMATIC Modbus/TCP PN-CPU Single License, on CD	**6AV6676-6MB20-3AX0**
SIMATIC Modbus/TCP PN Red for S7-400 PN-(H) systems Single License, on CD	**6AV6676-6MB10-0AX0**
Spare parts	
CPU 410SIS as spare part Conformal coating; for operating temperature up to 70 °C RAM 4 MB (2 MB each for program and data); module occupies 2 slots; can only be operated with system expansion card E4MB	**6ES7410-5FM08-0AB0**

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Overview



Simplified representation of the safety lifecycle (IEC 61511)

Safety lifecycle services for the process industry in accordance with IEC 61511

The area of functional safety covers much more than just 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 corrected later at great effort and cost. We systematically prevent errors in all project phases using our standardized engineering guidelines and verification templates.

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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

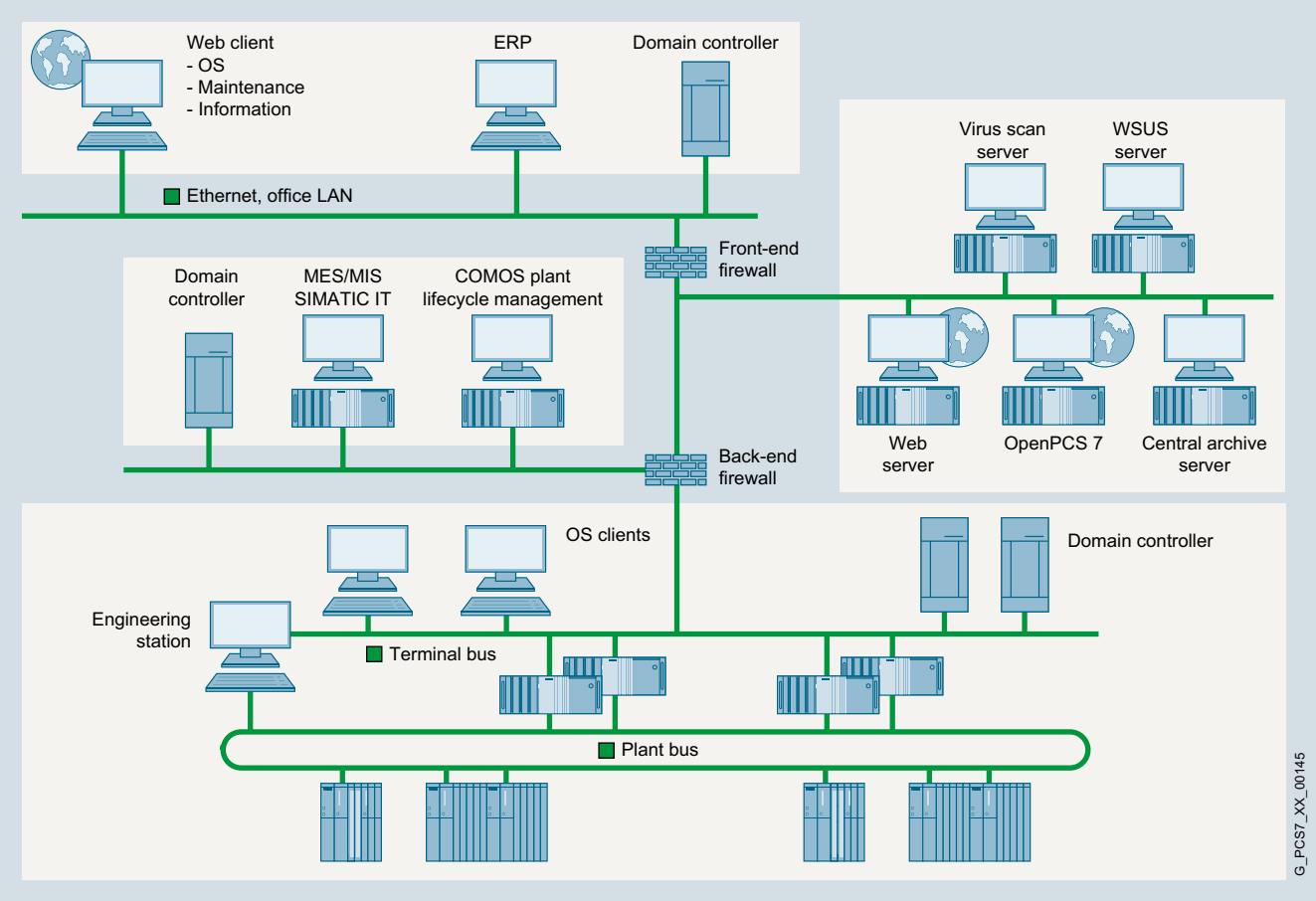
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15/2 Network Security
15/6 Plant Security Services
15/8 SIMATIC Logon

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Overview



Example of a defense-in-depth security architecture

With advancing standardization, openness and networking, the security risks for process control systems have risen significantly. The danger potential arising from malicious programs such as computer viruses, worms and trojans or from access by unauthorized personnel ranges from network overloads or failures and theft of passwords and data to unauthorized interventions in the process automation. Apart from property damage, targeted sabotage can also have dangerous consequences for personnel and the environment.

With the security concept developed for SIMATIC PCS 7 you have comprehensive protection for your process control system against these various dangers. Siemens supports you with additional services as needed, including security assessment, security implementation and security management during operation (for details see section "Plant Security Services").

SIMATIC PCS 7 security concept

The SIMATIC PCS 7 security concept, which is described in the "Security concept PCS 7 & WinCC (Basic)" manual and in detail in other documents, provides far-reaching recommendations (best practices) for safeguarding process plants based on a defense-in-depth security architecture. It is not restricted to the use of individual security methods (e.g. encryption) or devices (e.g. firewalls).

The strengths of this holistic concept lie rather in the interaction of a host of security measures in the plant network:

- Formation of a network architecture with defense-in-depth security, 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 authorizations and SIMATIC PCS 7 operator authorizations; integration of SIMATIC PCS 7 operator authorizations 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 access and remote access (VPN, IPSec)

The manual "PCS 7 & WinCC security concept, basic document" is available from the Siemens Industry Online Support:

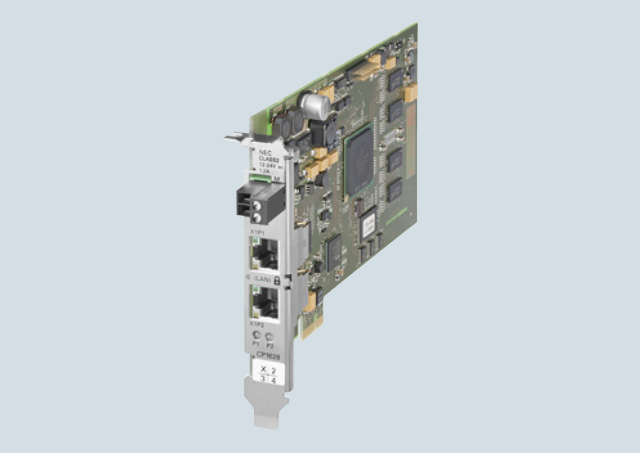
https://support.industry.siemens.com/cs/ww/en/view/26462131

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Design

On the system side, SIMATIC PCS 7 supports implementation of guidelines and recommendations of the security concept by:

- Compatibility with 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 setup, e.g. in DCOM, registry and Windows firewall
- Operator administration and authentication using SIMATIC Logon (for details, see "SIMATIC Logon" section, see page 15/8)
- CP 1628 communication module with integrated security features (firewall, VPN) as an alternative to the Industrial Ethernet connection of SIMATIC PCS 7 Industrial Workstations
- Integration of the SCALANCE S602, S612, S623 and S627-2M industrial security appliances
- Automation firewall
- Application whitelisting



CP 1628 communication module

CP 1628 communication module

The CP 1628 is a PCI Express card (PCIe x1) with its own microprocessor and integrated 2-port switch (2 x RJ45 connection, 10/100/1000 Mbps) for the connection of SIMATIC PCS 7 workstations 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 appliances

SCALANCE S industrial security appliances

The SCALANCE S industrial security appliances provide scalable security features, such as firewall, port filter, NAT, NAPT address translation and DHCP server (S602, S612, S623 and S627-2M) as well as authentication and data encryption with virtual private network (VPN) over IPsec tunnel (S612, S623 and S627-2M). 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 appliances have a rugged industrial design. For connection to Industrial Ethernet, they have 2 (S602 and S612) or 3 (S623 and S627-2M) 10/100/1000 Mbps ports (RJ45). The S627-2M also has two slots for optional 2-port media modules (electrical or optical; for ordering data, see SCALANCE X-300).

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Design (continued)

Product versions:

- SCALANCE S602 industrial security appliances
  - Uses the Stateful Inspection Firewall to protect network segments against unauthorized access
  - "Ghost mode" for protection of individual, even alternating, devices by dynamically taking over the IP address
- SCALANCE S612 industrial security appliances
  - Uses the Stateful Inspection Firewall and VPN (Virtual Private Network) functionality to protect network segments against unauthorized access, data manipulation and espionage
  - Up to 128 IPsec tunnels can be operated simultaneously
- SCALANCE S623 industrial security appliances
  - Uses the Stateful Inspection Firewall and VPN (Virtual Private Network) functionality to protect network segments against unauthorized access, data manipulation and espionage
  - Up to 128 IPsec tunnels can be operated simultaneously
  - Additional RJ45 DMZ port (yellow) for setting up a "Demilitarized Zone" (DMZ), which can terminate VPNs and is secured by firewalls to the red and green port
  - Redundant protection of automation cells by means of router and firewall redundancy as well as stand-by linking of the redundant device via the yellow port
- SCALANCE S627-2M industrial security appliances
  - Uses the Stateful Inspection Firewall and VPN (Virtual Private Network) functionality to protect network segments against unauthorized access, data manipulation and espionage
  - Up to 128 IPsec tunnels can be operated simultaneously
  - Additional RJ45 DMZ port (yellow) for setting up a "Demilitarized Zone" (DMZ), which can terminate VPNs and is secured by firewalls to the red and green port
  - Redundant protection of automation cells by means of router and firewall redundancy as well as stand-by mode of the redundant device; status matching of the firewall by means of a synchronization cable between the yellow ports
  - Two additional slots for one 2-port media module each (see SCALANCE X-300) for direct integration in ring structures and FO networks with two additional switched red or green ports per module
  - Bridging of longer cable runs; use of existing 2-wire cables by deploying MM992-2VD (variable distance) media modules

Note:

Using the supplied Security Configurations Tool (SCT), it is easy to create and configure the industrial security appliances 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 industrial security appliance. This permits easy and fast replacement of modules in the event of a fault.

For more information and technical specifications of the SCALANCE S security appliances, see Catalog IK PI, section "Industrial Ethernet", "Industrial Ethernet Security".

Automation firewall

The automation firewall (see Catalog ST PCS 7 AO, "Architecture and Configuration" section) features Stateful Inspection packet filter, application layer firewall, VPN gateway functionality, URL filtering, Web proxy 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.

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Ordering data	Article No.
SCALANCE S Industrial Security Appliances	
SCALANCE S602 Industrial Security appliance with Stateful Inspection Firewall; 2 ports 10/100/1000 Mbps	**6GK5602-0BA10-2AA3**
SCALANCE S612 Industrial Security appliance 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 Industrial Security appliance 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 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**

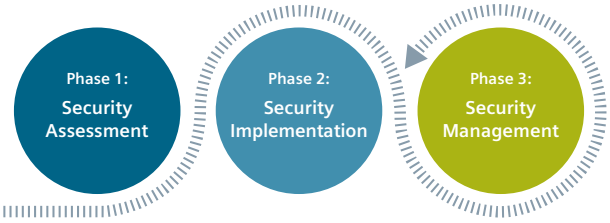
	Article No.
Accessories	
C-PLUG Swap medium for simple replacement of devices in event of fault; for saving of configuration and application data, can be used in SIMATIC NET products with C-PLUG slot	**6GK1900-0AB00**
SITOP compact 24 V/0.6 A Single-phase power supply with wide-range input 85 to 264 V AC; 110 to 300 V DC; stabilized output voltage 24 V, rated output current value 0.6 A, slim design	**6EP1331-5BA00**
Automation firewall	
Order data for automation firewall and service contracts, see Catalog ST PCS 7 AO (add-ons for the SIMATIC PCS 7 process control system), "Architecture and configuration"	

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" as well as Catalog IK PI.

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Overview



Siemens Plant Security Services offer industry-specific concepts for reliable protection from cyber attacks and highest service integrity of industrial plants.

Infected devices, unauthorized personnel, unauthorized access via networks and the internet now threaten more than just the administrative level. Even production facilities are exposed to constant danger from disruptions, integrity impairment and know-how loss.

Many weak spots in security are not obvious at first glance. That is why continuous analysis and optimization of security in existing plants is advisable. Only in this way can plant availability be kept at a consistently high level.

Siemens offers you wide-ranging support with integrated Plant Security Services for a complete solution.

Assess Security

Assess Security includes comprehensive analysis of threats, identification of risks and the recommendation of specific security measures. You benefit: A plant-specific and risk-based security map ensures an integrated and optimal security level.

Implement Security

Implement Security means the implementation of security measures to increase the security level of plants and production sites. You benefit: Avoid security vulnerability and profit from better protection from cyber threats thanks to technical and organizational measures.

Manage Security

Manage Security means regular monitoring and updating of the implemented measures through our Cyber Security Operation Center (CSOC). You benefit: You get the highest level of transparency over the security status of your plants and avoid any potential threat scenarios proactively with the help of our security experts working around the globe.

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Ordering data

	Article No.
Assess Security	
IEC 62443 Assessment Available for systems from Siemens and third-party suppliers	**9AS1411-3AA11-1AA1**
• Additional cell for IEC 62443 assessment	**9AS1411-3AA11-2AA1**
ISO 27001 Assessment Available for systems from Siemens and third-party suppliers	**9AS1411-1AA11-1AA1**
SIMATIC PCS 7 & WinCC Assessment • According to SIMATIC PCS 7 and WinCC security concept • Specifically for SIMATIC PCS 7 and WinCC systems	**9AS1411-2AA11-1AA1**
Risk & Vulnerability Assessment • Data-based analysis of threats, weaknesses and gaps • Risk classification and evaluation taking system criticality into consideration	**9AS1431-1AA11-1AB1**
Implement Security	
Security awareness training • Web-based SITRAIN training courses • Heighten security awareness of plant personnel regarding current situation and in handling threats and risks, detection of security incidents	**9AS1432-1AA11-1AB0**
Security policy consulting Introduction of new and tested security-relevant standards, guidelines and processes for plant security	**9AS1432-1AA11-1AB1**
Network security consulting Support during planning and segmentation of the automation network in security cells according to IEC 62443 and the SIMATIC PCS 7 and WinCC security concept	**9AS1432-1AA11-1AC1**
Perimeter firewall installation Installation, configuration and testing of the firewall as well as the firewall rules	**9AS1433-1AA11-1AB3**
Clean slate validation Identification of security risks with two different virus scanners: McAfee Command Line Scanner and Kaspersky Rescue Disk	**9AS1432-1AA11-1AB2**
Antivirus installation Installation and configuration of McAfee VirusScan Enterprise antivirus software; compatibility consideration for SIMATIC PCS 7	**9AS1432-1AA11-1AB7**
Whitelisting installation Installation and configuration of McAfee Application Control whitelisting software; compatibility consideration for SIMATIC PCS 7	**9AS1432-1AA11-1AB8**
ePO Management server deployment Installation of a McAfee ePO central management console (recommended by more than 10 antivirus or whitelisting agents)	**9AS1433-1AA11-1AB1**
McAfee Application Control for fixed devices Whitelisting license	**9AS1425-1AA11-1BA1**
McAfee Application Control for fixed devices - 1 year support Annual contract extension	**9AS1425-1AA11-1BB1**
McAfee Application Control for servers Whitelisting license for server operating systems	**9AS1425-1AA11-1BC1**
McAfee Application Control for servers - 1 year support Annual contract extension	**9AS1425-1AA11-1BD1**
McAfee SAV for fixed devices Virus protection license	**9AS1425-1AA11-1CA1**
McAfee SAV for fixed devices - 1 year support Annual contract extension	**9AS1425-1AA11-1CB1**
McAfee SAV for Server Virus protection license for server operating systems	**9AS1425-1AA11-1CC1**
McAfee SAV for servers - 1 year support Annual contract extension	**9AS1425-1AA11-1CD1**
Windows patch installation Installation of Microsoft® operating system patches with the help of a customer-owned WSUS server; compatibility considerations for SIMATIC PCS 7	**9AS1432-1AA11-1AB6**
System backup Execution of a one-time backup of critical plant systems through Symantec System Recovery software	**9AS1432-1AA11-1AB3**
Manage Security	
Industrial security monitoring • Continuous monitoring of plant security • Continuous analysis and correlation of the log files as well as synchronization with "Global Threat Intelligence" databases • Recognition, classification as well as notification upon detection of security threats and potential incidents	**On request**
Remote incident handling Quick response as well as cause and criticality analysis by Siemens Industrial Security experts	**9AS1433-1AA11-1AC3**
Perimeter firewall review • Support of extensive variety of firewall technologies • Analysis of firewall rules, firmware version as well as consistency check	**9AS1433-1AA11-1AC1**
Patch & vulnerability management Central WSUS server with information about Microsoft Security patches released for SIMATIC PCS 7	**9AS1433-1AA11-1AB5**

More information

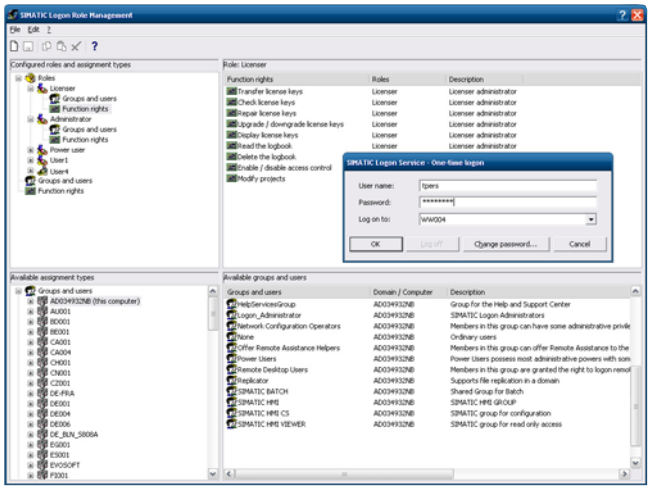
You will find more information on Plant Security Services on the Internet:
www.siemens.com/plant-security-services

If you have any further questions, please contact:

Email: industrialsecurity.i@siemens.com

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Overview



SIMATIC Logon role management

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

The SIMATIC Logon V1.6 software package is released for the following systems:

- SIMATIC PCS 7 Process Control System V8.0, V8.1, V8.2 and V9.0
- SIMATIC WinCC V7.0+SP3, V7.2, V7.3 and V7.4
- 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 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 V8.2 or V9.0. SIMATIC Logon software and licenses are already integrated in the system software of SIMATIC PCS 7 Process Control System V8.2 and V9.0.

Design

Logon devices

The following logon devices are supported by SIMATIC Logon:

- Keyboard
- Smart card reader (see "SIMATIC Industrial Workstation/IPC" under "Expansion components"), see page 3/52.
- Logon devices which can be operated with a Microsoft device driver for the respective operating system, e.g. logon devices on a USB interface

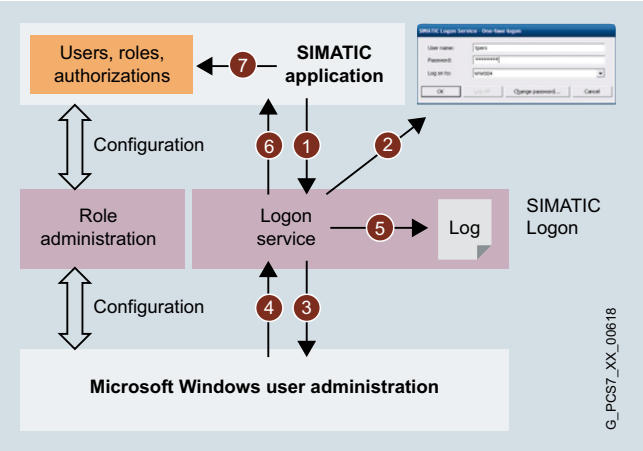
Number of licenses

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.

Function



User logon procedure using the SIMATIC Logon Service.

SIMATIC Logon can be used to configure the associated roles and functional authorizations (role management) for a SIMATIC application. This configuration is stored in the database of the SIMATIC application.

