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Catalog ST 70 · 2007

simatic

Products for
Totally Integrated Automation
and Micro Automation

SIEMENS

Related catalogs

Industrial Communication IK PI
Industrial Communication for Automation and Drives

Order No.:
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Order No.:
CD: E86060-D4001-A110-C5-7600
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A&D Mall

Internet:
www.siemens.com/automation/mall

1) Available in German and English.
For further information contact Your local Siemens branch office.

Products for Totally Integrated Automation and Micro Automation

Catalog ST 70 · 2007

Supersedes:
Catalog ST 70 · 2005
Catalog ST 70 News · 2006

The products contained in this catalog can also be found in the e-Catalog CA 01
Order No.:
E86060-D4001-A110-C5-7600 (CD-ROM)
E86060-D4001-A510-C5-7600 (DVD)

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The certificate is recognized by all IQNet countries.

SIEMENS

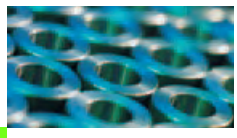
Siemens Automation and Drives. Welcome

More than 60,000 people aiming for the same goal: increasing your competitiveness. That's Siemens Automation and Drives.

We offer you a comprehensive portfolio for sustained success in your sector, whether you're talking automation engineering, drives or electrical installation systems. Totally Integrated Automation (TIA) and Totally Integrated Power (TIP) form the core of our offering. TIA and TIP are the basis of our integrated range of products and systems for the manufacturing and process industries as well as building automation. This portfolio is rounded off by innovative services over the entire life cycle of your plants.

Learn for yourself the potential our products and systems offer. And discover how you can permanently increase your productivity with us.

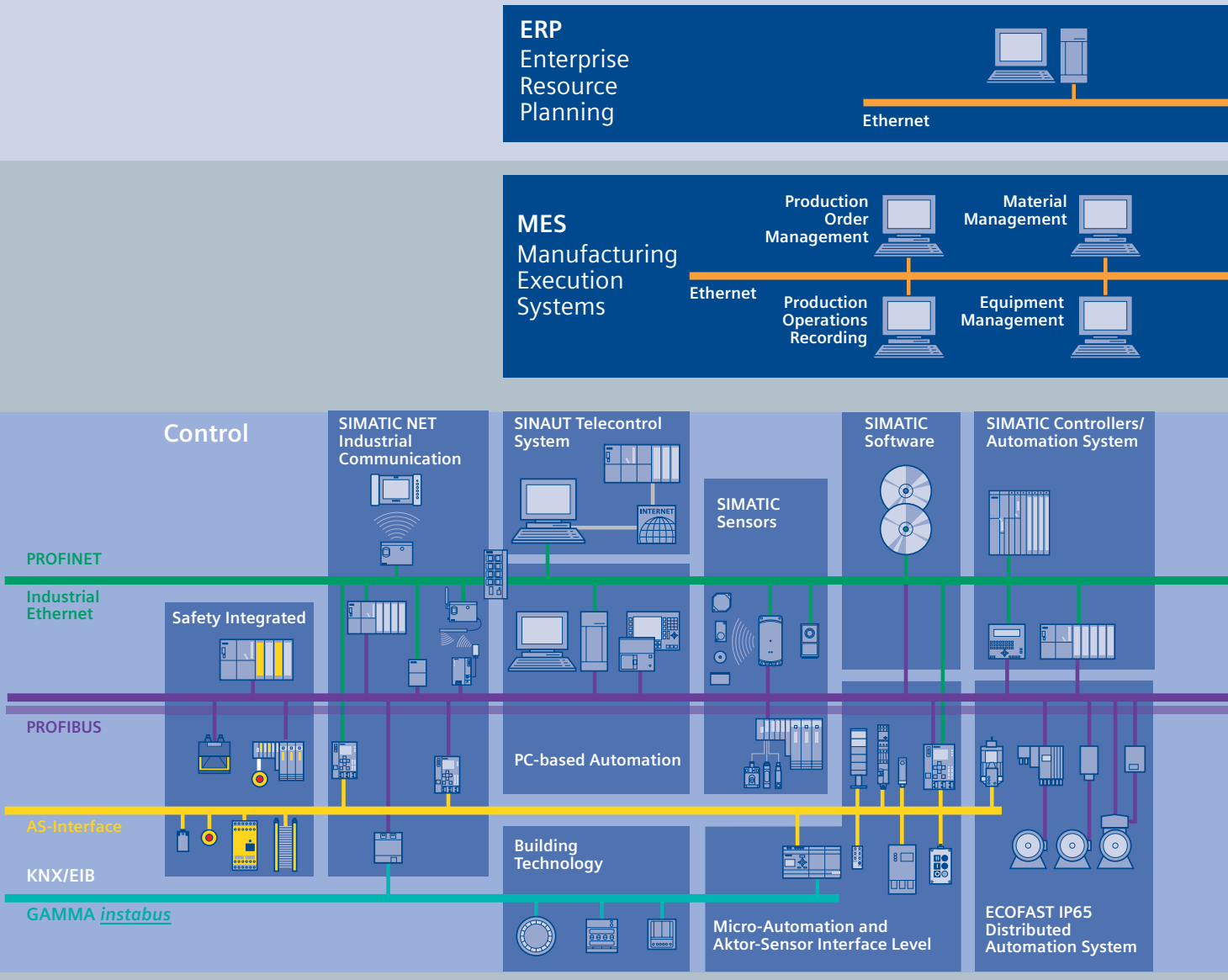
Your regional Siemens contact can provide more information. He or she will be glad to help.



Sharpen your competitive edge.
Totally Integrated Automation

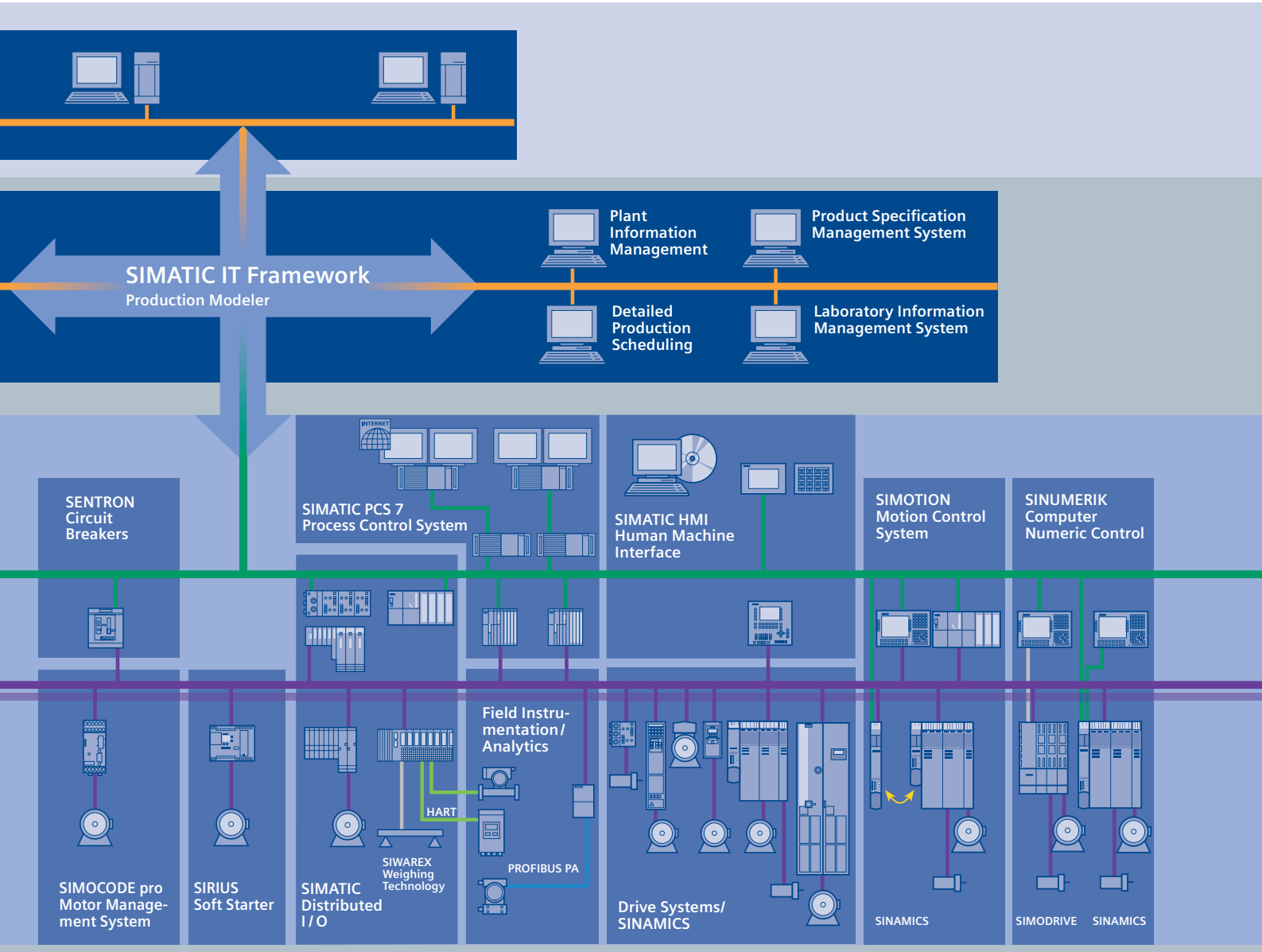
With Totally Integrated Automation (TIA), Siemens is the only manufacturer to offer an integrated range of products and systems for automation in all sectors - from incoming goods to outgoing goods, from the field level through the production control level to connection with the corporate management level.

On the basis of TIA, we implement solutions that are perfectly tailored to your specific requirements and are characterized by a unique level of integration. This integration not only ensures significant reductions in interface costs but also guarantees the highest level of transparency across all levels.



It goes without saying that you profit from Totally Integrated Automation during the entire life cycle of your plants - from the first planning steps, through operation, right up to modernization. Consistent integration in the further development of our products and systems guarantees a high degree of investment security here.

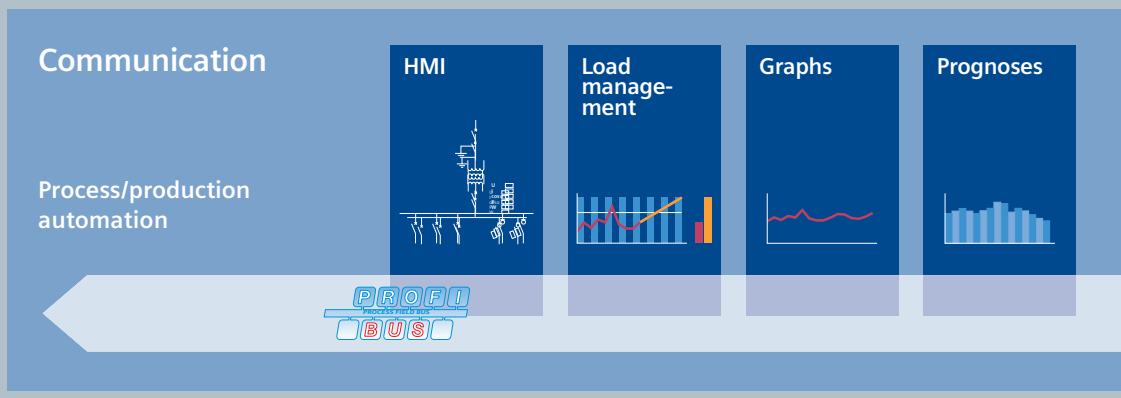
Totally Integrated Automation makes a crucial contribution towards optimizing everything that happens in the plant and thus creates the conditions for a significant increase in productivity.

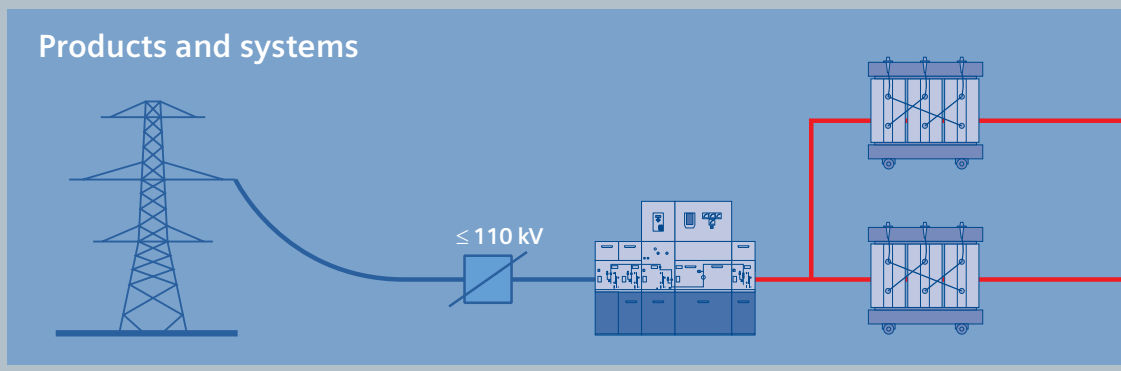


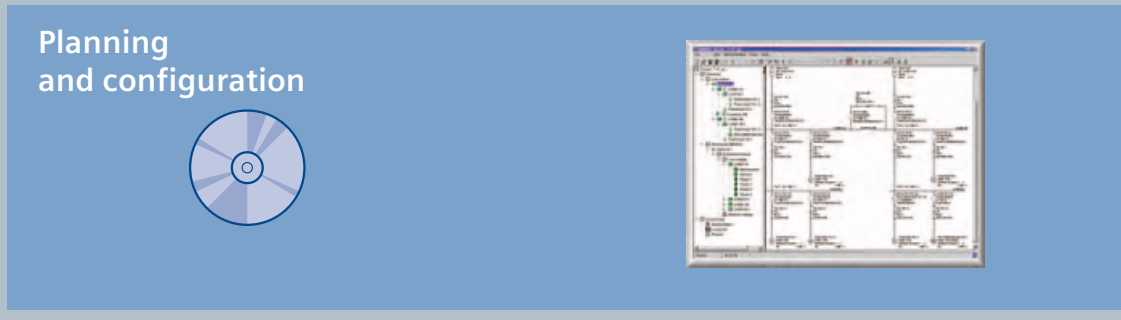
Integrated energy distribution from a single source. Totally Integrated Power

Totally Integrated Power (TIP) brings together all the components of electrical energy distribution into an integrated whole. Thus TIP provides the answer to growing market demands in the planning, construction and use of utility buildings and industrial buildings.

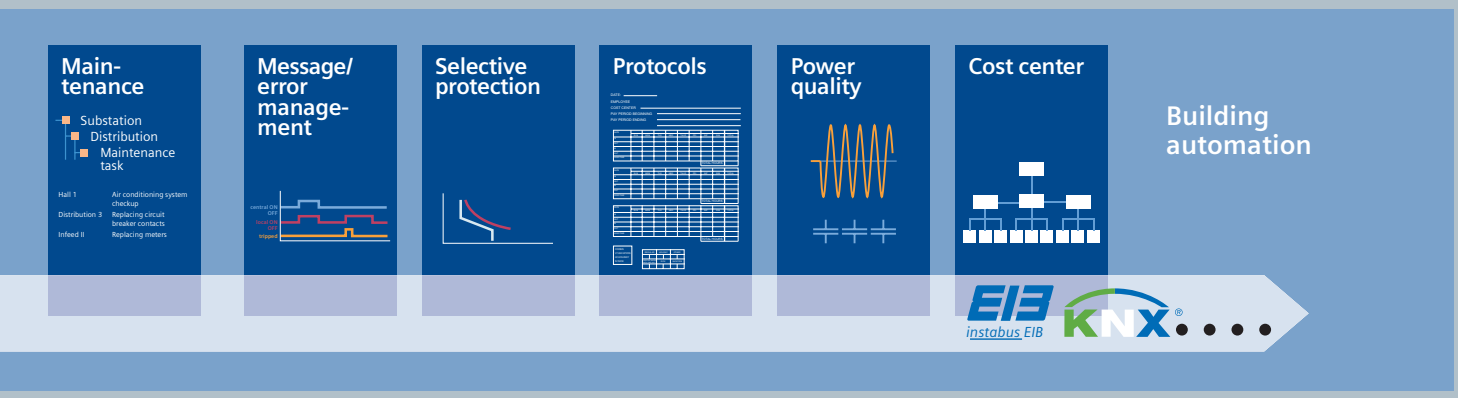
On the basis of TIP, we offer integrated solutions for energy distribution, from medium voltage to the power outlet. Totally Integrated Power is based here on integration in planning and configuring as well as on perfectly matched products and systems.

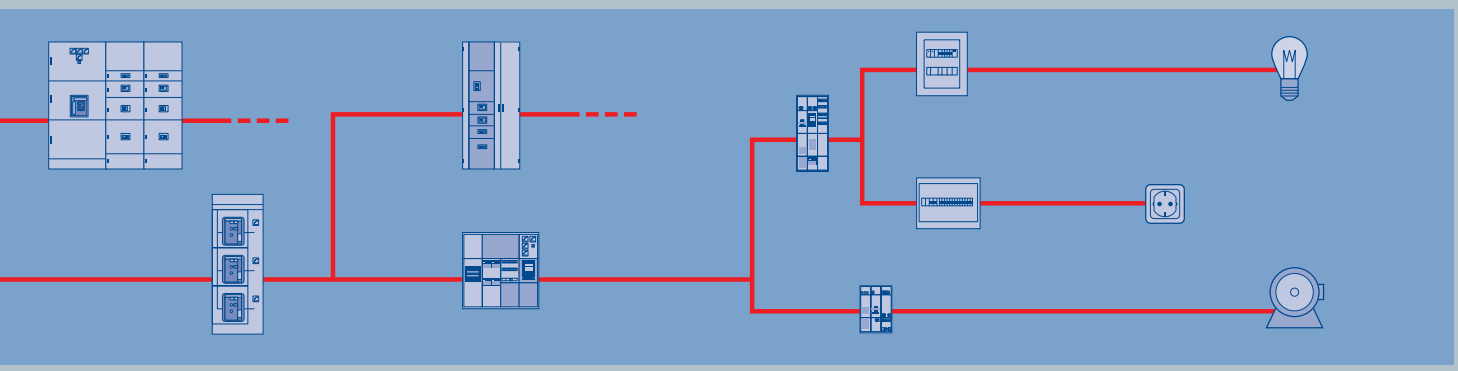


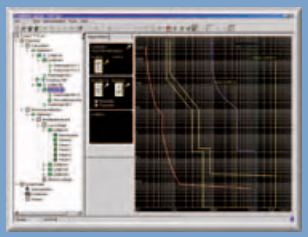


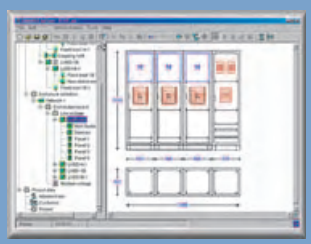


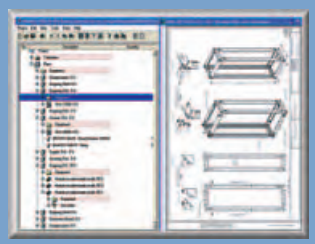
Totally Integrated Power offers communication and software modules for connecting the energy distribution systems to industrial automation and building automation. This enables the implementation of significant savings potential.











Introduction
Micro Automation

LOGO!:
Technology with a future which simplifies many things

LOGO! Logic Module

The compact, user-friendly and low-cost solution for simple control tasks.
For universal applications in the industry, non-residential buildings or residential buildings.
No wiring is necessary since functions are linked.
Operates in a similar manner as a PLC.
With integrated operator control and display unit for input of alarm message texts / variables direct at the device.

Easy operation:

- Linking of functions at the click of the mouse at the PC or by pressing a key on the device

Minimum expenditure of time:

- Only the inputs and outputs need to be wired
- Simultaneous wiring diagram generation and control cabinet installation

Reduced costs:

- Many switchgear technology functions are integrated

High flexibility:

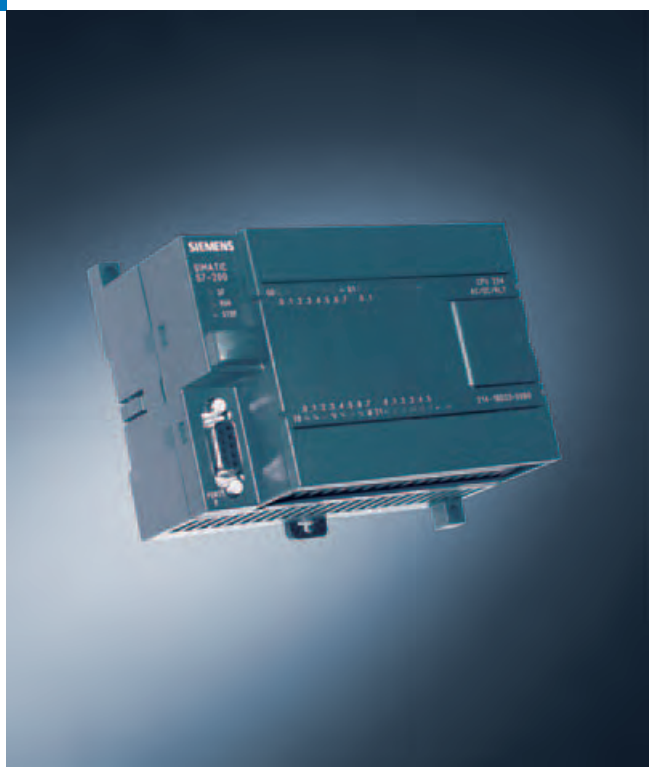
- Functions are simply modified at the push of a button
- Variants for different operating voltages
- Modular design, can be expanded at any time

Further information can be found at:
http://www.siemens.com/logo

LOGO!	24 24o	12/24RC 12/24RCo	24RC 24RCo	230RC 230RCo
Supply voltage	24 V DC	12/24 V DC	24 V AC/DC	115/230 V AC/DC
Inputs	8 (2 can be used as analog inputs)	8 (2 can be used as analog inputs)	8	8
Outputs	4, transistor	4, relay		
Continuous current	0.3 A	10 A (under resistive load); 3 A (under inductive load)		
Short-circuit protection	electrical (1 A)	external fuse protection required		
Integrated time switches/ power reserve	––	8/typ. 80 h		
Ambient temperature	0 to +55 °C			
RI suppression	to EN 50 011 (limit class B)			
Degree of protection	IP20			
Certification	to VDE 0631, IEC 1131, FM, Class 1, Div 2, cULus, C-Tick, CSA, marine approvals			
Mounting	on 35 mm DIN rail or wall mounting			
Dimensions (B x H x T)	72 × 90 × 55 mm (4 width modules)			

■ = can be used/available
–– = can not be used/not available

SIMATIC S7-200: Control technology that is a class of its own



SIMATIC S7-200

The Micro PLC SIMATIC S7-200 is truly in a class of its own: it is both compact and highly powerful (e.g. in relation to its real-time response), it is fast, features great communications capabilities and comes with very user-friendly software and hardware.

- Graduated range of CPUs with many basic PLC functions.
- Modular expansion capability for individual adaptations to the respective tasks.
- Can be easily networked over point-to-point interfaces (PPI) with the functions programming, communication, operator control and monitoring.
- Programming with STEP 7-Micro/WIN - a software especially optimized for the performance range of the S7-200.
- Wizards for particularly easy and user-friendly operation.

Further information can be found at:

http://www.siemens.com/s7-200

SIMATIC S7-200, CPU	221	222	224	224 XP	226
Program memory	4 KB	4 KB	8/12 KB	12/16 KB	16 /24 KB
Data memory	2 KB	2 KB	8 KB	10 KB	10 KB
Processing time per binary instruction	0.22 µs	0.22 µs	0.22 µs	0.22 µs	0.22 µs
Bit memories	256	256	256	256	256
Counters	256	256	256	256	256
Timers	256	256	256	256	256
Digital inputs/outputs	max. 10; 10 integrated	max. 40 / 38; 14 integrated	max. 94 / 74; 24 integrated	max. 94 / 74; 24 integrated	max. 128 / 120; 40 integrated
Analog inputs/outputs	––	max. 8/2 or 0/4	max. 28/7 or 0/14	max. 28/7 or 0/14 3 integrated	max. 28/7 or 0/14
HMI devices	■	■	■	■	■
Communication interface	1 x PPI (point-to-point)	1 x PPI (point-to-point)	1 x PPI (point-to-point)	2 x PPI (point-to-point)	2 x PPI (point-to-point)
Networking	––	AS-Interface PROFIBUS DP Ethernet Internet Modem	AS-Interface PROFIBUS DP Ethernet Internet Modem	AS-Interface PROFIBUS DP Ethernet Internet Modem	AS-Interface PROFIBUS DP Ethernet Internet Modem
Real-time clock	optional	optional	integrated	integrated	integrated

■ = can be used/available
–– = can not be used/not available

Introduction
SIMATIC Controller

SIMATIC S7-300:
The modular PLC for innovative system solutions in the manufacturing industry

SIMATIC S7-300

The SIMATIC S7-300 has been designed for innovative system solutions with the focus on manufacturing engineering, and as a universal automation system, it represents an optimal solution for applications in centralized and distributed configurations:

- The ability to integrate powerful CPUs with Industrial Ethernet/PROFINET interface, integrated technological functions, or fail-safe designs make additional investments unnecessary.
- The S7-300 can be set up in a modular configuration without the need for slot rules for I/O modules. There is a wide range of modules available both for the centralized and the distributed configuration with ET 200M.
- The Micro Memory Card as a data and program memory makes a backup battery superfluous, and with it, part of the maintenance costs. In addition, an associated project, including symbols and comments, can be stored on this memory card to facilitate service calls.

SIMATIC S7-300, CPU	312/ 314	315-2 DP/ 315-2 PN/DP	317-2 DP/ 317-2 PN/DP	319-3 PN/DP	315T-2 DP	317T-2 DP
Memory						
Instructions	32/96 KB 10/32 K	128/256 KB 42/84 K	512/1024 KB 170/340 K	1,4 MB 470 K	128 KB 42 K	512 KB 170 K
Execution times (µs)						
Bit/ord/fixed pt./floating pt.	0.2/0.4/5/6 0.1/0.2/2/3[1)]	0.1/0.2/2/3	0.05/0.2/0.2/1	0.01/0.02/0.02/0.04	0.1/0.2/2/3	0.05/0.2/0.2/1
Timers/counters	128/128 256/256[1)]	256/256	512/512	2048/2048	256/256	512/512
Address areas						
Digital channels	256/1024	1024	1024	1024	256	256
Analog channels	64/256	256	256	256	64	64
Interfaces						
DP master sys. intern./CP 342-5	––/■	■/■	■/■	■/■	■/■	■/■
DP slaves	––	■	■	■	■	■
PtP communication	––	––	––	––	––	––
PROFINET	––	■[2)]	■[2)]	■	––	––
Integrated I/O						
DI/DO	––	––	––	––	4/8	4/8
AI/AO	––	––	––	––	––	––
Integrated functions					**Technological functions**, e. g.	
Counter/frequency meter	––	––	––	––	Gearbox/curve synchronism, Travel to fixed	
Pulse outputs	––	––	––	––	stop, Travel/time-dependent cam switching,	
Controlling/positioning	––/––	––/––	––/––	––/––	Position-controlled positioning	
Mounting dim. WxHxD (mm)	40 x 125 x 130	40/80 x 125 x 130	80 x 125 x 130	120 x 125 x 130	160 x 125 x 130	160 x 125 x 130

■ = can be used/available
–– = can not be used/not available

1) CPU 314
2) CPU 31x-2 PN/DP

SIMATIC S7-300:
The modular PLC for innovative system solutions in the manufacturing industry

- The Micro Memory Card also enables simple program or firmware updates. The Micro Memory Card can be used during operation for storing and accessing data, e.g. for measured value archiving or recipe processing.
- Safety technology and standard automation can be integrated in an S7-300 controller.
- Isochronous mode on PROFIBUS

Further information can be found at:
http://www.siemens.com/simatic-s7-300

SIMATIC S7-300, CPU	312C/ 313C	313C-2 PtP/ 313C-2 DP	314C-2 PtP/ 314-2 DP	315F-2 DP/ 315F-2 PN/DP	317F-2 DP/ 317F-2 PN/DP
Memory					
Instructions	32/64 KB 10 /21 K	64 KB 21 K	96 KB 32 K	192/256 KB 36/50 K (F inst.)	1 MB 200 K (F instr.)
Execution times (µs)					
Bit/word/fixed pt./floating pt.	0.2/0.4/5/6 0.1/0.2/2/3[1]	0.1/0.2/2/3	0.1/0.2/2/3	0.1/0.2/2/3	0.05/0.2/0.2/1
Timers/counters	128/128 256/256[1]	256/256	256/256	256/256	512/512
Address areas					
Digital channels	266/1016	1008	1016	1024	1024
Analog channels	64/253	248	253	256	256
Interfaces					
DP master sys. intern./CP 342-5	–– /■	– (■)[2]	– (■)[2]	■/■	■/■
DP slaves	––	–– (■)[2]	–– (■)[2]	■	■
PtP communication	––	ASCII, RK512, 3964R[3]	ASCII, RK512, 3964R[3]	––	––
PROFINET	––	––	––	–– (■)[4]	–– (■)[4]
Integrated I/O					
DI/DO	10/6 (24/16)[1]	16/16	24/16	––	––
AI/AO	4/2[1]	––	4/2	––	––
Integrated functions					
Counter/frequency meter	2 (10 kHz)/3 (30 kHz)	3 (30 kHz)	4(60 kHz)	––	––
Pulse outputs	2 (2.5 kHz)/3 (2.5 kHz)	3 (2.5 kHz)	4 (2.5 kHz)	––	––
Controlling/positioning	■/––	■/––	■/■		
Mounting dim. WxHxD (mm)	80/120 x 125 x 130	120 x 125 x 130	120 x 125 x 130	40 x 125 x 130	80 x 125 x 130

■ = can be used/available
–– = can not be used/not available

1) CPU 313C
2) CPU 31xC-2 DP
3) CPU 31xC-2 PtP
4) CPU 31xF-2 PN/DP

Introduction
SIMATIC Controller

SIMATIC S7-400:
The Power Controller for system solutions in the manufacturing and process industries

SIMATIC S7-400

Within the Controller family, the SIMATIC S7-400 is designed for system solutions in the manufacturing and process automation.

- The S7-400 is especially suited for data-intensive tasks in the process industry; high processing speeds and deterministic response times guarantee short machine cycle times on high-speed machines in the manufacturing industry. The fast backplane bus of the S7-400 ensures efficient data transfer to central I/O modules.
- The S7-400 is used preferably to coordinate overall plants and to control lower-level communication lines with slave stations; this is guaranteed by the high communicationpower and the integral interfaces.
- The power of the S7-400 is scalable thanks to a graded range of CPUs; the capacity for I/O is almost unlimited.
- The performance reserves of the CPUs make it possible to integrate new functions without any other hardware investment, for example, processing of quality data, user-friendly diagnostics, integration into higher-level MES solutions or high-speed communication via bus systems.

SIMATIC S7-400, CPU	412-1/ 412-2	414-2	414-3	414-3 PN/DP	416-2	416-3
Memory						
Instructions	144/256[1] KB 24/42[1] K	512 KB 84 K	1.4 MB 230 K	2.8 MB 460 K	2.8 MB 460 K	5.6 MB 920 K
Execution times (µs)						
Bit/word/fixed pt./floating pt.	0.1/0.1/0.1/0.3	0.06/0.06/0.06/0.18	0.06/0.06/0.06/0.18	0.045/0.045/0.045/ 0.135	0.04/0.04/0.04/0.12	0.04/0.04/0.04/0.12
Timers/counters	2048/2048	2048/2048	2048/2048	2048/2048	2048/2048	2048/2048
Address areas						
Digital channels	32768/32768	65536/65536	65536/65536	131072/131072	131072/131072	131072/131072
Analog channels	2048/2048	4096/4096	4096/4096	8192/8192	8192/8192	8192/8192
DP interfaces						
Number of DP interfaces	1[1]	1	2	2	1	2
Number of DP slaves	64[1]	96	96 each	125 each	125	125 each
Plug-in interface modules	––	––	1 x DP	1 x DP	––	1 x DP
PN interfaces						
Number of PN-interfaces	––	––	––	1 (2 Ports)	––	––
PROFINET IO	––	––	––	■	––	––
PROFINET CBA	––	––	––	■	––	––
TCP/IP	––	––	––	■	––	––
UDP	––	––	––	■	––	––
Web server	––	––	––	■	––	––
ISO-on-TCP (RFC 1006)	––	––	––	■	––	––
Mounting dim. WxHxD (mm)	25 x 290 x 219	25 x 290 x 219	50 x 290 x 219	50 x 290 x 219	25 x 290 x 219	50 x 290 x 219

■ = can be used/available
–– = can not be used/not available

1) CPU 412-2

SIMATIC S7-400:
The Power Controller for system solutions in the manufacturing and process industries

- The S7-400 can be structured in a modular way without regard to slot rules; there is a wide variety of modules available both for centralized configurations and distributed structures.
- The configuration of the distributed I/O of the S7-400 can be modified during operation. In addition, signal modules can be connected and disconnected under power (hot swapping). This makes it very easy to expand the system or replace modules in the event of a fault.
- Storage of the entire project data, including symbols and comments, on the CPU makes service and maintenance work easier.
- Safety engineering and standard automation can be integrated into a single S7-400 controller; plant availability can be increased through the redundant structure of the S7-400.

Further information can be found at:

http://www.siemens.com/simatic-s7-400

SIMATIC S7-400, CPU	416-3 PN/DP	417-4	414-4H	417-4H for S7-400H/FH	416F-2
Memory					
Instructions	11.2 MB 1900 K	20 MB 3300 K	1.4 MB 230 K	2.8 MB 280 K	2.8 MB 280 K
Execution times (µs)					
Bit/word/fixed pt./floating pt.	0.03/0.03/0.03/0.09	0.03/0.03/0.03/0.09	0.06/0.06/0.06/0.18	0.03/0.03/0.03/0.09	0.04/0.04/0.04/0.12
Timers/counters	2048/2048	2048/2048	2048/2048	2048/2048	2048/2048
Address areas					
Digital channels	131072/131072	131072/131072	65536/65536	131072/131072	131072/131072
Analog channels	8192/8192	8192/8192	4096/4096	8192/8192	8192/8192
DP interfaces					
Number of DP interfaces	2	3	1	3	1
Number of DP slaves	125 each	125 each	96	125 each	125
Plug-in interface modules	1 x DP	2 x DP	––	2 x DP	––
PN interfaces					
Number of PN-interfaces	1 (2 Ports)	––	––	––	––
PROFINET IO	■	––	––	––	––
PROFINET CBA	■	––	––	––	––
TCP/IP	■	––	––	––	––
UDP	■	––	––	––	––
Web server	■	––	––	––	––
ISO-on-TCP (RFC 1006)	■	––	––	––	––
Mounting dim. WxHxD (mm)	50 x 290 x 219	50 x 290 x 219	50 x 290 x 219	50 x 290 x 219	25 x 290 x 219

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SIMATIC C7: All-in-one unit comprising controller and panel

SIMATIC C7

As a control system – PLC and OP (operator panel) in a single unit – SIMATIC C7 offers the following decisive benefits:

- Space savings: the compact design reduces the installation space required when mounted directly at the machine.
- Time savings: the turnkey complete solution reduces the engineering overhead for design, installation, and wiring, for example.
- Cost savings: Purchase costs are up to 20% lower than those for a comparable modular solution – the control cabinet can frequently be smaller or can be dispensed with entirely, or the C7 unit is integrated directly into the front panel.
- Flexibility: Thanks to easy expandability with all S7-300 modules, the C7 devices are open to extensive and demanding automation solutions.
- System integration: as a component part of Totally Integrated Automation, SIMATIC C7 is optimally integrated into the Siemens automation environment.
- Support of Cyrillic and various Asian character sets (Chinese, Korean, Japanese).
- Customized design for optimum adaptation to machine.

Further information can be found at:

http://www.siemens.com/simatic-c7

SIMATIC C7	C7-613	C7-635 Key C7-635 Touch	C7-636 Key C7-636 Touch
PLC-CPU	CPU 313C	CPU 314C-2 DP	CPU 315-2 DP
CPU user memory	64 KB	96 KB	128 KB
OP	––	OP 170B (Key) TP 170B (Touch)	OP 270B 6" (Key) TP 270B 10" (Touch)
Number lines x characters per line, resolution	4 x 20	Pixel, vector graphics 320 x 240	Pixel, vector graphics 320 x 240 (Key)/640 x 480 (Touch)
I/O	24 DI 16 DO 4 AI + 1 Pt100 2 AO	24 DI 16 DO 4 AI + 1 Pt100 2 AO	24 DI 16 DO 4 AI + 1 Pt100 2 AO
Communication interface	MPI	MPI PROFIBUS DP (Master/Slave)	MPI PROFIBUS DP (Master/Slave)
Programming PLC part HMI part	 STEP 7 STEP 7	 STEP 7 WinCC flexible Compact or higher	 STEP 7 WinCC flexible Standard or higher

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Introduction
SIMATIC Programming Devices

Field PG M: the ideal industrial notebook

SIMATIC programming devices are the first choice when it comes to configuring and programming SIMATIC software. The SIMATIC Field PG M distinguishes itself by its wireless technology, powerful Intel Pentium M processor, large display and integral data backup concept. In addition, the new device has a long battery life, large working memory and all common interfaces for industrial applications.

Another decisive advantage of SIMATIC Field PG M is its robustness and the pre-installed STEP 7 Professional software. The programming device can be used immediately after it has been licensed.

Robustness

- The rugged magnesium die-cast housing and the shock absorbers on the edges of the device protect the Field PG M against shock and vibration.
- The fold-out carrying handle ensures a safe grip during transport in the production hall.
- The new industrial design with its dark color is dirt-resistant.
- The metallized plastic components on the inside of the housing protect against electromagnetic interferences - comparable with a Faraday Cage (EMC/EMS compliant).

Interfaces

- All common interfaces for industrial applications are integrated.
- 2 x 2 USB 2.0 interfaces – Each pair makes 1 A available for supplying external devices with power.
- Industrial WLAN, based on WLAN standards 802.11 a, b and g, permits secure and wireless communication with automation devices.

Hardware components

- The Intel Pentium M processor uses little power and offers more performance thanks to intelligent power distribution.
- The lithium ion battery supplies the Field PG M with up to four hours of power.
- The brilliant 15 inch display with XGA or SXGA+ resolution with up to 1400 x 1050 pixels puts less strain on the eyes and supports ergonomic work practices.
- The working memory with 1 GB DDR2 RAM and a 533 MHz clock cycle permits fast execution and parallel processing of several applications.
- The replaceable 60 or 80 GB S-ATA hard disk can be replaced easily depending on the environment and software versions required.
- The data are written directly onto the optical data carrier with CD RW or the multi standard DVD RW.

Software

- The integral data backup function can generate an automatic backup in configurable intervals and allows backed up data to be easily loaded if required.
- STEP 7 Professional and WinCC flexible are already installed on Field PG M and can be enabled with a license key.
- Every Field PG M is delivered with a trial license for installed software. The type and extent of additional licenses is decided when purchasing the device.

Further information can be found at:
http://www.siemens.com/simatic-pg

Introduction
SIMATIC PC

SIMATIC PC –
the more industrial PC

Professional automation solutions place varying, high demands on the industrial PCs used - vibration, low temperatures, heat, steam - year after year and around the clock. SIMATIC PCs are the ideal industry-standard PC platforms for this environment. SIMATIC PCs can offer

- high system availability,
- high investment protection,
- excellent industrial functionality.

A wide range of different designs is available for different applications:

SIMATIC Rack PC
Flexible and powerful industrial PCs in 19" format.

SIMATIC Box PC
Compact and rugged industrial PCs for universal use.

SIMATIC Panel PC
Rugged and powerful industrial PCs with brilliant displays.

SIMATIC PCs can be individually configured. Matched expansion components are available for individual definition of the system availability, e.g. the SIMATIC PC DiagMonitor for diagnostics and preventive maintenance. SIMATIC PCs are the ideal platform for PC-based Automation and are used in both the production and process industries, as well as in industrial areas such as traffic engineering, business management, warehouse systems.

Further information can be found at:

http://www.siemens.de/simatic-pc

SIMATIC Rack PC	SIMATIC Box PC	SIMATIC Panel PC
SIMATIC Rack PC IL 43	**SIMATIC Microbox PC 420**	**Common industrial functionality**
State-of-the-art PC technology	Ultra-compact for use directly at the machine	CE marking for industrial sector
High performance and scalability	Maintenance-free thanks to operation without fan and hard disk	**SIMATIC Panel PC 477 embedded**
PCI- and AGP-Slots	PC components from the Intel Embedded line with long-term availability	Maximum industrial compatibility: Vibration 1.0 g, shock 5.0 g (in operation)
CE marking for industry and office	Scalable and expandable with up to 3 PC/104/*Plus* modules	High industrial functionality: Onboard PROFIBUS DP/MPI interface as option Maintenance-free (no fan or hard disk)
Dust protection	High system availability by rugged, EMC-suitable design	Turnkey devices with software bundles: HMI: preinstalled WinCC flexible 2005 software including archives/recipes HMI/RTX: additionally with WinAC RTX 2005
Service-friendly	Long-term availab. of spare parts min. 5 years	**SIMATIC Panel PC 577**
Transportation lock for expansion cards	**SIMATIC Box PC 627 and 840**	High industrial compatibility: Vibration 0.25g, shock 1.0 g (in operation)
Monitoring functions	High-performance processor	High investment security: State-of-the-art PC technology
Long-term availab. of spare parts min. 3 years	Maximum compactness and performance	High system availability
SIMATIC Rack PC 840	Can be operated at high temp. levels	**SIMATIC Panel PC 677 and 877**
Protection against vibration/shock during operation	Powerful diagnostics	Maximum industrial compatibility: Vibration 1.0 g, shock 5.0 g (in operation)
Can be operated at high temp. levels	Integrated PROFIBUS/MPI interface (optional)	High industrial compatibility: Integrated PROFIBUS DP/MPI interface PCI slots, ISA slots (Panel PC 877)
Efficient self-diagnostics (SIMATIC PC DiagMonitor) and preventive data backup	ISA- and PCI-Slots	High system availability: Software tools: SIMATIC PC DiagMonitor, SIMATIC PC/PG Image & Partition Creator Second hard disk RAID1
Integrated PROFIBUS/MPI interface (optional)	High flexibility and expandability with the components	
ISA- and PCI-Slots	Long-term availab. of spare parts min. 5 years	
High flexibility and expandability with the components		
Long-term availab. of spare parts min. 5 years		

Introduction
SIMATIC Industrial Software

The future-oriented software basis

SIMATIC Industrial Software is one of the main components of Totally Integrated Automation and offers the perfect tool for any automation task and project phase. Whether in manufacturing or process technology, in mechanical or plant engineering, with SIMATIC Industrial Software you can tap the full engineering workflow potential.

- Fewer interfaces thanks to the integrated engineering environment for logic modules, HMI, motion control and process technology.
- Fast implementation of the process design in the automation structure thanks to system-wide engineering from a central control point.
- Shorter design and implementation times thanks to structured, process-oriented programming methodology.
- Reduced overhead for follow-up projects thanks to modules that can be easily re-used.
- Less overhead for entering data and no inconsistencies thanks to a shared database.
- Less overhead thanks to user-friendly configuring instead of programming.
- Shorter training periods for the programming and maintenance personnel thanks to intuitive operation and the use of standard languages.
- Application software can be transferred thanks to the shared engineering environment for PLC- and PC-based solutions.
- Increased plant availability thanks to efficient process diagnostics.

Standard Tools

- STEP 7,
  the basic engineering platform for all SIMATIC Controllers.
- STEP 7 Professional,
  the comprehensive Engineering Suite for all SIMATIC Controllers.

Engineering Tools

- SIMATIC iMap,
  software for Component based Automation.
- S7-HiGraph,
  state diagrams.
- CFC,
  function charts.
- Distributed Safety Software,
  configuring of failsafe applications

- DOCPRO,
  generation of plant documentation.
- S7-PDIAG,
  process diagnostics.
- TeleService,
  remote maintenance and remote interfacing.
- D7-SYS,
  configuring of closed-loop control tasks.

Premium Studio

- The most important software tools for Totally Integrated Automation on one data medium (DVD).

Further information can be found at:
http://www.siemens.com/simatic-software

Introduction
SIMATIC PC-based Controller and Embedded Automation

**WinAC –
The SIMATIC S7
in the PC**

PC-based Controller

SIMATIC WinAC supplements SIMATIC S7 with PC-based controls. It is used when different tasks, such as data processing, communication, visualization and technology, are to be integrated on one PC.

SIMATIC WinAC is available in two basic versions:

- **SIMATIC WinAC Software PLCs** for tasks that require high flexibility and openness.
- **SIMATIC WinAC Slot PLCs**
  if the focus is on PC-independent operation, availability and high operational reliability.

With the open and powerful interfaces, SIMATIC WinAC is the ideal **platform for tailor-made automation solutions**.

SIMATIC WinAC hardware and software can be used on SIMATIC PCs and most commercially available PCs with the Professional versions of Windows 2000/XP.

SIMATIC WinAC can be easily combined with components from other manufacturers and can be integrated into the Office world over the standard interface OPC (OLE for Process Control).

Furthermore, SIMATIC WinAC permits easy horizontal integration of technological applications. For this purpose, the ODK (Open Development Kit) permits the integration of C++ programs into the WinAC control program and thus access to all hardware and software components of the PC.

Programming of WinAC is implemented with the standard SIMATIC programming tools - with STEP 7 or, if required, with the tried and tested engineering tools. SIMATIC WinAC is code-compatible with SIMATIC S7-400, i.e. program sections generated for SIMATIC S7-300 and S7-400 can continue to be used in WinAC and vice versa.

SIMATIC WinCC and WinCC flexible can be connected via a SIMATIC interface to be able to use the comprehensive diagnostics functionality and the shared database, for example. The PG/OP communication permits the connection of SIMATIC programming devices and operator panels.

SIMATIC Embedded Automation

The SIMATIC Embedded Automation products are combinations of hardware and software that have been pre-configured as turnkey solutions for specific automation tasks. They combine the openness of PC-based controllers with the ruggedness of conventional controllers. In addition, they boast flexible software installed on powerful, scalable hardware in an open, compact combination.

The architecture is PC-like and does not require fans.
A Compact Flash Card (CF Card) is used instead of a hard disk.
Microsoft Windows XP Embedded is the standard operating system.

- **SIMATIC Microbox 420-RTX**:
  Turnkey, rail-mounted PC with software PLC
- **SIMATIC Microbox 420-T**:
  Turnkey, rail-mounted PCwith software PLC and Motion Control
- **SIMATIC Panel PC 477-HMI/RTX:**
  Turnkey Panel PC with software PLC and visualization software
- **SIMATIC WinAC MP**:
  Software PLC on multifunctional platform

Further information can be found at:

http://www.siemens.com/pc-based-automation
http://www.siemens.com/embedded-automation

Introduction
SIMATIC ET 200

The fast fieldbus as system bus

Distributed I/O

Decentralized structures are widely accepted because they are more flexible, easier, and many times more cost-effective.
In the case of SIMATIC, a uniform solution permitting maximum system performance has been implemented in this regard in association with PROFIBUS and PROFINET.
These open standards additionally offer pioneering innovations:

- PROFIsafe for transmitting safety-relevant signals over the fieldbus
- With PROFIdrive for Motion Control, the fieldbus becomes a drive bus as well

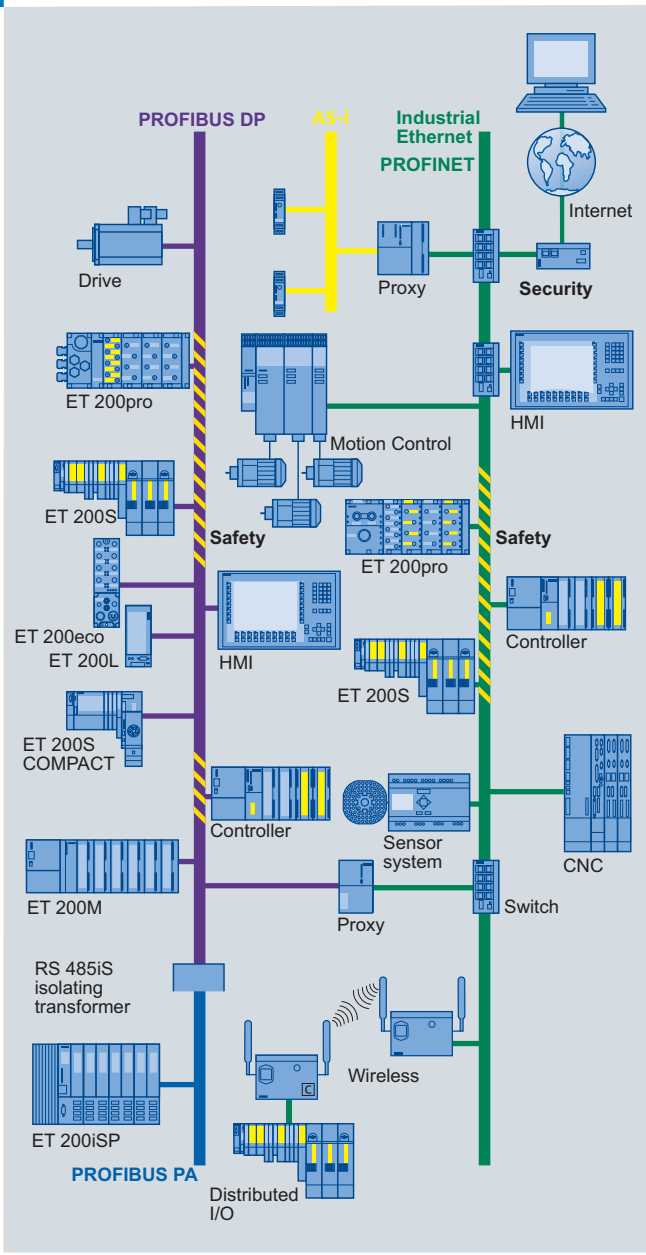
The system is integrated: SIMATIC does not differentiate any longer between centralized and distributed I/O. One software package suffices for implementing hardware configuration, parameterization, tests, commissioning and documentation of all components. You can program and diagnose online from any location in the plant. Drives are also perfectly integrated into this concept.
The system is powerful: The interfaces have been integrated into a number of controller CPUs. This type of connection avoids the execution times at the interface and the backplane bus and saves space and costs while retaining full performance and speed.
I/O devices with distributed intelligence accept CPU tasks on site and off-load the central control even more.
In addition to I/O devices with distributed intelligence, drives can also communicate over PROFIBUS and PROFINET.
The Drive Engineering System (Drive ES) is totally integrated in the SIMATIC Manager and permits easy and fast integration of drives in the SIMATIC environment.
Motion control tasks can also be implemented through the isochronous mode function for control and synchronization of drives over the bus, and internode communication for direct communication between drives and I/O.

The System is flexible:
Additional bus systems can be linked in a transparent manner using routers/couplers.

A comprehensive range of distributed I/O devices is available. Whether analog or digital inputs/outputs, technology functions, pneumatics, integrated CPU functionality, motor starters, frequency converters or integrated safety technology: the ET 200 range offers the right solution for every application:

Design in control cabinet with IP20 degree of protection:

- ET 200L: small and low-cost.
- ET 200M: modular and multi-channel.
- ET 200S: bit-modular and multifunctional.
- ET 200iSP: intrinsically-safe for hazardous areas



Design without control cabinet with IP65/67 degree of protection:

- ET 200eco: low-cost block.
- ET 200pro: modular and multifunctional.
- ET 200R: rugged for robots.

Further information can be found at:
http://www.siemens.com/et200

Introduction
SIMATIC HMI

Maintaining the overview easily

To maintain the overview, operator control and monitoring systems are becoming increasingly important - also in the lower performance range.

In this context SIMATIC is relying heavily, within the framework of Totally Integrated Automation, on the SIMATIC HMI system family - from Panels over PC-based single-user systems right up to networked Client-Server structures.

The HMI systems request the process data required for their configured sequence diagrams from the SIMATIC controller. The transfer is then implemented fully automatically and does not need to be included in the user program.

The configuration of the operator panels at machine level from the smallest Micro Panel to the PC, is executed with **WinCC flexible** (or ProTool). WinCC flexible considerably increases the efficiency of configuration in this case.

WinCC flexible is based on the latest software technologies and supports the project engineer with its user-friendly operator interface, libraries with pre-generated objects and picture blocks and intelligent tools. Text export/import and automatic translation permit the generation of multi-language configurations.

Additional options permit that new innovative automation concepts and additional service and maintenance functions are added to the application range of the SIMATIC operator panels and PC-based single-user systems.

TCP/IP communication permits that each operator panel can access the other to obtain variables and pictures. Thus operator panels with plant-wide access to process values and pictures, distributed operator panels on large, geographically separated machines, or simple local control station solutions can be implemented.

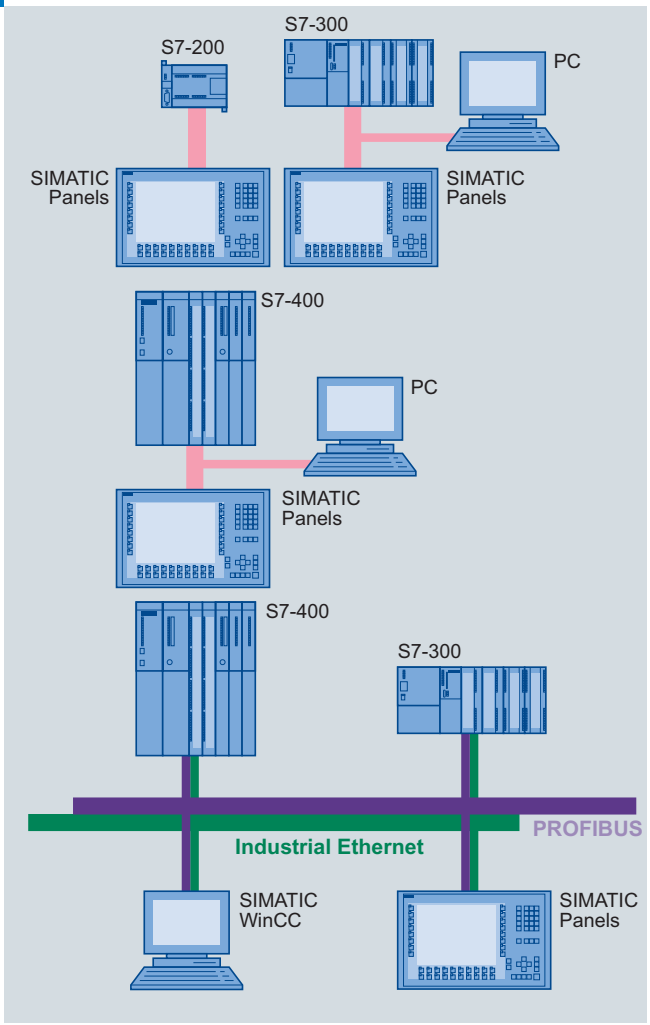
Event-triggered forwarding of emails, diagnostic functions, remote operation of local control stations over the intranet/Internet, as well as service and maintenance functions accelerate the entire process sequence from the disturbance to fault clearance.

Existing ProTool projects can be integrated or converted without a problem and ensure continued investment protection of prior engineering services.

The Runtime software **WinCC flexible Runtime** is used for PC-based single-user solutions at the machine level under Windows 2000/XP. It includes the visualization and signaling components and can be expanded as required using option packages.

SIMATIC WinCC from the SIMATIC HMI product range is available as PC-based process visualization system.

SIMATIC WinCC can be used as single-user system or in networked Client-Server configurations as multi-user system under Windows 2000/XP. Software packages, graded according to the number of variables, and option packages



offer individual connection options in case of increasing quantity structures and functional expansions.

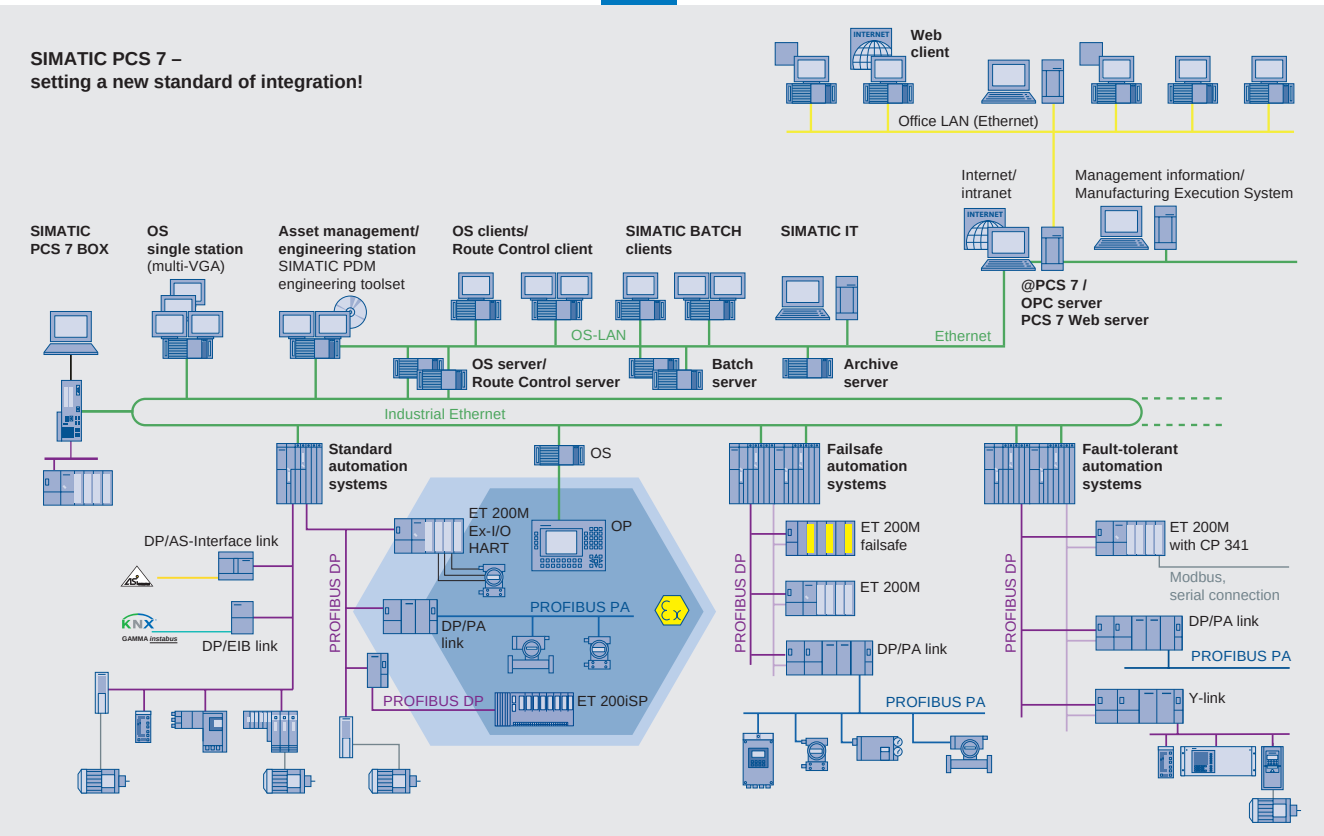
Archive data are stored in a relational database (MS SQL Server 2000) and can be read from there, e.g. over OLE-DB. Applications executing parallel with WinCC, e.g. MS Excel, can request process data via open standard interfaces. Furthermore, commercially available OCX (OLE Custom Controls) can be integrated.
Thanks to the Windows-compliant operator interface, fast and easy configuring is possible, e.g. integration of existing standard and application programs. Online configuring permits modifications on site without interrupting the ongoing operator control and monitoring process.

Further information can be found at:

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

Introduction
SIMATIC PCS 7

The process control system for all automation applications



Totally Integrated Automation with SIMATIC PCS 7

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

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

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

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

Introduction
SIMATIC PCS 7

The process control system for all automation applications

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

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

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

Benefits

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

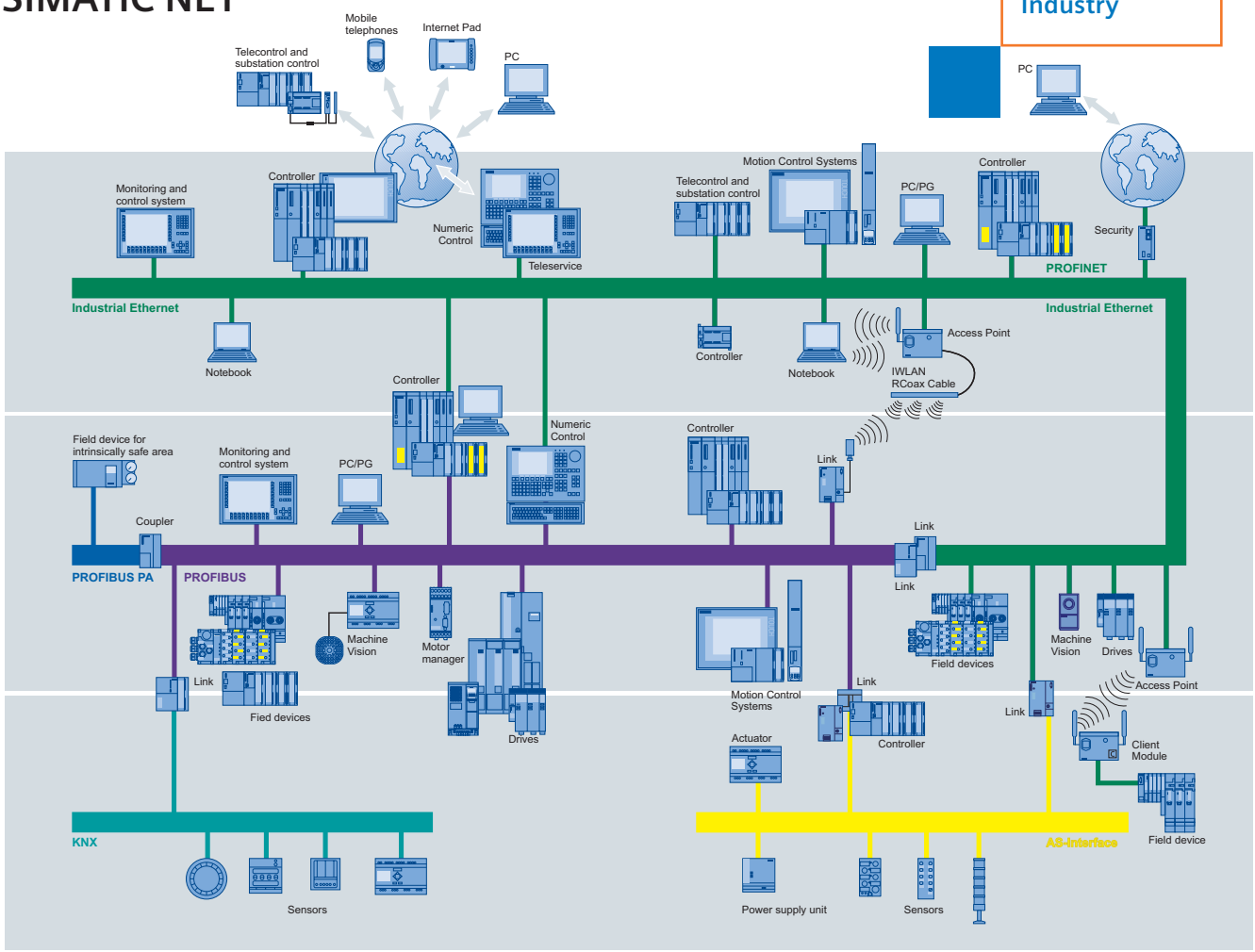
Customers benefit from Totally Integrated Automation and the SIMATIC PCS 7 process control system mainly through

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

Further information can be found at:
http://www.siemens.com/simatic-pcs7
and in the ST PCS 7 Catalog.

Introduction
SIMATIC NET

Networking for Industry



Industrial communication

Communications networks are an important component of automation solutions. SIMATIC NET Networking for Industry offers a wide range of modular components - designed for industry - to solve your communications tasks efficiently:

- For the different automation tasks
- Throughout the entire workflow.
- Throughout the plant's entire life cycle.
- For all sectors.

SIMATIC NET offers solutions that not only utilize the benefits of Ethernet, but also easily integrate fieldbus systems.

Some prominent examples are:

- Making the field level available for Industrial Ethernet applications.
- Uniformity from the field level right up to the corporate management level.
- Pushing ahead with mobile communication.
- Integration of IT technologies.

SIMATIC NET supports the following bus systems:

Industrial Ethernet (IEEE 802.3, 802.3u and 802.11) – today the international standard for area networking is the global No. 1 network in the LAN sector with a share of over 90 %.

High-performance communications networks spanning large distances can be created over Industrial Ethernet.

The international **PROFINET** standard uses Industrial Ethernet and permits real-time communication down to the field level. If existing IT standards are completely utilized, PROFINET also permits Motion Control applications on Industrial Ethernet in isochrone mode.

PROFIBUS (IEC 61158/EN 50170) – the international standard for the field level is the global market leader in the fieldbus area. As only fieldbus it permits communication both in production- and process-oriented applications.

AS-Interface (IEC 62026-2/EN 50295) – as low-cost alternative to the cable harness, AS-Interface links sensors and actuators over a two-wire line.

KNX (EN 50090, ANSI EIA 776) – the global standard KNX is the basis for building automation. Network transitions are implemented via controls or links.

Further information can be found at:

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

Introduction

LOGO! logic module

2

Brochures

For brochures serving as selection guides for SIMATIC products refer to:

http://www.siemens.com/simatic/printmaterial

2

LOGO! logic module

Overview

LOGO! logic module

- The compact, easy-to-use and low-cost solution for simple control tasks
- Compact, easy to operate, universally applicable without accessories
- "All in one": Integrated display and operator panel
- 36 different functions can be connected at the click of a button or by means of PC software; up to 130 times over
- Functions are easily changed at the press of a key. No more time-consuming rewiring

SIPLUS LOGO!

- The PLC for use under harshest environmental conditions
- With extended temperature range from -25 °C to +70 °C (-40 °C to +70 °C for selected types)
- Suitable for use under medial load (pollution gas atmosphere)
- Occasional short-term condensation and increased mechanical loading permissible
- With the proven LOGO! PLC technology
- Convenient handling, programming, maintenance and service
- Ideal for use in the automative industry, environmental technology, mining, chemical plants, production technology, food industry, etc.
- The alternative for expensive custom solutions

For more information please visit our Internet site:

http://www.siemens.com/siplus

For brochures serving as selection guides for SIMATIC products refer to:

http://www.siemens.com/simatic/printmaterial

General technical data SIPLUS LOGO!

Climatic ambient conditions	
Temperature	Horizontal mounting: -40/-25 °C to +70 °C Vertical mounting: -40/-25 °C to +50 °C
Relative humidity	5 to 95%; transient condensation permissible, corresponding to relative humidity (RH-), stress grade 2 according to IEC 1131-2 and IEC 721 3-3 class 3K5
Transient icing	-40/-25 °C to 0 °C IEC 721 3-3 class 3K5
Air pressure	1080 class 795 hPa corresponding to a height of –1000 to 2000 m
Pollutant concentration	SO2: < 0,5 ppm; relative humidity <60%, test: 10 ppm, 4 days H2S: < 0,1 ppm; relative humidity <60%, test: 1 ppm, 4 days (according to IEC 721 3-3; class 3C3)
Mechanical ambient conditions	
Vibrations	Type of vibration: frecuency progressions changing at 1 octave per minute. 2 Hz ≤ f ≤ 9 Hz, constant amplitude 3,0 mm, 9 Hz ≤ f ≤ 150 Hz, constant acceleration 1 g, duration of vibration: 10 frecuency progressions per axis in each direction of the three mutually perpendicular axes Vibration testing according to IEC 68 section 2-6 (sinus) and IEC 721 3-3, class 3M4
Shock	Type of shock: semisinusoidal, shock strength: 15 g peak value, duration 11 ms, shock direction: 3 shocks each in +/- direction on each of the mutually perpendicular axes Shock testing according to IEC 68 section 2-27

Overview

- The space-saving basic variants
- Interface for the connection of expansion modules, up to 24 digital inputs, 16 digital outputs, 8 analog inputs and 2 analog outputs can be addressed.

Technical specifications

	6ED1 052-1CC00-0BA5	6ED1 052-1MD00-0BA5	6ED1 052-1HB00-0BA5	6ED1 052-1FB00-0BA5
Supply voltages				
Rated value				
• 12 V		Yes		
• 24 V	Yes	Yes	Yes	
• 115 V				Yes
• 230 V				Yes
• permissible range, lower limit (DC)	20.4 V	10.8 V	20.4 V	100 V
• permissible range, upper limit (DC)	28.8 V	28.8 V	28.8 V	253 V
• 24 V AC			Yes	
• 115 V AC				Yes
• 230 V AC				Yes
• permissible range, lower limit (AC)			20.4 V	85 V
• permissible range, upper limit (AC)			26.4 V	265 V
Time				
Time switching clocks				
• Power reserve		80 h	80 h	80 h
Digital inputs				
Number of digital inputs	8; of which 2 can be for analog use (0..10V)	8; of which 2 can be for analog use (0..10V)	8	8
Digital outputs				
Number of digital outputs	4; Transistor	4; Relay	4; Relay	4; Relay
Short-circuit protection of the output	Yes; electrical (1 A)	No; external fusing necessary	No; external fusing necessary	No; external fusing necessary

Technical specifications (continued)

	6ED1 052-1CC00-0BA5	6ED1 052-1MD00-0BA5	6ED1 052-1HB00-0BA5	6ED1 052-1FB00-0BA5
Relay outputs				
Switching capacity of the contacts				
• with inductive load, max.		3 A	3 A	3 A
• with resistive load, max.	0.3 A	10 A	10 A	10 A
EMC				
Emission of radio interference to EN 55 011 (limit class B)	Yes	Yes	Yes	Yes
Environmental requirements				
Operating temperature				
• min.	0 °C	0 °C	0 °C	0 °C
• max.	55 °C	55 °C	55 °C	55 °C
Degree and class of protection				
• IP 20	Yes	Yes	Yes	Yes
Standards, approvals, certificates				
CSA approval	Yes	Yes	Yes	Yes
developed to IEC1131	Yes	Yes	Yes	Yes
FM approval	Yes	Yes	Yes	Yes
to VDE 0631	Yes	Yes	Yes	Yes
Marine approval	Yes	Yes	Yes	Yes
UL Approval	Yes	Yes	Yes	Yes
Dimensions and weight				
Mounting	on 35 mm DIN rail, 4 spacing units wide	on 35 mm DIN rail, 4 spacing units wide	on 35 mm DIN rail, 4 spacing units wide	on 35 mm DIN rail, 4 spacing units wide
Width	72 mm	72 mm	72 mm	72 mm
Height	90 mm	90 mm	90 mm	90 mm
Depth	55 mm	55 mm	55 mm	55 mm

Ordering data	Order No.
LOGO! 24 Logic Module 24 V DC power supply, 8 24 V DC digital inputs, of which 2 can be used in analog mode (0 to 10 V), 4 24 V DC digital outputs, 0.3 A; 130 function blocks can be interlinked, modular expansion capability	**6ED1 052-1CC00-0BA5**
LOGO! 12/24RC Logic Module 12/24 V DC power supply, 8 12/24 V DC digital inputs, of which 2 can be used in analog mode (0 to 10 V), 4 relay outputs 10 A, integral time switch; 130 function blocks can be interlinked, modular expansion capability	**6ED1 052-1MD00-0BA5**
LOGO! 24RC Logic Module 24 V AC/DC power supply, 8 24 V AC/DC digital inputs, 4 relay outputs 10 A, integral time switch; 130 function blocks can be interlinked, modular expansion capability	**6ED1 052-1HB00-0BA5**
LOGO! 230RC Logic Module 115/230 V AC/DC power supply, 8 115/230 V AC/DC digital inputs, 4 relay outputs 10 A, integral time switch; 130 function blocks can be interlinked, modular expansion capability	**6ED1 052-1FB00-0BA5**
Accessories	
LOGO! Manual	
German	**6ED1 050-1AA00-0AE6**
English	**6ED1 050-1AA00-0BE6**
French	**6ED1 050-1AA00-0CE6**
Spanish	**6ED1 050-1AA00-0DE6**
Italian	**6ED1 050-1AA00-0EE6**
LOGO! Memory Card Program module for copying, with know-how protection	**6ED1 056-5CA00-0BA0**

		Order No.
LOGO! PROM Programming device used to simultaneously reproduce program module contents on up to 8 program modules	A)	**6AG1 057-1AA01-0BA5**
LOGO!Soft Comfort V5.0 For programming on the PC in LAD/FBD; executes on Windows 98 SE and higher, Linux, MAC OSX; on CD-ROM		**6ED1 058-0BA01-0YA0**
LOGO!Soft Comfort Upgrade From V1.0 or higher to V5.0		**6ED1 058-0CA01-0YE0**
LOGO! PC cable For program transfer between LOGO! and the PC		**6ED1 057-1AA00-0BA0**
Front panel mounting set		
Width 4 width units		**6AG1 057-1AA00-0AA0**
Width 8 width units		**6AG1 057-1AA00-0AA1**
Width 8 width units, with keys		**6AG1 057-1AA00-0AA2**
LOGO! News Box, 12/24 V Contains LOGO! 12/24RC, LOGO! PC cable, LOGO!Soft Comfort, Tips&Tricks Manual, screw driver, information material		
German	C)	**6ED1 057-3BA00-0AA4**
English	C)	**6ED1 057-3BA00-0BA4**
LOGO! News Box, 230 V Contains LOGO! 230RC, LOGO! PC cable, LOGO!Soft Comfort, Tips&Tricks Manual, screw driver, information material		
German	C)	**6ED1 057-3AA01-0AA0**
English	C)	**6ED1 057-3AA01-0BA0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

C) Subject to export regulations: AL: N and ECCN: EAR99T

SIPLUS LOGO! modular basic variants

Overview

- The space-saving basic variants
- Interface for the connection of expansion modules, up to 24 digital inputs, 16 digital outputs, 8 analog inputs and 2 analog outputs can be addressed

	SIPLUS LOGO! 24	SIPLUS LOGO! 12/24RC	SIPLUS LOGO! 24RC	SIPLUS LOGO! 230RC
Order No.	**6AG1 052-1CC00-2BA5**	**6AG1 052-1MD00-2BA5**	**6AG1 052-1HB00-2BA5**	**6AG1 052-1FB00-2BA5**
Order No. based on	**6ED1 052-1CC00-0BA5**	**6ED1 052-1MD00-0BA5**	**6ED1 052-1HB00-0BA5**	**6ED1 052-1FB00-0BA5**
Ambient temperature range	-25 to +70 °C -25 to +55 °C (for applications with cUL approval), condensation permissible			
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).			
Approvals	CE, cUL			
Technical data	The technical data are identical with the technical data of the based on modules.			

Ordering data

	Order No.
SILPUS LOGO! 24 (extended temperature range and medial load) 24 V DC power supply, 8 24 V DC digital inputs, of which 2 can be used in analog mode (0 to 10 V), 4 24 V DC digital outputs, 0.3 A; 130 function blocks can be interlinked, modular expansion capability	**6AG1 052-1CC00-2BA5**
SIPLUS LOGO! 12/24RC (extended temperature range and medial load) 12/24 V DC power supply, 8 12/24 V DC digital inputs, of which 2 can be used in analog mode (0 to 10 V), 4 relay outputs 10 A, integral time switch; 130 function blocks can be interlinked, modular expansion capability	**6AG1 052-1MD00-2BA5**
SIPLUS LOGO! 24RC (extended temperature range and medial load) 24 V AC/DC power supply, 8 24 V AC/DC digital inputs, 4 relay outputs 10 A, integral time switch; 130 function blocks can be interlinked, modular expansion capability	**6AG1 052-1HB00-2BA5**
SIPLUS LOGO! 230RC (extended temperature range and medial load) 115/230 V AC/DC power supply, 8 115/230 V AC/DC digital inputs, 4 relay outputs 10 A, integral time switch; 130 function blocks can be interlinked, modular expansion capability	**6AG1 052-1FB00-2BA5**
Accessories	see ordering data for LOGO! modular basic variants, page 2/5

Overview

- Basic versions optimized for costs
- Interface for the connection of expansion modules, up to 24 digital inputs, 16 digital outputs, 8 analog inputs and 2 analog outputs can be addressed.

Technical specifications

	6ED1 052-2CC00-0BA5	6ED1 052-2MD00-0BA5	6ED1 052-2HB00-0BA5	6ED1 052-2FB00-0BA5
Supply voltages				
Rated value				
• 12 V DC		Yes		
• 24 V DC	Yes	Yes	Yes	
• 115 V DC				Yes
• 230 V DC				Yes
• permissible range, lower limit (DC)	20.4 V	10.8 V	20.4 V	100 V
• permissible range, upper limit (DC)	28.8 V	28.8 V	28.8 V	253 V
• 24 V AC			Yes	
• 115 V AC				Yes
• 230 V AC				Yes
• permissible range, lower limit (AC)			20.4 V	85 V
• permissible range, upper limit (AC)			26.4 V	265 V
Time				
Time switching clocks				
• Number		8	8	8
• Power reserve		80 h	80 h	80 h
Digital inputs				
Number of digital inputs	8; of which 2 can be for analog use (0..10V)	8; of which 2 can be for analog use (0..10V)	8	8
Digital outputs				
Number of digital outputs	4; Transistor	4; Relay	4; Relay	4; Relay
Short-circuit protection of the output	Yes; electrical (1 A)	No; external fusing necessary	No; external fusing necessary	No; external fusing necessary

Technical specifications (continued)

	6ED1 052-2CC00-0BA5	6ED1 052-2MD00-0BA5	6ED1 052-2HB00-0BA5	6ED1 052-2FB00-0BA5
Relay outputs				
Switching capacity of the contacts				
• with inductive load, max.		3 A	3 A	3 A
• with resistive load, max.	0.3 A	10 A	10 A	10 A
EMC				
Emission of radio interference to EN 55 011 (limit class B)		Yes	Yes	Yes
Environmental requirements				
Operating temperature				
• min.	0 °C	0 °C	0 °C	0 °C
• max.	55 °C	55 °C	55 °C	55 °C
Degree and class of protection				
• IP 20	Yes	Yes	Yes	Yes
Standards, approvals, certificates				
CSA approval	Yes	Yes	Yes	Yes
developed to IEC1131	Yes	Yes	Yes	Yes
FM approval	Yes	Yes	Yes	Yes
to VDE 0631	Yes	Yes	Yes	Yes
Marine approval	Yes	Yes	Yes	Yes
UL Approval	Yes	Yes	Yes	Yes
Dimensions and weight				
Mounting	on 35 mm DIN rail, 4 spacing units wide	on 35 mm DIN rail, 4 spacing units wide	on 35 mm DIN rail, 4 spacing units wide	on 35 mm DIN rail, 4 spacing units wide
Width	72 mm	72 mm	72 mm	72 mm
Height	90 mm	90 mm	90 mm	90 mm
Depth	55 mm	55 mm	55 mm	55 mm

Ordering data	Order No.
LOGO! 24o logic module 24 V DC power supply, 8 digital inputs 24 V DC, of which 2 can be used in analog mode (0 to 10 V), 4 digital outputs 24 V DC, 0.3 A; without display and keyboard; 130 function blocks can be interlinked, modular expansion capability	**6ED1 052-2CC00-0BA5**
LOGO! 12/24RCo logic module 12/24 V DC power supply, 8 digital inputs 12/24 V DC, of which 2 can be used in analog mode (0 to 10 V), 4 relay outputs 10 A, integral time switch; without display and keyboard; 130 function blocks can be interlinked, modular expansion capability	**6ED1 052-2MD00-0BA5**
LOGO! 24RCo logic module 24 V AC/DC power supply, 8 digital inputs 24 V AC/DC, 4 relay outputs 10 A, integral time switch; without display and keyboard; 130 function blocks can be interlinked, modular expansion capability	**6ED1 052-2HB00-0BA5**
LOGO! 230RCo logic module 115/230 V AC/DC power supply, 8 digital inputs 115/230 V AC/DC, 4 relay outputs 10 A, integral time clock; without display and keyboard; 130 function blocks can be interlinked, modular expansion capability	**6ED1 052-2FB00-0BA5**

	Order No.
Accessories	
LOGO! manual	
German	**6ED1 050-1AA00-0AE6**
English	**6ED1 050-1AA00-0BE6**
French	**6ED1 050-1AA00-0CE6**
Spanish	**6ED1 050-1AA00-0DE6**
Italian	**6ED1 050-1AA00-0EE6**
LOGO! Memory Card Program module for copying, with know-how protection	**6ED1 056-5CA00-0BA0**
LOGO! PROM A) Programming device used to simultaneously reproduce program module contents on up to 8 program modules	**6AG1 057-1AA01-0BA5**
LOGO!Soft Comfort V5.0 For programming on the PC in LAD/FBD; executes on Windows 98 SE and higher, Linux, MAC OSX; on CD-ROM	**6ED1 058-0BA01-0YA0**
LOGO!Soft Comfort Upgrade From V1.0 or higher to V5.0	**6ED1 058-0CA01-0YE0**
LOGO! PC cable For program transfer between LOGO! and the PC	**6ED1 057-1AA00-0BA0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

SIPLUS LOGO! modular pure variants

Overview

- Basic variants optimized for costs
- Interface for the connection of expansion modules, up to 24 digital inputs, 16 digital outputs, 8 analog inputs and 2 analog outputs can be addressed
- 3 types with temperature range -40 °C to +70 °C

	SIPLUS LOGO! 24o	SIPLUS LOGO! 12/24RCo	SIPLUS LOGO! 24RCo	SIPLUS LOGO! 230RCo
Order No.	**6AG1 052-2CC00-2BA5**	**6AG1 052-2MD00-2BA5**	**6AG1 052-2HB00-2BA5**	**6AG1 052-2FB00-2BA5**
Order No. based on	**6ED1 052-2CC00-0BA5**	**6ED1 052-2MD00-0BA5**	**6ED1 052-2HB00-0BA5**	**6ED1 052-2FB00-0BA5**
Ambient temperature range	-25 to +70 °C -25 to +55 °C (for applications with cUL approval), condensation permissible			
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).			
Approvals	CE, cUL			
Technical data	The technical data are identical with the technical data of the based on modules.			

