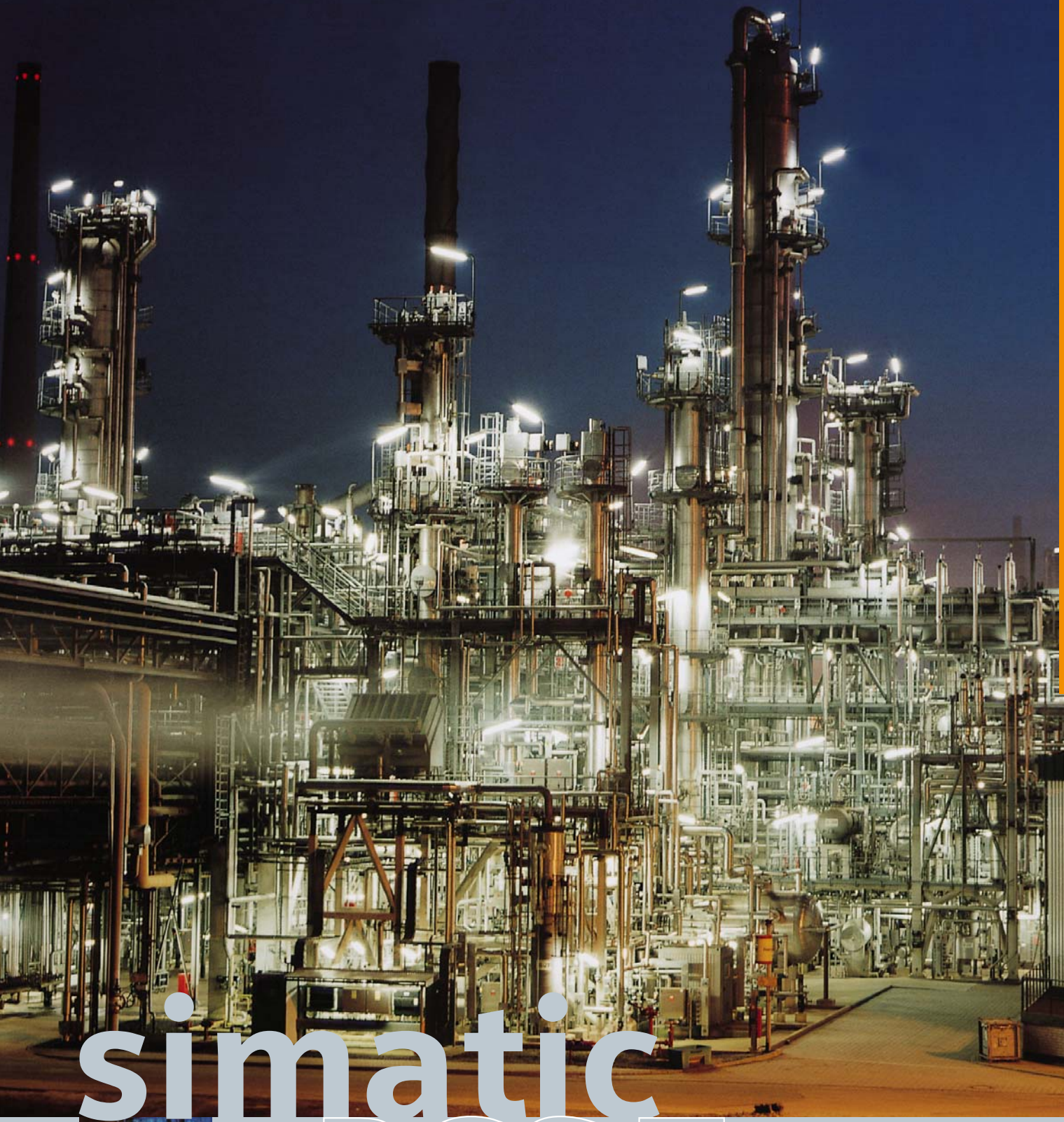
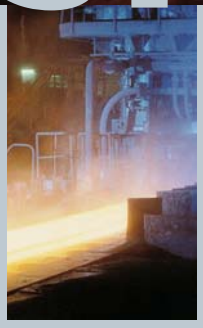
Catalog ST PCS 7 · 05/2003



simatic PCS 7



SIMATIC PCS 7
Process Control System

SIEMENS

Related catalogs

SIMATIC PCS 7 ST PCS7.A
Add-ons for the SIMATIC PCS 7 Process Control System
Order No.:
E86060-K4678-A121-A2-7600



SIMATIC ST 70
Components for Totally Integrated Automation
Order No.:
E86060-K4670-A111-A8-7600



SIMATIC HMI ST 80
Human Machine Interface Systems
Order No.:
E86060-K4680-A101-B1-7600



SIMATIC NET IK PI
Industrial Communication and Field Devices
Order No.:
E86060-K6710-A101-B3-7600



TELEPERM M PLT 112
AS 488/TM Automation Systems
Order No.:
E86060-K3812-A100-A3-7600



Field Instruments for Process Automation FI 01

Order No.:
E86060-K6201-A101-A3-7600



Information and Training ITC
for Automation and Drives Technology (in German)
Order No.:
Paper: E86060-K6850-A101-B3
CD-ROM: E86060-D6850-A100-B8-7400



Components for Automation CA 01

Order No.:
E86060-D4001-A100-B8-7600



A&D Mall

Internet:
www.siemens.com/automation/mall



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SIMATIC PCS 7
Process Control System

Catalog ST PCS 7· 2003



Supersedes:
Catalog ST PCS 7 · 2002

The products listed in this catalog are also available in Catalog CA 01 on CD-ROM
Order No.:
E86060-D4001-A100-B9-7600

Please contact your nearest Siemens branch office

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The products and systems listed in this catalog are manufactured under application of a quality management system certified by DQS in accordance with DIN EN ISO 9001 (Certificate registration No.: 1323-03). The DQS Certificate is recognized in all EQ Net countries (Reg. No. 1323).

SIEMENS

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Appendix 11

Welcome to Automation and Drives



We would like to cordially 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 integrated automation blocks, powerful engineering tools and innovative concepts such as 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.





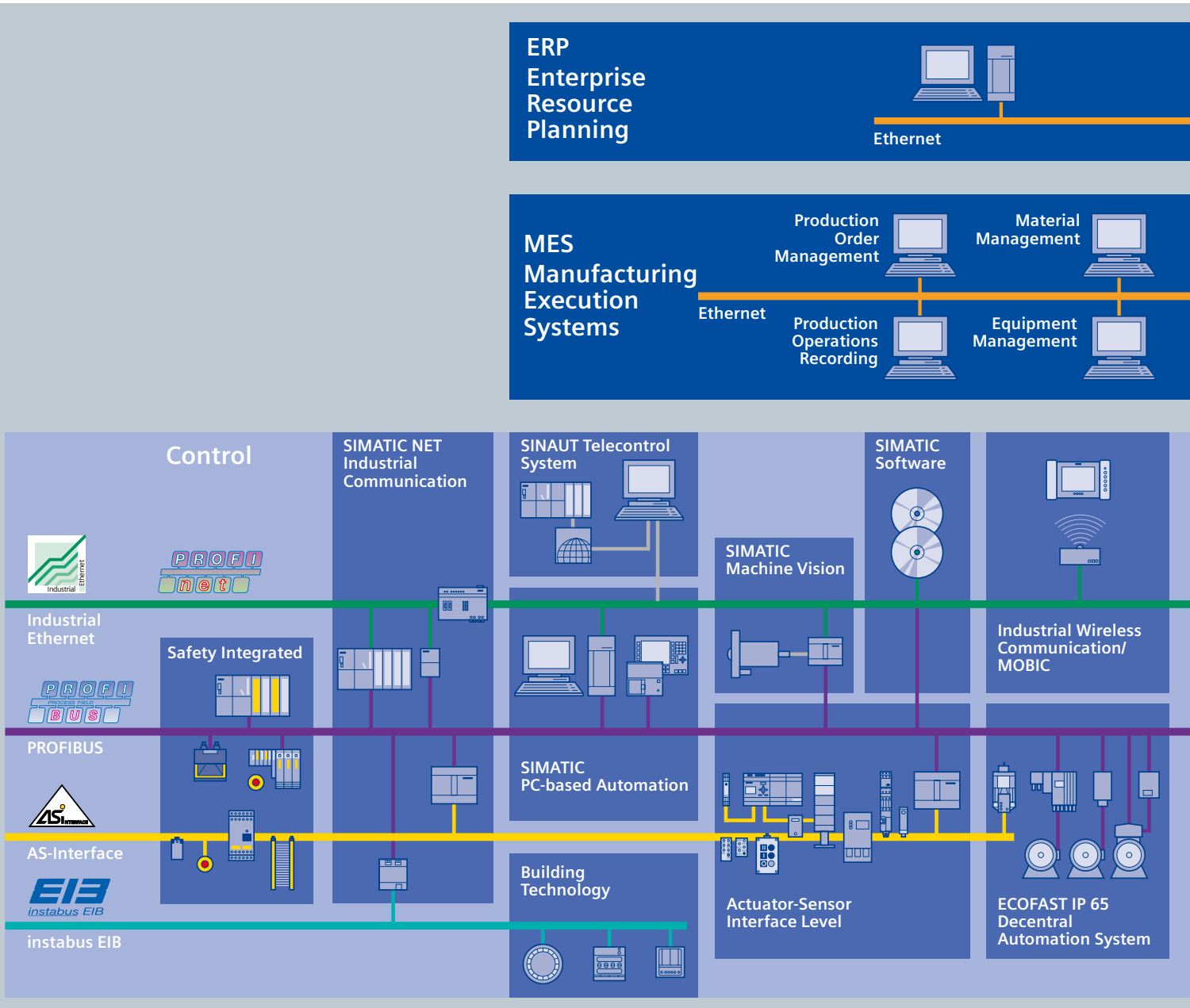




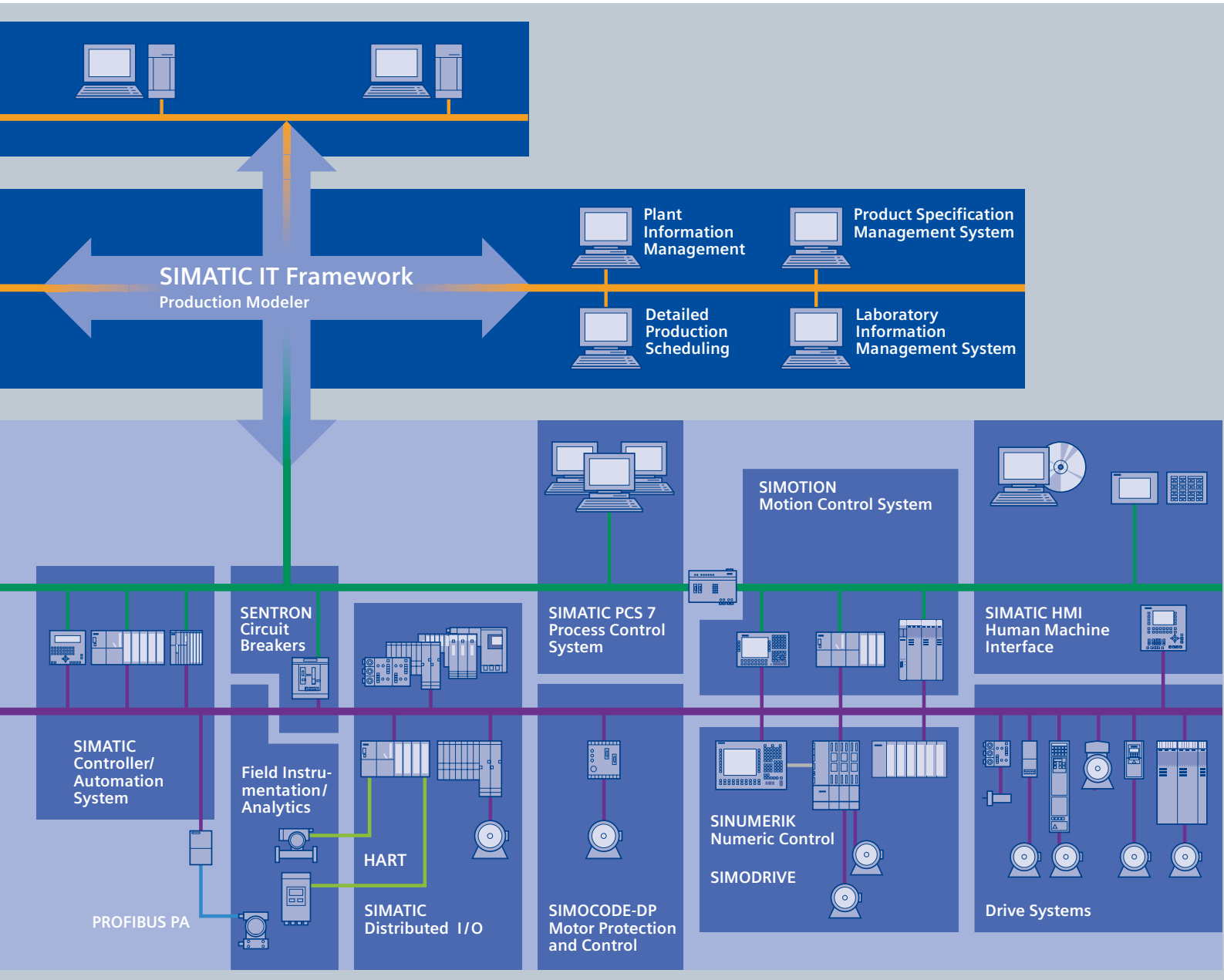


Totally Integrated Automation – innovations for more productivity

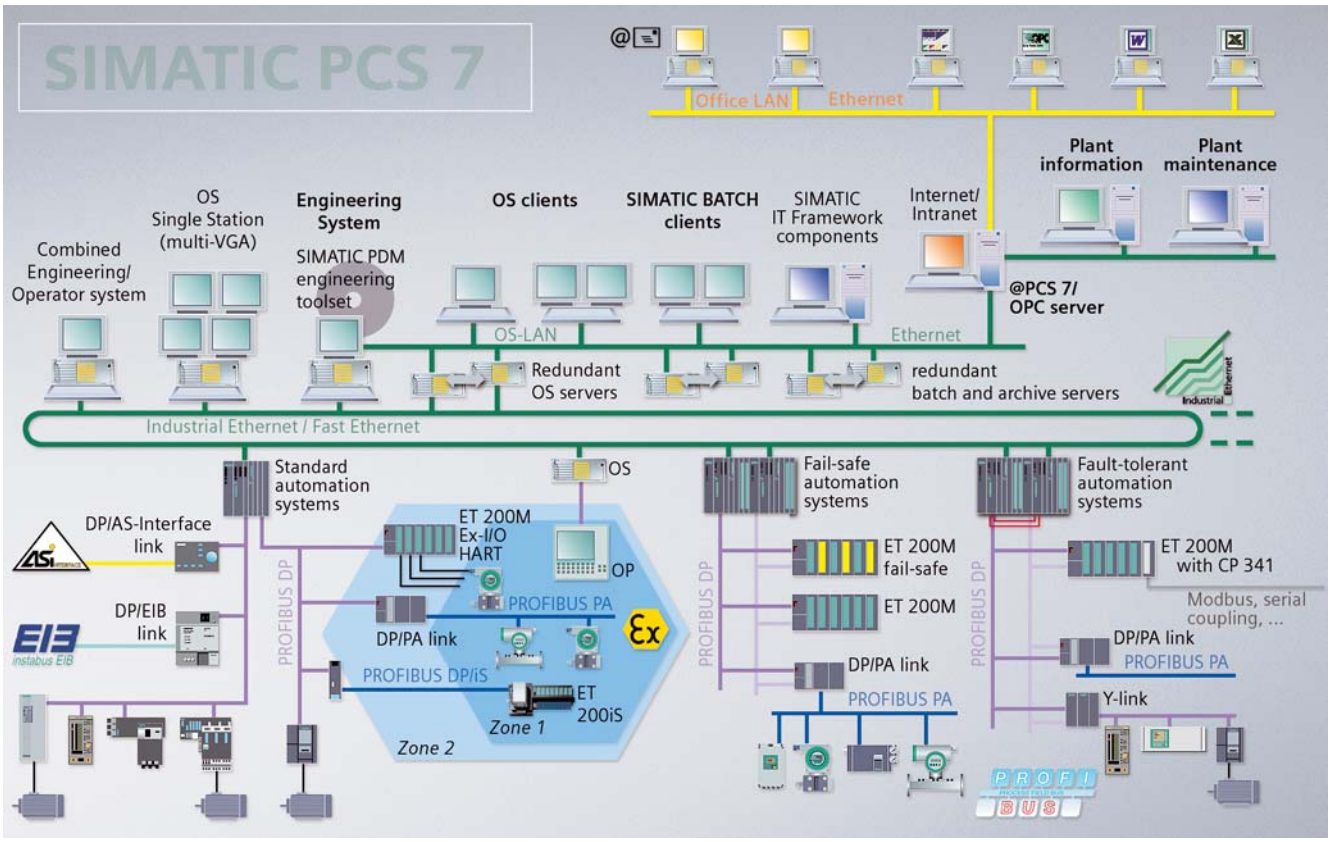
With the launch of Totally Integrated Automation in 1996, we were the first ones on the market to consistently implement the trend from equipment to an integrated automation solution, and have continuously perfected the system ever since.
Whether your industry is process- and production-oriented or a 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.



Overview



SIMATIC PCS 7 System Configuration

SIMATIC PCS 7 – The process control system for Totally Integrated Automation

Using Totally Integrated Automation® (TIA), Siemens provides 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 uniform automation technology also facilitates the optimization of all company operations, covering the enterprise resource planning (ERP) level, the management execution system (MES) level, the process control level, down to the field level.

Horizontal integration

Horizontal integration means that common and standard hardware/software components from the SIMATIC product portfolio are used for the complete production process - covering input logistics, primary and secondary processes, up to output logistics.

As the process control system component of Totally Integrated Automation, SIMATIC PCS 7 uses standard hardware and software components from the SIMATIC TIA range. The uniform data management, communication and configuration capabilities of TIA offer an open platform for advanced, future-oriented and economical automation solutions in all sectors of the process industry, manufacturing industry and hybrid industries (which include a mixture of continuous/batch/discrete processes such as in the glass or pharmaceuticals industries).

While secondary and logistics processes in the process and hybrid industries are often automated by Motion Control and SIMATIC components, the primary processes are a domain of the SIMATIC PCS 7 process control system.

Within the TIA network, SIMATIC PCS 7 not only handles standard (primary) process control tasks, but it can also automate secondary processes (e.g. filling, packaging) or input/output logistics (e.g. raw material distribution, storage) for a production location.

Vertical integration

Vertical integration is characterized by uniform and transparent data communication from the ERP level, through the MES level and the Control level, down to the field level. It is reflected in the increased fusion of automation technology and information technology and their standards in the wake of establishing company-wide information networks. This enables the modularization and standardization of whole subprocesses, resulting in far higher flexibility of production.

Vertical integration of SIMATIC PCS 7 into the company environment includes:

- Integration in the company-wide information network
- Integration of field systems

By linking the automation level to the IT world, process data becomes available throughout the company for evaluation, planning, coordination and optimization of operation, production processes and commercial processes. Also taken into account are the geographical requirements of distributed production facilities, as is the case with global companies.

SIMATIC PCS 7 is optimized for integration of distributed field systems into the process control system, and is based on PROFIBUS technology. PROFIBUS is simple, rugged and reliable, and is used worldwide in all sectors of the process, manufacturing and hybrid industries – for input/output logistics as well as for primary and secondary processes. It supports redundancy and failsafe architectures, in addition to online expansions, and can be used in standard environments or in hazardous areas. The plant can be equipped with classical signal inputs/outputs on the ET 200 distributed I/O station, or with state-of-the-art, intelligent field devices.

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 Motion Control and SIMATIC as a uniform and homogeneous 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 increasing complexity, due in particular to the merging of automation engineering with information technology, the importance of system platforms that are uniform in both horizontal and vertical directions is growing while that of automation solutions with so-called "best-of-breed products" is waning. As a component of Totally Integrated Automation, SIMATIC PCS 7 is therefore ideally equipped for the challenges of the future.

High performance and outstanding system characteristics - together with uniform data management, communication and configuration - guarantee that the typical demands made of a process control system are satisfied in full by SIMATIC PCS 7:

- simple and reliable process control,
- user-friendly operation and visualization,
- powerful, fast and uniform system-wide engineering,
- system-wide online alterability,
- system openness at all levels,
- flexibility and scalability,
- redundancy at all levels,
- failsafe automation solutions,
- comprehensive field bus integration,
- flexible solutions for batch processes,
- direct connection to 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 (online) 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 measuring points (motors, valves, PID controllers), such as might be used for a laboratory system of a pilot plant, up to a distributed multi-user system with client/server architecture and approx. 60,000 measuring points, 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, TCP/IP, OPC, @aGlance, ISA S88 and S95, just to mention a few.

SIMATIC PCS 7's openness covers all levels and applies as much to automation system and process peripherals as to operator and engineering systems, industrial communication networks or the SIMATIC IT framework as a link to information, coordination and planning tools for company management.

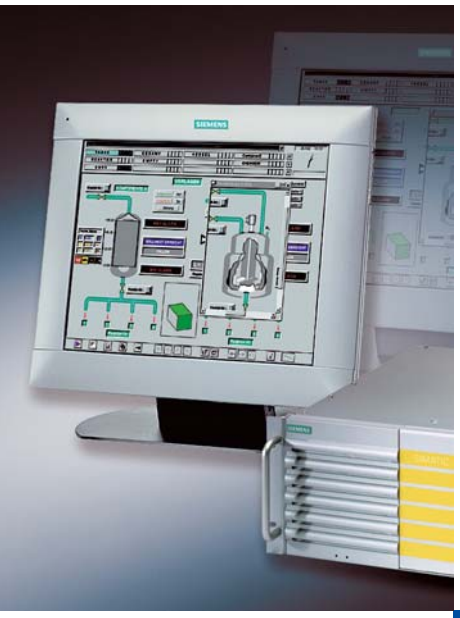
However, this openness is not only characterized by the system architecture, horizontal/vertical integration and communication, but also by programming and data exchange interfaces for user programs as well as import/export functions for graphics, text and data, e.g. from the CAD/CAE world.

SIMATIC PCS 7 can therefore also be combined with components from other vendors, and integrated in existing infrastructures.

Introduction

System-neutral components

2





1/2	**System documentation**
1/3	**Administration**
1/4	**Software Update Service**
1/5	**ES/OS/BATCH/IT basic devices**
1/5	Introduction
1/6	Basic hardware
1/8	Control units/monitors
1/9	Operating system

2

System documentation

Overview

Complete documentation for the SIMATIC PCS 7 process control system is available on CD-ROM. The documentation comes in 3 languages (German/English/French) and includes all essential manuals: from system-wide documentation to individual descriptions of engineering tools, distributed I/Os, automation systems, operator systems and communication components.

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.

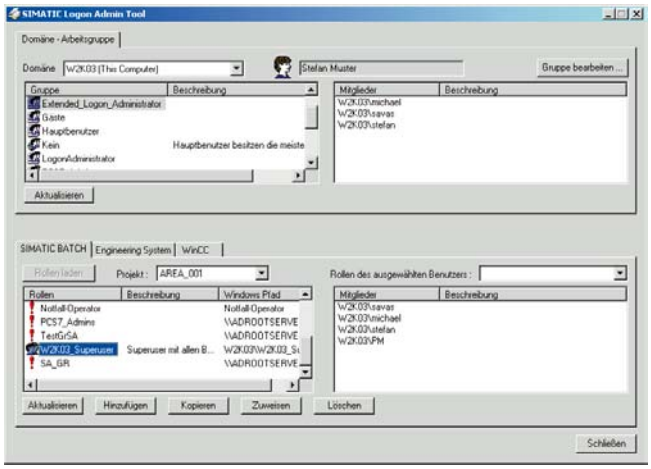
In addition there is a multilingual S7 Manual Collection, which includes manuals for SIMATIC S7-200/300/400, SIMATIC C7, the LOGO! logic module, SIMATIC DP, SIMATIC PC, SIMATIC programming units, STEP 7, Engineering Software, Runtime Software, SIMATIC PCS 7, SIMATIC HMI and SIMATIC NET. Comprehensive documentation is thus available for all SIMATIC S7 components used in context with SIMATIC PCS 7.

Ordering Data

	Order No.	
SIMATIC PCS 7 Documentation CD SIMATIC PCS 7 documentation on CD-ROM, trilingual (German, English, French) Contents include: • General documentation for SIMATIC PCS 7, e.g. - Getting Started - ES/OS Configuration Manual - PCS 7 Program Library - Automation of Batch Processes - Service Support and Diagnostics • Distributed I/Os - ET 200M - ET 200 X - ET 200 S - ET 200iS • SIMATIC Operator System – Basic Process Control • SIMATIC PDM • SIMATIC Engineering Tools - STEP 7 - CFC - SFC - S7-SCL - DOCPRO • Communication - S7-300 Communication - General Communication with SIMATIC - Bus Links - Couplers - SIMATIC NET Manuals • SIMATIC Controls (Automation Systems) - S7-300, S7-400 Module Data - S7-300 Central Modules - S7-400 H Fault-tolerant Systems - S7-400 F/FH Failsafe Systems	**6ES7 650-0XX06-8YX8**	C)
SIMATIC PCS 7 Programming instructions for creating driver blocks for SIMATIC PCS 7 V6.0, in Acrobat Reader Format (PDF) on CD-ROM, German/English	**6ES7 653-1XD06-8YX8**	C)
SIMATIC S7 manuals		
S7 Manual Collection Electronic manuals on CD, in 5 languages (German, English, French, Italian, Spanish)	**6ES7 998-8XC01-8YE0**	C)
S7 Manual Collection - Maintenance Service for 1 Year Scope of supply: Current CD "S7 Manual Collection" and the three subsequent updates	**6ES7 998-8XC01-8YE2**	C)

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

Overview



Central user management, access control and electronic signature

SIMATIC Logon offers central user administration with security and access control based on Windows 2000 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.

SIMATIC Logon Admin Tool
(initially only in combination with SIMATIC BATCH)

Using the SIMATIC Logon Admin Tool it is possible to assign the roles defined in the SIMATIC PCS 7 applications to the Windows uses/user groups. The assignment is performed from a central position for all the SIMATIC PCS 7 projects of a plant. Administrators with the necessary Windows administrator privileges can also use the SIMATIC Logon Admin Tool to edit Windows users and user groups.

The SIMATIC Logon Admin Tool is required once per plant. It can be installed on any station of the plant (server/client/single station).

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. Double clicking on the user name displayed in the application calls the SIMATIC Logon Service dialog for logoff, user change or password edit. The SIMATIC Logon Service is required on all clients/single stations that access applications which are managed by SIMATIC Logon.

SIMATIC Electronic Signature
(initially only in combination with SIMATIC BATCH)

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. The SIMATIC Electronic Signature has to be installed on all clients/single stations of the plant that access this application.

Ordering Data

	Order No.	
SIMATIC Logon Admin Tool Single license for 1 installation Engineering software on CD-ROM (German, English and French) and authorization diskette	**6ES7 658-7AX01-2YA0**	C)
SIMATIC Logon Service Single license for 1 installation Runtime software on CD-ROM (German, English and French) and authorization diskette	**6ES7 658-7BX01-2YA0**	C)
SIMATIC Electronic Signature Single license for 1 installation Runtime software on CD-ROM (German, English and French) and authorization diskette	**6ES7 658-7CX01-2YA0**	C)

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

Software Update Service

Overview

Siemens offers a SIMATIC PCS 7 Software Update Service. At a charge this subscription will automatically provide you with all ServicePacks issued within a year for the SIMATIC PCS 7 software products listed in the confirmation of order / software product certificate. Delivery is to the address entered in the order. The subscription is automatically extended for a further year unless canceled no later than 3 months prior to expiration.

Ordering Data

	Order No.	
SIMATIC PCS 7 Software Update Service Subscription for 1 year with automatic extension; Requirements: current software version	**6ES7 658-4XX00-0YL0**	C)

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

Overview

For engineering systems (ES), operator systems (OS) and SIMATIC BATCH we provide a range of modern, powerful basic devices that can also be used for connecting SIMATIC PCS 7 to the IT world. These basic devices can be expanded for system-specific purposes, are already optimized for use as single stations, clients or servers, and come equipped with the corresponding multi-lingual version of the operating systems Microsoft Windows 2000 (German, English, French, Italian and Spanish).

The basic hardware (basic PC unit) can be combined with the color monitors recommended for SIMATIC PCS 7 in the catalog "PC-base Automation" to suit the operating environment and the customer's requirements.

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.

Minimum features of basic devices for ES, OS and SIMATIC BATCH

- Programming device or personal computer with:
  - Pentium 4 processor or higher
  - min. 512 Mbyte RAM
  - min. 40 Gbyte hard disk memory
- Recommended features:
  - Programming device or personal computer with:
  - Pentium 4 processor with 2 GHz or higher
  - 1 Gbyte RAM for server/single stations, 512 Mbyte for clients
  - min. 60 Gbyte hard disk memory
- graphics card and monitor with 1280 x 1024 resolution (min. 1024 x 768)

Basic hardware

Overview



The basic devices available for engineering systems, operator systems and SIMATIC BATCH are based on a SIMATIC rack PC in 19“ design. This industrial PC meets the specific requirements of the process instrumentation and control system, and has a powerful innovative Intel PC architecture. It is specially protected from dust by filters and pressurized cooling.

Specially optimized versions are available for operation as single stations, servers or clients.

Single stations and servers can be connected in two ways to the Industrial Ethernet bus:

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

Technical data

Packaging	19" rack, 4 HE screw-fitted 19" fixtures for easy removal
CPU	Intel Pentium 4, 2 GHz and higher
Main memory (RAM)	
• Single station/server	1 Gbyte (max. expansion)
• Client	512 Mbyte (expandable to max. 2 x 512 Mbyte)
Hard disk memory	
• Single station/server	EIDE-RAID 1 (mirror) with two 60 Gbyte hard disks, 7200 rpm
• Client	30 Gbyte hard disk, 7200 rpm
Interchangeable drives	• Diskette drive • CD-RW IDE (single station) • CD-ROM (server/client)
Graphics card	on board 2D/3D graphic controller on AGP bus, up to 48 Mbyte Dynamic Video Memory
Mouse	Optical mouse
Power supply	300 W 115/230 V AC, 50/60 Hz, PFC, autorange

Technical data

Operating system	
• Single station/server	Microsoft Windows 2000 Professional MUI switch-selectable: German, English, French, Italian, Spanish
• Server	Microsoft Windows 2000 Server MUI incl. 5 CAL (Client Access Licenses) switch-selectable: German, English, French, Italian, Spanish
Interface modules/interfaces	
OS-LAN interface module	FastEthernet RJ45 (on board)
Plant bus interface module (single station/server)	
• IL 40 BCE	FastEthernet RJ45 (PCI card)
• IL 40 IE	CP 1613 communications processor
Interfaces	
• USB	2 x at rear (high current), Hi-Speed 2.0
• Serial	1 x COM1 (9-pin, 16550) external 1 x COM2 internal
• Parallel	1 x LPT1 (25-pin, EPP and ECP)
• Audio	1 x Line In; 1 x Line Out; 1 x Micro In
• VGA	1X
• Keyboard	1 x PS/2
• Mouse	1 x PS/2
Ambient conditions	
• Gegree of protection according to EN 60529	Front IP 20 with closed front door
• Protection class	Protection class I according to VDE 0106 Part 1 (IEC 536)
• Ambient temperature during operation	5...35 °C for full expansion
• Vibration during operation	approx. 0.2 g
• Shock during operation	approx. 1.0 g
• Humidity	5...80% at 25 °C
Noise	
• Sound pressure level at the workplace	< 45 dB (A)
Approvals	
• Safety approval	IEC 60950
• Approvals	UL, CSA
• CE marking	Use in the industrial sector, use in the home, business and trade sector, as well as for small companies
Dimensions and weights	
• Overall dimensions in mm *(W x H x D)*	430 x 177 x 444
• Weight	approx. 18.5 kg

Ordering Data	Order No.	
Single station		
SIMATIC PC in rack with 19" packaging system, Pentium 4 with 2 GHz and higher, 1 Gbyte RAM, EIDE-RAID 1 with two 60 Gbyte hard disks, on board graphics controller up to 48 Mbyte Dynamic Video Memory, CD-RW IDE, mouse, FastEthernet RJ45 on board for connection to OS-LAN, without monitor, keyboard and printer, Windows 2000 Professional operating system (German, English, French, Italian, Spanish)		
• **PCS 7 ES/OS IL 40 BCE** Connection to plant bus through *Basic Communication Ethernet* (BCE) with FastEthernet RJ45 network card (PCI card)	**6ES7 650-4GC06-0XX0**	A)
• **PCS 7 ES/OS IL 40 IE** Connection to plant bus through Industrial Ethernet with CP 1613 communications processor	**6ES7 650-4GC16-0XX0**	A)
Server		
SIMATIC PC in rack with 19" packaging system, Pentium 4 with 2 GHz and higher, 1 Gbyte RAM, EIDE-RAID 1 with two 60 Gbyte hard disks, on board graphics controller up to 48 Mbyte Dynamic Video Memory, CD-ROM IDE, mouse, FastEthernet RJ45 on board for connection to OS-LAN, without monitor, keyboard and printer, Windows 2000 Server operating system (German, English, French, Italian, Spanish)		
• **PCS 7 OS Server IL 40 BCE** Connection to plant bus through *Basic Communication Ethernet* (BCE) with FastEthernet RJ45-network card (PCI card)	**6ES7 650-4GE06-0XX0**	A)
• **PCS 7 OS Server IL 40 IE** Connection to plant bus through Industrial Ethernet with CP 1613 communications processor	**6ES7 650-4GE16-0XX0**	A)
Client		
PCS 7 OS Client IL 40 SIMATIC PC in rack with 19" packaging system, Pentium 4 with 2 GHz and higher, 1 x 512 Mbyte RAM, 30 Gbyte hard disk, on board graphics controller up to 48 Mbyte Dynamic Video Memory, CD-ROM IDE, mouse, FastEthernet RJ45 on board for connection to OS-LAN, without monitor, keyboard and printer, Windows 2000 Professional operating system (German, English, French, Italian, Spanish)	**6ES7 650-4GD06-0XX0**	A)

Ordering Data	Order No.	
Additional components		
Keyboard (PS/2 and USB connection)		
• German key assignment	**6ES7 648-0CA00-0AA0**	B)
• International key assignment	**6ES7 648-0CA00-0YA0**	B)
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**	

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.

