Catalog ST PCS 7 · March 2006

simatic PCS 7

SIMATIC PCS 7
Process Control System

SIEMENS

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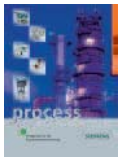
Field Instruments for Process Automation FI 01

Order No.:
E86060-K6201-A101-A7-7600



Training for Automation and Industrial Solutions ITC

Order No.:
E86060-K6850-A101-B6 (Paper)
E86060-D6850-A100-C4-7400 (CD-ROM)

CA 01 - The Offline Mall for Automation and Drives CA 01

Order No.:
E86060-D4001-A110-C4-7600 (CD-ROM)
E86060-D4001-A510-C4-7600 (DVD)

A&D Mall

Internet:
www.siemens.com/automation/mall

SIMATIC PCS 7
Process Control System

Catalog
ST PCS 7 · March 2006

Supersedes:
Catalog ST PCS 7 · April 2005

The products contained in this catalog can also be found in the e-Catalog CA 01
Order No.:
E86060-D4001-A110-C4-7600 (CD-ROM)
E86060-D4001-A510-C4-7600 (DVD)

Please contact
your local
Siemens branch

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. 1323-03). The certificate is recognized by all IQNet countries.

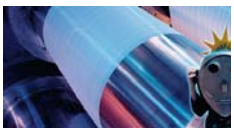
SIEMENS

Welcome to Automation and Drives

We would like to welcome you to Automation and Drives and our comprehensive range of products, systems, solutions and services for production and process automation and building technology worldwide.

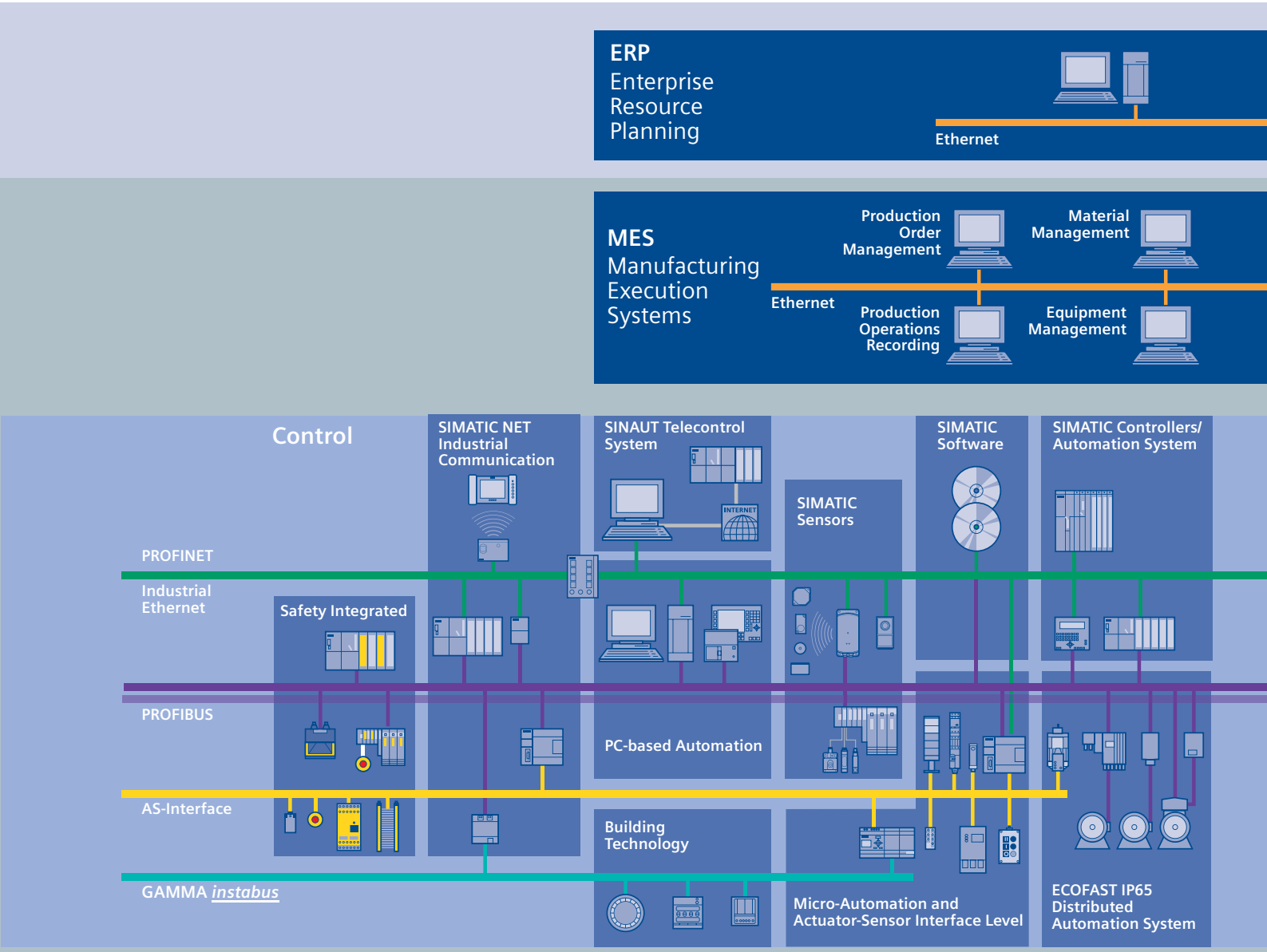
With Totally Integrated Automation and Totally Integrated Power, we deliver solution platforms based on standards that offer you a considerable savings potential.

Discover the world of our technology now. If you need more detailed information, please contact one of your regional Siemens partners.
They will be glad to assist you.

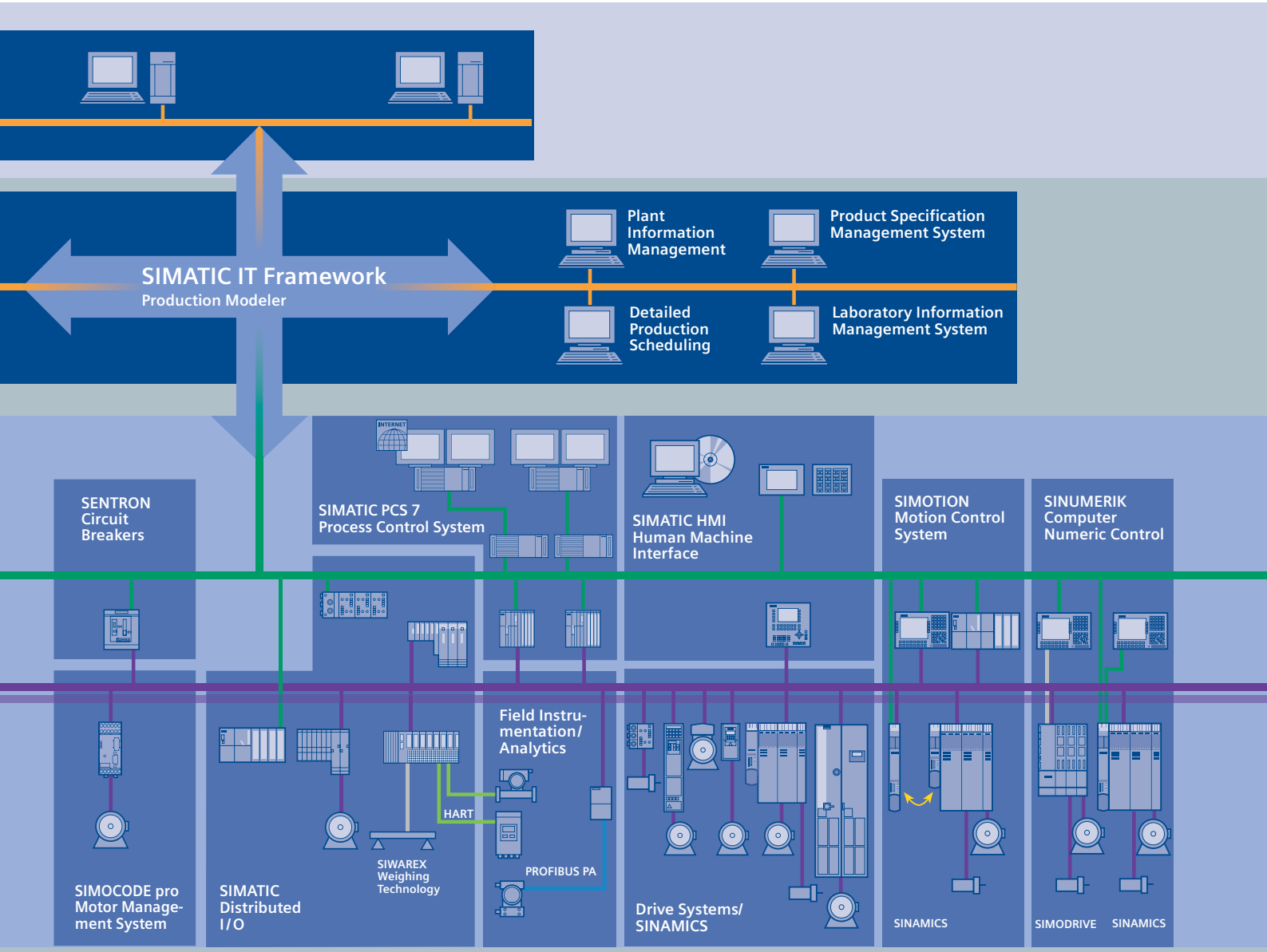


Totally Integrated Automation – innovations for more productivity

With the launch of Totally Integrated Automation, we were the first ones on the market to consistently implement the trend from equipment to an integrated automation solution, and have continuously improved the system ever since.
Whether your industry is process- and production-oriented or a hybrid, Totally Integrated Automation is a unique "common solution" platform that covers all the sectors.
Totally Integrated Automation is an integrated platform for the entire production line - from receiving to technical processing



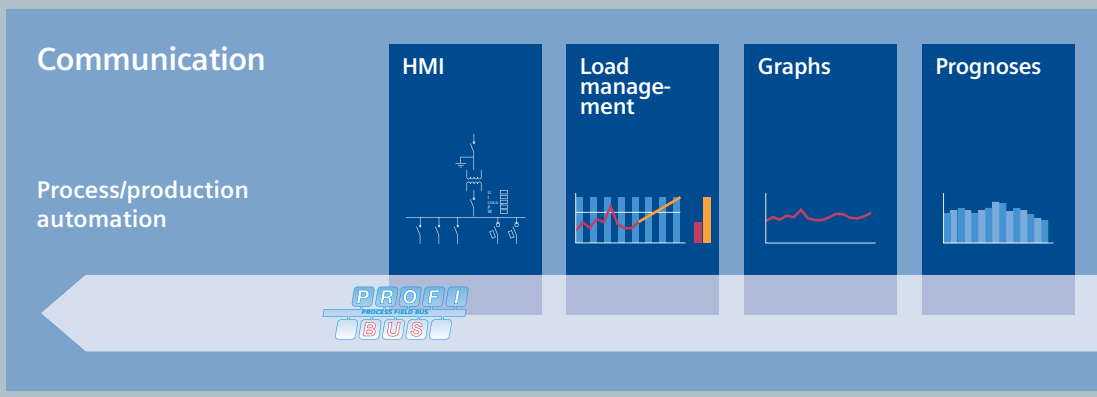
and production areas to shipping. Thanks to the system-oriented engineering environment, integrated, open communications as well as intelligent diagnostics options, your plant now benefits in every phase of the life cycle.
In fact, to this day we are the only company worldwide that can offer a control system based on an integrated platform for both the production and process industry.

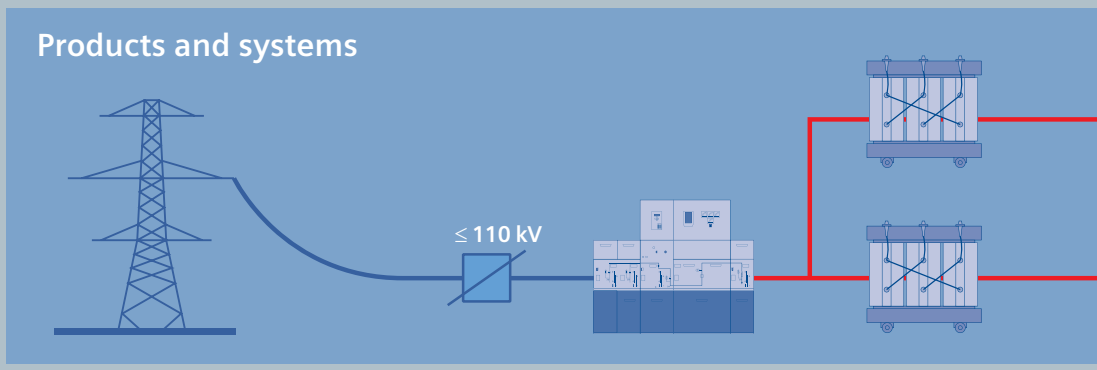


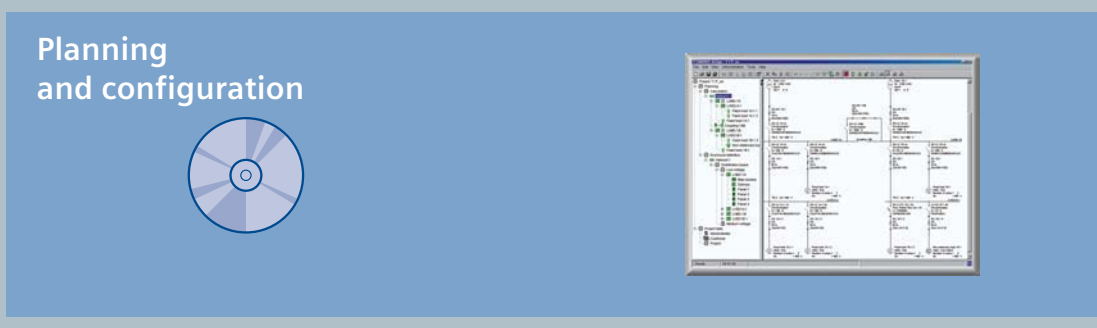
Totally Integrated Power – integrated power distribution from one source

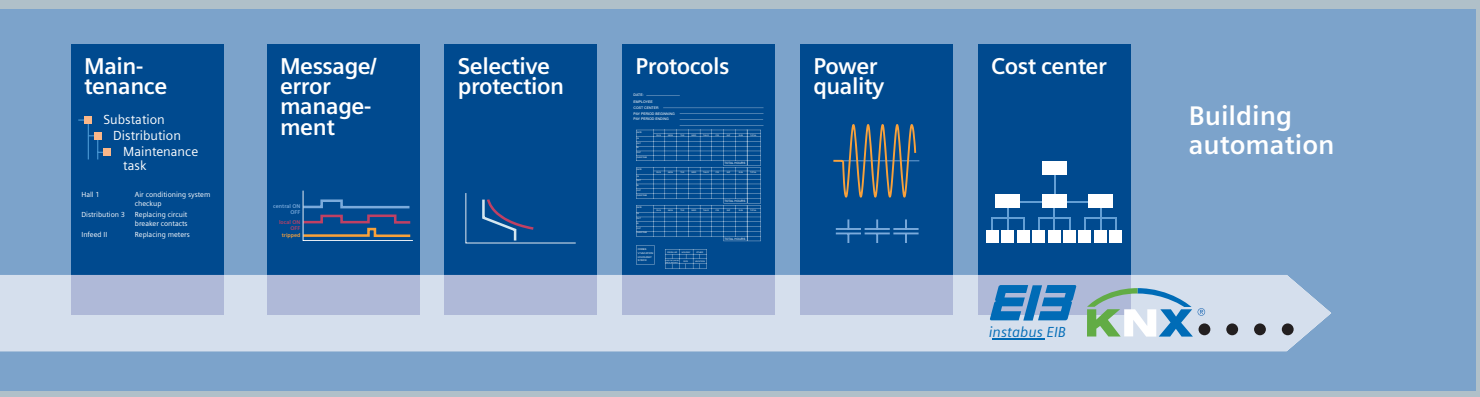
Totally Integrated Power by Siemens offers integrated solutions for power distribution in commercial, institutional and industrial buildings ranging from medium voltage to the wall outlet.

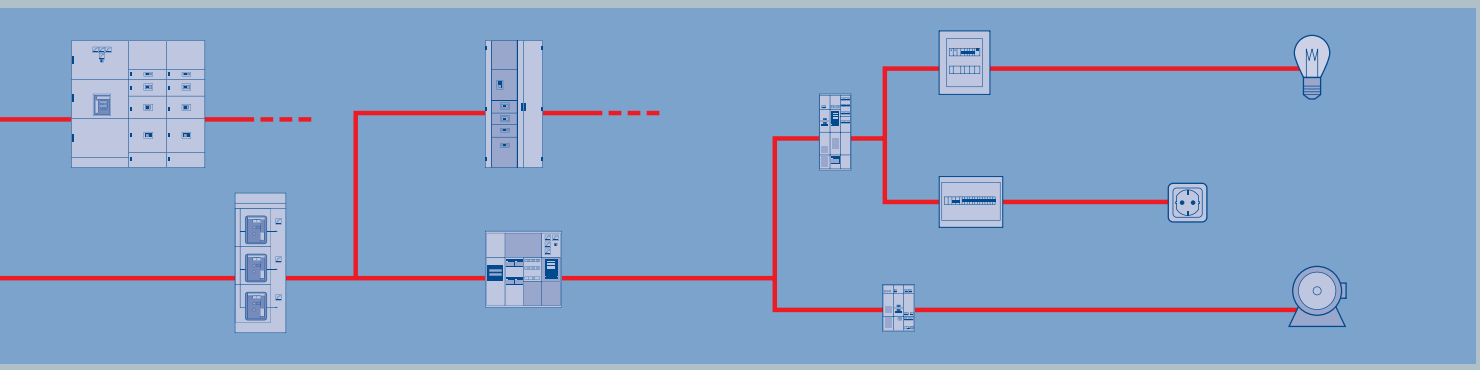
Totally Integrated Power is based on the integration in planning and configuration as well as on interface-optimized products and systems. In addition, it features communication and software modules for interfacing power distribution systems to industrial automation and building automation, thus offering a substantial savings potential.

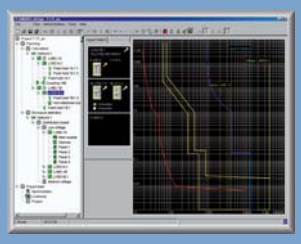


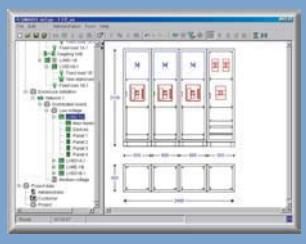


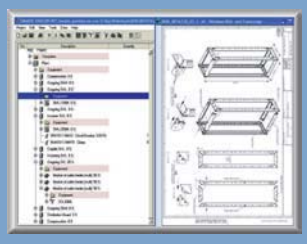




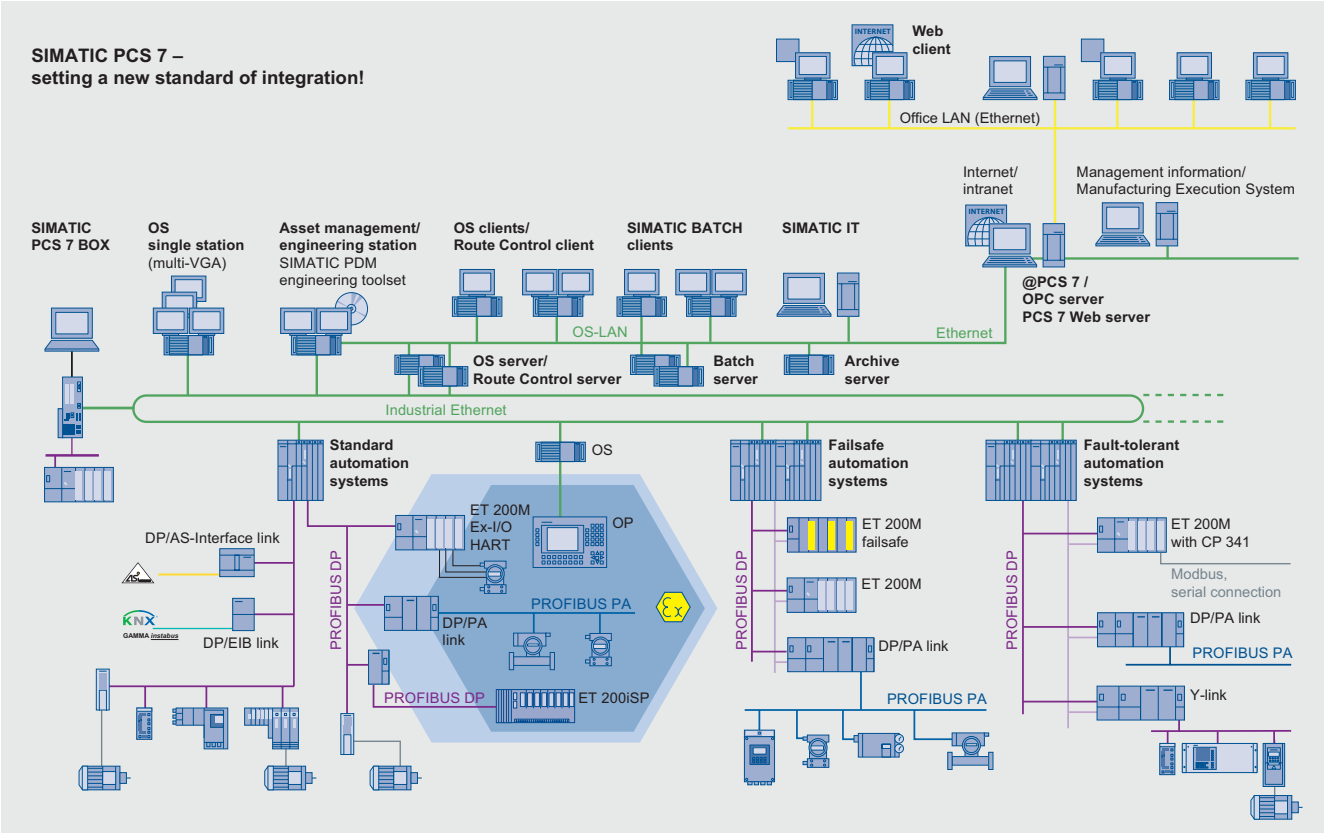








Overview



SIMATIC PCS 7 system configuration

Totally Integrated Automation with SIMATIC PCS 7

The SIMATIC PCS 7 process control system is a significant component of Totally Integrated Automation (TIA), the unique basis offered by Siemens for uniform and customized automation in all sectors of the production, process and hybrid industries. Using TIA, Siemens is the only company able to offer uniform automation technology on one single platform for all applications of process automation, starting with input logistics, covering production or primary processes as well as downstream (secondary) processes, up to output logistics. This is suitable for optimization of all operating sequences of an entire company, i.e. from the ERP (Enterprise Resource Planning) level and MES (Management Execution System) level to the control level, right down to the field level.

Integrated in a holistic automation solution for a production site, automation of the primary processes is the prime task of SIMATIC PCS 7. On the other hand, secondary processes (e.g. filling, packaging) or input/output logistics (e.g. raw material distribution, storage) are frequently implemented using the PLC-based or PC-based components of SIMATIC.

The advantages of Totally Integrated Automation, in particular the uniform data management, communication and configuration, are already evident during planning and engineering, but also during installation and commissioning, everyday operation as well as maintenance, repairs and modernization.

Uniform data management means that all software components access a common database. Within a project, inputs and modifications are therefore only necessary at one point. This reduces the work required, and simultaneously avoids potential faults. Once symbolic identifications have been introduced, they are understood by every software component. Data consistency is also guaranteed even if several persons are working simultaneously on a project. Parameters defined in the engineering system can be transferred beyond the network limits down to sensors, actuators or drives in the field.

Uniform communication from the corporate management level down to the field level is based on internationally recognized standards such as Industrial Ethernet or PROFIBUS, and also supports the global flow of information via the Internet. Since the hardware and software components involved also use these communications mechanisms, connections are extremely easy to configure, also cross-system or over different networks.

The use of an engineering system with a uniform and matched range of tools minimizes the configuration overhead. The engineering tools for the application software, the hardware components and the communications functions can be called from a central project manager (SIMATIC Manager). This is also the basic application for creation, management, saving and documentation of a project.

Compatibility of further developments is guaranteed within TIA. This also guarantees that the company's investments have a secure future, and allows the company to modernize and expand the plants throughout the complete lifecycle.

Benefits

The innovative design of SIMATIC PCS 7 is based on a modular and open architecture using state-of-the-art SIMATIC technology, consistent implementation of industrial standards, and process control functionalities combined with high performance. This means that with the SIMATIC PCS 7 process control system, users can achieve cost-effective implementation and economical operation of process control facilities during all phases of their life cycle and with due allowance for all aspects: from planning, engineering, commissioning and training to operation, maintenance, servicing, expansion and renovation. In the process, SIMATIC PCS 7 unifies high performance and reliability with simple and safe operation and maximum convenience.

Customers benefit from Totally Integrated Automation and the SIMATIC PCS 7 process control system mainly through

- calculable development, implementation and life cycle costs,
- minimization of engineering resources,
- process optimization options,
- flexibility to adapt quickly to changes in requirements,
- advantages resulting from the use of SIMATIC standard components, such as
  - low hardware and engineering costs,
  - proven quality and stability,
  - simple, fast definition and selection of system components,
  - low costs for spare parts,
  - short delivery times for spare parts and expansion components,
  - worldwide availability,
  - savings in logistics, maintenance and training costs.

Function

A uniform and homogeneous overall system

SIMATIC PCS 7 is a modern process control system that can be used alone and in combination with other systems, e.g. SIMATIC, SIMOTION or drive systems, as a consistent and homogenous overall system. The attractiveness of SIMATIC PCS 7 is growing in step with the demand for seamless, uniform automation engineering, which is being fueled by unrelenting competition and pressure on prices, demand for production plants of increasing flexibility, and the need to enhance productivity.

Against the background of ever-increasing complexity, in particular due to the merging of automation engineering with information technology, horizontal and vertical integrated system platforms are being increasingly accepted in comparison with automation solutions with so-called "best-in-class products".

Totally Integrated Automation with SIMATIC PCS 7 combines consistent data management, communication and configuration with outstanding system properties and high performance. This guarantees that the typical demands placed on a process control system are comprehensively satisfied, and that you are perfectly equipped for future requirements:

- Simple and reliable process control
- User-friendly operation and visualization, also using the Internet
- Powerful, fast and consistent system-wide engineering
- System-wide online modifications
- System openness at all levels
- Flexibility and scalability
- Redundancy at all levels
- Failsafe automation solutions
- Extensive fieldbus integration
- Flexible solutions for batch processes
- Incorporation of material transport
- Asset management for I&C equipment (diagnostics, preventive maintenance and repairs),
- Direct interface with the IT world.

Flexibility and scalability

As a result of its modular and open architecture, which is based on selected hardware and software components from the standard SIMATIC range, SIMATIC PCS 7 can be applied effectively in small and large plants alike. It allows easy expansion or system modification to enable customers to meet the changing production requirements of their facility. SIMATIC PCS 7 is scalable from a small single system consisting of approx. 160 process objects (motors, valves, PID controllers), such as might be used for a laboratory system or a test center, up to a distributed multi-user system with client/server architecture and approx. 60,000 process objects, such as might be used for automation of a very large production plant or for groups of connected facilities.

SIMATIC PCS 7 thus covers all sizes of plant - and if the plant grows, SIMATIC PCS 7 grows with it!

Open for the future

SIMATIC PCS 7 is based on modular hardware and software components, which are perfectly matched to one another due to their conformance with TIA. These components are flexible and expandable, and are open for future enhancements through the use of standard interfaces with long-term stability. This means it is possible to provide long-term protection for customer investments despite high innovation speeds and short product life cycles.

SIMATIC PCS 7 consistently applies new, powerful technologies together with internationally established industrial standards such as IEC, XML, PROFIBUS, Ethernet Gigabit technology, TCP/IP, OPC, @aGlance, ISA-88 and ISA-95, just to mention a few.

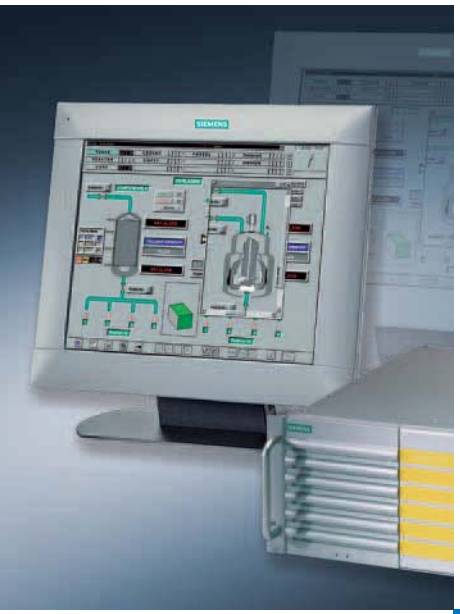
The openness of SIMATIC PCS 7 extends over all levels, and covers the automation systems and process I/Os as well as industrial communications networks, operator systems and engineering systems.

It not only includes the system architecture and communications, but also the programming and data exchange interfaces for user programs as well as the import and export functions for graphics, text and data, e.g. from the CAD/CAE world. SIMATIC PCS 7 can therefore also be combined with components from other vendors, and integrated in existing infrastructures.

Introduction

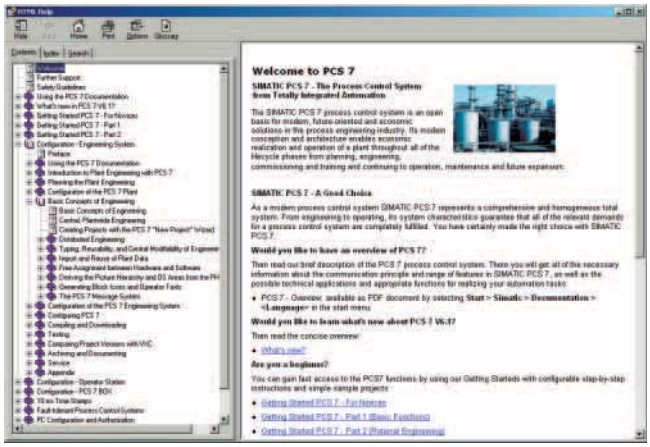
System-neutral components

2



System documentation

Overview



The system documentation of the SIMATIC PCS 7 process control system is an integral component of the SIMATIC PCS 7 system software. It is available in two versions:

- As online help (HTML help)
- As electronic documentation in Acrobat Reader format (PDF)

The 3-language documentation (German, English, French) 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.

Programming guide for creating driver blocks

A separate programming guide for creating driver blocks is also available. This programming guide helps the advanced SIMATIC PCS 7 user to create system-conform driver blocks, which can be placed like standard components on system plans and automatically parameterized and configured in HW Config.

S7 Manual Collection

As a supplement to the SIMATIC PCS 7 system documentation, the S7 Manual Collection provides comprehensive information on all system components offered in the context of SIMATIC S7. This multi-language collection of electronic manuals on DVD contains the following documentation in addition to the SIMATIC PCS 7 system documentation:

- SIMATIC S7-200/300/400,
- SIMATIC C7,
- LOGO! logic module,
- SIMATIC DP,
- SIMATIC PC,
- SIMATIC programming devices,
- STEP 7,
- engineering software,
- runtime software,
- SIMATIC PCS 7,
- SIMATIC HMI and
- SIMATIC NET.

The electronic manuals of the S7 Manual Collection are usually in 5 languages (German, English, French, Italian, Spanish), those of the integral SIMATIC PCS 7 system documentation mostly in 3 languages (German, English, French). When migrating existing plants, you may also require detailed information on the system components of TELEPERM M or SIMATIC S5.

TELEPERM M Manual Collection

The TELEPERM M Manual Collection comprises TELEPERM M manuals in 2 languages (German, English) on CD.

S5 Manual Collection

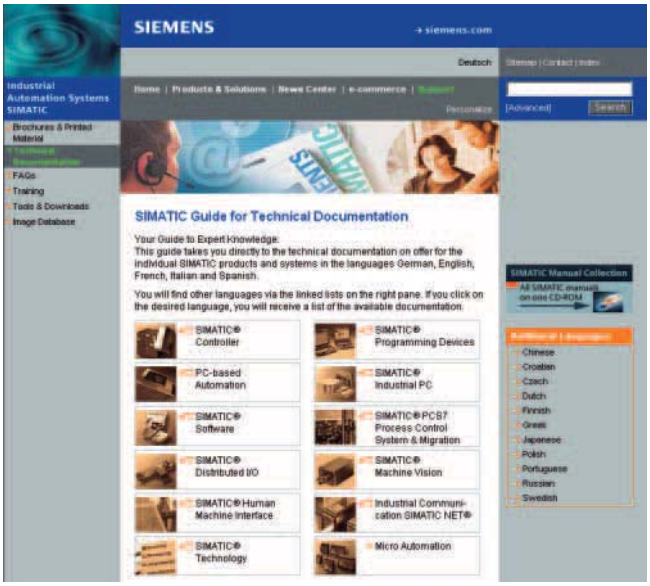
An S5 Manual Collection in 2 languages (German, English) on CD, which contains all electronic manuals concerning SIMATIC S5, rounds off the range of available information.

Selection and Ordering Data

	Order No.	
SIMATIC PCS 7 Programming Instructions for creating driver blocks for SIMATIC PCS 7 V6.x and V5.2, in Acrobat Reader format (PDF) on CD, German, English	**6ES7 653-1XD16-8YX8**	
SIMATIC S7 Manuals		
S7 Manual Collection Electronic manuals on DVD, in 5 languages (German, English, French, Italian, Spanish)	**6ES7 998-8XC01-8YE0**	D)
S7 Manual Collection - maintenance service for 1 year Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates	**6ES7 998-8XC01-8YE2**	D)
TELEPERM M Migration Manuals		
TELEPERM M Manual Collection Electronic manuals on CD, in 2 languages (German, English)	**6DL5 900-8AX03-8YX8**	D)
SIMATIC S5 Manuals		
S5 Manual Collection Electronic manuals on CD, in 2 languages (German, English)	**6ES5 998-7WE02**	D)

D) Subject to export regulations: AL: N, ECCN: 5D992B1

More information



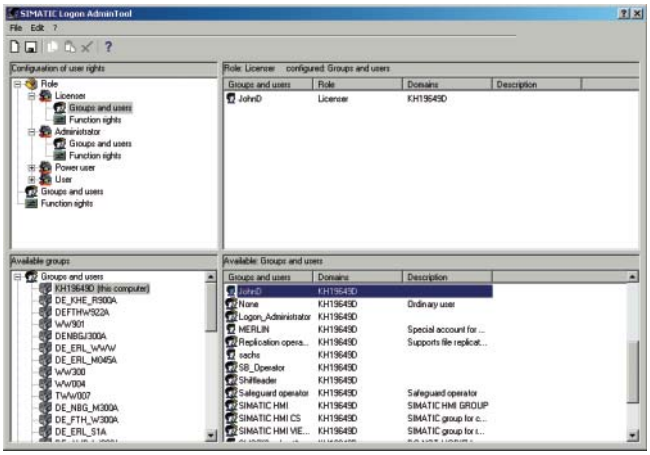
The "SIMATIC Technical Documentation Guide" on the Internet directs you straight to the complete range of technical documentation available for SIMATIC products and systems in German, English, French, Italian and Spanish. If other languages are available, you can also find them there. You can select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

Additional informationen is available in the Internet under:

http://www.siemens.com/simatic-docu

Administration

Overview



Central user management, access control and electronic signature

SIMATIC Logon offers central user administration with access control based on Windows 2000/XP and Windows Server 2003 for the SIMATIC PCS 7 system components as well as non-SIMATIC components connected through an interface. It can be used to fulfill the validation requirements of 21 CFR Part 11. An electronic signature function can also be used in conjunction with SIMATIC Logon.

The optional chipcard reader can be used as a logon device in addition to the keyboard. SIMATIC Logon additionally supports logon devices which can be operated with a Microsoft device driver for the respective operating system (e.g. logon devices at a USB port). It is also possible, however, to connect logon devices using a specially created device-specific driver, e.g. a fingerprint mouse.

The number of SIMATIC Logon licenses required depends on the number of clients/single stations that access applications for which SIMATIC Logon is used for access protection.

Function

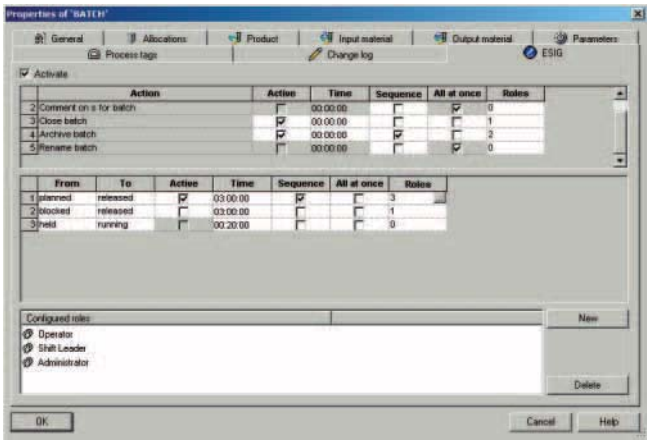
SIMATIC Logon Admin Tool

Using the SIMATIC Logon Admin Tool it is possible to assign the roles defined in the SIMATIC PCS 7 applications (e.g. Automation License Manager and SIMATIC BATCH) to the Windows users/user groups. Administrators with the necessary Windows administrator privileges can also use the SIMATIC Logon Admin Tool to edit Windows users and user groups.

SIMATIC Logon Service

The login dialog of the SIMATIC Logon Service is activated when an application is started which is managed by SIMATIC Logon. The user receives his specific privileges after making the login, password and domain entries. The SIMATIC Logon Service dialog for logging off, changing users or editing passwords can be called in the applications..

SIMATIC Electronic Signature



The SIMATIC Electronic Signature ensures that operations cannot be performed until enabled by previously assigned Windows users/user groups. Users/user groups are assigned to the operations in the respective application.

At the moment, this function is implemented as a system function only on SIMATIC BATCH. However, the Electronic Signature can be used on any products in the specific applications.

Selection and Ordering Data

	Order No.
SIMATIC Logon V1.3 Single license for 1 installation 7 languages (German, English, French, Spanish, Italian), executes with Windows 2000 Professional, XP Professional, Server 2003 Engineering software and electronic documentation on CD Type of delivery: CD-ROM, license key disk, emergency key disk, certificate of license, terms and conditions	**6ES7 658-7BX31-2YA0**
SIMATIC Logon Upgrade V1.0/V1.1/V1.2 to V1.3 Single license for 1 installation 7 languages (German, English, French, Spanish, Italian), executes with Windows 2000 Professional, XP Professional, Server 2003 Engineering software and electronic documentation on CD Type of delivery: CD-ROM, license key disk, emergency key disk, certificate of license, terms and conditions	**6ES7 658-7BX31-2YE0**
Options	
Chipcard reader Chipcard reader as desktop version, V.24 connection, PS/2 power supply with 1.8 m cable, driver software and instruction manual	**6ES7 652-0XX01-1XC0**
Chipcard Chipcard for chipcard reader; 1 card required per user; package with 10 chipcards	**6ES7 652-0XX05-1XD1**

Options

Access security by means of chipcard reader

A chipcard reader can be used to check a person's authorization to access and operate a single station or a client. This method of access security uses the chipcard as a "key" to the operator terminals. Operations are only allowed when the card is actually inserted in the reader.

The unmistakable identification of access rights is required in particular for plants which have to meet validation requirements. The chipcard reader is compliant with EN 55022 Class B and EN 50082-1 standards.

The reader is connected to a serial interface (COM1 or COM2) of the operator station.

Software update service

Overview

Software update service for SIMATIC PCS 7

Siemens offers a low-cost software update service (SUS) for SIMATIC PCS 7 software products. If you use this service, you participate in the further development of the SIMATIC PCS 7 software you are using, and you always have the latest versions available. 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 based on functional and system-specific aspects. The number and composition of the package components identified as **List elements** are largely characterized by licensing aspects (see "Design" for structure and contents). A list element can be a representative of a single software product or also a synonym for several products of the same type.

When purchasing **one** SUS package, you will automatically receive all upgrades and ServicePacks for the software belonging to this SUS 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. How many SUS packets of a type you require in total is therefore determined by the list element which combines most of the software licenses you use.

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 expiry. Discontinuation must be made in writing with reference to the contract number, and sent to the supply department.

Software update service for TIA products

In addition to the software update service for products of the SIMATIC PCS 7 process control system, a further software update service is also available for products used in association with Totally Integrated Automation (TIA) in a different context (CFC, SIMATIC PDM). With SIMATIC PDM, this is identical to the SUS PDM package for the software update service of SIMATIC PCS 7.

Design

Structure and contents of the SUS packages for the SIMATIC PCS 7 software update service

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

SUS Engineering AS/OS

- PCS 7 Engineering AS, OS: AS from 250 POs to unlimited POs; OS von 250 POs/RC 8K to 8,500 POs/RC 256K (including PowerPacks in each case)
- PCS 7 Import/Export Assistant
- PCS 7 Library Blocks runtime license
- PCS 7 PID-Tuner
- Version Cross Checker
- Version Trail

SUS PDM

- PDM Single Point: 1 TAG
- PDM Basic, PDM Service, PDM S7, PDM PCS 7, PDM Integration in STEP 7/PCS 7, PDM Routing S7-400: from 4 TAGs to unlimited TAGs (including TAG options and PowerPacks)
- PDM Standard HART Multiplexer

SUS Runtime OS

- PCS 7 OS software Single Station, OS software Server: from 250 POs/RT 8K to 8,500 POs/RT 256K (including PowerPacks and redundancy)
- PCS 7 OS Archive PowerPacks: from 512 to 10,000 variables
- StoragePlus
- PCS 7 Central Archive Server

SUS OS Client, SFC Visualization

- PCS 7 OS software Client
- PCS 7 SFC Visualization

SUS OS Web server

- PCS 7 OS Web server: 3 clients up to 50 clients (including PowerPacks)
- PCS 7 OS Web diagnostics server
- PCS 7 OS Web diagnostics client

SUS Asset Management

- PCS 7 Asset Engineering
- PCS 7 Asset Runtime: from 128 TAGs to unlimited TAGs (including PowerPacks)

SUS SIMATIC BATCH server

- PCS 7 SIMATIC BATCH server basic package: from 150 POs to unlimited POs (including PO options and PowerPacks)
- PCS 7 SIMATIC BATCH Hierarchical Recipe
- PCS 7 SIMATIC BATCH ROP Library
- PCS 7 SIMATIC BATCH Separation Procedures/Formulas
- PCS 7 SIMATIC BATCH API

SUS SIMATIC BATCH client

- PCS 7 SIMATIC BATCH Recipe System
- PCS 7 SIMATIC BATCH BatchCC
- PCS 7 SIMATIC BATCH Batch Planning

SUS SIMATIC Route Control

- PCS 7 SIMATIC Route Control Engineering
- PCS 7 SIMATIC Route Control Center
- PCS 7 SIMATIC Route Control Server: 30 to 300 material transports simultaneously (including PowerPacks)

Selection and Ordering Data	Order No.
SIMATIC PCS 7 Software Update Service Subscription for 1 year with automatic extension; requirement: current software version	
• PCS 7 Software Update Service for Engineering AS/OS	**6ES7 658-1XX00-0YL8**
• PCS 7 Software Update Service for PDM	**6ES7 658-3XX00-0YL8**
• PCS 7 Software Update Service for Runtime OS	**6ES7 658-2XX00-0YL8**
• PCS 7 Software Update Service for OS Client, SFC Visualization	**6ES7 658-2CX00-0YL8**
• PCS 7 Software Update Service for OS Web Server	**6ES7 658-2GX00-2YL8**
• PCS 7 Software Update Service for Asset Management	**6ES7 658-7GX00-0YL8**
• PCS 7 Software Update Service for SIMATIC BATCH Server	**6ES7 657-0SA00-0YL8**
• PCS 7 Software Update Service for SIMATIC BATCH Client	**6ES7 657-0XX00-2YL8**
• PCS 7 Software Update Service for Route Control	**6ES7 658-7DX00-0YL8**

Selection and Ordering Data	Order No.
Software update service for TIA products (SIMATIC PCS 7 products used in a different context) Subscription for 1 year with automatic extension; requirement: current software version	
• CFC Software Update Service	**6ES7 658-1EX00-2YL8**
• SIMATIC PDM Software Update Service	**6ES7 658-3XX00-0YL8**

Operating system

Overview

Operating system upgrade

When existing SIMATIC PCS 7 systems are updated to Version 6.1, it may also be necessary to upgrade the operating system.

If you replace your existing software by new ES/OS/BATCH/IT basic devices from this catalog during the upgrade, the Windows 2000 Professional / 2000 Server or Windows XP Professional / Server 2003 operating systems required for SIMATIC PCS 7 V6.1 are already included in the scope of supply. You can otherwise order individual operating systems from Fujitsu Siemens Computers GmbH.

Contact address for quotations and orders:

Fujitsu Siemens Computers GmbH

Mr. Dominikus Besserer

Tel.: +49 821 804-2434
Fax: +49 821 804-2972
E-mail: dominikus.besserer@fujitsu-siemens.com

Note:
Please note when ordering that SIMATIC PCS 7 V6.1 with ServicePack 1 or later can be operated together with Windows XP Professional ServicePack 2 and Windows Server 2003 ServicePack 1.
Release 2 of Windows Server 2003 has not yet been approved for SIMATIC PCS 7 V6.1.

Overview

We provide a range of modern, powerful basic devices for the systems/applications positioned in the SIMATIC PCS 7 system architecture above the controller level, e.g. engineering system, operator system, SIMATIC BATCH, SIMATIC Route Control, PCS 7 Asset Management, process control via Internet/intranet or IT applications. The basic devices identified as ES/OS/BATCH/IT are optimized for use as single stations, clients or servers, and can be expanded for system-specific purposes.

Microsoft Windows operating system

The version of the multilingual Microsoft Windows operating system selected depending on the use as single station, client or server, as well as the SIMATIC PCS 7 software (ES/OS software), are already preinstalled on delivery.

Monitors

The basic hardware (basic PC unit) can be combined with the color monitors recommended in the Section "HMI devices/monitors for SIMATIC PCS 7" in the Catalog "PC-based Automation" (ST PC) to suit the operating environment and the customer's requirements.

Options

Use of other basic hardware

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

The use of basic software that is not offered in this catalog is at the user's own risk and does not qualify for free support in the event of any compatibility problems.

From SIMATIC PCS 7 V6.1 onwards, the licenses for the Basic Communication Ethernet no longer belong to the scope of delivery of the SIMATIC PCS 7 system software but are part of the ES/OS/BATCH/IT basic devices. If you are not using SIMATIC PCS 7 V6.1 on the specified ES/OS/BATCH/IT basic devices, you additionally require a SIMATIC PCS 7 BCE V6.1 license, Order No. 6ES7 650-1CD16-2YB5, for all single stations or servers which are not connected to the plant bus via a CP 1613 communications processor.

Minimum features of SIMATIC PCS 7 basic devices

- Programming device or personal computer with:
  - Pentium 4 processor or better
  - Min. 512 MB RAM
  - Min. 40 GB hard disk
- Recommended features:
  - Programming device or personal computer with:
  - Pentium 4 processor with 2 GHz or higher
  - 1 GB RAM for servers/single stations, 512 MB for clients
  - Min. 60 GB hard disk
- Graphics card and monitor with 1280 x 1024 resolution (min. 1024 x 768)

Basic hardware

Overview

The ES/OS/BATCH/IT basic devices are based on a SIMATIC Rack PC in 19" design which is certified with the CE marking for use in industrial and office environments. This industrial PC meets the specific requirements of the process instrumentation and control system, and has a powerful innovative Intel PC architecture. Its service-friendly all-metal housing is mechanically robust, electromagnetically resistant, and specially protected from dust by filters and pressurized cooling. Reliable 24-hour continuous operation at ambient temperatures between 5 and 40 °C is made possible by the use of high-grade components with high MTBF values and monitoring functions for the inner housing temperature, fan and program execution.

Specially optimized versions of the standard device are available for operation as single stations, servers or clients. The operating system and the ES/OS software of the SIMATIC PCS 7 process control system are already preinstalled when delivered:

- Single station: PCS 7 engineering software for AS/OS (including OS runtime software)
- Server: PCS 7 OS software for server
- Client: PCS 7 OS software for client

You only need the corresponding licenses in order to use the preinstalled SIMATIC PCS 7 software.

Please note the standard installation if you use the basic devices within the SIMATIC PCS 7 process control system for other tasks, e.g. as basic hardware for SIMATIC BATCH, SIMATIC Route Control, StoragePlus, Central Archive Server or PCS 7 Web Server. You can then extend or reject the existing SIMATIC PCS 7 installation, and restore it for the operating system using the restore DVD.

Design

The ES/OS/BATCH/IT basic devices of type IL 43 have a painted, all-metal housing of 19" design which is particularly protected against dust by a filter and pressurized ventilation. This mechanically and electromagnetically rugged housing has a service-friendly design. The basic devices of type IL 43 can be positioned and installed either vertically or horizontally. The use of high-grade components with high MTBF values and monitoring functions for the internal temperature, fan and program execution (watchdog) enable reliable 24-hour continuous operation at ambient temperatures between 5 and 40 °C.

The basic devices have the following features:

- Pentium-4 motherboard with future-oriented Intel architecture based on an Intel 945G Express chipset
- Powerful AGP graphics with dynamic video memory, sound (Line In, Line Out, Mic.) and FastEthernet RJ45 port integrated on board
- 6 slots for drives:
  - Three 5.25" slots at front (1 occupied by DVD-ROM/ DVD-RW) and
  - One 3.25" slot (occupied by diskette drive);
  - Two internal 3.5" slots (occupied by 1 hard disk on the client, and 2 hard disks on the server and ES/OS single station)
- Enhanced system availability provided by RAID 1 with 2 SATA hard disks and NCQ technology (native command queuing) for server and ES/OS single station
- Second serial interface available for server (COM 2)
- Total of six USB 2.0 ports (4 at rear, 2 and front)
- High electromagnetic compatibility (CE-certified for industrial and office environments)
- Dust protection by means of pressurized ventilation in conjunction with a front fan and a dust filter
- PC front complies with IP30 degree of protection when the front door is closed
- Front door can be locked to prevent unauthorized access to removable media, control elements and interfaces located at the front
- Easy and fast installation and maintenance of PC components: access to the front drives through a hinged front door; only 3 screws to open the device
- 3 LEDs on the front of the PC visualize the operating status:
  - Power (switched on)
  - HD (access to hard disk)
  - Status (fan and temperature monitoring)
- Prepared for easy mounting with telescopic rails
- Easy to remove fixing bracket with handles
- Card hold-down device to secure PC modules during transportation and to protect them from vibration and shock
- Power supply unit with temperature-controlled fan
- Power connector lock for the power supply cable

Restore DVD

The operating system and SIMATIC PCS 7 software are preinstalled on the basic devices. Two restore DVDs are supplied for quickly restoring the delivery status if required.

- Restore DVD 1 contains only the operating system with default settings for optimum PCS 7 operation
- Restore DVD 2 contains the full installation (including SQL server and PCS 7 V6.1 + SP1)

Technical specifications

Basic hardware for single stations, servers and clients	
Design	19" rack, 4 HU, for horizontal and vertical installation, prepared for easy mounting with telescopic rails, 19" fixing bracket with handle, easy to remove
CPU	
• Processor base	LGA 775
• Processor	Intel Pentium 4, No. 551 (3.4 GHz, hyper threading)
• Front side bus (FSB)	800 MHz
• Second level cache	1 MB
User memory (SDRAM)	
• Type	Dual channel DDR2 533 SDRAM (PC2 4200)
• Maximum configuration	4 memory bases in total (expandable to 4 GB)
• Standard configuration	Single station/server: 1 GB (2 x 512 MB) Client: 512 MB (2 x 256 MB)
Motherboard slots	4 x PCI (max. 265 mm long) 1 x PCIe x1 1 x PCIe x16
Slots for drives	
• At front	1 x 3.5" (occupied by diskette drive) 3 x 5.25" (1 occupied by DVD-ROM/DVD-RW)
• Inside	2 x 3.5" (occupied by hard disk drive, 2 with server/single station; 1 with client)
RAID controller	RAID controller Intel ICH7R with Intel storage manager software (on board)
Hard disk memory	
• Type	120 GB (3.5" SATA 150, 8 MB cache, 7200 rpm)
• Single station/server	SATA-RAID 1 (mirror) with 2 hard disks
• Client	1 SATA hard disk

Interchangeable drives	
• Diskette drive	3.5" diskette drive, 1.44 MB
• DVD drive in ES/OS single station	DVD burner Read: • DVD-ROM: single layer 16x, dual layer 12x • DVD-R/+R: single layer 16x, dual layer 7x • DVD-RW/+RW 13x • CD-ROM/CD-R 48x, CD-RW 40x Write: • DVD+R 16x, DVD+RW 8x, DVD-R 16x, DVD-RW 6x • DVD+R9 (DL) 8x, DVD-R DL 6x • CD-R 48x, CD-RW 32x
• DVD drive in server/client	DVD-ROM 5.25" ATAPI Read: • DVD-ROM: single layer 16x, dual layer 8x • DVD+R/RW, DVD-R/RW 8x, DVD-RAM 2x • CD-ROM, CD-R 32x, CD-RW 20x
Graphics card	Intel GMA950 graphics controller, 2D and 3D engine integrated in chipset, up to 2048 x 1536 pixels with 75 Hz image refresh rate
• Graphic controller memory	Dynamic video memory technology
• Resolutions/frequencies/color depth	• Up to 800 x 600 at 120 Hz / 32-bit color depth • Up to 1280 x 1024 at 100 Hz / 32-bit color depth • Up to 2048 x 1536 at 75 Hz / 16-bit color depth
Mouse	Optical mouse
Power supply	300 W 120/230 V AC, 50/60 Hz, autorange

Operating systems

ES/OS single station/client	• Microsoft Windows 2000 Professional MUI, selectable: German, English, French, Italian, Spanish, Japanese, Chinese (simplified) • Microsoft Windows XP Professional MUI, selectable: German, English, French, Italian, Spanish, Japanese, Chinese (simplified)
Server	• Microsoft Windows 2000 Server MUI incl. 5 CAL (client access licenses), selectable: German, English, French, Italian, Spanish, Japanese, Chinese (simplified) • Microsoft Windows Server 2003 (standard edition) MUI, selectable: German, English, French, Italian, Spanish, Japanese, Chinese (simplified)

Basic hardware

Interface modules / interfaces	
OS-LAN interface module	10/100/1000 Mbit/s (RJ45 on board)
Plant bus interface module (single station/server)	
• IL 43 BCE	FastEthernet 10/100/1000 Mbit/s RJ45 (PCI card)
• IL 43 IE	CP 1613 A2 communications processor
Ports	
• USB	4 x at rear and 2 x at front (high current), high-speed USB 2.0
• Serial	Server: 1 x COM1 and 1 x COM2 (each V.24), 9-pin Sub-D plug Single station/client: 1 x COM1 (V.24), 9-pin Sub-D plug
• Parallel	1 x LPT1 (25-pin, EPP and ECP)
• Audio	1 x Line In; 1 x Line Out; 1 x Micro In
• VGA	1 x Sub-D socket, 15-pin
• Keyboard	1 x PS/2
• Mouse	1 x PS/2
Safety	
Protection class	Protection class I to IEC 61140
Safety specifications	IEC 60950-1; UL60950; CSA C22.2 No. 60950-00
Electromagnetic compatibility (EMC)	
Emitted interference (AC)	EN 55022 Class B; FCC Class A EN 61000-3-2 Class D, EN 61000-3-3
Immunity to conducted interference on the supply lines	± 2 kV (to IEC 61000-4-4, burst) ± 1 kV (to IEC 61000-4-5, surge sym.) ± 2 kV (to IEC 61000-4-5, surge asym.)
Immunity to interference on signal lines	± 1 kV (to IEC 61000-4-4, burst, length < 10 m) ± 2 kV (to IEC 61000-4-5, surge sym., length > 30 m)
Immunity to static discharge	± 4 kV, contact discharge (to IEC 61000-4-2) ± 8 kV, air discharge (to IEC 61000-4-2)
Immunity to radio frequency interference	10 V/m, 80 MHz to 1 GHz and 1.4 to 2 GHz, 80% AM (to IEC 61000-4-3) 10 V/m, 10 kHz to 80 MHz (to IEC 61000-4-6)
Magnetic field	100 A/m, 50 Hz/60 Hz (to IEC 61000-4-8)
Climatic conditions	
Temperature	Tested to IEC 60068-2-2, IEC 60068-2-1, IEC 60068-2-14
• During operation	+5 ... +40 °C (no DVD burner operation), +5 ... +35 °C (without limitations) CPU up to 90 W dissipated power Gradient: max. 10 °C/h, no condensation
• Storage/transport	-20 ... +60 °C Gradient: max. 20 °C/h, no condensation
Relative humidity	Tested to IEC 60068-2-78, IEC 60068-2-30
• During operation	5 ... 80% at 25 °C (no condensation) Gradient: max. 10 °C/h, no condensation
• Storage/transport	5 ... 95% at 25 °C (no condensation) Gradient: max. 20 °C/h, no condensation
Mechanical environmental conditions	
Vibrations	Tested to IEC 60068-2-6, 10 cycles
• During operation	20 ... 58 Hz, amplitude 0.015 mm; 58 ... 200 Hz: 2 m/s^2 Note: no mechanical interferences are tolerable when burning is being carried out by CD/DVD burners.
• Storage/transport	5 ... 8.51 Hz, amplitude 3.5 mm; 8.51 ... 500 Hz: 9.8 m/s^2
Resistance to shock	Tested according to DIN IEC 60068-2-27
• During operation	Half-sine: 9.8 m/s^2, 20 ms, 100 shocks per axis Note: no mechanical interferences are tolerable when burning is being carried out by CD/DVD burners.
• Storage/transport	Half-sine: 250 m/s^2, 6 ms, 1000 shocks per axis
Approvals	
CE living accommodation (emitted interference)	EN 61000-6-3:200
CE industrial environment (immunity)	EN 61000-6-2:2001
cULus	60950
Power supply	
Nominal supply voltage	100 V AC to 240 V AC (90 to 264 V AC)
Line voltage frequency	50 ... 60 Hz
Transient voltage interruption	16 ms at 0.85 nominal supply (max. 10 events per hour; min. recovery time 1 s)
Power consumption (at 210 W secondary power)	310 W (efficiency approx. 68%)
General technical specifications	
Noise emission	< 45 dB(A) to DIN 45635
Degree of protection	IP30 with closed front door; IP20 at rear in conformity with EN 60529
Dimensions and weight	
Overall dimensions in mm *(W x H x D)*	430.4 x 177.4 x 444.4
Weight	Approx. 19 kg

Selection and Ordering Data — Order No.

Single Station

SIMATIC PC in rack of 19" design, Pentium 4 3.4 GHz, 1 GB RAM (2 x 512 MB), sound, SATA-RAID 1 with 2 hard disks of 120 GB, graphics controller on board with dynamic video memory, DVD burner DVD±RW IDE, 3.5" diskette drive, optical mouse, FastEthernet RJ45 on board for connection to OS-LAN, without monitor, keyboard and printer, SIMATIC PCS 7 preinstalled and 2 restore DVDs

Windows 2000 Professional MUI operating system (German, English, French, Italian, Spanish, Chinese, Japanese)

• **SIMATIC PCS 7 ES/OS IL43 BCE W2K** Connection to plant bus through Basic Communication Ethernet (BCE) with FastEthernet RJ45 network card (PCI card)	**6ES7 650-0LC16-0YX0**	D)
• **SIMATIC PCS 7 ES/OS IL43 IE W2K** Connection to plant bus through Industrial Ethernet with CP 1613 A2 communications processor	**6ES7 650-0LC16-0YX1**	D)

Windows XP Professional MUI operating system (German, English, French, Italian, Spanish, Chinese, Japanese)

• **SIMATIC PCS 7 ES/OS IL43 BCE WXP** Connection to plant bus through Basic Communication Ethernet (BCE) with FastEthernet RJ45 network card (PCI card)	**6ES7 650-0LF16-0YX0**	D)
• **SIMATIC PCS 7 ES/OS IL43 IE WXP** Connection to plant bus through Industrial Ethernet with CP 1613 A2 communications processor	**6ES7 650-0LF16-0YX1**	D)

Selection and Ordering Data — Order No.

Server

SIMATIC PC in rack of 19" design, Pentium 4 3.4 GHz, 1 GB RAM (2 x 512 MB), sound, SATA-RAID 1 with 2 hard disks of 120 GB, graphics controller on board with dynamic video memory, DVD-ROM IDE, 3.5" diskette drive, optical mouse, FastEthernet RJ45 on board for connection to OS-LAN, without monitor, keyboard and printer, SIMATIC PCS 7 preinstalled and 2 restore DVDs

Windows 2000 Server MUI operating system (German, English, French, Italian, Spanish, Chinese, Japanese)

• **SIMATIC PCS 7 OS Server IL43 BCE W2K** Connection to plant bus through Basic Communication Ethernet (BCE) with FastEthernet RJ45 network card (PCI card)	**6ES7 650-0LE16-0YX0**	D)
• **SIMATIC PCS 7 OS Server IL43 IE W2K** Connection to plant bus through Industrial Ethernet with CP 1613 A2 communications processor	**6ES7 650-0LE16-0YX1**	D)

Windows Server 2003 MUI operating system (German, English, French, Italian, Spanish, Chinese, Japanese)

• **SIMATIC PCS 7 OS Server IL43 BCE SRV03** Connection to plant bus through Basic Communication Ethernet (BCE) with FastEthernet RJ45 network card (PCI card)	**6ES7 650-0LH16-0YX0**	D)
• **SIMATIC PCS 7 OS Server IL43 IE SRV03** Connection to plant bus through Industrial Ethernet with CP 1613 A2 communications processor	**6ES7 650-0LH16-0YX1**	D)

D) Subject to export regulations: AL: N, ECCN: 5D992B1

Selection and Ordering Data

	Order No.	
Client		
SIMATIC PC in rack of 19" design, Pentium 4 3.4 GHz, 512 MB RAM (2 x 256 MB), SATA hard disk of 120 GB, graphics controller on board with dynamic video memory, DVD-ROM IDE, 3.5" diskette drive, optical mouse, FastEthernet RJ45 on board for connection to OS-LAN, without monitor, keyboard and printer, SIMATIC PCS 7 preinstalled and 2 restore DVDs		
Windows 2000 Professional MUI operating system (German, English, French, Italian, Spanish, Chinese, Japanese)		
• **SIMATIC PCS 7 OS Client IL43 W2K**	**6ES7 650-0LD16-0YX0**	D)
Windows XP Professional MUI operating system (German, English, French, Italian, Spanish, Chinese, Japanese)		
• **SIMATIC PCS 7 OS Client IL43 WXP**	**6ES7 650-0LG16-0YX0**	D)
Additional and expansion components		
Memory modules for expanding the main memory		
• 512 MB memory expansion kit for SIMATIC Rack PC IL 43 (2 x 256 MB) for dual channel	**6ES7 648-2AF30-0GB0**	B)
• 1 GB memory expansion kit for SIMATIC Rack PC IL 43 (2 x 512 MB) for dual channel	**6ES7 648-2AF40-0GB0**	B)
• 2 GB memory expansion kit for SIMATIC Rack PC IL 43 (2 x 1 GB) for dual channel	**6ES7 648-2AF50-0GB0**	B)
SIMATIC PC keyboard (USB connection)		
• International key assignment	**6ES7 648-0CB00-0YA0**	
3-m power cable for Rack PC [1]		
• For Great Britain	**6ES7 900-0BA00-0XA0**	
• For Switzerland	**6ES7 900-0CA00-0XA0**	
• For USA	**6ES7 900-0DA00-0XA0**	
• For Italy	**6ES7 900-0EA00-0XA0**	

B) Subject to export regulations: AL: N, ECCN: EAR99H

D) Subject to export regulations: AL: N, ECCN: 5D992B1

1) The PCS 7 systems are delivered as standard with a "European power cable". The country-specific versions listed above are required for some countries.

Accessories

Keyboards

The PCS 7 ES/OS/BATCH/IT basic devices are supplied without a keyboard. The following keyboard is suitable for process operation with SIMATIC PCS 7:

- SIMATIC PC keyboard with USB connection, international key assignments
  The SIMATIC PC keyboard is a standard MF2 keyboard with 105 keys, without additional special functions. It combines the convenience of an office keyboard with the EMC of an industrial device. Standards/approvals: UL 1950, CSA C22.2 No. 950, FCC Part 15, subpart B, class B, VDE-GS (EN 60950/ZHI/618), CE, C-TICK-Mark (Australia)

Power supply cable for Rack PC

The PCS 7 systems are delivered as standard with a "European power cable". 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 appearance of the power supply plugs:

Country-specific power supply cables for Rack PC

Overview

The ES/OS/BATCH/IT basic devices available for SIMATIC PCS 7 are supplied as standard with a graphics interface for controlling a process monitor. The Multi-VGA graphics cards "2 Screens" and "4 Screens" are available for multichannel operation with 2 or as many as 4 process monitors.

With a special Multi-VGA graphics card, the visualization of a project/subproject during engineering or of a plant/unit in process mode can be shared among as many as 4 process monitors per operator terminal using various views. These project/plant sections can all be operated using just one keyboard and one mouse. The efficiency, user-friendliness and ergonomics of engineering and process control can thus be greatly improved compared to the single-channel mode of operation.

Technical specifications

Multi-VGA Graphics Cards	
Memory	32 Mbyte DDRAM per output
• Graphics card "2 Screens"	2 x 32 Mbyte
• Graphics card "4 Screens"	4 x 32 Mbyte
Clock frequency	360 MHz integrated RAMDAC
Max. analog resolution per channel	2048 x 1536 at 24 bpp and 85 Hz
Max. digital resolution per channel	1280 x 1024
Electromagnetic compatibility (EMC)	
• Emitted interference	EN 55022 Class B
• Immunity to interference	EN 50082
Slot assignment	1 PCI slot

Selection and Ordering Data

	Order No.	
Multi-VGA Graphics Card "2 Screens" for operating 2 process monitors on 1 station Type of delivery: Dual graphics card, driver CD, manual, 1 dual DVI cable for 2 digital outputs, 2 adapters for VGA outputs	**6ES7 652-0XX03-1XE0**	B)
Multi-VGA Graphics Card "4 Screens" for operating 4 process monitors on 1 station Type of delivery: Quad graphics card, driver CD, manual, 2 dual DVI cables for 4 digital outputs, 4 adapters for VGA outputs	**6ES7 652-0XX03-1XE1**	B)

B) Subject to export regulations: AL: N, ECCN: EAR99H

Operating devices/monitors

Overview

Operating devices

A mouse and keyboard are the standard operating devices (see "Basic hardware"). Additional operating devices such as fingerprint mouse, trackball or Ex PC operator control unit can be found in Catalog ST PCS 7.1 (Add-ons for the SIMATIC PCS 7 process control system).

Process monitors

We recommend the Siemens industrial monitor SCD 19101-D (LCD color monitor) for the SIMATIC PCS 7 process control system.

Further monitors with degree of protection IP65 and suitable for installing in desks, 19" racks or switchgear cabinets can be found in:

- the catalog "PC-based Automation" or
- the A&D Mall/CA 01 at "Automation systems - Monitors, printers and input devices for industry"

Benefits

Outstanding characteristics of the SCD 19101-D LCD monitor include:

- Rugged, fail-safe and long-life industrial design:
  - High resistance to shock and vibration
  - Extremely high electromagnetic compatibility
  - Anti-glare and hardened mineral glass pane for high mechanical protection
  - IP20 degree of protection
  - Complies with CE standard "Industry"
- Modern design with exceptional ergonomics:
  - Sharp and high-contrast picture with uniform brightness
  - No flickering
  - Large reading angle up to 170° horizontal and vertical
  - Automatic picture adjustment (Auto Adjust)
- No X-rays
- Low energy consumption and heat development
- Small space requirement and low weight
- Configuration using on-screen display (OSD)
- Long service life

Technical specifications

Monitor	SCD 19101-D
Screen	19" (48 cm) TFT color display, 1280 x 1024 pixels, 16 million colors
Line frequency	50...97 kHz
Image refresh rate	30...100 Hz
Power supply	110/230 V AC
Dimensions (WxHxD) in mm	465 x 444 x 91 (stand depth 240)
Degree of protection	IP20
Weight	Approx. 10 kg

Detailed technical specifications can be found in

- the Catalog ST PC "PC-based Automation" or
- on the Mall/CA 01 at "Automation systems - Monitors, printers and input devices for industry"

Selection and Ordering Data

	Order No.
Industrial LCD color monitor SCD 19101-D (design same as SCD 1898-I) Desktop unit 230 V AC, screen diagonal 19" (48 cm), horizontal frequency 50...97 kHz, degree of protection IP20	**6GF6 220-1DA01** B)
Additional and expansion components	
Connection cable	
• Video + Touch, length 1.8 m	**6AV8 107-0BA00-0AA0**
• Video + Touch, length 5 m	**6AV8 107-0DA00-0AA0**
• Video + Touch, length 10 m	**6AV8 107-0FA00-0AA0**
• Video, connecting cable length 20 m	**6AV8 107-0HB00-0AA0**

B) Subject to export regulations: AL: N, ECCN: EAR99H

3

Starter systems

SIMATIC PCS 7 BOX

Overview

SIMATIC PCS 7 BOX extends the product spectrum of SIMATIC PCS 7 by adding a cost-effective entrance-level product that unites SIMATIC PCS 7 functionality for automation, operation, visualization and engineering in one compact PC system. In conjunction with the distributed I/Os on the PROFIBUS, SIMATIC PCS 7 BOX represents a complete SIMATIC PCS 7 process control system.

Application

SIMATIC PCS 7 BOX can be used just as readily for small applications in production or self-contained subprocesses (Package Units) as for the automation of a laboratory or test center. As a fully fledged member of the SIMATIC PCS 7 range, SIMATIC PCS 7 BOX works with the standard SIMATIC PCS 7 system software, is scalable and can be expanded without disruption of compatibility. The quantity framework is limited to 2000 POs/64 K variables.

SIMATIC PCS 7 BOX can be operated in stand-alone mode as well as in a plant network.

A plant created with SIMATIC PCS 7 BOX can be expanded at any time with additional SIMATIC PCS 7 hardware and software components. And SIMATIC PCS 7 BOX can be integrated just as easily in existing SIMATIC PCS 7 plants.

Use with SIMATIC BATCH

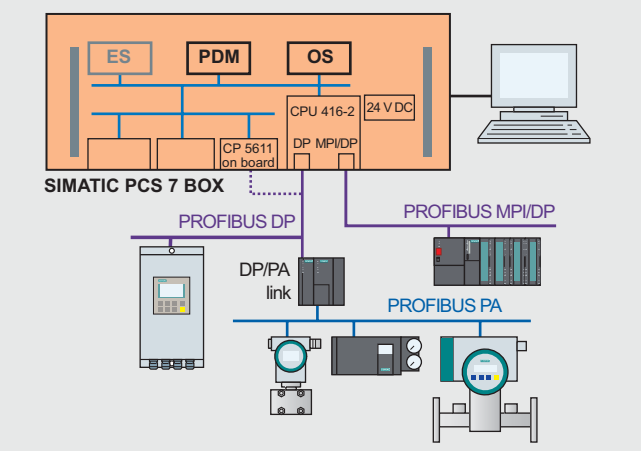
Based on SIMATIC PCS 7 V6.1 or later, SIMATIC PCS 7 BOX can be used for automation of batch processes with SIMATIC BATCH. The capacity of SIMATIC BATCH is limited to 150 batch POs (instances of units and technical equipment) in this case. In addition to the SIMATIC BATCH server basic package for up to 150 batch POs, the following SIMATIC BATCH option packages can be executed on the SIMATIC PCS 7 BOX:

- Batch control center
- Recipe system
- Batch planning
- Hierarchical recipe
- ROP library
- Separation procedures/formulas

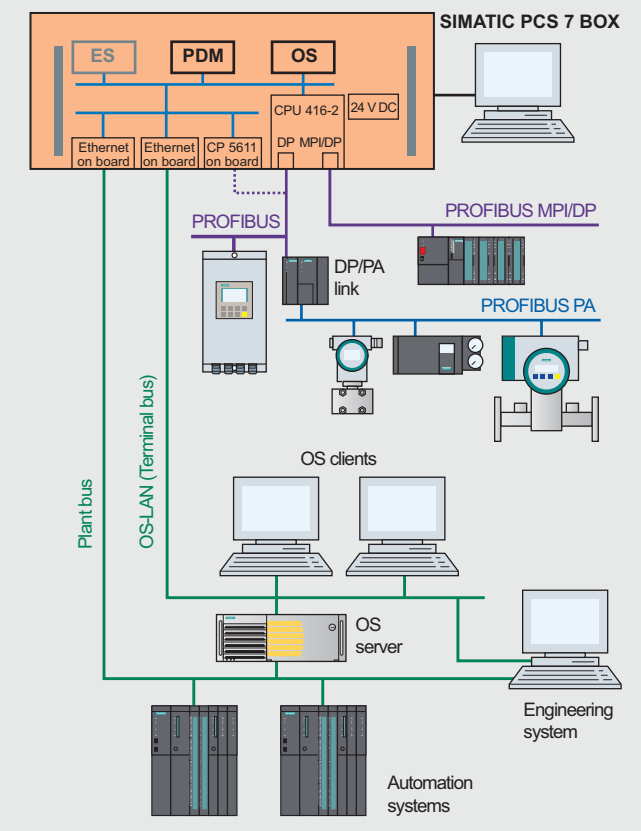
Use as asset management station

Equipped as a complete system with software licenses for SIMATIC PDM and SIMATIC PCS 7 asset management, SIMATIC PCS 7 BOX is also suitable for operation as a maintenance station (for further information, see Section "Asset management").

Design



SIMATIC PCS 7 BOX in stand-alone operation



SIMATIC PCS 7 BOX integrated in the SIMATIC PCS 7 plant network

SIMATIC PCS 7 BOX is based on a Box PC 627 industrial PC with an installed CPU WinAC Slot 416 V3.4; this means that the often distributed PCS functionality for automation, operation, visualization and engineering can be brought together in a single system. SIMATIC PCS 7 BOX uses standard system software of SIMATIC PCS 7 V6.1 and is integrated in SIMATIC PCS 7 engineering and in the PCS 7 project wizard. This ensures full compatibility with SIMATIC PCS 7 V6.1.

Using the CPU WinAC Slot 416 means that the automation program runs in the slot CPU fully independent of the industrial PC and the Windows operating system. The PC-independent power supply to the slot CPU is arranged through a separate power supply extension board. Software errors on the PC side have no effect on the slot CPU. Like voltage failures or rebooting the PC, they have no impact on execution of the automation program in the slot CPU.

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 modifications on the SIMATIC PCS 7 BOX or on the central engineering system can be downloaded online, i.e. without having to terminate the OS process operation.

SIMATIC PCS 7 BOX supports not only the distributed I/O devices of the ET 200 range with an extensive selection of cost-effective signal and function modules but also the connection of intelligent field/process devices on PROFIBUS PA. The process I/Os are connected through the two PROFIBUS DP ports of the slot CPU. As SIMATIC PDM can only access field devices on the PROFIBUS DP through the CP 5611 onboard communications processor, an additional cross connection between the DP port and CP 5611 is required to use SIMATIC PDM. A plug required for this purpose is supplied with the SIMATIC PCS 7 BOX.