SIMATIC Logon performs Windows user authentication during application runtime; the procedure is as follows:

- When prompted by a SIMATIC application (1), the SIMATIC Logon Service opens a logon dialog (2). The user enters his or her name, password and domain. The logon data are sent to the user administration of the operating system (3), which then reports the authentication attempt event to the logon service (4).
- The logon service records all events in an event log (5), for example successful logon, failed logon attempts, logoff by the user, automatic logoff and password change.
- If authentication is successful, the SIMATIC Logon Service sends this information, including the Windows group membership, to the SIMATIC application (6), which maps the roles and associated functional rights within the application (7).

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Function (continued)

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 associating the users grouped at operating system level with the group with the 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.
For TIA applications only	
SIMATIC Logon V1.6 Single license for 1 installation, 7 languages (English, German, French, Italian, Spanish, Chinese, Japanese), software class A Runs with the following operating systems: • Windows Vista (Business/ Enterprise/Ultimate) up to SP2 32/64-bit • Windows 7 (Professional/ Enterprise/Ultimate) up to SP1 32/64-bit • Windows 8.0 (Standard/Pro/ Enterprise) 32/64-bit • Windows 8.1 (Standard/Pro/ Enterprise) 32/64-bit • Windows 10 (Professional/ Enterprise) 2016 LTSB 64-bit • Windows Server 2003 SP1/SP2 32-bit • Windows Server 2003 R2/2003 R2 SP2 32-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 • Windows Server 2012 (Foundation/ Essentials/Standard/Datacenter) 64-bit • Windows Server 2012 R2 (Essentials/Standard/Datacenter) 64-bit Delivery form: Software and electronic documentation on CD, license key on USB flash drive, certificate of license Note: This product is not intended for SIMATIC PCS 7 applications!	**6ES7658-7BX61-0YA0**
SIMATIC Logon upgrade to V1.6 Single license for 1 installation, 7 languages (English, German, French, Italian, Spanish, Chinese, Japanese), software class A For operating systems, see above Physical delivery: Software and electronic documentation on CD, license key on USB flash drive, certificate of license Note: This product is not intended for SIMATIC PCS 7 applications!	**6ES7658-7BX61-0YE0**

	Article No.
Supplementary components for SIMATIC Logon with SIMATIC WinCC flexible	
SIMATIC Logon Remote Access (3 clients) Remote access for 3 clients (configured with WinCC flexible Version 2007 and higher or WinCC TIA Portal), single license for 1 installation Physical delivery: License key USB flash drive, certificate of license	**6ES7658-7BA00-2YB0**
SIMATIC Logon Remote Access (10 clients) Remote access for 10 clients (configured with WinCC flexible Version 2007 and higher or WinCC TIA Portal), single license for 1 installation Physical delivery: License key USB flash drive, certificate of license	**6ES7658-7BB00-2YB0**

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Notes

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Update/Upgrade Packages



16/2 Upgrades for SIMATIC PCS 7 V8.x to V9.0

16/2 Upgrades for Engineering System and Management Console
16/3 Upgrades for Operator System incl. OpenPCS 7 and Web Option for OS
16/5 Upgrades for Process Historian and Information Server
16/6 Upgrades for Maintenance Station
16/7 Upgrades for SIMATIC BATCH
16/8 Upgrades for SIMATIC Route Control

16/9 Upgrades from SIMATIC PCS 7 V8.0/V8.1 to V8.2

16/9 Upgrades for Engineering System and Management Console
16/10 Upgrades for Operator System incl. OpenPCS 7 and Web Option for OS
16/12 Upgrades for Process Historian and Information Server
16/13 Upgrades for Maintenance Station
16/14 Upgrades for SIMATIC BATCH
16/15 Upgrades for SIMATIC Route Control

16/16 Upgrades from SIMATIC PCS 7 V7.1 to V8.2

16/16 Upgrades for Engineering System and Management Console
16/18 Upgrades for Operator System incl. OpenPCS 7 and Web Option for OS
16/21 Upgrades for Maintenance Station
16/22 Upgrades for SIMATIC BATCH
16/23 Upgrades for SIMATIC Route Control

16/24 Upgrades from SIMATIC PCS 7 V7.1/V8.0 to V8.1

16/24 Upgrades for Engineering System and Management Console
16/26 Upgrades for Operator System incl. OpenPCS 7 and Web Option for OS
16/30 Upgrades for Process Historian and Information Server
16/31 Upgrades for Maintenance Station
16/32 Upgrades for SIMATIC BATCH
16/33 Upgrades for SIMATIC Route Control

16/34 Updates/Upgrades Asynchronous to the PCS 7 Version

16/34 Upgrades for SIMATIC Logon
16/35 Upgrades for SIMATIC PDM
16/37 Upgrades Safety Integrated for Process Automation
16/39 Upgrades for S7-PLCSIM Simulation Software
16/40 System Communication via Industrial Ethernet

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Upgrades for Engineering System and Management Console

Overview

Engineering Upgrade Package AS/OS V8.x to V9.0

The SIMATIC PCS 7 Engineering System with Engineering Software V8.x and Management Console V8.x can be upgraded to Version 9.0 using the SIMATIC PCS 7 Engineering Upgrade Package AS/OS.

The licenses included in the Engineering Upgrade Package AS/OS V8.x to V9.0 apply to the following SIMATIC PCS 7 software products:

- PCS 7 ES Single Station, PCS 7 AS Engineering Software, PCS 7 AS/OS Engineering Software
- PCS 7 Import-Export Assistant
- SIMATIC Version Cross Manager
- SIMATIC Version Trail
- PCS 7 SFC Visualization
- PCS 7 BCE
- PCS 7 Management Console
- Industrial Ethernet communication software for CP

SIMATIC PCS 7 ES Single Station SN ASIA Upgrade Package V8.x to V9.0

The ASIA regional product version "SIMATIC PCS 7 ES Single Station SN ASIA" that comes with communication software SOFTNET-REDCONNECT can be upgraded to V9.0 with the SIMATIC PCS 7 ES single station SN ASIA Upgrade Package specifically designed for this purpose.

SIMATIC PCS 7 Logic Matrix upgrade

A separate upgrade is available for upgrading the SIMATIC PCS 7 Logic Matrix Viewer to V9.0.

SIMATIC Version Cross Manager Upgrade

The further developed SIMATIC Version Cross Manager V9.0 is available for use in SIMATIC PCS 7 V9.0. The upgrade to SIMATIC Version Cross Manager V9.0 is part of the Engineering Upgrade Package AS/OS V8.x to V9.0.

Advanced Engineering System Upgrade

The SIMATIC PCS 7 Advanced Engineering System V8.0 (incl. SP) can be used in SIMATIC PCS 7 V8.0, V8.1, V8.2 and V9.0. Consequently, there is no need to offer a SIMATIC PCS 7 Advanced Engineering System Upgrade Package for upgrading to V9.0.

Ordering data

Engineering software

	Article No.
Engineering Software Upgrade from V8.x to V9.0, based on the existing number of POs	
SIMATIC PCS 7 Engineering Upgrade Package AS/OS V8.x to V9.0 Software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit or Windows Server 2008 R2 Standard 64-bit (see SIMATIC PCS 7 V9.0 Readme for the latest information), floating license for 1 user	
5 languages (English, German, French, Italian, Spanish)	
With SIMATIC PCS 7 Software Media Package	
• Goods delivery License key on USB flash drive, certificate of license, bundled with 1 × SIMATIC PCS 7 Software Media Package per order item	**6ES7651-5AX58-0YE5**
• Online delivery License key download, online certificate of license, combined with SIMATIC PCS 7 Software Media Package (software download and online certificate of license) Note: Email address required!	**6ES7651-5AX58-0YK5**
ASIA, 2 languages (English, Chinese)	
With SIMATIC PCS 7 Software Media Package ASIA	
• Goods delivery ASIA license key on USB hardlock, certificate of license, bundled with 1 × SIMATIC PCS 7 Software Media Package ASIA per order item	**6ES7651-5AX58-0CE5**
SIMATIC PCS 7 ES Single Station SN ASIA Upgrade Package V8.x to V9.0 (including SOFTNET REDCONNECT) 2 languages (English, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit or Windows Server 2008 R2 Standard 64-bit (see SIMATIC PCS 7 V9.0 Readme for the latest information), single license for 1 installation	**6ES7651-5AA58-6CE0**
Without SIMATIC PCS 7 Software Media Package ASIA	
• Goods delivery ASIA license key on USB hardlock, certificate of license	
SIMATIC PCS 7 Logic Matrix upgrade from V8.2 to V9.0	
SIMATIC PCS 7 Logic Matrix Viewer upgrade from V8.2 to V9.0 Runtime software, 2 languages (English, German), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit or Windows Server 2008 R2 Standard 64-bit (see SIMATIC PCS 7 V9.0 Readme for the latest information), single license for 1 installation	**6ES7658-1JB58-2YE0**
Without SIMATIC PCS 7 Software Media Package	
Goods delivery License key on USB flash drive and certificate of license	

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Overview

Upgrades combined in packages allow existing Operator Systems to be upgraded from V8.x to V9.0 in line with the number of existing process objects and archive tags.

OS Software upgrades from V8.x to V9.0

The following upgrade packages for upgrading to V9.0 will be offered for SIMATIC PCS 7 operator stations with OS Software V8.x:

- SIMATIC PCS 7 OS Single Station Upgrade Package
- SIMATIC PCS 7 OS Server Upgrade Package
- SIMATIC PCS 7 OS Client/SFC Visualization Upgrade Package

The ASIA product versions "SIMATIC PCS 7 OS Single Station SN ASIA" and "SIMATIC PCS 7 OS Server SN ASIA" that come with communication software SOFTNET-REDCONNECT can be upgraded to V9.0 with specific upgrade packages:

- SIMATIC PCS 7 OS Single Station SN ASIA Upgrade Package
- SIMATIC PCS 7 OS Server SN ASIA 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.

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 also part of the Upgrade Package SIMATIC PCS 7 OS Client/SFC Visualization.

With a SIMATIC PCS 7 OS Server Upgrade Package, only one SIMATIC PCS 7 OS Server can be upgraded.

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 V8.x to V9.0.

Ordering data

OS software

	Article No.
OS Software upgrade from V8.x to V9.0, based on the existing number of POs	
SIMATIC PCS 7 OS single station Upgrade Package V8.x to V9.0 For OS single station, software class A, runs with Windows 7 Ultimate 64-bit or Windows 10 Enterprise 2015 LTSB 64-bit (see SIMATIC PCS 7 V9.0 Readme for the latest information), single license for 1 installation	
5 languages (English, German, French, Italian, Spanish)	
With SIMATIC PCS 7 Software Media Package	
• Goods delivery License key on USB flash drive, certificate of license, bundled with 1 × SIMATIC PCS 7 Software Media Package per order item	**6ES7652-5AX58-0YE0**
• Online delivery License key download, online certificate of license, combined with SIMATIC PCS 7 Software Media Package (software download and online certificate of license) Note: Email address required!	**6ES7652-5AX58-0YK0**
ASIA, 2 languages (English, Chinese)	
With SIMATIC PCS 7 Software Media Package ASIA	
• Goods delivery ASIA license key on USB hardlock, certificate of license, bundled with 1 × SIMATIC PCS 7 Software Media Package ASIA per order item	**6ES7652-5AX58-0CE0**

	Article No.
SIMATIC PCS 7 OS Single Station SN ASIA Upgrade Package V8.x to V9.0 (including SOFTNET REDCONNECT) For OS Single Station	
2 languages (English, Chinese), software class A, runs with Windows 7 Ultimate 64-bit or Windows 10 Enterprise 2015 LTSB 64-bit (see SIMATIC PCS 7 V9.0 Readme for the latest information), single license for 1 installation	
Without SIMATIC PCS 7 Software Media Package ASIA	
• Goods delivery ASIA license key on USB hardlock, certificate of license	**6ES7658-2AA58-6CE0**
SIMATIC PCS 7 OS Server Upgrade Package V8.x to V9.0 For OS Server	
Software class A, runs with Windows Server 2012 R2 Standard 64-bit (see SIMATIC PCS 7 V9.0 Readme for the latest information), single license for 1 installation	
With SIMATIC PCS 7 Software Media Package	
5 languages (English, German, French, Italian, Spanish)	
With SIMATIC PCS 7 Software Media Package	
• Goods delivery License key on USB flash drive, certificate of license, bundled with 1 × SIMATIC PCS 7 Software Media Package per order item	**6ES7652-5BX58-0YE0**
• Online delivery License key download, online certificate of license, combined with SIMATIC PCS 7 Software Media Package (software download and online certificate of license) Note: Email address required!	**6ES7652-5BX58-0YK0**

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Upgrades for Operator System incl. OpenPCS 7 and Web Option for OS

Ordering data	Article No.
ASIA, 2 languages (English, Chinese)	
With SIMATIC PCS 7 Software Media Package ASIA	
• Goods delivery ASIA license key on USB hardlock, certificate of license, bundled with 1 × SIMATIC PCS 7 Software Media Package ASIA per order item	**6ES7652-5BX58-0CE0**
SIMATIC PCS 7 OS Server SN ASIA Upgrade Package V8.x to V9.0 For OS Server	
2 languages (English, Chinese), software class A, runs with Windows Server 2012 R2 Standard 64-bit (see SIMATIC PCS 7 V9.0 Readme for the latest information), single license for 1 installation	
Without SIMATIC PCS 7 Software Media Package ASIA	
• Goods delivery ASIA license key on USB hardlock, certificate of license	**6ES7658-2BA58-6CE0**
SIMATIC PCS 7 OS Client/ SFC Visualization Upgrade Package V8.x to V9.0 Software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit or Windows Server 2012 R2 Standard 64-bit (see SIMATIC PCS 7 V9.0 Readme for the latest information), floating license for 1 user	
5 languages (English, German, French, Italian, Spanish)	
Without SIMATIC PCS 7 Software Media Package	
• Goods delivery License key on USB flash drive, certificate of license	**6ES7652-5CX58-0YF5**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7652-5CX58-0YK5**
ASIA, 2 languages (English, Chinese)	
Without SIMATIC PCS 7 Software Media Package ASIA	
• Goods delivery ASIA license key on USB hardlock, certificate of license	**6ES7652-5CX58-0CF5**

Web Option for OS	Article No.
PCS 7 Web Server Upgrade from V8.x to V9.0	
SIMATIC PCS 7 Web Server Upgrade Package V8.x to V9.0 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 the following operating systems (see SIMATIC PCS 7 V9.0 Readme for latest information): • Windows Server 2012 R2 Standard 64-bit (Web server/Web diagnostics server) • Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit (Web diagnostics client)	
Single license for 1 installation, without SIMATIC PCS 7 Software Media Package	
• Goods delivery License key on USB flash drive, certificate of license	**6ES7652-5DX58-0YF0**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7652-5DX58-0YK0**

16

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Overview

You can upgrade the following products from V8.x to version V9.0 with the SIMATIC PCS 7 PH/IS Upgrade Package:

- Process Historian and Information Server V8.0/V8.1/V8.2 (bundle license)
- Process Historian Archive - BATCH V8.0/V8.1/V8.2
- Process Historian Server Redundancy V8.0/V8.1/V8.2 (bundle license, upgrade package is required 2×)
- Information Server V8.0
- Process Historian Server V8.0

Ordering data

Ordering data	Article No.
PCS 7 Process Historian and Information Server upgrade from V8.x to V9.0	
SIMATIC PCS 7 PH/IS Upgrade Package V8.x to V9.0 5 languages (English, German, French, Italian, Spanish), software class A, runs with Windows Server 2012 R2 Standard 64-bit (see SIMATIC PCS 7 V9.0 Readme for latest information), single license for 1 installation	
Without SIMATIC PCS 7 Software Media Package	
• Goods delivery License key on USB flash drive, certificate of license	**6ES7652-7AX58-2YE0**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7652-7AX58-2YK0**

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Upgrades for Maintenance Station

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 and the SIMATIC PCS 7 Maintenance Station Engineering from V8.x to V9.0. The SNMP OPC server license is also taken into account for the upgrade.

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.x to V9.0	
SIMATIC PCS 7 Maintenance Station Upgrade Package V8.x to V9.0 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 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit or Windows Server 2012 R2 Standard 64-bit, single license for 1 installation Without SIMATIC PCS 7 Software Media Package	
• Goods delivery License key on USB flash drive, certificate of license	**6ES7652-5FX58-0YF0**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7652-5FX58-0YK0**

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Overview

SIMATIC BATCH Upgrade Packages

Upgrades combined in packages allow you to upgrade existing SIMATIC BATCH systems from V8.x to V9.0:

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

The cumulative SIMATIC BATCH UNITs are independent of the version. Existing UNITs are completely available following the upgrade.

Ordering data	Article No.
SIMATIC BATCH upgrade from V8.x to V9.0	
SIMATIC BATCH Server Upgrade Package V8.x to V9.0 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64 Bit or Windows Server 2012 R2 Standard 64-bit (see SIMATIC PCS 7 V9.0 Readme for the latest information), single license for 1 installation	
Without SIMATIC PCS 7 Software Media Package	
• Goods delivery License key on USB flash drive, certificate of license	**6ES7657-5XX58-0YF0**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7657-5XX58-0YK0**
SIMATIC BATCH Client Upgrade Package V8.x to V9.0 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64 Bit or Windows Server 2012 R2 Standard 64-bit (see SIMATIC PCS 7 V9.0 Readme for the latest information), floating license for 1 user	
Without SIMATIC PCS 7 Software Media Package	
• Goods delivery License key on USB flash drive, certificate of license	**6ES7657-5XX58-0YF5**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7657-5XX58-0YK5**

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Upgrades for SIMATIC Route Control

Overview

SIMATIC Route Control upgrade packages

With SIMATIC Route Control Upgrade Packages, you can upgrade Route Control Engineering, Route Control Server and Route Control Center from V8.x to V9.0. The number of existing "Routes" (quantity option for number of simultaneous material transports) is fully available again after the upgrade.

SIMATIC Route Control Center upgrades, which are only available for online delivery, allow you to upgrade the Route Control Center software separately from V8.x to V9.0.

Ordering data

	Article No.
SIMATIC Route Control upgrade from V8.x to V9.0	
SIMATIC Route Control Upgrade Package V8.x to V9.0 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64 Bit or Windows Server 2012 R2 Standard 64-bit (see SIMATIC PCS 7 V9.0 Readme for the latest information), single license for 1 installation	
Without SIMATIC PCS 7 Software Media Package	
• Goods delivery License key on USB flash drive, certificate of license	**6ES7652-5XX58-0YF0**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7652-5XX58-0YK0**
SIMATIC Route Control Center upgrade V8.x to V9.0 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64 Bit or Windows Server 2012 R2 Standard 64-bit (see SIMATIC PCS 7 V9.0 Readme for the latest information), floating license for 1 user	
Without SIMATIC PCS 7 Software Media Package	
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7658-7EX58-0YK0**

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Overview

Engineering Upgrade Package AS/OS V8.0/V8.1 to V8.2

SIMATIC PCS 7 Engineering System with Engineering Software V8.0/V8.1 and Management Console V8.0/V8.1 can be upgraded to Version 8.2 using the SIMATIC PCS 7 Engineering Upgrade Package AS/OS.

The licenses included in the Engineering Upgrade Package AS/OS V8.0/V8.1 to V8.2 apply to the following software products of SIMATIC PCS 7:

- PCS 7 ES Single Station, PCS 7 AS Engineering Software, PCS 7 AS/OS Engineering Software
- PCS 7 Import-Export Assistant
- SIMATIC Version Cross Manager
- SIMATIC Version Trail
- PCS 7 SFC Visualization
- PCS 7 BCE
- PCS 7 Management Console
- Industrial Ethernet communication software for CP

SIMATIC PCS 7 ES Single Station SN ASIA Upgrade Package V8.1 to V8.2

The ASIA regional product variant "SIMATIC PCS 7 ES Single Station SN ASIA V8.1" that comes with communication software SOFTNET-REDCONNECT can be upgraded to V8.2 with the SIMATIC PCS 7 ES Single Station SN ASIA Upgrade Package specifically intended for this purpose.

SIMATIC Version Cross Manager Upgrade

The SIMATIC Version Cross Manager was last offered in Version 7.1, which is suitable for use in SIMATIC PCS 7 V7.1, V8.0 and V8.1. The further developed SIMATIC Version Cross Manager V8.2 is available for use in SIMATIC PCS 7 V8.2. The upgrade from SIMATIC Version Cross Manager V7.1 to V8.2 is a component of the Engineering Upgrade Package AS/OS V8.0/V8.1 to V8.2.