A) Subject to export regulations AL: N, ECCN: 5D992B2

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

Control units/monitors

Overview

Operating devices

A mouse and keyboard are the standard operating devices (see in "Basic hardware"). Additional operating devices such as a fingerprint mouse, trackball, Ex PC operator control unit and TS-Mobic and be found in the ST PCS 7.A Add-on Catalog .

Process monitors

Depending on the ambient conditions we recommend the SCD 1898-I (LCD color) or SCM 2196-I (CRT color) industrial monitors as well as the SCM 2197 (CRT color) office monitor, all from Siemens.

The CRT monitors provide a top-quality picture throughout their long service life.

Outstanding characteristics of the SCD 1898-I LCD monitor include:

- long service life
- clear, high-contrast and flicker-free picture
- exact picture geometry
- small space requirement and low weight
- low energy consumption and heat development
- high resistance to shock and vibration
- high electromagnetic compatibility
- no X-radiation

Technical data

Monitors	SCD 1898-I	SCM 2196-I	SCM 2197
Monitor	18.1“ (45 cm) TFT color monitor, 1280 x 1024 pixels	21“ (54 cm) CRT color monitor	21“ (54 cm) CRT color monitor
Line frequency	30...97 kHz	30...96 kHz	30...96 kHz
Image refresh rate	50...100 Hz	50...120 Hz	50...160 Hz
Dimensions (WxHxD) in mm	465 x 444 x 91	499 x 480 x 520	504 x 508 x 492
Degree of protection	IP 20	IP 30	IP 20
Weight	approx. 10 kg	approx. 30.5 kg	approx. 26 kg

Detailed technical data can be found in

- the catalog "PC-based Automation", or
- the Mall / CA 01 at "Automation systems – PC-based automation“

Ordering Data

	Order No.
Process Monitors	
Industrial Monitors	
LCD Color Monitor SCD 1898-I 46 cm (18“) picture diagonal, desktop model, line frequency 30...97 kHz, degree of protection IP 20, power supply unit 230 V AC	
• 1.8 m cable	**6AV8 101-2DA00-0BA0**
• 5 m cable	**6AV8 101-2DA00-0DA0**
• 10 m cable	**6AV8 101-2DA00-0FA0**
• 20 m cable	**6AV8 101-2DA00-0JA0**
SCM 2196-I CRT Color Monitor 54 cm (21“) picture diameter, desktop model 115/230 V AC, line frequency up to 96 kHz, degree of protection IP 30, with video cable (Sub-D, BNC)	**6GF6 100-1BA**
P95 Supporting Foot for SCM 2196-I	**6GF6 180-1AH**
Office Monitors	
SCM 2197 CRT Color Monitor 54 cm (21“), picture diagonal degree of protection IP 20, with power connection cable and video cable with 15-pin/3-row Sub-D connector	**6GF6 100-1PC**

Overview

Operating system upgrade

When the SIMATIC PCS 7 is updated to version V6.0, the NT workstation/server on PCs with the Windows NT operating system have to be upgraded to Windows 2000.

The upgrade packages can be ordered as follows:

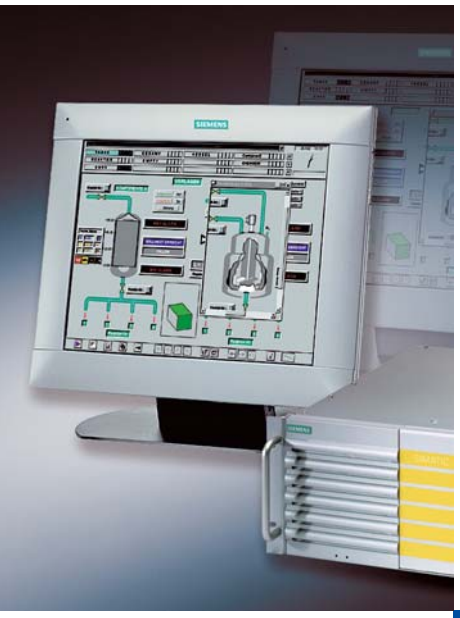
- By Fax: +49 821 804 3006
- By e-mail: dominikus.besserer@fujitsu-siemens.com
- By mechanical means (Org ID: 13000054)

Ordering Data

	Order No.
Upgrade from Windows NT Workstation to Windows 2000 Professional operating system	
• SB Windows 2000 Pro, German, pack of 3	**MSO:B23-03607/KIT**
• SB Windows 2000 Pro, German, pack of 1	**MSO:B23-03631/KIT**
• SB Windows 2000 Pro, English, pack of 3	**MSO:B23-03604/KIT**
Upgrade Betriebssystem Windows NT Server auf Windows 2000 Server	
• SB Windows 2000 Server, German (for up to 5 clients)	**MSO:C11-02925/KIT**
• SB Windows 2000 Server, English (for up to 5 clients)	**MSO:C11-02973/KIT**
• 5er Client Access License (CAL) for Windows 2000 Server, German	**MSO:C78-00013**
• 5er Client Access License (CAL) for Windows 2000 Server, English	**MSO:C11-00007**

Engineering system

3



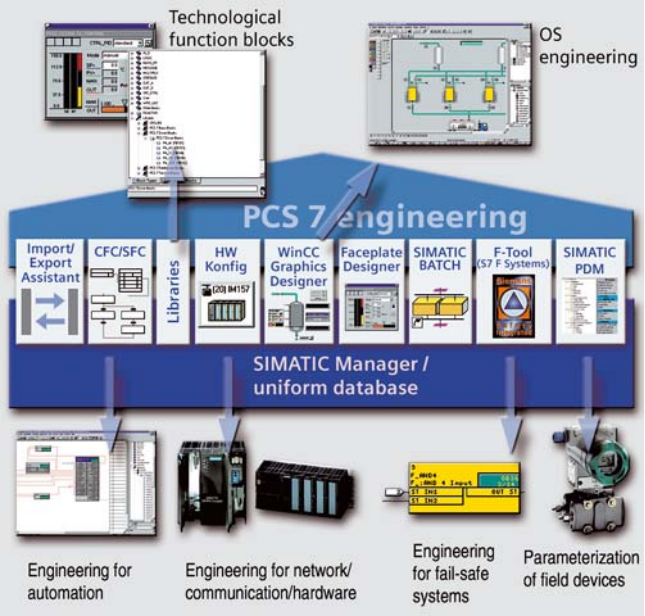
3/2	**Introduction**
3/3	**ES hardware**
3/4	**ES software**
3/5	Standard software for engineering
3/8	Engineering for H/F/FH systems
3/8	Engineering for F/FH systems
3/8	Version Cross Checker
3/9	Import/export assistant
3/10	**ES software SIMATIC PDM**
3/10	SIMATIC PDM
3/12	PDM package for PCS 7
3/13	PDM stand-alone version
3/14	**Supplementary ES software**
3/14	Controller optimization
3/14	Simulation with S7-PLCSIM



3

Engineering system

Overview



The SIMATIC PCS 7 Engineering System contains tools which are compatible with all Siemens system components and can be used for:

- hardware and field device configuration,
- communication networks configuration,
- configuration of continuous and sequential process operations,
- configuration of operation and monitoring strategies,
- configuration of SIMATIC BATCH.

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 and the predefined blocks and plans.

Function

Typical automation components such as motors, valves and PID controllers are already saved as standardized software objects (measuring point 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 data base for the engineering systems ensures that data which has been entered once is 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.

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 can be loaded online into the system components.

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 measuring point types as well as the import and export of measuring points (process object view)
- Multi-project engineering
- Branch & merge
- Extended rename
- Version cross-checker
- Import/export assistant
- SFC type

Overview



The central engineering system of the SIMATIC PCS 7 process control system is based on the same hardware as the OS single station of the operator system. This is characterized by powerful PC technology that can be used together with the Windows 2000 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 as many as 4 process monitors through a special Multi-VGA card.

ES/OS single station

The ES/OS single station is available as the standard item of hardware for engineering stations. It is based on the SIMATIC Rack PC IL 40 for installation in 19" rack systems. Two versions are available and differ in the way they communicate with the plant bus:

- *PCS 7 ES/OS IL 40 BCE*
  Communication through Basic Communication Ethernet (BCE) for a maximum of 8 stations
- *PCS 7 ES/OS IL 40 IE*
  Communication through CP 1613

The ES/OS single station is delivered complete with the Windows 2000 Professional operating station and a mouse. The keyboard and monitor have to be ordered separately.

Options/expansions

A Multi-VGA card can be added to the engineering system. It enables the connection of 2 or 4 monitors per operator terminal.

Technical data

Detailed technical data for single stations are provided in table form in the chapter "ES/OS/BATCH/IT basic devices".

Ordering data

	Order no.	
Basic hardware for ES/OS single station, SIMATIC PC in rack of 19" design, Pentium 4 with 2 GHz and more, 1 Gbyte RAM, EIDE-RAID 1 with 2 hard disks of 60 Gbyte, on board graphics controller up to 48 Mbyte Dynamic Video Memory, CD-RW IDE, mouse, FastEthernet RJ45 on board for connection to OS-LAN, without keyboard and monitor, Windows 2000 Professional operating system (German, English, French, Italian, Spanish)		
PCS 7 ES/OS IL 40 BCE Connection to system bus through *Basic Communication Ethernet* (BCE) with FastEthernet RJ45 network card (PCI card)	**6ES7 650-4GC06-0XX0**	A)
PCS 7 ES/OS IL 40 IE Connection to system bus through Industrial Ethernet with CP 1613 communication processor	**6ES7 650-4GC16-0XX0**	A)
Additional components		
Keyboard (PS/2 and USB connection)		
• German key assignment	**6ES7 648-0CA00-0AA0**	B)
• international key assignment	**6ES7 648-0CA00-0YA0**	B)
Expansions and options		
Multi-VGA card		
• **2 Screens**; Operation of 2 process monitors on 1 operator terminal	**6ES7 652-0XX02-1XE0**	
• **4 Screens**; Operation of 4 process monitors on 1 operator terminal	**6ES7 652-0XX02-1XE1**	

Monitors, refer to chapter "ES/OS/BATCH/IT basic devices"

A) Subject to export regulations AL: N, ECCN: 5D992B2

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

ES software

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:

- PCS 7 optional package S7 H Systems for the engineering of automation systems with H architecture (H/F/FH systems)
- Option package F-Tool (S7 F Systems) for the engineering of failsafe automation systems (F/FH systems)
- Version cross-checker
- Import/export assistant
- SIMATIC PDM process device manager
- PCS 7 PID Tuner for controller optimization
- S7-PLCSIM for the functional testing of CFC/SFC programs

Application

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.

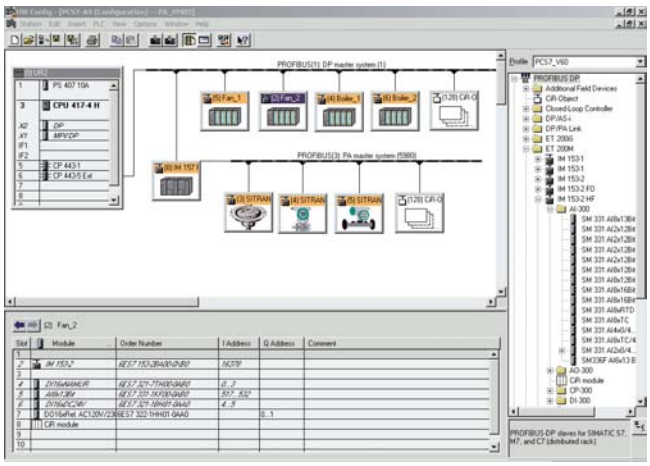
Therefore, the use of non-system software in the SIMATIC PCS 7 environment is your responsibility. You have no claims for free support in the event of compatibility problems.

Overview

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

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

Function



Hardware configuration in the SIMATIC manager with HW Config

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 three different views within SIMATIC Manager:

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

Plant view (plant hierarchy)

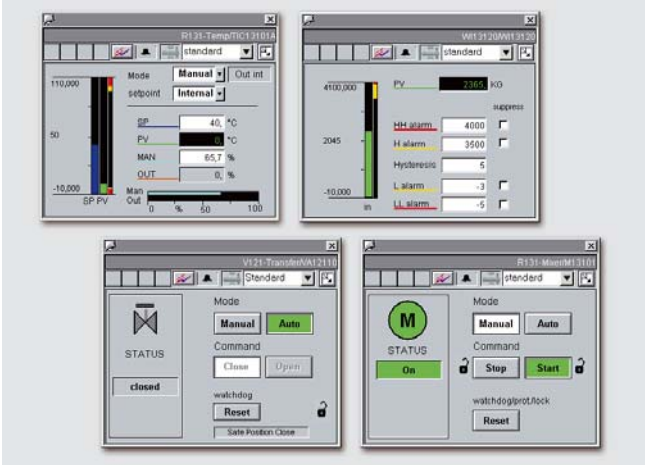
The plant view is used to structure and display a project in accordance with technological aspects. A technologically oriented project structure enables the technologist to find his bearings quickly. This technological hierarchy can also be used to derive the OS areas and the image hierarchy. And it is the basis for the plant-oriented identification of process objects.

Plant unit overviews, in which all operable and observable CFC blocks are positioned and connected, can be generated automatically.

Process object view

The process object view of the SIMATIC Manager permits 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).

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.



Examples of editable OS standard displays (faceplates) from the PCS 7 Library

Libraries containing process control applications

Preconfigured and tested blocks, faceplates and symbols are organized in 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 (incl. standardized evaluation of the process value status).

Documentation on the libraries for process control applications can be found on the SIMATIC PCS 7 Documentation CD (see *Documentation*).

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).

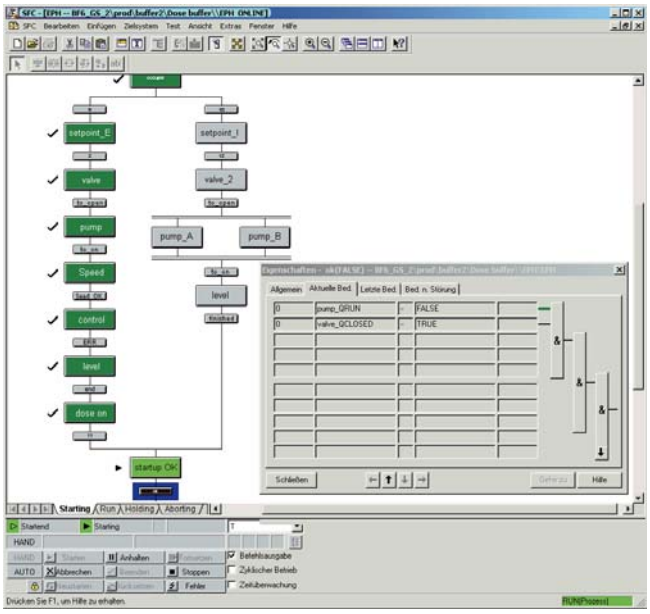
The (sub)projects belonging to a multi-project are all saved on a central server and can be sent to a local engineering station for editing. The engineering performance is then not affected by network access.

Standard software for engineering

Branch & Merge

Branch & Merge capability is provided in conjunction with multi-project engineering and supports the effective dividing and merging of projects. Charts or plant units can be copied into another project and edited there.

Charts with the same name in the master project are overwritten during Branch & Merge. Interconnections which are not specific to a project, typically for interlocking, become text interconnections when branched. When merging, these text interconnections – including those entered by the user himself – can be closed by pressing a key.



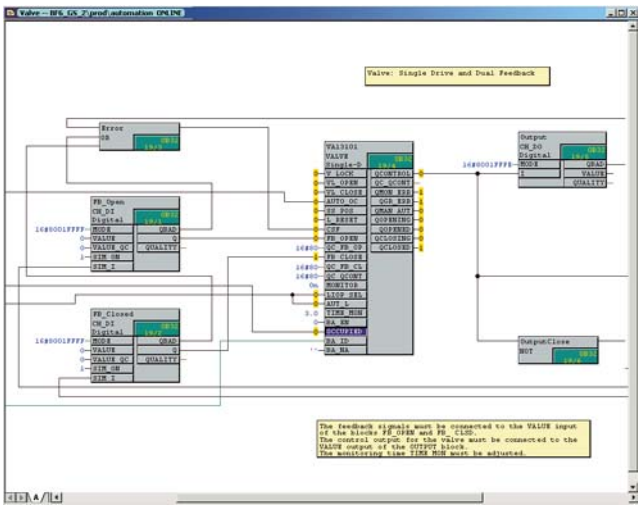
Sequential function chart

Sequential function chart (SFC)

SFC is used for the graphical configuration of sequence control systems for non-continuous production operations. Each SFC plan contains inputs and outputs for the control function and for status data. SFCs can be directly positioned in a CFC and interconnected. The required CFC block connections are selected by simple operations and connected to the steps or transitions of the step chains.

An ISA S88-conform status manager enables the configuration of up to 8 separate sequence chains for special treatments within a single SFC, e.g. for states such as HOLDING or ABORTING, for SAFE STATE or for different operating modes.

SFC configuration is supported by user-friendly editing functions and powerful test and IBS functions.



Continuous function chart

Continuous function chart (CFC)

CFC is the tool for graphical configuration 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. 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. The order of the run sequence can be optimized during compilation. An algorithm first determines the optimal order of the blocks and then the order of the run-time groups.

SFC type

An SFC type can be placed, parameterized and interconnected as an instance in a CFC just like a normal function block. It can therefore be reused, and a change to the master causes all instances to be automatically updated accordingly.

Automatic interconnection of blocks

The function "Generate module driver" can be used to automatically generate and place diagnostics blocks for the I/O components of the S7-400 automation system, the ET 200M, ET 200iS, ET 200S and ET 200X distributed I/O systems, and for PROFIBUS field devices according to the PROFIBUS PA Profile 3.0 and field devices with HART communication. The blocks are interconnected by a wizard on the basis of the symbolic addresses.

Graphics designer and faceplate designer

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

Customer-specific faceplates can be created in addition to the standard faceplates for operation and monitoring of control elements or parts of the plant. With the faceplate designer it is easy and quick to generate such customer-specific faceplates.

DOCPRO

DOCPRO generates plant documentation for SIMATIC PCS 7 projects in accordance with defined standards, as well as a circuit manual in which special requirements can be entered.

Ordering data	Order no.	
PCS 7 Engineering Software		
Single license trilingual (German/English/French)		
Electronic documentation on PCS 7 Toolset CDs and PCS 7 Documentation CD		
Type of delivery: Certificate of license, authorization diskette, PCS 7 Toolset CDs and additional CDs with Service Pack 3 for Microsoft Windows 2000, Microsoft Internet Explorer, Microsoft SQL Server 2000 and PC Anywhere		
• AS/OS, for 250 POs (process objects)	**6ES7 658-5AA06-0YA0**	C)
• AS/OS, for 2,000 POs	**6ES7 658-5AB06-0YA0**	C)
• AS/OS, for 3,000 POs	**6ES7 658-5AC06-0YA0**	C)
• AS/OS, for 5,000 POs	**6ES7 658-5AD06-0YA0**	C)
• AS/OS, POs unlimited	**6ES7 658-5AE06-0YA0**	C)
PCS 7 Engineering PowerPack		
for extending the Engineering Software for AS/OS		
Type of delivery: Certificate of license and authorization diskette		
• from 250 POs to 2,000 POs	**6ES7 658-5AB06-0YD0**	C)
• from 2,000 POs to 3,000 POs	**6ES7 658-5AC06-0YD0**	C)
• from 3,000 POs to 5,000 POs	**6ES7 658-5AD06-0YD0**	C)
• from 5,000 POs to POs unlimited	**6ES7 658-5AE06-0YD0**	C)

Ordering data	Order no.	
Engineering Software Upgrade from V5.x to V6.0		
Electronic documentation on PCS 7 Toolset CDs and PCS 7 Documentation CD		
Type of delivery: Certificate of license, authorization diskette, PCS 7 Toolset CDs and additional CDs with Service Pack 3 for Microsoft Windows 2000, Microsoft Internet Explorer, Microsoft SQL Server 2000 and PC Anywhere		
and		
Upgrade-specific PowerPacks V6.0		
Type of delivery: Certificate of license and authorization diskette		
Upgrade PCS 7 Starter Package		
• AS/OS upgrade, for 250 POs	**6ES7 658-5AA06-0YE0**	C)
Upgrade ES Software Engineering		
• AS/OS upgrade, for 3,000 POs	**6ES7 658-1AC06-0YE0**	C)
• AS PowerPack from 3,000 POs to 5,000 POs	**6ES7 658-1AD06-0YD0**	C)
• AS upgrade for POs unlimited	**6ES7 658-1AE06-0YE0**	C)
Upgrade OS Software Engineering		
• OS upgrade for 2,000 POs/RC 64K	**6ES7 658-2DB06-0YE0**	C)
• OS PowerPack from 2,000 POs/RC 64K to 3,000 POs/RC 100K	**6ES7 658-2DC06-0YD0**	C)
• OS PowerPack from 3,000 POs/RC 100K to 5,000 POs/RC 150K	**6ES7 658-2DD06-0YD0**	C)
• OS upgrade for 5,000 POs/RC 150K	**6ES7 658-2DD06-0YE0**	C)
• OS PowerPack from 5,000 POs/RC 150K to POs unlimited	**6ES7 658-2DE06-0YD0**	C)

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

Engineering for H/F/FH systems
Version Cross Checker

Overview

Engineering for H/F/FH systems

The S7-400H option package has to be installed on the engineering system in order to be able to configure automation systems with H architecture (H/F/FH systems). The F-Tool engineering tool (S7 F Systems) is required in addition for F/FH systems.

Engineering for F/FH systems

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 the CPU and F signal modules and
- generation of failsafe applications in the CFC.

Predefined, TÜV-approved blocks are available for this purpose. The failsafe 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 failsafe (F) and non-failsafe standard programs (S), where strict separation of F and S program components together with data exchange by means 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 to non-authorized persons.

Version Cross Checker

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

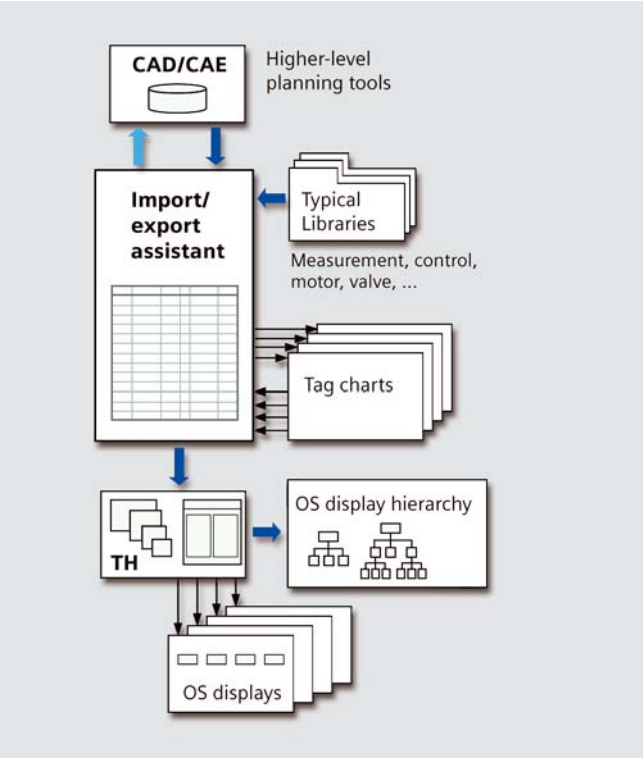
- Comparison of CFCs/SFCs, block types, signals and sequences in order to determine what is new, what has been deleted, and what has been changed
- Graphic display of comparison results in a combination of tree and tabular format
- Color-coded identification of objects and attribute values

Ordering data

	Order no.	
S7-400H V5.2 Option Package For STEP 7 and SIMATIC PCS 7 Type of delivery: Certificate of license and authorization diskette	**6ES7 833-2AC01-0YB0**	C)
S7 F Systems V5.2 F program software and function block library, single license Bilingual (German, English) Type of delivery: Certificate of license and authorization diskette;software and electronic documentation on CD	**6ES7 833-1CC00-0YX0**	C)
PCS 7 Version Cross Checker V6.0 Single license trilingual (German/English/French) Software on PCS 7 Toolset CDs, electronic documentation as online help integrated in the software Type of delivery: Certificate of license and authorization diskette	**6ES7 658-1CX06-2YA0**	C)

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

Overview



Efficient bulk engineering using the import/export assistant

The import/export assistant is a large plant engineering tool for replicating common configuration elements, e.g. based on standardized types of control element. It can significantly shorten the time required for configuration by allowing users to import plant data which have already been configured (such as control element lists or charts from the CAD/CAE world) directly into the engineering system and automatically generating the corresponding user program. Existing PCS 7 projects can be both exported and reimported.

Benefits

The import/export wizard offers the following benefits:

- Importing of pre-existing plant layout data, such as control element lists from the higher-level CAD/CAE world
  - No multiple inputs, minimized configuration errors
  - Simple handling, easy-to-use graphic environment
- Automatic generation of control elements based on the imported control element lists and typicals
  - Generation of technological hierarchy
  - Charts of the individual control elements
  - Drastic reduction of time, and avoidance of errors through automatic/reproducible generation
- Automatic derivation of the OS display hierarchy, automatic interconnecting of blocks and placing in displays
  - Considerable reduction of time and costs
- Commissioning the individual control elements 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 higher-level planning tools

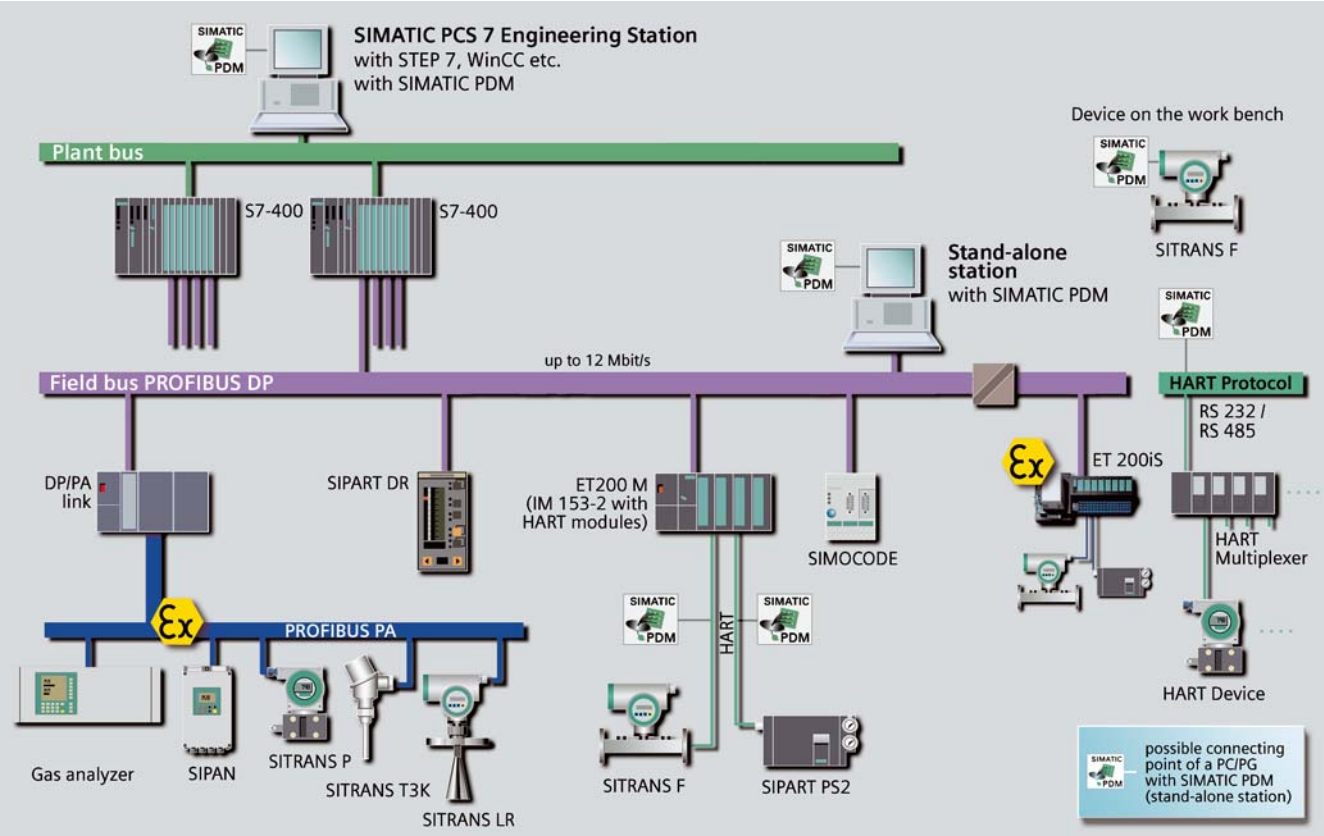
Ordering data

	Order no.	
PCS 7 Import/Export Assistant V6.0 Single license trilingual (German/English/French) Software on PCS 7 Toolset CDs, electronic documentation on PCS 7 Documentation CD Type of delivery: Certificate of license and authorization diskette	**6ES7 658-1DX06-2YB0**	C)

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

SIMATIC PDM

Overview



Configuration options with SIMATIC PDM

SIMATIC PDM (Process Device Manager) is a universal tool for the configuration, parameterization, commissioning and diagnostics of intelligent process devices. SIMATIC PDM enables you to configure a large number of process devices from Siemens and other vendors using *one* software on *one* uniform user interface. With respect to the breadth of devices that can be managed using this tool, SIMATIC PDM is the most powerful process device manager available worldwide.

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

The primary functions of SIMATIC PDM are

- adjustment,
- modification,
- plausibility testing,
- management,
- simulation and
- diagnosis

of process devices. In addition, SIMATIC PDM also permits online monitoring of process values, alarms and status signals of the devices.

The SIMATIC PDM process device manager is available in two versions:

- As a PDM package for SIMATIC PCS 7 it can be fully integrated in the central engineering system of SIMATIC PCS 7.
- As a stand-alone version it can also be operated independent of SIMATIC pcs 7 on a PC/PG with Microsoft Windows 95, 98, ME, NT, 2000 or XP Professional operating system.

Design

User interface

The operator 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 the user to help him with his tasks:

- Hardware project view
- Process devices system view as a TAG-related view, also with display of diagnostic information
- Parameter view for parameterization of the field devices
- Lifelist view for identification/diagnostics and online parameterization of the field devices
- Process devices network view for the stand-alone application

Communication

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

- Devices with PROFIBUS DP/PA interface
- Devices with HART interface
- Devices with MODBUS interface
- Devices with special interface from Siemens

Routing

SIMATIC PDM allows access from the central engineering system - through the various bus systems and remote I/Os - to any parameterizable field device in the plant. It is then possible from a central position to

- read diagnostic information from the field devices,
- modify device settings,
- calibrate and adjust field devices,
- monitor process values,
- generate simulation values in the field devices, or
- modify the field device parameters.