Configuration modifications during operation (CiR) are not yet supported by the current CPU WinAC Slot 416. However, plans to include this functionality in future WinAC Slot CPUs are currently in the pipeline.

In a plant network with other SIMATIC PCS 7 system components such as AS, OS, ES or BATCH and MES applications, bus communication is implemented through the Ethernet interfaces integrated in the SIMATIC PCS 7 BOX.

SIMATIC PCS 7 BOX is available in the form of two product bundles:

- As a preinstalled SIMATIC PCS 7 complete system with AS, ES and OS functionality for up to 250 process objects (POs) / 8 K OS variables
- As a preinstalled SIMATIC PCS 7 runtime system with AS and OS functionality for up to 250 process objects (POs) / 8 K OS variables

These can be further expanded using the following add-on/expansion components (see also Chapter "ES/OS/Batch/IT basic devices" and the Catalog "PC-based Automation"):

- SIMATIC PCS 7 Power Packs for up to 2,000 POs / 64 K OS variables
- SIMATIC PDM Package for PCS 7
- SIMATIC PC keyboard
- LC displays and CRT monitors for office and industrial environments
- SITOP power supply 230 V AC / 24 V DC
- SITOP power DC-UPS module 15 A with RS 232 interface
- DC-UPS software for the further processing of signals sent from the DC-UPS module using the RS 232 interface on the PC (state visualization and definition of reactions to different operating states of the DC-UPS module), can be used with Windows NT, 2000 and XP; freeware for downloading at www.siemens.com/sitop
- SITOP power battery module 24 V DC / 20 A / 7 Ah for DC-UPS module 15 A

SIMATIC PCS 7 BOX

Technical specifications

Industrial PC: SIMATIC Box PC 627	
CPU	Intel Pentium M 2.0 GHz Dothan
RAM	1 GB
Second level cache	2 MB
Hard disk memory	80 GB
Diskette drive	1.44 MB
DVD-ROM/CD-RW	Combo drive 8/8/24x
Graphics	Intel 8 to 132 MB, max. VGA 1600 x 1024 at 85 Hz
Ethernet	2 x integral Ethernet interface 10/100 Mbit/s (RJ45)
PROFIBUS DP	12 Mbit/s (electrically isolated, CP 5611-compatible)
USB	4 terminals, 2 of which high current
Expansions	Slot for CompactFlash card
Power supply	24 V DC
Operating system	Microsoft Windows XP Professional incl. SP2 MUI
Automation: SlotPLC module	
CPU	WinAC Slot 416 V3.4 incl. SP1
RAM	1.6 + 1.6 MB (integrated)
Load memory	256 KB
Memory card	2 MB RAM (installed)
Processing times	Binary command: 0.08 µs, IEEE floating point: 0.48 µs
PROFIBUS DP	PROFIBUS DP and PROFIBUS DP/MPI interface onboard
Connectable distributed I/Os	ET 200M, ET 200iSP, ET 200S, PROFIBUS DP standard slaves, PROFIBUS PA devices (via DP/PA link or DP/PA coupler)
Dimensions	PCI plug-in card (3/4 long)
Power supply	Power supply extension board independent of PC; external power supply 24 V DC and battery backup
Operation and visualization	
Software	PCS 7 OS Software Single Station V6.1 (preinstalled)
Licenses	250 POs/RT 8K variables (extendable to 2000 POs/RT 64K per PowerPack)
Engineering	
Software	PCS 7 Engineering Software V6.1 (preinstalled)
Licenses	AS/OS for 250 POs/RC 8K (extendable to 2000 POs/RC 64K per PowerPack)

Selection and Ordering Data

	Order No.	
SIMATIC PCS 7 BOX complete system (ES, OS and AS) assembled and preinstalled, comprising: • SIMATIC Box PC 627, 24 V DC, with WinAC Slot 416 and Windows XP Professional MUI (German, English, French, Italian, Spanish) • Memory card 2 MB • WinAC power supply extension board • Backup battery • Mouse • SIMATIC PCS 7 Engineering Software V6.1 for AS/OS, 250 POs/RC 8K, 3 languages (German, English, French), floating license for 1 user • PCS 7 Library Blocks V6.1, 3 languages (German, English, French), runtime license for 1 automation system	**6ES7 650-2KA16-0YX0**	D)
SIMATIC PCS 7 BOX runtime system (OS and AS) assembled and preinstalled, comprising: • SIMATIC Box PC 627, 24 V DC, with WinAC Slot 416 and Windows XP Professional MUI (German, English, French, Italian, Spanish) • Memory card 2 MB • WinAC power supply extension board • Backup battery • Mouse • SIMATIC PCS 7 OS Software Single Station V6.1, 250 POs/RT 8K, 3 languages (German, English, French), floating license for 1 user • PCS 7 Library Blocks V6.1, 3 languages (German, English, French), runtime license for 1 automation system	**6ES7 650-2KB16-0YX0**	D)

D) Subject to export regulations: AL: N, ECCN: 5D992B1

Selection and Ordering Data — Order No.

Additional and expansion components

SIMATIC PCS 7 PowerPacks

- **PCS 7 Engineering PowerPack AS/OS V6.1**
  3 languages (German, English, French), executes with Windows 2000 Professional/2000 Server or Windows XP Professional/Server 2003, floating license for 1 user

  Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions

  - For expanding the engineering software for AS/OS from 250 POs/ RC 8 K to 1,000 POs/ RC 32 K — **6ES7 658-5AB16-0YD5**
  - For expanding the engineering software for AS/OS from 1,000 POs/ RC 32 K to 2,000 POs/ RC 64 K — **6ES7 658-5AC16-0YD5**

- **SIMATIC PCS 7 PowerPack OS Software Single Station V6.1**
  3 languages (German, English, French), executes with Windows 2000 Professional or Windows XP Professional, single license for 1 installation

  Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions

  - For expanding the OS Software Single Station from 250 POs/ RT 8 K to 1,000 POs/ RT 32 K — **6ES7 658-2AB16-0YD0**
  - For expanding the OS Software Single Station from 1,000 POs/ RT 32 K to 2,000 POs/ RT 64 K — **6ES7 658-2AC16-0YD0**

SIMATIC PDM

SIMATIC PDM PCS 7 V6.0 — **6ES7 658-3LX06-0YA5**

Preferred version for SIMATIC PCS 7, in 5 languages (German, English, French, Italian and Spanish), executes with Windows 2000 Professional or Windows XP Professional, floating license for 1 user, with:

- SIMATIC PDM Basic
- Option: Integration in STEP 7/PCS 7
- Option: Routing through S7-400
- Option: 128 TAGs

Software and electronic documentation on toolset DVD

Type of delivery:

- License key disk, emergency key disk, certificate of license, terms and conditions
- 2 CDs with SIMATIC PDM V6.0 and device library as well as supplementary DVD with Microsoft ServicePacks and tools

Note: See Section "SIMATIC PDM ES software" for TAG options and PowerPacks

Selection and Ordering Data — Order No.

Further SIMATIC PCS 7 system software

- SIMATIC BATCH: see Section "Batch automation"
- SIMATIC PCS 7 Asset Management: see Section "Asset management"

SIMATIC PC keyboard (USB connection)

- International key assignment — **6ES7 648-0CB00-0YA0**

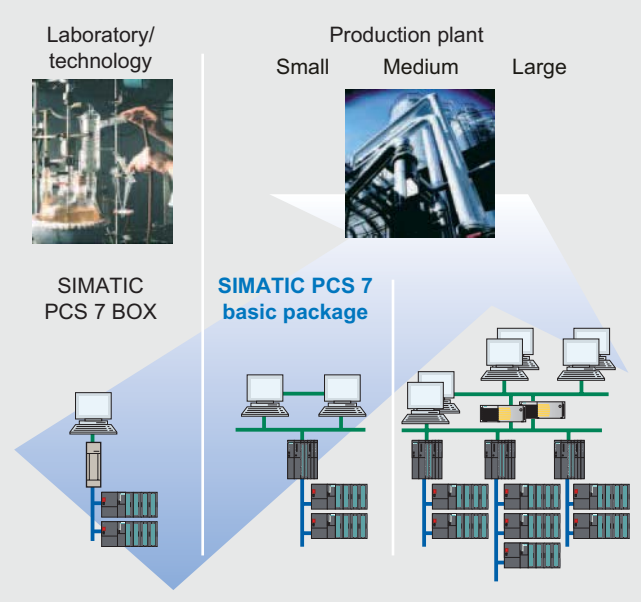
Power supply 230 V AC / 24 V DC

- SITOP SMART 240W stabilized load power supply, input: 120/230 V AC, output: 24 V DC/10 A — **6EP1 334-2AA01**
- SITOP DC-UPS module 24 V DC/15 A [1] with RS 232 interface and charger unit for 24 V lead-acid battery Input: 24 V DC/16 A, output: 24 V DC/15 A — **6EP1 931-2EC31**
- SITOP battery module 24 V DC /20 A/7 Ah for DC-UPS module 15 A — **6EP1 935-6ME21**

[1] Add-on DC-UPS software (executes with Windows NT, 2000 and XP) for further processing of signals sent from the DC-UPS module using the RS 232 interface on the PC as freeware for downloading at http://www.siemens.de/sitop

SIMATIC PCS 7 Basic Package

Overview

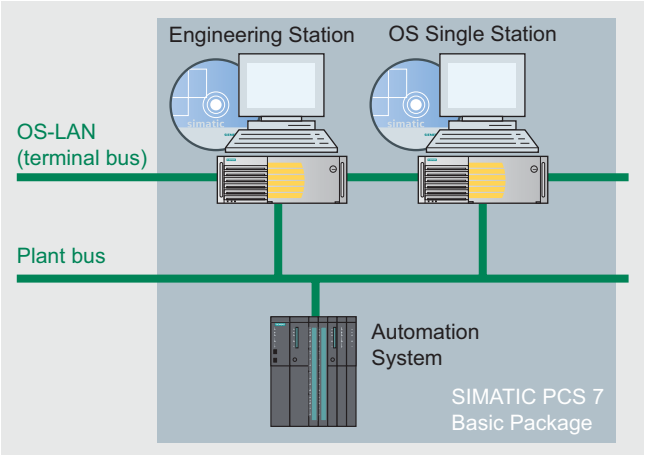


The SIMATIC PCS 7 Basic Package designed for approx. 650 measuring points (1,000 process objects / 32K OS variables) has a performance above that of the SIMATIC PCS 7 BOX. This attractive product bundle equipped with all I&C system basic functions (AS, OS, ES) is a low-cost starter solution to process automation with standard hardware and software components of SIMATIC PCS 7. As a result of the upwards compatibility of the hardware and software, all components can be used further without limitation when subsequently extending to larger plant configurations.

Application

The SIMATIC PCS 7 Basic Package has been specially designed as a low-cost starter solution for process automation with SIMATIC PCS 7. Since the hardware and system software are both expandable and scalable, this attractive product bundle keeps all options open for subsequent capacity expansions.

Design



The SIMATIC PCS 7 Basic Package V6.1 comprises:

- One AS 416-3 automation system with:
  - PS 407 power supply; 10 A for 120/230 V AC/DC
  - UR2 rack (9 slots)
  - Memory card 8 MB
  - CP 443-1EX11 communications processor for connection to Industrial Ethernet plant bus
  - CP 443-5 Extended communications processor for connection to PROFIBUS DP fieldbus, with data record gateway for utilization of SIMATIC PDM routing function
- One engineering station with:
  - Basic device SIMATIC PCS 7 ES/OS IL 43 BCE WXP
  - SIMATIC PCS 7 engineering software for AS/OS; 1,000 POs/RC 32K, floating license
  - SIMATIC PCS 7 SFC Visualization, floating license
  - SIMATIC PCS 7 Import/Export Assistant, floating license
  - SIMATIC PDM PCS 7, floating license
- One OS single station with:
  - Basic device SIMATIC PCS 7 ES/OS IL 43 BCE WXP
  - SIMATIC PCS 7 OS software Single Station for 1,000s POs/RT 32K, single license
  - SIMATIC PCS 7 SFC Visualization, floating license

Note:
Please note that network components as well as supplementary components for ES/OS basic hardware such as keyboards, power cables, multi-VGA graphics cards, monitors etc. are not included in the scope of supply of the SIMATIC PCS 7 Basic Package and must be ordered separately.

SIMATIC PCS 7 Basic Package

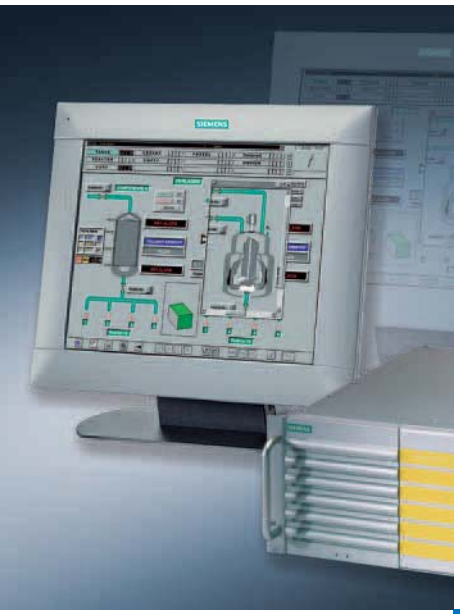
Selection and Ordering Data

	Order No.
PCS 7 Basic Package V6.1 consisting of : • 1 x AS 416-3 with - PS 407 power supply; 10 A for 120/230 V AC/DC - UR2 rack (9 slots) - Memory card 8 MB - CP 443-1EX11 - CP443-5 Extended • 1 x engineering station with - Basic device SIMATIC PCS 7 ES/OS IL 43 BCE WXP - PCS 7 engineering software for AS/OS; 1,000 POs/RC 32K, floating license - SFC Visualization, floating license - PCS 7 Import/Export Assistant, floating license - SIMATIC PDM PCS 7, floating license • 1 x OS single station - Basic device SIMATIC PCS 7 ES/OS IL 43 BCE WXP - PCS 7 OS software Single Station for 1,000s POs/RT 32K, single license - SFC Visualization, floating license	**6ES7 650-3GD16-0YX0** D)

D) Subject to export regulations: AL: N, ECCN: 5D992B1

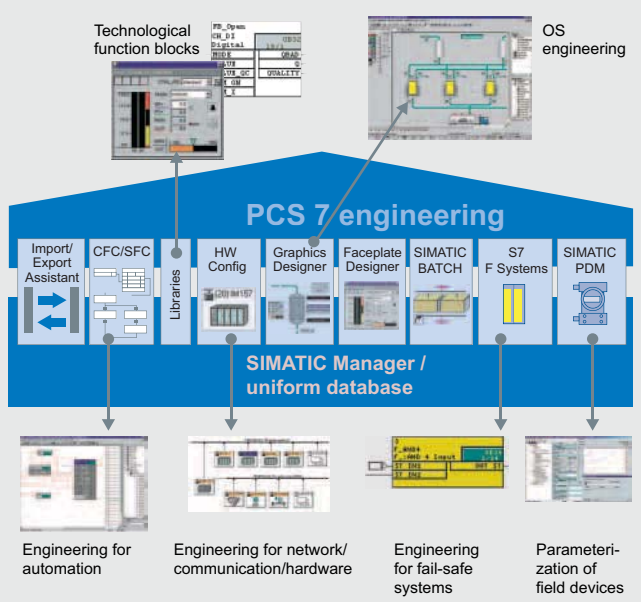
Note:
Please note that network components as well as supplementary components for ES/OS basic hardware such as keyboards, power cables, multi-VGA graphics cards, monitors etc. are not included in the scope of supply of the SIMATIC PCS 7 Basic Package and must be ordered separately.

4 Engineering system



Introduction

Overview



The SIMATIC PCS 7 engineering system 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 permit you to carry out the engineering of standard automation functions as well as the configuration of consistent safety functions for safe, fault-tolerant and high-availability process applications. The engineering toolset comprises the following tools for engineering:

- of the hardware and field devices,
- of the communications networks,
- of continuous and sequential process operations,
- of the HMI strategies,
- of batch processes with SIMATIC BATCH and
- of route controls with SIMATIC Route Control.

Technologists as well as process and production engineers can plan and configure in the environment they are familiar with by utilizing the engineering toolset designed for technological needs together with the predefined blocks and plans.

Function

Typical automation components such as motors, valves and PID controllers are already saved as standardized software objects (process tag types) in a control engineering library and need only be integrated in the process operations and graphically connected. This is easy and quick to accomplish even by technologists without any programming experience. When image objects are connected, the associated OS variables are saved (together with the associated blocks where applicable) in the block list.

The uniform database for the engineering systems ensures that data which have been entered once are available system-wide.

All project modifications associated with the automation systems, the operator systems and SIMATIC BATCH can be compiled and loaded in one step. The engineering system automatically ensures the correct sequence. A central dialog displays and controls the operation.

Selective changes to the configuration can be loaded online into the corresponding system components. Short turnaround times result in short waiting times for the commissioning engineer and have a positive impact on the commissioning costs. Changes to the configuration which are relevant to automation systems can be debugged in a test system before being downloaded into the target system of the running plant.

The engineering system supports the implementation of large projects and the related processing of bulk data by providing appropriate functions such as:

- Plant hierarchy (plant view)
- Project library for process tag types as well as the import and export of process tags (process object view)
- Multi-project engineering
- Branch & merge
- Extended rename
- Version cross-checker
- Import/export assistant
- SFC type

Overview

Just like the single-user system of the operator system, the central engineering system of the SIMATIC PCS 7 process control system is based on an ES/OS/BATCH/IT basic device of single station design. This is characterized by powerful PC technology that can be used together with the Windows 2000 Professional or Windows XP Professional operating system in the office as well as industrial environments and provides an optimum basis for engineering.

For more user-friendliness, the operating range can be extended by connecting up to 4 process monitors using a special multi-VGA graphics card.

Design

ES single station

The hardware platform for the engineering system of the SIMATIC PCS 7 process control system is the ES/OS/BATCH/IT basic device of single station design. This is based on the SIMATIC Rack PC IL 43 and is already prepared for installation in 19" rack systems.

The operating system you have selected as well as the SIMATIC PCS 7 system software are preinstalled on the basic device when delivered. Microsoft Windows XP Professional and Microsoft Windows 2000 Professional can be used as alternatives for the operating system. Please check whether the operating system you select supports all additionally required engineering components in addition to the standard engineering software.

Each version of the operating system (W2K/XP) of the basic device is available in two variants which differ in the interfacing of communication to the Industrial Ethernet plant bus:

- SIMATIC PCS 7 ES/OS IL 43 BCE
  Communication through Basic Communication Ethernet (BCE) for max. 8 stations
- SIMATIC PCS 7 ES/OS IL 43 IE
  Communication through CP 1613 (without limitations)

A FastEthernet RJ45 port is already on board and can be used for connecting to an OS LAN (terminal bus).

The scope of delivery also includes a mouse. The keyboard and monitor have to be ordered separately (see chapter "ES/OS/BATCH/IT basic devices" in Section "System-neutral components").

Options/expansions

A multi-VGA card can be added to the engineering system. 2 or 4 monitors can then be connected per station (see chapter "ES/OS/BATCH/IT basic devices" in Section "System-neutral components").

Technical specifications

Detailed technical specifications for single stations are provided in table form in the chapter "ES/OS/BATCH/IT basic devices" in Section "System-neutral components".

Selection and Ordering Data

	Order No.	
Single Station		
Windows 2000 Professional MUI operating system (German, English, French, Italian, Spanish, Japanese, Chinese)		
• **SIMATIC PCS 7 ES/OS IL 43 BCE W2K** Connection to plant bus through Basic Communication Ethernet (BCE) with FastEthernet RJ45 network card (PCI card)	**6ES7 650-0LC16-0YX0**	D)
• **SIMATIC PCS 7 ES/OS IL 43 IE W2K** Connection to plant bus through Industrial Ethernet with CP 1613 A2 communications processor	**6ES7 650-0LC16-0YX1**	D)
Windows XP Professional MUI operating system (German, English, French, Italian, Spanish, Japanese, Chinese)		
• **SIMATIC PCS 7 ES/OS IL 43 BCE WXP** Connection to plant bus through Basic Communication Ethernet (BCE) with FastEthernet RJ45 network card (PCI card)	**6ES7 650-0LF16-0YX0**	D)
• **SIMATIC PCS 7 ES/OS IL 43 IE WXP** Connection to plant bus through Industrial Ethernet with CP 1613 A2 communications processor	**6ES7 650-0LF16-0YX1**	D)
Additional and expansion components		
See chapter "ES/OS/BATCH/IT basic devices" in Section "System-neutral components"		

D) Subject to export regulations: AL: N, ECCN: 5D992B1

Note:
Ordering data in abbreviated form; for detailed Ordering data, see chapter "ES/OS/BATCH/IT basic devices" in Section "System-neutral components".

Introduction

Overview

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

- SIMATIC PCS 7 Import/Export Assistant
- SIMATIC Version Cross Checker
- SIMATIC Version Trail
- Engineering Process Safety for engineering of fail-safe systems, including SIMATIC Safety Matrix engineering tool
- SIMATIC PCS 7 Asset Engineering
- SIMATIC Route Control Engineering
- SIMATIC PDM Process Device Manager for SIMATIC PCS 7
- SIMATIC PCS 7 PID-Tuner for controller optimization
- S7-PLCSIM for the functional testing of CFC/SFC programs.

Integration

The ES software can be run on the ES hardware offered in this catalog and has been tested with it. Siemens guarantees the compatibility of hardware and software for system configurations based on components in this catalog.

Should you use basic hardware other than that offered in this catalog, please note the minimum requirements quoted in the chapter "ES/OS/BATCH/IT basic devices".

If you configure your own SIMATIC PCS 7 engineering system using other/own hardware components, you carry full responsibility and will not receive any free support in the event of compatibility problems.

Despite comprehensive tests it cannot be ruled out that the function of a SIMATIC PCS 7 system may be disturbed or impaired by additional non-system software, i.e. software not explicitly released for SIMATIC PCS 7.

Therefore, the use of non-system software in the SIMATIC PCS 7 environment is your responsibility. You have no claims for free support in the event of compatibility problems.

Design

SIMATIC PCS 7 engineering system with Windows XP Professional or Windows 2000 Professional operating system		
Basic devices incl. operating system, alternatives		
BCE communication		SIMATIC PCS 7 ES/OS IL 43 BCE WXP/W2K
IE communication		SIMATIC PCS 7 ES/OS IL 43 IE WXP/W2K
Standard engineering software		
SIMATIC PCS 7 engineering software V6.1, alternatives	AS	●
	OS	●
	AS and OS	●
Supplementary engineering software (optional)		
Import/Export Assistant V6.1		●
Version Cross Checker V6.1		●
Engineering Process Safety	S7 F Systems V5.2	●
	Safety Matrix tool	●
PCS 7 Asset Engineering V6.1		●
SIMATIC Route Control Engineering V6.1		●
SIMATIC PDM PCS 7 V6.0		●
Controller optimization SIMATIC PCS 7 PID Tuner V6.1		●
Simulation with S7-PLCSIM V5.3		●

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

Note on Microsoft SQL Server software

The "SQL Server" software from Microsoft which is delivered with SIMATIC PCS 7 must not be used outside the SIMATIC PCS 7 environment without previous written approval by Siemens.

Overview

The standard engineering software provides the basic functionality for configuration of core SIMATIC PCS 7 system components (automation systems, process I/Os, communications networks, operator systems and SIMATIC BATCH).

It is available in packages of various size to match the number of configurable process objects (250, 1,000, 2,000, 3,000, 5,000 or unlimited/8,500 POs). The number of configurable process objects can be subsequently increased at any time by means of SIMATIC PCS 7 PowerPacks engineering software.

Depending on the engineering requirements for automation systems and/or operator systems, the engineering software is available in three different versions:

- For AS automation systems
- For OS operator systems
- For AS/OS automation systems and operator systems

We can offer you an economical solution for the engineering of automation systems or operator systems for short-term projects using a rental license limited to 50 hours.

Function

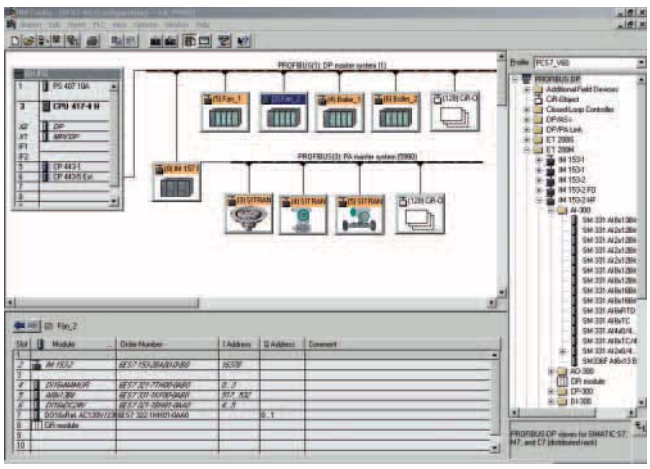
Essential tools of the standard engineering software and their functions:

SIMATIC Manager

The SIMATIC Manager is the integration platform for the engineering tools as well as the configuration interface for all engineering tasks of the SIMATIC PCS 7 process control system. All aspects of the SIMATIC PCS 7 project are managed, archived and documented here. The SIMATIC Manager provides tools for configuring the automation systems, the I/Os and the communication networks, and it provides the ability to select the required hardware from an electronic catalog.

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

- The component view for configuration of hardware such as automation systems, bus components or process I/Os
- The process object view as the central development environment for all aspects of process tags/objects.



Component view hardware configuration in the SIMATIC Manager with HW Config

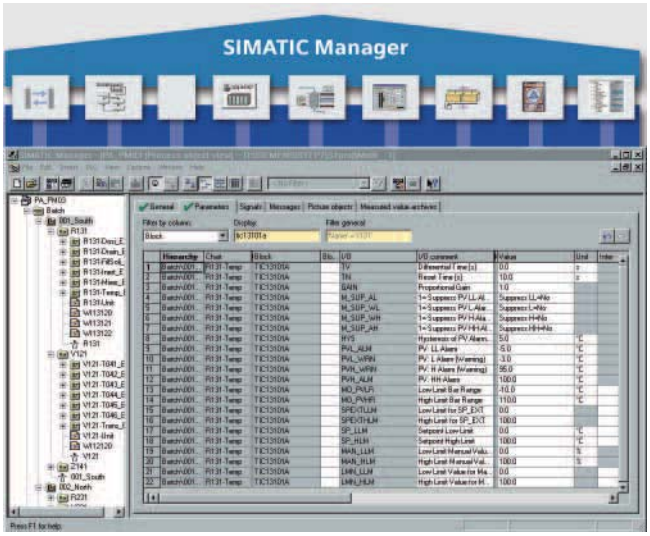
Process object view

The process object view of the SIMATIC Manager supports operation by the process engineer through a universal view of the measuring point. It shows the technological hierarchy of the plant (presented in tree form) in combination with a tabular view of all aspects of the measuring point/process object (general data, parameters, signals, messages, image objects and measured value archives). This provides the engineer with rapid 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 is 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 interconnected to subordinate images. The configuration engineer is only responsible for the correct positioning. Since the number of common display blocks and their semantics can be configured, it is also possible to implement customized alarm configurations.



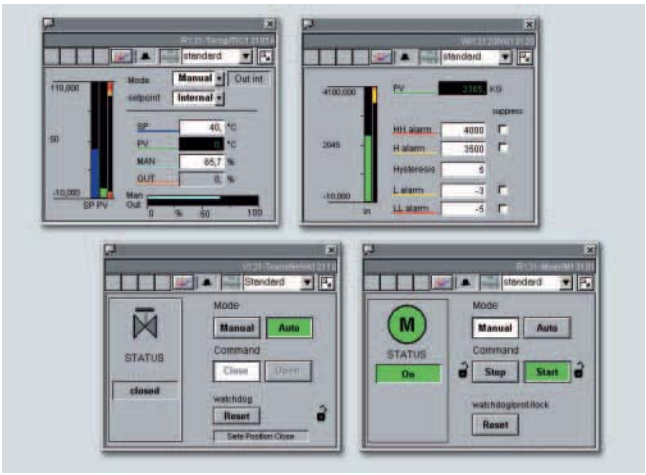
Process object view

Standard engineering software

I&C libraries

Preconfigured and tested blocks, faceplates and symbols are organized in I&C libraries and form the basic elements for the graphic configuration of automation solutions. The use of these library elements plays a major role in minimizing the engineering input and project costs.

The comprehensive range of blocks includes simple logic and driver blocks, technological blocks with integral alarming and HMI features such as PID controllers, motors or valves, and also blocks for the integration of PROFIBUS field devices according to PROFIBUS PA Profile 3.0 (including standardized evaluation of the process value status).



Examples of standard OS faceplates from the PCS 7 library

Multi-project engineering

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

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.

The (sub)projects belonging to a multi-project are saved on a central server and can be sent to local engineering stations for editing. The engineering performance is then unaffected by network access.

Branch & Merge

Branch & Merge supports the division and merging of sub(projects) from the technological viewpoint.

Charts or plant units can be copied into another project and edited there. Interconnections which are not specific to a project, typically for interlocking, become text interconnections. When merged, the charts with the same name in the original object are overwritten, and text interconnections – even self-entered ones – can be closed by clicking a button.

Sequential function chart (SFC)

The SFC editor is suitable for the graphical configuration and commissioning of sequence control systems for non-continuous production operations. It possesses convenient editing functions as well as powerful test and commissioning functions.

In the case of a sequence control, the basic automation functions which are typically created per CFC are controlled and selectively processed using changes in operating mode and status. Depending on the subsequent application, the sequence controls can be created either as an SFC plan or SFC type.

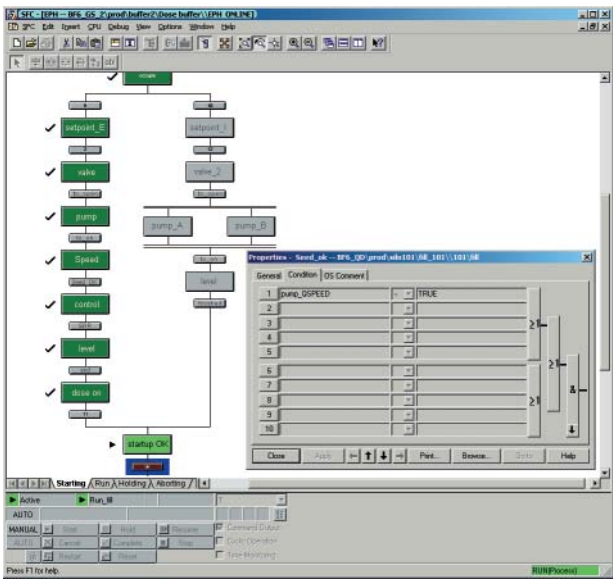
SFC plan

The SFC plan can be used to implement sequence controls which can be used once and which intervene in several subareas of a production plant. Each SFC plan contains standardized inputs and outputs for status data and for control by the user program or the user. The SFC plan can be positioned and interconnected in the CFC like a block. The required CFC block connections are selected by simple operations and connected to the steps or transitions of the step chains. An ISA 88-conform status manager enables the configuration of up to 8 separate sequence chains within a single SFC plan, e.g. for states such as HOLDING or ABORTING, for SAFE STATE or for different operating modes.

SFC type

SFC types are standardized sequence controls for multiple use which intervene in one subarea of a 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 parameterized as an instance in a CFC plan.

A change in the original automatically results in a corresponding change in all instances. An SFC type can contain up to 32 sequence chains. 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.



Sequential function chart

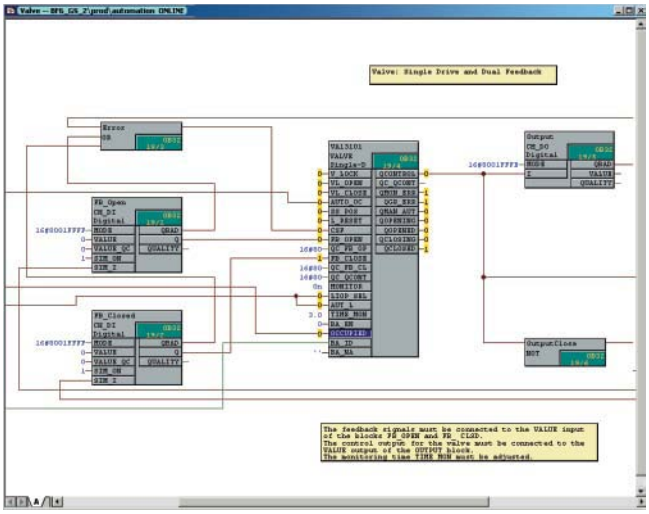
Continuous function chart (CFC)

The CFC editor is the tool for graphical configuration and commissioning of continuous automation functions. Preengineered function blocks can be positioned, configured and interconnected within CFCs with the support of powerful autorouting and integral configuration of HMI messages. Special configuration techniques such as the chart-in-chart technique for implementing hierarchical charts or the multiple application of chart block types (charts compiled as block type) or SFC types (standardized sequence controls) in the form of instances offer an additional rationalization potential.

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 inserting, and configuration engineers can optimize these properties by means of modifications in the runtime editor or using algorithms.

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

In addition to convenient editing functions, the CFC's scope of functions also includes powerful test and commissioning functions as well as individually configurable documentation functions.



Continuous function chart

Graphics designer and faceplate designer

The project data for the engineering of the operator systems are organized with the SIMATIC Manager. All data relevant to operation and monitoring of a control element, 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.

In addition to the standard faceplates, the faceplate designer can be used to simply generate customized faceplates for operation and monitoring of process tags or plant components. Block symbols can be conveniently interconnected to process tags using Drag & Drop.

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.

Standard engineering software

Selection and Ordering Data	Order No.
SIMATIC PCS 7 Engineering Software V6.1 3 languages (German, English, French), executes with Windows 2000 Professional/ 2000 Server or Windows XP Professional/ Server 2003, floating license for 1 user Electronic documentation on PCS 7 toolset DVD Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions; PCS 7 V6.1 Toolset DVD, Microsoft SQL Server incl. EULA, PC Anywhere Host as well as supplementary CDs/DVDs (e.g. Microsoft ServicePacks and Tools)	
Engineering software for AS	
• 250 POs (process objects)	**6ES7 658-1AA16-0YA5**
• 1,000 POs	**6ES7 658-1AB16-0YA5**
• 2,000 POs	**6ES7 658-1AC16-0YA5**
• 3,000 POs	**6ES7 658-1AD16-0YA5**
• 5,000 POs	**6ES7 658-1AE16-0YA5**
• Unlimited POs	**6ES7 658-1AF16-0YA5**
Engineering software for OS	
• 250 POs/RC 8K	**6ES7 658-2DA16-0YA5**
• 1,000 POs/RC 32K	**6ES7 658-2DB16-0YA5**
• 2,000 POs/RC 64K	**6ES7 658-2DC16-0YA5**
• 3,000 POs/RC 100K	**6ES7 658-2DD16-0YA5**
• 5,000 POs/RC 150K	**6ES7 658-2DE16-0YA5**
• 8,500 POs/RC 256K	**6ES7 658-2DF16-0YA5**
Engineering software for AS/OS	
• 250 POs/RC 8K	**6ES7 658-5AA16-0YA5**
• 1,000 POs/RC 32K	**6ES7 658-5AB16-0YA5**
• 2,000 POs/RC 64K	**6ES7 658-5AC16-0YA5**
• 3,000 POs/RC 100K	**6ES7 658-5AD16-0YA5**
• 5,000 POs/RC 150K	**6ES7 658-5AE16-0YA5**
• Unlimited POs/RC 256K	**6ES7 658-5AF16-0YA5**
SIMATIC PCS 7 Engineering Software V6.1 Rental License 3 languages (German, English, French), executes with Windows 2000 Professional/ 2000 Server or Windows XP Professional/ Server 2003 Rental license for 50 hours Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions; PCS 7 V6.1 Toolset DVD, Microsoft SQL Server incl. EULA, PC Anywhere Host as well as supplementary CDs/DVDs (e.g. Microsoft ServicePacks and Tools)	
• For AS, 2,000 POs	**6ES7 658-1AC16-0YA6**
• For OS, 2,000 POs/RC 64K	**6ES7 658-2DC16-0YA6**

Selection and Ordering Data	Order No.
SIMATIC PCS 7 PowerPacks Engineering Software	
SIMATIC PCS 7 PowerPack Engineering Software AS for extending the engineering software for AS 3 languages (German, English, French), executes with Windows 2000 Professional/ 2000 Server or Windows XP Professional/ Server 2003, floating license for 1 user Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions	
• From 250 POs to 1,000 POs	**6ES7 658-1AB16-0YD5**
• From 1,000 POs to 2,000 POs	**6ES7 658-1AC16-0YD5**
• From 2,000 POs to 3,000 POs	**6ES7 658-1AD16-0YD5**
• From 3,000 POs to 5,000 POs	**6ES7 658-1AE16-0YD5**
• From 5,000 POs to unlimited POs	**6ES7 658-1AF16-0YD5**
SIMATIC PCS 7 PowerPack Engineering Software OS for extending the engineering software for OS 3 languages (German, English, French), executes with Windows 2000 Professional/ 2000 Server or Windows XP Professional/ Server 2003, floating license for 1 user Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions	
• From 250 POs/RC 8K to 1,000 POs/RC 32K	**6ES7 658-2DB16-0YD5**
• From 1,000 POs/RC 32K to 2,000 POs/RC 64K	**6ES7 658-2DC16-0YD5**
• From 2,000 POs/RC 64K to 3,000 POs/RC 100K	**6ES7 658-2DD16-0YD5**
• From 3,000 POs/RC 100K to 5,000 POs/RC 150K	**6ES7 658-2DE16-0YD5**
• From 5,000 POs/RC 150K to 8,500 POs/RC 256K	**6ES7 658-2DF16-0YD5**
SIMATIC PCS 7 PowerPack Engineering Software AS/OS for extending the engineering software for AS/OS 3 languages (German, English, French), executes with Windows 2000 Professional/ 2000 Server or Windows XP Professional/ Server 2003, floating license for 1 user Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions	
• From 250 POs/RC 8K to 1,000 POs/RC 32K	**6ES7 658-5AB16-0YD5**
• From 1,000 POs/RC 32K to 2,000 POs/RC 64K	**6ES7 658-5AC16-0YD5**
• From 2,000 POs/RC 64K to 3,000 POs/RC 100K	**6ES7 658-5AD16-0YD5**
• From 3,000 POs/RC 100K to 5,000 POs/RC 150K	**6ES7 658-5AE16-0YD5**
• From 5,000 POs/RC 150K to unlimited POs/RC 256K	**6ES7 658-5AF16-0YD5**

Overview

Upgrade packages are available for versions V5.x and V6.0 of the engineering software.

Upgrade package for engineering software from V6.0 to V6.1

The upgrade package contains licenses for upgrading from V6.0 to V6.1 for the following software:

- PCS 7 engineering AS (for all PO versions)
- PCS 7 engineering OS (for all PO versions)
- PCS 7 PID-Tuner
- Version cross-checker
- Import/export assistant

Selection and Ordering Data

Order No.

Upgrade of engineering software from V6.0 to V6.1

PCS 7 engineering upgrade package for AS/OS upgrade from V6.0 to V6.1
3 languages (German, English, French),
executes with Windows 2000 Professional/ 2000 Server or Windows XP Professional/ Server 2003, floating license for 1 user

Type of delivery:
license key disk, emergency key disk, certificate of license, terms and conditions;
PCS 7 V6.1 toolset DVD, Microsoft SQL Server incl. EULA,
PC Anywhere Host as well as supplementary CDs/DVDs (e.g. Microsoft ServicePacks and tools)

6ES7 651-5AX16-0YE5

Upgrades of engineering software from V5.x to V6.1

Upgrade of PCS 7 starter package from V5.x to V6.1
3 languages (German, English, French),
executes with Windows 2000 Professional/ 2000 Server or Windows XP Professional/ Server 2003, floating license for 1 user

Type of delivery:
license key disk, emergency key disk, certificate of license, terms and conditions;
PCS 7 V6.1 toolset DVD, Microsoft SQL Server incl. EULA,
PC Anywhere Host as well as supplementary CDs/DVDs (e.g. Microsoft ServicePacks and tools)

- AS/OS upgrade for 250 POs/RC 8K — **6ES7 658-5AA16-0YE5**

Selection and Ordering Data

Order No.

Upgrade of AS software engineering from V5.x to V6.1
3 languages (German, English, French),
executes with Windows 2000 Server or Windows Server 2003, single license for 1 installation

Type of delivery:
license key disk, emergency key disk, certificate of license, terms and conditions;
PCS 7 V6.1 toolset DVD, Microsoft SQL Server incl. EULA,
PC Anywhere Host as well as supplementary CDs/DVDs (e.g. Microsoft ServicePacks and tools)

- AS upgrade for 3,000 POs — **6ES7 658-1AD16-0YE5**
- AS upgrade for unlimited POs — **6ES7 658-1AF16-0YE5**

Upgrade of OS software engineering from V5.x to V6.1
3 languages (German, English, French),
executes with Windows 2000 Server or Windows Server 2003, single license for 1 installation

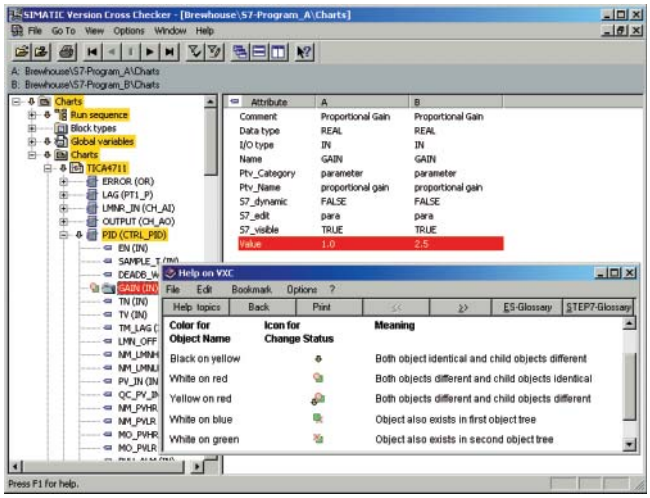
Type of delivery:
license key disk, emergency key disk, certificate of license, terms and conditions;
PCS 7 V6.1 toolset DVD, Microsoft SQL Server incl. EULA,
PC Anywhere Host as well as supplementary CDs/DVDs (e.g. Microsoft ServicePacks and tools)

- OS upgrade for 2,000 POs/RC 64K — **6ES7 658-2DC16-0YE5**
- OS upgrade for 5,000 POs/RC 150K — **6ES7 658-2DE16-0YE5**

4

Version Cross Checker

Overview



The version cross-checker tool determines the differences between various versions of a project by:

- Comparison of CFCs/SFCs, block types, signals and sequences in order to determine additional, missing or different objects
- Graphic display of comparison results in a combination of tree and tabular formats
- Color-coded identification of objects and attribute values

Upgrade from V6.0

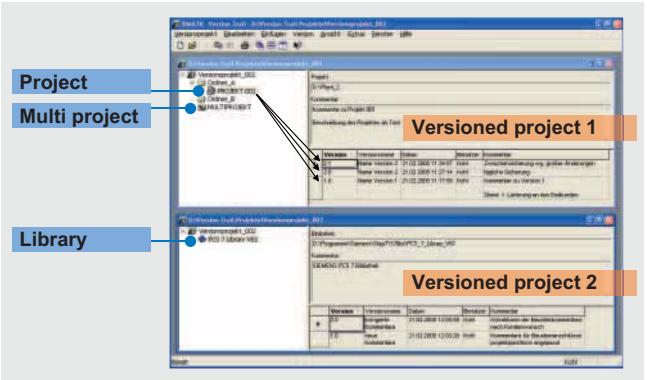
For SIMATIC PCS 7 users, the engineering software upgrade package already includes an upgrade of the version cross-checker from V6.0 to V6.1.

A separate upgrade can be purchased for applications in which the version cross-checker is used outside SIMATIC PCS 7.

Selection and Ordering Data	Order No.
SIMATIC Version Cross Checker V6.1 3 languages (German, English, French), executes with Windows 2000 Professional or Windows XP Professional, floating license for 1 user Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions	**6ES7 658-1CX16-2YB5**
SIMATIC upgrade of Version Cross Checker V6.0 to V6.1 3 languages (German, English, French), executes with Windows 2000 Professional or Windows XP Professional, floating license for 1 user Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions	**6ES7 658-1CX16-2YF5**

Version Trail

Overview



SIMATIC Version Trail is a software option for engineering which, together with the SIMATIC Logon central user administration, can assign a version history to libraries, projects and multi-projects. It can be used within SIMATIC PCS 7 or also in the context of Totally Integrated Automation with SIMATIC.

Function

When archiving, SIMATIC Version Trail creates a version history with the following information in association with SIMATIC Logon:

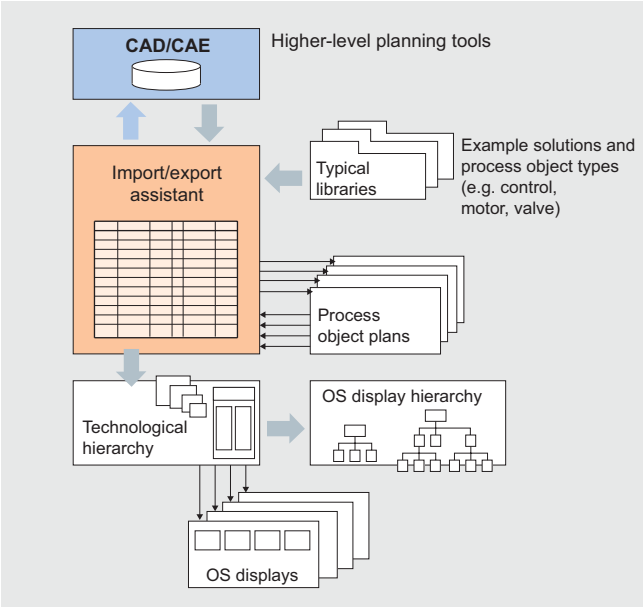
- Version
- Version name
- Date and time
- User
- Comment.

This version history can be displayed and printed. Individual versions can be retrieved from the version history, and used further. SIMATIC Logon organizes the access protection.

Note:
Please note that Version Trail cannot be used on its own, but only in combination with SIMATIC Logon (see Chapter "Administration" in Section "System-neutral components").

Selection and Ordering Data	Order No.
SIMATIC Version Trail V6.1 5 languages (German, English, French, Italian, Spanish), executes with Windows 2000 Professional, Windows XP Professional or Windows Server 2003, floating license for 1 user Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions	**6ES7 658-1FX16-2YB5**

Overview



Efficient processing of mass data

The import/export assistant (IEA) is an effective tool for rational engineering of mass data, and is based on multiple use of process tag types and example solutions. It is particularly suitable for large plants with many process tags of the same type or with several plant components of the same type. Plant data which have already been configured (such as process tag lists or charts from the CAD/CAE world) can be imported into the engineering system and used for largely automatic generation of process tags. The data of the host planning system can be subsequently matched again with the parameters optimized during commissioning.

To permit simple and fast modification, the PCS 7 projects can also be exported, the data processed using the IEA editor or other programs (e.g. Microsoft Excel or Access), and subsequently reimported.

Benefits

The import/export assistant offers the following benefits when using previously configured plant data:

- Importing of previously configured plant data, such as process tag list from the host CAD/CAE world
  - No multiple inputs with the associated input errors
  - Simple handling, easy-to-use graphic environment
- Automatic and reproducible generation of process tags and derivatives based on the imported process tag lists and example solutions (technological hierarchy, charts of the individual process tags)
  - Drastic reduction in time required, and avoidance of errors
- Automatic derivation of the OS display hierarchy, automatic interconnecting of blocks and positioning in displays
  - Considerable reduction in time required and costs
- Commissioning of individual process tag with the user-friendly CFC and SFC graphic tools
- Exporting of parameters optimized during commissioning back to the CAD/CAE world
  - Consistent data in the host planning tools

Function

- Generation/modification of process tag types or example solutions
- Importing of data from plant planning
  - Generation of process tags from process tag types and derivatives from example solutions, and provision with data from the import file (one process tag/derivative per import file line in each case)
  - Assignment of an import file to a process tag type, and checking of the assignment
  - Generation of a template for an input file for the process tag
- Exporting of data for plant planning
  - Generation of an export file per process tag type/example solution in each case, with one line for each process tag of this type or each derivative of this example solution
- Matching of process tags
  - Removal of parameter/signal connection points not present on the process tag type and of messages from the process tags
  - Addition of parameter/signal connection points and messages newly defined on the process tag type
  - Correction of modified categories of process tag type
  - Display of inconsistencies between process tag and type which cannot be matched automatically

Selection and Ordering Data

	Order No.
SIMATIC PCS 7 Import/Export Assistant V6.1 3 languages (German, English, French), executes with Windows 2000 Professional/ 2000 Server or Windows XP Professional/ Server 2003, floating license for 1 user Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions	**6ES7 658-1DX16-2YB5**

Introduction

Overview

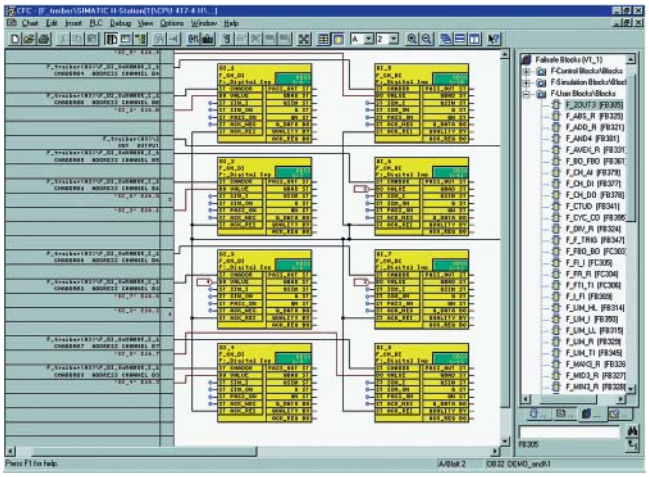
The process industry is characterized by technological processes which are frequently complex and have high safety demands, and faults and failures in the process automation may have fatal consequences for mankind, machines, plant or the environment. Particular importance is therefore attached to process safety. The safety system used must reliably detect faults in the process as well as own internal faults, and automatically set the plant/application to a safe state if a fault is detected.

With SIMATIC Safety Integrated, SIMATIC PCS 7 combines standard automation and safety engineering in an innovative complete system which offers totally integrated safety engineering for safe, fault-tolerant and high-availability applications in the process industry:

- AS 414F/FH and AS 417F/FH automation systems
- PROFIBUS communication with the PROFIsafe profile
- ET 200M and ET 200S distributed I/O systems with special safety-oriented modules
- Convenient process visualization, including safety-relevant fault messages, via the operator system
- Engineering system with S7 F Systems software package, CFC and SIMATIC Safety Matrix

The SIMATIC PCS 7 engineering system provides you with a totally integrated engineering tool for standard and safety applications. Using Continuous Function Chart (CFC) and S7 F Systems you can configure safety functions for the AS 414F/FH and AS 417F/FH automation systems and safety-oriented I/O modules simply, efficiently and without lengthy familiarization times. Even more advantages are provided by the SIMATIC Safety Matrix. The convenient configuration tool automatically creates complex safety programs on the basis of a causes & effects matrix in which the events (causes) occurring during a process are linked to exactly defined reactions (effects).

Overview



The S7 F Systems engineering tool, which is integrated in the SIMATIC Manager, can be used to configure an F system (F/FH). This tool enables

- parameterization of CPU and F signal modules, and
- creation of safety-oriented applications in the CFC.

Predefined, TÜV-approved blocks are available for this purpose. The safety-oriented blocks relieve the user of having to perform the diverse programming tasks for the detection of errors and reaction to errors.

The application program may contain safety-oriented (F) and non-safety-oriented standard programs (S), where strict separation of F and S program components together with data exchange by means of special conversion blocks prevent conflicts.

S7 F Systems supports the acceptance testing and comparison of F programs using a checksum that enables every minor change to be detected. This checksum is recorded during the TÜV acceptance test. A password prevents access by non-authorized persons.

An S7 F Configuration Pack is required for the engineering when using the safety-oriented I/Os SM 326F/336F (AI, DI, DO) as standard I/Os (without F functionality). This is a component of the F programming tool S7 F Systems V5.2 and can also be downloaded from the Internet (as part of product support provided by Automation and Drives Service & Support: S7 F Configuration Pack V5.3).

Selection and Ordering Data

	Order No.
S7 F Systems V5.2 F program software and function block library 2 languages (German, English), executes with Windows 2000 Professional or Windows XP Professional, single license for 1 installation Type of delivery: Certificate of license; software and electronic documentation on CD	**6ES7 833-1CC00-0YX0**

SIMATIC Safety Matrix

Overview

The Safety Matrix is an innovative configuration tool for processes requiring safety reactions to defined statuses. The Safety Matrix is based on the proven principle of a causes & effects matrix with which exactly defined reactions (effects) can be assigned to events (causes) occurring during a process. This is part of a plant's risk analysis. The specification of the safety program also corresponds to the input parameters for the Safety Matrix Using these parameters, the Safety Matrix automatically generates complex, safety-oriented CFC programs for SIMATIC PCS 7.

Compared to conventional programming, the safety logic can thus be configured significantly faster and with a greatly reduced overhead. Configuration engineers require no programming knowledge, and can concentrate fully on the safety requirements of their plants. If necessary, several matrices can be linked together.

Benefits

The advantages of Safety Matrix at a glance:

- Configuration of safety functions (logic) using the proven cause & effect method – i.e. on the basis of process events and process reactions
- Automatic generation of the safety-oriented SIMATIC PCS 7 program
- Minimization of sources of error due to easy and clearly presented configuration
- Automatic creation of documentation after safety checks
- Shortened configuration times and no need for special programming skills
- Automatic generation of visualization and convenient display of the Safety Matrix on the SIMATIC PCS 7 operator station
- Automatic management of project versions of the program
- User-friendly tracking of changes
- Easy modification of safety functions and simple adaptation of the specification in test mode, as well as bypass, reset and override functions.

Design

In association with SIMATIC PCS 7, the following individual products are available for the SIMATIC Safety Matrix:

- *SIMATIC Safety Matrix Tool*
  for configuration of safety functions on the PCS 7 engineering system
- *SIMATIC Safety Matrix Editor*
  for creation and testing of the Safety Matrix logic in an external computer, independent of the engineering system; (can be optionally used additive to the SIMATIC Safety Matrix Tool)
- *SIMATIC Safety Matrix Viewer for SIMATIC PCS 7*
  for accessing and monitoring the Safety Matrix using the SIMATIC PCS 7 operator system (for Ordering data, see also Chapter "OS software" in Section "Operator system")

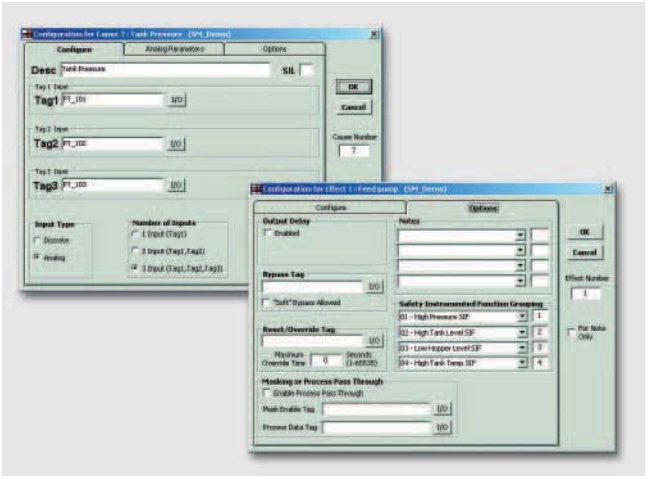
System requirements

	Hardware requirements	Software requirements
SIMATIC Safety Matrix Tool	SIMATIC PCS 7 AS 414H or AS 417H	PCS 7 V6.0 SP2 and higher, S7 F Systems V5.2 HF 2 and higher with S7 F-Lib V1.2
SIMATIC Safety Matrix Editor		Windows 2000 Professional SP2 and higher or Windows XP Professional
SIMATIC Safety Matrix Viewer	SIMATIC PCS 7 AS 414H or AS 417H	PCS 7-OS V6.0 SP2 and higher

The SIMATIC Safety Matrix Editor provides the advantage that the Safety Matrix can also be created, edited and tested outside the SIMATIC PCS 7 engineering system. The SIMATIC Safety Matrix Editor executes on a computer with Windows 2000 Professional SP2 and higher or Windows XP Professional. However, generation of the safety-oriented CFC program as well as compilation and downloading to the automation system are only possible using the SIMATIC engineering system with the SIMATIC Safety Matrix Tool.

Function

Safety Matrix: "Intersections" define the linking of "cause" and "effect"



Configuration of analog or digital "causes" and digital "effects"

The matrix table is similar to a conventional spreadsheet. In the horizontal lines, the user first enters possible process events (inputs) and configures the type and number of inputs, possible delays, interlockings and logical operations. The user also defines here if and which faults can be tolerated. After configuring the causes, the effects, i.e. the reactions (outputs) to a specific event are entered in the vertical columns. The interlinking of causes and effects is then implemented by simply clicking the cell at the intersection of row and column. This opens a window in which the user can select the type of link.

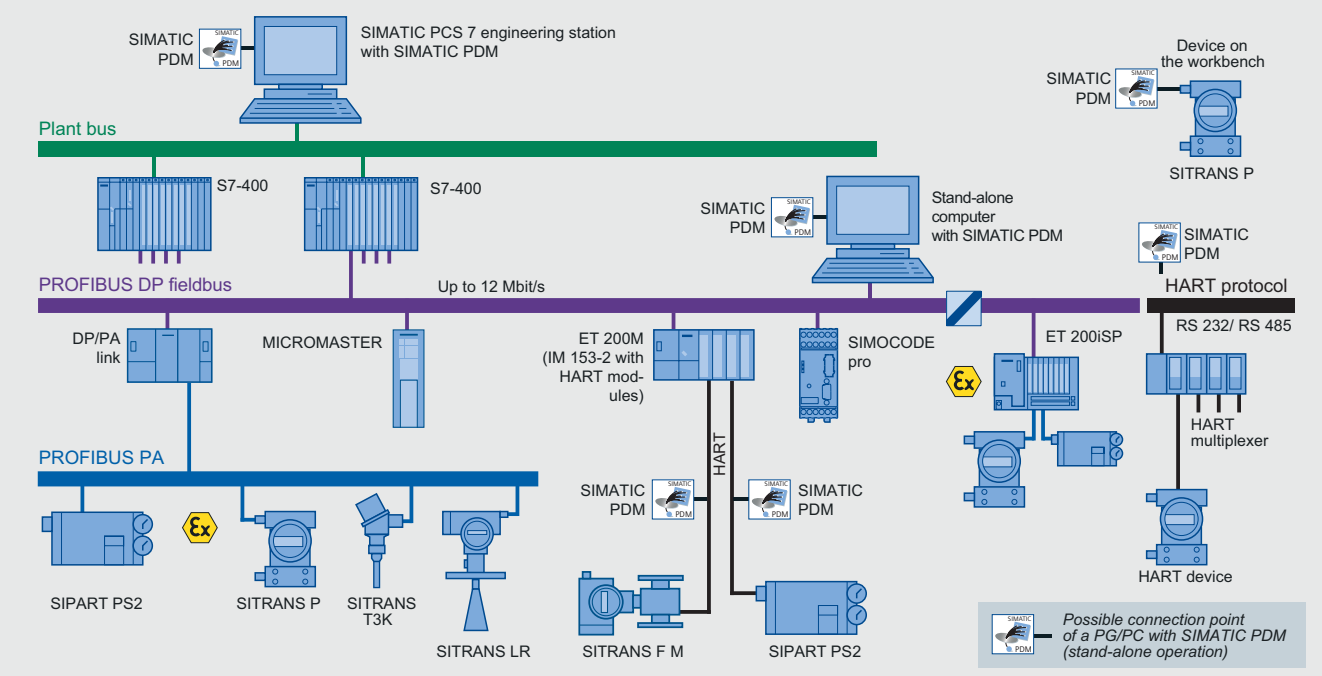
Selection and Ordering Data

	Order No.	
SIMATIC Safety Matrix Tool Creation, configuration, compilation, loading and online monitoring of the Safety Matrix in a SIMATIC PCS 7 environment incl. SIMATIC Safety Matrix Viewer for SIMATIC PCS 7, for operation and monitoring of the Safety Matrix in a SIMATIC PCS 7 environment with several operator control levels 2 languages (German, English), executes with Windows 2000 Professional or Windows XP Professional, single license for 1 installation Type of delivery: Certificate of license and authorization diskette for Safety Matrix Tool and Safety Matrix Viewer; software and electronic documentation on CD	**6ES7 833-1SM00-0YA5**	C)
SIMATIC Safety Matrix Editor Creation and checking of the Safety Matrix logic on an external computer without a SIMATIC PCS 7/ STEP 7 environment 2 languages (German, English), executes with Windows 2000 Professional or Windows XP Professional, single license for 1 installation Type of delivery: Certificate of license and authorization diskette; software and electronic documentation on CD	**6ES7 833-1SM40-0YA5**	C)

C) Subject to export regulations: AL: N, ECCN: EAR99S

Introduction

Overview



Configuration options with SIMATIC PDM

SIMATIC PDM (Process Device Manager) is a universal, vendor-independent tool for the configuration, parameterization, commissioning, diagnostics and servicing of intelligent field devices (sensors and actuators) and field components (remote I/Os, multiplexers, control room devices, compact controllers), which in the following sections will be referred to simply as devices. Using *one* software, SIMATIC PDM enables the processing of more than 1,200 devices from Siemens and over 100 vendors worldwide on *one* homogeneous user interface.

With respect to device integration, SIMATIC PDM is the most powerful device manager available on the world market. Devices which previously were not supported can be easily integrated in SIMATIC PDM at any time by importing their device descriptions (EDD). This provides security for your investment and saves you investment costs, training expenses and consequential costs.

Parameters and functions for all supported devices are displayed in a consistent and uniform fashion independent of their communications interface.

SIMATIC PDM is integrated in the asset management of SIMATIC PCS 7. The Process Device Manager provides wider information for all devices described by the Electronic Device Description (EDD), e.g. detailed diagnostics information (vendor information, information on fault diagnostics and troubleshooting, further documentation), modification logbook (audit trial), parameter information. You can change directly to SIMATIC PDM from the diagnostics faceplates in the maintenance station.

Design

Product versions

A customer-oriented product structure enables you to adapt the scope of functions and the performance of SIMATIC PDM to your individual requirements. You can select the minimum configuration, one of the predefined product configurations, or produce your desired configuration from the individual components offered (see table).

Depending on the application environment, SIMATIC PDM can be categorized as follows:

- SIMATIC PDM system-integrated:
  Complete packages for operation in a SIMATIC PCS 7/S7 configuration environment
  - SIMATIC PDM PCS 7 (for integration in an engineering system for SIMATIC PCS 7)
  - SIMATIC PDM S7 (for integration in a SIMATIC S7 configuration environment)
- SIMATIC PDM stand-alone:
  Service tools for operation on a mobile computer on the PROFIBUS or with direct connection to the device
  - SIMATIC PDM Single Point (for processing of a single field device via a point-to-point coupling)
  - SIMATIC PDM Service (for enhanced servicing, incl. modification logbook and lifelist detailed diagnostics)

	SIMATIC PDM stand-alone			**SIMATIC PDM system-integrated**	
	Minimum configuration	Components for individual configuration	Predefined product configurations		
Product name	SIMATIC PDM Single Point	SIMATIC PDM Basic	SIMATIC PDM Service	SIMATIC PDM S7	SIMATIC PDM PCS 7
TAGs included in scope of delivery	**1**	**4**	**128**	**128**	**128**
TAG expansions	*Cannot be expanded*	**TAG options** - 128 TAGs - 512 TAGs - 1,024 TAGs - 2,048 TAGs and/or **PowerPacks**	**PowerPacks** - From 128 to 512 TAGs - From 512 to 1,024 TAGs - From 1,024 to 2,048 TAGs - From 2,048 to unlimited TAGs		
Option "Integration in STEP 7/ PCS 7"		×	×	●	●
Option "Routing through S7-400"		×	×	×	●
Option "Communication through standard HART multiplexer"		×	×	×	×

●: Components included in delivery of individual PDM configurations

×: Can be ordered as options

TAG options/PowerPacks

The predefined product configurations can be expanded by further functions and PowerPacks. Product configurations with 512, 1,024, 2,048 or unlimited TAGs can be implemented in this manner. In contrast to the PowerPacks, TAG options can only be combined with SIMATIC PDM Basic. They can only be used for product configurations based on individual components.

A TAG corresponds to a SIMATIC PDM object, which represents individual field devices or components within a project, e.g. transmitters, positioners, switching devices or remote I/Os. TAGs are also relevant for diagnosis with the lifelist of SIMATIC PDM. In this case, TAGs are considered to be all recognized devices with diagnostics capability, whose detailed diagnosis is effected through the device description (EDD).

Introduction

4

Function

Core functions

- Adjustment and modification of device parameters
- Comparing (e.g. project and device data)
- Plausibility testing of data input
- Device identification and testing
- Device status indication with operating modes, alarms and states
- Device identification and testing
- Simulation
- Diagnostics
- Management (e.g. networks and PCs)
- Commissioning functions, e.g. measuring circuit tests of device data
- Export/import (parameter data, reports)
- Device replacement (lifecycle management)
- Global and device-specific modification logbook for user operations (audit trail)
- Device-specific calibration reports
- Graphic presentations of echo envelope curves, trend display, valve diagnosis results etc.

Support of system management

SIMATIC PDM supports the operative system management in particular through:

- Uniform presentation and operation of devices
- Indicators for preventive maintenance and servicing
- Detection of changes in the project and device
- Increasing the operational reliability
- Reducing the investment, operating and maintenance costs

Graphical user interface

The user interface of SIMATIC PDM satisfies the requirements of the directives VDI/VDE GMA 2187 and IEC 65/349/CD. Even complex devices with several hundred parameters can thus be represented clearly and processed quickly. Using SIMATIC PDM it is very easy to navigate in highly complex stations such as remote I/Os and even connected field devices.

Several views are available to users to help them with their tasks:

- Hardware project view
- Process device network view (preferably for stand-alone application)
- Process device plant view as TAG-related view, also with display of diagnosis information
- Parameter view for parameterizing the field devices
- Lifelist view for commissioning and service

Communication

SIMATIC PDM supports several communication protocols and components for communicating with devices that have the following interfaces:

- PROFIBUS DP/PA interface
- HART interface
- Modbus interface
- Special interface from Siemens

Routing

From the central engineering system of the SIMATIC PCS 7 process control system it is possible with SIMATIC PDM to reach every EDD-parameterizable device in the field plant-wide through the various bus systems and remote I/Os. SIMATIC PDM can thus perform the following from a central position:

- Read diagnosis information from the devices
- Modify device settings
- Adjust and calibrate devices
- Monitor process values
- Create simulation values
- Reparameterize devices.

Integration

Device Integration

SIMATIC PDM supports all devices described by EDD (Electronic Device Description). EDD is standardized to EN 50391 and IEC 61804. Internationally it is the most widely used standardized technology for device integration. At the same time it is the directive of the established organizations for PROFIBUS (PNO: PROFIBUS International) and HART (HCF: HART Communication Foundation).

The devices are directly integrated in SIMATIC PDM through their EDD or the current HCF catalog. In the EDD the device is described in terms of its functions and construction using the Electronic Device Description Language (EDDL) specified by PNO. Using this description, SIMATIC PDM automatically creates its user interface with the specific device data.

The current device catalog of SIMATIC PDM covers more than 1,000 devices from over 100 manufacturers world-wide. In addition, devices from all manufacturers can be integrated in SIMATIC PDM by simply importing their EDDs. It is thus possible to keep the device range up to date at all times and to add to the number of manufacturers and devices supported by SIMATIC PDM. To permit improved transparency, SIMATIC PDM also allows you to create project-specific device catalogs. If you would like to use any devices which cannot be found in the SIMATIC PDM device catalog, we will be glad to help you integrate them.

Contact addresses

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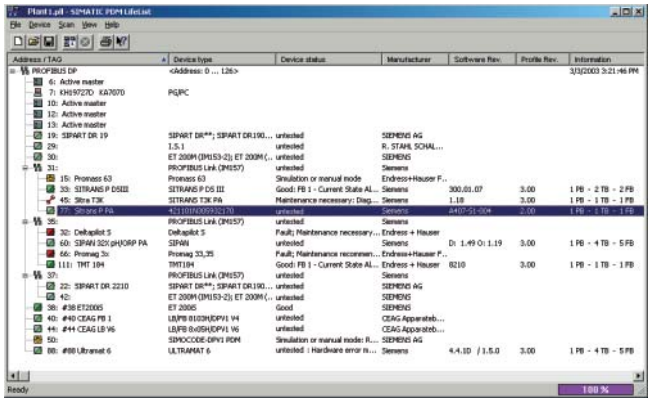
Overview



PDM lifelist with status and diagnostics display

SIMATIC PDM can be used either integrated in a SIMATIC PCS 7/S7 configuration environment, as a mobile servicing tool on a computer with connection to PROFIBUS, or directly on the device.

Design

The customer-oriented product structure of SIMATIC PDM offers you many variations. You can select the minimum configuration (SIMATIC PDM Single Point), one of the predefined and application-specific product configurations, or produce your individual configuration from the components offered.

Each individual component is available as a floating license for one user, and as a rental license for 50 operating hours. The rental license is particularly suitable for low-price processing of short-term projects.

Minimum configuration SIMATIC PDM Single Point

The functionality of this minimum configuration is matched to the processing of exactly *one* field device via a point-to-point coupling. All functions of this device are supported as defined in the device description. These functions include:

- Unlimited selection of device / management of device catalog
- Communication through PROFIBUS DP/PA or HART modem
- Parameterization and diagnostics corresponding to device description
- Export and import of parameter data
- Device identification
- Lifelist

The following system functions of SIMATIC PDM Basic are not available with SIMATIC PDM Single Point:

- EDD-based diagnostics in the lifelist
- Project processing
- Save function (only export and import of parameter data)
- Record functions
- Routing
- Communication with HART field devices through remote I/Os

SIMATIC PDM Single Point cannot be expanded with respect to its functions (e.g. to SIMATIC PDM Basic or with routing option via S7-400) or by means of the TAG option or PowerPack.

SIMATIC PDM Basic

SIMATIC PDM Basic is the basic version with all functions required for operation and parameterization of the devices, and with enabled communications paths for

- PROFIBUS DP/PA,
- HART communication (modem, RS 232 and PROFIBUS),
- Modbus,
- SIREC bus and
- SIPART DR.

The SIMATIC PDM Basic software supports projects with as many as 4 TAGs and, provided the system requirements are met, can be used for stand-alone operation on any computers (PCs/notebooks) with local connection to bus segments or direct connection to the device.

SIMATIC PDM Basic can be expanded by functional options and TAG options/PowerPacks. Use of the following functions depends on at least 128 TAGs:

- Modification logbook
- Calibration report
- Detailed diagnostics in the lifelist

Functional options

SIMATIC PDM option "Integration in STEP 7/PCS 7"

This option is required for using SIMATIC PDM in a SIMATIC S7 or SIMATIC PCS 7 configuration environment. SIMATIC PDM can thus be started directly from the hardware project (HW Config).

SIMATIC PDM Option "Routing through S7-400"

This option is required as an add-on to the option "Integration in STEP7/PCS 7" when SIMATIC PDM is to be used in a central engineering system for SIMATIC PCS 7/S7 with Ethernet bus link to the automation systems for the plant-wide configuration, parameterization, commissioning and diagnosis of the devices in the field.

SIMATIC PDM Option "Communication through standard HART multiplexer"

This option enables SIMATIC PDM to use the HART OPC server for communicating with HART field devices through HART multiplexers.

TAG options/PowerPacks

With the SIMATIC PDM TAG options it is possible to increase the SIMATIC PDM Basic software from 4 TAGs to 128, 512, 1,024 or 2,048 TAGs, or when using an additive PowerPack even to unlimited TAGs.

One TAG corresponds to one SIMATIC PDM object, which represents individual field devices or components within a project, e.g. measuring devices, positioners, switching devices or remote I/Os. TAGs are also relevant for diagnosis with the lifelist of SIMATIC PDM. In this case, TAGs are considered to be all recognized devices with diagnostics capability, whose detailed diagnosis is effected through the device description (EDD).

The SIMATIC PDM PowerPacks can be used to subsequently increase the number of available TAGs for all SIMATIC PDM product configurations. PowerPacks can be obtained for expansion to 512, 1,024, 2,048 and unlimited TAGs.