Advanced Engineering System Upgrade

The SIMATIC PCS 7 Advanced Engineering System V8.0 (incl. SP) can be used in SIMATIC PCS 7 V8.0, V8.1 and V8.2. Consequently there is no need to offer a SIMATIC PCS 7 Advanced Engineering System Upgrade Package for upgrading from V8.0/V8.1 to V8.2.

Ordering data

	Article No.
Engineering software	
Engineering Software Upgrade from V8.0/8.1 to V8.2, based on the existing number of POs	
SIMATIC PCS 7 Engineering Upgrade Package AS/OS V8.0/8.1 to V8.2 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)	
With SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license, bundled with 1 × SIMATIC PCS 7 Software Media Package per order item	**6ES7651-5AX28-0YE5**
• Online delivery License key download, online certificate of license, combined with SIMATIC PCS 7 Software Media Package (software download and online certificate of license) Note: Email address required!	**6ES7651-5AX28-0YK5**
ASIA, 2 languages (English, Chinese)	
With SIMATIC PCS 7 Software Media Package ASIA	
• Physical delivery ASIA license key on USB hardlock, certificate of license, bundled with 1 × SIMATIC PCS 7 Software Media Package ASIA per order item	**6ES7651-5AX28-0CE5**
SIMATIC PCS 7 ES Single Station SN ASIA Upgrade Package V8.1 to V8.2 (including SOFTNET REDCONNECT) 2 languages (English, 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	**6ES7651-5AA28-6CE0**
No SIMATIC PCS 7 Software Media Package ASIA	
• Physical delivery ASIA license key on USB hardlock, certificate of license	
SIMATIC Version Cross Manager Upgrade from V7.1 to V8.2 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Professional/Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user	
No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license and TIA Engineering Toolset CD	**6ES7658-1CX28-2YE5**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7658-1CX28-2YK5**

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Upgrades for Operator System incl. OpenPCS 7 and Web Option for OS

Overview

Upgrades combined in packages enable upgrading of existing Operator Systems V8.0/V8.1 to V8.2 with consideration of the number of existing process objects and archive tags.

OS software Upgrades V8.0/V8.1 to V8.2

The following Upgrade Packages for upgrading to V8.2 will be offered for SIMATIC PCS 7 Operator Stations with OS Software V8.0/8.1 as a matter of course:

- SIMATIC PCS 7 OS Single Station Upgrade Package
- SIMATIC PCS 7 OS Server Upgrade Package
- SIMATIC PCS 7 OS Client/SFC Visualization Upgrade Package

The ASIA product variants "SIMATIC PCS 7 OS Single Station SN ASIA V8.1" and "SIMATIC PCS 7 OS Server SN ASIA V8.1" that come with communication software SOFTNET-REDCONNECT can be upgraded to V8.2 with specific upgrade packages:

- SIMATIC PCS 7 OS Single Station SN ASIA Upgrade Package
- SIMATIC PCS 7 OS Server SN ASIA 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.

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 also part of the Upgrade Package SIMATIC PCS 7 OS Client/ SFC Visualization.

The upgrade licenses for Process Historian and Information Server are also embedded in the SIMATIC PCS 7 OS Server Upgrade Package. With a SIMATIC PCS 7 OS Server Upgrade Package, only one SIMATIC PCS 7 OS Server or one SIMATIC PCS 7 Process Historian (with/without Information Server) can be upgraded (for details see table in section "Upgrades for Process Historian and Information Server").

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 V8.0 or V8.1 to V8.2.

Ordering data

OS software

	Article No.
OS Software Upgrade from V8.0/ 8.1 to V8.2, based on the existing number of POs	
SIMATIC PCS 7 OS Single Station Upgrade Package V8.0/8.1 to V8.2 For OS Single Station, software class A, runs with Windows 7 Ultimate 32/64-bit or Windows 10 Enterprise 2015 LTSB 64-bit, single license for 1 installation	
5 languages (English, German, French, Italian, Spanish)	
With SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license, bundled with 1 × SIMATIC PCS 7 Software Media Package per order item	**6ES7652-5AX28-0YE0**
• Online delivery License key download, online certificate of license, combined with SIMATIC PCS 7 Software Media Package (software download and online certificate of license) Note: Email address required!	**6ES7652-5AX28-0YK0**
ASIA, 2 languages (English, Chinese)	
With SIMATIC PCS 7 Software Media Package ASIA	
• Physical delivery ASIA license key on USB hardlock, certificate of license, bundled with 1 × SIMATIC PCS 7 Software Media Package ASIA per order item	**6ES7652-5AX28-0CE0**
SIMATIC PCS 7 OS Single Station SN ASIA Upgrade Package V8.1 to V8.2 (including SOFTNET RED-CONNECT) For OS Single Station	
2 languages (English, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows 10 Enterprise 2015 LTSB 64-bit, single license for 1 installation	
No SIMATIC PCS 7 Software Media Package ASIA	
• Physical delivery ASIA license key on USB hardlock, certificate of license	**6ES7658-2AA28-6CE0**

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Ordering data	Article No.
SIMATIC PCS 7 OS Server Upgrade Package V8.0/8.1 to V8.2 For OS Server	
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	
With SIMATIC PCS 7 Software Media Package	
5 languages (English, German, French, Italian, Spanish)	
With SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license, bundled with 1 × SIMATIC PCS 7 Software Media Package per order item	**6ES7652-5BX28-0YE0**
• Online delivery License key download, online certificate of license, combined with SIMATIC PCS 7 Software Media Package (software download and online certificate of license) Note: Email address required!	**6ES7652-5BX28-0YK0**
ASIA, 2 languages (English, Chinese)	
With SIMATIC PCS 7 Software Media Package ASIA	
• Physical delivery ASIA license key on USB hardlock, certificate of license, bundled with 1 × SIMATIC PCS 7 Software Media Package ASIA per order item	**6ES7652-5BX28-0CE0**
SIMATIC PCS 7 OS Server SN ASIA Upgrade Package V8.1 to V8.2 For OS Server	
2 languages (English, Chinese), 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	
No SIMATIC PCS 7 Software Media Package ASIA	
• Physical delivery ASIA license key on USB hardlock, certificate of license	**6ES7658-2BA28-6CE0**
SIMATIC PCS 7 OS Client/SFC Visualization Upgrade Package V8.0/8.1 to V8.2 Software class A, runs with Windows 7 Ultimate 32/64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2008 R2 Standard 64-bit or Windows Server 2012 R2 Standard 64-bit, floating license for 1 user	
5 languages (English, German, French, Italian, Spanish)	
No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	**6ES7652-5CX28-0YF5**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7652-5CX28-0YK5**
ASIA, 2 languages (English, Chinese)	
No SIMATIC PCS 7 Software Media Package ASIA	
• Physical delivery ASIA license key on USB hardlock, certificate of license	**6ES7652-5CX28-0CF5**

Web Option for OS

PCS 7 Web Server Upgrade from V8.0/8.1 to V8.2	
SIMATIC PCS 7 Web Server Upgrade Package V8.0/8.1 to V8.2 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, Windows Server 2012 R2 Standard 64-bit (Web server/Web diagnostics server) or Windows 7 Ultimate 32/64-bit, Windows 10 Enterprise 2015 LTSB 64-bit (Web diagnostics client), single license for 1 installation	
No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	**6ES7652-5DX28-0YF0**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7652-5DX28-0YK0**

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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/V8.1 to V8.2. The following table shows the number of SIMATIC PCS 7 OS Server Upgrade Packages required for upgrading the various types of station.

Upgrade Package	Single Server				Server Redundancy	
	OS Server	Process Historian plus Information Server	Information Server	Process Historian	OS Server	Process Historian
PCS 7 OS Server Upgrade Package V8.0/V8.1 to V8.2	1	1	–	1	2	2

A separate upgrade package is not required for a separate Information Server.

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Overview

Maintenance Station Upgrade Package

With 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 V8.0 or V8.1 to V8.2. The SNMP OPC server license is also taken into account for the upgrade.

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 V8.0/8.1 to V8.2	
SIMATIC PCS 7 Maintenance Station Upgrade Package V8.0/8.1 to V8.2 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, Windows Server 2008 R2 Standard 64-bit or Windows Server 2012 R2 Standard 64-bit, single license for 1 installation	
No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	**6ES7652-5FX28-0YF0**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7652-5FX28-0YK0**

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Upgrades for SIMATIC BATCH

Overview

SIMATIC BATCH Upgrade Packages

Upgrades combined in packages enable upgrading of existing SIMATIC BATCH systems from V8.0 or V8.1 to V8.2:

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

The cumulative SIMATIC BATCH UNITs are independent of the version. Existing UNITs are completely available following the upgrade.

Ordering data

	Article No.
SIMATIC BATCH Upgrade from V8.0/8.1 to V8.2	
SIMATIC BATCH Server Upgrade Package V8.0/8.1 to V8.2 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows Server 2008 R2 Standard 64-bit or Windows Server 2012 R2 Standard 64-bit, single license for 1 installation	
No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	**6ES7657-5XX28-0YF0**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7657-5XX28-0YK0**
SIMATIC BATCH Client Upgrade Package V8.0/8.1 to V8.2 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2008 R2 Standard 64-bit or Windows Server 2012 R2 Standard 64-bit, floating license for 1 user	
No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	**6ES7657-5XX28-0YF5**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7657-5XX28-0YK5**

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Overview

SIMATIC Route Control Upgrade Packages

With SIMATIC Route Control Upgrade Packages you can upgrade Route Control Engineering, Route Control Server and Route Control Center from V8.0 or V8.1 to V8.2. The number of existing "Routes" (quantity option for number of simultaneous material transports) is fully available again after the upgrade.

SIMATIC Route Control Center Upgrades, which are only available only as an online delivery, allow separate upgrading of the Route Control Center software from V8.0 or V8.1 to V8.2.

Ordering data

	Article No.
SIMATIC Route Control Upgrade from V8.0/8.1 to V8.2	
SIMATIC Route Control Upgrade Package V8.0/8.1 to V8.2 6 languages (English, German, French, Italian, Spanish, Chinese), 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 1 installation	
No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	**6ES7652-5XX28-0YF0**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7652-5XX28-0YK0**
SIMATIC Route Control Center Upgrade V8.0/8.1 to V8.2 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2008 R2 Standard 64-bit or Windows Server 2012 R2 Standard 64-bit, floating license for 1 user	
No SIMATIC PCS 7 Software Media Package	
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7658-7EX28-0YK0**

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Upgrades for Engineering System and Management Console

Overview

Engineering Upgrade Package V7.1 to V8.2

SIMATIC PCS 7 Engineering System with Engineering Software V7.1 can be upgraded in two steps, initially to V8.0 and then to V8.2. 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
  (without 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 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 V8.2 apply to the following software products:

- PCS 7 Engineering AS, OS, AS/OS (250 to 2 000 POs or unlimited POs)
- PCS 7 Import-Export Assistent
- SIMATIC Version Cross Manager
- SIMATIC Version Trail
- PCS 7 SFC Visualization
- PCS 7 BCE
- PCS 7 Management Console
- Industrial Ethernet communication software for CP

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. service pack) can be used in SIMATIC PCS 7 V8.0 as well as in SIMATIC PCS 7 V8.1 and V8.2, this upgrade is only available for the upgrade from V7.1 to V8.0 (incl. SP1).

Ordering data

Engineering software

	Article No.
Engineering Software Upgrade from V7.1 to V8.2, based on the existing number of POs	
SIMATIC PCS 7 Engineering Upgrade Package AS/OS (250 to 2 000 POs) V7.1 to V8.2 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)	
comprising:	
• SIMATIC PCS 7 Engineering Upgrade Package AS/OS (250 to 2 000 POs) V7.1 to V8.0	
• SIMATIC PCS 7 Engineering Upgrade Package AS/OS V8.0/8.1 to V8.2	
• SIMATIC PCS 7 OS Single Station Upgrade Package V8.0/8.1 to V8.2	
• SIMATIC PCS 7 Software Media Package V8.2	
- Delivery form package License key USB stick, certificate of license, bundled with 1 × SIMATIC PCS 7 Software Media Package per order item	**6ES7651-7AC28-0YE5**
- Online delivery License key download, online certificate of license, combined with SIMATIC PCS 7 Software Media Package (software download and online certificate of license) Note: E-mail address required!	**6ES7651-7AC28-0YK5**

	Article No.
ASIA, 2 languages (English, Chinese),	
comprising:	
• SIMATIC PCS 7 Engineering Upgrade Package AS/OS ASIA (250 to 2 000 POs) V7.1 to V8.0	
• SIMATIC PCS 7 Engineering Upgrade Package AS/OS ASIA V8.0/8.1 to V8.2	
• SIMATIC PCS 7 OS Single Station Upgrade Package ASIA V8.0/8.1 to V8.2	
• SIMATIC PCS 7 Software Media Package ASIA V8.2	
- Delivery form package ASIA license key USB hardlock, certificate of license, bundled with 1 × SIMATIC PCS 7 Software Media Package ASIA per order item	**6ES7651-7AC28-0CE5**

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Ordering data	Article No.
SIMATIC PCS 7 Engineering Upgrade Package AS/OS (unlimited POs) V7.1 to V8.2 Software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license für 1 user	
5 languages (English, German, French, Italian, Spanish) comprising: • SIMATIC PCS 7 Engineering Upgrade Package AS/OS (unlimited POs) V7.1 to V8.0 • SIMATIC PCS 7 Engineering Upgrade Package AS/OS V8.0/8.1 to V8.2 • SIMATIC PCS 7 Software Media Package V8.2	
- Delivery form package License key USB stick, certificate of license, bundled with 1 × SIMATIC PCS 7 Software Media Package per order item	**6ES7651-7AF28-0YE5**
- Online delivery License key download, online certificate of license, combined with SIMATIC PCS 7 Software Media Package (software download and online certificate of license) Note: E-mail address required!	**6ES7651-7AF28-0YK5**

Ordering data	Article No.
ASIA, 2 languages (English, Chinese), comprising: • SIMATIC PCS 7 Engineering Upgrade Package AS/OS ASIA (unlimited POs) V7.1 to V8.0 • SIMATIC PCS 7 Engineering Upgrade Package AS/OS ASIA V8.0/8.1 to V8.2 • SIMATIC PCS 7 Software Media Package ASIA V8.2	
- Delivery form package ASIA license key USB hardlock, certificate of license, bundled with 1 × SIMATIC PCS 7 Software Media Package ASIA per order item	**6ES7651-7AF28-0CE5**

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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 to V8.2 with consideration of the number of existing process objects and archive variables.

SIMATIC PCS 7 Operator Stations with OS Software V7.1 can be upgraded in two steps, initially to V8.0 and then to V8.2. 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.

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 also part of the Upgrade Package SIMATIC PCS 7 OS Client/ SFC Visualization.

The upgrade licenses for Process Historian and Information Server are also embedded in SIMATIC PCS 7 OS Server Upgrade Package V8.0/8.1 to V8.2 (part of SIMATIC PCS 7 OS Server Upgrade Package V7.1 to V8.2). With a SIMATIC PCS 7 OS Server Upgrade Package V8.0/8.1 to V8.2, only one SIMATIC PCS 7 OS Server or one SIMATIC PCS 7 Process Historian (with/without Information Server) can be upgraded.

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 V8.2. It is first necessary to upgrade to V8.0 and subsequently to V8.2.

Ordering data

OS software

	Article No.
OS Software Upgrade from V7.1 to V8.2, based on the existing number of POs	
SIMATIC PCS 7 OS Single Station Upgrade Package V7.1 to V8.2 for OS Single Station, software class A, runs with Windows 7 Ultimate 32/64-bit or Windows 10 Enterprise 2015 LTSB 64-bit, single license for 1 installation	
5 languages (English, German, French, Italian, Spanish),	
comprising:	
• SIMATIC PCS 7 OS Single Station Upgrade Package V7.1 to V8.0	
• SIMATIC PCS 7 OS Single Station Upgrade Package V8.0/8.1 to V8.2	
• SIMATIC PCS 7 Software Media Package V8.2	
- Delivery form package License key USB stick, certificate of license, bundled with 1 × SIMATIC PCS 7 Software Media Package per order item	**6ES7652-8AX28-0YE0**
- Online delivery License key download, online certificate of license, combined with SIMATIC PCS 7 Software Media Package (software download and online certificate of license) Note: E-mail address required!	**6ES7652-8AX28-0YK0**

	Article No.
ASIA, 2 languages (English, Chinese),	
comprising:	
• SIMATIC PCS 7 OS Single Station Upgrade Package ASIA V7.1 to V8.0	
• SIMATIC PCS 7 OS Single Station Upgrade Package ASIA V8.0/8.1 to V8.2	
• SIMATIC PCS 7 Software Media Package ASIA V8.2	
- Delivery form package ASIA license key USB hardlock, certificate of license, bundled with 1 × SIMATIC PCS 7 Software Media Package ASIA per order item	**6ES7652-8AX28-0CE0**

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Ordering data

	Article No.
SIMATIC PCS 7 OS Single Station Redundancy Upgrade Package V7.1 to V8.2 for redundant OS Single Stations, software class A, runs with Windows 7 Ultimate 32/64-bit or Windows 10 Enterprise 2015 LTSB 64-bit, single license for 2 installations	
5 languages (English, German, French, Italian, Spanish), 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 V8.0/8.1 to V8.2 • SIMATIC PCS 7 Software Media Package V8.2	
- Delivery form package License key USB stick, certificate of license, bundled with 1 × SIMATIC PCS 7 Software Media Package per order item	**6ES7652-3AX28-2YE0**
- Online delivery License key Ddownload, online certificate of license, combined with SIMATIC PCS 7 Software Media Package (software download and online certificate of license) Note: E-mail address required!	**6ES7652-3AX28-2YK0**
ASIA, 2 languages (English, Chinese), comprising: • SIMATIC PCS 7 OS Single Station Redundancy Upgrade Package ASIA V7.1 to V8.0 • 2 x SIMATIC PCS 7 OS Single Station Upgrade Package ASIA V8.0/8.1 to V8.2 • SIMATIC PCS 7 Software Media Package ASIA V8.2	
- Delivery form package ASIA license key USB hardlock, certificate of license, bundled with 1 × SIMATIC PCS 7 Software Media Package ASIA per order item	**6ES7652-3AX28-2CE0**

	Article No.
SIMATIC PCS 7 OS Server Upgrade Package V7.1 to V8.2 for OS Server, software class A, runs with Windows Server 2008 R2 Standard 64-bit or Windows Server 2012 R2 Standard 64-bit, single license für 1 installation	
5 languages (English, German, French, Italian, Spanish), comprising: • SIMATIC PCS 7 OS Server Upgrade Package V7.1 to V8.0 • SIMATIC PCS 7 OS Server Upgrade Package V8.0/8.1 to V8.2 • SIMATIC PCS 7 Software Media Package V8.2	
- Delivery form package License key USB stick, certificate of license, bundled with 1 × SIMATIC PCS 7 Software Media Package per order item	**6ES7652-8BX28-0YE0**
- Online delivery License key download, online certificate of license, combined with SIMATIC PCS 7 Software Media Package (software download and online certificate of license) Note: E-mail address required!	**6ES7652-8BX28-0YK0**
ASIA, 2 languages (English, Chinese), comprising: • SIMATIC PCS 7 OS Server Upgrade Package ASIA V7.1 to V8.0 • SIMATIC PCS 7 OS Server Upgrade Package ASIA V8.0/8.1 to V8.2 • SIMATIC PCS 7 Software Media Package ASIA V8.2	
• Delivery form package ASIA license key USB hardlock, certificate of license, bundled with 1 × SIMATIC PCS 7 Software Media Package ASIA per order item	**6ES7652-8BX28-0CE0**

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Upgrades for Operator System incl. OpenPCS 7 and Web Option for OS

Ordering data	Article No.
SIMATIC PCS 7 OS Server Redundancy Upgrade Package V7.1 to V8.2 for redundant OS server pair, 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 5 languages (English, German, French, Italian, Spanish), comprising: • SIMATIC PCS 7 OS Server Redundancy Upgrade Package V7.1 to V8.0 • 2 x SIMATIC PCS 7 OS Server Upgrade Package V8.0/8.1 to V8.2 • SIMATIC PCS 7 Software Media Package V8.2	
- Delivery form package License key USB stick, certificate of license, bundled with 1 × SIMATIC PCS 7 Software Media Package per order item	**6ES7652-3BX28-2YE0**
- Online delivery License key download, online certificate of license, combined with SIMATIC PCS 7 Software Media Package (software download and online certificate of license) Note: E-mail address required!	**6ES7652-3BX28-2YK0**
ASIA, 2 languages (English, Chinese), comprising: • SIMATIC PCS 7 OS Server Redundancy Upgrade Package ASIA V7.1 to V8.0 • 2 x SIMATIC PCS 7 OS Server Upgrade Package ASIA V8.0/8.1 to V8.2 • SIMATIC PCS 7 Software Media Package ASIA V8.2	
- Delivery form package ASIA license key USB hardlock, certificate of license, bundled with 1 × SIMATIC PCS 7 Software Media Package ASIA per order item	**6ES7652-3BX28-2CE0**

Ordering data	Article No.
SIMATIC PCS 7 OS Client/ SFC Visualization Upgrade Package V7.1 to V8.2 Software class A, runs with Windows 7 Ultimate 32/64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2008 R2 Standard 64-bit or Windows Server 2012 R2 Standard 64-bit, floating license for 1 user 5 languages (English, German, French, Italian, Spanish), without SIMATIC PCS 7 Software Media Package, comprising: • SIMATIC PCS 7 OS Client/ SFC Visualization Upgrade Package V7.1 to V8.0 • SIMATIC PCS 7 OS Client/ SFC Visualization Upgrade Package V8.0/8.1 to V8.2	
- Delivery form package License key USB stick, certificate of license	**6ES7652-8CX28-0YF5**
- Online delivery License key download, online certificate of license Note: E-mail address required!	**6ES7652-8CX28-0YK5**
ASIA, 2 languages (English, Chinese), without SIMATIC PCS 7 Software Media Package ASIA, comprising: • SIMATIC PCS 7 OS Client/ SFC Visualization Upgrade Package ASIA V7.1 to V8.0 • SIMATIC PCS 7 OS Client/ SFC Visualization Upgrade Package ASIA V8.0/8.1 to V8.2	
- Delivery form package ASIA license key USB hardlock, certificate of license	**6ES7652-8CX28-0CF5**

Web Option for OS

PCS 7 Web Server Upgrade from V7.1 to V8.2	
SIMATIC PCS 7 Web Server Upgrade Package V7.1 to V8.2 for SIMATIC PCS 7 Web Server, SIMATIC PCS 7 Web Diagnose Server, SIMATIC PCS 7 Web Diagnose Client, 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows Server 2008 R2 Standard 64-bit, Windows Server 2012 R2 Standard 64-bit (Web Server/ Web Diagnose Server) oder Windows 7 Ultimate 32/64-bit, Windows 10 Enterprise 2015 LTSB 64-bit (Web Diagnose Client), single license for 1 installation; without SIMATIC PCS 7 Software Media Package, comprising: • SIMATIC PCS 7 Web Server Upgrade Package V7.1 to V8.0 • SIMATIC PCS 7 Web Server Upgrade Package V8.0/8.1 to V8.2	
- Delivery form package License key USB stick, certificate of license	**6ES7652-8DX28-0YF0**
- Online delivery License key download, online certificate of license Note: E-mail address required!	**6ES7652-8DX28-0YK0**

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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 V8.2. It is first necessary to upgrade to V8.0 and subsequently to V8.2.