	SIPLUS LOGO! 24o	SIPLUS LOGO! 24RCo	SIPLUS LOGO! 230RCo
Order No.	**6AG1 052-2CC00-2BY5**	**6AG1 052-2HB00-2BY5**	**6AG1 052-2FB00-2BY5**
Order No. based on	**6ED1 052-2CC00-0BA5**	**6ED1 052-2HB00-0BA5**	**6ED1 052-2FB00-0BA5**
Ambient temperature range	-40 to +70 °C -25 to +55 °C (for applications with cUL approval), condensation permissible		
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).		
Approvals	CE, cUL (available soon)		
Technical data	The technical data are identical with the technical data of the based on modules.		

Ordering data

	Order No.
SIPLUS LOGO! 24o	
(extended temperature range and medial load)	
24 V DC power supply, 8 digital inputs 24 V DC, of which 2 can be used in analog mode (0 to 10 V), 4 digital outputs 24 V DC, 0.3 A; without display and keyboard; 130 function blocks can be interlinked, modular expansion capability	
Temperature range -25 ... +70 °C	**6AG1 052-2CC00-2BA5**
Temperature range -40 ... +70 °C	**6AG1 052-2CC00-2BY5**
SIPLUS LOGO! 12/24RCo	**6AG1 052-2MD00-2BA5**
(extended temperature range and medial load)	
12/24 V DC power supply, 8 digital inputs 12/24 V DC, of which 2 can be used in analog mode (0 to 10 V), 4 relay outputs 10 A, integral time switch; without display and keyboard; 130 function blocks can be interlinked, modular expansion capability	

	Order No.
SIPLUS LOGO! 24RCo	
(extended temperature range and medial load)	
24 V AC/DC power supply, 8 digital inputs 24 V AC/DC, 4 relay outputs 10 A, integral time switch; without display and keyboard; 130 function blocks can be interlinked, modular expansion capability	
Temperature range -25 ... +70 °C	**6AG1 052-2HB00-2BA5**
Temperature range -40 ... +70 °C	**6AG1 052-2HB00-2BY5**
SIPLUS LOGO! 230RCo	
(extended temperature range and medial load)	
115/230 V AC/DC power supply, 8 digital inputs 115/230 V AC/DC, 4 relay outputs 10 A, integral time clock; without display and keyboard; 130 function blocks can be interlinked, modular expansion capability	
Temperature range -25 ... +70 °C	**6AG1 052-2FB00-2BA5**
Temperature range -40 ... +70 °C	**6AG1 052-2FB00-2BY5**
Accessories	see LOGO! modular pure variants, page 2/9

LOGO! modular expansion modules

Overview

- Expansion modules for the connection to LOGO! Modular
- With digital inputs and outputs, analog inputs or analog outputs

Technical specifications

	6ED1 055-1CB00-0BA0	6ED1 055-1HB00-0BA0	6ED1 055-1MB00-0BA1	6ED1 055-1FB00-0BA1
Supply voltages				
Rated value				
• 12 V DC			Yes	
• 24 V DC	Yes	Yes	Yes	
• 115 V DC				Yes
• 230 V DC				Yes
• permissible range, lower limit (DC)	20.4 V	20.4 V	10.8 V	100 V
• permissible range, upper limit (DC)	28.8 V	28.8 V	28.8 V	253 V
• 24 V AC		Yes		
• 115 V AC				Yes
• 230 V AC				Yes
• permissible range, lower limit (AC)		20.4 V		85 V
• permissible range, upper limit (AC)		26.4 V		265 V
Digital inputs				
Number of digital inputs	4	4	4	4
Digital outputs				
Number of digital inputs	4	4; Relay	4; Relay	4; Relay
Short-circuit protection of the output	Yes; electrical (1 A)	No; external fusing necessary	No; external fusing necessary	No; external fusing necessary
Relay outputs				
Switching capacity of the contacts				
• with inductive load, max.		3 A	3 A	3 A
• with resistive load, max.		5 A	5 A	5 A
• Thermal continuous current, max.	0.3 A			
EMC				
Emission of radio interference to EN 55 011 (limit class B)	Yes	Yes	Yes	Yes
Environmental requirements				
Operating temperature				
• min.	0 °C	0 °C	0 °C	0 °C
• max.	55 °C	55 °C	55 °C	55 °C
Degree and class of protection				
• IP 20	Yes	Yes	Yes	Yes

Technical specifications (continued)

	6ED1 055-1CB00-0BA0	6ED1 055-1HB00-0BA0	6ED1 055-1MB00-0BA1	6ED1 055-1FB00-0BA1
Standards, approvals, certificates				
CSA approval	Yes	Yes	Yes	Yes
developed to IEC1131	Yes	Yes	Yes	Yes
FM approval	Yes	Yes	Yes	Yes
to VDE 0631	Yes	Yes	Yes	Yes
Marine approval	Yes	Yes	Yes	Yes
UL Approval	Yes	Yes	Yes	Yes
Dimensions and weight				
Mounting	on 35 mm DIN rail, 2 spacing units wide	on 35 mm DIN rail, 2 spacing units wide	on 35 mm DIN rail, 2 spacing units wide	on 35 mm DIN rail, 2 spacing units wide
Width	36 mm; 2 TE	36 mm; 2 TE	36 mm; 2 TE	36 mm; 2 TE
Height	90 mm	90 mm	90 mm	90 mm
Depth	55 mm	55 mm	55 mm	55 mm

	6ED1 055-1CB10-0BA0	6ED1 055-1NB10-0BA0	6ED1 055-1FB10-0BA0
Supply voltages			
Rated value			
• 24 V DC	Yes	Yes	
• 115 V DC			Yes
• 230 V DC			Yes
• permissible range, lower limit (DC)	20.4 V	20.4 V	100 V
• permissible range, upper limit (DC)	28.8 V	28.8 V	253 V
• 115 V AC			Yes
• 230 V AC			Yes
• permissible range, lower limit (AC)			85 V
• permissible range, upper limit (AC)			265 V
• permissible frequency range, lower limit			47 Hz
• permissible frequency range, upper limit			63 Hz
Digital inputs			
Number of digital inputs	8	8	8
Input voltage			
• for signal "0"	< 5 V DC	< 5 V DC	< 40 V AC; < 30 V DC
• for signal "1"	> 12 V DC	> 12 V DC	> 79 V AC; > 79 V DC

	6ED1 055-1CB10-0BA0	6ED1 055-1NB10-0BA0	6ED1 055-1FB10-0BA0
Input current			
• for signal "0", max. (permissible quiescent current)	1 mA	1 mA	0.03 mA
• for signal "1", typ.	2 mA	2 mA	0.08 mA
Input delay (for rated value of input voltage)			
• for standard inputs			
- at "0" to "1", max.	1.5 ms	1.5 ms	50 ms
- at "1" to "0", max.	1.5 ms	1.5 ms	50 ms
Digital outputs			
Number of digital outputs	8	8; Relay	8; Relay
Short-circuit protection of the output	Yes; electrical (1 A)	No; external fusing necessary	
Lamp load, max.		1,000 W; 500 W at 115 V AC	1,000 W; 500 W at 115 V AC
Controlling a digital input	Yes	Yes	Yes
Parallel switching of 2 outputs			
• for increased power	No	No	No

Technical specifications (continued)

	6ED1 055-1CB10-0BA0	6ED1 055-1NB10-0BA0	6ED1 055-1FB10-0BA0
Switching frequency			
• with resistive load, max.	10 Hz	2 Hz	2 Hz
• with inductive load, max.	0.5 Hz	0.5 Hz	0.5 Hz
• mechanical, max.		10 Hz	10 Hz
Relay outputs			
Switching capacity of the contacts			
• with inductive load, max.		3 A	3 A
• with resistive load, max.		5 A	5 A
• Thermal continuous current, max.	0.3 A		
EMC			
Emission of radio interference to EN 55 011 (limit class B)	Yes	Yes	Yes
Environmental requirements			
Operating temperature			
• min.	0 °C	0 °C	0 °C
• max.	55 °C	55 °C	55 °C
Degree and class of protection			
• IP 20	Yes	Yes	Yes
Standards, approvals, certificates			
CSA approval	Yes	Yes	Yes
developed to IEC1131	Yes	Yes	Yes
FM approval	Yes	Yes	Yes
to VDE 0631	Yes	Yes	Yes
Marine approval	Yes	Yes	Yes
UL Approval	Yes	Yes	Yes
Dimensions and weight			
Mounting	on 35 mm DIN rail, 4 spacing units wide	on 35 mm DIN rail, 4 spacing units wide	on DIN rail 25 mm, 4 module spaces wide
Width	72 mm; 4 DU	72 mm; 4 DU	72 mm; 4 DU
Height	90 mm	90 mm	90 mm
Depth	53 mm	53 mm	53 mm

	6ED1 055-1MA00-0BA0	6ED1 055-1MD00-0BA0
Supply voltages		
Rated value		
• 12 V DC	Yes	Yes
• 24 V DC	Yes	Yes
Analog inputs		
Number of analog inputs	2	2
Input ranges (rated values), voltages		
• Voltage	Yes	
• 0 to +10 V	Yes	
Input ranges (rated values), currents		
• Current	Yes	
• 0 to 20 mA	Yes	
Input ranges (rated values), resistance thermometers		
• Resistance thermometer		Yes
• Pt 100		Yes
EMC		
Emission of radio interference to EN 55 011 (limit class B)	Yes	Yes
Environmental requirements		
Operating temperature		
• min.	0 °C	0 °C
• max.	55 °C	55 °C
Degree and class of protection		
• IP 20	Yes	Yes
Standards, approvals, certificates		
CSA approval	Yes	Yes
developed to IEC1131	Yes	Yes
FM approval	Yes	Yes
to VDE 0631	Yes	Yes
Marine approval	Yes	Yes
UL Approval	Yes	Yes
Dimensions and weight		
Mounting	on 35 mm DIN rail, 2 spacing units wide	on 35 mm DIN rail, 2 spacing units wide
Width	36 mm	36 mm
Height	90 mm	90 mm
Depth	55 mm	55 mm

Technical specifications (continued)

	6ED1 055-1MM00-0BA0
Supply voltages	
Rated value	
• 12 V DC	No
• 24 V DC	Yes
Analog outputs	
Number of analog outputs	2
Output ranges, voltage	
• 0 to 10 V	Yes
EMC	
Emission of radio interference to EN 55 011 (limit class B)	Yes
Environmental requirements	
Operating temperature	
• min.	0 °C
• max.	55 °C

	6ED1 055-1MM00-0BA0
Degree and class of protection	
• IP 20	Yes
Standards, approvals, certificates	
CSA approval	Yes
developed to IEC1131	Yes
FM approval	Yes
to VDE 0631	Yes
Marine approval	Yes
UL Approval	Yes
Dimensions and weight	
Mounting	on 35 mm DIN rail, 2 spacing units wide
Width	36 mm
Height	90 mm
Depth	55 mm

Ordering data

	Order No.
LOGO! DM8 24 24 V DC supply voltage, 4 digital inputs 24 V DC, 4 digital outputs 24 V DC, 0.3 A	**6ED1 055-1CB00-0BA0**
LOGO! DM16 24 24 V DC supply voltage, 8 digital inputs 24 V DC, 8 digital outputs 24 V DC, 0.3 A	**6ED1 055-1CB10-0BA0**
LOGO! DM8 12/24R 12/24 V DC supply voltage, 4 digital inputs 12/24 V DC, 4 relay outputs 5 A	**6ED1 055-1MB00-0BA1**
LOGO! DM8 24R 24 V AC/DC supply voltage, digital inputs 24 V AC/DC, 4 relay outputs 5 A	**6ED1 055-1HB00-0BA0**
LOGO! DM16 24R 24 V DC supply voltage, 8 digital inputs 24V DC, 8 relay outputs 5 A	**6ED1 055-1NB10-0BA0**
LOGO! DM8 230R 115/230 V AC/DC supply voltage, 4 digital inputs 115/230 V AC/DC, 4 relay outputs 5 A	**6ED1 055-1FB00-0BA1**
LOGO! DM16 230R 115/230 V AC/DC supply voltage, 8 digital inputs 115/230 V AC/DC, 8 relay outputs 5 A	**6ED1 055-1FB10-0BA0**
LOGO! AM2 12/24 V DC supply voltage, 2 analog inputs 0 to 10 V or 0 to 20 mA, 10-bit resolution	**6ED1 055-1MA00-0BA0**
LOGO! AM2 PT 100 12/24 V DC supply voltage, 2 Pt100 analog inputs, temperature range -50 °C to 200 °C	**6ED1 055-1MD00-0BA0**

		Order No.
LOGO! AM2 AQ 24 V DC supply voltage, 2 analog outputs 0 to 10 V		**6ED1 055-1MM00-0BA0**
Accessories		
LOGO! manual		
German		**6ED1 050-1AA00-0AE6**
English		**6ED1 050-1AA00-0BE6**
French		**6ED1 050-1AA00-0CE6**
Spanish		**6ED1 050-1AA00-0DE6**
Italian		**6ED1 050-1AA00-0EE6**
LOGO! memory card For copying, with know-how protection		**6ED1 056-5CA00-0BA0**
LOGO!Soft Comfort V5.0 For programming on the PC in LAD/FDB; Executes under Windows 98 SE and higher, Linux, MAC OSX; on CD-ROM		**6ED1 058-0BA01-0YA0**
LOGO!Soft Comfort upgrade From V1.0 and higher to V5.0		**6ED1 058-0CA01-0YE0**
LOGO! PC cable For transferring programs between LOGO! and the PC		**6ED1 057-1AA00-0BA0**
LOGO! News Box, 12/24 V Contains LOGO! 12/24RC, LOGO! PC cable, LOGO!Soft Comfort, Tips & Tricks manual, screwdriver, documentation		
German	C)	**6ED1 057-3BA00-0AA4**
English	C)	**6ED1 057-3BA00-0BA4**
LOGO! News Box, 230 V Contains LOGO! 230RC, LOGO! PC cable, LOGO!Soft Comfort, Tips & Tricks manual, screwdriver, documentation		
German	C)	**6ED1 057-3AA01-0AA0**
English	C)	**6ED1 057-3AA01-0BA0**

C) Subject to export regulations: AL: N and ECCN: EAR99T

SIPLUS LOGO! modular expansion modules

Overview

- Expansion modules for the connection to LOGO! modular
- With digital inputs and outputs, analog inputs or analog outputs
- 5 types with temperature range -40 °C to +70 °C

	SIPLUS LOGO! DM8 24	SIPLUS LOGO! DM8 12/24	SIPLUS LOGO! DM8 24R
Order No.	**6AG1 055-1CB00-2XB0**	**6AG1 055-1PB00-2XB0 Supply voltage 12/24 V DC**	**6AG1 055-1HB00-2XB0**
Order No. based on	**6ED1 055-1CB00-0BA0**	**6ED1 055-1CB00-0BA0**	**6ED1 055-1HB00-0BA0**
Ambient temperature range	-25 to +70 °C -25 to +55 °C (for applications with cUL approval), condensation permissible		
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).		
Approvals	CE, cUL		
Technical data	The technical data are identical with the technical data of the based on modules.		

	SIPLUS LOGO! DM8 12/24R	SIPLUS LOGO! DM8 230R	SIPLUS LOGO! AM2
Order No.	**6AG1 055-1MB00-2XB1**	**6AG1 055-1FB00-2XB1**	**6AG1 055-1MA00-2XB0**
Order No. based on	**6ED1 055-1MB00-0BA1**	**6ED1 055-1FB00-0BA1**	**6ED1 055-1MA00-0BA0**
Ambient temperature range	-25 to +70 °C -25 to +55 °C (for applications with cUL approval), condensation permissible		
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).		
Approvals	CE, cUL		
Technical data	The technical data are identical with the technical data of the based on modules.		

	SIPLUS LOGO! DM8 24	SIPLUS LOGO! DM8 24R	SIPLUS LOGO! DM8 12/24R	SIPLUS LOGO! DM8 230R	SIPLUS LOGO! AM2
Order No.	**6AG1 055-1CB00-2BY0**	**6AG1 055-1HB00-2BY0**	**6AG1 055-1MB00-2BY1**	**6AG1 055-1FB00-2BY1**	**6AG1 055-1MA00-2BY0**
Order No. based on	**6ED1 055-1CB00-0BA0**	**6ED1 055-1HB00-0BA0**	**6ED1 055-1MB00-0BA1**	**6ED1 055-1FB00-0BA1**	**6ED1 055-1MA00-0BA0**
Ambient temperature range	-40 to +70 °C -25 to +55 °C (for applications with cUL approval), condensation permissible				
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).				
Approvals	CE, cUL (available soon)				
Technical data	The technical data are identical with the technical data of the based on modules.				

Ordering data	Order No.
SIPLUS LOGO! DM8 24	
(extended temperature range and medial load)	
24 V DC supply voltage, 4 digital inputs 24 V DC, 4 digital outputs 24 V DC, 0.3 A	
Temperature range -25 ... +70 °C A)	**6AG1 055-1CB00-2XB0**
Temperature range -40 ... +70 °C	**6AG1 055-1CB00-2BY0**
SIPLUS LOGO! DM8 12/24	**6AG1 055-1PB00-2XB0**
(extended temperature range and medial load)	
12/24 V DC supply voltage, 4 digital inputs 12/24 V DC, 4 digital outputs 24 V DC, 0.3 A	
SIPLUS LOGO! DM8 24R	
(extended temperature range and medial load)	
24 V AC/DC supply voltage, 4 digital inputs 24 V AC/DC, 4 relay outputs 5 A	
Temperature range -25 ... +70 °C B)	**6AG1 055-1HB00-2XB0**
Temperature range -40 ... +70 °C	**6AG1 055-1HB00-2BY0**
SIPLUS LOGO! DM8 12/24R	
(extended temperature range and medial load)	
12/24 V DC supply voltage, 4 digital inputs 12/24 V DC, 4 relay outputs 5 A	
Temperature range -25 ... +70 °C A)	**6AG1 055-1MB00-2XB1**
Temperature range -40 ... +70 °C	**6AG1 055-1MB00-2BY1**
SIPLUS LOGO! DM8 230R	
(extended temperature range and medial load)	
115/230 V AC/DC supply voltage, 4 digital inputs 12/24 V DC, 4 relay outputs 5 A	
Temperature range -25 ... +70 °C B)	**6AG1 055-1FB00-2XB1**
Temperature range -40 ... +70 °C	**6AG1 055-1FB00-2BY1**
SIPLUS LOGO! AM2	
(extended temperature range and medial load)	
12/24 V DC supply voltage, 2 analog inputs 0 to 10 V or 0 to 20 mA, 10-bit resolution	
Temperature range -25 ... +70 °C A)	**6AG1 055-1MA00-2XB0**
Temperature range -40 ... +70 °C	**6AG1 055-1MA00-2BY0**
Accessories	see LOGO! modular expansion modules, page 2/15

A) Subject to export regulations: AL: N and ECCN: EAR99H

B) Subject to export regulations: AL: N and ECCN: 4A994

LOGO! CM EIB/KNX communications module

Overview

- Expansion module for LOGO! basic versions
- For communication between the LOGO! master and external *EIB* components through *EIB*

Technical specifications

	CM EIB/KNX
Supply voltage	24 V AC/DC
Inputs, max.	16 DI/12 DO/8 AI/2 AO
Outputs, max.	16 digital
Continuous current	25 mA
Short-circuit protection	External fuse protection is required
Integrated time switches/ power reserve	-
Ambient temperature	0 to +55 °C
RI specification	To EN 55 011 (limit class B)
Degree of protection	IP20
Certification	To VDE 0631, IEC61131-2, cULus, FM
Mounting	On DIN rail 35 mm, 2 module widths wide
Dimensions (W x H x D) in mm	36 (2 MW) × 90 × 55

Ordering data

	Order No.
Communications module LOGO! CM EIB/KNX For connecting to *EIB*, 24 V DC supply voltage	**6BK1 700-0BA00-0AA1**
Accessories	
LOGO! manual	
German	**6ED1 050-1AA00-0AE6**
English	**6ED1 050-1AA00-0BE6**
French	**6ED1 050-1AA00-0CE6**
Spanish	**6ED1 050-1AA00-0DE6**
Italian	**6ED1 050-1AA00-0EE6**

Overview

Each LOGO! can now be connected to the AS-Interface system

An intelligent slave can be integrated into the AS-Interface system with the AS-Interface for LOGO! The modular interface allows the different basic units to be integrated into the system depending on the required functionality. In addition, the functionality can be quickly and simply adapted to changed requirements by replacing the basic unit.

The interface provides four inputs and four outputs for the system. These I/Os, however, are not implemented in hardware, but are only virtually available via the interface.

Technical specifications

Supply voltage in V	24 V DC	
Inputs/outputs	4 / 4 (virtual inputs / outputs)	
Bus connection	AS-Interface according to specification	
Ambient temperature in °C	0 ... +55	
Degree of protection	IP20	
Mounting	Onto standard mounting rail	
Dimensions (W x H x D)	36 x 90 x 58	
Indications of the LEDs	*LED*	*Status*
	Green	OK
	Red	No data traffic
	Flashes red/yellow	Zero adress

Ordering data

	Order No.
AS-Interface connection for LOGO!	**3RK1 400-0CE10-0AA2**

LOGO!Power

Application

The power supplies of the LOGO!Power range are primary switched-mode devices that are optimally matched to the LOGO! logic modules in their functionality and design.

Depending on the power rating required, the LOGO!Power units are available in two sizes and the new generation is now even more compact despite increased functionality. The width of the small version is only 54 mm instead of 72 mm and the large size has shrunk from 126 mm to 72 mm. An extremely compact 4-A power supply with a width of only 90 mm now supplements the 24 V line. An LED indicates whether the output voltage is o.k., and in the event of an overload or short-circuit, the primary switched-mode regulators supply a constant current, that is, without restart attempts.

LOGO!Power naturally supplies the small LOGO! control modules. But these power supplies can also be used elsewhere. As well as being system power supplies, the LOGO!Power modules are also suitable for supplying other loads in the low-end performance range. With the wide-range input 85 V to 264 V AC and radio interference level B, they can be used universally in the most diverse application areas in the low-end performance range. Because the benefits of the primary switched-mode regulators convince all along the line.

For example:

- Improved protection of connected loads through the regulated output voltage
- Low power losses in the control cabinet thanks to high efficiency
- Compact design and low weight.

And LOGO!Power is also predestined for networking devices in standard low-voltage distribution boards

- Can be installed on 35-mm mounting rail
- Low installation depth and stepped profile of the design.

The power supplies naturally comply with the relevant European and American regulations.

Technical specifications LOGO!power 12 V

Power supply, type	**12 V/1.9 A**	**12 V/4.5 A**
Order No.	**6EP1 321-1SH02**	**6EP1 322-1SH02**
Input	Single-phase AC	Single-phase AC
Rated voltage $V_{in\ rated}$	**100 to 240 V AC** wide-range input	**100 to 240 V AC** wide-range input
Voltage range	85 to 264 V AC	85 to 264 V AC
Overvoltage strength	2.3 x $V_{in\ rated}$/1.3 ms	2.3 x $V_{in\ rated}$/1.3 ms
Mains buffering at $I_{out\ rated}$	> 40 ms at V_{in} = 187 V	> 40 ms at V_{in} = 187 V
Rated line frequency; range	50/60 Hz; 47 to 63 Hz	50/60 Hz; 47 to 63 Hz
Rated current $I_{in\ rated}$	0.53 to 0.3 A	1.13 to 0.61 A
Inrush current limitation (+25 °C)	< 15 A	< 30 A
I^2t	< 0,8 A^2s	< 3 A^2s
Integrated line-side fuse	Internal	Internal
Recommended circuit-breaker (IEC 898) in mains supply line	From 16 A Characteristic B or from 10 A Characteristic C	From 16 A Characteristic B or from 10 A Characteristic C
Output	Stabilized, floating direct voltage	Stabilized, floating direct voltage
Rated voltage $V_{outrated}$	**12 V DC**	**12 V DC**
Total tolerance, static	±3%	±3%
• Static mains compensation	Approx. 0.2%	Approx. 0.1%
• Static load compensation	Approx. 1.5%	Approx. 1.5%
Residual ripple (clock frequency approx. 90 kHz)	< 200 m V_{pp}	< 200 m V_{pp}
Spikes (bandwidth approx. 20 MHz)	< 300 m V_{pp}	< 300 m V_{pp}
Setting range	10.5 to 16.1 V	10.5 to 16.1 V
Status display	Green LED for output voltage OK	Green LED for output voltage OK
Power ON/OFF behavior	No overshoot of V_{out} (soft start)	No overshoot of V_{out} (soft start)
Starting delay/voltage rise	< 0.5 s/typ. 15 ms	< 0.5 s/typ. 10 ms

Technical specifications LOGO!power 12 V (continued)

Power supply, type	12 V/1.9 A	12 V/4.5 A
Order No.	**6EP1 321-1SH02**	**6EP1 322-1SH02**
Rated current $I_{outrated}$	**1.9 A**	**4.5 A**
Current range up to +55 °C	0 to 1.9 A	0 to 4.5 A
Parallel connection for increased output	Yes	Yes
Efficiency		
Efficiency at $V_{outrated}$, $I_{out\ rated}$	typ. 80%	typ. 85%
Power loss at $V_{outrated}$, $I_{out\ rated}$	typ. 5 W	typ. 10 W
Control		
Dyn. mains compensation ($V_{out\ rated}$ ±15%)	< 0,2% U_a	< 0,2% U_a
Dyn. load compensation (I_{out}: 10/90/10%)	±3% U_a	±4,2% U_a
Settling time		
• Load step from 10 to 90%	typ. 20 ms	typ. 20 ms
• Load step from 90 to 10%	typ. 20 ms	typ. 20 ms
Protection and monitoring		
Current limitation	typ. 2.5 A	typ. 5.9 A
Short-circuit protection	Stabilized current characteristic	Stabilized current characteristic
RMS sustained short-circuit current	< 4 A	< 8 A
Overload/short-circuit indicator	-	-
Safety		
Galvanic isolation primary/secondary	Yes, SELV output voltage V_{out} acc. to EN 60950 and EN 50178	Yes, SELV output voltage V_{out} acc. to EN 60950 and EN 50178
Protective class	Class II (without PE conductor)	Class II (without PE conductor)
CE marking	Yes	Yes
UL/cUL (CSA) approval	Yes, cULus listed (UL 508, CSA 22.2 No. 14-M95), File E197259; cURus recognized (UL 60950, CSA 22.2 No. 60950), File E151273	Yes, cULus listed (UL 508, CSA 22.2 No. 14-M95), File E197259; cURus recognized (UL 60950, CSA 22.2 No. 60950), File E151273
FM approval	Yes, Class I Div. 2, Group A, B, C, D T4	Yes, Class I Div. 2, Group A, B, C, D T4
Appr. for use in marine vessels	Yes, GL, ABS	Yes, GL, ABS
Degree of protection (EN 60529)	IP20	IP20
EMC		
Interference emission	EN 55022 Class B	EN 55022 Class B
Line harmonics limitation	Not applicable	Not applicable
Interference immunity	EN 61000-6-2	EN 61000-6-2
Operating specifications		
Ambient temperature range	-20 to +55 °C with natural convection	-20 to +55 °C with natural convection
Transportation and storage temperature range	-40 to +70 °C	-40 to +70 °C
Humidity rating	Climatic class 3K3 acc. to EN 60721, no condensation	Climatic class 3K3 acc. to EN 60721, no condensation
Mechanical specifications		
Connections		
• Mains input L1, N	One screw-type terminal each for 0.5 to 2.5 mm^2 single-core/finely stranded	One screw-type terminal each for 0.5 to 2.5 mm^2 single-core/finely stranded
• Output +		
• Output -	2 screw-type terminals each for 0.5 to 2.5 mm^2	2 screw-type terminals each for 0.5 to 2.5 mm^2
Dimensions (W x H x D) in mm	54 x 90 x 55	72 x 90 x 55
Weight	Approx. 0.17 kg	Approx. 0.25 kg
Mounting	Snap-mounting on DIN rail EN 50022-35x7.5/15	Snap-mounting on DIN rail EN 50022-35x7.5/15

Technical specifications LOGO!power 24 V

Typ	24 V/1.3 A	24 V/2.5 A	24 V/4 A
Order number	**6EP1 331-1SH02**	**6EP1 332-1SH42**	**6EP1 332-1SH51**
Input	Single-phase AC	Single-phase AC	Single-phase AC
Rated voltage $U_{inrated}$	**100 V - 240 V AC** wide-range input	**100 V - 240 V AC** wide-range input	**100 V - 240 V AC** wide-range input
Voltage range	85 V to 264 V AC	85 V to 264 V AC	85 V to 264 V AC
Overvoltage strength	2.3 x $U_{in\ rated}$/1.3 ms	2.3 x $U_{in\ rated}$/1.3 ms	2.3 x $U_{in\ rated}$/1.3 ms
Line buffering at $I_{out\ rated}$	> 40 ms at U_{in} = 187 V	> 40 ms at U_{in} = 187 V	> 40 ms at U_{in} = 187 V
Rated line frequency, rated line-frequency range	50/60 Hz; 47 Hz to 63 Hz	50/60 Hz; 47 Hz to 63 Hz	50/60 Hz; 47 Hz to 63 Hz
Rated current $I_{inrated}$	0.7-0.35 A	1.22-0.66 A	1.95-0.97 A
Switch-on current limit (+25 °C)	< 15 A	< 30 A	< 30 A
I^2t	< 0.8 A^2s	< 3 A^2s	< 2.5 A^2s
Built-in line-side fuse	Internal	Internal	Internal
Recommended miniature circuit-breaker (IEC 898) in the supply feeder	At and above 16 A, B characteristic or at and above 10 A, C characteristic	At and above 16 A, B characteristic or at and above 10 A, C characteristic	At and above 16 A, B characteristic or at and above 10 A, C characteristic
Output	Controlled, isolated DC voltage	Controlled, isolated DC voltage	Controlled, isolated DC voltage
Rated voltage $U_{outrated}$	**24 V DC**	**24 V DC**	**24 V DC**
Total tolerance, static	±3%	±3%	±3%
• Static line smoothing	Approx. 0.1%	Approx. 0.1%	Approx. 0.1%
• Static load smoothing	Approx. 1.5%	Approx. 1.5%	Approx. 1.5%
Ripple content (clock frequency approx. 90 kHz)	< 200 m V_{pp}	< 200 m V_{pp}	< 200 m V_{pp}
Spikes (bandwidth approx. 20 MHz)	< 300 m V_{pp}	< 300 m V_{pp}	< 300 m V_{pp}
Adjustment range	22.2 V to 26.4 V	22.2 V to 26.4 V	22.2 V to 26.4 V
Operation indicator	Green LED for output voltage OK	Green LED for output voltage OK	Green LED for output voltage OK
Response on activation/deactivation	No overshoot of U_{out} (soft start)	No overshoot of U_{out} (soft start)	No overshoot of U_{out} (soft start)
Startup delay/voltage rise	< 0.5 s/typ. 15 ms	< 0.5 s/typ. 10 ms	< 0.5 s/typ. 35 ms
Rated current $I_{outrated}$	**1.3 A**	**2.5 A**	**4 A**
Current range up to +55 °C	0 A to 1.3 A	0 A to 2.5 A	0 A to 4 A
Parallel switching for enhanced performance	Yes	Yes	Yes
Efficiency			
Efficiency at $U_{outrated}$, $I_{out\ rated}$	Typically 82%	Typically 87%	Typically 89%
Heat loss at $U_{outrated}$, $I_{out\ rated}$	Typically 7 W	Typically 9 W	Typically 12 W
Control			
Dynamic line smoothing ($U_{in\ rated}$ ±15%)	< 0.2% U_{out}	< 0.2% U_{out}	< 0.2% U_{out}
Dynamic load smoothing (I_{out}: 10/90/10%)	±1.5% U_{out}	±1.5% U_{out}	±1.5% U_{out}
Load-step settling time			
• 10 at 90%	Typically 20 ms	Typically 20 ms	Typically 20 ms
• 90 at 10%	Typically 20 ms	Typically 20 ms	Typically 20 ms
Protection and monitoring			
Current limit	Typically 2 A	Typically 3.4 A	Typically 4.7 A
Short-circuit protection	Constant-current characteristic	Constant-current characteristic	Constant-current characteristic
Sustained-short-circuit-current rms value	< 4 A	< 8 A	< 10 A
Overload/short-circuit indicator	-	-	-

Technical specifications LOGO!power 24 V (continued)

Type	24 V/1.3 A	24 V/2.5 A	24 V/4 A
Order number	**6EP1 331-1SH02**	**6EP1 332-1SH42**	**6EP1 332-1SH51**
Security			
Primary/secondary galvanic isolation	Yes, safety extra-low output voltage U_{out} to EN 60950 and EN 50178	Yes, safety extra-low output voltage U_{out} to EN 60950 and EN 50178	Yes, safety extra-low output voltage U_{out} to EN 60950 and EN 50178
Protection class	Class II (without protective conductor)	Class II (without protective conductor)	Class II (without protective conductor)
CE marking	Yes	Yes	Yes
UL/cUL (CSA) approval	Yes, cULus-listed (UL 508, CSA 22.2), file E197259; cURus-recognized (UL 60950, CSA 22.2), file E151273	Yes, cULus-listed (UL 508, CSA 22.2), file E197259; cURus-recognized (UL 60950, CSA 22.2), file E151273	Yes, cULus-listed (UL 508, CSA 22.2), file E197259; cURus-recognized (UL 60950, CSA 22.2), file E151273
FM approval	Yes, Class I Div. 2, Group A, B, C, D T4	Yes, Class I Div. 2, Group A, B, C, D T4	Yes, Class I Div. 2, Group A, B, C, D T4
Marine Type Approval	Yes, GL, ABS	Yes, GL, ABS	Yes, GL, ABS
Degree of protection (EN 60529)	IP20	IP20	IP20
EMC			
Emitted interference	EN 55022 Class B	EN 55022 Class B	EN 55022 Class B
Supply-harmonics limitation	Not applicable	Not applicable	EN 61000-3-2
Noise immunity	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2
Operating data			
Ambient temperature range	-20 °C to +55 °C with natural convection	-20 °C to +55 °C with natural convection	-20 °C to +55 °C with natural convection
Transport/storage temperature range	-40 °C to +70 °C	-40 °C to +70 °C	-40 °C to +70 °C
Humidity class	Climate class 3K3 to EN 60721, no condensation	Climate class 3K3 to EN 60721, no condensation	Climate class 3K3 to EN 60721, no condensation
Mechanical system			
Supply-input connections L1, N	Solid/finely-stranded per screw-type terminal for 0.5 mm to 2.5 mm^2	Solid/finely-stranded per screw-type terminal for 0.5 mm to 2.5 mm^2	Solid/finely-stranded per screw-type terminal for 0.5 mm to 2.5 mm^2
Connections			
• Output + • Output -	Per 2 screw-type terminals for 0.5 mm to 2.5 mm^2	Per 2 screw-type terminals for 0.5 mm to 2.5 mm^2	Per 2 screw-type terminals for 0.5 mm to 2.5 mm^2
Dimensions (W x H x D) in mm	54 x 90 x 55	72 x 90 x 55	90 x 90 x 55
Weight	Approx. 0.17 kg	Approx. 0.25 kg	Approx. 0.34 kg
Mounting	Snaps onto DIN rail DIN EN 50022-35x15/7.5	Snaps onto DIN rail DIN EN 50022-35x15/7.5	Snaps onto DIN rail DIN EN 50022-35x15/7.5

Ordering data

	Order No.		Order No.
LOGO!Power 12 V 1.9 A Input 100-240 V AC Output 12 V DC, 1.9 A	**6EP1 321-1SH02**	**LOGO!Power 24 V 1.3 A** Input 100-240 V AC Output 24 V DC, 1.3 A	**6EP1 331-1SH02**
LOGO!Power 12 V 4.5 A Input 100-240 V AC Output 12 V DC, 4.5 A	**6EP1 322-1SH02**	**LOGO!Power 24 V 2.5 A** Input 100-240 V AC Output 24 V DC, 2.5 A	**6EP1 332-1SH42**
		LOGO!Power 24 V 4 A Input 100-240 V AC Output 24 V DC, 4 A	**6EP1 332-1SH51**

2

LOGO!Contact

Overview

- Switching module for the direct switching of resistive loads and motors

Technical specifications

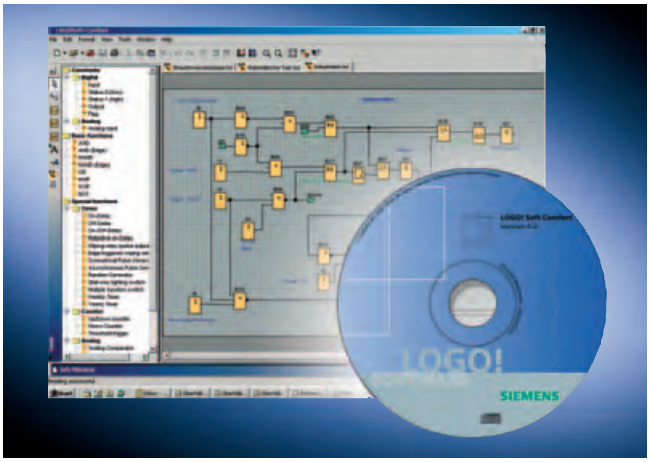
	6ED1 057-4CA00-0AA0	6ED1 057-4EA00-0AA0
Weights		
Weight, approx.	160 g	160 g

Ordering data

	Order No.
LOGO!Contact	
Module for direct switching of resistive consumers up to 20 A and motors up to 4 kW	
Switching voltage 24 V	**6ED1 057-4CA00-0AA0**
Switching voltage 230 V	**6ED1 057-4EA00-0AA0**

LOGO! Software

Overview



- The user-friendly software for creating control programs on a PC
- Creation of control programs in Function Block Diagram (FBD) or Ladder Diagram (LAD)
- Plus testing, simulation, online testing and archiving of control programs
- Professional documentation via numerous comment and print functions

Minimum system requirements

Windows 98 SE, NT 4.0, ME, 2000 or XP

- PC Pentium
- 90 MB vacant disk
- 64 MB RAM
- SVGA graphics card with minimum resolution 800x600 (256 colors).

Mac OS X

- PowerMac G3, G4, G4 Cube, IMac, PowerBook G3, G4 or iBook.

Linux (tested using Caldera OpenLinux 2.4)

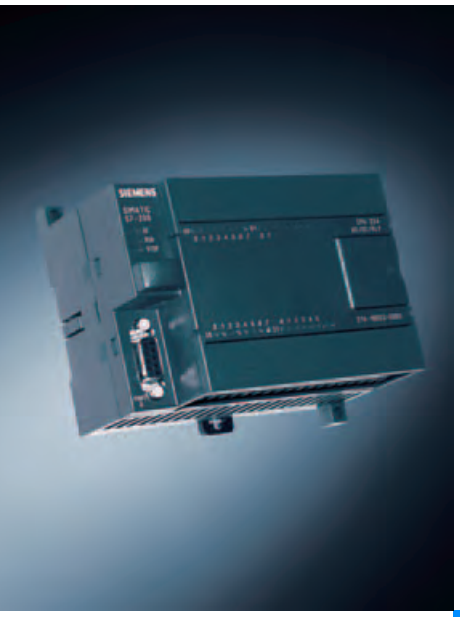
- Executes on all Linux distributions on which the Java 2 SDK Version 1.3.1 also executes.
- Please refer to your respective Linux distribution for the hardware requirements.

Ordering data

	Order No.
LOGO!Soft Comfort V5.0	**6ED1 058-0BA01-0YA0**
For programming on the PC in LAD/FBD; executes under Windows 98 SE and higher, Linux, MAC OSX; on CD-ROM	
LOGO!Soft Comfort upgrade	**6ED1 058-0CA01-0YE0**
From V1.0 and higher to V5.0	

SIMATIC S7-200

3



Brochures

For brochures serving as selection guides for SIMATIC products refer to:

http://www.siemens.com/simatic/printmaterial

S7-200, SIPLUS S7-200

Overview

SIMATIC S7-200

- The micro PLC that offers maximum automation at minimum cost.
- Extremely simple installation, programming and operation.
- Large-scale integration, space-saving, powerful.
- Can be used both for simple controls and for complex automation tasks.
- All CPUs can be used in stand-alone mode, in networks and within distributed structures.
- Suitable for applications where programmable controllers would not have been economically viable in the past.
- With outstanding real-time performance and powerful communication options (PPI, PROFIBUS DP, AS-Interface)
- Shipbuilding certification from
  - American Bureau of Shipping (ABS)
  - Bureau Veritas (BV)
  - Des Norske Veritas (DNV)
  - Germanischer Lloyd (GL)
  - Lloyds Register of Shipping (LRS)
  - Registro Italiano Navale (RINA)
  - Nippon Kaiji Kyokai (NK)

SIPLUS S7-200

- The PLC for use under harshest environmental conditions
- With extended temperature range from -25 °C to +70 °C
- Suitable for extraordinary medial load (pollution gas atmosphere)
- Occasional short-term condensation and increased mechanical loading permissible
- With the proven PLC technology of the S7-200
- Convenient handling, programming, maintenance and service
- Ideal for use in the automotive industry, environmental technology, mining, chemical plants, production technology, food industry, etc.
- The alternative to expensive custom solutions

For more information please visit our Internet site:

http://www.siemens.com/siplus

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http://www.siemens.com/simatic/printmaterial

Technical specifications

General technical specifications SIMATIC S7-200	
Degree of protection	IP20 in accordance with IEC 529
Ambient temperature	
• Operation (95% relative humidity)	
- With horizontal mounting	0 to 55 °C
- With vertical mounting	0 to 45 °C
• Transport and storage	-40 to +70 °C
- with 95% relative humidity	25 to 55 °C
Isolation	
• 5/24 V DC circuits	Test voltage 500 V AC
• 115/230 V AC circuits to ground	Test voltage 1500 V AC
• 115/230 V AC circuits to 115/230 V AC circuits	Test voltage 1500 V AC
• 230 V AC circuits to 5/24 V DC circuits	Test voltage 1500 V AC
• 115 V AC circuits to 5/24 V DC circuits	Test voltage 1500 V AC
Electromagnetic compatibility	Requirements of EMC law
• Noise immunity to EN 50082-2	Tested according to: IEC 801-2, IEC 801-3, IEC 801-4, EN 50141, EN 50204, IEC 801-5, VDE 0160
• Emitted interference according to EN 50081-1 and EN 50081-2	Tested according to EN 55011, Class A, Group 1 and EN 55011, Class B, Group 1
Mechanical rating	
• Vibrations, tested according to/tested with	IEC 68, Part 2-6: 10 to 57 Hz; constant amplitude 0.3 mm; 58 to 150 Hz; constant acceleration 1 g (mounted on DIN rail) or 2 g (mounted in control cabinet); type of vibration: frequency cycles with a rate of change of 1 octave/minute; vibration duration: 10 frequency cycles per axis in each direction of the 3 mutually perpendicular axes
• Shock, tested according to/tested with	IEC 68, Part 2-27/half-sine: shock strength 15 g (peak value), duration 11 ms, 6 shocks on each of the 3 mutually perpendicular axes

General technical specifications SIPLUS S7-200	
Climatic environmental conditions	
Temperature	Horizontal mounting: -25 °C top 70 °C Vertical mounting: -25 °C to 50 °C
Relative humidity	5 to 95%; transient condensation permissible, corresponding to relative humidity (RH-), stress grade 2 according to IEC 1131-2 and IEC 721 3-3 class 3K5
Transient icing	-25 °C to 0 °C IEC 721 3-3 class 3K5
Atmospheric pressure	1080 to 795 hPa corresponding to a height of –1000 to 2000 m
Pollutant concentration	SO2: < 0,5 ppm; relative humidity <60%, test: 10 ppm, 4 days H2S: < 0,1 ppm; relative humidity <60%, test: 1 ppm, 4 days (according to IEC 721 3-3; class 3C3)
Mechanical environmental conditions	
Vibrations	Type of vibration: frequency progressions changing at 1 octave per minute. 2 Hz ≤ f ≤ 9 Hz, constant amplitude 3,0 mm, 9 Hz ≤ f ≤ 150 Hz, constant acceleration 1 g, duration of vibration: 10 frequency progressions per axis in each direction of the three mutually perpendicular axes Vibration testing according to IEC 68 section 2-6 (sinus) and IEC 721 3-3, class 3M4
Shock	Type of shock: semisinusoidal, shock strength: 15 g peak value, duration 11 ms, shock direction: 3 shocks each in +/- direction on each of the mutually perpendicular axes Shock testing according to IEC 68 section 2-27
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1	Yes[1)]

1) Not valid for:
6AG1 214-2AD23-2XB0, 6AG1 214-2BD23-2XB0,
6AG1 232-0HB22-2XB0, 6AG1 235-0KD22-2XB0,
6AG1 231-7PB22-2XA0, 6AG1 901-3CB30-2XA0

CPU 221, CPU 222, CPU 224, CPU 224 XP, CPU 226

Overview CPU 221

- The smart compact solution
- With 10 inputs/outputs on board
- Not expandable

Overview CPU 224

- The compact high-performance CPU
- With 24 inputs/outputs on board
- Expandable with up to 7 expansion modules

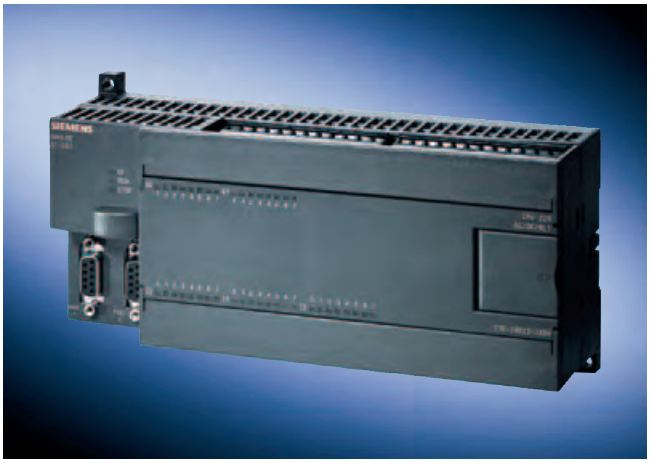
Overview CPU 222

- The superior compact solution
- With 14 inputs/outputs on board
- Expandable with up to 2 expansion modules

Overview CPU 224 XP

- The power CPU
- With 24 digital and 3 analog inputs/outputs onboard
- Expandable with up to 7 expansion modules

Overview CPU 226



- The high-performance package for complex technical tasks
- With additional PPI port for added flexibility and communication options
- With 40 inputs/outputs on board
- Expansion capability for max. 7 expansion racks

Technical specifications

	6ES7 211-0AA23-0XB0	6ES7 211-0BA23-0XB0	6ES7 212-1AB23-0XB0	6ES7 212-1BB23-0XB0
Supply voltages				
Rated value				
• DC 24 V	Yes		Yes	
• permissible range, lower limit (DC)	20.4 V		20.4 V	
• permissible range, upper limit (DC)	28.8 V		28.8 V	
• AC 120 V		Yes		Yes
• AC 230 V		Yes		Yes
• permissible range, lower limit (AC)		85 V		85 V
• permissible range, upper limit (AC)		264 V		264 V
• permissible frequency range, lower limit		47 Hz		47 Hz
• permissible frequency range, upper limit		63 Hz		63 Hz
Voltages and currents				
Load voltage L+				
• Rated value (DC)	24 V	24 V	24 V	24 V
• permissible range, lower limit (DC)	20.4 V	5 V	20.4 V	5 V
• permissible range, upper limit (DC)	28.8 V	30 V	28.8 V	30 V
Load voltage L1				
• Rated value (AC)		100 V; 100 to 230 V AC		100 V; 100 to 230 V AC
• permissible range, lower limit (AC)		5 V		5 V
• permissible range, upper limit (AC)		250 V		250 V
• permissible frequency range, lower limit		47 Hz		47 Hz
• permissible frequency range, upper limit		63 Hz		63 Hz
Current consumption				
Inrush current, max.	10 A; at 28.8 V	20 A; at 264 V	10 A; at 28.8 V	20 A; at 264 V

Technical specifications (continued)

	6ES7 211-0AA23-0XB0	6ES7 211-0BA23-0XB0	6ES7 212-1AB23-0XB0	6ES7 212-1BB23-0XB0
from supply voltage L+, max.	450 mA; 80 to 450 mA		500 mA; 85 to 500 mA, output current for expansion modules (DC 5 V) 340 mA	
from supply voltage L1, max.		120 mA; 15 to 60 mA (240 V), 30 to 120 mA (120 V), output current for expansion modules (DC 5 V) 340mA		140 mA; 20 to 70 mA (240 V), 40 to 140 mA (120 V); output current for expansion modules (DC 5 V) 340 mA
Backup battery				
• Backup time, max.	50 h; (min. 8 h at 40 °C); 200 days (typ.) with optional battery module	50 h; (min. 8 h at 40 °C); 200 days (typ.) with optional battery module	50 h; (min. 8 h at 40 °C); 200 days (typ.) with optional battery module	50 h; (min. 8 h at 40 °C); 200 days (typ.) with optional battery module
Memory				
Memory				
• Number of memory modules (optional)	1; pluggable memory module, content identical with integral EEPROM; can additionally store recipes, data logs and other files	1; pluggable memory module, content identical with integral EEPROM; can additionally store recipes, data logs and other files	1; pluggable memory module, content identical with integral EEPROM; can additionally store recipes, data logs and other files	1; pluggable memory module, content identical with integral EEPROM; can additionally store recipes, data logs and other files
• Data and program memory				
- Data memory, max.	2 KByte	2 KByte	2 KByte	2 KByte
- Program memory, max.	4 KByte	4 KByte	4 KByte	4 KByte
Backup				
• present	Yes; Program: complete program maintenance-free in integral EEPROM, programmable via CPU; Data: entire DB1 loaded by PG/PC maintenance-free in integrated EEPROM, current values of the DB 1 in the RAM, retentive memory bits, times, counters etc. maintenance-free via high-performance capacitor; optional battery for long-term buffering	Yes; Program: complete program maintenance-free in integral EEPROM, programmable via CPU; Data: entire DB1 loaded by PG/PC maintenance-free in integrated EEPROM, current values of the DB 1 in the RAM, retentive memory bits, times, counters etc. maintenance-free via high-performance capacitor; optional battery for long-term buffering	Yes; Program: complete program maintenance-free in integral EEPROM, programmable via CPU; Data: entire DB1 loaded by PG/PC maintenance-free in integrated EEPROM, current values of the DB 1 in the RAM, retentive memory bits, times, counters etc. maintenance-free via high-performance capacitor; optional battery for long-term buffering	Yes; Program: complete program maintenance-free in integral EEPROM, programmable via CPU; Data: entire DB1 loaded by PG/PC maintenance-free in integrated EEPROM, current values of the DB 1 in the RAM, retentive memory bits, times, counters etc. maintenance-free via high-performance capacitor; optional battery for long-term buffering
CPU/processing times				
for bit operations, max.	0.22 µs	0.22 µs	0.22 µs	0.22 µs
Times/counters and their remanence				
S7 counter				
• Number	256	256	256	256
• of which remanent with battery				
- adjustable	Yes; via high-performance capacitor or battery	Yes; via high-performance capacitor or battery	Yes; via high-performance capacitor or battery	Yes; via high-performance capacitor or battery
- lower limit	1	1	1	1
- upper limit	256	256	256	256
• Counting range				
- lower limit	0	0	0	0
- upper limit	32.767	32.767	32.767	32.767
S7 times				
• Number	256	256	256	256
• of which remanent with battery				
- adjustable	Yes; via high-performance capacitor or battery	Yes; via high-performance capacitor or battery	Yes; via high-performance capacitor or battery	Yes; via high-performance capacitor or battery
- upper limit	64	64	64	64

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Technical specifications (continued)

	6ES7 211-0AA23-0XB0	6ES7 211-0BA23-0XB0	6ES7 212-1AB23-0XB0	6ES7 212-1BB23-0XB0
S7 times				
• Time range				
- lower limit	1 ms	1 ms	1 ms	1 ms
- upper limit	54 min; 4 times, 1 ms to 30 s 16 times, 10 ms to 5 min 236 times, 100 ms to 54 min	54 min; 4 times, 1 ms to 30 s 16 times, 10 ms to 5 min 236 times, 100 ms to 54 min	54 min; 4 times, 1 ms to 30 s 16 times, 10 ms to 5 min 236 times, 100 ms to 54 min	54 min; 4 times, 1 ms to 30 s 16 times, 10 ms to 5 min 236 times, 100 ms to 54 min
Data areas and their remanence				
Flag				
• Number, max.	32 Byte	32 Byte	32 Byte	32 Byte
• Remanence available	Yes; M0.0 to M31.7	Yes; M0.0 to M31.7	Yes; M0.0 to M31.7	Yes; M0.0 to M31.7
• of which remanent with battery	0 to 255, via high-performance capacitor or battery, adjustable	0 to 255, via high-performance capacitor or battery, adjustable	0 to 255, via high-performance capacitor or battery, adjustable	0 to 255, via high-performance capacitor or battery, adjustable
• of which remanent without battery	0 to 112 in EEPROM, adjustable	0 to 112 in EEPROM, adjustable	0 to 112 in EEPROM, adjustable	0 to 112 in EEPROM, adjustable
Hardware configuration				
Connectable programming devices/PCs	SIMATIC PG/PC, Standard PC	SIMATIC PG/PC, Standard PC	SIMATIC PG/PC, Standard PC	SIMATIC PG/PC, Standard PC
Expansion devices, max.			2; Only expansion modules of the S7-22x series may be used. Due to limited output current, the use of expansion modules may be subject to restrictions.	2; Only expansion modules of the S7-22x series may be used (due to limited output current, the use of expansion modules may be subject to restrictions.)
Extension of distributed I/O				
• Analog inputs/outputs, max.			10; max. 8 inputs and 2 outputs (EM) or max. 0 inputs and 4 outputs (EM)	10; max. 8 inputs and 2 outputs (EM) or max. 0 inputs and 4 outputs (EM)
• Digital inputs/outputs, max.			78; max. 40 inputs and 38 outputs (CPU+EM)	78; max. 40 inputs and 38 outputs (CPU+EM)
• AS interface inputs/outputs max.			62; AS-Interface A/B slaves (CP 243-2)	62; AS-Interface A/B slaves (CP 243-2)
Connection point				
pluggable I/O terminals	No	No	No	No
1st interface				
Type of interface	Integral RS 485 interface	Integral RS 485 interface	Integral RS 485 interface	Integral RS 485 interface
Physics	RS 485	RS 485	RS 485	RS 485
Functionality				
• MPI	Yes; as MPI slave for data exchange with MPI masters (S7-300/S7-400-CPUs, OPs, TDs, Push Button Panels); S7-200-internal CPU/CPU communication is possible in the MPI network with restrictions; transmission rates: 19.2/187.5 kbit/s	Yes; as MPI slave for data exchange with MPI masters (S7-300/S7-400-CPUs, OPs, TDs, Push Button Panels); S7-200-internal CPU/CPU communication is possible in the MPI network with restrictions; transmission rates: 19.2/187.5 kbit/s	Yes; as MPI slave for data exchange with MPI masters (S7-300/S7-400-CPUs, OPs, TDs, Push Button Panels); S7-200-internal CPU/CPU communication is possible in the MPI network with restrictions; transmission rates: 19.2/187.5 kbit/s	Yes; as MPI slave for data exchange with MPI masters (S7-300/S7-400-CPUs, OPs, TDs, Push Button Panels); S7-200-internal CPU/CPU communication is possible in the MPI network with restrictions; transmission rates: 19.2/187.5 kbit/s
• PPI	Yes; with PPI protocol for program functions, HMI functions (TD 200, OP), S7-200-internal CPU/CPU communication; transmission rates 9.6/19.2/187.5 kbit/s	Yes; with PPI protocol for program functions, HMI functions (TD 200, OP), S7-200-internal CPU/CPU communication; transmission rates 9.6/19.2/187.5 kbit/s	Yes; with PPI protocol for program functions, HMI functions (TD 200, OP), S7-200-internal CPU/CPU communication; transmission rates 9.6/19.2/187.5 kbit/s	Yes; with PPI protocol for program functions, HMI functions (TD 200, OP), S7-200-internal CPU/CPU communication; transmission rates 9.6/19.2/187.5 kbit/s

Technical specifications (continued)

	6ES7 211-0AA23-0XB0	6ES7 211-0BA23-0XB0	6ES7 212-1AB23-0XB0	6ES7 212-1BB23-0XB0
Functionality				
• serial data exchange	Yes; as a freely programmable interface with an interrupt option for serial data transmission with external units with ASCII protocol baud rates: 0.3/0.6/1.2/2.4/4.8/9.6/ 19.2/38.4 kbit/s; at 1.2 to 38.4 kbit/s, the PC/PPI cable can be used as an RS232/RS485 converter	Yes; as a freely programmable interface with an interrupt option for serial data transmission with external units with ASCII protocol baud rates: 0.3/0.6/1.2/2.4/4.8/9.6/ 19.2/38.4 kbit/s; at 1.2 to 38.4 kbit/s, the PC/PPI cable can be used as an RS232/RS485 converter	Yes; as a freely programmable interface with an interrupt option for serial data transmission with external units with ASCII protocol baud rates: 0.3/0.6/1.2/2.4/4.8/9.6/ 19.2/38.4 kbit/s; at 1.2 to 38.4 kbit/s, the PC/PPI cable can be used as an RS232/RS485 converter	Yes; as a freely programmable interface with an interrupt option for serial data transmission with external units with ASCII protocol baud rates: 0.3/0.6/1.2/2.4/4.8/9.6/ 19.2/38.4 kbit/s; at 1.2 to 38.4 kbit/s, the PC/PPI cable can be used as an RS232/RS485 converter
MPI				
• Transmission speeds, max.	187.5 kBit/s	187.5 kBit/s	187,5 kBit/s	187.5 kBit/s
• Transmission speeds, max.	19.2 kBit/s	19.2 kBit/s	19.2 kBit/s	19.2 kBit/s
CPU/programming				
Programming language				
• LAD	Yes	Yes	Yes	Yes
• FUP	Yes	Yes	Yes	Yes
• AWL	Yes	Yes	Yes	Yes
Operational stocks	Bit logic instructions, compare instructions, timer instructions, counter instructions, clock instructions, integer math instructions, floating-point math instructions, numeric functions, move instructions, table instructions, logic instructions, shift and rotate instructions, conversion instructions, program control instructions, interrupt and communications instructions, logic stack instructions	Bit logic instructions, compare instructions, timer instructions, counter instructions, clock instructions, integer math instructions, floating-point math instructions, numeric functions, move instructions, table instructions, logic instructions, shift and rotate instructions, conversion instructions, program control instructions, interrupt and communications instructions, logic stack instructions	Bit logic instructions, compare instructions, timer instructions, counter instructions, clock instructions, integer math instructions, floating-point math instructions, numeric functions, move instructions, table instructions, logic instructions, shift and rotate instructions, conversion instructions, program control instructions, interrupt and communications instructions, logic stack instructions	Bit logic instructions, compare instructions, timer instructions, counter instructions, clock instructions, integer math instructions, floating-point math instructions, numeric functions, move instructions, table instructions, logic instructions, shift and rotate instructions, conversion instructions, program control instructions, interrupt and communications instructions, logic stack instructions
User program protection/password protection	Yes; 3-stage password protection	Yes; 3-stage password protection	Yes; 3-stage password protection	Yes; 3-stage password protection
Program processing	free cycle (OB 1), interrupt-controller, time-controlled (1 to 255 ms)	free cycle (OB 1), interrupt-controller, time-controlled (1 to 255 ms)	free cycle (OB 1), interrupt-controller, time-controlled (1 to 255 ms)	free cycle (OB 1), interrupt-controller, time-controlled (1 to 255 ms)
Program organization	1 OB, 1 DB, 1 SDB subroutines with/without parameter transfer	1 OB, 1 DB, 1 SDB subroutines with/without parameter transfer	1 OB, 1 DB, 1 SDB subroutines with/without parameter transfer	1 OB, 1 DB, 1 SDB subroutines with/without parameter transfer
Number of subroutines, max.	64	64	64	64
Digital inputs				
Number of digital inputs	6; integrated	6; integrated	8	8
Cable length				
• Cable length, shielded, max.	500 m; Standard input: 500m, fast counter: 50m	500 m; Standard input: 500m, fast counter: 50m	500 m; Standard input: 500m, fast counter: 50m	500 m; Standard input: 500m, fast counter: 50m
• Cable length unshielded, max.	300 m; not for high-speed signals	300 m; not for high-speed signals	300 m; not for high-speed signals	300 m; not for high-speed signals
m/p-reading	Yes; optionally, per group	Yes; optionally, per group	Yes; optionally, per group	Yes; optionally, per group

Technical specifications (continued)

	6ES7 211-0AA23-0XB0	6ES7 211-0BA23-0XB0	6ES7 212-1AB23-0XB0	6ES7 212-1BB23-0XB0
Input voltage				
• Rated value, DC	24 V	24 V	24 V	24 V
• for signal "0"	0 to 5 V	0 to 5 V	0 to 5 V	0 to 5 V
• for signal "1"	min. 15 V	min. 15 V	min. 15 V	min. 15 V
Input current				
• for signal "1", typ.	2.5 mA	2.5 mA	2.5 mA	2.5 mA
Input delay (for rated value of input voltage)				
• for standard inputs				
- programmable	Yes; all	Yes; all	Yes; all	Yes; all
- at " to "1", min.	0.2 ms	0.2 ms	0.2 ms	0.2 ms
- at "0" to "1", max.	12.8 ms	12.8 ms	12.8 ms	12.8 ms
• for interrupt inputs				
- programmable	Yes; E0.0 to E0.3	Yes; E0.0 to E0.3	Yes; E0.0 to E0.3	Yes; E0.0 to E0.3
• for counter/technological functions				
- programmable	Yes; (E0.0 to E0.5) 30 kHz	Yes; (E0.0 to E0.5) 30 kHz	Yes; (E0.0 to E0.5) 30 kHz	Yes; (E0.0 to E0.5) 30 kHz
Digital outputs				
Number of digital outputs	4; Transistor	4; Relay	6; Transistor	6; Relay
Cable length, shielded, max.	500 m	500 m	500 m	500 m
Cable length unshielded, max.	150 m	150 m	150 m	150 m
Short-circuit protection of the output	No; to be provided externally	No; to be provided externally	No; to be provided externally	No; to be provided externally
Limitation of inductive shutdown voltage to	1 W		1 W	
Switching capacity of the outputs				
• with resistive load, max.	0.75 A	2 A	0.75 A	2 A
• on lamp load, max.	5 W		5 W	
Output voltage				
• for signal "1", min.	20 V DC	L+/L1	20 V DC	L+/L1
Output current				
• for signal "1" rated value	750 mA	2 A	750 mA	2 A
• for signal "0" residual current, max.	0.1 mA	0 mA	10 µA	0 mA
Output delay with resistive load				
• "0" to "1", max.	15 µs; of the standard outputs, max. (A0.2 to A0.3) 15 µs; of the pulse outputs, max. (A0.0 to A0.1) 2 µs	10 ms; all outputs	15 µs; of the standard outputs, max. (A0.2 to A0.5) 15 µs; of the pulse outputs, max. (A0.0 to A0.1) 2 µs	10 ms; all outputs
• "1" to "0", max.	130 µs; of the standard outputs, max. (A0.2 to A0.3) 100 µs; of the pulse outputs, max. (A0.0 to A0.1) 10 µs	10 ms; all outputs	130 µs; of the standard outputs, max. (A0.2 to A0.5) 100 µs; of the pulse outputs, max. (A0.0 to A0.1) 10 µs	10 ms; all outputs
Parallel switching of 2 outputs				
• for increased power	Yes	No	Yes	No
Switching frequency				
• of the pulse outputs, with resistive load, max.	20 kHz; A0.0 to A0.1		20 kHz; A0.0 to A0.1	
Aggregate current of the outputs (per group)				
• horizontal installation				
- up to 55 °C, max.	3 A	6 A	4.5 A	6 A
• up to 40 °C, max.	3 A	6 A	4.5 A	6 A

Technical specifications (continued)

	6ES7 211-0AA23-0XB0	6ES7 211-0BA23-0XB0	6ES7 212-1AB23-0XB0	6ES7 212-1BB23-0XB0
Relay outputs				
Number of operating cycles		10,000,000; mechanically 10 million, at rated load voltage 100,000		10,000,000; mechanically 10 million, at rated load voltage 100,000
Analog inputs				
Number of analog potentiometers	1; Analog potentiometer; resolution 8 bit	1; Analog potentiometer; resolution 8 bit	1; Analog potentiometer; resolution 8 bit	1; Analog potentiometer; resolution 8 bit
Encoder supply				
24 V encoder supply				
• 24 V	Yes; permissible range: 15.4 to 28.8 V	Ja; permissible range: 20,4 to 28,8 V	Yes; permissible range: 15.4 to 28.8 V	Yes; permissible range: 20.4 to 28.8 V
• Short-circuit protection	Yes; electronic at 600 mA	Yes; electronic at 600 mA	Yes; electronic at 600 mA	Yes; electronic at 600 mA
• Output current, max.	180 mA	180 mA	180 mA	180 mA
Encoder				
Connectable encoders				
• 2-wire BEROS	Yes	Yes	Yes	Yes
• permissible quiescent current (2-wire BEROS), max.	1 mA	1 mA	1 mA	1 mA
Integrated Functions				
Number of counters	4; high-speed counters (each 30 kHz), 32 bit (incl. sign), usable as forward/backward counter or for connection of 2 incremental encoders with 2 pulse series offset by 90° (max. 20 kHz (A/B counters)); parameterizable enable and reset input; Interrupt options (incl. calling subroutine with any content) on reaching setpoint; change counting direction etc.	4; high-speed counters (each 30 kHz), 32 bit (incl. sign), usable as forward/backward counter or for connection of 2 incremental encoders with 2 pulse series offset by 90° (max. 20 kHz (A/B counters)); parameterizable enable and reset input; Interrupt options (incl. calling subroutine with any content) on reaching setpoint; change counting direction etc.	4; high-speed counters (each 30 kHz), 32 bit (incl. sign), usable as forward/backward counter or for connection of 2 incremental encoders with 2 pulse series offset by 90° (max. 20 kHz (A/B counters)); parameterizable enable and reset input; Interrupt options (incl. calling subroutine with any content) on reaching setpoint; change counting direction etc.	4; high-speed counters (each 30 kHz), 32 bit (incl. sign), usable as forward/backward counter or for connection of 2 incremental encoders with 2 pulse series offset by 90° (max. 20 kHz (A/B counters)); parameterizable enable and reset input; Interrupt options (incl. calling subroutine with any content) on reaching setpoint; change counting direction etc.
Counter frequency (counter) max.	30 kHz	30 kHz	30 kHz	30 kHz
Number of alarm inputs	4; 4 rising edges and/or 4 falling edges	4; 4 rising edges and/or 4 falling edges	4; 4 rising edges and/or 4 falling edges	4; 4 rising edges and/or 4 falling edges
Number of pulse outputs	2; high-speed outputs, 20 kHz, with interrupt option; pulse-width and frequency modulation option	2; high-speed outputs, 20 kHz, with interrupt option; pulse-width and frequency modulation option	2; high-speed outputs, 20 kHz, with interrupt option; pulse-width and frequency modulation option	2; high-speed outputs, 20 kHz, with interrupt option; pulse-width and frequency modulation option
Limit frequency (pulse)	20 kHz	20 kHz	20 kHz	20 kHz
Isolation				
Isolation, digital outputs				
• between the channels	Yes; Optocoupler	Yes; Relay	Yes; Optocoupler	Yes; Relay
• between the channels, in groups of	4		6	3
Galvanic isolation, digital inputs				
• between the channels	Yes	Yes	Yes	Yes
• between the channels, in groups of			4	4

Technical specifications (continued)

	6ES7 211-0AA23-0XB0	6ES7 211-0BA23-0XB0	6ES7 212-1AB23-0XB0	6ES7 212-1BB23-0XB0
Permissible potential difference				
between different circuits	500 V DC between 24 V DC and 5 V DC	500 V DC between 24 V DC and 5 V DC; 1500 V AC between 24 V DC and 230 V AC	500 V DC between 24 V DC and 5 V DC	500 V DC between 24 V DC and 5 V DC; 1500 V AC between 24 V DC and 230 V AC
Environmental requirements				
Environmental conditions	For further environmental conditions, see "Automation System S7-200, System Manual"	For further environmental conditions, see "Automation System S7-200, System Manual"	For further environmental conditions, see "Automation System S7-200, System Manual"	For further environmental conditions, see "Automation System S7-200, System Manual"
Operating termperature				
• vertical installation, min.	0 °C	0 °C	0 °C	0 °C
• vertical installation, max.	45 °C	45 °C	45 °C	45 °C
• horizontal installation, min.	0 °C	0 °C	0 °C	0 °C
• horizontal installation, max.	55 °C	55 °C	55 °C	55 °C
Air pressure				
• permissible range, min.	860 hPa	860 hPa	860 hPa	860 hPa
• permissible range, max.	1,080 hPa	1,080 hPa	1,080 hPa	1,080 hPa
Relative humidity				
• Operation, min.	5%	5%	5%	5%
• Operation, max.	95%; RH stressing level 2 in accordance with IEC 1131-2	95%; RH stressing level 2 in accordance with IEC 1131-2	95%; RH stressing level 2 in accordance with IEC 1131-2	95%; RH stressing level 2 in accordance with IEC 1131-2
Degree and class of protection				
• IP 20	Yes	Yes	Yes	Yes
Dimensions and weight				
Width	90 mm	90 mm	90 mm	90 mm
Height	80 mm	80 mm	80 mm	80 mm
Depth	62 mm	62 mm	62 mm	62 mm
Weights				
Weight, approx.	270 g	310 g	270 g	310 g

	6ES7 214-1AD23-0XB0	6ES7 214-1BD23-0XB0	6ES7 214-2AD23-0XB0	6ES7 214-2BD23-0XB0	6ES7 216-2AD23-0XB0	6ES7 216-2BD23-0XB0
Supply voltages						
Rated value						
• DC 24 V	Yes		Yes		Yes	
• permissible range, lower limit (DC)	20.4 V		20.4 V		20.4 V	
• permissible range, upper limit (DC)	28.8 V		28.8 V		28.8 V	
• AC 120 V		Yes		Yes		Yes
• AC 230 V		Yes		Yes		Yes
• permissible range, lower limit (AC)		85 V		85 V		85 V
• permissible range, upper limit (AC)		264 V		264 V		264 V
• permissible frequency range, lower limit		47 Hz		47 Hz		47 Hz
• permissible frequency range, upper limit		63 Hz		63 Hz		63 Hz
Voltages and currents						
Load voltage L+						
• Rated value (DC)	24 V	24 V	24 V	24 V	24 V	24 V
• permissible range, lower limit (DC)	20.4 V	5 V	20.4 V	5 V	20.4 V	5 V
• permissible range, upper limit (DC)	28.8 V	30 V	28.8 V	30 V	28.8 V	30 V

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Technical specifications (continued)

	6ES7 214-1AD23-0XB0	6ES7 214-1BD23-0XB0	6ES7 214-2AD23-0XB0	6ES7 214-2BD23-0XB0	6ES7 216-2AD23-0XB0	6ES7 216-2BD23-0XB0
Load voltage L1						
• Rated value (AC)		100 V; 100 to 230 V AC		100 V; 100 to 230 V AC		100 V; 100 to 230 V AC
• permissible range, lower limit (AC)		5 V		5 V		5 V
• permissible range, upper limit (AC)		250 V		250 V		250 V
• permissible frequency range, lower limit		47 Hz		47 Hz		47 Hz
• permissible frequency range, upper limit		63 Hz		63 Hz		63 Hz
Current consumption						
Inrush current, max.	12 A; at 28.8 V	20 A; at 264 V	12 A; at 28.8 V	20 A; at 264 V	10 A; at 28.8 V	20 A; at 264 V
from supply voltage L+, max.	700 mA; 110 to 700 mA, output current for expansion modules (DC 5 V) 660 mA		900 mA; 120 to 900 mA, output current for expansion modules (DC 5 V) 660 mA		1,050 mA; 150 to 1050 mA output current for expansion modules (DC 5 V) 1000 mA	
from supply voltage L1, max.		200 mA; 30 to 100 mA (240 V), 60 to 200 mA (120 V); output current for expansion modules (DC 5 V) 600 mA		220 mA; 35 to 100 mA (240 V), 70 to 220 mA (120 V); output current for expansion modules (DC 5 V) 600 mA		320 mA; 40 to 160 mA (240 V), 80 to 320 mA (120 V); output current for expansion modules (DC 5 V) 1000 mA
Backup battery						
• Backup time, max.	100 h; (min. 70 h at 40 °C); 200 days (typ.) with optional battery module	100 h; (min. 70 h at 40 °C); 200 days (typ.) with optional battery module	100 h; (min. 70 h at 40 °C); 200 days (typ.) with optional battery module	100 h; (min. 70 h at 40 °C); 200 days (typ.) with optional battery module	100 h; (min. 70 h at 40 °C); 200 days (typ.) with optional battery module	100 h; (min. 70 h at 40 °C); 200 days (typ.) with optional battery module
Memory						
Memory						
• Number of memory modules (optional)	1; pluggable memory module, content identical with integral EEPROM; can additionally store recipes, data logs and other files	1; pluggable memory module, content identical with integral EEPROM; can additionally store recipes, data logs and other files	1; pluggable memory module, content identical with integral EEPROM; can additionally store recipes, data logs and other files	1; pluggable memory module, content identical with integral EEPROM; can additionally store recipes, data logs and other files	1; pluggable memory module, content identical with integral EEPROM; can additionally store recipes, data logs and other files	1; pluggable memory module, content identical with integral EEPROM; can additionally store recipes, data logs and other files
• Data and program memory						
- Data memory, max.	8 KByte	8 KByte	10 KByte	10 KByte	10 KByte	10 KByte
- Program memory, max.	12 KByte; 8 KB on active run-time edit	12 KByte; 8 KB on active run-time edit	16 KByte; 12 KB for active run-time edit	16 KByte; 12 KB for active run-time edit	24 KByte; 16 KB with active run-time edit	24 KByte; 16 KB with active run-time edit

Technical specifications (continued)

	6ES7 214-1AD23-0XB0	6ES7 214-1BD23-0XB0	6ES7 214-2AD23-0XB0	6ES7 214-2BD23-0XB0	6ES7 216-2AD23-0XB0	6ES7 216-2BD23-0XB0
Backup						
• present	Yes; Program: complete program maintenance-free in integral EEPROM, programmable via CPU; Data: entire DB1 loaded by PG/PC maintenance-free in integrated EEPROM, current values of the DB 1 in the RAM, retentive memory bits, times, counters etc. maintenance-free via high-performance capacitor; optional battery for long-term buffering	Yes; Program: complete program maintenance-free in integral EEPROM, programmable via CPU; Data: entire DB1 loaded by PG/PC maintenance-free in integrated EEPROM, current values of the DB 1 in the RAM, retentive memory bits, times, counters etc. maintenance-free via high-performance capacitor; optional battery for long-term buffering	Yes; Program: complete program maintenance-free in integral EEPROM, programmable via CPU; Data: entire DB1 loaded by PG/PC maintenance-free in integrated EEPROM, current values of the DB 1 in the RAM, retentive memory bits, times, counters etc. maintenance-free via high-performance capacitor; optional battery for long-term buffering	Yes; Program: complete program maintenance-free in integral EEPROM, programmable via CPU; Data: entire DB1 loaded by PG/PC maintenance-free in integrated EEPROM, current values of the DB 1 in the RAM, retentive memory bits, times, counters etc. maintenance-free via high-performance capacitor; optional battery for long-term buffering	Yes; Program: complete program maintenance-free in integral EEPROM, programmable via CPU; Data: entire DB1 loaded by PG/PC maintenance-free in integrated EEPROM, current values of the DB 1 in the RAM, retentive memory bits, times, counters etc. maintenance-free via high-performance capacitor; optional battery for long-term buffering	Yes; Program: complete program maintenance-free in integral EEPROM, programmable via CPU; Data: entire DB1 loaded by PG/PC maintenance-free in integrated EEPROM, current values of the DB 1 in the RAM, retentive memory bits, times, counters etc. maintenance-free via high-performance capacitor; optional battery for long-term buffering
CPU/processing times						
for bit operations, max.	0.22 µs	0.22 µs	0.22 µs	0.22 µs	0.22 µs	0.22 µs
Times/counters and their remanence						
S7 counter						
• Number	256	256	256	256	256	256
• of which remanent with battery						
- adjustable	Yes; via high-performance capacitor or battery	Yes; via high-performance capacitor or battery	Yes; via high-performance capacitor or battery	Yes; via high-performance capacitor or battery	Yes; via high-performance capacitor or battery	Yes; via high-performance capacitor or battery
- lower limit	1	1	1	1	1	1
- upper limit	256	256	256	256	256	256
• Counting range						
- lower limit	0	0	0	0	0	0
- upper limit	32,767	32,767	32,767	32,767	32,767	32,767
S7 times						
• Number	256	256	256	256	256	256
• of which remanent with battery						
- adjustable	Yes; via high-performance capacitor or battery	Yes; via high-performance capacitor or battery	Yes; via high-performance capacitor or battery	Yes; via high-performance capacitor or battery	Yes; via high-performance capacitor or battery	Yes; via high-performance capacitor or battery
- upper limit	64	64	64	64	64	64
• Time range						
- lower limit	1 ms	1 ms	1 ms	1 ms	1 ms	1 ms
- upper limit	54 min; 4 times, 1 ms to 30 s 16 times, 10 ms to 5 min 236 times, 100 ms to 54 min	54 min; 4 times, 1 ms to 30 s 16 times, 10 ms to 5 min 236 times, 100 ms to 54 min	54 min; 4 times, 1 ms to 30 s 16 times, 10 ms to 5 min 236 times, 100 ms to 54 min	54 min; 4 times, 1 ms to 30 s 16 times, 10 ms to 5 min 236 times, 100 ms to 54 min	54 min; 4 times, 1 ms to 30 s 16 times, 10 ms to 5 min 236 times, 100 ms to 54 min	54 min; 4 times, 1 ms to 30 s 16 times, 10 ms to 5 min 236 times, 100 ms to 54 min

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Technical specifications (continued)