SIMATIC PDM

Predefined product configurations

SIMATIC PDM Service

This is a product configuration specially predefined for servicing use. SIMATIC PDM Service offers all functions of SIMATIC PDM Basic, including modification logbook, calibration report and detailed diagnostics in the lifelist. In addition, SIMATIC PDM Service can be expanded by the offered options (functional and TAG options). The following program components are part of SIMATIC PDM Service:

- SIMATIC PDM Basic
- Option: 128 TAGs

SIMATIC PDM S7

SIMATIC PDM S7 is a predefined product configuration matched for use of SIMATIC PDM in a SIMATIC S7 configuration environment. It offers all functions of SIMATIC PDM Basic (including modification logbook, calibration report and detailed diagnostics in the lifelist) as well as the functionality for PDM integration in HW Config. SIMATIC PDM S7 can be expanded by the offered functional options and SIMATIC PDM PowerPacks. The following program components are part of SIMATIC PDM S7:

- SIMATIC PDM Basic
- Option: 128 TAGs
- Option: Integration in STEP 7/SIMATIC PCS 7

SIMATIC PDM PCS 7

SIMATIC PDM PCS 7 is a predefined SIMATIC PDM product configuration for integration into the engineering toolset of the SIMATIC PCS 7 engineering system. It offers all functions of SIMATIC PDM Basic (including modification logbook, calibration report and detailed diagnostics in the lifelist), the functionality for PDM integration in HW Config, as well as routing from the central engineering system to the field devices. SIMATIC PDM PCS 7 can be expanded by the offered functional options and SIMATIC PDM PowerPacks. The following program components are part of SIMATIC PDM PCS 7:

- SIMATIC PDM Basic
- Option: 128 TAGs
- Option: Integration in STEP 7/SIMATIC PCS 7
- Option: Routing through S7-400

Technical specifications

Requirements for stand-alone operation	
Hardware	• PG/PC/notebook with processor in accordance with the operating system requirements • 256 MB main memory or more • 210 MB free memory on hard disk or more
Operating system (alternative)	• Microsoft Windows 2000 Professional with SP1 or higher • Microsoft Windows XP Professional with SP1 or higher
Further software components	
• SIMATIC PDM integrated in STEP 7	STEP 7 V5.1 or higher with Service Pack 6 or higher, to be ordered separately

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Selection and Ordering Data	Order No.
SIMATIC PDM Single Point	
SIMATIC PDM Single Point V6.0 For operation and parameterization of one field device, communication using PROFIBUS DP/PA or HART modem, incl. 1 TAG Cannot be expanded by further functions or TAG option/PowerPack 5 languages (German, English, French, Spanish, Italian), executes with Windows 2000 Professional or Windows XP Professional Floating license for 1 user Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions; 2 CDs with SIMATIC PDM V6.0 and device library as well as supplementary DVD with Microsoft ServicePacks and tools	**6ES7 658-3HX06-0YA5**
SIMATIC PDM Basic	
SIMATIC PDM Basic V6.0 For operation and parameterization of field devices and components, communication using PROFIBUS DP/PA, HART modem/interface, RS 232, Modbus, SIREC bus, SIPART DR, incl. 4 TAGs 5 languages (German, English, French, Spanish, Italian), executes with Windows 2000 Professional or Windows XP Professional Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions; 2 CDs with SIMATIC PDM V6.0 and device library as well as supplementary DVD with Microsoft ServicePacks and tools	
• Floating license for 1 user	**6ES7 658-3AX06-0YA5**
• Rental license for 50 hours	**6ES7 658-3AX06-0YA6**
Functional options for SIMATIC PDM V6.0	
Integration in STEP 7 / SIMATIC PCS 7 Only required if it is intended to the use the integration of SIMATIC PDM in HW Config 5 languages (German, English, French, Spanish, Italian), executes with Windows 2000 Professional or Windows XP Professional Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions	
• Floating license for 1 user	**6ES7 658-3BX06-2YB5**
Routing through S7-400 5 languages (German, English, French, Spanish, Italian), executes with Windows 2000 Professional or Windows XP Professional Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions	
• Floating license for 1 user	**6ES7 658-3CX06-2YB5**
Communication through standard HART multiplexer 5 languages (German, English, French, Spanish, Italian), executes with Windows 2000 Professional or Windows XP Professional Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions	
• Floating license for 1 user	**6ES7 658-3EX06-2YB5**
TAG options/PowerPacks	
SIMATIC PDM TAG option For TAG expansion, additive to SIMATIC PDM Basic V6.0 5 languages (German, English, French, Spanish, Italian), executes with Windows 2000 Professional or Windows XP Professional Floating license for 1 user Type of delivery: License key disk, certificate of license, terms and conditions	
• Up to 128 TAGs	**6ES7 658-3XA06-2YB5**
• Up to 512 TAGs	**6ES7 658-3XB06-2YB5**
• Up to 1,024 TAGs	**6ES7 658-3XC06-2YB5**
• Up to 2,048 TAGs	**6ES7 658-3XD06-2YB5**
SIMATIC PDM PowerPack For subsequent TAG expansion of all SIMATIC PDM product configurations V6.0 5 languages (German, English, French, Spanish, Italian), executes with Windows 2000 Professional or Windows XP Professional Floating license for 1 user Type of delivery: License key disk, certificate of license, terms and conditions	
• From 128 TAGs to 512 TAGs	**6ES7 658-3XB06-2YD5**
• From 512 TAGs to 1,024 TAGs	**6ES7 658-3XC06-2YD5**
• From 1,024 TAGs to 2,048 TAGs	**6ES7 658-3XD06-2YD5**
• From 2,048 TAGs to unlimited TAGs	**6ES7 658-3XH06-2YD5**

SIMATIC PDM

4

Selection and Ordering Data — Order No.

Predefined SIMATIC PDM V6.0 product configurations for special applications

SIMATIC PDM Service V6.0 — **6ES7 658-3JX06-0YA5**
Complete package for stand-alone users in servicing, with
- SIMATIC PDM Basic V6.0
- Option "128 TAGs"

5 languages (German, English, French, Italian and Spanish), executes with Windows 2000 Professional or Windows XP Professional, floating license for 1 user

Type of delivery:
License key disk, emergency key disk, certificate of license, terms and conditions;
2 CDs with SIMATIC PDM V6.0 and device library as well as supplementary DVD with Microsoft ServicePacks and tools

SIMATIC PDM S7 V6.0 — **6ES7 658-3KX06-0YA5**
Complete package for use in a SIMATIC S7 configuration environment, with
- SIMATIC PDM Basic V6.0
- Option "Integration in STEP 7/ PCS 7"
- Option "128 TAGs"

5 languages (German, English, French, Italian and Spanish), executes with Windows 2000 Professional or Windows XP Professional, floating license for 1 user

Type of delivery:
License key disk, emergency key disk, certificate of license, terms and conditions;
2 CDs with SIMATIC PDM V6.0 and device library as well as supplementary DVD with Microsoft ServicePacks and tools

SIMATIC PDM PCS 7 V6.0 — **6ES7 658-3LX06-0YA5**
Complete package for integration in the engineering toolset of the SIMATIC PCS 7 engineering system

Floating license for 1 user, with
- SIMATIC PDM Basic
- Option "Integration in STEP 7/ PCS 7"
- Option "Routing through S7-400"
- Option "128 TAGs"

5 languages (German, English, French, Spanish, Italian), executes with Windows 2000 Professional or Windows XP Professional

Type of delivery:
License key disk, emergency key disk, certificate of license, terms and conditions;
2 CDs with SIMATIC PDM V6.0 and device library as well as supplementary DVD with Microsoft ServicePacks and tools

Selection and Ordering Data — Order No.

Demo software

SIMATIC PDM Demo V6.0 — **6ES7 658-3GX06-0YC8**
Without online communication and save functionality

5 languages (German, English, French, Spanish, Italian), executes with Windows 2000 Professional or Windows XP Professional

Type of delivery:
2 CDs with SIMATIC PDM V6.0 and device library as well as supplementary DVD with Microsoft ServicePacks and tools

SIMATIC PDM upgrade/update service

SIMATIC PDM Upgrade from V5.x to V6.0 — **6ES7 651-5CX06-0YE5**
For all product versions and combinations

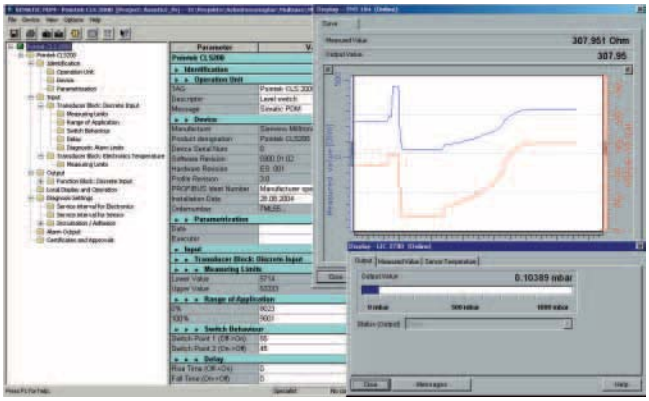
5 languages (German, English, French, Italian and Spanish), executes with Windows 2000 Professional or Windows XP Professional, floating license for 1 user

Type of delivery:
License key disk, emergency key disk, certificate of license, terms and conditions;
2 CDs with SIMATIC PDM V6.0 and device library as well as supplementary DVD with Microsoft ServicePacks and tools

SIMATIC PDM Software Update Service — **6ES7 658-3XX00-0YL8**
Subscription for 1 year with automatic extension

Precondition: current software version

Overview



Parameter view of SIMATIC PDM with curve and online display

SIMATIC PDM PCS 7 is a preconfigured program package for integration of SIMATIC PDM into the engineering toolset of the SIMATIC PCS 7 engineering system. It offers all functions of SIMATIC PDM Basic (including modification logbook and detailed diagnostics in the lifelist) as well as the functionality for PDM integration in HW Config and the routing from the central engineering system to the field devices.

Design

The SIMATIC PDM PCS 7 complete package optimized for integration into the engineering system of SIMATIC PCS 7 supports projects with up to 128 TAGs. It comprises

- SIMATIC PDM Basic (including modification logbook and detailed diagnostics in the lifelist),
- the option "128 TAGs",
- the option "Integration in STEP 7/PCS 7" and
- the option "Routing through S7-400".

See Section "SIMATIC PDM" for information on these individual components.

PowerPacks

The SIMATIC PDM PowerPacks can be used to subsequently increase the number of available TAGs. PowerPacks can be obtained for expansion to 512, 1,024, 2,048 and unlimited TAGs.

A TAG corresponds to a SIMATIC PDM object, which represents individual field devices or components within a project, e.g. transmitters, positioners, switching devices or remote I/Os. TAGs are also relevant for diagnosis with the lifelist of SIMATIC PDM. In this case, TAGs are considered to be all recognized devices with diagnostics capability, whose detailed diagnosis is effected through the device description (EDD).

Demo software

A demo version of SIMATIC PDM is available for demonstration purposes. Online communication and save functions are not available with this version.

Selection and Ordering Data

	Order No.
SIMATIC PDM PCS 7 V6.0 Complete package for integration in the engineering toolset of the SIMATIC PCS 7 engineering system 5 languages (German, English, French, Spanish, Italian), executes with Windows 2000 Professional or Windows XP Professional Floating license for 1 user, with • SIMATIC PDM Basic • Option "Integration in STEP 7/ PCS 7" • Option "Routing through S7-400" • Option "128 TAGs" Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions; 2 CDs with SIMATIC PDM V6.0 and device library as well as supplementary DVD with Microsoft ServicePacks and tools	**6ES7 658-3LX06-0YA5**
PowerPacks	
SIMATIC PDM PowerPack for expanding the TAGs of SIMATIC PDM PCS 7 V6.0 5 languages (German, English, French, Spanish, Italian), executes with Windows 2000 Professional or Windows XP Professional Floating license for 1 user Type of delivery: License key disk, certificate of license, terms and conditions	
• From 128 TAGs to 512 TAGs	**6ES7 658-3XB06-2YD5**
• From 512 TAGs to 1,024 TAGs	**6ES7 658-3XC06-2YD5**
• From 1,024 TAGs to 2,048 TAGs	**6ES7 658-3XD06-2YD5**
• From 2,048 TAGs to unlimited TAGs	**6ES7 658-3XH06-2YD5**
Demo software	
SIMATIC PDM Demo V6.0 Without online communication and save functionality 5 languages (German, English, French, Spanish, Italian), executes with Windows 2000 Professional or Windows XP Professional Type of delivery: 2 CDs with SIMATIC PDM V6.0 and device library as well as supplementary DVD with Microsoft ServicePacks and tools	**6ES7 658-3GX06-0YC8**

SIMATIC PDM PCS 7

4

Selection and Ordering Data — Order No.

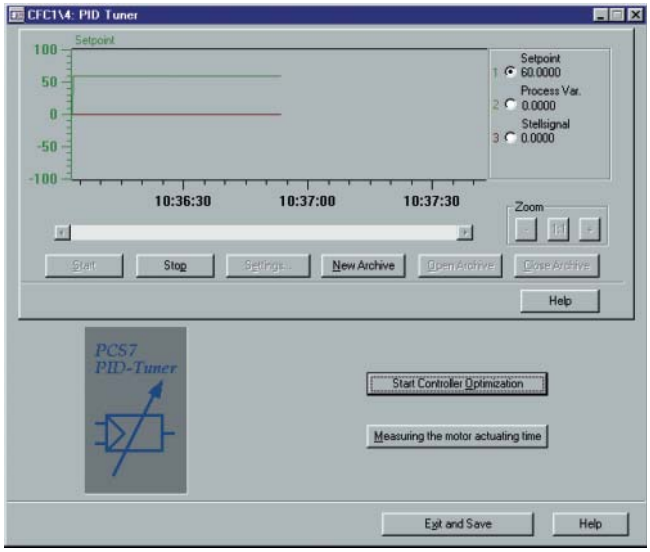
SIMATIC PDM upgrade/update service

SIMATIC PDM Upgrade from V5.x to V6.0 For all product versions and combinations 5 languages (German, English, French, Italian and Spanish), executes with Windows 2000 Professional or Windows XP Professional, floating license for 1 user Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions; 2 CDs with SIMATIC PDM V6.0 and device library as well as supplementary DVD with Microsoft ServicePacks and tools	**6ES7 651-5CX06-0YE5**

Selection and Ordering Data — Order No.

SIMATIC PDM Software Update Service Subscription for 1 year with automatic extension Precondition: current software version	**6ES7 658-3XX00-0YL8**

Overview



The PCS 7 PID-Tuner can be used for the CTRL_PID and CTRL_S software controllers. With the PCS 7 PID-Tuner function integrated in the CFC it is possible to determine the optimum control parameters for the PID, PI and P controllers of a loop in defined steps.

The tool can be used to optimize controlled systems with and without an integral component. Optimization can be carried out in manual or automatic mode. The transient response of the controllers with the determined controller parameters can be checked by carrying out step changes. The derived parameters can be saved and recalled as required.

During determination of the controller parameters, the typical controller values (actual value, setpoint, manipulated variable) can be recorded using a curve function.

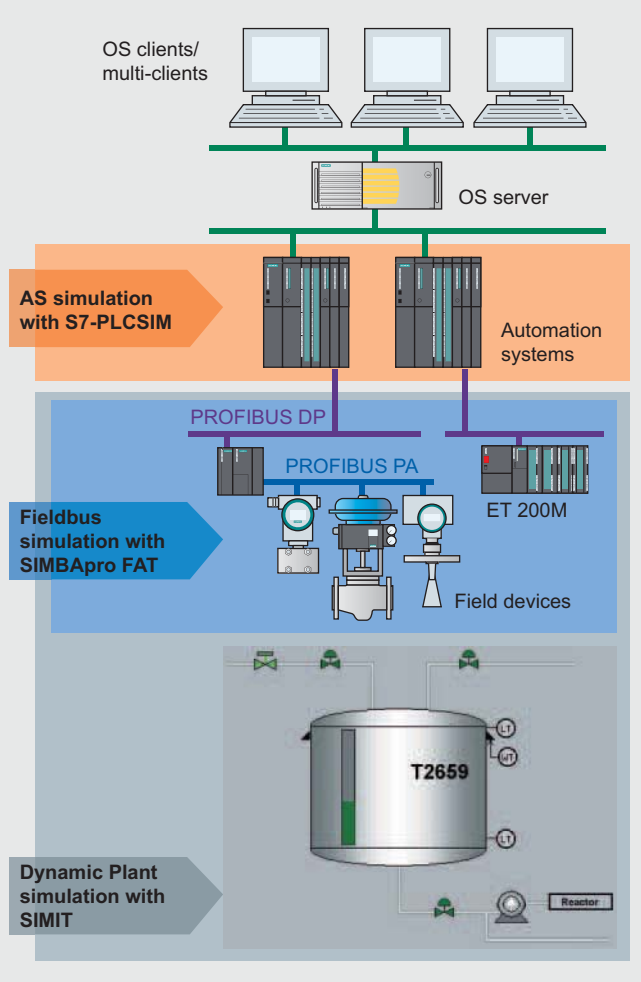
Selection and Ordering Data

	Order No.
SIMATIC PCS 7 PID Tuner V6.1 Controller optimization; option package for CFC 3 languages (German, English, French), executes with Windows 2000 Professional/ 2000 Server or Windows XP Professional/ Server 2003 Floating license for 1 user Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions	**6ES7 653-0SP16-2YB5**

For further programs concerning controller optimization, see the catalog "Add Ons for the SIMATIC PCS 7 Process Control System".

Simulation with S7-PLCSIM

Overview



Overview of simulation software for SIMATIC PCS 7

Using the S7-PLCSIM simulation software, user programs created with CFC/SFC can be tested on a PG/PC, regardless of whether the target hardware is available. The detection and elimination of errors is thus brought forward into an early phase of development. This results in faster commissioning, lower costs and better program quality.

Function

S7-PLCSIM simulates a SIMATIC S7 CPU with its associated process images. The program to be tested is loaded into the simulated S7 CPU in the same way as for a real CPU, and is executed there. S7-PLCSIM is fully integrated in STEP 7. Process values can be exchanged between S7-PLCSIM and other Windows applications through an interface.

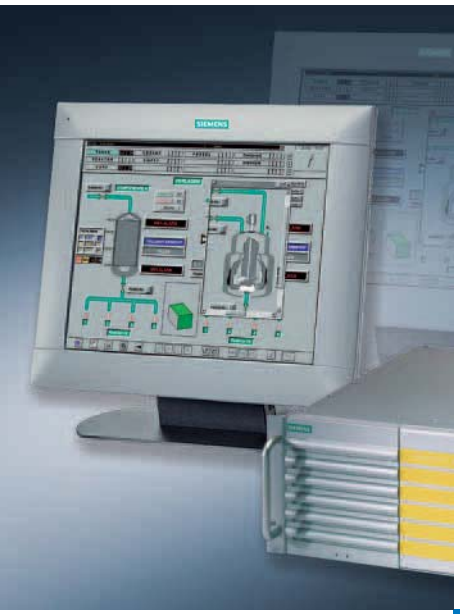
Selection and Ordering Data

	Order No.
S7-PLCSIM V5.3 Functional testing of programs which were created with CFC/SFC, on PC/PG 5 languages (German, English, French, Spanish, Italian), executes with Windows 2000 Professional/ 2000 Server or Windows XP Professional/ Server 2003 Type of delivery: License key disk, certificate of license, terms and conditions	
• Floating license for 1 user	**6ES7 841-0CC04-0YA5**
• Upgrade from V3.x, V4.x, V5.0 or V5.2 to V5.3	**6ES7 841-0CC04-0YE5**
S7-PLCSIM Software Update Service Subscription for 1 year with automatic extension; requirement: current software version	**6ES7 841-0CA01-0YX2**

For further programs concerning testing and simulation, see the catalog "Add Ons for the SIMATIC PCS 7 Process Control System".

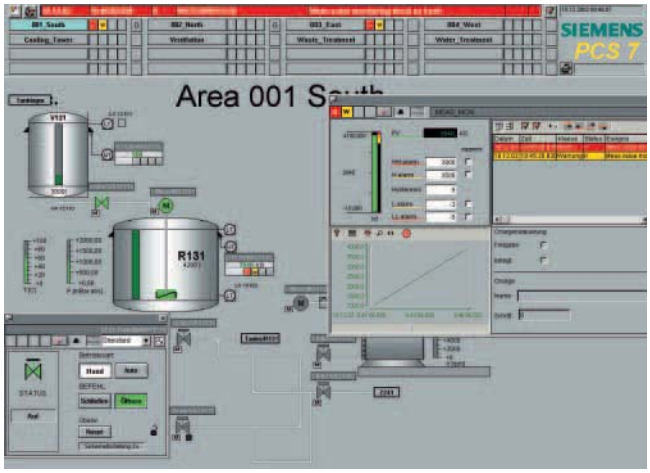
Operator system

5



Introduction

Overview



User interface of the OS process control system with freely positionable windows

The operator system is the human-machine interface of the SIMATIC PCS 7 process control system, and thus represents the user's window into the process. It is extremely flexible, and can be easily adapted to different plant architectures and customer requirements.

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

The system software of the operator stations is available in different levels based on the number of process objects (PO) used:

- 250, 1,000, 2,000, 3,000 or 5,000 POs per OS single station
- 250, 1,000, 2,000, 3,000, 5,000 or 8,500 POs per OS server

The number of POs can be increased at any time by means of PowerPacks to allow for higher requirements or system expansions.

Benefits

- Flexible, modular architecture with scalable hardware and software components for single-user and multi-user systems
- High-performance operated stations based on standard PC technology with Microsoft Windows 2000 Professional/ 2000 Server or Windows XP Professional/ Server 2003, can be used in office or industrial environments
- Client/server multi-user systems with up to 12 OS servers/pairs of servers, each for 5,000 process objects and up to 32 OS clients per server/pair of servers
- High-performance archive system based on Microsoft SQL server with cyclic archives and integral data backup, optionally with long-term archiving via StoragePlus/central archive server
- OS health check for monitoring important server applications
- Online modifications without interrupting runtime operations, and online testing with 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, also in conjunction with multi-screen technology
- Extended status displays through combination of status and analog values with alarm information
- Alarm suppression during startup or on malfunction of a sensor/actuator
- Alarm priorities as additional attribute for filtering important messages
- Central user management, access control, electronic signature
- Sign-of-life monitoring for subordinate systems connected to the plant bus
- System-wide time synchronization based on UTC (Universal Time Coordinated)

Technical specifications

Definitions

Process object (PO)	A process object (PO) is a synonym for an operable and observable block with approx. 30 OS variables. It allows comparison of the quantity framework data of the engineering system with those of the operating system.
OS variable	An OS variable is a defined memory location required for operating and monitoring with the operator system; values can be written into it and read from it.
Process tag	The process tag (also referred to as measuring point) identifies all functional units and processing functions (e.g. TIRCAS+: temperature display, registration, control, alarm and upper switching point) required for implementing an automation or process control task for a process variable (e.g. temperature, level). It has at least one process connection point and is also the position in the plant/process at which the automation function becomes effective through information acceptance, processing or output actions. In SIMATIC PCS 7, process tags are represented by CFCs for the basic automation of a special process control task, e.g. level control, as well as by matching faceplates and block symbols for operation and monitoring using an operator system. The number of OS variables belonging to a process tag depends on the type of tag, i.e. on the respective process control task. By definition, a process tag comprises an average of 50 OS variables, where motors, valves etc. require fewer variables, and controls, dosing functions etc. require more variables.

Process objects	Process tags	OS variables
250	160	8,192 (8K)
1.000	650	32,768 (32K)
2.000	1.300	65,536 (64K)
3.000	2.000	102,400 (100K)
5.000	3.000	153,600 (150K)
8.500	5.000	262,144 (256K)

OS quantity framework

Max. number of OS servers / pairs of servers	12
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)	32
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 variables/process objects:	
• Per OS single station	150K / 5,000 POs
• Per OS server	256K / 8,500 POs
Max. number of configurable messages per server	50.000
Number of process tags	
• Per OS single station	Approx. 3,000
• Per OS server	Approx. 5,000
• Per multi-user system	Approx. 60,000
Integral high-performance archive system (cyclic buffer), based on Microsoft SQL server, for:	
• Process value archiving (per OS server/ single station)	Approx. 1,000/s
• Message archiving (per OS server/ single station)	Steady-state load approx. 10/s Message peak approx. 3,000 / 4 s
Long-term archiving	
• Process value archiving with StoragePlus (process values from up to 4 single stations, servers or pairs of servers)	Process values of one server: Approx. 1,000/s Process values of all servers: Approx. 1,600/s
• Process value archiving with Central Archive Server CAS (process values from up to 11 servers or pairs of servers)	Process values of one server: Approx. 1,000/s Process values of all servers: Approx. 10,000/s

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

Introduction

Overview

All operator stations are based on modern PC technology with different performance levels which have been optimized for use as OS single station, OS client or OS server, combined with the following operating system:

- Microsoft Windows 2000 Professional/ 2000 Server or
- Microsoft Windows XP Professional/ Server 2003.

The use of standard components and interfaces from the PC world means that the operator stations are open for customer/sector-specific options and expansions. They can be used in harsh industrial environments as well as in the office.

OS single stations and OS clients can be installed with Multi-VGA graphic cards to permit the process control of several different plant areas using up to 4 monitors.

Design

Single-user system (OS single station)

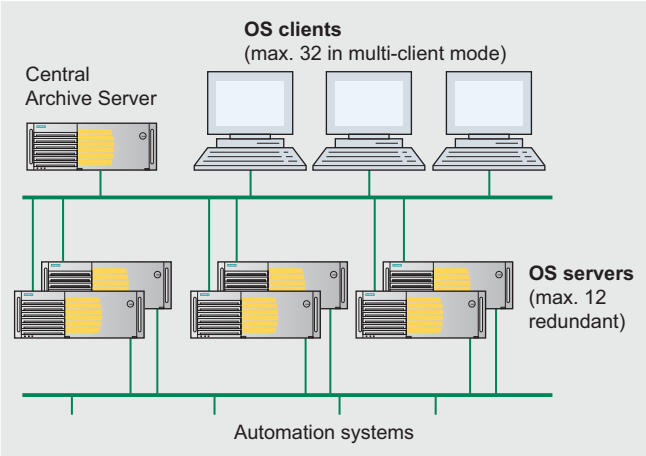
In a single-user system architecture, all operation and monitoring functions for a complete project (plant/unit) are concentrated in one station. A FastEthernet RJ45 port is already on board and can be used for connecting to an OS LAN (terminal bus). The OS single station can be connected to the Industrial Ethernet bus in two ways:

- through a CP 1613 communications processor (communication with max. 64 automation systems) or
- through a standard LAN card (Basic Communication Ethernet for communication with max. 8 automation systems).

The OS single station can be operated on the plant bus in parallel with other single-user systems or with a multi-user system architecture. By using the WinCC/Redundancy program package it is also possible to operate two OS single stations with redundant architecture.

Multi-user system with client/server architecture

A multi-user system consists of operator terminals (OS clients), which receive data (project data, process values, archives, alarms and messages) from one or more OS servers through an OS LAN (terminal bus). The OS LAN can share the transmission medium with the plant bus or it can be designed as a separate bus (Ethernet with TCP/IP).



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

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

SIMATIC PCS 7 supports multi-user systems with up to 12 OS servers or 12 redundant OS pairs of servers. In multi-client mode, OS clients can access data from one or more of the 12 OS servers/pairs of servers in parallel (up to 32 OS clients simultaneously on all).

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

Like the OS single stations, the OS servers can be connected to the Industrial Ethernet plant bus using a communications processor or a standard LAN card. A FastEthernet RJ45 port is already on board and can be used for connecting to an OS LAN (terminal bus).

OS archiving

The operator system already includes a high-performance archiving system based on Microsoft SQL Server with cyclic archives for short-term saving of process values and messages/events (alarms). These data as well as OS reports and batch data from SIMATIC BATCH can be exported time-controlled or event-controlled for permanent archiving in StoragePlus or a central archive server (CAS).

StoragePlus, the low-cost version, is able to archive approx. 1,600 process values/s from a total of 4 single stations/servers/pairs of servers. Increased requirements are satisfied by the powerful central archive server which can archive approx. 10,000 values/s from up to 11 servers/pairs of servers. The data managed in StoragePlus and in the central archive server can be saved on all storage media supported by the operating system. This requires additional hardware and software, e.g. a DVD writer with suitable burning software.

The StoragePlus computer and the central archive server are stations on the OS-LAN (terminal bus), and are not connected to the plant bus. When using an ES/OS/BATCH/IT basic device as the hardware platform, the FastEthernet RJ45 port already on board can be used for connecting to the OS-LAN.

Overview

The full range of basic hardware presented in chapter "ES/OS/BATCH/IT basic devices" in Section "System-neutral components" is available for the configuration of operator systems. This basic hardware may be expanded with the following options, depending on the customer's particular requirements and whether the hardware is used as OS single station, OS server or OS client:

- Hardware and software components for redundant operation
- Multi-VGA graphics card for connection of up to 4 monitors
- Display and CRT monitors for office and industry environments (see chapter "ES/OS/BATCH/IT basic devices" in Section "System-neutral components")
- Signal module for acoustic and visual signaling of messages
- Chipcard reader for access protection (see chapter "Administration" in Section "System-neutral components")

Technical specifications

Detailed technical specifications for single stations, clients and servers are provided in table form in chapter "ES/OS/BATCH/IT basic devices" in Section "System-neutral components".

Selection and Ordering Data

	Order No.	
Single Station		
Windows 2000 Professional MUI operating system (German, English, French, Italian, Spanish, Japanese, Chinese)		
• **SIMATIC PCS 7 ES/OS IL 43 BCE W2K** Connection to plant bus through Basic Communication Ethernet (BCE) with FastEthernet RJ45 network card (PCI card)	**6ES7 650-0LC16-0YX0**	D)
• **SIMATIC PCS 7 ES/OS IL 43 IE W2K** Connection to plant bus through Industrial Ethernet with CP 1613 A2 communications processor	**6ES7 650-0LC16-0YX1**	D)
Windows XP Professional MUI operating system (German, English, French, Italian, Spanish, Japanese, Chinese)		
• **SIMATIC PCS 7 ES/OS IL 43 BCE WXP** Connection to plant bus through Basic Communication Ethernet (BCE) with FastEthernet RJ45 network card (PCI card)	**6ES7 650-0LF16-0YX0**	D)
• **SIMATIC PCS 7 ES/OS IL 43 IE WXP** Connection to plant bus through Industrial Ethernet with CP 1613 A2 communications processor	**6ES7 650-0LF16-0YX1**	D)

Selection and Ordering Data

	Order No.	
Server		
Windows 2000 Server MUI operating system (German, English, French, Italian, Spanish, Chinese, Japanese)		
• **SIMATIC PCS 7 OS Server IL 43 BCE W2K** Connection to plant bus through Basic Communication Ethernet (BCE) with FastEthernet RJ45 network card (PCI card)	**6ES7 650-0LE16-0YX0**	D)
• **SIMATIC PCS 7 OS Server IL 43 IE W2K** Connection to plant bus through Industrial Ethernet with CP 1613 A2 communications processor	**6ES7 650-0LE16-0YX1**	D)
Windows Server 2003 MUI operating system (German, English, French, Italian, Spanish, Chinese, Japanese)		
• **SIMATIC PCS 7 OS Server IL 43 BCE SRV03** Connection to plant bus through Basic Communication Ethernet (BCE) with FastEthernet RJ45 network card (PCI card)	**6ES7 650-0LH16-0YX0**	D)
• **SIMATIC PCS 7 OS Server IL 43 IE SRV03** Connection to plant bus through Industrial Ethernet with CP 1613 A2 communications processor	**6ES7 650-0LH16-0YX1**	D)
Client		
Windows 2000 Professional MUI operating system (German, English, French, Italian, Spanish, Japanese, Chinese)		
• **SIMATIC PCS 7 OS Client IL 43 W2K**	**6ES7 650-0LD16-0YX0**	D)
Windows XP Professional MUI operating system (German, English, French, Italian, Spanish, Japanese, Chinese)		
• **SIMATIC PCS 7 OS Client IL 43 WXP**	**6ES7 650-0LG16-0YX0**	D)

D) Subject to export regulations: AL: N, ECCN: 5D992B1

OS basic hardware

Selection and Ordering Data

	Order No.
Upgrade from BCE to CP 1613 communication	
CP 1613 A2 (for PCS 7 V6.1, SP1 and later) PCI card for connection to Industrial Ethernet, with ITP and RJ45 connections	**6GK1 161-3AA01** B)
CP 1613 (required for PCS 7 V6.1 without SP1) PCI card for connection to Industrial Ethernet, with ITP and RJ45 connections	**6GK1 161-3AA00**
S7-1613 for Industrial Ethernet S7 communications software for CP 1613, can be used with Windows 2000 Professional/ 2000 Server/ XP Professional/ Server 2003 Single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, 2 languages (German/English)	**6GK1 716-1CB63-3AA0**
Additional and expansion components	
See chapter "ES/OS/BATCH/IT basic devices" in Section "System-neutral components"	

B) Subject to export regulations: AL: N, ECCN: EAR99H

Note:
Ordering data in abbreviated form; for detailed Ordering data, see chapter "ES/OS/BATCH/IT basic devices" in Section "System-neutral components".

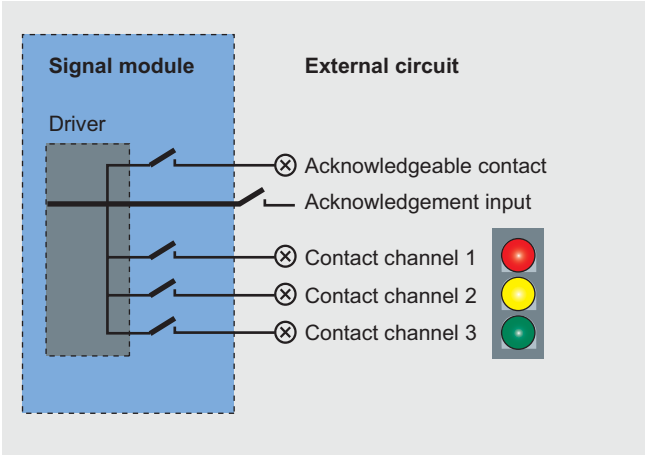
Options

Upgrading from BCE to CP 1613 communication

Single stations and servers with BCE communication can be subsequently upgraded for communication with CP 1613. Items required:

- CP 1613:
  PCI card for connecting to Industrial Ethernet
- S7-1613:
  Software for S7 communication for CP 1613

Overview



OS Single Station and OS Client can be expanded by a signal module. This signal module can operate a horn and up to 3 different lamps or buzzer sounds symbolizing different signal classes. Together with a hardware timer (watchdog) the signal module is able to detect and signal the failure of an operator station. A hardware acknowledge key can also be connected.

The signal module occupies one PCI slot in the operator station.

Selection and Ordering Data

	Order No.
PCI Signal Module PCI card for installing in an operator station	**6DS1 916-8RR** [B]
Connecting cable For connecting an external audio detector to a signal module	
• 3 m	**6XV2 175-8AH30**
• 10 m	**6XV2 175-8AN10**
• 32 m	**6XV2 175-8AN32**
• 50 m	**6XV2 175-8AN50**

[B] Subject to export regulations: AL: N, ECCN: EAR99H

5

Introduction

Overview

OS basic hardware and OS software are structured by OS single station, OS server and OS client in compliance with the architecture of the operator system and are accordingly coordinated in this regard.

Application

The OS software can be run on the OS basic hardware offered in this catalog and has been tested with it. Siemens guarantees the compatibility of hardware and software for system configurations based on components in this catalog.

Should you use basic hardware other than that offered in this catalog, please note the minimum requirements quoted in the chapter "ES/OS/BATCH/IT basic devices".

If you configure your own SIMATIC PCS 7 operator station (OS single station/ OS server/ OS client) using other/own hardware components, you carry full responsibility and will not receive any free support in the event of compatibility problems.

Despite comprehensive tests it cannot be ruled out that the function of a SIMATIC PCS 7 system may be disturbed or impaired by additional non-system software, i.e. software not explicitly released for SIMATIC PCS 7. For this reason, Siemens AG warns against installing non-system software on SIMATIC PCS 7 runtime systems, and does not provide a warranty in the event of any resulting damage.

Furthermore, the use of non-system software in the SIMATIC PCS 7 environment is your responsibility. You have no claims for free support in the event of compatibility problems.

Design

The OS standard software of OS single stations and OS clients can be expanded by SIMATIC PCS 7 SFC Visualization and the Safety Matrix Viewer.

The high-performance archiving system integrated as standard in OS single station and OS server for up to 512 variables can be expanded to 1,500, 5,000 or 10,000 variables using SIMATIC PCS 7 PowerPacks/Bundles OS Archive.

The following tables provide help when selecting the components required when ordering an operator station. Depending on whether a redundant or non-redundant design is selected, you require the indicated number of

- basic devices,
- licenses for the OS standard software, and
- licenses for the optionally used supplementary OS software.

Single-user system		
OS single station with Windows XP Professional or Windows 2000 Professional operating system		
Redundancy	**Without**	**With**
Basic devices incl. operating system, alternatives		
BCE communication	PCS 7 ES/OS IL 43 BCE WXP/W2K	
	1	2
Industrial Ethernet communication	PCS 7 ES/OS IL 43 IE WXP/W2K	
	1	2
OS standard software		
SIMATIC PCS 7 OS Software Single Station V6.1	1	2
WinCC Option "Redundancy"	--	1
RS 232 connecting cable, 10 m	--	1
Supplementary OS software (optional)		
SIMATIC PCS 7 SFC Visualization V6.1	1	2
SIMATIC Safety Matrix Viewer for PCS 7	1	2
SIMATIC PCS 7 PowerPack/Bundle OS Archive for expansion of cyclic backup archive	1	2

Multi-user system with client/server architecture		
OS server with Windows 2003 Server or Windows 2000 Server operating system		
Redundancy	**Without**	**With**
Basic devices incl. operating system, alternatives		
BCE communication	PCS 7 OS Server IL 43 BCE SRV03/W2K	
	1	2
Industrial Ethernet communication	PCS 7 OS Server IL 43 IE SRV03/W2K	
	1	2
OS standard software		
SIMATIC PCS 7 OS Software Server V6.1	1	--
PCS 7 Server Redundancy V6.1	--	1
Supplementary OS software (optional)		
SIMATIC PCS 7 PowerPack/Bundle OS Archive for expansion of cyclic backup archive	1	2
OS client with Windows XP Professional or Windows 2000 Professional operating system		
Basic devices incl. operating system, alternatives		
Connection for OS-LAN (terminal bus) on board	PCS 7 OS Client IL 43 WXP/W2K	
	1	
OS standard software		
SIMATIC PCS 7 OS Software Client V6.1	1	
Supplementary OS software (optional)		
SIMATIC PCS 7 SFC Visualization V6.1	1	
SIMATIC Safety Matrix Viewer for PCS 7	1	

Note on Microsoft SQL Server software

The "SQL Server" software from Microsoft which is delivered with SIMATIC PCS 7 must not be used outside the SIMATIC PCS 7 environment without previous written approval by Siemens.

Function

User interface

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. They are supported by a picture tree manager, which organizes the picture hierarchy according to user requirements and permits direct selection of subordinate areas.

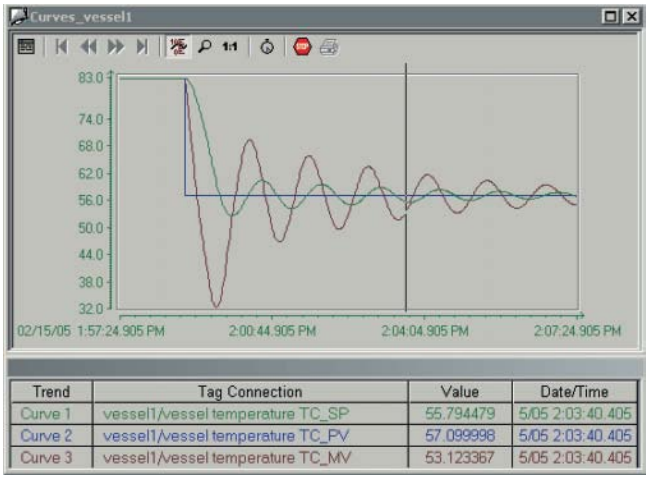
Process displays and measuring points can also be called up by name. An online language selector permits users to change the display language during runtime.

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

- Message line for display of last message, can be configured such that either the message of the highest class or with the highest priority is shown
- Date, time and name of the operator
- Area overview with up to 36/49/64 areas (depending on resolution of the process monitor)
- Working area for plant displays and movable windows for faceplates, historic trends, etc.
- System function keys

In a special message view it is possible to switch between I&C message pages such as new list, old list, cleared alarm list, operator action list, I&C list and message history list.

Trends



Trend window on the operator station

Trends can be displayed as a full-size picture or as a window in the working area, and printed directly. Some trends/trend groups are predefined during plant configuration. Operators can also compile their own trends while online, select them by process tag names, and save them for reuse.

Messages and alarms

Message priorities are issued as an additional attribute to the known signal classes in order to make it easier to assess large quantities of signals and to be better able to distinguish important messages from the less important.

Operators can specifically disable messages (alarms) from individual process tags or from all process tags of a display/area in the event of faults in a sensor/actuator or during startup. Disabling and enabling are recorded in an input report.

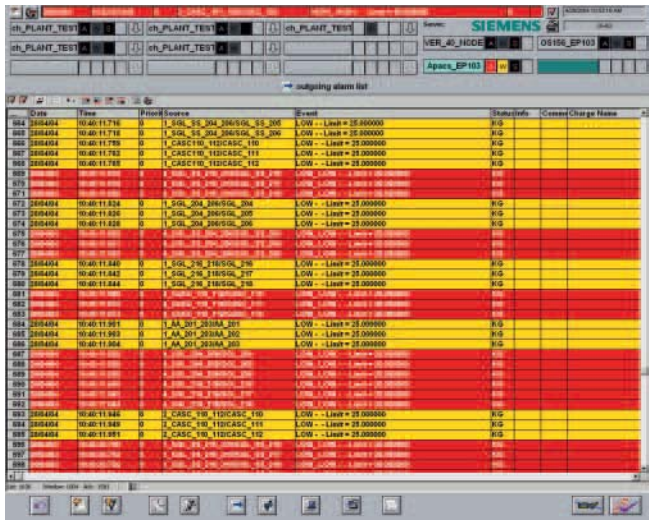
Active messages are signaled by group displays representing preconfigured views based on signal groups. The group displays also indicate whether messages are disabled or not.

The last message to have arrived – or the message with the highest priority when alarm priorities are utilized – is displayed at the top edge of the standard view. A predefined window with further messages can be called up with the "Extended message line" button.

The "Loop-in-alarm" and "Select display using measuring point" functions support the quick evaluation and resolution of faults. Using "Loop-in-alarm", operators can jump directly to the process display in which the fault has occurred, and can then call up the associated faceplate (loop display) through the process tag whose block symbol is colored (cyan).

The faceplate window (loop display) can be anchored using a pin button so that it remains visible even when the display is changed.

Flexible sound setting options and priorities which can be defined using signal variables support the audible annunciation of messages/alarms through a soundcard or by controlling external horns via a signal module.



Trend window on the operator station

Introduction

Function

Central user management, access control and electronic signature

(see chapter "Administration" in Section "System-neutral components")

SIMATIC Logon offers central user administration with access control based on Windows 2000 Professional or Windows XP Professional / Server 2003 for the SIMATIC PCS 7 system components as well as non-SIMATIC components connected through API. It can be used to fulfill the validation requirements of 21 CFR Part 11. An electronic signature function can also be used in conjunction with SIMATIC Logon.

A chipcard reader can also be used for access control.

Sign-of-life monitoring

With the "Sign-of-life monitoring function", the operator system is able to monitor the correct operation of all subordinate systems connected to the plant bus. A graphical plant configuration display shows the status of each monitored component. The SIMATIC PCS 7 asset management offers enhanced functionality in this context (see Section "Asset Management").

Time synchronization

SICLOCK TM central plant clock

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

Script languages

Visual Basic and C are the scripting languages available for custom programming of OS applications.

Overview

The OS standard software is adapted to the OS basic hardware (OS single station, OS server and OS client).

The OS standard software for OS single stations and OS servers can be adapted to plants of various size by changing the number of process objects (PO). The number of POs can be increased at any time by adding more PowerPacks in order to allow for higher requirements of system expansions.

The engineering of the SIMATIC PCS 7 process control system is usually concentrated in a separate engineering system. In the case of OS single stations used for small plants, engineering and operator functionality can be combined in one station, except with redundant systems (for engineering software, see Section "Engineering system").

The high-performance archiving system integrated as standard in OS single station and OS server for up to 512 variables can be expanded to 1,500, 5,000 or 10.000 variables using OS archive PowerPacks/bundles.

The OS standard software of OS single stations and OS clients can be expanded by SFC visualization and the safety matrix viewer.

Selection and Ordering Data

	Order No.
OS Software Single Station	
SIMATIC PCS 7 OS Software Single Station V6.1 3 languages (German, English, French), executes with Windows 2000 Professional or Windows XP Professional, single license for 1 installation Electronic documentation on PCS 7 toolset DVD Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions; PCS 7 V6.1 Toolset DVD, Microsoft SQL Server incl. EULA, PC Anywhere Host as well as supplementary CDs/DVDs (e.g. Microsoft ServicePacks and Tools)	
• 250 POs/RT 8K [1]	**6ES7 658-2AA16-0YA0**
• 1,000 POs/RT 32K	**6ES7 658-2AB16-0YA0**
• 2,000 POs/RT 64K	**6ES7 658-2AC16-0YA0**
• 3,000 POs/RT 100K	**6ES7 658-2AD16-0YA0**
• 5,000 POs/RT 150K	**6ES7 658-2AE16-0YA0**
SIMATIC PCS 7 PowerPack OS Software Single Station V6.1 For extending the OS Software Single Station 3 languages (German, English, French), executes with Windows 2000 Professional or Windows XP Professional, single license for 1 installation Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions	
• From 250 POs/RT 8K to 1,000 POs/RT 32K	**6ES7 658-2AB16-0YD0**
• From 1,000 POs/RT 32K to 2,000 POs/RT 64K	**6ES7 658-2AC16-0YD0**
• From 2,000 POs/RT 64K to 3,000 POs/RT 100K	**6ES7 658-2AD16-0YD0**
• From 3,000 POs/RT 100K to 5,000 POs/RT 150K	**6ES7 658-2AE16-0YD0**

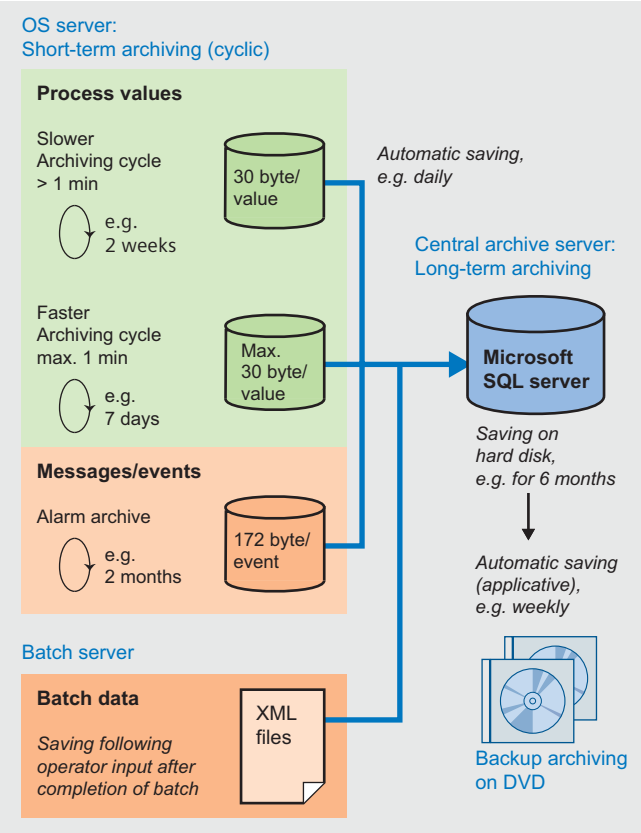
Selection and Ordering Data

	Order No.
OS Software Server	
SIMATIC PCS 7 OS Software Server V6.1 3 languages (German, English, French), executes with Windows 2000 Server or Windows Server 2003, single license for 1 installation Electronic documentation on PCS 7 Toolset DVD Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions; PCS 7 V6.1 Toolset DVD, Microsoft SQL Server incl. EULA, PC Anywhere Host as well as supplementary CDs/DVDs (e.g. Microsoft ServicePacks and Tools)	
• 250 POs/RT 8K	**6ES7 658-2BA16-0YA0**
• 1,000 POs/RT 32K	**6ES7 658-2BB16-0YA0**
• 2,000 POs/RT 64K	**6ES7 658-2BC16-0YA0**
• 3,000 POs/RT 100K	**6ES7 658-2BD16-0YA0**
• 5,000 POs/RT 150K	**6ES7 658-2BE16-0YA0**
• 8,500 POs/RT 256K	**6ES7 658-2BF16-0YA0**
SIMATIC PCS 7 PowerPack OS Software Server V6.1 For extending the OS Software Server 3 languages (German, English, French), executes with Windows 2000 Server or Windows Server 2003, single license for 1 installation Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions	
• From 250 POs/RT 8K to 1,000 POs/RT 32K	**6ES7 658-2BB16-0YD0**
• From 1,000 POs/RT 32K to 2,000 POs/RT 64K	**6ES7 658-2BC16-0YD0**
• From 2,000 POs/RT 64K to 3,000 POs/RT 100K	**6ES7 658-2BD16-0YD0**
• From 3,000 POs/RT 100K to 5,000 POs/RT 150K	**6ES7 658-2BE16-0YD0**
• From 5,000 POs/RT 150K to 8,500 POs/RT 256K	**6ES7 658-2BF16-0YD0**
OS Software Client	
SIMATIC PCS 7 OS Software Client V6.1 3 languages (German, English, French), executes with Windows 2000 Professional or Windows XP Professional, floating license for 1 user Electronic documentation on PCS 7 Toolset DVD Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions; PCS 7 V6.1 Toolset DVD, Microsoft SQL Server incl. EULA, PC Anywhere Host as well as supplementary CDs/DVDs (e.g. Microsoft ServicePacks and Tools)	**6ES7 658-2CX16-0YA5**

[1] A process object (PO) is a synonym for an operable and observable block with approx. 30 variables.

OS archiving

Overview



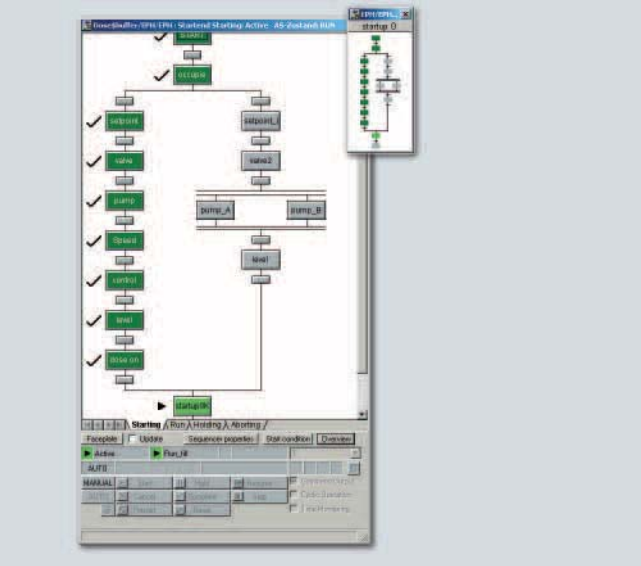
A high-performance archive system based on Microsoft SQL server technology can be configured online and saves process values and messages/events (alarms) in cyclic archives. These data as well as OS reports and batch data from SIMATIC BATCH can be exported time-controlled or event-controlled for permanent archiving in StoragePlus or a central archive server (CAS). The data managed in StoragePlus and in the central archive server can be saved on all storage media supported by the operating system. This requires additional hardware and software, e.g. a DVD writer with suitable burning software.

The high-performance archive system is usually designed for up to 512 variables. It can be expanded to 1,500, 5,000 or 10,000 variables using additive OS archive PowerPacks/bundles.

Selection and Ordering Data

	Order No.
Expansion of integral high-performance cyclic buffer archive (512 variables) of OS Single Station and OS Server	
SIMATIC PCS 7 PowerPack OS Archive V6.1 3 languages (German, English, French), executes with Windows 2000 Professional/ 2000 Server or Windows XP Professional/ Server 2003, single license for 1 installation Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions	
• For expansion from 512 to 1,500 variables	**6ES7 658-2EA16-2YD0**
• For expansion from 1,500 to 5,000 variables	**6ES7 658-2EB16-2YD0**
• For expansion from 5,000 to 10,000 variables	**6ES7 658-2EE16-2YD0**
SIMATIC PCS 7 Bundle OS Archive V6.1 3 languages (German, English, French), executes with Windows 2000 Professional/ 2000 Server or Windows XP Professional/ Server 2003, single license for 1 installation Type of delivery: 4 or 8 license key disks, emergency key disk, certificate of license, terms and conditions	
• 4 x 5,000 variables for 4 stations each (Single Station/Server)	**6ES7 652-1EA16-2YB0**

Overview



The SFC visualization function of the operator system enables you to display and operate the sequence controls configured with the SFC tool in the same way as on the engineering system. No additional configuration work is necessary.

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

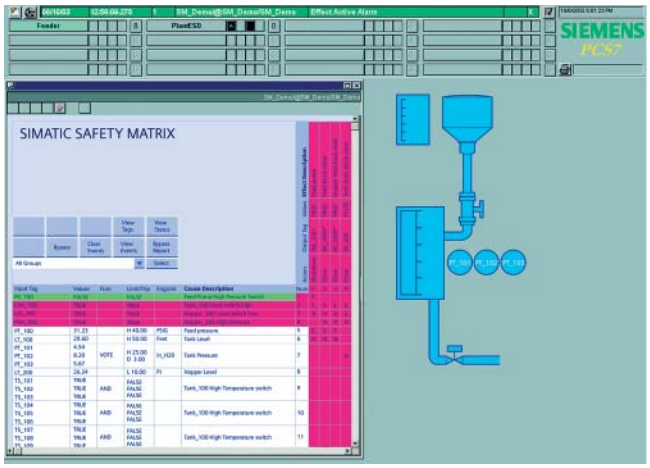
Selection and Ordering Data

	Order No.
SIMATIC PCS 7 **SFC Visualization V6.1** For displaying and operating SFC sequence controls on an operator station 3 languages (German, English, French), executes with Windows 2000 Professional or Windows XP Professional, floating license for 1 user Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions	**6ES7 652-0XD16-2YB5**
SIMATIC PCS 7 Upgrade **SFC Visualization V5.x to V6.1** 3 languages (German, English, French), executes with Windows 2000 Professional or Windows XP Professional, floating license for 1 user Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions	**6ES7 652-0XD16-2YF5**

5

SIMATIC Safety Matrix Viewer

Overview



The SIMATIC Safety Matrix Viewer for SIMATIC PCS 7 serves the operation and monitoring of the SIMATIC Safety Matrix using the SIMATIC PCS 7 operator system.

Hardware requirements: SIMATIC PCS 7 AS 414H or AS 417H

Software requirements: PCS 7-OS V6.0, SP2 or higher

For further details on the Safety Matrix, please refer to the section "ES Software - Engineering Process Safety" in the chapter "Engineering System".

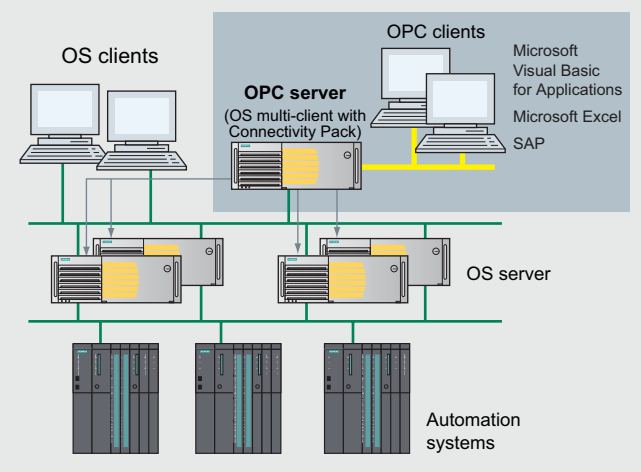
Selection and Ordering Data

	Order No.
SIMATIC safety matrix viewer for SIMATIC PCS 7 Operation and monitoring of the safety matrix in the SIMATIC PCS 7 environment with several operating levels 2 languages (German, English), executes with Windows 2000 Professional or Windows XP Professional, single license for 1 installation Type of delivery: Certificate of license and authorization diskette; software and electronic documentation on CD	**6ES7 833-1SM60-0YA5** C)

C) Subject to export regulations: AL: N, ECCN: EAR99S

Connectivity pack and client access licenses

Overview



Standardized access of process data in the OS single stations/OS servers by higher-level information systems, office applications or user-oriented applications is supported by the PCS 7 operator system with a range of specifications and interfaces.

Because the PCS 7 operator system is OPC-compliant, operator stations can act as OPC servers and be the data source for other applications. The OS single stations and OS servers already have an integral OPC Data Access Server for access to all online values that correspond to standards OPC Data Access 1.1 and 2.0. Additional open interfaces are also available as an optional WinCC/Connectivity Pack for access to archive data and indications of the operator system.

Design

Components of the WinCC/Connectivity Pack that can be used with SIMATIC PCS 7:

- OPC HDA (historical data access server):
  Data server for historical data from the WinCC archive system
- OPC A&E (alarm & events server):
  Data server for messages from the WinCC alarm system
- OLE-DB
  For direct access to the archived data stored in the Microsoft SQL server database

A WinCC/Connectivity Pack is required for each operator station (OS Single Station und OS Server) that provides archive and alarm data via these interfaces. With SIMATIC PCS 7, however, it is common to use an OS multi-client with WinCC/Connectivity Pack as the central OPC server. This collects the data from the OS servers and makes them available to the OPC clients. In this case, only the OPC server requires a WinCC/Connectivity Pack.

A WinCC/Client Access License is also required for each (office) computer (without WinCC installation) that accesses the archive and alarm data of an operator station (OS single station and OS server) using OPC HDA, OPC A&E or OLE-DB.

Function

OPC HDA (Historical Data Access Server)

As OPC HDA server, the PCS 7 operator station makes historical data from the WinCC archive system available to other applications. The OPC client, e.g. a reporting tool, can selectively request the required data by specifying the beginning and end of a time interval. A wide range of diverse unit functions, such as Variance, Mean Value or Integral, allow preprocessing by the HDA server, thus reducing the communication load.

OPC A&E (Alarm & Events Server)

As OPC A&E server, the PCS 7 operator station forwards WinCC indications, including all process-accompanying values, to subscribers at production and company management level, where they can of course also be acknowledged. Filter mechanisms and subscriptions ensure that only selected and/or changed data is transferred.

OLE DB

OLE DB offers easy to implement, standardized direct access to the archive data in the MS SQL server database of the operator system. It also provides access to all WinCC archive data with the relevant processaccompanying values, message and user texts.

For further information, see catalog ST 80, section "WinCC/Connectivity Pack" in the chapter "SIMATIC WinCC options".

Selection and Ordering Data

	Order No.
WinCC/Connectivity Pack Single license for 1 installation	**6AV6 371-1DR06-1AX0**
WinCC/Client Access License for access from (office) computers (without WinCC installation) to archive and interrupt data of an operator station (OS single station/OS server) per OPC HDA, OPC A&E or OLE-DB Single license for 1 installation	**6AV6 371-1ES06-0AX0**
WinCC/Client Access License per processor for client access to archive and interrupt data of an operator station (OS single station/OS server) per OPC HDA, OPC A&E or OLE-DB License for any number of clients per processor	**6AV6 371-1ES06-0CX0**

Upgrades for OS software

Overview

Upgrades combined in packages permit the upgrading of existing operating systems V5.x or V6.0 to V6.1. The number and composition of the upgrade packages differ according to the initial version. This is because of the differences in the performance, structure and scaling of the system software versions 5.x and 6.0.

Operator systems upgraded to V6.1 can of course also be expanded by additive OS software PowerPacks and OS archive PowerPacks/bundles.

Selection and Ordering Data

Order No.

Upgrades of OS software from V6.0 to V6.1

OS upgrade packages for upgrading all PO versions from V6.0 to V6.1

- **SIMATIC PCS 7 Upgrade Package Runtime OS V6.0 to V6.1** — **6ES7 652-5AX16-0YE0**
  for OS single station, OS server and archive server, three languages (German, English, French), executes with Windows 2000 Professional / 2000 Server or Windows XP Professional / Server 2003, single license for 1 installation

  Type of delivery: license key disk, emergency key disk, certificate of license, terms and conditions; PCS 7 V6.1 toolset DVD, Microsoft SQL Server incl. EULA, PC Anywhere Host as well as supplementary CDs/DVDs (e.g. Microsoft ServicePacks and tools)

- **SIMATIC PCS 7 Upgrade Package OS Client/ SFC Visualization V6.0 to V6.1** — **6ES7 652-5CX16-0YE5**
  three languages (German, English, French), executes with Windows 2000 Professional or Windows XP Professional, floating license for 1 user

  Type of delivery: license key disk, emergency key disk, certificate of license, terms and conditions; PCS 7 V6.1 toolset DVD, Microsoft SQL Server incl. EULA, PC Anywhere Host as well as supplementary CDs/DVDs (e.g. Microsoft ServicePacks and tools)

Selection and Ordering Data

Order No.

Upgrades of OS software from V5.x to V6.1

SIMATIC PCS 7 Upgrade OS Software Single Station V5.x to V6.1
3 languages (German, English, French), executes with Windows 2000 Professional or Windows XP Professional, single license for 1 installation

Type of delivery: license key disk, emergency key disk, certificate of license, terms and conditions; PCS 7 V6.1 toolset DVD, Microsoft SQL Server incl. EULA, PC Anywhere Host as well as supplementary CDs/DVDs (e.g. Microsoft ServicePacks and tools)

- 2,000 POs/RT 64K [1] — **6ES7 658-2AC16-0YE0**
- 5,000 POs/RT 150K [1] — **6ES7 658-2AE16-0YE0**

SIMATIC PCS 7 Upgrade OS Software Server V5.x to V6.1
3 languages (German, English, French), executes with Windows 2000 Server or Windows Server 2003, single license for 1 installation

Type of delivery: license key disk, emergency key disk, certificate of license, terms and conditions; PCS 7 V6.1 toolset DVD, Microsoft SQL Server incl. EULA, PC Anywhere Host as well as supplementary CDs/DVDs (e.g. Microsoft ServicePacks and tools)

- 2,000 POs/RT 64K [1] — **6ES7 658-2BC16-0YE0**
- 5,000 POs/RT 150K [1] — **6ES7 658-2BE16-0YE0**

SIMATIC PCS 7 Upgrade OS Software Client V5.x to V6.1 — **6ES7 658-2CX16-0YE5**
3 languages (German, English, French), executes with Windows 2000 Professional or Windows XP Professional, floating license for 1 user

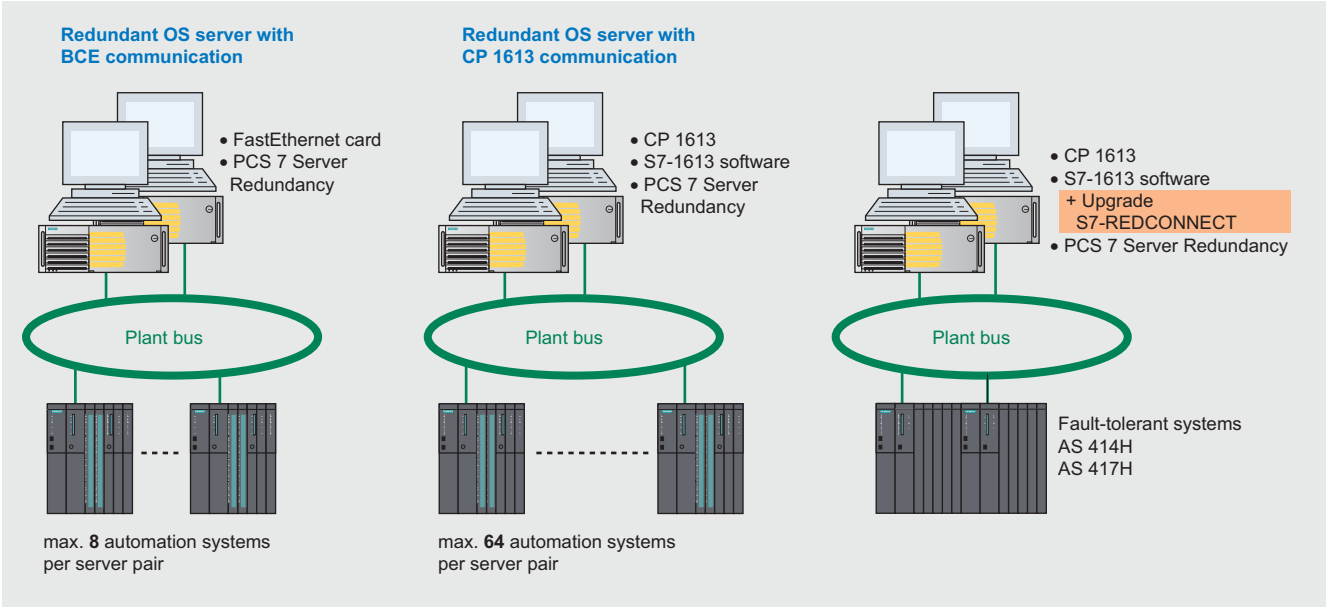
Type of delivery: license key disk, emergency key disk, certificate of license, terms and conditions; PCS 7 V6.1 toolset DVD, Microsoft SQL Server incl. EULA, PC Anywhere Host as well as supplementary CDs/DVDs (e.g. Microsoft ServicePacks and tools)

SIMATIC PCS 7 Upgrade SFC Visualization V5.x to V6.1 — **6ES7 652-0XD16-2YF5**
3 languages (German, English, French), executes with Windows 2000 Professional or Windows XP Professional, floating license for 1 user

Type of delivery: license key disk, emergency key disk, certificate of license, terms and conditions

[1] The upgrades OS Software Single Station and OS Software Server support a high-performance archive system for up to 512 variables. To implement larger archives, this volume can be extended using additive OS Archive V6.1 PowerPacks/bundles (see OS archiving).

Overview



Possible configurations for redundant OS server

Redundancy for operator systems

The following information should be observed if a redundant operator station is to be configured:

- The *WinCC/Redundancy* software for two installations is required for alignment of the archives of redundant OS single stations. An RS 232 cable for serial connection of the two redundant systems is used to optimize the internal communication.
- A PCS 7 Server Redundancy software package is required to design redundant OS servers, and contains an RS 232 cable for optimization of the internal server-to-server communication in addition to the OS software server and the WinCC/Redundancy software (in each case for two servers).
- BCE communication with the FastEthernet card is generally sufficient even for redundant operator stations. Up to 8 automation systems can be connected per pair of servers.
- Communication using CP 1613 is only required in cases where
  - a subordinate fault-tolerant automation system is connected, or
  - the maximum number of 8 stations per OS is insufficient.
- An operator station with CP 1613 is delivered with the S7-1613 software. If a subordinate fault-tolerant automation system is to be connected, the S7-REDCONNECT software is required. In this case, the S7-REDCONNECT upgrade package must be ordered.
- If an operator station with BCE communication is to be upgraded for redundant operation with a subordinate fault-tolerant automation system, the S7-REDCONNECT software is required in addition to the CP 1613 communications processor.
- If the plant bus is to be designed as a redundant dual ring, two network cards must be installed per OS (2 x FastEthernet card or 2 x CP 1613).

OS redundancy

Selection and Ordering Data — Order No.

Design of redundant OS single stations

WinCC/Redundancy
For alignment of archives following OS restart; single license for 2 installations
Installation required on each of the two redundant OS single stations — **6AV6 371-1CF06-0DX0**

RS 232 connecting cable, 10 m — **6ES7 902-1AC00-0AA0**

Design of redundant OS servers

SIMATIC PCS 7 Server Redundancy V6.1
3 languages (German, English, French), executes with Windows 2000 Server or Windows Server 2003, single license for 2 installations
with OS Software Server und WinCC/Redundancy as well as RS 232 connecting cable, 10 m
Type of delivery:
2 license key disks, emergency key disk, certificate of license, terms and conditions;
PCS 7 V6.1 Toolset DVD, Microsoft SQL Server incl. EULA, PC Anywhere Host as well as supplementary CDs/DVDs (e.g. Microsoft ServicePacks and Tools)

- 250 POs/RT 8K — **6ES7 652-3XA16-2YA0**
- 2,000 POs/RT 64K — **6ES7 652-3XC16-2YA0**
- 3,000 POs/RT 100K — **6ES7 652-3XD16-2YA0**
- 5,000 POs/RT 150K — **6ES7 652-3XE16-2YA0**
- 8,500 POs/RT 256K — **6ES7 652-3XF16-2YA0**

PowerPacks for PO expansion: see OS Software Server PowerPack V6.1 (2 PowerPacks each required)

WinCC Options V6 Manual
Contents: WinCC/User Archives, WinCC/Server and WinCC/Redundancy

- German — **6AV6 392-1DA06-0AA0**
- English — **6AV6 392-1DA06-0AB0**
- French — **6AV6 392-1DA06-0AC0**

Selection and Ordering Data — Order No.

Upgrade package for OS single stations / OS servers with BCE for communication with fault-tolerant AS

CP 1613 A2 (for PCS 7 V6.1, SP1 and later)
PCI card for connection to Industrial Ethernet, with ITP and RJ45 connections — **6GK1 161-3AA01** [B)]

CP 1613 (required for PCS 7 V6.1 without SP1)
PCI card for connection to Industrial Ethernet, with ITP and RJ45 connections — **6GK1 161-3AA00**

S7-REDCONNECT — **6GK1 716-0HB63-3AA0**
Software for failsafe S7 communication over redundant networks, for CP 1613, can be used with Windows 2000 Professional/ 2000 Server/ XP Professional/ Server 2003,
single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, 2 languages (German/English)

Upgrade package for OS single stations / OS servers with CP 1613 for communication with fault-tolerant AS

Upgrade S7-REDCONNECT — **6GK1 716-0HB63-3AA4**
Software for expansion of S7-1613 to S7-REDCONNECT, can be used with Windows 2000 Professional/ 2000 Server/ XP Professional/ Server 2003, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, 2 languages (German/English)

B) Subject to export regulations: AL: N, ECCN: EAR99H

Overview

The operator system already includes a high-performance archiving system based on Microsoft SQL Server with cyclic archives for short-term saving of process values (e.g. for 2 weeks) and messages/events (e.g. for 2 months). This short-term archive is scalable for up to 512, 1,500, 5,000 or 10,000 variables. Data from the short-term archive as well as OS reports and batch data from SIMATIC BATCH can be exported time-controlled or event-controlled for permanent archiving in a long-term archive.

Design

Two versions of different performance are available for OS long-term archiving:

- StoragePlus:
  Low-cost version for archiving approx. 1,600 values/s from up to 4 single stations/servers/pairs of servers
- Central archive server (CAS):
  High-performance version for archiving approx. 10,000 values/s from up to 11 servers/pairs of servers

In the case of long-term archiving with StoragePlus, the archived data can only be visualized using StoragePlus. Process values exported to the central archive server can also be accessed from the OS client.

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

The StoragePlus computer and the central archive server are stations on the OS-LAN (terminal bus), and are not connected to the plant bus. When using an ES/OS/BATCH/IT basic device as the hardware platform, the FastEthernet RJ45 port already on board can be used for connecting to the OS-LAN.

StoragePlus

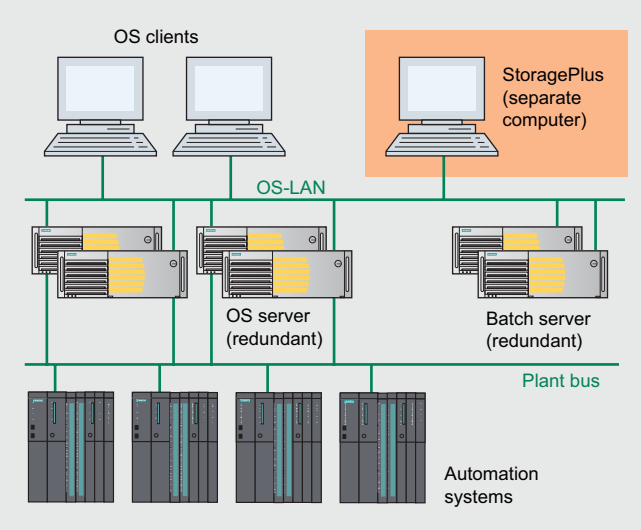
Overview

StoragePlus is a program package for long-term archiving of

- OS archive data (process values and messages),
- OS reports and
- batch data of the SIMATIC PCS 7 process control system.

StoragePlus manages the process values and messages exported from the OS archives, the OS reports as well as batch data from SIMATIC BATCH in a central database. All these data can be visualized in graphic and clear manner using the Internet Explorer and be swapped out onto the storage media supported by the operating system.

Application



StoragePlus can be used for long-term archiving of process values and messages, OS reports and SIMATIC BATCH data from up to 4 single stations/servers/pairs of servers of the SIMATIC PCS 7 V6.1 process control system. For this purpose StoragePlus has to be installed on a separate computer with Microsoft Windows 2000 Professional / 2000 Server or Windows XP Professional / Server 2003 (see chapter "ES/OS/Batch/IT basic devices" in Section "System-neutral components") which is connected by OS-LAN/terminal bus to the OS and batch servers/single stations of the SIMATIC PCS 7 system.

StoragePlus manages the process values, messages and OS reports which are swapped out of the OS archives, as well as batch data from SIMATIC BATCH, in a central database and makes these data available independent of the PCS 7 runtime systems. All the data can be visualized in a graphic and clear manner using the Internet Explorer. Data selection is supported by integrated filter functions. Messages and process values can be shown in table form, and process values also in graphic form. Tables of process values can be exported in CSV format for processing in other Windows applications, e.g. Microsoft Excel.

The data managed by StoragePlus and the cataloging can be swapped out onto all storage media supported by the operating system. This requires additional hardware and software, e.g. a DVD writer with suitable burning software.

StoragePlus is able to read in data which were swapped out using Storage V5.2 and to convert the data into the SIMATIC PCS 7 V6.1 data format.

Function

- Archiving of messages, process values and reports of the SIMATIC PCS 7 V6.1 operator systems
- Archiving of batch data from SIMATIC BATCH V6.1
- Cataloging of all StoragePlus data
- Swapping out of all StoragePlus data as well as the cataloging onto external storage media
- Reading-in of the swapped-out StoragePlus data and cataloging from external storage media
- Parameterizing of views (display windows and masks) incl. 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
- Exporting of process values in CSV format, e.g. to Microsoft Excel
- Visualizing a batch overview (selecting the detailed protocol of a batch from the batch overview is possible)
- Web-based presentation of data
- Access protection with user-specific rights
- Migration of messages and measurement values from Storage V5.2

Technical specifications

StoragePlus	
Long-term archiving	Up to 4 single stations, servers or pairs of servers simultaneously
Data input for process-value archiving by one server	Approx. 1,000/s
Data input for process-value archiving by all servers	Approx. 1,600/s
Max. data volume input per day	500 MB
Hardware requirements	
Main memory	512 MB or more, 1 GB recommended
Hard disk memory recommended	
• Security	EIDE-RAID 1 with 2 hard disks for 60 GB or more
• Capacity	2 hard disks for 60 Gbyte or more for separating database and log files
Software requirements	
Operating system / applications	• Microsoft Windows 2000 Professional / 2000 Server (each incl. SP 4) or Windows XP Professional incl. SP1 / Server 2003 • Microsoft Internet Explorer V6.0 incl. ServicePack 1 • Microsoft Internet Information Services (IIS) and installed Message Queuing
Software included in delivery of SIMATIC PCS 7 for which no additional license has to be purchased in connection with StoragePlus	• Microsoft SQL Server 2000 incl. ServicePack 3 • OS Client SIMATIC PCS 7 V6.1 • Client software SIMATIC BATCH V6.1

Selection and Ordering Data

	Order No.
SIMATIC StoragePlus V1.1 Software for long-term archiving of data from the SIMATIC PCS 7 process control system; for up to 4 single stations, servers or pairs of servers 3 languages (German, English, French), executes with Windows 2000 Professional/ 2000 Server or Windows XP Professional/ Server 2003, single license for 1 installation Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions	**6ES7 652-0XC11-2YB0**
SIMATIC Upgrade StoragePlus V1.0 to V1.1 Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions	**6ES7 652-0XC11-2YF0**

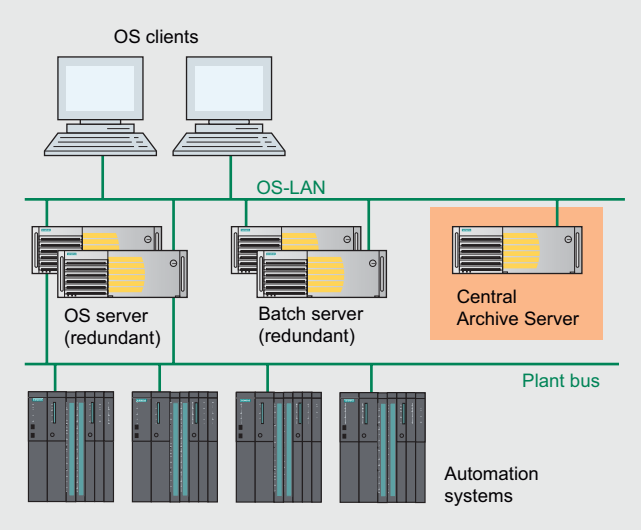
OS long-term archiving

Central archive server

Overview

The Central Archive Server (CAS) can be used for long-term storage of OS archive data (process values and messages), OS reports and batch data of the SIMATIC PCS 7 process control system. The CAS manages the process values and messages exported from the OS archives, the OS reports as well as batch data from SIMATIC BATCH in a central database. The data can be visualized in graphic and clear manner on the OS clients, and swapped out to all storage media (e.g. DVD) supported by the operating system.