Device integration

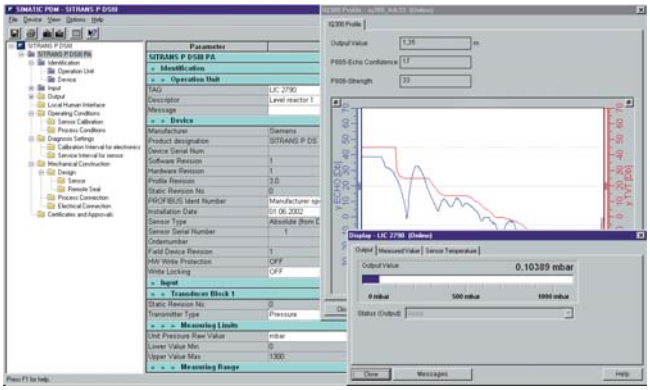
SIMATIC PDM supports field devices compliant with the PROFIBUS PA profile descriptions by the PROFIBUS User Organization (PNO) as well as field devices which are described by an electronic device description (EDD) and HART device description (HART-DD).

The design and functions of the field devices are described by the Electronic Device Description Language EDDL specified by the PROFIBUS User Organization (PNO). SIMATIC PDM automatically creates its graphical user interface with the corresponding field device information using these descriptions. The HART field devices described by HART-DDL are integrated into SIMATIC PDM using the HCF catalog (Hart Communication Foundation). HART-DDL is standardized, vendor-independent and very widely used. Other HART field devices are integrated in SIMATIC PDM through EDD.

The SIMATIC PDM device catalog currently contains more than 1,000 field devices of various makes. Additional process devices from Siemens as well as devices from other vendors can be simply integrated into SIMATIC PDM by importing their device descriptions (EDD, GSD).

PDM package for PCS 7

Application



Parameter view of SIMATIC PDM with curve and online display

The PDM package for PCS 7 is integrated in the engineering system of SIMATIC PCS 7 as a tool for the configuration, parameterization, commissioning and diagnostics of intelligent process devices.

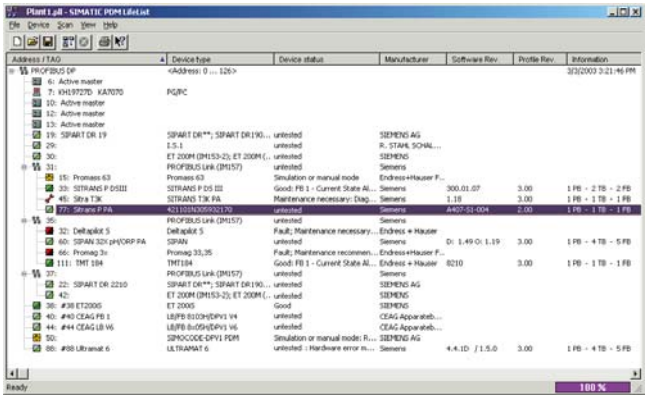
The starter package is designed for 128 TAGs. The TAGs are mainly terminals such as measurement transducers, e.g. SITRANS P. The number of TAGs can be increased through TAG options. If required, additional software is available for communication through standard HART multiplexers.

Ordering data

	Order no.	
PDM Starter Package V5.2 for SIMATIC PCS 7	**6ES7 658-3PX05-0YC0**	C)
Preferred version for SIMATIC PCS 7, in 5 languages (German, English, French, Italian and Spanish), with • SIMATIC PDM basic software (incl. communication through PROFIBUS DP/PA, HART modem and RS 232) • Integration in STEP 7/PCS 7 • Routing via S7-400 • 128 TAGs • SIMATIC PDM documentation		
TAG options		
PowerPack		
• From 128 TAGs to 512 TAGs	**6ES7 658-3XB05-2XD5**	C)
• From 512 TAGs to 1024 TAGs	**6ES7 658-3XC05-2XD5**	C)
• From 1024 TAGs to 2048 TAGs	**6ES7 658-3XD05-2XD5**	C)
• From 2048 TAGs to TAGs unlimited	**6ES7 658-3XH05-2XD5**	C)
Supplementary Software		
Communication through standard HART multiplexer in 1 language (English)	**6ES7 658-3EX00-2XD0**	C)
Demo Software		
SIMATIC PDM Demo V5.2 in 5 languages (German, English, French, Italian and Spanish), can be used for 60 days without restriction	**6ES7 658-3GX05-0YC8**	C)
Update		
SIMATIC PDM Update from V5.1 to V5.2 in 5 languages (German, English, French, Italian and Spanish), works on basic software, all combinations of the supplementary software and the PDM starter package	**6ES7 658-3AX05-0YC3**	C)

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

Function



PDM Lifelist with status and diagnostics display

SIMATIC PDM can be operated as a stand-alone version on a PC/PG with Microsoft Windows 95, 98, ME, NT, 2000 or XP Professional operating system

The SIMATIC PDM basic software for the operation and parameterization of process devices supports communication through PROFIBUS DP/PA, HART modem and RS 232, and is designed for 4 TAGs. The number of TAGs can be increased through PDM TAG options.

The functionality of the SIMATIC PDM basic software can be expanded with the following options:

- Integration in STEP 7/PCS 7 (is only necessary if it is intended to use the integration of SIMATIC PDM in HWconfig)
- Routing through S7-400
- Communication through standard HART multiplexer

The functionality of SIMATIC PDM can be tested with a demo version, which can be used without restriction for 60 days.

Requirements for stand-alone operation

For SIMATIC PDM to run on a stand-alone computer (PC/PG) the following minimum requirements have to be fulfilled:

Operating system	Processor	RAM	Hard disk memory
Windows 95c + Internet Explorer and Windows 98 SE	Pentium 133	128 MB	250 MB
Windows ME	Pentium 150	256 MB	250 MB
Windows NT 4.0 Workstation with Service Pack 6a and Windows 2000 Professional with Service Pack 1 and higher	Pentium 233	256 MB	250 MB
Windows XP Professional (Service Pack 1 recommended)	Pentium 333	256 MB	250 MB

Software requirements

- SIMATIC PDM without STEP 7:
  SIMATIC Manager V5.2 (available on SIMATIC PDM CD)
- SIMATIC PDM integrated in STEP 7:
  STEP 7 V5.0 and higher with ServicePack 4 or higher; order separately

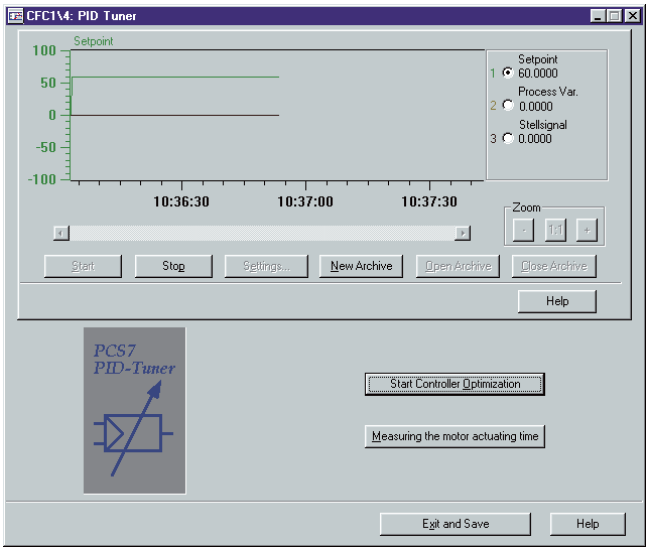
Ordering data

	Order no.	
SIMATIC PDM Basic Software V5.2 Basic software for the operation and parameterization of process devices and components, in 5 languages (German, English, French, Italian and Spanish), incl. • communication through HART modem, • communication through RS 232, • communication through PROFIBUS DP/PA • 4 TAGs • SIMATIC PDM documentation	**6ES7 658-3AX05-0YC0**	C)
Supplementary Software		
Extensions to SIMATIC PDM basic software		
Integration in STEP 7 / SIMATIC PCS 7 is only required if it is intended to use the integration of SIMATIC PDM in HW Config in 5 languages (German, English, French, Italian and Spanish)	**6ES7 658-3BX00-2XD0**	C)
Routing through S7-400 in 5 languages (German, English, French, Italian and Spanish)	**6ES7 658-3CX00-2XD0**	C)
Communication through standard HART multiplexer in 1 language (English)	**6ES7 658-3EX00-2XD0**	C)
SIMATIC PDM TAG Options		
• Up to 128 TAGs	**6ES7 658-3XA00-2XD0**	C)
• Up to 512 TAGs	**6ES7 658-3XB00-2XD0**	C)
• Up to 1,024 TAGs	**6ES7 658-3XC00-2XD0**	C)
• Up to 2,048 TAGs	**6ES7 658-3XD00-2XD0**	C)
• TAGs unlimited	**6ES7 658-3XH05-2XD0**	C)
• PowerPacks		
- From 128 TAGs to 512 TAGs	**6ES7 658-3XB05-2XD5**	C)
- From 512 TAGs to 1024 TAGs	**6ES7 658-3XC05-2XD5**	C)
- From 1024 TAGs to 2048 TAGs	**6ES7 658-3XD05-2XD5**	C)
- From 2048 TAGs to TAGs unlimited	**6ES7 658-3XH05-2XD5**	C)
Demo Software		
SIMATIC PDM Demo Version V5.2 in 5 languages (German, English, French, Italian and Spanish), can be used for 60 days without restriction	**6ES7 658-3GX05-0YC8**	C)
Update		
SIMATIC PDM Update from V5.1 to V5.2 in 5 languages (German, English, French, Italian and Spanish), works on all combinations of supplementary software and options	**6ES7 658-3AX05-0YC3**	C)

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

Controller optimization
Simulation with S7-PLCSIM

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.

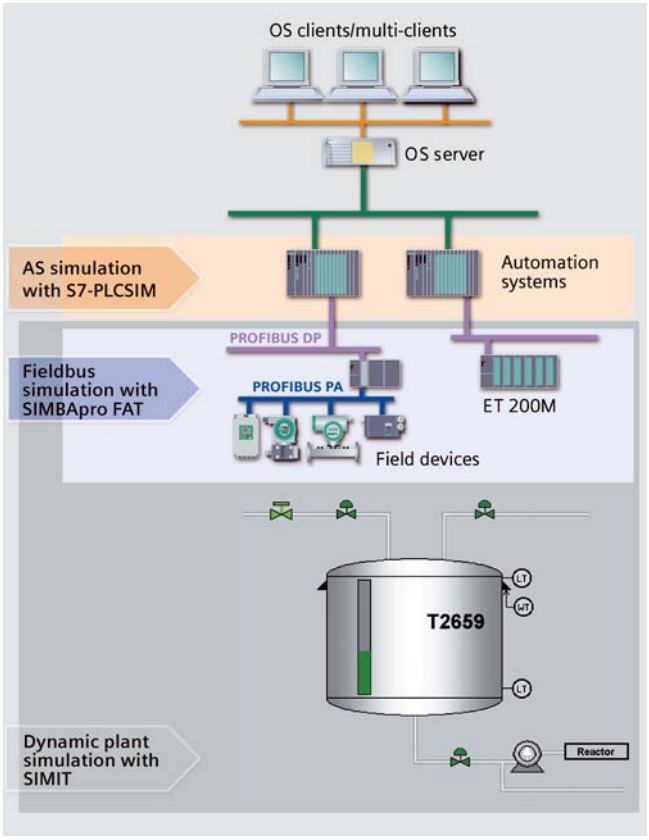
Ordering data

	Order no.	
PCS 7 PID Tuner single license	**6ES7 653-0SP06-2YB0**	C)
Controller optimization; options package for CFC trilingual (German, English, French)		
Software on PCS 7 Toolset CDs, electronic documentation on PCS 7 Documentation CD		
Type of delivery: Certificate of license and authorization diskette;		

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

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

Overview



Overview 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.

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.

Ordering data

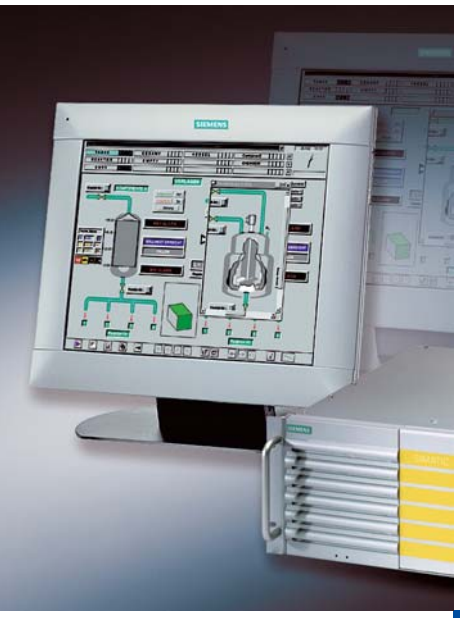
	Order no.	
S7-PLCSIM Functional testing of programs which were created with CFC/SFC, on PC/PG in 5 languages (German, English, French, Spanish, Italian)		
Type of delivery: Certificate of license and authorization diskette; software and electronic documentation on CD		
• Single license	**6ES7 841-0CC03-0YE0**	C)
• Upgrade to V5	**6ES7 841-0CC03-0YE4**	C)
• Software Update Service	**6ES7 841-0CA01-0YX2**	C)

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

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

Operator system

4

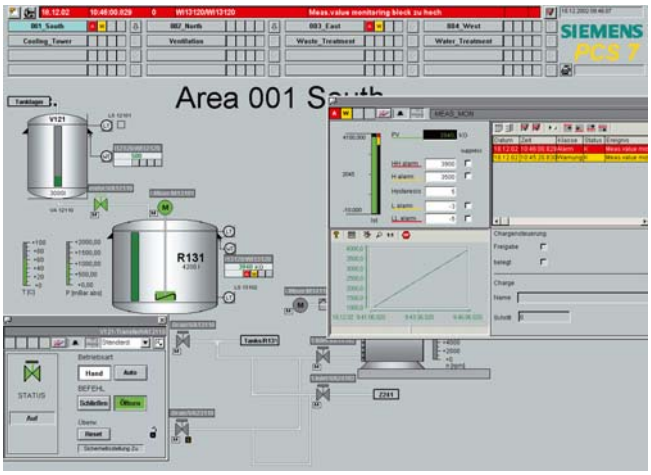




4/2	**Introduction**
4/3	**OS hardware**
4/4	OS basic hardware
4/5	OS redundancy
4/6	Multi-VGA graphics cards
4/6	Signal output
4/6	Access protection using chipcard reader
4/7	**OS software**
4/8	OS software for single station/server/client
4/9	OS archiving
4/9	SFC visualization

Operator system

Overview



Operator 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 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, 2,000, 3,000 or 5,000 POs per OS single station
- 250, 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 operator stations based on standard PC technology with Microsoft Windows 2000 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 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:
  AS reply cycle can be 500 ms, but with data transmission only after change of data; suppression of nuisance alarms
- User-friendly process control and higher operational reliability, also in conjunction with multi-screen technology
- Extended status display through the combination of status and analog values with alarm information
- Alarm priorities as additional attribute for filtering important messages
- Central user management, access control, electronic signature
- Sign-of-life system status monitoring for subordinate systems connected to the plant bus
- System-side time synchronization based on UTC (Universal Time Coordinated)

Overview



All operator stations are based on standard PC technology combined with the Microsoft Windows 2000 operating system. PCs are offered with different performance levels, which have been optimized for different functions such as OS single station, OS client or OS server. The use of standard components and interfaces from the PC world means that the operator stations are open for customer and 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. The OS single station can be connected to the Industrial Ethernet bus in two ways:

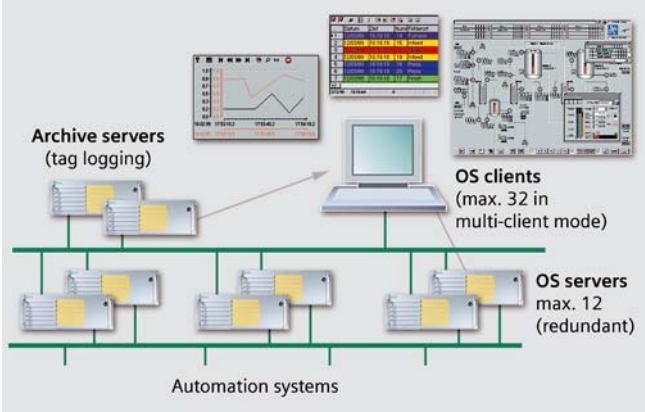
- through a CP 1613 communications processor (communication with max. 64 automation systems) or
- through a standard LAN card (Basic Communication Ethernet for communication with max. 8 automation systems).

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 (Local Area Network). 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 (hot standby). Critical applications running on the OS server are monitored by Health Check for software faults. If a fault is detected, switchover to the redundant system is triggered. Synchronization of the redundant OS servers takes place automatically and at high speed.



OS clients can access the data of not only one OS server/server pair, but from several OS servers/pairs of servers simultaneously (multi-client mode). This makes it possible to subdivide 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) from the other OS servers of in the multi-user system. This means that process graphics on one OS server can also be linked with variables on other OS servers (area-independent displays).

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

Additional archive server

An operator system may be equipped with an additional, preferably redundant archive server for process values. Using such an archive server it is possible to archive approx. 5,000 process values/s. The archive server is a station on the OS LAN and is not connected to the plant bus.

Technical data

OS quantity framework	
Max. number of OS servers / pairs of servers	12
Max. number of OS clients in multi-client mode [1] (per multi-user system)	32
Number of measuring points	
• per OS server	approx. 5,000
• per multi-user system	approx. 60,000
High-performance archive system (Microsoft SQL server) for:	
• Process values	approx. 5,000/s (with archive server)
• Messages	Steady-state load approx. 10/s (per server) Message peak approx. 1,500 / 10 s

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

Overview

The full range of basic hardware presented in the chapter "ES/OS/Batch/IT basic devices" 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, archive server or OS client:

- Hardware and software components for redundant operations
- Multi-VGA graphics card for connection of up to 4 monitors
- Display and CRT monitors for office and industrial environments (see the chapter "ES/OS/Batch/IT basic devices")
- Signal module for acoustic and visual signalling of messages
- Chipcard reader for access security

The archive server is only a station in the OS-LAN, and therefore available only in the standard version with BCE communication.

Upgrading from BCE to CP 1613 communication

OS single stations and OS 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

Technical data

Detailed technical data for single stations, clients and servers are provided in table form in the chapter "ES/OS/BATCH/IT basic devices".

Ordering Data

	Order no.	
OS Single Station		
SIMATIC PC in rack with 19" packaging system, Pentium 4 with 2 GHz and higher, 1 Gbyte RAM, EIDE-RAID 1 with two 60 Gbyte hard disks, on board graphics controller up to 48 Mbyte Dynamic Video Memory, CD-RW IDE, mouse, FastEthernet RJ45 on board for connection to OS-LAN, without monitor, keyboard and printer, Windows 2000 Professional operating system (German, English, French, Italian, Spanish)		
PCS 7 ES/OS IL 40 BCE Connection to system bus through *Basic Communication Ethernet* (BCE) with FastEthernet RJ45 network card (PCI card)	**6ES7 650-4GC06-0XX0**	A)
PCS 7 ES/OS IL 40 IE Connection to system bus through Industrial Ethernet with CP 1613 communications processor	**6ES7 650-4GC16-0XX0**	A)
OS Server		
SIMATIC PC in rack with 19" packaging system, Pentium 4 with 2 GHz and higher, 1 Gbyte RAM, EIDE-RAID 1 with two 60 Gbyte hard disks, on board graphics controller up to 48 Mbyte Dynamic Video Memory, CD-ROM IDE, mouse, FastEthernet RJ45 on board for connection to OS-LAN, without monitor, keyboard and printer, Windows 2000 Server operating system (German, English, French, Italian, Spanish)		
PCS 7 OS Server IL 40 BCE Connection to system bus through *Basic Communication Ethernet* (BCE) with FastEthernet RJ45 network card (PCI card)	**6ES7 650-4GE06-0XX0**	A)
PCS 7 OS Server IL 40 IE Connection to system bus through Industrial Ethernet with CP 1613 communications processor	**6ES7 650-4GE16-0XX0**	A)
Archive Server		
SIMATIC PC in rack with 19" packaging system, Pentium 4 with 2 GHz and higher, 1 Gbyte RAM, EIDE-RAID 1 with two 60 Gbyte hard disks, on board graphics controller up to 48 Mbyte Dynamic Video Memory, CD-ROM IDE, mouse, FastEthernet RJ45 on board for connection to OS-LAN, without monitor, keyboard and printer, Windows 2000 Server operating system (German, English, French, Italian, Spanish)		
PCS 7 OS Server IL 40 BCE With *Basic Communication Ethernet* (BCE) based on FastEthernet RJ45 network card (PCI card)	**6ES7 650-4GE06-0XX0**	A)
OS Client		
PCS 7 OS Client IL 40 SIMATIC PC in rack with 19" packaging system, Pentium 4 with 2 GHz and higher, 1 x 512 Mbyte RAM, 30 Gbyte hard disk, on board graphics controller up to 48 Mbyte Dynamic Video Memory, CD-ROM IDE, mouse, FastEthernet RJ45 on board for connection to OS-LAN, without monitor, keyboard and printer, Windows 2000 Professional operating system (German, English, French, Italian, Spanish)	**6ES7 650-4GD06-0XX0**	A)
Upgrade from BCE to CP 1613 Communication		
CP 1613 PCI card for connection to Industrial Ethernet, with AUI/ITP and RJ45 connections	**6GK1 161-3AA00**	
S7-1613 Software for S7 communication for CP 1613, with documentation on CD-ROM, German/English Languages: German/English Type of delivery: Certificate of license and authorization diskette;software and electronic documentation on CD	**6GK1 716-1CB60-3AA0**	D)
Additional Components		
Keyboard (PS/2 and USB connection)		
• German key assignment	**6ES7 648-0CA00-0AA0**	B)
• International key assignment	**6ES7 648-0CA00-0YA0**	B)
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**	

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.

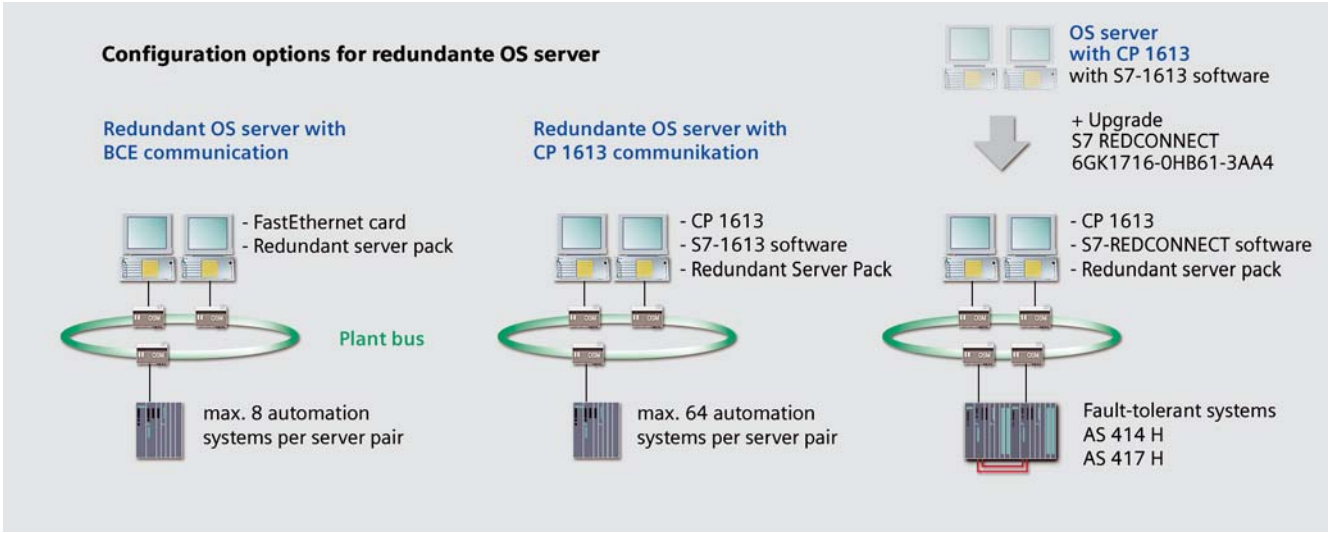
A) Subject to export regulations AL: N, ECCN: 5D992B2

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

D) Subject to export regulations AL: N, ECCN: 5D002ENC3A

Monitors, see chapter "ES/OS/BATCH/IT basic devices"

Overview



Redundancy for operator systems

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

- The *WinCC/Redundancy* software is required for redundant OS single stations for alignment of the archives.
- An *OS Software Redundant Server Pack* is required to configure a redundant OS server.
- 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).

Ordering Data

	Order no.	
For the configuration 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 371-1CF06-0AX0**	C)
RS 232 connecting cable, 10 m	**6ES7 902-1AC00-0AA0**	
For the configuration of redundant OS servers		
OS Software Redundant Server Pack V6.0 Single license for 2 installations, with OS software server and WinCC/Redundancy as well as RS 232 connecting cable, 10 m		
• 250 POs/RT 8K	**6ES7 652-3XA06-2YA0**	C)
• 2,000 POs/RT 64K	**6ES7 652-3XB06-2YA0**	C)
• 3,000 POs/RT 100K	**6ES7 652-3XC06-2YA0**	C)
• 5,000 POs/RT 150K	**6ES7 652-3XD06-2YA0**	C)
• 8,500 POs/RT 256K	**6ES7 652-3XE06-2YA0**	C)
PowerPacks for PO expansion, see OS Software Server (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**	
Upgrade package for OS single stations / OS servers with BCE for communication with fault-tolerant AS		
CP 1613 PCI card for connection to Industrial Ethernet, with AUI/ITP and RJ45 connections	**6GK1 161-3AA00**	
S7-REDCONNECT Software for failsafe S7 communication through redundant networks Languages: German/English Type of delivery: CD	**6GK1 716-0HB61-3AA0**	D)
Upgrade package for OS single stations / OS servers with CP 1613 for communication with fault-tolerant AS		
Upgrade S7-REDCONNECT from S7-1613 to S7-REDCONNECT Languages: German/English Type of delivery: CD	**6GK1 716-0HB61-3AA4**	D)

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

D) Subject to export regulations AL: N, ECCN: 5D002ENC3A

Multi-VGA graphics cards, Signal output, Access protection using chipcard reader

Overview

Multi-VGA graphics cards



OS single station and OS client are supplied as standard with a graphics card for operating one process monitor. The Multi-VGA graphics cards "2 Screens" and "4 Screens" are available for multichannel operation of an operator station with 2 or as many as 4 process monitors.

Plant sections distributed over 2 or as many as 4 process monitors by means of a graphics cards 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.

Signal output

OS single station and OS client can be expanded with 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.

Access protection using chipcard reader

A chipcard reader can be used to check a person's authorization to access and operate an OS single station or an OS 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.

4

Ordering Data

	Order no.	
Multi-VGA Graphics Card "2 Screens" for operating 2 process monitors on 1 operator station	**6ES7 652-0XX02-1XE0**	
Multi-VGA Graphics Card "4 Screens" for operating 4 process monitors on 1 operator station	**6ES7 652-0XX02-1XE1**	
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**	
Chipcard Reader Chipcard reader as desktop version, V.24 connection, PS/2 power supply with 1.8 m cable , instruction manual	**6ES7 652-0XX01-1XC0**	
Chipcard Chipcard for chipcard reader; 1 card required per user; package with 10 chipcards	**6ES7 652-0XX05-1XD1**	

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

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. The optional archive server for process values is based on the starter software for OS server 250 PO/RT 8K with 512 variables. The size of the archive can be expanded by means of additive Archive PowerPacks to 1,500, 5,000, 30,000 or 80,000 variables. All operator stations can be equipped in addition with SFC visualization.

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.

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. The operator can survey the process extremely easily, and rapidly navigate between different views of the plant. He is 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 the user to change the display language dynamically 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
- 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 control message pages such as new list, old list, cleared alarm list, operator action list, control element list and message history list.

Trends can be displayed as a full-size picture or as a window in the working area. Some trends/trend groups are predefined during plant configuration. The operator is also able, however, to compile his own trends while online and to select them by measuring point name.

Messages / 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.

Active messages are signaled by group displays representing preconfigured views based on signal groups.

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".

The "Loop-in-alarm" and "Select display using measuring point" functions support the quick evaluation and resolution of faults. Using "Loop-in-alarm", the operator 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 measuring point.

Flexible sound setting options support the audible annunciation of messages/alarms through a soundcard or by controlling external horns through a signal module.

Central user management, access control and electronic signature

(see the chapter "Administration")

SIMATIC Logon offers central user administration with security and access control based on Windows 2000 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 be used to provide an additional level of security for controlling access to the operator stations by checking the operator privileges stored on a chipcard.

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 plan configuration display shows the status of each monitored component.

Time synchronization

The operator system can implement time synchronization based on UTC (Universal Time Coordinated) (UTC), which is a standard feature within the SIMATIC PCS 7 process control system. 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 language available for custom programming of OS applications.

OS software for single station/server/client

Overview

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

The OS 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 (engineering software, see the chapter "Engineering system").

Ordering Data

	Order no.	
OS Software Single Station V6.0		
Single license for 1 installation, trilingual (German/English/French)		
Electronic documentation on PCS 7 Toolset CDs and PCS 7 Documentation CD		
Type of delivery: Certificate of license, authorization diskette, PCS 7 Toolset CDs and additional CDs with Service Pack 3 for Microsoft Windows 2000, Microsoft Internet Explorer, Microsoft SQL Server 2000 and PC Anywhere		
• 250 POs/RT 8K [1]	**6ES7 658-2AA06-0YA0**	C)
• PO 2.000/RT 64K	**6ES7 658-2AB06-0YA0**	C)
• PO 3.000/RT 100K	**6ES7 658-2AC06-0YA0**	C)
• PO 5.000/RT 150K	**6ES7 658-2AD06-0YA0**	C)
OS Software Single Station PowerPack V6.0		
For extending the OS software for a single station		
Single license for 1 installation trilingual (German/English/French)		
Type of delivery: Certificate of license and authorization diskette		
• from 250 POs to 2,000 POs	**6ES7 658-2AB06-0YD0**	C)
• from 2,000 POs to 3,000 POs	**6ES7 658-2AC06-0YD0**	C)
• from 3,000 POs to 5,000 POs	**6ES7 658-2AD06-0YD0**	C)
OS Software Server V6.0		
Single license for 1 installation trilingual (German/English/French)		
Electronic documentation on PCS 7 Toolset CDs and PCS 7 Documentation CD		
Type of delivery: Certificate of license, authorization diskette, PCS 7 Toolset CDs and additional CDs with Service Pack 3 for Microsoft Windows 2000, Microsoft Internet Explorer, Microsoft SQL Server 2000 and PC Anywhere		
• PO 250/RT 8K	**6ES7 658-2BA06-0YA0**	C)
• PO 2.000/RT 64K	**6ES7 658-2BB06-0YA0**	C)
• PO 3.000/RT 100K	**6ES7 658-2BC06-0YA0**	C)
• PO 5.000/RT 150K	**6ES7 658-2BD06-0YA0**	C)
• PO 8.500/RT 256K	**6ES7 658-2BE06-0YA0**	C)

Ordering Data

	Order no.	
OS Software Server PowerPack V6.0		
For expanding the OS software for servers Single license for 1 Installation trilngual (German/English/French)		
Type of delivery: Certificate of license and authorization diskette		
• from 250 POs to 2,000 POs	**6ES7 658-2BB06-0YD0**	C)
• from 2,000 POs to 3,000 POs	**6ES7 658-2BC06-0YD0**	C)
• from 3,000 POs to 5,000 POs	**6ES7 658-2BD06-0YD0**	C)
• from 5,000 POs to 8,500 POs	**6ES7 658-2BE06-0YD0**	C)
OS Software Client V6.0	**6ES7 658-2CX06-0YA0**	C)
Single license for 1 installation, trilingual (German/English/French)		
Electronic documentation on PCS 7 Toolset CDs and PCS 7 Documentation CD		
Type of delivery: Certificate of license, authorization diskette, PCS 7 Toolset CDs and additional CDs with Service Pack 3 for Microsoft Windows 2000, Microsoft Internet Explorer, Microsoft SQL Server 2000 and PC Anywhere		
Upgrade of operator software from V5.x to V6.0		
Single license for 1 installation trilingual (German/English/French)		
Electronic documentation on PCS 7 Toolset CDs and PCS 7 Documentation CD		
Type of delivery: Certificate of license, authorization diskette, PCS 7 Toolset CDs and additional CDs with Service Pack 3 for Microsoft Windows 2000, Microsoft Internet Explorer, Microsoft SQL Server 2000 and PC Anywhere		
• Upgrade of OS software for single station with 2,000 POs/RT 64K	**6ES7 658-2AB06-0YE0**	C)
• Upgrade of OS software for single station with 5,000 POs/RT 150K	**6ES7 658-2AD06-0YE0**	C)
• Upgrade of OS software for server 2,000 POs/RT 64K	**6ES7 658-2BB06-0YE0**	C)
• Upgrade of OS software for server 5,000 POs/RT 150K	**6ES7 658-2BD06-0YE0**	C)
• Upgrade of OS software for client	**6ES7 658-2CX06-0YE0**	C)

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

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

Overview

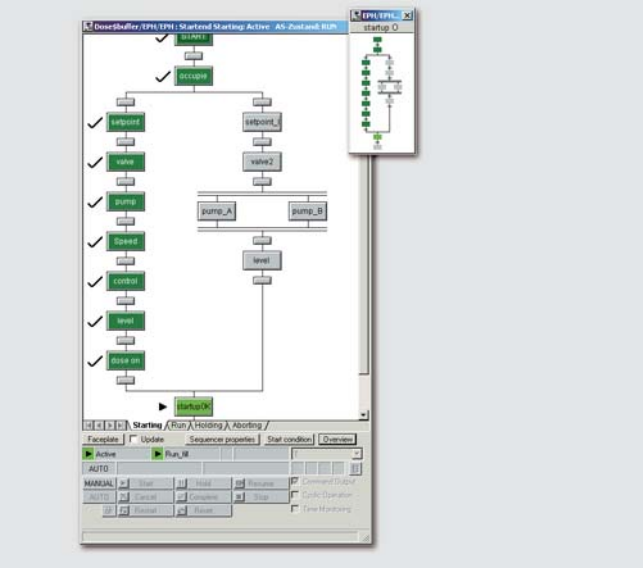
OS archiving

A high-performance archive system based on Microsoft SQL server technology can be configured online to save process values and messages in cyclic archives, and has an integral archive backup function for exporting and storing old data. The high-performance archive system is usually designed for up to 512 variables. The number of variables can be increased with the help of an add-on OS Archive PowerPack.