	6ES7 214-1AD23-0XB0	6ES7 214-1BD23-0XB0	6ES7 214-2AD23-0XB0	6ES7 214-2BD23-0XB0	6ES7 216-2AD23-0XB0	6ES7 216-2BD23-0XB0
Data areas and their remanence						
Flag						
• Number, max.	32 Byte	32 Byte	32 Byte	32 Byte	32 Byte	32 Byte
• Remanence available	Yes; M0.0 to M31.7	Yes; M0.0 to M31.7	Yes; M0.0 to M31.7	Yes; M0.0 to M31.7	Yes; M0.0 to M31.7	Yes; M0.0 to M31.7
• of which remanent with battery	0 to 255, via high-performance capacitor or battery, adjustable	0 to 255, via high-performance capacitor or battery, adjustable	0 to 255, via high-performance capacitor or battery, adjustable	0 to 255, via high-performance capacitor or battery, adjustable	0 to 255, via high-performance capacitor or battery, adjustable	0 to 255, via high-performance capacitor or battery, adjustable
• of which remanent without battery	0 to 112 in EEPROM, adjustable	0 to 112 in EEPROM, adjustable	0 to 112 in EEPROM, adjustable	0 to 112 in EEPROM, adjustable	0 to 112 in EEPROM, adjustable	0 to 112 in EEPROM, adjustable
Hardware configuration						
Connectable programming devices/PCs	SIMATIC PG/PC, Standard PC	SIMATIC PG/PC, Standard PC	SIMATIC PG/PC, Standard PC	SIMATIC PG/PC, Standard PC	SIMATIC PG/PC, Standard PC	SIMATIC PG/PC, Standard PC
Expansion devices, max.	7; Only expansion modules of the S7-22x series may be used (due to limited output current, the use of expansion modules may be subject to restrictions.)					
Extension of distributed I/O						
• Analog inputs/outputs, max.	35; max. 28 inputs and 7 outputs (EM) or max. 0 inputs and 14 outputs (EM)	35; max. 28 inputs and 7 outputs (EM) or max. 0 inputs and 14 outputs (EM)	38; two on board inputs and one output, in addition; max. 28 inputs and 7 outputs (EM) or max. 0 inputs and 14 outputs (EM)	38; two on board inputs and one output, in addition; max. 28 inputs and 7 outputs (EM) or max. 0 inputs and 14 outputs (EM)	35; max. 28 inputs and 7 outputs (EM) or max. 0 inputs and 14 outputs (EM)	35; max. 28 inputs and 7 outputs (EM) or max. 0 inputs and 14 outputs (EM)
• Digital inputs/outputs, max.	168; max. 94 inputs and 74 outputs (CPU+EM)	168; max. 94 inputs and 74 outputs (CPU+EM)	168; max. 94 inputs and 74 outputs (CPU+EM)	168; max. 94 inputs and 74 outputs (CPU+EM)	148; max. 128 inputs and 120 outputs (CPU+EM)	148; max. 128 inputs and 120 outputs (CPU+EM)
• AS interface inputs/outputs max.	62; AS-Interface A/B-slaves (CP 243-2)	62; AS-Interface A/B-slaves (CP 243-2)	62; AS-Interface A/B-slaves (CP 243-2)	62; AS-Interface A/B-slaves (CP 243-2)	62; AS-Interface A/B-slaves (CP 243-2)	62; AS-Interface A/B-slaves (CP 243-2)
Connection point						
pluggable I/O terminals	Yes	Yes	Yes	Yes	Yes	Yes
1st interface						
Type of interface	Integral RS 485 interface	Integral RS 485 interface	Integral RS 485 interface	Integral RS 485 interface	Integral RS 485 interface	Integral RS 485 interface
Physics	RS 485	RS 485	RS 485	RS 485	RS 485	RS 485
Functionality						
• MPI	Yes; as MPI slave for data exchange with MPI masters (S7-300/S7-400-CPUs, OPs, TDs, Push Button Panels); S7-200-internal CPU/CPU communication is possible in the MPI network with restrictions; transmission rates: 19.2/187.5 kbit/s					
• PPI	Yes; with PPI protocol for program functions, HMI functions (TD 200, OP), S7-200-internal CPU/CPU communication; transmission rates 9.6/19.2/187.5 kbit/s					
• serial data exchange	Yes; as a freely programmable interface with an interrupt option for serial data transmission with external units with ASCII protocol baud rates: 0.3/0.6/1.2/2.4/4.8/9.6/19.2/38.4 kbit/s; at 1.2 to 38.4 kbit/s, the PC/PPI cable can be used as an RS232/RS485 converter					

Technical specifications (continued)

	6ES7 214-1AD23-0XB0	6ES7 214-1BD23-0XB0	6ES7 214-2AD23-0XB0	6ES7 214-2BD23-0XB0	6ES7 216-2AD23-0XB0	6ES7 216-2BD23-0XB0
MPI						
• Transmission speeds, max.	187.5 kBit/s	187.5 kBit/s	187.5 kBit/s	187.5 kBit/s	187.5 kBit/s	187.5 kBit/s
• Transmission speeds, min.	19.2 kBit/s	19.2 kBit/s	19.2 kBit/s	19.2 kBit/s	19.2 kBit/s	19.2 kBit/s
2nd interface						
Type of interface			Integated RS 485 interface	Integrated RS 485 interface	Integrated RS 485 interface	Integrated RS 485 interface
Physics			RS 485	RS 485	RS 485	RS 485
Functionality						
• MPI			Yes; as MPI slave for data exchange with MPI masters (S7-300/S7-400-CPUs, OPs, TDs, Push Button Panels); S7-200-internal CPU/CPU communication is possible in the MPI network with restrictions; transmission rates: 19.2/187.5 kbit/s			
• PPI			Yes; with PPI protocol for program functions, HMI functions (TD 200, OP), S7-200-internal CPU/CPU communication; transmission rates 9.6/19.2/187.5 kbit/s			
• serial data exchange			Yes; as a freely programmable interface with an interrupt option for serial data transmission with external units with ASCII protocol baud rates: 0.3/0.6/1.2/2.4/4.8/9.6/19.2/38.4 kbit/s; at 1.2 to 38.4 kbit/s, the PC/PPI cable can be used as an RS232/RS485 converter			
MPI						
• Transmission speed, max.			187.5 kBit/s	187.5 kBit/s	187.5 kBit/s	187.5 kBit/s
• Transmission speed, min.			19.2 kBit/s	19.2 kBit/s	19.2 kBit/s	19.2 kBit/s
CPU/programming						
Programming language						
• LAD	Yes	Yes	Yes	Yes	Yes	Yes
• FUP	Yes	Yes	Yes	Yes	Yes	Yes
• AWL	Yes	Yes	Yes	Yes	Yes	Yes
Operational stocks	Bit logic instructions, compare instructions, timer instructions, counter instructions, clock instructions, integer math instructions, floating-point math instructions, numeric functions, move instructions, table instructions, logic instructions, shift and rotate instructions, conversion instructions, program control instructions, interrupt and communications instructions, logic stack instructions					
User program protection/password protection	Yes; 3-stage password protection	Yes; 3-stage password protection	Yes; 3-stage password protection	Yes; 3-stage password protection	Yes; 3-stage password protection	Yes; 3-stage password protection
Program processing	free cycle (OB 1), interrupt-controller, time-controlled (1 to 255 ms)	free cycle (OB 1), interrupt-controller, time-controlled (1 to 255 ms)	free cycle (OB 1), interrupt-controller, time-controlled (1 to 255 ms)	free cycle (OB 1), interrupt-controller, time-controlled (1 to 255 ms)	free cycle (OB 1), interrupt-controller, time-controlled (1 to 255 ms)	free cycle (OB 1), interrupt-controller, time-controlled (1 to 255 ms)
Program organization	1 OB, 1 DB, 1 SDB subroutines with/without parameter transfer	1 OB, 1 DB, 1 SDB subroutines with/without parameter transfer	1 OB, 1 DB, 1 SDB subroutines with/without parameter transfer	1 OB, 1 DB, 1 SDB subroutines with/without parameter transfer	1 OB, 1 DB, 1 SDB subroutines with/without parameter transfer	1 OB, 1 DB, 1 SDB subroutines with/without parameter transfer
Number of subroutines, max.	64	64	64	64	64	64

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Technical specifications (continued)

	6ES7 214-1AD23-0XB0	6ES7 214-1BD23-0XB0	6ES7 214-2AD23-0XB0	6ES7 214-2BD23-0XB0	6ES7 216-2AD23-0XB0	6ES7 216-2BD23-0XB0
Digital inputs						
Number of digital inputs	14	14	14	14	24	24
Cable length						
• Cable length, shielded, max.	500 m; Standard input: 500m, fast counter: 50m	500 m; Standard input: 500m, fast counter: 50m	500 m; Standard input: 500m, fast counter: 50m	500 m; Standard input: 500m, fast counter: 50m	500 m; Standard input: 500m, fast counter: 50m	500 m; Standard input: 500m, fast counter: 50m
• Cable length unshielded, max.	300 m; not for high-speed signals	300 m; not for high-speed signals	300 m; not for high-speed signals	300 m; not for high-speed signals	300 m; not for high-speed signals	300 m; not for high-speed signals
m/p-reading	Yes; optionally, per group	Yes; optionally, per group	Yes; optionally, per group	Yes; optionally, per group	Yes; optionally, per group	Yes; optionally, per group
Input voltage						
• Rated value, DC	24 V	24 V	24 V	24 V	24 V	24 V
• for signal "0"	0 to 5 V	0 to 5 V	0 to 5 V; 0 to 1V (I0.3 to I0.5)	0 to 5 V; 0 to 1V (I0.3 to I0.5)	0 to 5 V	0 to 5 V
• for signal "1"	min. 15 V	min. 15 V	min. 15 V; at least 4V (I0.3 to I0.5)	min. 15 V; at least 4V (I0.3 to I0.5)	min. 15 V	min. 15 V
Input current						
• for signal "1", typ.	2.5 mA	2.5 mA	2.5 mA; 8 mA for I0.3 to I0.5	2.5 mA; 8 mA for I0.3 to I0.5	2.5 mA	2.5 mA
Input delay (for rated value of input voltage)						
• for standard inputs						
- programmable	Yes; all	Yes; all	Yes; all	Yes; all	Yes; all	Yes; all
- at " to "1", min.	0.2 ms	0.2 ms	0.2 ms	0.2 ms	0.2 ms	0.2 ms
- at "0" to "1", max.	12.8 ms	12.8 ms	12.8 ms	12.8 ms	12.8 ms	12.8 ms
• for interrupt inputs						
- programmable	Yes; E0.0 to E0.3	Yes; E0.0 to E0.3	Yes; E0.0 to E0.3	Yes; E0.0 to E0.3	Yes; E0.0 to E0.3	Yes; E0.0 to E0.3
• for counter/technological functions						
- programmable	Yes; (E0.0 to E1.5) 30 kHz	Yes; (E0.0 to E1.5) 30 kHz	Yes; (E0.0 to E1.5) up to 200 kHz	Yes; (E0.0 to E1.5) up to 200 kHz	Yes; (E0.0 to E1.5) 30 kHz	Yes; (E0.0 to E1.5) 30 kHz

Technical specifications (continued)

	6ES7 214-1AD23-0XB0	6ES7 214-1BD23-0XB0	6ES7 214-2AD23-0XB0	6ES7 214-2BD23-0XB0	6ES7 216-2AD23-0XB0	6ES7 216-2BD23-0XB0
Digital outputs						
Number of digital outputs	10; Transistor	10; Relay	10; Transistor	10; Relay	16; Transistor	16; Relay
Cable length, shielded, max.	500 m	500 m	500 m	500 m	500 m	500 m
Cable length unshielded, max.	150 m	150 m	150 m	150 m	150 m	150 m
Short-circuit protection of the output	No; to be provided externally	No; to be provided externally	No; to be provided externally	No; to be provided externally	No; to be provided externally	No; to be provided externally
Limitation of inductive shutdown voltage to	1 W		1 W		1 W	
Switching capacity of the outputs						
• with resistive load, max.	0.75 A	2 A	0.75 A	2 A	0.75 A	2 A
• on lamp load, max.	5 W	200 W; 30 W DC, 200 W AC	5 W	200 W; 30 W DC, 200 W AC	5 W	200 W; 30 W DC, 200 W AC
Output voltage						
• for signal "1", min.	20 V DC	L+/L1	L+ minus 0.4 V (5V/20.4V for A0.0 to A0.4; 20.4 V A0.5 to A1.1)	L+/L1	20 V DC	L+/L1
Output current						
• for signal "1" rated value	750 mA	2 A	750 mA	2 A	750 mA	2 A
• for signal "0" residual current, max.	10 µA	0 mA	10 µA	0 mA	10 µA	0 mA
Output delay with resistive load						
• "0" to "1", max.	15 µs; of the standard outputs, max. (A0.2 to A1.1) 2 µs; of the pulse outputs, max. (A0.0 to A0.1) 2 µs	10 ms; all outputs	15 µs; of the standard outputs, max. (A0.2 to A1.1) 15 µs; of the pulse outputs, max. (A0.0 to A0.1) 0.5 µs	10 ms; all outputs	15 µs; of the standard outputs, max. (A0.2 to A1.1) 2 µs; of the pulse outputs, max. (A0.0 to A0.1) 2 µs	10 ms; all outputs
• "1" to "0", max.	130 µs; of the standard outputs, max. (A0.2 to A1.1) 10 µs; of the pulse outputs, max. (A0.0 to A0.1) 10 µs	10 ms; all outputs	130 µs; of the standard outputs, max. (A0.2 to A1.1) 130 µs; of the pulse outputs, max. (A0.0 to A0.1) 1.5 µs	10 ms; all outputs	130 µs; of the standard outputs, max. (A0.2 to A1.1) 10 µs; of the pulse outputs, max. (A0.0 to A0.1) 10 µs	10 ms; all outputs
Parallel switching of 2 outputs						
• for increased power	Yes	No	Yes	No	Yes	No
Switching frequency						
• of the pulse outputs, with resistive load, max.	20 kHz; A0.0 to A0.1	1 Hz	100 kHz; A0.0 to A0.1	1 Hz	20 kHz; A0.0 to A0.1	1 kHz
Aggregate current of the outputs (per group)						
• horizontal installation - up to 55 °C, max.	6 A	10 A	3.75 A	10 A	6 A	10 A
• up to 40 °C, max.	6 A	10 A	3.75 A	10 A	6 A	10 A
Relay outputs						
Number of operating cycles		10,000,000; mechanically 10 million, at rated load voltage 100,000		10,000,000; mechanically 10 million, at rated load voltage 100,000		10,000,000; mechanically 10 million, at rated load voltage 100,000

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Technical specifications (continued)

	6ES7 214-1AD23-0XB0	6ES7 214-1BD23-0XB0	6ES7 214-2AD23-0XB0	6ES7 214-2BD23-0XB0	6ES7 216-2AD23-0XB0	6ES7 216-2BD23-0XB0
Analog inputs						
Number of analog potentiometers	2; Analog potentiometer; resolution 8 bit	2; Analog potentiometer; resolution 8 bit	2; Analog potentiometer; resolution 8 bit	2; Analog potentiometer; resolution 8 bit	2; Analog potentiometer; resolution 8 bit	2; Analog potentiometer; resolution 8 bit
Encoder supply						
24 V encoder supply						
• 24 V	Yes; permissible range: 15.4 to 28.8 V	Yes; permissible range: 20.4 bis 28.8 V	Yes; permissible range: 15.4 to 28.8 V	Yes; permissible range: 20.4 bis 28.8 V	Yes; permissible range: 15.4 to 28.8 V	Yes; permissible range: 20.4 bis 28.8 V
• Short-circuit protection	Yes; electronic at 280 mA	Yes; electronic at 280 mA	Yes; electronic at 280 mA	Yes; electronic at 280 mA	Yes; electronic at 400 mA	Yes; electronic at 400 mA
• Output current, max.	280 mA	280 mA	280 mA	280 mA	400 mA	400 mA
Encoder						
Connectable encoders						
• 2-wire BEROS	Yes	Yes	Yes	Yes	Yes	Yes
• permissible quiescent current (2-wire BEROS), max.	1 mA	1 mA	1 mA	1 mA	1 mA	1 mA
Integrated Functions						
Number of counters	6; high-speed counters (each 30 kHz), 32 bit (incl. sign), usable as forward/backward counter or for connection of 4 incremental encoders with 2 pulse series offset by 90° (max. 20 kHz (A/B counters)); parameterizable enable and reset input; Interrupt options (incl.calling subroutine with any content) on reaching setpoint; change counting direction etc.		6; high-speed counters (2 to 200 kHz and 4 to 30 kHz), 32 bit (incl. sign), usable as forward/backward counter or for connection of 2 incremental encoders with 2 pulse series offset by 90° (max. 1 to 100 kHz and 3 to 20 kHz (A/B counters)); parameterizable enable and reset input; Interrupt options (incl.calling subroutine with any content) on reaching setpoint; change counting direction etc.		6; high-speed counters (each 30 kHz), 32 bit (incl. sign), usable as forward/backward counter or for connection of 4 incremental encoders with 2 pulse series offset by 90° (max. 20 kHz (A/B counters)); parameterizable enable and reset input; Interrupt options (incl.calling subroutine with any content) on reaching setpoint; change counting direction etc.	
Counter frequency (counter) max.	30 kHz	30 kHz	200 kHz	200 kHz	30 kHz	30 kHz
Number of alarm inputs	4; 4 rising edges and/or 4 falling edges	4; 4 rising edges and/or 4 falling edges	4; 4 rising edges and/or 4 falling edges	4; 4 rising edges and/or 4 falling edges	4; 4 rising edges and/or 4 falling edges	4; 4 rising edges and/or 4 falling edges
Number of pulse outputs	2; high-speed outputs, 20 kHz, with interrupt option; pulse-width and frequency modulation option					
Limit frequency (pulse)	20 kHz	20 kHz	20 kHz	20 kHz	20 kHz	20 kHz
Isolation						
Isolation, digital outputs						
• between the channels	Yes; Optocoupler	Yes; Relay	Yes; Optocoupler	Yes; Relay	Yes; Optocoupler	Yes; Relay
• between the channels, in groups of	5		5			
Galvanic isolation, digital inputs						
• between the channels	Yes	Yes	Yes	Yes	Yes	Yes; Optocoupler
Permissible potential difference						
between different circuits	500 V DC between 24 V DC and 5 V DC	500 V DC between 24 V DC and 5 V DC; 1500 V AC between 24 V DC and 230 V AC	500 V DC between 24 V DC and 5 V DC	500 V DC between 24 V DC and 5 V DC; 1500 V AC between 24 V DC and 230 V AC	500 V DC between 24 V DC and 5 V DC	500 V DC between 24 V DC and 5 V DC; 1500 V AC between 24 V DC and 230 V AC

Technical specifications (continued)

	6ES7 214-1AD23-0XB0	6ES7 214-1BD23-0XB0	6ES7 214-2AD23-0XB0	6ES7 214-2BD23-0XB0	6ES7 216-2AD23-0XB0	6ES7 216-2BD23-0XB0
Environmental requirements						
Environmental conditions	For further environmental conditions, see "Automation System S7-200, System Manual"					
Operating termperature						
• vertical installation, min.	0 °C	0 °C	0 °C	0 °C	0 °C	0 °C
• vertical installation, max.	45 °C	45 °C	45 °C	45 °C	45 °C	45 °C
• horizontal installation, min.	0 °C	0 °C	0 °C	0 °C	0 °C	0 °C
• horizontal installation, max.	55 °C	55 °C	55 °C	55 °C	55 °C	55 °C
Air pressure						
• permissible range, min.	860 hPa	860 hPa	860 hPa	860 hPa	860 hPa	860 hPa
• permissible range, max.	1,080 hPa	1,080 hPa	1,080 hPa	1,080 hPa	1,080 hPa	1,080 hPa
Relative humidity						
• Operation, min.	5%	5%	5%	5%	5%	5%
• Operation, max.	95%; RH stressing level 2 in accordance with IEC 1131-2	95%; RH stressing level 2 in accordance with IEC 1131-2	95%; RH stressing level 2 in accordance with IEC 1131-2	95%; RH stressing level 2 in accordance with IEC 1131-2	95%; RH stressing level 2 in accordance with IEC 1131-2	95%; RH stressing level 2 in accordance with IEC 1131-2
Degree and class of protection						
• IP 20	Yes	Yes	Yes	Yes	Yes	Yes
Dimensions and weight						
Width	120.5 mm	120.5 mm	140 mm	140 mm	196 mm	196 mm
Height	80 mm	80 mm	80 mm	80 mm	80 mm	80 mm
Depth	62 mm	62 mm	62 mm	62 mm	62 mm	62 mm
Weights						
Weight, approx.	360 g	410 g	390 g	440 g	550 g	660 g

CPU 221, CPU 222, CPU 224, CPU 224 XP, CPU 226

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Ordering data		Order No.
CPU 221		
Compact CPU, main memory 4 KB, power supply 24 V DC, 6 DI/4 DO integrated	A)	**6ES7 211-0AA23-0XB0**
Compact CPU, main memory 4 KB, power supply 100 V to 230 V AC, 6 DI/4 DO integrated, relay outputs	A)	**6ES7 211-0BA23-0XB0**
CPU 222		
Compact CPU, expandable, main memory 4 KB, power supply 24 V DC, 8 DI/6 DO integrated	A)	**6ES7 212-1AB23-0XB0**
Compact CPU, expandable, main memory 4 KB, power supply 100 V to 230 V AC, 8 DI/6 DO integrated, relay outputs	A)	**6ES7 212-1BB23-0XB0**
CPU 224		
Compact CPU, expandable, main memory 8/12 KB program, 8 KB data, power supply 24 V DC, 14 DI/10 DO integrated	A)	**6ES7 214-1AD23-0XB0**
Compact CPU, expandable, main memory 8/12 KB program, 8 KB data, power supply 100 V to 230 V AC, 14 DI/10 DO integrated, relay outputs	A)	**6ES7 214-1BD23-0XB0**
CPU 224 XP		
Compact CPU, expandable, main memory 12/16 KB program, 10 KB data, power supply 24 V DC, 14 DI/10 DO/ 2 AI/1 AO integrated	A)	**6ES7 214-2AD23-0XB0**
Compact CPU, expandable, main memory 12/16 KB program, 10 KB data, power supply 100 V to 230 V AC, 14 DI/10 DO (relay outputs)/ 2 AI/1 AO integrated	A)	**6ES7 214-2BD23-0XB0**
CPU 226		
Compact CPU, expandable, main memory 16/24 KB program, 10 KB data, power supply 24 V DC, 24 DI/16 DO integrated	A)	**6ES7 216-2AD23-0XB0**
Compact CPU, expandable, main memory 16/24 KB program, 10 KB data, power supply 100 V to 230 V AC, 24 DI/16 DO integrated, relay outputs	A)	**6ES7 216-2BD23-0XB0**
S7-200 True Power Box		
Complete package, comprising CPU 222, STEP 7 Micro/WIN V4, simulator, intelligent USB/PPI multi-master cable, manual; delivered in a practical box		
German	C)	**6ES7 298-0AA20-0AA3**
English	C)	**6ES7 298-0AA20-0BA3**

A) Subject to export regulations: AL: N and ECCN: EAR99H

C) Subject to export regulations: AL: N and ECCN: EAR99T

		Order No.
MC 291 memory module, EEPROM		
for CPU 221/222//224/224 XP/226		
64 KB	A)	**6ES7 291-8GF23-0XA0**
256 KB	A)	**6ES7 291-8GH23-0XA0**
Grounding clamp		**6ES5 728-8MA11**
10 units		
Front flap set	A)	**6ES7 291-3AX20-0XA0**
contains various cover flaps for CPUs and EMs; spare part		
SIM 274 simulator (optional)		
with 8 terminals for CPU 221/222	A)	**6ES7 274-1XF00-0XA0**
with 14 terminals for CPU 224/ 224 XP	A)	**6ES7 274-1XH00-0XA0**
with 24 terminals for CPU 226	A)	**6ES7 274-1XK00-0XA0**
Pluggable terminal block (spare part)		
With 12 terminals (for CPU 22x)	A)	**6ES7 292-1AE20-0AA0**
With 18 terminals (for CPU 224/ 224 XP)	A)	**6ES7 292-1AG20-0AA0**
With 14 terminals (for CPU 226)	A)	**6ES7 292-1AF20-0AA0**
Intelligent RS 232/PPI multi-master cable	A)	**6ES7 901-3CB30-0XA0**
For connecting devices with an RS 232 interface to SIMATIC S7-200 or the PPI network; master in the multi-master PPI network		
Intelligent USB/PPI multi-master cable	A)	**6ES7 901-3DB30-0XA0**
For connecting devices with an USB interface to SIMATIC S7-200 or the PPI network; master in the multi-master PPI network		
MPI cable		**6ES7 901-0BF00-0AA0**
5 m; for connecting the S7-200 to MPI		
Backplane bus expansion cable	A)	**6ES7 290-6AA20-0XA0**
For interconnection of the two rows of modules with double-tier configuration, for CPU 222/224/224 XP/226		
Optional battery module	A)	**6ES7 291-8BA20-0XA0**
Optional combined clock and battery module	A)	**6ES7 297-1AA23-0XA0**
only for CPU 221/222		

Ordering data

		Order No.
S7-200 programmable controller, System Manual		
for CPU 221/222/224/224 XP/226 and STEP 7 Micro/Win V4		
German		**6ES7 298-8FA24-8AH0**
English		**6ES7 298-8FA24-8BH0**
French		**6ES7 298-8FA24-8CH0**
Spanish		**6ES7 298-8FA24-8DH0**
Italian		**6ES7 298-8FA24-8EH0**
Chinese		**6ES7 298-8FA24-8FH0**
SIMATIC Manual Collection	D)	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, five languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET		
SIMATIC Manual Collection update service for 1 year	D)	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		

1) Upgrade for all previous STEP 7-Micro/WIN and STEP 7-Micro/DOS versions

		Order No.
STEP 7-Micro/WIN V4 programming software		
Target system: All CPUs of the SIMATIC S7-200 *Prerequisite:* Windows 2000/XP on programming device or PC *Type of delivery:* German, English, French, Spanish, Italian, Chinese; with online documentation		
Single license	E)	**6ES7 810-2CC03-0YX0**
Upgrade Single License[1)]	E)	**6ES7 810-2CC03-0YX3**
PROFIBUS bus connector, IP 20 with 90° cable outlet		
• Without PG connection		**6ES7 972-0BA12-0XA0**
• With PG connection		**6ES7 972-0BB12-0XA0**
PROFIBUS bus connector, IP 20 with 35° cable outlet		
• Without PG connection		**6ES7 972-0BA41-0XA0**
• With PG connection		**6ES7 972-0BB41-0XA0**
PROFIBUS FC standard cable		**6XV1 830-0EH10**
For connection to PPI; standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m		
RS 485 repeater for PROFIBUS		**6ES7 972-0AA01-0XA0**

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

E) Subject to export regulations: AL: N and ECCN: EAR99S

SIPLUS CPU 221, CPU 222, CPU 224, CPU 224 XP, CPU 226

Overview SIPLUS CPU 221

- The smart compact solution
- With 10 inputs/outputs on board
- Not expandable

	SIPLUS CPU 221	
Order No.	**6AG1 211-0AA23-2XB0**	**6AG1 211-0BA23-2XB0**
Order No. based on	**6ES7 211-0AA23-0XB0**	**6ES7 211-0BA23-0XB0**
Ambient temperature range	-25 to +70 °C; -25 to +55 °C (for applications with cUL approval), condensation permissible	
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).	
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1)	Yes	Yes
Approvals	CE, cUL	
Technical data	The technical data are identical with the technical data of the based on modules.	

Overview SIPLUS CPU 222

- The superior compact solution
- With 14 inputs/outputs on board
- Expandable with up to 2 expansion modules

	SIPLUS CPU 222	
Order No.	**6AG1 212-1AB23-2XB0**	**6AG1 212-1BB23-2XB0**
Order No. based on	**6ES7 212-1AB23-0XB0**	**6ES7 212-1BB23-0XB0**
Ambient temperature range	-25 to +70 °C; -25 to +55 °C (for applications with cUL approval), condensation permissible	
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).	
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1).	Yes	Yes
Approvals	CE, cUL	
Technical data	The technical data are identical with the technical data of the based on modules.	

Overview SIPLUS CPU 224

- The compact high-performance CPU
- With 24 inputs/outputs on board
- Expandable with up to 7 expansion modules

	SIPLUS CPU 224	
Order No.	**6AG1 214-1AD23-2XB0**	**6AG1 214-1BD23-2XB0**
Order No. based on	**6ES7 214-1AD23-0XB0**	**6ES7 214-1BD23-0XB0**
Ambient temperature range	-25 to +70 °C; -25 to +55 °C (for applications with cUL approval), condensation permissible	
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).	
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1)	Yes	Yes
Approvals	CE, cUL	
Technical data	The technical data are identical with the technical data of the based on modules..	

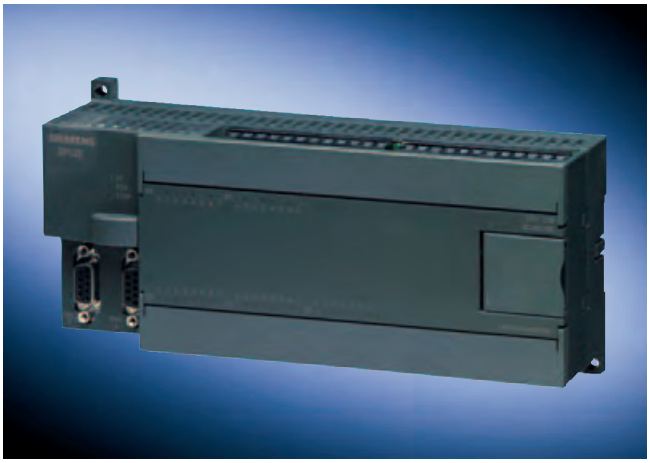
Overview SIPLUS CPU 224 XP

- The power CPU
- With 24 digital and 3 analog inputs/outputs onboard
- Expandable with up to 7 expansion modules

	SIPLUS CPU 224 XP	
Order No.	**6AG1 214-2AD23-2XB0**	**6AG1 214-2BD23-2XB0**
Order No. based on	**6ES7 214-2AD23-0XB0**	**6ES7 214-2BD23-0XB0**
Ambient temperature range	-25 to +70 °C; -25 to +55 °C (for applications with cUL approval), condensation permissible	
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).	
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1)	No	No
Approvals	CE	
Technical data	The technical data are identical with the technical data of the based on modules.	

SIPLUS CPU 221, CPU 222, CPU 224, CPU 224 XP, CPU 226

Overview SIPLUS CPU 226



- The high-performance package for complex technical tasks
- With additional PPI port for added flexibility and communication options
- With 40 inputs/outputs on board
- Expansion capability for max. 7 expansion racks

	SIPLUS CPU 226	
Order No.	**6AG1 216-2AD23-2XB0**	**6AG1 216-2BD23-2XB0**
Order No. based on	**6ES7 216-2AD23-0XB0**	**6ES7 216-2BD23-0XB0**
Ambient temperature range	-25 to +70 °C; -25 to +55 °C (for applications with cUL approval), condensation permissible	
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).	
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1)	Yes	Yes
Approvals	CE, cUL	
Technical data	The technical data are identical with the technical data of the based on modules.	

Ordering data		Order No.
SIPLUS CPU 221		
(extended temperature range and medial load)		
Compact CPU, main memory 4 KB, power supply 24 V DC, 6 DI/4 DO integrated	A)	**6AG1 211-0AA23-2XB0**
Compact CPU, main memory 4 KB, power supply 100 V to 230 V AC, 6 DI/4 DO integrated, relay outputs	A)	**6AG1 211-0BA23-2XB0**
SIPLUS CPU 222		
(extended temperature range and medial load)		
Compact CPU, expandable, main memory 4 KB, power supply 24 V DC, 8 DI/6 DO integrated	A)	**6AG1 212-1AB23-2XB0**
Compact CPU, expandable, main memory 4 KB, power supply 100 V to 230 V AC, 8 DI/6 DO integrated, relay outputs	A)	**6AG1 212-1BB23-2XB0**
SIPLUS CPU 224		
(extended temperature range and medial load)		
Compact CPU, expandable, main memory 8/12 KB program, 8 KB data, power supply 24 V DC, 14 DI/10 DO integrated	A)	**6AG1 214-1AD23-2XB0**
Compact CPU, expandable, main memory 8/12 KB program, 8 KB data, power supply 100 V to 230 V AC, 14 DI/10 DO integrated, relay outputs	A)	**6AG1 214-1BD23-2XB0**

		Order No.
SIPLUS CPU 224 XP		
(extended temperature range and medial load)		
Compact CPU, expandable, main memory 12/16 KB program, 10 KB data, power supply 24 V DC, 14 DI/10 DO/ 2 AI/1 AO integrated		**6AG1 214-2AD23-2XB0**
Compact CPU, expandable, main memory 12/16 KB program, 10 KB data, power supply 100 V to 230 V AC, 14 DI/10 DO (relay outputs)/ 2 AI/1 AO integrated	A)	**6AG1 214-2BD23-2XB0**
SIPLUS CPU 226		
(extended temperature range and medial load)		
Compact CPU, expandable, main memory 16/24 KB program, 10 KB data, power supply 24 V DC, 24 DI/16 DO integrated	A)	**6AG1 216-2AD23-2XB0**
Compact CPU, expandable, main memory 16/24 KB program, 10 KB data, power supply 100 V to 230 V AC, 24 DI/16 DO integrated, relay outputs	A)	**6AG1 216-2BD23-2XB0**
Accessories		see central processig units SIMATIC S7-200, page 3/20

A) Subject to export regulations: AL: N and ECCN: EAR99H

Digital modules

3

Overview

- Digital inputs/outputs to supplement the onboard I/Os of the CPUs
- For flexible adaptation of PLC to respective task
- For subsequent upgrading of the system with additional inputs and outputs

Technical specifications EM 221

	6ES7 221-1BH22-0XA0	6ES7 221-1BF22-0XA0	6ES7 221-1EF22-0XA0
Current consumption			
from backplane bus DC 5 V, max.	70 mA	30 mA	30 mA
Power loss, typ.	3 W	2 W	3 W
Connection point			
pluggable I/O terminals	Yes	Yes	Yes
Digital inputs			
Number of digital inputs	16	8	8
Cable length			
• Cable length, shielded, max.	500 m	500 m	500 m
• Cable length unshielded, max.	300 m	300 m	300 m
m/p-reading	Yes	Yes	
Input characteristic curve to IEC 1131, Typ 1	Yes		Yes
Input voltage			
• Rated value, AC			230 V; AC 220/230 V (47 to 63 Hz)
• Rated value, DC	24 V	24 V	
• for signal "0"	0 to 5 V	0 to 5 V	up to 20 V AC
• for signal "1"	15 to 30 V	15 to 30 V	79 V AC or more
Input current			
• for signal "1", typ.	4 mA	4 mA	2.5 mA
Input delay (for rated value of input voltage)			
• for standard inputs - at "0" to "1", max.	4.5 ms	4.5 ms	15 ms
Encoder			
Connectable encoders			
• 2-wire BEROS	Yes	Yes	Yes
• permissible quiescent current (2-wire BEROS), max.	1 mA	1 mA	1 mA
Isolation			
Galvanic isolation, digital inputs			
• galvanic isolation, digital inputs	Yes	Yes	Yes
• between the channels, in groups of	4	4	1; (8 groups)

Technical specifications EM 221 (continued)

	6ES7 221-1BH22-0XA0	6ES7 221-1BF22-0XA0	6ES7 221-1EF22-0XA0
Dimensions and weight			
Width	71.2 mm	46 mm	71.2 mm
Height	80 mm	80 mm	80 mm
Depth	62 mm	62 mm	62 mm
Weights			
Weight, approx.	160 g	150 g	160 g

Technical specifications EM 222

	6ES7 222-1BD22-0XA0	6ES7 222-1BF22-0XA0
Voltages and currents		
Load voltage L+		
• Rated value (DC)	24 V	24 V
• permissible range, lower limit (DC)	20.4 V	20.4 V
• permissible range, upper limit (DC)	28.8 V	28.8 V
Current consumption		
Digital outputs		
from backplane bus DC 5 V, max.	40 mA	50 mA
Power loss, typ.	3 W	2 W
Connection point		
pluggable I/O terminals	Yes	Yes
Digital outputs		
Number of digital outputs	4	8
Cable length, shielded, max.	500 m	500 m
Cable length unshielded, max.	150 m	150 m
Short-circuit protection of the output	No	No; to be provided externally (see manual package "Setting up an S7-200")
Limitation of inductive shutdown voltage to	L+ (-48 V)	L+ (-48 V)
Output voltage		
• for signal "1", min.	DC 20 V	20 V
Output current		
• for signal "1", permissible range for 0 to 55 °C, max.	5 A	750 mA
• for signal "0" residual current, max.	30 µA	10 µA
Parallel switching of 2 outputs		
• for increased power		Yes
Aggregate current of the outputs (per group)		
• horizontal installation - up to 55 °C, max.	20 A	3 A
• up to 40 °C, max.	20 A	3 A
• maximum current per conductor/group	5 A	3 A
Relay outputs		
Switching capacity of the contacts		
• with inductive load, max.	5 A	0,75 A
• on lamp load, max.	50 W	5 W
• with resistive load, max.	5 A	0.75 A
Isolation		
Isolation, digital outputs		
• Galvanic isolation, digital outputs	Yes	Yes
• between the channels, in groups of	1	4

Technical specifications EM 222 (continued)

	6ES7 222-1BD22-0XA0	6ES7 222-1BF22-0XA0
Dimensions and weight		
Width	45 mm	45 mm
Height	80 mm	80 mm
Depth	62 mm	62 mm
Weights		
Weight, approx.	120 g	150 g

	6ES7 222-1HD22-0XA0	6ES7 222-1HF22-0XA0	6ES7 222-1EF22-0XA0
Voltages and currents			
Load voltage L+			
• Rated value (DC)	24 V	24 V	
• permissible range, lower limit (DC)	12 V	5 V	
• permissible range, upper limit (DC)	30 V	30 V	
Load voltage L1			
• Rated value (AC)	24 V; 24 to 230 V AC	24 V; 24 to 230 V AC	230 V; 220/230 V AC
• permissible range, lower limit (AC)	12 V	5 V	65 V
• permissible range, upper limit (AC)	250 V	250 V	264 V
• permissible frequency range, lower limit		47 Hz	47 Hz
• permissible frequency range, upper limit		63 Hz	63 Hz
Current consumption			
Digital outputs			
• from load voltage L+, max.	80 mA; 20 mA per switched output	72 mA; 9 mA per switched output	
from backplane bus DC 5 V, max.	30 mA	40 mA	110 mA
Power loss, typ.	4 W	2 W	4 W
Connection point			
pluggable I/O terminals	Yes	Yes	Yes
Digital outputs			
Number of digital outputs	4; Relay	8; Relay	8
Cable length, shielded, max.	500 m	500 m	500 m
Cable length unshielded, max.	150 m	150 m	150 m
Short-circuit protection of the output	No; to be provided externally (see manual package "Setting up an S7-200")	No; to be provided externally (see manual package "Setting up an S7-200")	No; to be provided externally (see manual package "Setting up an S7-200")
Limitation of inductive shutdown voltage to	to be provided externally (see manual package "Setting up an S7-200")	to be provided externally (see manual package "Setting up an S7-200")	to be provided externally (see manual package "Setting up an S7-200")
Output voltage			
• for signal "1", min.			L1 (-0.9 V)
Output current			
• for signal "1", permissible range for 0 to 55 °C, max.	10 A	2 A	500 mA; AC
• for signal "1" minimum load current			50 mA
• for signal "0" residual current, max.	0 mA	0 mA	1,8 mA; at 264 V AC
Aggregate current of the outputs (per group)			
• horizontal installation - up to 55 °C, max.	20 A	8 A	0.5 A
• up to 40 °C, max.	40 A	8 A	0.5 A
• maximum current per conductor/group	10 A	8 A	0.5 A
Relay outputs			
Number of operating cycles	30,000,000; mechanically 30 million, at rated load voltage 30,000	10,000,000; mechanically 10 million, at rated load voltage 100,000	

Technical specifications EM 222 (continued)

	6ES7 222-1HD22-0XA0	6ES7 222-1HF22-0XA0	6ES7 222-1EF22-0XA0
Switching capacity of the contacts			
• with inductive load, max.	3 A; 2 A (DC), 3 A (AC)	2 A	0.5 A
• on lamp load, max.	1.000 W; 100/1000 W (DC/AC)	200 W; 30/200 W (DC/AC)	60 W
• with resistive load, max.	10 A	2 A	0.5 A
Isolation			
Isolation, digital outputs			
• Galvanic isolation, digital outputs	Yes	Yes	Yes
• between the channels, in groups of	1; 4 groups	4	1; 8 groups
Dimensions and weight			
Width	45 mm	45 mm	71,2 mm
Height	80 mm	80 mm	80 mm
Depth	62 mm	62 mm	62 mm
Weights			
Weight, approx.	150 g	170 g	170 g

Technical specifications EM 223

	6ES7 223-1BF22-0XA0	6ES7 223-1BH22-0XA0	6ES7 223-1BL22-0XA0
Voltages and currents			
Load voltage L+			
• Rated value (DC)	24 V	24 V	24 V
• permissible range, lower limit (DC)	20.4 V	20.4 V	20.4 V
• permissible range, upper limit (DC)	28.8 V	28.8 V	28.8 V
Current consumption			
from backplane bus DC 5 V, max.	40 mA	80 mA	160 mA
Power loss, typ.	2 W	3 W	6 W
Connection point			
pluggable I/O terminals	Yes	Yes	Yes
Digital inputs			
Number of digital inputs	4	8	16
Input voltage			
• Rated value, DC	24 V	24 V	24 V
• for signal "0"	0 to 5 V	0 bis 5 V	0 bis 5 V
• for signal "1"	15 to 30 V DC	15 to 30 V DC	15 to 30 V DC
Input current			
• for signal "1", typ.	4 mA	4 mA	4 mA
Input delay (for rated value of input voltage)			
• for standard inputs - at "0" to "1", max.	4.5 ms	4.5 ms	4.5 ms
Digital outputs			
Number of digital outputs	4	8	16
Cable length, shielded, max.	500 m	500 m	500 m
Cable length unshielded, max.	150 m	150 m	150 m
Short-circuit protection of the output	No; to be provided externally	No; to be provided externally	No; to be provided externally
Limitation of inductive shutdown voltage to	L+ (-48 V)	L+ (-48 V)	L+ (-48 V)

Technical specifications EM 223 (continued)

	6ES7 223-1BF22-0XA0	6ES7 223-1BH22-0XA0	6ES7 223-1BL22-0XA0
Output voltage			
• for signal "0" (DC), max.	0.1 V	0.1 V	0.1 V
• for signal "1", min.	20 V	20 V	20 V
Output current			
• for signal "1" rated value	750 mA	750 mA	750 mA
Aggregate current of the outputs (per group)			
• maximum current per conductor/group	3 A	3 A	3 A; 3 / 3 / 6
Relay outputs			
Switching capacity of the contacts			
• with inductive load, max.	0.75 A; each output	0.75 A; each output	0.75 A; each output
• on lamp load, max.	5 W	5 W	5 W
• with resistive load, max.	0.75 A; each output	0.75 A; each output	0.75 A; each output
Encoder			
Connectable encoders			
• 2-wire BEROS	Yes	Yes	Yes
• permissible quiescent current (2-wire BEROS), max.	1 mA	1 mA	1 mA
Isolation			
Isolation checked with	AC 500 V	AC 500 V	AC 500 V
Isolation			
Isolation, digital outputs			
• Galvanic isolation, digital outputs	Yes	Yes	Yes
• between the channels, in groups of	4	4	4; 4 / 4 / 8
Galvanic isolation, digital inputs			
• galvanic isolation, digital inputs	Yes	Yes	Yes
• between the channels, in groups of	4	4	4
Dimensions and weight			
Width	46 mm	71.2 mm	137.5 mm
Height	80 mm	80 mm	80 mm
Depth	62 mm	62 mm	62 mm
Weights			
Weight, approx.	160 g	200 g	360 g

	6ES7 223-1HF22-0XA0	6ES7 223-1PH22-0XA0	6ES7 223-1PL22-0XA0
Voltages and currents			
Load voltage L+			
• Rated value (DC)	24 V	24 V	24 V
• permissible range, lower limit (DC)	5 V	5 V	5 V
• permissible range, upper limit (DC)	30 V	30 V	30 V
Load voltage L1			
• Rated value (AC)	230 V; 24 to 230 V AC	230 V; 24 to 230 V AC	230 V; 24 to 230 V AC
• permissible range, lower limit (AC)	5 V	5 V	5 V
• permissible range, upper limit (AC)	250 V	250 V	250 V
Current consumption			
from backplane bus DC 5 V, max.	40 mA	80 mA	150 mA
from coil current, max.	9 mA; for each output on signal "1"	9 mA; for each output on signal "1"	9 mA; for each output on signal "1"
from sensor current supply or external current supply (DC 24 V), max.	72 mA	72 mA	72 mA
Power loss, typ.	2 W	3 W	6 W

Technical specifications EM 223 (continued)

	6ES7 223-1HF22-0XA0	6ES7 223-1PH22-0XA0	6ES7 223-1PL22-0XA0
Connection point			
pluggable I/O terminals	Yes	Yes	Yes
Digital inputs			
Number of digital inputs	4	8	16
Input voltage			
• Rated value, DC	24 V	24 V	24 V
• for signal "0"	0 to 5 V	0 to 5 V	0 to 5 V
• for signal "1"	15 to 30 V DC	15 to 30 V DC	15 to 30 V DC
Input current			
• for signal "1", typ.	4 mA	4 mA	4 mA
Input delay (for rated value of input voltage)			
• for standard inputs - at "0" to "1", max.	4.5 ms	4.5 ms	4.5 ms
Digital outputs			
Number of digital outputs	4; Relay	8; Relay	16; Relay
cable length, shielded, max.	500 m	500 m	500 m
Cable length unshielded, max.	150 m	150 m	150 m
Short-circuit protection of the output	No; to be provided externally	No; to be provided externally	No; to be provided externally
Output voltage			
• for signal "0" (DC), max.	0.1 V; with 10 kOhm load	0.1 V; with 10 kOhm load	0.1 V; with 10 kOhm load
• for signal "1", min.	L+/L1	L+/L1	L+/L1
Output current			
• for signal "1" rated value	2,000 mA	2,000 mA	2,000 mA
Aggregate current of the outputs (per group)			
• maximum current per conductor/group	8 A	8 A	8 A
Relay outputs			
Number of operating cycles	10.000.000; mechanically 10 million, at rated load voltage 100,000	10.000.000; mechanically 10 million, at rated load voltage 100,000	10.000.000; mechanically 10 million, at rated load voltage 100,000
Switching capacity of the contacts			
• with inductive load, max.	0.75 A; each output	0.75 A; each output	0.75 A; each output
• on lamp load, max.	200 W; 30/200 W (DC/AC)	200 W; 30/200 W (DC/AC)	200 W; 30/200 W (DC/AC)
• with resistive load, max.	0.75 A; each output	0.75 A; each output	0.75 A; each output
Encoder			
Connectable encoders			
• 2-wire BEROS	Yes	Yes	Yes
• permissible quiescent current (2-wire BEROS), max.	1 mA	1 mA	1 mA
Isolation			
Isolation checked with	AC 500 V	AC 500 V	AC 500 V
Isolation			
Isolation, digital outputs			
• Galvanic isolation, digital outputs	Yes	Yes	Yes
• between the channels, in groups of	4	4	4
Galvanic isolation, digital inputs			
• galvanic isolation, digital inputs	Yes	Yes	Yes
• between the channels, in groups of	4	4	8

Digital modules

3

Technical specifications EM 223 (continued)

	6ES7 223-1HF22-0XA0	6ES7 223-1PH22-0XA0	6ES7 223-1PL22-0XA0
Dimensions and weight			
Width	46 mm	71,2 mm	137,5 mm
Height	80 mm	80 mm	80 mm
Depth	62 mm	62 mm	62 mm
Weights			
Weight, approx.	160 g	300 g	400 g

Ordering data

		Order No.
Digital input module EM 221		
For CPU 221/222/224/224 XP/226		
• 8 inputs, 24 V DC, galvanically isolated, source/sink switching	A)	**6ES7 221-1BF22-0XA0**
• 16 inputs, 24 V DC, galvanically isolated, source/sink switching	A)	**6ES7 221-1BH22-0XA0**
• 8 inputs, 120/230 V AC, galvanically isolated, source/sink switching	A)	**6ES7 221-1EF22-0XA0**
Digital output module EM 222		
For CPU 221/222/224/224 XP/226		
• 4 outputs, 24 V DC; 5 A, galvanically isolated	A)	**6ES7 222-1BD22-0XA0**
• 8 outputs, 24 V DC; 0.75 A, galvanically isolated	A)	**6ES7 222-1BF22-0XA0**
• 4 outputs, 24 V DC/24 V AC up to 230 V; 10 A, galvanically isolated, relay outputs	A)	**6ES7 222-1HD22-0XA0**
• 8 outputs, 24 V DC/24 V AC up to 230 V; 2 A, galvanically isolated, relay outputs	A)	**6ES7 222-1HF22-0XA0**
• 8 outputs, AC 120/230 V; 0.5 A, galvanically isolated	A)	**6ES7 222-1EF22-0XA0**
Digital input/output module EM 223		
For CPU 221/222/224/224 XP/226		
• 4 inputs 24 V DC, 4 outputs 24 V DC; 0.75 A, galvanically isolated	A)	**6ES7 223-1BF22-0XA0**
• 8 inputs 24 V DC, 8 outputs 24 V DC; 0.75 A, galvanically isolated	A)	**6ES7 223-1BH22-0XA0**
• 16 inputs 24 V DC, 16 outputs 24 V DC; 0.75 A, galvanically isolated	A)	**6ES7 223-1BL22-0XA0**
• 4 inputs 24 V DC, 4 outputs, relay	A)	**6ES7 223-1HF22-0XA0**
• 8 inputs 24 V DC, 8 outputs, relay	A)	**6ES7 223-1PH22-0XA0**
• 16 inputs 24 V DC, 16 outputs, relay	A)	**6ES7 223-1PL22-0XA0**

		Order No.
Front flap set		
contains different covering flaps for CPU and EM; Spare part	A)	**6ES7 291-3AX20-0XA0**
Plug-in terminal block (spare part)		
• with 7 connection terminals (for EM 221/222)	A)	**6ES7 292-1AD20-0AA0**
• with 12 connection terminals (for EM 223)	A)	**6ES7 292-1AE20-0AA0**
SIM 274 simulator (optional)		
with 8 connection terminals for EM 221 and EM 223	A)	**6ES7 274-1XF00-0XA0**
S7-200 programmable controller, system manual		
for CPU 221/222/224/224 XP/226 and STEP 7-Micro/Win V4		
German		**6ES7 298-8FA24-8AH0**
English		**6ES7 298-8FA24-8BH0**
French		**6ES7 298-8FA24-8CH0**
Spanish		**6ES7 298-8FA24-8DH0**
Italian		**6ES7 298-8FA24-8EH0**
Chinese		**6ES7 298-8FA24-8FH0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

Overview

- Digital inputs/outputs to supplement the integral I/Os of the CPUs
- For flexible adaptation of the controller to the task
- For subsequent upgrading of the system with additional inputs and outputs

SIPLUS EM 221 digital input modules for CPU 22x		
	8 DI	**16 DI**
Order No.	**6AG1 221-1BH22-2XA0**	**6AG1 221-1BF22-2XB0**
Order No. based on	**6ES7 221-1BH22-0XA0**	**6ES7 221-1BF22-0XA0**
Ambient temperature range	-25 to +70 °C; -25 to +55 °C (for applications with cUL approval), condensation permissible	
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).	
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1)	Yes	Yes
Approvals	CE, cUL	
Technical data	The technical data are identical with the technical data of the based on modules.	

SIPLUS EM 222 digital output modules for CPU 22x		
	8 DO	**8 RO**
Order No.	**6AG1 222-1BF22-2XB0**	**6AG1 222-1HF22-2XB0**
Order No. based on	**6ES7 222-1BF22-0XB0**	**6ES7 222-1HF22-0XB0**
Ambient temperature range	-25 to +70 °C; -25 to +55 °C (for applications with cUL approval), condensation permissible	
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).	
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1)	Yes	Yes
Approvals	CE, cUL	
Technical data	The technical data are identical with the technical data of the based on modules.	

SIPLUS digital modules

Overview (continued)

SIPLUS EM 223 input/output modules for CPU 22x			
	4 DI/4 DO	**8 DI/8 DO**	**16 DI/16 DO**
Order No.	**6AG1 223-1BF22-2XB0**	**6AG1 223-1BH22-2XB0**	**6AG1 223-1BL22-2XB0**
Order No. based on	**6ES7 223-1BF22-0XA0**	**6ES7 223-1BH22-0XA0**	**6ES7 223-1BL22-0XA0**
Ambient temperature range	-25 to +70 °C; -25 to +55 °C (for applications with cUL approval), condensation permissible		
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).		
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1)	Yes	Yes	Yes
Approvals	CE, cUL		
Technical data	The technical data are identical with the technical data of the based on modules.		

SIPLUS EM 223 input/output modules for CPU 22x			
	4 DI/4 DO	**8 DI/8 DO**	**16 DI/16 DO**
Order No.	**6AG1 223-1HF22-2XB0**	**6AG1 223-1PH22-2XB0**	**6AG1 223-1PL22-2XB0**
Order No. based on	**6ES7 223-1HF22-0XA0**	**6ES7 223-1PH22-0XA0**	**6ES7 223-1PL22-0XA0**
Ambient temperature range	-25 to +70 °C; -25 to +55 °C (for applications with cUL approval), condensation permissible		
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).		
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1)	Yes	Yes	Yes
Approvals	CE, cUL		
Technical data	The technical data are identical with the technical data of the based on modules.		

Ordering data

	Order No.
Digital input module SIPLUS EM 221	
(extended temperature range and medial load)	
For CPU 221/222/224/224 XP/226	
• 8 inputs, 24 V DC, galvanically isolated, source/sink switching A)	**6AG1 221-1BF22-2XB0**
• 16 inputs, 24 V DC, galvanically isolated, source/sink switching A)	**6AG1 221-1BH22-2XA0**
Digital output module SIPLUS EM 222	
(extended temperature range and medial load)	
For CPU 221/222/224/224 XP/226	
• 8 outputs, 24 V DC; 0.75 A, galvanically isolated A)	**6AG1 222-1BF22-2XB0**
• 8 outputs, 24 V DC/24 V AC up to 230 V; 2 A, galvanically isolated, relay outputs A)	**6AG1 222-1HF22-2XB0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

	Order No.
Digital input/output module SIPLUS EM 223	
(extended temperature range and medial load)	
For CPU 221/222/224/224 XP/226	
• 4 inputs 24 V DC, 4 outputs 24 V DC; 0.75 A, galvanically isolated A)	**6AG1 223-1BF22-2XB0**
• 8 inputs 24 V DC, 8 outputs 24 V DC; 0.75 A, galvanically isolated A)	**6AG1 223-1BH22-2XB0**
• 16 inputs 24 V DC, 16 outputs 24 V DC; 0.75 A, galvanically isolated A)	**6AG1 223-1BL22-2XB0**
• 4 inputs 24 V DC, 4 outputs, relay A)	**6AG1 223-1HF22-2XB0**
• 8 inputs 24 V DC, 8 outputs, relay A)	**6AG1 223-1PH22-2XB0**
• 16 inputs 24 V DC, 16 outputs, relay A)	**6AG1 223-1PL22-2XB0**
Accessories	see digital modules S7-200, page 3/32

Overview

- Analog inputs and outputs for the SIMATIC S7-200
- With extremely short conversion times
- For connections of analog sensors and actuators without additional amplifier
- For solving the more complex automation tasks

Technical specifications EM 231

	6ES7 231-0HC22-0XA0
Current consumption	
from load voltage L+ (without load), max.	60 mA
from backplane bus DC 5 V, max.	20 mA
Power loss, typ.	2 W
Connection point	
pluggable I/O terminals	No
Analog inputs	
Number of analog inputs	4; Difference
Cable length, shielded, max.	100 m; to the sensor
permissible input frequency for voltage input (destruction limit), max.	30 V
permissible input current for current input (destruction limit), max.	32 mA
Input ranges (rated values), voltages	
• 0 to +5 V	Yes
• 0 to +10 V	Yes
• -2.5 V to +2.5 V	Yes
• -5 V to +5 V	Yes
Input ranges (rated values), currents	
• 0 to 20 mA	Yes
Characteristic linearization	
• for voltage measurement	No
• for current measurement	No
Temperature compensation	
• programmable	No

	6ES7 231-0HC22-0XA0
Displayable conversion value range	
• bipolar signals	-32,000 to +32,000
• unipolar signals	0 to 32000
Errors/accuracies	
Interference voltage suppression for f = n x (fl +/- 1 %), fl = interference frequency	
• common mode voltage, max.	12 V
Analog value creation	
Integrations and conversion time/resolutionper channel	
• Resolution with overload area (bit including sign), max.	12 Bit
• Interference voltage suppression for interference frequency f1 in Hz	40 dB, DC to 60 V for interference frequency 50 / 60 Hz
• Conversion time (per channel)	250 µs
Isolation	
Isolation, analog inputs	
• Isolation, analog inputs	No
Dimensions and weight	
Width	71.2 mm
Height	80 mm
Depth	62 mm
Weights	
Weight, approx.	183 g

Analog modules

Technical specifications EM 232

	6ES7 232-0HB22-0XA0
Current consumption	
from backplane bus DC 5 V, max.	20 mA
from sensor current supply or external current supply (DC 24 V), max.	70 mA
Power loss, typ.	2 W
Connection point	
pluggable I/O terminals	No
Analog outputs	
Number of analog outputs	2
Output ranges, voltage	
• -10 to +10 V	Yes
Output ranges, current	
• 4 to 20 mA	Yes
Load impedance (in rated range of output)	
• with voltage outputs, min.	5 kΩ
• with current outputs, max.	0,5 kΩ
Analog value creation	
Integrations and conversion time/resolutionper channel	
• Resolution (incl. overload area)	U/12 bit, I/11 bit
Settling time	
• for voltage output	100 µs
• for current output	2 ms

	6ES7 232-0HB22-0XA0
Displayable conversion value range	
• bipolar signals	-32.000 to +32.000
• unipolar signals	0 to 32.000
Errors/accuracies	
Operational limit in overall temperature range	
• Voltage, relative to output area	+/- 2 %
• Current, relative to output area	+/- 2 %
Basic error limit (operational limit at 25 °C)	
• Voltage, relative to output area	+/- 0.5 %
• Current, relative to output area	+/- 0.5 %
Isolation	
Isolation, analog outputs	
• Galvanic isolation, analog outputs	No
Dimensions and weight	
Width	46 mm
Height	80 mm
Depth	62 mm
Weights	
Weight, approx.	148 g

Technical specifications EM 235

	6ES7 235-0KD22-0XA0
Current consumption	
from backplane bus DC 5 V, max.	30 mA
from sensor current supply or external current supply (DC 24 V), max.	60 mA
Power loss, typ.	2 W
Connection point	
pluggable I/O terminals	No
Analog inputs	
Number of analog inputs	4; Difference
permissible input frequency for voltage input (destruction limit), max.	30 V
permissible input current for current input (destruction limit), max.	32 mA
Input ranges (rated values), voltages	
• Voltage	Yes
• 0 to +50 mV	Yes
• 0 to +100 mV	Yes
• 0 to +500 mV	Yes
• 0 to +1 V	Yes

	6ES7 235-0KD22-0XA0
• 0 to +5 V	Yes
• 0 to +10 V	Yes
• -1 V to +1 V	Yes
• -10 V to +10 V	Yes
• -100 mV to +100 mV	Yes
• -2.5 V to +2.5 V	Yes
• -25 mV to +25 mV	Yes
• -250 mV to +250 mV	Yes
• -5 V to +5 V	Yes
• -50 mV to +50 mV	Yes
• -500 mV to +500 mV	Yes
Input ranges (rated values), currents	
• Current	Yes
• 0 to 20 mA	Yes
Characteristic linearization	
• for voltage measurement	No
• for current measurement	No
Temperature compensation	
• programmable	No

Technical specifications EM 235 (continued)

	6ES7 235-0KD22-0XA0
Analog outputs	
Number of analg outputs	1
Output ranges, voltage	
• -10 to +10 V	Yes
Output ranges, current	
• 0 to 20 mA	Yes
Load impedance (in rated range of output)	
• with voltage outputs, min.	5 kΩ
• with current outputs, max.	0,5 kΩ
Analog value creation	
Integrations and conversion time/resolutionper channel	
• Resolution with overload area (bit including sign), max.	12 Bit; 11 bits for current output
• Basic conversion time, ms	< 0.25 ms
• Interference voltage suppression for interference frequency f1 in Hz	40 dB, DC to 60 Hz
Settling time	
• for voltage output	100 µs
• for current output	2 ms
Displayable conversion value range	
• bipolar signals	-32,000 to +32,000
• unipolar signals	0 to 32,000
Errors/accuracies	
Operational limit in overall temperature range	
• Voltage, relative to output area	+/- 2 %
• Current, relative to output area	+/- 2 %
Basic error limit (operational limit at 25 °C)	
• Voltage, relative to output area	+/- 0.5 %
• Current, relative to output area	+/- 0.5 %
Interference voltage suppression for f = n x (fl +/- 1 %), fl = interference frequency	
• common mode voltage, max.	12 V
Isolation	
Isolation, analog outputs	
• Galvanic isolation, analog outputs	No
Isolation, analog inputs	
• Isolation, analog inputs	No
Dimensions and weight	
Width	71.2 mm
Height	80 mm
Depth	62 mm
Weights	
Weight, approx.	186 g

Ordering data

		Order No.
EM 231 analog input module For CPU 222/224/224 XP/226; 4 inputs , 0 - 10 V, 12-bit resolution	A)	**6ES7 231-0HC22-0XA0**
EM 232 analog output module For CPU 222/224/224 XP/226; 2 outputs, ± 10 V, 12-bit resolution	A)	**6ES7 232-0HB22-0XA0**
EM 235 analog input/output module For CPU 222/224/224 XP/226; 4 inputs, 1 output, ±10 V DC, 12-bit resolution	A)	**6ES7 235-0KD22-0XA0**
Grounding terminal 10 items		**6ES5 728-8MA11**
Front flap set contains different covering flaps for CPU and EM; Spare part	A)	**6ES7 291-3AX20-0XA0**
S7-200 programmable controller, system manual for CPU 221/222/224/224 XP/226 and STEP 7-Micro/Win V4		
German		**6ES7 298-8FA24-8AH0**
English		**6ES7 298-8FA24-8BH0**
French		**6ES7 298-8FA24-8CH0**
Spanish		**6ES7 298-8FA24-8DH0**
Italian		**6ES7 298-8FA24-8EH0**
Chinese		**6ES7 298-8FA24-8FH0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

EM 231 thermocouple module

Overview

- For user-friendly, high precision temperature detection
- 7 standard types of thermocouple can be used
- For measuring low-level analog signals (±80 mV), as well
- Easy to install in an existing system

Technical specifications

	6ES7 231-7PD22-0XA0
Current consumption	
from load voltage L+ (without load), max.	60 mA
from backplane bus DC 5 V, max.	87 mA
Power loss, typ.	1.8 W
Connection point	
pluggable I/O terminals	No
Analog inputs	
Number of analog inputs	4
cable length, shielded, max.	100 m; to the sensor
permissible input frequency for voltage input (destruction limit), max.	30 V
Loop resistance cable	100 Ω
Updating time (all channels)	405 ms
Input ranges (rated values), voltages	
• -80 mV to +80 mV	Yes
Input ranges (rated values), thermoelements	
• Type E	Yes
• Type J	Yes
• Type K	Yes
• Type N	Yes
• Type R	Yes
• Type S	Yes
• Type T	Yes
Analog value creation	
Measurement principle	Sigma-Delta
Integrations and conversion time/resolution per channel	
• Resolution with overload area (bit including sign), max.	16 Bit; Temperature 0.1 °C / 0.1 °F
• Interference voltage suppression for interference frequency f1 in Hz	85 dB at 50 / 60 / 400 Hz
Displayable conversion value range	
• bipolar signals	-27,648 to +27,648
Errors/accuracies	
cold connection point	+/-1.5 °C
Repeat accuracy in settled status at 25 °C (relative to input area)	+/- 0.05 %
Operational limit in overall temperature range	
• Voltage, relative to output area	+/- 0.1 %
Interference voltage suppression for f = n x (fl +/- 1 %), fl = interference frequency	
• common mode voltage, max.	120 V; AC
• common mode voltage, min.	120 dB; at 120 V AC
Isolation	
Isolation, analog inputs	
• Isolation, analog inputs	Yes
Dimensions and weight	
Width	71.2 mm
Height	80 mm
Depth	62 mm
Weights	
Weight, approx.	210 g

Ordering data

	Order No.
EM 231 thermocouple modules A) 4 inputs +/- 80 mV, 15-bit resolution + sign, thermocouples type J, K, S, T, R, E, N	**6ES7 231-7PD22-0XA0**
Grounding terminal 10 items	**6ES5 728-8MA11**
Backplane bus expansion cable A) for connecting the two equipment tiers in a two-tier configuration, for CPU 222/224/224 XP/226	**6ES7 290-6AA20-0XA0**
S7-200 programmable controller, system manual for CPU 221/222/224/224 XP/226 and STEP 7-Micro/Win V4	see analog modules, page 3/37

A) Subject to export regulations: AL: N and ECCN: EAR99H

Overview

- For user-friendly, high precision temperature detection
- Supports 31 standard resistance temperature sensors
- Easy to install in an existing system

Technical specifications

	6ES7 231-7PB22-0XA0
Current consumption	
from load voltage L+ (without load), max.	60 mA
from backplane bus DC 5 V, max.	87 mA
Power loss, typ.	1.8 W
Connection point	
pluggable I/O terminals	No
Analog inputs	
Number of analog inputs	2
Cable length, shielded, max.	100 m; to the sensor
permissible input frequency for voltage input (destruction limit), max.	30 V; 30 V DC (probe), 5 V DC (source)
Loop resistance cable	20 Ω; max. 2.7 Ohm for Cu
Updating time (all channels)	405 ms; 700 ms at Pt 10000
Input ranges (rated values), resistors	
• 0 to 150 Ohm	Yes
• 0 to 300 Ohm	Yes
• 0 to 600 Ohm	Yes
Input ranges (rated values), resistance thermometers	
• Cu 10	Yes
• Ni 10	Yes
• Ni 1000	Yes
• Ni 120	Yes
• Pt 100	Yes
• Pt 1000	Yes
• Pt 10000	Yes
• Pt 200	Yes
• Pt 500	Yes

	6ES7 231-7PB22-0XA0
Analog value creation	
Measurement principle	Sigma-Delta
Integrations and conversion time/resolutionper channel	
• Resolution with overload area (bit including sign), max.	16 Bit; Temperature 0.1 °C / 0.1 °F
• Interference voltage suppression for interference frequency f1 in Hz	85 dB at 50 / 60 / 400 Hz
Displayable conversion value range	
• bipolar signals	-27,648 to +27,648
Errors/accuracies	
Repeat accuracy in settled status at 25 °C (relative to input area)	+/- 0.05 %
Operational limit in overall temperature range	
• Voltage, relative to output area	+/- 0.1 %
Interference voltage suppression for f = n x (fl +/- 1 %), fl = interference frequency	
• common mode voltage, max.	0 V
• common mode voltage, min.	120 dB; at 120 V AC
Isolation	
Isolation, analog inputs	
• Isolation, analog inputs	Yes
Dimensions and weight	
Width	71.2 mm
Height	80 mm
Depth	62 mm
Weights	
Weight, approx.	210 g

EM 231 RTD module

Ordering data		Order No.
EM 231 RTD modules 2 inputs for thermistors Pt100/200/500/1000/10000, Ni100/120/1000, Cu10; resistance 150/300/600 Ohms, 15-bit resolution + sign	A)	**6ES7 231-7PB22-0XA0**
Grounding terminal 10 items		**6ES5 728-8MA11**
Backplane bus expansion cable for connecting the two equipment tiers in a two-tier configuration, for CPU 222/224/224 XP/226	A)	**6ES7 290-6AA20-0XA0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

	Order No.
S7-200 programmable controller, system manual for CPU 221/222/224/224 XP/226 and STEP 7-Micro/Win V4	
German	**6ES7 298-8FA24-8AH0**
English	**6ES7 298-8FA24-8BH0**
French	**6ES7 298-8FA24-8CH0**
Spanish	**6ES7 298-8FA24-8DH0**
Italian	**6ES7 298-8FA24-8EH0**

Overview SIPLUS analog modules

- Analog inputs and outputs for the SIMATIC S7-200
- With extremely short conversion times
- For connections of analog sensors and actuators without additional amplifier
- For solving the more complex automation tasks

SIPLUS EM 231 analog input modules for the CPU 22x	
	4 AI
Order No.	**6AG1 231-0HC22-2XB0**
Order No. based on	**6ES7 231-0HC22-0XA0**
Ambient temperature range	-25 to +70 °C; -25 to +55 °C (for applications with cUL approval), condensation permissible
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1)	Yes
Approvals	CE, cUL
Technical data	The technical data are identical with the technical data of the based on modules.

SIPLUS EM 232 analog output modules for the CPU 22x	
	2 AO
Order No.	**6AG1 232-0HB22-2XB0**
Order No. based on	**6ES7 232-0HB22-0XA0**
Ambient temperature range	-25 to +70 °C; -25 to +55 °C (for applications with cUL approval), condensation permissible
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1)	No
Approvals	CE, cUL
Technical data	The technical data are identical with the technical data of the based on modules.

SIPLUS EM 235 analog input/output modules for CPU 22x	
	4 AI/1 AO
Order No.	**6AG1 235-0KD22-2XB0**
Order No. based on	**6ES7 235-0KD22-0XA0**
Ambient temperature range	-25 to +70 °C; -25 to +55 °C (for applications with cUL approval), condensation permissible
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1)	No
Approvals	CE, cUL
Technical data	The technical data are identical with the technical data of the based on modules.

SIPLUS analog modules

3

Overview SIPLUS EM 231 RTD module

- For user-friendly, high precision temperature detection
- Supports 31 standard resistance temperature sensors
- Easy to install in an existing system

SIPLUS EM 231 RTD modules for CPU 22x		
	2 AI Thermo	**2 AI Thermo**
Order No.	**6AG1 231-7PB22-2XA0**	**6AG1 231-7PB22-2XY0**
Order No. based on	**6ES7 231-7PB22-0XA0**	**6ES7 231-7PB22-0XA0**
Ambient temperature range	-25 to +70 °C; -25 to +55 °C (for applications with cUL approval), condensation permissible	
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).	
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1)	No	Yes
Approvals	CE, cUL	
Technical data	The technical data are identical with the technical data of the based on modules.	

Ordering data

		Order No.
Analog input module SIPLUS EM 231 (extended temperature range and medial load) For CPU 222/224/224 XP/226; 4 inputs , 0 - 10 V, 12-bit resolution	A)	**6AG1 231-0HC22-2XB0**
Analog output module SIPLUS EM 232 (extended temperature range and medial load) For CPU 222/224/224 XP/226; 2 outputs, ± 10 V, 12-bit resolution	A)	**6AG1 232-0HB22-2XB0**
Analog input/output module SIPLUS EM 235 (extended temperature range and medial load) For CPU 222/224/224 XP/226; 4 inputs, 1 output, ±10 V DC, 12-bit resolution	A)	**6AG1 235-0KD22-2XB0**

		Order No.
SIPLUS EM 231 RTD module (extended temperature range and medial load) 2 inputs for thermistors Pt100/200/500/1000/10000, Ni100/120/1000, Cu10; resistance 150/300/600 Ohms, 15-bit resolution + sign	A)	**6AG1 231-7PB22-2XA0**
SIPLUS EM 231 RTD module (extended temperature range and medial load) Conformity with EN 50155; 2 inputs for thermistors Pt100/200/500/1000/10000, Ni100/120/1000, Cu10; resistance 150/300/600 Ohms, 15-bit resolution + sign	A)	**6AG1 231-7PB22-2XY0**
Accessories		see analog modules S7-200, pages 3/37, 3/40

A) Subject to export regulations: AL: N and ECCN: EAR99H

Overview

- Function modules for simple positioning tasks (1 axis)
- Stepper motors and servo motors from the Micro Stepper to the high-performance servo drive can be connected
- Flexible connection possibilities
- Full support from STEP 7-Micro/WIN with parameterization and startup

Technical specifications

	6ES7 253-1AA22-0XA0
Supply voltages	
Rated value	
• permissible range, lower limit (DC)	11 V
• permissible range, upper limit (DC)	30 V
Current consumption	
from backplane bus DC 5 V, max.	190 mA
from supply voltage L+, max.	300 mA; from 12 V DC, 130 mA from 24 V DC
Hardware config.	
Number of modules per CPU	max. 5 with CPU 226/226 XM, max. 3 with CPU 224, max. 1 with CPU 222
Digital inputs	
Number of digital inputs	5
Functions	Stop (STP), reference point switch (RPS), upper limit switch (LMT+), lower limit switch (LMT-), zero point (ZP)
Cable length	
• Cable length, shielded, max.	100 m; STP, RPS, LMT+, LMT- 100 m, ZP 10 m
• Cable length unshielded, max.	30 m; STP, RPS, LMT+, LMT- 30 m, ZP not recommended
Type	IEC Type 1, active-high
Input voltage	
• Rated value, DC	24 V
• for signal "0"	STP, RPS, LMT+, LMT- DC 5 V; ZP DC 1 V
• for signal "1"	STP, RPS, LMT+, LMT- DC 15 V; ZP DC 3 V
Input delay (for rated value of input voltage)	
• for standard inputs - programmable	Yes; STP, RPS, LMT+, LMT- 0.2 to 12.8 ms; ZP min 2 µs

	6ES7 253-1AA22-0XA0
Encoder	
Connectable encoders	
• 2-wire BEROS	Yes
• permissible quiescent current (2-wire BEROS), max.	1 mA
Drive interface	
Signal output I	
• Number	4; optionally RS422/RS485 or 5 V DC
• Type	RS422/RS485 (P0+, P0-, P1+, P1-)
• Differential output voltage, min.	2.8 V; RL=200 Ohm
• Pulse frequency	200 kHz; (P0+, P0-, P1+, P1-, P0, P1)
• Cable length, max.	10 m; shielded; 1 m unshielded
Signal output III	
• Type	5 V DC(P0, P1, DIS, CLR)
• Output voltage	30 V DC
• Output current	50 mA; output delay (DIS, CLR) max. 30 µs
Isolation	
Galvanic isolation, digital inputs	
• between the channels	Yes
Dimensions and weight	
Width	71.2 mm
Height	80 mm
Depth	62 mm
Weights	
Weight, approx.	190 g

EM 253 positioning module

Ordering data		Order No.
EM 253 positioning modules for activating stepper motors or servo drives	A)	**6ES7 253-1AA22-0XA0**
Grounding terminal 10 items		**6ES5 728-8MA11**
Backplane bus expansion cable for connecting the two equipment tiers in a two-tier configuration, for CPU 222/224/224 XP/226	A)	**6ES7 290-6AA20-0XA0**

	Order No.
S7-200 programmable controller, system manual for CPU 221/222/224/224 XP/226 and STEP 7-Micro/Win V4	
German	**6ES7 298-8FA24-8AH0**
English	**6ES7 298-8FA24-8BH0**
French	**6ES7 298-8FA24-8CH0**
Spanish	**6ES7 298-8FA24-8DH0**
Italian	**6ES7 298-8FA24-8EH0**
Chinese	**6ES7 298-8FA24-8FH0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

Overview

SIWAREX MS is a versatile weighing module for all simple weighing and force measuring tasks. The compact module is easy to install in the SIMATIC S7-200 automation systems. The data for the actual weight can be accessed directly in the SIMATIC CPU without the need for any additional interfaces.

Technical specifications

	SIWAREX MS
Integration in S7-200 automation systems • CPU 222 (6ES7212-1*B23-0XB0) • CPU 224 (6ES7214-1*D23-0XB0) • CPU 224XP (6ES7214-2*D23-0XB0) • CPU 226 (6ES7216-2*D23-0XB0)	
Communication interfaces	SIMATIC S7 Bus, RS 232, TTY
Connection of remote indicators (through TTY interface)	Weight value (gross, net)
Adjustment of scales settings	Using PC parameterization software SIWATOOL MS (RS 232)
Measuring properties	
• Error limit according to DIN 1319-1 of full-scale value at 20 °C ± 10 K	0.05%
• Internal resolution Data format of weight values	65.535 2 byte (fixed-point)
Number of measurements/second	50 or 30
Digital filter	0.05 - 5 Hz (in 7 steps), mean-value filter
Weighing functions	
• Weight values	Gross, net
• Limit values	2 (min./max.)
• Zero setting function	Per command
• Tare function	Per command
• Tare specification	Per command
Load cells	Strain gauges in 4-wire or 6-wire system
Load cell powering	
• Supply voltage U_s (rated value)	6 V DC typ.
• Max. supply current	≤ 150 mA
• Permissible load impedance	
- R_{Lmin}	> 40 Ω
- R_{Lmax}	< 4010 Ω
	With SIWAREX IS or SIWAREX Pi Ex interface:
- R_{Lmin}	> 87 Ω
- R_{Lmax}	< 4010 Ω

	SIWAREX MS
Load cell characteristic	1 mV/V to 4 mV/V
Permissible range of measuring signal (at greatest set characteristic)	-2,4 to +26,4 mV
Max. distance of load cells	500 m
Intrinsically-safe load cell supply	
Connection to load cells in Exzone 1	Optionally via SIWAREX IS or SIWAREX Pi Ex interface
Ex approvals and safety	CE, ATEX 100a, FM, UL, cUL_{US} Haz. Loc.
Supply voltage 24 V DC	
• Rated voltage	24 V DC
• Max. current consumption	130 mA
Supply voltage 5 V DC (from CPU)	
• Rated voltage	5 V DC
• Max. current consumption	145 mA
IP degree of protection to DIN EN 60529; IEC 60529	IP20
Climatic requirements $T_{min\ (IND)}$ to $T_{max\ (IND)}$) (operating temperature)	
• Vertical installation	0 ... +55 °C
• Horizontal installation	0 ... +40 °C
EMC requirements according to	EN 61326, EN 45501 NAMUR NE21, Part 1

SIWAREX MS

3

Ordering data	Order No.
SIWAREX MS Weighing electronics for scales in SIMATIC S7-200 for applications that do not require official calibration	**7MH4 930-0AA01**
SIWAREX MS Manual • German, English, Italian, Spanish, French Free download on the Internet at: www.siemens.com/weighing-technology	
Configuration package SIWAREX MS on CD-ROM for SIMATIC MicroWIN 32, version 3.2 or higher • Software for SIWATOOL MS scale adjustment (German, English, Italian, Spanish, French) • Manuals on CD (German/English) • Micro/WIN library MicroScale for communication with SIWAREX MS	**7MH4 930-0AK01**
SIWAREX MS "Getting started" Sample software for easy acquaintance with programming of the scale. Free download on the Internet at: www.siemens.com/weighing-technology	
SIWATOOL cable from SIWAREX M, FTA, FTC, MS with serial PC interface, for 9-pin PC interfaces (RS 232)	
• 2 m long	**7MH4 702-8CA**
• 5 m long	**7MH4 702-8CB**
Shield clamps for shield termination Pack of 10; 1 item required for each shielded cable	**6ES5 728-8MA11**
Remote displays (option) The digital remote displays can be connected directly to the SIWAREX MS through the TTY interface. The following remote display can be used: S102 Siebert Industrieelektronik GmbH P.O. Box 1180 D-66565 Eppelborn Tel.: 06806/980-0 Fax: 06806/980-999 Internet: http://www.siebert.de Detailed information available from manufacturer.	
Accessories	
SIWAREX JB junction box, aluminium housing for connecting up to 4 load cells in parallel, and for connecting several junction boxes	**7MH4 710-1BA**
SIWAREX JB junction box, stainless steel housing for connecting up to 4 load cells in parallel	**7MH4 710-1EA**
Ex interface, type SIWAREX Pi With UL and FM approvals, but **without ATEX approval** for intrinsically safe connection of weighing cells, suitable for weighing modules SIWAREX U, M, FTA, FTC, CS, MS and P. Not approved for use in the EU.	**7MH4 710-5AA**
Manual for Ex interface type SIWAREX Pi	**C71000-T5974-C29**
Ex interface, type SIWAREX IS With ATEX approval, but **without UL and FM approvals** for intrinsically safe connection of weighing cells, including manual, suitable for weighing modules SIWAREX U, M, FTA, FTC, CS, MS and P. Suitable for use in the EU.	
• With short-circuit current < 199 mA DC	**7MH4 710-5BA**
• With short-circuit current < 137 mA DC	**7MH4 710-5CA**
Cable (optional)	
Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, orange sheath to connect SIWAREX U, M, P, FTA, FTC, CS, MS and CF to the junction box (JB), extension box (EB) or Ex interface (Ex-I) or between two JBs, for fixed laying, occasional bending is possible, 10.8 mm outer diameter, for ambient temperature –40 to +80 °C	**7MH4 702-8AG**
Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, blue sheath to connect the junction box (JB) or extension box (EB) in a potentially explosive atmosphere to the Ex interface (Ex-I), for fixed laying, occasional bending is possible, blue PVC insulating sheath, approx. 10.8 mm outer diameter, for ambient temperature -40 to +80 °C	**7MH4 702-8AF**
Cable LiYCY 4 x 2 x 0.25 mm² A) for TTY (connect 2 pairs of conductors in parallel), for connection of a remote display	**7MH4 407-8BD0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

Radio clock module SIPLUS DCF 77

Overview

The sychronisation of the real-time clock for the automation systems SIMATIC S7-200, S7-300 and S7-400 with the official time of day of the time signal transmitter DCF 77 of the Physikalisch-Technische Bundesanstalt Braunschweig is made by this module.

The time receipt occurs via a DCF transmitter (antenna with solid-state) which is connected to the the SIMATIC and SIPLUS PLC via two digital inputs and a software driver included in the scope of supply (function block FB). The function blocks can be downloaded under:
http://www.siemens.com/siplus - Support - Tools & Downloads!