The SNMP OPC server license is also taken into account for the upgrade.

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 V7.1 to V8.2	
SIMATIC PCS 7 Maintenance Station Upgrade Package V7.1 to V8.2 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, Windows Server 2008 R2 Standard 64-bit or Windows Server 2012 R2 Standard 64-bit, single license for 1 installation without SIMATIC PCS 7 Software Media Package, comprising: • SIMATIC PCS 7 Maintenance Station Upgrade Package V7.1 to V8.0 • SIMATIC PCS 7 Maintenance Station Upgrade Package V8.0/8.1 to V8.2	
- Delivery form package License key USB stick, certificate of license	**6ES7652-8FX28-0YF0**
- Online delivery License key download, online certificate of license Note: E-mail address required!	**6ES7652-8FX28-0YK0**

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Upgrades for SIMATIC BATCH

Overview

SIMATIC BATCH Upgrade Packages

Upgrades combined in packages enable upgrading of existing SIMATIC BATCH systems from V7.1 to V8.2:

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

It is first necessary to upgrade to V8.0 and subsequently to V8.2.

The cumulative SIMATIC BATCH UNITs are independent of the version. Existing UNITs are completely available following the upgrade.

Ordering data

	Article No.
SIMATIC BATCH Upgrade from V7.1 to V8.2	
SIMATIC BATCH Server Upgrade Package V7.1 to V8.2 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows Server 2008 R2 Standard 64-bit or Windows Server 2012 R2 Standard 64-bit, single license for 1 installation	
without SIMATIC PCS 7 Software Media Package, comprising: • SIMATIC BATCH Server Upgrade Package V7.1 to V8.0 • SIMATIC BATCH Server Upgrade Package V8.0/8.1 to V8.2 • SIMATIC BATCH Client Upgrade Package V8.0/8.1 to V8.2	
- Delivery form package License key USB stick, certificate of license	**6ES7657-8XX28-0YF0**
- Online delivery License key Ddownload, online certificate of license Note: E-mail address required!	**6ES7657-8XX28-0YK0**
SIMATIC BATCH Client Upgrade Package V7.1 to V8.2 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2008 R2 Standard 64-bit or Windows Server 2012 R2 Standard 64-bit, floating license for 1 user	
without SIMATIC PCS 7 Software Media Package, comprising: • SIMATIC BATCH Client Upgrade Package V7.1 to V8.0 • SIMATIC BATCH Client Upgrade Package V8.0/8.1 to V8.2	
- Delivery form package License key USB stick, certificate of license	**6ES7657-8XX28-0YF5**
- Online delivery License key download, online certificate of license Note: E-mail address required!	**6ES7657-58XX28-0YK5**

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Overview

SIMATIC Route Control Upgrade Packages

With SIMATIC Route Control Upgrade Packages you can upgrade Route Control Engineering, Route Control Server and Route Control Center from V7.1 to V8.2. The number of existing "Routes" (quantity option for number of simultaneous material transports) is fully available again after the upgrade.

It is first necessary to upgrade to V8.0 and subsequently to V8.2. When upgrading to V8.0, the "Routes" are converted into cumulative "Count Relevant Licenses".

Ordering data

	Article No.
SIMATIC Route Control Upgrade from V7.1 to V8.2	
SIMATIC Route Control Upgrade Package V7.1 to V8.2 6 languages (English, German, French, Italian, Spanish, Chinese), 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 1 installation	
without SIMATIC PCS 7 Software Media Package, comprising: • SIMATIC Route Control Upgrade Package V7.1 to V8.0 • SIMATIC Route Control Upgrade Package V8.0/8.1 to V8.2	
- Delivery form package License key USB stick, certificate of license	**6ES7652-8XX28-0YF0**
- Online delivery License key download, online certificate of license Note: E-mail address required!	**6ES7652-8XX28-0YK0**

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Upgrades for Engineering System and Management Console

Overview

Engineering Upgrade Package V8.0 to V8.1

SIMATIC PCS 7 Engineering System with Engineering Software V8.0 and Management Console 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 System 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
  (without 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 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

SIMATIC Version Cross Manager V7.1 can be used in both SIMATIC PCS 7 V7.1 and in SIMATIC PCS 7 V8.0 and V8.1. As a result, there is no need for this upgrade when upgrading from SIMATIC PCS 7 V7.1 to V8.0 or V8.1. Consequently, SIMATIC Version Cross Manager is not included in the SIMATIC PCS 7 Engineering Upgrade Packages AS/OS for upgrading from V7.1 to V8.0 or 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. service pack) can be used both in SIMATIC PCS 7 V8.0 and SIMATIC PCS 7 V8.1, this upgrade is only available for the upgrade from V7.1 to V8.0 (incl. SP1).

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Ordering data

Engineering software

	Article No.
Engineering Software Upgrade from V8.0 auf V8.1, based on the existing number of POs	
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	
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**
• 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**
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**

	Article No.
Engineering Software Upgrade from V7.1 to V8.1	
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	
- 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**
• 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

	Article No.
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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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 also part of the Upgrade Package SIMATIC PCS 7 OS Client/ SFC Visualization.

The upgrade licenses for Process Historian and Information Server are also embedded in SIMATIC PCS 7 OS Server Upgrade Package V8.0 to V8.1. With a SIMATIC PCS 7 OS Server Upgrade Package V8.0 to V8.1, only one SIMATIC PCS 7 OS Server or one SIMATIC PCS 7 Process Historian (with/ without Information Server) can be upgraded (for details see table in section "Upgrades for Process Historian and Information Server").

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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Ordering data

OS Software

	Article No.
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**

16

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Upgrades for Operator System incl. OpenPCS 7 and Web Option for OS

Ordering data	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 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**

Ordering data	Article No.
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 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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Ordering data

Web option for OS

	Article No.
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**

	Article No.
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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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 required for upgrading the various types of station.

Upgrade Package	Single Server				Server Redundancy	
	OS Server	Process Historian plus Information Server	Information Server	Process Historian	OS Server	Process Historian
PCS 7 OS Server Upgrade Package V8.0 to V8.1	1	1	–	1	2	2

A separate upgrade package is not required for a separate information server.

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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 taken into account for the upgrade.

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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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.
SIMATIC BATCH Upgrade from V8.0 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	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	**6ES7657-5XX18-0YF0**
• 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**
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	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	**6ES7657-5XX18-0YF5**
• 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**

	Article No.
SIMATIC BATCH Upgrade from V7.0 or V7.1 to V8.1	
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	**6ES7657-8XX18-0YF0**
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	**6ES7657-8XX18-0YK0**
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	**6ES7657-8XX18-0YF5**
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	**6ES7657-8XX18-0YK5**

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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 fully available again after the upgrade.

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 as an online delivery, 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.
SIMATIC Route Control Upgrade from V8.0 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	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	**6ES7652-5XX18-0YF0**
• 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**
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	
• 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**

	Article No.
SIMATIC Route Control Upgrade from V7.0 or V7.1 to V8.1	
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	**6ES7652-8XX18-0YF0**
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	**6ES7652-8XX18-0YK0**
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	
• 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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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.

With the online compatibility tool, you can determine the SIMATIC Logon versions that are suitable for the various SIMATIC PCS 7 versions:

https://support.industry.siemens.com/cs/de/en/view/64847781

Ordering data

	Article No.
SIMATIC Logon Upgrade to V1.6 7 languages (English, German, French, Italian, Spanish, Chinese and Japanese), software class A Runs with the following operating systems • Windows Vista (Business/ Enterprise/Ultimate) up to SP2 32/64-bit • Windows 7 (Professional/ Enterprise/Ultimate) up to SP1 32/64-bit • Windows 8.0 (Standard/Pro/ Enterprise) 32/64-bit • Windows 8.1 (Standard/Pro/ • Enterprise) 32/64-bit • Windows 10 Enterprise 2015 LTSB 64-bit • Windows Server 2003 SP1/SP2 32-bit • Windows Server 2003 R2/2003 R2 SP2 32-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 • Windows Server 2012 (Foundation/Essentials/Standard/ Datacenter) 64-bit • Windows Server 2012 R2 (Essentials/Standard/Datacenter) 64-bit Single license for 1 installation Physical delivery: License key on USB flash drive, certificate of license, software and electronic documentation on CD	**6ES7658-7BX61-0YE0**

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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 following overview shows some of the SIMATIC PDM versions and the compatible SIMATIC PCS 7 versions:

SIMATIC PDM version	Compatible SIMATIC PCS 7 version
V9.0	V8.2 V8.1, V8.1+SP1 V8.0+SP2 (without Communication FOUNDATION Fieldbus)
V8.2	V8.0+SP2, V8.1, V8.1+SP1
V8.1	V8.0, V8.0+SP1/SP2
V6.1	V6.1, V7.1 and V8.0

The compatibility tool on the Internet provides detailed information on how the various SIMATIC PCS 7 versions correlate with the versions of SIMATIC PDM:

https://support.industry.siemens.com/cs/de/en/view/64847781

Existing installations with SIMATIC PDM V7.0 can only be upgraded to version 9.0 by first upgrading to version 8.0. Projects based on SIMATIC PDM V6.x or V8.x (including SP in each case) can be upgraded directly to V9.0 with upgrade packages. Alternatively, an upgrade is also possible via the Software Update Service (for details, see "Software Media and Logistics" chapter, "Software Update Service" section).

Two upgrade packages are offered for SIMATIC PDM V8.x:

- SIMATIC PDM Upgrade Package Basic[1)] (with/without SIMATIC PDM HART Server) for configurations based on:
  - SIMATIC PDM Basic
  - SIMATIC PDM Service
  - SIMATIC PDM S7
  - SIMATIC PDM PCS 7
- SIMATIC PDM Upgrade Package Complete[1)] for configurations based on:
  - SIMATIC PDM PCS 7 Server
  - SIMATIC PDM PCS 7-FF

1) Optional product components for SIMATIC PDM such as PDM Extended, PDM Integration in STEP 7/PCS 7, PDM Routing, PDM Server and PDM Communication FOUNDATION Fieldbus are each included in a product package listed in the SIMATIC PDM Upgrade Package Basic or SIMATIC PDM Upgrade Package Complete and are implicitly authorized to be updated via the corresponding license. The SIMATIC PDM Upgrade Package Complete is required for use of the product components PDM Server or PDM Communication FOUNDATION Fieldbus.

Ordering data

	Article No.
SIMATIC PDM upgrade/update service	
SIMATIC PDM Upgrade Package V6.x to V9.1 For product packages and optional product components of SIMATIC PDM V6.0/V6.1 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2008 R2 Standard 64-bit or Windows Server 2012 R2 Standard 64-bit (see SIMATIC PDM V9.1 Readme for latest information), floating license for 1 user No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive and certificate of license, bundled with 1? × SIMATIC PDM Software Media Package per order item	**6ES7651-5CX68-0YE5**
• Online delivery License key download and online certificate of license combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download) Note: Email address required!	**6ES7651-5CX68-0YK5**
SIMATIC PDM Upgrade Package Basic from V8.x/V9.0 to V9.1 For configurations based on SIMATIC PDM Basic, Service, S7, PCS 7 (with/without SIMATIC PDM HART Server) 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs on Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2008 R2 Standard 64-bit, or Windows Server 2012 R2 Standard 64-bit (see SIMATIC PDM V9.1 Readme for latest information), floating license for 1 user No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive and certificate of license, bundled with 1? × SIMATIC PDM Software Media Package per order item	**6ES7651-5EX68-0YE5**
• Online delivery License key download and online certificate of license combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download) Note: Email address required!	**6ES7651-5EX68-0YK5**

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Upgrades for SIMATIC PDM

Ordering data	Article No.
SIMATIC PDM Upgrade Package Complete from V8.x/V9.0 to V9.1 For configurations based on SIMATIC PDM PCS 7 Server, PCS 7-FF	
6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2008 R2 Standard 64-bit or Windows Server 2012 R2 Standard 64-bit (see SIMATIC PDM V9.1 Readme for latest information), single license for 1 installation	
No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive and certificate of license, bundled with 1? × SIMATIC PDM Software Media Package per order item	**6ES7651-5FX68-0YE5**
• Online delivery License key download and online certificate of license combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download) Note: Email address required!	**6ES7651-5FX68-0YK5**

Ordering data	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 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	
No SIMATIC PCS 7 Software Media Package	
• Physical delivery SIMATIC PDM V8.0 software and device library on DVD, license key on USB flash drive, certificate of license	**6ES7651-5DX08-0YE5**
• Online delivery Software image download (SIMATIC PDM and device library), license key download, online certificate of license Note: Email address required!	**6ES7651-5DX08-0YK5**

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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.

SIMATIC PCS 7 version	Compatible versions	
	S7 F Systems	Safety Matrix Tool, Safety Matrix Viewer
V8.1, V8.2, V9.0	V6.1 SP2 or higher V6.2	V6.2 SP2 or higher

Compatibility tool

With the compatibility tool on the Internet you can determine the versions of S7 F Systems and SIMATIC Safety Matrix that are suitable for the various versions of SIMATIC PCS 7:

https://support.industry.siemens.com/cs/de/en/view/64847781

Ordering data

	Article No.
S7 F Systems	
S7 F Systems V6.2 Upgrade Package For S7 F Systems upgrade from V6.0/V6.1 to V6.2 2 languages (English, German), software class A, runs on the engineering station under Windows 7 SP1 64-bit (Professional, Enterprise, Ultimate) or Windows Server 2008 R2 SP1 Standard 64-bit; on operator station additionally under Windows 7 SP1 32-bit (Enterprise, Ultimate), Windows 10 Enterprise 2015 LTSB 64-bit or Windows Server 2012 R2 Standard 64-bit,floating license for 1 user Without SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive and certificate of license, bundled with 1 × S7 F Systems Software Media Package per order item	**6ES7833-1CC26-0YE5**
• Online delivery License key download and online certificate of license combined with S7 F Systems Software Media Package (software download and online certificate of license) Note: E-mail address required.	**6ES7833-1CC26-0YK5**

	Article No.
S7 F Systems V6.1 Upgrade Package For S7 F Systems upgrade from V5.x/V6.0 to V6.1 (incl. SP) 2 languages (English, German), 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 Without SIMATIC PCS 7 Software Media Package 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.	
• Physical delivery License key on USB flash drive and certificate of license, bundled with 1 × S7 F Systems Software Media Package per order item	**6ES7833-1CC02-0YE5**
• Online delivery License key download and online certificate of license combined with S7 F Systems Software Media Package (software download and online certificate of license) Note: E-mail address required.	**6ES7833-1CC02-0YK5**

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Upgrades Safety Integrated for Process Automation

Ordering data	Article No.
Safety Matrix Tool	
SIMATIC Safety Matrix Tool Upgrade Package V5.x/V6.1 to V6.2 (including SP) 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, floating license for 1 user	
Without SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive and certificate of license, bundled with 1 × SIMATIC Safety Matrix Software Media Package per order item	**6ES7833-1SM02-0YE5**
• Online delivery License key download and online certificate of license, combined with SIMATIC Safety Matrix Software Media Package (software download and online certificate of license) Note: E-mail address required.	**6ES7833-1SM02-0YK5**

Ordering data	Article No.
Safety Matrix Viewer	
SIMATIC Safety Matrix Viewer Upgrade Package V6.0/V6.1 to V6.2 (incl. SP) 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; as of V6.2 SP2 Update 1 additionally under Windows Server 2012 R2 Standard 64-bit or Windows 10 Enterprise 2015 LTSB 64-bit, floating license for 1 user	
Without SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive and certificate of license, bundled with 1 × SIMATIC Safety Matrix Software Media Package per order item	**6ES7833-1SM62-0YE5**
• Online delivery License key download and online certificate of license, combined with SIMATIC Safety Matrix Software Media Package (software download and online certificate of license) Note: E-mail address required.	**6ES7833-1SM62-0YK5**

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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 and V8.2.

With the compatibility tool on the Internet you can determine which S7-PLCSIM versions are suitable for the various SIMATIC PCS 7 versions:

https://support.industry.siemens.com/cs/ww/en/view/64847781

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 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 No SIMATIC PCS 7 Software Media Package Physical delivery License key on USB flash drive, certificate of license, software and electronic documentation on CD	**6ES7841-0CC05-0YE5**

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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 V9.0 with SIMATIC NET products V14
- SIMATIC PCS 7 V8.2 with SIMATIC NET products V13
- SIMATIC PCS 7 V8.1 with SIMATIC NET products V12
- SIMATIC PCS 7 V8.0 with SIMATIC NET products:
  - V8.1 (Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit operating system)
  - V7.1 (Windows XP Professional 32-bit or Windows Server 2003 R2 Standard 32-bit operating system)

When upgrading SIMATIC PCS 7, a separate upgrade is only required for the S7-REDCONNECT and SOFTNET-IE RNA communication software. For the other SIMATIC NET products, the version upgrade is implemented for the SIMATIC PCS 7 upgrade with SIMATIC PCS 7 Upgrade Packages.