Application



The Central Archive Server (CAS) can be used for long-term archiving of process values and messages, OS reports and SIMATIC BATCH data from up to 11 servers/pairs of servers of the SIMATIC PCS 7 V6.1 process control system.

The basic server device with the Microsoft Windows Server 2003 operating system offered in chapter "ES/OS/Batch/IT basic devices" in Section "System-neutral components" can be used as the basic hardware for the CAS. The OS Software Server of the SIMATIC PCS 7 V6.1 process control system is preinstalled on this basic device in addition to the operating system. The CAS does not require a connection to the plant bus. It can be connected to the OS and batch servers of the SIMATIC PCS 7 system via OS-LAN/terminal bus (e.g. via the FastEthernet RJ45 port of the basic server device integrated on board).

The process values, messages, OS reports and batch data managed in the database of the Central Archive Server can be visualized in graphic and clear manner on the OS clients. Data selection is supported by integrated filter functions. Messages and process values can be shown in table form, and process values also in graphic form. Tables of process values can be exported in CSV format for processing in other Windows applications, e.g. Microsoft Excel.

The data managed by the Central Archive Server and the cataloging can be swapped out onto all storage media supported by the operating system. This requires additional hardware and software, e.g. a DVD writer with suitable burning software. Swapping out can be started by an operator input or when a certain amount of the hard disk has been filled.

Function

- Archiving of messages, process values and reports of the SIMATIC PCS 7 V6.1 operator systems
- Archiving of batch data from SIMATIC BATCH V6.1
- Cataloging of all data
- Swapping out of all data as well as the cataloging onto external storage media
- Reading-in of the swapped-out data and cataloging from external storage media
- Data visualization on the OS clients:
  - Parameterizing of views (display windows and masks) incl. the selection criteria for displaying the data
  - Visualizing of messages in table form dependent on filter functions
  - Displaying of process values in table or graphic form dependent on filter functions
  - Visualizing a batch overview (selecting the detailed protocol of a batch from the batch overview is possible)
- Exporting of process values in CSV format, e.g. to Microsoft Excel
- Access protection with user-specific privileges, also using SIMATIC logon

Technical specifications

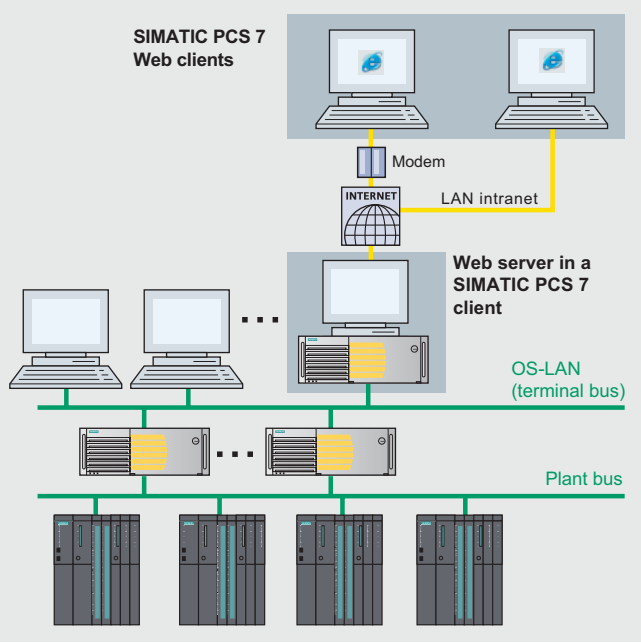
Central Archive Server

Long-term archiving	Up to 11 servers/server pairs simultaneously
Data input for process-value archiving by one server	Approx. 1,000/s
Data input for process-value archiving by all servers	Approx. 10,000/s

Selection and Ordering Data

	Order No.
SIMATIC PCS 7 Central Archive Server V6.1 Software for long-term archiving of data from the SIMATIC PCS 7 process control system; for up to 11 servers or pairs of servers 3 languages (German, English, French), executes with Windows Server 2003, single license for 1 installation Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions	**6ES7 658-2FX16-0YB0**

Overview



You can use the SIMATIC PCS 7 Web server to operate and monitor your system via intranet/Internet. The SIMATIC PCS 7 Web server uses the mechanisms of a multi-client for accessing the subordinate OS servers, and makes the project data globally available via intranet/Internet. The project-specific process data in the SIMATIC PCS 7 Web server are accessed via Web clients which are equipped with Internet Explorer and plug-ins which can be installed over the World Wide Web.

Application

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

- Standard:
  Up to 50 Web clients access the data of **one** SIMATIC PCS 7 Web server over intranet/Internet.
- Diagnostics:
  One or only a few Web clients have access to **several** SIMATIC PCS 7 Web servers/single-user systems for remote operation, diagnostics or monitoring.

Design

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

- For the "Standard" application, server-based licensing is recommended. Each SIMATIC PCS 7 Web server then requires a SIMATIC PCS 7 Web server license, which includes simultaneous access of 3, 10, 25 or 50 Web clients. The Web clients do not require a license.
- The diagnostics licenses are tailored to the application with the same name. The SIMATIC PCS 7 Web diagnostics license available for the Web client allows the client to access the assigned SIMATIC PCS 7 Web servers/single-user systems at any time. At the server end, a SIMATIC PCS 7 Web diagnostics server or SIMATIC PCS 7 Web server license is required per SIMATIC PCS 7 Web server/single-user system. Since there are no functional differences between the license-free Web client and the Web client with SIMATIC PCS 7 Web diagnostics license, mixed operation is possible.

The basic server device with the Microsoft Windows Server 2003 operating system offered in chapter "ES/OS/Batch/IT basic devices" in Section "System-neutral components" can be used as the basic hardware for the SIMATIC PCS 7 Web server . The OS Software Server of the SIMATIC PCS 7 V6.1 process control system is preinstalled on this basic device in addition to the operating system. In order to configure the SIMATIC PCS 7 Web server, you require the license for the OS software client in addition to the SIMATIC PCS 7 Web server or SIMATIC PCS 7 Web diagnostics license. Deviating from the data in the Ordering data, the license of the OS software client in this special application is applicable for the Microsoft Windows Server 2003 operating system.

Function

The Web clients equipped with Internet Explorer and with plug-ins installable via the World Wide Web access the project data provided by the SIMATIC PCS 7 Web server via intranet/Internet. The process displays are converted by "publication" into a form suitable for presentation by the Internet Explorer.

You can operate and monitor your plant via the Web clients in the same manner as via the OS clients. You must log on with the Web client just as with an OS client, and the rules for assignment of privileges are also identical. The input operations made on the Web clients are recorded in the OS operating log.

The integral OS user management guarantees high security when accessing the OS servers from the SIMATIC PCS 7 Web server. In line with the security requirements of the respective system, access protection is possible using password, firewall technology and individual security strategies.

SIMATIC PCS 7 Web server

Selection and Ordering Data	Order No.
SIMATIC PCS 7 Web Server V6.1 3 languages (German, English, French), executes with Windows Server 2003, single license for 1 installation Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions	
• For 3 clients	**6ES7 658-2GA16-2YB0**
• For 10 clients	**6ES7 658-2GB16-2YB0**
• For 25 clients	**6ES7 658-2GC16-2YB0**
• For 50 clients	**6ES7 658-2GD16-2YB0**
SIMATIC PCS 7 PowerPack Web Server V6.1 3 languages (German, English, French), executes with Windows Server 2003, single license for 1 installation Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions For expansion of PCS 7 Web server license	
• From 3 to up to 10 clients	**6ES7 658-2GB16-2YD0**
• From 10 to up to 25 clients	**6ES7 658-2GC16-2YD0**
• From 25 to up to 50 clients	**6ES7 658-2GD16-2YD0**

Selection and Ordering Data	Order No.
OS software client	
SIMATIC PCS 7 OS Software Client V6.1 [1] 3 languages (German, English, French), executes with Windows 2000 Professional or Windows XP Professional, floating license for 1 user Electronic documentation on PCS 7 Toolset DVD Type of delivery: • License key disk, emergency key disk, certificate of license, terms and conditions • PCS 7 V6.1 Toolset DVD, Microsoft SQL Server incl. EULA, as well as supplementary CDs/DVDs (e.g. Microsoft ServicePacks & Tools)	**6ES7 658-2CX16-0YA5**
SIMATIC PCS 7 Web Diagnostics Client V6.1 3 languages (German, English, French), executes with Windows Server 2003, single license for 1 installation Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions	**6ES7 658-2JX16-2YB0**
SIMATIC PCS 7 Web Diagnostics Server V6.1 3 languages (German, English, French), executes with Windows Server 2003, single license for 1 installation Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions	**6ES7 658-2HX16-2YB0**

[1] Deviating from the data in the Ordering data, the license of the OS Software Client V6.1 in this special application is also applicable for the Microsoft Windows Server 2003 operating system.

6

Batch automation

Introduction

Design

SIMATIC BATCH is configured as a single-user system or as a client/server system, and can be used in plants of any size due to its modular architecture and scalability in 5 steps using 150, 300, 600, 1800 and >1800 batch process objects (instances of plant units and equipment modules).

With small applications, e.g. for laboratory automation, SIMATIC BATCH can also be combined with the PC-based starter system SIMATIC PCS 7 BOX. The capacity of SIMATIC BATCH is limited to 150 batch process objects in this case.

However, characteristic for the automation of batch processes using SIMATIC BATCH are client/server architectures with which one batch server and several batch clients process a plant project together. The batch server can also be configured with redundancy in order to increase availability.

Integration

Integration in SIMATIC PCS 7

SIMATIC BATCH is fully integrated in SIMATIC PCS 7. The plant data can be configured entirely using the engineering system. The engineering system passes on all data required for recipe creation to the batch server, making recipe processing possible separate from the engineering system. Changes to the configuration which are made on the engineering system are available to the batch server using an update function (online/offline).

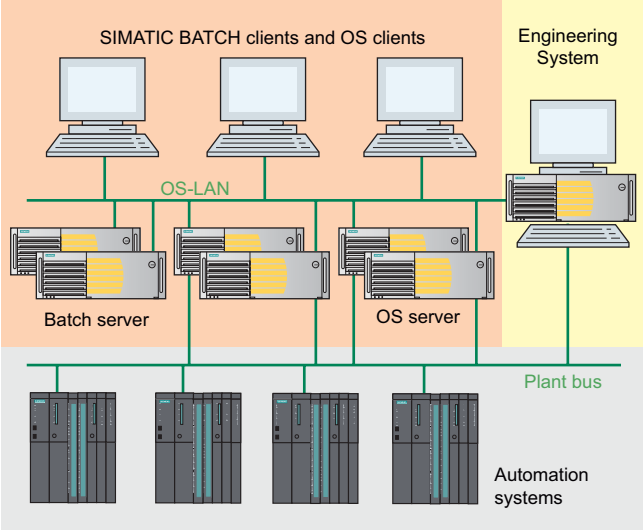
Depending on the load on the operator system, the batch server software can also be executed on the OS server (OS/Batch Server). However, it is usually executed on separate server hardware (Batch Server), isolated from the OS servers. SIMATIC BATCH clients and OS clients can run on separate or common basic hardware. The PCS 7 operator stations relevant to the batch are made known to the batch server during configuration of the batch applications.

Communication with the automation systems

SIMATIC BATCH communicates with the automation system through the PCS 7 operator system. Operator instructions and dialogs can also be integrated into the communication. Attention is then drawn to necessary operator inputs, or a facility for data input (e.g. for laboratory values) is offered. SIMATIC BATCH provides special standard faceplates for controlling and monitoring plant units and equipment modules.

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, such as modes of operation, setpoints/actual values, instance parameters, times etc. can be defined through a properties dialog. However, it is also possible to use special batch interface blocks for communication with the processing programs in the automation systems, e.g. for plant expansions or when connecting non-SIMATIC systems.

Design



The modularity and flexibility of SIMATIC BATCH are optimally supported by the hardware available. The basic hardware from the Section "ES/OS/BATCH/IT basic devices" 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 preinstalled as standard on the single station, server or client as the basic device. If you use these basic devices for SIMATIC BATCH, you can extend or reject the existing SIMATIC PCS 7 installation, and restore it for the operating system using the restore DVD.

Hardware for small plants

For small plants, SIMATIC BATCH can be installed together with the OS software on a single station system. The hardware for this OS/BATCH single station can be selected below or in the chapters "ES/OS/BATCH/IT basic devices" or "Operator system".
A further alternative for small plants results from operation of SIMATIC BATCH on the starter system SIMATIC PCS 7 BOX.

Client/server configuration

Batch process automation typically has a distributed client/server configuration with one batch server and several batch clients, which together process a plant project. The batch server of 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. Depending on the load on the operator system, the OS and batch server software can also be executed on common server hardware (OS/Batch Server).

The batch server is only a station in the OS-LAN, and therefore available only in the standard version with BCE communication. A FastEthernet RJ45 port is already on board and can be used for connecting to the OS LAN.

Redundancy

The batch server redundancy is supported by the SIMATIC BATCH basic package. As with OS redundancy, we recommend that you additionally connect the two redundant servers through the COM interface using an RS 232 cable (see ordering data for accessories). If the SIMATIC BATCH server software and the PCS 7 OS software server in a client/server architecture with separate plant bus and OS-LAN (terminal bus) are installed together on a redundant pair of servers, the two servers must be connected together via one additional desktop adapter network card each for the redundant communication. No additional hardware and software components from the section "OS server redundancy" are required.

Expansion options

The basic hardware can be expanded by the following options according to the customer's particular requirements and whether the hardware is used as single station, server or client:

- Multi-VGA graphics card for connecting up to 4 monitors
- Display and CRT monitors for office and industry environments (see the chapter "ES/OS/BATCH/IT basic devices")

The Multi-VGA graphics cards "2 Screens" and "4 Screens" are offered for multichannel operation of an OS/batch single station or a batch client with 2 up to 4 process monitors. Using a multi-VGA graphics card, the visualization of the plant/unit can be divided among up to 4 process monitors per operator station by using different views. These plant sections can all be operated using just one keyboard and one mouse. The Multi-VGA graphics cards are compliant with EN 55022 and EN 50082 standards. Each card occupies one PCI slot in the operator station.

Note:
Since all messages from SIMATIC BATCH are processed in the operator system's message system, it is not recommendable to use a signal module.

SIMATIC BATCH hardware

Selection and Ordering Data — Order No.

Single Station

Windows 2000 Professional MUI operating system
(German, English, French, Italian, Spanish, Chinese, Japanese)

- **SIMATIC PCS 7 ES/OS IL 43 BCE W2K** — **6ES7 650-0LC16-0YX0** D)
  Connection to plant bus through Basic Communication Ethernet (BCE) with FastEthernet RJ45 network card (PCI card)
- **SIMATIC PCS 7 ES/OS IL 43 IE W2K** — **6ES7 650-0LC16-0YX1** D)
  Connection to plant bus through Industrial Ethernet with CP 1613 A2 communications processor

Windows XP Professional MUI operating system
(German, English, French, Italian, Spanish, Chinese, Japanese)

- **SIMATIC PCS 7 ES/OS IL 43 BCE WXP** — **6ES7 650-0LF16-0YX0** D)
  Connection to plant bus through Basic Communication Ethernet (BCE) with FastEthernet RJ45 network card (PCI card)
- **SIMATIC PCS 7 ES/OS IL 43 IE WXP** — **6ES7 650-0LF16-0YX1** D)
  Connection to plant bus through Industrial Ethernet with CP 1613 A2 communications processor

Server

Windows 2000 Server MUI operating system
(German, English, French, Italian, Spanish, Chinese, Japanese)

- **SIMATIC PCS 7 OS Server IL 43 BCE W2K** — **6ES7 650-0LE16-0YX0** D)
  Connection to plant bus through Basic Communication Ethernet (BCE) with FastEthernet RJ45 network card (PCI card)

Windows Server 2003 MUI operating system
(German, English, French, Italian, Spanish, Chinese, Japanese)

- **SIMATIC PCS 7 OS Server IL 43 BCE SRV03** — **6ES7 650-0LH16-0YX0** D)
  Connection to plant bus through Basic Communication Ethernet (BCE) with FastEthernet RJ45 network card (PCI card)

Selection and Ordering Data — Order No.

Client

Windows 2000 Professional MUI operating system
(German, English, French, Italian, Spanish, Chinese, Japanese)

- **SIMATIC PCS 7 OS Client IL 43 W2K** — **6ES7 650-0LD16-0YX0** D)

Windows XP Professional MUI operating system
(German, English, French, Italian, Spanish, Chinese, Japanese)

- **SIMATIC PCS 7 OS Client IL 43 WXP** — **6ES7 650-0LG16-0YX0** D)

Additional and expansion components

See chapter "ES/OS/BATCH/IT basic devices" in Section "System-neutral components"

RS 232 connecting cable, 10 m — **6ES7 902-1AC00-0AA0**
For connecting the redundant batch servers through the COM interface

Desktop adapter network card — **A5E00504378** B)
For redundant communication between two servers in the case of redundant operation of OS and batch server software on common hardware

SIMATIC PCS 7 BOX

See Section "SIMATIC PCS 7 BOX"

B) Subject to export regulations: AL: N, ECCN: EAR99H
D) Subject to export regulations: AL: N, ECCN: 5D992B1

Note:
Ordering data in abbreviated form; for detailed Ordering data, see chapter "ES/OS/BATCH/IT basic devices" in Section "System-neutral components".

Overview

The basic software for all SIMATIC BATCH system configurations is the SIMATIC BATCH Server Basic Package, configured with

- Batch server software for 150 batch POs (instances of plant units and equipment modules),
- a SIMATIC BATCH BatchCC (batch control center) and
- a SIMATIC BATCH recipe system (recipe editor).

The basic software is always required. It provides everything needed to implement a small SIMATIC BATCH project on the hardware of a SIMATIC PCS 7 BOX, a single station or a client/server configuration consisting of a batch client and a batch server.

Design

The capacity of the SIMATIC BATCH server basic packages can be expanded by SIMATIC BATCH PO options and PowerPacks. An appropriate number of SIMATIC BATCH BatchCC und SIMATIC BATCH Recipe System option packages is needed to expand the client/server configuration with additional batch clients. The functions of SIMATIC PCS 7 BOX, single stations, batch clients and batch servers can be expanded using the following optional packages (see table).

SIMATIC BATCH software components for SIMATIC PCS 7 BOX, single station, batch server and batch client

Software component		SIMATIC PCS 7 BOX	Single station	Batch server	Batch client 1	Batch client 1+n
Basic software						
SIMATIC BATCH server basic package	Batch server for 150 batch POs	●	●	●		
	Batch control center	●	●		●	
	Recipe system	●	●		●	
Option packages						
SIMATIC BATCH ROP library		×	×	×		
SIMATIC BATCH hierarchical recipe		×	×	×		
SIMATIC BATCH separation procedures/formulas		×	×	×		
SIMATIC BATCH API			×	×		
SIMATIC BATCH batch planning		×	×		×	×
SIMATIC BATCH batch control center						×
SIMATIC BATCH recipe system						×
SIMATIC BATCH PO options	Batch PO 300		×	×		
	Batch PO 600		×	×		
	Batch PO 1,800		×	×		
	Batch PO unlimited		×	×		

●: Components included in delivery of basic software

×: Can be ordered as options

SIMATIC BATCH works closely with the operator system and communicates through the operator system with the automation systems. For small plants, SIMATIC BATCH can therefore be installed together with the OS software on a single station or a SIMATIC PCS 7 BOX. The ordering data for the OS software can be found in the chapter "Operator system".

Function

SIMATIC BATCH offers a versatile range of powerful functions for automating batch processes, and these are described in detail in the system documentation. The most important functions of the various program components are presented in summarized form on the following pages.

The current system version SIMATIC BATCH V6.1 particularly features the following new functions:

- Occupation strategy and assignment of units can be modified online during batch processing
- "Manual selection of unit" as additional occupation strategy
- Importing and exporting of basic recipes, formulas and library objects
- Status scanning of recipe objects (RUP, ROP, RPH) in transition criteria
- Selection of unit candidates using limitation of equipment properties
- Electronic signature for release of master recipes, formulas and library objects
- Integration of user-specific plausibility tests

Server basic package

Overview

The SIMATIC BATCH server basic package contains

- batch server software for 150 batch POs (instances of plant units and equipment modules),
- a SIMATIC BATCH BatchCC (batch control center) and
- a SIMATIC BATCH recipe system (recipe editor).

It enables a small SIMATIC BATCH project to be implemented on the hardware of a SIMATIC PCS 7 BOX, single station or client/server combination (batch client and batch server).

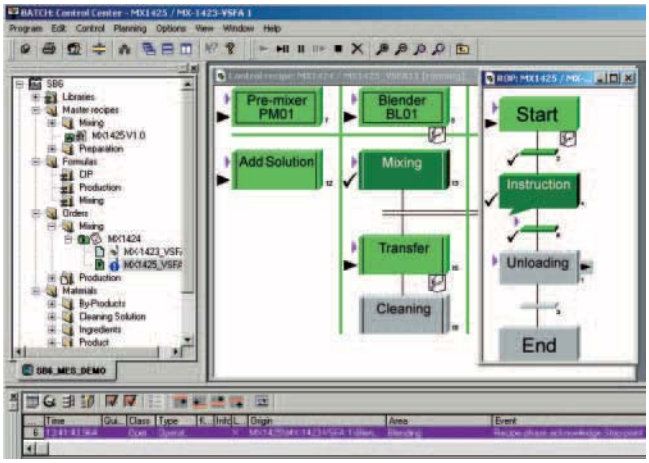
The capacity of the server basic package can be extended by means of SIMATIC BATCH PO options and PowerPacks to batches with 300, 600, 1,800 or unlimited POs.

Selection and Ordering Data

	Order No.
SIMATIC BATCH Server Basic Package V6.1 (PO 150) For single station or client/server configuration, comprising • Batch server for 150 batch POs [1] • Recipe system • Batch control center (BatchCC) 3 languages (German, English, French), executes with Windows 2000 Professional/ 2000 Server or Windows XP Professional/ Server 2003, single license for 1 installation Type of delivery: License key disk, certificate of license, terms and conditions	**6ES7 657-0SA16-0YB0**
SIMATIC BATCH PO Options V6.1 For expansion of the BATCH Server Basic Package 3 languages (German, English, French), executes with Windows 2000 Professional/ 2000 Server or Windows XP Professional/ Server 2003, single license for 1 installation Type of delivery: License key disk, certificate of license, terms and conditions	
• To batch with 300 POs	**6ES7 657-0XE16-2YB0**
• To batch with 600 POs	**6ES7 657-0XB16-2YB0**
• To batch with 1,800 POs	**6ES7 657-0XC16-2YB0**
• To batch with unlimited POs	**6ES7 657-0XD16-2YB0**
SIMATIC BATCH PowerPacks V6.1 For expansion of batch POs 3 languages (German, English, French), executes with Windows 2000 Professional/ 2000 Server or Windows XP Professional/ Server 2003, single license for 1 installation Type of delivery: License key disk, certificate of license, terms and conditions	
• From batch with 300 POs to batch with 600 POs	**6ES7 657-0XB16-2YD0**
• From batch with 600 POs to batch with 1,800 POs	**6ES7 657-0XC16-2YD0**
• From batch with 1,800 POs to batch with unlimited POs	**6ES7 657-0XD16-2YD0**

[1] Whereas process objects (PO) represent operable and observable blocks with approx. 30 variables, batch process objects (batch POs) represent instances of plant units and equipment modules (EPH/EOP).

Overview



The SIMATIC BATCH batch control center (BatchCC) is the "command center" for monitoring and controlling batch processes with SIMATIC BATCH. Using BatchCC it is possible to manage all data relevant to SIMATIC BATCH through a graphical user interface.

Note:
The SIMATIC BATCH batch control center option package is included once in the SIMATIC BATCH server basic package.

Function

BatchCC offers powerful functions for the following tasks:

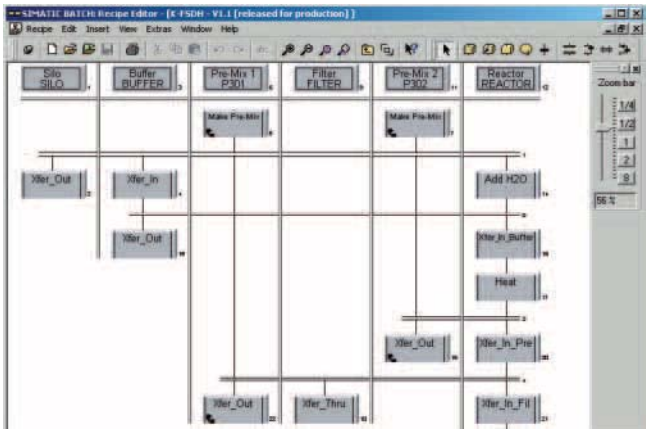
- Reading in and updating the plant data of the basic automation
- Definition of user privileges for all functions, for clients, or for plant units of SIMATIC BATCH
- Definition of material names and codes
- Management of master recipes, and starting the recipe editor in order to enter the recipe structure
- Management of libraries with recipe elements (library operations)
- Editing of formula categories and management of associated formulas (parameter sets)
- Creation of batches with master recipes
- Starting of batch processing and controlling of batches
- Monitoring and diagnostics of batch processing
- Recording and archiving of recipes and batch data

Selection and Ordering Data

	Order No.
SIMATIC BATCH BatchCC V6.1 3 languages (German, English, French), executes with Windows 2000 Professional/ 2000 Server or Windows XP Professional/ Server 2003, floating license for 1 user Type of delivery: License key disk, certificate of license, terms and conditions	**6ES7 657-0LX16-2YB5**

Recipe system

Overview



The SIMATIC BATCH recipe system option package presents itself to the user in the form of a recipe editor. The recipe editor is a convenient tool for simple, intuitive creation and modification of master recipes and library operations. It has a graphical user interface, editing functions typical of those in Microsoft Windows for single and group objects, and a structural syntax check function.

The basis for recipe creation are the batch objects created from the batch plant configuration using the SIMATIC PCS 7 engineering system, e.g. plant units and technological functions. The batch recipe editor can be started individually, but can also be called from BatchCC.

Note:
The SIMATIC BATCH recipe system option package is included once in the SIMATIC BATCH server basic package.

Function

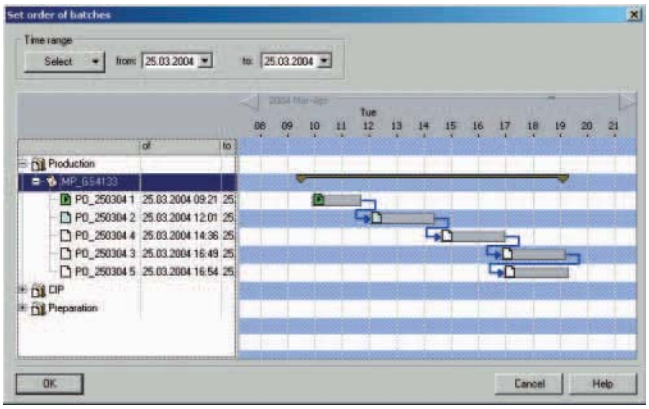
The recipe editor can be used to:

- Create new master recipes and library operations
- Modify existing master recipes and library operations (changes of structure or parameters)
- Document new master recipes and library operations
- Carry out plausibility tests
- Assign releases for testing or production of master recipes and library operations

Selection and Ordering Data

	Order No.
SIMATIC BATCH Recipe System V6.1 3 languages (German, English, French), executes with Windows 2000 Professional/ 2000 Server or Windows XP Professional/ Server 2003, floating license for 1 user Type of delivery: License key disk, certificate of license, terms and conditions	**6ES7 657-0AX16-2YB5**

Overview



The SIMATIC BATCH BatchCC enables the creation of individual production orders and batches. Far more planning functionality is offered by the additional SIMATIC BATCH batch planning option package. BatchCC can then be used to plan batches in advance for a large number of production orders.

Function

The range of functions includes not only the planning but also the modification, canceling, deleting and releasing of batches. Dividing and saving batches for a production can be performed manually or, after specifying the number of batches and the production quantity, automatically. The following batch parameters can be selected and changed before the release order is given:

- Quantity to be prepared
- Starting mode (immediately, by operator input or time-controlled)
- Plant unit assignment
- Formula (parameter set)
- Run sequence (interlinking with the previous or next batch)
- Indication of batch runtime

Batch planning and control are conveniently supported and simplified by special displays such as order category list, production order list, batch planning list, batch status list and batch results list.

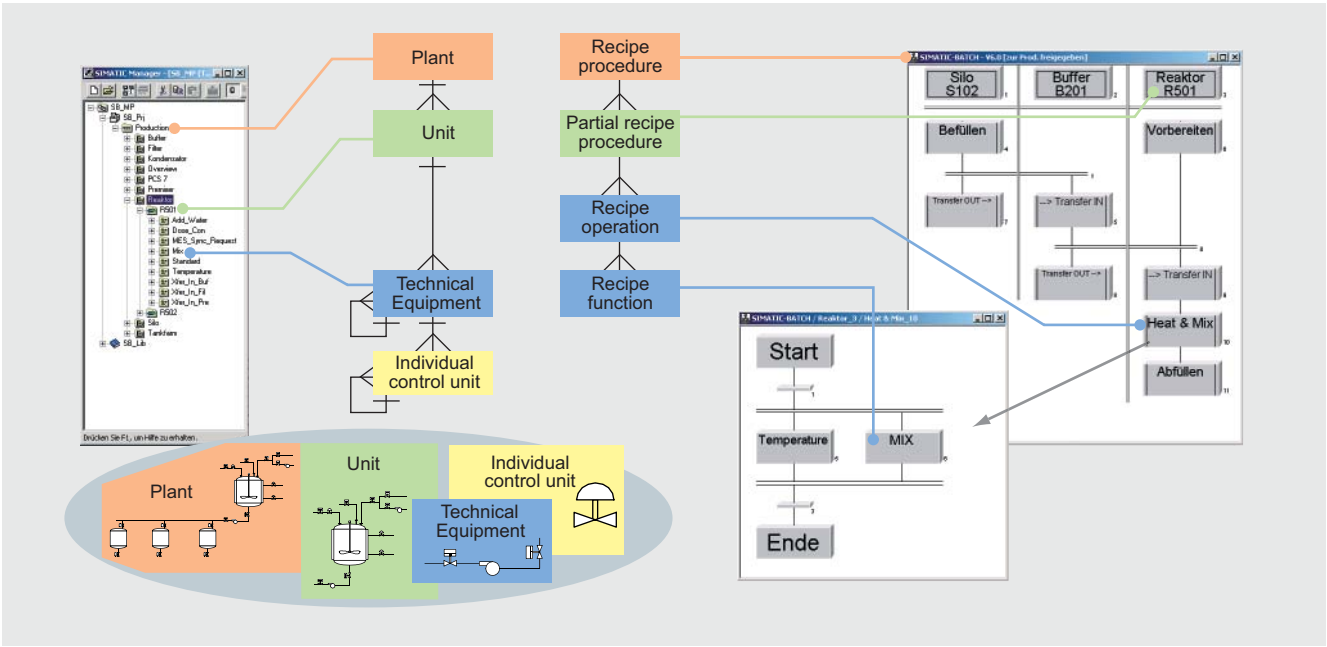
All batches and their plant unit assignments can be clearly presented by a combination of Gantt diagram and table. Conflicts of time or due to multiple assignment of plant units are marked by symbols. Time conflicts are easily eliminated by moving the affected batches in the Gantt diagram.

Selection and Ordering Data

	Order No.
SIMATIC BATCH **Batch Planning V6.1** 3 languages (German, English, French), executes with Windows 2000 Professional/ 2000 Server or Windows XP Professional/ Server 2003, floating license for 1 user Type of delivery: License key disk, certificate of license, terms and conditions	**6ES7 657-0BX16-2YB5**

Hierarchical recipe

Overview



Hierarchical recipes according to ISA-88.01

SIMATIC BATCH and SIMATIC PCS 7 form a functional unit that fully covers the models described in the ISA-88.01 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
- Partial recipe procedure for controlling a process step in a plant unit
- Recipe operation/function for the process engineering task/function in an equipment module

Selection and Ordering Data

	Order No.
SIMATIC BATCH Hierarchical Recipe V6.1 3 languages (German, English, French), executes with Windows 2000 Professional/ 2000 Server or Windows XP Professional/ Server 2003, single license for 1 installation Type of delivery: License key disk, certificate of license, terms and conditions	**6ES7 657-0FX16-2YB0**

ROP library

Overview

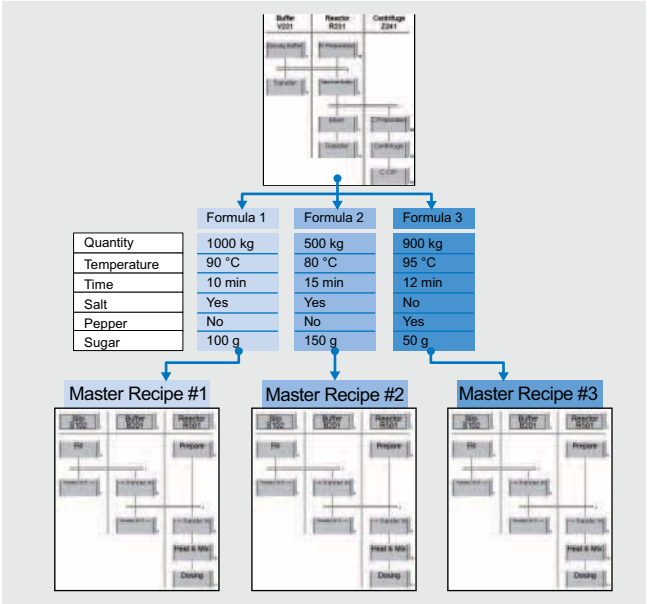
The management of recipe operations is conveniently supported by a user library (ROP library). Library recipe operations can be inserted as a reference in recipe procedures and can thus be modified from a central location. This reduces the requirements for engineering and validation. If the reference link is broken, the recipe operation becomes a fixed component of the recipe procedure, and is thus independent of further central modifications.

Selection and Ordering Data

	Order No.
SIMATIC BATCH ROP Library V6.1 3 languages (German, English, French), executes with Windows 2000 Professional/ 2000 Server or Windows XP Professional/ Server 2003, single license for 1 installation Type of delivery: License key disk, certificate of license, terms and conditions	**6ES7 657-0GX16-2YB0**

Separation Procedures/Formulas

Overview



The flexibility achieved by recipes which are independent of plant units can be increased even further if the procedure and parameter sets (formulas) are separated from one another. Various master recipes can be created by linking several formulas using a recipe procedure. This enables central modification of procedures. The formula structure is determined by the formula category defined by the user.

Selection and Ordering Data

	Order No.
SIMATIC BATCH Separation Procedures/Formulas V6.1 3 languages (German, English, French), executes with Windows 2000 Professional/ 2000 Server or Windows XP Professional/ Server 2003, single license for 1 installation Type of delivery: License key disk, certificate of license, terms and conditions	**6ES7 657-0HX16-2YB0**

SIMATIC BATCH API

Overview

The SIMATIC BATCH API application programming interface is an open interface for custom expansions. It provides the user with access to SIMATIC BATCH data and functions and enables the programming of special industry or project specific applications.

Selection and Ordering Data

	Order No.
SIMATIC BATCH API V6.1 1 language (German, English, French), executes with Windows 2000 Professional/ 2000 Server or Windows XP Professional/ Server 2003, single license for 1 installation Type of delivery: License key disk, certificate of license, terms and conditions	**6ES7 657-0MX16-2YB0**

Upgrade Packages

Overview

Upgrade of BATCH flexible V4.02

Customers who are already using BATCH *flexible* V4.02 can upgrade to SIMATIC BATCH V6.1. Recipes created with BATCH *flexible* V4.02 can be converted for use in SIMATIC BATCH V6.1. The interface blocks of BATCH*flexible* V4.02 can also be used in SIMATIC BATCH V6.1.

Upgrade of SIMATIC BATCH software from V6.0 to V6.1

SIMATIC BATCH client upgrade package

The SIMATIC BATCH client upgrade package contains upgrade licenses for

- SIMATIC BATCH recipe system V6.0 to V6.1
- SIMATIC BATCH batch planning V6.0 to V6.1
- SIMATIC BATCH BatchCC V6.0 to V6.1

SIMATIC BATCH server upgrade package

The SIMATIC BATCH server upgrade package contains upgrade licenses for

- SIMATIC BATCH server basic package V6.0 to V6.1
- SIMATIC BATCH hierarchical recipe V6.0 to V6.1
- SIMATIC BATCH ROP library V6.0 to V6.1
- SIMATIC BATCH separation procedures/formulas V6.0 to V6.1
- SIMATIC BATCH API V6.0 to V6.1

Selection and Ordering Data

	Order No.
SIMATIC BATCH Upgrade Package from BATCH *flexible* V4.02 to SIMATIC BATCH V6.1 3 languages (German, English, French), executes with Windows 2000 Professional/ 2000 Server or Windows XP Professional/ Server 2003, floating license for 1 user Type of delivery: License key disk, certificate of license, terms and conditions	**6ES7 657-0XX16-0YF0**
SIMATIC BATCH Upgrade Package BATCH Client from V6.0 to V6.1 3 languages (German, English, French), executes with Windows 2000 Professional/ 2000 Server or Windows XP Professional/ Server 2003, floating license for 1 user Type of delivery: License key disk, certificate of license, terms and conditions	**6ES7 657-5XX16-0YF5**
SIMATIC BATCH Upgrade Package BATCH Server from V6.0 to V6.1 3 languages (German, English, French), executes with Windows 2000 Professional/ 2000 Server or Windows XP Professional/ Server 2003, single license for 1 installation Type of delivery: License key disk, certificate of license, terms and conditions	**6ES7 657-5XX16-0YF0**

SIMATIC Route Control

7

Introduction

Overview

SIMATIC Route Control adds a tool for the configuration, control, monitoring and diagnostics of material transports in pipeline networks. It is not specialized on any particular industry.

With SIMATIC Route Control, which can also be combined with SIMATIC BATCH, users of SIMATIC PCS 7 are capable of automating not only their production processes and associated warehouses but also the material transports linking both areas.

SIMATIC Route Control can handle complex networks as well as simple transport routes. In particular SIMATIC Route Control is predestined 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

Preferred applications:

- Plants in the medium and high capacity range with an extensive route/pipeline network
- Frequent conversions and extensions of the transport network incl. actuators and sensors
- Transport routes with high flexibility:
  - regularly changing materials
  - dynamic selection of the source and destination of the material transport (incl. reversing of direction on bidirectional transport routes)
- numerous simultaneous material transports
- plant projects in combination with SIMATIC BATCH

Configuration

SIMATIC Route Control is fully integrated in SIMATIC PCS 7 and, thanks to the modular architecture and 3-step scalability (up to 30 / up to 100 / up to 300 simultaneous material transports), can be flexibly adapted to different sizes of plant.

SIMATIC Route Control provides graded user privileges for engineering, operating and maintenance personnel. These privileges are integrated in the user administration with SIMATIC Logon.

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 a central engineering system. The configuration of Route Control builds on the basic configuration of the SIMATIC PCS 7 process control system using blocks from the PCS 7 Standard Library. Technological elements of relevance for Route Control (RC elements) are adapted in the CFC Editor using uniform interface blocks from the Route Control Library. Even existing SIMATIC PCS 7 plants are therefore easy to expand with SIMATIC Route Control.

The blocks of the Route Control library support redundancy at the controller level. They can be used with standard automation systems or also with fault-tolerant systems or mixed configurations.

Route Control Server

After the transport network is configured and the variants of a material transport tested, the Route Control configuration data are transferred to the Route Control Server where they can then be activated at a suitable time. Configuration changes are 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).

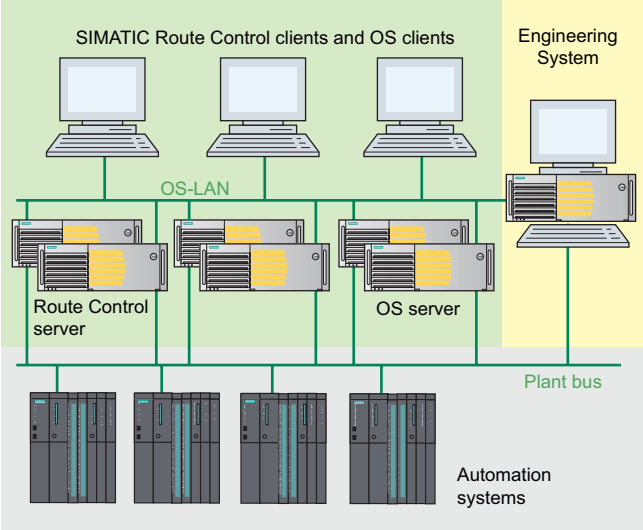
The Route Control Server (RC Server) supplies the Route Control Clients (Route Control Center) with the necessary data and transfers their operations to the automation systems. When a material transport is requested through the Route Control Center (RCC), it is the job of the RC Server to dynamically 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 configured parameters (e.g. material or function IDs) .

For maintenance purposes, an automation system can be specifically set to "in maintenance" (out of service). Material transport being carried out by this automation system is 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 RCC view.

Design



The modularity and flexibility of SIMATIC Route Control are optimally supported by the hardware available. The basic hardware from the chapter "ES/OS/BATCH/IT basic devices" 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. The hardware for this OS/RC single station can be selected below or in the chapters "ES/OS/BATCH/IT basic devices" or "Operator system".

Client/server configuration

Distributed multi-user systems with client/server architecture, expandable with up to 32 clients per server, are typical for the automation of material transports with SIMATIC Route Control. Basically it is possible to operate an RC Server, Batch Server and OS Server on shared basic hardware. However, availability will be higher and performance better if each component has its own server hardware. The availability of the RC Server can be further increased through redundant configuration of the server hardware. SIMATIC PCS 7 supports multiple-station systems with up to 12 servers/server pairs.

The Route Control 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.

RC servers and OS/RC single stations can be connected to the Industrial Ethernet plant bus using a communications processor or a standard LAN card.

Redundancy

RC Server redundancy is supported by the SIMATIC Route Control Server program package. Unlike with OS server redundancy, no additional hardware and software components are required.

Expansion options

The basic hardware (PC basic unit) is expandable according to the customer's particular requirements and whether the hardware is used as RC Single Station, RC Server or Batch Client with the following options:

- Multi-VGA graphics card for connection of up to 4 monitors
- Display and CRT monitors for office and industry environments (see the chapter "ES/OS/BATCH/IT basic devices")

The Multi-VGA graphics cards "2 Screens" and "4 Screens" are offered for multichannel operation of an OS/RC Single Station or a client with 2 up to 4 process monitors. Views distributed over 2 or as many as 4 process monitors by means of a graphics card can be controlled using one keyboard and one mouse. The Multi-VGA graphics cards are compliant with EN 55022 and EN 50082 standards. Each card occupies one PCI slot in the operator station.

Note:
Since all messages from SIMATIC Route Control are processed in the operator system's message system, it is not recommendable to use a signal module.

Route control hardware

Selection and Ordering Data — Order No.

Single Station

Windows 2000 Professional MUI operating system (German, English, French, Italian, Spanish, Chinese, Japanese)

- **SIMATIC PCS 7 ES/OS IL 43 BCE W2K** — Connection to plant bus through Basic Communication Ethernet (BCE) with FastEthernet RJ45 network card (PCI card) — **6ES7 650-0LC16-0YX0** D)
- **SIMATIC PCS 7 ES/OS IL 43 IE W2K** — Connection to plant bus through Industrial Ethernet with CP 1613 A2 communications processor — **6ES7 650-0LC16-0YX1** D)

Windows XP Professional MUI operating system (German, English, French, Italian, Spanish, Chinese, Japanese)

- **SIMATIC PCS 7 ES/OS IL 43 BCE WXP** — Connection to plant bus through Basic Communication Ethernet (BCE) with FastEthernet RJ45 network card (PCI card) — **6ES7 650-0LF16-0YX0** D)
- **SIMATIC PCS 7 ES/OS IL 43 IE WXP** — Connection to plant bus through Industrial Ethernet with CP 1613 A2 communications processor — **6ES7 650-0LF16-0YX1** D)

Server

Windows 2000 Server MUI operating system (German, English, French, Italian, Spanish, Chinese, Japanese)

- **SIMATIC PCS 7 OS Server IL 43 BCE W2K** — Connection to plant bus through Basic Communication Ethernet (BCE) with FastEthernet RJ45 network card (PCI card) — **6ES7 650-0LE16-0YX0** D)
- **SIMATIC PCS 7 OS Server IL 43 IE W2K** — Connection to plant bus through Industrial Ethernet with CP 1613 A2 communications processor — **6ES7 650-0LE16-0YX1** D)

Windows Server 2003 MUI operating system (German, English, French, Italian, Spanish, Chinese, Japanese)

- **SIMATIC PCS 7 OS Server IL 43 BCE SRV03** — Connection to plant bus through Basic Communication Ethernet (BCE) with FastEthernet RJ45 network card (PCI card) — **6ES7 650-0LH16-0YX0** D)
- **SIMATIC PCS 7 OS Server IL 43 IE SRV03** — Connection to plant bus through Industrial Ethernet with CP 1613 A2 communications processor — **6ES7 650-0LH16-0YX1** D)

Selection and Ordering Data — Order No.

Client

Windows 2000 Professional MUI operating system (German, English, French, Italian, Spanish, Chinese, Japanese)

- **SIMATIC PCS 7 OS Client IL 43 W2K** — **6ES7 650-0LD16-0YX0** D)

Windows XP Professional MUI operating system (German, English, French, Italian, Spanish, Chinese, Japanese)

- **SIMATIC PCS 7 OS Client IL 43 WXP** — **6ES7 650-0LG16-0YX0** D)

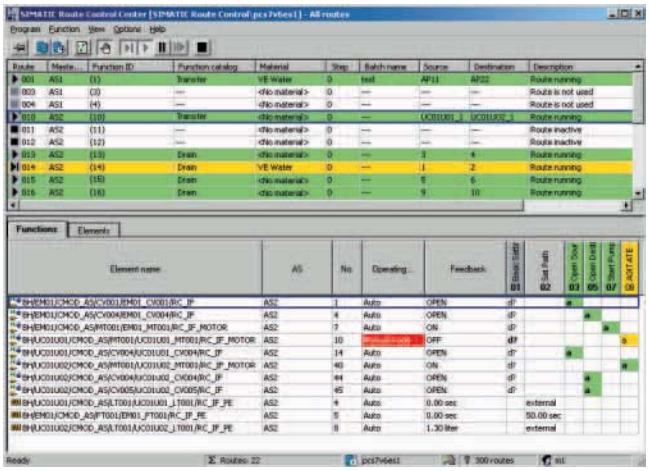
Additional and expansion components

See chapter "ES/OS/BATCH/IT basic devices" in Section "System-neutral components"

D) Subject to export regulations: AL: N, ECCN: 5D992B1

Note:
Ordering data in abbreviated form; for detailed Ordering data, see chapter "ES/OS/BATCH/IT basic devices" in Section "System-neutral components".

Overview



Route Control Center

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)

Software components (runtime)		Single station	Server	Client
SIMATIC Route Control Server	Up to 30 simultaneous material transports	●	●	
SIMATIC Route Control Server PowerPack	From 30 up to 100 simultaneous material transports	●	●	
	From 100 up to 300 simultaneous material transports	●	●	
SIMATIC Route Control Center		●		●

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 Server program package suitable for up to 30 simultaneous material transports can be expanded by means of add-on PowerPacks to meet higher requirements (up to 100 or 300 simultaneous material transports).

The Route Control 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.

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 (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 and request details
- Operation of the selected material transport: Selection of operating mode: manual/automatic; request, start, stop, continue and end material transport in manual mode; set/change request parameters (locations: source, destination, intermediate locations) and general properties (function catalog, function ID, material ID and "ignore error") in manual mode; activate/deactivate 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

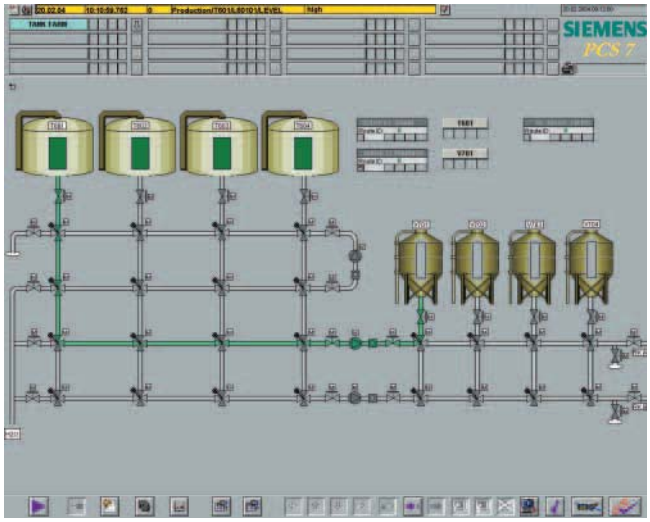
Route control runtime software

Selection and Ordering Data	Order No.
SIMATIC Route Control Server V6.1 **for up to 30 simultaneous material transports** For single station and client/server configuration 3 languages (German, English, French), executes with Windows 2000 Server or Windows Server 2003, single license for 1 installation Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions	**6ES7 658-7FA16-0YB0**
SIMATIC Route Control Server PowerPack V6.1 for expansion of SIMATIC Route Control Server 3 languages (German, English, French), executes with Windows 2000 Server or Windows Server 2003, single license for 1 installation Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions	
• From 30 to up to 100 simultaneous material transports	**6ES7 658-7FB16-0YD0**
• From 100 to up to 300 simultaneous material transports	**6ES7 658-7FC16-0YD0**
SIMATIC Route Control Center V6.1 3 languages (German, English, French), executes with Windows 2000 Professional or Windows XP Professional, floating license for 1 user Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions	**6ES7 658-7EX16-0YB5**

Selection and Ordering Data	Order No.
SIMATIC Route Control upgrade packages	
Update SIMATIC Route Control Server from V6.0 to V6.1 For single station and client/server configuration 3 languages (German, English, French), executes with Windows 2000 Server or Windows Server 2003, single license for 1 installation Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions	**6ES7 652-5BX16-0YF0**
Update SIMATIC Route Control Center from V6.0 to V6.1 3 languages (German, English, French), executes with Windows 2000 Professional or Windows XP Professional, floating license for 1 user Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions	**6ES7 658-7EX16-0YF5**

Route control engineering software

Overview



The configuration of Route Control builds on the basic configuration of the SIMATIC PCS 7 process control system using blocks from the PCS 7 Standard Library. Technological elements of relevance for Route Control (RC elements) are adapted in the CFC Editor using uniform interface blocks from the Route Control Library. This means that existing plants are also easy to upgrade with SIMATIC Route Control.

Function

The SIMATIC Route Control Engineering program package with the following configuration components is available in addition to the basic tools of the SIMATIC PCS 7 Engineering System for configuring Route Control applications:

Route Control Library

The Route Control Library contains blocks for RC configuration, blocks for creating transport routes, and interface blocks for RC elements: control (actuator) elements, sensor elements, parameter (RC setpoint) elements and connection elements (material data related to a partial route). It is made available in the catalog of the CFC Editor.

Route Control Wizard

The Route Control Wizard is the interface between the RC configuration and the SIMATIC PCS 7 basic configuration. The wizard, which can be called up from the SIMATIC Manager menu, receives the RC-specific configuration data of the SIMATIC PCS 7 project for importing into the Route Control Engineering. In doing so it carries out a plausibility check, defines the AS-OS and AS-AS communication connections and configures the RC server signals.

Route Control Engineering Tool

Once the RC-relevant basic data of a PCS 7 project have been adopted in a Route Control project, the next step is to configure the RC-specific objects with the Route Control Engineering Tool:

- Partial Routes:
  Dividing the transport routes into partial routes helps to increase flexibility and to minimize the amount of configuration work through grouping. Relevant partial route parameters: "bidirectional" and "priority" (when searching for a route, the lowest total of partial route priorities is decisive for the overall route)
- Locations:
  The beginning and end of each partial route - and hence the source and destination of a material transport - are marked by locations. The locations are also parameters for requesting a material transport (source, destination, intermediate locations/via).
- Interconnections:
  The RC elements are incorporated in a partial route and thus "interconnected" with it. As a result, the RC elements acquire additional properties depending on their type (e.g. "close valve" in base position). These properties can be edited in configuration windows.
- Function Catalogs:
  The partial routes can be assigned to certain function catalogs, e.g. "Cleaning" or "Product Transport", according to technological and product-specific aspects. When searching for routes, function catalogs allow you to limit the results to the type of material transport.
- Function Steps/Sequence Functions
  Each function catalog includes as many as 32 configurable technological sequence functions, e.g. base position of the control elements, open transport valves, open source valve, switch on pump. Together with the RC elements interconnected in the partial routes, the sequence functions determine the sequence of the material transport.

Special configuration functions make it easier to perform repetitive routine and extend the range of options for controlling material transports, e.g.:

- Exporting configuration data in the form of CSV files to MS Excel, copying and editing the data there, and then reimporting 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
- Connecting to the route block in runtime the dynamic (external) setpoint values arriving from the process (e.g. weighed quantity)

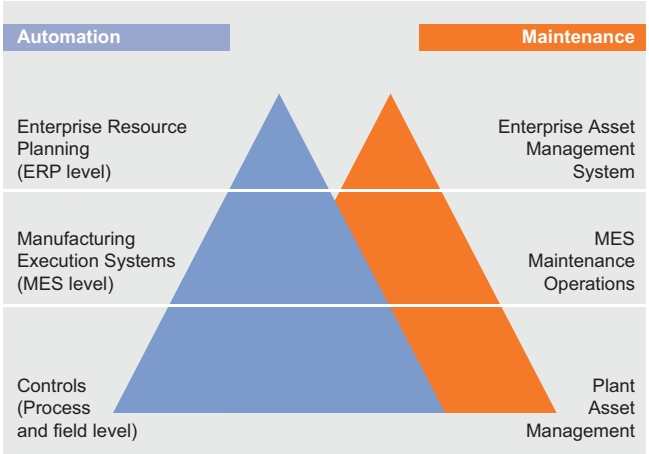
Selection and Ordering Data

	Order No.
SIMATIC Route Control Engineering V6.1 3 languages (German, English, French), executes with Windows 2000 Professional/ 2000 Server or Windows XP Professional/ Server 2003 Type of delivery: License key disk, emergency key disk (not with rental license), certificate of license, terms and conditions	
• Floating license for 1 user	**6ES7 658-7DX16-0YB5**
• Rental license for 50 hours	**6ES7 658-7DX16-0YB6**
Upgrade package	
SIMATIC Route Control Engineering Upgrade from V6.0 to V6.1 3 languages (German, English, French), executes with Windows 2000 Professional/ 2000 Server or Windows XP Professional/ Server 2003, floating license for 1 user Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions	**6ES7 658-7DX16-0YF5**

8 Asset Management

Introduction

Overview



The PCS 7 Asset Management supplements SIMATIC PCS 7 by a valuable instrument for minimization of the total cost of ownership of a plant.

Asset management for plant engineering is understood to be the administration and management of the plant equipment, particularly the I&C equipment, as well as all activities and measures which serve to retain or increase the value of a plant.

These primarily include

- the reaction to existing fault and diagnostics messages (corrective maintenance),
- preventive diagnostics and maintenance, and
- predictive maintenance and diagnostics.

In the past, maintenance functions and information were usually only available in a separate level independent of the production. In line with customer requirements, and parallel to process control, the integral asset management function of SIMATIC PCS 7 now provides uniform maintenance information and functions for the system components in the plant (assets) within the process control system. Supplementary hardware or software tools for asset management functions are therefore superfluous.

Whereas the plant operator receives all information relevant to the process via the operator system and can specifically access the process, the maintenance engineer checks the hardware of the automation plant via the maintenance station, and processes its diagnostics messages and maintenance requests.

Conformity with international standards was consistently observed during implementation of the PCS 7 Asset Management function. SIMATIC PCS 7 Asset Management complies with the NAMUR requirements (process control standards committee in the chemical and pharmaceutical industries) defined in the following documents for systems for asset management at plant level and for status messages from field devices:

- NAMUR recommendation NE91 (requirements for systems for asset management at plant level),
- NAMUR working sheet NA64 (status messages "Device failure", "Maintenance requirements", "Function check" from field devices).

In addition, it takes into account IEC 61804-2 for self-diagnostics of devices described by the Electronic Device Description (EDD).

Integration

The PCS 7 Asset Management is integrated seamlessly into the SIMATIC PCS 7 process control system as a sector-independent software package. It consistently uses the hardware and software components of the engineering system and operator system.

The system interface for maintenance engineers is the maintenance station based on the engineering system. Via this, they have access to the complete hardware structure of the process control system, and can process diagnostics messages and maintenance requests. All system assets are recorded in the hardware structure, commencing with the intelligent field devices and I/O modules, and covering fieldbus, controllers, network components and plant bus up to the servers and clients of the operator systems.

Further information can be called from the maintenance station for assets described by EDD according to IEC 61804-2, e.g.

- detailed diagnostics information,
- modification logbook (audit trail) or
- parameter view of components.

The scope of information is filtered depending on the user's field of responsibility.

The message system, the type of presentation, the hierarchy and the operator prompting of the maintenance station are derived from the HMI philosophy developed for the operator. The diagnostics data of all assets are displayed on uniform faceplates whose contents depend on the intelligence of the respective component.

Configuration

The PCS 7 Asset Management 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. Supported by the system, all data relevant to the PCS 7 asset management are derived from the project data of the application simply by pressing a button, and the diagnostics displays are also generated.

The procedure is simple, and no additional overhead is required for the asset management. It can be summarized as follows:

- Generation of the hardware and software project of the application.
- System-supported generation of the diagnostics displays with all components present in the project, including the display hierarchy according to the project's hardware structure. The names of the displays, symbols etc. imported from the project can be changed by users according to personal requirements or depending on project-specific features. These modifications are retained during further operations.
- Compilation of the configuration data, and downloading to the operator station and maintenance station with subsequent test and commissioning phase.

Overview

The maintenance station for PCS 7 asset management uses hardware and software components of the engineering system and operator system.

The message system, user desktop, display hierarchy and operator prompting are oriented according to 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 maintenance station is simple and intuitive – complex familiarization is not required.

As a result of the close interlacing, ES, OS and asset management functions execute on common hardware. Such a multifunctional station cannot only be used for asset management, but also for system engineering or HMI.

The diagnostics displays structured according to the plant hierarchy with the operating states of all PCS 7 components can be displayed on the maintenance station and also on an OS client. However, enhanced online diagnostics functions in conjunction with HW Config or SIMATIC PDM can only be called from the maintenance station.

The SIMATIC logon handles user management and access control for the maintenance station.

Design

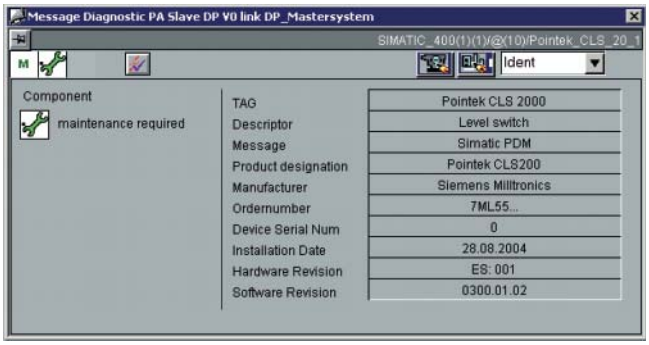
Depending on the architecture of the SIMATIC PCS 7 plant, the maintenance station can be implemented based on a SIMATIC PCS 7 BOX, PCS 7 single station or client/server combination.

The following table shows possible hardware/software configurations of the maintenance station (MS).

Required PCS 7 hardware/software	PCS 7 BOX	PCS 7 ES single station	MS/ES client	MS server
Basic hardware				
SIMATIC PCS 7 BOX, complete system (Windows XP operating system)	●			
SIMATIC PCS 7 ES/OS IL 43 BCE/IE (Windows 2000 or XP operating system)		●	●	
SIMATIC PCS 7 OS Server IL43 BCE/IE (Windows 2000 Server or Server 2003 operating system)				●
Required SIMATIC PCS 7 software corresponding to operating system or basic hardware (without taking into account the quantity frameworks)				
SIMATIC PCS 7 Engineering Software V6.1 AS/OS		●	●	
SIMATIC PDM PCS 7 V6.0	●	●	●	
SIMATIC PCS 7 OS Software Server V6.1				●
PCS 7 Asset Engineering V6.1	●	●	●	
PCS 7 Asset Runtime V6.1	●	●	●	

Maintenance station

Function



Diagnostics message of a component

The maintenance station provides comprehensive maintenance information for the system components of the plant (assets). In order to obtain information on the diagnostics status of individual plant areas or components, maintenance engineers can change from the overview display to the respective diagnostics display of the subordinate hardware level. 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 following information can be provided for every component:

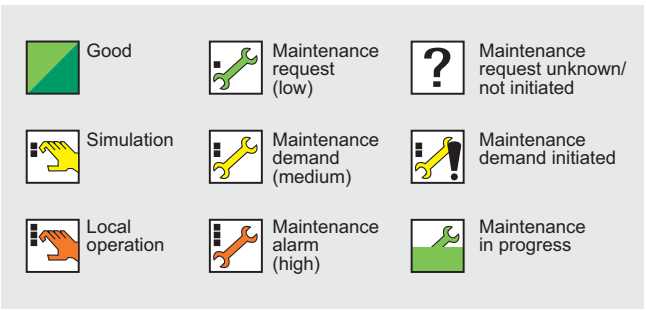
- Display of diagnostics status determined by the system
- Information on component such as process tag name, vendor or serial number (depending on the respective component)
- Display of diagnostics messages of a component
- Visualization of type and current state of initiated maintenance measure

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.

- Detailed diagnostics information
  - Device-specific information from the vendor
  - Information on fault diagnostics and troubleshooting
  - Additional documentation
- Display of associated modification logbook (audit trail) of this component with all entries on the persons, times and types of operator intervention on the component
- Parameter view of the component (display of parameters saved in the component and in the project; if required, also differences between them)

Uniform symbols



Uniform symbols for visualization of the maintenance status and for HMI on the maintenance station

A significant feature with visualization of the access management functionality is the uniform symbols and texts for displaying the statuses of all assets, i.e. for operator stations as well as for network components, controllers or field devices. The asset faceplates are also uniform. The amount of information displayed depends on the intelligence of the respective component.

Typical sequence of a maintenance cycle

- Intelligent sensors recognize the threat of failures by means of the implemented diagnostics system long before the actual failure, and can signal these.
- Diagnostics information on network components and basic PC devices is transferred to the maintenance station via an OPC SNMP link.
- The symbol of the associated component (e.g. a field device) signals "Maintenance required" on the maintenance station. An entry is automatically made in the message log so that the chronology of occurred events can also be analyzed later. Parallel to this, the vendor's detailed diagnostics information is determined by means of SIMATIC PDM and the device description (EDD).
- On the overview display, maintenance engineers recognize "Maintenance required" in the technological plant. The maintenance engineers are rapidly guided to the corresponding device using standard mechanisms known from the operator station such as "Common display" and "Operator prompting using loop in alarm". Important information is then shown in the faceplate of the associated device, e.g. process tag number, location and device type.
- The existing detailed diagnostics information on the problem can then be called using the "Diagnostics" view depending on the device type and vendor, e.g. fault description, cause, trend information or handling instructions.
- They can assess the fault in the "Maintenance" view, and initiate corresponding reactions. This can be e.g. the input of a comment or handling instructions, the assignment of a work instruction number, or the increasing/decreasing of the maintenance requirement priority depending on the significance for the technological plant. Current working measures can also be traced/accompanied in this view. All operations can be logged. The log also contains the faceplate contents with ID data, messages, detailed diagnostics information, work instructions, notes and status.
- The work request with all information gained on the maintenance station is passed on to the corresponding maintenance department (identified by symbol "Maintenance order requested"). The release for maintenance of the component can also be made on the maintenance station (identified by symbol "Maintenance order being processed"). The current status of the maintenance measure is then indicated for all involved parties, and also for subsequent shifts.
- Once the maintenance measure has been carried out, it is concluded on the maintenance station – the status displays then return to the normal state. The complete maintenance cycle is documented on the maintenance station without gaps – automatically and without additional configuration overhead.

Selection and Ordering Data

	Order No.
SIMATIC PCS 7 Asset Runtime V6.1 incl. 128 asset TAGs [1] and one OPC server license For installation on SIMATIC PCS 7 BOX, single station or client 3 languages (German, English, French), executes with Windows 2000 Professional/ 2000 Server or Windows XP Professional/ Server 2003, single license for 1 installation Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions	**6ES7 658-7GA16-0YB0**
SIMATIC PCS 7 PowerPack Asset Runtime V6.1 for expanding the TAGs of SIMATIC PCS 7 Asset Runtime V6.1 3 languages (German, English, French), executes with Windows 2000 Professional/ 2000 Server or Windows XP Professional/ Server 2003, single license for 1 installation Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions	
• From 128 to 512 asset TAGs, incl. one OPC server license	**6ES7 658-7GB16-0YD0**
• From 512 to 1,024 asset TAGs	**6ES7 658-7GC16-0YD0**
• From 1,024 to 2,048 asset TAGs	**6ES7 658-7GD16-0YD0**
• From 2,048 to unlimited asset TAGs	**6ES7 658-7GH16-0YD0**
Asset engineering	
SIMATIC PCS 7 Asset Engineering V6.1 For installation on SIMATIC PCS 7 BOX, single station or client 3 languages (German, English, French), executes with Windows 2000 Professional/ 2000 Server or Windows XP Professional/ Server 2003, floating license for 1 user Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions	**6ES7 658-7GX16-0YB5**

[1] With asset TAGs, the number of asset objects monitored in SIMATIC PCS 7 is licensed. An asset object represents individual hardware components within a SIMATIC PCS 7 project, e.g.
- measuring devices, positioners, switchgear or remote I/Os monitored per EDD or
- basic devices or Ethernet components monitored in the maintenance station via an OPC link.

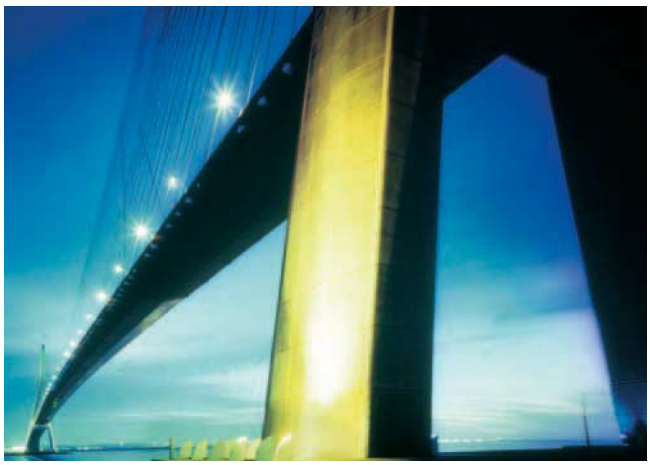
In conjunction with PowerPacks, licenses are available for 128, 512, 1,024, 2,048 and unlimited asset TAGs.

IT world

9

SIMATIC IT

Overview



Integration and synchronization of all business processes with SIMATIC IT

In order to remain competitive, manufacturers must shorten their product launch times, increase production transparency and flexibility, optimize planning and scheduling, and reduced waste, warehouse costs and downtimes. At the same time, high quality standards, compliance with directives, and maximum productivity in global production locations with optimum cost structuring must be guaranteed.

Manufacturing execution systems (MES), such as SIMATIC IT from Siemens, permit effective integration of product processes and material management systems, and provide support in every production phase for coordination of all production-relevant equipment and applications.

SIMATIC IT can be used to model the complete production know-how, to precisely define the operating processes, and to record data from the ERP and production levels in real-time. It is then possible to control business processes more effectively, to minimize downtimes, production waste and reworking, to optimize stockkeeping, and to react rapidly and flexibly to different customer requirements.

Benefits

SIMATIC IT from Siemens offers significant advantages. The model of the business and production processes is transparent, understandable, and independent of the control systems. Even complex business and production processes are simple to model. Subsequent modifications can be incorporated efficiently and without problem.

In addition to complete documentation, modeling of the business and production processes with SIMATIC IT simultaneously provides effective protection of the implemented know-how.

The plant and production models can be saved in libraries, and then used again in other projects. In this manner,they can be used at any company location for standardization of sequences. "Best practices" are then available everywhere. This prevents implementation errors, provides safeguarding of investments, reduces launch and maintenance costs, and leads to a significant reduction in project duration.

The product architecture and functionality of SIMATIC IT conform with ISA-95, the internationally recognized standard for Manufacturing Execution Systems.

Design

SIMATIC IT Production Suite

SIMATIC IT consists of various components designed for different tasks which can be coordinated by the SIMATIC IT Production Modeler.

The basic functions are implemented using SIMATIC IT components. They are marketed in the form of product bundles of different composition which permit optimum adaptation to individual requirements:

- SIMATIC IT MIS (Management Information System)
  defines key performance indicators in agreement with the plant model. The plant performance can be realistically evaluated using SIMATIC IT MIS.
- SIMATIC IT Genealogy Management
  for material management in the complete company with observation of statutory directives. Typical tasks are reverse and forwards genealogy, fundamental material monitoring, and synchronization of material master data with the ERP system.
- SIMATIC IT Orders Management
  for management of orders from planning up to implementation, including shipping, replanning of sequence, implementation monitoring and recording.

Bundles are additionally available consisting of several of the bundles mentioned here, e.g. SIMATIC IT Basic Tracking & Tracing or SIMATIC IT Basic Production Management. Each of these product bundles includes a license for the following components (further licenses are available as additions):

- SIMATIC IT Report Manager
  offers comprehensive reporting functions. It provides valuable knowledge concerning the company, and support for compliance with the statutory requirements for ad hoc reporting (e.g. EU directive EC 178/2002, US bioterrorism act).
- SIMATIC IT Client Application Builder
  provides the GUI for MES applications on the basis of a complete Web-based environment. Patented functions for optimization of page refreshing are available based on standard technology. The SIMATIC IT Client Application Builder fully supports zero administration cost clients.

The range of MES products within SIMATIC IT is rounded off by the following components for special ISA-95 functions which are also available as standalone products:

- SIMATIC IT Unilab
  Laboratory Information Management System (LIMS) for management and control of laboratory data and processes.
- SIMATIC IT Interspec
  Specifications Management System (PLM) for management and control of production specifications within the complete company. The PLM facilitates product lifecycle management.

More information

You can obtain further information from:

Marketing Germany
Manfred Graeter
E-mail: manfred.graeter@siemens.com
European help line : +49 (0) 180 5050 111

Siemens Automation and Drives
Automation Solutions MES
Viale Cembrano, 11
I-16148 Genoa, Italy
Tel.: +39 010 3434-1
Fax.: +39 010 383 115
E-mail: marketing.simatic-it@siemens.com

Additional informationen is available in the Internet under:

http://www.siemens.com/simatic-it

@PCS 7

Overview

Company-wide availability of process data with @PCS 7

@PCS 7 offers a simple, cost-effective solution for remote access to the process data that reside in the SIMATIC PCS 7 system. The data can be displayed and processed further on any computer with any operating system using the standard software package @aGlance – even through the intranet/Internet.

@aGlance is integrated in an @PCS 7 server on every operator station of SIMATIC PCS 7 . To read the data, the target PC requires only a Web@aGlance package and a standard Web browser. For writing and communication with other @aGlance servers, the operator station must have a corresponding license.

Upon integration of @aGlance/IT, the SIMATIC PCS 7 can communicate with a large number of software products for the plant management/company management level. @PCS 7 provides customers with access through the @aGlance interface to the PCS 7 operator system data, including the archives and messages.

An intelligent log-on procedure provides the @aGlance product range with plug and play interfacing while incorporating safety features. Security and access privileges are programmed using a powerful administration tool.

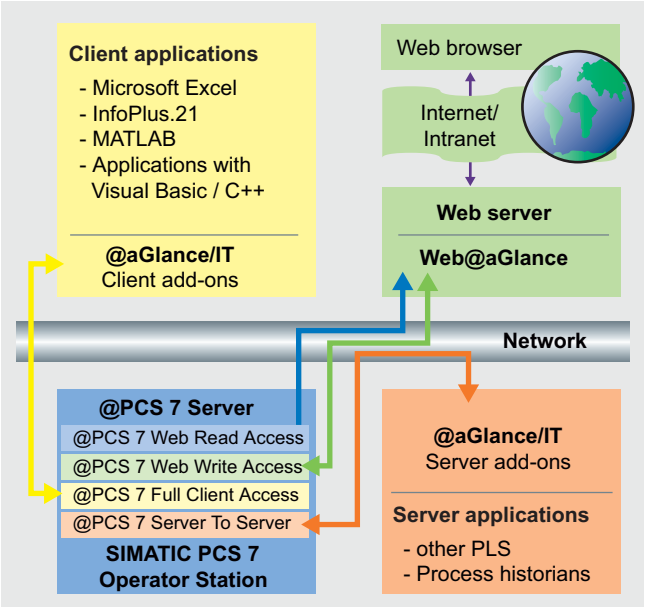
A further advantage of the open architecture of the client/server technology is the ability to select the operating systems or applications on the server or at the client end of the @aGlance/IT software package. This also means that the implementation of @aGlance is independent of any existing hardware and software architecture. Hence there is no dependence on specific suppliers or systems, including those that already exist in the company and may be introduced in the future. The costs of a possible change of system can be avoided.

Benefits

@PCS 7 offers the following benefits:

- @PCS 7 makes process data available to the operational management / company management levels on a client/server basis.
- @PCS 7 makes process data available throughout the company. The process data can be visualized, analyzed and processed further from each office desktop.
- @PCS 7 permits access to all data of the PCS 7 operator stations, e.g. to archived data.
- Any client/server application that has an @aGlance interface can be connected to @PCS 7.
- @PCS 7 is based on @aGlance technology; @aGlance has established itself as one of the de facto standards for interface software (Middleware) for Internet connections.
- Users can develop their own custom client/server applications based on the @aGlance product range.

Design



SIMATIC PCS 7 offers several different versions of @PCS 7:

- @PCS 7 Web Read Access
  is already integrated in the OS software and permits reading of OS data (process data, messages, archived data) over Internet/intranet
- @PCS 7 Web Write Access option package
  permits writing of OS data in addition to reading
- @PCS 7 Full Client Access option package
  enables communication with @aGlance/IT client applications, e.g. with the InfoPlus.21 information management system
- @PCS 7 Server To Server Communication option package
  enables communication with server applications of the @aGlance/IT server add-ons

Note:

- For @PCS 7 to be run with an OS single station, the software has to be installed on the computer in question. The clients of @PCS 7 can communicate with the server in both local and remote modes.
- @PCS 7 can be used together with WinCC outside the SIMATIC PCS 7 environment.
- If @PCS 7 is not installed on a SIMATIC PCS 7 operator station, WinCC is required in addition on the @PCS 7 computer.