A central process value archive server based on the hardware of the OS server can be configured with the standard software for the OS server (250 POs/RT 8K) and one add-on OS Archive PowerPack.

Archive servers for process values are operated preferably as redundant systems.

SFC visualization



The SFC visualization function of the operator system enables the sequence controls configured with the SFC tool to be displayed and operated 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.

Ordering Data

	Order no.	
OS Software Server V6.0 Single license for 1 installation, trilingual (German/English/French) up to 512 variables Electronic documentation on PCS 7 Toolset CDs and PCS 7 Documentation CD Type of delivery: Certificate of license, authorization diskette, PCS 7 Toolset CDs and additional CDs with Service Pack 3 for Microsoft Windows 2000, Microsoft Internet Explorer, Microsoft SQL Server 2000 and PC Anywhere	**6ES7 658-2BA06-0YA0**	C)
OS Archive V6.0 PowerPack Single license for 1 installation, trilingual (German/English/French) Type of delivery: Certificate of license and authorization diskette		
• von 512 to 1,500 variables	**6ES7 658-2EA06-2YD0**	C)
• from 1,500 to 5,000 variables	**6ES7 658-2EB06-2YD0**	C)
• from 5,000 to 30,000 variables	**6ES7 658-2EC06-2YD0**	C)
• from 30,000 to 80.000 variables	**6ES7 658-2ED06-2YD0**	C)
SFC Visualization V6.0 For displaying and operating SFC sequence controls on an operator station Single license for 1 installation, trilingual (German/English/French) Software on PCS 7 Toolset CDs, electronic documentation on PCS 7 Documentation CD Type of delivery: Certificate of license and authorization diskette	**6ES7 652-0XD06-2YB0**	C)
SFC Visualization Upgrade from SIMATIC PCS 7 V5.x to V6.0 Single license for 1 installation trilingual (German/English/French) Software on PCS 7 Toolset CDs, electronic documentation on PCS 7 Documentation CD Type of delivery: Certificate of license and authorization diskette	**6ES7 652-0XD06-2YF0**	C)

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

Batch automation

5

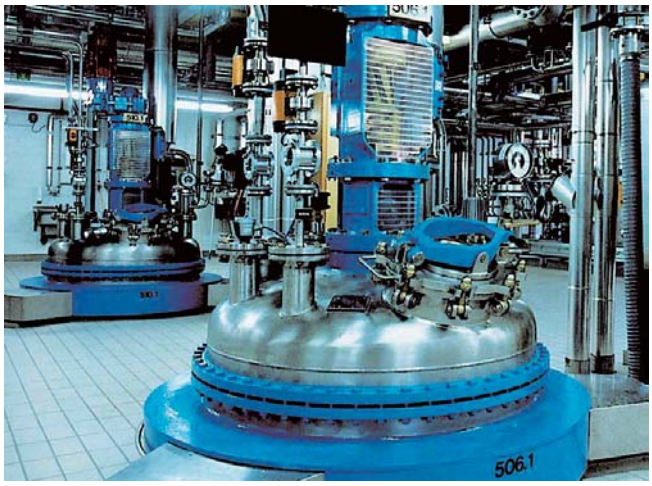




5/2	**SIMATIC BATCH**
5/3	**BATCH hardware**
5/4	**SIMATIC BATCH software**
5/4	Basic Package
5/5	Batch Control Center
5/5	Recipe System
5/6	Batch Planning
5/6	Hierarchical Recipe
5/7	ROP Library
5/7	Separation of procedure/formula
5/7	SIMATIC BATCH API
5/8	Upgrade

SIMATIC BATCH

Design



SIMATIC BATCH is configured either 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 flexible scalability in 4 steps using 150, 600, 1800 and >1800 batch process objects (instances of plant units and equipment modules).

A typical batch automation process is comprised of a batch server and several batch clients, which together process a plant project. The batch server can be configured with redundancy (hot standby) in order to increase availability.

Integration

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).

The hardware of the batch server can be separate from the OS servers. SIMATIC BATCH clients and OS clients can run on separate or common basic hardware. The PCS 7 operator systems relevant to the batch are made known to the batch server during configuration of the batch applications.

SIMATIC BATCH communicates with the automation system through the PCS 7 operator systems. Operator instructions and dialogs can also be integrated into the communication. These functions can be used to draw attention to necessary operator inputs, or to offer a facility for data input, e.g. for laboratory values. 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. All the basic hardware from the chapter "ES/OS/BATCH/IT basic devices" can be used for SIMATIC BATCH.

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".

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 be configured with redundancy (hot standby) in order to increase availability.

The batch server is only a station in the OS-LAN, and therefore available only in the standard version with BCE communication.

The batch server redundancy is supported by the SIMATIC BATCH basic package. Unlike for OS serve redundancy, no additional hardware and software components are required.

The basic hardware (PC basic unit) is expandable according to the customer's particular requirements and whether the hardware is used as OS single station, batch 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 industrial 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. Plant sections distributed over 2 or as many as 4 process monitors by means of a graphics cards 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:
An additional signal module is only relevant in the context of the operator system and has no significance in connection with SIMATIC BATCH.

Ordering data

Ordering data	Order No.	
OS/Batch Single Station		
SIMATIC PC in rack with 19" packaging system, Pentium 4 with 2 GHz and higher, 1 Gbyte RAM, EIDE-RAID 1 with two 60 Gbyte hard disks, on board graphics controller up to 48 Mbyte Dynamic Video Memory, CD-RW IDE, mouse, FastEthernet RJ45 on board for connection to OS-LAN, without monitor, keyboard and printer, Windows 2000 Professional operating system (German, English, French, Italian, Spanish)		
• **PCS 7 ES/OS IL 40 BCE** Connection to plant bus through *Basic Communication Ethernet* (BCE) with FastEthernet RJ45 network card (PCI card)	**6ES7 650-4GC06-0XX0**	A)
• **PCS 7 ES/OS IL 40 IE** Connection to plant bus through Industrial Ethernet with CP 1613 communications processor	**6ES7 650-4GC16-0XX0**	A)

Ordering data

Ordering data	Order No.	
Batch Server		
SIMATIC PC in rack with 19" packaging system, Pentium 4 with 2 GHz and higher, 1 Gbyte RAM, EIDE-RAID 1 with two 60 Gbyte hard disks, on board graphics controller up to 48 Mbyte Dynamic Video Memory, CD-ROM IDE, mouse, FastEthernet RJ45 on board for connection to OS-LAN, without monitor, keyboard and printer, Windows 2000 Server operating system (German, English, French, Italian, Spanish)		
• **PCS 7 OS Server IL 40 BCE** Connection to plant bus through *Basic Communication Ethernet* (BCE) with FastEthernet RJ45 network card (PCI card)	**6ES7 650-4GE06-0XX0**	A)
Client		
PCS 7 OS Client IL 40	**6ES7 650-4GD06-0XX0**	A)
SIMATIC PC in rack with 19" packaging system, Pentium 4 with 2 GHz and higher, 1x 512 Mbyte RAM, 30 Gbyte hard disk, on board graphics controller up to 48 Mbyte Dynamic Video Memory, CD-ROM IDE, mouse, FastEthernet RJ45 on board for connection to OS-LAN, without monitor, keyboard and printer, Windows 2000 Professional operating system (German, English, French, Italian, Spanish)		
Additional Components		
Keyboard (PS/2 and USB connection)		
• German key assignment	**6ES7 648-0CA00-0AA0**	B)
• International key assignment	**6ES7 648-0CA00-0YA0**	B)
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**	
Multi-VGA graphics card		
• "2 Screens" for operating 2 process monitors on 1 operator station	**6ES7 652-0XX02-1XE0**	
• "4 Screens" for operating 4 process monitors on 1 operator station	**6ES7 652-0XX02-1XE1**	

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.

A) Subject to export regulations AL: N, ECCN: 5D992B2

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

Monitors, refer to chapter "ES/OS/BATCH/IT basic devices"

Basic Package

The basic software for all SIMATIC BATCH system configurations is provided in the basic package consisting of 150 batch POs (instances of plant units and equipment modules), a BatchCC (batch control center) and a Recipe System (recipe editor). It provides everything needed to implement a small SIMATIC BATCH project on the hardware of a single station or on a client-server configuration consisting of a batch client and a batch server.

The capacity of the basic package can be expanded by means of PO options and PowerPacks as described in the section "Basic package". An appropriate number of BatchCC and Recipe System option packages is needed to expand the client/server configuration with additional batch clients. Option packages are available to expand single stations, batch clients and batch servers in their functions as well.

Option packages for single stations, batch servers and batch clients:

	Single station	Batch server	Batch client
ROP Library	X	X	
Hierarchical Recipe	X	X	
Separation Procedures/ Formulas	X	X	
SIMATIC BATCH API	X	X	
Batch Planning	X		X
Batch Control Center			X
Recipe System			X

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

Redundant SIMATIC BATCH systems cannot be installed on OS servers, only on separate BATCH servers.

Overview

The basic package includes 150 batch POs (instances of plant units and equipment modules), one BatchCC (batch control center) and one Recipe System (recipe editor). It enables a small SIMATIC BATCH project to be implemented on the hardware of a single station or on a client-server combination consisting of a batch client and a batch server.

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

Ordering data

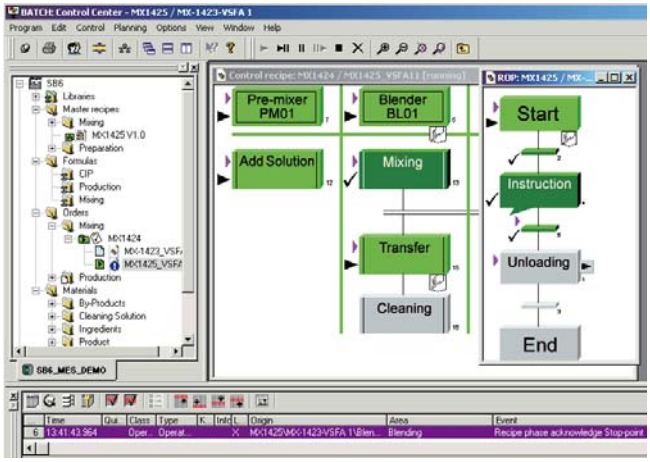
	Order No.	
SIMATIC BATCH Basic Package V6.0 (Batch PO 150) [1] For single station and client-server configuration Single license for 1 installation, trilingual (German/English/French) electronic documentation on PCS 7 Documentation CD Type of delivery: Certificate of license, authorization diskette, PCS 7 Toolset CDs and additional CDs with Service Pack 3 for Microsoft Windows 2000, Microsoft Internet Explorer, Microsoft SQL Server and PC Anywhere	**6ES7 657-0SA06-0YA0**	C)
SIMATIC BATCH PO Option V6.0 For expansion of the SIMATIC BATCH Basic Package Single license for 1 installation, trilingual (German/English/French) Type of delivery: Certificate of license and authorization diskette		
• To batch with 600 POs	**6ES7 657-0XB06-2YB0**	C)
• To batch with 1,800 POs	**6ES7 657-0XC06-2YB0**	C)
• To batch with unlimited POs	**6ES7 657-0XD06-2YB0**	C)
SIMATIC BATCH PowerPack V6.0 For expansion of batch POs Single license for 1 installation, trilingual (German/English/French) Type of delivery: Certificate of license and authorization diskette		
• From batch with 600 POs to batch with 1,800 POs	**6ES7 657-0XC06-2YD0**	C)
• From batch with 1,800 POs to batch with unlimited POs	**6ES7 657-0XD06-2YD0**	C)

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.

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

Overview

Batch Control Center



The 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.

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

Recipe System

The 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.

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

Note:
The Recipe System option package is included once in the basic package.

5

Ordering data

	Order No.	
SIMATIC BATCH BatchCC V6.0 Single license for 1 installation , trilingual (German/English/ French) Software on PCS 7 Toolset CDs, electronic documentation on PCS 7 Documentation CD Type of delivery: Certificate of license and authorization diskette	**6ES7 657-0LX06-2YB0**	C)

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

Ordering data

	Order No.	
SIMATIC BATCH Recipe System V6.0 Single license for 1 installation , trilingual (German/English/ French) Software on PCS 7 Toolset CDs, electronic documentation on PCS 7 Documentation CD Type of delivery: Certificate of license and authorization diskette	**6ES7 657-0AX06-2YB0**	C)

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

Batch Planning
Hierarchical Recipe

Overview

Batch Planning

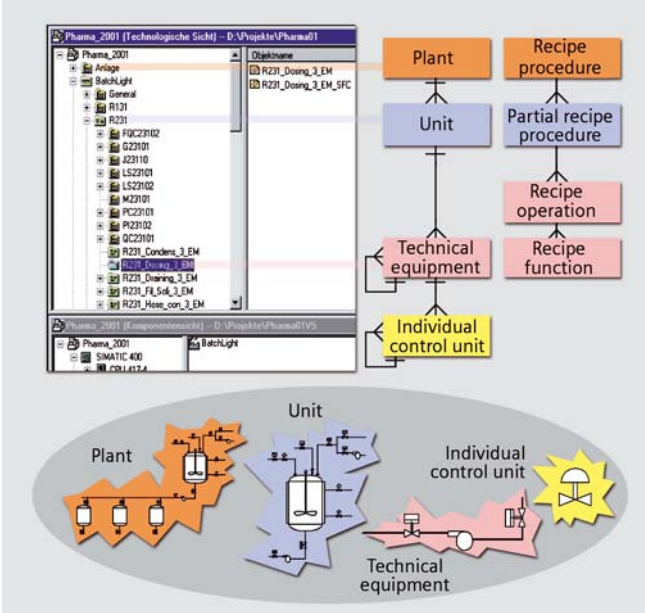
The basic package enables the creation of individual production orders and batches. Far more planning functionality is offered by the additional Batch Planning option package. BatchCC can then be used to plan batches in advance for a large number production orders. The range of functions includes not 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.

Hierarchical Recipe



Hierarchical recipes according to ISA S88.01

SIMATIC BATCH and SIMATIC PCS 7 form a functional unit that fully covers the models described in the ISA S88.01 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 or a plant unit
- Recipe operation/function for the process engineering task/function on an equipment module

Ordering data

	Order No.	
SIMATIC BATCH Batch Planning V6.0 Single license for 1 installation , trilingual (German/English/French) Software on PCS 7 Toolset CDs, electronic documentation on PCS 7 Documentation CD Type of delivery: Certificate of license and authorization diskette	**6ES7 657-0BX06-2YB0**	C)

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

Ordering data

	Order No.	
SIMATIC BATCH Hierarchical Recipe V6.0 Single license for 1 installation , trilingual (German/English/French) Software on PCS 7 Toolset CDs, electronic documentation on PCS 7 Documentation CD Type of delivery: Certificate of license and authorization diskette	**6ES7 657-0FX06-2YB0**	C)

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

Overview

ROP library

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.

Separation of procedure and formula

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.

SIMATIC BATCH API

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.

Ordering data

	Order No.	
SIMATIC BATCH ROP Library V6.0 Single license for 1 installation trilingual (German/English/French) Software on PCS 7 Toolset CDs, electronic documentation on PCS 7 Documentation CD Type of delivery: Certificate of license and authorization diskette	**6ES7 657-0GX06-2YB0**	C)
SIMATIC BATCH Separation Procedures/Formulas V6.0 Single license for 1 installation , trilingual (German/English/French) Software on PCS 7 Toolset CDs, electronic documentation on PCS 7 Documentation CD Type of delivery: Certificate of license and authorization diskette	**6ES7 657-0HX06-2YB0**	C)
SIMATIC BATCH API V6.0 Single license for 1 installation , trilingual (German/English/French) Software on PCS 7 Toolset CDs, electronic documentation on PCS 7 Documentation CD Type of delivery: Certificate of license and authorization diskette	**6ES7 657-0MX06-2YB0**	C)

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

Upgrade

Overview

Customers who are already using BATCH *flexible* V4.02 can upgrade to SIMATIC BATCH V6.0. Recipes created with BATCH *flexible* V4.02 can be converted for use in SIMATIC BATCH V6.0. The interface blocks of BATCH *flexible* V4.02 can also be used in SIMATIC BATCH V6.0.

Ordering data

	Order No.	
SIMATIC BATCH Upgrade From BATCH *flexible* V4.02 to SIMATIC BATCH V6.0 Single license for 1 installation , trilingual (German/English/French) Electronic documentation on PCS 7 Documentation CD Type of delivery: Certificate of license, authorization diskette, PCS 7 Toolset CDs and additional CDs with Service Pack 3 for Microsoft Windows 2000, Microsoft Internet Explorer, Microsoft SQL Server 2000 and PC Anywhere	**6ES7 657-0XX06-0YE0**	C)

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

IT world

6



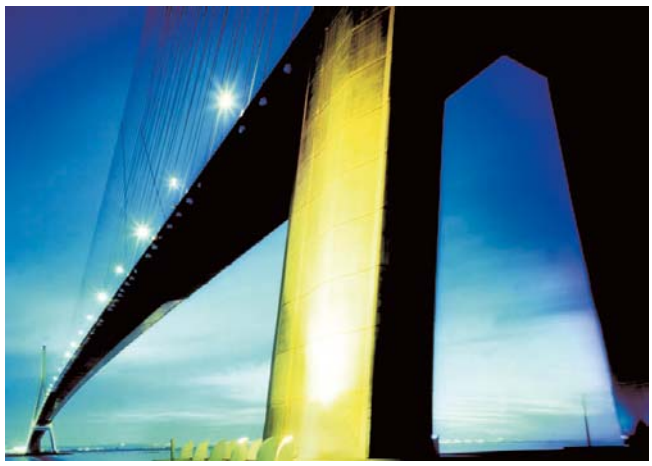


6/2 SIMATIC IT

6/3 @PCS 7

SIMATIC IT

Overview



Integration and synchronization of all business processes using SIMATIC IT

The integration of planning, procurement and manufacturing is a complex task, especially when location-specific equipment and procedural differences are taken into consideration. SIMATIC IT makes the integration of these processes transparent, and helps to optimize the complete system.

SIMATIC IT is a MES (Manufacturing Execution System) concept based on the ISA S95 standard. It coordinates manufacturing functions according to explicit business and production rules such that an optimum workflow is reached.

The main elements of SIMATIC IT are:

- SIMATIC IT Framework (plant modeling)
- SIMATIC IT Components (specific functionality)

SIMATIC IT Framework connects the process automation level to the operational management, production management, company management and enterprise planning levels. SIMATIC IT Framework provides a cross-industry integration and coordination platform for operational processes, data and functionalities. This platform includes basic functions for internal sequence control and user management etc., as well as plant and production modeling capabilities.

Design

Components of SIMATIC IT Framework are, for example, Production Modeler and Services. SIMATIC IT Framework permits integration of heterogeneous applications and makes it easier to execute and control complex production processes. Processes and communication are effectively synchronized, coordinated and optimized by SIMATIC IT Framework, both within and between locations.

SIMATIC IT Framework is not only able to integrate current SIMATIC IT components but also existing and vendor-independent IT products. The SIMATIC PCS 7 process control system can be incorporated into SIMATIC IT Framework using adapters.

SIMATIC IT components are standard products that provide various cross-sector and sector-specific IT functions - defined by ISA S95 - for various branches of industry. Examples of SIMATIC IT components are, for example,

- Production Suite (basic MES functions such as material management, production order management etc.),
- SIMATIC IT Historian (plant performance analysis),
- SIMATIC IT Unilab (LIMS – laboratory information management system),
- SIMATIC IT Interspec (product specification management system), and
- Detailed Production Scheduler.

In addition to the SIMATIC IT components there are largely sector-independent SIMATIC IT Suite libraries that provide useful basic units and procedures for easy implementation of the various applications. Functions tailored for special sectors are available in the Industry Suite Libraries.

More information

You can obtain further information from:

Siemens Compex IT Plant Solutions NV
Halsesteenweg 31
B-9402 Ninove
Belgium

Tel.: +32 54 312 610
Fax.: +32 54 324 660

E-mail: rudy.de-smedt@siemens.com

Further information is available in the Internet at



www.siemens.com/simatic-it-framework

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 resides 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 achieves 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.

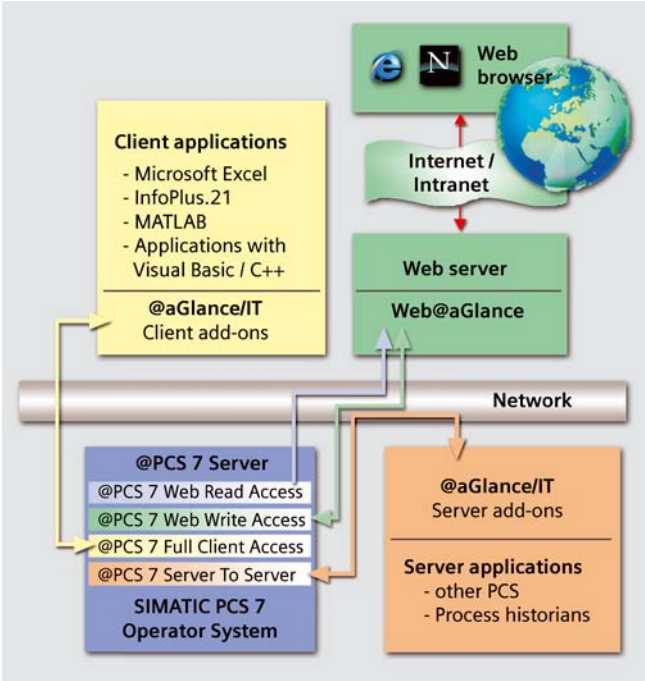
A further advantage of the open architecture of the client/server technology is the ability to select the operating systems or applications on the server or at the client end of the @aGlance/IT software package. This also means that the implementation of @aGlance is independent of any existing hardware 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 integrated in the OS software and offers reading Internet/Intranet access to OS data (process data, messages, archived data)
- @PCS 7 Web Write Access option package
  provides writing access in addition to reading access to OS data
- @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

Notes:

- 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.

@PCS 7

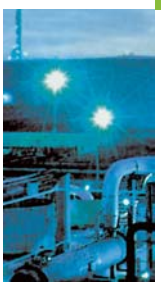
Ordering data	Order No.	
@PCS 7 Web Write Access Single license for 1 installation, trilingual (German/English/French) Electronic documentation on PCS 7 Documentation CD Type of delivery: Certificate of license, authorization diskette, PCS 7 Toolset CDs and additional CDs with Service Pack 3 for Microsoft Windows 2000, Microsoft Internet Explorer, Microsoft SQL Server and PC Anywhere	**6ES7 658-0DX06-0YA0**	C)
@PCS 7 Full Client Access Single license for 1 installation, trilingual (German/English/French) Electronic documentation on PCS 7 Documentation CD Type of delivery: Certificate of license, authorization diskette, PCS 7 Toolset CDs and additional CDs with Service Pack 3 for Microsoft Windows 2000, Microsoft Internet Explorer, Microsoft SQL Server and PC Anywhere	**6ES7 658-0EX06-0YA0**	C)
@PCS 7 Server to Server Communication Single license for 1 installation, trilingual (German/English/French) Electronic documentation on PCS 7 Documentation CD Type of delivery: Certificate of license, authorization diskette, PCS 7 Toolset CDs and additional CDs with Service Pack 3 for Microsoft Windows 2000, Microsoft Internet Explorer, Microsoft SQL Server and PC Anywhere	**6ES7 658-0FX06-0YA0**	C)

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

Communication

7





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Introduction

Overview

Communication within SIMATIC PCS 7 utilizes the SIMATIC NET networking components. Based on proven worldwide standards, a communication concept is offered which guarantees reliable data transfer between all levels and locations within a plant.

All SIMATIC NET products have been specially developed for industrial applications, and are optimized for all industries and plants.

The network components meet high standards, especially in areas where the components are subject to external influences, such as

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

The SIMATIC NET buses promote uniform, trouble-free communication between all system components:

- engineering and operator stations,
- automation systems, I/O and field components.

Industrial Ethernet communication is typically used for the system bus. When integrated in small systems, it allows Ethernet functionality without a communications processor in the ES/OS.

State-of-the-art Fast Ethernet technology is used with SIMATIC PCS 7 to meet high data throughput demands in medium- and large-sized plants, while providing all the advantages of a high communication speed of 100 Mbit/s, switching technology, and the reliability of redundant optical rings.

PROFIBUS DP/PA, which complies with the international standard IEC 61158, is used for the I/O bus and for field device connections, respectively. Both implementations allow the connection of bus-based field devices in potentially explosive areas.

This enables production sectors to be equipped with absolutely uniform, consistent communication from all automation levels; from the field level up to the operations management level.

Overview

Industrial Ethernet is used as the bus for the SIMATIC PCS 7 process control system. Industrial Ethernet is a powerful cell network based on the IEEE 802.3 standard.

With a market share of over 80%, Ethernet is todays leading network for LAN applications worldwide. Thanks to its characteristics, Ethernet provides a number of significant benefits for the user:

- Fast commissioning through simple connections
- High availability because existing installations can be expanded without affecting their operation.
- Virtually unlimited communications capacity through scalability using switching technology
- Networking of different application domains, such as office and shopfloor.
- Company-wide communication through connection to WAN (wide area network), e.g. ISDN or Internet.
- Investment protection through ongoing compatible development

SIMATIC NET offers major expansions of the Ethernet system for harsh industrial environments:

- Network components for use in these special environmental conditions
- Fast local assembly using the FastConnect cabling system with RJ45 technology
- Failsafe networks through high-speed redundancy
- Continuous monitoring of network components using a simple but effective signal concept

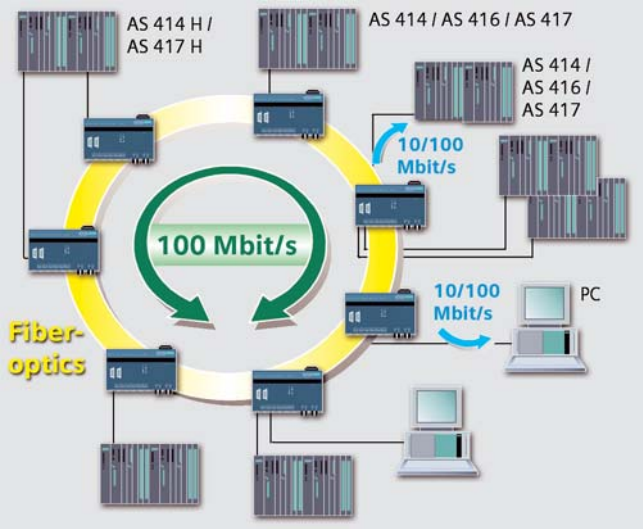
Note:
Detailed information on Industrial Ethenet and the bus components can be found in the IK PI catalog, in the A&D Mall or in CA 01 at "Communication/Networks / SIMATIC NET communication systems".

Technical data

Plant bus / OS-LAN	Industrial Ethernet
Number of stations	1,023 per network segment (IEEE 802.3)
Length of the network	
• Local network	Electrical: up to approx. 1.5 km Optical: up to approx. 150 km
• WAN	Worldwide with TCP/IP
Topology	Line, tree, ring, star, redundant ring

Fast Ethernet

Overview



The components used for the SIMATIC PCS 7 bus support modern Fast Ethernet technology.

The advantages of Fast Ethernet are:

- High communication speed of 100 Mbit/s
- Switching technology
- Redundancy through optical rings

The growing popularity of Fast Ethernet (100 Mbit/s) is owed to its great similarity with the well-known Ethernet. Data format and access procedures are the same. Industrial twisted pair (ITP) and fiberoptic (FO) cables can be used and existing technology expertise can be leveraged. This reduces the costs, the work load and the learning effort associated with Fast Ethernet implementation.

OSM optical switch modules from the SIMATIC NET range are a simple and cost-effective way of connecting existing plants or plant units with 10 Mbit/s Ethernet (triaxial cables, OLM, star hubs) to communication networks with 100 Mbit/s Fast Ethernet. OSM thus enables you to introduce 100 Mbit/s technology one step at a time.

Application

Industrial Ethernet optical switch modules *(OSM)* enable the configuration of switched networks with 100Mbit/s in the control level area where high requirements are imposed on network availability and extensive diagnosis options are needed.

With segmentation (splitting a network into subnetworks/segments) and connecting these segments to an Industrial Ethernet OSM, load separation and an increased performance can be achieved in existing networks.

The redundancy manager integrated in the OSM allows the assembly of redundant optical Industrial Ethernet ring structures in switching technology with fast media redundancy (reconfiguration time max. 0.3 seconds). The data rate in the ring is 100Mbit/s; up to 50 Industrial Ethernet OSMs per ring can be used.

In addition to the 2 ring ports, Industrial Ethernet OSMs have other ports (optionally with RJ45, ITP or BFOC interface) to which both terminals and network segments can be connected.

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

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.

The Industrial Ethernet *Electrical Switch Modules (ESM)* enable the design of electrical rings. The data rate in the ring is likewise 100Mbit/s; up to 50ESMs per ring can be used. In addition to the 2 ring ports, the ESMs have other ports to which both terminals and network segments can be connected.

Optical and electrical transmission media

FIBER OPTIC CABLE) is preferably used as optical transmission medium. The standard cables are suitable for overground installation in the outdoor and indoor area. They are available in fixed lengths, preassembled with 4 BFOC connectors.

The data packages arriving from a bus station are only relayed to the port to which the receiver is connected. The redundant, optical ring topology enhances the reliability of a network; communication is maintained even if a fiberoptic cable breaks.

The terminals are 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 connector with straight outgoing cable, for connection to OSM/ESM, OLM or ELM
- 15-pin connector with variable outgoing cable, 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".