Ordering data

Communication products for SIMATIC PCS 7 V9.0

	Article No.
SIMATIC NET HARDNET-IE S7 V14 Software for S7, open communication, OPC, PG/OP communication Configuration software; up to 120 connections; floating license Runtime software, software and electronics manual on DVD; license key, 2 languages (German, English) for 32/64-bit: Windows 7 SP1 Professional/Ultimate, 64-bit: Windows 8.1 Professional, Windows 10, Server 2008 R2 SP1, Server 2012 R2 For max. 4 CP 1623, CP 1628	
• Goods delivery Software and electronic manual on CD, license key on USB flash drive	**6GK1716-1CB14-0AA0**
• Online delivery Software and license key download Note: Email address required!	**6GK1716-1CB14-0AK0**
SIMATIC NET HARDNET-IE S7-REDCONNECT V14 S7 communication software for failsafe S7 communication over redundant networks with license for up to 4 Industrial Ethernet CPs Runtime software, 2 languages (English, German); for 32/64-bit: Windows 7 SP1 Professional/Ultimate, 64-bit: Windows 8.1 Professional; Windows 10, Server 2008 R2 SP1, Server 2012 R2 For max. 4 CP 1623, CP 1628	
• Goods delivery Software and electronic manual on CD, license key on USB flash drive	**6GK1716-0HB14-0AA0**
• Online delivery Software and license key download Note: Email address required!	**6GK1716-0HB14-0AK0**
SIMATIC NET HARDNET-IE S7-REDCONNECT PowerPack V14 For expansion of HARDNET-IE S7 communication software to HARDNET-IE S7-REDCONNECT, with license for up to 4 Industrial Ethernet CPs 2 languages (English, German) for 32/64-bit: Windows 7 SP1 Professional/Ultimate, 64-bit: Windows 8.1 Professional, Windows 10, Server 2008 R2 SP1, Server 2012 R2 For max. 4 CP 1623, CP 1628	
• Goods delivery Software and electronic manual on CD, license key on USB flash drive	**6GK1716-0HB14-0AC0**
• Online delivery Software and license key download Note: Email address required!	**6GK1716-0HB14-0AK1**
SIMATIC NET SOFTNET-IE RNA V14 Software for connecting PCS 7 stations to PRP-enabled networks with integrated SNMP Runtime software, 2 languages (English, German), software class A, for 32/64-bit: Windows 7 SP1 Professional/Ultimate, 64-bit: Windows 8.1 Professional; Windows 10, Server 2008 R2 SP1, Server 2012 R2 Single license for 1 installation Without SIMATIC PCS 7 Software Media Package Goods delivery Software and electronic manual on CD, license key on USB flash drive	**6GK1711-1EW14-0AA0**

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Ordering data	Article No.
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, Windows Server 2008 R2 Standard 64-bit or Windows Server 2012 R2 Standard 64-bit, single license for 1 installation	
Physical delivery Software and electronic manual on CD, license key on USB flash drive	
No SIMATIC PCS 7 Software Media Package	
• As of 2006 edition (V6.4)	**6GK1716-0HB00-3AE0**
• For V6.0, V6.1, V6.2, and 2005 edition (V6.3)	**6GK1716-0HB00-3AE1**
SIMATIC NET SOFTNET-IE RNA Upgrade Upgrade for SIMATIC NET SOFTNET-IE RNA as of V8.1	**6GK1711-1EW00-3AE0**
Runtime software, 2 languages (English, German), 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 1 installation	
Physical delivery Software and electronic manual on CD, license key on USB flash drive	
No SIMATIC PCS 7 Software Media Package	

	Article No.
SIMATIC PCS 7 BCE V9.0 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 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, or Windows Server 2012 R2 Standard 64-bit, floating license for 1 user	
Without SIMATIC PCS 7 Software Media Package	
• Goods delivery License key on USB flash drive, certificate of license	**6ES7650-1CD58-2YB5**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7650-1CD58-2YH5**

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Ordering data

Communication products for SIMATIC PCS 7 V8.2

	Article No.
SIMATIC NET HARDNET-IE S7 V13 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, Windows Server 2008 R2 Standard 64-bit, or Windows Server 2012 R2 Standard 64-bit, single license for 1 installation	
No SIMATIC PCS 7 Software Media Package	
• Physical delivery Software and electronic manual on CD, license key on USB flash drive	**6GK1716-1CB13-0AA0**
• Online delivery Software and license key download Note: Email address required!	**6GK1716-1CB13-0AK0**
SIMATIC NET HARDNET-IE S7-REDCONNECT V13 S7 communication software for failsafe 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, Windows Server 2008 R2 Standard 64-bit or Windows Server 2012 R2 Standard 64-bit, single license for 1 installation	
No SIMATIC PCS 7 Software Media Package	
• Physical delivery Software and electronic manual on CD, license key on USB flash drive	**6GK1716-0HB13-0AA0**
• Online delivery Software and license key download Note: Email address required!	**6GK1716-0HB13-0AK0**
SIMATIC NET HARDNET-IE S7-REDCONNECT PowerPack V13 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, Windows Server 2008 R2 Standard 64-bit or Windows Server 2012 R2 Standard 64-bit, single license for 1 installation	
No SIMATIC PCS 7 Software Media Package	
• Physical delivery Software and electronic manual on CD, license key on USB flash drive	**6GK1716-0HB13-0AC0**
• Online delivery Software and license key download Note: Email address required!	**6GK1716-0HB13-0AK1**
SIMATIC NET SOFTNET-IE RNA V13 Software for linking of PCS 7 stations to PRP-enabled networks with integrated SNMP	**6GK1711-1EW13-0AA0**
Runtime software, 2 languages (English, German), 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 1 installation	
Physical delivery Software and electronic manual on CD, license key on USB flash drive	
No SIMATIC PCS 7 Software Media Package	
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, Windows Server 2008 R2 Standard 64-bit or Windows Server 2012 R2 Standard 64-bit, single license for 1 installation	
Physical delivery Software and electronic manual on CD, license key on USB flash drive	
No SIMATIC PCS 7 Software Media Package	
• As of 2006 edition (V6.4)	**6GK1716-0HB00-3AE0**
• For V6.0, V6.1, V6.2, and 2005 edition (V6.3)	**6GK1716-0HB00-3AE1**
SIMATIC NET SOFTNET-IE RNA Upgrade Upgrade for SIMATIC NET SOFTNET-IE RNA as of V8.1	**6GK1711-1EW00-3AE0**
Runtime software, 2 languages (English, German), 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 1 installation	
Physical delivery Software and electronic manual on CD, license key on USB flash drive	
No SIMATIC PCS 7 Software Media Package	
SIMATIC PCS 7 BCE V8.2 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, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2008 R2 Standard 64-bit or Windows Server 2012 R2 Standard 64-bit, floating license for 1 user	
No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	**6ES7650-1CD28-2YB5**
• Online delivery License key download, online certificate of license Note: Email address required!	**6ES7650-1CD28-2YH5**

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Ordering data	Article No.
Communication products for SIMATIC PCS 7 V8.1	
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 Physical delivery Software and electronic manual on CD, license key on USB flash drive No SIMATIC PCS 7 Software Media Package	**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 Physical delivery Software and electronic manual on CD, license key on USB flash drive No SIMATIC PCS 7 Software Media Package	**6GK1716-0HB12-0AA0**
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 Physical delivery Software and electronic manual on CD, license key on USB flash drive No SIMATIC PCS 7 Software Media Package	**6GK1716-0HB12-0AC0**
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 Physical delivery Software and electronic manual on CD, license key on USB flash drive No SIMATIC PCS 7 Software Media Package	**6GK1711-1EW12-0AA0**

	Article No.
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 Physical delivery Software and electronic manual on CD, license key on USB flash drive No SIMATIC PCS 7 Software Media Package	
• As of 2006 edition (V6.4)	**6GK1716-0HB00-3AE0**
• For V6.0, V6.1, V6.2, and 2005 edition (V6.3)	**6GK1716-0HB00-3AE1**
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 Physical delivery Software and electronic manual on CD, license key on USB flash drive No SIMATIC PCS 7 Software Media Package	**6GK1711-1EW00-3AE0**
BCE license	
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 No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	**6ES7650-1CD18-2YB5**
• Online delivery License key download, online certificate of license Note: E-mail address required!	**6ES7650-1CD18-2YH5**

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Ordering data	Article No.
Communication products for SIMATIC PCS 7 V8.0	
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 Physical delivery Software and electronic manual on CD, license key on USB flash drive No SIMATIC PCS 7 Software Media Package	**6GK1716-1CB08-1AA0**
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 Physical delivery Software and electronic manual on CD, license key on USB flash drive No SIMATIC PCS 7 Software Media Package	**6GK1716-0HB08-1AA0**
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 Physical delivery Software and electronic manual on CD, license key on USB flash drive No SIMATIC PCS 7 Software Media Package	**6GK1716-0HB08-1AC0**
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 Physical delivery Software and electronic manual on CD, license key on USB flash drive No SIMATIC PCS 7 Software Media Package	
• As of 2006 edition (V6.4)	**6GK1716-0HB00-3AE0**
• For V6.0, V6.1, V6.2, and 2005 edition (V6.3)	**6GK1716-0HB00-3AE1**
BCE license	
PCS 7 BCE V8.0 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 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 No SIMATIC PCS 7 Software Media Package	
• Physical delivery License key on USB flash drive, certificate of license	**6ES7650-1CD08-2YB5**
• Online delivery License key download, online certificate of license Note: E-mail address required!	**6ES7650-1CD08-2YH5**

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Services for SIMATIC PCS 7

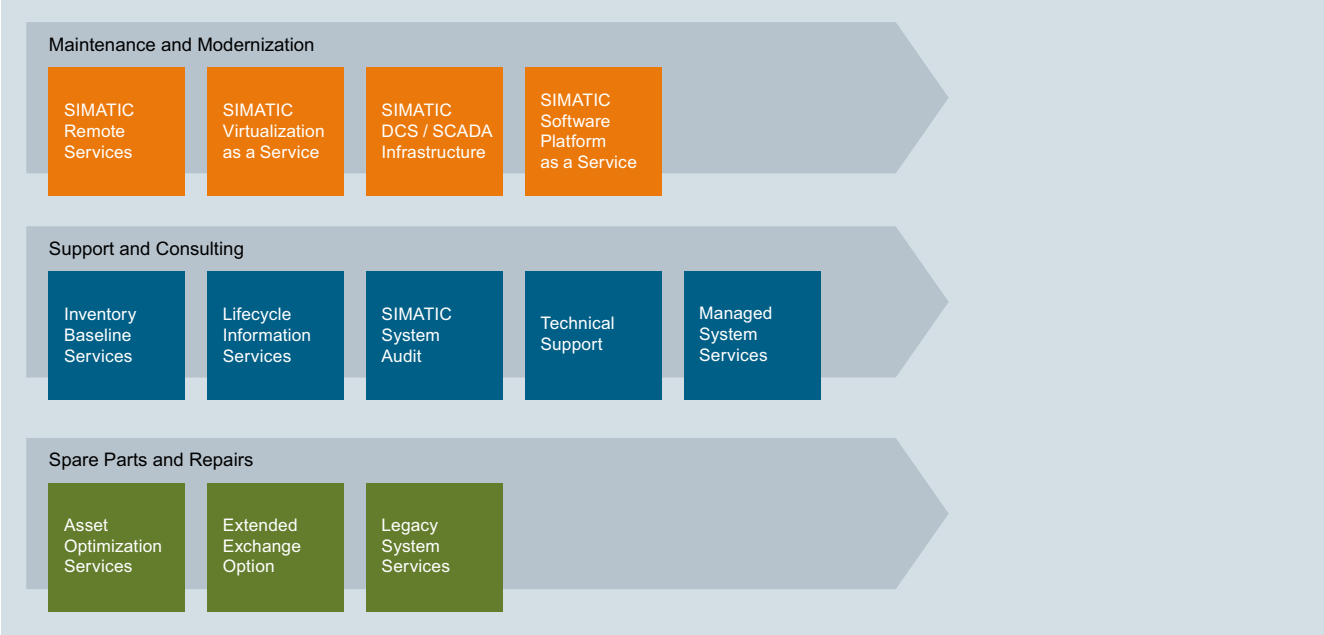


17/2 Lifecycle Services
17/3 Lifecycle Management Suite
17/4 Managed System Services
17/5 Remote Services
17/6 Inventory Baseline Services
17/7 SIMATIC System Audit
17/8 Lifecycle Information Services
17/9 Asset Optimization Services
17/10 Legacy System Services
17/11 DCS Application Services
17/12 Lifecycle Service Contracts

17/14 Technology Services
17/14 SIMATIC Virtualization as a service
17/16 SIMATIC DCS / SCADA infrastructure
17/17 Power Control Integration Services

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Overview



The service capability of your process control system is the key success criterion when it comes to making operating costs predictable and optimizing them continuously, to protect investments and thus ensure plant availability.

Reactive, proactive and preventive lifecycle services therefore ensure the service capability of the process control system in modern plants at optimized costs throughout the entire lifecycle.

The high pressure for innovation, especially through the use of IT systems that are constantly being upgraded, requires regular modernizations - even in automation. Only process control systems that can be updated/upgraded throughout their entire lifecycle can keep pace with the ongoing development of system technology at reasonable costs.

The requirements and specifications for operation of a plant are very specific, especially with a service life of 15 years and more. The service requirements are just as diverse. The SIMATIC PCS 7 Lifecycle Services provide an efficient service program for everything to do with the SIMATIC PCS 7 control system. These services can be easily integrated into individual service contracts that are customized to meet your specific requirements.

The standardized yet still flexible structure of the SIMATIC PCS 7 Lifecycle Services offers a future-proof basis for:

- Protection of your investments
- Securing plant availability
- Ability to calculate long-term maintenance costs
- Cost-optimized modernizations

More information

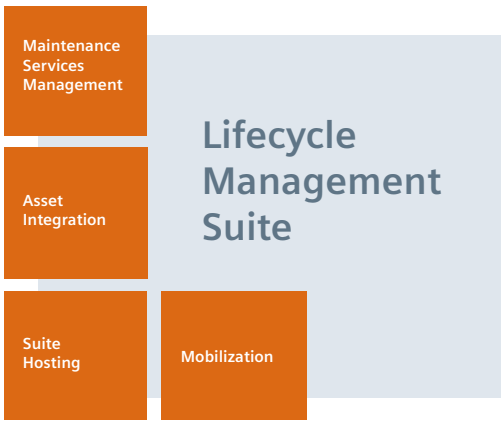
More information is available on the Internet at:

www.siemens.de/PCS7LCS

www.siemens.de/pils

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Overview



The Lifecycle Management Suite optimizes plant maintenance with regard to the planning, execution and documentation of all service activities. The pre-configured, COMOS MRO-based system provides standard operating procedures (SOP) which are assigned to the SIMATIC PCS 7 system components already entered.

"Mobilization" module – Initial setup is performed in the Mobilization module to precisely determine

- the products and systems used and their lifecycle status
- the existing maintenance processes and plant documentation

The execution of this module is a prerequisite and therefore an integral component for all further configuration modules.

"Suite Hosting" module – This module contains the COMOS MRO hosting – cloud-based or on-premises – with support and Software Update Service.

Option: Integration of the SIPIX Service Tablet

"Asset Integration" module – In addition to the "Suite Hosting" module, this module contains

- the integration of the installed base (iBase)
- the product master data entered
- the availability of obsolescence information

Option: Analyzer integration (automatic checkpoints)
Reports: Lifecycle Information Services | Trends

"Maintenance Services Management" module – In addition to the "Asset Integration" module, this module contains the integration of standard operation procedures for lifecycle services, for instance, service checkpoints that have to be performed regularly. Together with the imported project data and parts lists from SIMATIC PCS 7 installations, service work schedules can be automatically generated on this basis.

Reports: Service SOP Reports | Trends

Benefits

- Pre-configured CMMS system with assets and service checkpoints entered
- Consistent data maintenance through integration in a data platform creates transparency and traceability
- Mobile data access on site with maintenance information and documentation in real time

Ordering data

Ordering data	Article No.
Modules	
Suite Hosting	**9LA1110-5CA00-0AA0**
Asset Integration	**9LA1110-5CA00-0BA0**
• Maintenance Services Management	**9LA1110-5CA00-0CA0**
• Product Data Integration	**9LA1110-5CA00-1AA0**
• Installed Base Integration	**9LA1110-5CA00-1AB0**
• Service Standards Integration	**9LA1110-5CA00-1AC0**
• Obsolescence Check	**9LA1110-5CA00-1AD0**
System Status Integration	**9LA1110-5CA00-1AE0**
Mobilization – Suite Hosting	**9LA1110-5CA00-1CA0**
Mobilization – Asset Integration	**9LA1110-5CA00-1CB0**
Mobilization – Maintenance Services Management	**9LA1110-5CA00-1CC0**
Additional COMOS MRO floating license	**9LA1110-5CA00-1BA0**
Additional COMOS MRO named user	**9LA1110-5CA00-1CA0**
Additional 10-hour technical support / subscription cycle	**9LA1110-5CA00-1CD0**
Mobile Integration	**9LA1110-5CA00-1MA0**

More information

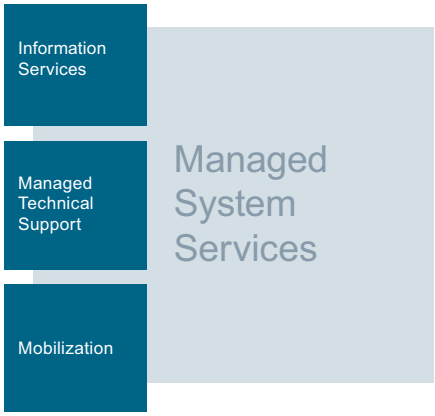
More information is available online at:

https://intranet.entry.siemens.com

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Managed System Services

Overview



Managed System Services offer competent and efficient support through a dedicated support manager. This central contact person ensures an efficient exchange of information between all parties involved.

The dedicated support manager brings together, coordinates and prioritizes all activities, is familiar with the customer's plant, knows the maintenance processes and the installed base and, if necessary, uses remote access for diagnostic and troubleshooting purposes.

Benefits

- Quicker processing and resolution of complex support requests
- Simplification of requests by means of central coordination and an exclusive "incoming" channel
- Higher “first-time-fix-rate"
- Prevents more expensive on-site service calls
- Greater transparency through active support management and regular status reports

Ordering data

You can choose from three different product versions for 5, 20 or 50 systems (number of utilized PLC and HMI systems). When ordering, the minimum contractual term is always at least one year.

	Article No.
Managed System Services for SIMATIC PCS 7	
• 6 months – DCS Starter, recommended for 20 systems	**9LA1110-1BG00**
• 1 year – DCS Small, recommended for 5 systems	**9LA1110-1BH00**
• 1 year – DCS Medium, recommended for 20 systems	**9LA1110-1BJ00**
• 1 year – DCS Large, recommended for 50 systems	**9LA1110-1BK00**
• 25-hour MSS support extension	**9LA1110-1BL00**

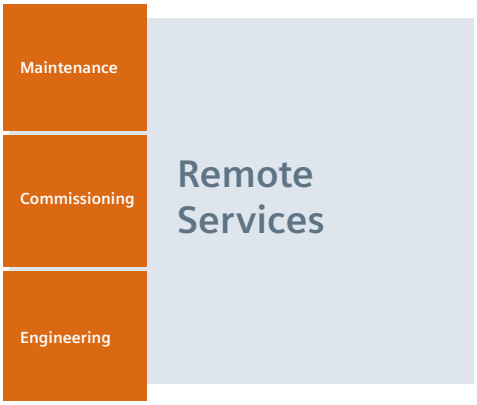
More information

More information is available online at:

www.siemens.de/mss

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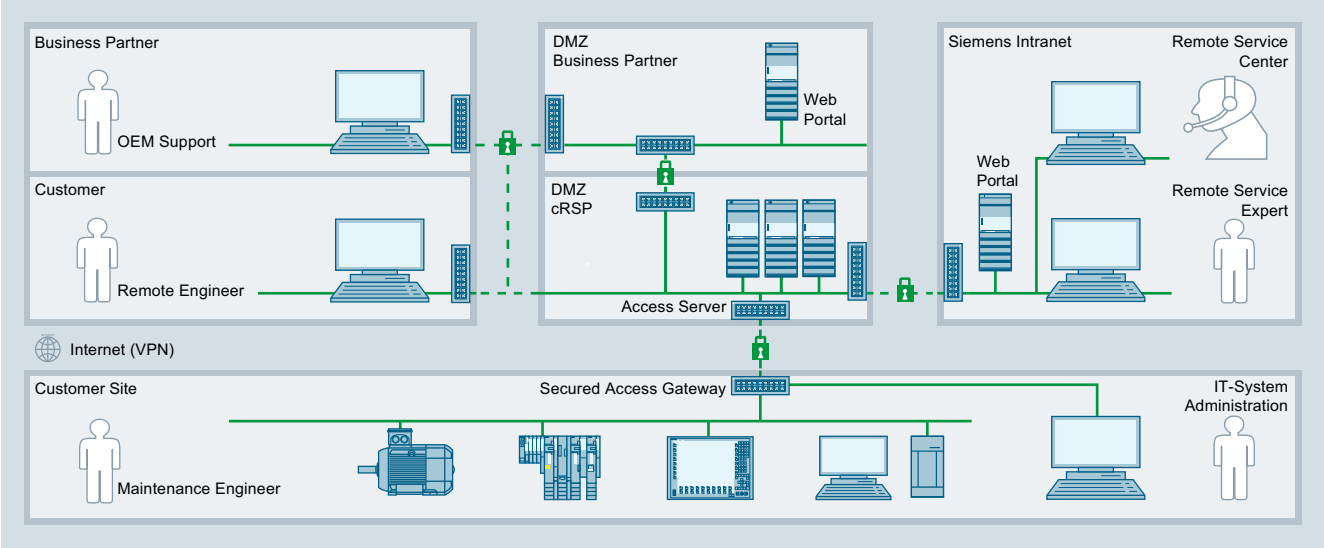
Overview



The engineering, commissioning and maintenance of automation systems involves significant amounts of both time and personnel resources, regardless of whether in a hazardous area or not. It is precisely these service tasks which can be optimally supported and even carried out remotely using powerful, modern communication media. It is imperative here that the growing IT safety requirements are met and that remote activities can be accounted for.