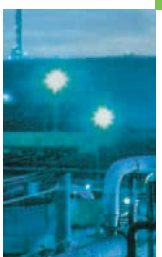
Selection and Ordering Data	Order No.
@PCS 7 Web Write Access Single license for 1 installation, 3 languages (German, English, French) Type of delivery: Certificate of license, authorization diskette, PCS 7 Toolset DVD V6.1 and additional CDs with Service Pack for Microsoft Windows 2000 (in 5 languages), Microsoft Internet Explorer and PC Anywhere	**6ES7 658-0DX06-0YA0**
@PCS 7 Full Client Access Single license for 1 installation, 3 languages (German, English, French) Type of delivery: Certificate of license, authorization diskette, PCS 7 Toolset DVD V6.1 and additional CDs with Service Pack for Microsoft Windows 2000 (in 5 languages), Microsoft Internet Explorer and PC Anywhere	**6ES7 658-0EX06-0YA0**

Selection and Ordering Data	Order No.
@PCS 7 Server to Server Communication Single license for 1 installation, 3 languages (German, English, French) Type of delivery: Certificate of license, authorization diskette, PCS 7 Toolset DVD V6.1 and additional CDs with Service Pack for Microsoft Windows 2000 (in 5 languages), Microsoft Internet Explorer and PC Anywhere	**6ES7 658-0FX06-0YA0**

Note:
The @PCS 7 products can be used with SIMATIC PCS 7 V6.0 and V6.1.

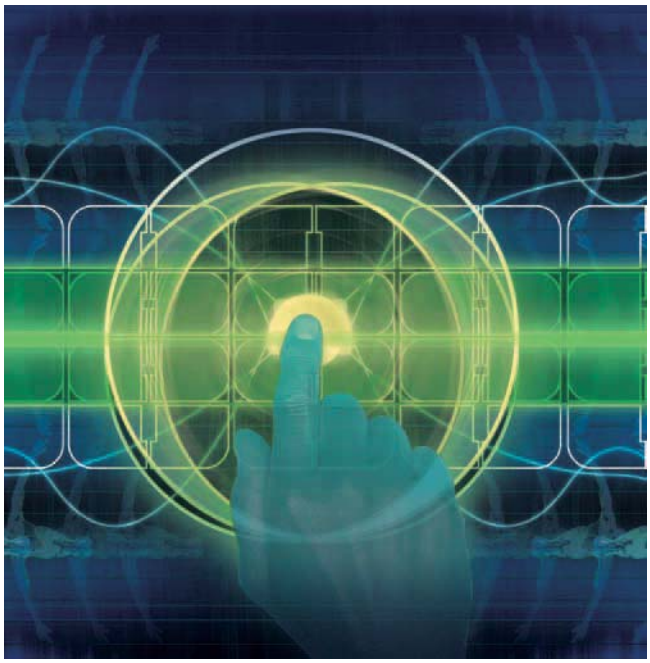
Communication

10



Introduction

Overview



The SIMATIC NET network components based on globally established standards provide SIMATIC PCS 7 with a powerful and rugged range of products for implementing totally integrated communications networks for reliable data exchange between all system components and levels of a plant.

The SIMATIC NET products specially developed for industrial applications are completely suitable for all types of plant in all industrial sectors. They are matched to one another and meet high standards, especially in areas where they are subject to extreme influences, such as

- interfering electromagnetic fields,
- corrosive liquids and atmospheres,
- explosion hazards,
- high mechanical loads.

The SIMATIC NET products guarantee expandability and safeguard investments through compatible further developments as well as uniformity from incoming goods to outgoing goods and from field devices up to the management information system.

Design

Incorporated in Totally Integrated Automation, the unique basis offered by Siemens for uniform automation of all sectors in the production, process or hybrid industries, the SIMATIC NET busses promote fast and reliable communication between the individual systems/applications of the SIMATIC PCS 7 process control systems such as:

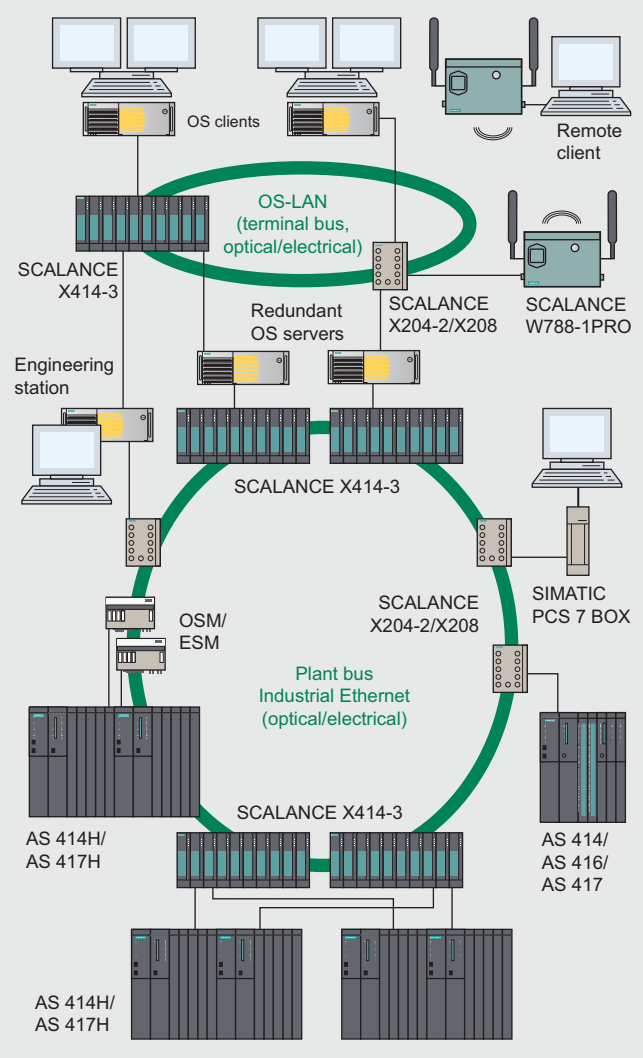
- automation systems, distributed I/Os and field components,
- asset management/engineering system and operator system,
- SIMATIC BATCH and SIMATIC Route Control, and
- process control via Internet/intranet and IT applications.

Industrial Ethernet is used as the plant bus as well as OS-LAN (terminal bus) for multi-user systems with client/server architecture. For small systems, the "Basic Communication Ethernet" integrated in the ES/OS/BATCH/IT basic devices permits operation of single stations and servers on the plant bus even without a communications processor.

In medium and large plants characterized by high requirements, SIMATIC PCS 7 applies modern Gigabit and FastEthernet technology which combines the high security provided by redundant optical rings with the scalable performance provided by switching technology and high transmission rates up to 1 Gbit/s.

PROFIBUS in the DP or PA version is used as the communications medium for interfacing intelligent distributed I/O devices, transmitters and actuators to the controller level. The rugged and reliable PROFIBUS is a universal, open fieldbus complying with the IEC 61158 and IEC 61784 international standards. In the PA version (which permits digital data transmission and power supply for the field devices on a two-wire cable), or with a series-connected isolating transformer (RS 485iS coupler), it can be routed intrinsically-safe into hazardous areas of Zone 1.

Overview



Industrial Ethernet, connection examples

The plant bus and the OS-LAN (terminal bus) for multi-user systems with client/server architecture are implemented with Industrial Ethernet, a powerful area and cell network for industrial applications in line with the international IEEE 802.3 standard (Ethernet). Bus structures with optical rings are particularly suitable for this because of their high noise immunity and high availability.

In medium-sized and large plants characterized by high requirements, SIMATIC PCS 7 applies modern Gigabit and FastEthernet technology. This combines the high reliability of optical rings with the scalable performance of switching technology and high transmission rates up to 1 Gbit/s.

Benefits

Ethernet currently has a market share of over 80% with a tendency to rise further, thus placing it in pole position in the global LAN landscape. Ethernet offers important characteristics that can give you significant advantages for your application:

- Fast commissioning through simple connections
- High flexibility since existing networks can be extended without any adverse effects
- High availability thanks to redundant network topologies
- Almost unlimited communications performance because scalable performance is available through switching technology if required
- Networking of different application areas such as office and production areas
- Investment protection through continuous and compatible further development
- Plant-wide clock system permits exact assignment of events within the complete plant

Ethernet technology for industrial environment

With Industrial Ethernet, SIMATIC NET expands the Ethernet technology by special components and capabilities for use in industrial environments:

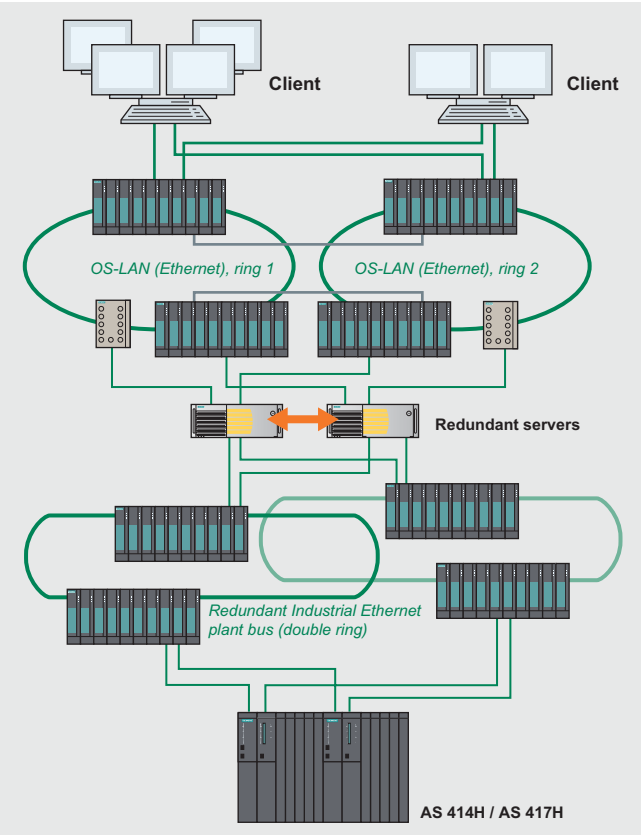
- Network components for tough industrial environments
- Fast local assembly using the FastConnect cabling system with RJ45 technology
- Failsafe networks with fast switchover to redundant system (≤ 300 ms)
- Continuous monitoring of network components through a simple yet effective signaling concept
- Future-oriented network components with the new SCALANCE X Ethernet product family

Introduction

Design

In the various SIMATIC PCS 7 subsystems (ES, OS, AS etc.), either interfaces integrated onboard, simple network cards or special communications processors (e.g. CP 1613) are used as communications interfaces. These are defined when selecting the respective components depending on the requirements (for further information, see "System connection for PCS 7 systems" at the end of this catalog section).

The nodes participating in communication are integrated into the bus using Industrial Ethernet switches. The modern Industrial Ethernet switches from the SCALANCE X product range are particularly recommendable for this, since they provide a scalable performance at an attractive price and support versatile configuration possibilities. Further alternatives result through the use of the proven ESM and OSM switches.



Example configuration of plant bus and OS LAN with two redundant rings

OS-LAN (terminal bus)

Client-server and server-server communication is carried out on a dedicated Ethernet LAN. The communications network referred to as OS LAN or terminal bus can be implemented using standard SIMATIC NET components such as switches, onboard interfaces, network cards, communications processors (CP), cables etc.

When designed with a ring topology, communication failures are avoided should e.g. the line be damaged or interrupted. To increase the availability even further, the OS-LAN can also be distributed redundantly between two rings which are connected together by 2 pairs of switches (see example configuration). Each of the redundant servers and clients can then be connected to both rings via two separate interfaces (redundant terminal bus adapter package). As standard, communication is over ring 1. Communication over ring 2 is only activated if a fault occurs on ring 1 which is relevant to the redundant switchover.

Industrial Ethernet plant bus

Automation systems (AS) communicate with each other and with the engineering system and the operator systems (servers/single stations) over the Industrial Ethernet plant bus. This can be designed analogous to the OS-LAN using standard SIMATIC NET components such as switches, network cards, communications processors (CP), cables etc. In the case of small plants with up to 8 standard automation systems per operator system, single stations and servers can be operated cost-effectively on the plant bus using "Basic Communication Ethernet" and FastEthernet network cards. The CP 1613 communications processor is always required if more than 8 standard automation systems or fault-tolerant automation systems are used.

When considering availability, ring structures are always the first choice for the plant bus. If particularly high availability demands exist, 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 simultaneous interruption in the bus cable on ring 2 can then also be tolerated. The two rings are physically separated from each other in such a configuration. The coupling partners are linked together logically when configuring with NetPro by using a fault-tolerant S7 connection (4-way redundancy). One SCALANCE X414-3 switch in each case takes over the function of the redundancy manager for each ring.

Note:
Detailed information on Industrial Ethernet and the network components can be found in the IK PI catalog, in the A&D Mall or in CA 01 at "Communication/Networks / SIMATIC NET communication systems".

Function

Decision aid for Industrial Ethernet switches

Different types of switches can be used for the Industrial Ethernet communication within the SIMATIC PCS 7 process control system. In addition to the OSM/ESM switches, these are currently the SCALANCE X414-3E and X208 and X204-2 switches of the SCALANCE X product ranges X-400 and X-200. To support you in your selection, the following list presents the advantages of the various switch ranges.

SCALANCE X-400

- 1-Gbit ports (either 2 x optical or 2 x electrical)
- Modularity (retrofitting of optical ports, expansion by 8 further ports)
- Support of office standards such as virtual LANs incl. priority assignment (port-based VLANs), Rapid Spanning Tree (RSTP), Simple Network Management Protocol (SNMP) or IP Multicast filtering (e.g. for video applications) permits integration of automation networks into company networks
- Router functionality (connection of two subnetworks)
- Standby functionality (redundant connection between two rings)
- Many ports at one central position in the control cabinet
- Electrical 100-Mbit ports with collar for FastConnect cabling system
- C-PLUG swap medium for simple replacement of devices in event of fault
- Redundancy manager for the ring
- Digital inputs
- Configuration of MAC address filters
- Slot numbering and labeling strips

SCALANCE X-200

- Variable assembly (DIN rail, SIMATIC rail, horizontal and vertical wall mounting)
- Max. 8 ports in IP30
- Electrical ports with collar for FastConnect cabling system
- Operation of SCALANCE X208 in temperature range from -20 to +70 °C
- Optional: C-PLUG swap medium for simple replacement of devices in event of fault

OSM/ESM

- Standby between two rings
- Redundancy manager for the ring
- Digital inputs
- Configuration of MAC address filters

Technical specifications

Plant bus / OS-LAN	**Industrial Ethernet**
Number of stations	1,023 per network segment (IEEE 802.3 standard)
Number of switches	Up to 50
Length of the network	
• Local network	Electrical: up to approx. 5 km Optical: up to approx. 150 km
• WAN	Worldwide with TCP/IP
Topology	Line, tree, ring, star

SCALANCE X Industrial Ethernet switches

Overview

Switches are active network components that specifically distribute data to the relevant addressees. SCALANCE X is the new range of Industrial Ethernet switches from SIMATIC NET. The SCALANCE X family comprises product lines that complement each other and are carefully tuned to the specific automation task.

Application

The following products from the SCALANCE X-400 and X-200 ranges are used with SIMATIC PCS 7:

- SCALANCE X414-3E with two Gigabit-Ethernet ports for design of plant bus and OS-LAN (terminal bus) with redundant, optical Gigabit ring technology; permits maximum communications performance, especially with very large plants with comprehensive quantity frameworks and wide communication networks
- SCALANCE X208 with 8 ports for transmission rates up to 100 Mbit/s, suitable for electrical Industrial Ethernet structures with linear, star or ring topology (ring together with OSM/ESM or SCALANCE X-400)
- SCALANCE X204-2 with 2 optical and 4 electrical ports for transmission rates up to 100 Mbit/s, suitable for optical Industrial Ethernet structures with linear or ring topology (ring together with OSM/ESM or SCALANCE X-400)

Design

Product properties

Features	X414-3E	X208	X204-2
Compact housing		•	•
2 x 24 V DC	•	•	•
LED diagnostics	•	•	•
Signaling contact	•	•	•
SIMATIC environment	•	•	•
Diagnostics: Web, SNMP, RMON	•	•	•
PROFINET diagnostics		•	•
Ring redundancy without RM	•	•	•
C-PLUG	•	•	•
Ring redundancy with RM	•		
Local display (mode button)	•		
Gigabit technology	•		
Modular design	•		
Digital inputs	8		
Office features (VLAN, RSTP, IGMP, ...)	•		

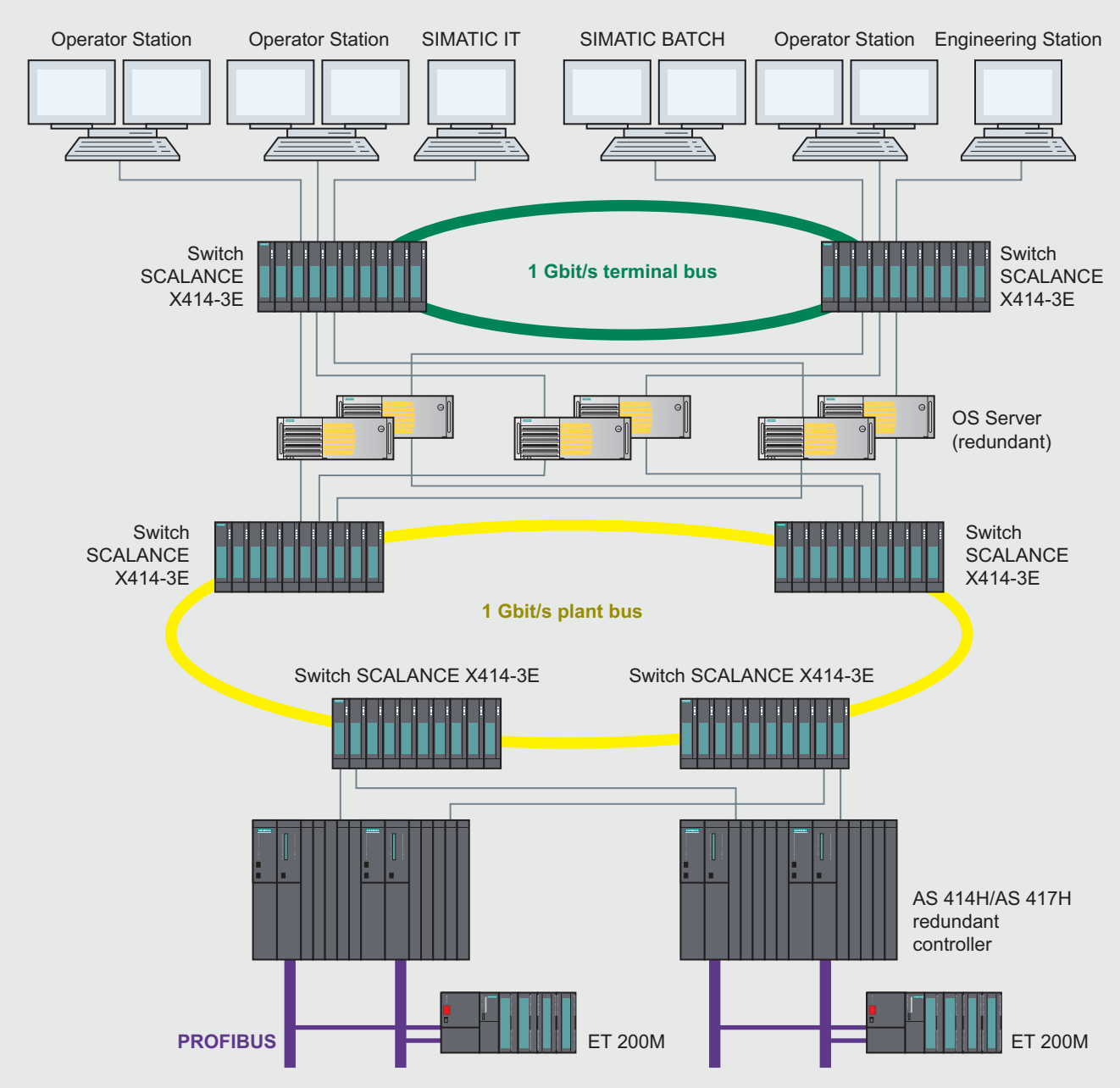
Interface overview

Module type	Type and number of ports			
	Gigabit Ethernet 1.000 Mbit/s		*Fast Ethernet 100 Mbit/s*	
	Electrical (TP) RJ45 socket	Optical (FOC) SC sockets	Electrical (TP) RJ45 socket	Optical (FOC) ST sockets (BFOC connection)
X414-3E (optical or electrical ports in each case as alternatives)	2	2 (multimode or singlemode)	12 / 20[1]	4[2] / 12[3] (multimode or singlemode)
X208	–	–	8	–
X204-2 (optical and electrical ports additive)	–	–	4	2 (multimode)

[1] With additional EM495-8 extender module

[2] 2 additive plug-on media modules

[3] With EM496-4 extender module and 4 plug-on media modules additive to 2)



Example of use of SCALANCE X414-3E switches in the SIMATIC PCS 7 process control system

SCALANCE X Industrial Ethernet switches

SCALANCE X414-3E

- Modular switch with IP20 degree of protection for installation in control cabinets, can be combined with media modules and extenders
- Mounting options: SIMATIC S7-300 rail or 35 mm DIN rail
- Redundant 24 V DC supply
- 10/100/1,000 Mbit/s technology for various transmission media (8-core electrical, twisted pair or fiber-optic, multi/single-mode)
- Two integral Gigabit Ethernet twisted pair interfaces (10/100/1,000 Mbit/s) for connecting several switches together
- Node connection via 12 Fast Ethernet twisted ports (10/100 Mbit/s) integrated in the switch.
- Connection of a further 8 twisted pair nodes is possible via an 8-port Fast Ethernet extender (attached to right of switch)
- Max. cable lengths between two modules with communication via twisted pair cable (for cables, refer to section on passive network components):
  - Up to 100 m via 10/100BaseTX (10/100 Mbit/s) or 1000BaseTX ports (1,000 Mbit/s)
- Implementation of optical Gigabit rings with 2-port Gigabit Ethernet media module for converting the two integral Gigabit Ethernet ports to fiber-optic cables (FOC):
  - Module versions for multi-mode (1000BaseSX ports for FOC length up to 750 m) and
  - single-mode (FOC length up to 10 km, see Catalog IK PI)
- Integration in optical 100 Mbit/s rings with SCALANCE X204-2 or OSM optical switch module via a plug-in 2-port Fast Ethernet media module for multi-mode FOC (up to 3 km long) or single-mode FOC as alternative (up to 26 km long)
- Optical interfacing of remote nodes via a second plug-in 2-port FOC media module for Fast Ethernet
- Upgrading to max. 8 further optical Fast Ethernet ports using a module extender and media modules
- Max. cable lengths between two modules with communication via multi-mode fiber-optic cable (for cables, refer to section on passive network components):
  - Up to 3,000 m via 100BaseFX ports (100 Mbit/s)
  - Up to 750 m via 1000BaseSX ports (1,000 Mbit/s)
- Hot swapping of media modules and extenders
- Detection of failure of a transmission link or a switch in the ring, and activation of replacement link within 0.3 s (also in large networks):
  - for Gigabit Ethernet (SCALANCE X-400 switches in the ring) just as
  - for Fast Ethernet (SCALANCE X-400 switches in the ring in combination with SCALANCE X-200 or OSM/ESM)
- Standby functionality for the redundant connection of two rings
- Slot numbering and labeling strips for unambiguous identification of port.

SCALANCE X208 and X204-2

The X208 and X204-2 switches of the SCALANCE X-200 range permit the implementation of low-cost electrical and optical ring structures with transmission rates up to 100 Mbit/s. A SCALANCE X414-3E or ESM (electrical) / OSM (optical) switch is then additionally required as redundancy manager. The redundancy manager monitors the SCALANCE X-200 switches connected via its ring ports. It recognizes the failure of a transmission link or a switch in the ring and activates the standby link within 0.3 seconds.

Features of the X208 and X204-2 switches:

- Rugged metal housing with S7-300 format, IP30 degree of protection, for installation in control cabinets
- Redundant 24 V DC supply
- Mounting options: DIN rail, SIMATIC S7-300 rail, direct wall mounting
- Cable length between two devices with electrical transmission system via TP ports 10/100BaseTX with RJ45 sockets:
  - Depending on cable type, up to 100 m with IE FC cable and IE FC RJ45 plugs (see section on passive network components in this catalog or in Catalog IK PI)
  - Up to 10 m with TP-cord (see section on passive network components in Catalog IK PI)
- Cable length of a segment with optical transmission via 100BaseFX ports with BFOC socket (corresponds to ST socket):
  - Up to 3 km with Industrial Ethernet glass fiber-optic cable (see section on passive network components in this catalog or in Catalog IK PI)

SCALANCE X208

- Suitable for operating temperatures from –20 to +70 °C
- Can be used to design electrical Industrial Ethernet networks with linear, star or ring topology with transmission rate of 10/100 Mbit/s.
- 8 electrical TP ports 10/100BaseTX with RJ45 socket, MDI-X assignments (Medium Dependent Interface Autocrossover), for connecting terminal equipment or further network segments.

SCALANCE X204-2

- Suitable for operating temperatures from 0 to +60°C
- Can be used to design optical Industrial Ethernet networks with linear or ring topology with transmission rate of 100 Mbit/s.
- 2 optical ports 100BaseFX with BFOC interface (ST socket) and 4 electrical TP ports 10/100BaseTX with RJ45 socket, MDI-X assignments (Medium Dependent Interface Autocrossover), for connecting terminal equipment or further network segments

Technical specifications

Type	SCALANCE X414-3E	SCALANCE X204-2	SCALANCE X208
Data transfer rate	10/100/1000 Mbit/s	10/100 Mbit/s	10/100 Mbit/s
Interface variants			
• Electrical (see additional table with summary of interfaces)	RJ45 socket (10/100/1000 Mbit/s; TP)	RJ45 socket (10/100 Mbit/s; TP)	RJ45 socket (10/100 Mbit/s; TP)
• Optical (see additional table with summary of interfaces)	BFOC sockets (100 Mbit/s; ST); SC sockets (1000 Mbit/s)	BFOC sockets (100 Mbit/s)	–
• Connection for supply voltage	1 x 4-pole terminal block	1 x 4-pole terminal block	1 x 4-pole terminal block
• Connector for signaling contact	–	1 x 2-pole terminal block	1 x 2-pole terminal block
Power supply	24 V DC (18 to 32 V)	2 x 24 V DC (18 to 32 V)	2 x 24 V DC (18 to 32 V)
Current consumption	< 2000 mA	215 mA	185 mA
Power loss at 24 V DC	15 W (without media and extender modules), < 48 W (maximum configuration)	5.16 W	4.4 W
Network size parameters / TP cable length			
• 0 ... 85 m	–	IE FC marine/trailing/flexible cable with IE FC RJ45 plug 180	IE FC marine/trailing/flexible cable with IE FC RJ45 plug 180
		IE FC marine/trailing/flexible cable (0 - 75 m) + 10 m TP cord	IE FC marine/trailing/flexible cable (0 - 75 m) + 10 m TP cord
• 0 ... 100 m	IE FC standard cable	IE FC standard cable with IE FC RJ45 plug 180	IE FC standard cable with IE FC RJ45 plug 180
		IE FC outlet RJ45 with IE FC standard cable (0 - 90 m) + 10 m TP cord	IE FC outlet RJ45 with IE FC standard cable (0 - 90 m) + 10 m TP cord
• 0 ... 750 m	Cable lengths for multimode fiber-optic cable at 1000 Mbit/s; MM492-2 with glass FOC 50/125 µm; ≤ 2.7 dB/km at 850 nm; ≥ 600 MHz x km	–	–

SCALANCE X Industrial Ethernet switches

Type	SCALANCE X414-3E	SCALANCE X204-2	SCALANCE X208
• 0 ... 3000 m	Cable lengths for multimode fiber-optic cable at 100 Mbit/s; MM491-2 with glass FOC 62.5/125 µm or 50/125 µm; ≤ 1 dB/km at 1300 nm; ≥ 600 MHz x km	Glass fiber-optic cable 62.5/125 µm or 50/125 µm; ≤ 1.0 dB/km at 1300 nm; ≥ 600 MHz x km	–
• 0 ... 10 km	Cable lengths for single-mode fiber-optic cable at 1000 Mbit/s; MM492-2 LD with glass FOC 10/125 µm or 9/125 µm; ≤ 0.5 dB/km at 1300 nm	–	–
• 0 ... 26 km	Cable lengths for single-mode fiber-optic cable at 100 Mbit/s; MM491-2 with glass FOC 10/125 µm or 9/125 µm; ≤ 0.5 dB/km at 1300 nm	–	–
Perm. ambient conditions			
• Operating temperature	0 ... +60 °C	-10 ... +60 °C	-20 ... +70 °C
• Transport/storage temperature	-40 ... +80°C	-40 ... +80°C	-40 ... +80°C
• Relative humidity during operation	< 95% (non-condensing)	< 95%, non-condensing	< 95%, non-condensing
Design			
• Dimensions (W x H x D) in mm	344 x 145 x 112	60 x 125 x 124	60 x 125 x 124
• Weight	3.4 kg	780 g	780 g
• Mounting	S7-300 rail, DIN rail	Standard rail, S7-300 rail, wall mounting	Standard rail, S7-300 rail, wall mounting
Degree of protection	IP20	IP30	IP30
Approvals			
• RF interference level	EN 50081-2 Class A	EN 50081-2 Class A	EN 50081-2 Class A
• Immunity to interference	EN 61000-6-2: 2001	EN 50082-2	EN 50082-2
• cULus listing	UL 60950, CSA C22.2 No. 60950, UL 508, CSA C22.2 No. 14-M91 UL 1604 and 2279 (hazard-ous location)	UL 60950-1, CSA C22.2 No. 60950-1	UL 60950-1, CSA C22.2 No. 60950-1
• FM	FM 3611, FM hazardous location	FM 3611	FM 3611
• ATEX Zone 2	EN 50021	EN 50021	EN 50021
• C-Tick	AS/NZS 2064 (Class A)	AS/NZS 2064 (Class A)	AS/NZS 2064 (Class A)
• CE	EN 50081-2, EN 50082-2	EN 50081-2, EN 50082-2	EN 50081-2, EN 50082-2

Selection and Ordering Data — Order No.

Industrial Ethernet switch, transmission rate 10/100/1000 Mbit/s
Especially for Fast Ethernet and Gigabit rings

SCALANCE X414-3E Industrial Ethernet switch Modular Industrial Ethernet switch for designing electrical and/or optical Industrial Ethernet networks; with integral TP ports (2 x 1 Gbit/s and 12 x 100 Mbit/s), media module slots (1 x 1 Gbit/s, 2 x 100 Mbit/s) and extender interface	**6GK5 414-3FC00-2AA2**	E)
MM492-2 media module with 2 ports 1000BaseSX, 1 Gbit/s, multi-mode fiber-optic cable up to 750 m, SC connection	**6GK5 492-2AL00-8AA2**	B)
MM492-2LD media module with 2 ports 1000BaseLX, 1 Gbit/s, single-mode fiber-optic cable up to 10 km, SC connection	**6GK5 492-2AM00-8AA2**	E)
MM491-2 media module with 2 ports 100BaseFX, 100 Mbit/s, multi-mode fiber-optic cable up to 3 km, BFOC connection (ST sockets)	**6GK5 491-2AB00-8AA2**	E)
MM491-2LD media module with 2 ports 100BaseFX, long distance, 100 Mbit/s, single-mode fiber-optic cable up to 26 km, BFOC connection (ST sockets)	**6GK5 491-2AC00-8AA2**	E)
EM495-8 extender module for SCALANCE X414-3E with 8 x 10/100 Mbit/s TP ports	**6GK5 495-8BA00-8AA2**	E)
EM496-4 extender module for SCALANCE X414-3E with 4 slots for 100 Mbit/s media modules	**6GK5 496-4MA00-8AA2**	E)

Selection and Ordering Data — Order No.

Industrial Ethernet switch, transmission rate 10/100 Mbit/s
for electrical Industrial Ethernet line, star or ring topologies

SCALANCE X208 Industrial Ethernet switch with 8 RJ45 ports	**6GK5 208-0BA00-2AA3**	E)
SCALANCE X204-2 Industrial Ethernet switch with 4 RJ45 ports and 2 ports 100BaseFX, BFOC connection	**6GK5 204-2BB00-2AA3**	E)
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	**6GK1 900-0AB00**	B)

B) Subject to export regulations: AL: N, ECCN: EAR99H
E) Subject to export regulations: AL: N, ECCN: 5A991

Note:
For further components and accessories for the SCALANCE X switches, see Catalog IK PI.

OSM/ESM/OMC Industrial Ethernet switches

Overview

The Industrial Ethernet OSM and ESM switches are used to construct Industrial Ethernet networks at the control level:

- The modules are interconnected (backbone) at 100 Mbit/s over
  - Glass fiber-optic cables (FO) for OSM
  - Twisted pair cables for ESM
- Connection of data terminals or network segments depending on the OSM/ESM type through
  - 2 to 8 twisted pair ports 10/100BaseTX in RJ45 or 9-pole Sub-D design for 10/100 Mbit/s
  - 3 or 8 FO ports 100BaseFX with BFOC interface (ST socket) for 100 Mbit/s
- Integral redundancy manager supports high-speed media redundancy also for large networks
- Very easy network configuration and extension without complex configuration rules or parameterization

Application

Industrial Ethernet OSM and ESM

The Industrial Ethernet OSM (Optical Switch Module) and ESM (Electrical Switch Module) are used in the construction of switched networks with data transmission rates of 100 Mbit/s in the control level range, in which strict demands are placed on network availability and comprehensive diagnostics are required.

In existing networks, load decoupling and thus increased network performance can be achieved by creating segments (dividing a network into subnetworks/segments) and connecting these segments to an OSM/ESM.

The redundancy manager integrated into OSM/ESM allows redundant Industrial Ethernet rings to be constructed in switching technology with high-speed media redundancy (reconfiguration time 0.3 seconds max.).

The transmission rate in the ring is 100 Mbit/s; for each ring, up to 50 Industrial Ethernet OSMs (optical ring) or ESMs (electrical ring) can be used. Apart from the 2 ring ports, OSM/ESM has other ports (with either RJ45, ITP or BFOC interfaces) to which data terminals or network segments can be connected.

Selection support for the various product versions of OSM is provided by the table in the section "Technical specifications".

Optical Media Converter (OMC)

The Optical Media Converters (OMC) convert an electrical twisted pair interface into an optical interface. It is thus possible to connect a station with RJ45-TP interface to one of the 8 optical ports of an OSM BC08.

Technical specifications

Selection support for product versions of OSM and ESM

	Type and number of ports				Preferentially for use		
	RJ45 (TP)	Sub-D (ITP)	Multi-mode-LWL	Single-mode-LWL	with high EMC loading	for plant bus	for terminal bus (OS-LAN)
OSM TP22	2	–	2	–	● 1)	●	●
OSM ITP62 (standard)	–	6	2	–	●	●	●
OSM TP62	6	–	2	–		●	●
OSM ITP62-LD	–	6	–	2	●	●	●
OSM ITP53	–	5	3	–	●	● 2)	● 2)
OSM BC08	–	---	8	–	● 3)	● 3)	● 3)
OMC TP11	1	---	1	–	● 4)	● 4)	● 4)
ESM ITP80	–	8	–	–	●	● 5)	●
ESM TP40	4	–	–	–		● 6)	●
ESM TP80	8	–	–	–		● 6)	●

1) TP cable preferably inside a control cabinet

2) For cross-building connection of Fast Ethernet networks with OSM

3) For design of an optical network, where TP cables are preferably only used inside control cabinets

4) Connects a station with RJ45-TP interface to one of the 8 optical ports of an OSM BC08

5) Inside buildings

6) Inside switchrooms

Selection and Ordering Data	Order No.
Industrial Ethernet OSM TP22 Optical switch module with 2 fiber optic ports 100 Mbit/s, 2 RJ45 ports 10/100 Mbit/s and 4 digital inputs; redundant 24 V DC supply and signal contact; with network management	**6GK1 105-2AE00**
Industrial Ethernet OSM ITP62 Optical switch module with 2 fiber optic ports 100 Mbit/s, 6 ITP ports 10/100 Mbit/s and 8 digital inputs; redundant 24 V DC supply and signal contact; with network management	**6GK1 105-2AA10**
Industrial Ethernet OSM TP62 Optical switch module with 2 fiber optic ports 100 Mbit/s, 6 RJ45 ports 10/100 Mbit/s and 8 digital inputs; redundant 24 V DC supply and signal contact; with network management	**6GK1 105-2AB10**
Industrial Ethernet OSM ITP62-LD Optical switch module with 2 fiber optic ports 100 Mbit/s long distance (single-mode fiber optic cable up to 26 km), 6 ITP ports 10/100 Mbit/s and 8 digital inputs; redundant 24 V DC supply and signal contact; with network management	**6GK1 105-2AC10**
Industrial Ethernet OSM ITP53 Optical switch module with 3 fiber optic ports 100 Mbit/s, 5 ITP ports 10/100 Mbit/s and 8 digital inputs; redundant 24 V DC supply and signal contact; with network management, for cross-building connection of two Fast Ethernet networks with OSM	**6GK1 105-2AD10**

Selection and Ordering Data	Order No.
Industrial Ethernet ESM TP40 Electrical switch module with 4 RJ45 ports 10/100 Mbit/s and 4 digital inputs; redundant 24 V DC supply and signal contact with network management, preferably for OS-LAN	**6GK1 105-3AC00**
Industrial Ethernet ESM ITP80 Electrical switch module with 8 ITP ports 10/100 Mbit/s and 8 digital inputs; redundant 24 V DC supply and signal contact; with network management, preferably for OS-LAN	**6GK1 105-3AA10**
Industrial Ethernet ESM TP80 Electrical switch module with 8 RJ45 ports 10/100 Mbit/s and 8 digital inputs; redundant 24 V DC supply and signal contact with network management, preferably for OS-LAN	**6GK1 105-3AB10**
Industrial Ethernet OSM BC08 Optical switch module with 8 fiber optic ports 100 Mbit/s and 8 digital inputs; redundant 24 V DC supply and signal contact; with network management	**6GK1 105-4AA00**
Industrial Ethernet OMC TP11 Optical media converter RJ45 on multimode fiber optic cable (BFOC) with 100 Mbit/s up to 3 km; redundant 24 V DC supply and signal contact	**6GK1 100-2AB00**

FastConnect

Overview

Industrial Ethernet FastConnect (IE FC) is a fast assembly system with insulation displacement for easy assembly and wiring of 4-core and 8-core IE FC cables. Using the FC Stripping Tool it is possible to remove the outer casing and the woven shield of the IE FC cable accurately in a single step. The cable prepared in this manner is subsequently assembled on the contacts of the connection element.

Application

Connection elements

The connection 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 90/180 (10/100 Mbit/s) in association with 4-core (2 x 2) IE FC cables
- IE FC Outlet RJ45 (10/100 Mbit/s) in association with 4-core (2 x 2) IE FC cables
- IE FC RJ45 Modular Outlet (10/100/1000 Mbit/s) with 8-core (4 x 2) IE FC cables

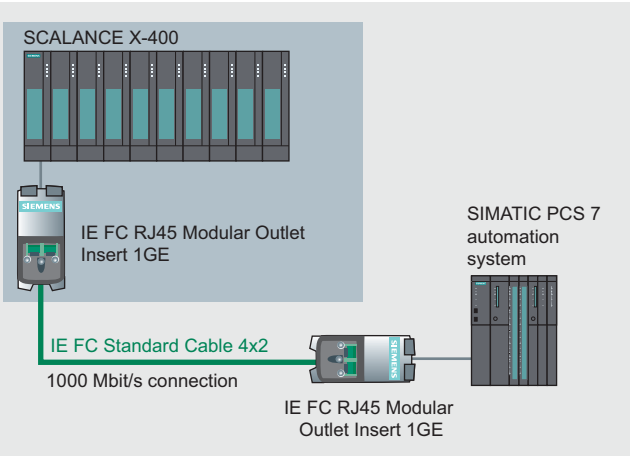
The following table provides an overview of the available switches, the transmission rates they support, and the IE FC standard cables and IE FC connection elements which can be used. In addition to the IE FC standard cables, Catalog IK PI offers further IE FC cables with special properties.

Switches	**X414-3E, X208, X204-2, ESM**		**X414-3E**
Port type	10/100BaseTX		1000BaseTX
Data transfer rate	10/100 Mbit/s		1,000 Mbit/s
Max. cable length	100 m		100 m
Cable type	IE FC Standard Cable 2 x 2	IE FC Standard Cable 4 x 2	IE FC Standard Cable 4 x 2
Connection elements	IE FC RJ45 Plug 90/180, alternative: IE FC Outlet RJ45 + TP Cord	IE FC RJ45 Modular Outlet with insert 2FE + TP Cord	IE FC RJ45 Modular Outlet with insert 1GE + TP Cord

IE FC RJ45 Plugs

The IE FC RJ45 Plugs are the ideal solution for communication links with a transmission rate up to 100 Mbit/s. They permit simple, fast and direct assembly of the 4-core (2 x 2) twisted pair (TP) FastConnect installation cables in the field (without patch technology) up to a cable length of 100 m. Since the IE FC RJ45 Plugs have no parts which can be lost, assembly is also possible under difficult conditions.

IE FC Outlet RJ45 and IE FC RJ45 Modular Outlet



Alternatives for conversion from RJ45 to the insulation displacement system are the

- IE FC Outlet RJ45 for 4-core TP (2 x 2) IE FC cables and transmission rates up to 100 Mbit/s and
- IE FC RJ45 Modular Outlet for 8-core TP (4 x 2) IE FC cables and transmission rates up to 1,000 Mbit/s.

The latter has the advantage that the existing wiring can still be used if the communication is converted from 100 Mbit/s to 1,000 Mbit/s. It is only necessary to replace the 2FE insert by one of type 1GE. In contrast to the plugs, an RJ45 patch cable (TP Cord) is additionally required for each outlet which connects this to the network components or data terminal.

Detailed information on the FastConnect Outlets and the available TP Cords can be found in Catalog IK PI, Section "Industrial Ethernet", and in the A&D Mall, or in CA 01 under "Communication/networks / SIMATIC NET communication systems".

Further information on network structures is provided in the manual for TP and fiber-optic networks.

Design

IE FC RJ45 plug with 90° outgoing cable (left) and with 180° outgoing cable (right)

Industrial Ethernet FastConnect RJ45 Plugs are available in two versions:

- with 180° (straight) outgoing cable,
- with 90° (angled) cable outlet.

They are used for optimized connection of Industrial Ethernet FastConnect cables to data terminals and network components. The plugs have a rugged, industry-compatible metal housing that provides optimum protection against faults in data communication. The 4 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.

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 and an interface for the replaceable insert, e.g.:

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

Selection and Ordering Data

	Order No.
Industrial Ethernet FC Standard Cable GP 2 x 2 For universal use, for connection to IE FC Outlet RJ45 or IE FC RJ45, 4-core (2 x 2), shielded	
• Cut-to-length; max. delivery length 1,000 m, minimum ordering length 20 m	**6XV1 840-2AH10**
• Preferred length 1,000 m	**6XV1 840-2AU10**

Selection and Ordering Data

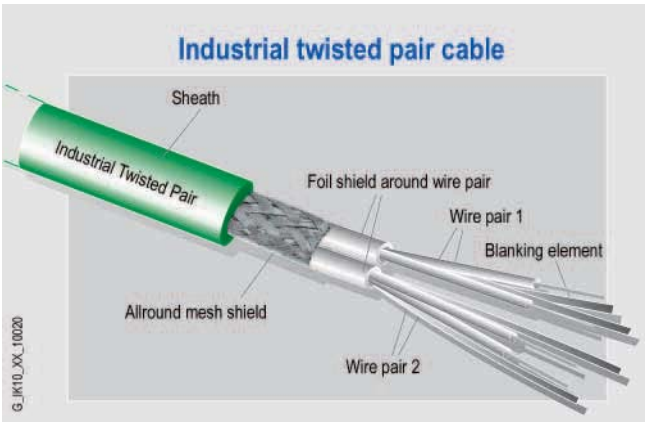
	Order No.
Industrial Ethernet FC Standard Cable GP 4 x 2 For universal use, for connection to IE FC Modular Outlet RJ45, 8-core (4 x 2), shielded	
• Cut-to-length; max. delivery length 1,000 m, minimum ordering length 20 m	**6XV1 870-2E**
Industrial Ethernet FC Stripping Tool Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables	**6GK1 901-1GA00**
Industrial Ethernet FC Blade Cassettes Spare blade cassettes for the FC stripping tool, 5 cassettes	**6GK1 901-1GB00**
IE FC RJ45 Plug 180 RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1 901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1 901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1 901-1BB10-2AE0**
Industrial Ethernet FC RJ45 Plug 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	**6GK1 901-1BB20-2AA0**
• 1 pack = 10 units	**6GK1 901-1BB20-2AB0**
• 1 pack = 50 units	**6GK1 901-1BB20-2AE0**
Industrial Ethernet FC Outlet RJ45	**6GK1 901-1FC00-0AA0**
IE FC RJ45 Modular Outlet with Insert 1GE FastConnect RJ45 Outlet for Industrial Ethernet with a replaceable insert for 1 x 1,000 Mbit/s interface	**6GK1 901-1BE00-0AA2**
IE FC RJ45 Modular Outlet with Insert 2FE FastConnect RJ45 Outlet for Industrial Ethernet with a replaceable insert for 2 x 100 Mbit/s interface	**6GK1 901-1BE00-0AA1**
For further IE FC RJ45 Modular Outlet versions and replaceable inserts, see Catalog IK PI	
Documentation	
Manual for TP and fiber-optic networks Network architecture, components, configurations, installation	
• German	**6GK1 970-1BA10-0AA0**
• English	**6GK1 970-1BA10-0AA1**

10

ITP cables and connectors

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 stations and network components. Line lengths of up to 100 m can be achieved while saving on patch technology.

The *ITP standard cable 9/15* is equipped with a 9-pin and a 15-pin connector. The cable is used for direct connection of terminals with ITP interface to Industrial Ethernet components with ITP interface.

The *ITP XP standard cable 9/9* is equipped with two 9-pin connectors. This cable is crossed for direct connection of two Industrial Ethernet network components with ITP interface.

The *ITP XP standard cable 15/15* is equipped with two 15-pin connectors. This cable is crossed for direct connection of two terminals with ITP interface.

The Industrial Ethernet *ITP connectors* have Sub-D connectors made of metal and are available in two versions:

- 9-pin plug with straight cable outlet, for connection to OSM/ESM, OLM or ELM
- 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 TP cord cables can be found in the IK PI catalog, in the A&D Mall or in CA 01 at "Communication/Networks / SIMATIC NET communication systems".

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Selection and Ordering Data

	Order No.
ITP Standard Cable for Industrial Ethernet Not preassembled, cut-to-length	
2 x 2-core, without connectors For connection of a terminal; for self-assembly of connectors or for the connection between patch panel and socket	**6XV1 850-0AH10**
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	**6XV1 850-0BH20**
• 5 m	**6XV1 850-0BH50**
• 8 m	**6XV1 850-0BH80**
• 12 m	**6XV1 850-0BN12**
• 15 m	**6XV1 850-0BN15**
• 20 m	**6XV1 850-0BN20**
• 30 m	**6XV1 850-0BN30**
• 40 m	**6XV1 850-0BN40**
• 50 m	**6XV1 850-0BN50**
• 60 m	**6XV1 850-0BN60**
• 70 m	**6XV1 850-0BN70**
• 80 m	**6XV1 850-0BN80**
• 90 m	**6XV1 850-0BN88**
• 100 m	**6XV1 850-0BT10**
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	**6XV1 850-0CH20**
• 5 m	**6XV1 850-0CH50**
• 8 m	**6XV1 850-0CH80**
• 12 m	**6XV1 850-0CN12**
• 15 m	**6XV1 850-0CN15**
• 20 m	**6XV1 850-0CN20**
• 30 m	**6XV1 850-0CN30**
• 40 m	**6XV1 850-0CN40**
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	**6XV1 850-0DH20**
• 6 m	**6XV1 850-0DH60**
• 10 m	**6XV1 850-0DN10**
ITP Connector for Industrial Ethernet	
• 9-pin, for connection to OSM/ESM, OLM or ELM	**6GK1 901-0CA00-0AA0**
• 15-pin, for connection to terminals with ITP interface	**6GK1 901-0CA01-0AA0**

Overview

Optical transmission media

Glass fiber-optic cables are preferably used as the optical transmission medium. The two types of cable offered are suitable for above-ground routing indoors or outdoors. They are available in fixed lengths, precut/preassembled with 2 x 2 BFOC connectors (FIBER OPTIC standard cable) or 2 x 2 SC-connectors (FO Standard Cable).

The FO Standard Cable with 2 x 2 SC connectors is required for optical networks in the Gigabit range, e.g. for implementing optical Gigabit Ethernet rings with SCALANCE X414-3E and MM492-2 media modules.

Technical specifications

Switches	X414-3E + MM492-2	X414-3E + MM491-2, X204-2, OSM
Port type	1000BaseSX	100BaseFX
Data transfer rate	1,000 Mbit/s	10/100 Mbit/s
Max. cable length	750 m	3,000 m
Cable type	FO Standard Cable	FIBER OPTIC standard cable
FO multi-mode fiber type	50/125 µm	62.5/125 µm
Connector type	2 x 2 SC	2 x 2 BFOC (ST)

Cable type	FO Standard Cable	FIBER OPTIC standard cable
Applications	Universal cable for installation indoors and outdoors	
Delivery format	Cut-to-length; pre-assembled with 4 BFOC(ST) or 4 SC connectors	Cut-to-length, pre-assembled with 4 BFOC connectors (ST)
Cable type (standard designation)	AT-W(ZN)YY 2x1G50/125	AT-VYY 2G62,5/125 3.1B200 + 0.8F600 F
Fiber type	Multi-mode gradient fiber 50/125 mm	Multi-mode gradient fiber 62.5/125 mm
Damping		
• At 850 nm	≤ 2.7 dB/km	≤ 3.1 dB/km
• At 1300 nm	≤ 0.7 dB/km	≤ 0.8 dB/km
Modal bandwidth		
• At 850 nm	≥ 600 MHz × km	≥ 200 MHz × km
• At 1300 nm	≥ 1200 MHz × km	≥ 600 MHz × km
Number of fibers	2	2
Cable design	Segmentable	Segmentable outer conductor
Core type	Hollow core, filled	Compact core
Materials		
• Basic element	PVC, orange/black	PVC, gray
• Strain relief	Aramide fibers	Kevlar fiber and impregnated glass fiber
• Outer sheath/color of cable	PVC, green	PVC, black
Mechanical-characteristics		
• Dimensions of basic element	2.9 mm diam.	(3.5 ± 0.2) mm diam.
• Cable dimensions	4.5 x 7.4 mm	(6.3 × 9.8) ± 0.4 mm
• Cable weight	Approx. 40 kg/km	Approx. 74 kg/km
• Permissible tensile force	≤ 500 N	≤ 500 N (temporary)
• Bend radius	70 mm	≥ 100 mm only on the flat side
• Resistance to lateral force	300 N/cm	–
Perm. ambient conditions		
• Routing and installation temperature	-5 ... +50 °C	-5 ... +50 °C
• Operating temperature	-25 ... +80 °C	-20 ... +60 °C
• Storage temperature	-25 ... +80 °C	-25 ... +70 °C
Behavior in fire	–	Flame-retardant to IEC 60332-3 and VDE 0482-266-2-4
Silicone-free	Yes	Yes
Resistance to mineral oils and grease	Partially resistant	–
UL/CSA approvals	OFNG, UL1651 FT4/IEEE1202	–
UV-resistant	Yes	–
Rodent protection	–	Yes
Gigabit length		
• 1000BaseSX	750 m	–
• 1000BaseLX	2,000 m	–

Fiber-optic cable

Selection and Ordering Data	Order No.	
FO Standard Cable 50/125 [1]		
Preferred lengths, preassembled with 2 x 2 SC connectors:		
• 1 m	**6XV1 873-6AH10**	
• 3 m	**6XV1 873-6DH30**	
• 5 m	**6XV1 873-6DH50**	
• 10 m	**6XV1 873-6AN10**	
• 20 m	**6XV1 873-6DN20**	
• 50 m	**6XV1 873-6DN50**	
• 100 m	**6XV1 873-6AT10**	
• 200 m	**6XV1 873-6AT20**	
• 300 m	**6XV1 873-6GT30**	
FIBER OPTIC standard cable 62.5/125, splittable [1]		
Preferred lengths, preassembled with 2 x 2 BFOC (ST) connectors:		
• 1 m	**6XV1 820-5BH10**	B)
• 3 m	**6XV1 820-5BH30**	B)
• 5 m	**6XV1 820-5BH50**	B)
• 10 m	**6XV1 820-5BN10**	B)
• 20 m	**6XV1 820-5BN20**	B)
• 50 m	**6XV1 820-5BN50**	B)
• 100 m	**6XV1 820-5BT10**	B)
• 200 m	**6XV1 820-5BT20**	B)
• 300 m	**6XV1 820-5BT30**	B)
BFOC (ST) connector set For FIBER OPTIC standard cable, 20 units	**6GK1 901-0DA20-0AA0**	B)

B) Subject to export regulations: AL: N, ECCN: EAR99H

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

Other lengths and other fiber-optic cables can be found in Catalog IK PI.

Note:
Supplementary components for the SIMATIC NET cable range can be ordered from your local contact person. For technical support, please contact:
J. Hertlein, A&D SE PS
Tel.: +49 911 750-4465
Fax: +49 911 750-9991
E-mail: juergen.hertlein@siemens.com

Design

Connection of subsystems for human-machine interaction

The SIMATIC PCS 7 subsystems for engineering, operation and monitoring (also via Internet/intranet), batch control, route control, asset management or IT applications which are characterized by human-machine interaction are distributed - depending on the configuration - among various process control system (PCS) stations which can be single stations, servers or clients. Depending on their task and the associated integration into the total plant, these PCS stations are connected either only to the plant bus, only to the OS LAN (terminal bus) or to both buses of the Industrial Ethernet network. The connection is made using onboard interfaces, simple network cards or special communications processors, and either redundant or non-redundant configurations are possible.

CP 1613

Connection to plant bus

Single stations and servers can be operated on the plant bus with Basic Communication Ethernet (network card plus Softnet license) or CP 1613 communication. CP 1613 communication is always required for ES/OS single stations and OS servers if more than 8 automation systems are subordinate to an operator system, or if fault-tolerant automation systems are used. In all other cases, it is possible to use the low-cost Basic Communication Ethernet (BCE).

BCE and CP 1613 communication are each embedded in two alternative basic devices ES/OS/BATCH/IT for single stations and servers.

The separately available desktop adapter network card can also be used for BCE. If it is used for this purpose in a single station or server with alternative hardware, the associated PCS station additionally requires a Softnet license.

The CP 1613 communication delivered with the basic devices ES/OS/BATCH/IT for single stations and servers is a combination of the CP 1613 communications processor and the S7-1613 communications software. However, when using the fault-tolerant automation systems, ES/OS single stations and OS servers require the S7-REDCONNECT software instead of the S7-1613 communications software. ES/OS single stations and OS servers with S7-1613 communications software can be appropriately upgraded in this case using the S7-REDCONNECT upgrade.

Single stations and servers with BCE can also be subsequently upgraded to CP 1613 communication. Depending on the criteria mentioned above, either the S7-1613 communications software or the S7-REDCONNECT software is required for this in addition to the CP 1613 communications processor.

Connection to OS LAN (terminal bus)

PCS stations which are clients, servers or single stations are connected as standard to the OS LAN using the onboard Industrial Ethernet interface. In the case of servers or single stations which do not have a connection to the plant bus, the network card provided for BCE can also be used as an alternative.

The OS-LAN can also have a redundant design where two rings are connected together using two pairs of switches (see also "Introduction" at the beginning of the catalog section on Industrial Ethernet). A "SIMATIC PCS 7 redundant terminal bus adapter package", consisting of server and desktop adapter network cards, is required to connect the PCS stations to the two rings of the redundant OS LAN.

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) over the Industrial Ethernet plant bus. The automation systems are connected to the plant bus using the CP 443-1 communications processor; this connection is also redundant for fault-tolerant systems.

System connection for PCS 7 systems

Selection and Ordering Data	Order No.	
System connection for operator systems / engineering systems		
Desktop adapter network card for BCE and redundant terminal bus INTEL PCI network card for connection to Industrial Ethernet (10/100/1000 Mbit/s), with RJ45 connection	**A5E00504378**	B)
SIMATIC PCS 7 redundant terminal bus adapter package Server and desktop adapter for establishment of a redundant terminal bus, consisting of two INTEL PCI network cards for connection to Industrial Ethernet (10/100/1000 Mbit/s), with RJ45 connection	**6ES7 652-0XX01-1XF0**	B)
SOFTNET S7 for Industrial Ethernet Software for S7 and S5-compatible communication, for CP 1612, can be used with Windows 2000/XP, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, 2 languages (German/English)	**6GK1 704-1CW63-3AA0**	
CP 1613 A2 (for PCS 7 V6.1, SP1 and later) PCI card for connection to Industrial Ethernet, with ITP and RJ45 connections	**6GK1 161-3AA01**	B)
S7-1613 for Industrial Ethernet S7 communication software for CP 1613, can be used with Windows 2000 Professional/ 2000 Server/ XP Professional/ Server 2003, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, 2 languages (German/English)	**6GK1 716-1CB63-3AA0**	
S7-REDCONNECT Software for failsafe S7 communication over redundant networks, for CP 1613, can be used with Windows 2000 Professional/ 2000 Server/ XP Professional/ Server 2003, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, 2 languages (German/English)	**6GK1 716-0HB63-3AA0**	
Upgrade S7-REDCONNECT Software for expansion of S7-1613 to S7-REDCONNECT, can be used with Windows 2000 Professional/ 2000 Server/ XP Professional/ Server 2003, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, 2 languages (German/English)	**6GK1 716-0HB63-3AA4**	

Selection and Ordering Data	Order No.
System connection for automation systems	
CP 443-1 Communications processor for connection of SIMATIC S7-400 to Industrial Ethernet through TCP/IP, ISO and UDP; for S7 communication, S5-compatible communication (SEND/RECEIVE) with FETCH/ WRITE with or without RFC 1006, diagnostics expansion, Multicast, commissioning through LAN 10/100 Mbit/s, with electronic manual on CD-ROM	**6GK7 443-1EX11-0XE0**

B) Subject to export regulations: AL: N, ECCN: EAR99H

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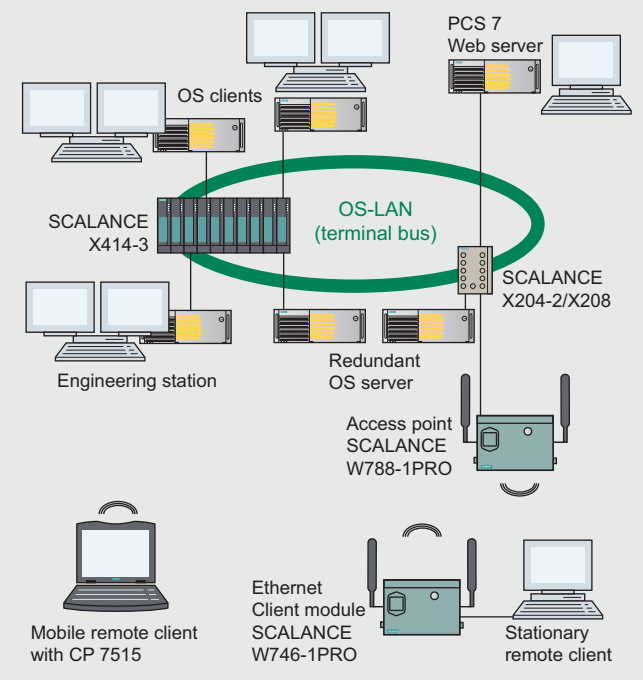
Overview



SIMATIC PCS 7 allows you to integrate mobile or stationary remote clients into the OS-LAN (terminal bus) via a SCALANCE W788-1PRO access point. Mobile remote clients (e.g. notebooks) with a CardBus port can communicate with the access point via Industrial Wireless LAN (IWLAN) by means of the CP 7515 communications processor. Stationary remote clients in a desktop/tower housing (SIMATIC PCS 7 basic devices ES/OS/BATCH/IT) require a SCALANCE W746-1PRO Ethernet client module for IWLAN communication with the access point. All IWLAN components referred to are extremely rugged, use state-of-the-art authentication and encoding procedures, and guarantee high reliability of the radio channel.

This allows the following applications to be implemented:

- Use of additional remote OS clients (up to 2 clients on WLAN)
- Linking of Web clients to a SIMATIC PCS 7 Web server (up to 2 Web clients on WLAN)
- Remote access to an engineering station with application of Remote Desktop (Windows XP or Server 2003 operating system) or PC Anywhere, e.g. during commissioning

Note:
Please note that Industrial Wireless LAN is not approved as a terminal bus (OS-LAN) or as a plant bus of SIMATIC PCS 7.

Design

CP 7515 communications processor

The CP 7515 is a PC card (32-bit CardBus) for operation on an Industrial Wireless LAN (IWLAN) radio network with reliable communication. It can also be used in a standard WLAN according to IEEE 802.11b/g and IEEE 802.11a at 2.4 GHz or 5 GHz.

Special features of the CP 7515 include:

- Can be used in industrial environments as well as in office/enterprise areas
- Two integrated antennae (for antenna diversity) for reliable reception in areas that place high demands on radio communication
- Transmission rate up to 54 Mbit/s at 2.4 GHz and 5 GHz with radio approval in more than 30 countries
- Conforms to standards IEEE 802.11b/g and IEEE 802.11a
- High reliability through reservation of data transfer rate for IWLAN communication with SCALANCE W788-1PRO access point
- High degree of protection against unauthorized access thanks to WPA and 128-bit encoding (AES)
- IP20 protection against dust and splashwater
- Suitable for ambient temperatures from 0 to 55 °C

Further information and detailed technical specifications can be found in Catalog IK PI, in the A&D Mall or in Catalog CA 01 under "Communication/Networks, SIMATIC NET Communications Systems, Industrial Mobile Communication".

Industrial Wireless LAN (IWLAN)

SCALANCE W746-1PRO Ethernet client module

The SCALANCE W746-1PRO Ethernet client module is optimally suitable for integrating devices with an Industrial Ethernet connection into Industrial Wireless LAN (IWLAN) radio networks with reliable communication. The SCALANCE W746-1PRO Ethernet client module administers the wireless connection for *up to eight devices* with Ethernet interface. If one of the connected devices is replaced, the Ethernet client module recognizes this automatically, and administers the new address.

Special features of the SCALANCE W746-1PRO Ethernet client module include:

- Many different power supplies possible (operation on 100 V - 240 V AC line network with PS791-1PRO power supply)
- Antenna diversity for reliable reception in difficult areas with two omnidirectional ANT795-4MR antennas screwed onto the housing, can be replaced by other types from the SCALANCE W700 range
- Transmission rate up to 54 Mbit/s at 2.4 GHz and 5 GHz with radio approval in more than 30 countries
- Conforms to standards IEEE 802.11b/g and IEEE 802.11a
- High reliability through reservation of data transfer rate for IWLAN communication with SCALANCE W788-1PRO access point
- High degree of protection against unauthorized access thanks to WPA and 128-bit encoding (AES)
- Rugged metal housing resistant to shock and vibration with IP65 degree of protection against water and dust
- Suitable for ambient temperatures from -20 to +60°C (resistant to condensation)

Further information and detailed technical specifications can be found in Catalog IK PI, in the A&D Mall or in Catalog CA 01 under "Communication/Networks, SIMATIC NET Communications Systems, Industrial Mobile Communication".

SCALANCE W788-1PRO access point

The SCALANCE W788-1PRO access point is exceptionally suitable for designing Industrial Wireless LAN (IWLAN) radio networks with reliable communication. It has an Industrial Ethernet interface for connection to the wired network.

Special features of the SCALANCE W788-1PRO access point include:

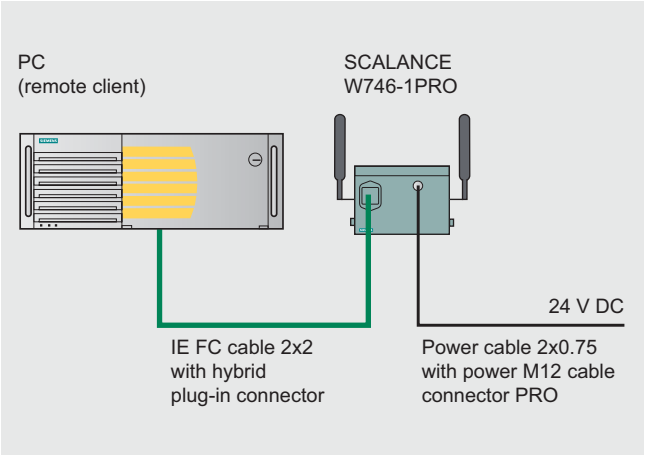
- Many different power supplies possible (operation on 100 V - 240 V AC line network with PS791-1PRO power supply)
- Antenna diversity for reliable reception in difficult areas with two omnidirectional ANT795-4MR antennas screwed onto the housing, can be replaced by other types from the SCALANCE W700 range
- Transmission rate up to 54 Mbit/s at 2.4 GHz and 5 GHz with radio approval in more than 30 countries
- Conforms to standards IEEE 802.11b/g and IEEE 802.11a
- High degree of protection against unauthorized access thanks to WPA and 128-bit encoding (AES)
- Rugged metal housing resistant to shock and vibration with IP65 degree of protection against water and dust
- Suitable for ambient temperatures from -20 to +60°C (resistant to condensation)

Further information and detailed technical specifications can be found in Catalog IK PI, in the A&D Mall or in Catalog CA 01 under "Communication/Networks, SIMATIC NET Communications Systems, Industrial Mobile Communication".

Integration

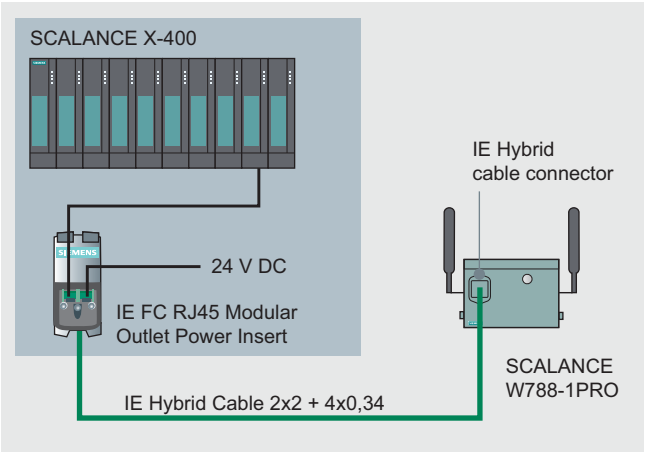
The data and power connections for the SCALANCE W746-1PRO Ethernet client module and the SCALANCE W788-1PRO access point can be made using a hybrid cable or separate cables (preferably over short distances):

- With separate cables, a 4-core TP (2 x 2) IE FC Standard Cable (type A) is used as the data cable. This Industrial Ethernet cable is connected on site to the supplied IP67 hybrid plug connector. A Power M12 Cable Connector PRO is additionally required for the power supply. IE FC Standard Cable and Power M12 Cable Connector PRO must be ordered in addition.



Example of data and power supply connections using separate cables

- If the data and power supply are connected using one cable, an FC Modular Outlet with power insert and the hybrid cable must be ordered in addition. The hybrid connector included in the scope of supply and the FC Modular Outlet with power insert can be assembled and connected on site.



Example of data and power supply connections using a hybrid cable

- If 100 ... 240 V AC is available on site, the PS791-1PRO power supply can be used (to be ordered in addition). It is supplied including AC connector and cable to the Ethernet client module/access point, but without AC cable.

Selection and Ordering Data

Order No.

Mobile remote client

CP 7515 communications processor
IWLAN PC card (32 bit; CardBus) for connecting a programming device/PC/notebook to Industrial Wireless LAN acc. to IEEE 802.11b/g/a (2.4/5 GHz, up to 54 Mbit/s), and national approvals; incl. Client Manager and driver for 32-bit Windows 2000 Professional/Server, XP Professional; manual on CD-ROM (German, English)

6GK1 751-5AA00 F)

Stationary remote client

SCALANCE W746-1PRO
IWLAN Ethernet client module with built-in radio interface; radio networks IEEE 802.11b/g/a at 2.4/5 GHz to 54 Mbit/s. National approvals; WPA/AES; Power over Ethernet (PoE), IP65 degree of protection (-20 to +60 °C)

For administration of the wireless connection of up to eight devices with Industrial Ethernet connection

Scope of supply:
Two ANT795-4MR antennas, IP67 hybrid plug-in connector, assembly material,
manual on CD-ROM (German, English)

- National approvals for operation outside the USA and Canada — **6GK5 746-1ST00-2AA6** F)
- National approvals for operation in the USA and Canada — **6GK5 746-1ST00-2AB6** F)

Access Point

SCALANCE W788-1PRO
IWLAN Access Point with built-in radio interface; radio networks IEEE 802.11b/g/a at 2.4/5 GHz to 54 Mbit/s. National approvals; WPA/AES; Power over Ethernet (PoE), IP65 degree of protection (-20 to +60 °C)

Scope of supply:
Two ANT795-4MR antennas, IP67 hybrid plug-in connector, assembly material,
manual on CD-ROM (German, English)

- National approvals for operation outside the USA and Canada — **6GK5 788-1ST00-2AA6**
- National approvals for operation in the USA and Canada — **6GK5 788-1ST00-2AB6**

F) Subject to export regulations: AL: N, ECCN: 5D002ENC3

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Industrial Wireless LAN (IWLAN)

Selection and Ordering Data — Order No.

Components for system connection

Data and power supply connections using separate cables	
IE FC Standard Cable GP 2 x 2 4-core (2 x 2), shielded TP installation cable for universal use, can be connected to IE FC Outlet RJ45/IE FC RJ45 Plug; cut-to-length; max. delivery unit 1000 m, minimum ordering quantity 20 m	**6XV1 840-2AH10**
Power M12 Cable Connector PRO Terminal socket for connection of SCALANCE W-700 for 24 V DC supply; 4-pole, a-coded, with assembly instructions, 3 units	**6GK1 907-0DC10-6AA3**
Data and power supply connections using a common cable	
IE FC Standard Cable GP 2 x 2 4-core (2 x 2), shielded TP installation cable for universal use, can be connected to IE FC Outlet RJ45/IE FC RJ45 Plug; cut-to-length; max. delivery unit 1000 m, minimum ordering quantity 20 m	**6XV1 840-2AH10**
IE FC RJ45 Modular Outlet with power insert Fast Connect RJ45 Modular Outlet for Industrial Ethernet with a replaceable insert for 1 x 24 V and 1 x 100 Mbit/s interface	**6GK1 901-1BE00-0AA3**
IE Hybrid Cable 2x2 + 4x0.34 4-core, shielded installation cable; cut-to-length, max. delivery unit 1000 m, minimum ordering quantity 20 m	**6XV1 870-2J**
IP 67 hybrid connector (1 unit included in scope of supply of SCALANCE W746/788) Connector for connecting SCALANCE W-700 to Industrial Ethernet and Power over Ethernet (PoE), with assembly instructions, 1 unit	**09 45 125 1300.00** [1]

Selection and Ordering Data — Order No.

Power supply for 100 ... 240 V AC

PS791-1PRO power supply AC/DC power supply, 10 W, IP65 (-20 to +60°C), input: 90 to 265 V AC, output: 24 V DC, metal casing Scope of supply: AC power 3+PE cable connector, DC power cord M12, installation material, instruction manual (German, English)	**6GK5 791-1PS00-0AA6** [B]

Accessories

Antennas and further accessories for access points and Ethernet client modules can be found in Catalog IK PI, in the A&D Mall or in Catalog CA 01 under "Communication/Networks, SIMATIC NET Communications Systems, Industrial Mobile Communication"	

[B] Subject to export regulations: AL: N, ECCN: EAR99H

[1] Order directly from:
HARTING Deutschland GmbH & Co. KG
PO Box 2451
D-32381 Minden
Tel. +49 571-8896-0
Fax. +49 571-8896-354
E-mail: de.sales@HARTING.com
Internet: www.HARTING.com

Further information on country approvals

Additional informationen is available in the Internet under:

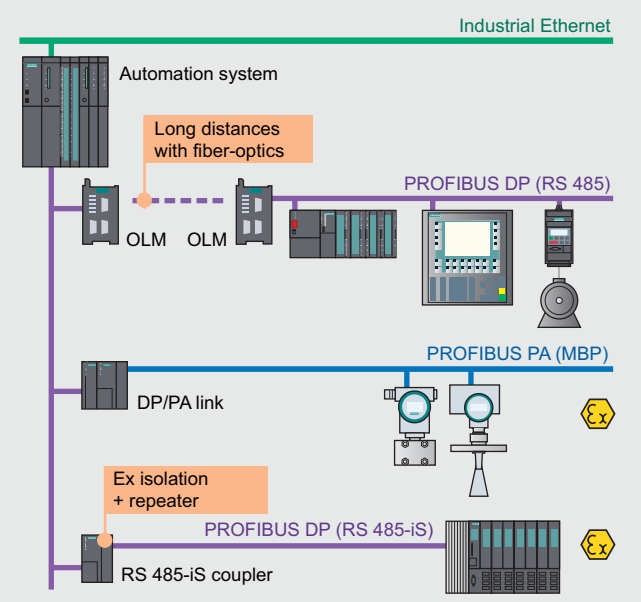
http://www.siemens.com/simatic-net/ik-info

More information

Note:
Supplementary components for the SIMATIC NET cable range can be ordered from your local contact person. Technical advice on this subject is available from:

J. Hertlein A&D SE PS
Tel. +49 (0)911/750 44 65
Fax. 0911/750 99 91
E-mail: juergen.hertlein@siemens.com

Overview



Communication at field level with PROFIBUS

Distributed peripherals such as I/O modules, transmitters, drives, valves or operator terminals communicate with the automation systems at field level through a powerful real-time bus system. This communication is characterized by the cyclic transmission of process data and the acyclic transmission of alarms, 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 supports:

- HART communication for integration of previously installed HART devices
- Redundancy
- Fail-safety (PROFIsafe up to SIL 3 according to IEC 61508)
- Isochronous mode
- Time synchronization
- Time tagging

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. On account of these characteristics, PROFIBUS is now established in all sectors of the production, process and hybrid industries and has become the most successful open fieldbus in the world. This is confirmed by more than 14 million installed PROFIBUS nodes.

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 through processing and evaluation of diagnostics and status information by an asset management system

Introduction

Application

The PROFIBUS DP fieldbus enables the SIMATIC PCS 7 automation systems 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. It is possible to route the PROFIBUS DP into Ex zone 1 by using a fieldbus isolating transformer (RS 485-iS coupler) and the RS 485-iS transmission technology. Connection of the intelligent, distributed field/process devices and operator terminals on PROFIBUS PA to the automation system takes place likewise through PROFIBUS DP.

Depending on the type of automation system and the number of available slots, up to 4 PROFIBUS DP lines can be connected to a SIMATIC PCS 7 automation system through internal interfaces in the CPU, and up to 10 PROFIBUS DP lines through additional CP 443-5 Extended communications processors. 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.