Technical specifications

Radio clock module SIPLUS DCF 77	
Radio frequency	77,5 Hz
Power supply	24 V DC (20,4 V ... 28, 8 V DC)
Power consumption, typ.	50 mA
Dimensions (W x H x D)	75 x 125 [1] x 75

1) Additionally 25 mm (0.98 in) for heavy duty threaded joint and bending radius for cables

Ordering data

		Order No.
Radio clock module SIPLUS DCF 77 For sychronisation of SIMATIC S7-200, S7-300 and S7-400 with the official time of day of the time signal transmitter DCF77 of the Physikalisch-Technische Bundes-anstalt Braunschweig	A)	**6AG1 057-1AA03-0AA0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

Modem EM 241

Overview

- Modem expansion module for SIMATIC S7-200
- The Plug&Play solution for all classical modem tasks in the PLC field
- Used for remote maintenance/remote diagnostics, CPU-to-CPU/PC communication or SMS/pager messaging
- Minimal engineering outlay required
- Replaces external modems connected via the communications interface of the CPU
- Easy to retrofit

Technical specifications

	6ES7 241-1AA22-0XA0
Voltages and currents	
Load voltage L+	
• Rated value (DC)	24 V
• permissible range, lower limit (DC)	20.4 V
• permissible range, upper limit (DC)	28.8 V
Current consumption	
from load voltage L+ (without load), max.	70 mA
from backplane bus DC 5 V, max.	80 mA; from expansion bus
Power loss, typ.	2.1 W
Communication functions	
Bus protocol/transmission protocol	PPI, Modbus
Connection point	
Telephone lines	RJ11 (4 cables, 6 contacts)
Modem	
Standards	Bell 103, Bell 212, V. 21, V. 22, V. 22 bis, V. 23c, V. 32, V. 32 to, V. 34 (preset)
Touch tone service	Yes
Pulse dialing	Yes
Dimensions and weight	
Width	71.2 mm
Height	80 mm
Depth	62 mm
Weights	
Weight, approx.	190 g

Ordering data

		Order No.
Modem EM 241	A)	**6ES7 241-1AA22-0XA0**
Analog modem for remote maintenance/remote diagnostics; CPU-to-CPU/PC communication, SMS/pager messaging		
Grounding terminal		**6ES5 728-8MA11**
10 items		
S7-200 programmable controller, system manual		
for CPU 221/222/224/224 XP/226 and STEP 7-Micro/Win V4		
German		**6ES7 298-8FA24-8AH0**
English		**6ES7 298-8FA24-8BH0**
French		**6ES7 298-8FA24-8CH0**
Spanish		**6ES7 298-8FA24-8DH0**
Italian		**6ES7 298-8FA24-8EH0**
Chinese		**6ES7 298-8FA24-8FH0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

Overview

- For connecting S7-22x to PROFIBUS DP (as a slave) and MPI
- Simultaneous operation as MPI slave and DP slave is possible
- Transmission rate max. 12 Mbit/s
- Version 6ES7 2xx-xxx**21**-xxxx and higher can be used with CPU

Technical specifications

	6ES7 277-0AA22-0XA0
Voltages and currents	
Load voltage L+	
• Rated value (DC)	24 V
• permissible range, lower limit (DC)	20.4 V
• permissible range, upper limit (DC)	28.8 V
Current consumption	
from backplane bus DC 5 V, max.	150 mA
from sensor current supply or external current supply (DC 24 V), max.	180 mA; 30 to 180 mA
Power loss, typ.	2.5 W
Hardware config.	
Connectable nodes	TD 200 as of V2.0, OP, TP, PG/PC, S7-300/400, PROFIBUS-DP-Master
Communication functions	
Bus protocol/transmission protocol	PROFIBUS DP (Slave), MPI (Slave)
Number of connections	
• MPI connections, max.	6
• MPI connections reserved for OP communication	1
• MPI connections reserved for PG communication	1
Interfaces	
Number of RS 485 interfaces	1
DC 5 V	
• Output current, max.	90 mA
DC 24 V	
• Voltage range	20,4 to 28,8 V
• Output current, max.	120 mA
• Current limiting	0,7 to 2,4 A
Connection point	
pluggable I/O terminals	No
PROFIBUS DP	
Transmission speed, max.	12 Mbit/s; 9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 kbit/s 1 / 1.5 / 3 / 6 / 12 Mbit/s
Node addresses	0 to 99, adjustable
Cable length, max.	1,200 m; 100 to 1200 m, depending on transmission speed
Number of stations in network, max.	126; of which max. 99 EM 277
Number of stations per segment, max.	32
Automatic detection of transmission speed	Yes
Dimensions and weight	
Width	71.2 mm
Height	80 mm
Depth	62 mm
Weights	
Weight, approx.	175 g

Ordering data

		Order No.
EM 277 PROFIBUS DP input module	A)	**6ES7 277-0AA22-0XA0**
for CPU 222/224/224 XP/226, for connecting to PROFIBUS DP (slave) and MPI		

A) Subject to export regulations: AL: N and ECCN: EAR99H

SIPLUS EM 277 PROFIBUS DP module

Overview

- For connecting S7-22x to PROFIBUS DP (as a slave) and MPI
- Simultaneous operation as MPI slave and DP slave is possible
- Transmission rate max. 12 Mbit/s
- Version 6ES7 2xx-xxx**21**-xxxx and higher can be used with CPU

SIPLUS EM 277 PROFIBUS DP module	
Order No.	**6AG1 277-0AA22-2XA0**
Order No. based on	**6ES7 277-0AA22-0XA0**
Ambient temperature range	-25 to +70 °C; -25 to +55 °C (for applications with cUL approval), condensation permissible
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1)	Yes
Approvals	CE, cUL
Technical data	The technical data are identical with the technical data of the based on modules.

Ordering data

		Order No.
SIPLUS EM 277 PROFIBUS DP input module (extended temperature range and medial load) for CPU 222/224/224 XP/226, for connecting to PROFIBUS DP (slave) and MPI	A)	**6AG1 277-0AA22-2XA0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

Overview

The CP 243-2 is the AS-Interface master for the innovated generation of SIMATIC S7-200. The communications processor (6GK1 243-2AX01-0AX0) supports the extended AS-Interface specification V2.1 and has the following functions:

- Up to 62 AS-Interface slaves can be connected and integrated analog value transfer (according to the extended AS-Interface specification V2.1)
- Supports all AS-Interface master functions in accordance with the extended AS-Interface specification V2.1
- Status displays for operating states and display of the functional readiness of connected slaves with LEDs in the front panel
- Indication of errors (incl. AS-Interface voltage errors, configuration errors) with LEDs in the front panel
- Compact enclosure designed to match the new generation of SIMATIC S7-200

Technical specifications

	CP 243-2
AS-Interface specification	V 2.1
Interfaces	
• Allocation of analog address space in the PLC	corresponding to two I/O modules (8 DI/8 DO and 8 AI/ 8 AO)
• AS-Interface connection	terminal connection
Current consumption	
• through backplane bus	type. 220 mA for 5 V DC
• via AS-Interface from the AS-Interface shaped cables	max. 100 mA
Power loss	approx. 2 W
Perm. ambient conditions	
• Operating temperature	
- horizontal installation	0 °C … +55 °C
- vertical mounting	0 °C … +45 °C
• Transport/storage temperature	- 40 °C … +70 °C
• Relative humidity	max. 95% at +25 °C
Construction	
• Module format	S7-22x expansion module
• Dimensions (W x H x D) in mm	71.2 x 80 x 62 (H+16 mm with holes for wall mounting)
• Weight	approx. 250 g
• Space requirements	1 slot

Ordering data

		Order No.
CP 243-2 communications processor	A)	**6GK7 243-2AX01-0XA0**
For connection of SIMATIC S7-200 (2nd generation) to AS-Interface with bus connector		
Manual for CP 243-2		
Including AS-Interface fundamentals and diskette with program examples paper version		
• German		**6GK7 243-2AX00-8AA0**
• English		**6GK7 243-2AX00-8BA0**
• French		**6GK7 243-2AX00-8CA0**
• Spanish		**6GK7 243-2AX00-8DA0**
• Italian		**6GK7 243-2AX00-8EA0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

CP 243-1

Overview

PN	ISO	TCP/IP	UDP	PG	S7	S5	IT	FTP
		■		■	■			

- Connection of S7-200 to Industrial Ethernet with
  - 10/100 Mbit/s
  - Half/full duplex
  - RJ 45 socket
  - TCP/IP
- Configuration, remote programming and service with STEP 7 Micro/WIN over Industrial Ethernet possible (program upload and program download, status)
- CPU/CPU communication over Industrial Ethernet possible (client + server, 8 S7 connections + 1 PG connection)
- An S7 OPC server (e.g. in SOFTNET-S7) allows PLC data to be further processed in PC applications.
- Module replacement possible without PG

Technical specifications

	CP 243-1
Data transmission rate	10/100 Mbit/s autosensing
Interfaces	
• Communication connection, electrical	1 x RJ45 (10/100 Mbit/s; TP)
• Connection for supply voltage	1 x 2-pin terminal block
Supply voltage	24 V DC (±5%)
Current consumption	
• from the backplane bus	55 mA
• from 24 V DC external	60 mA
Power loss at 24 V DC	1.75 W
Perm. ambient conditions	
• Operating temperature	
- horizontal installation	0 °C … +55 °C
- vertical installation	0 °C … +45 °C
• Transport/storage temperature	-40 °C … +70 °C
• Relative humidity	Max. 95% at +25 °C
Construction	
• Dimensions (W x H x D) in mm	71.2 x 80 x 62
• Weight	150 g
Performance data	
S7 communication/ PG communication	
• Number of connections that can be used	8 S7 connections + 1 PG connection
Configuration	With STEP 7-Micro/WIN (V3.2 SP1 or higher)

Ordering data

		Order No.
CP 243-1 communications processor for connection of SIMATIC S7-200 to Industrial Ethernet; for S7 communication, PG communication with electronic manual on CD-ROM, German, English, French, Italian, Spanish	D)	**6GK7 243-1EX00-0XE0**
SOFTNET-S7 Edition 2005 for Industrial Ethernet Software for S7 and S5-compatible communication, incl. OPC server, PG/OP communication and NCM PC; up to 64 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, 2000 Professional/Server; German/English		**6GK1 704-1CW63-3AA0**
SOFTNET-S7 Lean Edition 2005 for Industrial Ethernet Software for S7 and S5-compatible communication, incl. OPC server, PG/OP communication and NCM PC; up to 8 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, 2000 Professional/Server; German/English		**6GK1 704-1LW63-3AA0**
S7-1613 Edition 2005 Software for S7 and S5 communication, incl. PG/OP communication, OPC server and NCM PC; up to 120 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, Windows 2000 Professional/Server; for CP 1613/CP 1613 A2 German/English		**6GK1 716-1CB63-3AA0**
STEP 7-Micro/WIN V4 programming software *Target system:* All CPUs of the SIMATIC S7-200 *Prerequisite:* Windows 2000/XP on PG or PC *Type of delivery:* German, English, French, Spanish, Italian, Chinese; with online documentation		
• Single license	E)	**6ES7 810-2CC03-0YX0**
• Upgrade Single License[1]	E)	**6ES7 810-2CC03-0YX3**

1) Upgrade for all previous STEP 7-Micro/WIN and STEP 7-Micro/DOS versions

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

E) Subject to export regulations: AL: N and ECCN: EAR99S

CP 243-1 IT

Overview

PN	ISO	TCP/IP	UDP	PG	S7	S5	IT	FTP
		■		■	■		■	■

- Connection of S7-200 to Industrial Ethernet with
  - 10/100 Mbit/s
  - Half/full duplex
  - RJ 45 socket
  - TCP/IP
- Configuration, remote programming and service with STEP 7 Micro/WIN over Industrial Ethernet possible (program upload and program download, status)
- CPU/CPU communication over Industrial Ethernet possible (client + server, 8 S7 connections + 1 PG connection)
- IT communication
  - Web function
  - E-mail function
  - FTP client function for program-controlled data communication (e.g. DOS, UNIX, LINUX, embedded systems)
- FTP server with 8 MB memory
- An S7 OPC server (e.g. in SOFTNET-S7) allows PLC data to be further processed in PC applications

Technical specifications

	CP 243-1 IT
Data transmisssion rate	10/100 Mbit/s autosensing
Interfaces	
• Communication connection, electrical	1 x RJ45 (10/100 Mbit/s; TP)
• Connection for supply voltage	1 x 2-pin terminal block
Voltage supply	24 V DC (±5%)
Current consumption	
• from the backplane bus	55 mA
• from 24 V DC external	60 mA
Power loss at 24 V DC	1.75 W
Permissible ambient conditions	
• Operating temperature	
- horizontal installation	0 °C … +55 °C
- vertical installation	0 °C … +45 °C
• Transport/storage temperature	-40 °C … +70 °C
• Relative humidity	max. 95% at +25 °C
Design	
• Dimensions (W x H x D) in mm	71.2 x 80 x 62
• Weight	150 g
Performance data	
IT communication	
• Number of connections to an e-mail server	1
• E-mail client:	32 e-mails with max. 1024 characters
• Number of FTP connections	1
• Number of HTTP connections	4
• Programmable access protection	8 users
• Capacity of flash memory file system	8 Mbyte
• Service life of the Flash Memory cells	1000000 write cycles
S7 communication/ PG communication	
• Number of connections that can be used	Eight S7 connections + 1 PG connection
Configuration	With STEP 7-Micro/WIN V3.2 SP3 or higher

Ordering data

		Order No.
CP 243-1 IT communications processor for connection of SIMATIC S7-200 to Industrial Ethernet; for S7 communication, PG communication, E-mail and WWW server; with electronic manual on CD-ROM German, English, French, Italian, Spanish	D)	**6GK7 243-1GX00-0XE0**
SOFTNET-S7 Edition 2005 for Industrial Ethernet Software for S7 and S5-compatible communication, incl. OPC server, PG/OP communication and NCM PC; up to 64 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, 2000 Professional/Server; German/English		**6GK1 704-1CW63-3AA0**
SOFTNET-S7 Lean Edition 2005 for Industrial Ethernet Software for S7 and S5-compatible communication, incl. OPC server, PG/OP communication and NCM PC; up to 8 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, 2000 Professional/Server; German/English		**6GK1 704-1LW63-3AA0**
S7-1613 Edition 2005 Software for S7 and S5 communication, incl. PG/OP communication, OPC server and NCM PC; up to 120 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, Windows 2000 Professional/Server; for CP 1613/CP 1613 A2 German/English		**6GK1 716-1CB63-3AA0**
STEP 7-Micro/WIN V4 programming software *Target system:* All CPUs of the SIMATIC S7-200 *Prerequisite:* Windows 2000/XP on PG or PC *Type of delivery:* German, English, French, Spanish, Italian, Chinese; with online documentation		
• Single license	E)	**6ES7 810-2CC03-0YX0**
• Upgrade Single License[1)]	E)	**6ES7 810-2CC03-0YX3**

1) Upgrade for all previous STEP 7-Micro/WIN and STEP 7-Micro/DOS versions

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

E) Subject to export regulations: AL: N and ECCN: EAR99S

MD720-3 GSM/GPRS modem

Overview

- GPRS modem for linking SIMATIC S7-200 PLCs over GPRS to a PC control center with SINAUT MICRO SC
- Used for low-cost monitoring and control of simple telecontrol tasks
- Permanent wireless online connection of SIMATIC S7-200 with secure linking over public networks
- Use as GSM modem for teleservice
- Simple startup possible without special knowledge of radio systems

Technical specifications

	MD 720-3
Data transmission rate	
• RS232	300 bit/s … 57,600 bit/s
• GSM data calls	CSD 9600 bit/s
• GPRS up to 2 uplinks up to 4 downlinks	13.4 kbit … 27 kbit upload gross (modem->Internet) Net approx. 30% less 40 kbit … 54 kbit download gross (Internet -> modem) Net approx. 30% less
Interfaces	
• RS232	1 x 9-pin Sub-D socket
• GSM/GPRS	1 x SMA antenna socket (50 Ohm)
Frequency ranges	850, 900, 1800, 1900 MHz
Transmitted output power	2 W at 850, 900 MHz 1 W at 1800, 1900 MHz
Current consumption	
Send mode	
• at 12 V	430 mA
• at 24 V	140 mA
Receive mode	
• at 12 V	90 mA
• at 24 V	50 mA
Supply voltage	12 … 30 V DC
Power loss	typ. 5 W max. 6.2 W

A) Subject to export regulations: AL: N and ECCN: EAR99H

	MD 720-3
Perm. ambient conditions	
• Operating temperature	- 20 °C … +60 °C
• Transport/storage temperature	- 25 °C … +85 °C
• Relative humidity	Max. 95 % at +25 °C
Design	
• Dimensions (W x H x D) in mm	22.5 x 99 x 114
• Weight	Approx. 150 g
• Assembly	Standard rail
Degree of protection	IP40
Configuration	AT commands through S7-200 program blocks
National approvals	Current approvals can be found on the Internet at http:/www.siemens.com/simatic-net/ik-info

Ordering data

		Order No.
SINAUT MD720-3 GPRS modem for IP-based data transmission over GSM networks, quad band, AT command interface, automatic establishment of GPRS connection, switchable to CSD mode, RS 232, including gender changer for RS 232/PPI adapter; manual on CD-ROM in German, English, Chinese, Russian		**6NH9 720-3AA0**
Accessories		
ANT 794-4MR antenna Quad band antenna, omnidirectional with 5 m cable		**6NH9 860-1AA0**
SINAUT MICRO SC Single license for one installation; OPC server for GPRS communication with S7-200; connection management with 8, 64 or 256 remote stations; routing for connections between S7-200 stations; connection monitoring; German and English GUI; for Windows XP Professional SP 2 and higher, Windows 2003 Server SP 1, Windows 2000 Professional/Server SP 4; manual on CD-ROM in German, English, Chinese, Russian		
• **SINAUT MICRO SC8** connection management for 8 remote stations;	E)	**6NH9 910-0AA10-0AA3**
• **SINAUT MICRO SC64** connection management for 64 remote stations;	E)	**6NH9 910-0AA10-0AA6**
• **SINAUT MICRO SC256** connection management for 256 remote stations;	E)	**6NH9 910-0AA10-0AA8**
SIMATIC S7-200 PC/PPI cable Multimaster, for connecting S7-200 to serial PC interface, supports Freeport and GSM modems	A)	**6ES7 901-3CB30-0XA0**

E) Subject to export regulations: AL: N and ECCN: EAR99S

ANT794-4MR GSM/GPRS antenna

Overview

- Omnidirectional antenna for use in GSM/GPRS networks
- Remote antenna for indoors/outdoors
- Suitable for quad band
- Complete with cable and mounting bracket for direct connection to SINAUT GPRS modems

Technical specifications

	ANT794-4MR
Mobile telephone networks	GSM / GPRS
Frequencies	850 MHz, 900 MHz, 1800 MHz, 1900 MHz, 2200 MHz
Characteristic	Omnidirectional
Antenna amplification	0 dB
SWR	< 2.0
Max. power	20 W
Polarity	Linear vertical
Connectors	SMA
Length of antenna cable	5 m
Perm. ambient conditions	
• Operating temperature	- 40 °C … +70 °C
• Transport/storage temperature	- 40 °C … +70 °C
• Relative humidity	100 %
Design	
• Dimensions (D x H) in mm	25 x 193
• Weight	380 g (incl. packaging)
• Assembly	Using supplied bracket
Degree of protection	IP65
Outer material	Hard PVC UV-resistance

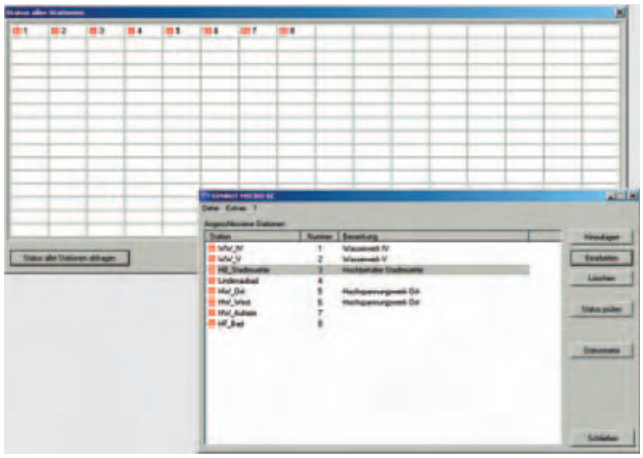
Ordering data

		Order No.
ANT794-4MR GSM/GPRS quad band antenna; weather-resistant for indoor/outdoor use; 5 m cable with fixed connection to antenna; SMA connector; including mounting bracket, screws, wall plugs		**6NH9 860-1AA00**
Accessories		
SINAUT MD720-3 GPRS modem for IP-based data transmission over GSM networks, quad band, AT command interface, automatic establishment of GPRS connection, switchable to CSD mode, RS 232, including gender changer for RS 232/PPI adapter; manual on CD-ROM in German, English, Chinese, Russian		**6NH9 720-3AA0**
SINAUT MICRO SC Single license for one installation; OPC server for GPRS communication with S7-200; connection management with 8, 64 or 256 remote stations; routing for connections between S7-200 stations; connection monitoring; German and English GUI; for Windows XP Professional SP 2 and higher, Windows 2003 Server SP 1, Windows 2000 Professional/Server SP 4; manual on CD-ROM in German, English, Chinese, Russian		
• **SINAUT MICRO SC8** connection management for 8 remote stations;	E)	**6NH9 910-0AA10-0AA3**
• **SINAUT MICRO SC64** connection management for 64 remote stations;	E)	**6NH9 910-0AA10-0AA6**
• **SINAUT MICRO SC256** connection management for 256 remote stations;	E)	**6NH9 910-0AA10-0AA8**

E) Subject to export regulations: AL: N and ECCN: EAR99S

SINAUT MICRO SC

Overview



- Software package for PC and SIMATIC S7-200, comprising:
  - *PC:*
    OPC server,
    connection manager
  - *S7-200:*
    PLC block library
- OPC server for GPRS linking as many as 256 SIMATIC S7-200 stations to a control center
- Permanent, bidirectional and wireless online connection to the S7-200 via GPRS
- GPRS communication between S7-200 stations by means of routing function
- Clear monitoring of GPRS station connections
- Low GPRS mobile radio costs due to optimized communication with effective frame design
- Encrypted transmission for protection against data manipulation and tapping

Technical specifications

	SINAUT MICRO SC
Controls that are supported	S7-200 CPU 224 or higher (block library included in scope of supply)
Number of stations that can be used	8, 64 or 256 controllers
Interfaces to the OPC Client	DCOM protocol OPC "data access interface V2.05" Synchronous and asynchronous reading of variables
Interfaces and functions for the SIMATIC S7-200	Writing of variables in the SIMATIC S7 in the case of values changes to OPC variables Transfer of SIMATIC S7 data to OPC variables (for event-driven communication from the SIMATIC S7) Activatable cyclic reading of variables; adjustable time interval Monitoring of connected SIMATIC S7 with time-of-day synchronization Routing of data packets between connected SIMATIC S7-200 stations Protocol optimized for GRPS; tunnel configuration from GPRS modem Via Internet access as server with public IP address (recommendation: fixed public Internet address)
Operating systems	Microsoft Windows XP Professional from Service Pack 2; Microsoft Windows 2003 Server Service Pack 1; Microsoft Windows 2000 Professional/Server Service Pack 4
Diagnostics data	Integral OPC client for connection monitoring
Configuration	Using integral configuration tool

Ordering data

	Order No.
SINAUT MICRO SC Single license for one installation; OPC server for GPRS communication with S7-200; connection management with 8, 64 or 256 remote stations; routing for connections between S7-200 stations; connection monitoring; German and English GUI; for Windows XP Professional SP 2 and higher, Windows 2003 Server SP 1, Windows 2000 Professional/Server SP 4; manual on CD-ROM in German, English, Chinese, Russian	
• **SINAUT MICRO SC8** E) connection management for 8 remote stations;	**6NH9 910-0AA10-0AA3**
• **SINAUT MICRO SC64** E) connection management for 64 remote stations;	**6NH9 910-0AA10-0AA6**
• **SINAUT MICRO SC256** E) connection management for 256 remote stations;	**6NH9 910-0AA10-0AA8**
Accessories	
SINAUT MD720-3 GPRS modem for IP-based data transmission over GSM networks, quad band, AT command interface, automatic establishment of GPRS connection, switchable to CSD mode, RS232, including gender changer for RS232/PPI adapter; manual on CD-ROM in German, English, Chinese, Russian	**6NH9 720-3AA0**
ANT 794-4MR antenna Quad band antenna, omnidirectional with 5 m cable	**6NH9 860-1AA0**

E) Subject to export regulations: AL: N and ECCN: EAR99S

Overview

SITOP 3,5 A, S7-200 design

The controlled load power supply for the SIMATIC S7-200:

- Harmonized in design and functionality with trouble-free integration in PLC network.
- For reliable 24 V DC; 3.5 A power to controllers, encoders and sensors.
- Flexible, whether in industrial or house-hold networks.

LOGO!Power 4 A

LOGO!Power supplies are primary switched-mode power supplies that are optimized to the LOGO! logic modules in terms of functionality and design. With the wide input range of 85 V to 264 V AC, radio interference level B and assembly option in built-in miniature distribution boards, they can be used universally in a diverse range of applications in the low-end performance range.

SITOP smart

Slimline dimensions, strong performance. This new range of power supplies requires approximately a third less width space on the top-hat rail than its predecessor and features with temporarily up to 150% of the output current excellent overload behavior. Numerous certifications permit universal use around the world.

Power supplies

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Technical specifications SITOP power 3.5 A

Power supply, type	3.5 A
Order No.	**6EP1 332-1SH31** [1]
Input	Single-phase AC
Rated voltage $V_{in\ rated}$	**120/230 V AC** Settable using wire jumper
Voltage range	93 to 132 V/187 to 264 V AC
Overvoltage strength	2.3 x $V_{inrated}$, 1.3 ms
Mains buffering $I_{out\ rated}$	> 20 ms at V_{in} = 187 V
Rated line frequency; range	50/60 Hz; 47 to 63 Hz
Rated current$I_{in\ rated}$	1.65/0.95 A
Inrush current limitation (+25 °C)	< 33 A, < 3 ms (V_{in} = 230 V)
I^2t	< 1.0 A^2s
Integrated line-side fuse	T 2.5 A/250 V (not accessible)
Recommended circuit-breaker (IEC 898) in mains supply line	Two-pole circuit-breaker from 10 A, Characteristic C or from 6 A, Characteristic D
Output	Stabilized, floating direct voltage
Rated voltage $V_{out\ rated}$	**24 V DC**
Total tolerance	± 5 % (typ. ± 2 %)
• Stat. mains compensation	Approx. ± 0.1 %
• Stat. load compensation	Approx. ± 0.2 %
Residual ripple (clock frequency: approx. 50 kHz)	< 150 mV_{pp} (typ. 30 mV_{pp})
Spikes (bandwidth: 20 MHz)	< 240 mV_{pp} (typ. 110 mV_{pp})
Setting range	-
Status display	-
Power ON/OFF behavior	No overshoot of V_{out} (soft start)
Starting delay/voltage rise	< 1 s/typ. 80 ms
Rated current $I_{out\ rated}$	**3.5 A**
Current range	
• Up to +45 °C	0 to 3.5 A
• Up to +60 °C	0 to 3.5 A
Dyn. V/I with	
• Starting on short circuit	typ. 5 A for 100 ms
• Short-circuit in operation	typ. 5 A for 100 ms
Parallel connection for increased output	Yes, up to 5
Efficiency	
Efficiency at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 84 %
Power loss at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 16 W
Control	
Dyn. mains compensation ($V_{in\ rated}$ ± 15 %)	± 0.3 % V_{out}
Dyn. load compensation (I_{out}: 50/100/50 %)	< ± 10 % V_{out} (typ. ± 3 % V_{out})
Settling time	
• Load step from 50 to 100 %	< 5 ms
• Load step from 100 to 50 %	< 5 ms

Power supply, type	3.5 A
Protection and monitoring	
Output overvoltage protection	
Current limitation	3.8 A
Short-circuit protection	Stabilized current characteristic to typ. 14 V, electronic shutdown below that, automatic restart
RMS sustained short-circuit current	< 4 A
Overload/short-circuit indicator	-
Safety	
Galvanic isolation primary/secondary	Yes, SELV output voltage V_{out} acc. to EN 60950
Protective class	Class I
Discharge current	< 3.5 mA
TÜV test	Yes
CE marking	Yes
UL/cUL (CSA) approval	Yes, cULus listed (UL 508, CSA 22.2 No. 14-M91), File E143289
FM approval	-
Appr. for use in marine vessels	-
Degree of protection (EN 60529)	IP20
EMC	
Interference emission	EN 55022 Class B
Line harmonics limitation	EN 61000-3-2
Interference immunity	EN 61000-6-2
Operating specifications	
Ambient temperature range	0 to +60 °C with natural convection
Transportation and storage temperature range	-25 to +85 °C
Humidity rating	Climatic class 3K3 acc. to EN 60721, no condensation
Mechanical specifications	
Connections	
• Mains input L, N, PE	One screw-type terminal each for 0.5 to 1 mm^2 finely stranded, 0.5 to 1.5 mm^2 single-core
• Output L+	1 screw-type terminal for 0.5 to 1 mm^2
• Output M	2 screw-type terminals for 0.5 to 1 mm^2
Dimensions (W x H x D) in mm	160 x 80 x 62
Weight approx.	0.5 kg
Mounting	Snap-mounting on DIN rail EN 50022-35x15/7.5, wall mounting
Accessories	Mounting bracket

1) SIPLUS module 6AG1203-1SH31-2AA0 for extended temperature range -25 to + 60 °C and for use under medium loading (e.g. atmospheres containing a high concentration of chlorine and sulphur).

Technical specifications LOGO!Power 4 A

Type	24 V/4 A
Order number	**6EP1 332-1SH51**
Input	Single-phase AC
Rated voltage $U_{inrated}$	**100 V - 240 V AC** wide-range input
Voltage range	85 V to 264 V AC
Overvoltage strength	2.3 x $U_{in\ rated}$/1.3 ms
Line buffering at $I_{out\ rated}$	> 40 ms at U_{in} = 187 V
Rated line frequency, rated line-frequency range	50/60 Hz; 47 Hz to 63 Hz
Rated current $I_{inrated}$	1.95 A - 0.97 A
Switch-on current limit (+25 °C)	< 30 A
I^2t	< 2.5 A^2s
Built-in line-side fuse	Internal
Recommended miniature circuit-breaker (IEC 898) in the supply feeder	At and above 16 A, B characteristic or at and above 10 A, C characteristic
Output	Controlled, isolated DC voltage
Rated voltage $U_{outrated}$	**24 V DC**
Total tolerance, static	±3%
• Static line smoothing	Approx. 0.1%
• Static load smoothing	Approx. 1.5%
Ripple content (clock frequency approx. 90 kHz)	< 200 m V_{pp}
Spikes (bandwidth approx. 20 MHz)	< 300 m V_{pp}
Adjustment range	22.2 V to 26.4 V
Operation indicator	Green LED for output voltage OK
Response on activation/deactivation	No overshoot of U_{out} (soft start)
Startup delay/voltage rise	< 0.5 s/typ. 35 ms
Rated current $I_{outrated}$	**4 A**
Current range up to +55 °C	0 A to 4 A
Parallel switching for enhanced performance	Yes
Efficiency	
Efficiency at $U_{outrated}$, $I_{out\ rated}$	Typically. 89%
Heat loss at $U_{outrated}$, $I_{out\ rated}$	Typically 12 W
Control	
Dynamic line smoothing ($U_{in\ rated}$ ±15%)	< 0.2% U_{out}
Dynamic load smoothing (I_{out}: 10/90/10%)	±1.5% U_{out}
Setting time	
• 10 at 90%	Typically 20 ms
• 90 at 10%	Typically 20 ms

Type	24 V/4 A
Protection and monitoring	
Current limit	Typically 4.7 A
Short-circuit protection	Constant-current characteristic
Sustained-short-circuit-current rms value	< 10 A
Overload/short-circuit indicator	-
Security	
Primary/secondary galvanic isolation	Yes, safety extra-low output voltage U_{out} to EN 60950 and EN 50178
Protection class	Class II (without protective conductor)
CE marking	Yes
UL/cUL (CSA) approval	Yes, cULus-listed (UL 508, CSA 22.2), file E197259; cURus-recognized (UL 60950, CSA 22.2), file E151273
FM approval	Yes, Class I Div. 2, Group A, B, C, D T4
Marine Type Approval	Yes, GL, ABS
Degree of protection (EN 60529)	IP20
EMC	
Emitted interference	EN 55022 Class B
Supply-harmonics limitation	EN 61000-3-2
Noise immunity	EN 61000-6-2
Operating data	
Ambient temperature range	-20 °C to +55 °C with natural convection
Transport/storage temperature range	-40 °C to +70 °C
Humidity class	Climate class 3K3 to EN 60721, no condensation
Mechanical system	
Supply-input connections L1, N	Solid/finely-stranded per screw-type terminal for 0.5 mm to 2.5 mm^2
Connections	
• Output +	Per 2 screw-type terminals for 0.5 mm to 2.5 mm^2
• Output -	
Dimensions (W x H x D) in mm	90 x 90 x 55
Weight	Approx. 0.34 kg
Mounting	Snaps onto DIN rail DIN EN 50022-35x15/7.5

Power supplies

3

Technical specifications SITOP smart

Power supply, type	2.5 A
Order number	**6EP1 332-2BA10**
Input	Single-phase AC
Rated voltage $U_{in\ rated}$	**120/230 V AC** set via change-over switch
Voltage range	85 V to 132 V AC/ 170 V to 264 V AC
Overvoltage strength	2.3 x $U_{in\ rated}$, 1.3 ms
Line buffering at $I_{out\ rated}$	> 20 ms at Uin = 93/187 V
Rated line frequency; rated line-frequency range	50/60 Hz; 47 Hz to 63 Hz
Rated current $I_{in\ rated}$	1.1/0.65 A
Switch-on current limit (+25°C)	< 27 A, typ. 3 ms
I^2t	< 0.3 A^2s
Built-in line-side fuse	T 2 A/250 V (inaccessible)
Recommended miniature circuit-breaker (IEC 898) in the supply feeder	At and above 3 A, C characteristic
Output	Controlled, isolated DC voltage
Rated voltage Uout rated	**24 V DC**
Total tolerance	±3
• Static line smoothing	Approx. 0.1%
• Static load smoothing	Approx. 0.5%
Ripple content (clock frequency: approx. 90 kHz)	< 150 mV_{ss} (typ. 10mV_{ss})
Spikes (bandwidth: 20 MHz)	< 240 mV_{ss} (typ. 50mV_{ss})
Adjustment range	22.8 V to 28.0 V
Operation indicator	24 V OK = green LED
Response on activation/ deactivation	Overshoot of U_{out} approx. 4%
Startup delay/voltage rise	< 0.1 s at 230 V AC/typ. 50 ms
Rated current $I_{out\ rated}$	**2.5 A**
Current range	
• Up to +45°C	0 A to 3 A
• Up to +60°C	0 A to 2.5 A
Dynamic U/I at	
• Power-up on short-circuit	Typically 7 A for 100 ms
• Short-circuit during operation	Typically 7 A for 200 ms
Parallel switching for enhanced performance	Yes, 2
Efficiency	
Efficiency at $U_{out\ rated}$, $I_{out\ rated}$	Approx. 85%
Heat loss at $U_{out\ rated}$, $I_{out\ rated}$	Approx. 9 W
Control	
Dynamic line smoothing ($U_{in\ rated}$ ±15%)	Approx. ±0.3% U_{out}
Dynamic load smoothing (I_{out}: 50/100/50%)	±1%U_{out}
Load-step settling time	
• 50 at 100%	Typically 0.2 ms
• 100 at 50%	Typically 0.2 ms

Power supply, type	2.5 A
Protection and monitoring	
Output overvoltage protection	Yes, acc. to EN 60950 (typ. < 45 V)
Current limit	Typically 3.2 A to 3.4 A, overload capability 150% $I_{out\ rated}$ up to 5 s/min
Short-circuit protection	Constant-current characteristic, automatic restart
Sustained-short-circuit-current rms value	Approx. 5 A
Overload/short-circuit indicator	LED off = overload/short-circuit
Security	
Primary/secondary galvanic isolation	Yes, safety extra-low output voltage U_{out} to EN 60950
Protection class (IEC 536; VDE 0106 T1)	Class I
Leakage current	< 3.5 mA (typ. 0.4 mA)
German Technical Inspectorate approval	Notified Body (CB Scheme)
CE marking	Yes
UL/cUL (CSA) approval	Yes, cULus-listed (UL 508, CSA 22.2), file E197259, CSA (C22.2 no.14, no.60950-1-03)
Explosion protection	ATEX Directive 94/9/EC; Cat. 3, EEx nC II T4 U
Marine Type Approval	GL
Degree of protection (EN 60 529; VDE 0470 T1)	IP20
EMC	
Emitted interference	EN 55022, Class B
Supply-harmonics limitation	Not applicable
Noise immunity	EN 61000-6-2
Operating data	
Ambient temperature range	0°C to +60°C with natural convection
Transport/storage temperature range	-40°C to +85°C
Humidity class	Climate class 3K3 to EN 60721, no condensation
Mechanical system	
Connections	
• Supply input L, N, PE	Solid/finely-stranded per screw-type terminal for 0.5 mm to 2.5 mm^2
• Output L+	2 screw-type terminals for 0.5 mm to 2.5 mm^2
• Output M	2 screw-type terminals for 0.5 mm to 2.5 mm^2
Dimensions (W x H x D) in mm	32.5 x 125 x 125
Weight, approx.	0.4 kg
Mounting	Snaps onto DIN rail DIN EN 50022-35 x 15/7.5
Accessories	-

Technical specifications SITOP smart (continued)

Power supply, type	5 A	5 A
Order number	**6EP1 333-2AA01**	**6EP1 333-2BA01**
Input	Single-phase AC	Single-phase AC
Rated voltage $U_{in\ rated}$	**120/230 V AC** set via change-over switch	**120/230 V AC** set via change-over switch
Voltage range	85 V to 132 V AC/170 V to 264 V AC	85 V to 132 V AC/170 V to 264 V AC
Overvoltage strength	2.3 x $U_{in\ rated}$, 1.3 ms	2.3 x $U_{in\ rated}$, 1.3 ms
Line buffering at $I_{out\ rated}$	> 20 ms at U_{in} = 93/187 V	> 20 ms at U_{in} = 93/187 V
Rated line frequency; rated line-frequency range	50/60 Hz; 47 Hz to 63 Hz	50/60 Hz; 47 Hz to 63 Hz
Rated current $I_{in\ rated}$	2.1/1.15 A	2.1/1.15 A
Switch-on current limit (+25°C)	< 32 A, typ. 3 ms	< 32 A, typ. 3 ms
I^2t	< 0.8 A^2s	< 0.8 A^2s
Built-in line-side fuse	T 3.15 A/250 V (inaccessible)	T 3.15 A/250 V (inaccessible)
Recommended miniature circuit-breaker (IEC 898) in the supply feeder	At and above 6 A, C characteristic	At and above 6 A, C characteristic
Output	Controlled, isolated DC voltage	Controlled, isolated DC voltage
Rated voltage $U_{out\ rated}$	**24 V DC**	**24 V DC**
Total tolerance	±3%	± 3 %
• Static line smoothing	Approx. 0.1%	Approx. 0.1%
• Static load smoothing	Approx. 0.5%	Approx. 0.5%
Ripple content (clock frequency: approx. 84 kHz)	< 150 mV_{ss} (typ. 50mV_{ss})	< 150 mV_{ss} (typ. 50mV_{ss})
Spikes (bandwidth: 20 MHz)	< 240 mV_{ss} (typ. 150mV_{ss})	< 240 mV_{ss} (typ. 150m_{Vss})
Adjustment range	22.8 V to 28.0 V	22.8 V to 28.0 V
Operation indicator	24 V OK = green LED	24 V OK = green LED
Response on activation/deactivation	Overshoot of U_{out} approx. 4%	Overshoot of U_{out} approx. 4%
Startup delay/voltage rise	< 0.1 s at 230 V AC/typ. 50 ms	< 0.1 s at 230 V AC/typ. 50 ms
Rated current $I_{out\ rated}$	**5 A**	**5 A**
Current range		
• Up to +45°C	0 A to 6 A	0 A to 6 A
• Up to +60°C	0 A to 5 A	0 A to 5 A
Dynamic U/I at		
• Power-up on short-circuit	Typically 17 A for 100 ms	Typically 17 A for 100 ms
• Short-circuit during operation	Typically 17 A for 200 ms	Typically 17 A for 200 ms
Parallel switching for enhanced performance	Yes, 2	Yes, 2
Efficiency		
Efficiency at $U_{out\ rated}$, $I_{out\ rated}$	Approx. 87%	Approx. 87%
Heat loss at $U_{out\ rated}$, $I_{out\ rated}$	Approx. 17 W	Approx. 17 W
Control		
Dynamic line smoothing (U_{in} rated ±15%)	±0.3% U_{out}	± 0,3 % U_{out}
Dynamic load smoothing (I_{out}: 50/100/50%)	±1% U_{out}	± 1 % U_{out}
Load-step settling time		
• 50 at 100%	• Typically 0.2 ms	Typically 0.2 ms
• 100 at 50%	• Typically 0.2 ms	Typically 0.2 ms

Technical specifications SITOP smart (continued)

Power supply, type	5 A	5 A
Protection and monitoring		
Output overvoltage protection	Yes, acc. to EN 60950 (typ. < 45 V)	Yes, acc. to EN 60950 (typ. < 45 V)
Current limit	Typically 6.4 A to 6.6 A, overload capability 150% $I_{out\ rated}$ up to 5 s/min	Typically 6.4 A to 6.6 A, overload capability 150% $I_{out\ rated}$ up to 5 s/min
Short-circuit protection	Constant-current characteristic, automatic restart	Constant-current characteristic, automatic restart
Sustained-short-circuit-current rms value	Approx. 10 A	Approx. 10 A
Overload/short-circuit indicator	LED off = overload/short-circuit	LED off = overload/short-circuit
Security		
Primary/secondary galvanic isolation	Yes, safety extra-low output voltage U_{out} to EN 60950	Yes, safety extra-low output voltage U_{out} to EN 60950
Protection class (IEC 536; VDE 0106 T1)	Class I	Class I
Leakage current	< 3.5 mA (typ. 0.4 mA)	< 3.5 mA (typ. 0.4 mA)
German Technical Inspectorate approval	Notified Body (CB Scheme)	Notified Body (CB Scheme)
CE marking	Yes	Yes
UL/cUL (CSA) approval	Yes, cULus-listed (UL 508, CSA 22.2), file E197259, CSA (C22.2 no.14, no.60950-1-03)	Yes, cULus-listed (UL 508, CSA 22.2), file E197259, CSA (C22.2 no.14, no.60950-1-03)
Explosion protection	ATEX Directive 94/9/EC; Cat. 3, EEx nC II T4 U	ATEX Directive 94/9/EC; Cat. 3, EEx nC II T4 U
Marine Type Approval	GL	GL
Degree of protection (EN 60 529; VDE 0470 T1)	IP20	IP20
EMC		
Emitted interference	EN 55022 Class B	EN 55022 Class B
Supply-harmonics limitation	-	EN 61000-3-2
Noise immunity	EN 61000-6-2	EN 61000-6-2
Operating data		
Ambient temperature range	0°C to +60°C with natural convection	0°C to +60°C with natural convection
Transport/storage temperature range	-40°C to +85°C	-40°C to +85°C
Humidity class	Climate class 3K3 to EN 60721, no condensation	Climate class 3K3 to EN 60721, no condensation
Mechanical		
Connections		
• Supply input L, N, PE	Solid/finely-stranded per screw-type terminal for 0.5 mm to 2.5 mm^2	Solid/finely-stranded per screw-type terminal for 0.5 mm to 2.5 mm^2
• Output L+	2 screw-type terminals for 0.5 mm to 2.5 mm^2	2 screw-type terminals for 0.5 mm to 2.5 mm^2
• Output M	2 screw-type terminals for 0.5 mm to 2.5 mm^2	2 screw-type terminals for 0.5 mm to 2.5 mm^2
Dimensions (W x H x D) in mm	50 x 125 x 125	50 x 125 x 125
Weight, approx.	0.5 kg	0.5 kg
Mounting	Snaps onto DIN rail DIN EN 50022-35x15/7.5	Snaps onto DIN rail DIN EN 50022-35x15/7.5
Accessories	-	-

Power supply, type	10 A	10 A
Order number	**6EP1 334-2AA01**	**6EP1 334-2BA01**
Input	Single-phase AC	Single-phase AC
Rated voltage $U_{in\ rated}$	**120/230 V AC** set via change-over switch	**120/230 V AC** set via change-over switch
Voltage range	85 V to 132 V AC/170 V to 264 V AC	85 V to 132 V AC/170 V to 264 V AC
Overvoltage strength	2.3 x $U_{in\ rated}$, 1.3 ms	2.3 x $U_{in\ rated}$, 1.3 ms
Line buffering at $I_{out\ rated}$	> 20 ms at U_{in} = 93/187 V	> 20 ms at U_{in} = 93/187 V

Technical specifications SITOP smart (continued)

Power supply, type	10 A	10 A
Rated line frequency; rated line-frequency range	50/60 Hz; 47 Hz to 63 Hz	50/60 Hz; 47 Hz to 63 Hz
Rated current $I_{in\ rated}$	4.1/2.4 A	4.1/2.0 A
Switch-on current limit (+25°C)	< 65 A, typ. 3 ms	< 65 A, typ. 3 ms
I^2t	< 3.3 A^2s	< 3.3 A^2s
Built-in line-side fuse	T 6.3 A/250 V (inaccessible)	T 6.3 A/250 V (inaccessible)
Recommended miniature circuit-breaker (IEC 898) in the supply feeder	At and above 10 A, C characteristic	At and above 10 A, C characteristic
Output	Controlled, isolated DC voltage	Controlled, isolated DC voltage
Rated voltage $U_{out\ rated}$	**24 V DC**	**DC 24 V**
Total tolerance	±3%	± 3 %
• Static line smoothing	Approx. 0.1%	Approx. 0.1%
• Static load smoothing	Approx. 0.5%	Approx. 0.5%
Ripple content (clock frequency: approx. 60 kHz)	< 150 mV_{ss} (typ. 50mV_{ss})	< 150 mV_{ss} (typ. 50mV_{ss})
Spikes (bandwidth: 20 MHz)	< 240 mV_{ss} (typ. 150mV_{ss})	< 240 mV_{ss} (typ. 150mV_{ss})
Adjustment range	22.8 V to 28.0 V	22.8 V to 28.0 V
Operation indicator	24 V OK = green LED	24 V OK = green LED
Response on activation/deactivation	Overshoot of U_{out} approx. 4%	Overshoot of U_{out} approx. 4%
Startup delay/voltage rise	< 0.1 s at 230 V AC/typ. 50 ms	< 0.1 s at 230 V AC/typ. 50 ms
Rated current $I_{out\ rated}$	**10 A**	**10 A**
Current range		
• Up to +45°C	0 A to 12 A	0 A to 12 A
• Up to +60°C	0 A to 10 A	0 A to 10 A
Dynamic U/I at		
• Power-up on short-circuit	Typically 30 A for 100 ms	Typically 30 A for 100 ms
• Short-circuit during operation	Typically 33 A for 200 ms	Typically 33 A for 200 ms
Parallel switching for enhanced performance	Yes, 2	Yes, 2
Efficiency		
Efficiency at $U_{out\ rated}$, $I_{out\ rated}$	Approx. 90%	Approx. 91%
Heat loss at $U_{out\ rated}$, $I_{out\ rated}$	Approx. 27 W	Approx. 24 W
Control		
Dynamic line smoothing ($U_{in\ rated}$ ±15%)	±0.3% U_{out}	±0.3% U_{out}
Dynamic load smoothing (I_{out}: 50/100/50%)	±1% U_{out}	±1% U_{out}
Load-step settling time		
• 50 at 100%	Typically 0.2 ms	Typically 0.2 ms
• 100 at 50%	Typically 0.2 ms	Typically 0.2 ms
Protection and monitoring		
Output overvoltage protection	Yes, acc. to EN 60950 (typ. < 45 V)	Yes, acc. to EN 60950 (typ. < 45 V)
Current limit	Typically 12.5 A to 13.5 A, overload capability 150% $I_{out\ rated}$ up to 5 s/min	Typically 12.5 A to 13.5 A, overload capability 150% $I_{out\ rated}$ up to 5 s/min
Short-circuit protection	Constant-current characteristic, automatic restart	Constant-current characteristic, automatic restart
Sustained-short-circuit-current rms value	Approx. 16 A	Approx. 16 A
Overload/short-circuit indicator	LED off = overload/short-circuit	LED off = overload/short-circuit

Power supplies

3

Technical specifications SITOP smart (continued)

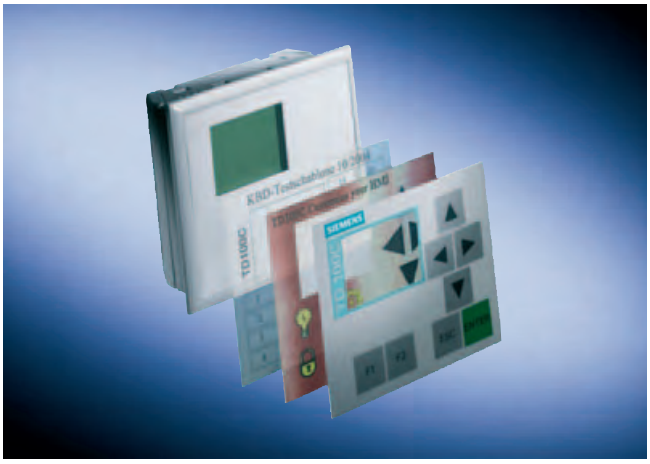
Power supply, type	10 A	10 A
Security		
Primary/secondary galvanic isolation	Yes, safety extra-low output voltage U_{out} to EN 60950	Yes, safety extra-low output voltage U_{out} to EN 60950
Protection class (IEC 536; VDE 0106 T1)	Class I	Class I
Leakage current	< 3.5 mA (typ. 0.8 mA)	< 3.5 mA (typ. 0.8 mA)
German Technical Inspectorate approval	Notified Body (CB Scheme)	Notified Body (CB Scheme)
CE marking	Yes	Yes
UL/cUL (CSA) approval	Yes, cULus-listed (UL 508, CSA 22.2), file E197259, CSA (C22.2 no.14, no.60950-1-03)	Yes, cULus-listed (UL 508, CSA 22.2), file E197259, CSA (C22.2 no.14, no.60950-1-03)
Explosion protection	ATEX Directive 94/9/EC; Cat. 3, EEx nC II T4 U	ATEX Directive 94/9/EC; Cat. 3, EEx nC II T4 U
Marine Type Approval	GL	GL
Degree of protection (EN 60 529; VDE 0470 T1)	IP20	IP20
EMC		
Emitted interference	EN 55022 Class B	EN 55022 Class B
Supply-harmonics limitation	-	EN 61000-3-2
Noise immunity	EN 61000-6-2	EN 61000-6-2
Operating data		
Ambient temperature range	0°C to +60°C with natural convection	0°C to +60°C with natural convection
Transport/storage temperature range	-40°C to +85°C	-40°C to +85°C
Humidity class	Climate class 3K3 to EN 60721, no condensation	Climate class 3K3 to EN 60721, no condensation
Mechanical system		
Connections		
Supply input L, N, PE	Solid/finely-stranded per screw-type terminal for 0.5 mm to 2.5 mm^2	Solid/finely-stranded per screw-type terminal for 0.5 mm to 2.5 mm^2
Output L+	2 screw-type terminals for 0.5 mm to 2.5 mm^2	2 screw-type terminals for 0.5 mm to 2.5 mm^2
Output M	2 screw-type terminals for 0.5 mm to 2.5 mm^2	2 screw-type terminals for 0.5 mm to 2.5 mm^2
Dimensions (W x H x D) in mm	70 x 125 x 125	70 x 125 x 125
Weight, approx.	0.75 kg	0.8 kg
Mounting	Snaps onto DIN rail DIN EN 50022-35x15/7.5	Snaps onto DIN rail DIN EN 50022-35x15/7.5
Accessories	-	-

Ordering data

	Order No.
Regulated load current supply SITOP power 3.5 A	**6EP1 332-1SH31**
120/230 V AC, 24 V DC /3.5 A	
Mounting bracket	**6EP1 971-1AA01**
For space-saving assembly of the SITOP power load current supply unit to the rear panel of the control cabinet (power supply is attached to the rear panel of the housing with the side wall); for control cabinets with depths of 240 mm or more	
Regulated load current supply LOGO!Power 24 V/4 A	**6EP1 332-1SH51**
100 ... 240 V AC, 24 V DC/4 A	

	Order No.
Regulated load current supply SITOP smart	
120/230 V AC, 24 V DC	
2.5 A	**6EP1 332-2BA10**
5 A	**6EP1 333-2AA01**
5 A, with restriction of the supply harmonics acc. to EN 61000-3-2	**6EP1 333-2BA01**
10 A	**6EP1 334-2AA01**
10 A, with restriction of the supply harmonics acc. to EN 61000-3-2	**6EP1 334-2BA01**

Overview



- The low-cost text display for the S7-200 with customized display
- For HMI functions:
  display of message texts, interventions in the control program, setting of inputs and outputs
- Direct connection to CPU interface
- No separate power supply required
- No separate parameterization software required
- Front design can be selected individually
- Addressing and setting of contrast in supplied menu

Technical specifications

	6ES7 272-1BA10-0YA0
Power supply	
Input voltage	
• Rated value (DC)	24 V; Supply from S7-200 communication interface
Input current	
• Rated value at 24 V DC	25 mA
MPI	
Transmission speed (PPI), max.	187.5 kBit/s
1st interface	
Physics	RS 485
Functionality	
• PPI	Yes
PPI	
• Number of nodes, max.	126; S7-200, OP, TP, TBP, PG/PC
Operator control and monitoring	
Display	
• Type	LC display (reflecting)
• Number of lines	4
• Number of characters per line	12
• Font size	3.34 mm
Environmental requirements	
Operating temperature	
• min.	0 °C
• max.	60 °C
Storage/transport temperature	
• min.	-20 °C
• max.	70 °C
Degree and class of protection	
• IP 65	Yes
Dimensions and weight	
Width	90 mm
Height	76 mm
Depth	36 mm; max. 44 mm with fittings
Mounting cutout, width	82 mm
Mounting cutout, height	69.5 mm
Cabinet/switchboard strength	1.5 mm
Weights	
Weight, approx.	120 g

Ordering data

	Order No.
Text Display TD 100C With individually configurable control elements on the device front; for connecting to SIMATIC S7-200; for use with STEP 7 Micro/WIN V4 and higher, plug-in cable required	**6ES7 272-1BA10-0YA0**
Connecting cables For connecting TD 100C or TD 200C to S7-200	**6ES7 901-3EB10-0XA0**
Blank film For printing customized keyboard layouts; 6 perforated foils per sheet; 10 sheets per packing unit	**6ES7 272-1BF00-7AA0**
Accessories for supplementary ordering	
Connecting cables	see catalog ST 80
Connectors	see catalog ST 80

Text Display TD 200

Overview

- The user-friendly text display for the S7-200
- For control and monitoring:
  Message text display, intervention in PLC program, setting of inputs and outputs
- Direct connection to CPU interface using supplied cable or incorporation into network (also via EM 277)
- No separate power supply required
- No separate parameterization software required
- Addressing and setting of contrast in supplied menu

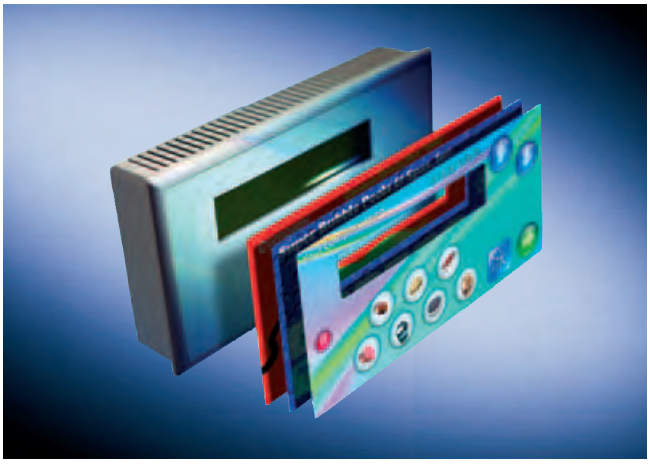
Technical specifications

	6ES7 272-0AA30-0YA0
Power supply	
Input voltage	
• Rated value (DC)	24 V; Supply through S7-200 communication interface or optional external power supply unit. Sensor power supply (24 V DC) of the CPU is not loaded
Input current	
• Rated value at 24 V DC	120 mA
MPI	
Transmission speed (PPI), max.	187.5 kBit/s
1st interface	
Physical	RS 485
Functionality	
• PPI	Yes
PPI	
• Number of nodes, max.	126; S7-200, OP, TP, TBP, PG/PC
Operator control and monitoring	
Display	
• Type	LCD backlit
• Number of lines	2
• Number of characters per line	20; Chars/line: ASCII, Cyrillic; 10 chars per line: Chinese
• Font size	5 mm
Environmental requirements	
Operating temperature	
• min.	0 °C
• max.	60 °C
Storage/transport temperature	
• min.	-40 °C
• max.	70 °C
Degree and class of protection	
• IP 65	Yes; at front
Dimensions and weight	
Width	148 mm
Height	76 mm
Depth	27 mm
Mounting cutout, width	138 mm
Mounting cutout, height	68 mm
Cabinet/switchboard strength	0.3 mm
Weights	
Weight, approx.	250 g

Ordering data

	Order No.
Text Display TD 200	
for connection to SIMATIC S7-200; can be used with STEP 7-Micro/WIN V3.2 SP4 or higher, incl. connecting cable	**6ES7 272-0AA30-0YA0**
Connecting cables	
For connecting TD 100C or TD 200C to S7-200	**6ES7 901-3EB10-0XA0**
Accessories for supplementary ordering	
Connecting cables	see catalog ST 80
Connectors	see catalog ST 80

Overview



- The user-friendly text display for the S7-200 with customizable display
- For control and monitoring:
  Message text display, intervention in PLC program, setting of inputs and outputs
- Direct connection to CPU interface using supplied cable or incorporation into network (also via EM 277)
- No separate power supply required
- No separate parameterization software required
- Frontpanel design can be individually selected
- Addressing and setting of contrast in supplied menu

Technical specifications

	6ES7 272-1AA10-0YA0
Power supply	
Input voltage	
• Rated value (DC)	24 V; Supply through S7-200 communication interface or optional external power supply unit. Sensor power supply (24 V DC) of the CPU is not loaded
Input current	
• Rated value at 24 V DC	120 mA
MPI	
Transmission speed (PPI), max.	187.5 kBit/s
1st interface	
Physics	RS 485
Functionality	
• PPI	Yes
PPI	
• Number of nodes, max.	126; S7-200, OP, TP, TBP, PG/PC
Operator control and monitoring	
Display	
• Type	LCD backlit
• Number of lines	2
• Number of characters per line	20; Chars/line: ASCII, Cyrillic; 10 chars per line: Chinese
• Font size	5 mm
Environmental requirements	
Operating temperature	
• min.	0 °C
• max.	60 °C
Storage/transport temperature	
• min.	-20 °C
• max.	70 °C
Degree and class of protection	
• IP 65	Yes
Dimensions and weight	
Width	148 mm
Height	76 mm
Depth	28 mm
Mounting cutout, width	138 mm
Mounting cutout, height	68 mm
Cabinet/switchboard strength	0.3 mm
Weights	
Weight, approx.	200 g

Ordering data

	Order No.
Text Display TD 200C	
With individually configurable control elements on the device front; for connecting to SIMATIC S7-200; for use with STEP 7 Micro/WIN V4 and higher, incl. plug-in cable	**6ES7 272-1AA10-0YA0**
Connecting cables	**6ES7 901-3EB10-0XA0**
For connecting TD 100C or TD 200C to S7-200	
Accessories for supplementary ordering	
Connecting cables	see catalog ST 80
Connectors	see catalog ST 80s

SIMATIC TP 177micro

Overview

- Touch panel for operator control and monitoring of small machines and plants
- Low-cost starter device in the touch panel class with graphical capability complete with all the basic functions required for simple tasks
- Pixel graphics 5.7" STN touch screen (analog/resistive), Bluemode (4 levels)
- Specifically for SIMATIC S7-200:
  Communication to the PLC is performed via the integrated interface over a point-to-point connection
- Connected to the PLC via MPI or PROFIBUS DP cable
- The SIMATIC TP 177micro is the redesigned successor to the SIMATIC TP 070/TP 170micro touch panels

Technical specifications

	6AV6 640-0CA11-0AX0
Supply voltage	
Supply voltage	24 V DC
Permitted range	+20,4 to +28,8 V DC
Rated current	0.24 A
Memory	
Type	Flash
Memory usable for project data	256 kByte User memory
Time	
Clock	
• Clock	Software clock, not battery backed
Configuration	
Configuration tool	WinCC flexible ES Micro as of Version 2004 SP 1 (must be ordered separately)
Display	
Display type	STN liquid crystal display (LCD), 4 blue scales
Size	5.7"
Resolution (W x H in pixels)	320 x 240
MTBF backlighting (at 25 °C)	approx. 50000 h
Operating mode	
Operating elements	Touch screen
Function keys, programmable	none
System keys	0
Touchscreen	analog, resistive
Numeric/alphabetical input	Yes / Yes
Degree of protection	
Front	IP65, NEMA 4X (when installed)
Rear	IP20
Certifications & Standards	
Certifications	CE, GL, ABS, BV, DNV, LRS, FM Class I Div. 2, UL, CSA, cULus, EX zone 2/22, C-Tick, NEMA 4X
• Ship classification society	Yes

	6AV6 640-0CA11-0AX0
Ambient conditions	
Mounting position	vertical
Maximum permissible angle of incliniation without external ventilation	+/- 35°
Max. relative humidity (in %)	90%
Temperature	
• Operation (vertical installation)	0 to +50°C
• Operation (max. tilt angle)	0 to +40°C
• Transport, storage	-20 to +60°C
Interfaces	
Interfaces	1 x RS485 (max. 0.1875 Mbit/s)
Operating systems	
Operating system	Smart
Processor/hardware	
Processor	ARM
Functionality under WinCC flexible	
Task planner	Yes
Help system	Yes
Status/control	not possible
Message system	
• Number of messages	500
• Bit messages	Yes
• Analog messages	Yes
• Message buffer	Circulating buffer (n x 128 Entries)
Process pictures/number	
• Process images	250
• Tags	250
• Limit values	Yes
• Multiplexing	Yes

Technical specifications (continued)

	6AV6 640-0CA11-0AX0
Image elements	
• Text objects	500 Text elements
• Graphics objects	Bitmaps, Icons, Icon (screen filling), Vector graphic
• Dynamic objects	Bar
Lists	
• Text lists	150
• Graphics lists	100
• Libraries	Yes
Security	
• Number of user groups	1
• Number of users	1
• Passwords exportable	Yes
Data medium support	
• Multi Media Card	No
Logging/printer driver	
• Printer driver	-
Fonts	
• Keyboard fonts	US American (English)
Languages	
• Online languages	5
• Configuration languages	German, English, French, Italian, Spanish, Chinese traditional, Chinese simplified, Danish, Finnish, Greek, Japanese, Korean, Dutch, Norwegian, Polish, Portuguese, Russian, Swedish, Czech, Turkish, Hungarian
• Fonts	WinCC flexible-Standard, Pictographic languages
Transfer (Upload/Download)	
• Transfer of configuration	serial
Process connecting	
• Connection to controller	S7-200, see catalog ST 80, chapter "system interfaces"
Expandability/openness	
• OPP	No
Dimensions	
Front panel W x H (mm)	212 mm x 156 mm
Mounting cutout/depth W x H x D (mm)	198 mm x 142 mm / 45 mm Device depth
Weights	
Weight	0.75 kg

Ordering data

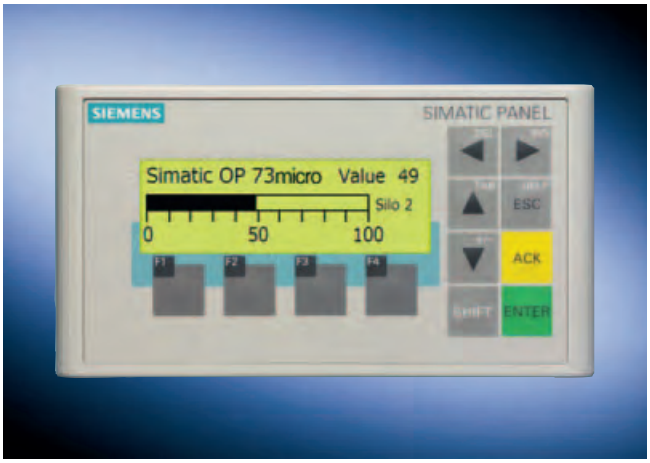
	Order No.
SIMATIC TP 177micro F)	**6AV6 640-0CA11-0AX0**
Touch Panel for connection to the SIMATIC S7-200, 5.7" STN display	
TP 177micro starter package F)	**6AV6 650-0DA01-0AA0**
Consisting of:	
• TP 177micro Touch Panel	
• SIMATIC WinCC flexible Micro engineering software	
• SIMATIC HMI Manual Collection (DVD), 5 languages (English, French, German, Italian, Spanish), comprising: all currently available user manuals, manuals and communication manuals for SIMATIC HMI	
• MPI cable (5m) (for test purposes)	
Configuring	
with SIMATIC WinCC flexible	see section 7, page 7/55
Documentation (to be ordered separately)	
Operating Instructions OP 73micro, TP 177micro	
• German	**6AV6 691-1DF01-0AA0**
• English	**6AV6 691-1DF01-0AB0**
• French	**6AV6 691-1DF01-0AC0**
• Italian	**6AV6 691-1DF01-0AD0**
• Spanish	**6AV6 691-1DF01-0AE0**
User Manual WinCC flexible Micro	
• German	**6AV6 691-1AA01-0AA0**
• English	**6AV6 691-1AA01-0AB0**
• French	**6AV6 691-1AA01-0AC0**
• Italian	**6AV6 691-1AA01-0AD0**
• Spanish	**6AV6 691-1AA01-0AE0**
SIMATIC HMI Manual Collection E)	**6AV6 691-1SA01-0AX0**
Electronic documentation, on DVD	
5 languages (English, French, German, Italian, Spanish); contains: all currently available user manuals, manuals and communication manuals for SIMATIC HMI	
Accessories for supplementary ordering	
Service packages, protective cover, cover foil, adapter, connecting cables, connectors, system interfaces	see catalogs ST 80, CA 01 or in the A&D Mall

E) Subject to export regulations: AL: N and ECCN: EAR99S

F) Subject to export regulations: AL: N and ECCN: 5D002ENC3

SIMATIC OP 73micro

Overview



- Operator Panel for controlling and monitoring machines and systems.
- Graphics in a new dimension: small and smart
- Pixel-graphics 3" LCD, monochrome
- 8 system keys, 4 user-configurable function keys
- Specific to the SIMATIC S7-200:
  Communication with the controller takes place via the integrated interface (point-to-point)
- Connection to the controller via MPI or PROFIBUS DP cable

Technical specifications

	6AV6 640-0BA11-0AX0
Supply voltage	
Supply voltage	24 V DC
Permitted range	+20.4 bis +28.8 V DC
Rated current	0.1 A
Memory	
Type	Flash
Memory usable for project data	128 kByte User memory
Time	
Clock	
• Clock	Software clock, not battery backed
Configuration	
Configuration tool	WinCC flexible ES Micro as of Version 2004 SP 1 (must be ordered separately)
Display	
Display type	STN liquid crystal display (LCD), Black and white
Size	3 "
Resolution (W x H in pixels)	160 x 48
MTBF backlighting (at 25 °C)	approx. 100000 h
Operating mode	
Operating elements	Membrane keyboard
Function keys, programmable	4 Function keys
System keys	8
Touchscreen	No
Numeric/alphabetical input	Yes / Yes
Connection for mouse/keyboard/barcode reader	- / - / -
Degree of protection	
Front	IP65, NEMA 4X (when installed)
Rear	IP 20

	6AV6 640-0BA11-0AX0
Certifications & Standards	
Certifications	CE, GL, ABS, BV, DNV, LRS, UL, CSA, cULus, C-Tick, NEMA 4X
• Ship classification society	Yes
Ambient conditions	
Mounting position	vertical
Maximum permissible angle of incliniation without external ventilation	+/- 80°
Max. relative humidity (in %)	90%
Temperature	
• Operation (vertical installation)	0 to +50 °C
• Operation (max. tilt angle)	0 to +40 °C
• Transport, storage	-20 to +60 °C
Interfaces	
Interfaces	1 x RS 485 (max. 0.1875 Mbit/s)
Operating systems	
Operating system	Smart
Processor/hardware	
Processor	ARM
Functionality under WinCC flexible	
Task planner	Yes
Help system	Yes
Status/control	not possible
Message system	
• Number of messages	250
• Bit messages	Yes
• Analog messages	Yes
• Message buffer	Circulating buffer (n x 100 Entries)
Process pictures/number	
• Process images	250
• Tags	500
• Limit values	Yes
• Multiplexing	Yes

Technical specifications (continued)

	6AV6 640-0BA11-0AX0
Image elements	
• Text objects	1000 Text elements
• Graphics objects	Bitmaps, Icons, Icon (screen filling)
• Dynamic objects	Bar
Lists	
• Text lists	150
• Graphics lists	0
• Libraries	Yes
Security	
• Number of user groups	1
• Number of users	1
• Passwords exportable	Yes
Data medium support	
• Multi Media Card	No
Logging/printer driver	
• Printer driver	-
Fonts	
• Keyboard fonts	US American (English)
Languages	
• Online languages	5
• Configuration languages	German, English, French, Italian, Spanish, Chinese traditional, Chinese simplified, Danish, Finnish, Greek, Japanese, Korean, Dutch, Norwegian, Polish, Portuguese, Russian, Swedish, Czech, Turkish, Hungarian
• Fonts	WinCC flexible-Standard, Pictographic languages
Transfer (Upload/Download)	
• Transfer of configuration	serial
Process connecting	
• Connection to controller	S7-200, see catalog ST 80, chapter "system interfaces
Expandability/openness	
• OPP	No
Dimensions	
Front panel W x H (mm)	154 mm x 84 mm
Mounting cutout/depth W x H x D (mm)	138 mm x 68 mm / 28.5 mm Device depth
Weights	
Weight	0.25 kg

Ordering data

	Order No.
SIMATIC OP 73micro F)	**6AV6 640-0BA11-0AX0**
Operator panel for connection to the SIMATIC S7-200, with 3" display, monochrome incl. mounting accessories	
OP 73micro starter package F)	**6AV6 650-0BA01-0AA0**
Consisting of:	
• OP 73micro Operator Panel	
• SIMATIC WinCC flexible Micro engineering software	
• SIMATIC HMI Manual Collection, 5 languages (English, French, German, Italian, Spanish), comprising: all currently available user manuals, manuals and communication manuals for SIMATIC HMI	
• MPI cable (5 m) (for test purposes)	
Configuring	
with SIMATIC WinCC flexible	see section 7, page 7/55
Documentation (to be ordered separately)	
Operating Instructions OP 73micro/TP 177micro	
• German	**6AV6 691-1DF01-0AA0**
• English	**6AV6 691-1DF01-0AB0**
• French	**6AV6 691-1DF01-0AC0**
• Italian	**6AV6 691-1DF01-0AD0**
• Spanish	**6AV6 691-1DF01-0AE0**
User Manual WinCC flexible Micro	
• German	**6AV6 691-1AA01-0AA0**
• English	**6AV6 691-1AA01-0AB0**
• French	**6AV6 691-1AA01-0AC0**
• Italian	**6AV6 691-1AA01-0AD0**
• Spanish	**6AV6 691-1AA01-0AE0**
SIMATIC HMI Manual Collection E)	**6AV6 691-1SA01-0AX0**
Electronic documentation, on DVD	
5 languages (English, French, German, Italian and Spanish); contains: all currently available user manuals, manuals and communication manuals for SIMATIC HMI	
Accessories for supplementary ordering	
Service packages, connecting cables, connectors, system interfaces	see catalogs ST 80, CA 01 or in the A&D Mall

E) Subject to export regulations: AL: N and ECCN: EAR99S

F) Subject to export regulations: AL: N and ECCN: 5D002ENC3

3

Software

Overview

- Software for the SIMATIC S7-200
- Functions for all phases of an automation project:
  - Planning, configuring and parameterization of hardware and communication
  - Creation of a user program
  - Documentation
  - Testing, commissioning and service
  - Process control
  - Archiving

The following are available:

- STEP 7- Micro/WIN
- STEP 7 Micro/WIN command library
- WinCC flexible micro
- S7-200 PC-Access

For further information see section 7.

PPI cable

Overview

- For connecting devices with RS 232 or USB interface to SIMATIC S7-200 or PPI network (RS 485)
- The following are available:
  - Intelligent RS 232/PPI multimaster cable:
    For connecting devices with RS 232 interface to the RS 485 interface of the SIMATIC S7-200 or to the PPI network; can be used as master on a multimaster PPI network.
  - Intelligent USB/PPI multimaster cable:
    For connecting devices with USB interface to the RS 485 interface on SIMATIC S7-200 or to the PPI network; can be used as master on a multimaster PPI network.

Technical specifications

	6ES7 901-3CB30-0XA0	6ES7 901-3DB30-0XA0
Power supply		
Description	from CPU	from USB interface
Protocols		
PPI	Yes; 10/11 bit	Yes; 10/11 bit
ASCII	Yes; Freeport	
MPI		
Transmission speed (PPI), max.	187.5 kBit/s; 9.6 / 19.3 / 187.5 kBits/s; Setting: DIP switch; RS 232 not required	187.5 kBit/s; 9.6 / 19.2 / 187.5 kBits/s; Setting: not required
Status information/ alarms/diagnostics		
Diagnostics indication LED		
• Description	Tx (green): RS-232-transmit indication; Rx (Grün): RS-232-receive indication; PPI (Green): RS-485-transmit indication	Tx (green): USB transmit indication; Rx (Grün): USB receive indication; PPI (Green): RS-485-transmit indication

	6ES7 901-3CB30-0XA0	6ES7 901-3DB30-0XA0
Isolation		
Galvanic isolation	Yes	Yes
Software requirement		
Software required	STEP 7 Micro/WIN V3.2 SP4 or higher	STEP 7 Micro/WIN V3.2 SP4 or higher
Weights		
Weight, approx.	300 g	300 g

Ordering data

		Order No.
Intelligent RS 232/PPI multi-master cable For connecting devices with an RS 232 interface to SIMATIC S7-200 or PPI network Master in multi-master PPI network	A)	**6ES7 901-3CB30-0XA0**
Intelligent USB/PPI multi-master cable For connecting devices with a USB interface to SIMATIC S7-200 or PPI network; Master in multi-master PPI network	A)	**6ES7 901-3DB30-0XA0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

Overview

- Intelligent RS 232/PPI multi-master cable;
  for connecting devices with RS 232 interface to the RS 485 interface of the SIMATIC S7-200 or to the PPI network;
  can be used as master in a multi-master PPI network

	SIPLUS cable 901
Order No.	**6AG1 901-3CB30-2XA0**
Order No. based on	**6ES7 901-3CB30-0XA0**
Ambient temperature range	-25 to +70 °C; -25 to +55 °C (for applications with cUL approval), condensation permissible
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1)	No
Approvals	CE, cUL
Technical data	The technical data are identical with the technical data of the based on modules.

Ordering data

	Order No.
SIPLUS cable 901 (extended temperature range and medial load) Intelligent RS 232/PPI multi-master cable; for connecting devices with an RS 232 interface to SIMATIC S7-200 or PPI network Master in multi-master PPI network	**6AG1 901-3CB30-2XA0**

SIMATIC S7-300

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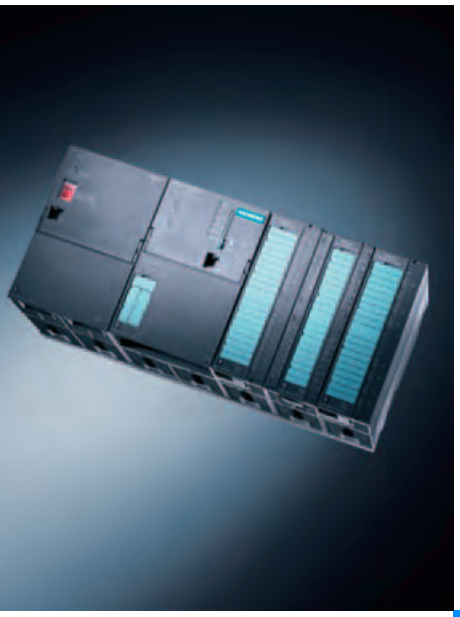

Brochures

For brochures serving as selection guides for SIMATIC products refer to:

http://www.siemens.com/simatic/printmaterial

S7-300/S7-300F/SIPLUS S7-300

Overview

S7-300

- The modular mini PLC system for the low and mid-performance ranges
- With comprehensive range of modules for optimum adaptation to the automation task
- Flexible use through simple implementation of distributed structures and versatile networking
- User-friendly handling and uncomplicated design without a fan
- Can be expanded without problems when the tasks increase
- Powerful thanks to a range of integrated functions

S7-300F

- Failsafe automation system for plants with increased safety requirements for production technology
- Based on S7-300
- Additional ET 200S and ET 200M distributed I/O stations complete with safety-related modules can be connected; safety-related communication over PROFIBUS DP with the PROFIsafe profile
- Standard modules can be used in addition for non-safety-relevant applications

SIPLUS S7-300

- The PLC for use under harshest environmental conditions
- With extended temperature range from -25 °C to +60 °C
- Suitable for extraordinary medial load (pollution gas atmosphere)
- Occasional short-term condensation and increased mechanical loading permissible
- With the proven PLC technology of the S7-300
- Convenient handling, programming, maintenace and service
- Ideal for use in the automative industry, environmental technology, mining, chemical plants, production technology, food industry, etc.
- The alternative to expensive custom solutions

For more information please visit our Internet site:

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Technical specifications

General technical specifications S7-300, S7-300F	
Degree of protection	Degree of protection IP20 to IEC 60 529
Ambient temperature	
• With horizontal mounting	0 to 60 °C
• With vertical mounting	0 to 40 °C
Relative humidity	5 to 95%, no condensation (RH severity level 2 in accordance with IEC 61131-2)
Atmospheric	795 to 1080 hPa
Isolation	
• 24 V DC circuits	Test voltage 500 V DC
• 230 V AC circuits	Test voltage 1460 V AC
Electromagnetic compatibility	Requirements of EMC law; Noise immunity according to IEC 61000-6-2, tested according to: IEC 61000-4-2, 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6 Emitted interference according to EN 50081-2, tested according to EN 55011, class A, group 1
Mechanical rating	
• Vibrations, tested according to/tested with	IEC 60068, Part 2-6/10 up 58 Hz; constant amplitude 0.075 mm; 58 to 150 Hz; constant acceleration 1 g; oscillation period: 10 frequency cycles per axis in each direction of the 3 mutually perpendicular axes
• Shock, tested according to/tested with	IEC 60068, Part 2-27/half-sine: strength of impact 15 g (peak value), duration 11 ms

General technical specifications SIPLUS S7-300	
Climatic environmental conditions	
Temperature	Horizontal mounting: -25 °C to 60 °C Vertical mounting: -25 °C to 40 °C
Relative humidity	5 to 95%; transient condensation permissible, corresponding to relative humidity (RH-), stress grade 2 according to IEC 1131-2 and IEC 721 3-3 class 3K5
Transient icing	-25 °C to 0 °C IEC 721 3-3 class 3K5
Atmospheric pressure	1080 to 795 hPa corresponding to a height of –1000 to 2000 m
Pollutant concentration	SO2: < 0,5 ppm; relative humidity <60%, test: 10 ppm, 4 days H2S: < 0,1 ppm; relative humidity <60%, test: 1 ppm, 4 days (according to IEC 721 3-3; class 3C3)
Mechanical environmental conditions	
Vibrations	Type of vibration: frequency progressions changing at 1 octave per minute. 2 Hz ≤ f ≤ 9 Hz, constant amplitude 3,0 mm, 9 Hz ≤ f ≤ 150 Hz, constant acceleration 1 g, duration of vibration: 10 frequency progressions per axis in each direction of the three mutually perpendicular axes Vibration testing according to IEC 68 section 2-6 (sinus) and IEC 721 3-3, class 3M4
Shock	Type of shock: semisinusoidal, shock strength: 15 g peak value, duration 11 ms, shock direction: 3 shocks each in +/- direction on each of the mutually perpendicular axes Shock testing according to IEC 68 section 2-27
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1)	Yes[1)]

1) Not valid for:
6AG1314-6CF02-2AB0, 6AG1315-6EG10-2AB0, 6AG1317-6EJ10-2AB0, 6AG1336-1HE00-2AB0, 6AG1314-6CF02-2AB0, 6AG1331-7KF02-2AB0, 6AG1331-7PF02-2AB0, 6AG1332-5HF00-2AB0, 6AG1334-0KE00-2AB0, 6AG1331-7TB00-4AB0

Compact CPUs

Overview CPU 312C

- The compact CPU with integrated digital inputs and outputs
- For small applications with high requirements in terms of processing power
- With process-related functions

Micro memory card required to operate the CPU

Overview 313C-2 PtP

- The compact CPU with integrated digital I/Os and second serial interface
- For installations with high requirements in terms of processing power and response time.
- With process-related functions

Micro memory card required to operate the CPU.