With our offering of platform-based remote services, our customers around the world can access centrally available expert knowledge of product manufacturers 24/7.

The 'Remote Access Services' (so-called 'connectivity packages') are required once per installation and enable communication between the customer system and Siemens IT infrastructure (cRSP = common Remote Service Platform); they consist of different hardware and software components. You can obtain detailed information from the Siemens representative in your region.



Siemens Remote Service platform

Benefits

- Secure remote connection of your automation system to the SIMATIC TechSupport IT infrastructure
- Global, direct connection to the network of the Siemens system experts
- Provision of the remote infrastructure including support and maintenance
- Complete transparency due to central administration of all system accesses
- Compatible with generally valid Industrial Security concepts
- TÜV/CERT certification of the Siemens cRSP infrastructure

Article No.

Ordering data

	Article No.
Modules	
Reactive services over cRSP, with max. 5 solved service requests	**9LA1110-1AA00**
Remote services for field devices – Reactive Services 1	**9LA1110-1PB00-0AA0**
Remote services for field devices – Reactive Services 5	**9LA1110-1PC00-0AA0**

More information

More information is available online at:

www.siemens.de/siremote

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Inventory Baseline Services

Overview



The correct decisions have to be made when planning modernization measures or when budgeting necessary maintenance measures. The basis for such decisions is an in-depth knowledge of the installed system base. The requirements in this context are:

- Uniform and complete inclusion of all installed automation components
- Implement inclusion in a relatively short time and at low costs
- Make the result available through standardized reports

With its Inventory Baseline Services, Siemens offers modern data-driven services that use new methods and tools to help you plan the maintenance of machines and plants even more efficiently.

Performing an inventory provides an overview of the currently installed plant equipment and the spare parts inventory. The result of the inventory is used as a decision-making tool when planning future measures for maintenance and modernization.

Inventory Baseline Services offer transparency with regard to the installed automation components of machines and plants and provide the data for additional lifecycle services such as SIMATIC System Audit, Lifecycle Information Services and Asset Optimization Services.

Benefits

- Cost-efficient and standardized inventory of all of the installed automation components
- Valid decision aid for planned plant expansions, modernizations as well as preparation for updates/upgrades
- Solid basis for planning and implementation of additional lifecycle services

Selection and ordering data

Complete order processing	**9LA1110-8AJ00-1AA0**
Partial processing evaluation of SDT data	**9LA1110-8AJ00-2AA0**
Expanded data volume for large plants	**9LA1110-8AJ00-4AA0**

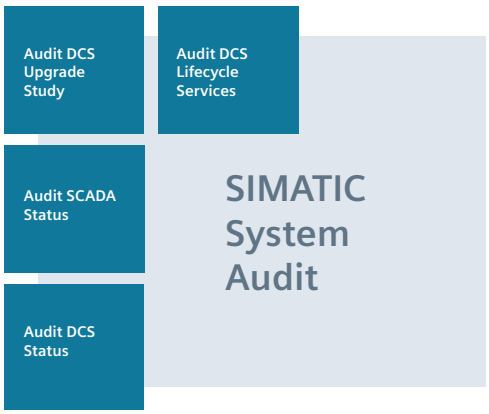
More information

More information is available online at:

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Overview



SIMATIC System Audit is used to analyze and evaluate the system status of SIMATIC PCS 7 systems or SIMATIC WinCC-based SCADA systems with lower SIMATIC S7 levels with regard to service capability, upgrade capability or lifecycle service contract compliance.

The modular structure allows for selective evaluation of the system status (assessment) as well as a detailed, comprehensive system analysis with fundamental statements on the current plant status and recommendations for restoration of the service and upgrade capability (audit).

Benefits

SIMATIC System Audit not only provides you with a comprehensive overview of the status of your automation system and the utilized components, it also offers a number of additional benefits:

- Competent analysis of weak points and risks with recommendations
- Avoidance or minimization of system risks for service and upgrade capability
- Reduction of standstill and downtimes by ensuring service capability
- Valid basis for the preparation of long-term lifecycle service contracts

SIMATIC System Audit is available for physical as well as virtual system configurations.

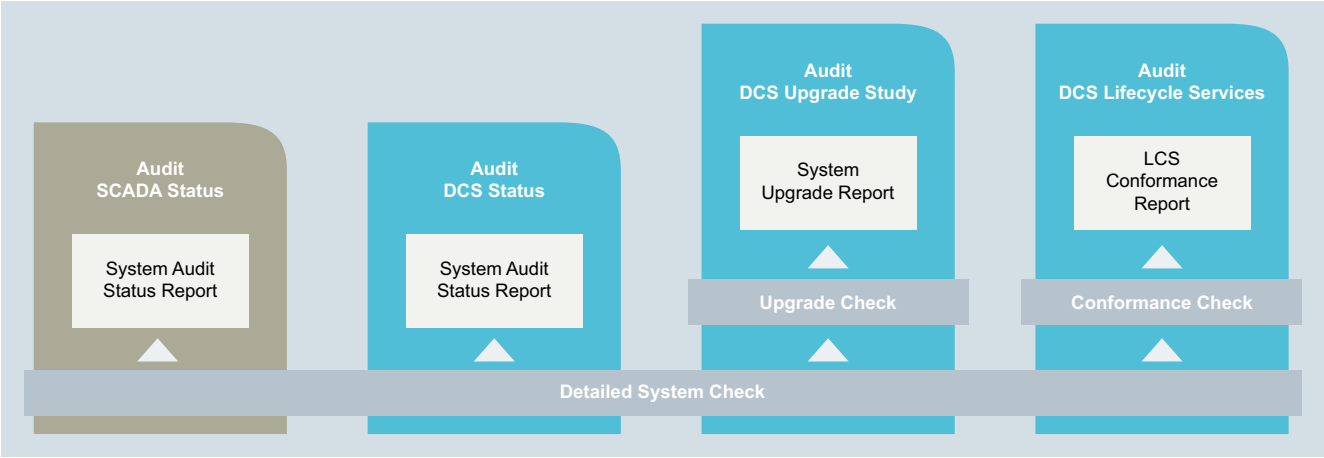
Ordering data

SIMATIC System - Assessment DCS	**9LA1110-8AC10-0AA1**
SIMATIC System Audit - DCS Status	**9LA1110-8AC10-4AA1**
SIMATIC System DCS - Upgrade Study	**9LA1110-8AC10-4AA2**
SIMATIC System Audit - DCS Lifecycle Services	**9LA1110-8AC10-4AA3**
SIMATIC System Audit DCS - Special Configurations	**9LA1110-8AC10-3AA1**
SIMATIC System - Assessment SCADA	**9LA1110-8AD10-0AA1**
SIMATIC System Audit - SCADA Status	**9LA1110-8AD10-1AA1**

More information

More information is available online at:

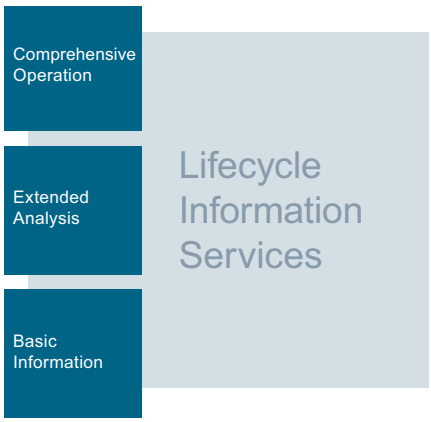
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Lifecycle Information Services

Overview



To plan your maintenance strategy, Lifecycle Information Services provide you regularly with detailed information on the product lifecycle of the utilized components.

The Lifecycle Information Services have a modular structure so that you need only request information that you actually require. Each of the following three methods returns a plant-specific report as result. You can decide for yourself how comprehensive you want this report to be.

- **Basic Information**
  Product Lifecycle Status focusing on analysis of functional obsolescence
- **Extended Analysis**
  "Basic Information" module and analysis of product-related statistical mean time between failures (MTBF)
- **Comprehensive Operation**
  "Extended" module supplemented with plant-specific information on updates/upgrades and general recommendations

Benefits

- Proactive, regular service information on the reduction of obsolescence risks
- Securing plant availability by means of specific service recommendations
- Prevention of unscheduled downtimes or cost-intensive supply bottlenecks
- Evaluation of new technological innovations

Ordering data

Ordering data	Article No.
Basic Information	
• Up to 50 article numbers	
- One-time service	**9LA1110-8AG10-1AA0**
- Cyclically 1 × per year	**9LA1110-8AG10-1AB0**
- Cyclically 2 × per year	**9LA1110-8AG10-1AC0**
- Cyclically 4 × per year	**9LA1110-8AG10-1AD0**
• 50 to 150 article numbers	
- One-time service	**9LA1110-8AG10-1BA0**
- Cyclically 1 × per year	**9LA1110-8AG10-1BB0**
- Cyclically 2 × per year	**9LA1110-8AG10-1BC0**
- Cyclically 4 × per year	**9LA1110-8AG10-1BD0**
• 150 to 300 article numbers	
- One-time service	**9LA1110-8AG10-1CA0**
- Cyclically 1 × per year	**9LA1110-8AG10-1CB0**
- Cyclically 2 × per year	**9LA1110-8AG10-1CC0**
- Cyclically 4 × per year	**9LA1110-8AG10-1CD0**
Extended Analysis	
• Up to 50 article numbers	
- One-time service	**9LA1110-8AG10-2AA0**
- Cyclically 1 × per year	**9LA1110-8AG10-2AB0**
- Cyclically 2 × per year	**9LA1110-8AG10-2AC0**
- Cyclically 4 × per year	**9LA1110-8AG10-2AD0**
• 50 to 150 article numbers	
- One-time service	**9LA1110-8AG10-2BA0**
- Cyclically 1 × per year	**9LA1110-8AG10-2BB0**
- Cyclically 2 × per year	**9LA1110-8AG10-2BC0**
- Cyclically 4 × per year	**9LA1110-8AG10-2BD0**
• 150 to 300 article numbers	
- One-time service	**9LA1110-8AG10-2CA0**
- Cyclically 1 × per year	**9LA1110-8AG10-2CB0**
- Cyclically 2 × per year	**9LA1110-8AG10-2CC0**
- Cyclically 4 × per year	**9LA1110-8AG10-2CD0**
Comprehensive Operation	
• Up to 50 article numbers	
- One-time service	**9LA1110-8AG10-3AA0**
- Cyclically 1 × per year	**9LA1110-8AG10-3AB0**
- Cyclically 2 × per year	**9LA1110-8AG10-3AC0**
- Cyclically 4 × per year	**9LA1110-8AG10-3AD0**
• 50 to 150 article numbers	
- One-time service	**9LA1110-8AG10-3BA0**
- Cyclically 1 × per year	**9LA1110-8AG10-3BB0**
- Cyclically 2 × per year	**9LA1110-8AG10-3BC0**
- Cyclically 4 × per year	**9LA1110-8AG10-3BD0**
• 150 to 300 article numbers	
- One-time service	**9LA1110-8AG10-3CA0**
- Cyclically 1 × per year	**9LA1110-8AG10-3CB0**
- Cyclically 2 × per year	**9LA1110-8AG10-3CC0**
- Cyclically 4 × per year	**9LA1110-8AG10-3CD0**

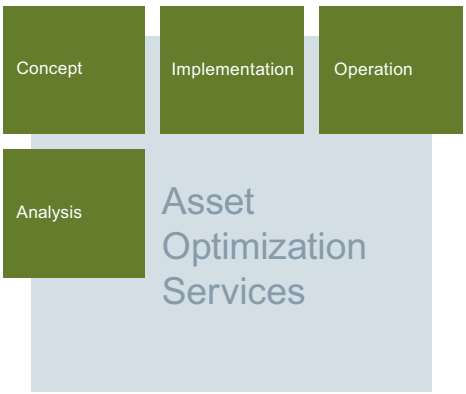
More information

More information is available online at:

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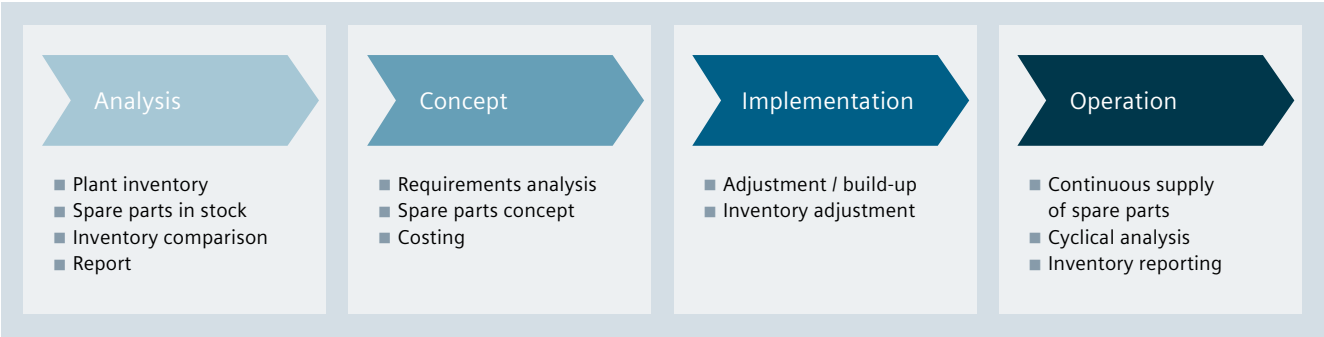
Overview



High plant availability with optimal spare part supply - Asset Optimization Services provide a structured and systematic procedure for the holistic optimization of the supply of spare parts.

The four phases of Asset Optimization Services are coordinated with each other but can also be used independently:

- Phase I: **Analysis**
  Determine the current spare part situation on site: Availability, product lifecycle, spare part delivery times
- Phase II: **Concept**
  The concept phase consists of an analysis of the actual requirements and the development of a spare part concept.
- Phase III: **Implementation**
  Based on the results of the concept phase, necessary inventory structures and inventory locations are established and spare parts procured.
- Phase IV: **Operation**
  The optimized and continuous supply of spare parts is an essential contribution to high plant availability. Depending on the specific contractual agreements, cyclic inventory analysis and a regular exchange of information also take place.



Benefits

- Creates transparency about the actual spare part requirements
- Ensures spare part availability across the entire lifecycle of the machine or plant and therefore fulfills an important prerequisite for improved service capability
- Shift to external inventory keeping and continuous supply with necessary spare parts

Ordering data

	Article No.
Analysis	**9LA1110-8AE10-1AA0**
Concept	**9LA1110-8AE10-2AA0**
Implementation	**9LA1110-8AE10-3AA0**
Operation - Spare Parts Supply	**9LA1110-8AE10-4AA0**
Operation - Spare Part Management	**9LA1110-8AE10-4BA0**
Additional options	
Product Extension Including 500 additional article numbers in the analysis phase	**9LA1110-8AE10-8AA0**
Time Extension 1 additional day for analysis and concept phase	**9LA1110-8AE10-8BA0**

More information

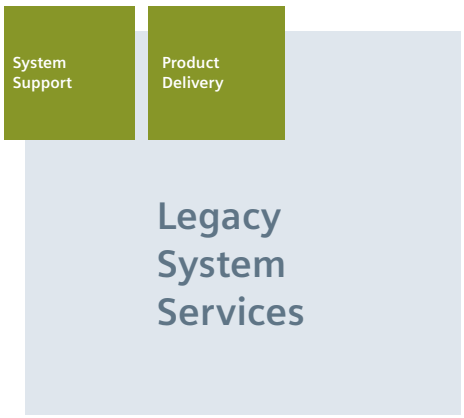
More information is available online at:

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Legacy System Services

Overview



Legacy System Services bridge the time until a planned plant modernisation of instrumentation and control based on SIMATIC PCS 7. Selected component from the product range of obsolete SIMATIC PCS 7 versions together with technical support ensure the continued operation of an exisiting plant for the agreed time.

System Support module

- Contractually guaranteed access to technical support for obsolete SIMATIC PCS 7 V(n-2) components
- Specialists with the relevant technological expertise who coordinate all queries.
- System support as a necessary option for the purchase of selected discontinued system components

Product Delivery module

- Guaranteed access to components of product version SIMATIC PCS 7 V(n-2)
- Purchase using standard ordering processes and regular article numbers
- This module is only available in combination with the "System Support" module

Benefits

- **Proactive support**
  Contractually guaranteed support for obsolete SIMATIC PCS 7 components – for operators and maintenance engineers – ensures continued plant operation.
- **Investment protection**
  Legacy System Services give you the necessary time and financial leeway until you can implement plant modernisation.
- **Cost transparency**
  Far more reliable maintenance cost planning ensures the cost-effective operation of the plant.

Ordering data

	Article No.
LSS System Support Starter	**9LA1110-8LA11-1AS0**
LSS System Support S	**9LA1110-8LA11-1AA0**
LSS System Support M	**9LA1110-8LA11-1AB0**
LSS System Support L	**9LA1110-8LA11-1AC0**
LSS Extension	**9LA1110-8LA11-1AX0**

More information

More information is available online at:

www.siemens.de/lss

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Overview



Holistic DCS system modernization not only requires updating the system software, but also modernizing and standardizing the individual applications. "DCS Library Services" offers you the ideal solution for library exchange to APL:

- Standardized library exchange at a fixed price and project-specific implementation of AS and OS components
- AS/OS analysis creates transparency
- More flexible blocks and higher-level control algorithms
- Swift and secure implementation with short test phase

Benefits

Innovative – The modernization of libraries enables participation in current and future DCS innovations.

Cost-efficient – The use of a standardized library leads to reduced maintenance costs and thereby avoids unplanned service costs.

Effective – System-oriented, customized processing in accordance with a standardized procedure results in efficient solutions, even for complex tasks.

Ordering data

Ordering data	Article No.
Block Exchange AS Basic Package/MP	**9LA1110-8DA00-3AA0**
Block Exchange AS per AS 417	**9LA1110-8DA00-3AD0**
Block Exchange AS per AS 416	**9LA1110-8DA00-3AC0**
Block Exchange AS per AS 414	**9LA1110-8DA00-3AB0**
AS Option – Reposition CFC Blocks	**9LA1110-8DA00-8AA0**
AS Option – SFC Plan Parameter Exchange	**9LA1110-8DA00-8AB0**
AS Option – Dissolve Chart-in-Chart	**9LA1110-8DA00-8AC0**
Block Exchange AS Analysis 5AS	**9LA1110-8DA00-1AA0**
Block Exchange AS Analysis 10AS	**9LA1110-8DA00-1AB0**
Block Exchange AS Analysis 20AS	**9LA1110-8DA00-1AC0**
Block Exchange AS Analysis 30AS	**9LA1110-8DA00-1AD0**
Block Exchange AS Analysis 50AS	**9LA1110-8DA00-1AE0**
Block Exchange OS Analysis	**9LA1110-8DA00-1BA0**
Block Exchange OS Analysis Option Detail	**9LA1110-8DA00-6BA0**
DCS Modernization Flexible Use	**9LA1110-8DA00-0CA0**
DCS Modernization Travel Costs	**9LA1110-8DA00-0CB0**

More information

More information is available online at:

https://intranet.entry.siemens.com

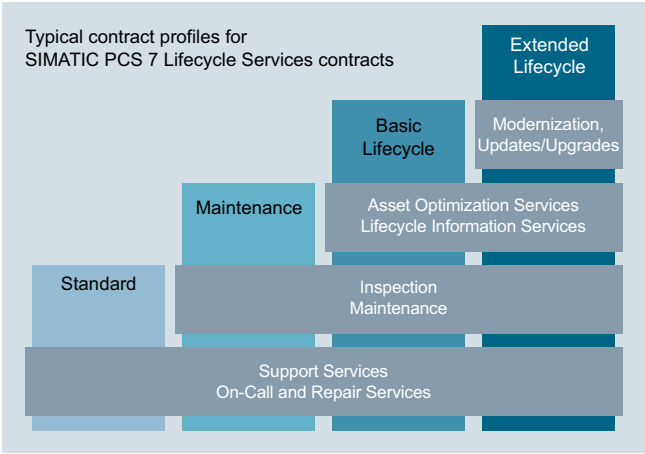
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Overview



The service elements introduced in the preceding sections form the basis for customized SIMATIC PCS 7 Lifecycle Service Contracts. Additional specific contract parameters, so-called service KPIs (e.g. terms of payment) can be agreed upon individually.