Overview

Shielded twisted-pair cables are used as the transmission medium for electric PROFIBUS DP networks. The PROFIBUS DP stations are connected to these bus lines through a bus connector (max. 32 stations per segment).

Design

FastConnect Stripping Tool

FastConnect

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 required in addition to the standard repeater functionality, a diagnostics repeater can be alternatively used. It additionally performs physical online monitoring of the copper bus cables. 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 stations provides a defined RS 485 signal level, and suppresses reflections on the line. Bus stations (e.g. ET 200S) can be coupled and decoupled without feedback to/from PROFIBUS networks terminated by active RS 485 terminating elements.

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

- is required to connect intrinsically-safe PROFIBUS DP stations, e.g. ET 200iSP, ET 200iS or devices from other vendors with Ex i DP connection,
- converts the electrical PROFIBUS DP RS 485 transmission technology into the intrinsically-safe RS 485-iS transmission technology with a transmission rate of 1.5 Mbit/s,
- acts as a safety barrier, and
- can be additionally used as a repeater in the hazardous area.

The RS 485-iS coupler as an open unit 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 station on the intrinsically-safe PROFIBUS DP segment (not further RS 485-iS couplers) must be terminated by a selectable resistance using the connector, Order No. 6ES7 972-0DA60-0XA0.

Electrical networks

Selection and Ordering Data	Order No.
PROFIBUS FastConnect Standard Cable Standard type with special design for fast mounting, 2-core, shielded, cut-to-length	**6XV1 830-0EH10**
Specify length in m Max. delivery unit 1,000 m, minimum order quantity 20 m	
Preferred lengths	
- 20 m	**6XV1 830-0EN20**
- 50 m	**6XV1 830-0EN50**
- 100 m	**6XV1 830-0ET10**
- 200 m	**6XV1 830-0ET20**
- 500 m	**6XV1 830-0ET50**
Other PROFIBUS cables	See Catalog IK PI
PROFIBUS FastConnect Stripping Tool Preadjusted stripping tool for fast stripping of PROFIBUS FastConnect bus cables	**6GK1 905-6AA00**
PROFIBUS FastConnect Blade Cassettes Spare blade cassettes for PROFIBUS FastConnect stripping tool, 5 units	**6GK1 905-6AB00**
PROFIBUS FastConnect bus connector RS 485 with 90° cable outlet With insulation displacement system, max. data transfer rate 12 Mbit/s	
• Without PG interface	**6ES7 972-0BA50-0XA0**
• With PG interface	**6ES7 972-0BB50-0XA0**
PROFIBUS FastConnect bus connector RS 485 Plug 180 With 180° cable outlet, with insulation displacement system, for connection of PC, PG, OP	**6GK1 500-0FC00**
Other bus connectors See Catalog IK PI	
RS 485 Repeater for PROFIBUS Data transfer rate max. 12 Mbit/s, 24 V DC, IP 20 housing	**6ES7 972-0AA01-0XA0**
RS 485 Diagnostic Repeater For connection of 1 or 2 segments to PROFIBUS DP; with online diagnostics functions for monitoring of bus cables	**6ES7 972-0AB01-0XA0**
Active RS 485 Terminating Element for PROFIBUS For terminating bus segments for data transfer rates of 9.6 Kbit/s to 12 Mbit/s	**6ES7 972-0DA00-0AA0**

Selection and Ordering Data	Order No.	
RS 485-IS Coupler Isolating transformer for connection of PROFIBUS DP segments with RS 485 and RS 485-iS transmission technologies	**6ES7 972-0AC80-0XA0**	
PROFIBUS connector with selectable terminating resistor For connection of IM 152 to PROFIBUS DP with RS 485-iS transmission technology	**6ES7 972-0DA60-0XA0**	B)
S7-300 rail Lengths:		
• 160 mm	**6ES7 390-1AB60-0AA0**	
• 482 mm	**6ES7 390-1AE80-0AA0**	
• 530 mm	**6ES7 390-1AF30-0AA0**	
• 830 mm	**6ES7 390-1AJ30-0AA0**	
• 2,000 mm	**6ES7 390-1BC00-0AA0**	

B) Subject to export regulations: AL: N, ECCN: EAR99H

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Optical networks with glass fiber-optic cables

Overview

We recommend use of glass fiber optic cables with 2 multi-mode fibers for optical PROFIBUS networks in indoor and outdoor areas.

The standard FIBER OPTIC CABLE is available in fixed lengths for distances up to 3,000 m, preassembled with 4 BFOC connectors. A BFOC connector set with 20 connectors is available as an accessory.

Further fiber optic cables can be found in the PROFIBUS section of Catalog IK PI.

Optical Link Module

Optical Link Modules (OLM) permit the construction of optical and hybrid (electrical/optical) networks in line, ring or star topology. The maximum distance between two OLMs can be up to 15 km for OLMs of type G12-1300 (see Catalog IK PI) and glass fiber optic cables with single-mode fibers (on request). The PROFIBUS OLM/G12 used as standard is equipped with one RS 485 interface and two glass fiber optic cable interfaces (4 BFOC sockets). The fiber optic line length between two OLMs of this type can be up to 3,000 m when using the standard FIBER OPTIC CABLE.

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.

Selection and Ordering Data

	Order No.	
FIBER OPTIC CABLE **Standard glass FO cable, splittable** Pre-assembled with 4 BFOC connectors		
Preferred lengths		
• 1 m	**6XV1 820-5BH10**	B)
• 5 m	**6XV1 820-5BH50**	B)
• 10 m	**6XV1 820-5BN10**	B)
• 20 m	**6XV1 820-5BN20**	B)
• 50 m	**6XV1 820-5BN50**	B)
Other lengths and cables	See Catalog IK PI	
BFOC Connector Set [1] For standard and trailing FIBER OPTIC CABLES, 20 units	**6GK1 901-0DA20-0AA0**	B)
PROFIBUS OLM/G12 Optical link module with 1 x RS 485 and 2 x glass FOC interfaces (4 BFOC sockets), for standard distances up to 3,000 m, with signal contact and measuring output	**6GK1 502-3CB10**	B)

B) Subject to export regulations: AL: N, ECCN: EAR99H

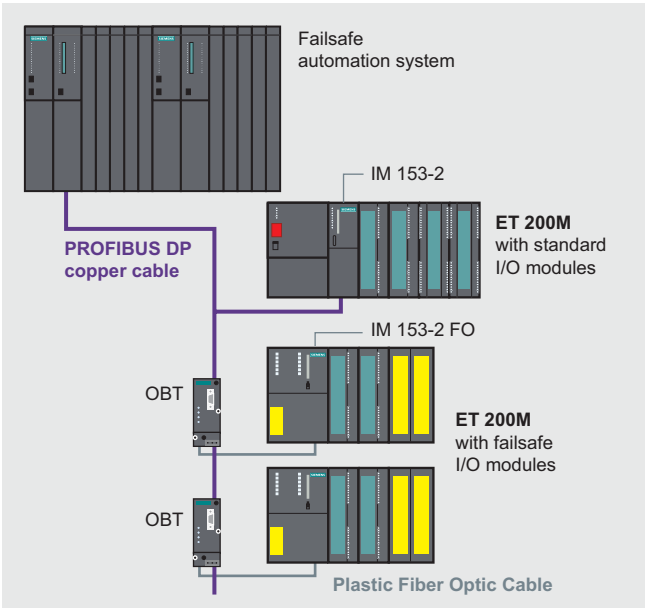
1) Note:
Additional components of the SIMATIC NET wiring range can be ordered from your local contact person.
For technical advice contact:
J. Hertlein, A&D SE PS
Tel.: +49 911 750-4465,
Fax: +49 911 750-9991
E-mail: juergen.hertlein@siemens.com

Optical networks with plastic fiber-optic cables

Overview

SIMATIC NET plastic fiberoptic cables can be used for the construction of optical PROFIBUS DP networks for indoor applications. Plastic fiberoptic cables are easy to assemble on-site with 2 x 2 simplex connectors. The maximum cable length between two DP devices is 50 m.

Using SIMATIC PCS 7, plastic fiberoptic cables are an alternative for automation system connections of ET 200M with only failsafe I/O modules when compliance with SIL 3 is demanded for the failsafe application. Plastic fiberoptic cables are then used to connect the ET 200Ms through Optical Bus Terminals (OBT) to the electrical bus cable of the PROFIBUS DP. The advantage of this configuration is that it eliminates the disconnecting module for decoupling the signal between the IM and the failsafe modules, which is otherwise obligatory for the direct electrical connection of the ET 200M (only failsafe modules in a rack with IM 153-2).



OBT for PROFIBUS DP

With the OBT (Optical Bus Terminal) for PROFIBUS it is possible to connect a PROFIBUS DP station with an integrated optical interface to an RS 485 segment or a PROFIBUS DP station without an integrated optical interface. Plastic fiberoptic cables can be used for the optical connection between the PROFIBUS DP station with an integrated optical interface and the OBT.

Design

Different versions of plastic FOC are available:

- PROFIBUS plastic fiber optic standard cable
  Rugged round cable with purple PVC outer casing and Kevlar tension-relief elements as well as plastic fibers with rugged polyamide inner casing. For indoor applications with cable lengths up to 50 m.
- PROFIBUS plastic fiber optic, duplex core
  Flat double core with PVC inner casing but without outer casing, for indoor applications with low mechanical loads, e.g. inside cabinets. Cable lengths up to 50 m.

To use the plastic FOC, the following items are required in addition to the OBT:

- Simplex connector/polishing set (set with 100 simplex connectors and 5 polishing sets)
- Stripping tool set for removing the outer casing and core casing
- Plug adapter for using simplex connectors with the integrated FO interfaces (e.g. IM 153-2 FO)

Selection and Ordering Data

	Order No.	
PROFIBUS OBT Optical bus terminal for connecting a PROFIBUS station or an RS 485 segment without integrated optical interface to the optical PROFIBUS; without simplex connector	**6GK1 500-3AA00**	
PROFIBUS Plastic Fiber Optic, standard cable Robust round cable with 2 plastic fiber optic cores, PVC external sheath and PA internal sheath, without connectors, for indoor use, cut-to-length	**6XV1 821-0AH10**	B)
PROFIBUS Plastic Fiber Optic, duplex core Plastic fiber optic cable with 2 cores, PVC sheath, without connectors, for use in environments with low mechanical stress, 50-m ring	**6XV1 821-2AN50**	B)
PROFIBUS Plastic Fiber Optic, Simplex Connector/Polishing Set 100 simplex connectors and 5 polishing sets for assembling PROFIBUS plastic fiber optic cables for the optical PROFIBUS DP	**6GK1 901-0FB00-0AA0**	B)
PROFIBUS Plastic Fiber Optic, Stripping Tool Set To remove the external or core sleeve of plastic fiber optic cables	**6GK1 905-6PA10**	B)
Connection Adapter Pack of 50, for using simplex connectors with the integrated FO interfaces (e.g. IM 153-2 FO); for 25 modules	**6ES7 195-1BE00-0XA0**	

B) Subject to export regulations: AL: N, ECCN: EAR99H

Overview

PROFIBUS DP lines can be connected to a SIMATIC PCS 7 automation system through up to 4 internal interfaces in the CPU and up to 10 additional CP 443-5 Extended communication modules.

If the module slot provided in the CPU for the PROFIBUS connection is not equipped yet, an IF 964-DP interface module will be required in addition. The CP 443-5 Extended communications processor is required for the PROFIBUS connection when data record routing is used with SIMATIC PDM.

Benefits of the communication module:

- Compact design 9-pin Sub-D connector for connecting to PROFIBUS DP
- Easy assembly
  Can be installed in a slot of the AS subrack; connection with the other S7-400 modules through the backplane bus
- Can be operated without fans; a backup battery or memory module is not required.

Selection and Ordering Data

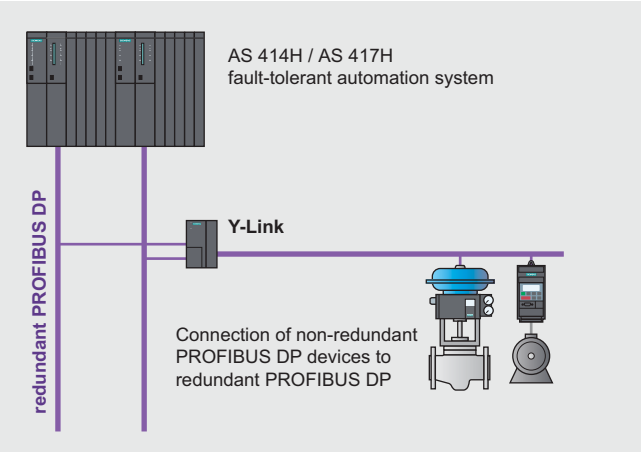
	Order No.
CP 443-5 Extended Communications processor for connection of SIMATIC S7-400 to PROFIBUS as DP master or for S7 communication, for data set routing of SIMATIC PDM	**6GK7 443-5DX04-0XE0**
IF 964-DP Interface module for connection of another PROFIBUS DP line, for plugging into a free DP module slot of the CPU	**6ES7 964-2AA04-0AB0**

Y-Link

Overview

The Y-link is a bus coupler for transition from a redundant PROFIBUS DP master system to a single-channel PROFIBUS DP master system. It can be used for connecting devices with only one PROFIBUS DP interface to the redundant PROFIBUS DP master system AS 414H/ AS 417H.

Design



The Y-link comprises:

- Two IM 157 interface modules
- One Y-coupler incl. RS 485 repeater
- One BM IM 157 bus module
- 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.

Selection and Ordering Data

	Order No.
Y-Link for connection of devices with only one PROFIBUS DP interface to a fault-tolerant automation system, comprising: • 2 IM 157 interface modules • 1 Y-coupler • 1 BM IM 157 bus module • 1 BM Y-coupler bus module	**6ES7 197-1LA02-0XA0**
PS 307 Load Power Supply Including connection assembly; 120/230 V AC; 24 V DC	
• 2 A; 50 mm wide	**6ES7 307-1BA00-0AA0**
• 5 A; 80 mm wide	**6ES7 307-1EA00-0AA0**
• 5 A, extended temperature range; 80 mm wide	**6ES7 307-1EA80-0AA0**
• 10 A, 200 mm wide	**6ES7 307-1KA01-0AA0**
PS 305 Load Power Supply 24/48/60/110 V DC; 24 V DC	
• 2 A, extended temperature range; 80 mm wide	**6ES7 305-1BA80-0AA0**

Overview

The transmission technology of the PROFIBUS PA profile is tailored to the needs of the process industry. The standardized communications services guarantee interoperability and replaceability between multi-vendor field devices and remote parameterization of the field devices during operation.

The PROFIBUS PA networks are based on electrical data transfer components. Data and the power supply are conveyed over a shielded 2-wire cable. Network lengths of up to approx. 1.9 km are possible with line and tree topologies. The passive terminating element for PROFIBUS PA (SpliTConnect terminator) is used for the termination of bus segments. The DP/PA Link is preferred for the gateway to the PROFIBUS DP.

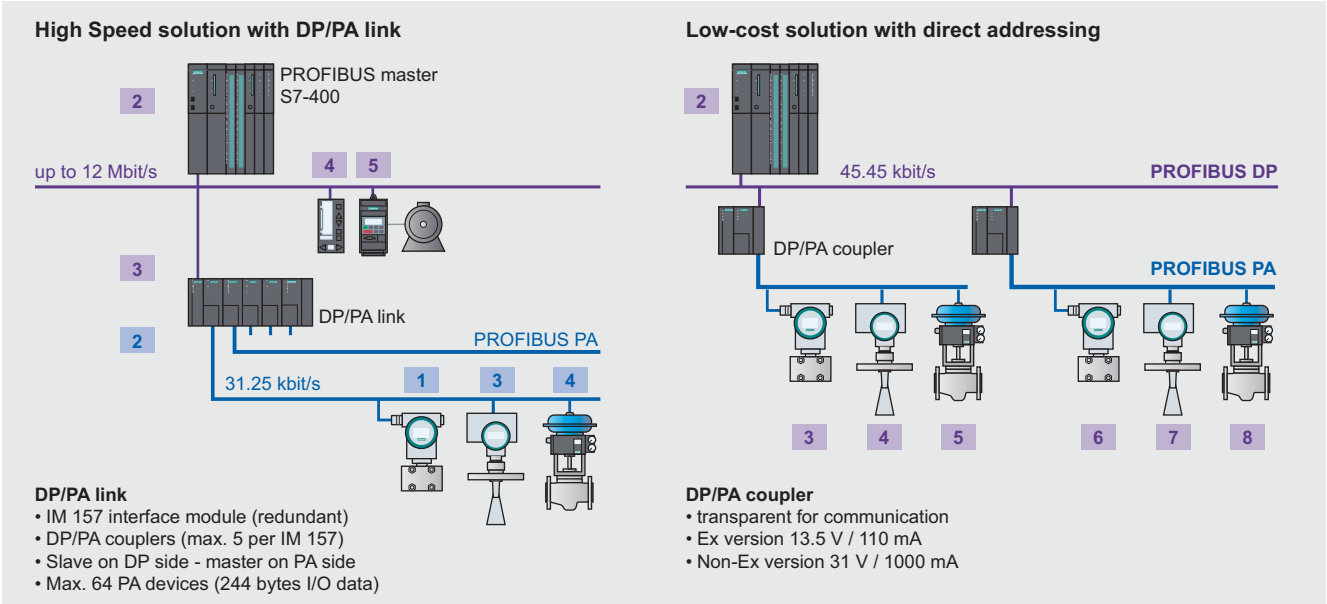
Benefits

The advantages of distributed field automation using the PROFIBUS PA are: less hardware, most cost-effective engineering, higher operational reliability and straightforward maintenance. These advantages are highlighted by the following characteristics:

- New plant concepts enabled by modularity and consistency from the sensor up into the control level
- Implementation of intrinsically safe applications through use of the field bus in use hazardous areas
- Reduced costs of configuration through simple, central engineering of the field devices (PROFIBUS PA and HART with SIMATIC PDM, multi-vendor devices also possible)
- Simple installation through 2-wire cable for joint conveyance of power supply and data
- Reduced commissioning costs through simplified loop check
- Low service costs thanks to simple wiring and more extensive diagnostics options

Basic components

Overview



Configuration examples with DP/PA link and DP/PA coupler

To create a smooth network transition between PROFIBUS DP and PROFIBUS PA, the SIMATIC product range offers two components: the DP/PA coupler and the DP/PA link. As a rule:

- DP/PA coupler: for small signal quantities and low time requirements
- DP/PA link: for a large number of participants and high cycle time requirements

The DP/PA coupler is available in two versions, an intrinsically-safe (Ex) version with max. 110 mA output current and a non-Ex version with 1000 mA output current. These are mounted together with a 24 V DC load power supply on an S7-300 rail and can be installed in environments up to Ex zone 2.

When using the DP/PA coupler, the data transfer rate on the PROFIBUS DP is limited to 45.45 kbit/s. The PROFIBUS PA slaves are addressed directly by the PROFIBUS master. The DP/PA coupler is an electrical participant, but is transparent for communication between the master and PA field devices; it therefore does not require setting of parameters or addresses.

The DP/PA coupler is also an integral component of the DP/PA link which is a modular combination consisting of the PROFIBUS DP interface module IM 157 (with optional redundancy) and up to 5 DP/PA couplers (Ex or non-Ex version) packaged in an S7-300 design.

The DP/PA Link is a very simple gateway that interconnects the two bus systems PROFIBUS DP and PROFIBUS PA, but decouples their data transfer rates. It is thus possible to combine PROFIBUS DP and PROFIBUS PA without impairing the performance of PROFIBUS DP.

The DP/PA link functions as a slave on the PROFIBUS DP and as a master on the PROFIBUS PA. From the viewpoint of the host controller, the DP/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 DP/PA link which itself only requires one DP address. The host PROFIBUS master can scan devices connected to the DP/PA all at once.

Design

The DP/PA link can be operated on PROFIBUS DP standard masters and enables the construction of large systems with large addressing ranges and high cycle time requirements.

The DP/PA link is a combination of the IM 157 interface module (redundant as option) and up to 5 DP/PA couplers (Ex or non-Ex versions). All components of the DP/PA link are interconnected through the S7 backplane bus.

The DP/PA link is mounted together with a 24 V DC load power supply on an S7-300 rail and can be installed in environments up to Ex zone 2. The PS 307 or PS 305 load power supply can be used for the 24 V DC.

The use of active bus modules as the backplane bus enables hot swapping of individual modules and redundant configuration of the IM 157 interface module for PROFIBUS DP. Applications with a high level of availability are thus possible in conjunction with the AS 414H / AS 417H automation systems. With a redundant IM 157 interface module for PROFIBUS DP, it is also recommendable to have a redundant design of the 24 V DC supply, e.g. with two PS 307/PS 305 load power supplies.

The semi-modular DP/PA link can be extended to a maximum of five PROFIBUS PA lines per DP connection, according to the number of DP/PA couplers. The PROFIBUS PA lines are physically separated as regards current input, but form one bus system in communication terms.

The following basic components are available to configure the DP/PA link:

- PS 307 load power supply for 120/230 V AC; 24 V DC, version in 2, 5 or 10 A, or
  PS 305 load power supply for 24/48/60/110 V DC; 24 V DC, 2 A
- IM 157 interface module
- DP/PA coupler (Ex and non-Ex version)

Hot swapping

The following components are required in addition or as alternatives to the DP/PA link basic components for the hot swapping function and for a redundant PROFIBUS DP interface module:

- Bus modules for hot swapping
  - IM 157 bus module for two IM 157 modules, for redundant and non-redundant design, for extended temperature range
  - DP/PA bus module for one 1 DP/PA coupler, for extended temperature range (up to 5 DP/PA couplers possible per DP/PA link)
- DIN rail for hot swapping (as an alternative to the standard DIN rail)

Technical specifications

DP/PA Coupler

Connection for PROFIBUS PA	
• Intrinsically safe version	2-pin screw-type terminal, permanently integrated terminating resistor Output current max. 110 mA Output voltage 13...14 V DC
• Non-intrinsically safe version	4-pin screw-type terminal, switchable terminating resistor Output current max. 1000 mA Output voltage 31 V DC
Connection for PROFIBUS DP	9-pin Sub-D plug, contact assignment as described in IEC 61158/EN 50170
Backplane bus	Connection through S7 backplane bus connector (only necessary for PA Link); non-isolated The active BM DP/PA bus modules are required for the hot swapping function
Displays	Bus activity DP (yellow) Bus activity PA (yellow)
Supply voltage	24 V DC (green)
Current consumption	
• Ex version	Max. 400 mA
• Non-Ex version	Max. 1800 mA
Power loss	
• Ex version	approx. 7 W
• Non-Ex version	approx. 12 W
Operating temperature	
• Ex version	-25 ... +60 °C
• Non-Ex version	-25 ... +60 °C
Dimensions (W x H x D) in mm	80 x 125 x 130

Basic components

IM 157	
Function	Linking of PROFIBUS DP (9.6 Kbit/s to 12 Mbit/s, slave functionality) and PROFIBUS PA with support of the "hot configuration" function (configuration when the plant is in operation) The DP/PA Link function is only implemented by extending the IM 157 with one or more DP/PA couplers. Stand-alone operation of the IM 157 is not possible. Up to 5 DP/PA couplers and as many as 64 slaves are connectable Isolation from the higher-level DP Master System
Interfaces	
• Connection for PROFIBUS DP	9-pin Sub-D plug, contact assignment as described in IEC 61158/EN 50170, Vol. 2
• Backplane bus	Connection through S7 bus backplane connector, non-isolated Bus modules and profile rails for hot swapping (see the section "Hot swapping") are required for the hot swapping function and for a redundant PROFIBUS DP interface module.
Displays	SF (red) BF DP (red) BF PA (red) Active (yellow) 24 V DC (green)
Supply voltage	24 V DC
Current consumption	max. 100 mA (in DP/PA Link) max. 200 mA (in Y-Link)
Power loss	approx. 2 W (in DP/PA Link) approx. 4 W (in Y-Link)
Voltage failure bridging	20 ms
Mechanical design	4-pin screw terminal, short-circuiting link between PE and M24, for earth-free operation the short-circuiting link must be removed (independent of this, the DP interface is always earth-free)
Permissible operating temperature	-25...+60 °C
Dimensions (W x H x D) in mm	40 x 125 x 130
Configuration	with STEP 7 in version 5.2 and higher

Selection and Ordering Data

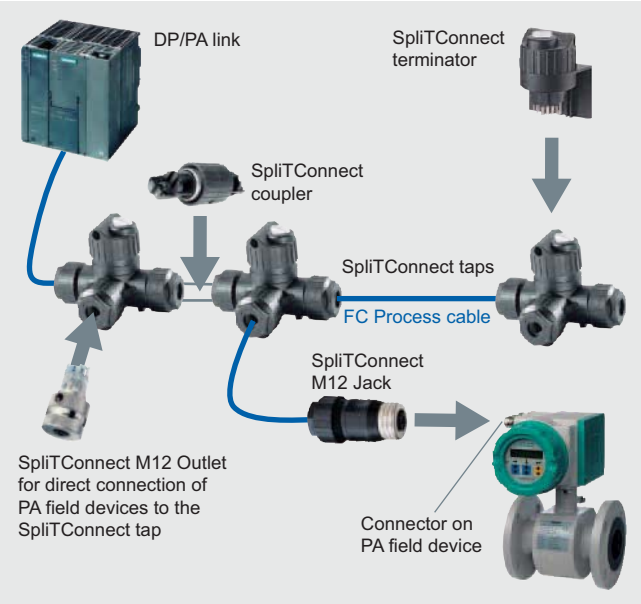
	Order No.
DP/PA Coupler For transition from RS 485 to MBP	
• Intrinsically safe version	**6ES7 157-0AD82-0XA0**
• Non-intrinsically safe version	**6ES7 157-0AC82-0XA0**
IM 157 Interface module for DP/PA Link and Y-Link	**6ES7 157-0AA82-0XA0**
Accessories	
PS 307 Load Power Supply Including connection assembly; 120/230 V AC; 24 V DC	
• 2 A; 50 mm wide	**6ES7 307-1BA00-0AA0**
• 5 A; 80 mm wide	**6ES7 307-1EA00-0AA0**
• 5 A, extended temperature range; 80 mm wide	**6ES7 307-1EA80-0AA0**
• 10 A, 200 mm wide	**6ES7 307-1KA01-0AA0**
PS 305 Load Power Supply 24/48/60/110 V DC; 24 V DC	
• 2 A, extended temperature range; 80 mm wide	**6ES7 305-1BA80-0AA0**
Standard DIN rails (without hot swapping function)	
• 482 mm wide (19 inches)	**6ES7 390-1AE80-0AA0**
• 530 mm wide	**6ES7 390-1AF30-0AA0**
Components for hot swapping and for redundant design	
Active bus modules for hot swapping	
• BM IM 157 For two IM 157 modules, for redundant and non-redundant configuration, for extended temperature range, for hot swapping function, permissible operating temperature -25...+60 °C	**6ES7 195-7HD80-0XA0**
• BM DP/PA For one DP/PA coupler, for extended temperature range, for hot swapping function, permissible operating temperature -25...+60 °C	**6ES7 195-7HF80-0XA0**
DIN rail for hot swapping For max. 5 active bus modules	
• 482 mm wide (19 inches)	**6ES7 195-1GA00-0XA0**
• 530 mm wide	**6ES7 195-1GF30-0XA0**
• 620 mm wide	**6ES7 195-1GG30-0XA0**

Overview

PROFIBUS FC process cables, color-coded for the various applications (Ex, non-Ex area) are available for designing field bus networks in accordance with IEC 61158-2 (e.g. PROFIBUS PA).

The FastConnect stripping tool can be used to strip the FC process cable for PROFIBUS PA to the correct length for casing and shield.

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 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.

Selection and Ordering Data

	Order No.
FC Process Cable	
2-core, shielded	
• Blue for Ex applications	**6XV1 830-5EH10**
• Black for non-Ex applications	**6XV1 830-5FH10**
Sold by the meter; Max. delivey unit 1000 m, minimum ordering quantity 20 m	
PROFIBUS FastConnect Stripping Tool	**6GK1 905-6AA00**
Stripping tool for rapid stripping of insulation from PROFIBUS FastConnect bus cables	
PROFIBUS FastConnect Blade Cassettes	**6GK1 905-6AB00**
Spare blade cassettes for the PROFIBUS FastConnect stripping tool, 5 pcs	
SpliTConnect Tap	**6GK1 905-0AA00**
For design of PROFIBUS PA segments and connection of PA field devices, insulation displacement system, IP67, 10 pcs	
SpliTConnect M12 Outlet	**6GK1 905-0AB10**
Replacement element for direct connection of PA field devices to the SpliTConnect Tap, 5 pcs	
SpliTConnect Coupler	**6GK1 905-0AC00**
Connection element for cascading SpliTConnect Taps in order to configure star points, 10 pcs	
SpliTConnect Terminator	
For termination of PROFIBUS PA segments, 5 pcs	
• Terminator (Ex); use possible in hazardous area	**6GK1 905-0AD00**
• Terminator (non-Ex); use not possible in hazardous area	**6GK1 905-0AE00**
SpliTConnect M12 Jack	**6GK1 905-0AF00**
Connection element between FC process cable and M12 plug on the PROFIBUS PA field device, 5 pcs	

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AS-Interface

Overview

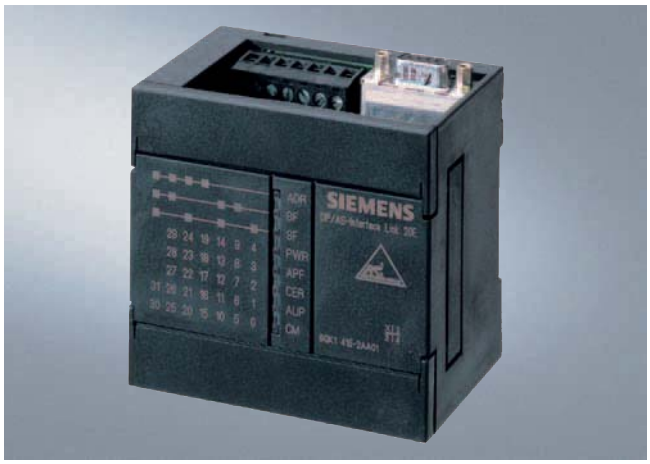
The actuator-sensor interface (AS-Interface) is a multi-vendor networking system for simple - usually binary - actuators and sensors in the lowest field area. AS-Interface enables a wiring loom with parallel wiring to be replaced by a simple two-wire cable shared by all sensors or actuators.

The AS-Interface works by the master-slave principle. Sensors/actuators connected through the AS-Interface cable are controlled by the master as slaves.

Note:

AS-Interface is integrated in SIMATIC pcs 7 as a *subordinate* bus. Consequently, this bus does not offer the full functionality of SIMATIC PCS 7; this applies in particular to diagnostics functions. Further information, see Catalog IK PI.

Design



System components

The basic components of a system installation are:

- CP 343-2 AS-Interface master module for ET 200M *or/and* DP/AS-Interface link for connection of an AS-Interface line to PROFIBUS DP
- 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

Selection and Ordering Data

	Order No.
CP 343-2 Communications processor for connection of SIMATIC S7-300 and ET 200M to AS-Interface, without front connector	**6GK7 343-2AH00-0XA0**
Front Connector 20-pin, with screw contacts	**6ES7 392-1AJ00-0AA0**
CP 343-2 Manual Including software and examples	
• German	**6GK7 343-2AH00-8AA0**
• English	**6GK7 343-2AH00-8BA0**
• French	**6GK7 343-2AH00-8CA0**
• Italian	**6GK7 343-2AH00-8EA0**
DP/AS-Interface Link 20E PROFIBUS DP/ AS-Interface gateway, degree of protection IP 20	**6GK1 415-2AA01**
Manual for DP/AS-Interface Link 20E Paper version incl. type and GSD files	
• German	**6GK1 971-2DS01-0AA0**
• English	**6GK1 971-2DS01-0AA1**
• French	**6GK1 971-2DS01-0AA2**
• Spanish	**6GK1 971-2DS01-0AA3**
• Italian	**6GK1 971-2DS01-0AA4**

Overview

DB/EIB Link connects the production automation and process automation to building installation systems

- Data is exchanged between PROFIBUS DP and EIB (European Installation Bus)
- Compact housing to degree of protection IP20, for use in switchgear cabinets as well as in distribution systems
- Configurable as a DP slave with STEP 7 or COM PROFIBUS standard tools and with the EIB configuring software ETS 2

Note :

EIB instabus is integrated in SIMATIC PCS 7 as a *subordinate* bus. Consequently, this bus does not offer the full functionality of SIMATIC PCS 7; this applies in particular to diagnostics functions. Further information, see Catalog IK PI.

Selection and Ordering Data

	Order No.	
DP/EIB Link Gateway for data exchange between PROFIBUS DP and EIB	**6GK1 415-0AA01**	E)
Manual for DP/EIB Link incl. GSD file and ETS database entry		
• German	**6GK1 971-3DA00-0AA0**	
• English	**6GK1 971-3DA00-0AA1**	

E) Subject to export regulations: AL: N, ECCN: 5A991

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Modbus

Overview

Modbus is connected to PROFIBUS DP using an ET 200M with a CP 341 communications processor. 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.

Selection and Ordering Data

	Order No.
CP 341 communications processor with one RS 232 C (V.24) interface	**6ES7 341-1AH01-0AE0**
RS 232 connecting cable for linking to SIMATIC S7	
• 5 m	**6ES7 902-1AB00-0AA0**
• 10 m	**6ES7 902-1AC00-0AA0**
• 15 m	**6ES7 902-1AD00-0AA0**
CP 341 communications processor with one 20 mA (TTY) interface	**6ES7 341-1BH01-0AE0**
20 mA (TTY) connecting cable for linking to SIMATIC S7	
• 5 m	**6ES7 902-2AB00-0AA0**
• 10 m	**6ES7 902-2AC00-0AA0**
• 50 m	**6ES7 902-2AG00-0AA0**
CP 341 communications processor with one RS 422/485 (X.27) interface	**6ES7 341-1CH01-0AE0**
RS 422/485 connecting cable for linking to SIMATIC S7	
• 5 m	**6ES7 902-3AB00-0AA0**
• 10 m	**6ES7 902-3AC00-0AA0**
• 50 m	**6ES7 902-3AG00-0AA0**
Loadable drivers for CP 341	
MODBUS master (RTU format)	
• Single license	**6ES7 870-1AA01-0YA0**
• Single license, without software or documentation	**6ES7 870-1AA01-0YA1**
MODBUS slave (RTU format)	
• Single license	**6ES7 870-1AB01-0YA0**
• Single license, without software or documentation	**6ES7 870-1AB01-0YA1**

11

Automation systems

Introduction

Overview

Select SIMATIC S7-400 components can be combined in the automation systems of the SIMATIC PCS 7 process control system.

The following characteristics make the SIMATIC S7-400 predestined for use as a SIMATIC PCS 7 automation system:

- modular and fan-free design,
- high degree of expansion capability and robust design,
- simple or redundant design,
- comprehensive communications capabilities,
- integral system functions and
- simple connection of central or distributed I/Os.

Various automation systems are available with a price/performance ratio which can be tailored to your system requirements. All automation systems are equipped with an onboard PROFIBUS DP field-bus connection. Additional PROFIBUS communication modules can be fitted if required.

Design

The automation systems are delivered as preassembled and tested complete systems without surcharge, and are mostly comprised of:

- Racks with 9 or 18 slots, which can be physically separate in the case of redundant systems
- Standard CPU 414-3, 416-2, 416-3 or 417-4 as well as the redundant CPU 414-4H or 417-4H
- 24 V DC or 120/230 V AC power supply incl. backup battery (batteries)
- Main memory from 1.4 MB to 20 MB
- Memory card with 2 to 16 MB RAM
- Interface to industrial Ethernet

A corresponding Runtime license is required per automation system when using the "PCS 7 Library Blocks V6.0" library.

Technical specifications

	AS 414-3, AS 414-4-1H/2H	AS 416-2	AS 416-3, AS 417-4 with MC 4 MB, AS 417-4-1H/2H with MC 4 MB	AS 417-4 with MC 16 MB AS 417-4-1H/2H with MC 16 MB
Analog value measurements	30	50	150	500
Digital value measurements	60	150	400	1000
PID controls	20	50	130	200
Motors	20	75	150	300
Valves	25	75	150	300
SFC	2	20	50	100
Steps	4	200	500	1000
Dosing	2	5	15	30
Digital inputs DI	100	300	850	1500
Digital outputs DO	50	150	315	630
Analog inputs AI	30	100	275	500
Analog outputs AO	20	50	130	200

Typical mixed quantity frameworks for SIMATIC PCS 7 automation systems

Note:
The values quoted here are not AS-specific maximum values for the particular item but represent a typical distribution of the available total capacity of the AS during mixed operation of all the items of an assembled block.

Comparison of main memory and processing time

AS type	Integrated main memory in MB	Processing time in ns
AS 414-3	1,4	60
AS 416-2	2,8	40
AS 416-3	5,6	40
AS 417-4	20	30
AS 414H	1,4	60
AS 417H	20	30

Overview

Compared to the standard automation systems previously available, the innovated standard automation systems have the following key features:

- Improved processing performance (1.6 to 3 times as fast)
- Significantly improved communications performance
- Larger integrated main memory (5 times for AS 417, 1.75 to 2 times for AS 414 and AS 416)

Application

The AS 414-3 automation systems are tailored for small applications with small quantity frameworks. They therefore meet the demand for low-cost initial implementation with a modular and scalable system. Larger quantity frameworks can be implemented with the AS 416-2, AS 416-3 and AS 417-4 automation systems. These systems are preferred for medium-sized systems and bigger.

Design

The automation systems are available complete with rack, power supply, CPU, memory card and PROFIBUS DP interfaces. They are delivered already assembled and tested. Each version has a different main memory:

Controller type	RAM
AS 414-3	1.4 MB (0.7 MB each for program and data)
AS 416-2	2.8 MB (1.4 MB each for program and data)
AS 416-3	5.6 MB (2.8 MB each for program and data)
AS 417-4	20 MB (10 MB each for program and data)

A 120/230 V AC or 24 V DC power supply can be chosen. In addition, systems are also available without power supply or memory card.

Standard automation systems

Selection and Ordering Data — Order No.

Ordering units for automation systems

AS 414-3 automation system
Comprising:
controller type 414-3 with
3 interfaces (MPI/DP, DP and slot for IF module), 1.4 MB main memory (0.7 MB each for program and data), memory card 2 MB RAM,
2 backup batteries,
CP 443-1EX11 communications processor for connection to Industrial Ethernet plant bus as well as

- UR1 rack (18 slots):
  - PS 407 power supply; 20 A for 120/230 V AC/DC — **6ES7 654-3QD47-0XX0**
  - PS 405 power supply; 20 A for 24 V DC — **6ES7 654-6QD47-0XX0**
  - Without power supply, without memory card — **6ES7 654-0QX47-0XX0**
- UR2 rack (9 slots):
  - PS 407 power supply; 10 A for 120/230 V AC/DC — **6ES7 654-1QD57-0XX0**
  - PS 405 power supply; 10 A for 24 V DC — **6ES7 654-4QD57-0XX0**
  - Without power supply, without memory card — **6ES7 654-0QX57-0XX0**

AS 416-2 automation system
Comprising:
controller type 416-2 with
2 interfaces (MPI/DP and DP),
2.8 MB main memory (1.4 MB each for program and data),
memory card 4 MB RAM,
2 backup batteries,
CP 443-1EX11 communications processor for connection to Industrial Ethernet plant bus as well as

- UR1 rack (18 slots):
  - PS 407 power supply; 20 A for 120/230 V AC/DC — **6ES7 654-3JE47-0XX0**
  - PS 405 power supply; 20 A for 24 V DC — **6ES7 654-6JE47-0XX0**
  - Without power supply, without memory card — **6ES7 654-0JX47-0XX0**
- UR2 rack (9 slots):
  - PS 407 power supply; 10 A for 120/230 V AC/DC — **6ES7 654-1JE57-0XX0**
  - PS 405 power supply; 10 A for 24 V DC — **6ES7 654-4JE57-0XX0**
  - Without power supply, without memory card — **6ES7 654-0JX57-0XX0**

Selection and Ordering Data — Order No.

AS 416-3 automation system
Comprising:
controller type 416-3 with
3 interfaces (MPI/DP, DP and slot for IF module), 5.6 MB main memory (2.8 MB each for program and data), memory card 8 MB RAM,
2 backup batteries,
CP 443-1EX11 communications processor for connection to Industrial Ethernet plant bus as well as

- UR1 rack (18 slots):
  - PS 407 power supply; 20 A for 120/230 V AC/DC — **6ES7 654-3KF47-0XX0**
  - PS 405 power supply; 20 A for 24 V DC — **6ES7 654-6KF47-0XX0**
  - Without power supply, without memory card — **6ES7 654-0KX47-0XX0**
- UR2 rack (9 slots):
  - PS 407 power supply; 10 A for 120/230 V AC/DC — **6ES7 654-1KF57-0XX0**
  - PS 405 power supply; 10 A for 24 V DC — **6ES7 654-4KF57-0XX0**
  - Without power supply, without memory card — **6ES7 654-0KX57-0XX0**

AS 417-4 automation system
Comprising:
controller type 417-4 with
4 interfaces (MPI/DP, DP and
2 slots for IF modules), 20 MB main memory (10 MB each for program and data), memory card,
2 backup batteries,
CP 443-1EX11 communications processor for connection to Industrial Ethernet plant bus as well as

- UR1 rack (18 slots):
  - PS 407 power supply; 20 A for 120/230 V AC/DC and memory card 4 MB RAM — **6ES7 654-3LE47-0XX0**
  - PS 407 power supply; 20 A for 120/230 V AC/DC and memory card 16 MB RAM — **6ES7 654-3LG47-0XX0**
  - PS 405 power supply; 20 A for 24 V DC and memory card 4 MB RAM — **6ES7 654-6LE47-0XX0**
  - PS 405 power supply; 20 A for 24 V DC and memory card 16 MB RAM — **6ES7 654-6LG47-0XX0**
  - Without power supply, without memory card — **6ES7 654-0LX47-0XX0**
- UR2 rack (9 slots):
  - PS 407 power supply; 10 A for 120/230 V AC/DC and memory card 4 MB RAM — **6ES7 654-1LE57-0XX0**
  - PS 407 power supply; 10 A for 120/230 V AC/DC and memory card 16 MB RAM — **6ES7 654-1LG57-0XX0**
  - PS 405 power supply; 10 A for 24 V DC and memory card 4 MB RAM — **6ES7 654-4LE57-0XX0**
  - PS 405 power supply; 10 A for 24 V DC and memory card 16 MB RAM — **6ES7 654-4LG57-0XX0**
  - Without power supply, without memory card — **6ES7 654-0LX57-0XX0**

Selection and Ordering Data	Order No.
Individual components for automation systems	
CPU 414-3 Main memory 1.4 MB (0.7 MB each for program and data); module occupies 2 slots	**6ES7 414-3XJ04-0AB0**
CPU 416-2 Main memory 2.8 MB (1.4 MB each for program and data); module occupies 1 slot	**6ES7 416-2XK04-0AB0**
CPU 416-3 Main memory 5.6 MB (2.8 MB each for program and data); module occupies 2 slots	**6ES7 416-3XL04-0AB0**
CPU 417-4 Main memory 20 MB (10 MB each for program and data); module occupies 2 slots	**6ES7 417-4XL04-0AB0**
Memory card RAM	
• 2 MB	**6ES7 952-1AL00-0AA0**
• 4 MB	**6ES7 952-1AM00-0AA0**
• 8 MB	**6ES7 952-1AP00-0AA0**
• 16 MB	**6ES7 952-1AS00-0AA0**
• 64 MB	**6ES7 952-1AY00-0AA0**
Memory card Flash-EPROM Only required to update firmware	
• 4 MB	**6ES7 952-1KM00-0AA0**
CP 443-1EX11 Communications processor for connection of SIMATIC S7-400 to Industrial Ethernet through TCP/IP and ISO; for S7 communication, S5-compatible communication (SEND/RECEIVE) with FETCH/WRITE with or without RFC 1006, 10/100 Mbit/s, with AUI/ITP and RJ45 connections, electronic manual on CD; module occupies 1 slot	**6GK7 443-1EX11-0XE0**
CP 443-5 Extended Communications processor for connection of SIMATIC S7-400 to PROFIBUS as DP master or for S7 communication, for increasing the number of DP lines, for data set routing with SIMATIC PDM and for 10-ms time stamp, electronic manual on CD; module occupies 1 slot	**6GK7 443-5DX04-0XE0**
IF 964-DP Interface module for connection of another PROFIBUS DP line, for plugging into a free DP module slot of the CPU	**6ES7 964-2AA04-0AB0**

Selection and Ordering Data	Order 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	**6ES7 407-0KA01-0AA0**
PS 407 power supply module; 10 A, redundant design possible 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	**6ES7 407-0KR00-0AA0**
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 3 slots	**6ES7 407-0RA01-0AA0**
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	**6ES7 405-0KA02-0AA0**
PS 405 power supply module; 10 A, redundant design possible 24 V DC; 5 V DC/10 A, 24 V DC/1 A; with battery compartment for 2 backup batteries, module occupies 2 slots	**6ES7 405-0KR00-0AA0**
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 3 slots	**6ES7 405-0RA01-0AA0**
Backup battery Type AA, 1.9 Ah	**6ES7 971-0BA00**
UR1 rack 18 slots	**6ES7 400-1TA01-0AA0**
UR2 rack 9 slots	**6ES7 400-1JA01-0AA0**
UR2 aluminium rack 9 slots	**6ES7 400-1JA11-0AA0**
Runtime licenses for libraries	
PCS 7 Library Blocks runtime license Valid for *one* SIMATIC PCS 7 automation system Trilingual (German, English, French) Type of delivery: Certificate of license	**6ES7 653-2BG06-2YB0**

11

Fault-tolerant automation systems

Overview

Fault-tolerant automation systems are used to minimize the risk of production failures. The higher investment in fault-tolerant automation systems is often negligible compared to the costs resulting from production stoppages. The higher the costs resulting from loss of production, the more important a fault-tolerant system becomes.

Design

The *AS 414-4-1H and AS 417-4-1H* automation systems are initially equipped with just one CPU. They are used in particular when the redundant subsystems have to be physically separated from one another for safety reasons or when the customer would like to keep open his options for a redundant configuration in the future. The safety-oriented AS 414F and AS 417F automation systems are based likewise on this hardware in the corresponding version.

There are two configuration possibilities for the AS 414-4-1H and AS 417-4-1H automation systems:

- Configuration with two standard racks (UR1 or UR2)
  This configuration is ideal when the two redundant subsystems have to be completely separated for availability reasons. Each subsystem contains a CPU, a potentially redundant power supply module (AC), and a communications processor for Industrial Ethernet.
- Configuration with a UR2-H rack
  The UR2-H compact rack with split backplane bus is suitable for configuring a complete fault-tolerant automation system. For the AS 414-4-1H and AS 417-4-1H, the UR2-H is equipped with a CPU, a potentially redundant power supply module and a communications processor for Industrial Ethernet.

In the case of the redundant *AS 414-4-2H and AS 417-4-2H* automation systems, the two subsystems are accommodated in the UR2-H rack. Each subsystem is usually equipped with a CPU, a potentially redundant power supply module and a communications processor for Industrial Ethernet.

In all the configurations described, potentially redundant power supply modules can be expanded to a redundant configuration by retrofitting a second power supply module of the same type.

Another 4 sync modules (for distances up to 10 m or 10 km) and 2 sync cables have to be ordered in addition to create a redundant system from two AS 414-4-1H or AS 417-4-1H automation systems (UR1/UR2 racks) and to subsequently expand an AS 414-4-1H or AS 417-4-1H in a UR2-H rack into a redundant AS 414-4-2H or AS 417-4-2H system.

Connection of process I/Os

Several PROFIBUS DP lines with distributed process I/Os can be operated on each sub-AS through the internal PROFIBUS DP interface or by using additional communications processors.

The distributed ET 200M I/Os are connected through two IM 153-2 interface modules on a special bus module to two redundant PROFIBUS DP lines, and the intelligent field devices on the PROFIBUS PA are connected through a redundant DP/PA link with two IM 157 interface modules. The Y-link can also be used to connect non-redundant PROFIBUS DP devices to the redundant PROFIBUS DP.

A mixture of these configurations is also possible.

Communication through the plant bus

The redundant, fault-tolerant AS 414H and AS 417H automation systems are connected by one communications processor per sub-AS to the plant bus. The plant bus can be implemented in the form of a ring structure, which can also be configured with redundant architecture if the availability requirements are high. When there are two redundant rings it makes sense to use two communications processors per sub-AS and to distribute their connections between the two rings. Double faults such as OSM failure on ring 1 with simultaneous opening of the bus cable on ring 2 can thus be tolerated.

Function

The AS 414H and AS 417H models are the fault-tolerant automation systems for use with SIMATIC PCS 7. They are based on the 1-out-of-2 principle and switch to the backup system in the event of a fault. These systems use a completely redundant design to maximize availability. This means that all major components such as CPU, power supply and hardware for coupling the two CPUs are present in pairs. Which other components are also made available in pairs in the interest of availability depends on the particular automation task.

The two subsystems of a redundant automation system are electrically isolated from one another. This increases the system stability with respect to EMC interference. A redundant automation system can be installed mechanically in a one- or two-rack architecture. Automation systems are installed in two racks, for example, if the two parts of the automation system have to be physically separated from one another by a fire-resistant wall. Appropriate complete units are available for every type of application. Mixed operation of redundant and standard systems is also possible.

Selection and Ordering Data	Order No.
AS 414-4-1H automation system Prepared system with one CPU 414-4H for physically separated redundant systems, for F systems or for later upgrading to a redundant system Comprising: controller type 414-4-1H with 2 integrated interfaces (MPI/DP master and DP master), 1.4 MB main memory (0.7 MB each for program and data), memory card 2 MB RAM, 2 backup batteries, CP 443-1EX11 communications processor for connection to Industrial Ethernet plant bus as well as	
• UR1 rack (18 slots), without sync modules	
- PS 407 power supply; 10 A for 120/230 V AC/DC, redundant design possible	**6ES7 654-2MD47-0XX0**
- PS 407 power supply; 20 A for 120/230 V AC/DC	**6ES7 654-3MD47-0XX0**
- PS 405 power supply; 20 A for 24 V DC	**6ES7 654-6MD47-0XX0**
- Without power supply, without memory card	**6ES7 654-0MX47-0XX0**
• UR2 rack (9 slots), without sync modules	
- PS 407 power supply; 10 A for 120/230 V AC/DC, redundant design possible	**6ES7 654-2MD57-0XX0**
- PS 405 power supply; 10 A for 24 V DC	**6ES7 654-4MD57-0XX0**
- Without power supply, without memory card	**6ES7 654-0MX57-0XX0**

Selection and Ordering Data	Order No.
AS 414-4-2H automation system Complete fault-tolerant automation system with two CPUs 414-4H Comprising: controller type 414-4-2H with 2 x 2 integrated interfaces (MPI/DP master and DP master), 2 x 1.4 MB main memory (0.7 MB each for program and data), 2 memory cards with 2 MB RAM each, 4 backup batteries, two CP 443-1EX11 communications processors for connection to Industrial Ethernet plant bus as well as	
• UR2-H rack (2x 9 slots), without sync modules	
- 2x PS 407 power supply; 10 A for 120/230 V AC/DC, redundant design possible	**6ES7 654-2ND67-0XX0**
- 2x PS 405 power supply; 10 A for 24 V DC	**6ES7 654-4ND67-0XX0**
• UR2-H rack (2 x 9 slots), with 4 sync modules for distances up to 10 m and 2 fiberoptic sync cables, 1 m	
- 2x PS 407 power supply; 10 A for 120/230 V AC/DC, redundant design possible	**6ES7 654-2ND67-0XC0**
- 2x PS 405 power supply; 10 A for 24 V DC	**6ES7 654-4ND67-0XC0**
- Without power supply, without memory card	**6ES7 654-0NX67-0XC0**

Fault-tolerant automation systems

Selection and Ordering Data	Order No.
AS 417-4-1H automation system Prepared system with one CPU 417-4H for physically separated redundant systems, for F systems or for later upgrading to a redundant system Comprising: controller type 417-4-1H with 2 integrated interfaces (MPI/DP master and DP master), 20 MB main memory (10 MB each for program and data), 2 backup batteries, CP 443-1EX11 communications processor for connection to Industrial Ethernet plant bus as well as	
• UR1 rack (18 slots), without sync modules	
- PS 407 power supply; 10 A for 120/230 V AC/DC, redundant design possible, memory card 4 MB RAM	**6ES7 654-2RE47-0XX0**
- PS 407 power supply; 10 A for 120/230 V AC/DC, redundant design possible, memory card 16 MB RAM	**6ES7 654-2RG47-0XX0**
- PS 407 power supply; 20 A for 120/230 V AC/DC, memory card 4 MB RAM	**6ES7 654-3RE47-0XX0**
- PS 407 power supply; 20 A for 120/230 V AC/DC, memory card 16 MB RAM	**6ES7 654-3RG47-0XX0**
- PS 405 power supply; 20 A for 24 V DC, memory card 4 MB RAM	**6ES7 654-6RE47-0XX0**
- PS 405 power supply; 20 A for 24 V DC, memory card 16 MB RAM	**6ES7 654-6RG47-0XX0**
- Without power supply, without memory card	**6ES7 654-0RX47-0XX0**
• UR2 rack (9 slots), without sync modules	
- PS 407 power supply; 10 A for 120/230 V AC/DC, redundant design possible, memory card 4 MB RAM	**6ES7 654-2RE57-0XX0**
- PS 407 power supply; 10 A for 120/230 V AC/DC, redundant design possible, memory card 16 MB RAM	**6ES7 654-2RG57-0XX0**
- PS 405 power supply; 10 A for 24 V DC, memory card 4 MB RAM	**6ES7 654-4RE57-0XX0**
- PS 405 power supply; 10 A for 24 V DC, memory card 16 MB RAM	**6ES7 654-4RG57-0XX0**
- Without power supply, without memory card	**6ES7 654-0RX57-0XX0**

Selection and Ordering Data	Order No.
AS 417-4-2H automation system Complete fault-tolerant automation system with two CPUs 417-4H Comprising: controller type 417-4-2H with 2 x 2 integrated interfaces (MPI/DP master and DP master), 2 x 20 MB main memory (10 MB each for program and data), 4 backup batteries, two CP 443-1EX11 communications processors for connection to Industrial Ethernet plant bus as well as	
• UR2-H rack (2x 9 slots), without sync modules	
- 2x PS 407 power supply; 10 A for 120/230 V AC/DC, redundant design possible, memory card 4 MB RAM	**6ES7 654-2PE67-0XX0**
- 2x PS 407 power supply; 10 A for 120/230 V AC/DC, redundant design possible, memory card 16 MB RAM	**6ES7 654-2PG67-0XX0**
- 2x PS 405 power supply; 10 A for 24 V DC, memory card 4 MB RAM	**6ES7 654-4PE67-0XX0**
- 2x PS 405 power supply; 10 A for 24 V DC, memory card 16 MB RAM	**6ES7 654-4PG67-0XX0**
• UR2-H rack (2 x 9 slots), with 4 sync modules for distances up to 10 m and 2 fiberoptic sync cables, 1 m	
- 2x PS 407 power supply; 10 A for 120/230 V AC/DC, redundant design possible, memory card 4 MB RAM	**6ES7 654-2PE67-0XC0**
- 2x PS 407 power supply; 10 A for 120/230 V AC/DC, redundant design possible, memory card 16 MB RAM	**6ES7 654-2PG67-0XC0**
- 2x PS 405 power supply; 10 A for 24 V DC, memory card 4 MB RAM	**6ES7 654-4PE67-0XC0**
- 2x PS 405 power supply; 10 A for 24 V DC, memory card 16 MB RAM	**6ES7 654-4PG67-0XC0**
- Without power supply, without memory card	**6ES7 654-0PX67-0XC0**
Individual components of fault-tolerant automation systems	
CPU 414-4H Main memory 1.4 MB (0.7 MB each for program and data) Module occupies 2 slots	**6ES7 414-4HJ04-0AB0**
CPU 417-4H Main memory 20 MB (10 MB each for program and data) Module occupies 2 slots	**6ES7 417-4HL04-0AB0**
Sync module For linking the two CPUs 414-4H or 417-4H; two modules required per CPU For distances of up to	
• 10 m	**6ES7 960-1AA04-0XA0**
• 10 km	**6ES7 960-1AB04-0XA0** B)

B) Subject to export regulations: AL: N, ECCN: EAR99H

Selection and Ordering Data	Order No.
Sync cable (fiberoptic cable) For connecting the two CPUs 414-4H or 417-4H; each redundant automation system requires 2 cables	
• 1 m	**6ES7 960-1AA04-5AA0**
• 2 m	**6ES7 960-1AA04-5BA0**
• 10 m	**6ES7 960-1AA04-5KA0**
Other lengths	On request
Memory card RAM	
• 2 MB	**6ES7 952-1AL00-0AA0**
• 4 MB	**6ES7 952-1AM00-0AA0**
• 8 MB	**6ES7 952-1AP00-0AA0**
• 16 MB	**6ES7 952-1AS00-0AA0**
• 64 MB	**6ES7 952-1AY00-0AA0**
Memory card Flash-EPROM Only required to update firmware	
• 4 MB	**6ES7 952-1KM00-0AA0**
CP 443-1EX11 Communications processor for connection of SIMATIC S7-400 to Industrial Ethernet through TCP/IP and ISO; for S7 communication, S5-compatible communication (SEND/RECEIVE) with FETCH/WRITE with or without RFC 1006, 10/100 Mbit/s, with AUI/ITP and RJ45 connections, electronic manual on CD; module occupies 1 slot	**6GK7 443-1EX11-0XE0**
CP 443-5 Extended Communications processor for connection of SIMATIC S7-400 to PROFIBUS as DP master or for S7 communication, for increasing the number of DP lines, for data set routing with SIMATIC PDM and for 10-ms time stamp, electronic manual on CD; module occupies 1 slot	**6GK7 443-5DX04-0XE0**
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	**6ES7 407-0KA01-0AA0**
PS 407 power supply module; 10 A, redundant design possible 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	**6ES7 407-0KR00-0AA0**
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 3 slots	**6ES7 407-0RA01-0AA0**
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	**6ES7 405-0KA02-0AA0**

Selection and Ordering Data	Order No.
PS 405 power supply module; 10 A, redundant design possible 24 V DC; 5 V DC/10 A, 24 V DC/1 A; with battery compartment for 2 backup batteries, module occupies 2 slots	**6ES7 405-0KR00-0AA0**
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 3 slots	**6ES7 405-0RA01-0AA0**
Backup battery Type AA, 1.9 Ah	**6ES7 971-0BA00**
UR1 rack 18 slots	**6ES7 400-1TA01-0AA0**
UR2 rack 9 slots	**6ES7 400-1JA01-0AA0**
UR2-H rack For divided central controllers; 2 x 9 slots	**6ES7 400-2JA00-0AA0**
UR2 aluminium rack 9 slots	**6ES7 400-1JA11-0AA0**
UR2-H aluminium rack For divided central controllers; 2 x 9 slots	**6ES7 400-2JA10-0AA0**
Runtime licenses for libraries	
PCS 7 Library Blocks runtime license Valid for *one* SIMATIC PCS 7 automation system Trilingual (German, English, French) Type of delivery: Certificate of license	**6ES7 653-2BG06-2YB0**
Y-Link	
Y-Link For connection of devices with only one PROFIBUS DP interface to a fault-tolerant automation system	**6ES7 197-1LA02-0XA0**

Options

Y-link

- Bus coupler for transition from a redundant PROFIBUS DP master system to a single-channel PROFIBUS DP master system
- For connecting devices with only one PROFIBUS DP interface to the redundant PROFIBUS DP master system AS 414H/ AS 417H

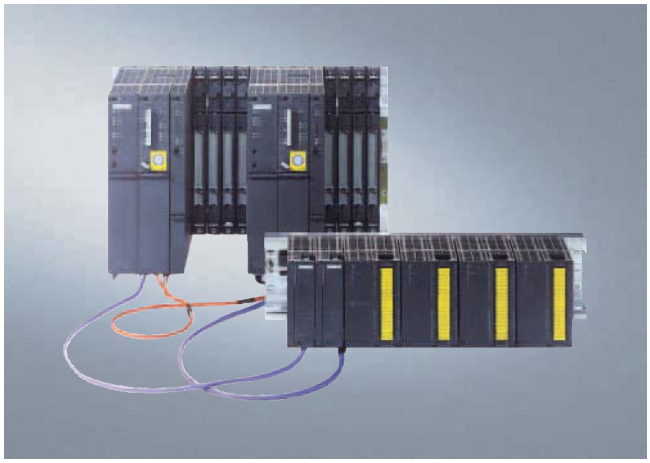
The Y-link comprises:

- 2 IM 157 interface modules
- 1 Y-coupler incl. RS 485 repeater
- 1 BM IM157 bus module
- 1 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.

Failsafe automation systems

Overview



Safety-oriented automation systems are used for critical applications in which an incident can result in danger to persons, plant damage or environmental pollution. These F/FH systems, frequently referred to as "failsafe automation systems", detect not only errors in the process but also their own internal errors, and will automatically set the plant to a safe state if an error is detected.

The safety-oriented automation systems based on AS 414H and AS 417H combine standard factory automation and safety engineering in a single system. They are TÜV-certified and comply with

- Safety Integrity Levels SIL 1 to SIL 3 according to IEC 61508,
- Requirement classes AK 1 to AK 6 according to DIN V 19250/DIN V VDE 0801 and
- Categories 2 to 4 according to EN 954-1.

The safety function configured by the user in CFC is executed twice in different parts of the processor by means of redundant, diversified command processing. Potential errors are then detected in the subsequent comparison of results.

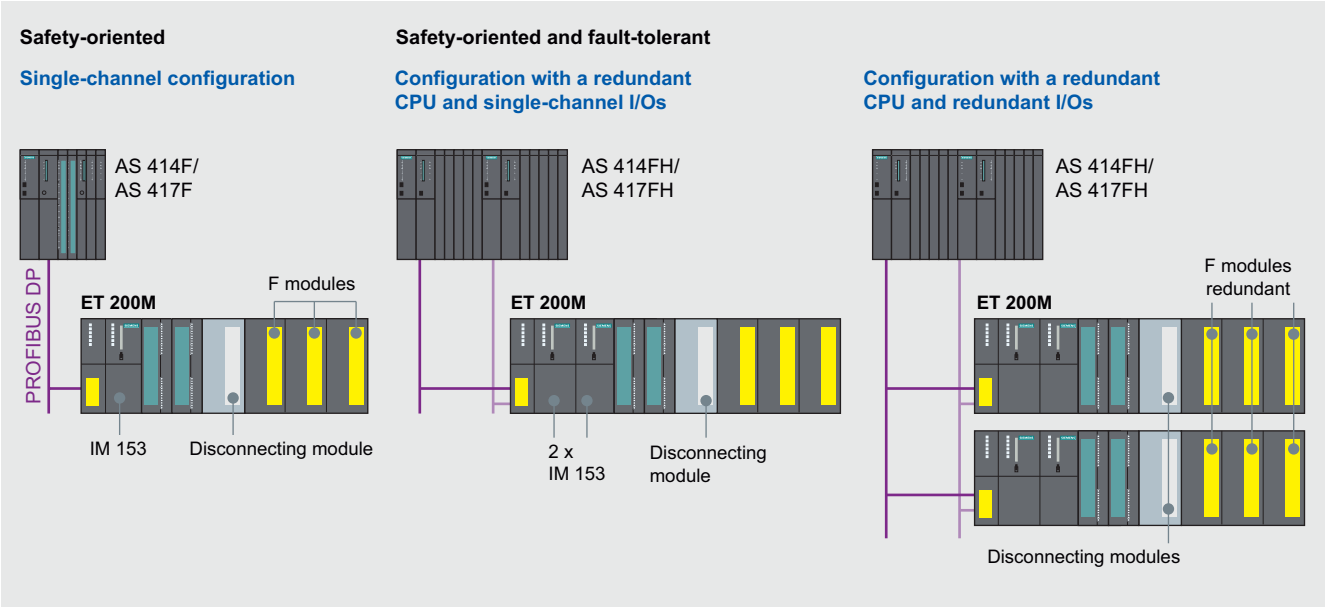
Safety-oriented automation systems can be designed as single-channel systems (F systems with one CPU) and redundant systems (FH systems).

The redundancy of the FH systems only serves to increase availability. It is not relevant to processing of the safety functions or the fault detection associated with this.

Benefits

- Use of standard SIMATIC S7 components for safety-oriented applications
- Safety levels SIL 3, AK 6 can be achieved with only one CPU
- Safe communication over PROFIBUS with PROFIsafe
- Safe communication over Industrial Ethernet plant bus
- Standard (S) and safety-oriented (F) functions can be mixed in the same automation system
- S and F I/Os can be operated on the same PROFIBUS DP segment
- Configuration of S and F functions with one engineering tool, CFC
- F programming tool (S7 F Systems) provides support for TÜV-acceptance:
  – Separation of S and F functions
  – Checksum for user program
  – Comparison function
  – Password-protected access to F functions
- Reduction in engineering costs through simple data exchange between standard systems and safety-oriented F/FH systems
- Minimum familiarization requirements because the same tools are used for standard and F/FH systems
- Simple fault analysis because the same HMI system is used for standard and F/FH systems (message sequence)
- Low hardware costs through mixed configurations; particularly suitable for small applications
- Minimization of lifecycle costs

Design



Different configurations for safety-oriented systems

The safety-oriented F/FH automation systems are based on the hardware of the fault-tolerant systems. The picture shows different configurations which comply with safety class SIL 3 (IEC 61508) or AK 6 (VDE 0801).

Function

Safety functions

The safety functions of the F/FH systems are present in the F program of the CPU and in the safety-oriented ET 200 I/O modules. The PROFIsafe profile is used for the safety-oriented PROFIBUS DP communication between CPU and process I/Os. Using this additional safety message, F/FH systems and F I/O modules can recognize corrupt data and can initiate appropriate error responses.

Standard modules as well as safety-oriented I/Os (F modules) can be used in F/FH systems. Standard and safety applications can thus be automated with one and the same system and configured with uniform standard tools.

Integrated in the SIMATIC Manager is the F engineering tool (S7 F Systems). This programming tool enables the parameterization of the CPU and the F signal modules as well as the generation of safety-oriented applications in the CFC based on predefined, TÜV-approved blocks. The safety-oriented blocks are extremely robust and intercept programming errors such as division by zero or out-of-range values. They save the user having to perform diverse programming tasks for detecting and reacting to errors. Functions such as the comparison of F programs, the detection of changes in F programming using a checksum, or password-based access protection provide further support and guarantee simple, safe operation.

The application program may contain safety-oriented (F) and standard programs (S), where strict separation of F and S program components together with data exchange by means special conversion blocks prevent conflicts. An error detected in the F program does not result in stopping of the CPU, but leads to triggering of configurable shutdown logic for the affected F sequence group or the entire F program. After the fault has been eliminated, the F program can be started again with the CPU still running.

Failsafe automation systems

Selection and Ordering Data

	Order No.
F-Runtime license For processing safety-oriented application programs, for one AS 414F/FH or AS 417F/FH system	**6ES7 833-1CC00-6YX0**
AS 414F/FH and AS 417F/FH Engineering (see chapter "Engineering system")	
S7 F Systems V5.2 F programming tool with F block library for programming safety-oriented user programs on the engineering system, comprising F program software and function block library, single license Bilingual (German, English) Type of delivery: Certificate of license as well as software and electronic documentation on CD	**6ES7 833-1CC00-0YX0**

Options

Ordering information

An AS 414H or AS 417H automation system is required as hardware for a safety-oriented AS 414F or AS 417F automation system.

The following H systems can be used depending on the type and design of the safety-oriented automation system:

- For safety-oriented systems (F systems): one AS 414-1H or AS 417-1H each
- For safety-oriented and fault-tolerant systems (FH systems):
  - the two subsystems on one subrack: one AS 414-2H or AS 417-2H each
  - the two subsystems on separate subracks: two AS 414-1H or AS 417-1H each

The following components are required in addition:

- F programming tool (S7 F Systems)
  F programming tool with F block library for programming safety-oriented user programs on the engineering system (see the chapter "Engineering system")
- F runtime license
  For processing safety-oriented application programs, for one AS 414F/FH or AS 417F/FH

Process I/O

12

Introduction

Overview

The SIMATIC PCS 7 process control system offers various possibilities for connecting I/O devices and for detecting and emitting process signals through sensors and actuators:

- Analog and digital I/O modules of the SIMATIC S7-400 operated centrally in the automation system
- Distributed ET 200M, ET 200S, ET 200iSP I/O systems with an extensive range of cost-effective signal and function modules, connected through PROFIBUS DP to the automation system (AS)
- Direct AS connection of intelligent, distributed field/process devices and operator terminals through PROFIBUS DP/PA (redundant or in hazardous zones 0, 1 or 2 also possible)

Signal groups of the SIMATIC S7-400 can be operated centrally in the automation system and are mainly used in small applications or systems of limited distributed expansion.

Characteristics such as

- modularity and consistency,
- flexible adaptability to the plant structure,
- minimum cabling and engineering requirements,
- low commissioning, servicing and lifecycle costs and a
- wide range of technical options

are the main reasons why distributed process peripherals are now predominant: ET 200 remote I/Os in conjunction with classical field/process devices and HART field devices or intelligent field/process devices directly on PROFIBUS.

Design

Integration of I/O modules in the hazardous area

The graphics show the various interfacing possibilities for the distributed I/Os of SIMATIC PCS 7 with consideration of various ambient conditions.

Ex I/O modules from the ET 200M range

The ET 200M can be run in Ex zone 2. The actuators/sensors can be positioned in Ex zone 1 when suitable Ex I/O modules are used. Hot swapping of I/O modules within Ex zone 2 is allowed with the right permit (e.g. fire certificate). FM approvals: Class I, Division 2 and Class I, Zone 2.

Field devices with PROFIBUS PA capability

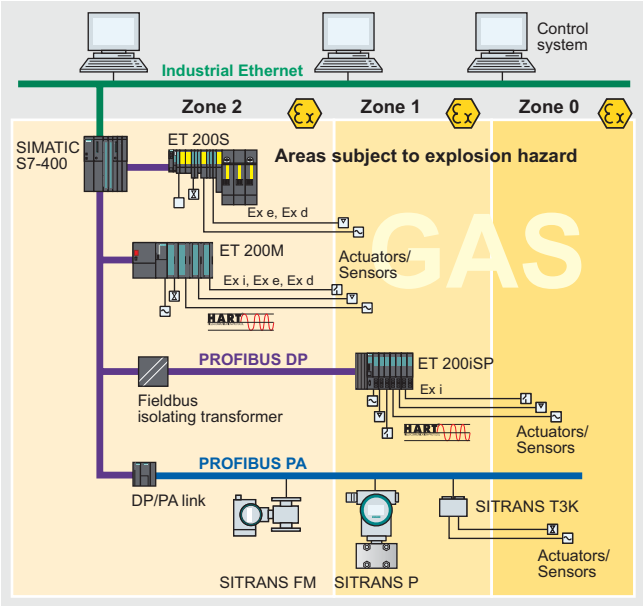
Using PROFIBUS it is possible to integrate field/process devices directly in Ex zone 1 or 2, and sensors/actuators can also be integrated in zone 0. FM approvals: Class I, Division 1 and Class I, Zone 0.

Integration of actuators/sensors using ET 200iSP

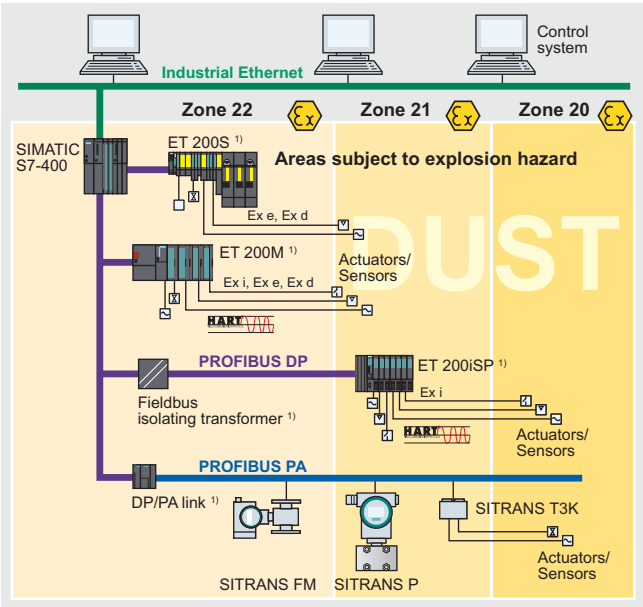
The ET 200iSP appropriate for gaseous and dusty atmospheres can be installed, according to CENELEC II 2 G (1) GD Eex d e [ib/ia] IIC T4 directly in the Ex zones 1, 2, 21 or 22 as well as in non-hazardous areas. The intrinsically-safe sensors, actuators and HART field devices can also be located in zone 0 or 20 if necessary.

Intrinsically-safe operator control unit

An intrinsically safe PC operator control unit can be used in hazardous areas, zone 1 or 2, if required. For further details on this operator control unit, see Catalog "Add Ons for the SIMATIC PCS 7 Process Control System".



ET 200 in potentially explosive gas atmospheres



ET 200 in potentially explosive dust atmospheres

1) Dusty atmosphere: Installation of components always in an enclosure with IP6x degree of protection. A manufacturer's declaration is required for installation in zone 22. Certification for the dusty area must be provided for installation in zone 21.

Function

Possible online modifications among the process I/Os	
ET 200M	• Adding of ET 200M stations • Adding of I/O modules for the station • Reparameterization of I/O modules • Parameterization of connected HART field devices with SIMATIC PDM
ET 200iSP	• Adding of ET 200iSP stations • Adding of modules for the station • Reparameterization of modules
ET 200S	• Adding of ET 200S stations
PROFIBUS DP, PROFIBUS PA	• Adding of PROFIBUS DP stations • Adding of DP/PA links and field devices • Parameterization of field devices with SIMATIC PDM

Overview

If required, signal modules from the SIMATIC S7-400 range can be used in the SIMATIC PCS 7 automation system. These modules are an alternative to distributed I/Os particularly for small applications or plants with limited distributed expansion.

The I/O modules listed in the order data from the S7-400 signal module range were selected for SIMATIC PCS 7.

Notes:

Apart from these selected modules it is also possible to use - with limitations in functions - all other I/O modules from the current S7-400 signal module range.

All the process data from the I/Os is available for PCS 7 engineering in the CFC and can be graphically linked to the signal names from the signal list. The diagnostics information is generated automatically when using the I/O modules listed below.

Integration in SIMATIC PCS 7 is limited to the process data when using other I/O components, i.e. the full range of diagnostics functions is not automatically available. These modules can therefore only be used meaningfully in SIMATIC PCS 7 if it is permissible to omit the diagnostics functions.

Online modifications and redundancy are not supported by the central I/O modules.