Technical data

Selection support for product versions of OSM and ESM

	Type and number of ports				Preferentially for use		
	Sub-D (ITP)	RJ45 (TP)	Multimode DO	Singlemode FO	with high EMC loading	for plant bus	for 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 inside a switchgear cabinet

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

3) For design of an optical network, where TP cable (max. 6 m) are only used inside switchgear 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

Ordering Data

	Order No.	
OSM TP22 for Industrial Ethernet Optical switch module with 2 fiberoptic ports 100 Mbit/s, 2 RJ45 ports 10/100 Mbit/s and 4 digital inputs; redundant DC 24 V supply and signal contact; with network management	**6GK1 105-2AE00**	D)
OSM ITP62 for Industrial Ethernet Optical switch module with 2 fiberoptic ports 100 Mbit/s, 6 ITP ports 10/100 Mbit/s and 8 digital inputs; redundant DC 24 V supply and signal contact; with network management	**6GK1 105-2AA10**	D)
OSM TP62 for Industrial Ethernet Optical switch module with 2 fiberoptic ports 100 Mbit/s, 6 RJ45 ports 10/100 Mbit/s and 8 digital inputs; redundant DC 24 V supply and signal contact; with network management	**6GK1 105-2AB10**	D)
OSM ITP62-LD for Industrial Ethernet Optical switch module with 2 fiberoptic ports 100 Mbit/s long distance (single-mode fiberoptic cable up to 26 km), 6 ITP ports 10/100 Mbit/s and 8 digital inputs; redundant DC 24 V supply and signal contact; with network management	**6GK1 105-2AC10**	D)

Ordering Data

	Order No.	
OSM ITP53 for Industrial Ethernet Optical switch module with 3 fiberoptic ports 100 Mbit/s, 5 ITP ports 10/100 Mbit/s and 8 digital inputs; redundant DC 24 V supply and signal contact; with network management, for cross-building connection of two Fast Ethernet networks with OSM	**6GK1 105-2AD10**	D)
Industrial Ethernet ESM TP40 Electrical switch module with 4 RJ45 ports 10/100 Mbit/s and 4 digital inputs; redundant DC 24 V supply and signal contact; with network management, preferably for OS-LAN	**6GK1 105-3AC00**	D)
Industrial Ethernet ESM ITP80 Electrical switch module with 8 ITP ports 10/100 Mbit/s and 8 digital inputs; redundant DC 24 V supply and signal contact; with network management, preferably for OS-LAN	**6GK1 105-3AA10**	D)
Industrial Ethernet ESM TP80 Electrical switch module with 8 RJ45 ports 10/100 Mbit/s and 8 digital inputs; redundant DC 24 V supply and signal contact; with network management, preferably for OS-LAN	**6GK1 105-3AB10**	D)
OSM BC08 for Industrial Ethernet Optical switch module with 8 fiberoptic ports 100 Mbit/s and 8 digital inputs; redundant DC 24 V supply and signal contact; with network management	**6GK1 105-4AA00**	D)
Industrial Ethernet OMC TP11 Optical media converter RJ45 on multimode fiberoptic cable (BFOC) with 100 Mbit/s up to 3 km; redundant DC 24 V supply and signal contact	**6GK1 100-2AB00**	

D) Subject to export regulations AL: N, ECCN: 5D002ENC3A

7

Fast Ethernet

Ordering Data	Order No.	
Optical transmission media		
FIBER OPTIC CABLE standard cable, splittable		
Preassembled 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)
BFOC Connector Set	**6GK1 901-0DA20-0AA0**	B)
For FIBER OPTIC CABLE, 20 standard cables		
Electrical transmission media		
ITP Standard Cable for Industrial Ethernet		
Not preassembled, sold by the meter		
2 x 2-core, without connectors	**6XV1 850-0AH10**	
For connection of a terminal; for self-assembly of connectors or for the connection between patch panel and socket		
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**	

Ordering Data	Order No.
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**

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

For other lengths of the FIBER OPTIC CABLE and other fiberoptic cables, see the IK PI catalog.

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 44 65
Fax: +49 (911)750 99 91
E-mail: juergen.hertlein@fthw.siemens.de

Overview



Industrial Ethernet FastConnect is a system for fast, easy assembly of Industrial Ethernet FC cables. The FastConnect stripping method enables fast and easy connection of the Industrial Ethernet FC cable to the RJ45 outlet. Terminals and/or network components are connected through TP cord cables.

Using the *FC Stripping Tool* it is possible to remove the outer casing and the woven shield accurately in a single step. Thus prepared, the cable is connected to the *FC Outlet RJ45* (see picture) by the insulation displacement method or directly to the terminal using the Industrial Ethernet *FastConnect RJ45 Plug 180* (available soon).

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".

You will find other specifications of the network topology in the manual for TP and fiberoptic networks.

Ordering Data

	Order No.
Industrial Ethernet FC Standard Cable	**6XV1 840-2AH10**
TP installation cable for connection to Industrial Ethernet FC Outlet RJ45 for universal use, 4-core, shielded, sold by the meter	Max. delivery unit 1000 m, minimum order 20 m
Preferred length 1,000 m	**6XV1 840-2AU10**
Industrial Ethernet FC Stripping Tool	**6GK1 901-1GA00**
Preset stripping tool for rapid stripping of insulation from Industrial Ethernet FC cables	
Industrial Ethernet FC Blade Cassettes	**6GK1 901-1GB00**
Spare blade cassettes for the FC stripping tool, 5 cassettes	
Industrial Ethernet FC Outlet RJ45	**6GK1 901-1FC00-0AA0**
Industrial Ethernet FastConnect RJ45 Plug 180	**6GK1 901-1FC10-0AA0**
Documentation	
Manual for TP and fiberoptic networks	
Network architecture, components, configurations, installation	
• German	**6GK1 970-1BA10-0AA0**
• English	**6GK1 970-1BA10-0AA1**

7

System connection for PCS 7 systems

Overview

The CP 443-1 communication module is used for connecting SIMATIC PCS 7 automation systems to Industrial Ethernet.

The following selection criteria apply for connecting operator systems (single stations / server) and engineering systems to Industrial Ethernet:

- The supplied FastEthernet card is sufficient for basic communications (connection of up to 8 lower-level automation systems). An alternative is to use a CP 1612 communication module incl. SOFTNET-S7/Windows software.
- If a maximum of 8 automation systems per operator system is not enough or a fault-tolerant automation system needs to be connected you will need a CP 1613 communication module (see picture).
- S7-1613 software is required to operate the CP 1613. S7-REDCONNECT software is required to operate a fault-tolerant automation system. Systems with S7-1613 software, e.g. preassembled operator systems, can be upgraded to this software with a S7-REDCONNECT upgrade.



CP 1613

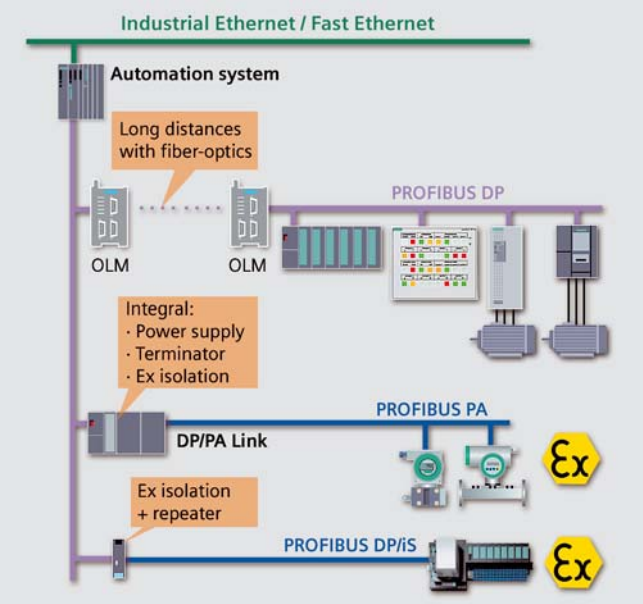
Ordering Data

	Order No.	
System Connection AS		
CP 443-1 Communications module 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**	D)
System Connection OS/ES		
CP 1612 PCI card for connection to Industrial Ethernet (10/100 Mbit/s), with RJ45 connection	**6GK1 161-2AA00**	B)
SOFTNET-S7/Windows Software for S5-compatible communication (SEND/RECEIVE) and S7 communication for CP 1612, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, bilingual (German/English)	**6GK1 704-1CW61-3AA0**	D)
CP 1613 PCI card for connection to Industrial Ethernet (10/100 Mbit/s), with AUI/ITP and RJ45 connections	**6GK1 161-3AA00**	
S7-1613 Software for S7 communication for CP 1613, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, bilingual (German/English)	**6GK1 716-1CB61-3AA0**	D)
S7-REDCONNECT Software for failsafe S7 communication through redundant networks for CP 1613, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, bilingual (German/English)	**6GK1 716-0HB61-3AA0**	D)
Upgrade S7-REDCONNECT Software for expansion of S7-1613 to S7-REDCONNECT single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, bilingual (German/English)	**6GK1 716-0HB61-3AA4**	D)

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

D) Subject to export regulations AL: N, ECCN: 5D002ENC3A

Overview



Communication at field level with PROFIBUS

Distributed peripherals such as I/O modules, measurement transducers, 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 diagnostic data.

PROFIBUS is predestined for these tasks because it enables high-speed communication with the distributed I/Os by means of a communications protocol (PROFIBUS DP), and permits direct connection of bus-capable intelligent field devices, including power supply in accordance with IEC 61158 (PROFIBUS PA).

PROFIBUS is simple, rugged and reliable, and supports online parameterization of the distributed components, communication with HART field devices, redundancy and failsafe structures. It enables online expansions with new distributed components and can be used in standard environments or in 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 field bus in the world. This is confirmed by the more than 9 million PROFIBUS DP nodes and the more than 210,000 PROFIBUS PA nodes installed to date.

SIMATIC PCS 7 utilizes the benefits of the PROFIBUS from start to finish:

- Optimal distributed system structure: smaller space requirement, less cabling effort
- Effective engineering through standardization of the process signals, diagnostics and profiles
- Shorter commissioning times through short loop checks, easy parameterization and the elimination of calibration work
- Optimal life cycle management through best possible diagnostics and preventive maintenance

Application

The PROFIBUS DP field bus 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. The intrinsically safe version (PROFIBUS DP/iS) can be taken into Ex zone 1 when used with an additional field bus isolating transformer. 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 communication modules. 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. Network lengths of up to approx. 100 km are possible in combination with optical transmission technologies. With SIMATIC PCS 7, PROFIBUS DP topologies are always configured 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 OLM. As regards communication between the stations, there is no difference between electrical two-wire technology and fiber optic technology.

Following topologies are configurable: Line, tree, ring, star, redundant

Electrical networks

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).

Individual bus segments can be interconnected through repeaters.

If required, a diagnostics repeater can be used for detailed diagnostics of PROFIBUS DP segments. It performs physical online monitoring of the copper bus cables. In the event of a fault it sends a diagnostics message to the DP master containing detailed data on the fault type and fault location.

Bus segments are terminated by the active RS 485 terminating element.

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
- FastConnect PROFIBUS bus connector

Ordering Data

	Order No.	
PROFIBUS FastConnect Standard Cable Standard type with special design for fast mounting, 2-core, shielded, sold by the meter Specify length in m Max. delivery unit 1,000 m, minimum order quantity 20 m	**6XV1 830-0EH10**	
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 the IK PI catalog	
PROFIBUS FastConnect Stripping Tool Preset stripping tool for rapid stripping of PROFIBUS FastConnect bus cables	**6GK1 905-6AA00**	
PROFIBUS FastConnect Blade Cassettes Spare blade cassettes for the PROFIBUS FastConnect stripping tool	**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 RS 485 bus connector Plug 180 With 180° cable outlet, with insulation displacement system, for connection of PC, PG, OP	**6GK1 500-0FC00**	
Other bus connectors See the IK PI catalog		
RS 485 Repeater for PROFIBUS Data transfer rate up to max. 12 Mbit/s, DC 24 V, IP 20 housing	**6ES7 972-0AA01-0XA0**	
Diagnostic Repeater RS 485 For connection of up to 2 segments to PROFIBUS DP; with online diagnostics function for the monitoring of bus cables	**6ES7 972-0AB01-0XA0**	B)
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**	

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

Overview

Glass fiberoptic cables are 2-fiber cables for optical PROFIBUS networks in the indoor and outdoor area.

The standard FIBER OPTIC CABLE is available in fixed lengths, preassembled with 4 BFOC connectors. A BFOC connector set with 20 connectors is also available.

Optical Link Module

Optical Link Modules (OLM) permit the construction of optical and hybrid (electrical/optical) networks in line, tree, ring or star topology. The maximum distance between two OLMs can be up to 15 km. The PROFIBUS OLM/G12 is equipped with one RS 485 interface and two glass fiberoptic cable interfaces (4 BFOC sockets). The OLM enables a fiberoptic line length of up to 3,000 m. Errors are quickly located by means of signal contacts and a measurement output.

Ordering Data

	Order No.	
FIBER OPTIC CABLE standard cable, splittable		
Preassembled 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 the IK PI catalog	
BFOC Connector Set	**6GK1 901-0DA20-0AA0**	B)
For standard and trailing FIBER OPTIC CABLES, 20 pcs		
PROFIBUS OLM/G12	**6GK1 502-3CB10**	B)
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		

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

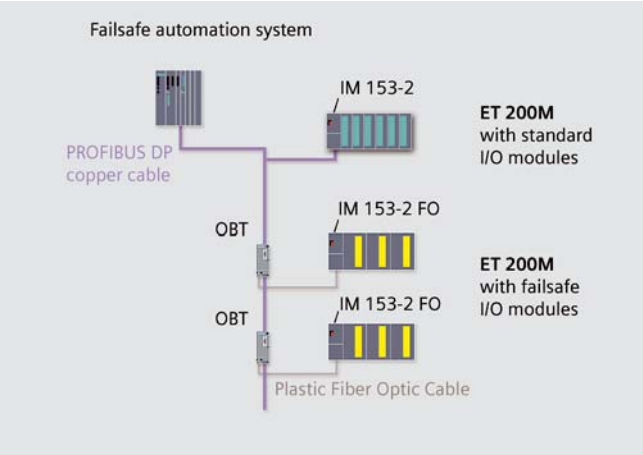
Note:
You can order supplementary components for the SIMATIC NET range of cables from your local partner.
Technical advice can be obtained from:
J. Hertlein
Tel.: +49 (911) 750 44 65, Fax: +49 (911)750 99 91
E-mail: juergen.hertlein@fthw.siemens.de

Plastic fiber-optic cable

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 fiberoptic, duplex core
  flat double core with PVC inner casing and no outer casing, for indoor applications with low mechanical loads, e.g. inside cabinets. Cable length up to 50 m.

To use the plastic FOC, 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)

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 fiberoptic cores, PVC external sheath and PA internal sheath, without connectors, for indoor use, sold by the meter	**6XV1 821-0AH10**	B)
PROFIBUS Plastic Fiber Optic, Duplex Core Plastic fiberoptic 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 fiberoptic 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 fiberoptic 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.

Ordering Data

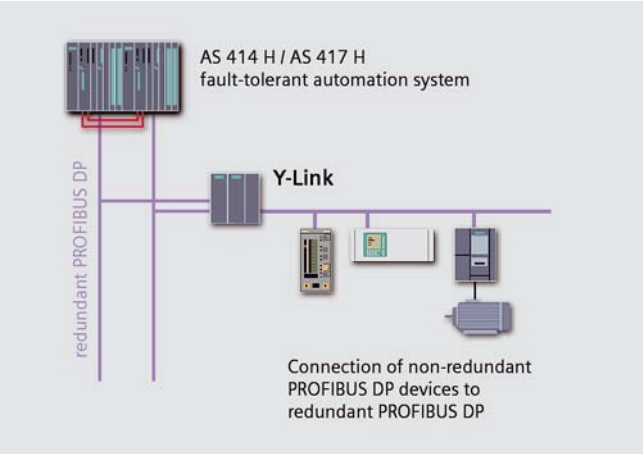
	Order No.	
CP 443-5 Extended Communications module for connection of SIMATIC S7-400 to PROFIBUS as DP master or for S7 communication, for data set routing of SIMATIC PDM	**6GK7 443-5DX03-0XE0**	D)
IF 964-DP Interface module for connection of another PROFIBUS DP line, for plugging into a free DP module slot of the CPU	**6ES7 964-2AA01-0AB0**	

D) Subject to export regulations AL: N, ECCN: 5D002ENC3A

7

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 414 H/ AS 417 H.

The Y-link comprises:

- 2 IM 157interface modules
- 1 Y-coupler incl. RS 485 repeater
- 1 BM IM 157 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.

Ordering Data

	Order No.	
Y link For connection of devices with only one PROFIBUS DP interface to a fault-tolerant automation system	**6ES7 197-1LA02-0XA0**	B)

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

7

Overview

The transmission technology of the PROFIBUS PA profile is tailored to the needs of the process industry. The standardized communications services guarantee interoperability 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, tree and star 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.

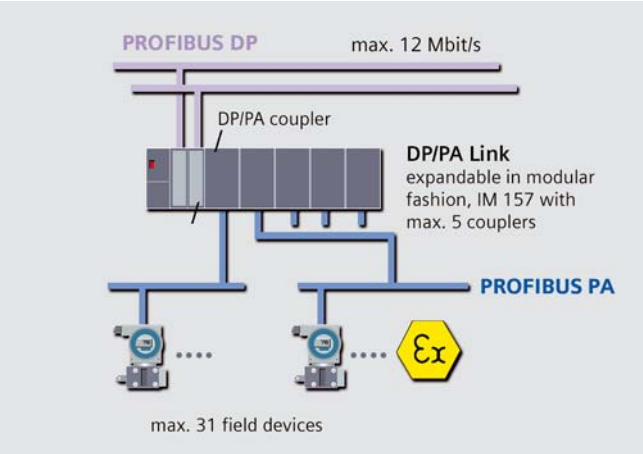
With SIMATIC PCS 7, communication between the automation system and the field devices takes place through token blocks in the CPU which cover all field device types. These token blocks are configured with the engineering system, which also creates the configuration data that are loaded into the DP/PA Link and the field devices during startup. Parameterization, commissioning and diagnostics are performed by the SIMATIC PDM process device manager, which is integrated in the engineering system.

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



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 time-related performance of PROFIBUS DP.

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 demands of cycle time.

The DP/PA Link is formed from an IM 157 interface module and up to 5 DP/PA couplers. DP/PA couplers are available in Ex and non-Ex versions. All components of the DP/PA Link are interconnected through the S7 backplane bus.

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 414 H / AS 417 H automation systems.

The semi-modular DP/PA Link can be extended to a maximum 5 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.

Following basic components are available to configure the DP/PA Link:

- PS 307 load power supply for AC 120/230 V; DC 24 V, version in 2, 5 or 10 A, or
  PS 305 load power supply for DC 24/48/60/110 V; DC 24 V, 2 A
- IM 157 interface module
- DP/PA couplers (Ex and non-Ex version)

Technical data

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 DC 13...14 V
• Non-intrinsically safe version	4-pin screw-type terminal, switchable terminating resistor Output current max. 400 mA Output voltage DC 19... V
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	DC 24 V (green)
Current consumption	
• Ex version	Max. 400 mA
• Non-Ex version	Max. 750 mA
Power loss	
• Ex version	approx. 7 W
• Non-Ex version	approx. 7 W
Operating temperature	
• Ex version	0...60 °C
• Non-Ex version	-25...+60 °C
Dimensions (W x H x D) in mm	80 x 125 x 130

Technical data

IM 157

Function	Linking of PROFIBUS DP (9.6 Kbit/s to 12 Mbit/s, slave functionality) and PROFIBUS PA with support of the function "hot configuration" (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 up to 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 The active BM IM157 bus module is required for the hot swapping function in a redundant setup. The same module is also needed in a singular setup in order to be able to replace downstream DP/PA couplers during operation.
Displays	SF (red) BF DP (red) BF PA (red) Active (yellow) DC 24 V (green)
Supply voltage	DC 24 V
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

Ordering Data

	Order No.	
PS 307 Load Power Supply		
Including connection assembly; AC 120/230 V; DC 24 V		
• 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 307-1KA00-0AA0**	
PS 305 load power supply		
DC 24/48/60/110 V; DC 24 V		
• 2 A, extended temperature range; 80 mm wide	**6ES7 305-1BA80-0AA0**	
IM 157	**6ES7 157-0AA82-0XA0**	B)
Interface module for DP/PA Link and Y-Link		
DP/PA Coupler		
For transition from RS 485 to IEC 61158		
• Intrinsically safe version	**6ES7 157-0AD81-0XA0**	
• Non-intrinsically safe version	**6ES7 157-0AC80-0XA0**	
Standard Profile Rails (without hot swapping)		
• 482 mm wide (19 inches)	**6ES7 390-1AE80-0AA0**	
• 530 mm wide	**6ES7 390-1AF30-0AA0**	

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

7

Hot swapping

Overview

Following components are required in addition or as alternatives to the DP/PA Link basic components for the hot swapping function:

- Bus modules for hot swapping
  - BM IM 157 for two IM 157 modules, for redundant and non-redundant design, for extended temperature range
  - BM DP/PA for one DP/PA coupler, for extended temperature range
- Profile rail for hot swapping (as an alternative to the standard profile rail)

Ordering Data

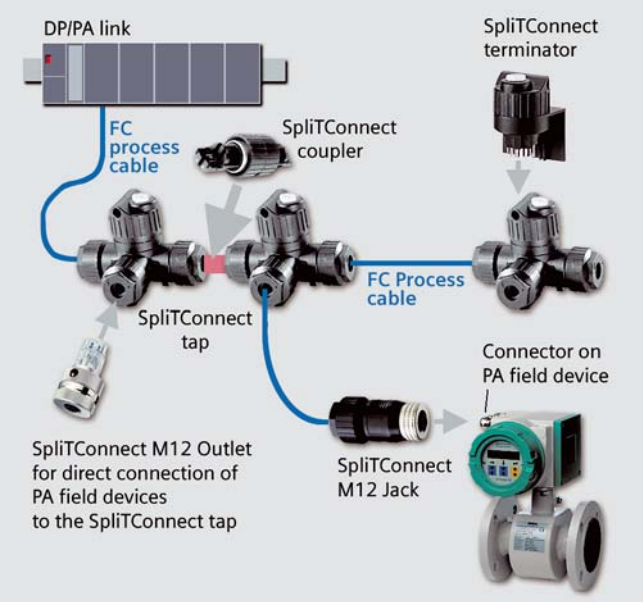
	Order No.
Bus Modules for Hot Swapping	
• BM IM 157 For 2 IM 157 modules, for redundant and non-redundant configuration, for extended temperature range, for hot swapping function, permissible operating temperature -25...+60°C	**6ES7 195-7HD80-0XA0**
• BM DP/PA For 1 DP/PA coupler, for extended temperature range, for hot swapping function, permissible operating temperature -25...+60°C	**6ES7 195-7HF80-0XA0**
Profile Rail for Hot Swapping	
• 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 field bus 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 with the SpliTConnect Terminator, the SpliTConnect tap can be used as a bus terminating element.

The terminals 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 M12 connection. The SpliTConnect M12 jack is a connecting element between FC process cable and M12 connector on the PROFIBUS PA field device. For details of SpliTConnect network components, see the IK PI catalog.

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, IP 67, 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	

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.

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 integrated ASIC slave
- Address programming device for setting the slave address

Ordering Data

	Order No.
CP 343-2 Communications module 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 65 For connection of AS-Interface to PROFIBUS DP, degree of protection IP 65	**6ES7 156-0AA01-0XA0**
DP/AS-Interface Link 20 PROFIBUS DP/ AS-Interface gateway, degree of protection IP 20	**6GK1 415-2AA01**
Stabilized AS-Interface Power Supply SITOP Power Special Line, IP 65 DC/DC power supply 24 V/30 V, max. 2.4 A; degree of protection IP 65; for power supply to AS-Interface	**6EP1 632-1AL01**
AS-Interface Socket For connection of AS-Interface to the DP/AS-Interface link	**6ES7 194-5AA00-0XA0**
DP/AS-Interface Link Manual	
• German	**6ES7 156-0AA00-8AA0**
• English	**6ES7 156-0AA00-8BA0**
• French	**6ES7 156-0AA00-8CA0**
• Spanish	**6ES7 156-0AA00-8DA0**
• Italian	**6ES7 156-0AA00-8EA0**
DP/AS-Interface Link 20 Manual Including 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**
PROFIBUS Bus Connector Degree of protection IP 66/67, for bus signals, 12-pin power supply, with pin insert	**6ES5 760-2CB11**

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 IP 20, for use in switchgear cabinets as well as in distribution systems
- Configurable as a DP slave using the 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.

Ordering Data

	Order No.	
DP/EIB Link Gateway for data exchange between PROFIBUS DP and EIB	**6GK1 415-0AA01**	E)
DP/EIB Link Manual Including 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

Modbus

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**	
CP 341 manual		
• German	**6ES7 341-1AH00-8AA0**	
• English	**6ES7 341-1AH00-8BA0**	
• French	**6ES7 341-1AH00-8CA0**	
• Italian	**6ES7 341-1AH00-8EA0**	
Loadable drivers for CP 341		
MODBUS Master (RTU format)		
• Single License	**6ES7 870-1AA01-0YA0**	C)
• Single License, without software and documentation	**6ES7 870-1AA01-0YA1**	C)
MODBUS Slave(RTU format)		
• Single License	**6ES7 870-1AB01-0YA0**	C)
• Single License, without software and documentation	**6ES7 870-1AB01-0YA1**	C)

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

Automation Systems

8





8/2	Introduction
8/3	Standard automation systems
8/5	Fault-tolerant automation systems
8/8	Fail-safe automation systems

Automation systems

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 comprised of:

- Subracks 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 and 417-4H
- 24 V DC or 120/230 V AC power supply incl. backup battery (batteries)
- Main memory from 768 Kbyte to 20 Mbyte
- Memory card with 1 to 8 Mbyte RAM
- Runtime license for the PCS 7 Library Blocks
- Connection to Industrial Ethernet

Overview



The AS 414-3 automation systems are tailored for small applications with small quantity frameworks. They thus 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.

The automation systems are available complete with subrack, power supply, CPU, memory card and PROFIBUS DP interface. They are delivered in assembled and tested form. Each version has a different main memory:

- *AS 414-3*: Main memory 768 Kbyte (2 x 384 Kbyte, 384 Kbyte for code and 384 Kbyte for data)
- *AS 416-2*: Main memory 1600 Kbyte (2 x 800 Kbyte; 800 Kbyte for code and 800 Kbyte for data)
- *AS 416-3*: Main memory 3200 Kbyte (2 x 1600 Kbyte; 1600 Kbyte for code and 1600 Kbyte for data)
- *AS 417-4*: Main memory 4,000 Kbyte (2 x 2,000 Kbyte, 2,000 Kbyte for code and 2,000 Kbyte for data)

All systems are available with a choice of 120/230 V AC or 24 V DC power supply.

Ordering Data

Order No.

Ordering units for automation systems

AS 414-3 Automation System

Comprising:
CPU 414-3 with integrated PROFIBUS DP interfaces, 768 Kbyte main memory (384 Kbyte available user memory), memory card 1 Mbyte RAM, 2 backup batteries, runtime license PCS 7 Library Blocks, CP 443-1 communications module for connection to Industrial Ethernet plant bus

- PS 407 power supply; 10 A for 120/230 V AC, with subrack
  - UR1 (18 slots) — **6ES7 654-2BA32-0XX0**
  - UR2 (9 slots) — **6ES7 654-2BB32-0XX0**
- PS 405 power supply; 10 A for 24 V DC, with subrack
  - UR1 (18 slots) — **6ES7 654-5BA32-0XX0**
  - UR2 (9 slots) — **6ES7 654-5BB32-0XX0**

Ordering Data

Order No.

AS 416-2 Automation System

Comprising:
CPU 416-2 with integrated PROFIBUS DP interfaces, 1,600 Kbyte main memory (800 Kbyte available user memory), memory card 2 Mbyte RAM, 2 backup batteries, runtime license PCS 7 Library Blocks, CP 443-1 communications module for connection to Industrial Ethernet plant bus

- PS 407 power supply; 10 A for 120/230 V AC, with subrack
  - UR1 (18 slots) — **6ES7 654-2DA32-0XX0**
  - UR2 (9 slots) — **6ES7 654-2DB32-0XX0**
- PS 405 power supply; 10 A for 24 V DC, with subrack
  - UR1 (18 slots) — **6ES7 654-5DA32-0XX0**
  - UR2 (9 slots) — **6ES7 654-5DB32-0XX0**

AS 416-3 Automation System

Comprising:
CPU 416-3 with integrated PROFIBUS DP interfaces, 3,200 Kbyte main memory (1,600 Kbyte available user memory), memory card 4 Mbyte RAM, 2 backup batteries, runtime license PCS 7 Library Blocks, CP 443-1 communications module for connection to Industrial Ethernet plant bus

- PS 407 power supply; 10 A for 120/230 V AC, with subrack
  - UR1 (18 slots) — **6ES7 654-2EA32-0XX0**
  - UR2 (9 slots) — **6ES7 654-2EB32-0XX0**
- PS 405 power supply; 10 A for 24 V DC, with subrack
  - UR1 (18 slots) — **6ES7 654-5EA32-0XX0**
  - UR2 (9 slots) — **6ES7 654-5EB32-0XX0**

AS 417-4 Automation System

Comprising:
CPU 417-4 with integrated PROFIBUS DP interfaces, 4,000 Kbyte main memory (2,000 Kbyte available user memory), memory card, 2 backup batteries, runtime license PCS 7 Library Blocks, CP 443-1 communications module for connection to Industrial Ethernet plant bus

- PS 407 power supply; 10 A for 120/230 V AC, with subrack
  - UR1 (18 slots) and memory card 4 Mbyte RAM — **6ES7 654-2GA32-0XX0**
  - UR2 (9 slots) and memory card 4 Mbyte RAM — **6ES7 654-2GB32-0XX0**
  - UR2 (9 slots) and memory card 8 Mbyte RAM — **6ES7 654-2GB32-0XY0**
- PS 405 power supply; 10 A for 24 V DC, with subrack
  - UR1 (18 slots) — **6ES7 654-5GA32-0XX0**
  - UR2 (9 slots) — **6ES7 654-5GB32-0XX0**

Standard automation systems

Accessories	Order No.	
Individual components for automation systems		
CPU 414-3 Main memory 768 Kbyte; module occupies 2 slots	**6ES7 414-3XJ00-0AB0**	
CPU 416-2 Main memory 1,600 Kbyte; module occupies 1 slot	**6ES7 416-2XK02-0AB0**	
CPU 416-3 Main memory 3,200 Kbyte; module occupies 2 slots	**6ES7 416-3XL00-0AB0**	
CPU 417-4 Main memory 4,000 Kbyte; module occupies 2 slots	**6ES7 417-4XL00-0AB0**	
RAM expansion for CPU 417-4		
Main memory RAM only for CPU 417-x)		
• 4 (2 x 2) Mbyte	**6ES7 955-2AL00-0AA0**	
• 8 (2 x 4) Mbyte	**6ES7 955-2AM00-0AA0**	
Memory card RAM		
• 1 Mbyte	**6ES7 952-1AK00-0AA0**	
• 2 Mbyte	**6ES7 952-1AL00-0AA0**	
• 4 Mbyte	**6ES7 952-1AM00-0AA0**	
• 8 Mbyte	**6ES7 952-1AP00-0AA0**	
Memory card flash-EPROM Only required to update firmware		
• 4 Mbyte	**6ES7 952-1KM00-0AA0**	
CP 443-1 Communications module 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**	D)
CP 443-5 Extended Communications module for connection of SIMATIC S7-400 to PROFIBUS as DP master or for S7 communication, for increasing the number of DP lines, for data set routing with SIMATIC PDM and for 10-ms time stamp, electronic manual on CD; module occupies 1 slot	**6GK7 443-5DX03-0XE0**	D)
IF 964-DP Interface module for connection of another PROFIBUS DP line, for plugging into a free DP module slot of the CPU	**6ES7 964-2AA01-0AB0**	

Accessories	Order No.	
PS 407 power supply module; 10 A 120/230 V AC; 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; 4 A 120/230 V AC5 V DC/4 A, 24 V DC/0.5 A; with battery compartment for 1 backup battery, module occupies 1 slot	**6ES7 407-0DA01-0AA0**	
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 405-0KA01-0AA0**	
Backup battery Type AA, 1.9 Ah	**6ES7 971-0BA00**	
UR1 subrack 18 slots	**6ES7 400-1TA01-0AA0**	
UR2 subrack 9 slots	**6ES7 400-1JA01-0AA0**	
Runtime licenses for libraries		
PCS 7 Library Blocks V6.0 runtime license Valid for *one* SIMATIC PCS 7 automation system (already included in orders for AS 414-3, AS 416-2, AS 416-3 and AS 417-4) trilingual (German, English, French) Type of delivery: Certificate of license	**6ES7 653-2BG06-2YB0**	C)

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

D) Subject to export regulations AL: N, ECCN: 5D002ENC3A

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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 failsafe AS 414 F and AS 417 F 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 subracks (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 communication module for Industrial Ethernet.
- Configuration with a UR2-H subrack
  The UR2-H compact subrack 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 module 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 subrack. Each subsystem is equipped with a CPU, a potentially redundant power supply module and a communications module for Industrial Ethernet.

In all the configurations described, potentially redundant power supply modules can be expanded to redundant configuration by retrofitting a second power supply module of the same type.

Another 4 sync modules 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 system (UR1/UR2 subracks) and to subsequently expand an AS 414-4-1H or AS 417-4-1H in a UR2-H subrack 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 414 H and AS 417 H automation systems are connected by one communication module 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 communication module per sub-AS and to distribute their connections between the two rings. Double faults such as OSM failure on ring 1 with simultaneous splitting of the bus cable on ring 2 can thus be tolerated.