A prerequisite for entering into a Lifecycle Service Contract is an in-depth knowledge of the installed system base.



Typical variants of a Lifecycle Service contract are:

- **Standard**
  mainly contains reactive service elements, such as Technical Support, on-call or even repair services
- **Maintenance**
  includes the "Standard" profile with added services such as preventive inspection and maintenance
- **Basic Lifecycle**
  includes the "Maintenance" profile with added Lifecycle Information Services and Asset Optimization Services
- **Extended Lifecycle**
  includes the "Basic Lifecycle" profile with added comprehensive modernizations as well as updates and upgrades

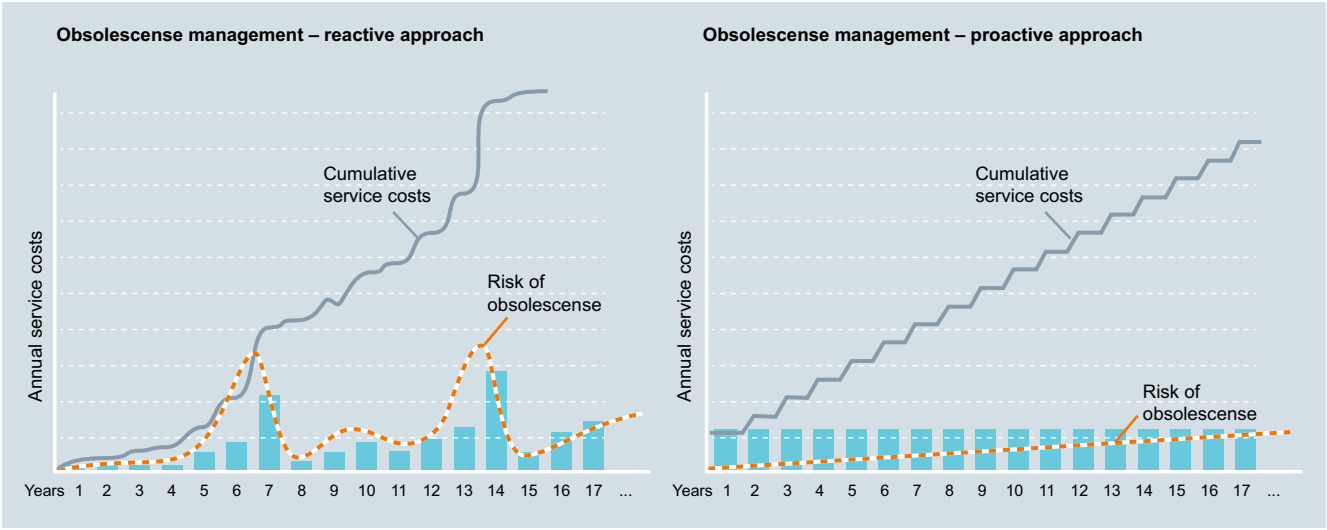
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Overview (continued)

Long-term investment protection with predictable costs

A **reactive service concept** increases the risk of obsolescence – operating expenses and unplanned standstills can fluctuate and are hard to predict. The investment pressure increases until an upgrade becomes necessary. Long-term maintenance planning is extremely difficult, the risks are difficult to assess and the overall costs cannot be clearly calculated.

With a **proactive service concept**, however, the management of obsolescence risks and modernizations can be planned consistently. The continuous maintenance of the plant keeps the obsolescence risk low; the optimized costs for maintenance and modernization (OPEX) are mostly consistent and therefore predictable.



Benefits

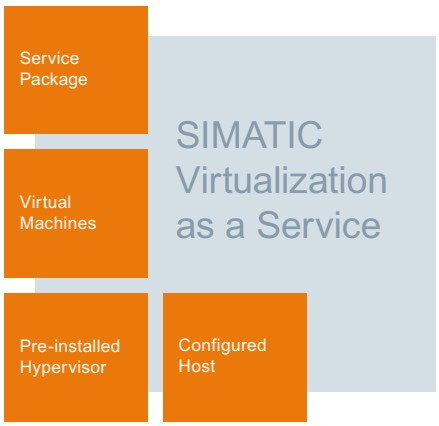
Benefits of a long-term service contract

- Long-term investment protection
- Planning capability for modernization and maintenance costs at the time of the investment across the entire lifetime of up to 15 years (TCO)
- Increased plant availability, for example, through guaranteed arrival times for service, secured spare part supply and preventive maintenance measures
- Ensure service capability through active obsolescence management for hardware and software components
- Securing system manufacturer know-how
- Professional project management from a single source for the entire duration of the contract

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SIMATIC Virtualization as a service

Overview



In addition to maintenance of the hardware platform, service and maintenance of the installed software components is decisive for the lifecycle costs of a PC-based control system. Together with IT technologies, innovative concepts, such as visualization, have been introduced to the industrial environment.

A virtual system needs less hardware, space and energy. It can also be serviced and maintained from a central location. The advantages are clear: greater flexibility at lower costs.

With SIMATIC Virtualization as a Service, you receive the lifecycle service for the virtual system including the matching hardware and software components directly from a single source and perfectly coordinated with each other.

SIMATIC Virtualization as a Service includes:

- Setup of a complete virtualization host
- Configuration of the virtual machines
- Installation and configuration of the operating systems
- Installation of the SIMATIC software
- Comprehensive service package

You have the option to supplement this offer with Managed Support Services and SIMATIC Remote Services.

Benefits

- Comprehensive lifecycle services for the virtual system including hardware and software – all from a single source
- Preconfigured, ready-to-use operator and engineering stations
- Optimal use of existing hardware resources
- Simple and cost-effective system expansions and updates

Ordering data

The offer comprises:

- Basic system (host hardware and installed Hypervisor software)
- Thin Client for system management
- Service package
- Range of different virtual machines (virtual machines can only be ordered in combination with a host)

You also have the option of ordering additional hardware and software components such as the VM vCenter server, the SIMATIC Batch SSD kit, additional thin clients as well as supplementary lifecycle services.

Virtual machines are subject to sliding-scale pricing.

	Article No.
Basic system for virtual machines with Windows Server 2008 or 2012	
HP ProLiant DL380 GEN10 with VMware Hypervisor	
• 12Cx1P HP Host System	**9LA1110-6SV00-1HB3**
• 16Cx1P HP Host System	**9LA1110-6SV00-1HC3**
• 12Cx2P HP Host System	**9LA1110-6SV00-1HE3**
• 16Cx2P HP Host System	**9LA1110-6SV00-1HF3**
Basic system for virtual machines with Windows Server 2016	
HP ProLiant DL380 GEN10 with VMware Hypervisor + 4x Microsoft Windows Server 2016 standard licenses 4Cx1P SIMATIC IPC	**9LA1110-6SV00-1HS1**
HP ProLiant DL380 GEN10 with VMware Hypervisor + 10x Microsoft Windows Server 2016 standard licenses 12Cx1P HP Host System	**9LA1110-6SV00-1HB4**
HP ProLiant DL380 GEN10 with VMware Hypervisor + Microsoft Windows Server 2016 datacenter license	
• 16Cx1P HP Host System	**9LA1110-6SV00-1HC4**
• 12Cx2P HP Host System	**9LA1110-6SV00-1HE4**
• 16Cx2P HP Host System	**9LA1110-6SV00-1HF4**
Management Console	
HP T630 Flexible Thin Client dual screen – international Win10 Emb operating system, international localization	**9LA1110-6SV00-1TA5**
HP T630 Flexible Thin Client dual screen – German Win10 Emb operating system, German localization	**9LA1110-6SV00-1TD5**
vSAN system for virtual machines with Windows Server 2016	
16Cx1P HP vSAN system HP ProLiant DL380 GEN10 with VMware Hypervisor + vSAN software + Microsoft Windows Server 2016 datacenter license	**9LA1110-6SV00-1HL4**
12Cx2P HP vSAN system HP ProLiant DL380 GEN10 with VMware Hypervisor + vSAN software + Microsoft Windows Server 2016 datacenter license	**9LA1110-6SV00-1HM4**

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Ordering data

	Article No.
vSAN switches	
HPE 5130 24G switch 24x1Gbit + 6x10Gbit network switch + 1x HPE242 10Gbit DAC cable 7m	**9LA1110-6SV00-1SW0**
Thin Clients	
Win10 Emb operating system, international localization	
• HP T730 Flexible Thin Client quad screen	**9LA1110-6SV00-1TB0**
• HP T630 Flexible Thin Client dual screen	**9LA1110-6SV00-1TA2**
Win10 Emb operating system, German localization	
• HP T730 Flexible Thin Client quad screen	**9LA1110-6SV00-1TD0**
• HP T630 Flexible Thin Client dual screen	**9LA1110-6SV00-1TD1**
Options	
SSD Batch kit For SIMATIC PCS 7 Batch server database	**9LA1110-6SV00-1BA0**
DIGI Anywhere USB 19" (for SIMIDongles)T	**9LA1110-6SV00-0SM0**
Extension Service for additional virtual machines For maximum 10 VMs	**9LA1110-6SV06-0AA0**
Service contract for Basic SIVaaS System	
2 year service contract	
• For 4Cx1P IPC	**9LA1110-6SV00-1AS4**
• For 12Cx1P host	**9LA1110-6SV00-1AB4**
• For 16Cx1P host	**9LA1110-6SV00-1AC4**
• For 12Cx2P host	**9LA1110-6SV00-1AE4**
• For 16Cx2P host	**9LA1110-6SV00-1AF4**
5 year service contract	
• For 4Cx1P IPC	**9LA1110-6SV00-1AS5**
• For 12Cx1P host	**9LA1110-6SV00-1AB5**
• For 16Cx1P host	**9LA1110-6SV00-1AC5**
• For 12Cx2P host	**9LA1110-6SV00-1AE5**
• For 16Cx2P host	**9LA1110-6SV00-1AF5**
Extension of service contracts	
3 year service contract extension	
• For host 9LA1110-6SV00-1HB1	**9LA1110-6SV00-1EB3**
• For host 9LA1110-6SV00-1HC1	**9LA1110-6SV00-1EC3**
• For host 9LA1110-6SV00-1HE1	**9LA1110-6SV00-1EE3**
• For host 9LA1110-6SV00-1HF1	**9LA1110-6SV00-1EF3**
Service contracts for vSAN system	
2 year service contract	
• For 16Cx1P vSAN host	**9LA1110-6SV00-1AL4**
• For 12Cx2P vSAN host	**9LA1110-6SV00-1AM4**
• For HPE 5130 24G switch	**9LA1110-6SV00-1SW1**
5 year service contract	
• For 12Cx2P vSAN host	**9LA1110-6SV00-1AM5**
• For 16Cx1P vSAN host	**9LA1110-6SV00-1AL5**
• For HPE 5130 24G switch	**9LA1110-6SV00-1SW3**

	Article No.
VMware software	
VMware vCenter Server Foundation Appliance with license	**9LA1110-6SV05-0VF0**
VMware vCenter Server Standard Appliance with license	**9LA1110-6SV05-0VS0**
VMware software service contract	
2 year service contract	
• For vCenter Server Foundation	**9LA1 110-6SV00-1VF0**
• For vCenter Server Standard	**9LA1 110-6SV00-1VS0**
5 year service contract	
• For vCenter Server Foundation	**9LA1110-6SV00-1VF1**
• For vCenter Server Standard	**9LA1110-6SV00-1VS1**
Virtual machines	
VM with W2008 Server R2, 64-bit	**9LA1110-6SV05-0AA1**
VM with W2012 Server R2, 64-bit	**9LA1110-6SV05-0AA2**
VM with PCS 7 V8.2 SP1 W2012 Server R2 operating system, 64-bit	
• OS server	**9LA1110-6SV05-1AB2**
• ES/OS client	**9LA1110-6SV05-1GB3**
• OS client	**9LA1110-6SV05-1HB2**
• BATCH server	**9LA1110-6SV05-1LB2**
• BATCH client and OS client	**9LA1110-6SV05-1JB2**
VM with WinCC V7.4 SP1 W2012 Server R2 operating system, 64-bit	
• Server	**9LA1110-6SV05-2AB2**
• Client	**9LA1110-6SV05-2BB2**
VM with PCS 7 V9.0 W2012 Server R2 operating system, 64-bit	
• OS server	**9LA1110-6SV05-1AB3**
• ES/OS client	**9LA1110-6SV05-1GB5**
• OS client	**9LA1110-6SV05-1HB3**
• BATCH server	**9LA1110-6SV05-1LB3**
• BATCH client and OS client	**9LA1110-6SV05-1JB3**
VM with W2016 Server, 64-bit	**9LA1110-6SV05-0AA3**
VM with PCS 7 V9.0 SP1 W2016 Server operating system, 64-bit	
• OS server	**9LA1110-6SV05-1AB4**
• ES/OS client	**9LA1110-6SV05-1GB6**
• OS client	**9LA1110-6SV05-1HB4**
• BATCH server	**9LA1110-6SV05-1LB4**
• BATCH client and OS client	**9LA1110-6SV05-1JB4**
• Route control server	**9LA1110-6SV05-1MB4**
• Route control client / OS client	**9LA1110-6SV05-1NB4**
VM with SIMIT V10 W2016 Server R2 operating system, 64-bit	
• Simulation software	**9LA1110-6SV05-0SM4**
• Virtual controller	**9LA1110-6SV05-0SM5**
VM with SINEMA Remote Connect	**9LA1110-6SV05-0SR0**

More information

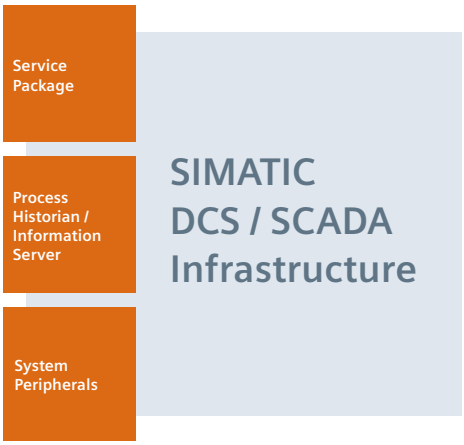
More information is available online at:

www.siemens.de/sivaas

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SIMATIC DCS / SCADA infrastructure

Overview



Historical data from the plant provides a central key to increased productivity. Tapping into the considerable volume of data for plant optimization requires a powerful archiving and reporting system. Siemens Industry Services supplies a comprehensive solution: an archiving system comprising server hardware and software, and process control keyboard, together with the necessary services – all from a single source.

SIMATIC DCS/SCADA infrastructure is a powerful, preconfigured IT infrastructure with preinstalled SIMATIC automation software. The hardware system is preconfigured in line with the specific requirements of the given application. The fully integrated archiving system comprises:

- A high-performance hardware platform
- Microsoft Windows Server installations and licenses
- Installation and configuration of Process Historian/Information Server software
- Optional: individual configuration for process control keyboard

This offer includes a 5-year comprehensive service package. A dedicated service contact person will provide you with professional assistance throughout the term of the contract and coordinate all support activities.

Benefits

- System configuration as required and preinstallation of software (Siemens and third-party software)
- Fully integrated long-term archiving solution for large volumes of data without additional engineering
- Plant expansion without disruption to operation
- Fast and easy access to historical plant data from an Office environment and rapid reporting
- Technical support for all components installed and for the complete system

Ordering data

The offer comprises:

- Basic server hardware, preinstalled and preconfigured
- Service package

	Article No.
Basic systems	
HP standard host for Process Historian (6Cx1P)	
• Small	**9LA1110-6PH11-0DA6**
• Large	**9LA1110-6PH11-0CA4**
Five-year service contract for the standard host	**9LA1110-6PH02-0DA6**
System peripherals	
Process control keyboard for SIMATIC PCS 7	**9AE4270-1AA00**

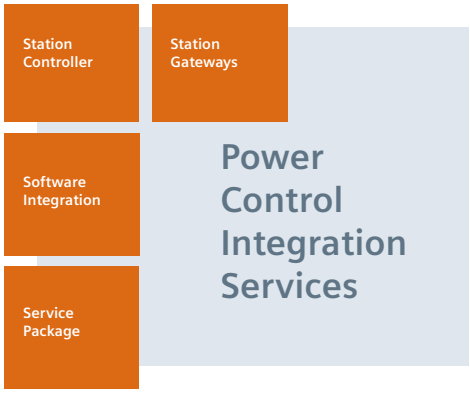
More information

More information is available online at:

www.siemens.de/sidsi

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Overview



In many process plants, large electrical loads with high levels of energy consumption are in use, e.g. large drives, heavy blowers, pumps, etc. They are integrated via medium-voltage switchgear which controls, switches and automates the individual loads via devices for protection and control functions (IEDs) on the basis of the IEC 61850 standard.

SIMATIC PCS 7 PowerControl allows the homogeneous integration of switchgear in the SIMATIC PCS 7 process control system, thus creating a uniform system platform for process and energy. This platform is freely scalable – from simple visualization of the protection devices in small plants to high-availability integration of electrical loads in large plants.

Benefits

- Efficient – Cost-effective solution based on standard components (Industrial Ethernet)
- Flexible – Scalable and flexible from just a few to several hundred devices
- Lifecycle-oriented – Long-term preservation of service capability through assured spare parts availability and technical support

Ordering data

Ordering data	Article No.
IEC61850 Station Gateway Hardware/Software Package for 64 IEDs	**9LA1110-6BC10-0AA0**
IEC61850 Station Gateway Hardware/Software Package for 128 IEDs	**9LA1110-6BC10-0AA1**
5 year service contract Technical support, hardware replacement parts, software updates	**9LA1110-6BC10-0AX0**
IEC61850 Station Gateway Single Upgrade 128 IEDs	**9LA1110-6BC10-0AU0**
IEC61850 Station Gateway Extension Package	**9LA1110-6BC10-0AE0**
System architecture, feasibility study	**9LA1110-6BC10-0AS0**
Headquarters project support 4-hour extended support when 2-hour standard support limit exceeded	**9LA1110-6BC10-0AS1**

More information

More information is available online at:

https://intranet.entry.siemens.com

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Notes

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18/2	**SITRAIN – Training for Industry**
18/3	**Partner · Industry Mall and Interactive Catalog CA 01**
18/4	**Information and Download Center**
18/5	**Partners at Siemens**
18/6	**Industry Services**
18/7	Portfolio overview
18/8	Online Support
18/9	**Software licenses**
18/11	**Conditions of sale and delivery**

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Your benefit from practical training directly from the manufacturer

SITRAIN – Training for Industry – provides you with comprehensive support in solving your tasks.

Training directly from the manufacturer enables you to make correct decisions with confidence.

Increased profits and lower costs:

- Shorter times for commissioning, maintenance and servicing
- Optimized production operations
- Reliable configuration and commissioning
- Shortened startup times, reduced downtimes, and faster troubleshooting
- Exclude expensive faulty planning right from the start.
- 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:

SITRAIN – Training for Industry
SITRAIN Customer Support Germany

Tel.: +49 911 895-7575
Fax: +49 911 895-7576

Email: info@sitrain.com

Your benefits with SITRAIN – Training for Industry

Certified top trainers

Our trainers are skilled specialists with practical experience. Course developers have close contact with product development, and pass on their knowledge to the trainers and then to you.

Practical application with practice

Practice, practice, practice! We have designed the trainings with an emphasis on practical exercises. They take up to half of the course time in our trainings. You can therefore implement your new knowledge in practice even faster.