Overview CPU 313C

- The compact CPU with integrated digital and analog inputs and outputs
- For installations with high requirements in terms of processing power and response time.
- With process-related functions

Micro memory card required to operate the CPU.

Overview CPU 313C-2 DP

- The compact CPU with integrated digital I/Os and PROFIBUS DP master/slave interface
- With process-related functions
- For tasks with special functions
- For the connection of standalone I/O devices

Micro memory card required to operate the CPU.

Overview CPU 314C-2 PtP

- The compact CPU with integrated digital and analog I/Os, as well as a second serial interface
- For installations with high requirements in terms of processing power and response time
- With process-related functions

Micro memory card required to operate the CPU.

Overview CPU 314C-2 DP

- The compact CPU with integrated digital and analog I/Os and PROFIBUS DP master/slave interface
- With process-related functions
- For tasks with special functions
- For the connection of standalone I/O devices

Micro memory card required to operate the CPU.

Technical specifications

	6ES7 312-5BE03-0AB0	6ES7 313-5BF03-0AB0	6ES7 313-6BF03-0AB0	6ES7 313-6CF03-0AB0	6ES7 314-6BG03-0AB0	6ES7 314-6CG03-0AB0
Product status						
Associated programming package	STEP 7 V5.2 + SP 1 or higher + HW update	STEP 7 V5.2 + SP 1 or higher + HW update	STEP 7 V5.2 + SP 1 or higher + HW update	STEP 7 V5.2 + SP 1 or higher + HW update	STEP 7 V 5.2 or higher + SP 1 with HW update	STEP 7 V 5.2 or higher + SP 1 with HW update
Supply voltages						
Rated value						
• DC 24 V	Yes	Yes	Yes	Yes	Yes	Yes
• permissible range, lower limit (DC)	20.4 V	20.4 V	20.4 V	20.4 V	20.4 V	20.4 V
• permissible range, upper limit (DC)	28.8 V	28.8 V	28.8 V	28.8 V	28.8 V	28.8 V
Voltages and currents						
External protection for supply cables (recommendation)	LS-switch Type C min 2 A; LS-switch Type B min. 4 A	LS-switch Type C min 2 A; LS-switch Type B min. 4 A	LS-switch Type C min 2 A; LS-switch Type B min. 4 A	LS-switch Type C min 2 A; LS-switch Type B min. 4 A	LS-switch Type C min 2 A; LS-switch Type B min. 4 A	LS-switch Type C min 2 A; LS-switch Type B min. 4 A
Current consumption						
Inrush current, typ.	3 A	11 A	11 A	11 A	11 A	11 A
I^2t	0.7 A^2s	0.7 A^2s	0.7 A^2s	0.7 A^2s	0.7 A^2s	0.7 A^2s
Current consumption (in no-load operation), typ.	60 mA	150 mA	100 mA	100 mA	150 mA	150 mA
Current consumption (rated value)	500 mA	700 mA	700 mA	900 mA	800 mA	1.000 mA
from supply voltage L+, max.	500 mA	700 mA	700 mA	900 mA	800 mA	1.000 mA
Power loss, typ.	6 W	14 W	10 W	10 W	14 W	14 W
Memory						
Memory						
• RAM						
- integrated	32 KByte; for program and data, less the display data	64 KByte; for program and data, less the display data	64 KByte; for program and data, less the display data	64 KByte; for program and data, less the display data	96 KByte; for program and data, less the display data	96 KByte; for program and data, less the display data
- expandable	No	No	No	No	No	No

Compact CPUs

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Technical specifications (continued)

	6ES7 312-5BE03-0AB0	6ES7 313-5BF03-0AB0	6ES7 313-6BF03-0AB0	6ES7 313-6CF03-0AB0	6ES7 314-6BG03-0AB0	6ES7 314-6CG03-0AB0
• Load memory						
- pluggable (MMC)	Yes	Yes	Yes	Yes	Yes	Yes
- pluggable (MMC), max.	4 MByte	8 MByte	8 MByte	8 MByte	8 MByte	8 MByte
Backup						
• present	Yes; Guaranteed by MMC (maintenance-free)	Yes; Guaranteed by MMC (maintenance-free)	Yes; Guaranteed by MMC (maintenance-free)	Yes; Guaranteed by MMC (maintenance-free)	Yes; Guaranteed by MMC (maintenance-free)	Yes; Guaranteed by MMC (maintenance-free)
• without batterie	Yes; Program and data	Yes; Program and data	Yes; Program and data	Yes; Program and data	Yes; Program and data	Yes; Program and data
CPU/blocks						
DB						
• Number, max.	511; Number band: 1 to 511	511; Number band: 1 to 511	511; Number band: 1 to 511	511; Number band: 1 to 511	511; Number band: 1 to 511	511; Number band: 1 to 511
• Size, max.	16 KByte	16 KByte	16 KByte	16 KByte	16 KByte	16 KByte
FB						
• Number, max.	1,024; Number band: 0 to 2047	1,024; Number band: 0 to 2047	1,024; Number band: 0 to 2047	1,024; Number band: 0 to 2047	1,024; Number band: 0 to 2047	1,024; Number band: 0 to 2047
• Size, max.	16 KByte	16 KByte	16 KByte	16 KByte	16 KByte	16 KByte
FC						
• Number, max.	1,024; Number band: 0 to 2047	1,024; Number band: 0 to 2047	1,024; Number band: 0 to 2047	1,024; Number band: 0 to 2047	1,024; Number band: 0 to 2047	1,024; Number band: 0 to 2047
• Size, max.	16 KByte	16 KByte	16 KByte	16 KByte	16 KByte	16 KByte
OB						
• Number, max.	See Operation List	See Operation List	See Operation List	See Operation List	See Operation List	See Operation List
• Size, max.	16 KByte	16 KByte	16 KByte	16 KByte	16 KByte	16 KByte
Nesting depth						
• per priority class	8	8	8	8	8	8
• additional within an error OB	4	4	4	4	4	4
CPU/processing times						
for bit operations, min.	0.2 µs	0.1 µs	0.1 µs	0.1 µs	0.1 µs	0.1 µs
for word operations, min.	0.4 µs	0.2 µs	0.2 µs	0.2 µs	0.2 µs	0.2 µs
for fixed point arithmetic, min.	5 µs	2 µs	2 µs	2 µs	2 µs	2 µs
for floating point arithmetic, min.	6 µs	3 µs	3 µs	3 µs	3 µs	3 µs
Times/counters and their remanence						
S7 counter						
• Number	128	256	256	256	256	256
• of which remanent without battery						
- adjustable	Yes	Yes	Yes	Yes	Yes	Yes
- lower limit	0	0	0	0	0	0
- upper limit	127	255	255	255	255	255
Remanence						
- adjustable	Yes	Yes	Yes	Yes	Yes	Yes
- lower limit	0	0	0	0	0	0
- upper limit	127	255	255	255	255	255
• Counting Range						
- lower limit	0	0	0	0	0	0
- upper limit	999	999	999	999	999	999

Technical specifications (continued)

	6ES7 312-5BE03-0AB0	6ES7 313-5BF03-0AB0	6ES7 313-6BF03-0AB0	6ES7 313-6CF03-0AB0	6ES7 314-6BG03-0AB0	6ES7 314-6CG03-0AB0
IEC-Counter						
• present	Yes	Yes	Yes	Yes	Yes	Yes
• Type	SFB	SFB	SFB	SFB	SFB	SFB
S7 times						
• Number	128	256	256	256	256	256
• Remanence						
- adjustable	Yes	Yes	Yes	Yes	Yes	Yes
- lower limit	0	0	0	0	0	0
- upper limit	127	255	255	255	255	255
- preset	no retentivity	no retentivity	no retentivity	no retentivity	no retentivity	no retentivity
• Time range						
- lower limit	10 ms	10 ms	10 ms	10 ms	10 ms	10 ms
- upper limit	9,990 s	9,990 s	9,990 s	9,990 s	9,990 s	9,990 s
IEC timer						
• present	Yes	Yes	Yes	Yes	Yes	Yes
• Type	SFB	SFB	SFB	SFB	SFB	SFB
Data areas and their remanence						
Flag						
• Number, max.	128 Byte	256 Byte	256 Byte	256 Byte	256 Byte	256 Byte
• Remanence available	Yes; MB 0 to MB 127	Yes; MB 0 to MB 255	Yes; MB 0 to MB 255	Yes; MB 0 to MB 255	Yes; MB 0 to MB 255	Yes; MB 0 to MB 255
• Number of clock memories	8; 1 memory byte	8; 1 memory byte	8; 1 memory byte	8; 1 memory byte	8; 1 memory byte	8; 1 memory byte
Data blocks						
• Number, max.	511; from DB1 to DB511	511; from DB1 to DB511	511; from DB1 to DB511	511	511	511
• Size, max.	16 KByte	16 KByte	16 KByte	16 KByte	16 KByte	16 KByte
• Remanence adjustable	Yes; via non-retain property on DB	Yes; via non-retain property on DB	Yes; via non-retain property on DB	Yes; via non-retain property on DB	Yes; via non-retain property on DB	Yes; via non-retain property on DB
• Remanence preset	Yes	Yes	Yes	Yes	Yes	Yes
Local data						
• per priority class, max.	256 Byte	510 Byte	510 Byte	510 Byte	510 Byte	510 Byte
Address area						
I/O address area						
• Inputs	1 KByte	1 KByte	1 KByte	1 KByte	1 KByte	1 KByte
• Outputs	1 KByte	1 KByte	1 KByte	1 KByte	1 KByte	1 KByte
• of which, distributed						
- Inputs			none	1,008 KByte; max.	none	1,000 Byte
- Outputs			none	1,008 KByte; max.	none	1,008 Byte
Process image						
• Inputs	128 Byte	128 Byte	128 Byte	128 Byte	128 Byte	128 Byte
• Outputs	128 Byte	128 Byte	128 Byte	128 Byte	128 Byte	128 Byte
Digital channels						
• Inputs	266	1,016	1,008	8,192	1,016	8,192
• Outputs	262	1,008	1,008	8,192	1,008	8,192
• Inputs, of which central	266	1,016	1,008	1,008	1,016	1,016
• Outputs, of which central	262	1,008	1,008	1,008	1,008	1,008

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Technical specifications (continued)

	6ES7 312-5BE03-0AB0	6ES7 313-5BF03-0AB0	6ES7 313-6BF03-0AB0	6ES7 313-6CF03-0AB0	6ES7 314-6BG03-0AB0	6ES7 314-6CG03-0AB0
Analog channels						
• Inputs	64	253	248	512	253	512
• Outputs	64	250	248	512	250	512
• Inputs, of which central	64	253	248	248	253	253
• Outputs, of which central	64	250	248	248	250	250
Hardware config.						
Central devices, max.	1	1	1	1	1	1
Expansion devices, max.	0	3	3	3	3	3
Racks, max.	1	4	4	4	4	4
Modules per rack, max.	8	8; in rack 3 max. 7	8; in rack 3 max. 7	8; in rack 3 max. 7	8; in rack 3 max. 7	8; in rack 3 max. 7
Number of DP masters						
• integrated	none	none	none	1	none	1
• via CP	4	4	4	4	4	4
Number of operable FMs and CPs (recommended)						
• FM	8	8	8	8	8	8
• CP, poin-to-point	8	8	8	8	8	8
• CP, LAN	4	6	6	6	10	10
Time						
Clock						
• Hardware clock (real-time clock)		Yes	Yes	Yes	Yes	Yes
• Software clock	Yes					
• Battery backed and synchronized	No	Yes	Yes	Yes	Yes	Yes
• Deviation per day, max.	15 s	10 s	10 s	10 s	10 s	10 s
Operating hours counter						
• Number	1	1	1	1	1	1
• Number/Number range	0	0	0	0	0	0
• Range of values	2^31 hours (when using the SFC 101)	2^31 hours (when using the SFC 101)	2^31 hours (when using the SFC 101)	2^31 hours (when using the SFC 101)	2^31 hours (when using the SFC 101)	2^31 hours (when using the SFC 101)
• Granularity	1 hour	1 hour	1 hour	1 hour	1 hour	1 hour
• remanent	Yes; must be restarted at each warm restart	Yes; must be restarted at each warm restart	Yes; must be restarted at each warm restart	Yes	Yes; must be restarted at each warm restart	Yes; must be restarted at each warm restart
Clock synchronization						
• supports	Yes	Yes	Yes	Yes	Yes	Yes
• to MPI, Master	Yes	Yes	Yes	Yes	Yes	Yes
• to MPI, Slave	Yes	Yes	Yes	Yes	Yes	Yes
• in AS, Master	Yes	Yes	Yes	Yes	Yes	Yes
S7 message functions						
Number of login stations for message functions, max.	6; depending on the configured connections for PG-/ OP- and S7- basic commmunication	8; depending on the configured connections for PG-/ OP- and S7- basic commmunication	8; depending on the configured connections for PG-/ OP- and S7- basic commmunication	8	12; depending on the configured connections for PG-/ OP- and S7- basic commmunication	12; depending on the configured connections for PG-/ OP- and S7- basic commmunication
Process diagnostic messages	Yes	Yes	Yes	Yes	Yes	Yes
Simultaneously active Alarm-S blocks, max.	20	20	20	20	40	40

Technical specifications (continued)

	6ES7 312-5BE03-0AB0	6ES7 313-5BF03-0AB0	6ES7 313-6BF03-0AB0	6ES7 313-6CF03-0AB0	6ES7 314-6BG03-0AB0	6ES7 314-6CG03-0AB0
Test commissioning functions						
Status/control						
• Status/control variable	Yes	Yes	Yes	Yes	Yes	Yes
• Variables	Inputs, outputs, memory bits, DB, times, counters	Inputs, outputs, memory bits, DB, times, counters	Inputs, outputs, memory bits, DB, times, counters	Inputs, outputs, memory bits, DB, times, counters	Inputs, outputs, memory bits, DB, times, counters	Inputs, outputs, memory bits, DB, times, counters
Monitoring functions						
• Number of variables, max.	30	30	30	30	30	30
• of which status variable, max.	30	30	30	30	30	30
• of which control variable, max.	14	14	14	14	14	14
Forcing						
• Forcing	Yes	Yes	Yes	Yes	Yes	Yes
• Force, variables	Inputs, outputs	Inputs, outputs	Inputs, outputs	Inputs, outputs	Inputs, outputs	Inputs, outputs
• Forcing, number of variables, max.	10	10	10	10	10	10
Status block	Yes	Yes	Yes	Yes	Yes	Yes
Single step	Yes	Yes	Yes	Yes	Yes	Yes
Number of breakpoints	2	2	2	2	2	2
Diagnostic buffer						
• present	Yes	Yes	Yes	Yes	Yes	Yes
• Number of breakpoints	100	100	100	100	100	100
• adjustable				No		
Communication functions						
PG/OP communication	Yes	Yes	Yes	Yes	Yes	Yes
Routing	No	No	No	Yes	No	Yes
Global data communication						
• supported	Yes	Yes	Yes	Yes	Yes	Yes
• Size of GD packets, max.	22 Byte	22 Byte	22 Byte	22 Byte	22 Byte	22 Byte
S7 basic communication						
• supported	Yes	Yes	Yes; Server	Yes	Yes	Yes
S7 communication						
• supported	Yes	Yes	Yes	Yes	Yes	Yes
S5-compatible communication						
• supported	Yes; via CP and loadable FC	Yes; via CP and loadable FC	Yes; via CP and loadable FC	Yes; via CP and loadable FC	Yes; via CP and loadable FC	Yes; via CP and loadable FC
Number of connections						
• overall	6	8	8	8	12	12
• usable for PG communication	5	7	7	7	11	11
• usable for OP communication	5	7	7	7	11	11
• usable for S7 basic communication	2	4	4	4	8	8
• usable for routing	No	No	No	4; max.	No	4; max.
Connection point						
required front connectors	1 x 40-pin	2 x 40-pin	1 x 40-pin	1 x 40-pin	2 x 40-pin	2 x 40-pin
MPI						
Cable length, max.	50 m; without repeater	50 m; without repeater	50 m; without repeater	50 m; without repeater	50 m; without repeater	50 m; without repeater
Point-to-point						
Cable length, max.			1,200 m		1,200 m	

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Technical specifications (continued)

	6ES7 312-5BE03-0AB0	6ES7 313-5BF03-0AB0	6ES7 313-6BF03-0AB0	6ES7 313-6CF03-0AB0	6ES7 314-6BG03-0AB0	6ES7 314-6CG03-0AB0
Integrated protocol driver						
• 3964 (R)			Yes		Yes	
• ASCII			Yes		Yes	
• RK512			No		Yes	
Transmission speed, RS 422/485						
• with 3964 (R) protocol, max.			38.4 kbit/s half duplex; 19.2 kbit/s full duplex		19.2 kBit/s; 38.4 kbit/s half duplex; 19.2 kbit/s full duplex	
• with ASCII protocol, max.			38.4 kbit/s half duplex; 19.2 kbit/s full duplex		19.2 kBit/s; 38.4 kbit/s half duplex; 19.2 kbit/s full duplex	
• with RK 512 protocol, max.					19.2 kBit/s; 38.4 kbit/s half duplex; 19.2 kbit/s full duplex	
1st interface						
Type of interface	integrated RS 422/485 interface	integrated RS 422/485 interface	integrated RS 422/485 interface	integrated RS 422/485 interface	integrated RS 485 interface	integrated RS 422/485 interface
Physics	RS 485	RS 485	RS 485	RS 485	RS 485	RS 485
isolated	No	No	No	Yes	No	No
Power supply to interface (15 to 30 V DC), max.	200 mA	200 mA	200 mA	200 mA	200 mA	200 mA
Functionality						
• MPI	Yes	Yes	Yes	Yes	Yes	Yes
• DP master	No	No	No	No	No	No
• DP slave	No	No	No	No	No	No
• Point-to-point coupling	No	No	No	No	No	No
MPI						
• Number of connections	6	8	8	8	12	12
• Services						
- PG/OP communication	Yes	Yes	Yes	Yes	Yes	Yes
- Routing	No	No	No	Yes	No	Yes
- Global data communication	Yes	Yes	Yes	Yes	Yes	Yes
- S7 basic communication	Yes	Yes	Yes	Yes	Yes	Yes
- S7 communication	Yes	Yes	Yes	Yes	Yes	Yes
- S7 communication, as client	No	No	No	No	No	No
- S7 communication, as server	Yes	Yes	Yes	Yes	Yes	Yes
• Transmission speeds, max.	187.5 kBit/s	187.5 kBit/s	187.5 kBit/s	187.5 kBit/s	187.5 kBit/s	187.5 kBit/s
2nd interface						
Type of interface			integrated RS 422/485 interface	integrated RS 422/485 interface	integrated RS 422/485 interface	integrated RS 422/485 interface
Physics			RS 422/ RS 485 (X.27)	RS 485	RS 422/ RS 485 (X.27)	RS 485
isolated			Yes	Yes	Yes	Yes
Power supply to interface (15 to 30 V DC), max.			No	200 mA	No	200 mA

Technical specifications (continued)

	6ES7 312-5BE03-0AB0	6ES7 313-5BF03-0AB0	6ES7 313-6BF03-0AB0	6ES7 313-6CF03-0AB0	6ES7 314-6BG03-0AB0	6ES7 314-6CG03-0AB0
Functionality						
• MPI			No	No	No	No
• DP master			No	Yes	No	Yes
• DP slave			No	Yes	No	Yes
• Point-to-point coupling			Yes	No	Yes	No
• PROFINET CBA			No	No	No	No
• PROFINET IO controller			No	No	No	No
DP master						
• Number of connections, max.				8; for PG/OP communication		12; for PG/OP communication
• Number of connections (of which reserved), max.				1 for PG, 1 for OP		1 for PG, 1 for OP
• Services						
- PG/OP communication				Yes		Yes
- Routing				Yes		Yes
- Global data communication				No		No
- S7 basic communication				Yes		Yes
- S7 communication				Yes		Yes
- S7 communication, as client				No		No
- S7 communication, as server				Yes		Yes
- equidistance support				Yes		Yes
- SYNC/FREEZE				Yes		Yes
- Activation/deactivation of DP slaves				Yes		Yes
- direct data exchange (cross traffic)				Yes		Yes
- DPV1				Yes		Yes
• Transmission speeds, max.				12 Mbit/s		12 Mbit/s
• Number of DP slaves, max.				32		32
• Address area						
- Inputs, max.				1 KByte		1 KByte
- Outputs, max.				1 KByte		1 KByte
• Useful data per DP slave						
- Inputs, max.				244 Byte		244 Byte
- Outputs, max.				244 Byte		244 Byte
DP slave						
• Number of connections				8		12
• Services						
- PG/OP communication				Yes		Yes
- Routing				Yes; only when interface active		Yes; only when interface active
- Global data communication				No		No
- S7 basic communication				Yes		Yes
- S7 communication, as client				No		No
- S7 communication, as server				Yes		Yes
- direct data exchange (cross traffic)				Yes		Yes
- DPV1				No		No

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Technical specifications (continued)

	6ES7 312-5BE03-0AB0	6ES7 313-5BF03-0AB0	6ES7 313-6BF03-0AB0	6ES7 313-6CF03-0AB0	6ES7 314-6BG03-0AB0	6ES7 314-6CG03-0AB0
• GSD file				You can obtain the current GSD file from http://www.ad.siemens.de/support in the Product Support area		You can obtain the current GSD file from http://www.ad.siemens.de/support in the Product Support area
• Transmission speeds, max.				12 kBit/s		12 kBit/s
• automatic baud rate search				Yes; only with passive interface		Yes; only with passive interface
• Transfer memory						
- Inputs				244 Byte		244 Byte
- Outputs				244 Byte		244 Byte
• Address area, max.				32		32
• Useful data per address area, max.				32 Byte		32 Byte
Point-to-point coupling						
• Transmission speed, max.			38.4 kbit/s half duplex; 19.2 kbit/s full duplex		38.4 kBit/s; 38.4 kbit/s half duplex; 19.2 kbit/s full duplex	
• Cable length, max.			1,200 m		1,200 m	
• interface from the user program controllable			Yes		Yes	
• interface can trigger alarm/interrupt in the user program			Yes; Message on break identification		Yes; Message on break identification	
• Protocol driver			3964 (R); ASCII		3964 (R); ASCII and RK 512	
CPU/programming						
Programming language						
• STEP 7	Yes; V5.2 + SP1 + HW update	Yes; V5.2 + SP1 + HW update	Yes; V5.2 + SP1 + HW update	Yes; V5.1 SP2 + HW update	Yes; V5.2 SP1 with HW update	Yes; V5.2 SP1 with HW update
• KOP	Yes	Yes	Yes	Yes	Yes	Yes
• FUP	Yes	Yes	Yes	Yes	Yes	Yes
• AWL	Yes	Yes	Yes	Yes	Yes	Yes
• SCL	Yes	Yes	Yes	Yes	Yes	Yes
• CFC					Yes	Yes
• GRAPH	Yes	Yes	Yes	Yes	Yes	Yes
• HiGraph	Yes	Yes	Yes	Yes	Yes	Yes
Software libraries						
Operational stocks	see Instruction List	see Instruction List	see Instruction List	see Instruction List	see Instruction List	see Instruction List
Nesting Levels	8	8	8	8	8	8
User program protection/password protection	Yes	Yes	Yes	Yes	Yes	Yes
System functions (SFC)	see Instruction List	see Instruction List	see Instruction List	see Instruction List	see Instruction List	see Instruction List
System function blocks (SFB)	see Instruction List	see Instruction List	see Instruction List	see Instruction List	see Instruction List	see Instruction List

Technical specifications (continued)

	6ES7 312-5BE03-0AB0	6ES7 313-5BF03-0AB0	6ES7 313-6BF03-0AB0	6ES7 313-6CF03-0AB0	6ES7 314-6BG03-0AB0	6ES7 314-6CG03-0AB0
Digital inputs						
Number of digital inputs	10	24	16	16	24	24
• of which, inputs usable for technological functions	8	12	12	12	16	16
Number of simultanneously controllable inputs						
• vertical installation						
- up to 40 °C, max.	5	12	8	8	12	12
• horizontal installation						
- up to 40 °C, max.	10	24	16	16	24	24
- up to 60 °C, max.	5	12	8	8	12	12
Cable length						
• Cable length, shielded, max.	1,000 m; 100 m for technological functions	1,000 m; 100 m for technological functions	1,000 m; 100 m for technological functions	1,000 m; 100 m for technological functions	1,000 m; 100 m for technological functions	1,000 m; 100 m for technological functions
• Cable length unshielded, max.	600 m; For technological functions: No	600 m; For technological functions: No	600 m; For technological functions: No	600 m; For technological functions: No	600 m; For technological functions: No	600 m; For technological functions: No
• Technological functions						
- shielded, max.	100 m	100 m	100 m	100 m	50 m	50 m
- unshielded, max.	not allowed	not allowed	not allowed	not allowed	not allowed	not allowed
• Standard-DI						
- shielded, max.	1,000 m	1,000 m	1,000 m	1,000 m	1,000 m	1,000 m
- unshielded, max.	600 m	600 m	600 m	600 m	600 m	600 m
Input characteristic curve to IEC 1131, type 1	Yes	Yes	Yes	Yes	Yes	Yes
Input voltage						
• Rated value, DC	24 V	24 V	24 V	24 V	24 V	24 V
• for signal "0"	-3 to 5 V	-3 to 5 V	-3 to 5 V	-3 to 5 V	-3 to 5 V	-3 to 5 V
• for signal "1"	15 to 30 V	15 to 30 V	15 to 30 V	15 to 30 V	15 to 30 V	15 to 30 V
Input current						
• for signal "1", typ.	9 mA	9 mA	9 mA	9 mA	9 mA	9 mA
Input delay (for rated value of input voltage)						
• for standard inputs						
- programmable	Yes; 0.1 / 0.3 / 3 / 15 ms	Yes; 0.1 / 0.3 / 3 / 15 ms	Yes; 0.1 / 0.3 / 3 / 15 ms	Yes; 0.1 / 0.3 / 3 / 15 ms	Yes; 0.1 / 0.3 / 3 / 15 ms	Yes; 0.1 / 0.3 / 3 / 15 ms
- Rated value	3 ms	3 ms	3 ms	3 ms	3 ms	3 ms
• for counter/technological functions						
- at "0" to "1", max.	48 µs	16 µs	16 µs	16 µs	8 µs	8 µs
Digital outputs						
Number of digital outputs	6	16	16	16	16	16
• of which, high-speed outputs	2	4	4	4	4	4
Cable length, shielded, max.	1,000 m	1,000 m	1,000 m	1,000 m	1,000 m	1,000 m
Cable length unshielded, max.	600 m	600 m	600 m	600 m	600 m	600 m
Short-circuit protection of the output	Yes; clocked electronically	Yes; clocked electronically	Yes; clocked electronically	Yes; clocked electronically	Yes; clocked electronically	Yes; clocked electronically
• Response threshold, typ.	1 A	1 A	1 A	1 A	1 A	1 A
Limitation of inductive shutdown voltage to	L+ (-48 V)	L+ (-48 V)	L+ (-48 V)	L+ (-48 V)	L+ (-48 V)	L+ (-48 V)
Lamp load, max.	5 W	5 W	5 W	5 W	5 W	5 W
Controlling a digital input	Yes	Yes	Yes	Yes	Yes	Yes

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Technical specifications (continued)

	6ES7 312-5BE03-0AB0	6ES7 313-5BF03-0AB0	6ES7 313-6BF03-0AB0	6ES7 313-6CF03-0AB0	6ES7 314-6BG03-0AB0	6ES7 314-6CG03-0AB0
Output voltage						
• for signal "1", min.	L+ (-0.8 V)	L+ (-0.8 V)	L+ (-0.8 V)	L+ (-0.8 V)	L+ (-0.8 V)	L+ (-0.8 V)
Output current						
• for signal "1" rated value	500 mA	500 mA	500 mA	500 mA	500 mA	500 mA
• for signal "1" permissible range, min.	5 mA	5 mA	5 mA	5 mA	5 mA	5 mA
• for signal "1" permissible range, max.	0.6 A	0.6 A	0.6 A	0.6 A	0.6 A	0.6 A
• for signal "1" minimum load current	5 mA	5 mA	5 mA	5 mA	5 mA	5 mA
• for signal "0" residual current, max.	0.5 mA	0.5 mA	0.5 mA	0.5 mA	0.5 mA	0.5 mA
Parallel switching of 2 outputs						
• for increased power	No	No	No	No	No	No
• for redundant control of a load	Yes	Yes	Yes	Yes	Yes	Yes
Switching frequency						
• with resistive load, max.	100 Hz	100 Hz	100 Hz	100 Hz	100 Hz	100 Hz
• with inductive load, max.	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz
• on lamp load, max.	100 Hz	100 Hz	100 Hz	100 Hz	100 Hz	100 Hz
• of the pulse outputs, with resistive load, max.	2.5 kHz	2.5 kHz	2.5 kHz	2.5 kHz	2.5 kHz	2.5 kHz
Aggregate current of the outputs (per group)						
• vertical installation						
- up to 40 °C, max.	1.5 A	2 A	2 A	2 A	2 A	2 A
• horizontal installation						
- up to 40 °C, max.	2 A	3 A	3 A	3 A	3 A	3 A
- up to 60 °C, max.	1.5 A	2 A	2 A	2 A	2 A	2 A
Load impedance range						
• lower limit	48 Ω	48 Ω	48 Ω	48 Ω	48 Ω	48 Ω
• upper limit	4 kΩ	4 kΩ	4 kΩ	4 kΩ	4 kΩ	4 kΩ
Analog inputs						
Number of analog inputs for voltage/current measurement		4			4	4
Number of analog inputs for resistance/temperature measurement		1			1	1
Cable length, shielded, max.		100 m			100 m	100 m
permissible input frequency for voltage input (destruction limit), max.		30 V; permanent			30 V; permanent	30 V; permanent
permissible input frequency for current input (destruction limit), max.		2.5 V; permanent			2.5 V; permanent	2.5 V; permanent
permissible input frequency for voltage input (destruction limit), max.		0.5 mA; permanent			0.5 mA; permanent	0.5 mA; permanent
permissible input current for current input (destruction limit), max.		50 mA; permanent			50 mA; permanentt	50 mA; permanent
technical unit for temperature measurement, adjustable		Yes; Degrees Celsius / degrees Fahrenheit / Kelvin			Yes; Degrees Celsius / degrees Fahrenheit / Kelvin	Yes; Degrees Celsius / degrees Fahrenheit / Kelvin

Technical specifications (continued)

	6ES7 312-5BE03-0AB0	6ES7 313-5BF03-0AB0	6ES7 313-6BF03-0AB0	6ES7 313-6CF03-0AB0	6ES7 314-6BG03-0AB0	6ES7 314-6CG03-0AB0
Input ranges (rated values), voltages						
• 0 to +10 V		Yes			Yes	Yes
• -10 V to +10 V		Yes			Yes	Yes
Input ranges (rated values), currents						
• 0 to 20 mA		Yes			Yes	Yes
• -20 to +20 mA		Yes			Yes	Yes
• 4 to 20 mA		Yes			Yes	Yes
Input ranges (rated values), resistors						
• No-Load voltage, typ.		2.5 V			2.5 V	2.5 V
• Measured current, typ.		1.8 mA to 3.3 mA			1.8 mA to 3.3 mA	1.8 mA to 3.3 mA
• 0 to 600 Ohm		Yes			Yes	Yes
Input ranges (rated values), resistance thermometers						
• Pt 100		Yes			Yes	Yes
Characteristic linearization						
• programmable		Yes; software			Yes; software	Yes; software
• for thermoresistor		Pt 100			Pt 100	Pt 100
Temperature compensation						
• programmable		No			No	No
Analog outputs						
Number of analog outputs		2			2	2
Cable length, shielded, max.		200 m			200 m	200 m
Voltage output, short-circuit protection		Yes			Yes	Yes
Voltage output, short-circuit current, max.		55 mA			55 mA	55 mA
Current output, no-load voltage, max.		17 V			17 V	17 V
Output ranges, voltage						
• 0 to 10 V		Yes			Yes	Yes
• -10 to +10 V		Yes			Yes	Yes
Output ranges, current						
• 0 to 20 mA		Yes			Yes	Yes
• -20 to +20 mA		Yes			Yes	Yes
• 4 to 20 mA		Yes			Yes	Yes
Connection of actuators						
• for voltage output 2-conductor connection		Yes; without compensation of the line resistances			Yes; without compensation of the line resistances	Yes; without compensation of the line resistances
• for voltage output 4-conductor connection		No			No	No
• for current output 2-conductor connection		Yes			Yes	Yes
Load impedance (in rated range of output)						
• with voltage outputs, min.		1 kΩ			1 kΩ	1 kΩ

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Technical specifications (continued)

	6ES7 312-5BE03-0AB0	6ES7 313-5BF03-0AB0	6ES7 313-6BF03-0AB0	6ES7 313-6CF03-0AB0	6ES7 314-6BG03-0AB0	6ES7 314-6CG03-0AB0
• with voltage outputs, capacitive load, max.		0.1 µF			0.1 µF	0.1 µF
• with current outputs, max.		300 Ω			300 Ω	300 Ω
• with current outputs, inductive load, max.		0.1 mH			0.1 mH	0.1 mH
Destruction limits against externally applied voltages and currents						
• Voltages at the outputs towards MANA		16 V; permanent			16 V; permanent	16 V; permanent
• Current, max.		50 mA; permanent			50 mA; permanent	50 mA; permanent
Analog value creation						
Measurement principle		Actual value encryption (successive approximation))			Actual value encryption (successive approximation))	Actual value encryption (successive approximation)
Integrations and conversion time/resolutionper channel						
• Resolution with overload area (bit including sign), max.		12 Bit			12 Bit	12 Bit
• Integration time, parameter-izable		Yes; 2,5 / 16,6 / 20 ms			Yes; 2,5 / 16,6 / 20 ms	Yes; 2,5 / 16,6 / 20 ms
• permissible input frequency, max.		400 Hz			400 Hz	400 Hz
• Interference voltage suppression for interference frequency f1 in Hz		400 / 60 / 50 Hz			400 / 60 / 50 Hz	400 / 60 / 50 Hz
• Conversion time (per channel)		1 ms			1 ms	1 ms
• Time constant of the input filter		0.38 ms			0.38 ms	0.38 ms
• Basic execution time of the module (all channels released)		1 ms			1 ms	1 ms
Settling time						
• for resistive load		0.6 ms			0.6 ms	0.6 ms
• for capacitive load		1 ms			1 ms	1 ms
• for inductive load		0.5 ms			0.5 ms	0.5 ms
Encoder						
Connection of signal encoders						
• for voltage measurement		Yes			Yes	Yes
• for current measurement as 2-wire transducer		Yes; with external supply			Yes; with external supply	Yes; with external supply
• for current measurement as 4-wire transducer		Yes			Yes	Yes
• for resistance measurement with 2-conductor connection		Yes; without compensation of the line resis-tances			Yes; without compensation of the line resis-tances	Yes; without compensation of the line resis-tances
• for resistance measurement with 3-conductor connection		No			No	No
• for resistance measurement with 4-conductor connection		No			No	No
Connectable encoders						
• 2-wire BEROS	Yes	Yes	Yes	Yes	Yes	Yes
• permissible quiescent current (2-wire BEROS), max.	1.5 mA	1.5 mA	1.5 mA	1.5 mA	1.5 mA	1.5 mA

Technical specifications (continued)

	6ES7 312-5BE03-0AB0	6ES7 313-5BF03-0AB0	6ES7 313-6BF03-0AB0	6ES7 313-6CF03-0AB0	6ES7 314-6BG03-0AB0	6ES7 314-6CG03-0AB0
Errors/accuracies						
Output ripple (output range band width 0...50 kHz)		+/- 0.1 %			+/- 0.1 %	+/- 0.1 %
Linearity error (relative to output area)		+/- 0.15 %			+/- 0.15 %	+/- 0.15 %
Temperature error (relative to output area)		+/- 0.01 %/K			+/- 0.01 %/K	+/- 0.01 %/K
Temperature error (relative to input areas)		+/- 0.006 %/K			+/- 0.006 %/K	+/- 0.006 %/K
Crosstalk between the outputs, min.		60 dB			60 dB	60 dB
Crosstalk between the inputs, min.		60 dB			60 dB	60 dB
Repeat accuracy in settled status at 25 °C (relative to output area)		+/- 0.06 %			+/- 0.06 %	+/- 0.06 %
Repeat accuracy in settled status at 25 °C (relative to input area)		+/- 0.06 %			+/- 0.06 %	+/- 0.06 %
Operational limit in overall temperature range						
• Voltage, relative to output area		+/- 1 %			+/- 1 %	+/- 1 %
• Current, relative to output area		+/- 1 %			+/- 1 %	+/- 1 %
• Voltage, relative to input area		+/- 1 %			+/- 1 %	+/- 1 %
• Current, relative to input area		+/- 1 %			+/- 1 %	+/- 1 %
• Impedance, relative to input area		+/- 5 %			+/- 5 %	+/- 5 %
Basic error limit (operational limit at 25 °C)						
• Voltage, relative to output area		+/- 0.7 %			+/- 0.7 %	+/- 0.7 %
• Current, relative to output area		+/- 0.7 %			+/- 0.7 %	+/- 0.7 %
• Voltage, relative to input area		+/- 0.7 %; Linearity error +/- 0.06%			+/- 0.7 %; Linearity error +/- 0.06%	+/- 0.7 %; Linearity error +/- 0.06%
• Current, relative to input area		+/- 0.7 %; Linearity error +/- 0.06%			+/- 0.7 %; Linearity error +/- 0.06%	+/- 0.7 %; Linearity error +/- 0.06%
• Impedance, relative to input area		+/- 3 %; Linearity error +/- 0.2%			+/- 3 %; Linearity error +/- 0.2%	+/- 3 %; Linearity error +/- 0.2%
• Resistance-type thermometer, relative to input area		+/- 3 %			+/- 3 %	+/- 3 %
Interference voltage suppression for f = n x (fl +/- 1 %), fl = interference frequency						
• Series mode interference (peak value of interference < rated value of input range), min.		30 dB			30 dB	30 dB
• common mode voltage, min.		40 dB			40 dB	40 dB

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Technical specifications (continued)

	6ES7 312-5BE03-0AB0	6ES7 313-5BF03-0AB0	6ES7 313-6BF03-0AB0	6ES7 313-6CF03-0AB0	6ES7 314-6BG03-0AB0	6ES7 314-6CG03-0AB0
Integrated Functions						
Number of counters	2; 2 channels (see "Technological Functions" manual)	3; 3 channels (see "Technological Functions" manual)	3; 3 channels (see "Technological Functions" manual)	3; 3 channels (see "Technological Functions" manual)	4; see "Technological Functions" manual	4; see "Technological Functions" manual
Counter frequency (counter) max.	10 kHz	30 kHz	30 kHz	30 kHz	60 kHz	60 kHz
Frequency measurement	Yes	Yes	Yes	Yes	Yes	Yes
Controlled positioning	No	No	No	No	Yes	Yes
PID controller	No	Yes	Yes	Yes	Yes	Yes
Number of pulse outputs	2; 2 channels pulse width modulation up to 2.5 kHz (see Manual "Technological Functions")	3; 3 channels pulse width modulation up to 2.5 kHz (see Manual "Technological Functions")	3; 3 channels pulse width modulation up to 2.5 kHz (see Manual "Technological Functions")	3; 3 channels pulse width modulation up to 2.5 kHz (see Manual "Technological Functions")	4; Pulse width modulation up to 2.5 kHz (see "Technological Functions" Manual)	4; Pulse width modulation up to 2.5 kHz (see "Technological Functions" Manual)
Limit frequency (pulse)	2.5 kHz	2.5 kHz	2.5 kHz	2.5 kHz	2.5 kHz	2.5 kHz
Isolation						
Isolation, analog outputs						
• Galvanic isolation, analog outputs		Yes			Yes	Yes
• between the channels		No			No	No
• between the channels and the backplane bus		Yes			Yes	Yes
Isolation, analog inputs						
• Isolation, analog inputs		Yes			Yes	Yes
• between the channels		No			No	No
• between the channels and the backplane bus		Yes			Yes	Yes
Isolation, digital outputs						
• Galvanic isolation, digital outputs	Yes	Yes	Yes	Yes	Yes	Yes
• between the channels	No	Yes	Yes	Yes	Yes	Yes
• between the channels, in groups of	6	8	8	8	8	8
• between the channels and the backplane bus	Yes	Yes	Yes	Yes	Yes	Yes
Galvanic isolation, digital inputs						
• galvanic isolation, digital inputs	Yes	Yes	Yes	Yes	Yes	Yes
• between the channels	No	No	No	No	No	No
• between the channels, in groups of	10					
• between the channels and the backplane bus	Yes	Yes	Yes	Yes	Yes	Yes
Dimensions and weight						
Width	80 mm	120 mm	120 mm	120 mm	120 mm	120 mm
Height	125 mm	125 mm	125 mm	125 mm	125 mm	125 mm
Depth	130 mm	130 mm	130 mm	130 mm	130 mm	130 mm
Weights						
Weight, approx.	409 g	660 g	566 g	566 g	676 g	676 g

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Ordering data		Order No.
CPU 312C Compact CPU, main memory 32 KB, power supply 24 V DC, 10 DI/6 DO integrated, integrated functions, MPI; including slot number labels and 2 keys; MMC is required	A)	**6ES7 312-5BE03-0AB0**
CPU 313C Compact CPU, main memory 64 KB, power supply 24 V DC, 24 DI/16 DO, 4 AI/2 AO integrated, integrated functions, MPI; MMC is required	A)	**6ES7 313-5BF03-0AB0**
CPU 313C-2 PtP Compact CPU, main memory 64 KB, power supply 24 V DC, 16 DI/16 DO integrated, integrated functions, MPI; RS 422/485 interface; MMC is required	A)	**6ES7 313-6BF03-0AB0**
CPU 313C-2 DP Compact CPU, main memory 64 KB, power supply 24 V DC, 16 DI/16 DO integrated, integrated functions, MPI PROFIBUS DP master/slave interface; MMC is required	A)	**6ES7 313-6CF03-0AB0**
CPU 314C-2 PtP Compact CPU, main memory 96 KB, power supply 24 V DC, 24DI/16DO/4AI/2AO integrated, integrated functions, MPI; RS 422/485 interface; MMC is required	A)	**6ES7 314-6BG03-0AB0**
CPU 314C-2 DP Compact CPU, main memory 96 KB, power supply 24 V DC, 24DI/16DO/4AI/2AO integrated, integrated functions, MPI; PROFIBUS DP master/slave interface; MMC is required	A)	**6ES7 314-6CG03-0AB0**
Micro Memory Card		
64 KB		**6ES7 953-8LF11-0AA0**
128 KB		**6ES7 953-8LG11-0AA0**
512 KB		**6ES7 953-8LJ11-0AA0**
2 MB		**6ES7 953-8LL11-0AA0**
4 MB		**6ES7 953-8LM11-0AA0**
8 MB		**6ES7 953-8LP11-0AA0**
MPI cable For connecting SIMATIC S7 and the PG through MPI; 5 m in length		**6ES7 901-0BF00-0AA0**
Point-to-point link cable for connection to CPU 31xC-2 PtP		
5 m		**6ES7 902-3AB00-0AA0**
10 m		**6ES7 902-3AC00-0AA0**
50 m		**6ES7 902-3AG00-0AA0**

		Order No.
Sub-D connector for connection to the second serial interface of the CPU 31xC-2 PtP; 15 pin, pins		**6ES5 750-2AA21**
Front connector (1 unit) for compact CPUs 40-pin, with screw contacts		
• 1 unit		**6ES7 392-1AM00-0AA0**
• 100 units		**6ES7 392-1AM00-1AB0**
40-pin with cage clamp contacts		
• 1 unit		**6ES7 392-1BM01-0AA0**
• 100 units		**6ES7 392-1BM01-1AB0**
SIMATIC TOP connect		See page 4/225; Information about which components can be used for the respective module, see A&D Mall or Catalog KT 10.2
Slot number plates		**6ES7 912-0AA00-0AA0**
S7-300 manual Design, CPU data, module data, instruction list		
German		**6ES7 398-8FA10-8AA0**
English		**6ES7 398-8FA10-8BA0**
French		**6ES7 398-8FA10-8CA0**
Spanish		**6ES7 398-8FA10-8DA0**
Italian		**6ES7 398-8FA10-8EA0**
SIMATIC Manual Collection Electronic manuals on DVD, multilingual: S7-200, S7-300, C7, S7-400, SIMATIC DP (Distributed I/O), SIMATIC PC, SIMATIC PG (Programming device), STEP 7, Engineering Tools, Runtime Software, SIMATIC PCS 7, SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication), SIMATIC Machine Vision, SIMATIC Sensors	D)	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	D)	**6ES7 998-8XC01-8YE2**
Power supply connector For compact CPUs, innovated standard CPUs and CPU 315F-2 DP (10 units, spare part)		**6ES7 391-1AA00-0AA0**
Labeling strips For compact CPUs, standard CPUs as well as CPU 315F-2 DP (10 units, spare part)		**6ES7 392-2XX00-0AA0**
Label cover For compact CPUs, standard CPUs as well as CPU 315F-2 DP (10 units, spare part)		**6ES7 392-2XY00-0AA0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

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

Compact CPUs

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Ordering data (continued)

	Order No.
S7 SmartLabel	**2XV9 450-1SL01-0YX0**
Software for automatic labeling of modules based on data of the STEP 7 project	
Labeling sheets for machine inscription	
For 16-channel signal modules, DIN A4, for printing with laser printer;	
10 units	
petrol	**6ES7 392-2AX00-0AA0**
light-beige	**6ES7 392-2BX00-0AA0**
yellow	**6ES7 392-2CX00-0AA0**
red	**6ES7 392-2DX00-0AA0**
For 32-channel signal modules, DIN A4, for printing with laser printer;	
10 units	
petrol	**6ES7 392-2AX10-0AA0**
light-beige	**6ES7 392-2BX10-0AA0**
yellow	**6ES7 392-2CX10-0AA0**
red	**6ES7 392-2DX10-0AA0**

	Order No.
PROFIBUS DP bus connector RS 485	
• With 90° cable outlet, max. transmission rate 12 Mbit/s	
- without PG interface	**6ES7 972-0BA12-0XA0**
- with PG interface	**6ES7 972-0BB12-0XA0**
• With 90° cable outlet for FastConnect connection system, max. transmission rate 12 Mbit/s	
- without PG interface	**6ES7 972-0BA50-0XA0**
- with PG interface	**6ES7 972-0BB50-0XA0**
• With axial cable outlet for SIMATIC OP, for connecting to PPI, MPI, PROFIBUS	**6GK1 500-0EA02**
PROFIBUS Fast Connect bus cable	**6XV1 830-0EH10**
Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m	
RS 485 repeater for PROFIBUS	**6ES7 972-0AA01-0XA0**
Data transfer rate up to 12 Mbit/s; 24 V DC; IP20 housing	
PROFIBUS bus components	see Catalogs IK PI, CA 01
For establishing MPI/PROFIBUS communication	

Overview CPU 312

- The starter CPU for Totally Integrated Automation (TIA).
- For small-scale applications with moderate requirements on the processing speed.

Micro memory card required to operate the CPU.

Overview CPU 315-2 DP

- The CPU with medium to large program memory and quantity framework for the use, if required, of SIMATIC Engineering Tools
- High processing performance in binary and floating-point arithmetic
- PROFIBUS DP master/slave interface
- For extensive I/O configurations
- For setting up distributed I/O structures

Micro memory card required for operation of CPU.

Overview CPU 314

- For installations with medium requirements on program scope
- High processing performance in binary and floating-point arithmetic

Micro memory card is required to operate the CPU.

Overview CPU 315-2 PN/DP

- The CPU with a medium program memory and quantity framework
- High processing performance in binary and floating-point arithmetic
- Used as a central controller on production lines with central and distributed I/O
- Integral PROFINET interface
- Combined MPI / PROFIBUS DP-master/slave interface
- Component Based Automation (CBA) on PROFINET
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component Based Automation (CBA)
- PROFINET IO Controller for operating distributed I/O on PROFINET

Micro Memory Card required for operation of CPU.

Standard CPUs

Overview CPU 317-2 DP

- The CPU with a large program memory and quantity framework for demanding requirements
- For multisector automation tasks in the construction of series machines, special machines and plants
- Used as a central controller on production lines with central and distributed I/O
- High processing performance in binary and floating-point arithmetic
- PROFIBUS DP master/slave interface
- For extensive I/O configurations
- For setting up distributed I/O structures
- Supports as an option the use of SIMATIC Engineering Tools
- Distributed intelligence in Component Based Automation (CBA) on PROFIBUS DP

Micro memory card required for operation of CPU.

Overview CPU 317-2 PN/DP

- The CPU with a large program memory and quantity framework for demanding requirements
- Distributed intelligence in Component Based Automation (CBA) on PROFINET
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component Based Automation (CBA)
- PROFINET I/O controller for operating distributed I/O on PROFINET
- For multisector automation tasks in the construction of series machines, special machines and plants
- Used as a central controller on production lines with central and distributed I/O
- For extensive I/O configurations
- For setting up distributed I/O structures
- High processing performance in binary and floating-point arithmetic
- Combined MPI/PROFIBUS DP-master/slave interface
- Supports as an option the use of SIMATIC Engineering Tools

Micro memory card required for operation of CPU.

Overview CPU 319-3 PN/DP

- The CPU with high command processing performance, large program memory and quantity framework for demanding applications
- For cross-sector automation tasks in series machine, special machine and plant construction
- Used as central controller in production lines with central and distributed I/O on PROFIBUS and PROFINET
- Distributed intelligence in Component Based Automation (CBA) on PROFINET
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component Based Automation (CBA)
- Isochronous mode on PROFIBUS
- Optionally supports the use of SIMATIC engineering tools

Micro Memory Card required for operation of CP

Technical specifications

	6ES7 312-1AE13-0AB0	6ES7 314-1AG13-0AB0	6ES7 315-2AG10-0AB0	6ES7 315-2EH13-0AB0
Product status				
Associated programming package	STEP7 V5.2 or higher + SP1 with HW update	STEP7 V5.2 or higher + SP1 with HW update	STEP 7 V 5.1 or higher + SP 4	STEP 7 V5.3 SP1 with hardware update
Supply voltages				
Rated value				
• DC 24 V	Yes	Yes	Yes	Yes
• permissible range, lower limit (DC)	20.4 V	20.4 V	20.4 V	20.4 V
• permissible range, upper limit (DC)	28.8 V	28.8 V	28.8 V	28.8 V
Voltages and currents				
External protection for supply cables (recommendation)	min. 2 A	min. 2 A	min. 2 A	min. 2 A
Current consumption				
Inrush current, typ.	2.5 A	2.5 A	2.5 A	2.5 A
I^2t	0.5 A^2s	0.5 A^2s	0.5 A^2s	1 A^2s
Current consumption (in no-load operation), typ.	60 mA	60 mA	60 mA	100 mA
Current consumption (rated value)	0.6 A	0.6 A		650 mA
from supply voltage L+, max.	600 mA	600 mA	800 mA	
Power loss, typ.	2.5 W	2.5 W	2.5 W	3.5 W
Memory				
Memory				
• RAM				
- integrated	32 KByte; for program and data, less the display data	96 KByte; for program and data, less the display data	128 KByte	256 KByte; for program and data, less the display data
- expandable	No	No	No	No
• Load memory				
- pluggable (MMC)	Yes	Yes	Yes	Yes
- pluggable (MMC), max.	4 MByte	8 MByte	8 MByte	8 MByte
Backup				
• present	Yes; guaranteed by MMC (maintenance-free)	Yes; guaranteed by MMC (maintenance-free)	Yes; guaranteed by MMC (maintenance-free)	Yes; guaranteed by MMC (maintenance-free)
• without battery	Yes; Program and data	Yes; Program and data		Yes; Program and data

Standard CPUs

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Technical specifications (continued)

	6ES7 312-1AE13-0AB0	6ES7 314-1AG13-0AB0	6ES7 315-2AG10-0AB0	6ES7 315-2EH13-0AB0
CPU/blocks				
DB				
• Number, max.	511; Number band: 1 to 511	511; Number band: 1 to 511	1,024; Number band: 1 to 1023	1,023; Number band: 1 to 1023
• Size, max.	16 KByte	16 KByte	16 KByte	16 KByte
FB				
• Number, max.	1,024; Number band: 0 to 2047	1,024; Number band: 0 to 2047	2,048; Number band: 0 to 2047	1,024; Number band: 0 to 2047
• Size, max.	16 KByte	16 KByte	16 KByte	16 KByte
FC				
• Number, max.	1,024; Number band: 0 to 2047	1,024; Number band: 0 to 2047	2,048; Number band: 0 to 2047	1,024; Number band: 0 to 2047
• Size, max.	16 KByte	16 KByte	16 KByte	16 KByte
OB				
• Number, max.	see Operation List	see Operation List		see Operation List
• Size, max.	16 KByte	16 KByte	16 KByte	16 KByte
Nesting depth				
• per priority class	8	8	8	8
• additional within an error OB	4	4	4	4
CPU/processing times				
for bit operations, min.	0.2 µs	0.1 µs	0.1 µs	0,1 µs
for word operations, min.	0.4 µs	0.2 µs	0.2 µs	0.2 µs
for fixed point arithmetic, min.	5 µs	2 µs	2 µs	2 µs
for floating point arithmetic, min.	6 µs	3 µs	3 µs	3 µs
Times/counters and their remanence				
S7 counter				
• Number	128	256	256	256
• of which remanent without battery				
- adjustable	Yes	Yes	Yes	Yes
- lower limit	0	0		0
- upper limit	127	255		255
• Remanence				
- adjustable	Yes	Yes	Yes	Yes
- lower limit	0	0		0
- upper limit	127	255		255
• Counting range				
- adjustable	Yes	Yes	Yes	Yes
- lower limit	0	0	0	0
- upper limit	999	999	999	999
IEC counter				
• present	Yes	Yes	Yes	Yes
• Type	SFB	SFB	SFB	SFB
S7 times				
• Number	128	256	256	256
• Remanence				
- adjustable	Yes	Yes	Yes	Yes
- lower limit	0	0		0
- upper limit	127	255		255
- preset	No retentivity	No retentivity	No retentivity	No retentivity
• Time range				
- lower limit	10 ms	10 ms	10 ms	10 ms
- upper limit	9,990 s	9,990 s	9,990 s	9,990 s

Technical specifications (continued)

	6ES7 312-1AE13-0AB0	6ES7 314-1AG13-0AB0	6ES7 315-2AG10-0AB0	6ES7 315-2EH13-0AB0
IEC timer				
• present	Yes	Yes	Yes	Yes
• Type	SFB	SFB	SFB	SFB
Data areas and their remanence				
Flag				
• Number, max.	128 Byte	256 Byte	2,048 Byte	2,048 Byte
• Remanence available	Yes; MB 0 to MB 127	Yes; MB 0 to MB 255	Yes; MB 0 to MB 2047	Yes; MB 0 to MB 2047
• Number of clock memories	8; 1 memory byte	8; 1 memory byte	8; 1 memory byte	8; 1 memory byte
Data blocks				
• Number, max.	511; from DB1 to DB511	511; from DB1 to DB511	1,023; from DB 1 to DB 1023	1,023; from DB 1 to DB 1023
• Size, max.	16 KByte	16 KByte	16 KByte; Local data size: max. 1024 bytes per priority class/ 510 bytes per block	16 KByte
• Remanence adjustable	Yes; via non-retain property on DB	Yes; via non-retain property on DB		Yes; via non-retain property on DB
• Remanence preset	Yes	Yes		Yes
Local data				
• per priority class, max.	256 Byte	510 Byte	128 Byte	1,024 Byte; per block max. 510
Address area				
I/O address area				
• Inputs	1 KByte	1 KByte	2 KByte	2 KByte
• Outputs	1 KByte	1 KByte	2 KByte	2 KByte
• of which, distributed				
- Inputs			2 KByte	2 KByte
- Outputs			2 KByte	2 KByte
Process image				
• Inputs	128 Byte	128 Byte	128 Byte	128 Byte
• Outputs	128 Byte	128 Byte	128 Byte	128 Byte
Digital channels				
• Inputs	256	1,024	16,384	16,384
• Outputs	256	1,024	16,384	16,384
• Inputs, of which central	256	1,024	1,024	1,024; max.
• Outputs, of which central	256	1,024	1,024	1,024; max.
Analog channels				
• Inputs	64	256	1,024	1,024
• Outputs	64	256	1,024	1,024
• Inputs, of which central	64	256	256	256; max.
• Outputs, of which central	64	256	256	256; max.
Hardware config.				
Central devices, max.	1	1		1
Expansion devices, max.	0	3		3
Racks, max.	1	4	4	4
Modules per rack, max.	8	8	8	8
Number of DP masters				
• integrated	0	0	1	1
• via CP	4	4	4	4

Standard CPUs

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Technical specifications (continued)

	6ES7 312-1AE13-0AB0	6ES7 314-1AG13-0AB0	6ES7 315-2AG10-0AB0	6ES7 315-2EH13-0AB0
Number of operable FMs and CPs (recommended)				
• FM	8	8	8	8
• CP, point-to-point	8	8	8	8
• CP, LAN	4	10	10	10
Time				
Clock				
• Hardware clock (real-time clock)		Yes	Yes	Yes
• Software clock	Yes			
• Battery backed and synchronized	No	Yes	Yes	Yes
• Deviation per day, max.	15 s	10 s	10 s	10 s
Operating hours counter				
• Number	1	1	1	1
• Number/Number range	0	0	0	0
• Range of values	0 to 2^31 hours (when using SFC101)	0 to 2^31 hours (when using SFC101)	0 to 2^31 hours (when using SFC101)	2^31 hours (when using the SFC 101)
• Granularity	1 hour	1 hour	1 hour	1 hour
• remanent	Yes; must be restarted at each warm restart	Yes; must be restarted at each warm restart	Yes; must be restarted at each warm restart	Yes; must be restarted at each warm restart
Clock synchronization				
• supports	Yes	Yes	Yes	Yes
• to MPI, Master	Yes	Yes	Yes	Yes
• to MPI, Slave	Yes	Yes	Yes	Yes
• in AS, Master	Yes	Yes	Yes	Yes
• in AS, Slave				Yes
S7 message functions				
Number of login stations for message functions, max.	6; depending on the configured connections for PG/OP and S7 basic communication	12; depending on the configured connections for PG/OP and S7 basic communication	16; depending on the configured connections for PG-/ OP- and S7-basic commmunication	16; (depending on the configured connections for PG-/OP and S7 basic communication)
Process diagnostic messages	Yes	Yes	Yes	Yes
Simultaneously active Alarm-S blocks, max.	20	40	40	40
Test commissioning functions				
Status/control				
• Status/control variable	Yes	Yes	Yes	Yes
• Variables	Inputs, outputs, memory bits, DB, times, counters	Inputs, outputs, memory bits, DB, times, counters	Inputs, outputs, memory bits, DB, times, counters	Inputs, outputs, memory bits, DB, times, counters
Monitoring functions				
• Number of variables, max.	30	30	30	30
• of which status variable, max.	30	30	30	30
• of which control variable, max.	14	14	14	14
Forcing				
• Forcing	Yes	Yes	Yes	Yes
• Force, variables	Inputs, outputs	Inputs, outputs	Inputs, outputs	Inputs, outputs
• Forcing, number of variables, max.	10	10	10	10
Status block	Yes	Yes	Yes	Yes
Single step	Yes	Yes	Yes	Yes
Number of breakpoints	2	2	2	2

Technical specifications (continued)

	6ES7 312-1AE13-0AB0	6ES7 314-1AG13-0AB0	6ES7 315-2AG10-0AB0	6ES7 315-2EH13-0AB0
Monitoring functions				
Diagnostic buffer				
• present	Yes	Yes	Yes	Yes
• Number of entries, max.	100	100	100	100
• adjustable	No	No	No	No
Communication functions				
PG/OP communication	Yes	Yes	Yes	Yes
Routing	No	No	Yes	Yes
Global data communication				
• supported	Yes	Yes	Yes	Yes
• Size of GD packets, max.	22 Byte	22 Byte	22 Byte	22 Byte
S7 basic communication				
• supported	Yes	Yes	Yes	Yes
S7 communication				
• supported	Yes	Yes	Yes	Yes
S5-compatible communication				
• supported	Yes; via CP and loadable FC	Yes; via CP and loadable FC	Yes; via CP and loadable FC	Yes; via CP and loadable FC
Open IE communication				
• TCP/IP				Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.				8
- Data length, max.				1,460 Byte
Number of connections				
• overall	6	12	16	16
• usable for PG communication	5	11	15	15; max.
• usable for OP communication	5	11	15	15
• usable for S7 basic communication	2	8	12	14
• usable for routing			4	
PROFINET CBA (at set setpoint communication load)				
• Setpoint for the CPU communication load				50%
• Number of remote interconnection partners				32
• Number of functions, master/slave				17
• Total of all master/slave connections				1,000
• Data length of all incoming connections master/slave, max.				4,000 Byte
• Data length of all outgoing connections master/slave, max.				4,000 Byte
• Number of device-internal and PROFIBUS interconnections				500
• Data length of device-internal und PROFIBUS interconnections, max.				4,000 Byte
• Data length per connection, max.				1,400 Byte

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Technical specifications (continued)

	6ES7 312-1AE13-0AB0	6ES7 314-1AG13-0AB0	6ES7 315-2AG10-0AB0	6ES7 315-2EH13-0AB0
PROFINET CBA (at set setpoint communication load)				
• Remote interconnections with acyclic transmission				
- Sampling frequency: sampling interval, min.				500 ms
- Number of incoming interconnections				100
- Number of outgoing interconnections				100
- Data length of all incoming interconnections, max.				2,000 Byte
- Data length of all outgoing interconnections, max.				2,000 Byte
- Data length per connection, max.				1,400 Byte
• Remote interconnections with cyclic transmission				
- Transmission frequency: transmission interval, min.				10 ms
- Number of incoming interconnections				200
- Data length of all incoming interconnections, max.				2,000 Byte
- Data length of all outgoing interconnections, max.				2,000 Byte
- Data length per connection, max.				450 Byte
• HMI variables via PROFINET (acyclic)				
- Number of log-in stations for HMI variables (PN OPC/iMap)				3; 2 * PN OPC / 1 * iMap
- HMI variable updating				500 ms
- Number of HMI variables				200
- Data length of all HMI variables, max.				2,000 Byte
• PROFIBUS proxy functionality				
- supported				Yes
- Number of linked PROFIBUS devices				16
- Data length per connection, max.				240 Byte; Slave-dependent
MPI				
Cable length, max.		50 m; without repeater		
1st interface				
Type of interface	Integral RS 485 interface	Integral RS 485 interface	Integral RS 485 interface	Integral RS 485 interface
Physics	RS 485	RS 485	RS 485	RS 485
isolated	No	No	No	Yes
Power supply to interface (15 to 30 V DC), max.	200 mA	200 mA	200 mA	200 mA
Functionality				
• MPI	Yes	Yes	Yes	Yes
• DP master	No	No	No	Yes
• DP slave	No	No	No	Yes
• Point-to-point coupling	No	No	No	No

Technical specifications (continued)

	6ES7 312-1AE13-0AB0	6ES7 314-1AG13-0AB0	6ES7 315-2AG10-0AB0	6ES7 315-2EH13-0AB0
MPI				
• Number of connections	6	12	16	16
• Services				
- PG/OP communication	Yes	Yes	Yes	Yes
- Routing	No	No	Yes	Yes
- Global data communication	Yes	Yes	Yes	Yes
- S7 basic communication	Yes	Yes	Yes	Yes
- S7 communication	Yes	Yes	Yes	Yes
- S7 communication, as client	No	No	No	No
- S7 communication, as server	Yes	Yes	Yes	Yes
• Transmission speeds, max.	187.5 kBit/s	187.5 kBit/s	187.5 kBit/s	12 Mbit/s
DP master				
• Services				
- PG/OP communication				Yes
- Routing				Yes
- Global data communication				No
- S7 basic communication				Yes
- S7 communication				Yes
- S7 communication, as client				No
- S7 communication, as server				Yes
- equidistance support				Yes
- SYNC/FREEZE				Yes
- DPV1				Yes
• Transmission speeds, max.				12 Mbit/s
• Number of DP slaves, max.				124
DP slave				
• Services				
- Routing				Yes; only when interface active
- Global data communication				No
- S7 basic communication				Yes
- S7 communication				Yes
- S7 communication, as client				No
- S7 communication, as server				Yes
- direct data exchange (cross traffic)				Yes
- DPV1				No
• Transmission speeds, max.				12 Mbit/s
• Transfer memory				
- Inputs				244 Byte
- Outputs				244 Byte
• Address area, max.				32; with max. 32 bytes each
2nd interface				
Type of interface			Integral RS 485 interface	PROFINET
Physics			RS 485	Ethernet
isolated			Yes	Yes
Power supply to interface (15 to 30 V DC), max.			200 mA	0 mA
Automatic detection of transmission speed				Yes; (10/100 MBit/s)

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Technical specifications (continued)

	6ES7 312-1AE13-0AB0	6ES7 314-1AG13-0AB0	6ES7 315-2AG10-0AB0	6ES7 315-2EH13-0AB0
Functionality				
• MPI			No	No
• DP master			Yes	No
• DP slave			Yes	No
• Point-to-point coupling			No	No
• PROFINET CBA				Yes
• PROFINET IO controller				Yes
DP master				
• Number of connections, max.			16	
• Services				
- PG/OP communication			Yes	
- Routing			Yes	
- Global data communication			No	
- S7 basic communication			Yes	
- S7 communication			Yes	
- S7 communication, as client			No	
- S7 communication, as server			Yes	
- Equidistance support			Yes	
- SYNC/FREEZE			Yes	
- DPV1			Yes	
• Transmission speeds, max.			12 Mbit/s	
• Number of DP slaves, max.			124; per station	
• Address area				
- Inputs, max.			244 Byte	
- Outputs, max.			244 Byte	
DP slave				
• Number of connections			16	
• Services				
- PG/OP communication			Yes	
- Routing			Yes; when interface active	
- Global data communication			No	
- S7 basic communication			Yes	
- S7 communication, as client			No	
- S7 communication, as server			Yes	
- direct data exchange (cross traffic)			Yes	
- DPV1			No	
• GSD file			http://www.ad.siemens.de/support in Product Support area	
• Transmission speeds, max.			12 Mbit/s	
• automatic baud rate search			Yes; only with passive interface	
• Transfer memory				
- Inputs			244 Byte	
- Outputs			244 Byte	
• Address area, max.			32	
• Useful data per address area, max.			32 Byte	
PROFINET CBA				
• Acyclic transmission				Yes
• cyclic transmission				Yes

Technical specifications (continued)

	6ES7 312-1AE13-0AB0	6ES7 314-1AG13-0AB0	6ES7 315-2AG10-0AB0	6ES7 315-2EH13-0AB0
PROFINET IO controller				
• Services				
- PG/OP communication				Yes
- Routing				Yes
- S7 communication				Yes; with loadable FBs, max. configurable connections: 14, max. number of instances: 32
- open IE communication				Yes; via TCP/IP
• Transmission speed, max.				100 Mbit/s
• Number of connectable IO-devices, max.				128
• Update time				1 to 512 ms (minimum value depends on communication share set for PROFINET IO, on the number of IO devices and on the number of configured useful data items)
• Address area				
- Inputs, max.				2 KByte
- Outputs, max.				2 KByte
• Useful data consistency, max.				256 Byte
CPU/programming				
Programming language				
• STEP 7	Yes; V5.2 + SP1 or higher + hardware update	Yes; V 5.2 SP 1 or higher with HW update	Yes; V 5.1 SP4 or higher	Yes; V 5.3 SP1 or higher + HW update
• LAD	Yes	Yes	Yes	Yes
• FUP	Yes	Yes	Yes	Yes
• AWL	Yes	Yes	Yes	Yes
• SCL	Yes	Yes	Yes	Yes
• CFC		Yes	Yes	Yes
• GRAPH	Yes	Yes	Yes	Yes
• HiGraph	Yes	Yes	Yes	Yes
Software libraries				
Operational stocks	See Operation List	See Operation List	See Operation List	See Operation List
Nesting levels	8	8	8	8
User program protection/password protection	Yes	Yes	Yes	Yes
System functions (SFC)	See Operation List	See Operation List	See Operation List	See Operation List
System function blocks (SFB)	See Operation List	See Operation List	See Operation List	See Operation List
Dimensions and weight				
Width	40 mm	40 mm	40 mm	80 mm
Height	125 mm	125 mm	125 mm	125 mm
Depth	130 mm	130 mm	130 mm	130 mm
Weights				
Weight, approx.	270 g	280 g	290 g	460 g

Standard CPUs

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Technical specifications (continued)

	6ES7 317-2AJ10-0AB0	6ES7 317-2EK13-0AB0	6ES7 318-3EL00-0AB0
Product status			
associated programming package	STEP 7 V5.2 + SP 1 or higher	STEP 7 V5.3 or higher with HW update	STEP 7 V5.3 or higher, Service pack 3 with HSP
Supply voltages			
Rated value			
• DC 24 V	Yes	Yes	Yes
• permissible range, lower limit (DC)	20.4 V	20.4 V	20.4 V
• permissible range, upper limit (DC)	28.8 V	28.8 V	28.8 V
Voltages and currents			
External protection for supply cables (recommendation)	Min. 2 A	Min. 2 A	min. 2 A
Current consumption			
Inrush current, typ.	2.5 A	2.5 A	4 A
I^2t	1 A^2s	1 A^2s	1.2 A^2s
Current consumption (in no-load operation), typ.	100 mA	100 mA	400 mA
Current consumption (rated value)		650 mA	1,050 mA
Power loss, typ.	4 W	3.5 W	14 W
Memory			
Memory			
• RAM			
- integrated	512 KByte	1 MByte; for program and data, less the display data	1,400 KByte
- expandable	No	No	No
• Load memory			
- pluggable (MMC)	Yes	Yes	Yes
- pluggable (MMC), max.	8 MByte	8 MByte	8 MByte
Backup			
• present	Yes; Guaranteed by MMC (maintenance-free)	Yes; Guaranteed by MMC (maintenance-free)	Yes; up to 700 KB, maintenance-free
• without battery		Yes; Program and data	
CPU/blocks			
DB			
• Number, max.	2,048; Number band: 0 to 2047	2,048; Number band: 0 to 2047	2,048; Number band: 0 to 2047
• Size, max.	64 KByte	64 KByte	64 KByte
FB			
• Number, max.	2,048; Number band: 0 to 2047	2,048; Number band: 0 to 2047	2,048; Number band: 0 to 2047
• Size, max.	64 KByte	64 KByte	64 KByte
FC			
• Number, max.	2,048; Number band: 0 to 2047	2,048; Number band: 0 to 2047	2,048; Number band: 0 to 2047
• Size, max.	64 KByte	64 KByte	64 KByte
OB			
• Number, max.		see Operation List	
• Size, max.	64 KByte	64 KByte	64 KByte
Nesting depth			
• per priority class	16	16	16
• additional within an error OB	4	4	4

Technical specifications (continued)

	6ES7 317-2AJ10-0AB0	6ES7 317-2EK13-0AB0	6ES7 318-3EL00-0AB0
CPU/processing times			
for bit operations, min.	0.05 µs	0.05 µs	0.01 µs
for word operations, min.	0.2 µs	0.2 µs	0.02 µs
for fixed point arithmetic, min.	0.2 µs	0.2 µs	0.02 µs
for floating point arithmetic, min.	1 µs	1 µs	0.04 µs
Times/counters and their remanence			
S7 counter			
• Number	512	512	2,048
• of which remanent without battery			
- adjustable	Yes	Yes	
- lower limit		0	
- upper limit		511	
• Remanence			
- adjustable	Yes	Yes	Yes
- lower limit		0	
- upper limit		511	
• Counting range			
- adjustable	Yes	Yes	Yes
- lower limit	0	0	0
- upper limit	999	999	999
IEC counter			
• present	Yes	Yes	Yes
• Type	SFB	SFB	SFB
S7 times			
• Number	512	512	2,048
• Remanence			
- adjustable	Yes	Yes	Yes
- lower limit		0	
- upper limit		511	
- preset	No retentivity	No retentivity	No retentivity
• Time range			
- lower limit	10 ms	10 ms	10 ms
- upper limit	9,990 s	9,990 s	9,990 s
IEC timer			
• present	Yes	Yes	Yes
• Type	SFB	SFB	SFB
Data areas and their remanence			
Flag			
• Number, max.	4,096 Byte	4,096 Byte	8 KByte
• Remanence available	Yes; MB 0 to MB 4095	Yes; MB 0 to MB 4095	Yes; MB 0 to MB 8191
• Number of clock memories	8; 1 memory byte	8; 1 memory byte	8; 1 memory byte
Data blocks			
• Number, max.	2,047; from DB 1 to DB 2047	2,047; from DB 1 to DB 2047	4,095; from DB 1 to DB 2047
• Size, max.	64 KByte	64 KByte	64 KByte
• Remanence adjustable		Yes; via non-retain property on DB	Yes; via non-retain property on DB
• Remanence preset		Yes	
Local data			
• per priority class, max.	1,024 Byte	1,024 Byte	1,024 Byte

Standard CPUs

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Technical specifications (continued)

	6ES7 317-2AJ10-0AB0	6ES7 317-2EK13-0AB0	6ES7 318-3EL00-0AB0
Address area			
I/O address area			
• Inputs	8 KByte	8 KByte	8 KByte
• Outputs	8 KByte	8 KByte	8 KByte
• of which, distributed			
- Inputs	8,192 Byte	8 KByte	8 KByte
- Outputs	8,192 Byte	8 KByte	8 KByte
Process image			
• Inputs	256 Byte	2,048 Byte	
• Outputs	256 Byte	2,048 Byte	
• Inputs, adjustable		2,048 Byte	2 KByte
• Outputs, adjustable		2,048 Byte	2 KByte
• Inputs, preset		256 Byte	256 Byte
• Outputs, preset		256 Byte	256 Byte
Subprocess images			
• Number of subprocess images, max.			1
Digital channels			
• Inputs	65,536	65,536	65,536
• Outputs	65,536	65,536	65,536
• Inputs, of which central	1,024	1,024	1,024
• Outputs, of which central	1,024	1,024	1,024
Analog channels			
• Inputs	4,096	4,096	4,096
• Outputs	4,096	4,096	4,096
• Inputs, of which central	256	256	256
• Outputs, of which central	256	256	256
Hardware config.			
Central devices, max.		1	
Expansion devices, max.		3	
Racks, max.	4	4	4
Modules per rack, max.	8	8	8
Number of DP masters			
• integrated	2	1	2
• via CP	4	4	4
Number of operable FMs and CPs (recommended)			
• FM	8	8	8
• CP, point-to-point	8	8	8
• CP, LAN	10	10	10
Time			
Clock			
• Hardware clock (real-time clock)	Yes	Yes	Yes
• Battery backed and synchronized	Yes	Yes	Yes
• Deviation per day, max.	10 s	10 s	10 s

Technical specifications (continued)

	6ES7 317-2AJ10-0AB0	6ES7 317-2EK13-0AB0	6ES7 318-3EL00-0AB0
Operating hours counter			
• Number	4	4	4
• Number/Number range	0 to 3	0 to 3	0 to 3
• Range of values	0 to 2^31 hours (when using SFC101)	0 to 2^31 hours (when using SFC101)	0 to 2^31 hours (when using SFC101)
• Granularity	1 hour	1 hour	1 hour
• remanent	Yes; must be restarted at each warm restart	Yes; must be restarted at each warm restart	Yes; must be restarted at each warm restart
Clock synchronization			
• supports	Yes	Yes	Yes
• to MPI, Master	Yes	Yes	Yes
• to MPI, Slave	Yes	Yes	Yes
• in AS, Master	Yes	Yes	Yes
• in AS, Slave	Yes	Yes	Yes
• on Ethernet via NTP			Yes
S7 message functions			
Number of login stations for message functions, max.	32; depending on the configured connections for PG/OP and S7 basic communication	32; depending on the configured connections for PG/OP and S7 basic communication	32; depending on the configured connections for PG/OP and S7 basic communication
Process diagnostic messages	Yes	Yes	Yes
Simultaneously active Alarm-S blocks, max.	60	60	60
Test commissioning functions			
Status/control			
• Status/control variable	Yes	Yes	Yes
• Variables	Inputs, outputs, memory bits, DB, times, counters	Inputs, outputs, memory bits, DB, times, counters	Inputs, outputs, memory bits, DB, times, counters
Monitoring functions			
• Number of variables, max.	30	30	30
• of which status variable, max.	30	30	30
• of which control variable, max.	14	14	14
Forcing			
• Forcing	Yes	Yes	Yes
• Force, variables	Inputs, outputs	Inputs, outputs	Inputs, outputs
• Forcing, number of variables, max.	10	10	10
Status block	Yes	Yes	Yes
Single step	Yes	Yes	Yes
Number of breakpoints	2	2	2
Diagnostic buffer			
• present	Yes	Yes	Yes
• Number of entries, max.	100	100	100
• adjustable	No	No	
Communication functions			
PG/OP communication	Yes	Yes	Yes
Routing	Yes	Yes	Yes
Global data communication			
• supported	Yes	Yes	Yes
• Size of GD packets, max.	22 Byte	22 Byte	22 Byte

Standard CPUs

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Technical specifications (continued)

	6ES7 317-2AJ10-0AB0	6ES7 317-2EK13-0AB0	6ES7 318-3EL00-0AB0
S7 basic communication			
• supported	Yes	Yes	Yes
S7 communication			
• supported	Yes	Yes	Yes
S5-compatible communication			
• supported	Yes; via CP and loadable FC	Yes; via CP and loadable FC	Yes; via CP and loadable FC
Open IE communication			
• TCP/IP		Yes; via integrated PROFINET interface and loadable FBs	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.		8	8
- Data length, max.		1,460 Byte	1,460 Byte
• ISO-on-TCP (RFC1006)			Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.			8
- Data length, max.			8,192 Byte
• UDP			Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.			8
- Data length, max.			1,472 Byte
Number of connections			
• overall	32	32	32
• usable for PG communication	31	31	31
• usable for OP communication	31	31	31
• usable for S7 basic communication	30	30	30
• usable for routing	8		
PROFINET CBA (at set setpoint communication load)			
• Setpoint for the CPU communication load		50%	
• Number of remote interconnection partners		32	
• Number of functions, master/slave		17	
• Total of all master/slave connections		1,000	
• Data length of all incoming connections master/slave, max.		4,000 Byte	
• Data length of all outgoing connections master/slave, max.		4,000 Byte	
• Number of device-internal and PROFIBUS interconnections		500	
• Data length of device-internal und PROFIBUS interconnections, max.		4,000 Byte	
• Data length per connection, max.		1,400 Byte	

Technical specifications (continued)

	6ES7 317-2AJ10-0AB0	6ES7 317-2EK13-0AB0	6ES7 318-3EL00-0AB0
PROFINET CBA (at set setpoint communication load, continued)			
• Remote interconnections with acyclic transmission			
- Sampling frequency: sampling interval, min.		500 ms	
- Number of incoming interconnections		100	
- Number of outgoing interconnections		100	
- Data length of all incoming interconnections, max.		2,000 Byte	
- Data length of all outgoing interconnections, max.		2,000 Byte	
- Data length per connection, max.		1,400 Byte	
• Remote interconnections with cyclic transmission			
- Transmission frequency: transmission interval, min.		10 ms	
- Number of incoming interconnections		200	
- Data length of all incoming interconnections, max.		200	
- Data length of all outgoing interconnections, max.		2,000 Byte	
- Data length per connection, max.		2,000 Byte	
• HMI variables via PROFINET (acyclic)		450 Byte	
- Number of log-in stations for HMI variables (PN OPC/iMap)		3; 2 * PN OPC / 1 * iMap	
- HMI variable updating		500 ms	
- Number of HMI variables		200	
- Data length of all HMI variables, max.		2,000 Byte	
• Remote interconnections with acyclic transmission			
- Sampling frequency: sampling interval, min.			
• PROFIBUS proxy functionality			
- supported		Yes	
- Number of linked PROFIBUS devices		16	
- Data length per connection, max.		240 Byte; Slave-dependent	
1st interface			
Type of interface	Integral RS 485 interface	Integral RS 485 interface	Integral RS 485 interface
Physics	RS 485	RS 485	RS 485
isolated	Yes	Yes	Yes
Power supply to interface (15 to 30 V DC), max.	200 mA	200 mA	150 mA
Functionality			
• MPI	Yes	Yes	Yes
• DP master	Yes	Yes	Yes
• DP slave	Yes	Yes	Yes
• Point-to-point coupling	No	No	No

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Technical specifications (continued)