Function

The AS 414 H and AS 417 H 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.

Fault-tolerant automation systems

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: 1 CPU 414-4H with integrated PROFIBUS DP interfaces, 768 Kbyte main memory (384 Kbyte available user memory), memory card 1 Mbyte RAM, 2 backup batteries, CP 443-1 communications module for connection to Industrial Ethernet plant bus, runtime license PCS 7 Library Blocks	
• PS 407 power supply; 10 A for 120/230 V AC, redundant design possible, with subrack	
- UR1 (18 slots)	**6ES7 654-2UA34-0XX0**
- UR2 (9 slots)	**6ES7 654-2UB34-0XX0**
- UR2-H (2 x 9 slots)	**6ES7 654-2UR34-0XX0**
• PS 405 power supply; 10 A for 24 V DC, with subrack	
- UR1 (18 slots)	**6ES7 654-5UA34-0XX0**
- UR2 (9 slots)	**6ES7 654-5UB34-0XX0**
- UR2-H (2 x 9 slots)	**6ES7 654-5UR34-0XX0**
AS 414-4-2H Automation System	
Complete fault-tolerant programmable logic controller with two CPUs 414-4H	
Comprising: 2 CPU 414-4H with integrated PROFIBUS DP interfaces, 768 Kbyte main memory (384 Kbyte available user memory), 2 memory cards with 1 Mbyte RAM, 4 backup batteries, 4 sync modules, 2 sync cables, 2 CP 443-1 communications modules for connection to Industrial Ethernet plant bus, runtime license PCS 7 Library Blocks	
• PS 407 power supply; 10 A for 120/230 V AC, redundant design possible, with UR2-H subrack (2 x 9 slots)	**6ES7 654-2VR34-0XX0**
• PS 405 power supply; 10 A for 24 V DC, with UR2-H subrack (2 x 9 slots)	**6ES7 654-5VR34-0XX0**

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: 1 x CPU 417-4H with integrated PROFIBUS DP interfaces, 4,000 Kbyte main memory (2,000 Kbyte available user memory), memory card with 4 Mbyte RAM, 2 backup batteries, CP 443-1 communications module for connection to Industrial Ethernet plant bus, runtime license PCS 7 Library Blocks	
• PS 407 power supply; 10 A for 120/230 V AC, redundant design possible, with subrack	
- UR1 (18 slots)	**6ES7 654-2SA34-0XX0**
- UR2 (9 slots)	**6ES7 654-2SB34-0XX0**
- UR2-H (2 x 9 slots)	**6ES7 654-2SR34-0XX0**
• PS 405 power supply; 10 A for 24 V DC, with subrack	
- UR1 (18 slots)	**6ES7 654-5SA34-0XX0**
- UR2 (9 slots)	**6ES7 654-5SB34-0XX0**
- UR2-H (2 x 9 slots)	**6ES7 654-5SR34-0XX0**
AS 417-4-2H Automation System	
Complete fault-tolerant programmable logic controller with two CPUs 417-4H	
Comprising: 2 x CPU 417-4H with integrated PROFIBUS DP interfaces, 4,000 Kbyte main memory (2,000 Kbyte available user memory), 2 memory cards with 4 Mbyte RAM, 4 backup batteries, 4 sync modules, 2 sync cables, 2 CP 443-1 communications modules for connection to Industrial Ethernet plant bus, runtime license PCS 7 Library Blocks	
• PS 407 power supply; 10 A for 120/230 V AC, redundant design possible, with UR2-H subrack (2 x 9 slots)	**6ES7 654-2TR34-0XX0**
• PS 405 power supply; 10 A for 24 V DC, with UR2-H subrack (2 x 9 slots)	**6ES7 654-5TR34-0XX0**

Accessories	Order No.	
Individual components of fault-tolerant automation systems		
CPU 414-4H Main memory 768 Kbyte module occupies 2 slots	**6ES7 414-4HJ00-0AB0**	
CPU 417-4H Main memory 4,000 Kbyte module occupies 2 slots	**6ES7 417-4HL01-0AB0**	
Sync Module For linking the two CPUs 414-4H or 417-4H; two modules required per CPU	**6ES7 960-1AA00-0XA0**	B)
Sync Cable (fiberoptic cable) For connecting the two CPUs 414-4H or 417-4H; each redundant automation systems requires 2 cables		
• 1 m	**6ES7 960-1AA00-5AA0**	
• 2 m	**6ES7 960-1AA00-5BA0**	
• 10 m	**6ES7 960-1AA00-5KA0**	
Other lengths	On request	
RAM Expansion for CPU 417-4H		
Main Memory RAM (only for CPU 417-x; 2 can be plugged in each)		
• 4 (2 x 2) Mbyte	**6ES7 955-2AL00-0AA0**	
• 8 (2 x 4) Mbyte	**6ES7 955-2AM00-0AA0**	
Memory Card RAM		
• 1 MB	**6ES7 952-1AK00-0AA0**	
• 2 Mbyte	**6ES7 952-1AL00-0AA0**	
• 4 Mbyte	**6ES7 952-1AM00-0AA0**	
• 8 Mbyte	**6ES7 952-1AP00-0AA0**	
Memory Card Flash-EPROM Only required to update firmware		
• 4 Mbyte	**6ES7 952-1KM00-0AA0**	
CP 443-1 Communications module 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**	D)
CP 443-5 Extended Communications module for connection of SIMATIC S7-400 to PROFIBUS as DP master or for S7 communication, for increasing the number of DP lines, for data set routing with SIMATIC PDM and for 10-ms time stamp, electronic manual on CD; module occupies 1 slot	**6GK7 443-5DX03-0XE0**	D)
PS 407 power supply module for redundant use; 10 A 120/230 V AC; 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**	

Accessories	Order No.	
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 405-0KA01-0AA0**	
Backup Battery Type AA, 1.9 Ah	**6ES7 971-0BA00**	
UR1 Subrack 18 slots	**6ES7 400-1TA01-0AA0**	
UR2 Subrack 9 slots	**6ES7 400-1JA01-0AA0**	
UR2-H Subrack For divided central controllers; 2 x 9 slots	**6ES7 400-2JA00-0AA0**	
Runtime licenses for libraries		
PCS 7 Library Blocks V6.0 runtime license Valid for *one* SIMATIC PCS 7 automation system (already included in orders for AS 414-4-1H, AS 414-4-2H, AS 417-4-1H and AS 417-4-2H) trilingual (German, English, French) Type of delivery: Certificate of license	**6ES7 653-2BG06-2YB0**	C)
Engineering		
(see the section "Engineering system") The S7-400H option package has to be installed on the engineering system in order to be able to configure automation systems with H architecture (H/F/FH systems).		
Option Package S7-400H V5.2 For STEP 7 and SIMATIC PCS 7 Type of delivery: Certificate of license and authorization diskette	**6ES7 833-2AC01-0YB0**	C)
Y-Link		
Y-Link For connection of devices with only one PROFIBUS DP interface to a fault-tolerant automation system	**6ES7 197-1LA02-0XA0**	B)

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

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

D) Subject to export regulations AL: N, ECCN: 5D002ENC3A

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 414 H/ AS 417 H

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.

Fail-safe automation systems

Overview



Failsafe automation systems (F/FH systems) are used for critical applications in which an incident can result in danger to persons, plant damage or environmental pollution. They 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 failsafe automation systems (F/FH systems) based on AS 414 H and AS 417 H combine standard factory automation and safety engineering in a single system. They are certified by TÜV (German Technical Inspectorate) and comply with safety requirements class SIL 1 to SIL 3 according to IEC 61508, requirements class AK 1 to AK 6 according to DIN V 19250/ DIN V VDE 0801, and category 2 to 4 according to EN 954-1.

The safety function configured by the user in CFC is executed twice in various parts of the processor by means of redundant, diversified command processing. Potential errors are then detected in the subsequent comparison of results.

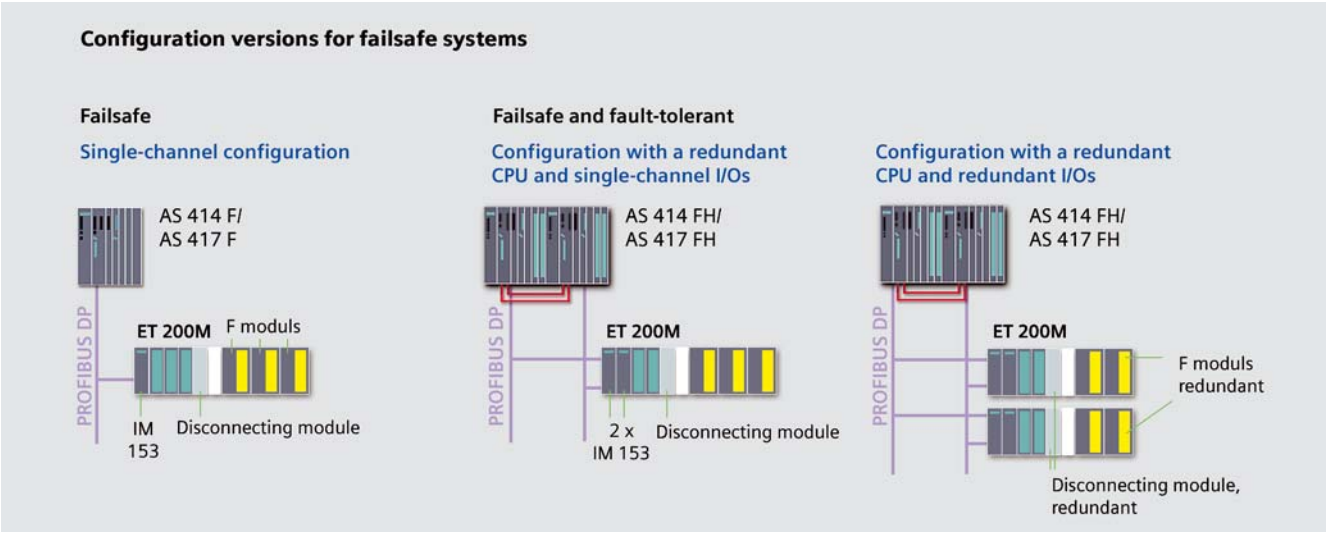
Failsafe automation systems can be designed as single-channel systems (F systems with a CPU) and redundant systems (FH systems).

The redundancy of FH systems is not relevant for failsafety. It is not used for error detection, but serves only to increase the availability of failsafe automation systems.

Benefits

- Use of SIMATIC S7 standard components for failsafe applications
- Safety levels SIL 3, AK 6 can be achieved with just one CPU
- Safe monitoring of communication through PROFIBUS with PROFIsafe
- Safe communication through Industrial Ethernet plant bus
- S and F functions can be mixed in the same automation system
- S and F I/Os can be operated on the same PROFIBUS DP line
- Configuration of S and F functions using a common engineering tool - CFC
- F-Tool (S7 F Systems) provides support for the TÜV acceptance:
  – separation of S and F functions
  – checksum by means of application program
  – comparison function
  – access to F functions is password protected
- Reduction of engineering costs through simple data exchange between standard and failsafe systems
- Minimum training requirements since same tools are used for standard and failsafe systems
- Simple fault analysis since same operation and monitoring for standard and failsafe systems (message sequence)
- Low hardware costs through mixed configurations; optimum for small applications
- Minimization of life cycle costs

Design



The failsafe automation systems are based on the hardware of the fault-tolerant systems. The picture shows the various packaging options for failsafe systems, all of which comply with safety class SIL 3 (IEC 61508) or AK 6 (VDE 0801).

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Function

Safety functions

The safety functions of the F/FH systems are present in the F program of the CPU and in the failsafe 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 failsafe I/Os can be used in F/FH systems. A plant consisting of safety-oriented and standard areas can thus be automated with one and the same system and be configured with uniform standard tools.

Integrated in the SIMATIC Manager is the F-Tool (S7 F systems). This engineering tool enables the parameterization of the CPU and the F signal modules as well as the generation of failsafe applications in the CFC based on predefined, TÜV-approved blocks. The failsafe 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 access privileges using passwords provide further support and guarantee simple, safe operation.

The application program may contain failsafe (F) and non-failsafe 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 which sets either the affected F sequence group or the entire F program to a safe state. The standard program is not influenced and continues to run as normal. After the fault is eliminated, the F program can be started again with the CPU still running.

Ordering Data

	Order No.	
F-Runtime License For processing failsafe application programs, for one AS 414 F/FH or AS 417 F/FH system	**6ES7 833-1CC00-6YX0**	C)
AS 414 F/FH and AS 417 F/FH Engineering see chapter "Engineering system")		
S7 F Systems V5.2 F programming tool with F block library for programming failsafe 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, software and electronic documentation on CD *The S7-400H option package has to be installed on the engineering system in order to be able to configure automation systems with H architecture (H/F/FH systems).*	**6ES7 833-1CC00-0YX0**	C)
S7-400H V5.2 Option Package For STEP 7 and SIMATIC PCS 7 Type of delivery: Certificate of license and authorization diskette	**6ES7 833-2AC01-0YB0**	C)

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

Options

Order information

An AS 414 H or AS 417 H automation system is required as hardware for a failsafe AS 414 F or AS 417 F automation system.

Following H systems can be used, depending on the type and design of the failsafe automation system:

- For failsafe systems (F systems): one AS 414-1H or AS 417-1H each
- For failsafe and system, 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 racks: two AS 414-1H or AS 417-1H each

The following components are required in addition:

- F-Tool (S7 F Systems)
  F programming tool with F block library for programming failsafe application programs on the engineering system (see the chapter "Engineering system")
- F-Runtime license
  for processing failsafe application programs, for one AS 414 F/FH or AS 417 F/FH system

Process I/O

9





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9/3	**Centralized I/O**
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9/4	Expansion units for centralized I/O
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9/6	Power supply
9/6	Interface modules
9/7	Accessories
9/8	Bundles
9/9	DI - digital input modules
9/10	DO - digital output modules
9/12	AI - analog input modules
9/13	AO - analog output modules
9/14	Ex modules [EEi xb]
9/15	Ex modules with HART
9/16	Fail-safe modules
9/17	Controller modules
9/18	**ET 200iS distributed I/O**
9/19	Electronics modules
9/20	Power supply
9/20	Interface modules
9/21	**ET 200S distributed I/O**
9/23	Terminal modules
9/25	Interface modules
9/25	Power modules
9/26	Digital electronics modules
9/27	Analog electronics modules
9/28	Motor starter
9/30	SIGUARD safety engineering
9/32	**ET 200X distributed I/O**
9/33	Digital and analog expansion modules
9/34	Pneumatic interface
9/34	Basic modules
9/34	Power modules

Process I/O

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 systems
- distributed ET 200M, ET 200S, ET 200iS and ET 200X (remote I/Os), 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 hazard zone 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,
- small cabling and engineering input,
- low commissioning, service and life cycle costs
- wide range of technical options

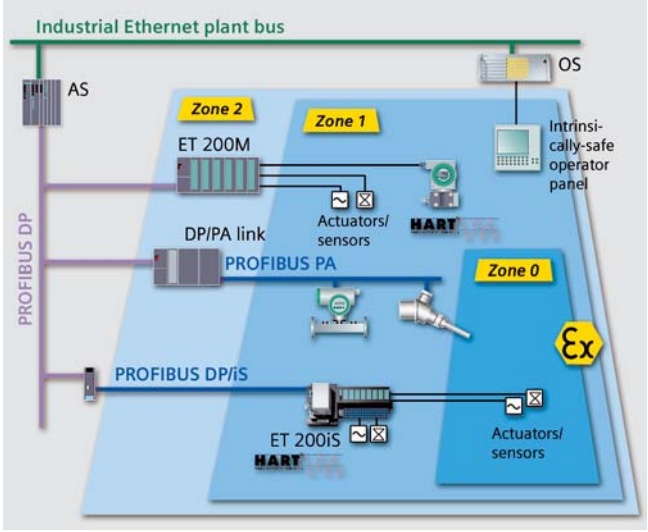
are the main reasons why distributed process peripherals are now predominant: ET 200 remote I/Os in conjunction with classical field/process devices and HART field devices or intelligent field/process devices directly on PROFIBUS.

Function

Possible online modifications among the process I/Os	
ET 200M	• Adding/removing ET 200M stations • Adding/removing new I/O modules • Parameterization of I/O modules • Parameterization of connected HART field devices through SIMATIC PDM
ET 200S, ET 200iS, ET 200X	• Adding/removing ET 200S/iS/X stations • ET 200iS: Parameterization of I/O modules, as well as HART field devices connected to HART modules, through SIMATIC PDM
PROFIBUS DP, PROFIBUS PA	• Adding/removing PROFIBUS DP stations • Adding/removing DP/PA links and field devices • Parameterization of field devices with SIMATIC PDM

Design

Connection of I/O modules in hazardous area



ET 200M Ex I/O modules

ET 200M can be used in Ex zone 2. The actuators/sensors can be located in Ex zone 1 whenusing appropriate Ex I/O modules. Hot swapping of I/O modules is possible in Ex zone 2 with appropriate safety practices (e.g. Hot Work Permits).

Distributes field devices via PROFIBUS PA

Intelligent field devices are connected to the control system via PROFIBUS or the HART interface modules in the remote I/O racks. The I/O modules in a remote I/O rack supports connection with field devices in the Ex zones 1 or 2, sensors/actuators also in zone 0.

Connecting actuators/sensors via ET 200iS

ET 200iS can be installed directly in Ex zone 1 or 2 (EEx de ib [ia/ib] IIC T4), with the sensors/actuators in zone 0 if required.

If required, an intrinsically-safe PC operator panel is available for use in potentially explosive atmospheres (Ex zone 1 or 2). For detailed information see catalog Add ons for the SIMATIC PCS 7 process control system.

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 data

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"

Ordering Data

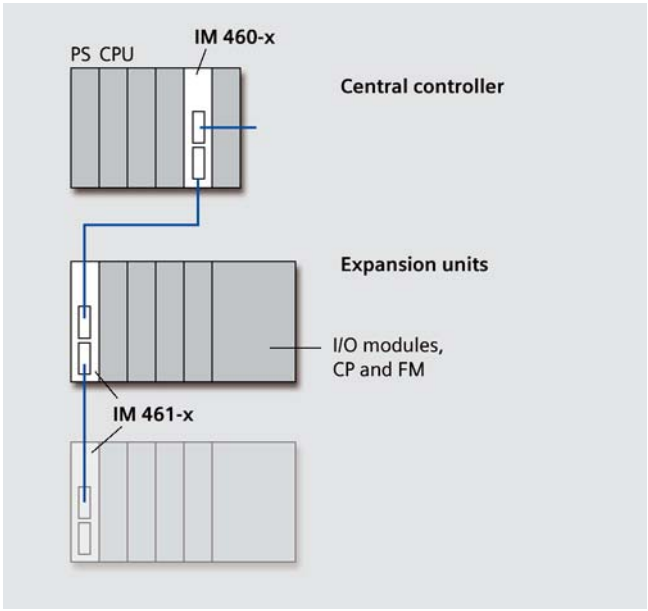
	Order No.	
SM 421 Digital Input Modules		
• 32 inputs, 24 V DC	**6ES7 421-1BL01-0AA0**	
• 32 inputs, AC/DC 120 V	**6ES7 421-1EL00-0AA0**	B)
• 16 inputs, 24 V DC, with process/diagnostics interrupt	**6ES7 421-7BH01-0AB0**	
• 16 inputs, AC/DC 24 to 60 V, with process/diagnostics interrupt	**6ES7 421-7DH00-0AB0**	
• 16 inputs, AC/DC 120/230 V, inputs according to IEC 1131-2 Type 2	**6ES7 421-1FH20-0AA0**	
• 16 inputs, 120 V AC	**6ES7 421-5EH00-0AA0**	B)
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**	B)
• 16 outputs; 20 to 120 V AC; 2 A	**6ES7 422-5EH00-0AB0**	B)
• 16 outputs; DC 20 to 138 V; 1.5 A; with diagnostics interrupt	**6ES7 422-5EH10-0AB0**	B)
• 16 outputs, 120/230 V AC; 2 A	**6ES7 422-1FH00-0AA0**	B)
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**	B)
• 8 inputs, floating, 16 bit; process interrupt capability, for thermal resistors, with diagnostics interrupt	**6ES7 431-7KF10-0AB0**	B)
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 pc)		
• With screw contacts	**6ES7 492-1AL00-0AA0**	
• With spring clamps	**6ES7 492-1BL00-0AA0**	
• With crimp contacts	**6ES7 492-1CL00-0AA0**	

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

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Expansion units for centralized I/O

Overview



Ordering Data	Order No.
IM 460-0 interface module	**6ES7 460-0AA01-0AB0**
Send interface module for central connection up to 5 m	
IM 461-0 interface module	**6ES7 461-0AA01-0AA0**
Receive interface module for central connection up to 5 m	
IM 460-1 interface module	**6ES7 460-1BA01-0AB0**
Send interface module for central connection up to 1.5 m; with 5 V power supply	
IM 461-1 interface module	**6ES7 461-1BA01-0AA0**
Receive interface module for central connection up to 1.5 m	
IM 460-3 interface module	**6ES7 460-3AA01-0AB0**
Send interface module for distributed connection up to 102 m	
IM 461-3 interface module	**6ES7 461-3AA01-0AA0**
Receive interface module for distributed connection up to 102 m	
UR1 rack	**6ES7 400-1TA01-0AA0**
for central controllers and expansion units • 18 slots	
UR2 rack	**6ES7 400-1JA01-0AA0**
for central controllers and expansion units • 9 slots	

Accessories	Order No.
468-1 connecting cable	
between 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 between 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**
Terminating connector	**6ES7 461-0AA00-7AA0**
for IM 461-0	
468-3 connecting cable	
between IM 460-1 and IM 461-1	
• 0.75 m	**6ES7 468-3AH50-0AA0**
• 1.5 m	**6ES7 468-3BB50-0AA0**

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 control functions:

- Standard-S7-300 signal modules
- Redundant S7-300 signal modules (DI 16 x 24 V DC, with diagnostics; DO 32 x 24 V DC/0.5 A; AI 8 x 12 Bit)
- I & C modules with enhanced diagnostics capability
- Ex I/O modules
- Controller and counter modules
- HART modules
- F modules for failsafe 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).
Following actions are possible in RUN of the automation system:

- adding new modules within a station
- reparameterization of modules
- adding ET 200M stations

The electronic modules and the connected HART field devices can be parameterized through SIMATIC PDM.

Design

The ET 200M distributed I/O station consists of

- a power supply module
- 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 S7-300 standard input/output modules there are special IC I/O modules with diagnostics capability offering the following functions:

- channel-specific error display,
- internal module monitoring,
- chatter monitoring for transducers,
- pulse extension,
- diagnostic interrupts,
- holding the last value or
- triggering a substitute value when the CPU or the external power supply fails.

These I/O modules recognize broken wires, short circuits, load voltage errors and module-internal errors, and they automatically notify the operator station of these incidents.

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 permitted with the right permit (e.g. fire certificate).

Technical data

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“

Power supply
Interface modules

Overview

Power Supply

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 (AC 120/230 V with 2 A, 5 A or 10 A, or DC 24...110 V with 2 A) to suit the field of application.

Interface modules

An IM 153-2 High Feature interface module is needed to connect the ET 200M to the PROFIBUS DP field bus.

The interface module supports the following functions:

- HART configuration of intelligent field devices,
- configuration of the ET 200M I/Os in RUN mode of the automation system,
- connection to the redundant AS 414 H / AS 417 H automation systems,
- use of ET 200M function modules (controller/counter modules).

This interface module is also available in a fiberoptic (FO) version for connecting to an optical PROFIBUS.

Notes:

Plastic fiberoptic cables and a mounting set for simplex connectors are required for use of the IM 153-2 FO (see "Plastic fiberoptic cables" in the section "Communication/PROFIBUS")

The active bus modules and the profile rail for hot swapping are required in order to be able to use the hot swapping function.

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 307-1KA00-0AA0**	
PS 305 Load Power Supply		
Including connection assembly;		
• DC 24/48/60/110 V; 24 V DC		
- 2 A, extended temperature range; 80 mm wide	**6ES7 305-1BA80-0AA0**	
IM 153-2 High Feature	**6ES7 153-2BA00-0XB0**	B)
Slave interface module for connection of an ET 200M to PROFIBUS DP, with time stamp (accuracy 10 ms), support of HART functionality, F modules, FM modules, "Configuration in RUN" function; also for use in redundant systems		
IM 153-2 FO High Feature	**6ES7 153-2BB00-0XB0**	B)
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		

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 connector
- Ex partition for ET 200M
- LK 393 cable duct

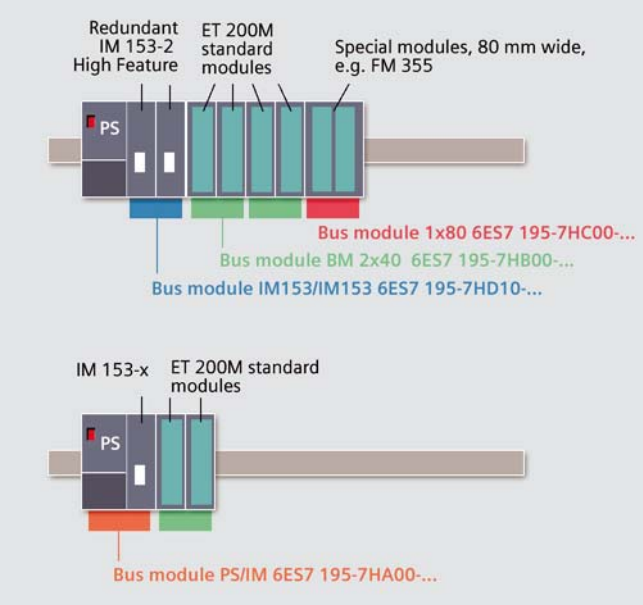
Ex partition

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. Redundant connection at the top, single connection at the bottom.

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 FO for design of redundant systems	**6ES7 195-7HD10-0XA0**	B)
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 Pack with 4 backplane bus covers and 1 bus module cover	**6ES7 195-1JA00-0XA0**	
Front Connector (1 pc)		
• 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**	
Ex partition for ET 200M • Separation of IM 153 and downstream Ex modules within an ET 200M row • Mixed operation von non-Ex and Ex modules within an ET 200M row • For support of the hot swapping function in connection with IM 153-2	**6ES7 195-1KA00-0XA0**	
LK 393 Cable Duct [EEx ib] IIC-conform routing of load voltage cable in front plug, 5 pcs	**6ES7 393-4AA00-0AA0**	

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

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Bundles

Overview

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 and one active IM 153/IM 153 bus modules, can be used for operating the ET 200M on the fault-tolerant AS 414 H / AS 417 H automation system.

Ordering Data

	Order No.	
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	**6ES7 153-2AR01-0XA0**	B)
Comprising two IM 153-2 High Feature and one active IM 153/ IM 153 bus module, for operation of the ET 200M on the fault-tolerant AS 414 H / AS 417 H automation system		

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

Overview

The digital input modules offered here are SM 321 modules selected from the SIMATIC S7-300 I/O range for use in SIMATIC PCS 7 systems.

The range extends from

- simple signal modules to
- modules with diagnostics capability and channel-specific error LED, diagnostic interrupts, internal module monitoring, holding of the last value or connection of a default value should the CPU or the load power supply fail. They detect e.g. broken wires, short circuits, load voltage errors and module-internal errors, and they automatically notify the operator system of these incidents.

Ordering Data

Ordering Data	Order No.	
SM 321 for Floating Contacts (with DC supply)		
• 16 inputs, 24 V DC, floating in groups of 16	**6ES7 321-1BH02-0AA0**	
• 16 inputs, 24 V DC, floating in groups of 16; temperature range -20...+60 °C	**6ES7 321-1BH82-0AA0**	
• 16 inputs, 24 V DC, floating in groups of 16; m-reading	**6ES7 321-1BH50-0AA0**	
• 32 inputs, 24 V DC, floating in groups of 16	**6ES7 321-1BL00-0AA0**	
• 32 inputs, 24 V DC, floating in groups of 16; temperature range -20...+60 °C	**6ES7 321-1BL80-0AA0**	
• 16 inputs, 48...125 V DC, floating in groups of 8; temperature range -20...+60 °C	**6ES7 321-1CH80-0AA0**	B)
SM 321 for floating contacts (with AC supply)		
• 32 inputs, AC 120 V, floating in groups of 8	**6ES7 321-1EL00-0AA0**	B)
• 8 inputs, 120/230 V AC, floating in groups of 2	**6ES7 321-1FF01-0AA0**	B)
• 8 inputs, 120/230 V AC, floating in groups of 2; temperature range -20...+60 °C	**6ES7 321-1FF81-0AA0**	B)
• 16 inputs, 120/230 V AC, floating in groups of 4	**6ES7 321-1FH00-0AA0**	B)
SM 321 for non-floating contacts (with AC supply)		
• 8 inputs, 120/230 V AC, floating in groups of 1	**6ES7 321-1FF10-0AA0**	B)
SM 323 Digital I/O Module		
• 8 inputs 24 V DC, 8 outputs 24 V DC, 0.5 A; temperature range -20...+60 °C	**6ES7 323-1BH81-0AA0**	

Ordering Data

Ordering Data	Order No.
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 - Floating in groups of 16 - **Redundant design possible** - Two short-circuit resistant 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) - Diagnostics inside module	**6ES7 321-7BH00-0AB0**
• 16 inputs, 24 V DC - Same data as 6ES7 321-7BH00-0AB0, - and a temperature range -20...+60 °C	**6ES7 321-7BH80-0AB0**
• 16 inputs, NAMUR - Floating in groups of 8 - Two sensor power supplies (each 8.2 V DC or 18 V DC) - Connection of NAMUR sensors or contacts with resistor circuit - Pulse extension - Channel-selective diagnostics (short circuit, wire break, chatter monitoring, discrepancy between changeover contacts) - Diagnostics inside module	**6ES7 321-7TH00-0AB0**

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

9

DO - digital output modules

Overview

The following digital output modules are SM 322 modules selected from the SIMATIC S7-300 I/O range for use in SIMATIC PCS 7 systems.

The range extends from

- simple signal modules to
- modules with diagnostics capability and channel-specific error LED, diagnostic interrupts, internal module monitoring, holding of the last value or connecting a default value should the CPU or the load power supply fail. They detect e.g. broken wires, short circuits, load voltage errors and module-internal errors, and they automatically notify the operator system of these incidents.

Ordering Data

	Order No.	
SM 322 for Direct Voltage (suitable for solenoid valves, contactors, indicator lights etc.)		
• 8 outputs, 24 V DC / 2 A, floating in groups of 4	**6ES7 322-1BF01-0AA0**	
• 16 outputs, 24 V DC / 0.5 A, floating in groups of 8	**6ES7 322-1BH01-0AA0**	
• 16 outputs, 24 V DC / 0.5 A, floating in groups of 8; temperature range -20...+60 °C	**6ES7 322-1BH81-0AA0**	
• 32 outputs, 24 V DC / 0.5 A, floating in groups of 8, **redundant design possible**	**6ES7 322-1BL00-0AA0**	
• 8 outputs, 48...120 V DC / 1.5 A, floating in groups of 4; temperature range -20...+60 °C	**6ES7 322-1CF80-0AA0**	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, floating in groups of 4	**6ES7 322-1FF01-0AA0**	B)
• 16 outputs, 120/230 V AC / 1 A, floating in groups of 8	**6ES7 322-1FH00-0AA0**	B)
• 32 outputs, 120 V AC / 1 A, floating in groups of 8	**6ES7 322-1EL00-0AA0**	B)

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, AL 48...230 V, max. 2 A floating in groups of 2	**6ES7 322-1HF01-0AA0**
• 8 outputs, 24...120 V DC, AL 48...230 V, max. 5 A floating in groups of 1	**6ES7 322-1HF10-0AA0**
• 8 outputs, 24...120 V AC, AL 48...230 V, max. 5 A floating in groups of 1; temperature range -20...+60 °C	**6ES7 322-1HF80-0AA0**
• 16 outputs, 24...120 V AC, AL 48...230 V, max. 2 A floating in groups of 8	**6ES7 322-1HH01-0AA0**
SM 323 Digital I/O Module	
• 8 inputs 24 V DC, 8 outputs 24 V DC, 0.5 A; temperature range -20...+60 °C	**6ES7 323-1BH81-0AA0**

Ordering Data	Order No.
SM 322 Modules with Diagnostics Capability (with channel and module diagnostics)	
For direct voltage (suitable for solenoid valves, DC contactors and indicator lights)	
• 8 outputs, 24 V DC / 0.5 A, floating in groups of 8 - Two connections per output (with and without series diode) - Connecting a default value by channel in the event of CPU stop (parameterizable) - Broken wire monitoring per channel - Monitoring of the load voltage per channel - Short-circuit monitoring according to M/L+ per channel - Diagnostics functions inside the module	**6ES7 322-8BF00-0AB0**
• 8 outputs, 24 V DC / 0.5 A, floating in groups of 8 - Same data as 6ES7 322-8BF00-0AB0, and temperature range -20...+60 °C	**6ES7 322-8BF80-0AB0**
• 16 outputs, 24 V DC / 0.5 A, floating in groups of 4 - Connecting a default value by channel in the event of CPU stop (parameterizable) - Broken wire monitoring per channel - Monitoring of the load voltage per channel group - Short-circuit monitoring according to M/L+ per channel group - Diagnostics functions inside the module	**6ES7 322-8BH00-0AB0**

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, floating in groups of 1 - Connecting a default value by channel in the event of CPU stop (parameterizable) - Diagnostics functions inside the module	**6ES7 322-5FF00-0AB0**	B)
• 16 outputs, AC/DC 24/48 V / 0.5 A, floating in groups of 1 - Connecting a default value by channel in the event of CPU stop (parameterizable) - Diagnostics functions inside the module	**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, floating in groups of 1 - with RC quenching element for protecting the contacts per channel - Connecting a default value by channel in the event of CPU stop (parameterizable) - Diagnostics functions inside the module	**6ES7 322-5HF00-0AB0**	B)

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

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AI - analog input modules

Overview

The analog input modules offered here are SM 331 modules selected from the SIMATIC S7-300 I/O range for use in SIMATIC PCS 7 systems.