300 courses in more than 60 countries

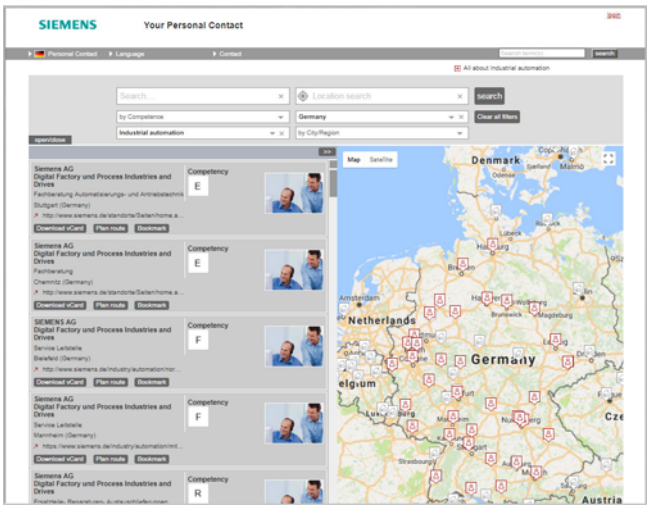
We offer a total of about 300 classroom-based courses. You can find us at more than 50 locations in Germany, and in 62 countries worldwide. You can find which course is offered at which location at:
www.siemens.com/sitrain

Skills development

Do you want to develop skills and fill in gaps in your knowledge? Our solution: We will provide a program tailored exactly to your personal requirements. After an individual requirements analysis, we will train you in our training centers near you or directly at your offices. You will practice on the most modern training equipment with special exercise units. The individual training courses are optimally matched to each other and help with the continuous development of knowledge and skills. After finishing a training module, the follow-up measures make success certain, as well as the refreshment and deepening of the knowledge gained.

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Partner at Siemens



At your service locally, around the globe for consulting, sales, training, service, support, spare parts on the entire portfolio of Digital Factory and Process Industries and Drives.

Your partner can be found in our Personal Contacts Database at:
www.siemens.com/automation-contact

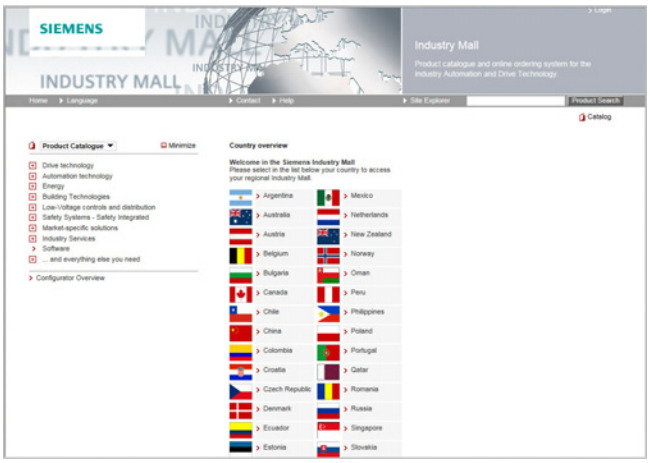
You start by selecting

- the required competence,
- products and branches,
- a country and a city

or by a

- location search or free text search.

Easy product selection and ordering in the Industry Mall and with the Interactive Catalog CA 01



Industry Mall

The Industry Mall is a Siemens Internet ordering platform. Here you have a clear and informative online access to a huge range of products.

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.

Data transfer allows the whole procedure, from selection through ordering to tracking and tracing, to be carried out online. Availability checks, customer-specific discounts and bid creation are also possible.

www.siemens.com/industrymall



Interactive Catalog CA 01 - Products for Automation and Drives

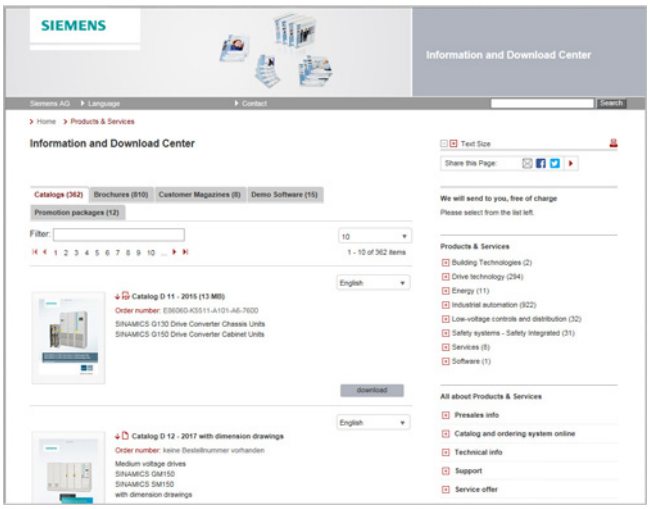
The Interactive Catalog CA 01 combined with the Siemens Industry Mall unites the benefits of offline and online media in one application – the performance of an offline catalog with the availability of manifold and up-to-date information on the Internet.

Select products and assemble orders with the CA 01, determine the availability of the selected products and track & trace via the Industry Mall.

More information and download:
www.siemens.com/automation/ca01

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Downloading catalogs



In the Information and Download Center you can download catalogs and brochures in PDF format without having to register.

The filter dialog makes it possible to carry out targeted searches.

www.siemens.com/industry/infocenter

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Overview

Siemens Solution and Approved Partner – Partners for your success



Highest competence in automation and drive technology

Siemens works closely together with selected partner companies around the world in order to ensure that customer requirements for all aspects of automation and drives are fulfilled as best as possible – wherever you are, and whatever the time.

We place great value on our customers acting in accordance with the same ideals which characterize Siemens as a whole: Competence, professionalism and quality. That is why continuous development through qualification and certification measures in line with global standards is a central aspect of our Partner Program. This means that with our partners, you benefit from the same high quality standards all over the world.
The partner emblem is the symbol for tried and tested quality.

The partner network for industry

The Siemens Partner Program offers you expertise and experience close at hand.

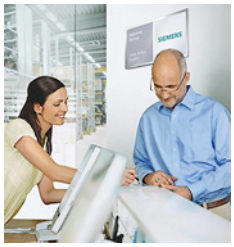
Within our global network, we distinguish between Solution Partners and Approved Partners. We currently work with more than 1,500 Solution Partners around the world. Our network of over 150 Approved Partners continues to grow. In more than 80 countries worldwide

Siemens Solution Partner – Automation Drives



At present we are working with more than 1,500 Solution Partners worldwide. They are characterized by extensive application, system and sector knowledge, as well as proven project experience, and are able to implement future-proof tailored solutions of the highest quality, based on our product and system portfolio.

Siemens Approved Partner – Value Added Reseller



With their detailed technical knowledge, Siemens Approved Partners – Value Added Resellers offer a combination of products and services that range from specialist technologies and customized modifications to the provision of high-quality system and product packages. They also provide qualified technical support and assistance.

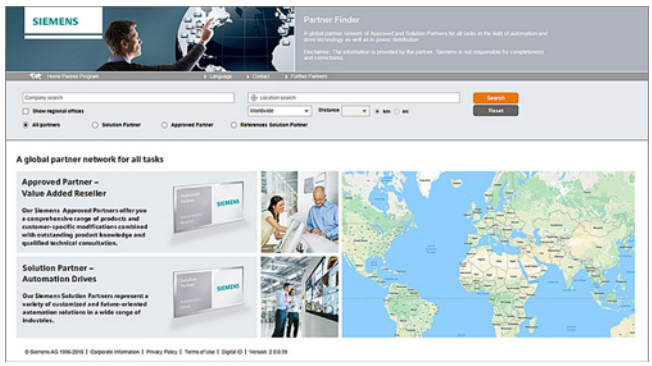
Siemens Approved Partner – Industry Services



Siemens Approved Partner – Industry Services put their unique expertise entirely at the service of enhancing your productivity and can be instrumental in ensuring the availability of your plants.

Partner Finder

The ideal partner for your task is just a mouse click away!



In the Siemens global Solution Partner program, customers are certain to find the optimum partner for their specific requirements – with no great effort. The Partner Finder is basically a comprehensive database that showcases the profiles of all our partners.

Easy selection:
Set filters in the search screen form according to the criteria that are relevant to you. You can also directly enter the name of an existing partner.

Skills at a glance:
Gain a quick insight into the specific competencies of any particular partner with the reference reports.

Direct contact option:
Use our electronic query form:

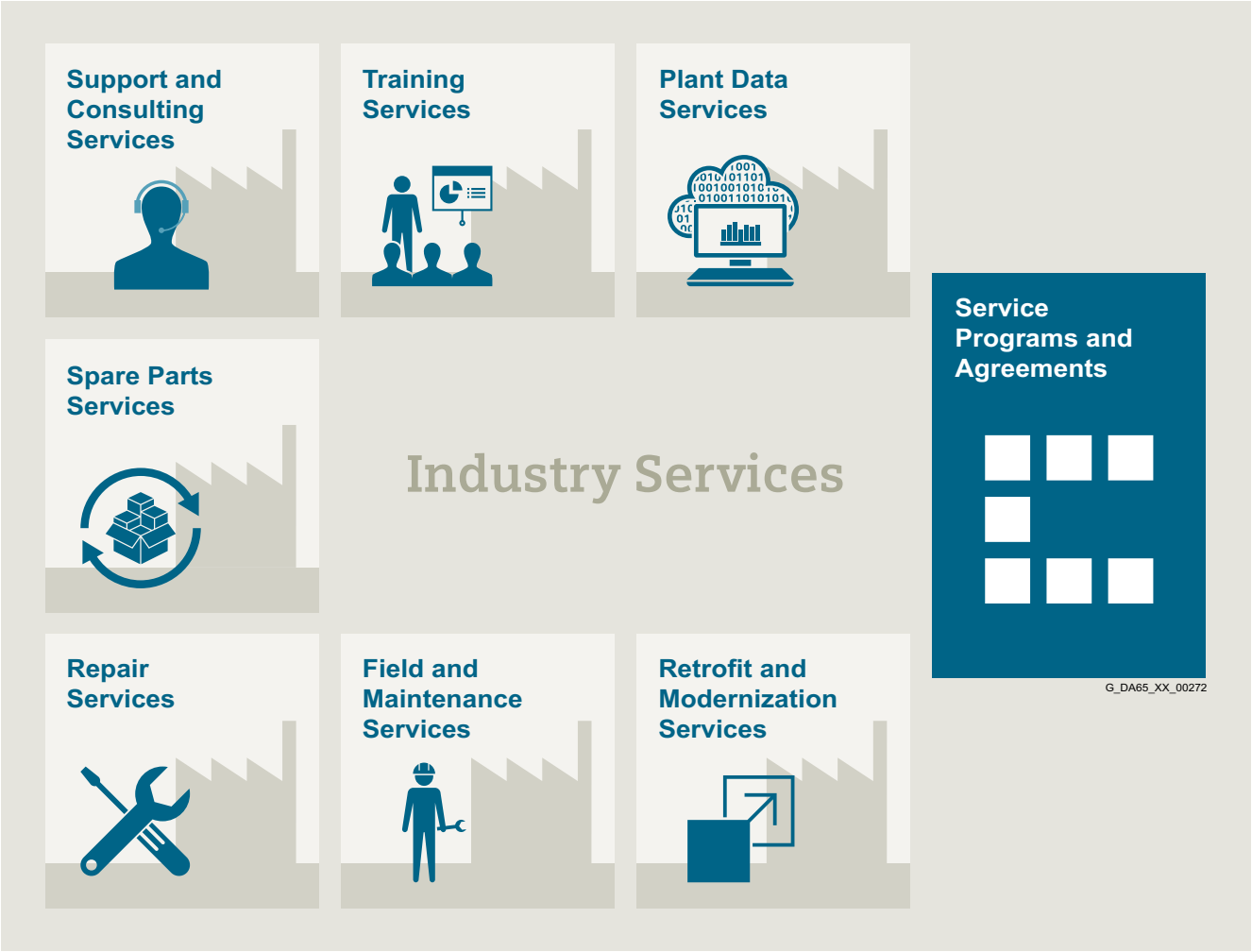
www.siemens.com/partnerfinder

Additional information of the Siemens Parners for industry is available online at:

www.siemens.com/partnerprogram

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Overview



Keep your business running and shaping your digital future – with Industry Services

Optimizing the productivity of your equipment and operations can be a challenge, especially with constantly changing market conditions. Working with our service experts makes it easier. We understand your industry's unique processes and provide the services needed so that you can better achieve your business goals.

You can count on us to maximize your uptime and minimize your downtime, increasing your operations' productivity and reliability. When your operations have to be changed quickly to meet a new demand or business opportunity, our services give you the flexibility to adapt. Of course, we take care that your production is protected against cyber threats. We assist in keeping your operations as energy and resource efficient as possible and reducing your total cost of ownership. As a trendsetter, we ensure that you can capitalize on the opportunities of digitalization and by applying data analytics to enhance decision making: You can be sure that your plant reaches its full potential and retains this over the longer lifespan.

You can rely on our highly dedicated team of engineers, technicians and specialists to deliver the services you need – safely, professionally and in compliance with all regulations. We are there for you, where you need us, when you need us.

www.siemens.com/industryservices

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Overview



Digital Industry Services

Digital Industry Services make your industrial processes transparent to gain improvements in productivity, asset availability, and energy efficiency.

Production data is generated, filtered and translated with intelligent analytics to enhance decision-making.

This is done whilst taking data security into consideration and with continuous protection against cyber-attack threats.
https://www.siemens.com/global/en/home/products/services/industry/digital-services.html



Training Services

From the basics and advanced to specialist skills, SITRAIN courses provide expertise right from the manufacturer – and encompass the entire spectrum of Siemens products and systems for the industry.

Worldworldwide, SITRAIN courses are available wherever you need a training course in more than 170 locations in over 60 countries.
https://support.industry.siemens.com/cs/ww/en/sc/2226

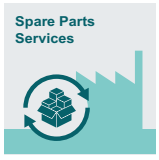


Support and Consulting Services

Industry Online Support site for comprehensive information, application examples, FAQs and support requests.

Technical and Engineering Support for advice and answers for all inquiries about functionality, handling, and fault clearance. The Service Card as prepaid support for value added services such as Priority Call Back or Extended Support offers the clear advantage of quick and easy purchasing.

Information & Consulting Services, e.g. SIMATIC System Audit; clarity about the state and service capability of your automation system or Lifecycle Information Services; transparency on the lifecycle of the products in your plants.
https://support.industry.siemens.com/cs/ww/en/sc/2235



Spare Parts

Spare Parts Services are available worldwide for smooth and fast supply of spare parts – and thus optimal plant availability. Genuine spare parts are available for up to ten years. Logistic experts take care of procurement, transport, custom clearance, storage and order management. Reliable logistics processes ensure that components reach their destination as needed.

Since not all spare parts can be kept in stock at all times, Siemens offers a preventive measure for spare parts provisioning on the customer's premises with optimized **Spare Parts Packages** for individual products, custom-assembled drive components and entire integrated drive trains – including risk consulting.

Asset Optimization Services help you design a strategy for parts supply where your investment and carrying costs are reduced and the risk of obsolescence is avoided.
https://support.industry.siemens.com/cs/ww/en/sc/2110



Repair Services

Repair Services are offered on-site and in regional repair centers for fast restoration of faulty devices' functionality.

Also available are extended repair services, which include additional diagnostic and repair measures, as well as emergency services.
https://support.industry.siemens.com/cs/ww/en/sc/2154



Field and Maintenance Services

Siemens specialists are available globally to provide expert field and maintenance services, including commissioning, functional testing, preventive maintenance and fault clearance.

All services can be included in customized service agreements with defined reaction times or fixed maintenance intervals.
https://support.industry.siemens.com/cs/ww/en/sc/2265



Retrofit and Modernization Services

Provide a cost-effective solution for the expansion of entire plants, optimization of systems or upgrading existing products to the latest technology and software, e.g. migration services for automation systems.

Service experts support projects from planning through commissioning and, if desired over the entire extended lifespan, e.g. Retrofit for Integrated Drive Systems for an extended lifetime of your machines and plants.
https://support.industry.siemens.com/cs/ww/en/sc/2286



Service Programs and Agreements

A technical Service Program or Agreement enables you to easily bundle a wide range of services into a single annual or multi-year agreement.

You pick the services you need to match your unique requirements or fill gaps in your organization's maintenance capabilities.

Programs and agreements can be customized as KPI-based and/or performance-based contracts.
https://support.industry.siemens.com/cs/ww/en/sc/2275

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Overview



Siemens Industry and Online Support with some 1.7 million visitors per month is one of the most popular web services provided by Siemens. It is the central access point for comprehensive technical know-how about products, systems and services for automation and drives applications as well as for process industries.

In connection with the challenges and opportunities related to digitalization you can look forward to continued support with innovative offerings.

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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 supply 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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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:

- for installation work the "General Conditions for Erection Works – Germany"[1] ("Allgemeine Montagebedingungen – Deutschland" (only available in German at the moment)) and/or
- for Plant Analytics Services the "Standard Terms and Conditions for Plant Analytics Services – for Customers in Germany"[1] ("Allgemeine Geschäftsbedingungen für das Plant Analytics Services – für Kunden in Deutschland" (only available in German at the moment)) and/or
- for stand-alone software products and software products forming a part of a product or project, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or registered Office in Germany"[1] and/or
- for other supplies and/or services the "General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry"[1].
  In case such supplies and/or services should contain Open Source Software, the conditions of which shall prevail over the " General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry "[1], a notice will be contained in the scope of delivery in which the applicable conditions for Open Source Software are specified. This shall apply mutatis mutandis for notices referring to other third party software components.

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:

- for Plant Analytics Services the "Standard Terms and Conditions for Plant Analytics Services"[1] and/or
- for services the "International Terms & Conditions for Services"[1] supplemented by "Software Licensing Conditions"[1] and/or
- for other supplies of hard- and software the "International Terms & Conditions for Products"[1] supplemented by "Software Licensing Conditions" [1]

1.3 For customers with master or framework agreement

To the extent our supplies and/or services offered are covered by an existing master or framework agreement, the terms and conditions of that agreement shall apply instead of T&C.

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 charge 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.

[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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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 may be subject to license. We shall indicate in the delivery details whether licenses are required under German, European and US export lists.

Our products are controlled by the U.S. Government (when labeled with "ECCN" unequal "N") and authorized for export only to the country of ultimate destination for use by the ultimate consignee or end-user(s) herein identified. They may not be resold, transferred, or otherwise disposed of, to any other country or to any person other than the authorized ultimate consignee or end-user(s), either in their original form or after being incorporated into other items, without first obtaining approval from the U.S. Government or as otherwise authorized by U.S. law and regulations.

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.

Products labeled with "AL" unequal "N" are subject to European / national export authorization. Products without label, with label "AL:N" / "ECCN:N", or label "AL:9X9999" / "ECCN: 9X9999" may require authorization from responsible authorities depending on the final end-use, or the destination.

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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Catalogs

Digital Factory, Process Industries and Drives and Energy Management

Further information can be obtained from our branch offices listed at www.siemens.com/automation-contact

Interactive Catalog	*Catalog*
Products for Automation and Drives	**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
Digital: 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 Converter Units SINAMICS S120 Cabinet Modules SINAMICS S150 Converter Cabinet Units	D 21.3
SINAMICS S120 and SIMOTICS	D 21.4
SINAMICS DCM DC Converter, Control Module	D 23.1
SINAMICS Inverters for Single-Axis Drives · Built-In Units	D 31.1
SINAMICS Inverters for Single-Axis Drives · Distributed Inverters	D 31.2
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Digital: SINAMICS S210 Servo Drive System	*D 32*
Digital: SINAMICS V90 Basic Servo Drive System	*D 33*
Digital: SINAMICS G120P and SINAMICS G120P Cabinet pump, fan, compressor converters	*D 35*
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Digital: Three-Phase Induction Motors SIMOTICS HV, SIMOTICS TN	*D 84.1*
Digital: Three-Phase Induction Motors SIMOTICS HV	*D 84.3*
High Voltage Three-phase Induction Motors SIMOTICS HV Series A-compact PLUS	D 84.9
Digital: Modular Industrial Generators SIGENTICS M	*D 85.1*
Synchronous Motors with Permanent-Magnet Technology, HT-direct	D 86.2
DC Motors	DA 12
SIMOVERT PM Modular Converter Systems	DA 45
MICROMASTER 420/430/440 Inverters	DA 51.2
MICROMASTER 411/COMBIMASTER 411	DA 51.3
Low-Voltage Three-Phase-Motors	
SIMOTOCS S-1FG1 Servo geared motors	D 41
SIMOTICS Low-Voltage Motors	D 81.1
SIMOTICS FD Low-Voltage Motors	D 81.8
LOHER Low-Voltage Motors	D 83.1
Digital: MOTOX Geared Motors	*D 87.1*
SIMOGEAR Geared Motors	MD 50.1
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FLENDER Standard Couplings	MD 10.1
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SINUMERIK 808 Equipment for Machine Tools	NC 81.1
SINUMERIK 828 Equipment for Machine Tools	NC 82
SIMOTION Equipment for Production Machines	PM 21
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Safety Technology for Factory Automation	SI 10

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