Technical specifications

Detailed technical data of the S7-400 modules can be found

- in the ST 70 catalog or
- in the Mall / CA 01 at "Industry automation systems / Controls / SIMATIC S7"

Selection and Ordering Data

	Order No	
SM 421 Digital Input Modules		
• 32 inputs, 24 V DC	**6ES7 421-1BL01-0AA0**	
• 32 inputs, 120 V AC/DC	**6ES7 421-1EL00-0AA0**	
• 16 inputs, 24 V DC, with process/diagnostics interrupt	**6ES7 421-7BH01-0AB0**	
• 16 inputs, 24 to 60 V AC/DC, with process/diagnostics interrupt	**6ES7 421-7DH00-0AB0**	
• 16 inputs, 120/230 V AC/DC, inputs according to IEC 1131-2 Type 2	**6ES7 421-1FH20-0AA0**	
SM 422 Digital Output Modules		
• 32 outputs; 24 V DC, 0.5 A	**6ES7 422-1BL00-0AA0**	
• 32 outputs, 24 V DC, 0.5 A; with diagnostics	**6ES7 422-7BL00-0AB0**	
• 16 outputs, 24 V DC; 2 A	**6ES7 422-1BH11-0AA0**	
• 16 outputs; relay contacts	**6ES7 422-1HH00-0AA0**	
• 16 outputs, 120/230 V AC; 2 A	**6ES7 422-1FH00-0AA0**	
SM 431 Analog Input Modules		
• 16 inputs, non-floating, 13 bit	**6ES7 431-0HH00-0AB0**	
• 8 inputs, floating, 13 bit	**6ES7 431-1KF00-0AB0**	
• 8 inputs, floating, 14 bit, with linearization (RTD/TC)	**6ES7 431-1KF10-0AB0**	
• 8 inputs, floating, 14 bit	**6ES7 431-1KF20-0AB0**	
• 16 inputs, floating, 16 bit; process interrupt capability, with diagnostics interrupt	**6ES7 431-7QH00-0AB0**	
• 8 inputs, floating, 16 bit; process interrupt capability, for thermocouples, with diagnostics interrupt	**6ES7 431-7KF00-0AB0**	
• 8 inputs, floating, 16 bit; process interrupt capability, for thermal resistors, with diagnostics interrupt	**6ES7 431-7KF10-0AB0**	
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	**6ES7 432-1HF00-0AB0**	
Front Connector (1 unit)		
• With screw contacts	**6ES7 492-1AL00-0AA0**	
• With spring clamps	**6ES7 492-1BL00-0AA0**	
• With crimp contacts	**6ES7 492-1CL00-0AA0**	B)

B) Subject to export regulations: AL: N, ECCN: EAR99H

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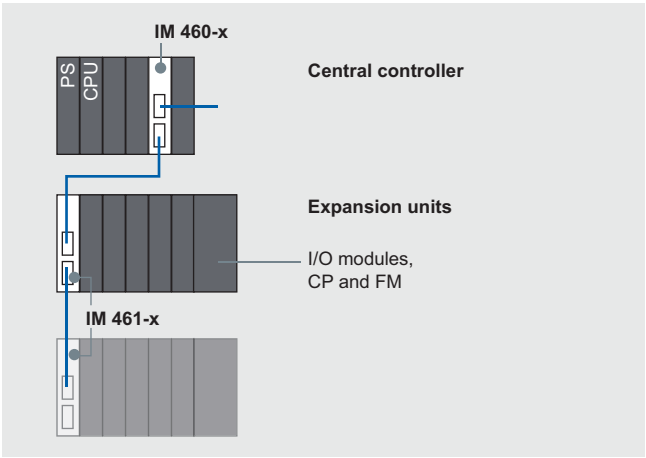
Expansion units for central I/O

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 normal operation

Subracks

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.

Selection and Ordering Data

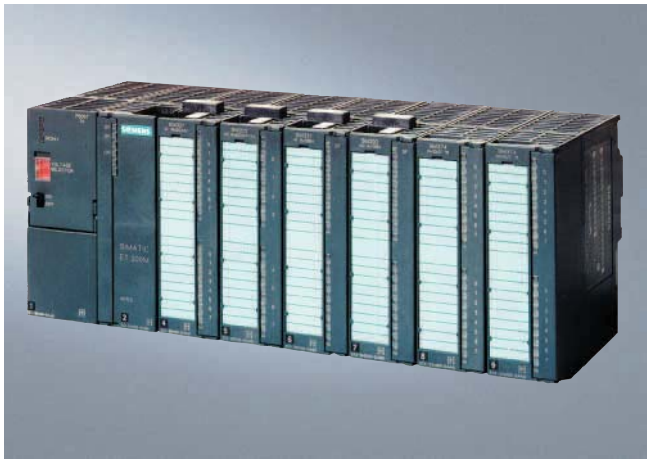
	Order No.
IM 460-0 interface module • Transmitter module for central controller • Without transmission of voltage to the expansion unit • Cable up to 5 m long • With K-bus for communication with CPs and FMs in the expansion unit • For connecting as many as 8 expansion units	**6ES7 460-0AA01-0AB0**
IM 461-0 interface module Corresponding receiver module for the expansion unit	**6ES7 461-0AA01-0AA0**
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	**6ES7 460-1BA01-0AB0**
IM 461-1 interface module Corresponding receiver module for the expansion unit	**6ES7 461-1BA01-0AA0**

Selection and Ordering Data

	Order No.
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	**6ES7 460-3AA01-0AB0**
IM 461-3 interface module Corresponding receiver module for the expansion unit	**6ES7 461-3AA01-0AA0**
UR1 rack for central controllers and expansion units • 18 slots • Suitable for redundant power supply	**6ES7 400-1TA01-0AA0**
UR2 rack for central controllers and expansion units • 9 slots • Suitable for redundant power supply	**6ES7 400-1JA01-0AA0**
Accessories	
468-1 connecting cable for connecting IM 460-0 and IM 461-0; IM 460-3 and IM 461-3	
• 0.75 m	**6ES7 468-1AH50-0AA0**
• 1.5 m	**6ES7 468-1BB50-0AA0**
• 5 m	**6ES7 468-1BF00-0AA0**
Additional lengths for connecting IM 460-3 and IM 461-3	
• 10 m	**6ES7 468-1CB00-0AA0**
• 25 m	**6ES7 468-1CC50-0AA0**
• 50 m	**6ES7 468-1CF00-0AA0**
• 100 m	**6ES7 468-1DB00-0AA0**
Terminator for IM 461-0	**6ES7 461-0AA00-7AA0**
468-3 connecting cable for connecting IM 460-1 and IM 461-1	
• 0.75 m	**6ES7 468-3AH50-0AA0**
• 1.5 m	**6ES7 468-3BB50-0AA0**

Introduction

Overview



The ET 200M distributed I/O stations are the line of choice from the ET 200 family for process control applications with SIMATIC PCS 7.

The ET 200M line contains a diversified selection of I/O modules in S7-300 design, some with special I&C functions:

- Standard analog and digital input/output modules
- Redundant input/output modules (DI 16 x 24 V DC, with diagnostics capability; DO 32 x 24 V DC/0.5 A; AI 8 x 12 bit)
- Input/output modules with enhanced diagnostics capability
- Ex input/output modules
- Controller and counter modules
- HART modules
- F modules for fail-safe applications

When active bus modules are used, defective I/O modules can be replaced during operation of the plant without neighboring modules being affected (hot swapping function).

The following actions are possible in RUN mode of the automation system:

- Adding of new modules within a station
- Reparameterization of modules
- Adding of ET 200M stations

The connected HART field devices can be parameterized through 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 S7-300 signal module range.

Design

The ET 200M distributed I/O station consists of

- 1 or 2 (redundant) power supply modules,
- 1 or 2 (redundant) IM 153 interface modules for connecting through PROFIBUS DP with data transfer rates up to 12 Mbit/s
- up to 8 I/O modules for connecting the sensor/actuator technology

All I/O modules are optically isolated from the backplane bus. Up to 8 I/O modules can be connected to one interface module. The interface modules can be also be configured for a redundant architecture if required.

In addition to the SIMATIC S7 standard input/output modules there are special IC I/O modules whose functions include the following:

- channel-specific diagnostics, e.g. wire break, short-circuit, overflow/underflow values
- internal module monitoring, e.g. parameterizaiton error, RAM error, fuse drop
- chatter monitoring for transducers
- pulse extension
- output of a parameterizable substitute value when the CPU fails

The modules with diagnostics capability automatically send the corresponding signal to the operator system when a fault occurs, enabling the problem to be solved quickly and easily.

The ET 200M can be run in standard environments or in Ex zone 2. The actuators/sensors can be positioned in Ex zone 1 when suitable Ex I/O modules are used. The hot swapping of I/O modules within Ex zone 2 is allowed with the right permit (e.g. fire certificate).

Technical specifications

Detailed technical data on ET 200M and S7-300 signal modules can be found

- in the ST 70 catalog or
- in the Mall / CA 01 at "Industry automation systems / Controls / SIMATIC S7"

Options

SIPLUS extreme series for enhanced temperature ranges and corrosive environments

The "standard" properties of a single device or system are often insufficient for harsh environmental conditions, applications in corrosive environments, or extreme temperature ranges. The environment in which the units are used could result in limitations in functions or operational safety, or even total failure of the system.

The SIPLUS extreme series offers individually adapted standard products which enable you to retain reliable working of your plant or process even under extreme conditions of use. These include:

- Environmental temperature range from -25°C to +60/+70°C
- Condensation, high humidity
- Increased mechanical stress
- Exceptional loading by media, e.g. toxic gas atmosphere
- Voltage ranges differing from standard ranges
- Enhanced degree of protection (dust, water)

You can find a summary on the Internet of the available product range classified according to the special features. The corresponding SIPLUS product is assigned to each standard product. Note: SIPLUS products are also included in Catalog ST 70.

Additional informationen is available in the Internet under:

http://www.siemens.com/siplus

Power supply

Overview

The PS 307 or PS 305 load power supply is used to supply power to the ET 200M. There is a choice of input voltages and output currents (120/230 V AC with 2 A, 5 A or 10 A, or 24...110 V DC with 2 A) to suit the field of application.

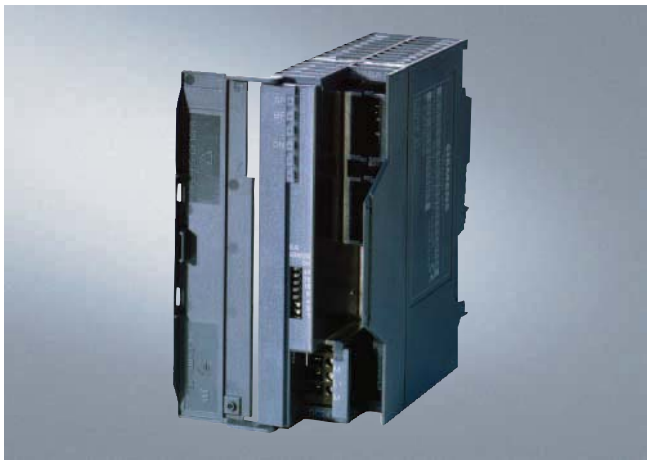
With a redundant connection of the ET 200M we recommend that you also use a redundant 24 V DC supply, e.g. with 2 load power supplies PS 307 / PS 305.

Selection and Ordering Data

	Order No.
PS 307 Load Power Supply Including connection assembly;	
• 120/230 V AC; 24 V DC	
- 2 A; 50 mm wide	**6ES7 307-1BA00-0AA0**
- 5 A; 80 mm wide	**6ES7 307-1EA00-0AA0**
- 5 A, extended temperature range; 80 mm wide	**6ES7 307-1EA80-0AA0**
- 10 A, 200 mm wide	**6ES7 307-1KA01-0AA0**
PS 305 Load Power Supply Including connection assembly;	
• 24/48/60/110 V DC; 24 V DC	
- 2 A, extended temperature range; 80 mm wide	**6ES7 305-1BA80-0AA0**

Interface modules

Overview



An IM 153-2 High Feature interface module is needed to connect the ET 200M to the PROFIBUS DP fieldbus. It supports the following functions:

- HART configuring of intelligent field devices,
- configuration of ET 200M I/Os in RUN mode of the automation system,
- connection to redundant AS 414H / AS 417H automation systems,
- use of ET 200M function modules (controller and counter modules).

This interface module is also available in a fiberoptic (FO) version for connecting to an optical PROFIBUS.

Note:
Additional plastic fiberoptic cables and an assembly set for Simplex connectors are required in order to use the IM 153-2 FO (see "Plastic fiberoptic cables in the Section "Communications/PROFIBUS")
In order to use the hot swapping function, you must also use the active bus module and the profile rail for hot swapping (see following Section "Accessories").

Selection and Ordering Data

	Order No.	
IM 153-2 High Feature Slave interface module for connection of an ET 200M to PROFIBUS DP, with time stamp (accuracy 5 ms), support of HART functionality, F modules, FM modules, "Configuration in RUN" function; also for use in redundant systems	**6ES7 153-2BA00-0XB0**	
IM 153-2 FO High Feature Slave interface module for connection of an ET 200M to optical PROFIBUS DP; support of HART functionality, F modules, FM modules, "Configuration in RUN" function; also for use in redundant systems	**6ES7 153-2BB00-0XB0**	B)

B) Subject to export regulations: AL: N, ECCN: EAR99H

Overview

Following components are available as accessories for the ET 200M:

- Bus modules for hot swapping
- Profile rails for hot swapping
- Covers for bus backplanes and bus modules
- Front connectors
- Ex partition for ET 200M
- LK 393 cable duct

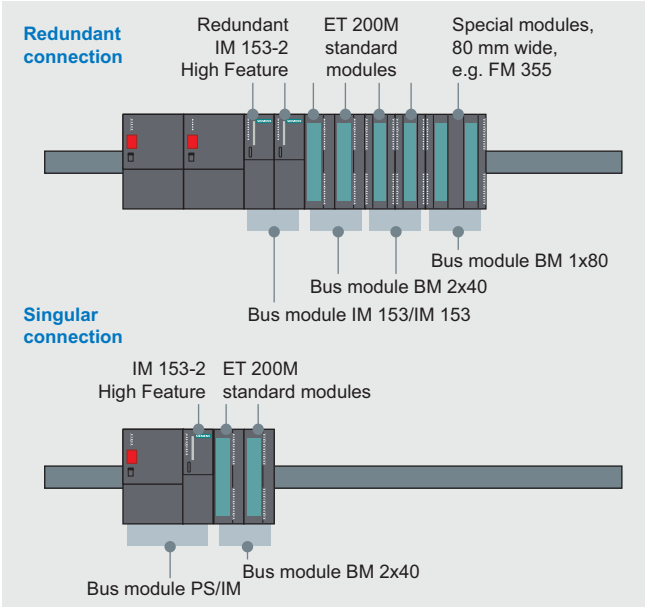
Ex partition

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 the ET 200M distributed I/O system.

LK 393 cable duct

The LK 393 cable duct guarantees 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 picture shows the various bus modules being used for hot swapping. Top: for redundant connection, Bottom: for singular connection.

Selection and Ordering Data

	Order No.
Bus Modules for Hot Swapping	
• BM PS/IM for power supply and IM 153, incl. 1 bus module cover	**6ES7 195-7HA00-0XA0**
• BM 2x40 for 2 modules, each 40 mm wide	**6ES7 195-7HB00-0XA0**
• BM 1x80 for 1 module, 80 mm wide	**6ES7 195-7HC00-0XA0**
• IM 153/IM 153 for two IM 153-2/-2 FOs for design of redundant systems	**6ES7 195-7HD10-0XA0**
Profile Rail for Hot Swapping	
• 482 mm long (19 inches)	**6ES7 195-1GA00-0XA0**
• 530 mm long	**6ES7 195-1GF30-0XA0**
• 630 mm long	**6ES7 195-1GG30-0XA0**
Covers	**6ES7 195-1JA00-0XA0**
Pack with 4 backplane bus covers and 1 bus module cover	
Front Connector (1 pcs)	
• 20-pin, with screw contacts	**6ES7 392-1AJ00-0AA0**
• 20-pin, with spring contacts	**6ES7 392-1BJ00-0AA0**
• 40-pin, with screw contacts	**6ES7 392-1AM00-0AA0**
• 40-pin, with spring contacts	**6ES7 392-1BM01-0AA0**
Front connector for Ex analog input module 6ES7 331-7SF00-0AB0 (1 pcs)	**6ES7 392-1AJ20-0AA0**
• 20-pin, with screw contacts enables an accuracy of ± 1.5 K for the internal reference point temperature when taking thermoelement temperature measurements in the measuring mode "internal compensation" at ambient temperatures of 0 ... 60 °C	
Ex partition for ET 200M	**6ES7 195-1KA00-0XA0**
• Separation of IM 153 and downstream Ex modules within an ET 200M line	
• Mixed operation of non-Ex and Ex modules within an ET 200M line	
• for supporting the hot swapping function in connection with IM 153-2	
LK 393 cable duct	**6ES7 393-4AA00-0AA0**
[EEx ib] IIC-conform routing of load voltage cable in front plug, 5 pcs	

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Bundles

Overview

The following preassembled bundles are available for ET 200M:

- I/O Subsystem ZuS:
  ET 200M with hot swapping of modules, comprising
  - profile rail for active bus modules,
  - PS/IM bus module and
  - IM 153-2 High Feature bus interface module
- IM 153 redundancy bundle:
  comprising two IM 153-2 High Feature bus modules and one active IM 153/IM 153 bus module, for operating the ET 200M on the fault-tolerant AS 414H / AS 417H automation system.

Selection and Ordering Data

Order No.

	Order No.	Price
I/O Subsystem ZuS ET 200M with hot swapping of modules, comprising profile rail for active bus modules size 482 mm (19 inches), PS/IM bus module and		
• IM 153-2 High Feature bus interface module for support of HART functionality, F modules, FM modules, "Configuration in RUN" function; also for use in redundant systems	**6ES7 654-0XX06-1XA0**	B)
IM 153 Redundancy Bundle comprising two IM 153-2 High Feature bus modules and one active IM 153/IM 153 bus module, for operating the ET 200M on the fault-tolerant AS 414H / AS 417H automation system	**6ES7 153-2AR01-0XA0**	B)

B) Subject to export regulations: AL: N, ECCN: EAR99H

Overview

The digital input modules described here break down into

- simple signal modules for direct and alternating voltage, and
- modules with diagnostics capability that automatically output a corresponding message to the operator system in the event of a fault.

Selection and Ordering Data

	Order No.	
SM 321 for floating contacts (with DC supply)		
• 16 inputs, 24 V DC - Electrically isolated in groups of 16, **redundant design possible** - Required front connector: 20-pin	**6ES7 321-1BH02-0AA0**	
• 16 inputs, 24 V DC - Electrically isolated in groups of 16; active low - Required front connector: 20-pin	**6ES7 321-1BH50-0AA0**	
• 16 inputs, 24 V DC, high speed - Electrically isolated in groups of 16 - 0.05 ms input delay - Required front connector: 20-pin	**6ES7 321-1BH10-0AA0**	
• 32 inputs, 24 V DC - Electrically isolated in groups of 16, **redundant design possible** - Required front connector: 40-pin	**6ES7 321-1BL00-0AA0**	
• 16 inputs, 48...125 V DC - Electrically isolated in groups of 8 - Required front connector: 20-pin	**6ES7 321-1CH20-0AA0**	B)
SM 321 for floating contacts (with DC/AC supply)		
• 16 inputs, 24...48 V AC/DC - Electrically isolated in groups of 1 - Required front connector: 40-pin	**6ES7 321-1CH00-0AA0**	B)
SM 321 for floating contacts (with AC supply)		
• 32 inputs, 120 V AC - Electrically isolated in groups of 8 - Required front connector: 40-pin	**6ES7 321-1EL00-0AA0**	

Selection and Ordering Data

	Order No.	
• 8 inputs, 120/230 V AC - Electrically isolated in groups of 2, **redundant design possible** - Required front connector: 20-pin	**6ES7 321-1FF01-0AA0**	B)
• 16 inputs, 120/230 V AC, electrically isolated in groups of 4 Required front connector: 20-pin	**6ES7 321-1FH00-0AA0**	
SM 321 for non-floating contacts (with AC supply)		
• 8 inputs, 120/230 V AC - Electrically isolated in groups of 1 - Required front connector: 40-pin	**6ES7 321-1FF10-0AA0**	B)
SM 321 modules with diagnostics capability (IM 153-2 High Feature interface module required) For floating contacts (with DC supply)		
• 16 inputs, 24 V DC - Electrically isolated in groups of 16, **redundant design possible** - **Time stamp in connection with IM 153-2 High Feature, 5 ms accuracy, rising or falling edge, channelselective parameterization possible** - Two short-circuit-proof sensor power supplies, each for 8 channels - Sensor power supply through the module; external redundant sensor power supply also possible - Diagnostics of missing sensor power supply for channel group (8 channels) - Module-internal diagnostics - Wire break monitoring - Required front connector: 20-pin	**6ES7 321-7BH01-0AB0**	
• 16 inputs, NAMUR - Electrically isolated in groups of 8, **redundant design possible** - **Time stamp in connection with IM 153-2 High Feature, 5 ms accuracy, rising or falling edge, channelselective parameterization possible** - Two sensor power supplies (each 8.2 V DC or 18 V DC) - Connection of NAMUR sensors or contacts with resistor circuit - Pulse stretching - Channel-selective diagnostics (short-circuit, wire break, chatter monitoring, discrepancy with changeover contacts) - Module-internal diagnostics - Required front connector: 40-pin	**6ES7 321-7TH00-0AB0**	

B) Subject to export regulations: AL: N, ECCN: EAR99H

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DO - digital output modules

Overview

The digital output modules described here break down into

- simple signal modules for DC and AC voltage with different output currents per channel, with a selection of relay modules available for higher output currents and voltages,
- modules with diagnostics capability that supply data for troubleshooting and enable parameterizable reactions to a failure of the automation system.

Selection and Ordering Data

	Order No.	
SM 322 for DC voltage (suitable for solenoid valves, contactors, indicator lights etc.)		
• 8 outputs, 24 V DC / 2 A - Electrically isolated in groups of 4, **redundant design possible** - Required front connector: 20-pin	**6ES7 322-1BF01-0AA0**	
• 16 outputs, 24 V DC / 0.5 A - Electrically isolated in groups of 8 - Required front connector: 20-pin	**6ES7 322-1BH01-0AA0**	
• 16 outputs, 24 V DC / 0.5 A, high speed - Electrically isolated in groups of 8 - Max. output delay 0.2 ms - Required front connector: 20-pin	**6ES7 322-1BH10-0AA0**	
• 32 outputs, 24 V DC / 0.5 A - Electrically isolated in groups of 8, **redundant design possible** - Required front connector: 40-pin	**6ES7 322-1BL00-0AA0**	
• 8 outputs, 48...125 V DC / 1.5 A - Electrically isolated in groups of 4 - Required front connector: 20-pin	**6ES7 322-1CF00-0AA0**	B)
SM 322 for AC voltage (suitable for AC magnet coils, contactors, motor starters, miniature motors and indicator lights)		
• 8 outputs, 120/230 V AC / 2 A - Electrically isolated in groups of 4, **redundant design possible** - Required front connector: 20-pin	**6ES7 322-1FF01-0AA0**	B)
• 16 outputs, 120/230 V AC / 1 A - Electrically isolated in groups of 8 - Required front connector: 20-pin	**6ES7 322-1FH00-0AA0**	
• 32 outputs, 120/230 V AC / 1 A - Electrically isolated in groups of 8 - Required front connector: 2 x 20-pin	**6ES7 322-1FL00-0AA0**	B)

B) Subject to export regulations: AL: N, ECCN: EAR99H

Selection and Ordering Data — Order No.

SM 322 for relay output (suitable for AC/DC solenoid valves, contactors, motor starters, miniature motors and indicator lights)

- 8 outputs, 24...120 V DC, 48...230 V AC / max. 2 A
  - Electrically isolated in groups of 2
  - Required front connector: 20-pin

  6ES7 322-1HF01-0AA0
- 8 outputs, 24...120 V DC, 48...230 V AC / max. 5 A
  - Electrically isolated in groups of 1
  - Required front connector: 40-pin

  6ES7 322-1HF10-0AA0
- 16 outputs, 24...120 V DC, 48...230 V AC / max. 2 A
  - Electrically isolated in groups of 8
  - Required front connector: 20-pin

  6ES7 322-1HH01-0AA0

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
  - Electrically isolated in groups of 8, **redundant design possible**
  - Two connections per output (with and without series diode)
  - Connection of channel-specific substitute value in event of CPU stop (parameterizable)
  - Wire break monitoring per channel
  - Load voltage monitoring per channel
  - Short-circuit monitoring for M/L+ per channel
  - Module-internal diagnostics functions
  - Required front connector: 20-pin

  6ES7 322-8BF00-0AB0
- 16 outputs, 24 V DC / 0.5 A
  - Electrically isolated in groups of 4
  - Connection of channel-specific substitute value in event of CPU stop (parameterizable)
  - Wire break monitoring per channel (with 0 and 1 signal)
  - Signal when output is overloaded
  - Monitoring of load voltage or ground per channel group
  - Short-circuit monitoring for M/L+ per channel
  - Module-internal diagnostics functions
  - Required front connector: 40-pin

  6ES7 322-8BH01-0AB0

Selection and Ordering Data — Order No.

For AC voltage (suitable for AC magnet coils, contactors, motor starters, miniature motors and indicator lights)

- 8 outputs, 120/230 V AC / 2 A
  - Electrically isolated in groups of 1
  - Connection of channel-specific substitute value in event of CPU stop (parameterizable)
  - Module-internal diagnostics functions
  - Required front connector: 40-pin

  6ES7 322-5FF00-0AB0 B)
- 16 outputs, 24/48 V AC/DC / 0.5 A
  - Electrically isolated in groups of 1
  - Connection of channel-specific substitute value in event of CPU stop (parameterizable)
  - Module-internal diagnostics functions
  - Required front connector: 40-pin

  6ES7 322-5GH00-0AB0 B)

For relay output (suitable for AC/DC magnet coils, contactors, motor starters, miniature motors and indicator lights)

- 8 outputs, 24...120 V DC, 24...230 V AC / max. 5 A
  - Electrically isolated in groups of 1
  - With RC quenching element for protecting the contacts per channel
  - Connection of channel-specific substitute value in event of CPU stop (parameterizable)
  - Module-internal diagnostics functions
  - Required front connector: 40-pin

  6ES7 322-5HF00-0AB0 B)

B) Subject to export regulations: AL: N, ECCN: EAR99H

12

AI - analog input modules

Overview

The analog input modules described here break down into

- multi-function modules for current, voltage and temperature measurements, and
- 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 331-1KF01-0AB0. With the latter module, channel failure is identified by the PCS 7 analog driver block.

The individual channels of the analog input modules can be parameterized in groups independently of each other.

Selection and Ordering Data

	Order No.	
SM 331 modules for current, voltage and temperature measurements		
• 8 inputs, individually parameterizable - Resolution 12 bit + sign - Current measurement 0/4...20 mA (8 channels; 2 wires with external supply or 4 wires) - Voltage measurement (8 channels) - Resistance thermometer Pt100, Ni100, Ni1000, LG-Ni1000 (8 channels; 2, 3 or 4 wires) - Required front connector: 40-pin	**6ES7 331-1KF01-0AB0**	
• 8 inputs in 4 channel groups, **redundant design possible** - Changeover of measurement type by range module per channel group - Resolution 14 bit + sign - Current measurement 0/4...20 mA (8 channels; 2 or 4 wires) - Voltage measurement (8 channels) - Resistance thermometer Pt100, Ni100 (4 channels, 2 or 4 wires) - Thermocouples type E, N, J, K, L (8 channels), internal compensation or external compensation with compensating box or 0 °C cold junction - Wire break monitoring - Module-internal diagnostics - Required front connector: 20-pin	**6ES7 331-7KF02-0AB0**	
• 2 inputs in 1 channel group - Changeover of measurement type by range module - Resolution 14 bit + sign - Current measurement 0/4...20 mA (2 channels; 2 or 4 wires) - Voltage measurement (2 channels) - 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 - Module-internal diagnostics - Required front connector: 20-pin	**6ES7 331-7KB02-0AB0**	B)
SM 331 modules for current and voltage measurement		
• 8 inputs in 4 channel groups, **redundant design possible** - Resolution 15 bit + sign - Current measurement 0/4...20 mA (8 channels; 2 or 4 wires) - Voltage measurement (8 channels) - Wire break monitoring - Module-internal diagnostics - Required front connector: 40-pin	**6ES7 331-7NF00-0AB0**	B)
• 8 inputs in 4 channel groups - Resolution 15 bit + sign - Fast module cycle (min. 10 ms for 4 channels) - Current measurement 0/4...20 mA (8 channels; 2 wires with external supply or 4 wires) - Voltage measurement (8 channels) - Wire break monitoring - Short-circuit-proof - Isolation between channel groups - Module-internal diagnostics - Required front connector: 40-pin	**6ES7 331-7NF10-0AB0**	B)
SM 331 modules for temperature measurement		
• 8 inputs in 4 channel groups - Resolution 15 bit - Resistance thermometer Pt100...1000, Ni100...1000, Cu10 (8 channels; 2, 3 or 4 wires) - Short-circuit-proof - Wire break monitoring - Module-internal diagnostics - Required front connector: 40-pin	**6ES7 331-7PF01-0AB0**	B)
• 8 inputs in 4 channel groups - Resolution 15 bit - 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 - Fast module cycle (10 ms for 4 channels) - Short-circuit-proof - Wire break monitoring - Module-internal diagnostics - Required front connector: 40-pin	**6ES7 331-7PF11-0AB0**	

B) Subject to export regulations: AL: N, ECCN: EAR99H

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Overview

The analog output modules for voltage and current described here break down into

- modules with 12 bit resolution and various numbers of channels, and
- a high-precision module with 15 bit resolution.

The analog output modules can be parameterized in groups independently of each other and automatically supply all channel-specific and module-internal diagnostics data.

Selection and Ordering Data

	Order No.	
SM 332 modules for current and voltage outputs		
• 2 outputs in 2 channel groups - Resolution 12 bit + sign - Voltage 0/1...5/10 V; ±10 V (2 channels; 2 or 4 wires) - Current 0/4...20 mA; ±20 mA (2 channels; 2 wires) - Parameterizable substitute value output in case of CPU stop - Wire break monitoring (only for current) - Short-circuit monitoring (only for voltage) - Module-internal diagnostics - Required front connector: 20-pin	**6ES7 332-5HB01-0AB0**	
• 4 outputs in 4 channel groups, **redundant design possible** - Resolution 12 bit + sign - Voltage 0/1...5/10 V; ±10 V (4 channels; 4 wires) - Current 0/4...20 mA; ±20 mA (4 channels; 2 wires) - Parameterizable substitute value output in case of CPU stop - Wire break monitoring (only for current) - Short-circuit monitoring (only for voltage) - Module-internal diagnostics - Required front connector: 20-pin	**6ES7 332-5HD01-0AB0**	
• 8 outputs in 8 channel groups, **redundant design possible** - Resolution 12 bit + sign - Voltage 0/1...5/10 V; ±10 V (8 channels; 4 wires) - Current 0/4...20 mA; ±20 mA (8 channels; 2 wires) - Parameterizable substitute value output in case of CPU stop - Wire break monitoring (only for current) - Short-circuit monitoring (only for voltage) - Module-internal diagnostics - Required front connector: 40-pin	**6ES7 332-5HF00-0AB0**	
• 4 outputs in 4 channel groups - Resolution 15 bit + sign - Voltage 0/1...5/10 V; ±10 V (4 channels; 4 wires) - Current 0/4...20 mA; ±20 mA (4 channels; 2 wires) - Parameterizable substitute value output in case of CPU stop - Isolated by channel - Module-internal diagnostics - Required front connector: 20-pin	**6ES7 332-7ND02-0AB0**	B)

B) Subject to export regulations: AL: N, ECCN: EAR99H

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Ex modules [EEi xb]

Overview

The following analog and digital I/O 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 circuit of the process. Sensors and actuators suitable for placing in zone 1 and 2 hazardous areas as well as intrinsically safe equipment compliant with DIN 50020 and [EEx ib] IIC can be operated from 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 322-5RD00-0AB0, 6ES7 331-7RD00-0AB0) can also be operated in redundant mode when used in non-hazardous plants.

Selection and Ordering Data

Order No.

Ex digital modules

Ex digital input module

- 4 NAMUR inputs in 4 channel groups, **redundant design possible**
  - Voltage supply to sensors 8.2 V
  - Individual electrically isolated channels
  - Wire break and short-circuit monitoring (directly at the contact for contacts with external resistor circuit)
  - Module-internal diagnostics
  - Required front connector: 20-pin

6ES7 321-7RD00-0AB0

Ex digital output module

- 4 outputs, 24 V DC / 10 mA in 4 channel groups, **redundant design possible**
  - Individual electrically isolated channels
  - Wire break monitoring
  - Short-circuit monitoring
  - Module-internal diagnostics
  - Required front connector: 20-pin

6ES7 322-5SD00-0AB0

- 4 outputs, 15 V DC / 20 mA in 4 channel groups, **redundant design possible**
  - Individual electrically isolated channels
  - Wire break monitoring
  - Short-circuit monitoring
  - Module-internal diagnostics
  - Required front connector: 20-pin

6ES7 322-5RD00-0AB0

Selection and Ordering Data

Order No.

Ex analog modules

Ex analog input module

- 4 inputs, 0/4...20 mA in 4 channel groups, **redundant design possible**
  - 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
  - Module-internal diagnostics
  - Required front connector: 20-pin

6ES7 331-7RD00-0AB0

- 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
  - Module-internal diagnostics
  - Required front connector: 20-pin

6ES7 331-7SF00-0AB0

Note:
A special front connector for the Ex analog input module 6ES7 331-7SF00-0AB0 enables greater accuracy when making thermocouple temperature measurements in "internal compensation" measuring mode (see the section "Accessories").

Ex analog output module

- 4 outputs, 0/4...20 mA in 4 channel groups
  - Individual electrically isolated channels
  - Resolution 15 bit
  - for 2-wire transmitters
  - Wire break monitoring
  - Module-internal diagnostics
  - Required front connector: 20-pin

6ES7 332-5RD00-0AB0

For further Ex modules, see the following section "Modules with HART".

Overview

The modules with HART (Highway Addressable Remote Transducer) which can be used in ET 200M distributed I/O devices (with IM 153-2 High Feature interface module) enable HART devices to be connected to SIMATIC PCS 7 automation systems.

All transmitters and HART actuators that are certified for digital communication with the HART protocol can be connected through these modules.

In addition, conventional transmitters with 4 to 20 mA technology 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 do not require additional engineering. Plain text messages output on the operator station provide information on faults and modifications in the HART parameterization.

Homogenous integration into the SIMATIC PDM Process Device Manager and the PCS 7 Asset Management enables intuitive online diagnostics and parameterization of all connected field devices from a central point.

Function

HART is a serial transfer procedure which is used to transfer additional parameter data, such as measurement range, damping etc. to connected transmitters and actuators through a 4 to 20 mA current loop. The HART jobs can be initiated remotely for each channel over PROFIBUS DP. This usually takes place from the central engineering system of the SIMATIC PCS 7 process control system using SIMATIC PDM.

The modules with HART have the following characteristics:

- Connection compatibility with conventional analog modules of the ET 200M
- Additional communication option through the current loop
- 8 analog channels per module (2 analog channels with Ex modules)
- Each channel is a primary master in the HART protocol
- Selectable input range per channel (AI):
  - 0...20 mA (without HART function)
  - ± 20 mA (without HART function, not for Ex module)
  - 4...20 mA (with/without HART function)
- Selectable output range per channel (AO):
  - 0...20 mA (with/without HART function, only without HART function for Ex module)
  - 4...20 mA (with/without HART function)

Parameterization

- For the analog input (AI), it is possible to parameterize e.g. conversion time, input range, limits, alarms, smoothing of measured values
- For the analog output (AO), it is possible to parameterize e.g. output range, response in event of AS (CPU) stop, diagnostics
- Remote parameterization of the HART transmitters and actuators is possible with SIMATIC PDM over PROFIBUS DP
- It is still possible to parameterize the HART devices with an operator terminal (handheld).

Technical specifications

Detailed technical data of the modules with HART can be found

- in Catalog IK PI (Section "Distributed I/O") or
- in the Mall / Catalog CA 01 under "Distributed I/Os / ET 200M".

Selection and Ordering Data

	Order No.	
SM 331 HART analog input module • 8 inputs, 0/4...20 mA or ±20 mA - Resolution: 15 bit + sign - Connection of 2-wire or 4-wire transmitters possible - HART (2 or 4 wires) - Wire break monitoring - Short-circuit-proof - Required front connector: 20-pin	**6ES7 331-7TF00-0AB0**	B)
SM 332 HART analog output module • 8 outputs, 0/4...20 mA - Resolution: 15 bit + sign - For 2-wire actuators - HART (2 wires) - Wire break monitoring - Required front connector: 20-pin	**6ES7 332-8TF00-0AB0**	B)
Ex analog input module with HART [EEx ib] • 2 inputs, 0/4...20 mA in 2 channel groups - Individual electrically isolated channels - Resolution: 15 bit + sign - Connection of 2-wire or 4-wire transmitters possible - Wire break monitoring - Short-circuit-proof - HART (2 or 4 wires) - Required front connector: 20-pin	**6ES7 331-7TB00-0AB0**	B)
Ex analog output module with HART [EEx ib] • 2 outputs, 0/4...20 mA in 2 channel groups - Individual electrically isolated channels - Resolution: 12 bit + sign - For 2-wire actuators - Wire break monitoring - HART - Required front connector: 20-pin	**6ES7 332-5TB00-0AB0**	B)

B) Subject to export regulations: AL: N, ECCN: EAR99H

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F modules

Overview

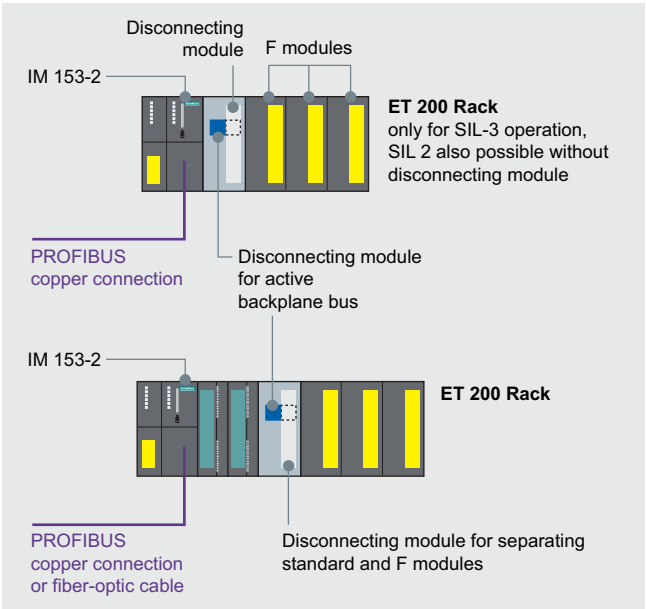
The special safety functions of the failsafe systems are coordinated with the safety-oriented I/O modules of the distributed ET 200M devices, whose job it is to also ensure plant safety should the CPU fail. The failsafe signal modules of these peripheral devices (digital inputs/outputs, analog input) are able to diagnose internal and external errors, have a redundant setup on account of safety demands, and meet requirements up to SIL 3 (IEC 61508) or AK 6 (VDE 0801).

The input modules work in SIL 3/AK 6 with internal 2-out-of-2 channel evaluation. A safety response is triggered immediately there are any differences. The digital output modules enable safe disconnection through a second disconnect path in the event of a faulty output.

Selection and Ordering Data

	Order No.
SM 326F failsafe digital input module for floating contacts	
• 24 inputs, 24 V DC, floating in groups of 12, **redundant design possible** - 4 short-circuit-resistant sensor power supplies, each for 6 channels, isolated in groups of 3: - External sensor power supply possible - SIL 2: single-channel evaluation, 24 channels - SIL 3: 2-out-of-2 evaluation on the module, 12 channels (adjustable discrepancy time) - Short-circuit monitoring to L+ - Discrepancy monitoring - Module-internal diagnostics - PROFIsafe telegram - Required front connector: 40-pin	**6ES7 326-1BK01-0AB0**
• 8 inputs, NAMUR [EEx ib] isolated by channel, **redundant design possible** - 8 short-circuit-resistant sensor power supplies, each for 1 channel, mutually isolated - SIL 2: single-channel evaluation, 8 channels - SIL 3: 2-out-of-2 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 - Required front connector: 40-pin	**6ES7 326-1RF00-0AB0**
SM 326F failsafe digital output module	**6ES7 326-2BF01-0AB0**
• 10 outputs, 24 V DC, 2 A, floating in groups of 5, **redundant design possible** (outputs with internal diode) - SIL 2, SIL 3 parameterizable (10 channels) - Wire break and short-circuit monitoring - Module-internal diagnostics - PROFIsafe telegram - Required front connector: 40-pin	
SM 336F failsafe analog input module	**6ES7 336-1HE00-0AB0**
• 6 inputs, 4...20 mA, **redundant design possible** - Isolated from the backplane bus - 2-wire or 4-wire connection - SIL 2: two-channel evaluation, 6 sensors - SIL 3: two-channel evaluation, 12 sensors (adjustable tolerance window) - Wire break monitoring - Tolerance monitoring between 2 sensors (SIL 3) - Module-internal diagnostics - PROFIsafe telegram - Required front connector: 40-pin	
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)	**6ES7 195-7KF00-0XA0**
Isolating bus module 80 mm wide, for isolating module, when using an active backplane bus	**6ES7 195-7HG00-0XA0**

Options



Isolating module

The following components can be used as accessories for the F modules:

- Isolating module
  - 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)
- Isolating bus submodule for the isolating module, when using an active backplane bus

Note:
The isolating module for F modules and the isolating bus sub-module can only be used together. The 40 mm wide gap cannot be used for other modules.

Control modules

Overview

The FM 355 controller module is the intelligent 4-channel controller module for universal control tasks. It can be used to control temperature, pressure and flow.

The FM 355 module is available in four versions:

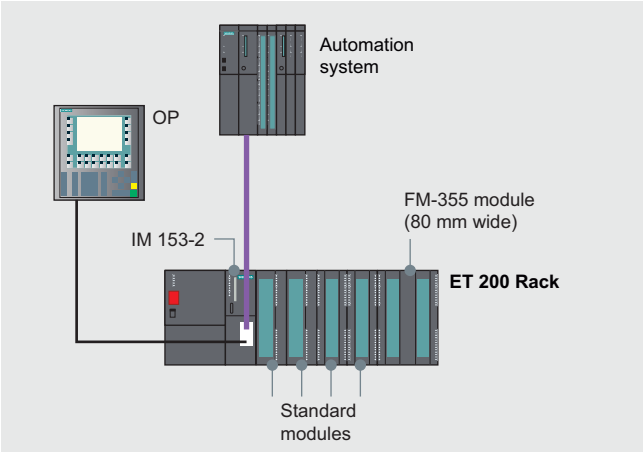
- FM 355 C as continuous-action controller with 4 analog outputs for controlling analog actuators
- FM 355 S as step or pulse controller with 8 digital outputs for controlling motor-driven (integrating) actuators or binary controlled actuators (e.g. electrical heating strips and cartridges)
- FM 355-2 C/S specially optimized for temperature controls with user-friendly online self-optimization integrated

Function

The FM 355 / FM 355-2 modules have four separate control channels. These controllers have the following features:

- Predefined controller structures for
  - fixed-setpoint control,
  - cascade control,
  - ratio control,
  - 3-component control
- Various operating modes:
  - automatic mode,
  - manual mode,
  - safety mode,
  - follow-up mode,
  - backup mode
- Sampling interval (dependent on the resolution of the analog inputs and the compensation input):
  - at 12 bit: 20 ms to 100 ms (only FM 355-2)
  - at 14 bit: 100 ms to 500 ms (dependent on the number of enabled analog inputs)
- 2 control algorithms:
  - self-optimized temperature control algorithm,
  - PID algorithm
- Integrated online self-optimization without configuration (only FM 355-2)
  - for faster adoption of the operating point
- User-friendly controller optimization
- Backup mode: The controller can maintain its control function in the event of CPU failure or CPU stop. Programmable safety setpoint values or safety manipulated variables are set for this purpose.
- Feedforward control: The analog inputs can be optionally used for feedforward control as well as for actual value acquisition.

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 OP17 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.

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 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.

Selection and Ordering Data	Order No.
FM 355 C controller module With 4 analog outputs for 4 continuous-action controllers Required front connector: 2 x 20-pin Incl. multi-lingual configuration package, manual and Getting Started (German, English, French, Italian) on CD-ROM	**6ES7 355-0VH10-0AE0**
FM 355 S controller module With 8 digital outputs for 4 step or pulse controllers Required front connector: 2 x 20-pin Incl. multi-lingual configuration package, manual and Getting Started (German, English, French, Italian) on CD-ROM	**6ES7 355-1VH10-0AE0**
FM 355-2 C temperature controller module With 4 analog outputs for 4 continuous-action controllers Required front connector: 2 x 20-pin Incl. multi-lingual configuration package, manual and Getting Started (German, English, French, Italian) on CD-ROM	**6ES7 355-2CH00-0AE0**
FM 355-2 S temperature controller module With 8 digital outputs for 4 step or pulse controllers Required front connector: 2 x 20-pin Incl. multi-lingual configuration package, manual and Getting Started (German, English, French, Italian) on CD-ROM	**6ES7 355-2SH00-0AE0**
The following operator panels can be used specially for local operation of the FM 355 C/S:	
SIMATIC OP17/DP operator panel	**6AV3 617-1JC20-0AX1**

Note:
In the case of the FM 355 C and FM 355 S controller modules, the channels are not electrically isolated from one another

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).

Selection and Ordering Data	Order 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 Required front connector: 1 x 20-pin incl. configuration package on CD-ROM	**6ES7 350-1AH03-0AE0**
FM 350-2 counter module 8 channels with max. 20 kHz counting frequency, where up to 4 channels are available when used with SIMATIC PCS 7; for 24 V encoders, for the following tasks: counting, frequency measurement, speed measurement, period measurement, dosing Required front connector: 1 x 40-pin incl. configuration package on CD-ROM	**6ES7 350-2AH00-0AE0**

Introduction

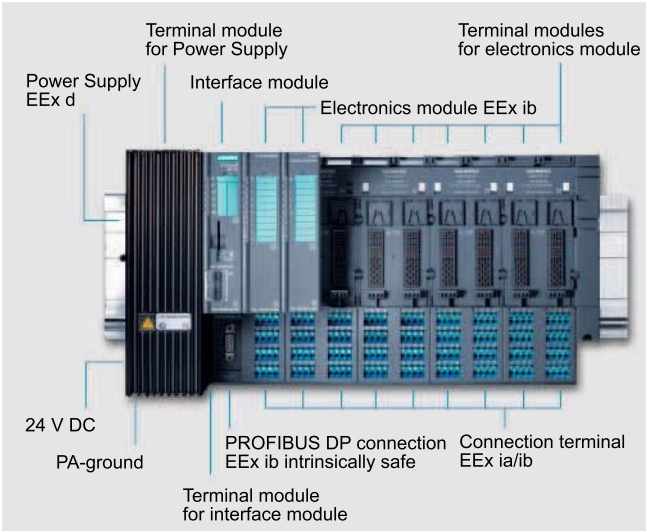
Overview

The ET 200iSP is a modular, intrinsically-safe I/O station in IP30 degree of protection, and can be configured with up to 32 electronics modules (4/8-channel). The range of electronics modules covers:

- 8-channel digital input module DI, can also be used as counter or frequency meter
- 4-channel digital output module DO
- 4-channel analog input modules AI for temperature measurements with resistance thermometer or thermocouple
- 4-channel analog input modules AI for connection of 2/4-wire transmitters with or without HART functionality
- 4-channel analog output module AO for connection of field devices with or without HART functionality

The ET 200iSP appropriate for gaseous and dusty atmospheres can be installed, according to CENELEC II 2 G (1) GD EEx d e [ib/ia] IIC T4 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.

Design



The ET 200iSP consists of:

- a carrier system with terminal modules for prewiring, and also for inserting power supply, interface and electronics modules, mounted on an S7-300 rail,
- 1 or 2 (redundant) power supply modules PS with pressurized enclosure,
- 1 or 2 (redundant) IM 152 interface modules for PROFIBUS DP,
- up to 32 electronics modules (4/8-channel) in any combination, and
- a terminating module (included in scope of delivery of terminal modules for the PROFIBUS interface).

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.

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.

If the ET 200iSP is used in a hazardous area, it must be installed in an Ex e housing which at least corresponds to the IP54 degree of protection. Appropriate versions of an IP65 housing are offered in the section on stainless steel wall housings.

Exceptional features of the ET 200iSP architecture

- Installation and testing of the wiring is possible in advance without the electronics module.
- Isolation of the mechanical and electronic systems, in conjunction with the independent process wiring, permits fast and easy replacement of the electronics modules.
- Mechanical coding which is carried out when an electronics module is plugged onto a terminal module for the first time prevents the connection of incorrect replacement modules.
- Hot swapping of the power supply modules and electronics modules is possible without a fire certificate.

Integration

Distributed ET 200iSP stations are connected to the SIMATIC PCS 7 automation systems (controllers) via the PROFIBUS DP, which can be routed intrinsically-safe into Ex zone 1 using an isolating transformer (RS485-iS coupler) as barrier. Data transfer rates of up to 1.5 Mbit/s are possible.

The modern architecture with independent wiring and automatic slot coding supports simple and reliable hot swapping of individual modules without a fire certificate. To increase plant availability, both the power supply and the PROFIBUS DP interface can be of redundant design.

The ET 200iSP is integrated into SIMATIC PCS 7 using standard driver blocks. You can therefore configure and parameterize the ET 200iSP in the SIMATIC Manager of the engineering system extremely simply using HW Config. The system function CiR (Configuration in Run) is also supported, and permits the following changes to be made to the configuration during runtime:

- Adding of an ET 200iSP station
- Adding of a module in an ET 200iSP station
- Reparameterization of modules.

Vendor-specific information and maintenance data are saved powerfail-proof on the electronics modules.

The existing standard diagnostics drivers preprocess the diagnostics messages generated by internal or external faults (e.g. wire breakage or short-circuit) as well as status messages of the connected HART field devices for the host operator system and the maintenance station of the PCS 7 asset management. The ET 200iSP and the HART field devices can also be parameterized using SIMATIC PDM (process device manager). With SIMATIC PDM you can directly access the HART field devices on the ET 200iSP by routing via PROFIBUS DP.

Technical specifications

ET 200iSP – general	
Degree of protection	IP30
Ambient temperature	-20 ... +70 °C
Vibration resistance	0,5 *g* continuously, 1 *g* occasionally
Standards and approvals	
• PROFIBUS	EN 50170, Volume 2
• EU directive	94/9/EC (ATEX 100a)
• CENELEC	II 2 G (1) GD Eex d e [ib/ia] IIC T4
• IEC	IEC61131, Part 2
• CE	According to 89/336/EEC and 73/23/EEC

For detailed technical specifications, especially on individual components such as power supply module, interface module or electronics modules, see:

- Catalog IK PI or
- the Mall / Catalog CA 01 under "Distributed I/Os / ET 200iSP"

ET 200iSP power supply unit

Overview

ET 200iSP power supply unit is the designation for the combination of one (standard) or two redundant power supply modules PS with the matching terminal module:

- Standard: TM-PS-A terminal module
- Redundancy: TM-PS-B terminal module (additionally)

Power supply modules and terminal modules must each be ordered separately.

Functions of the power supply modules

- They provide the ET 200iSP with the safely isolated operating voltages for
  - logic (via the backplane bus),
  - PROFIBUS DP interface (IM 152-1),
  - power bus (for powering the electronics modules).
- They handle the safety-related limitation of the output voltage.
- They have a pressurized metal enclosure (explosion protection EEx d).
- They can be operated in redundant mode.

Design

Depending on the operating mode (standard or redundant), one or two power supply modules are plugged onto the corresponding terminal modules. Hot swapping is also possible in the hazardous area.

The operating status of the power supply modules is displayed on two LEDs on the IM 152 interface module (one for each module).

The 24 V DC supply for the station is provided via EX e terminals on the terminal module of the power supply unit. This connection must not be removed in the hazardous area. The feeding power supply must be installed in the non-hazardous area.

The ET 200iSP must be terminated on the right-hand side (following the last electronics module) by a terminating module. The terminating module is included in the scope of delivery of the IM 152.

Selection and Ordering Data

	Order No.
Power supply module PS for ET 200iSP	**6ES7 138-7EA00-0AA0**
TM-PS-A terminal module for standard operation	**6ES7 193-7DA00-0AA0**
TM-PS-B terminal module for redundant operation	**6ES7 193-7DB00-0AA0**

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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 up to 1.5 Mbit/s. A redundant connection is also possible. In this case the ET 200iSP is connected via two interface modules to two redundant PROFIBUS DP segments of a fault-tolerant automation system.

The IM 152 is plugged onto a special terminal module (to be ordered separately). The following terminal modules are available:

- TM-IM/EM60 terminal module for one interface module and one electronics module (with screw-type or spring-loaded terminals)
- TM-IM/IM terminal module for two interface modules (for redundant PROFIBUS DP connection)

Tasks of the IM 152 interface module

- Connects the ET 200iSP to the intrinsically-safe PROFIBUS DP
- Communicates autonomously with the host automation system
- Prepares the data for the fitted electronic modules
- Saves the parameters of the electronics modules
- Can assign a 20 ms time stamp to digital process signals.

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.

Selection and Ordering Data

	Order No.	
IM 152-1 interface module for ET 200iSP incl. terminating module	**6ES7 152-1AA00-0AB0**	
TM-IM/EM60 terminal module for ET 200iSP for one IM 152 module and one electronics module		
• TM-IM/EM60S (screw-type terminals)	**6ES7 193-7AA00-0AA0**	B)
• TM-IM/EM60S (spring-loaded terminals)	**6ES7 193-7AA10-0AA0**	B)
TM-IM/IM terminal module for ET 200iSP for two IM 152 modules (redundant operation)	**6ES7 193-7AB00-0AA0**	
Accessories		
PROFIBUS connector with selectable terminating resistor for connection of IM 152 to PROFIBUS DP with RS 485-iS transmission technology	**6ES7 972-0DA60-0XA0**	B)
RS 485-IS coupler Isolating transformer for connection of PROFIBUS DP segments with RS 485 and RS 485-iS transmission technologies	**6ES7 972-0AC80-0XA0**	
S7-300 rails		
• 585 mm long, suitable for assembly of ET 200iSP in a 650-mm wide wall housing	**6ES7 390-1AF85-0AA0**	
• 885 mm long, suitable for assembly of ET 200iSP in a 950-mm wide wall housing	**6ES7 390-1AJ85-0AA0**	

B) Subject to export regulations: AL: N, ECCN: EAR99H

For further accessories such as labeling strips or plates, see Catalog IK PI or the A&D Mall/CA 01 under "ET 200iSP distributed I/O".

Electronics modules

Overview

The current range of electronics modules covers:

- 8-channel digital input module DI, can also be used as counter or frequency meter
- 4-channel digital output module DO
- 4-channel analog input modules AI for temperature measurements with resistance thermometer (RTD) or thermocouple (TC)
- 4-channel analog input modules AI for connection of 2/4-wire transmitters with or without HART functionality
- 4-channel analog output module AO for connection of field devices with or without HART functionality

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 compensation is possible for the 4 AI RTD module by connecting a PT100.

Design

- The electronics modules are plugged as planned onto the corresponding terminal modules using screw-type systems (TM-EM/EM60S) or spring-loaded systems (TM-EM/EM60C). The terminal modules must be ordered in addition.
- 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 to max. 2.5 mm^2) depending on the type of module.
- All electronics modules are implemented in the EEx i "intrinsically safe" degree of protection and can be easily replaced under hazardous conditions (hot swapping).
- Using a spare module plugged onto a terminal module for electronics modules (TM-EM/EM60S/ TM-EM/EM60C), you can reserve a slot for any electronics modules or close a gap resulting from the design. The spare module can be simply replaced by the electronics module at a later point in time.

Selection and Ordering Data	Order No.	
Digital electronics modules		
Digital input modules		
8 DI NAMUR	**6ES7 131-7RF00-0AB0**	B)
• 8 x 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 5 ms, rising or falling edge		
• Wire break monitoring		
• Short-circuit monitoring		
• Sensor power supply monitoring		
• Chatter monitoring		
Digital output modules		
4 DO DC 23.1 V/20 mA	**6ES7 132-7RD00-0AB0**	B)
• Short-circuit monitoring		
• Wire break monitoring		
• Parameterizable connection of substitute value in case of CPU failure		
• Load-free switching of outputs via external intrinsically-safe signal		
4 DO DC 17.4 V/27 mA	**6ES7 132-7RD10-0AB0**	B)
• Short-circuit monitoring		
• Wire break monitoring		
• Parameterizable connection of substitute value in case of CPU failure		
• Channels can be connected in parallel		
• Load-free switching of outputs via external intrinsically-safe signal		
4 DO DC 17.4 V/40 mA	**6ES7 132-7RD20-0AB0**	
• Short-circuit monitoring		
• Wire break monitoring		
• Parameterizable connection of substitute value in case of CPU failure		
• Channels can be connected in parallel		
• Load-free switching of outputs via external intrinsically-safe signal		
Analog electronics modules		
Analog input modules		
4 AI I 2 WIRE HART	**6ES7 134-7TD00-0AB0**	B)
• 4 x 4...20 mA, HART, 2-wire transmitter		
• Transmitter load: max. 750 Ω		
• Resolution 12 bit + sign		
• Short-circuit monitoring		
• Wire break monitoring		
4 AI I 4 WIRE HART	**6ES7 134-7TD50-0AB0**	
• 4 x 0/4...20 mA, HART, 4-wire transmitter		
• Transmitter load: max. 750 Ω		
• Resolution 12 bit + sign		
• Wire break monitoring		

Selection and Ordering Data	Order No.	
4 AI RTD	**6ES7 134-7SD50-0AB0**	
• 4 x RTD, resistance thermometer Pt100/Ni100		
• 2-, 3-, 4-wire		
• Resolution 15 bit + sign		
• Short-circuit monitoring		
• Wire break monitoring		
4 AI TC	**6ES7 134-7SD00-0AB0**	
• 4 x TC (thermocouples)		
• Type B [PtRh-PtRh]		
• Type N [NiCrSi-NiSi]		
• Type E [NiCr-CuNi]		
• Type R [PtRh-Pt]		
• Type S [PtPh-Pt]		
• Type J [Fe-CuNi]		
• Type L [Fe-CuNi]		
• Type T [Cu-CuNi]		
• Type K [NiCr-Ni]		
• Type U [Cu-CuNi]		
• Resolution 15 bit + sign		
• Internal temperature compensation 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		
Analog output modules		
4 AO I HART	**6ES7 135-7TD00-0AB0**	B)
• 4 x 0/4...20 mA, HART (max. load 750 Ω)		
• Resolution 14 bit		
• Short-circuit monitoring		
• Wire break monitoring		
• Parameterizable substitute value in case of CPU failure		
Terminal modules		
TM-EM/EM60S terminal module for ET 200iSP for two electronics modules, screw terminals	**6ES7 193-7CA00-0AA0**	B)
TM-EM/EM60C terminal module for ET 200iSP for two electronics modules, spring-loaded terminals	**6ES7 193-7CA10-0AA0**	B)
Accessories		
Reserve module for any electronics module	**6ES7 138-7AA00-0AA0**	B)
S7-300 rail		
• 585 mm long, suitable for assembly of ET 200iSP in a 650-mm wide wall housing	**6ES7 390-1AF85-0AA0**	
• 885 mm long, suitable for assembly of ET 200iSP in a 950-mm wide wall housing	**6ES7 390-1AJ85-0AA0**	

B) Subject to export regulations: AL: N, ECCN: EAR99H

For further accessories such as labeling strips or plates, see Catalog IK PI or the A&D Mall/CA 01 under "ET 200iSP distributed I/O".

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RS 485-IS coupler

Overview

The RS 485-iS coupler

- converts the electrical PROFIBUS DP RS 485 transmission technology into the intrinsically-safe RS 485-iS transmission technology with a transmission rate of 1.5 Mbit/s,
- is required to connect intrinsically-safe PROFIBUS DP stations, e.g. ET 200iSP, ET 200iS or devices from other vendors with Ex i DP connection,
- acts as a safety barrier, and
- can be additionally used as a repeater in the hazardous area,
- is a passive bus station (no configuration necessary),
- is certified according to ATEX 100a.

Design

- The RS 485-iS coupler is an open unit; assembly is only permissible in housings, cabinets or rooms for electrical equipment.
- The RS 485-iS coupler is approved for use in hazardous areas of zone 2.
  It must be fitted in a housing which at least corresponds to the IP54 degree of protection. A manufacturer's declaration for zone 2 (according to EN 50021) is required for the housing and the necessary cable glands.
- The RS 485-iS coupler can be used in a horizontal or vertical position.
- Installation is on a SIMATIC S7-300 rail.
- Diagnostics LEDs on the front panel signal the operating status.

Connection to PROFIBUS DP

- Connection to standard PROFIBUS DP via standard Sub-D socket (at the bottom on the RS 485-iS coupler, behind the right front door).

Integral bus connection for PROFIBUS DP with RS 485-iS transmission technology

- Connection of PROFIBUS DP with RS 485-iS transmission technology via screw terminals (at the top of the RS 485-iS coupler, behind the right front door)
- The last bus station on the intrinsically-safe PROFIBUS DP segment (not further RS 485-iS couplers) must be terminated by a selectable resistance using the connector, Order No. 6ES7 972-0DA60-0XA0.

Selection and Ordering Data

	Order No.
RS 485-IS coupler Isolating transformer for connection of PROFIBUS DP segments with RS 485 and RS 485-iS transmission technologies	**6ES7 972-0AC80-0XA0**
Accessories	
PROFIBUS connector with selectable terminating resistor For connection of IM 152 to PROFIBUS DP with RS 485-iS transmission technology	**6ES7 972-0DA60-0XA0** B)
S7-300 rails	
Lengths:	
• 160 mm	**6ES7 390-1AB60-0AA0**
• 482 mm	**6ES7 390-1AE80-0AA0**
• 530 mm	**6ES7 390-1AF30-0AA0**
• 830 mm	**6ES7 390-1AJ30-0AA0**
• 2000 mm	**6ES7 390-1BC00-0AA0**
PROFIBUS Fast Connect bus cable Standard type with special design for fast mounting, 2-core, shielded, cut-to-length; max. delivery unit 1000 m, minimum ordering quantity 20 m	**6XV1 830-0EH10**

B) Subject to export regulations: AL: N, ECCN: EAR99H

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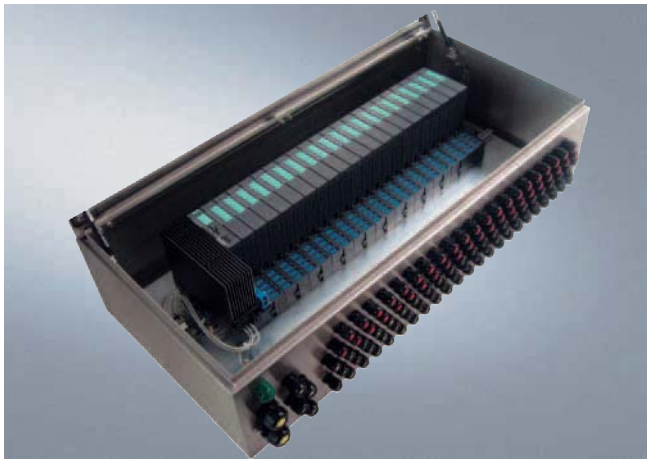
Design



ET 200iSP modules can also be installed in stainless steel wall housings designed to meet more exacting protection requirements. The housings are available in three different sizes. They comply with degree of protection IP65 and can also be used in Ex zone 1.

Selection and Ordering Data

Order No.

Stainless steel housing IP65 for Ex zone 1 in protection class EEx e

Empty housing without installation of modules, for use in gaseous area, IP65 (IP54 when using an air-conditioning nozzle)

- Wall housing 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in gaseous area, with 3 rows of M16 cable glands (total 41) and 2 rows of blanking plugs — **6DL2 804-0AD30**
- Wall housing 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in gaseous area, with 5 rows of M16 cable glands (total 66) — **6DL2 804-0AD50**
- Wall housing 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in gaseous area, with 3 rows of M16 cable glands (total 68) and 2 rows of blanking plugs — **6DL2 804-0AE30**
- Wall housing 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in gaseous area, with 5 rows of M16 cable glands (total 111) — **6DL2 804-0AE50**

Empty housing without installation of modules, for use in dusty area, IP65

- Wall housing 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in dusty area, with 3 rows of M16 cable glands (total 41) and 2 rows of blanking plugs — **6DL2 804-0DD30**
- Wall housing 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in dusty area, with 5 rows of M16 cable glands (total 66) — **6DL2 804-0DD50**

Selection and Ordering Data

Order No.

- Wall housing 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in dusty area, with 3 rows of M16 cable glands (total 68) and 2 rows of blanking plugs — **6DL2 804-0DE30**
- Wall housing 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in dusty area, with 5 rows of M16 cable glands (total 111) — **6DL2 804-0DE50**

Housing with installation of ET 200iSP modules, for use in gaseous area, IP65 (IP54 when using an air-conditioning nozzle) [1]

- Wall housing 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in gaseous area, with 3 rows of M16 cable glands (total 41) and 2 rows of blanking plugs — **6DL2 804-1AD30**
- Wall housing 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in gaseous area, with 5 rows of M16 cable glands (total 66) — **6DL2 804-1AD50**
- Wall housing 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in gaseous area, with 3 rows of M16 cable glands (total 68) and 2 rows of blanking plugs — **6DL2 804-1AE30**
- Wall housing 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in gaseous area, with 5 rows of M16 cable glands (total 111) — **6DL2 804-1AE50**

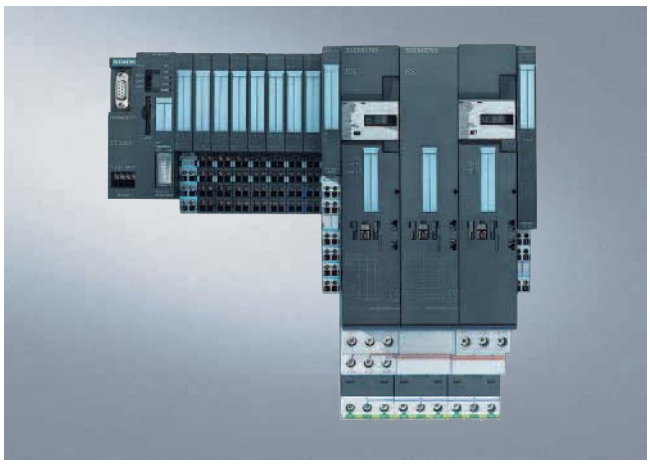
Housing with installation of modules, for use in dusty area, IP65 [1]

- Wall housing 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in dusty area, with 3 rows of M16 cable glands (total 41) and 2 rows of blanking plugs — **6DL2 804-1DD30**
- Wall housing 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in dusty area, with 5 rows of M16 cable glands (total 66) — **6DL2 804-1DD50**
- Wall housing 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in dusty area, with 3 rows of M16 cable glands (total 68) and 2 rows of blanking plugs — **6DL2 804-1DE30**
- Wall housing 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in dusty area, with 5 rows of M16 cable glands (total 111) — **6DL2 804-1DE50**

[1] The ET 200iSP components have to be ordered separately

Introduction

Overview



The ET 200S is a bit-modular distributed I/O system with IP20 degree of protection, and is approved for operation in Ex zone 2 (except the operation of motor starters). It is designed with independent wiring that supports the hot swapping of I/O modules (with hot work permits).

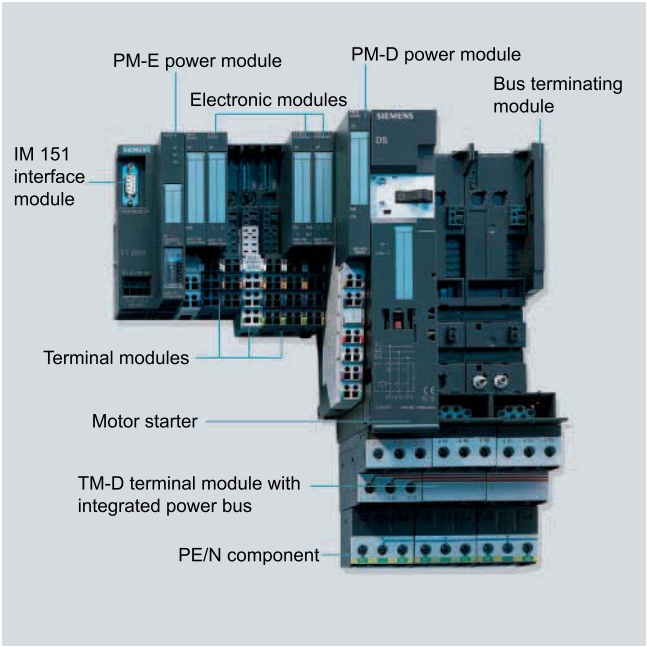
The range of I/Os that can be used with SIMATIC PCS 7 includes power modules for electronics modules and motor starters, analog and digital signal modules, and motor starters up to 7.5 kW.

The implementation of safety engineering applications is supported by:

- The safety-oriented F components incorporated in the SIMATIC Safety Integrated system such as terminal, power and electronics modules as well as motor starters
- SIGUARD safety engineering for motor starter applications with conventional safety logic in plants of safety categories 2 to 4 (EN 954-1)

Note:
In addition to the selected electronics modules, all further current ET 200S electronics modules can be used, but with functional limitations.
Use of components from the SIPLUS extreme range for applications in enhanced temperature ranges and under medial loading on request.

Design



Main components of the distributed ET 200S I/O system:

- Terminal modules
  enable the electrical and mechanical connection of the I/O modules and carry the terminals for the process wiring:
  - TM-P terminal modules for power modules
  - TM-E terminal modules for electronics modules
  - TM-DS/TM-RS terminal modules for motor starters and TM-xB expansion modules
- IM 151 interface module
  for connecting the PROFIBUS DP to the ET 200S station. The terminal module is included in the scope of delivery.
- Power modules for PM-E electronics modules and PM-D motor starters
  - For individual grouping of load and sensor supply voltages and their monitoring, as well as for the safe shutting down of digital output modules
  - For supplying and monitoring the auxiliary voltages for motor starters, as well as for the shutting down of a complete group of motor starters
- Electronics modules
  for process data exchange:
  - Digital electronics modules for connecting digital sensors and actuators
  - Analog electronics modules for connecting analog sensors and actuators
- Motor starter modules
  for switching and protecting any three-phase loads
- Accessories
  - Reserve module for reserving a slot for any electronics module
  - Label sheets for printing ID labels on a laser printer
  - Shield connection: shield connecting element, shield terminal, ground terminal, copper voltage bus 3 x 10 mm; components for the low-impedance connection of cable shielding at low cost of installation

Mounting

The terminal modules that can be mounted on a profile rail (35 x 15 x 7.5 or 15 mm) form the carrier system for the I/O modules. They are used for the process wiring and enable the electrical and mechanical connection of the I/O modules. The terminal modules can be prewired and tested without the I/O modules. Later the I/O modules are simply plugged in place. Terminal modules are available with screw connections, spring-loaded terminals or Fast Connect design for fast mounting.

The automatic coding of the I/O modules reliably prevents the risk of injury to persons and/or destruction of modules through accidental mounting of the wrong module.

Expansion limits

Depending on the IM 151 interface module used, the expansion of an ET 200S station is subject to the following limits:

- A maximum total of 63 I/O modules per station can be inserted between interface module and terminating module.
- The maximum permissible width of an ET 200S station is 2 m.
- The maximum address volume of all the inserted I/O modules is 244 byte for input data and 244 byte for output data.
- The maximum number of parameters is restricted to 244 byte per station.

ET 200S configuration

The ET 200S Configurator software tool enables simple configuration. The data entered can be adopted directly into STEP 7, and the electronic ordering of components is also possible through the Mall.

You can find the ET 200S configurator software in the current CD-ROM Catalog CA 01.