The range extends from

- simple signal modules to
- modules with diagnostics capability and channel-specific error LED, diagnostic interrupts, internal module monitoring, holding of the last value or connecting a default value should the CPU or the load power supply fail. They detect e.g. broken wires, short circuits, load voltage errors and module-internal errors, and they automatically notify the operator system of these incidents.

Ordering Data

Ordering Data	Order No.	
SM 331 Modules for Current/Voltage Measurement and Temperature Measurement		
• 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 (8 channels; 2, 3 or 4 wires)	**6ES7 331-1KF00-0AB0**	
• 8 inputs in 4 channel groups - 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 comparison point - Wire break monitoring **- Redundant design possible** - Diagnostics inside module	**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 comparison point - Wire break monitoring - Diagnostics inside module	**6ES7 331-7KB02-0AB0**	B)
• 2 inputs in 1 channel group - Same data as 6ES7 331-7KB02-0AB0, and temperature range -20...+60 °C	**6ES7 331-7KB82-0AB0**	B)

Ordering Data

Ordering Data	Order No.	
SM 331 Modules for Current and Voltage Measurement		
• 8 inputs in 4 channel groups - Resolution 15 bit + sign - Current measurement 0/4...20 mA (8 channels; 2 or 4 wires) - Voltage measurement (8 channels) - Wire break monitoring - Diagnostics inside module	**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 - Diagnostics inside module	**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 - Diagnostics inside module	**6ES7 331-7PF00-0AB0**	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 - Diagnostics inside module	**6ES7 331-7PF10-0AB0**	B)

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

Overview

The following analog output modules are SM 332 modules selected from the SIMATIC S7-300 I/O range for use in SIMATIC PCS 7 systems.

The range extends from

- simple signal modules to
- modules with diagnostics capability and channel-specific error LED, diagnostic interrupts, internal module monitoring, holding of the last value or connecting a default value should the CPU or the load power supply fail. They detect e.g. broken wires, short circuits, load voltage errors and module-internal errors, and they automatically notify the operator system of these incidents.

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 - Broken wire monitoring (only for current) - Short circuit monitoring (only for voltage) - Diagnostics inside module	**6ES7 332-5HB01-0AB0**	
• 2 outputs in 2 channel groups - Same data as 6ES7 332-5HB01-0AB0, and temperature range -20...+60 °C	**6ES7 332-5HB81-0AB0**	
• 4 outputs in 4 channel groups - 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 - Broken wire monitoring (only for current) - Short circuit monitoring (only for voltage) - Diagnostics inside module	**6ES7 332-5HD01-0AB0**	
• 8 outputs in 8 channel groups - 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 - Broken wire monitoring (only for current) - Short circuit monitoring (only for voltage) - Diagnostics inside module	**6ES7 332-5HF00-0AB0**	B)
• 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 channel by channel - Diagnostics inside module	**6ES7 332-7ND00-0AB0**	B)

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

9

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 with HART come with diagnostics capability (channel and module diagnostics).

Ordering Data	Order No.	
Ex Digital Modules		
Ex Digital Input Modules		
• 4 NAMUR inputs in 4 channel groups - Voltage supply to sensors 8.2 V - Individually floating channels - Wire break and short-circuit monitoring (directly at the contact for contacts with external resistor circuit) - Diagnostics inside module	**6ES7 321-7RD00-0AB0**	
Ex Digital Output Module		
• 4 outputs, 24 V DC / 10 mA in 4 channel groups - Individually floating channels - Wire break monitoring - Short-circuit monitoring - Diagnostics inside module	**6ES7 322-5SD00-0AB0**	
• 4 outputs, 15 V DC / 20 mA in 4 channel groups - Individually floating channels - Wire break monitoring - Short-circuit monitoring - Diagnostics inside module	**6ES7 322-5RD00-0AB0**	
Ex Analog Modules		
Ex Analog Input Module		
• 4 inputs, 0/4...20 mA in 4 channel groups - Individually floating channels - Resolution 15 bit + sign - Connection of 2- or 4-wire measurement transducer possible - Wire break monitoring - Measurement range monitoring - Short-circuit-proof - Diagnostics inside module	**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), compensation box or 0/50°C comparison point - Resistance thermometer Pt100, Pt200, Ni100 - Wire break monitoring - Diagnostics inside module	**6ES7 331-7SF00-0AB0**	
Ex Analog Output Module		
• 4 outputs, 0/4...20 mA in 4 channel groups - Individually floating channels - Resolution: 15 bit - For 2-wire measurement transducer - Wire break monitoring - Diagnostics inside module	**6ES7 332-5RD00-0AB0**	B)

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

9

Overview

The Ex modules with HART (Highway Addressable Remote Transducer), which can be used in distributed I/O devices of the ET 200M (with IM 153-2 High Feature interface module), enable HART devices with approval for potentially explosive areas to be connected to SIMATIC PCS 7 automation systems .

All measurement transducers and HART actuators that are certified for digital communication with the HART protocol can be connected through these modules.

In addition, conventional transducers with 4 to 20 mA technology without HART protocol can also be connected

All Ex modules with HART come with diagnostics capability (channel and module diagnostics).

Application

HART is a serial transfer protocol which is used to transfer additional parameter data, such as measurement range, isolation etc. to connected measuring transducers and actuators through a 4 to 20 mA power loop. The Ex I/O modules offered here enable the HART protocol to also be used for communication with HART devices in the hazardous area. The modules themselves and the ET 200M are positioned in the safe area of in Ex zone 2.

A KEMA certificate confirms that the modules are approved for operation with HART devices in the hazardous area.

Function

The HART jobs can be initiated remotely for each channel through PROFIBUS DP. This usually takes place from the central engineering system of the SIMATIC PCS 7 process control system using SIMATIC PDM.

The Ex modules with HART have the following characteristics:

- Connection compatibility with conventional analog modules of the ET 200M
- Additional communication option through the current loop
- Low energy requirement
- 2 analog channels per module
- Each channel is a primary master of the HART protocol
- All channels can be operated by several clients simultaneously and independently of one another
- The channels are electrically isolated from one another
- Selectable current signal per channel:
  - 0...20 mA (with HART function)
  - 4...20 mA (with/without HART function)

Parameterization

- Remote parameterization is possible for
  - conversion time,
  - resolution,
  - limit values,
  - alarms, etc.
- Remote parameterization of the HART measurement transducers and actuators is possible with SIMATIC PDM through PROFIBUS DP.
- It is still possible to parameterize the HART devices with an operator terminal.

Technical data

Detailed technical data of the Ex modules with HART can be found

- in the IK PI catalog (section "Distributed I/Os“) or
- in the Mall / CA 01 at "Distributed I/Os / ET 200M“

Ordering Data

	Order No.	
Ex Analog Input Module with HART [EEx ib] • 2 inputs, 0/4...20 mA in 2 channel groups - Individually floating channels - Resolution: 15 bit + sign - Connection of 2- or 4-wire measurement transducer possible - Wire break monitoring - Short-circuit-proof - HART (2 or 4 wires)	**6ES7 331-7TB00-0AB0**	B)
Ex Analog Output Module with HART [EEx ib] • 2 outputs, 0/4...20 mA in 2 channel groups - Individually floating channels - Resolution: 12 bit + sign - For 2-wire actuators - Wire break monitoring - HART	**6ES7 332-5TB00-0AB0**	B)

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

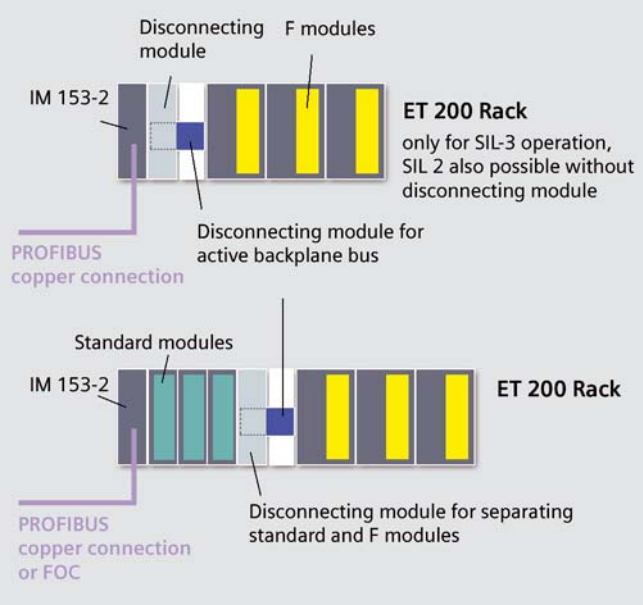
Fail-safe modules

Overview

The special safety functions of the failsafe systems are coordinated with the failsafe 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-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.

Options



Isolating module

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 module for the isolating module, when using an active backplane bus

Note
The isolating module for F modules and the isolating bus module can only be used together. The 40 mm wide gap cannot be used for other modules.

Ordering Data	Order No.
Isolating module	**6ES7 195-7KF00-0XA0**
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)	
Isolating bus module	**6ES7 195-7HG00-0XA0**
80 mm wide, for isolating module, when using an active backplane bus	

Ordering Data	Order No.	
SM 326F Failsafe Digital Input Module for floating contacts		
• 24 inputs, 24 V DC, floating in groups of 12 - 4 short-circuit resistant sensor power supplies, each for 6 channels, floating in groups of 3 - External sensor power supply possible - SIL 2: single-channel evaluation, 24 channels - SIL 3: 2-of-2 evaluation on the module, 12 channels (adjustable discrepancy time) - **Redundant design possible** - Short-circuit monitoring after L+ - Discrepancy monitoring - Diagnostics inside module - ProfiSafe frame	**6ES7 326-1BK00-0AB0**	
• 8 inputs, NAMUR [EEx ib] isolated by channel - 8 short-circuit resistant sensor power supplies, each for 1 channel, mutually isolated - SIL 2: single-channel evaluation, 8 channels - SIL 3: 2-of-2 evaluation on the module, 4 channels (adjustable discrepancy time) - **Redundant design possible** - Wire break and short-circuit monitoring (for contacts with external resistor circuit) - Discrepancy monitoring - Diagnostics inside module - ProfiSafe frame	**6ES7 326-1RF00-0AB0**	
SM 326F Failsafe Digital Output Module	**6ES7 326-2BF01-0AB0**	B)
• 10 outputs, 24 V DC, 2 A, floating in groups of 5 - SIL 2, SIL 3 | parameterizable (10 channels) - **Redundant design possible** (outputs with internal diode) - Wire break and short-circuit monitoring - Diagnostics inside module - ProfiSafe frame		
SM 336F Failsafe Analog Input Module	**6ES7 336-1HE00-0AB0**	
• 6 inputs, 4...20 mA - Isolated from the backplane bus - 2- 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) - Diagnostics inside module - ProfiSafe frame		

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

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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:

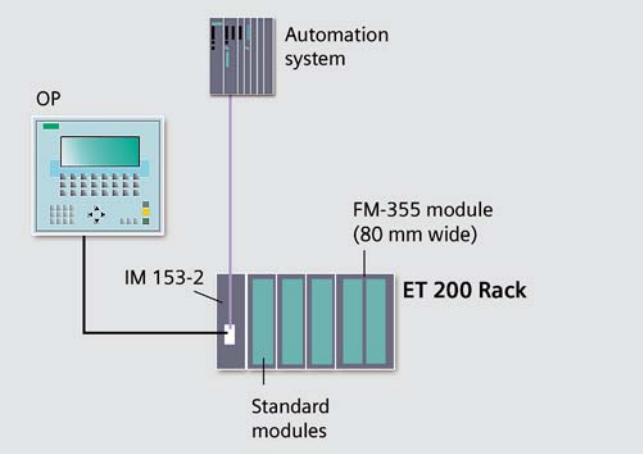
- FM 355 C is a continuous-action controller with 4 analog outputs for controlling analog actuators
- FM 355 S is a step or pulse controller with 8 digital outputs for controlling motor-driven (integrating) actuators or binary controlled actuators (e.g. electrical heating strips and cartridges)
- FM 355-2 C/S is specially optimized for temperature control applications with user-friendly integrated online self-optimization

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

With the FM 355 / FM 355-2 modules in SIMATIC PCS 7 it is possible to implement controller tasks outside the S7-400 CPU of the 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 a backup behavior, i.e. 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 for FM 355-2).

If the CPU of the automation system fails, the FM 355 module can be operated further with an OP17 operator panel. The operator panel is connected to the PROFIBUS DP field bus 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 operated with the operator panel are setpoint value and manipulated variable. If the FM 355 module is operated from the operator panel, the automation system reads back the values operable 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 delivery of the standard SIMATIC PCS 7 library (part of Engineering Software). These blocks are integrated in the PCS 7 driver concept, thus resulting in a homogeneous integration (incl. automatic diagnostics messages).

Parameterization in HW Config

A configuration package containing all parameterization masks required for configuring, parameterizing and commissioning are included in delivery of the FM 355 C and FM 355 S controller modules.

Ordering Data

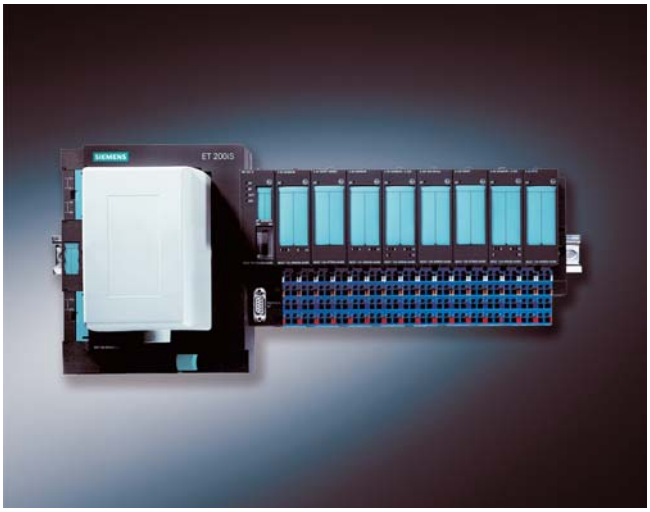
	Order No.	
FM 355 C Controller Module With 4 analog outputs for 4 continuous-action controllers	**6ES7 355-0VH10-0AE0**	B)
FM 355 S Controller Module With 8 digital outputs for 4 step or pulse controllers	**6ES7 355-1VH10-0AE0**	
FM 355-2 C Temperature Controller Module With 4 analog outputs for 4 continuous-action controllers	**6ES7 355-2CH00-0AE0**	B)
FM 355-2 S Temperature Controller Module With 8 digital outputs for 4 step or pulse controllers	**6ES7 355-2SH00-0AE0**	B)
all FM modules incl. multi-lingual configuration package, manual and Getting Started (German, English, French, Italian) on CD-ROM		
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**	

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

Note:
In the case of the FM 355 C and FM 355 S controller module, the channels are not electrically isolated from one another

ET 200iS distributed I/O

Overview



The intrinsically safe distributed ET 200iS I/O device in degree of protection IP 30 can be installed directly in Ex zone 1 or 2 (EEx de ib [ia/ib] IIC T4), and the sensors/actuators can also be installed in zone 0 if required. The ET 200iS is connected through PROFIBUS DP. With the help of an isolating transformer it it possible for PROFIBUS DP to be taken into Ex zone 1 as an intrinsically safe bus.

The ET 200iS is of bit-modular design: pressure-encapsulated power supply, interface module for PROFIBUS DP, and up to 32 electronic modules. HART capability is standard, as is the hot swapping of individual modules without a fire certificate. Data transfer rates of up to 1.5 Mbit/s are possible.

Integration in SIMATIC PCS 7 covers CFC driver blocks, system diagnostics and time stamp. Putting the ET 200iS into operation is easy and user-friendly. The configuration of electronic modules and the parameterization of field devices are performed with SIMATIC PDM in the engineering system.

The range of electronic modules covers a NAMUR digital input module, a digital output module and analog input/output modules with and without HART.

The electronic modules and the connected HART field devices can be parameterized through SIMATIC PDM.

Technical data

Detailed technical data on the ET 200iS can be found

- in the IK PI catalog or
- in the Mall / CA 01 at "Distributed I/Os / ET 200iS“

Overview

- The electronic modules are plugged into the corresponding terminal modules TM-E30S-44iS (screw-type terminal) or TM-E30C-44iS (cage-clamp method) (to be ordered separately).
- The modules are mechanically coded for automatic protection against polarity reversal when they are plugged in.
- Modules can be replaced under potentially explosive conditions during runtime.

Ordering Data

	Order No.	
Digital electronic modules		
Digital input module for floating contacts		
• 4 x NAMUR or contact with resistor circuit - Short-circuit monitoring - Wire break monitoring - Chatter monitoring - Diagnostics inside module	**6ES7 131-5RD00-0AB0**	B)
Digital Output Module for Ex-i Solenoid Valves, DC Relays and Actuators		
• 2 x 25 V DC, 25 mA - Short-circuit monitoring - Wire break monitoring - Parameterizable connection of a default value in case of CPU failure - Diagnostics inside module	**6ES7 132-5SB00-0AB0**	B)
Analog Electronic Modules		
Analog Input / Current Measurement		
• 2 x 4...20 mA, 2-wire transducer - Resolution 12 bit + sign - Short-circuit monitoring - Wire break monitoring - Diagnostics inside module	**6ES7 134-5RB00-0AB0**	B)
• 2 x 0(4)...20 mA, 4-wire transducer - Resolution 12 bit + sign - Wire break monitoring - Diagnostics inside module	**6ES7 134-5RB50-0AB0**	B)
• 2 x 4...20 mA, HART; 2-wire measurement transducer - Resolution 12 bit + sign - Short-circuit monitoring - Wire break monitoring - Diagnostics inside module	**6ES7 134-5TB00-0AB0**	B)
• 2 x 4...20 mA, HART; 4-wire transducer - Resolution 12 bit + sign - Wire break monitoring - Diagnostics inside module	**6ES7 134-5TB50-0AB0**	B)
Analog Input / Temperature Measurement		
• 2 x TC (thermocouples) - Type E, N, J, K, L, S, R, B, T, U - Resolution 15 bit + sign - Compensation through Pt100 with module 6ES7 134-5SB50-0AB0 of the same station - Wire break monitoring - Diagnostics inside module	**6ES7 134-5SB00-0AB0**	B)
• 2 x RTD, resistance thermometer Pt100/Ni100 - 2-, 3-, 4-wire - Resolution 15 bit + sign - Short-circuit monitoring - Wire break monitoring - Diagnostics inside module	**6ES7 134-5SB50-0AB0**	B)
Analog Output Module		
• 2 x 0(4)...20 mA, 2-wire transducer - Resolution: 14 bit - Short-circuit monitoring - Wire break monitoring - Diagnostics inside module - Parameterizable default value in case of CPU failure	**6ES7 135-5RB00-0AB0**	B)
• 2 x 0(4)...20 mA, 2-wire transducer HART - Resolution: 14 bit - Short-circuit monitoring - Wire break monitoring - Diagnostics inside module - Parameterizable default value in case of CPU failure	**6ES7 135-5TB00-0AB0**	B)
Terminal Module		
• TM-E30S44-iS Terminal module for ET 200iS, for integrating electronic modules, screw-type terminals	**6ES7 193-5CB00-0AA0**	
• TM-E30C44-iS Terminal module for ET 200iS, for integrating electronic modules, spring-loaded terminals	**6ES7 193-5CB10-0AA0**	

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

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Power supply and interface modules

Overview

The power supply module is plugged into the corresponding terminal module TM-PS-iS (to be ordered separately). The power supply unit

- provides a reliable isolated power supply for the ET 200iS with the necessary operating voltages for:
  - logic (through the backplane bus)
  - PROFIBUS DP interface of IM 151-2
  - power bus
- takes over the safety limit of the output voltage
- has an explosion-proof plastic enclosure (explosion protection type EX d)

The interface module IM151-2 is plugged into the corresponding terminal module TM-IM-iS (to be ordered separately). The interface module IM 151-2 has the following properties:

- Connects the ET 200iS to PROFIBUS DP
- Prepares data for the fitted electronic modules
- The PROFIBUS address of ET 200iS can be adjusted by switch

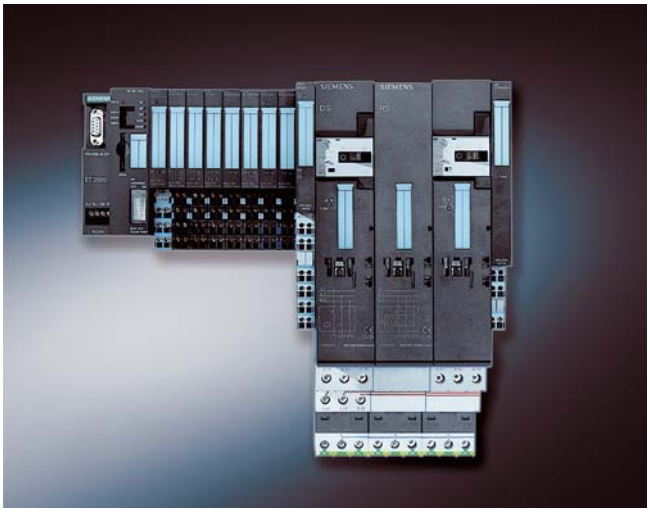
Ordering Data

	Order No.	
Starter Package for ET 200iS IM 151-2 interface module and power supply module, each with terminal module and RS 485-IS Coupler with SIMATIC PDM parameter assignment software, incl. integration in STEP 7	**6ES7 151-2AR00-0AB0**	A)
Power Supply		
Power Supply Module For ET 200iS	**6ES7 138-5EA00-0AA0**	B)
TM-PS-iS Terminal Module For integrating the power supply module	**6ES7 193-5DA00-0AA0**	
Bus Interface		
Interface Module IM 151-2 For ET 200iS, incl. power bus terminating module	**6ES7 151-2AA00-0AB0**	
TM-IM-iS Terminal Module For integrating the IM 151-2 interface module	**6ES7 193-5DB00-0AA0**	
Accessories		
Bus Connector For intrinsically safe PROFIBUS, 1.5Mbit/s	**6ES7 972-0BA30-0XA0**	
RS 485-IS Coupler Including bus terminating resistor PROFIBUS must be run intrinsically safely in hazardous areas through installation of a suitable field bus isolating transformer	**6ES7 972-0AC80-0AX0**	

A) Subject to export regulations AL: N, ECCN: 5D992B2

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

Overview



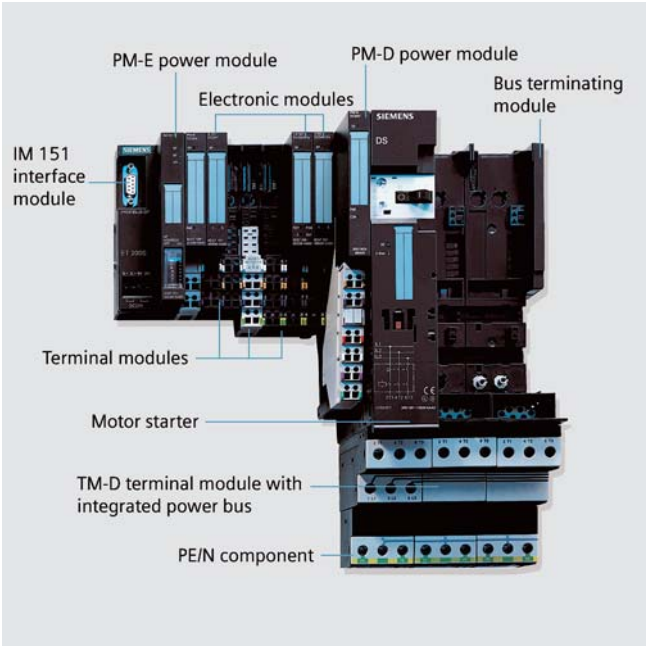
The ET 200S is a bit-modular distributed I/O system rated for IP 20 and approved for operation in Ex zone 2 (except the operation of motor starters). It is designed with permanent wiring that supports the hot swapping of I/O modules (with hot work permits).

The range of I/Os that can be used with SIMATIC PCS 7 includes power modules for electronic 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:

- failsafe terminal, power and electronic modules
- SIGUARD safety engineering for motor starter applications in plants of safety category 2 to 4 (EN 954-1)

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:
  - Terminal modules TM-P for power modules
  - TM-E terminal modules for electronic modules
  - Terminal modules for TM-DS/TM-RS 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 supply.
- Power modules for PM-E electronic modules and PM-D motor starters
  - for individual grouping of load and sensor supply voltages and their monitoring as well as
    for safe shutting down of digital output modules with PROFIsafe
  - for supplying and monitoring the auxiliary voltages for motor starters as well as for shutting down of a complete group of motor starters
- Electronic modules
  for process data exchange:
  - digital electronic modules for connecting digital sensors and actuators
  - analog electronic modules for connecting analog sensors and actuators
- Motor starter modules
  for switching and protecting three-phase current loads
- Accessories
  - Reserve module for reserving a slot for an electronic 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

ET 200S distributed I/O

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 is available for standard configuration. The data entered can be adopted directly into STEP7, and the electronic ordering of components is also possible through the Mall.

Technical data

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“

Overview

- Mechanical modules for integrating the power and electronic modules as well as the motor starters and expansion modules (ordering data of the terminal modules for motor starters and expansion module can be found at "Motor starters")
- For setting up permanent wiring through self-configuring voltage buses
- Alternatively with screw-type or spring-loaded terminals and Fast Connect design
- Replaceable terminal box
- Automatic coding of the electronic modules
- Self-shielding of the backplane bus for high data security
- Optional plug-in shield connection
- Color coding facility for the terminals and for identifying the slot numbers

Ordering Data

	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, FastConnect 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**

Ordering Data

	Order No.
TM-P15N23-A0 Terminal Module 2 x 3 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, FastConnect 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, FastConnect 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**

Terminal modules

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 pcs	**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 pcs	**6ES7 193-4CA30-0AA0**
TM-E15N24-A1 Terminal Module 2 x 4 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, FastConnect Ordering unit 5 pcs	**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 pcs	**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-type terminals Ordering unit 5 pcs	**6ES7 193-4CB30-0AA0**
TM-E15N24-01 Terminal Module 2 x 4 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, FastConnect Ordering unit 5 pcs	**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 pcs	**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-type terminals Ordering unit 5 pcs	**6ES7 193-4CB10-0AA0**
TM-E15N23-01 Terminal Module 2 x 3 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, FastConnect Ordering unit 5 pcs	**6ES7 193-4CB60-0AA0**
TM-E15N26-A1 Terminal Module 2 x 6 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, FastConnect Ordering unit 5 pcs	**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 pcs	**6ES7 193-4CA40-0AA0**

Ordering Data	Order No.
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 pcs	**6ES7 193-4CA50-0AA0**
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-type 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“

Overview

Interface modules

- IM 151-1 High Feature (RS 485)
- Interface module for electrical connection of the ET 200S to PROFIBUS DP through copper bus cables
- Handles all data exchange with the PROFIBUS DP master

Power Modules for PM-E Electronic Modules

- For monitoring and, depending on the version, securing the load and encoder supply voltage to the electronic module
- Diagnostic message of voltage and fuse drop (can be switched off through configuration)

PM-E F PROFIsafe Failsafe Power Module

- For safely switching off downstream digital standard output modules, 24 V DC up to 10 A (AK 4, SIL 2)
- Also 2 digital outputs, 24 V DC / 2 A (AK 6, SIL 3)

Power modules for PM-D motor starters

- For incoming supply and monitoring of auxiliary voltages for motor starters
- Possible to switch off a complete group of motor starters without additional effort (safety category 1 according to EN 954-1)

PM-D F PROFIsafe failsafe power module for failsafe motor starters

- In EMERGENCY STOP applications the failsafe motor starters are shut down selectively by means of the upstream PM-D F PROFIsafe power module. A total of 6 shut-down groups can be formed per power module. The interface from ET 200S PROFIsafe to systems with conventional safety engineering is formed by F-CM failsafe contact multipliers with 4 floating contacts.

Ordering Data

Order No.