	6ES7 317-2AJ10-0AB0	6ES7 317-2EK13-0AB0	6ES7 318-3EL00-0AB0
MPI			
• Number of connections	32	32	16
• Services			
- PG/OP communication	Yes	Yes	Yes
- Routing	Yes	Yes	Yes
- Global data communication	Yes	Yes	Yes
- S7 basic communication	Yes	Yes	Yes
- S7 communication	Yes	Yes	Yes
- S7 communication, as client	No	No	No
- S7 communication, as server	Yes	Yes	Yes
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s	12 Mbit/s
DP master			
• Services			
- PG/OP communication	Yes	Yes	Yes
- Routing	Yes	Yes	Yes
- Global data communication	No	No	No
- S7 basic communication	Yes	Yes	Yes
- S7 communication	Yes	Yes	Yes
- S7 communication, as client		No	
- S7 communication, as server		Yes	
- Equidistance support	Yes	Yes	Yes
- SYNC/FREEZE	Yes	Yes	Yes
- DPV1	Yes	Yes	Yes
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s	12 Mbit/s
• Number of DP slaves, max.	124	124	124
• Address area			
- Inputs, max.	244 Byte		244 KByte
- Outputs, max.	244 Byte		244 KByte
DP slave			
• Services			
- Routing	Yes; only when interface active	Yes; when interface active	Yes; when interface active
- Global data communication	No	No	No
- S7 basic communication	Yes	Yes	Yes
- S7 communication	Yes	Yes	Yes
- S7 communication, as client		No	
- S7 communication, as server		Yes	
- direct data exchange (cross traffic)	Yes	Yes	Yes
- DPV1	No	No	No
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s	12 Mbit/s
• Transfer memory			
- Inputs	244 Byte	244 Byte	244 Byte
- Outputs	244 Byte	244 Byte	244 Byte
• Address area, max.	32	32	32
• Useful data per address area, max.	32 Byte	32 Byte	32 Byte
2nd interface			
Type of interface	Integral RS 485 interface	PROFINET	Integral RS 485 interface
Physics	RS 485	Ethernet	RS 485
isolated	Yes	Yes	Yes

Technical specifications (continued)

	6ES7 317-2AJ10-0AB0	6ES7 317-2EK13-0AB0	6ES7 318-3EL00-0AB0
Power supply to interface (15 to 30 V DC), max.	200 mA	0 mA	200 mA
Automatic detection of transmission speed		Yes; (10/100 MBit/s)	
Functionality			
• MPI	No	No	No
• DP master	Yes	No	Yes
• DP slave	Yes	No	Yes
• Point-to-point coupling	No	No	No
• PROFINET CBA		Yes	No
• PROFINET IO controller		Yes; Firmware Status V2.3 or higher	No
DP master			
• Number of connections, max.	32		
• Services			
- PG/OP communication	Yes		Yes
- Routing	Yes		Yes
- Global data communication	No		No
- S7 basic communication	Yes		Yes
- S7 communication	Yes		Yes
- S7 communication, as client	No		
- S7 communication, as server	Yes		
- equidistance support	Yes		Yes
- SYNC/FREEZE	Yes		Yes
- DPV1	Yes		Yes
• Transmission speeds, max.	12 Mbit/s		12 Mbit/s
• Number of DP slaves, max.	124		124
• Address area			
- Inputs, max.	244 Byte		244 KByte
- Outputs, max.	244 Byte		244 KByte
DP slave			
• Number of connections	32		
• Services			
- PG/OP communication	Yes		Yes
- Routing	Yes; when interface active		Yes; when interface active
- Global data communication	No		No
- S7 basic communication	Yes		Yes
- S7 communication, as client	No		
- S7 communication, as server	Yes		
- direct data exchange (cross traffic)	Yes		Yes
- DPV1	No		No
• GSD file	http://www.ad.siemens.de/support in Product Support area		
• Transmission speeds, max.	12 Mbit/s		12 Mbit/s
• automatic baud rate search	Yes; only with passive interface		Yes; only with passive interface
• Transfer memory			
- Inputs	244 Byte		244 Byte
- Outputs	244 Byte		244 Byte
• Address area, max.	32		32
• Useful data per address area, max.	32 Byte		32 Byte

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Technical specifications (continued)

	6ES7 317-2AJ10-0AB0	6ES7 317-2EK13-0AB0	6ES7 318-3EL00-0AB0
PROFINET CBA			
• Acyclic transmission		Yes	
• Cyclic transmission		Yes	
PROFINET IO controller			
• Services			
- PG/OP communication		Yes	
- Routing		Yes	
- S7 communication		Yes; with loadable FBs, max. configurable connections: 16, max. number of instances: 32	
- open IE communication		Yes; via TCP/IP	
• Transmission speed, max.		100 Mbit/s	
• Number of connectable I/O-devices, max.		128	
• Update time		1 to 512 ms (minimum value depends on communication share set for PROFINET IO, on the number of IO devices and on the number of configured useful data items)	
• Address area			
- Inputs, max.		8 KByte	
- Outputs, max.		8 KByte	
• Useful data consistency, max.		256 Byte	
3rd interface			
Type of interfaces			PROFINET
Physics			RJ45
isolated			Yes
Automatic detection of transmission speed			Yes; (10/100 Mbit/s)
Functionality			
• MPI			No
• PROFINET CBA			Yes
• PROFINET IO controller			Yes
• PROFINET IO device			No
Open IE communication			
• Number of connections, max.			8
PROFINET CBA (at 50 % communication load)			
• Acyclic transmission			Yes
• Cyclic transmission			Yes
CPU/programming			
Programming language			
• STEP 7	Yes; V 5.2 SP1 or higher	Yes; V 5.3 or higher + HW update	Yes; 5.3 or higher, Service Pack 3 with HSP
• LAD	Yes	Yes	Yes
• FUP	Yes	Yes	Yes
• AWL	Yes	Yes	Yes
• SCL	Yes	Yes	Yes
• CFC	Yes	Yes	Yes
• GRAPH	Yes	Yes	Yes
• HiGraph	Yes	Yes	Yes

Technical specifications (continued)

	6ES7 317-2AJ10-0AB0	6ES7 317-2EK13-0AB0	6ES7 318-3EL00-0AB0
Software libraries			
Operational stocks	See Operation List	See Operation List	See Operation List
Nesting levels	8	8	8
User program protection/password protection	Yes	Yes	Yes
System functions (SFC)	See Operation List	See Operation List	See Operation List
System function blocks (SFB)	See Operation List	See Operation List	See Operation List
Dimensions and weight			
Width	80 mm	80 mm	120 mm
Height	125 mm	125 mm	125 mm
Depth	130 mm	130 mm	130 mm
Weights			
Weight, approx.	460 g	460 g	1,250 g

Ordering data

		Order No.
CPU 312 Main memory 32 KB, power supply 24 V DC, MPI; MMC required	A)	**6ES7 312-1AE13-0AB0**
CPU 314 Main memory 96 KB, power supply 24 V DC, MPI; MMC required	A)	**6ES7 314-1AG13-0AB0**
CPU 315-2 DP Main memory 128 KB, power supply 24 V DC, MPI/PROFIBUS DP master/slave interface, MMC required		**6ES7 315-2AG10-0AB0**
CPU 315-2 PN/DP Main memory 256 KB, power supply 24 V DC, combined MPI/PROFIBUS DP master/slave interface, Ethernet/PROFINET interface; MMC required	A)	**6ES7 315-2EH13-0AB0**
CPU 317-2 DP Main memory 512 KB, power supply 24 V DC, MPI/PROFIBUS DP master/slave interface, MMC required		**6ES7 317-2AJ10-0AB0**
CPU 317-2 PN/DP Main memory 1 MB, power supply 24 V DC, combined MPI/PROFIBUS DP master/slave interface, Ethernet/PROFINET interface; MMC required	A)	**6ES7 317-2EK13-0AB0**
CPU 319-3 PN/DP Main memory 1.4 MB, power supply 24 V DC, combined MPI/PROFIBUS DP master/slave interface, PROFIBUS DP master/slave interface, Ethernet/PROFINET interface; MMC required	A)	**6ES7 318-3EL00-0AB0**

		Order No.
Micro Memory Card		
64 KB		**6ES7 953-8LF11-0AA0**
128 KB		**6ES7 953-8LG11-0AA0**
512 KB		**6ES7 953-8LJ11-0AA0**
2 MB		**6ES7 953-8LL11-0AA0**
4 MB		**6ES7 953-8LM11-0AA0**
8 MB		**6ES7 953-8LP11-0AA0**
MPI cable For connecting SIMATIC S7 and the PG through MPI; 5 m in length		**6ES7 901-0BF00-0AA0**
Slot number plates		**6ES7 912-0AA00-0AA0**
S7-300 manual Design, CPU data, module data, instruction list		
German		**6ES7 398-8FA10-8AA0**
English		**6ES7 398-8FA10-8BA0**
French		**6ES7 398-8FA10-8CA0**
Spanish		**6ES7 398-8FA10-8DA0**
Italian		**6ES7 398-8FA10-8EA0**
SIMATIC Manual Collection Electronic manuals on DVD, multilingual: S7-200, S7-300, C7, S7-400, SIMATIC DP (Distributed I/O), SIMATIC PC, SIMATIC PG (Programming device), STEP 7, Engineering Tools, Runtime Software, SIMATIC PCS 7, SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication), SIMATIC Machine Vision, SIMATIC Sensors	D)	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	D)	**6ES7 998-8XC01-8YE2**

A) Subject to export regulations: AL: N and ECCN: EAR99H

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

Standard CPUs

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Ordering data (continued)

	Order No.
Power supply connector 10 units, spare part	**6ES7 391-1AA00-0AA0**
Labeling strips 10 units, spare part	**6ES7 392-2XX00-0AA0**
Label cover 10 units, spare part	**6ES7 392-2XY00-0AA0**
S7 SmartLabel Software for automatic labeling of modules based on data of the STEP 7 project	**2XV9 450-1SL01-0YX0**
Labeling sheets for machine inscription	
For 16-channel signal modules, DIN A4, for printing with laser printer;	
10 units	
petrol	**6ES7 392-2AX00-0AA0**
light-beige	**6ES7 392-2BX00-0AA0**
yellow	**6ES7 392-2CX00-0AA0**
red	**6ES7 392-2DX00-0AA0**
For 32-channel signal modules, DIN A4, for printing with laser printer;	
10 units	
petrol	**6ES7 392-2AX10-0AA0**
light-beige	**6ES7 392-2BX10-0AA0**
yellow	**6ES7 392-2CX10-0AA0**
red	**6ES7 392-2DX10-0AA0**
Manual "Communication for SIMATIC S7-300/-400"	
German	**6ES7 398-8EA00-8AA0**
English	**6ES7 398-8EA00-8BA0**
French	**6ES7 398-8EA00-8CA0**
Spanish	**6ES7 398-8EA00-8DA0**
Italian	**6ES7 398-8EA00-8EA0**
SIMATIC S7 demo case With mounting components for mounting S7-200 and S7-300	**6ES7 910-3AA00-0XA0**
PROFIBUS bus components	
PROFIBUS DP bus connector RS 485	
• With 90° cable outlet, max. transmission rate 12 Mbit/s	
- without PG interface	**6ES7 972-0BA12-0XA0**
- with PG interface	**6ES7 972-0BB12-0XA0**
• With 90° cable outlet for FastConnect connection system, max. transmission rate 12 Mbit/s	
- without PG interface	**6ES7 972-0BA50-0XA0**
- with PG interface	**6ES7 972-0BB50-0XA0**
• With axial cable outlet for SIMATIC OP, for connecting to PPI, MPI, PROFIBUS	**6GK1 500-0EA02**

	Order No.
PROFIBUS Fast Connect bus cable Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m	**6XV1 830-0EH10**
RS 485 repeater for PROFIBUS Data transmission rate up to 12 Mbit/s; 24 V DC; IP20 housing	**6ES7 972-0AA01-0XA0**
PROFIBUS bus components For establishing MPI/PROFIBUS communication	see Catalogs IK PI, CA 01
Industrial Ethernet bus components	
IE FC TP Standard Cable GP 2x2 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug; PROFINET-compatible; with UL approval; Sold by the meter	**6XV1 840-2AH10**
FO Standard Cable GP (50/125) Standard cable, segmentable, UL approval, sold by the meter	**6XV1 873-2A**
Industrial Ethernet Switch SCALANCE X204-2 Industrial Ethernet switches with integral SNMP access, Web diagnostics, copper cable diagnosis and PROFINET diagnosis for configuring line, star and ring topologies; four 10/100 Mbit/s RJ45 ports and two fiber-optic ports	**6GK5 204-2BB00-2AA3**
IE FC RJ45 Plug 180 RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet	
1 unit	**6GK1 901-1BB10-2AA0**
10 units	**6GK1 901-1BB10-2AB0**
50 units	**6GK1 901-1BB10-2AE0**

Overview CPU 315T-2 DP

- SIMATIC CPU with integrated technology/motion control functionality
- With the full functionality of the standard CPU 315-2 DP
- For multi-sector automation tasks in the construction of series machines, special machines and plants
- Ideal for synchronized motional sequences such a coupling to a virtual/real master, electronic gearbox, cam disc or print-mark correction.
- Used as a central controller on production lines with central and distributed I/O
- With integrated I/O for fast technological functions (e.g. cam switching, reference point detection)
- PROFIBUS DP (DRIVE) interface for the isochronous connection of drive components.
- A common S7 application program for control and motion control tasks (no additional programming language for motion control required)
- Optional "S7 Technology" package required

Micro Memory Card required for operation of CPU.

Overview CPU 317T-2 DP

- SIMATIC CPU with integrated technology/motion control functionality
- With the full functionality of the standard CPU 317-2 DP
- For multi-sector automation tasks in the construction of series machines, special machines and plants
- Ideal for synchronized motional sequences such a coupling to a virtual/real master, electronic gearbox, cam disc or print-mark correction.
- Used as a central controller on production lines with central and distributed I/O
- Distributed intelligence in Component Based Automation (CBA) on PROFIBUS DP
- With integrated I/O for fast technological functions (e.g. cam switching, reference point detection)
- PROFIBUS DP (DRIVE) interface for the isochronous connection of drive components.
- A common S7 application program for control and motion control tasks (no additional programming language for motion control required)
- Optional "S7 Technology" package required

Micro Memory Card required for operation of CPU.

Technical specifications

	6ES7 315-6TG10-0AB0	6ES7 317-6TJ10-0AB0
Product status		
associated programming package	STEP 7 V 5.3 or higher + SP1 and option package S7-Technology V2.0	STEP 7 V5.2 or higher + SP 1 + HF 1 and option package S7-Technology
Supply voltages		
Rated value		
• DC 24 V	Yes	Yes
• permissible range, lower limit (DC)	20.4 V	20.4 V
• permissible range, upper limit (DC)	28.8 V	28.8 V
Voltages and currents		
external protection for supply cables (recommendation)	min. 2 A	min. 2 A

	6ES7 315-6TG10-0AB0	6ES7 317-6TJ10-0AB0
Current consumption		
Inrush current, max.	2,5 A	2,5 A
I^2t	1 A^2s	1 A^2s
Current consumption (in no-load operation), typ.	200 mA	200 mA
Power loss, typ.	6 W	6 W
Memory		
Memory		
• RAM		
- integrated	128 KByte	512 KByte
- expandable	No	No
• Load memory		
- pluggable (MMC)	Yes	Yes; min. 4 MB required
- pluggable (MMC), max.	8 MByte	8 MByte

Technology CPUs

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Technical specifications (continued)

	6ES7 315-6TG10-0AB0	6ES7 317-6TJ10-0AB0
Backup		
• present	Yes; guaranteed by MMC (maintenance-free)	Yes; guaranteed by MMC (maintenance-free)
CPU/blocks		
DB		
• Number, max.	1,023; DB 0 reserved	2,047; DB 0 reserved
• Size, max.	16 KByte	64 KByte
FB		
• Number, max.	2,048; See Operation List	2,048; See Operation List
• Size, max.	16 KByte	64 KByte
FC		
• Number, max.	2,048; See Operation List	2,048; See Operation List
• Size, max.	16 KByte	64 KByte
OB		
• Number, max.	See Operation List	
• Size, max.	16 KByte	64 KByte
Nesting depth		
• per priority class	8	16
• additional within an error OB	4	4
CPU/processing times		
for bit operations, min.	0.1 µs	0.05 µs
for word operations, min.	0.2 µs	0.2 µs
for fixed point arithmetic, min.	2 µs	0.2 µs
for floating point arithmetic, min.	3 µs	1 µs
Times/counters and their remanence		
S7 counter		
• Number	256	512
• of which remanent without battery		
- adjustable	Yes	Yes
• Counting range		
- adjustable	Yes	Yes
- lower limit	0	0
- upper limit	999	999
IEC counter		
• present	Yes	Yes
• Type	SFB	SFB
S7 times		
• Number	256	512
• Remanence		
- adjustable	Yes	Yes
- preset	No retentivity	No retentivity
• Time range		
- lower limit	10 ms	10 ms
- upper limit	9,990 s	9,990 s
IEC timer		
• present	Yes	Yes
• Type	SFB	SFB
Data areas and their remanence		
Flag		
• Number, max.	2,048 Byte	4,096 Byte
• Remanence available	Yes; MB 0 to MB 2047	Yes; MB 0 to MB 4095
• Number of clock memories	8; 1 memory byte	8; 1 memory byte
Data blocks		
• Number, max.	1,023; DB 0 reserved	2,047; DB 0 reserved
• Size, max.	16 KByte	64 KByte
• Remanence adjustable	Yes	Yes
Local data		
• per priority class, max.	1,024 Byte	1,024 Byte
Address area		
I/O address area		
• Inputs	2 KByte	8 KByte
• Outputs	2 KByte	8 KByte
• of which, distributed		
- Inputs	2 KByte	8 KByte
- Outputs	2 KByte	8 KByte
Process image		
• Inputs	128 Byte	256 Byte
• Outputs	128 Byte	256 Byte
Digital channels		
• Inputs	16,384	65,636
• Outputs	16,384	65,636
• Inputs, of which central	256	256
• Outputs, of which central	256	256
Analog channels		
• Inputs	1,024	4,096
• Outputs	1,024	4,096
• Inputs, of which central	64	64
• Outputs, of which central	64	64
Hardware config.		
Racks, max.	1	1
Modules per rack, max.	8	8

Technical specifications (continued)

	6ES7 315-6TG10-0AB0	6ES7 317-6TJ10-0AB0
Number of DP masters		
• integrated	2; 1 DP and 1 DP (drive)	2
• via CP	2; for DP	2
Number of operable FMs and CPs (recommended)		
• FM	8	8
• CP, point-to-point	8	8
• CP, LAN	10	10
Time		
Clock		
• Hardware clock (real-time clock)	Yes	Yes
• Battery backed and synchronized	Yes	Yes
• Deviation per day, max.	10 s	10 s
Operating hours counter		
• Number	1	4
• Number/ Number range	0	0 bis 3
• Range of values	0 to 2^31 hours (when using SFC101)	0 to 2^31 hours (when using SFC101)
• Granularity	1 hour	1 hour
• remanent	Yes; must be restarted at each warm restart	Yes; must be restarted at each warm restart
Clock synchronization		
• supports	Yes	Yes
• to MPI, Master	Yes	Yes
• to MPI, Slave	Yes	Yes
• in AS, Master	Yes	Yes
• in AS, Slave	Yes	Yes
S7 message functions		
Number of login stations for message functions, max.	16; depending on the configured connections for PG/OP and S7 basic communication	32; depending on the configured connections for PG/OP and S7 basic communication
Process diagnostic messages	Yes	Yes
Simultaneously active Alarm-S blocks, max.	40	60
Test commissioning functions		
Status/control		
• Status/control variable	Yes	Yes
• Variables	Inputs, outputs, memory bits, DB, times, counters	Inputs, outputs, memory bits, DB, times, counters

	6ES7 315-6TG10-0AB0	6ES7 317-6TJ10-0AB0
Monitoring functions		
• Number of variables, max.	30	30
• of which status variable, max.	30	30
• of which control variable, max.	14	14
Forcing		
• Forcing	Yes	Yes
• Force, variables	Inputs, outputs	Inputs, outputs
• Forcing, number of variables, max.	10	10
Status block	Yes	Yes
Single step	Yes	Yes
Number of breakpoints	2	2
Diagnostic buffer		
• present	Yes	Yes
• Number of entries, max.	100	100
• adjustable	No	No
Communication functions		
PG/OP communication	Yes	Yes
Routing	Yes	Yes
Global data communication		
• supported	Yes	Yes
• Size of GD packets, max.	22 Byte	22 Byte
S7 basic communication		
• supported	Yes	Yes
S7 communication		
• supported	Yes	Yes
S5-compatible communication		
• supported	Yes; via CP and loadable FC	Yes; via CP and loadable FC
Number of connections		
• overall	16	32
• usable for PG communication	15	31
• usable for OP communication	15	31
• usable for S7 basic communication	12	30
1st interface		
Type of interface	Integral RS 485 interface	Integral RS 485 interface
Physics	RS 485	RS 485
isolated	Yes	Yes

Technical specifications (continued)

	6ES7 315-6TG10-0AB0	6ES7 317-6TJ10-0AB0
Power supply to interface (15 to 30 V DC), max.	200 mA	200 mA
Functionality		
• MPI	Yes	Yes
• DP master	Yes	Yes
• DP slave	Yes	Yes
• Point-to-point coupling	No	No
MPI		
• Services		
- PG/OP communication	Yes	Yes
- Routing	Yes	Yes
- Global data communication	Yes	Yes
- S7 basic communication	Yes	Yes
- S7 communication	Yes	Yes
- S7 communication, as client	Yes; via CP and loadable FB	Yes; via CP and loadable FB
- S7 communication, as server	Yes	Yes
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s
DP-Master		
• Services		
- PG/OP communication	Yes	Yes
- Routing	Yes	Yes
- Global data communication	No	No
- S7 basic communication	No	No
- S7 communication	No	No
- equidistance support	Yes	Yes
- SYNC/FREEZE	Yes	Yes
- DPV1	Yes	Yes
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s
• Number of DP slaves, max.	124	124
• Address area		
- Inputs, max.	244 KByte; KB --> 244 bytes per DP slave	244 KByte
- Outputs, max.	244 KByte; KB --> 244 bytes per DP slave	244 KByte

	6ES7 315-6TG10-0AB0	6ES7 317-6TJ10-0AB0
DP slave		
• Services		
- Routing	Yes	Yes
- Global data communication	No	No
- S7 basic communication	No	No
- S7 communication	No	No
- direct data exchange (cross traffic)	Yes	Yes
- DPV1	No	No
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s
• Transfer memory		
- Inputs	244 Byte	244 Byte
- Outputs	244 Byte	244 Byte
• Address area, max.	32	32
• Useful data per address area, max.	32 Byte	32 Byte
2nd interface		
Type of interface	Integral RS 485 interface	Integral RS 485 interface
Physics	RS 485	RS 485
isolated	Yes	Yes
Power supply to interface (15 to 30 V DC), max.	200 mA	200 mA
Functionality		
• MPI	No	No
• DP master	Yes; DP(DRIVE)-Master	Yes; DP(DRIVE)-Master
• DP slave	No	No
• Point-to-point coupling	No	No
DP master		
• Services		
- PG/OP communication	No	No
- Routing	No	No
- Global data communication	No	No
- S7 basic communication	No	No
- S7 communication	No	No
- equidistance support	Yes	Yes
- SYNC/FREEZE	No	No
- Activation/ deactivation of DP slaves	No	No
- DPV1	No	No

Technical specifications (continued)

	6ES7 315-6TG10-0AB0	6ES7 317-6TJ10-0AB0
DP-Master (continued)		
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s
• Number of DP slaves, max.	32	32
• Address area		
- Inputs, max.	244 KByte; KB --> 244 bytes per DP slave	244 KByte
- Outputs, max.	244 KByte; KB --> 244 bytes per DP slave	244 KByte
CPU/programming		
Configuration software		
• STEP 7	Yes	Yes
Programming language		
• STEP 7	Yes; V 5.2 SP 1 or higher and S7-Technology option package	Yes; V 5.2 SP 1 or higher and S7-Technology option package
• LAD	Yes	Yes
• FUP	Yes	Yes
• AWL	Yes	Yes
• SCL	Yes	Yes
• CFC	Yes	Yes
• GRAPH	Yes	Yes
• HiGraph	Yes	Yes
Software libraries		
Operational stocks	See Operation List	See Operation List
Nesting levels	8	8
User program protection/password protection	Yes	Yes
System functions (SFC)	See Operation List	See Operation List
System function blocks (SFB)	See Operation List	See Operation List
Digital inputs		
Number of digital inputs	4	4
Functions	technological functions, e.g. reference point recording (BERO), digital inputs can also be used (with restrictions) in STEP 7 user program.	technological functions, e.g. reference point recording (BERO), digital inputs can also be used (with restrictions) in STEP 7 user program.
Number of simultaneously controllable inputs		
• Number of simultaneously controllable inputs, up to 40 °C	4	4
• Number of simultaneously controllable inputs, up to 60 °C	4	4

	6ES7 315-6TG10-0AB0	6ES7 317-6TJ10-0AB0
Cable length		
• Cable length, shielded, max.	1,000 m	1,000 m
• Cable length unshielded, max.	600 m	600 m
• Standard-DI		
Input characteristic curve to IEC 1131, Typ 1	Yes	Yes
Input voltage		
• Rated value, DC	24 V	24 V
• for signal "0"	-3 to 5 V	-3 to 5 V
• for signal "1"	15 to 30 V	15 to 30 V
Input current		
• for signal "1", typ.	7 mA	7 mA
Input delay (for rated value of input voltage)		
• for counter/technological functions		
- at "0" to "1", max.	10 µs; typically	10 µs; typically
- at "1" to "0", max.	10 µs; typically	10 µs; typically
Digital outputs		
Number of digital outputs	8	8
Functions	for technological functions, e.g. fast cam switching signals	for technological functions, e.g. fast cam switching signals
Cable length, shielded, max.	1,000 m	1,000 m
Cable length unshielded, max.	600 m	600 m
Short-circuit protection of the output	Yes	Yes
• Response threshold, typ.	1.0 A	1.0 A
Limitation of inductive shutdown voltage to	2L+ (-48 V)	2L+ (-48 V)
Lamp load, max.	5 W	5 W
Controlling a digital input	No	No
Output voltage		
• for signal "0" (DC), max.	3 V	3 V
• for signal "1", min.	2L+ (-2.5 V)	2L+ (-2.5 V)

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Technical specifications (continued)

	6ES7 315-6TG10-0AB0	6ES7 317-6TJ10-0AB0
Output current		
• for signal "1" rated value	0.5 A	0.5 A
• for signal "1" permissible range for 0 to 60 °C, min.	5 mA	5 mA
• for signal "1" permissible range for 0 to 60 °C, max.	0.6 A	0.6 A
• for signal "0" residual current, max.	0.3 mA	0.3 mA
Parallel switching of 2 outputs		
• for increased power	No	No
• for redundant control of a load	No	No
Switching frequency		
• with resistive load, max.	100 Hz	100 Hz
• with inductive load, max.	0.2 Hz; to IEC 947-5-1, DC13	0.2 Hz; to IEC 947-5-1, DC13
• on lamp load, max.	100 Hz	100 Hz
Aggregate current of the outputs (per group)		
• horizontal installation		
- up to 40 °C, max.	4 A	4 A
- up to 60 °C, max.	3 A	3 mA
• all other mounting positions		
- up to 40 °C, max.	3 A	3 mA
Load impedance range		
• lower limit	48 Ω	48 Ω
• upper limit	4 kΩ	4 kΩ
Encoder		
Connectable encoders		
• 2-wire BEROS	No	No
Isolation		
Isolation, digital outputs		
• between the channels and the backplane bus	Yes	Yes
Galvanic isolation, digital inputs		
• between the channels and the backplane bus	Yes	Yes
Dimensions and weight		
Width	160 mm	160 mm
Height	125 mm	125 mm
Depth	130 mm	130 mm
Weights		
Weight, approx.	750 g	750 g

Ordering data		Order No.
CPU 315T-2 DP	A)	**6ES7 315-6TG10-0AB0**
Main memory 128 KB, power supply 24 V DC, MPI, PROFIBUS DP master/slave interface, PROFIBUS DP(DRIVE) interface; with Technology/Motion Control functions; MMC required		
CPU 317T-2 DP		**6ES7 317-6TJ10-0AB0**
Main memory 512 KB, power supply 24 V DC, MPI, PROFIBUS DP master/slave interface, PROFIBUS DP(DRIVE) interface; with Technology/Motion Control functions; MMC required		
S7 Technology V3.0		**6ES7 864-1CC30-0YX0**
Task: Option package for configuring and programming technology tasks with SIMATIC S7 CPU 31xT-2 DP Requirement: STEP 7 V5.3 SP3 or higher Delivery package: on CD; incl. documentation for CPU 31xT-2 DP (included on CD)		
Micro Memory Card		
4 MB		**6ES7 953-8LM11-0AA0**
8 MB		**6ES7 953-8LP11-0AA0**
MPI cable		**6ES7 901-0BF00-0AA0**
For connecting SIMATIC S7 and the PG through MPI; 5 m in length		
Front connector (1 unit)		
40-pin, with screw contacts		
• 1 unit		**6ES7 392-1AM00-0AA0**
• 100 units		**6ES7 392-1AM00-1AB0**
40-pin, with cage clamp contacts		
• 1 unit		**6ES7 392-1BM01-0AA0**
• 100 units		**6ES7 392-1BM01-1AB0**
Slot number plates		**6ES7 912-0AA00-0AA0**
S7-300 manual		
Design, CPU data, module data, instruction list		
German		**6ES7 398-8FA10-8AA0**
English		**6ES7 398-8FA10-8BA0**
French		**6ES7 398-8FA10-8CA0**
Spanish		**6ES7 398-8FA10-8DA0**
Italian		**6ES7 398-8FA10-8EA0**

		Order No.
SIMATIC Manual Collection	D)	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: S7-200, S7-300, C7, S7-400, SIMATIC DP (Distributed I/O), SIMATIC PC, SIMATIC PG (Programming device), STEP 7, Engineering Tools, Runtime Software, SIMATIC PCS 7, SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication), SIMATIC Machine Vision, SIMATIC Sensors		
SIMATIC Manual Collection update service for 1 year	D)	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		
Power supply connector		**6ES7 391-1AA00-0AA0**
10 units, spare part		
Labeling strips		**6ES7 392-2XX00-0AA0**
10 units, spare part		
Label cover		**6ES7 392-2XY00-0AA0**
10 units, spare part		
S7 SmartLabel		**2XV9 450-1SL01-0YX0**
Software for automatic labeling of modules based on data of the STEP 7 project		
Labeling sheets for machine inscription		
For 16-channel signal modules, DIN A4, for printing with laser printer;		
10 units		
petrol		**6ES7 392-2AX00-0AA0**
light-beige		**6ES7 392-2BX00-0AA0**
yellow		**6ES7 392-2CX00-0AA0**
red		**6ES7 392-2DX00-0AA0**
For 32-channel signal modules, DIN A4, for printing with laser printer;		
10 units		
petrol		**6ES7 392-2AX10-0AA0**
light-beige		**6ES7 392-2BX10-0AA0**
yellow		**6ES7 392-2CX10-0AA0**
red		**6ES7 392-2DX10-0AA0**
Manual "Communication for SIMATIC S7-300/-400"		
German		**6ES7 398-8EA00-8AA0**
English		**6ES7 398-8EA00-8BA0**
French		**6ES7 398-8EA00-8CA0**
Spanish		**6ES7 398-8EA00-8DA0**
Italian		**6ES7 398-8EA00-8EA0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

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

Technology CPUs

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Ordering data (continued)

	Order No.
PROFIBUS DP bus connector RS 485	
• With 90° cable outlet, max. transmission rate 12 Mbit/s	
- without PG interface	**6ES7 972-0BA12-0XA0**
- with PG interface	**6ES7 972-0BB12-0XA0**
• With 90° cable outlet for FastConnect connection system, max. transmission rate 12 Mbit/s	
- without PG interface	**6ES7 972-0BA50-0XA0**
- with PG interface	**6ES7 972-0BB50-0XA0**
• With axial cable outlet for SIMATIC OP, for connecting to PPI, MPI, PROFIBUS	**6GK1 500-0EA02**

	Order No.
PROFIBUS Fast Connect bus cable	**6XV1 830-0EH10**
Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m	
RS 485 repeater for PROFIBUS	**6ES7 972-0AA01-0XA0**
Data transfer rate up to 12 Mbit/s; 24 V DC; IP 20 housing	
PROFIBUS bus components	see Catalogs IK PI, CA 01
For establishing MPI/PROFIBUS communication	

Overview CPU 315F-2 DP

- For design of a fail-safe automation system for plants with increased safety requirements
- Based on the SIMATIC CPU 315-2 DP
- Complies with safety requirements up to SIL 3 to IEC 61508 and up to Cat. 4 according to EN 954-1
- Distributed fail-safe I/O modules can be connected through the integral PROFIBUS DP interface (PROFIsafe).
- Fail-safe I/O modules of the ET 200M range can also be centrally connected
- Central and distributed use of standard modules for non-safety-relevant applications

Micro Memory Card required for operation of CPU.

Overview CPU 315F-2 PN/DP

- For design of a fail-safe automation system for plants with increased safety requirements
- Complies with safety requirements up to SIL 3 to IEC 61508 and up to Cat. 4 according to EN 954-1
- Fail-safe I/O modules in distributed stations can be connected through the integrated PROFINET interface (PROFIsafe) and/or through the integrated PROFIBUS DP interface (PROFIsafe);
- Fail-safe I/O modules of the ET 200M range can also be centrally connected
- Central and distributed use of standard modules for non safety-relevant applications
- Component based Automation (CBA) on PROFINET
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component Based Automation (CBA)

Micro Memory Card required for operation of CPU.

Fail-safe CPUs

Overview CPU 317F-2 DP

- The fail-safe CPU with a large program memory and quantity framework for demanding applications
- For design of a fail-safe automation system for plants with increased safety requirements
- Complies with safety requirements up to SIL 3 to IEC 61508 and up to Cat. 4 according to EN 954-1
- Distributed fail-safe I/O modules can be connected through the two integral PROFIBUS DP interfaces (PROFIsafe).
- Fail-safe I/O modules of the ET 200M range can also be centrally connected
- Central and distributed use of standard modules for non safety-relevant applications

Micro Memory Card required for operation of CPU.

Overview CPU 317F-2 PN/DP

- The fail-safe CPU with a large program memory and quantity framework for demanding applications
- For design of a fail-safe automation system for plants with increased safety requirements
- Complies with safety requirements up to SIL 3 to IEC 61508 and up to Cat. 4 according to EN 954-1
- Fail-safe I/O modules in distributed stations can be connected through the integrated PROFINET interface (PROFIsafe) and/or through the integrated PROFIBUS DP interface (PROFIsafe)
- Fail-safe I/O modules of the ET 200M range can also be centrally connected
- Central and distributed use of standard modules for non safety-relevant applications
- Component Based Automation (CBA) on PROFINET
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component Based Automation (CBA)

Micro Memory Card required for operation of CPU.

Technical specifications

	6ES7 315-6FF01-0AB0	6ES7 315-2FH13-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK13-0AB0
Product status				
associated programming package	STEP 7 V5.1 or higher + SP 6	STEP 7 V5.3 SP3 or higher + HW update, S7 Distributed Safety V5.4 or higher	STEP 7 V5.2 or higher SP1 + HW update, Distributed Safety 5.2 or higher + SP1	STEP 7 V5.3 SP3 or higher + HW update, S7 Distributed Safety V5.4 or higher
Supply voltages				
Rated value				
• DC 24 V	Yes	Yes	Yes	Yes
• permissible range, lower limit (DC)	20.4 V	20.4 V	20.4 V	20.4 V
• permissible range, upper limit (DC)	28.8 V	28.8 V	28.8 V	28.8 V
Voltages and currents				
external protection for supply cables (recommendation)	min. 2 A	min. 2 A	min. 2 A	min. 2 A
Current consumption				
Inrush current, typ.	2.5 A	2.5 A	2.5 A	2.5 A
I^2t	0,5 A^2s	1 A^2s	1 A^2s	1 A^2s
Current consumption (in no-load operation), typ.	60 mA	100 mA	100 mA	100 mA
Current consumption (rated value)		650 mA		650 mA

Technical specifications (continued)

	6ES7 315-6FF01-0AB0	6ES7 315-2FH13-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK13-0AB0
Power loss, typ.	2.5 W	3.5 W	4 W	3.5 W
Memory				
Memory				
• RAM				
- integrated	192 KByte; The number of F-instructions compared to a standard program is limited due to the F-specific overheads; depending on the type of programming, about 36 K F-instructions are possible.	256 KByte; for program and data, less the display data	1,024 KByte	1 MByte; for program and data, less the display data
- expandable	No	No	No	No
• Load memory				
- pluggable (MMC)	Yes	Yes	Yes	Yes
- pluggable (MMC), max.	8 MByte	8 MByte	8 MByte	8 MByte
- expandable FEPROM		Pluggable via MMC		
Backup				
• present	Yes; Guaranteed by MMC (maintenance-free)	Yes; Guaranteed by MMC (maintenance-free)	Yes; Guaranteed by MMC (maintenance-free)	Yes; Guaranteed by MMC (maintenance-free)
• without battery		Yes; Program and data	Yes; Program and data	Yes; Program and data
CPU/blocks				
DB				
• Number, max.	1,023; DB 0 reserved	1,023; Number band: 1 to 1023	2,047; Number band: 1 to 2047	2,047; Number band: 1 to 2047
• Size, max.	16 KByte	16 KByte	64 KByte	64 KByte
FB				
• Number, max.	2,.048; See Operation List	1,024; Number band: 0 to 2047	2,048; Number band: 0 to 2047	2,048; Number band: 0 to 2047
• Size, max.	16 KByte	16 KByte	64 KByte	64 KByte
FC				
• Number, max.	2,048; See Operation List	1,024; Number band: 0 to 2047	2,048; Number band: 0 to 2047	2,048; Number band: 0 to 2047
• Size, max.	16 KByte	16 KByte	64 KByte	64 KByte
OB				
• Number, max.		See Operation List	See Operation List	See Operation List
• Size, max.	16 KByte	16 KByte	64 KByte	64 KByte
Nesting depth				
• per priority class	8	8	16	16
• additional within an error OB	4	4	4	4
CPU/processing times				
for bit operations, min.	0.1 µs	0.1 µs	0.05 µs	0.05 µs
for word operations, min.	0.2 µs	0.2 µs	0.2 µs	0.2 µs
for fixed point arithmetic, min.	2 µs	2 µs	0.2 µs	0.2 µs
for floating point arithmetic, min.	6 µs	3 µs	1 µs	1 µs
Times/counters and their remanence				
S7 counter				
• Number	256	256	512	512
• of which remanent without battery				
- adjustable	Yes	Yes	Yes	Yes
- lower limit		0		0
- upper limit		255		511

Fail-safe CPUs

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Technical specifications (continued)

	6ES7 315-6FF01-0AB0	6ES7 315-2FH13-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK13-0AB0
• Remanence				
- adjustable		Yes	Yes	Yes
- lower limit		0	0	0
- upper limit		255	511	511
• Counting range				
- adjustable		Yes	Yes	Yes
- lower limit	0	0	0	0
- upper limit	999	999	999	999
IEC counter				
• present	Yes	Yes	Yes	Yes
• Type	SFB	SFB	SFB	SFB
S7 times				
• Number	256	256	512	512
• Remanence				
- adjustable	Yes	Yes	Yes	Yes
- lower limit		0	0	0
- upper limit		255	511	511
- preset	no retentivity	no retentivity	no retentivity	no retentivity
• Time range				
- lower limit	10 ms	10 ms	10 ms	10 ms
- upper limit	9,990 s	9,990 s	9,990 s	9,990 s
IEC timer				
• present	Yes	Yes	Yes	Yes
• Type	SFB	SFB	SFB	SFB
Data areas and their remanence				
Flag				
• Number, max.	2,048 Byte	2,048 Byte	4,096 Byte	4,096 Byte
• Remanence available	Yes; MB 0 to MB 2047	Yes; MB 0 to MB 2047	Yes; MB 0 to MB 4095	Yes; MB 0 to MB 4095
• Number of clock memories	8; 1 memory byte	8; 1 memory byte	8; 1 memory byte	8; 1 memory byte
Data blocks				
• Number, max.	1,023; DB 0 reserved	1,023; from DB 1 to DB 1023	2,047; from DB 1 to DB 2047	2,047; from DB 1 to DB 2047
• Size, max.	16 KByte	16 KByte	64 KByte	64 KByte
• Remanence adjustable		Yes; via non-retain property on DB	Yes; via non-retain property on DB	Yes; via non-retain property on DB
• Remanence preset		Yes	Yes	Yes
Local data				
• per priority class, max.	1,024 Byte	1,024 Byte; per block max. 510	1,024 Byte	1,024 Byte
Address area				
I/O address area				
• Inputs	2 KByte	2 KByte	8 KByte	8 KByte
• Outputs	2 KByte	2 KByte	8 KByte	8 KByte
• of which, distributed				
- Inputs	2 KByte	2 KByte	8 KByte	8 KByte
- Outputs	2 KByte	2 KByte	8 KByte	8 KByte

Technical specifications (continued)

	6ES7 315-6FF01-0AB0	6ES7 315-2FH13-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK13-0AB0
Process image				
• Inputs	384 Byte	384 Byte	1,024 Byte	2,048 Byte
• Outputs	384 Byte	384 Byte	1,024 Byte	2,048 Byte
• Inputs, adjustable				2,048 Byte
• Outputs, adjustable				2,048 Byte
• Inputs, preset				1,024 Byte
• Outputs, preset				1,024 Byte
Digital channels				
• Inputs	16,384	16,384	65,536	65,536
• Outputs	16,384	16,384	65,536	65,536
• Inputs, of which central	1,024	1,024; max.	1,024	1,024
• Outputs, of which central	1,024	1,024; max.	1,024	1,024
Analog channels				
• Inputs	1,024	1,024	4,096	4,096
• Outputs	1,024	1,024	4,096	4,096
• Inputs, of which central	256	256; max.	256	256
• Outputs, of which central	256	256; max.	256	256
Hardware config.				
Central devices, max.		1	1	1
Expansion devices, max.		3	3	3
Racks, max.	4	4	4	4
Modules per rack, max.	8	8	8	8
Number of DP masters				
• integrated	1	1	2	1
• via CP	1	4	4	4
Number of operable FMs and CPs (recommended)				
• FM	8	8	8	8
• CP, point-to-point	8	8	8	8
• CP, LAN	10	10	10	10
Time				
Clock				
• Hardware clock (real-time clock)	Yes	Yes	Yes	Yes
• Battery backed and synchronized	Yes	Yes	Yes	Yes
• Deviation per day, max.	10 s	10 s	10 s	10 s
Operating hours counter				
• Number	1	1	4	4
• Number/Number range	0	0	0 to 3	0 to 3
• Range of values	0 to 2^31 hours (when using SFC101)	2 to the power of 31 hours (when using the SFC 101)	0 to 2^31 hours (when using SFC101)	0 to 2^31 hours (when using SFC101)
• Granularity	1 hour	1 hour	1 hour	1 hour
• remanent	Yes; must be restarted at each warm restart	Yes; must be restarted at each warm restart	Yes; must be restarted at each warm restart	Yes; must be restarted at each warm restart
Clock synchronization				
• supports	Yes	Yes	Yes	Yes
• to MPI, Master	Yes	Yes	Yes	Yes
• to MPI, Slave	Yes	Yes	Yes	Yes
• in AS, Master	Yes	Yes	Yes	Yes
• in AS, Slave		Yes	Yes	Yes

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Technical specifications (continued)

	6ES7 315-6FF01-0AB0	6ES7 315-2FH13-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK13-0AB0
S7 message functions				
Number of login stations for message functions, max.	16; depending on the configured connections for PG/OP and S7 basic communication	16; (depending on the configured connections for PG-/OP and S7 basic communication)	32; depending on the configured connections for PG/OP and S7 basic communication	32; depending on the configured connections for PG-/ OP- and S7-basic commmunication
Process diagnostic messages	Yes	Yes	Yes	Yes
simultaneously active Alarm-S blocks, max.	40	40	60	60
Test commissioning functions				
Status/control				
• Status/control variable	Yes	Yes	Yes	Yes
• Variables	Inputs, outputs, memory bits, DB, times, counters	Inputs, outputs, memory bits, DB, times, counters	Inputs, outputs, memory bits, DB, times, counters	Inputs, outputs, memory bits, DB, times, counters
Monitoring functions				
• Number of variables, max.	30	30	30	30
• of which status variable, max.	30	30	30	30
• of which control variable, max.	14	14	14	14
Forcing				
• Forcing	Yes	Yes	Yes	Yes
• Force, variables	Inputs, outputs	Inputs, outputs	Inputs, outputs	Inputs, outputs
• Forcing, number of variables, max.	10	10	10	10
Status block	Yes	Yes	Yes	Yes
Single step	Yes	Yes	Yes	Yes
Number of breakpoints	2	2	2	2
Diagnostic buffer				
• present	Yes	Yes	Yes	Yes
• Number of entries, max.	100	100	100	100
• adjustable	No	No	No	No
Communication functions				
PG/OP communication	Yes	Yes	Yes	Yes
Routing	Yes	Yes	Yes	Yes
Global data communication				
• supported	Yes	Yes	Yes	Yes
• Size of GD packets, max.	22 Byte	22 Byte	22 Byte	22 Byte
S7 basic communication				
• supported	Yes	Yes	Yes	Yes
S7 communication				
• supported	Yes	Yes	Yes	Yes
S5-compatible communication				
• supported	Yes; via CP and loadable FC	Yes; via CP and loadable FC	Yes; via CP and loadable FC	Yes; via CP and loadable FC
Open IE communication				
• TCP/IP		Yes; via integrated PROFINET interface and loadable FBs		Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.		8		8
- Data length, max.		1,460 Byte		1,460 Byte

Technical specifications (continued)

	6ES7 315-6FF01-0AB0	6ES7 315-2FH13-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK13-0AB0
Number of connections				
• overall	16	16	32	32
• usable for PG communication	15	15; max.	31	31
• usable for OP communication	15	15	31	31
• usable for S7 basic communication	13	14	30	30
• usable for routing		X1 as MPI: max. 10; X1 as DP-master: max. 24; X1 as DP-slave (active): max. 14; X2 as PROFINET: max. 24	8	
PROFINET CBA (at set setpoint communication load)				
• Setpoint for the CPU communication load		50%		50%
• Number of remote interconnection partners		32		32
• Number of functions, master/slave		17		17
• Total of all master/slave connections		1.000		1,000
• Data length of all incoming connections master/slave, max.		4,000 Byte		4,000 Byte
• Data length of all outgoing connections master/slave, max.		4,000 Byte		4,000 Byte
• Number of device-internal and PROFIBUS interconnections		500		500
• Data length of device-internal und PROFIBUS interconnections, max.		4,000 Byte		4,000 Byte
• Data length per connection, max.		1,400 Byte		1,400 Byte
• Remote interconnections with acyclic transmission				
- Sampling frequency: sampling interval, min.		500 ms		500 ms
- Number of incoming interconnections		100		100
- Number of outgoing interconnections		100		100
- Data length of all incoming interconnections, max.		2,000 Byte		2,000 Byte
- Data length of all outgoing interconnections, max.		2,000 Byte		2,000 Byte
- Data length per connection, max.		1,400 Byte		1,400 Byte
• Remote interconnections with cyclic transmission				
- Transmission frequency: transmission interval, min.		10 ms		10 ms
- Number of incoming interconnections		200		200
- Number of outgoing interconnections		200		200

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Technical specifications (continued)

	6ES7 315-6FF01-0AB0	6ES7 315-2FH13-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK13-0AB0
PROFINET CBA (at set setpoint communication load)				
• Remote interconnections with cyclic transmission (cont.)				
- Data length of all incoming interconnections, max.		2,000 Byte		2,000 Byte
- Data length of all outgoing interconnections, max.		2,000 Byte		2,000 Byte
- Data length per connection, max.		450 Byte		450 Byte
• HMI variables via PROFINET (acyclic)				
- Number of log-in stations for HMI variables (PN OPC/iMap)		3; 2 * PN OPC / 1 * iMap		3; 2 * PN OPC / 1 * iMap
- HMI variable updating		500 ms		500 ms
- Number of HMI variables		200		200
- Data length of all HMI variables, max.		2,000 Byte		2,000 Byte
• PROFIBUS proxy functionality				
- supported		Yes		Yes
- Number of linked PROFIBUS devices		16		16
- Data length per connection, max.		240 Byte; Slave-dependent		240 Byte; Slave-dependent
PROFINET CBA (at 50 % communication load)				
• Data length for arrays and structures (local interconnection), max.		Slave-dependent		Slave-dependent
• HMI variables via PROFINET (acyclic)				
- Number of log-in stations for HMI variables (PN OPC/iMap)		2 * PN OPC / 1 * iMap		2 * PN OPC / 1 * iMap
1st interface				
Type of interface	Integral RS 485 interface	Integral RS 485 interface	Integral RS 485 interface	Integral RS 485 interface
Physics	RS 485	RS 485	RS 485	RS 485
isolated	No	Yes	Yes	Yes
Power supply to interface (15 to 30 V DC), max.	200 mA	200 mA	200 mA	200 mA
Functionality				
• MPI	Yes	Yes	Yes	Yes
• DP master	No	Yes	Yes	Yes
• DP slave	No	Yes	Yes	Yes
• Point-to-point coupling	No	No	No	No
MPI				
• Number of connections	16	16	32	16
• Services				
- PG/OP communication	Yes	Yes	Yes	Yes
- Routing	Yes	Yes	Yes	Yes
- Global data communication	Yes	Yes	Yes	Yes
- S7 basic communication	Yes	Yes	Yes	Yes
- S7 communication	Yes	Yes	Yes	Yes
- S7 communication, as client	Yes; via CP and loadable FB	No	No	No
- S7 communication, as server	Yes	Yes	Yes	Yes

Technical specifications (continued)

	6ES7 315-6FF01-0AB0	6ES7 315-2FH13-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK13-0AB0
MPI (continued)				
• Transmission speeds, max.	187,5 kBit/s	12 Mbit/s	12 Mbit/s	12 Mbit/s
DP master				
• Services				
- PG/OP communication		Yes	Yes	Yes
- Routing		Yes	Yes	Yes
- Global data communication		No	No	No
- S7 basic communication		Yes	Yes	Yes
- S7 communication		Yes	Yes	Yes
- S7 communication, as client		No	No	No
- S7 communication, as server		Yes	Yes	Yes
- Equidistance support		Yes	Yes	Yes
- SYNC/FREEZE		Yes	Yes	Yes
- DPV1		Yes	Yes	Yes
• Transmission speeds, max.		12 Mbit/s	12 Mbit/s	12 Mbit/s
• Number of DP slaves, max.		124	124	124
• Address area				
- Inputs, max.			244 Byte	
- Outputs, max.			244 Byte	
DP slave				
• Services				
- Routing		Yes; only when interface active	Yes; only when interface active	Yes; only when interface active
- Global data communication		No	No	No
- S7 basic communication		Yes	Yes	Yes
- S7 communication		Yes	Yes	Yes
- S7 communication, as client		No	No	No
- S7 communication, as server		Yes	Yes	Yes
- direct data exchange (cross traffic)		Yes	Yes	Yes
- DPV1		No	No	No
• Transmission speeds, max.		12 Mbit/s	12 Mbit/s	12 Mbit/s
• Transfer memory				
- Inputs		244 Byte	244 Byte	244 Byte
- Outputs		244 Byte	244 Byte	244 Byte
• Address area, max.		32; with max. 32 bytes each	32	32
• Useful data per address area, max.			32 Byte	32 Byte
2nd interface				
Type of interface	Integral RS 485 interface	PROFINET	Integral RS 485 interface	PROFINET
Physics	RS 485	Ethernet	RS 485	Ethernet
isolated	Yes	Yes	Yes	Yes
Power supply to interface (15 to 30 V DC), max.	200 mA	0 mA	200 mA	0 mA
automatic detection of transmission speed		Yes; (10/100 Mbit/s)		Yes; (10/100 Mbit/s)
Functionality				
• MPI	No	No	No	No
• DP master	Yes	No	Yes	No

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Technical specifications (continued)

	6ES7 315-6FF01-0AB0	6ES7 315-2FH13-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK13-0AB0
Functionality (continued)				
• DP slave	Yes	No	Yes	No
• Point-to-point coupling	No	No	No	No
• PROFINET CBA		Yes		Yes
• PROFINET IO controller		Yes		Yes; Firmware Status V2.3 or higher
DP master				
• Number of connections, max.	16		32	
• Services				
- PG/OP communication	Yes		Yes	
- Routing	Yes		Yes	
- Global data communication	No		No	
- S7 basic communication	No		Yes	
- S7 communication	No		Yes	
- S7 communication, as client			No	
- S7 communication, as server			Yes	
- equidistance support	Yes		Yes	
- SYNC/FREEZE	Yes		Yes	
- DPV1	Yes		Yes	
• Transmission speeds, max.	12 Mbit/s		12 Mbit/s	
• Number of DP slaves, max.	125		124	
• Address area				
- Inputs, max.	244 KByte		244 Byte	
- Outputs, max.	244 KByte		244 Byte	
DP slave				
• Number of connections	16		32	
• Services				
- PG/OP communication	Yes		Yes	
- Routing	Yes; when interface active		Yes; when interface active	
- Global data communication	No		No	
- S7 basic communication	No		Yes	
- S7 communication, as client	No		No	
- S7 communication, as server	No		Yes	
- direct data exchange (cross traffic)	Yes		Yes	
- DPV1	No		No	
• GSD file	http://www.ad.siemens.de/csi_e/gsd		http://www.ad.siemens.de/support in Product Support area	
• Transmission speeds, max.	12 Mbit/s		12 Mbit/s	
• automatic baud rate search			Yes; only with passive interface	
• Transfer memory				
- Inputs	244 Byte		244 Byte	
- Outputs	244 Byte		244 Byte	
• Address area, max.	32		32	
• Useful data per address area, max.	32 Byte		32 Byte	
PROFINET CBA				
• Acyclic transmission		Yes		Yes
• Cyclic transmission		Yes		Yes

Technical specifications (continued)

	6ES7 315-6FF01-0AB0	6ES7 315-2FH13-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK13-0AB0
PROFINET IO controller				
• Services				
- PG/OP communication		Yes		Yes
- Routing		Yes		Yes
- S7 communication		Yes; with loadable FBs, max. configurable connections: 14, max. number of instances: 32		Yes; with loadable FBs, max. configurable connections: 16, max. number of instances: 32
- open IE communication		Yes; via TCP/IP		Yes; via TCP/IP
• Transmission speed, max.		100 Mbit/s		100 Mbit/s
• Number of connectable IO-devices, max.		128		128
• Update time		1 to 512 ms (minimum value depends on communication share set for PROFINET IO, on the number of IO devices and on the number of configured useful data items)		1 to 512 ms (minimum value depends on communication share set for PROFINET IO, on the number of IO devices and on the number of configured useful data items)
• Address area				
- Inputs, max.		2 KByte		8 KByte
- Outputs, max.		2 KByte		8 KByte
• Useful data consistency, max.		256 Byte		256 Byte
CPU/programming				
Programming language				
• STEP 7	Yes; V5.1 SP6 or higher	Yes; V 5.3 SP3 or higher + hardware update	Yes; V 5.2 SP1 or higher	Yes; V 5.3 SP3 or higher + HW update
• LAD	Yes	Yes	Yes	Yes
• FUP	Yes	Yes	Yes	Yes
• AWL	Yes	Yes	Yes	Yes
• SCL	Yes	Yes	Yes	Yes
• CFC		Yes	Yes	Yes
• GRAPH		Yes	Yes	Yes
• HiGraph		Yes	Yes	Yes
Software libraries				
Operational stocks	See Operation List	See Operation List	See Operation List	See Operation List
Nesting levels	8	8	8	8
User program protection/password protection	Yes	Yes	Yes	Yes
System functions (SFC)	See Operation List	See Operation List	See Operation List	See Operation List
System function blocks (SFB)	See Operation List	See Operation List	See Operation List	See Operation List
Dimensions and weight				
Width	40 mm	80 mm	80 mm	80 mm
Height	125 mm	125 mm	125 mm	125 mm
Depth	130 mm	130 mm	130 mm	130 mm
Weights				
Weight, approx.	290 g	460 g	460 g	460 g

Fail-safe CPUs

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Ordering data		Order No.
CPU 315F-2 DP		**6ES7 315-6FF01-0AB0**
CPU for SIMATIC S7-300F; main memory 192 KB, power supply 24 V DC, MPI/PROFIBUS DP master/slave interface, incl. single location number labels, MMC required		
CPU 315F-2 PN/DP	A)	**6ES7 315-2FH13-0AB0**
CPU for SIMATIC S7-300F; main memory 256 KB, power supply 24 V DC, MPI/PROFIBUS DP master/slave interface, Industrial Ethernet/PROFINET interface; incl. slot number labels, MMC required		
CPU 317F-2 DP	A)	**6ES7 317-6FF03-0AB0**
Main memory 1 MB, power supply 24 V DC, MPI, PROFIBUS DP master/slave interface, MMC required		
CPU 317F-2 PN/DP	A)	**6ES7 317-2FK13-0AB0**
Main memory 1 MB, power supply 24 V DC, MPI/PROFIBUS DP master/slave interface, Industrial Ethernet/PROFINET interface; MMC required		
Distributed Safety V5.4 programming tool		
Task: Software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, ET 200S Requirement: STEP 7 V5.3 SP3 and higher		
Floating license		**6ES7 833-1FC02-0YA5**
Software Update Service		**6ES7 833-1FC00-0YX2**
Distributed Safety Upgrade		
From V5.x to V5.4; Floating license for 1 user		**6ES7 833-1FC02-0YE5**
Micro Memory Card		
64 KB		**6ES7 953-8LF11-0AA0**
128 KB		**6ES7 953-8LG11-0AA0**
512 KB		**6ES7 953-8LJ11-0AA0**
2 MB		**6ES7 953-8LL11-0AA0**
4 MB		**6ES7 953-8LM11-0AA0**
8 MB		**6ES7 953-8LP11-0AA0**
MPI cable		**6ES7 901-0BF00-0AA0**
For connecting SIMATIC S7 and the PG through MPI; 5 m in length		
Slot number plates		**6ES7 912-0AA00-0AA0**

		Order No.
S7-300 manual		
Design, CPU data, module data, instruction list		
German		**6ES7 398-8FA10-8AA0**
English		**6ES7 398-8FA10-8BA0**
French		**6ES7 398-8FA10-8CA0**
Spanish		**6ES7 398-8FA10-8DA0**
Italian		**6ES7 398-8FA10-8EA0**
SIMATIC Manual Collection	D)	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: S7-200, S7-300, C7, S7-400, SIMATIC DP (Distributed I/O), SIMATIC PC, SIMATIC PG (Programming device), STEP 7, Engineering Tools, Runtime Software, SIMATIC PCS 7, SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication), SIMATIC Machine Vision, SIMATIC Sensors		
SIMATIC Manual Collection update service for 1 year	D)	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		
Power supply connector		**6ES7 391-1AA00-0AA0**
10 units, spare part		
Labeling strips		**6ES7 392-2XX00-0AA0**
10 units, spare part		
Label cover		**6ES7 392-2XY00-0AA0**
10 units, spare part		
S7 SmartLabel		**2XV9 450-1SL01-0YX0**
Software for automatic labeling of modules based on data of the STEP 7 project		
Labeling sheets for machine inscription		
For 16-channel signal modules, DIN A4, for printing with laser printer;		
10 units		
petrol		**6ES7 392-2AX00-0AA0**
light-beige		**6ES7 392-2BX00-0AA0**
yellow		**6ES7 392-2CX00-0AA0**
red		**6ES7 392-2DX00-0AA0**
For 32-channel signal modules, DIN A4, for printing with laser printer;		
10 units		
petrol		**6ES7 392-2AX10-0AA0**
light-beige		**6ES7 392-2BX10-0AA0**
yellow		**6ES7 392-2CX10-0AA0**
red		**6ES7 392-2DX10-0AA0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

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

Ordering data

	Order No.
Manual "Communication for SIMATIC S7-300/-400"	
German	**6ES7 398-8EA00-8AA0**
English	**6ES7 398-8EA00-8BA0**
French	**6ES7 398-8EA00-8CA0**
Spanish	**6ES7 398-8EA00-8DA0**
Italian	**6ES7 398-8EA00-8EA0**
PROFIBUS bus components	
PROFIBUS DP bus connector RS 485	
• With 90° cable outlet, max. transmission rate 12 Mbit/s	
- without PG interface	**6ES7 972-0BA12-0XA0**
- with PG interface	**6ES7 972-0BB12-0XA0**
• With 90° cable outlet for FastConnect connection system, max. transmission rate 12 Mbit/s	
- without PG interface	**6ES7 972-0BA50-0XA0**
- with PG interface	**6ES7 972-0BB50-0XA0**
• With axial cable outlet for SIMATIC OP, for connecting to PPI, MPI, PROFIBUS	**6GK1 500-0EA02**
PROFIBUS Fast Connect bus cable Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m	**6XV1 830-0EH10**
RS 485 repeater for PROFIBUS Data transmission rate up to 12 Mbit/s; 24 V DC; IP20 housing	**6ES7 972-0AA01-0XA0**
PROFIBUS bus components For establishing MPI/PROFIBUS communication	see catalogs IK PI, CA 01

	Order No.
Industrial Ethernet bus components	
IE FC TP Standard Cable GP 2x2 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug; PROFINET-compatible; with UL approval; Sold by the meter	**6XV1 840-2AH10**
FO Standard Cable GP (50/125) Standard cable, segmentable, UL approval, sold by the meter	**6XV1 873-2A**
Industrial Ethernet Switch SCALANCE X204-2 Industrial Ethernet switches with integral SNMP access, Web diagnostics, copper cable diagnosis and PROFINET diagnosis for configuring line, star and ring topologies; four 10/100 Mbit/s RJ45 ports and two fiber-optic ports	**6GK5 204-2BB00-2AA3**
IE FC RJ45 Plug 180 RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet	
1 unit	**6GK1 901-1BB10-2AA0**
10 units	**6GK1 901-1BB10-2AB0**
50 units	**6GK1 901-1BB10-2AE0**

SIPLUS compact CPUs

Overview SIPLUS CPU 312C

- The compact CPU with integrated digital inputs and outputs
- For small applications with high requirements in terms of processing power
- With process-related functions

Micro memory card required to operate the CPU.

	SIPLUS CPU 312C
Order No.	**6AG1 312-5BD01-2AB0**
Order No. based on	**6ES7 312-5BD01-0AB0**
Ambient temperature range	-25 °C to +60 °C, condensation permissible
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1)	Yes
Technical data	The technical data are identical with the technical data of the based on modules.

Overview SIPLUS CPU 313C

- The compact CPU with integrated digital and analog inputs and outputs
- For installations with high requirements in terms of processing power and response time.
- With process-related functions

Micro memory card required to operate the CPU.

	SIPLUS CPU 313C
Order No.	**6AG1 313-5BE01-2AB0**
Order No. based on	**6ES7 313-5BE01-0AB0**
Ambient temperature range	-25 °C to +60 °C, condensation permissible
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1)	Yes
Technical data	The technical data are identical with the technical data of the based on modules.

Overview SIPLUS CPU 313C-2 DP

- The compact CPU with integrated digital I/Os and PROFIBUS DP master/slave interface
- With process-related functions
- For tasks with special functions
- For the connection of standalone I/O devices

Micro memory card required to operate the CPU.

	SIPLUS CPU 313C-2 DP
Order No.	**6AG1 313-6CE01-2AB0**
Order No. based on	**6ES7 313-6CE01-0AB0**
Ambient temperature range	-25 °C to +60 °C, condensation permissible
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1)	Yes
Technical data	The technical data are identical with the technical data of the based on modules.

Overview SIPLUS CPU 314C-2 DP

- The compact CPU with integrated digital and analog inputs and outputs and PROFIBUS DP master/slave interface
- With process-related functions
- For tasks with special functions
- For connection of distributed I/O

Micro memory card required to operate the CPU.

	SIPLUS CPU 314C-2 DP
Order No.	**6AG1 314-6CF02-2AB0**
Order No. based on	**6ES7 314-6CF02-0AB0**
Ambient temperature range	-25 °C to +60 °C, condensation permissible
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1)	No
Technical data	The technical data are identical with the technical data of the based on modules.

Technical specifications

	6AG1 312-5BD01-2AB0	6AG1 313-5BE01-2AB0	6AG1 313-6CE01-2AB0	6AG1 314-6CF02-2AB0
Product status				
associated programming package	STEP 7 V5.2 + SP 1 or higher	STEP 7 V5.2 or higher + SP 1	STEP 7 V5.2 + SP 1 or higher (with STEP 7 5.1 + SP 3 or higher, please use predecessor-CPU)	STEP 7 V 5.2 or higher + SP 1 with HW update
Supply voltages				
Rated value				
• DC 24 V	Yes	Yes	Yes	Yes
• permissible range, lower limit (DC)	20.4 V	20.4 V	20.4 V	20.4 V
• permissible range, upper limit (DC)	28.8 V	28.8 V	28.8 V	28.8 V

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Technical specifications (continued)

	6AG1 312-5BD01-2AB0	6AG1 313-5BE01-2AB0	6AG1 313-6CE01-2AB0	6AG1 314-6CF02-2AB0
Current consumption				
Inrush current, typ.	3 A	11 A	11 A	11 A
I^2t				0.7 A^2s
Current consumption (in no-load operation), typ.	60 mA	150 mA	100 mA	150 mA
Current consumption (rated value)				1,000 mA
from supply voltage L+, max.	500 mA	700 mA	900 mA	1,000 mA
Power loss, typ.	6 W	14 W	10 W	14 W
Memory				
Memory				
• RAM				
- integrated	16 KByte; for program and data, less the display data	32 KByte; for program and data, less the display data	32 KByte; for program and data, less the display data	64 KByte; for program and data, less the display data
- expandable	No	No	No	No
• Load memory				
- pluggable (MMC)	Yes	Yes	Yes	Yes
- pluggable (MMC), max.	4 MByte	8 MByte	8 MByte	8 MByte
Backup				
• present	Yes; Guaranteed by MMC (maintenance-free)	Yes; Guaranteed by MMC (maintenance-free)	Yes; Guaranteed by MMC (maintenance-free)	Yes; Guaranteed by MMC (maintenance-free)
• without battery	Yes; Program and data	Yes; Program and data	Yes; Program and data	Yes; Program and data
CPU/blocks				
DB				
• Number, max.	511; Number band: 1 to 511	511; Number band: 1 to 511	511; Number band: 1 to 511	511; Number band: 1 to 511
• Size, max.	16 KByte	16 KByte	16 KByte	16 KByte
FB				
• Number, max.	512; Number band: 0 to 2047	512; Number band: 0 to 2047	512; Number band: 0 to 2047	512; Number band: 0 to 2047
• Size, max.	16 KByte	16 KByte	16 KByte	16 KByte
FC				
• Number, max.	512; Number band: 0 to 2047	512; Number band: 0 to 2047	512; Number band: 0 to 2047	512; Number band: 0 to 2047
• Size, max.	16 KByte	16 KByte	16 KByte	16 KByte
OB				
• Size, max.	16 KByte	16 KByte	16 KByte	16 KByte
Nesting depth				
• per priority class	8	8	8	8
• additional within an error OB	4	4	4	4
CPU/processing times				
for bit operations, min.	0.2 µs	0.1 µs	0,1 µs	0.1 µs
for word operations, min.	0.4 µs	0.2 µs	0.2 µs	0.2 µs
for fixed point arithmetic, min.	5 µs	2 µs	2 µs	2 µs
for floating point arithmetic, min.	6 µs	3 µs	3 µs	3 µs
Times/counters and their remanence				
S7 counter				
• Number	128	256	256	256

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Technical specifications (continued)

	6AG1 312-5BD01-2AB0	6AG1 313-5BE01-2AB0	6AG1 313-6CE01-2AB0	6AG1 314-6CF02-2AB0
S7 counter (continued)				
• of which remanent without battery				
- adjustable	Yes	Yes	Yes	Yes
- lower limit	0	0	0	0
- upper limit	128	256	256	256
• Counting range				
- lower limit	0	0	0	0
- upper limit	999	999	999	999
IEC counter				
• present	Yes	Yes	Yes	Yes
• Type	SFB	SFB	SFB	SFB
S7 times				
• Number	128	256	256	256
• Remanence				
- adjustable	Yes	Yes	Yes	Yes
- lower limit	0	0	0	0
- upper limit	128	256	256	256
- preset	no retentivity	no retentivity	no retentivity	no retentivity
• Time range				
- lower limit	10 ms	10 ms	10 ms	10 ms
- upper limit	9,990 s	9,990 s	9,990 s	9,990 s
IEC timer				
• present	Yes	Yes	Yes	Yes
• Type	SFB	SFB	SFB	SFB
Data areas and their remanence				
Flag				
• Number, max.	128 Byte	256 Byte	256 Byte	256 Byte
• Remanence available	Yes; MB 0 to MB 127	Yes; MB 0 to MB 255	Yes; MB 0 to MB 255	Yes; MB 0 to MB 255
• Number of clock memories	8; 1 memory byte	8; 1 memory byte	8	8
Data blocks				
• Number, max.	511; from DB1 to DB511	511; from DB1 to DB511	511	511
• Size, max.	16 KByte	16 KByte	16 KByte	16 KByte
Local data				
• per priority class, max.	256 Byte	510 Byte		510 Byte
Address area				
I/O address area				
• Inputs	1 KByte	1 KByte	1 KByte	1 KByte
• Outputs	1 KByte	1 KByte	1 KByte	1 KByte
Process image				
• Inputs	128 Byte	128 Byte	128 Byte	128 Byte
• Outputs	128 Byte	128 Byte	128 Byte	128 Byte
Digital channels				
• Inputs	256	992	8,192	992
• Outputs	256	992	8,192	992
• Inputs, of which central	256	992	992	992
• Outputs, of which central	256	992	992	992
Analog channels				
• Inputs	64	248	248	512
• Outputs	32	124	124	124
• Inputs, of which central		248	248	248
• Outputs, of which central		248	248	248

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Technical specifications (continued)

	6AG1 312-5BD01-2AB0	6AG1 313-5BE01-2AB0	6AG1 313-6CE01-2AB0	6AG1 314-6CF02-2AB0
Hardware config.				
Central devices, max.	1	1	1	1
Expansion devices, max.	0	3	3	3
Racks, max.	1	4	4	4
Modules per rack, max.	8	8; in rack 3 max. 7	8; in rack 3 max. 7	8; in rack 3 max. 7
Number of DP masters				
• integrated			1	1
• via CP	4	4	4	4
Number of operable FMs and CPs (recommended)				
• FM	8	8	8	8
• CP, point-to-point	8	8	8	8
• CP, LAN	4	6	6	10
Time				
Clock				
• Hardware clock (real-time clock)		Yes	Yes	Yes
• Software clock	Yes			
• Battery backed and synchronized	No	Yes	Yes	Yes
• Deviation per day, max.		10 s	10 s	10 s
Operating hours counter				
• Number	1	1	1	1
• Number/Number range	0	0	0	0
• Range of values	2^31 hours (when using the SFC 101)	2^31 hours (when using the SFC 101)	2^31 hours (when using the SFC 101)	2^31 hours (when using the SFC 101)
• Granularity	1 hour	1 hour	1 hour	1 hour
• remanent	Yes; must be restarted at each warm restart	Yes; must be restarted at each warm restart	Yes	Yes
Clock synchronization				
• supports	Yes	Yes	Yes	Yes
• to MPI, Master	Yes	Yes	Yes	Yes
• to MPI, Slave	Yes	Yes	Yes	Yes
• in AS, Master	Yes	Yes	Yes	Yes
S7 message functions				
Number of login stations for message functions, max.	6; depending on the configured connections for PG-/ OP- and S7-basic commmunication	8; depending on the configured connections for PG-/ OP- and S7-basic commmunication	8	12
Process diagnostic messages	Yes	Yes	Yes	Yes
simultaneously active Alarm-S blocks, max.	20	20	20	40
Test commissioning functions				
Status/control				
• Status/control variable	Yes	Yes	Yes	Yes
• Variables	Inputs, outputs, memory bits, DB, times, counters	Inputs, outputs, memory bits, DB, times, counters	Inputs, outputs, memory bits, DB, times, counters	Inputs, outputs, memory bits, DB, times, counters

Technical specifications (continued)

	6AG1 312-5BD01-2AB0	6AG1 313-5BE01-2AB0	6AG1 313-6CE01-2AB0	6AG1 314-6CF02-2AB0
Monitoring functions				
• Number of variables, max.	30	30	30	30
• of which status variable, max.	30	30	30	30
• of which control variable, max.	14	14	14	14
Forcing				
• Forcing	Yes	Yes	Yes	Yes
• Force, variables	Inputs, outputs	Inputs, outputs	Inputs, outputs	Inputs, outputs
• Forcing, number of variables, max.	10	10	10	10
Status block	Yes	Yes	Yes	Yes
Single step	Yes	Yes	Yes	Yes
Number of breakpoints	2	2	2	2
Diagnostic buffer				
• present				Yes
• Number of entries, max.				100
Communication functions				
PG/OP communication	Yes	Yes	Yes	Yes
Routing				Yes
Global data communication				
• supported	Yes	Yes	Yes	Yes
• Size of GD packets, max.	22 Byte	22 Byte	22 Byte	22 Byte
S7 basic communication				
• supported	Yes	Yes	Yes	Yes
S7 communication				
• supported	Yes	Yes	Yes	Yes
S5-compatible communication				
• supported	Yes; via CP and loadable FC	Yes; via CP and loadable FC	Yes; via CP and loadable FC	Yes; via CP and loadable FC
Number of connections				
• overall	6	8	8	12
• usable for PG communication	5	7	7	11
• usable for OP communication	5	7	7	11
• usable for S7 basic communication	2	4	4	8
• usable for routing			4	4
Connection point				
required front connectors	1 x 40-pin	2 x 40-pin	1 x 40-pin	2 x 40-pin
MPI				
Cable length, max.	50 m; without repeater	50 m; without repeater	50 m; without repeater	50 m; without repeater
1st interface				
Type of interface	integrated RS 422/ 485 interface	integrated RS 422/ 485 interface	integrated RS 422/ 485 interface	integrated RS 422/ 485 interface
Physics	RS 485	RS 485	RS 485	RS 485
isolated	No	No	Yes	No
Power supply to interface (15 to 30 V DC), max.	200 mA	200 mA	200 mA	200 mA
Functionality				
• MPI	Yes	Yes	Yes	Yes
• DP master	No	No	No	No
• DP slave	No	No	No	No
• Point-to-point coupling	No	No	No	No

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Technical specifications (continued)

	6AG1 312-5BD01-2AB0	6AG1 313-5BE01-2AB0	6AG1 313-6CE01-2AB0	6AG1 314-6CF02-2AB0
MPI				
• Number of connections	6	8	8	12
• Services				
- PG/OP communication	Yes	Yes	Yes	Yes
- Routing	No	No	Yes	Yes
- Global data communication	Yes	Yes	Yes	Yes
- S7 basic communication	Yes		Yes	Yes
- S7 communication	Yes	Yes	Yes	Yes
- S7 communication, as client	No	No	No	No
- S7 communication, as server	Yes	Yes	Yes	Yes
• Transmission speeds, max.	187.5 kBit/s	187.5 kBit/s	187.5 kBit/s	187.5 kBit/s
2nd interface				
Type of interface			integrated RS 422/ 485 interface	integrated RS 422/ 485 interface
Physics			RS 485	RS 485
isolated			Yes	Yes
Power supply to interface (15 to 30 V DC), max.			200 mA	200 mA
Functionality				
• MPI			No	No
• DP master			Yes	Yes
• DP slave			Yes	Yes
• Point-to-point coupling			No	No
DP master				
• Number of connections, max.			8; for PG/OP communication	8; for PG/OP communication
• Number of connections (of which reserved), max.			1 for PG, 1 for OP	1 for PG, 1 for OP
• Services				
- PG/OP communication			Yes	Yes
- Routing			Yes	Yes
- Global data communication			No	No
- S7 basic communication			Yes	Yes
- S7 communication			Yes	Yes
- S7 communication, as client			No	No
- S7 communication, as server			Yes	Yes
- equidistance support			Yes	Yes
- SYNC/FREEZE			Yes	Yes
- Activation/deactivation of DP slaves			Yes	Yes
- direct data exchange (cross traffic)			Yes	Yes
- DPV1			Yes	Yes
• Transmission speeds, max.			12 Mbit/s	12 Mbit/s
• Number of DP slaves, max.			32	32
• Address area				
- Inputs, max.			1 KByte	1 KByte
- Outputs, max.			1 KByte	1 KByte
• Useful data per DP slave				
- Inputs, max.			244 Byte	244 Byte
- Outputs, max.			244 Byte	244 Byte

Technical specifications (continued)

	6AG1 312-5BD01-2AB0	6AG1 313-5BE01-2AB0	6AG1 313-6CE01-2AB0	6AG1 314-6CF02-2AB0
DP slave				
• Number of connections			8	12
• Services				
- PG/OP communication			Yes	Yes
- Routing			Yes	Yes
- Global data communication			No	No
- S7 basic communication			Yes	Yes
- direct data exchange (cross traffic)			Yes	Yes
- DPV1			No	No
• GSD file			You can obtain the current GSD file from http://www.ad.siemens.de/support in the Product Support area	You can obtain the current GSD file from http://www.ad.siemens.de/support in the Product Support area
• Transmission speeds, max.			12 kBit/s	12 kBit/s
• automatic baud rate search			Yes	Yes
• Transfer memory				
- Inputs			244 Byte	244 Byte
- Outputs			244 Byte	244 Byte
• Address area, max.			32	32
• Useful data per address area, max.			32 Byte	32 Byte
CPU/programming				
Programming language				
• STEP 7	Yes; V5.1 SP2	Yes; V5.1 SP2	Yes; V5.1 SP2	Yes; V5.2 SP1 with HW update
• LAD	Yes	Yes	Yes	Yes
• FUP	Yes	Yes	Yes	Yes
• AWL	Yes	Yes	Yes	Yes
• SCL	Yes	Yes	Yes	Yes
• CFC				Yes
• GRAPH	Yes	Yes	Yes	Yes
• HiGraph	Yes	Yes	Yes	Yes
Software libraries				
Operational stocks	see Instruction List	see Instruction List	see Instruction List	see Instruction List
Nesting levels	8	8	8	8
User program protection/password protection	Yes	Yes	Yes	Yes
System functions (SFC)	see Instruction List	see Instruction List	see Instruction List	see Instruction List
System function blocks (SFB)	see Instruction List	see Instruction List	see Instruction List	see Instruction List
Digital inputs				
Number of digital inputs	10	24	16	24
Cable length				
• Cable length, shielded, max.	1,000 m; 100 m for technological functions	1,000 m; 100 m for technological functions	1,000 m; 100 m for technological functions	1,000 m; 100 m for technological functions
• Cable length unshielded, max.	600 m	600 m	600 m	600 m
Input voltage				
• Rated value, DC	24 V	24 V	24 V	24 V
• for signal "0"	-3 to 5 V	-3 to 5 V	-3 to 5 V	-3 to 5 V
• for signal "1"	15 to 30 V	15 to 30 V	15 to 30 V	15 to 30 V

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Technical specifications (continued)

	6AG1 312-5BD01-2AB0	6AG1 313-5BE01-2AB0	6AG1 313-6CE01-2AB0	6AG1 314-6CF02-2AB0
Input current				
• for signal "1", typ.	8 mA	8 mA	8 mA	8 mA
Input delay (for rated value of input voltage)				
• for standard inputs				
- programmable	Yes; 0.1 / 0.3 / 3 / 15 ms	Yes; 0.1 / 0.3 / 3 / 15 ms	Yes; 0.1 / 0.3 / 3 / 15 ms	Yes; 0.1 / 0.3 / 3 / 15 ms
• for counter/technological functions				
- at "0" to "1", max.	50 µs	16 µs	8 µs	8 µs
Digital outputs				
Number of digital outputs	6	16	16	16
Cable length, shielded, max.	1,000 m	1,000 m	1,000 m	1,000 m
Cable length unshielded, max.	600 m	600 m	600 m	600 m
Short-circuit protection of the output	Yes; clocked electronically	Yes; clocked electronically	Yes; clocked electronically	Yes; clocked electronically
Limitation of inductive shutdown voltage to	L+ (-48 V)	L+ (-48 V)	L+ (-48 V)	L+ (-48 V)
Output voltage				
• for signal "1", min.	L+ (-0,8 V)	L+ (-0,8 V)	L+ (-0,8 V)	L+ (-0,8 V)
Output current				
• for signal "1" permissible range for 0 to 40 °C, max.	500 mA	500 mA	500 mA	500 mA
• for signal "1" permissible range for 0 to 60 °C, max.	500 mA	500 mA	500 mA	500 mA
• for signal "1" minimum load current	5 mA	5 mA	5 mA	5 mA
• for signal "0" residual current, max.	0,5 mA	0,5 mA	0,5 mA	0,5 mA
Switching frequency				
• with resistive load, max.	100 Hz	100 Hz	100 Hz	100 Hz
• with inductive load, max.	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz
Aggregate current of the outputs (per group)				
• all other mounting positions				
• up to 40 °C, max.	3 A	8 A	8 A	8 A
• up to 60 °C, max.	1.5 A	4 A	4 A	4 A
Analog inputs				
Number of analog inputs for voltage/current measurement		4		4
Number of analog inputs for resistance/temperature measurement		1		1
Technical unit for temperature measurement, adjustable		Yes		Yes
Input ranges (rated values), voltages				
• 0 to +10 V		Yes		Yes
• -10 V to +10 V		Yes		Yes
Input ranges (rated values), currents				
• 0 to 20 mA		Yes		Yes
• -20 to +20 mA		Yes		Yes
• 4 to 20 mA		Yes		Yes

Technical specifications (continued)

	6AG1 312-5BD01-2AB0	6AG1 313-5BE01-2AB0	6AG1 313-6CE01-2AB0	6AG1 314-6CF02-2AB0
Input ranges (rated values), resistors				
• 0 to 600 Ohm		Yes		Yes
Input ranges (rated values), resistance thermometers				
• Pt 100		Yes		Yes
Analog outputs				
Number of analog outputs		2		2
Output ranges, voltage				
• 0 to 10 V		Yes		Yes
• -10 to +10 V		Yes		Yes
Output ranges, current				
• 0 to 20 mA		Yes		Yes
• -20 to +20 mA		Yes		Yes
• 4 to 20 mA		Yes		Yes
Analog value creation				
Integrations and conversion time/resolutionper channel				
• Resolution with overload area (bit including sign), max.		12 Bit		12 Bit
• Integration time, parameterizable		Yes; 2.5 / 16.6 / 20 ms		Yes; 2.5 / 16.6 / 20 ms
• Conversion time (per channel)		1 ms		1 ms
Encoder				
Connectable encoders				
• 2-wire BEROS	Yes	Yes	Yes	Yes
• permissible quiescent current (2-wire BEROS), max.	1.5 mA	1.5 mA	1.5 mA	1.5 mA
Errors/accuracies				
Basic error limit (operational limit at 25 °C)				
• Voltage, relative to output area		+/- 0,7 %		+/- 0,7 %
• Current, relative to output area		+/- 0,7 %		+/- 0,7 %
• Voltage, relative to input area		+/- 0,7 %		+/- 0,7 %
• Current, relative to input area		+/- 0,7 %		+/- 0,7 %
• Impedance, relative to input area		+/- 3 %		+/- 3 %
• Resistance-type thermometer, relative to input area		+/- 3 %		+/- 3 %
Integrated Functions				
Number of counters	2; 2 channels (see "Technological Functions" manual)	3; 3 channels (see "Technological Functions" manual)	3	4
Counter frequency (counter) max.	10 kHz	30 kHz	30 kHz	60 kHz
Frequency measurement	Yes	Yes	Yes	Yes
Controlled positioning	No	No	No	Yes
PID controller	No	Yes	Yes	Yes

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Technical specifications (continued)

	6AG1 312-5BD01-2AB0	6AG1 313-5BE01-2AB0	6AG1 313-6CE01-2AB0	6AG1 314-6CF02-2AB0
Number of pulse outputs	2; 2 channels pulse width modulation up to 2.5 kHz (see Manual "Technological Functions")	3; 3 channels pulse width modulation up to 2.5 kHz (see Manual "Technological Functions")	3	4
Limit frequency (pulse)	2.5 kHz	2.5 kHz	2.5 kHz	2.5 kHz
Isolation				
Isolation, analog outputs				
• Galvanic isolation, analog outputs		Yes		Yes
• between the channels and the backplane bus		Yes		Yes
Isolation, analog inputs				
• Isolation, analog inputs		Yes		Yes
• between the channels and the backplane bus		Yes		Yes
Isolation, digital outputs				
• Galvanic isolation, digital outputs	Yes	Yes	Yes	Yes
• between the channels, in groups of	6	8	8	8
• between the channels and the backplane bus	Yes	Yes	Yes	Yes
Galvanic isolation, digital inputs				
• galvanic isolation, digital inputs	Yes	Yes	Yes	Yes
• between the channels, in groups of	10	16; and 8	16	16
• between the channels and the backplane bus	Yes	Yes	Yes	Yes
Dimensions and weight				
Width	80 mm	120 mm	120 mm	120 mm
Height	125 mm	125 mm	125 mm	125 mm
Depth	130 mm	130 mm	130 mm	130 mm
Weights				
Weight, approx.	409 g	660 g	566 g	676 g

Ordering data	Order No.
SIPLUS CPU 312C (extended temperature range and medial load) Compact CPU, main memory 16 KB, power supply 24 V DC, 10 DI/6 DO integrated, integrated functions, MPI; including slot number labels and 2 keys; MMC is required	**6AG1 312-5BD01-2AB0**
SIPLUS CPU 313C A) (extended temperature range and medial load) Compact CPU, main memory 32 KB, power supply 24 V DC, 24 DI/16 DO, 4 AI/2 AO integrated, integrated functions, MPI; MMC is required	**6AG1 313-5BE01-2AB0**
SIPLUS CPU 313C-2 DP (extended temperature range and medial load) Compact CPU, main memory 32 KB, power supply 24 V DC, 16 DI/16 DO integrated, integrated functions, MPI PROFIBUS DP master/slave interface; MMC is required	**6AG1 313-6CE01-2AB0**
SIPLUS CPU 314C-2 DP (extended temperature range and medial load) Compact CPU, main memory 64 KB, power supply 24 V DC, 24DI/16DO/4AI/2AO integrated, integrated functions, MPI; PROFIBUS DP master/slave interface; MMC is required	**6AG1 314-6CF02-2AB0**
Accessories	see S7-300 Compact CPUs, page 4/19

A) Subject to export regulations: AL: N and ECCN: EAR99H

SIPLUS standard CPUs

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Overview SIPLUS CPU 314

- For installations with medium requirements on program scope
- High processing performance in binary and floating-point arithmetic

Micro memory card required to operate the CPU.