Technical specifications

Detailed technical data on the ET 200S can be found

- in the IK PI catalog or
- in the Mall / CA 01 at "Distributed I/Os / ET 200S“

Terminal modules

Overview

- Terminal modules are mechanical modules for integrating the power and electronics modules as well as the motor starters and expansion modules (Ordering data of the terminal modules for motor starters and expansion modules can be found under "Motor starters")
- For constructing the independent wiring using self-assembling voltage buses
- Alternatively with screw-type or spring-loaded terminals and Fast Connect design
- Replaceable terminal box
- Automatic coding of the electronics modules
- Build-as-you-go shielding of the backplane bus for high data security
- Optional plug-in shield connection
- Color coding facility for the terminals and for identifying the slot numbers

Selection and Ordering Data

	Order No.
Terminal Modules TM-P for Power Modules	
TM-P15S23-A1 Terminal Module 2 x 3 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals Ordering unit 1 piece	**6ES7 193-4CC20-0AA0**
TM-P15C23-A1 Terminal Module 2 x 3 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, spring-type terminals Ordering unit 1 piece	**6ES7 193-4CC30-0AA0**
TM-P15N23-A1 Terminal Module 2 x 3 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, Fast Connect Ordering unit 1 piece	**6ES7 193-4CC70-0AA0**
TM-P15S23-A0 Terminal Module 2 x 3 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, screw-type terminals Ordering unit 1 piece	**6ES7 193-4CD20-0AA0**
TM-P15C23-A0 Terminal Module 2 x 3 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, spring-type terminals Ordering unit 1 piece	**6ES7 193-4CD30-0AA0**
TM-P15N23-A0 Terminal Module 2 x 3 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, Fast Connect Ordering unit 1 piece	**6ES7 193-4CD70-0AA0**
TM-P15S22-01 Terminal Module 2 x 2 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals Ordering unit 1 piece	**6ES7 193-4CE00-0AA0**
TM-P15C22-01 Terminal Module 2 x 2 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals Ordering unit 1 piece	**6ES7 193-4CE10-0AA0**
TM-P15N22-01 Terminal Module 2 x 2 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, Fast Connect Ordering unit 1 piece	**6ES7 193-4CE60-0AA0**
TM-P30S44-A0 Terminal Module 7 x 2 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, screw-type terminals for PM-E F PROFIsafe Ordering unit 1 piece	**6ES7 193-4CK20-0AA0**
TM-P30C44-A0 Terminal Module 7 x 2 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, spring-loaded terminals for PM-E F PROFIsafe Ordering unit 1 piece	**6ES7 193-4CK30-0AA0**

Selection and Ordering Data	Order No.
TM-E Terminal Modules for Electronic Modules	
TM-E15S24-A1 Terminal Module 2 x 4 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals Ordering unit 5 pieces	**6ES7 193-4CA20-0AA0**
TM-E15C24-A1 Terminal Module 2 x 4 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, spring-type terminals Ordering unit 5 pieces	**6ES7 193-4CA30-0AA0**
TM-E15N24-A1 Terminal Module 2 x 4 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, Fast Connect Ordering unit 5 pieces	**6ES7 193-4CA70-0AA0**
TM-E15S24-01 Terminal Module 2 x 4 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals Ordering unit 5 pieces	**6ES7 193-4CB20-0AA0**
TM-E15C24-01 Terminal Module 2 x 4 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals Ordering unit 5 pieces	**6ES7 193-4CB30-0AA0**
TM-E15N24-01 Terminal Module 2 x 4 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, Fast Connect Ordering unit 5 pieces	**6ES7 193-4CB70-0AA0**
TM-E15S23-01 Terminal Module 2 x 3 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals Ordering unit 5 pieces	**6ES7 193-4CB00-0AA0**
TM-E15C23-01 Terminal Module 2 x 3 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals Ordering unit 5 pieces	**6ES7 193-4CB10-0AA0**
TM-E15N23-01 Terminal Module 2 x 3 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, Fast Connect Ordering unit 5 pieces	**6ES7 193-4CB60-0AA0**
TM-E15N26-A1 Terminal Module 2 x 6 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, Fast Connect Ordering unit 5 pieces	**6ES7 193-4CA80-0AA0**
TM-E15S26-A1 Terminal Module 2 x 6 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals Ordering unit 5 pieces	**6ES7 193-4CA40-0AA0**
TM-E15C26-A1 Terminal Module 2 x 6 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, spring-type terminals Ordering unit 5 pieces	**6ES7 193-4CA50-0AA0**

Selection and Ordering Data	Order No.
TM-E30S44-01 Terminal Module 4 x 4 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals Ordering unit 1 piece	**6ES7 193-4CG20-0AA0**
TM-E30C44-01 Terminal Module 4 x 4 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals Ordering unit 1 piece	**6ES7 193-4CG30-0AA0**
TM-E30S46-A1 Terminal Module 4 x 6 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals Ordering unit 1 piece	**6ES7 193-4CF40-0AA0**
TM-E30C46-A1 Terminal Module 4 x 6 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, spring-type terminals Ordering unit 1 piece	**6ES7 193-4CF50-0AA0**
TM-E15S24-AT Terminal Module For internal temperature compensation with 2AI TC High Feature, screw-type terminals Ordering unit 1 piece	**6ES7 193-4CL20-0AA0**
TM-E15C24-AT Terminal Module For internal temperature compensation with 2AI TC High Feature, spring-loaded terminals Ordering unit 1 piece	**6ES7 193-4CL30-0AA0**

Accessories for the terminal modules, see the IK PI catalog or A&D Mall / CA 01 at "Distributed I/Os / ET 200S"

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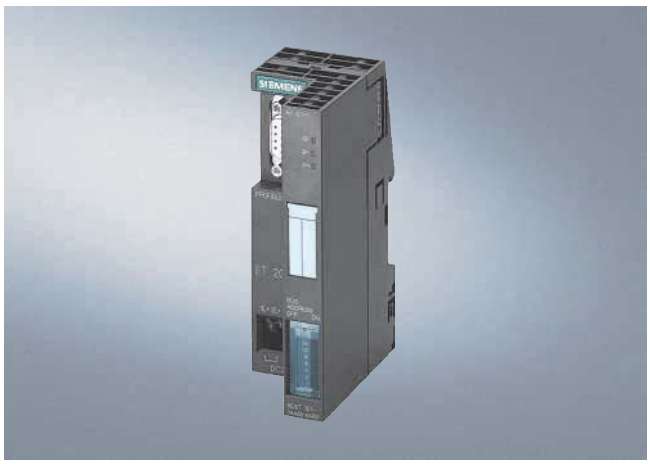
Interface modules

Overview



- IM 151-1 high feature (RS 485)
- Interface module for electrical connection of the ET 200S to PROFIBUS DP using copper bus cables
- Handles all data exchange with the PROFIBUS DP master

Selection and Ordering Data

	Order No.
IM151-1 interface module For ET 200S, high feature	**6ES7 151-1BA01-0AB0** B)

B) Subject to export regulations: AL: N, ECCN: EAR99H

Overview

PM-E power modules

- For all types of electronic modules (including safety-oriented electronic modules); limitations resulting from power supply with PM-E DC 24 V
- For monitoring and, depending on the version, fusing the voltage to electronic modules provided via the TM-P terminal module (load and sensor supply voltage)
- Diagnostics message for voltage and blown fuse (can be switched off per configuration)
- Two versions with different supply voltages:
  - PM-E DC 24 V (not for 2 DI AC 120 V, 2 DI AC 230 V and 2 DO AC 24 to 230 V)
  - PM-E DC 24 to 48 V; AC 24 to 230 V; with additional fuse

PM-E F power modules

- For all non-safety-oriented types of electronic modules with 24 V DC supply
- For monitoring the voltage to electronic modules provided via the TM-P terminal module (load and sensor supply voltage)
- For safe switching off of series-connected standard digital output modules 24 V DC (up to 10 A) via relay contacts (up to Cat. 3 according to EN 954 or SIL 2 according to IEC 61508):
  - 2 DO / 0.5 A standard, 6ES7 132-4BB01-0AA0
  - 2 DO / 2 A standard, 6ES7 132-4BB31-0AA0
  - 2 DO / 0.5 A high feature, 6ES7 132-4BB01-0AB0
  - 2 DO / 2 A high feature, 6ES7 132-4BB31-0AB0
  - 4 DO / 0.5 A standard, 6ES7 132-4BD01-0AA0
  - 4 DO / 2 A standard, 6ES7 132-4BD31-0AA0
- Two versions:
  - PM-E F pm DC 24 V PROFIsafe for ungrounded loads (separate ground and earth); with two additional safety-oriented digital outputs (p/m switching, up to Cat. 4 / SIL 3)
  - PM-E F pp DC 24 V PROFIsafe for grounded loads (ground and earth connected), e.g. actuators for connection to a central ground

Design

Depending on the possible combinations listed in the table, the power modules are plugged onto corresponding TM-P terminal modules. Power modules are suitable for dividing the ET 200S into potential groups. A power module must be provided at the beginning of each potential group. In addition, the first module following the IM 151-1 High Feature interface module must always be a power module.

The TM-P terminal module of the power module interrupts the voltage buses (P1/P2) and therefore opens up a new potential group. All sensor and load supplies of the downstream electronics modules are fed from the TM-P and monitored by the power module. The total current of all modules of a potential group is limited by the maximum current carrying capacity of the power module (up to 10 A depending on the voltage and temperature range; for details, refer to the technical specifications of the power modules in Catalog IK PI).

Possible combinations of the TM-P terminal modules and PM-E power modules

TM-P terminal modules for power modules				
Screw-type terminal 6ES7 193-...	**15S23-A1** ...4CC20 - 0AA0	**15S23-A0** ...4CD20 - 0AA0	**15S22-01** ...4CE00- 0AA0	**30S44-A0** ...4CK20- 0AA0
Spring terminal 6ES7 193-...	**TM-P15C23-A1** ...4CC30 - 0AA0	**TM-P15C23-A0** ...4CD30 - 0AA0	**TM-P15C22-01** ...4CE10- 0AA0	**TM-P30C44-A0** ...4CK30- 0AA0
Fast Connect 6ES7 193-...	**TM-P15N23-A1** ...4CC70 - 0AA0	**TM-P15N23-A0** ...4CD70 - 0AA0	**TM-P15N22-01** ...4CE60- 0AA0	--
Power modules				
PM-E 24 V DC	●	●	●	
PM-E 24 ... 48 V DC/ 24 ... 230 V AC	●	●	●	
PM-E F 24 V DC PROFIsafe				●
PM-D F 24 V DC PROFIsafe				●

Selection and Ordering Data

Order No.

Power modules for PM-E electronic modules

PM-E power modules

- 24 V DC/10 A
  - Monitoring of the load voltage
  6ES7 138-4CA01-0AA0 B)
- 24 to 48 V DC; 24 to 230 V AC
  - Monitoring of the fuse
  - Monitoring of the load voltage
  6ES7 138-4CB11-0AB0 B)

PM-E F power modules

- PM-E F pm DC 24 V PROFIsafe
  - 1 x relay 24 V DC/10 A, P/M switching, for switching off of series-connected standard digital output modules (up to AK 4, SIL 2)
  - 2 x 24 V DC/2 A, P/M switching, with wire break monitoring per channel (with "1" signal)
  - Safe monitoring of communication with PROFIsafe
  - Module-internal diagnostics
  - Overload diagnostics per channel
  6ES7 138-4CF02-0AB0 B)
- PM-E F pp DC 24 V PROFIsafe
  - 1 x relay 24 V DC/10 A, P/P switching, for switching off of series-connected standard digital output modules (up to AK 4, SIL 2)
  - Safe monitoring of communication with PROFIsafe
  - Module-internal diagnostics
  - Overload diagnostics per channel
  6ES7 138-4CF41-0AB0 B)

B) Subject to export regulations: AL: N, ECCN: EAR99H

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Digital electronics modules

Overview

- 2- and 4-channel digital inputs and outputs for the ET 200S
- Can be plugged onto TM-E terminal modules with automatic coding.
- High-feature versions for enhanced plant availability, additional functions and comprehensive diagnostics
- Hot swapping of modules possible
- Failsafe digital input module 4/8 F-DI PROFIsafe
- Failsafe digital output module 4 F-DO PROFIsafe 24 V DC/2 A
- Isolated from the backplane bus

Design

Possible combinations of the TM-E terminal modules and digital modules

TM-E terminal modules for electronics modules							
Screw-type terminal Order No. 6ES7 193...	**TM-E15S26-A1** …4CA40-0AA0	**TM-E15S24-A1** …4CA20-0AA0	**TM-E15S24-01** …4CB20-0AA0	**TM-E15S23-01** …4CB00-0AA0	**TM-E15S24-AT** …4CL20-0AA0	**TM-E30S44-01** …4CG20-0AA0	**TM-E30S46-A1** …4CF40-0AA0
Spring terminal Order No. 6ES7 193...	**TM-E15C26-A1** …4CA50-0AA0	**TM-E15C24-A1** …4CA30-0AA0	**TM-E15C24-01** …4CB30-0AA0	**TM-E15C23-01** …4CB10-0AA0	**TM-E15C24-AT** …4CL30-0AA0	**TM-E30C44-01** …4CG30-0AA0	**TM-E30C46-A1** …4CF50-0AA0
Fast Connect Order No. 6ES7 193...	**TM-E15N26-A1** …4CA80-0AA0	**TM-E15N24-A1** …4CA70-0AA0	**TM-E15N24-01** …4CB70-0AA0	**TM-E15N23-01** …4CB60-0AA0	--	--	--
Electronics modules							
2DI 24 V DC Standard 2DI 24 V DC High Feature 4DI 24 V DC Standard 4DI 24 V DC High Feature	•	•	•	•			
4DI 24 … 48 V AC/DC High Feature	•	•	•	•			
4 DI NAMUR	•	•	•	•			
2DI 120 V AC Standard	•	•	•	•			
2DI 230 V AC Standard	•	•	•	•			
2 DO 24 V DC/0.5 A Standard 2 DO 24 V DC/0.5 A High Feature 4 DO 24 V DC/0.5 A Standard	•	•	•	•			
2 DO 24 V DC/2 A Standard 2 DO 24 V DC/2 A High Feature 4 DO 24 V DC/2 A Standard	•	•	•	•			
2 DO 24 … 230 V AC/2 A	•	•	•	•			
2RO, 24 … 120 V DC/5 A, 24 … 230 V AC/5 A 2RO, 24 … 48 V DC/5 A, 24 … 230 V AC/5 A	•	•	•	•			
4/8 failsafe DI 24 V DC[1)]						•	•
4 failsafe DO 24 V DC/2 A[1)]						•	•
Reserve (width 15 mm)	•	•	•	•	•		
Reserve (width 30 mm)						•	•

[1)] See Manual "ET 200S failsafe modules" in the documentation packages "S7 F Systems" and "S7 Distributed Safety"

Selection and Ordering Data — Order No.

Digital inputs for floating contacts

• DI 2 x 24 V DC, standard	**6ES7 131-4BB01-0AA0**	B)
• DI 4 x 24 V DC, standard	**6ES7 131-4BD01-0AA0**	B)
• DI 2 x 24 V DC, high feature; with diagnostics - Short-circuit monitoring	**6ES7 131-4BB01-0AB0**	B)
• DI 4 x 24 V DC, high feature; with diagnostics - Short-circuit monitoring	**6ES7 131-4BD01-0AB0**	
• DI 4 x 24...48 V AC/DC, high feature; with diagnostics - Wire break monitoring (external resistance circuit required) - Monitoring of the fuse - Monitoring of the load voltage	**6ES7 131-4CD00-0AB0**	B)
• DI 4 x 24 V DC, NAMUR	**6ES7 131-4RD00-0AB0**	B)
• DI 2 x 120 V AC, standard	**6ES7 131-4EB00-0AB0**	B)
• DI 2 x 230 V AC, standard	**6ES7 131-4FB00-0AB0**	B)

Failsafe digital input

• 4/8 F-DI 24 V DC PROFIsafe 8 DI safety-oriented SIL 2 or 4 DI safety-oriented SIL 3, with diagnostics - Cyclic short-circuit test - Discrepancy monitoring of 2 channels for SIL 3 (adjustable discrepancy time) - Safe monitoring of communication with PROFIsafe	**6ES7 138-4FA02-0AB0**	B)

Digital outputs for DC voltage (suitable for solenoid valves, DC contactors, indicator lights etc.)

• DO 2 x 24 V DC/0.5 A, standard	**6ES7 132-4BB01-0AA0**	B)
• DO 2 x 24 V DC/2 A, standard	**6ES7 132-4BB31-0AA0**	
• DO 2 x 24 V DC/0.5 A, high feature, with diagnostics - Connection of channel-specific substitute value in event of CPU failure (parameterizable) - Short-circuit monitoring per channel - Wire break monitoring per channel (with "1" signal)	**6ES7 132-4BB01-0AB0**	B)
• DO 2 x 24 V DC/2 A, high feature, with diagnostics - Connection of channel-specific substitute value in event of CPU failure (parameterizable) - Short-circuit monitoring per channel - Wire break monitoring per channel (with "1" signal)	**6ES7 132-4BB31-0AB0**	B)
• DO 4 x 24 V DC/0.5 A, standard	**6ES7 132-4BD01-0AA0**	
• DO 4 x 24 V DC/2 A, standard	**6ES7 132-4BD31-0AA0**	

Selection and Ordering Data — Order No.

Digital output for AC voltage (suitable for solenoid valves, AC contactors, indicator lights etc.)

• DO 2 x 24...230 V AC, 2 A - Connection of channel-specific substitute value in event of CPU failure (parameterizable)	**6ES7 132-4FB00-0AB0**	B)

Relay output (suitable for solenoid valves, contactors, motor starters, miniature motors and indicator lights)

• 2 x RO, NO contact 24...120 V DC/5 A 24...230 V AC/5 A - Connection of channel-specific substitute value in event of CPU failure (parameterizable)	**6ES7 132-4HB01-0AB0**	
• 2 x RO, changeover contact 24...48 V DC/5 A 24...230 V AC/5 A - Connection of channel-specific substitute value in event of CPU failure (parameterizable)	**6ES7 132-4HB10-0AB0**	B)

Failsafe digital output

• 4 F-DO 24 V DC/2 A PROFISafe safety-oriented up to SIL 3, with diagnostics, PM-switching - Short-circuit monitoring per channel - Overload monitoring per channel - Wire break monitoring per channel (with "1" signal) - Safe monitoring of communication with PROFIsafe - Module-internal diagnostics	**6ES7 138-4FB02-0AB0**	B)

Accessories

Reserve modules for ET 200S for reserving unused slots for any electronics module		
• 15 mm wide (5 units)	**6ES7 138-4AA01-0AA0**	B)
• 30 mm wide (1 unit)	**6ES7 138-4AA11-0AA0**	B)
For further accessories, e.g. for labeling, see Catalog IK PI		

B) Subject to export regulations: AL: N, ECCN: EAR99H

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Analog electronics modules

Overview

- Analog inputs and outputs for the ET 200S
- Can be plugged onto TM-E terminal modules with automatic coding.
- High-feature variants with enhanced accuracy and resolution
- Hot swapping of modules possible

Design

Possible combinations of the TM-E terminal modules and analog modules

TM-E terminal modules for electronics modules					
Screw-type terminal Order No. 6ES7 193...	**TM-E15S26-A1** …4CA40-0AA0	**TM-E15S24-A1** …4CA20-0AA0	**TM-E15S24-01** …4CB20-0AA0	**TM-E15S23-01** …4CB00-0AA0	**TM-E15S24-AT** …4CL20-0AA0
Spring terminal Order No. 6ES7 193...	**TM-E15C26-A1** …4CA50-0AA0	**TM-E15C24-A1** …4CA30-0AA0	**TM-E15C24-01** …4CB30-0AA0	**TM-E15C23-01** …4CB10-0AA0	**TM-E15C24-AT** …4CL30-0AA0
Fast Connect Order No. 6ES7 193...	**TM-E15N26-A1** …4CA80-0AA0	**TM-E15N24-A1** …4CA70-0AA0	**TM-E15N24-01** …4CB70-0AA0	**TM-E15N23-01** …4CB60-0AA0	--
Electronics modules					
2AI U Standard 2AI U High Feature	•	•	•	•	
2AI I 2WIRE Standard	•	•	•	•	
2AI I 2/4WIRE High Feature	•		•		
2 AI I 4WIRE Standard	•		•		
2AI RTD Standard	•		•		
2AI RTD High Feature	•	•	•	•	
2 AI TC Standard	•	•	•	•	
2 AI TC High Feature					•
2AO U Standard 2AO U High Feature	•		•		
2 AO I Standard 2AO I High Feature	•	•	•	•	

Selection and Ordering Data	Order No.	
Analog input		
• AI 2 x U (±5 V, 1...5 V, ±10 V) / 13 bit, standard - Module-internal diagnostics - Overflow/underflow diagnostics	**6ES7 134-4FB01-0AB0**	
• AI 2 x I, 2-wire transmitter (4...20 mA) / 13 bit, standard - Module-internal diagnostics - Overflow/underflow diagnostics - Wire break monitoring	**6ES7 134-4GB01-0AB0**	B)
• AI 2 x I, 4-wire transmitter (±20 mA, 4...20 mA) / 13 bit, standard - Module-internal diagnostics - Overflow/underflow diagnostics - Wire break monitoring	**6ES7 134-4GB11-0AB0**	B)
• AI 2 x TC / 15 bit, standard - Module-internal diagnostics - Overflow/underflow diagnostics - Wire break monitoring - Compensation through external Pt100 in the same station with AI 2 x RTD standard	**6ES7 134-4JB00-0AB0**	B)
• AI 2 x RTD / 15 bit, standard - Module-internal diagnostics - Overflow/underflow diagnostics - Wire break monitoring - Resistance thermometer Pt100, Ni100 (2, 3 or 4 wires)	**6ES7 134-4JB50-0AB0**	B)
• AI 2 x U (1...5 V, ±5 V, ±10 V) / 15 bit, High Feature - Module-internal diagnostics - Overflow/underflow diagnostics	**6ES7 134-4LB00-0AB0**	B)
• AI 2 x I, 2/4-wire transmitter (±20 mA, 4...20 mA) / 15 bit, high feature - Module-internal diagnostics - Overflow/underflow diagnostics - Wire break monitoring	**6ES7 134-4MB00-0AB0**	B)
• AI 2 x TC / 15 bit, high feature - Module-internal diagnostics - Overflow/underflow diagnostics - Wire break monitoring - Internal temperature compensation with TM-E15S24-AT or TM-E15C24-AT terminal module	**6ES7 134-4NB01-0AB0**	B)
• AI 2 x RTD / 15 bit, high feature - Module-internal diagnostics - Overflow/underflow diagnostics - Wire break monitoring - Resistance thermometer Pt100/200/500/1000, Ni100/1000 (2, 3 or 4 wires) - Temperature in Celsius or Fahrenheit	**6ES7 134-4NB51-0AB0**	B)

Selection and Ordering Data	Order No.	
Analog output		
• AO 2 x U (1...5 V / 12 bit, ±10 V / 13 bit), standard - Module-internal diagnostics - Connection of substitute value in event of CPU stop (parameterizable) - Short-circuit monitoring	**6ES7 135-4FB01-0AB0**	B)
• AO 2 x I (±20 mA, 4...20 mA) / 13 bit, standard - Module-internal diagnostics - Connection of substitute value in event of CPU stop (parameterizable) - Wire break monitoring	**6ES7 135-4GB01-0AB0**	B)
• AO 2 x U (1...5 V, ±10 V) / 15 bit, high feature - Module-internal diagnostics - Connection of substitute value in event of CPU stop (parameterizable) - Short-circuit monitoring	**6ES7 135-4LB01-0AB0**	B)
• AO 2 x I (±20 mA, 4...20 mA) / 15 bit, high feature - Module-internal diagnostics - Connection of substitute value in event of CPU stop (parameterizable) - Wire break monitoring	**6ES7 135-4MB01-0AB0**	B)
Accessories		
Reserve modules for ET 200S for reserving unused slots for any electronics module		
• 15 mm wide (5 units)	**6ES7 138-4AA01-0AA0**	B)
• 30 mm wide (1 unit)	**6ES7 138-4AA10-0AA0**	
For further accessories, e.g. for labeling, see Catalog IK PI		

B) Subject to export regulations: AL: N, ECCN: EAR99H

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Motor starters

Overview

- Completely factory-wired motor starters for switching and protecting any three-phase loads
- Can be used as a direct-on-line, reversing or soft starter
- High Feature motor starter with a combination comprising starter circuit-breaker, solid-state overload protection and contactor or soft starter up to 7.5 kW
- Safety-oriented motor starters based on the High Feature motor starters (direct-on-line and reversing starters) with integral redundancy function for shutdown reliability up to Category 4 (EN 954-1)
- With self-assembling 50 A power bus, i.e. the load current is only supplied once for a group of motor starters
- Hot swapping is permissible
- Inputs and outputs for activating and signaling the states have been integrated
- Diagnostics capability for active monitoring of the switching and protection functions
- Can be combined with brake control module for controlling electromechanical brakes in three-phase motors

Design

Power modules and motor starters are operated on the terminal modules which are assigned to them in the tables in the sections "High Feature motor starters" and "Safety-oriented motor starters". The terminal modules are a carrier system which is simultaneously used for the power supply to the motor starters (electronics: 24 V DC and load: 400 V AC).

24 V DC for the electronics is provided by the power module inserted to the left of the first motor starter. The power module and the downstream motor starters constitute a potential group whose scope is limited by the current carrying capacity of the power module. When this limit is reached, a new potential group must be established with a further power module.

The load current is applied to the first (left) TM-xxxxS32 motor starter terminal module, and reaches the other motor starters via the power bus of the adjacent TM-xxxxS31 terminal modules. The power bus is designed for loads up to 50 A. When this limit is reached, a new load group must be started with a further TM-xxxxS32 terminal module, and provided with load current.

Brake control modules for motor starters

High Feature and safety-oriented motor starters can be expanded by a brake control module for controlling electromechanical brakes in three-phase motors. The following modules are available:

- For brakes with external supply 24 V DC/4 A:
  - xB3 (with two optional inputs for special functions)
  - xB1
- For brakes with internal supply 500 V DC/0.7 A:
  - xB4 (with two optional inputs for special functions)
  - xB2

The externally supplied 24 V DC brakes can be released independent of the switching status of the motor starter. The 500 V DC brakes, on the other hand, are generally supplied direct from the junction plate of the motor via a rectifier module and cannot be released if the motor starter is switched off. These brakes cannot be used in conjunction with the DSS1e-x motor starter (direct-on-line soft starter).

The outputs of the brake control modules can also be used for other purposes e.g. for controlling DC valves. Independent special functions can be implemented with the help of two optional local inputs each on a brake control module xB3 or xB4 and a control module 2DI of the High Feature motor starter. These operate independently of the bus and higher-level control, e.g. to implement rapid stop functions for slide controls.

Brake control modules are operated on different terminal modules depending on the design:

Brake control module	Terminal module for brake control module	
xB1 or xB2	**TM-xB15S24-01** 3RK1 903-0AG00	--
xB3 or xB4	--	**TM-xB215S24-01** 3RK1 903-0AG01

High Feature motor starters

The High Feature motor starters are used together with the PM-D power module. Combined with a terminal module according to the table, a PM-D power module opens up a new potential group. The scope of the group is limited in that the value specified for the current carrying capacity of the power module (10 A for PM-D) must not be exceeded by the total current of all modules in a potential group.

The PM-D handles the following tasks for the motor starters in a potential group:

- Supply of voltages for the electronics via the voltage buses of the terminal modules
- Monitoring of voltages for the electronics and contactors

	Terminal modules for motor starters and power modules		
With power bus supply for one load group, including 3 caps for termination of power bus	**TM-DS65-S32** 3RK1 903-0AK00	**TM-RS130-S32** 3RK1 903-0AL00	--
With power bus bushing	**TM-DS65-S31** 3RK1 903-0AK10	**TM-RS130-S31** 3RK1 903-0AL10	--
With screw terminals	--	--	**TM-P15-S27-01** 3RK1 903-0AA00
Power modul e			
PM-D DC 24 V			•
Motor starter s			
DS1e-x High Feature direct-online starter	•		
DSS1e-x High Feature direct-online soft starter	•		
RS1e-x High Feature reversing starter		•	

Safety-oriented motor starters

In EMERGENCY STOP applications, safety-oriented motor starters can be shut down selectively by means of the upstream PM-D F PROFIsafe power module. Up to 6 shut-down groups can be formed per power module. The PM-D F PROFIsafe obtains the shut-down signal from the F/FH automation system via the interface module of the ET 200S.

Combined with a terminal module according to the table, a PM-D F PROFIsafe power module opens up a new potential group. The scope of the group is limited in that the total current of all modules in a potential group must not exceed the current carrying capacity of the power module (with PM-D F PROFIsafe: inrush current 10 A; continuous current 5 A).

	Terminal modules for motor starters, power modules and supplementary/expansion modules		
With power bus supply for one load group, including 3 caps for termination of power bus	**TM-FD65-S32** 3RK1 903-3AC00	**TM-FRS130-S32** 3RK1 903-3AD00	--
With power bus bushing	**TM-FD65-S31** 3RK1 903-3AC10	**TM-FRS130-S31** 3RK1 903-3AD10	--
With screw terminals	--	--	**TM-PF30S47-F0** 3RK1 903-3AA00
Power modul e			
PM-D F PROFIsafe			•
Motor starter s			
F-DS1e-x High Feature direct-online starter	•		
F-RS1e-x High Feature reversing starter		•	

Supplementary/expansion modules for safety-oriented motor starter applications

The PM-D F X1 power/expansion module permits selective shut-down of 1 to 6 shut-down groups through external safety devices (e.g. safety relay or AS-i safety monitor). The PM-D F X1 uses the safety-oriented shut-down signals connected to the module to trigger the downstream failsafe motor starters which then safely switch off the assigned motors.

In addition, external safety devices can also be powered by a safe 24 V DC voltage V_1 via the safety-oriented PM-D F X1 power/expansion module.

The F-CM contact multiplier equipped with four safe floating contacts (NO contacts) can be used together with the PM-D F PROFIsafe or the PM-D F X1 as an interface to plants with conventional safety engineering. It has internal diagnostics functions, and can be set to one of 6 shut-down groups.

	Terminal modules for supplementary/expansion modules	
Without supply from left (as power module)	**TM-PFX30 S47-G1** 3RK1 903-3AE00	--
With supply from left (for expansion)	**TM-PFX30 S47-G0** 3RK1 903-3AE10	--
	--	**TM-FCM30-S47** 3RK1 903-3AB10
Additional/expansion modules		
PM-D F X1 safety-oriented power/expansion module	•	
F-CM safety-oriented contact multiplier		•

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Motor starters

Selection and Ordering Data	Order No.	
High Feature motor starters		
With diagnostics, expandable with brake control module		
DS1e-x direct-on-line starter		
Mechanical switching; electronic overload protection		
• Up to 1.1 kW/400 V; 0.3...3.0 A	**3RK1 301-0AB10-0AA3**	A)
• Up to 3.0 kW/400 V; 2.4...8.0 A	**3RK1 301-0BB10-0AA3**	A)
• Up to 7.5 kW/400 V; 2.4...16.0 A	**3RK1 301-0CB10-0AA3**	A)
DSS1e-x soft starter		
Electronic switching; electronic overload protection		
• Up to 1.1 kW/400 V; 0.3...3.0 A	**3RK1 301-0AB20-0AA3**	A)
• Up to 3.0 kW/400 V; 2.4...8.0 A	**3RK1 301-0BB20-0AA3**	
• Up to 7.5 kW/400 V; 2.4...16.0 A	**3RK1 301-0CB20-0AA3**	
RS1e-x reversing starter		
Mechanical switching; electronic overload protection		
• Up to 1.1 kW/400 V; 0.3...3.0 A	**3RK1 301-0AB10-1AA3**	A)
• Up to 3.0 kW/400 V; 2.4...8.0 A	**3RK1 301-0BB10-1AA3**	
• Up to 7.5 kW/400 V; 2.4...16.0 A	**3RK1 301-0CB10-1AA3**	A)
Accessories		
Terminal modules for motor starters		
• TM-DS65-S32 for DS1e-x, DSS1e-x direct-on-line starters with supply connection for power bus, incl. 3 caps for terminating the power bus	**3RK1 903-0AK00**	A)
• TM-DS65-S31 for DS1e-x, DSS1e-x direct-on-line starters without supply connection for power bus	**3RK1 903-0AK10**	A)
• TM-RS130-S32 for RS1e-x reversing starter with supply connection for power bus, incl. 3 caps for connecting the power bus	**3RK1 903-0AL00**	A)
• TM-RS130-S31 for RS1e-x reversing starter without supply connection for power bus	**3RK1 903-0AL10**	A)
PM-D power module for direct-on-line and reversing starters; 24 V DC, with diagnostics	**3RK1 903-0BA00**	A)
Terminal module for PM-D power module TM-P15-S27-01	**3RK1 903-0AA00**	
Jumper modules		
• M15-PEN PE/N terminal block, 15 mm wide, for jumpering a 15-mm module	**3RK1 903-0AH00**	
• M30-PEN PE/N terminal block, 30 mm wide, for jumpering a 30-mm module	**3RK1 903-0AJ00**	
• M15-L123 L1/L2/L3 terminal block, 15 mm wide, for jumpering a 15-mm module	**3RK1 903-0AE00**	
• M30-L123 L1/L2/L3 terminal block, 30 mm wide, for jumpering a 30-mm module	**3RK1 903-0AF00**	

Selection and Ordering Data	Order No.	
Control modules		
• 2DI COM 24 V DC control module Digital input module with two inputs for parameterizable motor starters, for front mounting on motor starter, with PC connection (LOGO! PC cable 6ED1057-1AA00-0AB0 required)	**3RK1 903-0CH10**	
• 2DI LC COM 24 V DC control module As 2DI COM control module, plus input for switching over to operator terminal mode	**3RK1 903-0CH20**	
M65-PEN-F infeed module 65 mm wide, incl. two caps, in combination with TM-DS65-32/TM-RS130-S32	**3RK1 903-2AC00**	
M65-PEN-S connection module 65 mm wide, in combination with TM-DS65-31/TM-RS130-S31	**3RK1 903-2AC10**	
Brake control expansion module For motors with mechanical brake		
• **xB1** 24 V DC / 4 A	**3RK1 903-0CB00**	
• **xB2** 500 V DC / 0.7 A	**3RK1 903-0CC00**	A)
• **xB3** 24 V DC / 4 A, DI 2 x 24 V DC with two optional inputs	**3RK1 903-0CE00**	A)
• **xB4** 500 V DC / 0.7 A, DI 2 x 24 V DC with two optional inputs	**3RK1 903-0CF00**	A)
Terminal modules for brake control expansion module		
• TM-xB15S24-01 for xB1 or xB2	**3RK1 903-0AG00**	
• TM-xB215S24-01 for xB3 or xB4	**3RK1 903-0AG01**	A)

A) Subject to export regulations: AL: N, ECCN: EAR99

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Selection and Ordering Data	Order No.	
Safety-oriented motor starters		
With diagnostics, expandable with brake control module		
F-DS1e-x safety-oriented direct-on-line starter Mechanical switching; electronic overload protection		
• Up to 1.1 kW/400 V; 0.3...3.0 A	**3RK1 301-0AB13-0AA2**	
• Up to 3.0 kW/400 V; 2.4...8.0 A	**3RK1 301-0BB13-0AA2**	
• Up to 7.5 kW/400 V; 2.4...16.0 A	**3RK1 301-0CB13-0AA2**	
F-RS1e-x safety-oriented reversing starter Mechanical switching; electronic overload protection		
• Up to 1.1 kW/400 V; 0.3...3.0 A	**3RK1 301-0AB13-1AA2**	
• Up to 3.0 kW/400 V; 2.4...8.0 A	**3RK1 301-0BB13-1AA2**	
• Up to 7.5 kW/400 V; 2.4...16.0 A	**3RK1 301-0CB13-1AA2**	
Accessories		
Terminal modules for safety-oriented motor starters		
• For F-DS1e-x direct-on-line starters, with coding		
- **TM-FDS65-S32** with supply connection for power bus	**3RK1 903-3AC00**	A)
- **TM-FDS65-S31** without supply connection for power bus	**3RK1 903-3AC10**	A)
• For F-RS1e-x reversing starters, with coding		
- **TM-FRS130-S32** with supply connection for power bus	**3RK1 903-3AD00**	A)
- **TM-FRS130-S31** without supply connection for power bus	**3RK1 903-3AD10**	A)
PM-D F PROFIsafe power module for direct-on-line and reversing starters; 24 V DC, with diagnostics	**3RK1 903-3BA00**	
Terminal module for PM-D F PROFIsafe power module TM PF30 S47-F0	**3RK1 903-3AA00**	A)
Jumper modules and control modules See under High Feature motor starters		
M65-PEN-F infeed module 65 mm wide, incl. two caps, in combination with TM-DS65-32 / TM-RS130-S32	**3RK1 903-2AC00**	
M65-PEN-S connection module 65 mm wide, in combination with TM-DS65-31/TM-RS130-S31	**3RK1 903-2AC10**	

Selection and Ordering Data	Order No.	
Brake control expansion module For motors with mechanical brake		
• **xB3** 24 V DC / 4 A, DI 2 x 24 V DC with two optional inputs	**3RK1 903-0CE00**	A)
• **xB4** 500 V DC / 0.7 A, DI 2 x 24 V DC with two optional inputs	**3RK1 903-0CF00**	A)
Terminal modules for brake control expansion module TM-xB215S24-01 for xB3 or xB4	**3RK1 903-0AG01**	A)
PM-D F X1 power module For feeding EMERGENCY STOP signals of external safety devices; for 6 switch-off groups, 24 V DC	**3RK1 903-3DA00**	
Terminal module for PM-D F X1 power module		
• **TM-PFX30 S47-G0** with infeed on left	**3RK1 903-3AE10**	A)
• **TM-PFX30 S47-G1** without infeed on left	**3RK1 903-3AE00**	A)
F-CM contact multiplier With 4 safe, floating contacts	**3RK1 903-3CA00**	
Terminal module for F-CM contact multiplier TM-FCM30 S47-F01	**3RK1 903-3AB10**	

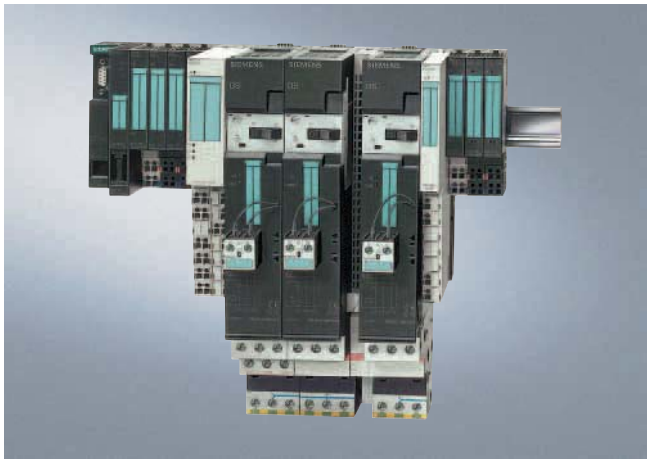
A) Subject to export regulations: AL: N, ECCN: EAR99

Note:
For color-coding plates and further accessories for ET 200S configurations with High Feature motor starters and for ET 200S configurations with safety-oriented motor starters, please refer to "Distributed I/O / ET 200S" on the A&D Mall or in the Catalogs IK PI and CA 01.

12

SIGUARD safety systems

Overview



The SIGUARD safety system is based on special terminal and power modules that can be combined with the ET 200S motor starters and a failsafe kit to achieve the highest safety category 4 (according to EN 954-1). It enables the evaluation of emergency stop circuits, the monitoring of protective doors or the implementation of time-delayed shut-downs. The costs involved in the configuration and wiring of conventional safety systems are no longer incurred. All standard safety applications can be covered with SIGUARD (see the ET 200S manual for examples of applications).

Design

Components required for applications with safety requirements

Components required	Safety category acc. to EN 954-1		
	2	3	4
PM-D F1...5	•	•	• [1]
TM-PF30 S47-..	•	•	•
F kit 1/2	• [2]	• [2]	• [2]
PM-X	•	•	•
TM-X15 S27-01	•	•	•
Redundantly switching, external infeed contactor		•	•

[1] PM-D F3 power module only approved up to Category 3

[2] F kit required for standard motor starter only; already integrated in high feature motor starter

Possible combinations of power and terminal modules

	PM-D F1	PM-D F2	PM-D F3	PM-D F4	PM-D F5	PM-X
TM-PF30 S47-B1 [1]	•	•				
TM-PF30 S47-B0 [2]	•	•				
TM-PF30 S47-C1 [3]			•	•		
TM-PF30 S47-C0 [4]			•	•		
TM-PF30 S47-D0					•	
TM-X15 S27-01						•

[1] For F1 or F2 in higher-level or individual safety group (voltage group)

[2] For F1 or F2 in lower-level cascaded safety group (partial voltage group)

[3] For expansion with F3 or F4 in separate ET 200S station (voltage group)

[4] For expansion with F3 or F4 in the same ET 200S station (partial voltage group)

Terminal modules for SIGUARD power modules

The terminal modules integrate the SIGUARD power modules. Using different terminal modules it is possible to separate various safety circuits by function or else to cascade them. Each such group has to be terminated with a SIGUARD PM-X connection module.

- The TM-PF30 S47-B1 terminal module always stands at the beginning of a safety segment and integrates either the PM-D F1 power module for emergency stop applications or the PM-D F2 power module for protective door monitoring. The 2-channel connection of the safety sensor (e.g. emergency stop button) as well as the 24 V DC supply for the electronics (V_1) and the contactor supply (V_2) of the motor starters have to be connected to this terminal module. Connections for the ON button (enable) and the safe output of the power module are also available.
- The TM-PF30 S47-B0 terminal module is used for the cascading of subordinate safety segments and integrates either the PM-D F1 power module for emergency stop applications or the PM-D F2 power module for protective door monitoring. No additional auxiliary voltage has to be connected to this terminal module. The supply is fed through the terminal module voltage buses from the preceding PM-D F1 or PM-D F2 power module. Switching off the voltage of the preceding power module means that the terminal module has no voltage either.
- The TM-PF30 S47-C1 terminal module always stands at the beginning of an expansion of a safety segment in a new station, e.g. in an interlaced configuration. It integrates the PM-D F3 power module for time-delayed shut-down or the PM-D F4 power module for direct shut-down in physically separated ET 200S stations. The 24-V voltages for the electronics (V_1) and for the contactor supply (V_2) are provided again. The shut-down command of a preceding ET 200S station is integrated through a safe input. Separate terminals are available for connecting the feedback circuit to the upstream ET 200S station. It is not possible to connect safety sensors to this terminal module.
- The TM-PF30 S47-C0 terminal module is used to cascade subordinate safety segments and integrates either the PM-DF3 power module for time-delayed shut-down or the PM-DF4 power module. Only the supply voltage V_2 for the contactor supply need be connected on this terminal module. The supply with V_1 is via the voltage buses of the terminal modules of the previous power modules (partial voltage group). It is not possible to connect safety sensors to this terminal module.
- The TM-PF30 S47-D0 terminal module is used to integrated the PM-D F5 power module. At this terminal module it is possible to forward safe signals to external systems through four groups, each with two safety relay contacts in redundant configuration. The terminal module must always be positioned between one of the above mentioned terminal modules and a terminal module for the TM-X connection module. It is not possible to connect safety sensors to this terminal module.

TM-X terminal module for SIGUARD connection module

For connecting an external incoming supply contactor (second shut-down option) in Categories 3 and 4. The SIGUARD connection module is inserted to the right of the last motor starter in a safety segment. The terminals for connecting the positively driven NC contact of the contactor are located alongside the terminals for connecting the contactor coil on the TM-X terminal module. If no redundant contactor is required in Category 2 (EN 954-1), for example, the feedback circuit has to be closed at these terminals by a jumper. This arrangement is also used instead of SIGUARD power module as an interface to the external safety relay when external safety relays are used.

SIGUARD PM-D F1/F2/F3/F4/F5 power modules

The following SIGUARD PM-D power modules are available for selection:

- PM-D F1 for evaluating emergency stop circuits with the function "Monitored start".
- PM-D F2 for monitoring safety doors with the function "Automatic start".
- PM-D F3 as expansion for PM-D F1/F2 for time-delayed tripping.
- PM-D F4 for expanding safety circuits with other ET200S motor starters, e.g. on a different tier.
- PM-D F5 for transmitting the status of PM-D F1...4 over four floating relay circuits to external safety devices (contact multipliers)

No additional PM-S power module is required when using the SIGUARD power modules. SIGUARD PM-D F1/F2/F3/F4 power modules monitor auxiliary voltages and contain the complete functionality of a safety relay. The PM-D F1 and PM-D F2 modules can be combined with the PM-D F3 or PM-D F4 modules. A PM-D F5 can be arranged in any position between PM-D F1...4 and a PM-X.

Every safety circuit, starting with a PM-D F1 ... 4, has to be terminated with a PM-X.

Failsafe kit

Every standard motor starter in a safety segment has to be supplemented by the failsafe kit (F-kit) in order to monitor the switching function. F-kit 1 supplements the DS1-x direct-on-line starter, F-kit 2 the RS1-x reversing starter.

The F-kits comprise

- contact carriers for the terminal modules,
- one or two auxiliary switch blocks for the contactor(s) of the motor starter and
- connecting lines.

High feature motor starters and their terminal modules come equipped with the F-kit functions.

SIGUARD safety systems

Selection and Ordering Data	Order No.	
SIGUARD Terminal Modules		
PM-PF30 S47 B1 Terminal Module For PM-D F1/2 power modules with U1/U2 incoming supply and sensor connection	**3RK1 903-1AA00**	A)
PM-PF30 S47 B0 Terminal Module For PM-D F1/2 power modules with sensor connection	**3RK1 903-1AA10**	A)
PM-PF30 S47 C1 Terminal Module For PM-D F3/4 power modules with U1/U2 incoming supply and IN+/IN- control input	**3RK1 903-1AC00**	A)
PM-PF30 S47 C0 Terminal Module For PM-D F3/4 power modules with U2 incoming supply	**3RK1 903-1AC10**	
PM-PF30 S47 D0 Terminal Module For PM-D F5 power modules	**3RK1 903-1AD10**	
PM-X15 S27 01 Terminal Module For SIGUARD connection module	**3RK1 903-1AB00**	A)
SIGUARD Power Modules		
PM-D F1 SIGUARD Power Module EMERGENCY STOP; monitored start; 2-channel	**3RK1 903-1BA00**	
PM-D F2 SIGUARD Power Module Protective door; autostart; 2-channel	**3RK1 903-1BB00**	
PM-D F3 SIGUARD Power Module Expansion to F1/2 for an additional voltage group; time-delayed	**3RK1 903-1BD00**	
PM-D F4 SIGUARD Power Module Expansion to F1/2 for an additional voltage group	**3RK1 903-1BC00**	
PM-D F5 SIGUARD Power Module Expansion to PM-D F1 up to PM-D F4, contact multiplier	**3RK1 903-1BE00**	

Selection and Ordering Data	Order No.	
Accessories		
PM-X SIGUARD Connection module for incoming-feeder contactor; external safety circuits	**3RK1 903-1CB00**	A)
Failsafe kit 1 Failsafe kit for DS1-x standard motor starter (not necessary for High Feature motor starter)	**3RK1 903-1CA00**	A)
Failsafe kit 2 Failsafe kit for RS1-x standard motor starter (not necessary for High Feature motor starter)	**3RK1 903-1CA01**	A)

A) Subject to export regulations: AL: N, ECCN: EAR99

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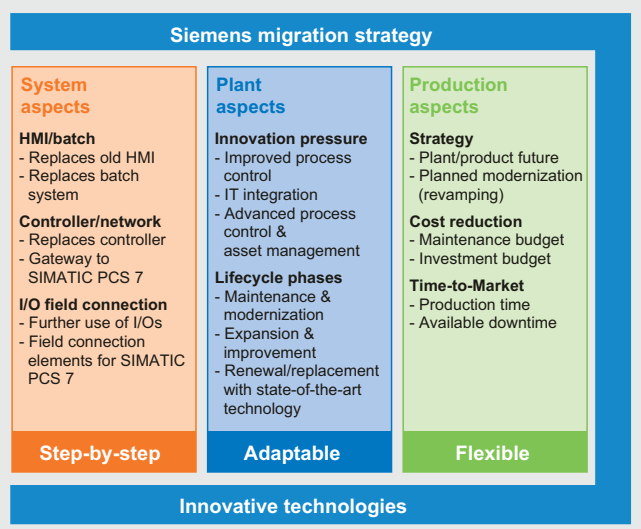
13 Migration to SIMATIC PCS 7

Introduction

Overview



Migration strategy

Globalization and permanently increasing competitive pressures are forcing companies to continuously increase productivity and shorten market launch times. To this end, it is necessary to continuously optimize engineering procedures and the process, and to simultaneously consider new industrial requirements and directives.

Many systems and plants must now be expanded and modernized to ensure that companies can continue to provide products complying with market requirements. However, since the installed basis of hardware, application software and know-how of the operating and maintenance engineers represents an enormous value, the safeguarding of investments for companies operating the plants is always assigned a high priority during all modernization plans.

Experience has shown that the success of migration is decisively determined by the provision of a technical solution optimally matched to customer requirements and the respective plant. Minimization of the technical and financial risks together with safeguarding of investments for as long a period as possible are always fundamental aspects. The different lifecycles of the various system components must also be considered, which currently vary from 5 years for PC-based workstations, 15 years for controllers, up to 25 years or more for input/output components and wiring. Therefore Siemens does not consider its task to simply be the complete replacement of an existing system, but in the close elaboration together with customers and their system integrators of an individual, future-oriented solution based on the state-of-the-art SIMATIC PCS 7 process control system - always under the directives:

- **Step-by-step** system innovation
- **Adaptable** to the specific conditions of the plant
- **Flexible** according to production requirements

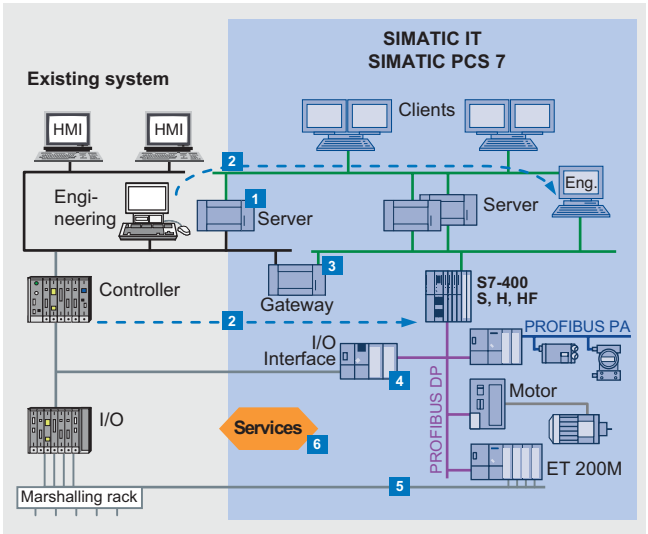
Function

Portfolio of the migration products

Siemens already recognized the significance of migration for process automation at an early point in time, and has offered a wide range of innovative migration products and solutions for its globally proven systems for many years already. Right from the beginning, the maxim of Siemens' migration strategy is to modernize the existing installed basis in steps and without completely changing the system – if possible without a plant shutdown or with minimum production downtimes. Siemens therefore supports customers' endeavors to achieve long-term safeguarding of investments together with maximization of their return on assets.

Siemens' know-how in the migration sector has continuously grown as time has passed. The experience gained in numerous migration projects has been incorporated into new products and technologies which are even more efficient. The basic technology for current and new migration solutions is the "Data Base Automation" (DBA) integrated in the engineering system of SIMATIC PCS 7. Using DBA and a plug-in interface, it is possible to download the configuration data, and to display and configure them using a standardized user interface. DBA allows system-based migration of operator system data from different output systems in standardized form, and guarantees uniform software quality, security and understandability.

The migration products can be categorized as follows:



1 SIMATIC PCS 7 operator stations with connection to the old system as replacement for the latter's HMI components

2 Engineering libraries for SIMATIC PCS 7 controllers and operator stations for importing the valuable configuration information from the old system

3 Network gateways for trouble-free exchange of information between controllers of the old system and the SIMATIC PCS 7 controllers

4 Interfaces for SIMATIC PCS 7 controllers for integrating the existing I/O level of the old system

5 Field connection components for SIMATIC PCS 7 to enable utilization of existing field wiring

6 Tool-based conversion service for converting tried-and-tested plant graphics for further use in SIMATIC PCS 7 operator stations

Introduction

Typical migration scenarios

A large number of different migration scenarios is imaginable depending on the specific technical and economical factors of each migration project. The migration products offer the modularity and flexibility required to implement such scenarios. Typical migration scenarios which can be implemented using these migration products:

Scenario 1: Replacement of existing HMI system by a SIMATIC PCS 7 operator system

If the HMI (Human Machine Interface) system is technically obsolete, if the stocking of spare parts is too expensive, if it no longer complies with current directives and standards for operator workstations, or if functional expansions are required (e.g. IT integration), it is possible to simply replace the existing HMI system by a SIMATIC PCS 7 operator system. The controller, process I/O and application software are retained.

- Minimum costs
- Clear risk
- Lengthening of service life of complete plant
- New application possibilities
- Opening of system for IT world

Scenario 2: Expansion of existing plant

The existing plant is initially retained, and is modernized by expanding with further sections/units with SIMATIC PCS 7.

- Simple, step-by-step increase in production capacity
- Clear risk
- Introduction of new technologies (e.g. PROFIBUS fieldbus, HMI)
- Opening of system for IT world
- Together with scenario 1, enables process control using a uniform operator system

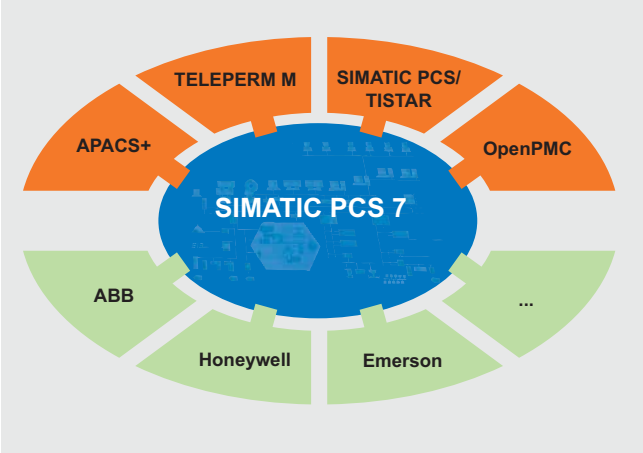
Scenario 3: Comprehensive modernization

Bottlenecks in the provision of spare parts, insufficient support, and the necessity for functional expansions (e.g. fieldbus technology or IT integration) can also force comprehensive modernization of the old system using the future-oriented SIMATIC PCS 7 process control system. Conversion may also be possible during operation. Further use of the existing I/O level is supported, and the investments made for wiring, hardware components or application engineering are safeguarded.

- Increase in performance
- Introduction of new technologies (e.g. PROFIBUS fieldbus, HMI)
- Opening of system for IT world
- Lengthening of service life of complete plant
- Reduction in number of system suppliers
- Elimination of bottlenecks and dependencies

Migration spectrum

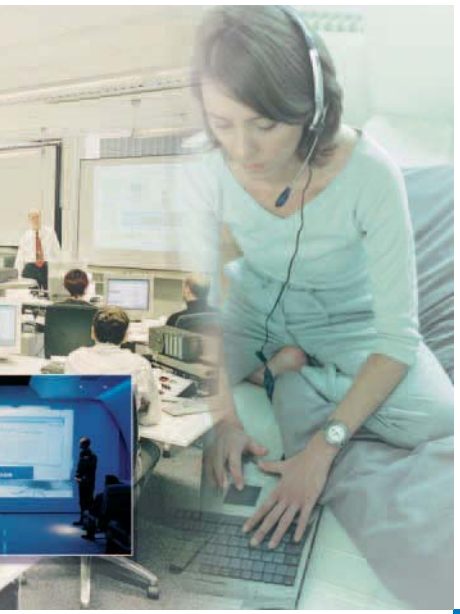
The migration of own process control systems with the modern SIMATIC PCS 7 is a matter of course for Siemens, and a significant component of the continued supplier/customer relationship. Using its universal migration technology "Data Base Automation", Siemens is additionally able to offer migration solutions for control systems from other vendors, e.g. for systems from ABB, Honeywell or Emerson.

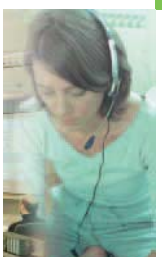


Siemens works closely with the customer's system integrators when implementing migration projects, for they have the know-how gained over many years and exactly know the plant as well as the customer's requirements. This partnership is a guarantee for the companies operating plants that they will receive an optimum migration solution. A further important aspect is that Siemens supports the migration products as well as the standard products by means of product updating and customer support. A special strength of Siemens compared to other suppliers of migration solutions is the ability to offer customers long-term support through know-how, servicing and provision of components, spare parts and upgrades.

With the future-oriented SIMATIC PCS 7 process control system, innovative migration solutions and services, many years of know-how in process automation and migration, as well as continuous worldwide servicing, Siemens demonstrates its expertise and offers the security of a reliable partner.

14 Appendix





Training

Training is decisive for your success

SITRAIN® - the Siemens Training for Automation and Industrial Solutions - provides you with comprehensive support when solving your tasks.

Training by the market leader in automation, plant installation and support permits you to make your decisions with certainty and full command. Especially where the optimum and efficient use of products and plants are concerned. You can eliminate deficiencies in existing plants, and exclude expensive faulty planning right from the beginning.

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The right mixture is the solution. Therefore blended learning can convey complex topics well, and train networked thinking. Additional effect: reduced travelling costs and periods of absence through training sequences independent of location and time.

The international training portal

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All training facilities at a glance: search in the worldwide range of courses at leisure, call up all course dates online, utilize the daily updated display of vacant course spaces - and register directly.

Customer comments on Sitrain

"... the good course documents, competence and flexibility convinced me."
[Manfred Riek from Festo Systemtechnik, responsible for planning the basic and further training of project engineers]

"... represents effective training, constructive dialogs, and solutions which provide great help."
[Günter Niedermaier, electrical design manager at AMT, Aalen]

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Course office, Infoline Germany:
Tel.: 01805 / 23 56 11 (0.12 €/Min)
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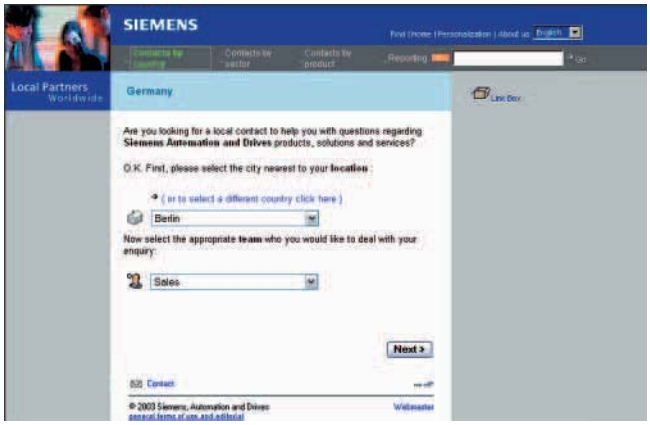

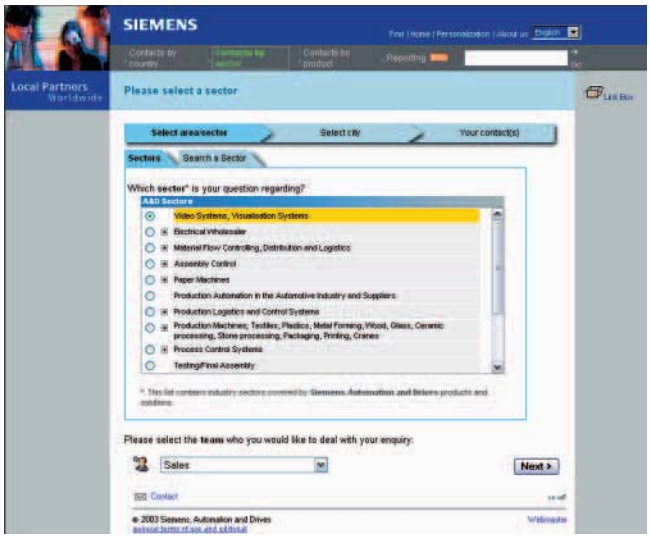

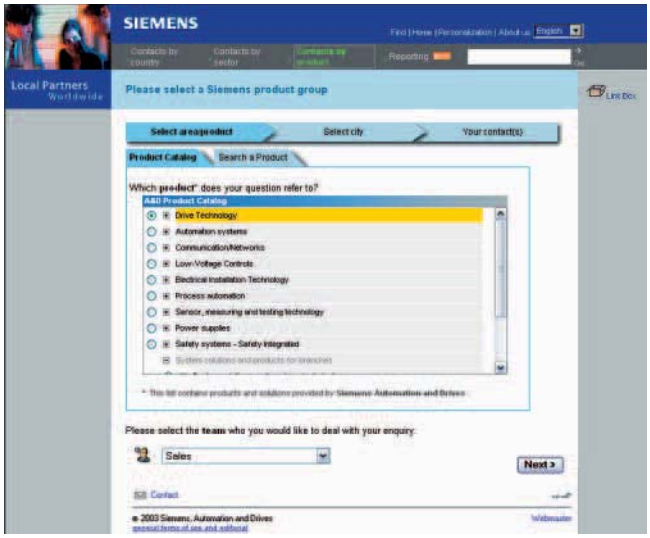

At

http://www.siemens.com/automation/partner

you can find details of Siemens contact partners worldwide responsible for particular technologies.

You can obtain in most cases a contact partner for

- Technical Support,
- Spare parts/repairs,
- Service,
- Training,
- Sales or
- Consultation/engineering.

You start by selecting a

- Country,
- Product or
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By further specifying the remaining criteria you will find exactly the right contact partner with his/her respective expertise.

Information and Ordering in the Internet and on CD-ROM

A&D in the WWW

A detailed knowledge of the range of products and services available is essential when planning and configuring automation systems. It goes without saying that this information must always be fully up-to-date.

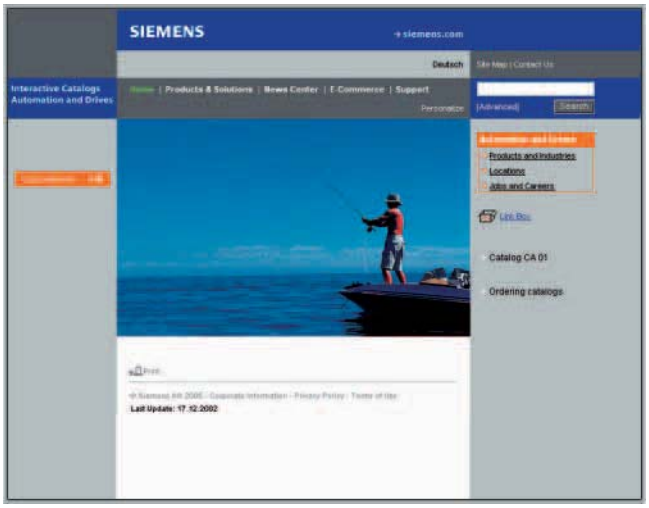
The Siemens Automation and Drives Group (A&D) has therefore built up a comprehensive range of information in the World Wide Web, which offers quick and easy access to all data required.

Under the address

http://www.siemens.com/automation

you will find everything you need to know about products, systems and services.

Product Selection Using the Offline Mall of Automation and Drives



Detailed information together with convenient interactive functions:
The Offline Mall CA 01 covers more than 80,000 products and thus provides a full summary of the Siemens Automation and Drives product base.

Here you will find everything that you need to solve tasks in the fields of automation, switchgear, installation and drives.
All information is linked into a user interface which is easy to work with and intuitive.

After selecting the product of your choice you can order at the press of a button, by fax or by online link.

Information on the Offline Mall CA 01 can be found in the Internet under

http://www.siemens.com/automation/ca01

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The A&D Mall is the virtual department store of Siemens AG in the Internet. Here you have access to a huge range of products presented in electronic catalogs in an informative and attractive way.

Data transfer via EDIFACT allows the whole procedure from selection through ordering to tracking of the order to be carried out online via the Internet.

Numerous functions are available to support you.

For example, powerful search functions make it easy to find the required products, which can be immediately checked for availability. Customer-specific discounts and preparation of quotes can be carried out online as well as order tracking and tracing.

Please visit the A&D Mall on the Internet under:

http://www.siemens.com/automation/mall

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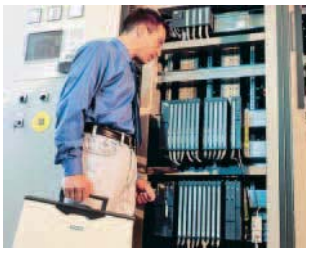
Configuration and Software Engineering

Support in configuring and developing with customer-oriented services from actual configuration to implementation of the automation project. [1])

Service On Site



With Service On Site we offer services for startup and maintenance, essential for ensuring system availability.

In Germany
0180 50 50 444 [1])

Repairs and Spare Parts

In the operating phase of a machine or automation system we provide a comprehensive repair and spare parts service ensuring the highest degree of operating safety and reliability.

In Germany
0180 50 50 446 [1])

Optimization and Upgrading

To enhance productivity and save costs in your project we offer high-quality services in optimization and upgrading. [1])

[1] For country-specific telephone numbers go to our Internet site at: http://www.siemens.com/automation/service&support

Knowledge Base on CD-ROM

For locations without online connections to the Internet there are excerpts of the free part of the information sources available on CD-ROM (Service & Support Knowledge Base). This CD-ROM contains all the latest product information at the time of production (FAQs, Downloads, Tips and Tricks, Updates) as well as general information on Service and Technical Support.

The CD-ROM also includes a full-text search and our Knowledge Manager for targeted searches for solutions. The CD-ROM will be updated every 4 months.

Just the same as our online offer in the Internet, the Service & Support Knowledge Base on CD comes complete in 5 languages (German, English, French, Italian, Spanish).

You can order the **Service & Support Knowledge Base** CD from your Siemens contact.

Order no. **6ZB5310-0EP30-0BA2**

Orders via the Internet
(with Automation Value Card or credit card) at:

http://www.siemens.com/automation/service&support

in the Shop domain.

Automation Value Card

Small card - great support

The Automation Value Card is an integral component of the comprehensive service concept with which Siemens Automation and Drives will accompany you in each phase of your automation project.

It doesn't matter whether you want just specific services from our Technical Support or want to purchase high-quality Support Tools in our Online Shop, you can always pay with your Automation Value Card. No invoicing, transparent and safe. With your personal card number and associated PIN you can view the state of your account and all transactions at any time.

Services on card. This is how it's done.

Card number and PIN are on the back of the Automation Value Card. When delivered, the PIN is covered by a scratch field, guaranteeing that the full credit is on the card.

By entering the card number and PIN you have full access to the Service & Support services being offered. The charge for the services procured is debited from the credits on your Automation Value Card.

All the services offered are marked in currency-neutral credits, so you can use the Automation Value Card worldwide.

Automation Value Card order numbers	
Credits	Order no.
200	**6ES7 997-0BA00-0XA0**
500	**6ES7 997-0BB00-0XA0**
1000	**6ES7 997-0BC00-0XA0**
10000	**6ES7 997-0BG00-0XA0**

Detailed information on the services offered is available on our Internet site at:

http://www.siemens.com/automation/service&support

Service & Support à la Card: Examples

Technical Support	
"Priority"	Priority processing for urgent cases
"24 h"	Availability round the clock
„Extended"	Technical consulting for complex questions
Support Tools in the Support Shop	
"System Utilities"	Tools that can be used directly for configuration, analysis and testing
"Applications"	Complete topic solutions including ready-tested software
"Functions & Samples"	Adaptable blocks for accelerating your developments

Siemens Automation Solution Provider

Automation solutions are becoming increasingly complex, and demands are permanently growing. We can help you find competent partners for an excellent, reliable solution. Partners who have competence and experience in the required sector linked with comprehensive know-how for automation solutions.

Our partner programs set new standards with respect to the specific competence of the companies involved and the global network of partners. As a result of the careful selection and permanent training of our solution providers, you will always be able to find a competent partner close at hand who is always working with state-of-the-art technology.

The program

You are searching for automation solutions for a particular task? Or you require professional consulting and support? You wish to contact specialists in your sector? You wish to secure market advantages? Then our Siemens automation solution providers are the right partners for you!

Our partner companies possess the know-how for developing reliable, economic and future-oriented solutions – for all sectors and all automation components: covering all SIMATIC components, visualization systems, communications networks using SIMATIC PCS 7, microsystems and motion control systems up to products for vertical integration of industrial automation and office environments.

Your benefits

- Customized, economic and future-oriented solutions
- Significant advantages with respect to speed, efficiency and locality
- Solution provider has special knowledge of sector
- Guaranteed state-of-the-art technology and knowledge of latest developments

Certification

The solution providers are continuously being trained in order to remain completely up-to-date. They are subjected to a special certification program where they have to prove their high competence using Siemens' automation tools. We can therefore guarantee a special standard of quality which is successively achieved by training on new components and during special solution provider workshops.

Internet:
www.siemens.com/automation/solution-provider

E-Mail:
SSPinfo@nbgm.siemens.de

Software Licenses

Overview

Software types

Software requiring a license is categorized into types.
The following software types have been defined:

- Engineering software
- Runtime software

Engineering software

This includes all software products for creating (engineering) user software, e.g. for configuring, programming, parameterizing, testing, commissioning or servicing.

Data generated with engineering software and executable programs can be duplicated for your own use or for use by third-parties free-of-charge.

Runtime software

This includes all software products required for plant/machine operation, e.g. operating system, basic system, system expansions, drivers, etc.

The duplication of the runtime software and executable programs created with the runtime software for your own use or for use by third-parties is subject to a charge.

You can find information about license fees according to use in the ordering data (e.g. in the catalog). Examples of categories of use include per CPU, per installation, per channel, per instance, per axis, per control loop, per variable, etc.

Information about extended rights of use for parameterization/configuration tools supplied as integral components of the scope of delivery can be found in the readme file supplied with the relevant product(s).

License types

Siemens Automation & Drives offers various types of software license:

- Floating license
- Single license
- Rental license
- Trial 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.

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 device, 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 number of hours (the operating hours do not have to be consecutive).
One license is required for each installation of the software.

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.

Certificate of license

The Certificate of License (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.

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 Automation & Drives 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).

Detailed explanations concerning license conditions can be found in the “Terms and Conditions of Siemens AG” or under http://www.siemens.com/automation/mall
(A&D Mall Online-Help System)

Subject index

Order no. index

Notes

Notes

Notes

Conditions of sale and delivery

Terms and Conditions of Sale and Delivery

By using this catalog you can acquire hardware and software products described therein from the Siemens AG subject to the following terms. Please note! The scope, the quality and the conditions for supplies and services, including software products, by any Siemens entity having a registered office outside of Germany, shall be subject exclusively to the General Terms and Conditions of the respective Siemens entity.

For customers with a seat or registered office in the Federal Republic of Germany

The „General Terms of Payment“ as well as the „General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry“ shall apply.

For software products, the „General License Conditions for Software Products for Automation and Drives for Customers with a Seat or registered Office in Germany“ shall apply.

For customers with a seat or registered office outside of Germany

The „General Terms of Payment“ as well as the „General Conditions for Supplies of Siemens, Automation and Drives for Customers with a Seat or registered Office outside of Germany“ shall apply.

For software products, the „General License Conditions for Software Products for Automation and Drives for Customers with a Seat or registered Office outside of Germany“ shall apply.

General

The prices are in € (Euro) ex works, exclusive packaging.

The sales tax (value added tax) is not included in the prices. It shall be debited separately at the respective rate according to the applicable legal regulations.

In addition to the prices of products which include silver, plump, aluminum and/or copper, surcharges may be calculated if the respective limits of the notes are exceeded. The respective note (e.g. source: German newspaper „Handesblatt“ in category „deutsche Edelmetalle“ and „Metallverarbeiter“) for silver („verarbeitetes Silber“), plump („Blei in Kabeln“), aluminum („Aluminium in Kabeln“) and copper („Elektrolytkupfer“, „DEL-Notiz“) respectively, of the day the order or rather the on call order is received, is decisive for the calculation of the surcharges.

Surcharges of copper shall be calculated for Drives at a note („DEL-Notiz“) above EUR 225,00 / 100 Kg and for chokes / transformers above EUR 150,00 / 100 kg.

Surcharges shall be charged based on the quantities of the materials which are contained in the relevant products.

Prices are subject to change without prior notice. We will debit the prices valid at the time of delivery.

The dimensions are in mm. In Germany, according to the German law on units in measuring technology, data in inches only apply to devices for export.

Illustrations are not binding.

Insofar as there are no remarks on the corresponding pages, - especially with regard to data, dimensions and weights given - these are subject to change without prior notice.

Comprehensive Terms and Conditions of Sale and Delivery are available free of charge from your local Siemens business office under the following Order Nos.:

- 6ZB5310-0KR30-0BA0
  (for customers based in the Federal Republic of Germany)
- 6ZB5310-0KS53-0BA0
  (for customers based outside of the Federal Republic of Germany)

or download them from the Internet:
http://www.siemens.com/automation/mall
(Germany: A&D Mall Online-Help System)

Export regulations

The products listed in this catalog / price list may be subject to European / German and/or US export regulations.

Therefore, any export requiring a license is subject to approval by the competent authorities.

According to current provisions, the following export regulations must be observed with respect to the products featured in this catalog / price list:

AL	Number of the German Export List. Products marked other than “N“ require an export license. In the case of software products, the export designations of the relevant data medium must also be generally adhered to. Goods labeled with an “AL not equal to N“ are subject to a European or German export authorization when being exported out of the EU.
ECCN	Export Control Classification Number. Products marked other than “N“ are subject to a reexport license to specific countries. In the case of software products, the export designations of the relevant data medium must also be generally adhered to. Goods labeled with an “ECCN not equal to N“ are subject to a US re-export authorization.

Even without a label or with an “AL: N“ or “ECCN: N“, authorization may be required due to the final destination and purpose for which the goods are to be used.

The deciding factors are the AL or ECCN export authorization indicated on order confirmations, delivery notes and invoices.

Errors excepted and subject to change without prior notice.

A&D/VuL/En 06.03.06

Catalogs of the Automation and Drives Group (A&D)

Further information can be obtained from our branch offices listed in the appendix or at www.siemens.com/automation/partner

	Catalog
Automation and Drives	
Interactive catalog on CD-ROM and on DVD	
• The Offline Mall of Automation and Drives	CA 01
Automation Systems for Machine Tools	
SINUMERIK & SIMODRIVE	NC 60
SINUMERIK & SINAMICS	NC 61
Drive Systems	
Variable-Speed Drives	
SINAMICS G130 Drive Converter Chassis Units, SINAMICS G150 Drive Converter Cabinet Units	D 11
SINAMICS G110 Inverter Chassis Units	D 11.1
SINAMICS GM150/SINAMICS SM150 Medium-Voltage Converter 0.6 MVA to 28 MVA	D 12
SINAMICS S120 Vector Control Drive System	D 21.1
SINAMICS S120 Servo Control Drive System	D 21.2
SINAMICS S150 Drive Converter Cabinet Units	D 21.3
Asynchronous Motors Standardline	D 86.1
DC Motors	DA 12
SIMOREG DC MASTER 6RA70 Digital Chassis Converters	DA 21.1
SIMOREG K 6RA22 Analog Chassis Converters	DA 21.2
SIMOREG DC MASTER 6RM70 Digital Converter Cabinet Units	DA 22
SIMOVERT PM Modular Converter Systems	DA 45
SIEMOSYN Motors	DA 48
MICROMASTER 410/420/430/440 Inverters	DA 51.2
MICROMASTER 411/COMBIMASTER 411	DA 51.3
SIMOVERT MASTERDRIVES Vector Control	DA 65.10
SIMOVERT MASTERDRIVES Motion Control	DA 65.11
Synchronous and asynchronous servomotors for SIMOVERT MASTERDRIVES	DA 65.3
SIMODRIVE 611 universal and POSMO	DA 65.4
Low-Voltage Three-Phase-Motors	
Squirrel-Cage Motors, Totally Enclosed, Fan-Cooled	M 11
Automation Systems for Machine Tools SIMODRIVE	NC 60
• Main Spindle/Feed Motors	
• Converter Systems SIMODRIVE 611/POSMO	
Automation Systems for Machine Tools SINAMICS	NC 61
• Main Spindle/Feed Motors	
• Drive System SINAMICS S120	
Drive and Control Components for Hoisting Equipment	HE 1
Electrical Installation Technology	
ALPHA Small Distribution Boards and Distribution Boards	ET A1
PDF: ALPHA 8HP Molded-Plastic Distribution System	*ET A3*
PDF: ALPHA FIX Terminal Blocks	*ET A5*
BETA Modular Installation Devices	ET B1
DELTA Switches and Outlets	ET D1
GAMMA Building Management Systems	ET G1
Human Machine Interface Systems SIMATIC HMI	ST 80

	Catalog
Industrial Communication for Automation and Drives	IK PI
Low-Voltage	
Controls and Distribution – SIRIUS, SENTRON, SIVACON	LV 1
Controls and Distribution – Technical Information SIRIUS, SENTRON, SIVACON	LV 1 T
SIDAC reactors and filters	LV 60
SIVENT Fans	LV 65
SIVACON 8PS Busbar trunking systems CD, BD01, BD2 up to 1250 A	LV 70
Motion Control System SIMOTION	PM 10
Process Instrumentation and Analytics	
Field Instruments for Process Automation Measuring Instruments for Pressure, Differential Pressure, Flow, Level and Temperature, Positioners and Liquid Meters	FI 01
PDF: Indicators for panel mounting	*MP 12*
SIREC Recorders and Accessories	MP 20
SIPART, Controllers and Software	MP 31
SIWAREX Weighing Systems	WT 01
Continuous Weighing and Process Protection	WT 02
Process Analytical Instruments	PA 01
PDF: Process Analytics, Components for the System Integration	*PA 11*
SIMATIC Industrial Automation Systems	
SIMATIC PCS Process Control System	ST 45
Products for Totally Integrated Automation and Micro Automation	ST 70
SIMATIC PCS 7 Process Control System	ST PCS 7
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System Solutions	
Applications and Products for Industry are part of the interactive catalog CA 01	
TELEPERM M Process Control System	
PDF: AS 488/TM automation systems	*PLT 112*

PDF: These catalogs are only available as pdf files.

www.siemens.com/simatic-pcs7

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