	Order no.	Price
IM151-1 Interface Module For ET 200S, High Feature	**6ES7 151-1BA00-0AB0**	
Power Modules for PM-E Electronic Modules		
PM-E Power Module		
• 24 V DC/10 A - Monitoring of the load voltage	**6ES7 138-4CA00-0AA0**	
• 24 V DC, 48 V; 24 V, 48 V, 120 V AC; 230 V AC - Monitoring of the fuse - Monitoring of the load voltage	**6ES7 138-4CB10-0AB0**	B)
PM-E F Failsafe Power Module		
• PM-E F PROFIsafe - 1 x relay 24 V DC/10 A, P/M switching, for switching off downstream standard digital output modules (up to AK 4, SIL 2) - 2 x 24 V DC/2 A, P/M switching, with broken wire monitoring by channel (with "1" signal) - Safe monitoring of communication with PROFIsafe - Diagnostics inside module - Overload diagnostics by channel	**6ES7 138-4CF00-0AB0**	B)
Power Module for PM-D Motor Starters		
PM-D Power Module		
• 2 x 24 V DC/10 A - For supplying the electronics and contactors of motor starters - Monitoring of the load voltage	**3RK1 903-0BA00**	F)
Power Modules for PM-D F Failsafe Motor Starters		
PM-D F PROFIsafe Power Module For 6 vector groups; safety-oriented	**3RK1 903-3BA00**	F)
F-CM Failsafe Contact Multiplier Expansion to PM-D F PROFIsafe;	**3RK1 903-3CA00**	
PM-D F X1 Failsafe Power Module Overvoltage protection; for incoming supply of external emergency stop signals; for 6 vector groups	**3RK1 903-3DA00**	F)

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

F) Subject to export regulations AL: N, ECCN: EAR99

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Digital electronics modules

Overview

- 2- and 4-channel digital inputs and outputs for the ET 200S
- Can be connected to TM-E terminal modules with automatic coding
- High-feature variants for enhanced plant availability, additional functions and comprehensive diagnostics
- Module replacement during operation and under power (hot swapping)
- 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

Ordering Data	Order No.	
Digital Inputs for Floating Contacts		
• DI 2 x 24 V DC, standard	**6ES7 131-4BB00-0AA0**	
• DI 4 x 24 V DC, standard	**6ES7 131-4BD00-0AA0**	
• DI 2 x 24 V DC, High Feature; with diagnostics - Short-circuit monitoring	**6ES7 131-4BB00-0AB0**	
• DI 4 x 24 V DC, High Feature; with diagnostics - Short-circuit monitoring	**6ES7 131-4BD00-0AB0**	B)
• DI 4 x 24...48 V DC/AC, High Feature; with diagnostics - Broken wire monitoring (external resistor circuit required) - Monitoring of the fuse - Monitoring of the load voltage	**6ES7 131-4CD00-0AB0**	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 138-4FA00-0AB0**	B)

Ordering Data	Order No.	
Digital Outputs for Direct Voltage (suitable for solenoid valves, DC contactors, indicator lights etc.)		
• DO 2 x 24 V DC/0.5 A, standard	**6ES7 132-4BB00-0AA0**	
• DO 2 x 24 V DC/2 A, standard	**6ES7 132-4BB30-0AA0**	
• DO 2 x 24 V DC/0.5 A, High Feature, with diagnostics - Connection of a default value by channel in the event of CPU failure (parameterizable) - Short-circuit monitoring by channel - Broken wire monitoring by channel (when "1" signal)	**6ES7 132-4BB00-0AB0**	
• DO 2 x 24 V DC/2 A, High Feature, with diagnostics - Connection of a default value by channel in the event of CPU failure (parameterizable) - Short-circuit monitoring by channel - Broken wire monitoring by channel (when "1" signal)	**6ES7 132-4BB30-0AB0**	
• DO 4 x 24 V DC/0.5 A, standard	**6ES7 132-4BD00-0AA0**	B)
• DO 4 x 24 V DC/2 A, standard	**6ES7 132-4BD30-0AA0**	
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 a default value by channel in the event of CPU failure (parameterizable)	**6ES7 132-4FB00-0AB0**	B)
Relay Output (suitable for AC/DC solenoid valves, contactors, motor starters, miniature motors and indicator lights)		
• 2 x relays DC/AC 24...230 V, 5 A - Connection of a default value by channel in the event of CPU failure (parameterizable)	**6ES7 132-4HB00-0AB0**	
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 by channel - Overload monitoring by channel - Broken wire monitoring by channel (when "1" signal) - Safe monitoring of communication with PROFIsafe - Diagnostics inside module	**6ES7 138-4FB00-0AB0**	B)

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

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Overview

- Analog inputs and outputs for the ET 200S
- Can be connected to TM-E terminal modules with automatic coding
- High-feature variants with enhanced accuracy and resolution
- Hot swapping of modules

Ordering Data

	Order No.	
Analog Input		
• AI 2xU (±5 V, 1...5 V, ±10 V) / 13 bit, Standard - Diagnostics inside module - Overflow/underflow diagnostics	**6ES7 134-4FB00-0AB0**	B)
• AI 2xI, 2-wire MU (4...20 mA) / 13 bit, standard - Diagnostics inside module - Overflow/underflow diagnostics - Wire break monitoring	**6ES7 134-4GB00-0AB0**	B)
• AI 2xI, 4-wire MU (±20 mA, 4...20 mA) / 13 bit, standard - Diagnostics inside module - Overflow/underflow diagnostics - Wire break monitoring	**6ES7 134-4GB10-0AB0**	B)
• AI 2xTC / 15 bit, standard - Diagnostics inside module - Overflow/underflow diagnostics - Wire break monitoring - Compensation through external Pt100 in the same station with AI 2xRTD High Feature	**6ES7 134-4JB00-0AB0**	B)
• AI 2xRTD / 15 bit, standard - Diagnostics inside module - Overflow/underflow diagnostics - Wire break monitoring - Pt100 resistance thermometer, Ni100 (2, 3 or 4 wires)	**6ES7 134-4JB50-0AB0**	B)
• AI 2xU (1...5 V, ±5 V, ±10 V) / 15 bit, high resolution - Diagnostics inside module - Overflow/underflow diagnostics	**6ES7 134-4LB00-0AB0**	B)
• AI 2xI (±20 mA, 4...20 mA) / 15 bit, high resolution - Diagnostics inside module - Overflow/underflow diagnostics - Wire break monitoring	**6ES7 134-4MB00-0AB0**	B)
• AI 2xTC / 15 bit, High Feature - Diagnostics inside module - Overflow/underflow diagnostics - Wire break monitoring - Internal temperature compensation	**6ES7 134-4NB00-0AB0**	B)
• AI 2xRTD / 15 bit, High Feature - Diagnostics inside module - Overflow/underflow diagnostics - Wire break monitoring - Resistance thermometer Pt100/200/500/1.000, Ni100/1.000 (2, 3 or 4 wires) - Temperature in Celsius or Fahrenheit	**6ES7 134-4NB50-0AB0**	B)

Ordering Data

	Order No.	
Analog Output		
• AO 2xU (1...5 V / 12 bit, ±10 V / 13 bit), standard - Diagnostics inside module - Parameterizable connection of a default value in case of CPU stop - Short-circuit monitoring	**6ES7 135-4FB00-0AB0**	B)
• AO 2xI (±20 mA, 4...20 mA) / 13 bit, standard - Diagnostics inside module - Parameterizable connection of a default value in case of CPU stop - Wire break monitoring	**6ES7 135-4GB00-0AB0**	B)
• AO 2xU (1...5 V, ±10 V) / 15 bit, high resolution - Diagnostics inside module - Parameterizable connection of a default value in case of CPU stop - Short-circuit monitoring	**6ES7 135-4LB00-0AB0**	B)
• AO 2xI (±20 mA, 4...20 mA) / 15 bit, high resolution - Diagnostics inside module - Parameterizable connection of a default value in case of CPU stop - Wire break monitoring	**6ES7 135-4MB00-0AB0**	B)

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

Motor starter

Overview

- Completely prewired motor starter for the switching and safeguarding of any three-phase current loads
- Optionally available as direct, reversing or soft starter
- High Feature motor starter with combination of motor circuit protector, electronic overload protection and contactor or soft starter up to 7.5 kW
- Failsafe motor starters based on the High Feature micro starters with integrated redundancy also offer shut-down reliability up to Category 4 (EN 954-1)
- With build-as-you-go 40/50 A power bus, i.e. once-only incoming supply of load voltage for a group of motor starters
- Hot swapping permissible
- Inputs and outputs for controlling and signalizing states already integrated
- Diagnostics-capable for active monitoring of the protection and switching function
- Combinable with expansion modules: Brake control module for operating electromechanical brakes in three-phase AC motors, and with two optional inputs for special functions

Ordering Data

	Order No.	
High Feature Motor Starter		
With diagnostics, unfused; expandable with brake control module		
DS1e-x Direct Starter		
Direct starter; mechanical switching; electronic UE protection		
• up to 1.1 kW/400 V; 0.3...3.0 A	**3RK1 301-0AB10-0AA3**	F)
• up to 3.0 kW/400 V; 2.4...8.0 A	**3RK1 301-0BB10-0AA3**	F)
• up to 7.5 kW/400 V; 2.4...16.0 A	**3RK1 301-0CB10-0AA3**	F)
DSS1e-x Soft Starter		
Direct soft starter; electronic switching; electronic UE protection		
• up to 1.1 kW/400 V; 0.3...3.0 A	**3RK1 301-0AB20-0AA3**	
• up to 3.0 kW/400 V; 2,4 mA ... 8.0 A	**3RK1 301-0BB20-0AA3**	
• up to 7.5 kW/400 V; 2.4 mA ... 16.0 A	**3RK1 301-0CB20-0AA3**	
RS1e-x Reversing Starter		
Reversing starter; mechanical switching; electronic UE protection		
• up to 1.1 kW/400 V; 0.3...3.0 A	**3RK1 301-0AB10-1AA3**	F)
• up to 3.0 kW/400 V; 2.4...8.0 A	**3RK1 301-0BB10-1AA3**	F)
• up to 7.5 kW/400 V; 2.4 mA ... 16.0 A	**3RK1 301-0CB10-1AA3**	F)

Ordering Data

	Order No.	
Accessories for Motor Starter High Feature		
Terminal Module		
• TM-DS65-S32 for DS1e-x, DSS1e-x direct starters with supply connection for power bus incl. 3 caps for terminating the power bus	**3RK1 903-0AK00**	F)
• TM-DS65-S31 for DS1e-x, DSS1e-x direct starters without supply connection for power bus	**3RK1 903-0AK10**	F)
• 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**	F)
• TM-RS130-S31 for RS1e-x reversing starter without supply connection for power bus	**3RK1 903-0AL10**	F)
Jumper Modules		
• M15-PEN 15 mm wide, for jumpering a 15-mm module	**3RK1 903-0AH00**	
• M30-PEN 30 mm wide, for jumpering a 30-mm module	**3RK1 903-0AJ00**	
• M15-L123 15 mm wide, for jumpering a 15-mm module	**3RK1 903-0AE00**	
• M30-L123 30 mm wide, for jumpering a 30-mm module	**3RK1 903-0AF00**	
2DI 24 V DC control module	**3RK1 903-0CH00**	
Digital input module with two inputs for local motor starter functions for mounting on the front of the motor starter		
M65-PEN-F Feeder Block	**3RK1 903-2AC00**	
65 mm wide, incl. two caps, in combination with TM-DS65-32/TM-RS130-S32		
M65-PEN-S Connection Module	**3RK1 903-2AC10**	
65 mm wide, in combination with TM-DS65-31/TM-RS130-S31		
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**	
• **xB3** 24 V DC / 4 A, DI 2 x 24 V DC local control	**3RK1 903-0CE00**	F)
• **xB4** 500 V DC / 0.7 A, DI 2 x 24 V DC local control	**3RK1 903-0CF00**	F)
Terminal Modules for Brake Control Expansion Module		
• TM-xB15 S24-01 for xB1 or xB2	**3RK1 903-0AG00**	
• TM-xB215 S24-01 for xB1 ... 4	**3RK1 903-0AG01**	

Ordering Data	Order No.	
Motor Starter Failsafe		
Unfused; expandable with brake control module; High Feature; for PM-D F PROFIsafe power module		
F-DS1e-x Failsafe Direct Starter		
• 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 Failsafe Reversing Starter		
• 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**	
Brake Control Module		
For motors with mechanical brake		
• **xB3** 24 V DC / 4 A, DI 2 x 24 V DC local control	**3RK1 903-0CE00**	F)
• **xB4** 500 V DC/ 0.7 A, DI 2 x 24 V DC local control	**3RK1 903-0CF00**	F)

Ordering Data	Order No.	
Accessories for Motorstarter Failsafe		
Terminal module		
• **PM-D F** PROFIsafe	**3RK1 903-3AA00**	F)
• **PM-D F X1, incoming supply on left**	**3RK1 903-3AE00**	
• **PM-D F X1, incoming supply in center**	**3RK1 903-3AE10**	
• **For contact multipliers**	**3RK1 903-3AB10**	
• **For F-DS1e-x, with supply connection**	**3RK1 903-3AC00**	F)
• **For F-DS1e-x, without supply connection**	**3RK1 903-3AC10**	F)
• **For F-RS1e-x, with supply connection**	**3RK1 903-3AD00**	F)
• **For F-RS1e-x, without supply connection**	**3RK1 903-3AD10**	F)
M65-PEN-F Feeder Block	**3RK1 903-2AC00**	
65 mm wide, incl. two caps, in combination with TM-DS65-32/TM-RS130-S32		
M65-PEN-S Connection Module	**3RK1 903-2AC10**	
65 mm wide, in combination with TM-DS65-31/TM-RS130-S31		

F) Subject to export regulations AL: N, ECCN: EAR99

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SIGUARD safety engineering

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

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-DF1 power module for emergency stop applications or the PM-DF2 power module for protective door monitoring. The 2-channel connection of the safety sensor (e.g. emergency stop sensor) as well as the 24-V supplies for the electronics (U_1) and the contactors (U_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-DF1 power module for emergency stop applications or the PM-DF2 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-DF1 or PM-DF2 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 supplies for the electronics (U1) and for the contactors (U2) are fed in anew. 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 for the cascading of subordinate safety segments and integrates either the PM-DF3 power module for time-delayed shut-down or the PM-DF4 power module. Only the U2 supply voltage has to be connected to this terminal module. The U1 supply is fed through the terminal module voltage buses of the preceding power module (voltage group section). 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 category 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 along side the terminals for connecting the contactor coil likewise 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 with 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

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 protective doors with the function "automatic start“
- PM-D F3 as PM-D F1/F2 expansion for time-delayed shut-down
- PM-D F4 for expanding safety circuits with other ET 200S motor starters, e.g. in another row
- PM-D F5 for transmitting the status of PM-D F1...4 over four floating release 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 with the failsafe kit (F-kit) in order to monitor the switching function. F-kit 1 supplements the DS1-x direct 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 / contactors of the motor starter, and
- connecting cables.

High Feature motor starters and their terminal modules come equipped with the F-kit functions.

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**	F)
PM-PF30 S47 B0 Terminal Module For PM-D F1/2 power modules with sensor connection	**3RK1 903-1AA10**	F)
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**	
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**	F)
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 dor; 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**	

Ordering Data	Order No.	
Accessories		
PM-X SIGUARD Connection module for incoming-feeder contactor; external safety circuits	**3RK1 903-1CB00**	F)
Failsafe kit 1 Failsafe kit for DS1-x standard motor starter (not necessary for High Feature motor starter)	**3RK1 903-1CA00**	F)
Failsafe kit 2 Failsafe kit for RS1-x standard motor starter (not necessary for High Feature motor starter)	**3RK1 903-1CA01**	F)

F) Subject to export regulations AL: N, ECCN: EAR99

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ET 200X distributed I/O

Overview



With its modular design and degree of protection IP 65/67, the ET 200X is predestined for local use. The ET 200X comprises a basic module for connecting to PROFIBUS DP and a maximum of 7 expansion modules. The expansion modules are arranged in series by means of integrated plug-in connectors. All the necessary signal leads and auxiliary voltages for inputs and outputs and lopped through in this arrangement. The modules can be replaced during servicing, without the entire station having to be dismantled.

Expansion modules used in conjunction with SIMATIC PCS 7 include an optional power module, and in particular digital and analog input/output modules as well as pneumatic interfaces for the FESTO valve terminals CPV-10/-14.

Technical data

Detailed technical data on the ET 200X can be found

- in the IK PI catalog or
- in the Mall / CA 01 at "Distributed I/Os / ET 200X“

Overview

Digital Expansion Modules

- Expansion modules with digital inputs/outputs for connection of actuators/ sensors
- Optionally with diagnostics functionality (single channel diagnostics)
- Programmable input delay

Analog Expansion Modules

- Expansion modules with analog inputs/outputs for connection of actuators/sensors
- With diagnostics functionality, limit values and default values

Ordering Data

	Order No.	
Digital Expansion Modules		
• 8 x DI; 24 V DC, 5-pin, M12, double assigned, IP 65 for all basic modules	**6ES7 141-1BF30-0XA0**	
• 8 x DI; 24 V DC, IP 66/67, 5-pin, M12, with single channel connection, 1 channel per M12 connector for all basic modules	**6ES7 141-1BF40-0XA0**	
• 4 x DO; 24 V DC, 2 A, IP 66/67, with diagnostics by channel for all basic modules	**6ES7 142-1BD40-0XB0**	B)
• 8 x DO, 24 V DC, 1,2 A, 5-pin, M12, IP 66/67 for all basic modules	**6ES7 142-1BF30-0XA0**	
Analog Expansion Modules		
• 2 x AI; IP 66/67, ±10 V, 12 bit + sign, with diagnostics by channel	**6ES7 144-1FB31-0XB0**	
• 2 x AI; IP 66/67, ±20 mA, 12 bit + sign, with diagnostics by channel, for 4-wire transducers	**6ES7 144-1GB31-0XB0**	
• 2 x AI; IP 66/67, 0(4) to 20 mA, 12 bit + sign, with diagnostics by channel, for 2-wire transducers	**6ES7 144-1GB41-0XB0**	
• 2 x AI; IP 66/67, Pt100, 12 bit + sign, with diagnostics by channel, 2/3/4 wire connection	**6ES7 144-1JB31-0XB0**	
• 2 x AO; IP 66/67, ±10 V, 11 bit + sign, with diagnostics by channel, 2/4-wire connection	**6ES7 145-1FB31-0XB0**	B)
• 2 x AO; IP 66/67, ±20 V, 0(4) to 20 mA, 12 bit + sign, with diagnostics by channel, 2-wire connection, 2 x 5-pin M12	**6ES7 145-1GB31-0XB0**	B)

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

Pneumatic interface
Basic modules, Power modules

Overview

Pneumatic Interface

- Interface to accommodate an original FESTO CPV 10 or CPV 14 Compact Performance Valve terminal
- For use of the ET 200X for applications with flexible pneumatics
- High level of flexibility in pneumatics thanks to the different valve functions and different flow rate volumes

BM 141, BM 142 Basic Modules

- Basic modules for handling communications between ET 200X and superordinate masters through PROFIBUS DP
- With additional integrated inputs and outputs

PM 148 Power Module

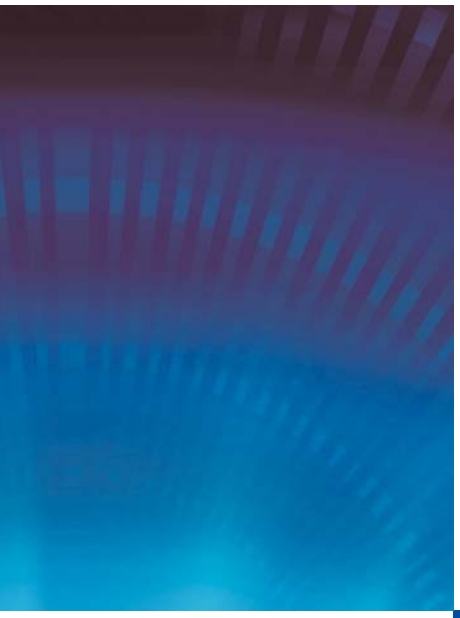
- Expansion module with digital outputs for connecting actuators
- With diagnostics functionality
- With additional auxiliary power supply (load supply)

Ordering Data

	Order No.
EM 148-P Pneumatic Interface	
• 16 x DO; pneumatic interface for coupling with	
- FESTO CPV-10 valve terminal	**6ES7 148-1EH01-0XA0**
- FESTO CPV-14 valve terminal	**6ES7 148-1EH11-0XA0**
Power Supply	
PM 148 Power Module DO 4 x 24 V DC, 2 A, with diagnostics and supply for auxiliary voltage (load)	**6ES7 148-1CA00-0XB0**
Bus Interface Module	
BM 141 Basic Module DI 8 x 24 V DC, 5-pin, M12, double assigned, IP 66/67, integrated PROFIBUS DP interface 12 Mbit/s, integrated power supply connections	**6ES7 141-1BF11-0XB0**
BM 142 Basic Module DO 4 x 24 V DC / 2 A, 5-pin, M12, IP 66/67, integrated PROFIBUS DP interface 12 Mbit/s, integrated power supply connections	**6ES7 142-1BD22-0XB0**

Migration to SIMATIC PCS 7

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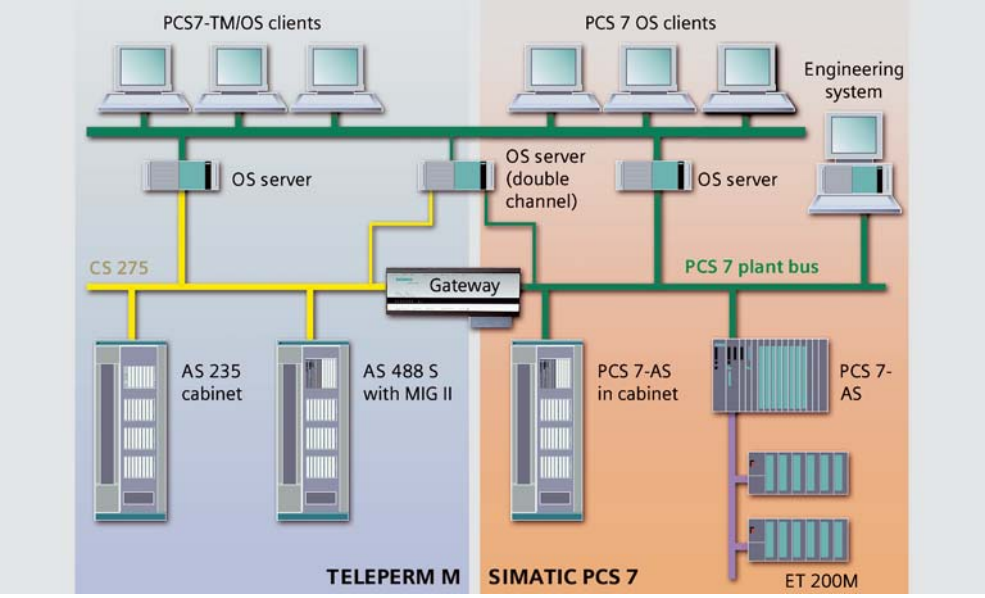




10/2 Migration TELEPERM M

Migration TELEPERM M

Overview



The TELEPERM® M process control system from Siemens has proven itself worldwide in many different industry sectors in the past 20 years. More than 15,000 installed systems have proven their performance, reliability and user-friendliness in many years of service, even under extreme operating conditions.

Many users are faced with the need to adapt their production operations to market requirements, which means having to expand or modernize their plants.

SIMATIC PCS 7, the succesor generation for the process control system, was introduced by Siemens in 1997 for new plants and plant expansions, and offers an open platform for modern, forward-looking and economical automation solutions in all industries.

The installed platform of the old process control system represents an immense investment in hardware and application software as well as a wealth of valuable and complex know-how accumulated by operating and maintenance personnel.

The objective of the migration is to modernize the existing platform step-by-step without changing the system, and at the same time to guarantee past investments for as long as possible. For this purpose, Siemens has been offering optimized migration solutions for the transition from TELEPERM M to SIMATIC PCS 7 since 1996. The range of migration products covers hardware and software components as well as services for converting application software, on-site conversions, and the migration of complete systems.

At the beginning, the main migration of customers was the step-by-step modernization and functional expansion of individual components of the existing TELEPERM M systems:

- Replacement of existing automation systems by future-compatible automation systems under the premise of importing existing application software and TELEPERM M I/O.
- Replacement of operation and monitoring systems by operator systems on the basis of SIMATIC PCS 7
- Integration of the distributed SIMATIC process I/Os

Customers are increasingly choosing a more direct migration of TELEPERM M to SIMATIC PCS 7. They are selecting the full range of SIMATIC system components, which have been proven worldwide. They therefore benefit from the characteristics of a modern process control system and the synergies of TIA, and are able at the same time to continue using their existing TELEPERM M I/Os. Siemens supports this trend by means of new migration products as well as optimized services and in-house tools for hardware and software conversion.

With the modern, pioneering SIMATIC PCS 7 process control system, innovative migration solutions and services, many years of know-how in process control engineering and migration, as well as worldwide servicing, Siemens demonstrates its expertise in the process control engineering field and offers the security of a reliable partner.

Order information

You can find further information, order data and technical data on the various migration products for TELEPERM M in "**TELEPERM M process control system**".

Further information is available in the Internet at



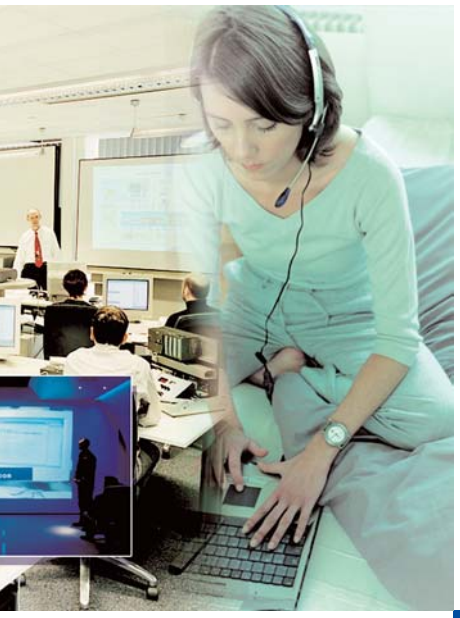
www.siemens.com/teleperm

Ordering data	Order No.
Products for migration of the TELEPERM M process control system to SIMATIC PCS 7	See Catalog PLT 112 and Catalog ST PCS7.A (Add-Ons for the SIMATIC PCS 7 Process Control System) as well as A&D Mall / CA 01

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Appendix

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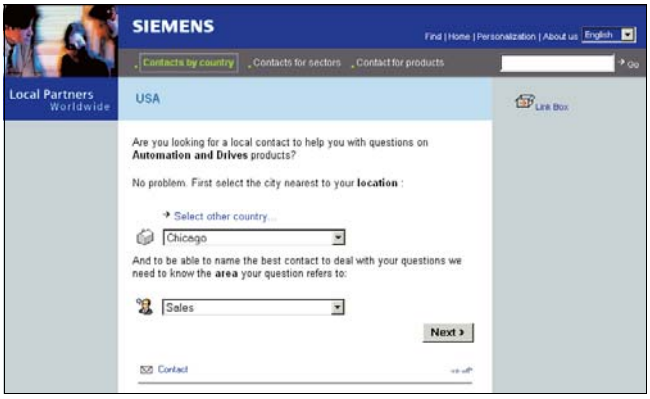


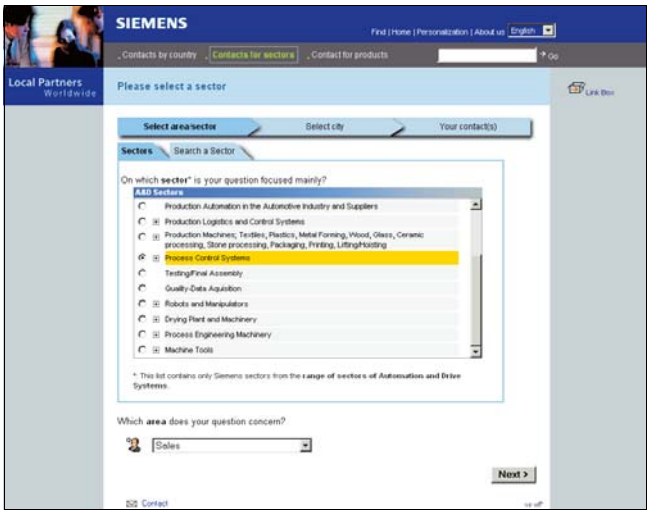


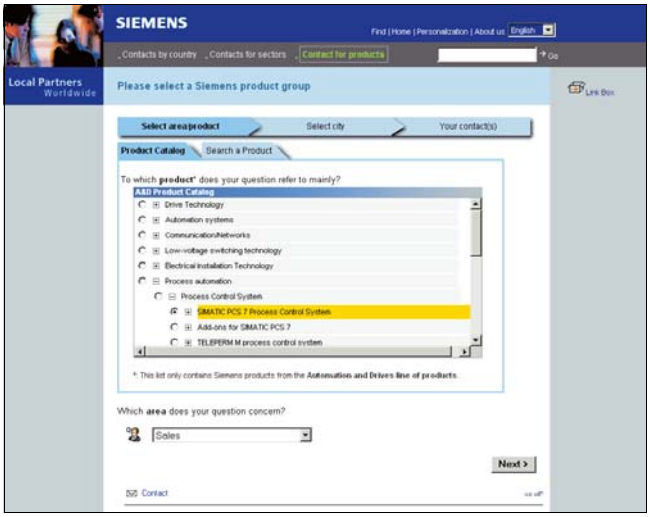
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Siemens contact partners

Siemens contacts worldwide







At



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,
- Spares/repairs,
- Service,
- Training,
- Sales or
- Consultation/engineering.

You start by selecting a

- Country,
- Product or
- Sector.

By further specifying the remaining criteria you will find exactly the right contact partner with his/her respective expertise.

Need more information?

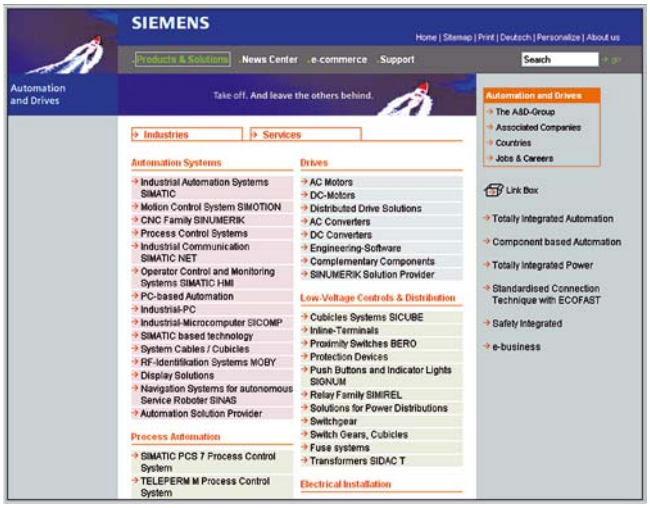
Then fax us!

Under the fax no.

0 08 00-74 62 84 27

you will find further information.

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.

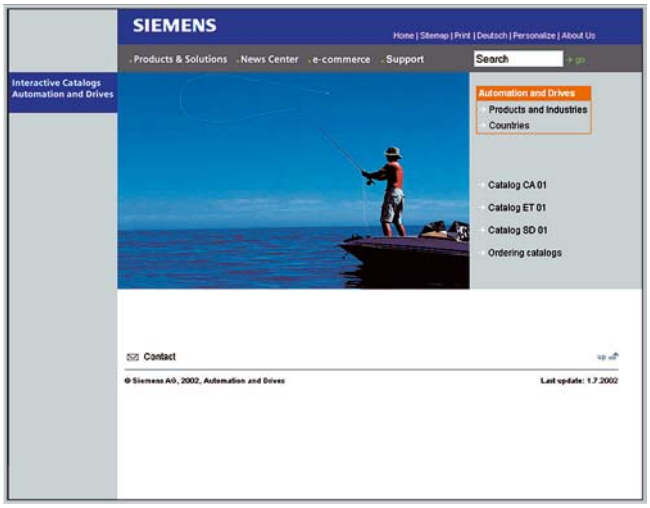
The Siemens Automation and Drives Group (A&D) has therefore built up a comprehensive range of information in the World Wide Web, which offers quick and easy access to all data required.

Under the address

www.siemens.com/automation

you will find everything you need to know about products, systems and services.

Product Selection Using the Interactive Catalogs



Detailed information together with convenient interactive functions:
The interactive catalogs CA 01 and SD 01 cover more than 80,000 products and thus provide 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 interactive catalogs can be found in the Internet under

www.siemens.com/automation/ca01

or on CD-ROM:

- Automation & Drives CA 01,
  Order No.: E86060-D4001-A100-B8-7600
- Standard Drives SD 01,
  Order No.: E86060-D5201-A100-A3-7600

Easy Shopping with the A&D Mall



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:

www.siemens.com/automation/mall

Our Services for Every Phase of Your Project



In the face of harsh competition you need optimum conditions to keep ahead all the time:
A strong starting position. A sophisticated strategy and team for the necessary support - in every phase.
Service & Support from Siemens provides this support with a complete range of different services for automation and drives.

In every phase: from planning and startup to maintenance and upgrading.

Our specialists know when and where to act to keep the productivity and cost-effectiveness of your system running in top form.

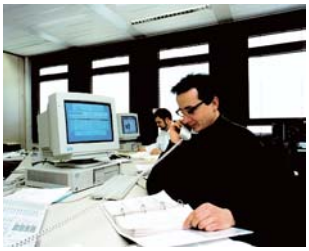
Online Support



The comprehensive information system available round the clock via Internet ranging from Product Support and Service & Support services to Support Tools in the Shop.

www.siemens.com/automation/service&support

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Competent consulting in technical questions covering a wide range of customer-oriented services for all our products and systems.

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Fax: +49 (0)180 50 50 223

E-Mail:
adsupport@siemens.com

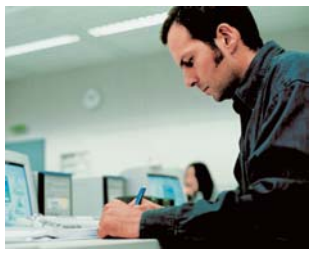
Technical Consulting



Support in the planning and designing of your project from detailed actual-state analysis, target definition and consulting on product and system questions right to the creation of the automation solution.

Get in touch with the sales contact in your region for questions about these services.
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will also put you through to the right contact or just visit our Internet site.

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Support in configuring and developing with customer-oriented services from actual configuration to implementation of the automation project.

Get in touch with the sales contact in your region for questions about these services.
Our Helpline
(tel.: +49 (0) 180 50 50 111)
will also put you through to the right contact or just visit our Internet site.

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With Service On Site we offer services for startup and maintenance, essential for ensuring system availability.

In Germany
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For country-specific telephone numbers go to our Internet site at
www.siemens.com/automation/service&support

Repairs and Spare Parts

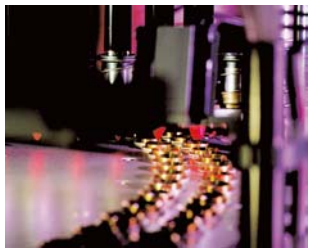


In the operating phase of a machine or automation system we provide a comprehensive repair and spare parts service ensuring the highest degree of operating safety and reliability.

In Germany
Tel.: 0180 50 50 448

For country-specific telephone numbers go to our Internet site at
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To enhance productivity and save costs in your project we offer high-quality services in optimization and upgrading.

Get in touch with the sales contact in your region for questions about these services.
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will also put you through to the right contact or just visit our Internet site.

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:

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:

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

Software licenses

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.

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.

Delivered 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.

Detailed explanations concerning license conditions can be found in the “Terms and Conditions of Siemens AG” or with the A&D Mall Online-Help System under

www.siemens.com/automation/mall

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).

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.

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