	SIPLUS CPU 314
Order No.	**6AG1 314-1AF11-2AB0**
Order No. based on	**6ES7 314-1AF11-0AB0**
Ambient temperature range	-25 °C to +60 °C, condensation permissible
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1)	Yes
Technical specifications	The technical data are identical with the technical data of the based on modules.

Overview CPU 315-2 DP

- The CPU with medium to large program memory and quantity framework for the use, if required, of SIMATIC Engineering Tools
- High processing performance in binary and floating-point arithmetic
- PROFIBUS DP master/slave interface
- For extensive I/O configurations
- For setting up distributed I/O structures

Micro memory card required to operate the CPU.

	SIPLUS CPU 315-2 DP
Order No.	**6AG1 315-2AG10-2AB0**
Order No. based on	**6ES7 315-2AG10-0AB0**
Ambient temperature range	-25 °C to +60 °C, condensation permissible
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1)	Yes
Technical specifications	The technical data are identical with the technical data of the based on modules.

Overview SIPLUS CPU 315-2 PN/DP

- The CPU with a medium program memory and quantity framework
- High processing performance in binary and floating-point arithmetic
- Used as a central controller on production lines with central and distributed I/O
- Integral PROFINET interface
- Combined MPI/PROFIBUS DP-master/slave interface
- Component Based Automation (CBA) on PROFINET
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component Based Automation (CBA)
- PROFINET I/O Controller for operating distributed I/O on PROFINET

Micro memory card required to operate the CPU.

Overview SIPLUS CPU 317-2 PN/DP

- The CPU with a large program memory and quantity framework for demanding requirements
- Distributed intelligence in Component Based Automation (CBA) on PROFINET
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component Based Automation (CBA)
- PROFINET I/O controller for operating distributed I/O on PROFINET
- For multisector automation tasks in the construction of series machines, special machines and plants
- Used as a central controller on production lines with central and distributed I/O
- For extensive I/O configurations
- For setting up distributed I/O structures
- High processing performance in binary and floating-point arithmetic
- Combined MPI/PROFIBUS DP master/slave interface
- Supports as an option the use of SIMATIC Engineering Tools

Micro memory card required to operate the CPU.

	SIPLUS CPU 315-2 PN/DP
Order No.	**6AG1 315-2EG10-2AB0**
Order No. based on	**6ES7 315-2EG10-0AB0**
Ambient temperature range	-25 °C to +60 °C, condensation permissible
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).
Technical data	The technical data are identical with the technical data of the based on modules.

	SIPLUS CPU 317-2 PN/DP
Order No.	**6AG1 317-2EJ10-2AB0**
Order No. based on	**6ES7 317-2EJ10-0AB0**
Ambient temperature range	-25 °C to +60 °C, condensation permissible
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).
Technical data	The technical data are identical with the technical data of the based on modules.

Technical specifications

	6AG1 314-1AF11-2AB0	6AG1 315-2AG10-2AB0	6AG1 315-2EG10-2AB0	6AG1 317-2EJ10-2AB0
Product status				
associated programming package	STEP 7 V 5.2 or higher + SP 1 with HW update	STEP 7 V 5.1 or higher + SP 4	STEP 7 V5.3 SP1	STEP 7 V5.3 or higher
Supply voltages				
Rated value				
• DC 24 V	Yes	Yes	Yes	Yes
• permissible range, lower limit (DC)	20.4 V	20.4 V	20.4 V	20.4 V

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Technical specifications (continued)

	6AG1 314-1AF11-2AB0	6AG1 315-2AG10-2AB0	6AG1 315-2EG10-2AB0	6AG1 317-2EJ10-2AB0
Rated value (continued)				
• permissible range, upper limit (DC)	28.8 V	28.8 V	28.8 V	28.8 V
Voltages and currents				
external protection for supply cables (recommendation)	min. 2 A	min. 2 A	min. 2 A	min. 2 A
Current consumption				
Inrush current, typ.	2,5 A	2,5 A	2,5 A	2,5 A
I^2t	0,5 A^2s	0,5 A^2s	1 A^2s	1 A^2s
Current consumption (in no-load operation), typ.	60 mA	60 mA	100 mA	100 mA
Current consumption (rated value)	0,6 A			
from supply voltage L+, max.	600 mA	800 mA		
Power loss, typ.	2.5 W	2.5 W	3.5 W	3.5 W
Memory				
Memory				
• RAM				
- integrated	64 KByte	128 KByte	128 KByte	512 KByte
- expandable	No	No	No	No
• Load memory				
- pluggable (MMC)	Yes	Yes	Yes	Yes
- pluggable (MMC), max.	8 MByte	8 MByte	8 MByte	8 MByte
Backup				
• present	Yes; Guaranteed by MMC (maintenance-free)	Yes; Guaranteed by MMC (maintenance-free)	Yes; Guaranteed by MMC (maintenance-free)	Yes; Guaranteed by MMC (maintenance-free)
CPU/blocks				
DB				
• Number, max.	511; Number band: 1 to 511	1,024; Number band: 1 to 1023	1,023; Number band: 1 to 1023	2,047; Number band: 1 to 2047
• Size, max.	16 KByte	16 KByte	16 KByte	64 KByte
FB				
• Number, max.	512; Number band: 0 to 2047	2,048; Number band: 0 to 2047	2,048; Number band: 0 to 2047	2,048; Number band: 0 to 2047
• Size, max.	16 KByte	16 KByte	16 KByte	64 KByte
FC				
• Number, max.	512; Number band: 0 to 2047	2,048; Number band: 0 to 2047	2,048; Number band: 0 to 2047	2,048; Number band: 0 to 2047
• Size, max.	16 KByte	16 KByte	16 KByte	64 KByte
OB				
• Size, max.	16 KByte	16 KByte	16 KByte	64 KByte
Nesting depth				
• per priority class	8	8	8	16
• additional within an error OB	4	4	4	4
CPU/processing times				
for bit operations, min.	0.1 µs	0.1 µs	0.1 µs	0.05 µs
for word operations, min.	0.2 µs	0.2 µs	0.2 µs	0.2 µs
for fixed point arithmetic, min	2 µs	2 µs	2 µs	0.2 µs
for floating point arithmetic, min.	3 µs	3 µs	3 µs	1 µs

Technical specifications (continued)

	6AG1 314-1AF11-2AB0	6AG1 315-2AG10-2AB0	6AG1 315-2EG10-2AB0	6AG1 317-2EJ10-2AB0
Times/counters and their remanence				
S7 counter				
• Number	256	256	256	512
• of which remanent without battery				
- adjustable	Yes	Yes	Yes	Yes
• Remanence				
- adjustable	Yes	Yes	Yes	
• Counting range				
- adjustable	Yes	Yes	Yes	Yes
- lower limit	0	0	0	0
- upper limit	999	999	999	999
IEC counter				
• present	Yes	Yes	Yes	Yes
• Type	SFB	SFB	SFB	SFB
S7 times				
• Number	256	256	256	512
• Remanence				
- adjustable	Yes	Yes	Yes	Yes
- preset	No retentivity	No retentivity	No retentivity	No retentivity
• Time range				
- lower limit	10 ms	10 ms	10 ms	10 ms
- upper limit	9,990 s	9,990 s	9,990 s	9,990 s
IEC timer				
• present	Yes	Yes	Yes	Yes
• Type	SFB	SFB	SFB	SFB
Data areas and their remanence				
Flag				
• Number, max.	256 Byte	2,048 Byte	2,048 Byte	4,096 Byte
• Remanence available	Yes; MB 0 to MB 255	Yes; MB 0 to MB 2047	Yes; MB 0 to MB 2047	Yes; MB 0 to MB 4095
• Number of clock memories	8; 1 memory byte	8; 1 memory byte	8; 1 memory byte	8; 1 memory byte
Data blocks				
• Number, max.	511; from DB1 to DB511	1,023; from DB 1 to DB 1023	1,023; from DB 1 to DB 1023	2,047; from DB 1 to DB 2047
• Size, max.	16 KByte	16 KByte; Local data size: max. 1024 bytes per priority class/ 510 bytes per block	16 KByte	64 KByte
• Remanence adjustable				Yes; via non-retain property on DB
Local data				
• per priority class, max.	510 Byte	128 Byte	1,024 Byte; per block max. 510	1,024 Byte
Address area				
I/O address area				
• Inputs	1 KByte	2 KByte	2,048 Byte	8 KByte
• Outputs	1 KByte	2 KByte	2,048 Byte	8 KByte
• of which, distributed				
- Inputs		2 KByte	2 KByte	8 KByte
- Outputs		2 KByte	2 KByte	8 KByte

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Technical specifications (continued)

	6AG1 314-1AF11-2AB0	6AG1 315-2AG10-2AB0	6AG1 315-2EG10-2AB0	6AG1 317-2EJ10-2AB0
Process image				
• Inputs	128 Byte	128 Byte	128 Byte	256 Byte
• Outputs	128 Byte	128 Byte	128 Byte	256 Byte
• Inputs, adjustable				2,048 KByte
• Outputs, adjustable				2,048 KByte
• Inputs, preset				256 Byte
• Outputs, preset				256 Byte
Digital channels				
• Inputs	1,024	16,384	16,384	65,536
• Outputs	1,024	16,384	16,384	65,536
• Inputs, of which central	1,024	1,024	1,024; max.	1,024
• Outputs, of which central	1,024	1,024	1,024; max.	1,024
Analog channels				
• Inputs	256	1,024	1,024	4,096
• Outputs	256	1,024	1,024	4,096
• Inputs, of which central	256	256	256; max.	256
• Outputs, of which central	256	256	256; max.	256
Hardware config.				
Racks, max.	4	4	4	4
Modules per rack, max.	8	8	8	8
Number of DP masters				
• integrated	0	1	1	1
• via CP	4	4	4	4
Number of operable FMs and CPs (recommended)				
• FM	8	8	8	8
• CP, point-to-point	8	8	8	8
• CP, LAN	10	10	10	10
Time				
Clock				
• Hardware clock (real-time clock)	Yes	Yes	Yes	Yes
• Battery backed and synchronized	Yes	Yes	Yes	Yes
• Deviation per day, max.	10 s	10 s	10 s	10 s
Operating hours counter				
• Number	1	1	1	4
• Number/Number range	0	0	0	0 to 3
• Range of values	0 to 2^31 hours (when using SFC101)	0 to 2^31 hours (when using SFC101)	2 to the power of 31 hours (when using the SFC 101)	0 to 2^31 hours (when using SFC101)
• Granularity	1 hour	1 hour	1 hour	1 hour
• remanent	Yes; must be restarted at each warm restart	Yes; must be restarted at each warm restart	Yes; must be restarted at each warm restart	Yes; must be restarted at each warm restart
Clock synchronization				
• supports	Yes	Yes	Yes	Yes
• to MPI, Master	Yes	Yes	Yes	Yes
• to MPI, Slave	Yes	Yes	Yes	Yes
• in AS, Master	Yes	Yes	Yes	Yes
• in AS, Slave			Yes	Yes
S7 message functions				
Number of login stations for message functions, max.	12; depending on the configured connections for PG/OP and S7 basic communication	16; depending on the configured connections for PG-/ OP- and S7-basic commmunication	16; depending on the configured connections for PG-/ OP- and S7-basic commmunication	32; depending on the configured connections for PG-/ OP- and S7-basic commmunication

Technical specifications (continued)

	6AG1 314-1AF11-2AB0	6AG1 315-2AG10-2AB0	6AG1 315-2EG10-2AB0	6AG1 317-2EJ10-2AB0
Process diagnostic messages	Yes	Yes	Yes	Yes
Simultaneously active Alarm-S blocks, max.	40	40	40	60
Test commissioning functions				
Status/control				
• Status/control variable	Yes	Yes	Yes	Yes
• Variables	Inputs, outputs, memory bits, DB, times, counters	Inputs, outputs, memory bits, DB, times, counters	Inputs, outputs, memory bits, DB, times, counters	Inputs, outputs, memory bits, DB, times, counters
Monitoring functions				
• Number of variables, max.	30	30	30	30
• of which status variable, max.	30	30	30	30
• of which control variable, max.	14	14	14	14
Forcing				
• Forcing	Yes	Yes	Yes	Yes
• Force, variables	Inputs, outputs	Inputs, outputs	Inputs, outputs	Inputs, outputs
• Forcing, number of variables, max.	10	10	10	10
Status block	Yes	Yes	Yes	Yes
Single step	Yes	Yes	Yes	Yes
Number of breakpoints	2	2	2	2
Diagnostic buffer				
• present	Yes	Yes	Yes	Yes
• Number of entries, max.	100	100	100	100
• adjustable	No	No	No	
Communication functions				
PG/OP communication	Yes	Yes	Yes	Yes
Routing	No	Yes	Yes	Yes
Global data communication				
• supported	Yes	Yes	Yes	Yes
• Size of GD packets, max.	22 Byte	22 Byte	22 Byte	22 Byte
S7 basic communication				
• supported	Yes	Yes	Yes	Yes
S7 communication				
• supported	Yes	Yes	Yes	Yes
S5-compatible communication				
• supported	Yes; via CP and loadable FC	Yes; via CP and loadable FC	Yes; via CP and loadable FC	Yes; via CP and loadable FC
Open IE communication				
• TCP/IP			Yes; via integrated PROFINET interface and loadable FBs	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.			8	8
- Data length, max.			1,460 Byte	1,460 Byte
Number of connections				
• overall	12	16	16	32
• usable for PG communication	11	15	15; max.	31
• usable for OP communication	11	15	15	31
• usable for S7 basic communication	8	12	14	30
• usable for routing		4		

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Technical specifications (continued)

	6AG1 314-1AF11-2AB0	6AG1 315-2AG10-2AB0	6AG1 315-2EG10-2AB0	6AG1 317-2EJ10-2AB0
PROFINET CBA (at set setpoint communication load)				
• Setpoint for the CPU communication load				50%
• Number of remote interconnection partners				32
• Number of functions, master/slave				17
• Total of all master/slave connections				1,000
• Data length of all incoming connections master/slave, max.				4,000 Byte
• Data length of all outgoing connections master/slave, max.				4,000 Byte
• Number of device-internal and PROFIBUS interconnections				500
• Data length of device-internal und PROFIBUS interconnections, max.				4,000 Byte
• Data length per connection, max.				1,400 Byte
• Remote interconnections with acyclic transmission				
- Sampling frequency: sampling interval, min.				500 ms
- Number of incoming interconnections				100
- Number of outgoing interconnections				100
- Data length of all incoming interconnections, max.				2,000 Byte
- Data length of all outgoing interconnections, max.				2,000 Byte
- Data length per connection, max.				1,400 Byte
• Remote interconnections with cyclic transmission				
- Transmission frequency: transmission interval, min.				10 ms
- Number of incoming interconnections				200
- Data length of all incoming interconnections, max.				2,000 Byte
- Data length of all outgoing interconnections, max.				2,000 Byte
- Data length per connection, max.				450 Byte
• HMI variables via PROFINET (acyclic)				
- Number of log-in stations for HMI variables (PN OPC/iMap)				3; 2 * PN OPC / 1 * iMap
- HMI variable updating				500 ms
- Number of HMI variables				200
- Data length of all HMI variables, max.				2,000 Byte

Technical specifications (continued)

	6AG1 314-1AF11-2AB0	6AG1 315-2AG10-2AB0	6AG1 315-2EG10-2AB0	6AG1 317-2EJ10-2AB0
• PROFIBUS proxy functionality				
- supported				Yes
- Number of linked PROFIBUS devices				16
- Data length per connection, max.				240 Byte; Slave-dependent
1st interface				
Type of interface	Integral RS 485 interface	Integral RS 485 interface	Integral RS 485 interface	Integral RS 485 interface
Physics	RS 485	RS 485	RS 485	RS 485
isolated	No	No	Yes	Yes
Power supply to interface (15 to 30 V DC), max.	200 mA	200 mA	200 mA	200 mA
Functionality				
• MPI	Yes	Yes	Yes	Yes
• DP master	No	No	Yes	Yes
• DP slave	No	No	Yes	Yes
• Point-to-point coupling	No	No	No	No
MPI				
• Number of connections	12	16	16	16
• Services				
- PG/OP communication	Yes	Yes	Yes	Yes
- Routing	No	Yes	Yes	Yes
- Global data communication	Yes	Yes	Yes	Yes
- S7 basic communication	Yes	Yes	Yes	Yes
- S7 communication	Yes	Yes	Yes	Yes
- S7 communication, as client	No	No	No	No
- S7 communication, as server	Yes	Yes	Yes	Yes
• Transmission speeds, max.	187.5 kBit/s	187.5 kBit/s	12 Mbit/s	12 Mbit/s
DP master				
• Services				
- PG/OP communication			Yes	Yes
- Routing			Yes	Yes
- Global data communication			No	No
- S7 basic communication			Yes	Yes
- S7 communication			Yes	Yes
- Equidistance support			Yes	Yes
- SYNC/FREEZE			Yes	Yes
- DPV1			Yes	Yes
• Transmission speeds, max.			12 Mbit/s	12 Mbit/s
• Number of DP slaves, max.			124	124
• Address area				
- Inputs, max.				244 KByte
- Outputs, max.				244 KByte
DP slave				
• Services				
- Routing			Yes; only when interface active	Yes; only when interface active
- Global data communication			No	No
- S7 basic communication			Yes	Yes
- S7 communication			Yes	Yes
- direct data exchange (cross traffic)			Yes	Yes
- DPV1			No	No

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Technical specifications (continued)

	6AG1 314-1AF11-2AB0	6AG1 315-2AG10-2AB0	6AG1 315-2EG10-2AB0	6AG1 317-2EJ10-2AB0
DP slave (continued)				
• Transmission speeds, max.			12 Mbit/s	12 Mbit/s
• Transfer memory				
- Inputs			244 Byte	244 Byte
- Outputs			244 Byte	244 Byte
• Address area, max.			32; with max. 32 bytes each	32
• Useful data per address area, max.				32 Byte
2nd interface				
Type of interface		Integral RS 485 interface	PROFINET	PROFINET
Physics		RS 485	Ethernet	RJ45
isolated		Yes	Yes	Yes
Power supply to interface (15 to 30 V DC), max.		200 mA	0 mA	0 mA
automatic detection of transmission speed			Yes; (10/100 MBit/s)	Yes; (10/100 MBit/s)
Functionality				
• MPI		No	No	No
• DP master		Yes	No	No
• DP slave		Yes	No	No
• Point-to-point coupling		No	No	No
• PROFINET CBA			Yes	Yes
• PROFINET IO-Controller			Yes	Yes; Yes; Firmware Status V2.3 or higher
DP master				
• Number of connections, max.		16		
• Services				
- PG/OP communication		Yes		
- Routing		Yes		
- Global data communication		No		
- S7 basic communication		Yes		
- S7 communication		Yes		
- S7 communication, as client		No		
- S7 communication, as server		Yes		
- equidistance support		Yes		
- SYNC/FREEZE		Yes		
- DPV1		Yes		
• Transmission speeds, max.		12 Mbit/s		
• Number of DP slaves, max.		124; per station		
• Address area				
- Inputs, max.		244 Byte		
- Outputs, max.		244 Byte		
DP slave				
• Number of connections		16		
• Services				
- PG/OP communication		Yes		
- Routing		Yes; when interface active		
- Global data communication		No		
- S7 basic communication		Yes		
- S7 communication, as client		No		

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Technical specifications (continued)

	6AG1 314-1AF11-2AB0	6AG1 315-2AG10-2AB0	6AG1 315-2EG10-2AB0	6AG1 317-2EJ10-2AB0
• Services (continued)				
- S7 communication, as server		Yes		
- direct data exchange (cross traffic)		Yes		
- DPV1		No		
• GSD file		http://www.ad.siemens.de/support in Product Support area		
• Transmission speeds, max.		12 Mbit/s		
• automatic baud rate search		Yes; only with passive interface		
• Transfer memory				
- Inputs		244 Byte		
- Outputs		244 Byte		
• Address area, max.		32		
• Useful data per address area, max.		32 Byte		
PROFINET CBA				
• Acyclic transmission			Yes	Yes
• cyclic transmission			Yes	Yes
PROFINET IO controller				
• Services				
- PG/OP communication			Yes	Yes
- Routing			Yes	Yes
- S7 communication			Yes; with loadable FBs, max. configurable connectons: 16	Yes; with loadable FBs, max. configurable connectons: 16
- open IE communication			Yes; via TCP/IP	Yes; via TCP/IP
• Transmission speed, max.			100 Mbit/s	100 Mbit/s
• Number of connectable IO-devices, max.			128	128
• Address area				
- Inputs, max.			2 KByte	8 KByte
- Outputs, max.			2 KByte	8 KByte
• Useful data consistency, max.			256 Byte	256 Byte
CPU/programming				
Programming language				
• STEP 7	Yes; V 5.2 SP 1 or higher with HW update	Yes; V 5.1 SP4 or higher	Yes; V 5.3 SP1 or higher	Yes; V 5.3 or higher
• LAD	Yes	Yes	Yes	Yes
• FUP	Yes	Yes	Yes	Yes
• AWL	Yes	Yes	Yes	Yes
• SCL	Yes	Yes	Yes	Yes
• CFC	Yes	Yes	Yes	Yes
• GRAPH	Yes	Yes	Yes	Yes
• HiGraph	Yes	Yes	Yes	Yes

SIPLUS standard CPUs

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Technical specifications (continued)

	6AG1 314-1AF11-2AB0	6AG1 315-2AG10-2AB0	6AG1 315-2EG10-2AB0	6AG1 317-2EJ10-2AB0
Software libraries				
Operational stocks	See Operation List	See Operation List	See Operation List	See Operation List
Nesting levels	8	8	8	8
User program protection/password protection	Yes	Yes	Yes	Yes
System functions (SFC)	See Operation List	See Operation List	See Operation List	See Operation List
System function blocks (SFB)	See Operation List	See Operation List	See Operation List	See Operation List
Dimensions and weight				
Width	40 mm	40 mm	80 mm	80 mm
Height	125 mm	125 mm	125 mm	125 mm
Depth	130 mm	130 mm	130 mm	130 mm
Weights				
Weight, approx.	280 g	290 g	460 g	460 g

Ordering data

		Order No.
SIPLUS CPU 314	A)	**6AG1 314-1AF11-2AB0**
(extended temperature range and medial load) Main memory 64 KB, power supply 24 V DC, MPI; MMC required		
SIPLUS CPU 315-2 DP	A)	**6AG1 315-2AG10-2AB0**
(extended temperature range and medial load) Main memory 128 KB, power supply 24 V DC, MPI/PROFIBUS DP master/slave interface, MMC required		
SIPLUS CPU 315-2 PN/DP		**6AG1 315-2EG10-2AB0**
(extended temperature range and medial load) Main memory 128 KB, power supply 24 V DC, combined MPI/PROFIBUS DP master/slave interface, Ethernet/PROFINET interface; MMC required		

	Order No.
SIPLUS CPU 317-2 PN/DP	**6AG1 317-2EJ10-2AB0**
(extended temperature range and medial load) Main memory 512 KB, power supply 24 V DC, combined MPI/PROFIBUS DP master/slave interface, Ethernet/PROFINET interface; MMC required	
Accessories	see S7-300 standard CPUs, page 4/41

A) Subject to export regulations: AL: N and ECCN: EAR99H

Overview SIPLUS CPU 315F-2 DP

- For design of a fail-safe automation system for plants with increased safety requirements
- Based on the SIMATIC CPU 315-2 DP
- Complies with safety requirements up to SIL 3 to IEC 61508 and up to Cat. 4 according to EN 954-1
- Distributed fail-safe I/O modules can be connected through the integral PROFIBUS DP interface (PROFIsafe).
- Fail-safe I/O modules of the ET 200M range can also be centrally connected
- Central and distributed use of standard modules for non-safety-relevant applications

Micro memory card required to operate the CPU.

	SIPLUS CPU 315F-2 DP
Order No.	**6AG1 315-6FF01-2AB0**
Order No. based on	**6ES7 315-6FF01-0AB0**
Ambient temperature range	-25 °C to +60 °C, condensation permissible
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1)	Yes
Technical data	The technical data are identical with the technical data of the based on modules.

Overview SIPLUS CPU 317F-2 DP

- The fail-safe CPU with a large program memory and quantity framework for demanding applications
- For design of a fail-safe automation system for plants with increased safety requirements
- Complies with safety requirements up to SIL 3 to IEC 61508 and up to Cat. 4 according to EN 954-1
- Distributed fail-safe I/O modules can be connected through the two integral PROFIBUS DP interfaces (PROFIsafe).
- Fail-safe I/O modules of the ET 200M range can also be centrally connected
- Central and distributed use of standard modules for non safety-relevant applications

Micro memory card required to operate the CPU.

	SIPLUS CPU 317F-2 DP
Order No.	**6AG1 317-6FF00-2AB0**
Order No. based on	**6ES7 317-6FF00-0AB0**
Ambient temperature range	-25 °C to +60 °C, condensation permissible
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1)	Yes
Technical data	The technical data are identical with the technical data of the based on modules.

SIPLUS fail-safe CPUs

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Technical specifications

	6AG1 315-6FF01-2AB0	6AG1 317-6FF00-2AB0
Product status		
associated programming package	STEP 7 V5.1 or higher + SP 6	STEP 7 V 5.2 or higher + SP1; S7 Distributed Safety V5.2 + SP1 or higher
Supply voltages		
Rated value		
• DC 24 V	Yes	Yes
• permissible range, lower limit (DC)	20.4 V	20.4 V
• permissible range, upper limit (DC)	28.8 V	28.8 V
Voltages and currents		
external protection for supply cables (recommendation)	min. 2 A	min. 2 A
Current consumption		
Inrush current, typ.	2.5 A	2.5 A
I^2t	0.5 A^2s	0.5 A^2s
Current consumption (in no-load operation), typ.	60 mA	60 mA
Power loss, typ.	2.5 W	2.5 W
Memory		
• RAM		
- integrated		
- expandable	192 KByte; The number of F-instructions compared to a standard program is limited due to the F-specific overheads; depending on the type of programming, about 36 K F-instructions are possible.	512 KByte; of which max. 256 kB for retentive DB
• RAM	No	No
• Load memory		
- pluggable (MMC)	Yes	Yes
- pluggable (MMC), max.	8 MByte	8 MByte
Backup		
• present	Yes; Guaranteed by MMC (maintenance-free)	Yes; Guaranteed by MMC (maintenance-free)
CPU/blocks		
DB		
• Number, max.	1,023; DB 0 reserved	2,047; DB 0 reserved
• Size, max.	16 KByte	64 KByte

	6AG1 315-6FF01-2AB0	6AG1 317-6FF00-2AB0
FB		
• Number, max.	2,048; See Operation List	2,048; See Operation List
• Size, max.	16 KByte	64 KByte
FC		
• Number, max.	2,048; See Operation List	2,048; See Operation List
• Size, max.	16 KByte	64 KByte
OB		
• Size, max.	16 KByte	64 KByte
Nesting depth		
• per priority class	8	8
• additional within an error OB	4	4
CPU/processing times		
for bit operations, min.	0.1 µs	0.1 µs
for word operations, min.	0.2 µs	0.1 µs
for fixed point arithmetic, min.	2 µs	0.2 µs
for floating point arithmetic, min.	6 µs	2 µs
Times/counters and their remanence		
S7 counter		
• Number	256	512
• of which remanent without battery - adjustable	Yes	Yes
• Counting range		
- lower limit	0	0
- upper limit	999	999
IEC counter		
• present	Yes	Yes
• Type	SFB	SFB
S7 times		
• Number	256	512
• Remanence		
- adjustable	Yes	Yes
- preset	No retentivity	No retentivity
• Time range		
- lower limit	10 ms	10 ms
- upper limit	9,990 s	9,990 s
IEC timer		
• present	Yes	Yes
• Type	SFB	SFB
Data areas and their remanence		
Flag		
• Number, max.	2,048 Byte	4,096 Byte
• Remanence available	Yes; MB 0 to MB 2047	Yes; MB 0 to MB 4095
• Number of clock memories	8; 1 memory byte	8; 1 memory byte

Technical specifications (continued)

	6AG1 315-6FF01-2AB0	6AG1 317-6FF00-2AB0
Data blocks		
• Number, max.	1,023; DB 0 reserved	2,047; DB 0 reserved
• Size, max.	16 KByte	64 KByte
Local data		
• per priority class, max.	1,024 Byte	1,024 Byte
Address area		
I/O address area		
• Inputs	2 KByte	8 KByte
• Outputs	2 KByte	8 KByte
• of which, distributed		
- Inputs	2 KByte	8 KByte
- Outputs	2 KByte	8 KByte
Process image		
• Inputs	384 Byte	1,024
• Outputs	384 Byte	1,024
Digital channels		
• Inputs	16,384	65,536
• Outputs	16,384	65,536
• Inputs, of which central	1,024	1,024
• Outputs, of which central	1,024	1,024
Analog channels		
• Inputs	1,024	1,024
• Outputs	1,024	1,024
• Inputs, of which central	256	256
• Outputs, of which central	256	256
Hardware config.		
Racks, max.	4	4
Modules per rack, max.	8	8
Number of DP masters		
• integrated	1	2
• via CP	1	2
Number of operable FMs and CPs (recommended)		
• FM	8	8
• CP, point-to-point	8	8
• CP, LAN	10	10
Time		
Clock		
• Hardware clock (real-time clock)	Yes	Yes
• Battery backed and synchronized	Yes	Yes
• Deviation per day, max.	10 s	10 s

	6AG1 315-6FF01-2AB0	6AG1 317-6FF00-2AB0
Operating hours counter		
• Number	1	4
• Number/Number range	0	0 bis 3
• Range of values	0 to 2^31 hours (when using SFC101)	0 to 2^31 hours (when using SFC101)
• Granularity	1 hour	1 hour
• remanent	Yes; must be restarted at each warm restart	Yes; must be restarted at each warm restart
Clock synchronization		
• supports	Yes	Yes
• to MPI, Master	Yes	Yes
• to MPI, Slave	Yes	Yes
• in AS, Master	Yes	Yes
S7 message functions		
Number of login stations for message functions, max.	16; depending on the configured connections for PG/OP and S7 basic communication	32; depending on the configured connections for PG-/ OP- and S7- basic commmunication
Process diagnostic messages	Yes	Yes
Simultaneously active Alarm-S blocks, max.	40	60
Test commissioning functions		
Status/control		
• Status/control variable	Yes	Yes
• Variables	Inputs, outputs, memory bits, DB, times, counters	Inputs, outputs, memory bits, DB, times, counters
Monitoring functions		
• Number of variables, max.	30	30
• of which status variable, max.	30	30
• of which control variable, max.	14	14
Forcing		
• Forcing	Yes	Yes
• Force, variables	Inputs, outputs	Inputs, outputs
• Forcing, number of variables, max.	10	10
Status block	Yes	Yes
Single step	Yes	Yes
Number of breakpoints	2	2
Diagnostic buffer		
• present	Yes	Yes
• Number of entries, max.	100	100
• adjustable	No	No

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Technical specifications (continued)

	6AG1 315-6FF01-2AB0	6AG1 317-6FF00-2AB0
Communication functions		
PG/OP communication	Yes	Yes
Routing	Yes	Yes
Global data communication		
• supported	Yes	Yes
• Size of GD packets, max.	22 Byte	22 Byte
S7 basic communication		
• supported	Yes	Yes
S7 communication		
• supported	Yes	Yes
S5-compatible communication		
• supported	Yes; via CP and loadable FC	Yes; via CP and loadable FC
Number of connections		
• overall	16	32
• usable for PG communication	15	31
• usable for OP communication	15	31
• usable for S7 basic communication	13	31
1st interface		
Type of interface	Integral RS 485 interface	Integral RS 485 interface
Physics	RS 485	RS 485
isolated	No	No
Power supply to interface (15 to 30 V DC), max.	200 mA	200 mA
Functionality		
• MPI	Yes	Yes
• DP master	No	Yes
• DP slave	No	No
• Point-to-point coupling	No	No
MPI		
• Number of connections	16	32
• Services		
- PG/OP communication	Yes	Yes
- Routing	Yes	Yes
- Global data communication	Yes	Yes
- S7 basic communication	Yes	Yes
- S7 communication	Yes	Yes
- S7 communication, as client	Yes; via CP and loadable FB	Yes; via CP and loadable FB
- S7 communication, as server	Yes	Yes
• Transmission speeds, max.	187.5 kBit/s	12 Mbit/s

	6AG1 315-6FF01-2AB0	6AG1 317-6FF00-2AB0
DP master		
• Number of connections, max.		32
• Services		
- PG/OP communication		Yes
- Routing		Yes
- Global data communication		No
- S7 basic communication		No
- S7 communication		No
- equidistance support		Yes
- SYNC/FREEZE		Yes
- DPV1		Yes
• Transmission speeds, max.		12 Mbit/s
• Number of DP slaves, max.		125
• Address area		
- Inputs, max.		244 KByte
- Outputs, max.		244 KByte
2nd interface		
Type of interface	Integral RS 485 interface	Integral RS 485 interface
Physics	RS 485	RS 485
isolated	Yes	Yes
Power supply to interface (15 to 30 V DC), max.	200 mA	200 mA
Functionality		
• MPI	No	No
• DP master	Yes	Yes
• DP slave	Yes	Yes
• Point-to-point coupling	No	No
DP master		
• Number of connections, max.	16	32
• Services		
- PG/OP communication	Yes	Yes
- Routing	Yes	Yes
- Global data communication	No	No
- S7 basic communication	No	No
- S7 communication	No	No
- equidistance support	Yes	Yes
- SYNC/FREEZE	Yes	Yes
- DPV1	Yes	Yes
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s
• Number of DP slaves, max.	125	125
• Address area		
- Inputs, max.	244 KByte	244 KByte
- Outputs, max.	244 KByte	244 KByte

Technical specifications (continued)

	6AG1 315-6FF01-2AB0	6AG1 317-6FF00-2AB0
DP slave		
• Number of connections	16	32
• Services		
- PG/OP communication	Yes	Yes
- Routing	Yes; when interface active	Yes; when interface active
- Global data communication	No	No
- S7 basic communication	No	No
- S7 communication, as client	No	No
- S7 communication, as server	No	No
- direct data exchange (cross traffic)	Yes	Yes
- DPV1	No	No
• GSD file	http://www.ad.siemens.de/csi_e/gsd	http://www.ad.siemens.de/csi_e/gsd
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s
• Transfer memory		
- Inputs	244 Byte	244 Byte
- Outputs	244 Byte	244 Byte
• Address area, max.	32	32
• Useful data per address area, max.	32 Byte	32 Byte
CPU/programming		
Programming language		
• STEP 7	Yes; V5.1 SP6 or higher	Yes; STEP 7 as of V 5.2 + SP1; S7 Distributed Safety as of V5.2 SP1
• LAD	Yes	Yes
• FUP	Yes	Yes
• AWL	Yes	Yes
• SCL	Yes	Yes
Software libraries		
Operational stocks	See Operation List	See Operation List
Nesting levels	8	8
User program protection/password protection	Yes	Yes
System functions (SFC)	See Operation List	See Operation List
System function blocks (SFB)	See Operation List	See Operation List
Dimensions and weight		
Width	40 mm	80 mm
Height	125 mm	125 mm
Depth	130 mm	130 mm
Weights		
Weight, approx.	290 g	560 g

Ordering data

	Order No.
SIPLUS CPU 315F-2 DP (extended temperature range and medial load) CPU for SIMATIC S7-300F; main memory 192 KB, power supply 24 V DC, MPI/PROFIBUS DP master/slave interface, incl. single location number labels; MMC required	**6AG1 315-6FF01-2AB0**
SIPLUS CPU 317F-2 DP (extended temperature range and medial load) Main memory 512 KB, power supply 24 V DC, MPI, PROFIBUS DP master/slave interface, MMC required	**6AG1 317-6FF00-2AB0**
Accessories	see S7-300 fail-safe CPUs, page 4/62

SM 321 digital input modules

Overview

- Digital inputs
- For connecting standard switches and two-wire proximity switches (BERO)

Technical specifications

	6ES7 321-1BH02-0AA0	6ES7 321-1BH50-0AA0	6ES7 321-1BL00-0AA0	6ES7 321-1BH10-0AA0
Voltages and currents				
Load voltage L+				
• Rated value (DC)	24 V	24 V	24 V	24 V
Current consumption				
from load voltage L+ (without load), max.	25 mA			
from backplane bus DC 5 V, max.	10 mA	10 mA	15 mA	110 mA
Power loss, typ.	3.5 W	3.5 W	6.5 W	3.8 W
Connection point				
required front connectors	20-pin	20-pin	40-pin	20-pin
Isochronous mode				
Isochronouos mode	No	No	No	Yes
Digital inputs				
Number of digital inputs	16	16	32	16
Number of simultaneously controllable inputs				
• vertical installation				
- up to 40 °C, max.	16	16	32	16
• horizontal installation				
- up to 40 °C, max.			32	
- up to 60 °C, max.	16	16	16	16
Cable length				
• Cable length, shielded, max.	1,000 m	1,000 m	1,000 m	1,000 m
• Cable length unshielded, max.	600 m	600 m	600 m	600 m
Input characteristic curve to IEC 1131, type 1	Yes	Yes	Yes	Yes
Input voltage				
• Rated value, DC	24 V	24 V	24 V	24 V
• for signal "0"	-30 V to 5 V	30 V to -5V	-30 to 5 V	-30 V to 5 V
• for signal "1"	13 to 30 V	-13 to -30 V	13 to 30 V	13 to 30 V
Input current				
• for signal "1", typ.	7 mA	7 mA	7 mA	7 mA

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Technical specifications (continued)

	6ES7 321-1BH02-0AA0	6ES7 321-1BH50-0AA0	6ES7 321-1BL00-0AA0	6ES7 321-1BH10-0AA0
Digital inputs				
Input delay (for rated value of input voltage)				
• for standard inputs				
- at "0" to "1", min.	1.2 ms	1.2 ms	1.2 ms	25 µs
- at "0" to "1", max.	4.8 ms	4.8 ms	4.8 ms	75 µs
Encoder				
Connectable encoders				
• 2-wire BEROS	Yes	Yes	Yes	Yes
• permissible quiescent current (2-wire BEROS), max.	1.5 mA	1.5 mA	1.5 mA	1.5 mA
Status information/ alarms/diagnostics				
Alarms				
• Alarms	No	No	No	No
Diagnoses				
• Diagnostic functions	No	No	No	No
Diagnostics indication LED				
• Status indicator digital input (green)	Yes	Yes	Yes	Yes
Isolation				
Isolation checked with	500 V DC	500 V DC	500 V DC	500 V DC
Isolation				
Galvanic isolation, digital inputs				
• between the channels			Yes	
• between the channels, in groups of	16	16	16	16
• between the channels and the backplane bus	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler
Dimensions and weight				
Width	40 mm	40 mm	40 mm	40 mm
Height	125 mm	125 mm	125 mm	125 mm
Depth	120 mm	120 mm	120 mm	120 mm
Weights				
Weight, approx.	200 g	200 g	260 g	200 g

	6ES7 321-7BH01-0AB0	6ES7 321-1CH00-0AA0	6ES7 321-1CH20-0AA0	6ES7 321-1FH00-0AA0
Voltages and currents				
Load voltage L+				
• Rated value (DC)	24 V	24 V	48 V	
Load voltage L1				
• Rated value (AC)		24 V		230 V; 120/230 V AC; all load voltages must have the same phase.
Current consumption				
from load voltage L+ (without load), max.	90 mA			
from backplane bus DC 5 V, max.	130 mA	100 mA	40 mA	29 mA
Power loss, typ.	4 W	1.5 W	4.3 W	4.9 W
Connection point				
required front connectors	20-pin	40-pin	20-pin	20-pin

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Technical specifications (continued)

	6ES7 321-7BH01-0AB0	6ES7 321-1CH00-0AA0	6ES7 321-1CH20-0AA0	6ES7 321-1FH00-0AA0
Isochronous mode				
Isochronouos mode	Yes	No	No	No
Digital inputs				
Number of digital inputs	16	16	16	16
Number of simultanneously controllable inputs				
• vertical installation				
- up to 40 °C, max.	16	16	8	16
• horizontal installation				
- up to 50 °C, max.			8	
- up to 60 °C, max.	16	16	8; 6 to Ue 146 V	16
Cable length				
• Cable length, shielded, max.	1,000 m	1,000 m	1,000 m	1,000 m
• Cable length unshielded, max.	600 m	600 m	600 m	600 m
Input characteristic curve to IEC 1131, type 1		Yes	Yes	Yes
Input characteristic curve to IEC 1131, type 2	Yes			
Input voltage				
• Rated value, AC		24 V; AC 24 or 48 V		230 V; 120/230 V AC
• Rated value, DC	24 V	24 V; DC 24 or 48 V	48 V; DC 48 to 125 V	
• for signal "0"	-30V to 5 V	-5 to 5 V AC	-146 V to 15 V DC	0 to 40 V
• for signal "1"	13 to 30 V	14 to 60 V AC	30 to 146 V DC	85 to 264 V
• Frequency range		0 to 63 Hz		47 to 63 Hz
Input current				
• for signal "1", typ.	7 mA	2.7 mA	3.5 mA	8 mA; (120V, 60Hz), 16mA (230V, 50Hz)
Input delay (for rated value of input voltage)				
• for standard inputs				
- programmable	Yes; 0.1 / 0.5 / 3 / 15 / 20 ms	No		No
- at "0" to "1", min.			0.1 ms	
- at "0" to "1", max.		16 ms	3.5 ms	25 ms
Encoder				
Connectable encoders				
• 2-wire BEROS	Yes	Yes	Yes	Yes
• permissible quiescent current (2-wire BEROS), max.	2 mA	1 mA	1 mA	2 mA
Status information/ alarms/diagnostics				
Alarms				
• Alarms	Yes	No	No	No
• Diagnostic alarm	Yes; parameterizable	No	No	No
• Process alarm	Yes; parameterizable	No	No	No
Diagnoses				
• Diagnostic functions	Yes; parameterizable	No	No	No
Diagnostics indication LED				
• Status indicator digital input (green)	Yes	Yes	Yes	Yes

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Technical specifications (continued)

	6ES7 321-7BH01-0AB0	6ES7 321-1CH00-0AA0	6ES7 321-1CH20-0AA0	6ES7 321-1FH00-0AA0
Isolation				
Isolation checked with	500 V DC	1500 V AC	1500 V DC	4000 V DC
Isolation				
Galvanic isolation, digital inputs				
• between the channels		Yes	Yes	Yes
• between the channels, in groups of	16	1	8	4
• between the channels and the backplane bus	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler
Dimensions and weight				
Width	40 mm	40 mm	40 mm	40 mm
Height	125 mm	125 mm	125 mm	125 mm
Depth	120 mm	120 mm	120 mm	120 mm
Weights				
Weight, approx.	200 g	260 g	200 g	240 g

	6ES7 321-1EL00-0AA0	6ES7 321-1FF01-0AA0	6ES7 321-1FF10-0AA0
Voltages and currents			
Load voltage L1			
• Rated value (AC)	120 V	230 V; 120V/230V AC	230 V; 120/230 V AC; all load voltages must have the same phase.
Current consumption			
from backplane bus DC 5 V, max.	16 mA	29 mA	100 mA
Power loss, typ.	4 W	4.9 W	4.9 W
Connection point			
required front connectors	40-pin	20-pin	40-pin
Isochronous mode			
Isochronouos mode	No	No	No
Digital inputs			
Number of digital inputs	32	8	8
Number of simultaneously controllable inputs			
• vertical installation - up to 40 °C, max.	32	8	8
• horizontal installation - up to 40 °C, max.	32		
- up to 60 °C, max.	24	8	8
Cable length			
• Cable length, shielded, max.	1,000 m	1,000 m	1,000 m
• Cable length unshielded, max.	600 m	600 m	600 m
Input characteristic curve to IEC 1131, type 1		Yes	Yes
Input characteristic curve to IEC 1131, type 2	Yes		
Input voltage			
• Rated value, AC	120 V	230 V; 120/230 V AC	120 V; 120/230 V AC
• for signal "0"	0 to 20 V	0 to 40 V	0 to 40 V
• for signal "1"	74 to 132 V	85 to 264 V	85 to 264 V
• Frequency range	47 to 63 Hz	47 to 63 Hz	47 to 63 Hz

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Technical specifications (continued)

	6ES7 321-1EL00-0AA0	6ES7 321-1FF01-0AA0	6ES7 321-1FF10-0AA0
Input current			
• for signal "1", typ.	21 mA	6.5 mA; (120 V); 11mA (230 V)	7.5 mA; (120 V); 17.3 mA (230 V)
Input delay (for rated value of input voltage)			
• for standard inputs			
- programmable	No	No	No
- at "0" to "1", max.	15 ms	25 ms	25 ms
Encoder			
Connectable encoders			
• 2-wire BEROS	Yes	Yes	Yes
• permissible quiescent current (2-wire BEROS), max.	4 mA	2 mA	2 mA
Status information/ alarms/diagnostics			
Alarms			
• Alarms	No	No	No
• Diagnostic alarm	No	No	No
• Process alarm	No	No	No
Diagnoses			
• Diagnostic functions	No	No	No
Diagnostics indication LED			
• Status indicator digital input (green)	Yes	Yes	Yes
Isolation			
Isolation checked with	2500 V DC	4000 V DC	1500 V AC
Isolation			
Galvanic isolation, digital inputs			
• between the channels	Yes	Yes	Yes
• between the channels, in groups of	8	2	1
• between the channels and the backplane bus	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler
Dimensions and weight			
Width	40 mm	40 mm	40 mm
Height	125 mm	125 mm	125 mm
Depth	120 mm	120 mm	120 mm
Weights			
Weight, approx.	300 g	240 g	240 g

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Ordering data		Order No.
SM 321 digital input modules		
incl. labeling strips, bus connector		
16 inputs, 24 V DC		**6ES7 321-1BH02-0AA0**
16 inputs, 24 V DC, active low		**6ES7 321-1BH50-0AA0**
32 inputs, 24 V DC		**6ES7 321-1BL00-0AA0**
16 inputs, 24 … 48 V DC	A)	**6ES7 321-1CH00-0AA0**
16 inputs, 48 … 125 V DC	A)	**6ES7 321-1CH20-0AA0**
16 inputs, 24 V DC, for isochronous mode		**6ES7 321-1BH10-0AA0**
32 inputs, 120 V AC	A)	**6ES7 321-1EL00-0AA0**
8 inputs, 120/230 V AC	A)	**6ES7 321-1FF01-0AA0**
8 inputs, 120/230 V AC, single root	A)	**6ES7 321-1FF10-0AA0**
16 inputs, 120/230 V AC	A)	**6ES7 321-1FH00-0AA0**
16 inputs, 24 V DC, for isochronous mode, diagnostics-capable		**6ES7 321-7BH01-0AB0**
Front connectors		
20-pin, with screw contacts		
• 1 unit		**6ES7 392-1AJ00-0AA0**
• 100 units		**6ES7 392-1AJ00-1AB0**
20-pin, with cage clamp contacts		
• 1 unit		**6ES7 392-1BJ00-0AA0**
• 100 units		**6ES7 392-1BJ00-1AB0**
40-pin, with screw contacts		
• 1 unit		**6ES7 392-1AM00-0AA0**
• 100 units		**6ES7 392-1AM00-1AB0**
40-pin with cage clamp contacts		
• 1 unit		**6ES7 392-1BM01-0AA0**
• 100 units		**6ES7 392-1BM01-1AB0**
SIMATIC TOP connect		See page 4/225; Information about which components can be used for the respective module, see A&D Mall or Catalog KT 10.2
Bus connectors		**6ES7 390-0AA00-0AA0**
1 unit (spare part)		
Labeling strips		
10 units (spare part)		
for modules with 20-pin front connector		**6ES7 392-2XX00-0AA0**
for modules with 40-pin front connector		**6ES7 392-2XX10-0AA0**
Label cover		
10 units (spare part)		
for modules with 20-pin front connector		**6ES7 392-2XY00-0AA0**
for modules with 40-pin front connector		**6ES7 392-2XY10-0AA0**

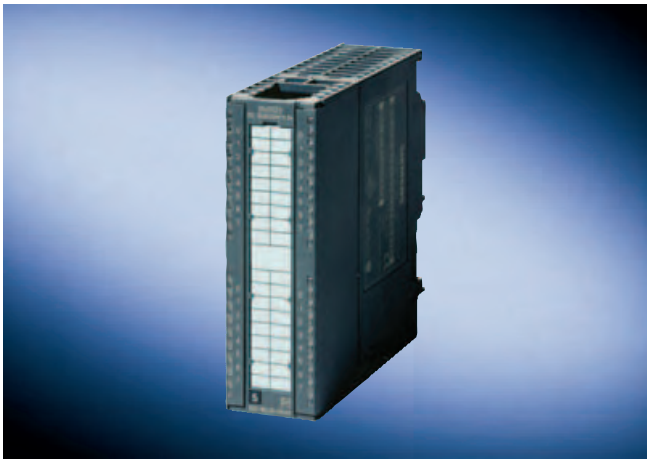
		Order No.
S7 SmartLabel		
Software for automatic labeling of modules based on data of the STEP 7 project		**2XV9 450-1SL01-0YX0**
Labeling sheets for machine inscription		
for 16-channel signal modules, DIN A4, for printing with laser printer; 10 units		
petrol		**6ES7 392-2AX00-0AA0**
light-beige		**6ES7 392-2BX00-0AA0**
yellow		**6ES7 392-2CX00-0AA0**
red		**6ES7 392-2DX00-0AA0**
for 32-channel signal modules, DIN A4, for printing with laser printer; 10 units		
petrol		**6ES7 392-2AX10-0AA0**
light-beige		**6ES7 392-2BX10-0AA0**
yellow		**6ES7 392-2CX10-0AA0**
red		**6ES7 392-2DX10-0AA0**
SIMATIC Manual Collection	D)	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: S7-200, S7-300, C7, S7-400, SIMATIC DP (Distributed I/O), SIMATIC PC, SIMATIC PG, STEP 7, Engineering Tools, Runtime Software, SIMATIC PCS 7, SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication), SIMATIC Machine Vision, SIMATIC Sensors		
SIMATIC Manual Collection update service for 1 year	D)	**6ES7 998-8XC01-8YE2**
Current S7 Manual Collection DVD and the three subsequent updates		
S7-300 manual		
Design, CPU data, module data, instruction list		
German		**6ES7 398-8FA10-8AA0**
English		**6ES7 398-8FA10-8BA0**
French		**6ES7 398-8FA10-8CA0**
Spanish		**6ES7 398-8FA10-8DA0**
Italian		**6ES7 398-8FA10-8EA0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

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

SM 322 digital output modules

Overview



- Digital outputs
- For connecting solenoid valves, contactors, low-power motors, lamps and motor starters

Technical specifications

	6ES7 322-1BH01-0AA0	6ES7 322-1BH10-0AA0	6ES7 322-1BL00-0AA0	6ES7 322-8BF00-0AB0	6ES7 322-5GH00-0AB0	6ES7 322-1CF00-0AA0
Voltages and currents						
Load voltage L+						
• Rated value (DC)	24 V	24 V	24 V	24 V	24 V; 24/48	48 V; 48 to 125 V DC
Current consumption						
from load voltage L+ (without load), max.	80 mA	110 mA	160 mA	90 mA	200 mA	2 mA
from backplane bus DC 5 V, max.	80 mA	70 mA	110 mA	70 mA	100 mA	100 mA
Power loss, typ.	4.9 W	5 W	6.6 W	5 W	2.8 W	7.2 W
Connection point						
required front connectors	20-pin	20-pin	40-pin	20-pin	40-pin	20-pin
Digital outputs						
Number of digital outputs	16	16	32	8	16	8
Cable length, shielded, max.	1,000 m	1,000 m	1,000 m	1,000 m	1,000 m	1,000 m
Cable length unshielded, max.	600 m	600 m	600 m	600 m	600 m	600 m
Short-circuit protection of the output	Yes; electronic	Yes; electronic	Yes; electronic	Yes; electronic	No; to be provided externally	Yes; electronic
Limitation of inductive shutdown voltage to	L+ (-53 V)	L+ (-53 V)	L+ (-53 V)	L+ (-45 V)		M (-1V)
Lamp load, max.	5 W	5 W	5 W	5 W	2.5 W	15 W; 15 W (48 V) or 40 W (125 V)
Output voltage						
• for signal "1", min.	L+ (-0.8 V)	L+ (-0.8 V)	L+ (-0.8 V)	L+ (-0.8 V to -1.6 V)	L+ (-0.25 V)	L+ (-1.2 V)
Output current						
• for signal "1" rated value	0.5 A	0.5 A	0.5 A	0.5 A	0.5 A	1.5 A
• for signal "1" permissible range for 0 to 40 °C, min.	5 mA	5 mA	5 mA	10 mA		10 mA
• for signal "1" permissible range for 0 to 40 °C, max.	0.6 A	0.6 A	0.6 A	0.6 A		1.5 A
• for signal "1" permissible range for 40 to 60 °C, min.	5 mA	5 mA	5 mA	10 mA		10 mA
• for signal "1" permissible range for 40 to 60 °C, max.	0.6 A	0.6 A	0.6 A	0.6 A		1.5 A

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Technical specifications (continued)

	6ES7 322-1BH01-0AA0	6ES7 322-1BH10-0AA0	6ES7 322-1BL00-0AA0	6ES7 322-8BF00-0AB0	6ES7 322-5GH00-0AB0	6ES7 322-1CF00-0AA0
Output current (continued)						
• for signal "1" minimum load current	5 mA	5 mA	5 mA	10 mA		10 mA
• for signal "1" permissible peak current, max.					1.5 A; for 50 ms, 1 A^2s one-time	3 A; for 10 ms
• for signal "0" residual current, max.	0.5 mA	0.5 mA	0.5 mA	0.5 mA	10 µA	0.5 mA
Switching frequency						
• with resistive load, max.	100 Hz	1,000 Hz	100 Hz	100 Hz	10 Hz	25 Hz
• with inductive load, max.	0.5 Hz	0.5 Hz	0.5 Hz	2 Hz		0.5 Hz
• on lamp load, max.	10 Hz	10 Hz	10 Hz	10 Hz	0.5 Hz	10 Hz
Aggregate current of the outputs (per group)						
• vertical installation - up to 40 °C, max.	2 A	2 A	2 A	4 A		4 A
• horizontal installation - up to 40 °C, max.	4 A	4 A	4 A	4 A		6 A
- up to 50 °C, max.						4 A
- up to 60 °C, max.	3 A	3 A	3 A	3 A	0.5 A	3 A
• all other mounting positions - up to 40 °C, max.					0.5 A	
Status information/ alarms/diagnostics						
Alarms						
• Diagnostic alarm	No	No	No	Yes; channel by channel	Yes; parameterizable	No
Diagnoses						
• Diagnostics	No	No	No	Yes	Yes; Parameters can be assigned	No
Isolation						
Isolation checked with	500 V DC	500 V DC	500 V DC	500 V DC	1500 V AC	1500 V AC
Isolation						
Isolation, digital outputs						
• between the channels, in groups of	8	8	8	8	1	4
• between the channels and the backplane bus	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler
Dimensions and weight						
Width	40 mm	40 mm	40 mm	40 mm	40 mm	40 mm
Height	125 mm	125 mm	125 mm	125 mm	125 mm	125 mm
Depth	120 mm	120 mm	120 mm	120 mm	120 mm	120 mm
Weights						
Weight, approx.	190 g	200 g	260 g	210 g	260 g	250 g

	6ES7 322-1BF01-0AA0	6ES7 322-1FF01-0AA0	6ES7 322-5FF00-0AB0	6ES7 322-1FH00-0AA0	6ES7 322-1FL00-0AA0	6ES7 322-1HF01-0AA0
Voltages and currents						
Load voltage L+						
• Rated value (DC)	24 V					24 V
Load voltage L1						
• Rated value (AC)		230 V; 120/230 V AC	230 V; 120/230 V AC	230 V; 120/230 V AC	230 V; 120/230 V AC	

SM 322 digital output modules

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Technical specifications (continued)

	6ES7 322-1BF01-0AA0	6ES7 322-1FF01-0AA0	6ES7 322-5FF00-0AB0	6ES7 322-1FH00-0AA0	6ES7 322-1FL00-0AA0	6ES7 322-1HF01-0AA0
Current consumption						
from load voltage L+ (without load), max.	60 mA			2 mA		110 mA; Current consumption of relay
from load voltage L1 (without load), max.		2 mA	2 mA	3 mA	10 mA	110 mA
from backplane bus DC 5 V, max.	40 mA	100 mA	100 mA	200 mA	190 mA	40 mA
Power loss, typ.	6.8 W	8.6 W	8.6 W	8.6 W	25 W	3.2 W
Connection point						
required front connectors	20-pin	20-pin	40-pin	20-pin	20-pin	20-pin
Digital outputs						
Number of digital outputs	8	8	8	16	32	8; Relay
Cable length, shielded, max.	1,000 m	1,000 m	1,000 m	1,000 m	1,000 m	1,000 m
Cable length unshielded, max.	600 m	600 m	600 m	600 m	600 m	600 m
Short-circuit protection of the output	Yes; electronic	Yes; Fuse, 8 A / 250 V: per group	Yes; to be provided externally; fuse 3,15 A / 250 V, quick response	Yes; Fuse 8A, 250 V; per group	No	
Limitation of inductive shutdown voltage to	L+ (-48 V)					
Lamp load, max.	10 W	50 W	50 W	50 W	50 W	50 W
Output voltage						
• for signal "1", min.	L+ (-0.8 V)	L1 (-1.5 V)	L1 (-8.5 V)	L+(-0.8 V)	L1 (-0.8 V)	
Output current						
• for signal "1" rated value	2 A	2 A	2 A	1 A	1 A	
• for signal "1" permissible range for 0 to 40 °C, min.	5 mA	10 mA	10 mA	10 mA	10 mA	
• for signal "1" permissible range for 0 to 40 °C, max.	2.4 A	2 A	2 A	1 A	1 A	
• for signal "1" permissible range for 40 to 60 °C, min.	5 mA	10 mA	10 mA	10 mA	10 mA	
• for signal "1" permissible range for 40 to 60 °C, max.	2.4 A	1 A	1 A	0.5 A	1 A	
• for signal "1" minimum load current	5 mA	10 mA	10 mA	10 mA	10 mA	5 mA
• for signal "1" permissible peak current, max.		20 A; max. 1 AC cycle	20 A; with 2 half waves	20 A; with 2 half waves	10 A; per group (for 2 AC cycles)	
• for signal "0" residual current, max.	0.5 mA	2 mA	2 mA	2 mA	2 mA	
Switching frequency						
• with resistive load, max.	100 Hz	10 Hz	10 Hz	10 Hz	10 Hz	2 Hz
• with inductive load, max.	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz
• on lamp load, max.	10 Hz	1 Hz	1 Hz	1 Hz	1 Hz	2 Hz
• mechanical, max.						10 Hz
Aggregate current of the outputs (per group)						
• vertical installation - up to 40 °C, max.	4 A	2 A	4 A	2 A	4 A	

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Technical specifications (continued)

	6ES7 322-1BF01-0AA0	6ES7 322-1FF01-0AA0	6ES7 322-5FF00-0AB0	6ES7 322-1FH00-0AA0	6ES7 322-1FL00-0AA0	6ES7 322-1HF01-0AA0
Aggregate current of the outputs (per group)						
• horizontal installation						
- up to 40 °C, max.		4 A	8 A	4 A	4 A	
- up to 60 °C, max.	4 A	2 A	4 A	2 A	3 A	
Relay outputs						
Rated input voltage of relay L+ (DC)						24 V; 110 mA
Number of operating cycles						300,000; 230 V AC: 100000, 120 V AC: 200000, 24 V DC: 300000 (at 2 A)
Switching capacity of the contacts						
• with inductive load, max.						2 A; 2 A (230 V AC), 2 A (24 V DC)
• with resistive load, max.						2 A
Status information/ alarms/diagnostics						
Alarms						
• Diagnostic alarm	No	No	Yes; parameterizable	No	No	No
Diagnoses						
• Diagnostics	No	Yes	Yes; Off / last value / substitute value	Yes	Yes	No
Isolation						
Isolation checked with	500 V DC	1500 V AC	1500 V AC	4000 V DC	4000 V DC	1500 V AC
Isolation						
Isolation, digital outputs						
• between the channels, in groups of	4	4	1	8	8	2
• between the channels and the backplane bus	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler
Dimensions and weight						
Width	40 mm	40 mm	40 mm	40 mm	80 mm	40 mm
Height	125 mm	125 mm	125 mm	125 mm	125 mm	125 mm
Depth	120 mm	120 mm	120 mm	120 mm	117 mm	120 mm
Weights						
Weight, approx.	190 g	275 g	275 g	275 g	500 g	190 g

	6ES7 322-1HF10-0AA0	6ES7 322-5HF00-0AB0	6ES7 322-1HH01-0AA0
Voltages and currents			
Load voltage L+			
• Rated value (DC)	120 V	24 V	120 V
Load voltage L1			
• Rated value (AC)	230 V	230 V	230 V
Current consumption			
from backplane bus DC 5 V, max.	40 mA	100 mA	100 mA
Power loss, typ.	4.2 W	3.5 W	4.5 W
Connection point			
required front connectors	40-pin	40-pin	20-pin

SM 322 digital output modules

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Technical specifications (continued)

	6ES7 322-1HF10-0AA0	6ES7 322-5HF00-0AB0	6ES7 322-1HH01-0AA0
Digital outputs			
Number of digital outputs	8; Relay	8; Relay	16; Relay
Cable length, shielded, max.	1,000 m	1,000 m	1,000 m
Cable length unshielded, max.	600 m	600 m	600 m
Short-circuit protection of the output	No; to be provided externally	No; to be provided externally	
Lamp load, max.	1,500 W; AC 230 V	1,500 W; AC 230 V	50 W; AC 230 V
Output current			
• for signal "1" minimum load current	5 mA	10 mA	10 mA
Switching frequency			
• with resistive load, max.	2 Hz	2 Hz	1 Hz
• with inductive load, max.	0.5 Hz	0.5 Hz	0.5 Hz
• on lamp load, max.	2 Hz	2 Hz	1 Hz
• mechanical, max.	10 Hz	10 Hz	10 Hz
Aggregate current of the outputs (per group)			
• vertical installation - up to 40 °C, max.	5 A	5 A	8 A
• horizontal installation - up to 60 °C, max.	5 A	5 A	8 A
Relay outputs			
Rated input voltage of relay L+ (DC)	24 V		24 V
Number of operating cycles	300,000; 300000 (DC 24 V, at 2 A), 200000 (AC 120 V, at 3 A), 100000 (AC 230 V, at 3 A)	100,000; 100,000 (DC 24 V, at 5 A), 100,000 (AC 230 V, at 5 A)	100,000; 50000 (24 V DC, at 2 A), 700000 (120 V AC, at 2 A), 100000 (230 V AC, at 2 A)
Switching capacity of the contacts			
• with inductive load, max.	3 A; 3 A (230 V AC), 2 A (24 V DC)	5 A; 5 A (230 V AC), 5 A (24 V DC)	2 A; 2 A (230 V AC), 2 A (24 V DC)
• with resistive load, max.	8 A; 8 A (230 V AC), 5 A (24 V DC)	5 A; 5 A (230 V AC), 5 A (24 V DC)	2 A; 2 A (230 V AC), 2 A (24 V DC)
Status information/ alarms/diagnostics			
Alarms			
• Diagnostic alarm	No	Yes; parameterizable	No
Diagnoses			
• Diagnostics	No	Yes; Off / last value / substitute value	No
Isolation			
Isolation checked with	2000 V AC	1500 V AC	1500 V AC
Isolation			
Isolation, digital outputs			
• between the channels, in groups of	1	1	8
• between the channels and the backplane bus	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler
Dimensions and weight			
Width	40 mm	40 mm	40 mm
Height	125 mm	125 mm	125 mm
Depth	120 mm	120 mm	120 mm
Weights			
Weight, approx.	320 g	320 g	250 g

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Ordering data		Order No.
SM 322 digital output modules		
incl. labeling strips, bus connector		
8 outputs, 24 V DC, 2 A		**6ES7 322-1BF01-0AA0**
16 outputs, 24 V DC, 0.5 A		**6ES7 322-1BH01-0AA0**
16 outputs, 24 V DC, 0.5 A, high speed		**6ES7 322-1BH10-0AA0**
32 outputs, 24 V DC, 0.5 A		**6ES7 322-1BL00-0AA0**
8 outputs, 24 V DC, 0.5 A, diagnostics-capable		**6ES7 322-8BF00-0AB0**
16 outputs, 24/48 V DC, 0.5 A	A)	**6ES7 322-5GH00-0AB0**
8 outputs, 48 to 125 V DC, 1.5 A	A)	**6ES7 322-1CF00-0AA0**
8 outputs, 120/230 V AC, 1 A	A)	**6ES7 322-1FF01-0AA0**
8 outputs, 120/230 V AC, 2 A	A)	**6ES7 322-5FF00-0AB0**
16 outputs, 120/230 V AC, 1 A	A)	**6ES7 322-1FH00-0AA0**
32 outputs, 120 V AC, 1 A	A)	**6ES7 322-1FL00-0AA0**
8 outputs, relay contacts, 2 A		**6ES7 322-1HF01-0AA0**
8 outputs, relay contacts, 5 A		**6ES7 322-1HF10-0AA0**
8 outputs, relay contacts, 5 A, with RC filter, overvoltage protection	A)	**6ES7 322-5HF00-0AB0**
16 outputs, relay contacts, 8 A		**6ES7 322-1HH01-0AA0**
Front connectors		
20-pin, with screw contacts		
• 1 unit		**6ES7 392-1AJ00-0AA0**
• 100 units		**6ES7 392-1AJ00-1AB0**
20-pin, with cage clamp contacts		
• 1 unit		**6ES7 392-1BJ00-0AA0**
• 100 units		**6ES7 392-1BJ00-1AB0**
40-pin, with screw contacts		
• 1 unit		**6ES7 392-1AM00-0AA0**
• 100 units		**6ES7 392-1AM00-1AB0**
40-pin with cage clamp contacts		
• 1 unit		**6ES7 392-1BM01-0AA0**
• 100 units		**6ES7 392-1BM01-1AB0**
Front door, elevated design	A)	**6ES7 328-0AA00-7AA0**
e.g. for 32-channel modules; for connecting 1.3 mm^2/16 AWG conductors		
SIMATIC TOP connect		See page 4/225; Information about which components can be used for the respective module, see A&D Mall or Catalog KT 10.2
Bus connectors		**6ES7 390-0AA00-0AA0**
1 unit (spare part)		
Set of fuses for SM 322		
10 fuses 8 A quick-response, 2 fuse holders; for 6ES7 322-1FF01-0AA0, 6ES7 322-1FH00-0AA0	A)	**6ES7 973-1HD00-0AA0**
10 fuses 6.3 A; for 6ES7 322-1CF00-0AA0		**6ES7 973-1GC00-0AA0**

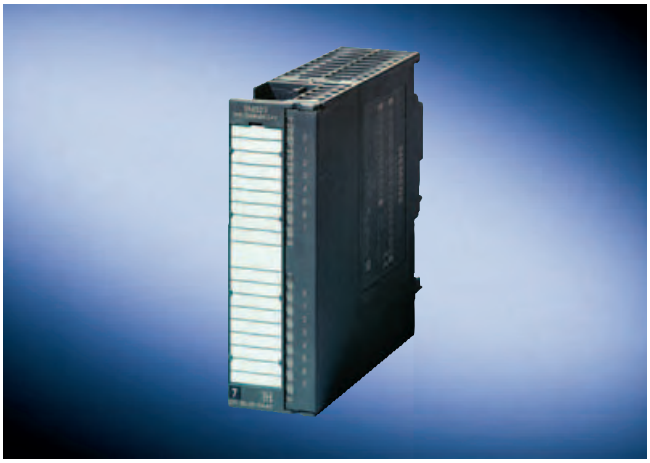
A) Subject to export regulations: AL: N and ECCN: EAR99H

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

		Order No.
Labeling strips		
10 units (spare part)		
for modules with 20-pin front connector		**6ES7 392-2XX00-0AA0**
for modules with 40-pin front connector		**6ES7 392-2XX10-0AA0**
Label cover		
10 units (spare part)		
for modules with 20-pin front connector		**6ES7 392-2XY00-0AA0**
for modules with 40-pin front connector		**6ES7 392-2XY10-0AA0**
S7 SmartLabel		
Software for automatic labeling of modules based on data of the STEP 7 project		**2XV9 450-1SL01-0YX0**
Labeling sheets for machine inscription		
For 16-channel signal modules, DIN A4, for printing with laser printer; 10 units		
petrol		**6ES7 392-2AX00-0AA0**
light-beige		**6ES7 392-2BX00-0AA0**
yellow		**6ES7 392-2CX00-0AA0**
red		**6ES7 392-2DX00-0AA0**
For 32-channel signal modules, DIN A4, for printing with laser printer; 10 units		
petrol		**6ES7 392-2AX10-0AA0**
light-beige		**6ES7 392-2BX10-0AA0**
yellow		**6ES7 392-2CX10-0AA0**
red		**6ES7 392-2DX10-0AA0**
SIMATIC Manual Collection	D)	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: S7-200, S7-300, C7, S7-400, SIMATIC DP (Distributed I/O), SIMATIC PC, SIMATIC PG (Programming device), STEP 7, Engineering Tools, Runtime Software, SIMATIC PCS 7, SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication), SIMATIC Machine Vision, SIMATIC Sensors		
SIMATIC Manual Collection update service for 1 year	D)	**6ES7 998-8XC01-8YE2**
Current S7 Manual Collection DVD and the three subsequent updates		
S7-300 manual		
Design, CPU data, module data, instruction list		
German		**6ES7 398-8FA10-8AA0**
English		**6ES7 398-8FA10-8BA0**
French		**6ES7 398-8FA10-8CA0**
Spanish		**6ES7 398-8FA10-8DA0**
Italian		**6ES7 398-8FA10-8EA0**

SM 323/SM 327 digital input/output modules

Overview



- Digital inputs and outputs
- For connecting standard switches, two-wire proximity switches (BERO), solenoid valves, contactors, low-power motors, lamps and motor starters

Technical specifications

	6ES7 323-1BH01-0AA0	6ES7 323-1BL00-0AA0	6ES7 327-1BH00-0AB0
Voltages and currents			
Load voltage L+			
• Rated value (DC)	24 V	24 V	24 V
Current consumption			
from load voltage L+ (without load), max.	40 mA	80 mA	20 mA
from backplane bus DC 5 V, max.	40 mA	80 mA	60 mA
Power loss, typ.	3.5 W	6.5 W	3 W
Connection point			
required front connectors	20-pin	40-pin	20-pin
Isochronous mode			
Isochronouos mode	No	No	No
Digital inputs			
Number of digital inputs	8	16	8; 8 hardwired, and 8 others individually parameterizable
Number of simultaneously controllable inputs			
• Number of simultaneously controllable inputs, up to 40 °C	8	16	16
• Number of simultaneously controllable inputs, up to 60 °C	8	8	16
Cable length			
• Cable length, shielded, max.	1,000 m	1,000 m	1,000 m
• Cable length unshielded, max.	600 m	600 m	600 m
Input characteristic curve to IEC 1131, type 1	Yes	Yes	Yes
Input voltage			
• Rated value, DC	24 V	24 V	24 V
• for signal "0"	-30V to 5 V	-30V to 5 V	-30V to 5 V
• for signal "1"	13 to 30 V	13 to 30 V	15 to 30 V
Input current			
• for signal "1", typ.	7 mA	7 mA	6 mA

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Technical specifications (continued)

	6ES7 323-1BH01-0AA0	6ES7 323-1BL00-0AA0	6ES7 327-1BH00-0AB0
Input delay (for rated value of input voltage)			
• for standard inputs			
- at " to "1", min.	1.2 ms	1.2 ms	1.2 ms
- at "0" to "1", max.	4.8 ms	4.8 ms	4.8 ms
- at "1" to "0", min.	1.2 ms	1.2 ms	1.2 ms
- at "1" to "0", max.	4.8 ms	4.8 ms	4.8 ms
Digital outputs			
Number of digital outputs	8	16	8; can also be parameterized individually as DI
Cable length, shielded, max.	1,000 m	1,000 m	1,000 m
Cable length unshielded, max.	600 m	600 m	600 m
Short-circuit protection of the output	Yes; electronic	Yes; electronic	Yes; electronic
• Response threshold, typ.	1 A	1 A	1A
Limitation of inductive shutdown voltage to	L+ (-53 V)	L+ (-48 V)	L+ (-54 V)
Lamp load, max.	5 W	5 W	5 W
Controlling a digital input	Yes	Yes	Yes
Output voltage			
• for signal "1", min.	L+ (-0.8 V)	L+ (-0.8 V)	L+ (-1.5 V)
Output current			
• for signal "1" rated value	0.5 A	0.5 A	0.5 A
• for signal "1" permissible range for 0 to 60 °C, min.			5 mA
• for signal "1" permissible range for 0 to 60 °C, max.			0.6 A
• for signal "1" minimum load current	5 mA	5 mA	
• for signal "0" residual current, max.	0.5 mA	0.5 mA	0.5 mA
Output delay with resistive load			
• "0" to "1", max.	100 µs	100 µs	350 µs
• "1" to "0", max.	500 µs	500 µs	500 µs
Parallel switching of 2 outputs			
• for increased power	No	No	No
• for redundant control of a load	Yes; Outputs of the same group only	Yes; Outputs of the same group only	Yes; only outputs of the same group
Switching frequency			
• with resistive load, max.	100 Hz	100 Hz	100 Hz
• with inductive load, max.	0.5 Hz	0.5 Hz	0.5 Hz
• on lamp load, max.	10 Hz	100 Hz	10 Hz
Aggregate current of the outputs (per group)			
• vertical installation			
- up to 40 °C, max.	4 A	2 A	2 A
• horizontal installation			
- up to 40 °C, max.		4 A	4 A
- up to 60 °C, max.	4 A	3 A	3 A

SM 323/SM 327 digital input/output modules

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Technical specifications (continued)

	6ES7 323-1BH01-0AA0	6ES7 323-1BL00-0AA0	6ES7 327-1BH00-0AB0
Digital outputs			
Load impedance range			
• lower limit	48 Ω	48 Ω	48 Ω
• upper limit	4 kΩ	4 kΩ	4 kΩ
Encoder			
Connectable encoders			
• 2-wire BEROS	Yes	Yes	Yes
• permissible quiescent current (2-wire BEROS), max.	2 mA	1.5 mA	1.5 mA
Status information/ alarms/diagnostics			
Alarms			
• Alarms	No	No	No
Diagnoses			
• Diagnostic functions	No	No	No
Diagnostics indication LED			
• Status indicator digital output (green)	Yes	Yes	Yes
• Status indicator digital input (green)	Yes	Yes	Yes
Isolation			
Isolation checked with	500 V DC	500 V DC	500 V DC
Isolation			
Isolation, digital outputs			
• between the channels	Yes	Yes	No
• between the channels, in groups of	8	8	
• between the channels and the backplane bus	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler
Galvanic isolation, digital inputs			
• between the channels	Yes	Yes	No
• between the channels, in groups of	8	16	
• between the channels and the backplane bus	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler
Permissible potential difference			
between different circuits	500 V DC	500 V DC	500 V DC
Dimensions and weight			
Width	40 mm	40 mm	40 mm
Height	125 mm	125 mm	125 mm
Depth	120 mm	120 mm	120 mm
Weights			
Weight, approx.	220 g	260 g	200 g

Ordering data	Order No.
SM 323 digital input/output modules	
incl. labeling strips, bus connector	
8 inputs, 8 outputs	**6ES7 323-1BH01-0AA0**
16 inputs, 16 outputs	**6ES7 323-1BL00-0AA0**
SM 327 digital input/output modules	
incl. labeling strips, bus connector	
8 inputs, 8 inputs or outputs (can be configured)	**6ES7 327-1BH00-0AB0**
Front connectors	
20-pin, with screw contacts	
• 1 unit	**6ES7 392-1AJ00-0AA0**
• 100 units	**6ES7 392-1AJ00-1AB0**
20-pin, with cage clamp contacts	
• 1 unit	**6ES7 392-1BJ00-0AA0**
• 100 units	**6ES7 392-1BJ00-1AB0**
40-pin, with screw contacts	
• 1 unit	**6ES7 392-1AM00-0AA0**
• 100 units	**6ES7 392-1AM00-1AB0**
40-pin with cage clamp contacts	
• 1 unit	**6ES7 392-1BM01-0AA0**
• 100 units	**6ES7 392-1BM01-1AB0**
Front door, elevated design A)	**6ES7 328-0AA00-7AA0**
e.g. for 32 channel modules; enables connection of 1.3 mm^2/16 AWG wires	
SIMATIC TOP connect	See page 4/225; Information about which components can be used for the respective module, see A&D Mall or Catalog KT 10.2
Bus connectors	**6ES7 390-0AA00-0AA0**
1 unit (spare part)	
Labeling strips	
10 units (spare part)	
for modules with 20-pin front connector	**6ES7 392-2XX00-0AA0**
for modules with 40-pin front connector	**6ES7 392-2XX10-0AA0**
Label cover	
10 units (spare part)	
for modules with 20-pin front connector	**6ES7 392-2XY00-0AA0**
for modules with 40-pin front connector	**6ES7 392-2XY10-0AA0**

	Order No.
S7 SmartLabel	
Software for automatic labeling of modules based on data of the STEP 7 project	**2XV9 450-1SL01-0YX0**
Labeling sheets for machine inscription	
For 16-channel signal modules, DIN A4, for printing with laser printer; 10 units	
petrol	**6ES7 392-2AX00-0AA0**
light-beige	**6ES7 392-2BX00-0AA0**
yellow	**6ES7 392-2CX00-0AA0**
red	**6ES7 392-2DX00-0AA0**
For 32-channel signal modules, DIN A4, for printing with laser printer; 10 units	
petrol	**6ES7 392-2AX10-0AA0**
light-beige	**6ES7 392-2BX10-0AA0**
yellow	**6ES7 392-2CX10-0AA0**
red	**6ES7 392-2DX10-0AA0**
SIMATIC Manual Collection D)	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: S7-200, S7-300, C7, S7-400, SIMATIC DP (Distributed I/O), SIMATIC PC, SIMATIC PG (Programming device), STEP 7, Engineering Tools, Runtime Software, SIMATIC PCS 7, SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication), SIMATIC Machine Vision, SIMATIC Sensors	
SIMATIC Manual Collection update service for 1 year D)	**6ES7 998-8XC01-8YE2**
Current S7 Manual Collection DVD and the three subsequent updates	
S7-300 manual	
Design, CPU data, module data, instruction list	
German	**6ES7 398-8FA10-8AA0**
English	**6ES7 398-8FA10-8BA0**
French	**6ES7 398-8FA10-8CA0**
Spanish	**6ES7 398-8FA10-8DA0**
Italian	**6ES7 398-8FA10-8EA0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

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

SIPLUS SM 321 digital input modules

Overview

- Digital inputs
- For connecting standard switches and two-wire proximity switches (BERO)

SIPLUS SM 321	16 DI	32 DI	16 DI
Order No.	**6AG1 321-1BH02-2AA0**	**6AG1 321-1BL00-2AA0**	**6AG1 321-7BH01-2AB0**
Order No. based on	**6ES7 321-1BH02-0AA0**	**6ES7 321-1BL00-0AA0**	**6ES7 321-7BH01-0AB0**
Ambient temperature range	-25 °C to +60 °C, condensation permissible		
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).		
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1)	Yes	Yes	Yes
Technical data	The technical data are identical with the technical data of the based on modules.		

SIPLUS SM 321	16 DI – 48 ... 125 V DC	8 DI – 120/230 V AC
Order No.	**6AG1 321-1CH20-2AA0**	**6AG1 321-1FF01-2AA0**
Order No. based on	**6ES7 321-1CH20-0AA0**	**6ES7 321-1FF01-0AA0**
Ambient temperature range	-25 °C to +60 °C, condensation permissible	
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).	
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1)	Yes	Yes
Technical data	The technical data are identical with the technical data of the based on modules.	

Ordering data

		Order No.
Digital input modules SIPLUS SM 321		
(extended temperature range and medial load)		
incl. labeling strips, bus connector		
16 inputs, 24 V DC	A)	**6AG1 321-1BH02-2AA0**
32 inputs, 24 V DC	A)	**6AG1 321-1BL00-2AA0**
16 inputs, 24 V DC, diagnostics-capable	A)	**6AG1 321-7BH01-2AB0**
16 inputs, 48 … 125 V DC	A)	**6AG1 321-1CH20-2AA0**
8 inputs, 120/230 V AC	A)	**6AG1 321-1FF01-2AA0**

	Order No.
Accessories	see S7-300 digital input modules, page 4/97

A) Subject to export regulations: AL: N and ECCN: EAR99H

Overview

- Digital outputs
- For connecting solenoid valves, contactors, low-power motors, lamps and motor starters

SIPLUS SM 322	16 DO	8 DO	8 DO	16 DO – 48 ... 125 V DC
Order No.	**6AG1 322-1BH01-2AA0**	**6AG1 322-1BF01-2XB0**	**6AG1 322-8BF00-2AB0**	**6AG1 322-1CF00-2AA0**
Order No. based on	**6ES7 322-1BH01-0AA0**	**6ES7 322-1BF01-0AA0**	**6ES7 322-8BF00-0AB0**	**6ES7 322-1CF00-0AA0**
Ambient temperature range	-25 °C to +60 °C, condensation permissible			
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).			
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1)	Yes	Yes	Yes	Yes
Technical data	The technical data are identical with the technical data of the based on modules.			

SIPLUS SM 322	8 DO – 120/230 V AC	8 RO	32 DO	16 RO
Order No.	**6AG1 322-1FF01-2AA0**	**6AG1 322-1HF10-2AA0**	**6AG1 322-1BL00-2AA0**	**6AG1 322-1HH01-2AA0**
Order No. based on	**6ES7 322-1FF01-0AA0**	**6ES7 322-1HF10-0AA0**	**6ES7 322-1BL00-0AA0**	**6ES7 322-1HH01-0AA0**
Ambient temperature range	-25 °C to +60 °C, condensation permissible			
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).			
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1)	Yes	Yes	Yes	Yes
Technical data	The technical data are identical with the technical data of the based on modules.			

Ordering data

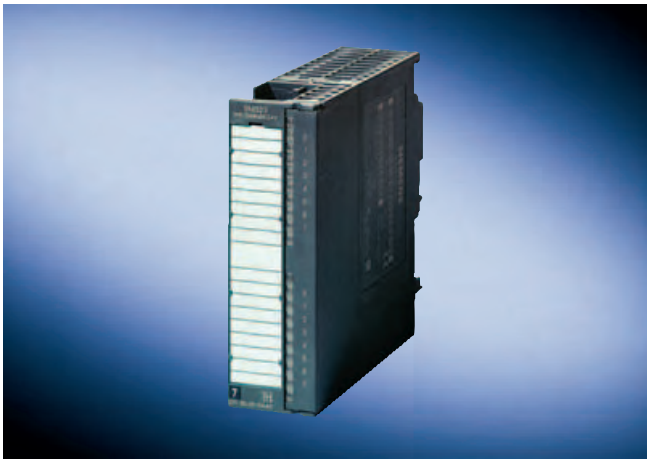
		Order No.
Digital output modules SIPLUS SM 322		
(extended temperature range and medial load)		
incl. labeling strips, bus connector		
16 outputs, 24 V DC, 0.5 A	A)	**6AG1 322-1BH01-2AA0**
8 outputs, 24 V DC, 2 A	A)	**6AG1 322-1BF01-2XB0**
8 outputs, 24 V DC, 0.5 A, diagnostics-capable	A)	**6AG1 322-8BF00-2AB0**
8 outputs, 48 to 125 V DC, 1.5 A	A)	**6AG1 322-1CF00-2AA0**

		Order No.
Digital output modules SIPLUS SM 322		
(extended temperature range and medial load)		
incl. labeling strips, bus connector		
8 outputs, 120/230 V AC, 1 A	A)	**6AG1 322-1FF01-2AA0**
8 outputs, relay contacts, 5 A		**6ES7 322-1HF10-0AA0**
32 outputs, 24 V DC, 0.5 A		**6AG1 322-1BL00-2AA0**
16 outputs, relay contacts, 8 A		**6AG1 322-1HH01-2AA0**
Accessories		see S7-300 digital output modules, page 4/103

A) Subject to export regulations: AL: N and ECCN: EAR99H

SIPLUS SM 323 digital input/output modules

Overview



- Digital inputs and outputs
- For connecting standard switches, two-wire proximity switches (BERO), solenoid valves, contactors, low-power motors, lamps and motor starters

SIPLUS SM 323	**8 DI/8 DO**
Order No.	**6AG1 323-1BH01-2AA0**
Order No. based on	**6ES7 323-1BH01-0AA0**
Ambient temperature range	-25 °C to +60 °C, condensation permissible
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1)	Yes
Technical data	The technical data are identical with the technical data of the based on modules.

Ordering data

		Order No.
Digital input/output modules SIPLUS SM 323		
(extended temperature range and medial load)		
incl. labeling strips, bus connector		
8 inputs, 8 outputs	A)	**6AG1 323-1BH01-2AA0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

	Order No.
Accessories	see S7-300 digital input/output modules, page 4/107

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Overview

- Analog inputs
- For connection of voltage and current sensors, thermocouples, resistors and resistance thermometers

Technical specifications

	6ES7 331-7KF02-0AB0	6ES7 331-7HF01-0AB0	6ES7 331-1KF01-0AB0	6ES7 331-7KB02-0AB0
Voltages and currents				
Load voltage L+				
• Rated value (DC)	24 V	24 V		24 V
• reverse polarity protection	Yes	Yes		Yes
Current consumption				
from load voltage L+ (without load), max.	200 mA	50 mA		80 mA
from backplane bus DC 5 V, max.	50 mA	60 mA	90 mA	50 mA
Power loss, typ.	1 W	1.5 W	0.4 W	1.3 W
Connection point				
required front connectors	20-pin	20-pin	40-pin	20-pin
Isochronous mode				
Isochronouos mode	No	Yes	No	No
Analog inputs				
Number of analog inputs	8	8	8	2
Number of analog inputs for resistance measurement	4		8	1
Cable length, shielded, max.	200 m; 50 m at 80 mV and with thermocouples	200 m	200 m; max. 50 m at 50 mV	200 m; 50 m at 80 mV and with thermocouples
permissible input frequency for voltage input (destruction limit), max.	20 V; continuous; 75 V for max. 1s (mark to space ratio 1:20)	20 V; 20 V continuous, 75 V for max. 1s (mark to space ratio 1:20)	30 V; 12 V continuous, 30 V for max. 1 s	20 V; continuous; 75 V for max. 1s (mark to space ratio 1:20)
permissible input current for current input (destruction limit), max.	40 mA	40 mA	40 mA	40 mA
Input ranges (rated values), voltages				
• 0 to +10 V			Yes	
• 1 to 5 V	Yes	Yes	Yes	Yes
• 1 to 10 V		Yes	No	
• -1 V to +1 V	Yes	Yes	Yes	Yes
• -10 V to +10 V	Yes	Yes	Yes	Yes
• -2.5 V to +2.5 V	Yes		No	Yes
• -250 mV to +250 mV	Yes		No	Yes
• -5 V to +5 V	Yes	Yes	Yes	Yes

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Technical specifications (continued)

	6ES7 331-7KF02-0AB0	6ES7 331-7HF01-0AB0	6ES7 331-1KF01-0AB0	6ES7 331-7KB02-0AB0
Input ranges (rated values), voltages (continued)				
• -50 mV to +50 mV			Yes	
• -500 mV to +500 mV	Yes		Yes	Yes
• -80 mV to +80 mV	Yes			Yes
Input ranges (rated values), currents				
• 0 to 20 mA	Yes	Yes	Yes	Yes
• -10 to +10 mA	Yes			Yes
• -20 to +20 mA	Yes	Yes	Yes	Yes
• -3.2 to +3.2 mA	Yes			Yes
• 4 to 20 mA	Yes	Yes	Yes	Yes
Input ranges (rated values), thermoelements				
• Type E	Yes			Yes
• Type J	Yes			Yes
• Type K	Yes			Yes
• Type N	Yes			Yes
Input ranges (rated values), resistors				
• 0 to 150 Ohm	Yes			Yes
• 0 to 300 Ohm	Yes			Yes
• 0 to 600 Ohm	Yes		Yes	Yes
• 0 to 6000 Ohm			Yes	
Input ranges (rated values), resistance thermometers				
• Ni 100	Yes; Standard		Yes; Standard/AirCon	Yes
• LG-Ni 1000			Yes; Standard/AirCon	
• Pt 100	Yes; Standard		Yes; Standard/AirCon	Yes
Characteristic linearization				
• programmable	Yes		Yes	Yes
• for thermoelements	Type N, E, J, K, L			Type N, E, J, K, L
• for thermoresistor	Pt 100 (Standard, climatic range), Ni 100 (Standard, climatic range)		yes; Pt100 standard/air con.; Ni100 standard/air con.; Ni1000 standard/air con.; LG-Ni1000 standard/air con.	Pt 100 (Standard, climatic range), Ni 100 (Standard, climatic range)
Temperature compensation				
• programmable	Yes			Yes
• external temperature compensation with compensations socket	Yes			Yes
• internal temperature compensation	Yes			Yes
Analog value creation				
Measurement principle	integrating	Conversion of instantaneous values	integrating	integrating
Integrations and conversion time/resolution per channel				
• Resolution with overload area (bit including sign), max.	15 Bit; unipolar: 9 / 12 / 12 / 14 bit, bipolar: 9 + sign/ 12 + sign/12 + sign/ 14 + sign bit	14 Bit; unipolar: 14 bit; bipolar: 13+sign bit	13 Bit	15 Bit; unipolar: 9 / 12 / 12 / 14 bit, bipolar: 9 + sign/ 12 + sign/12 + sign/ 14 + sign bit

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Technical specifications (continued)

	6ES7 331-7KF02-0AB0	6ES7 331-7HF01-0AB0	6ES7 331-1KF01-0AB0	6ES7 331-7KB02-0AB0
Integrations and conversion time/resolution per channel (continued)				
• Integration time, parameterizable	Yes; 2.5 / 16.67 / 20 / 100 ms	Yes	Yes; 60 / 50 ms	Yes; 2.5 / 16.67 / 20 / 100 ms
• Basic conversion time, including integration time, ms	3/ 17/ 22/ 102 ms		66 / 55 ms	6/ 34/ 44/ 204 ms
• Basic conversion time, ms		52 µs per channel	66 / 55 ms	
• Interference voltage suppression for interference frequency f1 in Hz	400 / 60 / 50 / 10 Hz	400 / 60 / 50 / 10 Hz	50 / 60 Hz	400 / 60 / 50 / 10 Hz
Encoder				
Connection of signal encoders				
• for current measurement as 2-wire transducer	Yes	Yes	Yes; with external supply	Yes
• for current measurement as 4-wire transducer	Yes	Yes	Yes	Yes
• for resistance measurement with 2-conductor connection	Yes		Yes	Yes
• for resistance measurement with 3-conductor connection	Yes		Yes	Yes
• for resistance measurement with 4-conductor connection	Yes		Yes	Yes
Errors/accuracies				
Operational limit in overall temperature range				
• Voltage, relative to input area	+/- 1 %; +/-1% (80mV), +/-0.6% (250-1000mV), +/-0.8% (2.5-10mV)	+/- 0.4 %	+/- 0.6 %; +/-0.6% (+/-5V,10V,1-5V,0-10V; +/-0,5% (+/-50 mV, 500 mV, 1 V	+/- 1 %; +/-1% (80mV), +/- 0.6% (250-1000mV), +/- 0.8% (2.5-10V)
• Current, relative to input area	+/- 0.7 %; from 3.2 to 20mA	+/- 0.3 %	+/- 0.5 %; +/-20mA, 0-20mA, 4-20mA	+/- 0.7 %; from 3.2 to 20mA
• Impedance, relative to input area	+/- 0.7 %; 150, 300, 600 Ohm		+/- 0.5 %; 0-6kOhm, 0-600kOhm	+/- 0.7 %; 150, 300, 600 Ohm
• Resistance-type thermometer, relative to input area	+/- 0.7 %; +/-0.7% (Pt100/ Ni100); +/-0.8% (Pt100 climat)			+/- 0.7 %; +/-0.7% (Pt100/ Ni100); +/-0.8% (Pt100 climat)
Basic error limit (operational limit at 25 °C)				
• Voltage, relative to input area	+/- 0.6 %; +/-0.4% (250-1000mV); +/-0.6% (2.5-10mV); +/-0.7% (80mV)	+/- 0.25 %	+/- 0.4 %; 0.4% (+/-5V,10V,1-5V, 0-10V); 0.3% (+/-50mV,500mV,1V)	+/- 0.6 %; +/-0.6% (80mV, 2.5-10V); +/-0.4% (250-1000mV)
• Current, relative to input area	+/- 0.5 %; 3,2 to 20mA	+/- 0.2 %	+/- 0.3 %; +/-20mA, 0-20mA,4-20mA	+/- 0.5 %; 3,2 to 20mA
• Impedance, relative to input area	+/- 0.5 %; 150, 300, 600 Ohm		+/- 0.3 %; 0-6kOhm, 0-600kOhm	+/- 0.5 %; 150, 300, 600 Ohm
• Resistance-type thermometer, relative to input area	+/- 0.6 %; +/-0.5% (Pt100/ Ni100); +/-0.6% (Pt100 climatic)			+/- 0.6 %; +/-0.5% (Pt100/ Ni100); +/-0.6% (Pt100 climatic)
Status information/ alarms/diagnostics				
Alarms				
• Diagnostic alarm	Yes; parameterizable channels 0 and 2	Yes; parameterizable	No	Yes
• Limit value alarm	Yes; parameterizable	Yes; parameterizable channels 0 and 2	No	Yes; parameterizable; Channel 0
Diagnoses				
• Diagnostic information readable	Yes	Yes	No	Yes

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Technical specifications (continued)

	6ES7 331-7KF02-0AB0	6ES7 331-7HF01-0AB0	6ES7 331-1KF01-0AB0	6ES7 331-7KB02-0AB0
Isolation				
Isolation checked with	500 V DC	500 V DC	500 V DC	500 V DC
Isolation				
Isolation, analog inputs				
• between the channels	Yes	No	No	No
• between the channels, in groups of	2			
• between the channels and the backplane bus	Yes	Yes	Yes	Yes
Dimensions and weight				
Width	40 mm	40 mm	40 mm	40 mm
Height	125 mm	125 mm	125 mm	125 mm
Depth	120 mm	120 mm	117 mm	120 mm
Weights				
Weight, approx.	250 g	200 g	250 g	250 g

	6ES7 331-7PF01-0AB0	6ES7 331-7PF11-0AB0	6ES7 331-7NF00-0AB0	6ES7 331-7NF10-0AB0
Voltages and currents				
Load voltage L+				
• Rated value (DC)	24 V	24 V		24 V
• reverse polarity protection	Yes	Yes		Yes
Current consumption				
from load voltage L+ (without load), max.	240 mA	200 mA		200 mA
from backplane bus DC 5 V, max.	100 mA	100 mA	130 mA	100 mA
Power loss, typ.	4.6 W	3 W	0.6 W	3 W
Connection point				
required front connectors	40-pin	40-pin	40-pin	40-pin
Isochronous mode				
Isochronouos mode	No	No	No	No
Analog inputs				
Number of analog inputs	8	8	8	8
Number of analog inputs for resistance measurement	8			
Cable length, shielded, max.	200 m	100 m	200 m	200 m
permissible input frequency for voltage input (destruction limit), max.	75 V; 35 V continuous, 75 V for max. 1 s (mark to space ratio 1:20)	75 V; 20 V DC permanent, 75 V DC for max. 1 s (pulse duty factor 1:20)	50 V; permanent	75 V; 35 V continuous, 75 V for max. 1 s (mark to space ratio 1:20)
permissible input current for current input (destruction limit), max.			32 mA	40 mA
Input ranges (rated values), voltages				
• 1 to 5 V			Yes	Yes
• -10 V to +10 V			Yes	Yes
• -5 V to +5 V			Yes	Yes
Input ranges (rated values), currents				
• 0 to 20 mA			Yes	Yes
• -20 to +20 mA			Yes	Yes
• 4 to 20 mA			Yes	Yes

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Technical specifications (continued)

	6ES7 331-7PF01-0AB0	6ES7 331-7PF11-0AB0	6ES7 331-7NF00-0AB0	6ES7 331-7NF10-0AB0
Input ranges (rated values), thermoelements				
• Type B		Yes		
• Type E		Yes		
• Type J		Yes		
• Type K		Yes		
• Type L		Yes		
• Type N		Yes		
• Type R		Yes		
• Type S		Yes		
• Type T		Yes		
• Type U		Yes		
• Typ TXK/TXK(L) to GOST		Yes		
Input ranges (rated values), resistors				
• 0 to 150 Ohm	Yes			
• 0 to 300 Ohm	Yes			
• 0 to 600 Ohm	Yes			
Input ranges (rated values), resistance thermometers				
• Cu 10	Yes			
• Ni 100	Yes			
• Ni 1000	Yes			
• Ni 120	Yes			
• Ni 200	Yes			
• Ni 500	Yes			
• Pt 100	Yes			
• Pt 1000	Yes			
• Pt 200	Yes			
• Pt 500	Yes			
Characteristic linearization				
• programmable	Yes	Yes		
• for thermoelements		Type B, E, J, K, L, N, R, S. T, U, C		
• for thermoresistor	Pt 100, Pt 200, Pt 500, Pt 1000, Ni 100, Ni 120, Ni 200, Ni 500, Ni 1000, Cu 10 (Standard/AirCon)			
Temperature compensation				
• programmable		Yes		
• external temperature compensation with compensations socket		Yes		
• external temperature compensation with Pt100		Yes		
• internal temperature compensation		Yes		

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Technical specifications (continued)

	6ES7 331-7PF01-0AB0	6ES7 331-7PF11-0AB0	6ES7 331-7NF00-0AB0	6ES7 331-7NF10-0AB0
Analog value creation				
Measurement principle	integrating	integrating	integrating	integrating
Integrations and conversion time/resolutionper channel				
• Resolution with overload area (bit including sign), max.	16 Bit; Two's complement	16 Bit; Two's complement	16 Bit; unipolar: 15 / 15 / 15 / 15 bit, bipolar: 15 + sign/15 + sign/ 15 + sign/15 + sign	16 Bit; unipolar: 15 / 15 / 15 / 15 bit, bipolar: 15 + sign/15 + sign/ 15 + sign/15 + sign
• Integration time, parameterizable	Yes	Yes	Yes; 10 / 16.67 / 20 / 100 ms	Yes; 23 / 72 / 83 / 95 ms
• Basic conversion time, ms	up to 4 channels: 10 ms per module, over 5 channels: 190 ms per module, 8 channels: 80 ms	up to 4 channels: 10 ms per module, as of 5 channels: 190 ms per module		10 ms (4-channel mode) 95 / 83/ 72/ 23 ms (8-channel mode)
• Interference voltage suppression for interference frequency f1 in Hz	400 / 60 / 50 Hz	400 / 60 / 50 Hz	400 / 60 / 50 / 10 Hz	400 / 60 / 50 Hz, combinations of 400, 60, 50 Hz
Encoder				
Connection of signal encoders				
• for current measurement as 2-wire transducer			Yes; with external transmitter; possible with separate supply for transmitter	Yes; with external transmitter, current supply; possible with separate supply for transmitter
• for current measurement as 4-wire transducer			Yes	Yes
• for resistance measurement with 2-conductor connection	Yes; without resistance correction			
• for resistance measurement with 3-conductor connection	Yes			
• for resistance measurement with 4-conductor connection	Yes			
Errors/accuracies				
Operational limit in overall temperature range				
• Voltage, relative to input area		+/- 1 K	+/- 0.1 %; +/-0.7%	+/- 0.1 %
• Current, relative to input area			+/- 0.3 %; +/-0.9%	+/- 0.1 %
• Impedance, relative to input area	+/- 0.1 %			
Basic error limit (operational limit at 25 °C)				
• Voltage, relative to input area		+/- 0.5 K	+/- 0.05 %	+/- 0.05 %
• Current, relative to input area			+/- 0.05 %	+/- 0.05 %
• Impedance, relative to input area	+/- 0.05 %			

Technical specifications (continued)

	6ES7 331-7PF01-0AB0	6ES7 331-7PF11-0AB0	6ES7 331-7NF00-0AB0	6ES7 331-7NF10-0AB0
Status information/ alarms/diagnostics				
Alarms				
• Diagnostic alarm	Yes; parameters can be set per group	Yes; parameters can be set per group	Yes; parameterizable	Yes; parameterizable
• Limit value alarm	Yes; parameterizable	Yes; parameterizable	Yes; parameterizable channels 0 and 2	Yes; parameterizable all channels (end of cycle interrupt is also supported across modules)
Diagnoses				
• Diagnostic information readable	Yes	Yes	Yes	Yes
Isolation				
Isolation checked with	500 V DC	500 V DC	500 V DC	500 V AC
Isolation				
Isolation, analog inputs				
• between the channels	Yes	Yes		Yes
• between the channels, in groups of	2	2		2
• between the channels and the backplane bus	Yes	Yes	Yes	Yes
Dimensions and weight				
Width	40 mm	40 mm	40 mm	40 mm
Height	125 mm	125 mm	125 mm	125 mm
Depth	120 mm	120 mm	120 mm	120 mm
Weights				
Weight, approx.	272 g	272 g	272 g	272 g

SM 331 analog input modules

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Ordering data		Order No.
SM 331 analog input modules		
Including labeling strips, bus connector, measuring range modules		
8 inputs, 13-bit resolution		**6ES7 331-1KF01-0AB0**
8 inputs, resolution 9/12/14 bits		**6ES7 331-7KF02-0AB0**
2 inputs, resolution 9/12/14 bits	A)	**6ES7 331-7KB02-0AB0**
8 inputs, enhanced resolution 16 bits	A)	**6ES7 331-7NF00-0AB0**
8 inputs, enhanced resolution 16 bits, 4-channel mode	A)	**6ES7 331-7NF10-0AB0**
8 inputs, resolution 14 bits, for isochronous mode		**6ES7 331-7HF01-0AB0**
8 inputs, for thermal resistors	A)	**6ES7 331-7PF01-0AB0**
8 inputs, for thermoelements		**6ES7 331-7PF11-0AB0**
Measuring range module for analog inputs		**6ES7 974-0AA00-0AA0**
1 module for 2 analog inputs; 2 units (spare part)		
Front connectors		
1 unit		
20-pin, with screw contacts		
• 1 unit		**6ES7 392-1AJ00-0AA0**
• 100 units		**6ES7 392-1AJ00-1AB0**
20-pin, with cage clamp terminals		
• 1 unit		**6ES7 392-1BJ00-0AA0**
• 100 units		**6ES7 392-1BJ00-1AB0**
40-pin, with screw contacts		
• 1 unit		**6ES7 392-1AM00-0AA0**
• 100 units		**6ES7 392-1AM00-1AB0**
40-pin, with cage clamp terminals		
• 1 unit		**6ES7 392-1BM01-0AA0**
• 100 units		**6ES7 392-1BM01-1AB0**
Front door, elevated design	A)	**6ES7 328-0AA00-7AA0**
e.g. for 32-channel modules; for connecting 1.3 mm^2/16 AWG wires		
SIMATIC TOP connect		See page 4/225; Information about which components can be used for the respective module, see A&D Mall or Catalog KT 10.2
Bus connectors		**6ES7 390-0AA00-0AA0**
1 unit (spare part)		
Shield connecting element		**6ES7 390-5AA00-0AA0**
80 mm wide, with 2 rows for 4 shielding connection clamps each		
Shielding connection clamps		
2 units		
For 2 cables with 2 mm to 6 mm diameter		**6ES7 390-5AB00-0AA0**
For 1 cable with 3 mm to 8 mm diameter		**6ES7 390-5BA00-0AA0**
For 1 cable with 4 mm to 13 mm diameter		**6ES7 390-5CA00-0AA0**

		Order No.
Label cover		**6ES7 392-2XY00-0AA0**
10 units (spare part), for modules with 20-pin front connector		
Labeling strips		**6ES7 392-2XX00-0AA0**
10 units (spare part), for modules with 20-pin front connector		
S7 SmartLabel		**2XV9 450-1SL01-0YX0**
Software for automatic labeling of modules based on data of the STEP 7 project		
Labeling sheets for machine labeling		
For 16-channel signal modules, DIN A4, for printing with laser printer; 10 units		
petrol		**6ES7 392-2AX00-0AA0**
light-beige		**6ES7 392-2BX00-0AA0**
yellow		**6ES7 392-2CX00-0AA0**
red		**6ES7 392-2DX00-0AA0**
For 32-channel signal modules, DIN A4, for printing with laser printer; 10 units		
petrol		**6ES7 392-2AX10-0AA0**
light-beige		**6ES7 392-2BX10-0AA0**
yellow		**6ES7 392-2CX10-0AA0**
red		**6ES7 392-2DX10-0AA0**
SIMATIC Manual Collection	D)	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: S7-200, S7-300, C7, S7-400, SIMATIC DP (Distributed I/O), SIMATIC PC, SIMATIC PG, STEP 7, Engineering Tools, Runtime Software, SIMATIC PCS 7, SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication), SIMATIC Machine Vision, SIMATIC Sensors		
SIMATIC Manual Collection update service for 1 year	D)	**6ES7 998-8XC01-8YE2**
Current S7 Manual Collection DVD and the three subsequent updates		
S7-300 manual		
Design, CPU data, module data, instruction list		
German		**6ES7 398-8FA10-8AA0**
English		**6ES7 398-8FA10-8BA0**
French		**6ES7 398-8FA10-8CA0**
Spanish		**6ES7 398-8FA10-8DA0**
Italian		**6ES7 398-8FA10-8EA0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

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

Overview

- Analog outputs
- For the connection of analog actuators

Technical specifications

	6ES7 332-5HB01-0AB0	6ES7 332-5HD01-0AB0	6ES7 332-5HF00-0AB0	6ES7 332-7ND02-0AB0
Voltages and currents				
Load voltage L+				
• Rated value (DC)	24 V	24 V	24 V	24 V
Current consumption				
from load voltage L+ (without load), max.	135 mA	240 mA	340 mA	290 mA
from backplane bus DC 5 V, max.	60 mA	60 mA	100 mA	120 mA
Power loss, typ.	3 W	3 W	6 W	3 W
Connection point				
required front connectors	20-pin	20-pin	40-pin	20-pin
Analog outputs				
Number of analog outputs	2	4	8	4; isochronous mode
Cable length, shielded, max.	200 m	200 m	200 m	200 m
Voltage output, short-circuit protection	Yes	Yes	Yes	Yes
Voltage output, short-circuit current, max.	25 mA	25 mA	25 mA	40 mA
Current output, no-load voltage, max.	18 V	18 V	18 V	18 V
Output ranges, voltage				
• 0 to 10 V	Yes	Yes	Yes	Yes
• 1 to 5 V	Yes	Yes	Yes	Yes
• -10 to +10 V	Yes	Yes	Yes	Yes
Output ranges, current				
• 0 to 20 mA	Yes	Yes	Yes	Yes
• -20 to +20 mA	Yes	Yes	Yes	Yes
• 4 to 20 mA	Yes	Yes	Yes	Yes
Load impedance (in rated range of output)				
• with voltage outputs, min.	1 kΩ	1 kΩ	1 kΩ	1 kΩ
• with voltage outputs, capacitive load, max.	1 µF	1 µF	1 µF	1 µF
• with current outputs, max.	500 Ω	500 Ω	500 Ω	500 Ω
• with current outputs, inductive load, max.	10 mH	10 mH	10 mH	1 mH

SM 332 analog output modules

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Technical specifications (continued)

	6ES7 332-5HB01-0AB0	6ES7 332-5HD01-0AB0	6ES7 332-5HF00-0AB0	6ES7 332-7ND02-0AB0
Analog value creation				
Integrations and conversion time/resolutionper channel				
• Resolution with overload area (bit including sign), max.	12 Bit; +/- 10 V, +/-20mA, 4 to 20 mA, 1 to 5 V: 11 bit + sign, 0 to 10 V, 0 to 20 mA: 12 bit	12 Bit; +/- 10 V, +/- 20mA, 4 to 20 mA, 1 to 5 V: 11 bit + sign, 0 to 10 V, 0 to 20 mA: 12 bit	12 Bit; +/- 10 V, +/- 20mA, 4 to 20 mA, 1 to 5 V: 11 bit + sign, 0 to 10 V, 0 to 20 mA: 12 bit	16 Bit
• Conversion time (per channel)	0,8 ms	0,8 ms	0,8 ms	200 µs; in clocked mode 640µs
Settling time				
• for resistive load	0.2 ms	0.2 ms	0.2 ms	0.2 ms
• for capacitive load	3.3 ms	3.3 ms	3.3 ms	3.3 ms
• for inductive load	0.5 ms; 0.5 ms (1mH); 3.3ms (10mH)	0.5 ms; 0.5ms (1mH); 3.3ms (10mH)	0.5 ms; 0.5ms (1mH); 3.3ms (10mH)	0.5 ms
Errors/accuracies				
Operational limit in overall temperature range				
• Voltage, relative to output area	+/- 0.5 %	+/- 0.5 %	+/- 0.5 %	+/- 0.12 %
• Current, relative to output area	+/- 0.6 %	+/- 0.6 %	+/- 0.6 %	+/- 0.18 %
Basic error limit (operational limit at 25 °C)				
• Voltage, relative to output area	+/- 0.4 %	+/- 0.4 %	+/- 0.4 %	+/- 0.02 %
• Current, relative to output area	+/- 0.5 %	+/- 0.5 %	+/- 0.5 %	+/- 0.02 %
Status information/ alarms/diagnostics				
Substitute values connectable	Yes; parameterizable	Yes; parameterizable	Yes; parameterizable	Yes; parameterizable
Alarms				
• Diagnostic alarm	Yes; parameterizable	Yes; parameterizable	Yes; parameterizable	Yes
Diagnoses				
• Diagnostic information readable	Yes	Yes	Yes	
Isolation				
Isolation checked with	500 V DC	500 V DC	500 V DC	1500 V DC
Isolation				
Isolation, analog outputs				
• between the channels and the backplane bus	Yes	Yes	Yes	Yes
Dimensions and weight				
Width	40 mm	40 mm	40 mm	40 mm
Height	125 mm	125 mm	125 mm	125 mm
Depth	120 mm	120 mm	120 mm	120 mm
Weights				
Weight, approx.	220 g	220 g	272 g	220 g

Ordering data		Order No.
SM 332 analog output modules		
incl. labeling strips, bus connector		
4 outputs, 11/12 bit		**6ES7 332-5HD01-0AB0**
4 outputs, 16 bit	A)	**6ES7 332-7ND02-0AB0**
2 outputs, 11/12 bit		**6ES7 332-5HB01-0AB0**
8 outputs, 11/12 bit		**6ES7 332-5HF00-0AB0**
Front connectors		
20-pin, with screw contacts		
• 1 unit		**6ES7 392-1AJ00-0AA0**
• 100 units		**6ES7 392-1AJ00-1AB0**
20-pin, with cage clamp terminals		
• 1 unit		**6ES7 392-1BJ00-0AA0**
• 100 units		**6ES7 392-1BJ00-1AB0**
40-pin, with screw contacts		
• 1 unit		**6ES7 392-1AM00-0AA0**
• 100 units		**6ES7 392-1AM00-1AB0**
40-pin, with cage clamp terminals		
• 1 unit		**6ES7 392-1BM01-0AA0**
• 100 units		**6ES7 392-1BM01-1AB0**
Front door, elevated design	A)	**6ES7 328-0AA00-7AA0**
e.g. for 32 channel modules; for connecting 1.3 mm^2/16 AWG wires		
SIMATIC TOP connect		See page 4/225; Information about which components can be used for the respective module, see A&D Mall or Catalog KT 10.2
Bus connectors		
1 unit (spare part)		**6ES7 390-0AA00-0AA0**
Shield connecting element		**6ES7 390-5AA00-0AA0**
80 mm wide, with 2 rows for 4 shielding connection clamps each		
Shielding connection clamps		
2 units		
For 2 cables with 2 mm to 6 mm diameter		**6ES7 390-5AB00-0AA0**
For 1 cable with 3 mm to 8 mm diameter		**6ES7 390-5BA00-0AA0**
For 1 cable with 4 mm to 13 mm diameter		**6ES7 390-5CA00-0AA0**
Label cover		**6ES7 392-2XY00-0AA0**
10 units (spare part), for modules with 20-pin front connector		

		Order No.
Labeling strips		**6ES7 392-2XX00-0AA0**
10 units (spare part), for modules with 20-pin front connector		
S7 SmartLabel		**2XV9 450-1SL01-0YX0**
Software for automatic labeling of modules based on data of the STEP 7 project		
Labeling sheets for machine labeling		
For 16-channel signal modules, DIN A4, for printing with laser printer; 10 units		
petrol		**6ES7 392-2AX00-0AA0**
light-beige		**6ES7 392-2BX00-0AA0**
yellow		**6ES7 392-2CX00-0AA0**
red		**6ES7 392-2DX00-0AA0**
For 32-channel signal modules, DIN A4, for printing with laser printer; 10 units		
petrol		**6ES7 392-2AX10-0AA0**
light-beige		**6ES7 392-2BX10-0AA0**
yellow		**6ES7 392-2CX10-0AA0**
red		**6ES7 392-2DX10-0AA0**
SIMATIC Manual Collection	D)	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: S7-200, S7-300, C7, S7-400, SIMATIC DP (Distributed I/O), SIMATIC PC, SIMATIC PG, STEP 7, Engineering Tools, Runtime Software, SIMATIC PCS 7, SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication), SIMATIC Machine Vision, SIMATIC Sensors		
SIMATIC Manual Collection update service for 1 year	D)	**6ES7 998-8XC01-8YE2**
Current S7 Manual Collection DVD and the three subsequent updates		
S7-300 manual		
Design, CPU data, module data, instruction list		
German		**6ES7 398-8FA10-8AA0**
English		**6ES7 398-8FA10-8BA0**
French		**6ES7 398-8FA10-8CA0**
Spanish		**6ES7 398-8FA10-8DA0**
Italian		**6ES7 398-8FA10-8EA0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

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

SM 334 analog input/output modules

Overview

- Analog inputs and outputs
- For the connection of analog sensors and actuators

Technical specifications

	6ES7 334-0CE01-0AA0	6ES7 334-0KE00-0AB0
Voltages and currents		
Load voltage L+		
• Rated value (DC)	24 V	24 V
Current consumption		
from load voltage L+ (without load), max.	110 mA	80 mA
from backplane bus DC 5 V, max.	55 mA	60 mA
Power loss, typ.	3 W	2 W
Connection point		
required front connectors	20-pin	20-pin
Analog inputs		
Number of analog inputs	4	4
Number of analog inputs for voltage measurement	4	2
Number of analog inputs for resistance measurement		4
permissible input frequency for voltage input (destruction limit), max.	20 V	20 V; continuous; 75 V for max. 1s (mark to space ratio 1:20)
permissible input current for current input (destruction limit), max.	40 mA	
Cycle time (all channels) max.	5 ms	85 ms
Input ranges (rated values), voltages		
• 0 to +10 V	Yes	Yes
Input ranges (rated values), currents		
• 0 to 20 mA	Yes	
Input ranges (rated values), resistors		
• 0 to 10000 Ohm		Yes
Input ranges (rated values), resistance thermometers		
• Pt 100		Yes; only climatic range

	6ES7 334-0CE01-0AA0	6ES7 334-0KE00-0AB0
Analog outputs		
Number of analog outputs	2	2
Cable length, shielded, max.	200 m	100 m
Voltage output, short-circuit protection	Yes	Yes
Voltage output, short-circuit current, max.	11 mA	10 mA
Current output, no-load voltage, max.	15 V	
Output ranges, voltage		
• 0 to 10 V	Yes	Yes
Output ranges, current		
• 0 to 20 mA	Yes	
Load impedance (in rated range of output)		
• with voltage outputs, min.	5 kΩ	2,5 kΩ
• with voltage outputs, capacitive load, max.	1 µF	1 µF
• with current outputs, max.	300 Ω	
• with current outputs, inductive load, max.	1 mH	
Analog value creation		
Integrations and conversion time/resolution per channel		
• Resolution with overload area (bit including sign), max.	8 Bit	12 Bit
• Integration time, ms		16.67; 20
Settling time		
• for resistive load	0.3 ms	0.8 ms
• for capacitive load	3 ms	0.8 ms
• for inductive load	0.3 ms	

Technical specifications (continued)

	6ES7 334-0CE01-0AA0	6ES7 334-0KE00-0AB0
Encoder		
Connection of signal encoders		
• for current measurement as 4-wire transducer	Yes	
• for resistance measurement with 2-conductor connection		Yes
• for resistance measurement with 3-conductor connection		Yes
• for resistance measurement with 4-conductor connection		Yes
Errors/accuracies		
Operational limit in overall temperature range		
• Voltage, relative to output area	+/- 0.6 %	+/- 1 %
• Current, relative to output area	+/- 1 %	
• Voltage, relative to input area	+/- 0.9 %	+/- 0,7 %; 0 to 10 V
• Current, relative to input area	+/- 0.8 %	
• Impedance, relative to input area		+/- 3.5 %; 10 kOhm
• Resistance-type thermometer, relative to input area		+/- 1 %
Basic error limit (operational limit at 25 °C)		
• Voltage, relative to output area	+/- 0.5 %	+/- 0.85 %
• Current, relative to output area	+/- 0.5 %	
• Voltage, relative to input area	+/- 0.7 %	+/- 0.5 %; 0 to 10 V

	6ES7 334-0CE01-0AA0	6ES7 334-0KE00-0AB0
Basic error limit (operational limit at 25 °C) (continued)		
• Current, relative to input area	+/- 0.6 %	
• Impedance, relative to input area		+/- 2.8 %; 10 kOhm
• Resistance-type thermometer, relative to input area		+/- 0.8 %
Status information/ alarms/diagnostics		
Alarms		
• Alarms	No	No
Diagnoses		
• Diagnostic functions	No	No
Isolation		
Isolation checked with	DC 500 V	DC 500 V
Isolation		
Isolation, analog outputs		
• between the channels and the backplane bus	No	Yes
Isolation, analog inputs		
• between the channels and the backplane bus	No	Yes
Dimensions and weight		
Width	40 mm	40 mm
Height	125 mm	125 mm
Depth	120 mm	120 mm
Weights		
Weight, approx.	285 g	200 g

SM 334 analog input/output modules

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Ordering data		Order No.
SM 334 analog input/output modules		
incl. labeling strips, bus connector		
4 inputs, 2 outputs		**6ES7 334-0CE01-0AA0**
4 inputs, 2 outputs, resistance measurement, Pt 100		**6ES7 334-0KE00-0AB0**
Front connectors		
20-pin, with screw contacts		
• 1 unit		**6ES7 392-1AJ00-0AA0**
• 100 units		**6ES7 392-1AJ00-1AB0**
20-pin, with cage clamp terminals		
• 1 unit		**6ES7 392-1BJ00-0AA0**
• 100 units		**6ES7 392-1BJ00-1AB0**
Front door, elevated design	A)	**6ES7 328-0AA00-7AA0**
e.g. for 32 channel modules; for connecting 1.3 mm^2/16 AWG wires		
SIMATIC TOP connect		See page 4/225; Information about which components can be used for the respective module, see A&D Mall or Catalog KT 10.2
Bus connectors		**6ES7 390-0AA00-0AA0**
1 unit (spare part)		
Shield connecting element		**6ES7 390-5AA00-0AA0**
80 mm wide, with 2 rows for 4 shielding connection clamps each		
Shielding connection clamps		
2 units		
For 2 cables with 2 mm to 6 mm diameter		**6ES7 390-5AB00-0AA0**
For 1 cable with 3 mm to 8 mm diameter		**6ES7 390-5BA00-0AA0**
For 1 cable with 4 mm to 13 mm diameter		**6ES7 390-5CA00-0AA0**
Label cover		**6ES7 392-2XY00-0AA0**
10 units (spare part), for modules with 20-pin front connector		
Labeling strips		**6ES7 392-2XX00-0AA0**
10 units (spare part), for modules with 20-pin front connector		

		Order No.
S7 SmartLabel		**2XV9 450-1SL01-0YX0**
Software for automatic labeling of modules based on data of the STEP 7 project		
Labeling sheets for machine labeling		
for 16-channel signal modules, DIN A4, for printing with laser printer; 10 units		
petrol		**6ES7 392-2AX00-0AA0**
light-beige		**6ES7 392-2BX00-0AA0**
yellow		**6ES7 392-2CX00-0AA0**
red		**6ES7 392-2DX00-0AA0**
SIMATIC Manual Collection	D)	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: S7-200, S7-300, C7, S7-400, SIMATIC DP (Distributed I/O), SIMATIC PC, SIMATIC PG, STEP 7, Engineering Tools, Runtime Software, SIMATIC PCS 7, SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication), SIMATIC Machine Vision, SIMATIC Sensors		
SIMATIC Manual Collection update service for 1 year	D)	**6ES7 998-8XC01-8YE2**
Current S7 Manual Collection DVD and the three subsequent updates		
S7-300 manual		
Design, CPU data, module data, instruction list		
German		**6ES7 398-8FA10-8AA0**
English		**6ES7 398-8FA10-8BA0**
French		**6ES7 398-8FA10-8CA0**
Spanish		**6ES7 398-8FA10-8DA0**
Italian		**6ES7 398-8FA10-8EA0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

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

SM 335 fast analog hybrid module

Application

The SM 335 fast analog input/output module converts

- Analog signals from the process into digital values for the SIMATIC S7-300 and
- Digital signals from the SIMATIC S7-300 into analog signals for the process.

In addition, the module can also supply encoders (e.g. linear potentiometers) with 10 V / 25 mA and has one counter input. Via the counter input it is possible, for example, to determine a speed, when the path length covered during the interval is known or the signals of simple rotating sensors can be recorded and the speed calculated by means of the interval duration.

Technical specifications

SM 335	
Module-specific data	
Number of inputs	4
Number of outputs	4
Cable length, shielded	200 m
With wire-break monitoring in range 0 V ... 10 V	30 m
Voltages, currents, potentials	
Rated load voltage	24 V DC
Polarity reversal protection	Yes
Galvanic isolation	Yes
Permissible potential difference	
• between inputs (U_{CM})	3 V
• between input (M terminal) and central grounding point	75 V DC
• Insulation	tested at 500 V DC
Current consumption	
• from S7-300 backplane bus, max.	75 mA
• from L+, max.	150 mA
Power losses, max.	3.6 W
Status, interrupts, diagnostics	
Interrupts	
• Limit value interrupt	No
• Cycle end interrupt	yes, parameterizable
• Diagnostics interrupt	yes, parameterizable
Diagnostic functions	
• Fault display for grouped fault	yes, red LED
• Diagnostic information can be read out	Yes
Analog value generation for inputs	
Measuring principle	successive approximation
Conversion time per channel	200 µs
• Basic conversion time for 4 channels, max.	1 ms

SM 335	
Resolution	
• Bipolar	13 bits + sign
• Unipolar	14 Bit
Analog inputs	
Interference between inputs	
• at 50 Hz	65 dB
• at 60 Hz	65 dB
Operational limits (over entire temperature range, referred to input range)	
• with voltage measurement	± 0.15% (with 14-bit resolution)
• with current measurement	0.25%
Basic error limit (operational limits at 25 °C, referred to input range)	0.13% (with 14-bit resolution)
Temperature error (referred to input range)	± 0.1% (with 14-bit resolution)
Linearity error (referred to input range)	± 0.015%
Repeatability (under steady-state conditions, at 25 °C, referred to input range)	± 0.05%
Encoder selection data	
Input range (rated values)/input resistance	
• Voltage	± 1 V; ± 10 V; ± 2.5 V; 0 V ... 2 V; 0 V ... 10 V: 10 MΩ
• Current (max. 2 channels programmable as current inputs)	± 10 mA; 0 mA ... 20 mA; 4 mA ... 20 mA: 100 Ω
Permissible input voltage for voltage input (destruction limit)	± 30 V
Permissible input current for current input (destruction limit)	25 mA
Connection of signal encoder	
• for voltage measurement	possible
• for current measurement	
- as 2-wire transducer	not possible
- as 4-wire transducer	possible
• for resistance measurement	not possible

SM 335 fast analog hybrid module

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Technical specifications (continued)

SM 335	
Output for supplying the transducer (short-circuit proof)	10 V/25 mA
Data for encoder supply output	
Rated voltage	10 V
Output current, max.	25 mA
Short-circuit proof	Yes
Operating limits (over entire temperature range)	0.2%
Temperature error	0.002%/K
Basic error for rated voltage	0.1%
Outputs	
Resolution (including overcontrol range)	
• ± 10 V	11 bits + sign
• from 0 V ... 10 V	12 bits
Conversion time per channel, max.	800 µs
Settling time	
• for resistive load	< 0.1 ms
• for capacitive load	< 3.3 ms
• for inductive load	< 0.5 ms
Interference between outputs	40 dB
Substitute values can be switched in	Yes
Operational limits (over entire temperature range, referred to output range)	0.5%

SM 335	
Basic error limit (operational limits at 25 °C, referred to output range)	0.2%
Linearity error (referred to output range)	± 0.05%
Repeatability (under steady-state conditions, at 25 °C, referred to output range)	± 0.05%
Output ripple (referred to output range)	± 0.05%
Actuator selection data	
Input ranges (rated values)	± 10 V and 0 V ... 10 V (switchover)
Load impedance	
• for voltage outputs, min.	3 kΩ
• for capacitive load, max.	1 µF
• for inductive load, max.	1 mH
Voltage output	
• Short-circuit proof	Yes
• Short-circuit current, max.	8 mA
Connection of the actuators for voltage output	
• as 2-wire connection	possible
• as 4-wire connection	not possible
Dimensions and weight	
Dimensions (w x h x d)	40 mm x 125 mm x 120 mm
Weight, approx.	300 g

Ordering data

	Order No.
SM 335 fast analog hybrid module 4 inputs, 4 outputs, 1 pulse input and encoder supply	**6ES7 335-7HG01-0AB0**
Interference suppressor filter for SM 335 to achieve the noise immunity common to SIMATIC S7; the filter is connected into the 24-V power supply circuit for the SM 335, and can protect up to four SM 335 modules	**6ES7 335-7HG00-6AA0**
SM 335 manual	
German	**6ES7 335-7HG00-8AA1**
English	**6ES7 335-7HG00-8BA1**

	Order No.
Front connector 20-pin, with screw-type terminals	
• 1 unit	**6ES7 392-1AJ00-0AA0**
• 100 units	**6ES7 392-1AJ00-1AB0**
Shield connecting element 80 mm wide, with 2 rows for 4 shielding connection clamps each	**6ES7 390-5AA00-0AA0**
Shielding connection clamps	
2 units	
For 2 cables with 2 mm to 6 mm diameter	**6ES7 390-5AB00-0AA0**
For 1 cable with 3 mm to 8 mm diameter	**6ES7 390-5BA00-0AA0**
For 1 cable with 4 mm to 13 mm diameter	**6ES7 390-5CA00-0AA0**

Overview

- Analog inputs
- For connection of voltage and current sensors, thermocouples, resistors and resistance thermometers

SIPLUS SM 321	2 AI	8 AI	8 AI, 16 bits	8 AI, 16 bits	8 AI, 40-pole
Order No.	**6AG1 331-7KB02-2AB0**	**6AG1 331-7KF02-2AB0**	**6AG1 331-7NF00-2AB0**	**6AG1 331-7NF10-2AB0**	**6AG1 331-7PF01-2AB0**
Order No. based on	**6ES7 331-7KB02-0AB0**	**6ES7 331-7KF02-0AB0**	**6ES7 331-7NF00-0AB0**	**6ES7 331-7NF10-0AB0**	**6ES7 331-7PF01-0AB0**
Ambient temperature range	-25 °C to +60 °C, condensation permissible				
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).				
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1)	Yes	No	Yes	No	No
Technical data	The technical data are identical with the technical data of the based on modules.				

Ordering data

		Order No.
SIPLUS SM 331 analog input modules		
(extended temperature range and medial load)		
Including labeling strips, bus connector, measuring range modules		
2 inputs, resolution 9/12/14 bit	A)	**6AG1 331-7KB02-2AB0**
8 inputs, resolution 9/12/14 bit		**6AG1 331-7KF02-2AB0**
8 inputs, enhanced resolution 16 bit	A)	**6AG1 331-7NF00-2AB0**
8 inputs, enhanced resolution 16 bit, 4-channel mode	A)	**6AG1 331-7NF10-2AB0**
8 inputs, for thermal resistors	A)	**6AG1 331-7PF01-2AB0**
Accessories		see S7-300 analog input modules, page 4/118

A) Subject to export regulations: AL: N and ECCN: EAR99H

SIPLUS SM 332 analog output modules

Overview

- Analog outputs
- For the connection of analog actuators

SIPLUS SM 321	2 AO	8 AO
Order No.	**6AG1 332-5HB01-2AB0**	**6AG1 332-5HF00-2AB0**
Order No. based on	**6ES7 332-5HB01-0AB0**	**6ES7 332-5HF00-0AB0**
Ambient temperature range	-25 °C to +60 °C, condensation permissible	
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).	
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1)	Yes	No
Technical specifications	The technical data are identical with the technical data of the based on modules.	

Ordering data

		Order No.
SIPLUS SM 332 analog output modules		
(extended temperature range and medial load)		
incl. labeling strips, bus connector		
2 outputs, 11/12 bit	A)	**6AG1 332-5HB01-2AB0**
8 outputs, 11/12 bit		**6AG1 332-5HF00-2AB0**
Accessories		see S7-300 analog output modules, page 4/121

A) Subject to export regulations: AL: N and ECCN: EAR99H

SIPLUS SM 334 analog input/output module

Overview

- Analog inputs and outputs
- For the connection of analog sensors and actuators

SIPLUS SM 334	**4 AI/2 AO**
Order No.	**6AG1 334-0KE00-2AB0**
Order No. based on	**6ES7 334-0KE00-0AB0**
Ambient temperature range	-25 °C to +60 °C, condensation permissible
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).
Technical data	The technical data are identical with the technical data of the based on modules.

Ordering data

		Order No.
SIPLUS SM 334 analog input/output modules		
(extended temperature range and medial load)		
incl. labeling strips, bus connector		
4 inputs, 2 outputs, resistance measurement, Pt 100	A)	**6AG1 334-0KE00-2AB0**
Accessories		see S7-300 analog input/ouput modules, page 4/124

A) Subject to export regulations: AL: N and ECCN: EAR99H

SM 326 F digital input module - Safety Integrated

Overview

- Digital inputs for the fail-safe SIMATIC S7 systems
- They are suitable for connecting:
  - switches and 2-wire proximity switches (BEROs)
  - Sensors according to NAMUR and mechanical contacts, also for signals from hazardous areas
- With integral safety functions for fail-safe operation
- Can be used in fail-safe mode
  - Centrally: With S7-31xF-2 DP
  - Distributed in ET 200M: With SIMATIC IM 151-7 F-CPU, S7-31xF-2 DP, S7-416F-2 and S7-400F/FH
- Can be used in standard mode as an S7-300 module

Technical specifications

	6ES7 326-1RF00-0AB0	6ES7 326-1BK01-0AB0
Supply voltages		
Supply voltage of electronics and encoders 1L+/2L+		
• Rated value (DC)	24 V	24 V
Current consumption		
from load voltage L+ (without load), max.	160 mA	450 mA
from backplane bus DC 5 V, max.	90 mA	100 mA
Power loss, typ.	4,5 W	10 W
Connection point		
required front connectors	40-pin	40-pin
Digital inputs		
Number of digital inputs	8; 8 (one-channel); 4 (two-channel)	24
Number of simultaneously controllable inputs		
• Number of simultaneously controllable inputs, up to 40 °C	8; vertical setup	24
• Number of simultaneously controllable inputs, up to 60 °C	8; horizontal set up	24; (at 24 V) or 18 (at 28.8 V)
Cable length		
• Cable length, shielded, max.	200 m	200 m
• Cable length unshielded, max.	100 m	100 m
Input voltage		
• Rated value, DC		24 V
• for signal "0"		-30V to 5 V
• for signal "1"		11 to 30 V
Input current		
• for signal "0", max. (permissible quiescent current)		2 mA
• for signal "1", typ.		10 mA

	6ES7 326-1RF00-0AB0	6ES7 326-1BK01-0AB0
Input delay (for rated value of input voltage)		
• for standard inputs		
- at "0" to "1", max.		3.4 ms
- at "1" to "0", max.		3.4 ms
Encoder supply		
Number of outputs	8	4; electrically isolated
Output voltage	DC 8,2 V	
Output current, rated value		400 mA
Encoder		
Connectable encoders		
• 2-wire BEROS		Yes; if short-circuit test is deactivated
• permissible quiescent current (2-wire BEROS), max.		2 mA
Ex(i) characteristics		
Module for Ex(i) protection	Yes	
Max. values of input circuits (per channel)		
• Co (permissible external capacity), max.	3 µF	
• Io (chort-circuit current), max.	13.9 mA	
• Lo (permissible external inductivity), max.	80 mH	
• Po (power of load), max.	33.1 mW	
• Uo (output no-load voltage), max.	10 V	
• Ta (permissible ambient temperature), max.	60 °C	60 °C

Technical specifications (continued)

	6ES7 326-1RF00-0AB0	6ES7 326-1BK01-0AB0
Status information/ alarms/diagnostics		
Alarms		
• Diagnostic alarm	Yes	Yes
Diagnoses		
• Diagnostic information readable	Yes	Yes
Isolation		
Isolation checked with	500 V DC	500 V DC / 350 V AC
Isolation		
Galvanic isolation, digital inputs		
• between the channels	Yes	Yes
• between the channels, in groups of		12
• between the channels and the backplane bus	Yes	Yes

	6ES7 326-1RF00-0AB0	6ES7 326-1BK01-0AB0
Standards, approvals, certificates		
Type of protection to EN 50020 (CENELEC)	II(2)G [EEx ib] IIC to EN 50020	
Test number KEMA	99 ATEX 2671 X	
Highest safety class achievable in safety mode		
• to DIN VDE 0801	AK 4 (one channel), AK 5 und 6 (two channel)	AK 6
• to EN 954	Cat. 3 (single channel), Cat. 4 (two-channel)	Kat. 4
• to IEC 61508	SIL 2 (single channel), SIL 3 (two-channel)	SIL 3
Dimensions and weight		
Width	80 mm	80 mm
Height	125 mm	125 mm
Depth	120 mm	120 mm
Weights		
Weight, approx.	482 g	442 g

SM 326 F digital input module - Safety Integrated

4

Ordering data	Order No.
SM 326 F digital input module	
24 inputs, 24 V DC	**6ES7 326-1BK01-0AB0**
8 inputs, 24 V DC, NAMUR	**6ES7 326-1RF00-0AB0**
Distributed Safety V5.4 programming tool Task: Software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, ET 200S Requirement: STEP 7 V5.3 SP3 and higher	
Floating license	**6ES7 833-1FC02-0YA5**
Software Update Service	**6ES7 833-1FC00-0YX2**
Distributed Safety Upgrade	
From V5.x to V5.4; Floating license for 1 user	**6ES7 833-1FC02-0YE5**
Labeling sheet with strips for 10 electronic blocks	
• For 16-channel electronic blocks incl. add-on terminals	**6ES7 193-1BH00-0XA0**
• For 32-channel electronic blocks incl. add-on terminals	**6ES7 193-1BL00-0XA0**
Connecting cable for PROFIBUS 12 Mbit/s, for connecting PG to PROFIBUS DP, pre-assembled with 2 x 9-pin Sub-D connector, 3 m	**6ES7 901-4BD00-0XA0**
PROFIBUS bus connector	
• 90° cable outlet, terminating resistor with isolating function, without PG socket, up to 12 Mbit/s	**6ES7 972-0BA12-0XA0**
• 90° cable outlet, terminating resistor with isolating function, without PG socket, up to 12 Mbit/s	**6ES7 972-0BB12-0XA0**
• Angular outgoing cable, insulation displacement terminals, without bus terminating resistor, without PG connection socket, up to 1.5 Mbit/s	**6ES7 972-0BA30-0XA0**
• 90° cable outlet, terminating resistor with isolating function, insulation displacement technology, Fast Connect, without PG socket, up to 12 Mbit/s	**6ES7 972-0BA50-0XA0**
• 90° cable outlet, terminating resistor with isolating function, insulation displacement technology, Fast Connect, with PG socket, up to 12 Mbit/s	**6ES7 972-0BB50-0XA0**
DIN rail for active bus modules for max. 5 active bus modules for hot swapping function	
• 483 mm long	**6ES7 195-1GA00-0XA0**
• 530 mm long	**6ES7 195-1GF30-0XA0**
• 620 mm long	**6ES7 195-1GG30-0XA0**
• 2000 mm long	**6ES7 195-1GC00-0XA0**

		Order No.
Active bus module BM 1 x 80 for 1 module with 80 mm width		**6ES7 195-7HC00-0XA0**
SITOP power supply module for ET 200M; 120/230 V AC, 24 V DC, 5 A; Type PS 307-1E		**6ES7 307-1EA00-0AA0**
Front connector 40-pin, with screw contacts		
• 1 unit		**6ES7 392-1AM00-0AA0**
• 100 units		**6ES7 392-1AM00-1AB0**
40-pin with cage clamp contacts		
• 1 unit		**6ES7 392-1BM01-0AA0**
• 100 units		**6ES7 392-1BM01-1AB0**
Labeling strips For fail-safe modules (spare part); 10 units		**6ES7 392-2XX20-0AA0**
Label cover For fail-safe modules (spare part); 10 units		**6ES7 392-2XY20-0AA0**
LK 393 cable guide For F modules; L+ and M connections; 5 units		**6ES7 393-4AA10-0AA0**
S7-300 manual Design, CPU data, module data, instruction list		
German		**6ES7 398-8FA10-8AA0**
English		**6ES7 398-8FA10-8BA0**
French		**6ES7 398-8FA10-8CA0**
Spanish		**6ES7 398-8FA10-8DA0**
Italian		**6ES7 398-8FA10-8EA0**
SIMATIC Manual Collection Electronic manuals on DVD, multilingual: S7-200, S7-300, C7, S7-400, SIMATIC DP (Distributed I/O), SIMATIC PC, SIMATIC PG (Programming device), STEP 7, Engineering Tools, Runtime Software, SIMATIC PCS 7, SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication), SIMATIC Machine Vision, SIMATIC Sensors	D)	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year Current S7 Manual Collection DVD and the three subsequent updates	D)	**6ES7 998-8XC01-8YE2**

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

SM 326 F digital output module - Safety Integrated

Overview

- Digital outputs for the fail-safe SIMATIC S7 systems
- Two variants (1 x source/source output, 1 x source/sink output)
- For connection of solenoid valves, DC contactors and signaling lamps
- With integral safety functions for fail-safe operation
- Can be used in fail-safe mode
  - Centrally: With S7-31xF-2 DP
  - Distributed in ET 200M: With SIMATIC IM 151-7 F-CPU, S7-31xF-2 DP, S7-416F-2 and S7-400F/FH
- Can be used in standard mode as an S7-300 module (only applies to 6ES7 326-2BF01-0AB0)

Technical specifications

	6ES7 326-2BF01-0AB0	6ES7 326-2BF40-0AB0
Voltages and currents		
Load voltage L+		
• Rated value (DC)	24 V; 1L+, 2L+, 3L+	24 V; 1L+, 2L+, 3L+
Current consumption		
from load voltage1L+, max.	70 mA; from supply voltage	75 mA; from supply voltage
from load voltage 2L+ (without load), max.	100 mA	100 mA
from load voltage 3L+ (without load), max.	100 mA	100 mA
from backplane bus DC 5 V, max.	100 mA	100 mA
Power loss, typ.	12 W	12 W
Connection point		
required front connectors	40-pin	40-pin
Digital outputs		
Number of digital outputs	10	8
Cable length, shielded, max.	1,000 m; 200 m for SIL3, AK 6, Cat 4	30 m
Cable length unshielded, max.	600 m	50 m
Short-circuit protection of the output	Yes; electronic	Yes; electronic
Limitation of inductive shutdown voltage to	L+ (-53 V) without series diode, L+ (-33 V) with series diode	L+ (-33 V)
Lamp load, max.	5 W	5 W
Output voltage		
• for signal "1" with series diode, min.	L+ (-1.8 V)	
• for signal "1" without series diode, min.	L+ (-1.0 V)	L+ (-1.0 V)

	6ES7 326-2BF01-0AB0	6ES7 326-2BF40-0AB0
Output current		
• for signal "1" rated value	2 A	2 A
• for signal "1" permissible range for 0 to 40 °C, min.	7 mA	7 mA
• for signal "1" permissible range for 0 to 40 °C, max.	2 A; 2 A for horizontal installation, 1 A for vertical installation	2 A; A for horizontal installation, 1 A for vertical installation
• for signal "1" permissible range for 40 to 60 °C, min.	7 mA	7 mA
• for signal "1" permissible range for 40 to 60 °C, max.	1 A; for horizontal installation	1 A; for horizontal installation
• for signal "0" residual current, max.	0.5 mA	0.5 mA
Switching frequency		
• with resistive load, max.	10 Hz	30 Hz
• with inductive load, max.	2 Hz	2 Hz
• on lamp load, max.	10 Hz	10 Hz
Aggregate current of the outputs (per group)		
• vertical installation		
- up to 40 °C, max.	5 A; without series diode, 4 A with series diode	5 A
• horizontal installation		
- up to 40 °C, max.	7.5 A; without series diode, 5 A with series diode	7.5 A
- up to 60 °C, max.	5 A; without series diode, 4 A with series diode	5 A

SM 326 F digital output module - Safety Integrated

Technical specifications (continued)

	6ES7 326-2BF01-0AB0	6ES7 326-2BF40-0AB0
Status information/ alarms/diagnostics		
Alarms		
• Diagnostic alarm	Yes	Yes; parameterizable
Diagnoses		
• Diagnostic information readable	Yes	Yes
Isolation		
Isolation checked with	500 V DC / 350 V AC	500 V DC / 350 V AC
Isolation		
Isolation, digital outputs		
• between the channels	Yes	Yes
• between the channels, in groups of	5	4
• between the channels and the backplane bus	Yes	Yes
• between the channels and the voltage supply to the electronics	Yes	Yes

	6ES7 326-2BF01-0AB0	6ES7 326-2BF40-0AB0
Standards, approvals, certificates		
Highest safety class achievable in safety mode		
• to DIN VDE 0801	AK 5 and 6	
• to EN 954	Cat. 4	Cat. 4
• to IEC 61508	SIL 3	SIL 3
Dimensions and weight		
Width	80 mm	80 mm
Height	125 mm	125 mm
Depth	120 mm	120 mm
Weights		
Weight, approx.	465 g	465 g

Ordering data

	Order No.
SM 326 F digital output module	
10 outputs, 24 V DC, 2 A	**6ES7 326-2BF01-0AB0**
8 outputs, 24 V DC, 2 A	**6ES7 326-2BF40-0AB0**
Distributed Safety V5.4 programming tool Task: Software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, ET 200S Requirement: STEP 7 V5.3 SP3 and higher	
Floating license	**6ES7 833-1FC02-0YA5**
Software Update Service	**6ES7 833-1FC00-0YX2**
Distributed Safety Upgrade	
From V5.x to V5.4; Floating license for 1 user	**6ES7 833-1FC02-0YE5**
Labeling sheet with strips for 10 electronic blocks	
• For 16-channel electronic blocks incl. add-on terminals	**6ES7 193-1BH00-0XA0**
• For 32-channel electronic blocks incl. add-on terminals	**6ES7 193-1BL00-0XA0**
Connecting cable for PROFIBUS 12 Mbit/s, for connecting PG to PROFIBUS DP, pre-assembled with 2 x 9-pin Sub-D connector, 3 m	**6ES7 901-4BD00-0XA0**
PROFIBUS bus connector	
• 90° cable outlet, terminating resistor with isolating function, without PG socket, up to 12 Mbit/s	**6ES7 972-0BA12-0XA0**
• 90° cable outlet, terminating resistor with isolating function, without PG socket, up to 12 Mbit/s	**6ES7 972-0BB12-0XA0**
• Angular outgoing cable, insulation displacement terminals, without bus terminating resistor, without PG connection socket, up to 1.5 Mbit/s	**6ES7 972-0BA30-0XA0**
• 90° cable outlet, terminating resistor with isolating function, insulation displacement technology, Fast Connect, without PG socket, up to 12 Mbit/s	**6ES7 972-0BA50-0XA0**
• 90° cable outlet, terminating resistor with isolating function, insulation displacement technology, Fast Connect, with PG socket, up to 12 Mbit/s	**6ES7 972-0BB50-0XA0**
DIN rail for active bus modules for max. 5 active bus modules, for function "Insertion and removal"	
• 483 mm long	**6ES7 195-1GA00-0XA0**
• 530 mm long	**6ES7 195-1GF30-0XA0**
• 620 mm long	**6ES7 195-1GG30-0XA0**
• 2000 mm long	**6ES7 195-1GC00-0XA0**

		Order No.
Active bus module BM 1 x 80 for 1 module with 80 mm width		**6ES7 195-7HC00-0XA0**
SITOP power supply module for ET 200M; 120/230 V AC, 24 V DC, 5 A Type PS 307-1E		**6ES7 307-1EA00-0AA0**
Front connector		
40-pin, with screw contacts		
• 1 unit		**6ES7 392-1AM00-0AA0**
• 100 units		**6ES7 392-1AM00-1AB0**
40-pin with cage clamp contacts		
• 1 unit		**6ES7 392-1BM01-0AA0**
• 100 units		**6ES7 392-1BM01-1AB0**
Labeling strips For fail-safe modules (spare part), 10 units		**6ES7 392-2XX20-0AA0**
Label cover For fail-safe modules (spare part), 10 units		**6ES7 392-2XY20-0AA0**
LK 393 cable guide For F modules; L+ and M connections, 5 units		**6ES7 393-4AA10-0AA0**
S7-300 manual Design, CPU data, module data, instruction list		
German		**6ES7 398-8FA10-8AA0**
English		**6ES7 398-8FA10-8BA0**
French		**6ES7 398-8FA10-8CA0**
Spanish		**6ES7 398-8FA10-8DA0**
Italian		**6ES7 398-8FA10-8EA0**
SIMATIC Manual Collection Electronic manuals on DVD, multilingual: S7-200, S7-300, C7, S7-400, SIMATIC DP (Distributed I/O), SIMATIC PC, SIMATIC PG (Programming device), STEP 7, Engineering Tools, Runtime Software, SIMATIC PCS 7, SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication), SIMATIC Machine Vision, SIMATIC Sensors	D)	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year Current S7 Manual Collection DVD and the three subsequent updates	D)	**6ES7 998-8XC01-8YE2**

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

SM 336 F analog input module - Safety Integrated

Overview

- Analog inputs for the fail-safe SIMATIC S7 systems
- For connection of analog voltage and current sensors
- With integral safety functions for fail-safe operation
- For use in the ET 200M distributed I/O station with SIMATIC IM151-7 F-CPU, S7-31xF-2 DP, S7-416F-2 and S7-400F/FH
- Can be used in standard mode as an S7-300 module

Technical specifications

	6ES7 336-1HE00-0AB0
Voltages and currents	
Load voltage L+	
• Rated value (DC)	24 V
• reverse polarity protection	Yes
Current consumption	
from backplane bus DC 5 V, max.	90 mA
from supply voltage L+, max.	160 mA; typically
Power loss, typ.	4.25 W
Connection point	
required front connectors	40-pin
Analog inputs	
Number of analog inputs	6
Number of analog inputs for voltage measurement	4
Cable length, shielded, max.	200 m
permissible input frequency for voltage input (destruction limit), max.	30 V
permissible input current for current input (destruction limit), max.	40 mA
Input ranges (rated values), voltages	
• 0 to +10 V	Yes
Input ranges (rated values), currents	
• 0 to 20 mA	Yes
• 4 to 20 mA	Yes

	6ES7 336-1HE00-0AB0
Analog value creation	
Integrations and conversion time/resolutionper channel	
• Resolution with overload area (bit including sign), max.	14 Bit
• Integration time, ms	20 ms (at 50 Hz); 16.66 ms (at 60 Hz)
• Interference voltage suppression for interference frequency f1 in Hz	38 dB
Encoder	
Connection of signal encoders	
• for current measurement as 2-wire transducer	Yes
• for current measurement as 4-wire transducer	Yes
Errors/accuracies	
Operational limit in overall temperature range	
• Voltage, relative to input area	+/- 0.48 %
• Current, relative to input area	+/- 0.48 %
Basic error limit (operational limit at 25 °C)	
• Voltage, relative to input area	+/- 0.4 %
• Current, relative to input area	+/- 0.4 %
Status information/ alarms/diagnostics	
Alarms	
• Diagnostic alarm	Yes; parameterizable

Technical specifications (continued)

	6ES7 336-1HE00-0AB0
Diagnoses	
• Diagnostic information readable	Yes
Isolation	
Isolation checked with	500 V DC / 350 V AC
Isolation	
Isolation, analog inputs	
• between the channels	No
• between the channels and the backplane bus	Yes
• between the channels and the voltage supply to the electronics	Yes; only if sensors are externally supplied

	6ES7 336-1HE00-0AB0
Standards, approvals, certificates	
Highest safety class achievable in safety mode	
• to DIN V 19250	AK 6
• to EN 954	Cat. 4
• to IEC 61508	SIL 3
Dimensions and weight	
Width	80 mm
Height	125 mm
Depth	120 mm
Weights	
Weight, approx.	480 g

Ordering data

	Order No.
FM 336 F analog input module	
6 inputs, 14 bit	**6ES7 336-1HE00-0AB0**
Distributed Safety V5.4 programming tool	
Task: Software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, ET 200S Requirement: STEP 7 V5.3 SP3 and higher	
Floating license	**6ES7 833-1FC02-0YA5**
Software Update Service	**6ES7 833-1FC00-0YX2**
Distributed Safety Upgrade	
From V5.x to V5.4; Floating license for 1 user	**6ES7 833-1FC02-0YE5**
Labeling sheet with strips for 10 electronic blocks	
• For 16-channel electronic blocks incl. add-on terminals	**6ES7 193-1BH00-0XA0**
• For 32-channel electronic blocks incl. add-on terminals	**6ES7 193-1BL00-0XA0**
Connecting cable for PROFIBUS	**6ES7 901-4BD00-0XA0**
12 Mbit/s, for connecting PG to PROFIBUS DP, pre-assembled with 2 x 9-pin Sub-D connector, 3 m	

	Order No.
PROFIBUS bus connector	
• 90° cable outlet, terminating resistor with isolating function, without PG socket, up to 12 Mbit/s	**6ES7 972-0BA12-0XA0**
• 90° cable outlet, terminating resistor with isolating function, without PG socket, up to 12 Mbit/s	**6ES7 972-0BB12-0XA0**
• Angular outgoing cable, insulation displacement terminals, without bus terminating resistor, without PG connection socket, up to 1.5 Mbit/s	**6ES7 972-0BA30-0XA0**
• 90° cable outlet, terminating resistor with isolating function, insulation displacement technology, Fast Connect, without PG socket, up to 12 Mbit/s	**6ES7 972-0BA50-0XA0**
• 90° cable outlet, terminating resistor with isolating function, insulation displacement technology, Fast Connect, with PG socket, up to 12 Mbit/s	**6ES7 972-0BB50-0XA0**
DIN rail for active bus modules	
for max. 5 active bus modules for hot swapping function	
• 483 mm long	**6ES7 195-1GA00-0XA0**
• 530 mm long	**6ES7 195-1GF30-0XA0**
• 620 mm long	**6ES7 195-1GG30-0XA0**
• 2000 mm long	**6ES7 195-1GC00-0XA0**

SM 336 F analog input module - Safety Integrated

Ordering data

	Order No.
Active bus module BM 1 x 80 for 1 module with 80 mm width	**6ES7 195-7HC00-0XA0**
SITOP power supply module for ET 200M; 120/230 V AC, 24 V DC, 5 A Type PS 307-1E	**6ES7 307-1EA00-0AA0**
Front connector 40-pin, with screw contacts	
• 1 unit	**6ES7 392-1AM00-0AA0**
• 100 units	**6ES7 392-1AM00-1AB0**
40-pin with cage clamp contacts	
• 1 unit	**6ES7 392-1BM01-0AA0**
• 100 units	**6ES7 392-1BM01-1AB0**
Labeling strips For fail-safe modules (spare part), 10 units	**6ES7 392-2XX20-0AA0**
Label cover For fail-safe modules (spare part), 10 units	**6ES7 392-2XY20-0AA0**
LK 393 cable guide For F modules; L+ and M connections, 5 units	**6ES7 393-4AA10-0AA0**

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

		Order No.
S7-300 manual Design, CPU data, module data, instruction list		
German		**6ES7 398-8FA10-8AA0**
English		**6ES7 398-8FA10-8BA0**
French		**6ES7 398-8FA10-8CA0**
Spanish		**6ES7 398-8FA10-8DA0**
Italian		**6ES7 398-8FA10-8EA0**
SIMATIC Manual Collection Electronic manuals on DVD, multilingual: S7-200, S7-300, C7, S7-400, SIMATIC DP (Distributed I/O), SIMATIC PC, SIMATIC PG (Programming device), STEP 7, Engineering Tools, Runtime Software, SIMATIC PCS 7, SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication), SIMATIC Machine Vision, SIMATIC Sensors	D)	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year Current S7 Manual Collection DVD and the three subsequent updates	D)	**6ES7 998-8XC01-8YE2**

Isolation module

Overview

See section 5, SIMATIC S7-400, page 5/101

Overview

- Digital inputs for the fail-safe SIMATIC S7 systems
- They are suitable for connecting:
  - switches and 2-wire proximity switches (BEROs)
  - Sensors according to NAMUR and mechanical contacts, also for signals from hazardous areas
- With integral safety functions for fail-safe operation
- Can be used in fail-safe mode
  - Centrally: With S7-31xF-2 DP
  - Distributed in ET 200M: With SIMATIC IM 151-7 F-CPU, S7-31xF-2 DP, S7-416F-2 and S7-400F/FH
- Can be used in standard mode as an S7-300 module

Fail-safe digital output module	**SIPLUS SM 326**
Order No.	**6AG1 326-1BK01-2AB0**
Order No. based on	**6ES7 326-1BK01-0AB0**
Ambient temperature range	-25 °C to +60 °C, condensation permissible
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).
Technical data	The technical data are identical with the technical data of the based on modules.

Ordering data

	Order No.
SIPLUS SM 326 F digital input module	
(extended temperature range and medial load)	
24 inputs, 24 V DC	**6AG1 326-1BK01-2AB0**
Accessories	see S7-300 F digital input modules, page 4/132

SIPLUS SM 326 F digital output module - Safety Integrated

Overview

- Digital outputs for the fail-safe SIMATIC S7 systems
- Two variants (1 x source/source output, 1 x source/sink output)
- For connection of solenoid valves, DC contactors and signaling lamps
- With integral safety functions for fail-safe operation
- Can be used in fail-safe mode
  - Centrally: With S7-31xF-2 DP
  - Distributed in ET 200M: With SIMATIC IM 151-7 F-CPU, S7-31xF-2 DP, S7-416F-2 and S7-400F/FH
- Can be used in standard mode as an S7-300 module (only applies to 6ES7 326-2BF01-0AB0)

SIPLUS SM 326 fail-safe digital output module	
Order No.	**6AG1 326-2BF01-2AB0**
Order No. based on	**6ES7 326-2BF01-0AB0**
Ambient temperature range	-25 °C to +60 °C, condensation permissible
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1).	Yes
Technical data	The technical data are identical with the technical data of the based on modules.

Ordering data

	Order No.
SIPLUS SM 326 F digital output module (extended temperature range and medial load)	
10 outputs, 24 V DC, 2 A	**6AG1 326-2BF01-2AB0**
Accessories	see S7-300 F digital output modules, page 4/135

SIPLUS Isolation module

Overview

See section 5, SIMATIC S7-400, page 5/102

Overview

- I/O modules for applications within potentially explosive chemical plants
- For connecting sensors and actuators from zones 1 and 2 in hazardous area installations
- Associated electrical equipment [EEx ib] IIC in accordance with DIN 50020
- For isolating non-intrinsically safe circuits of the programmable logic controller and the intrinsically safe circuits from the process

Technical specifications

	6ES7 321-7RD00-0AB0
Voltages and currents	
Load voltage L+	
• Rated value (DC)	24 V
Current consumption	
from load voltage L+ (without load), max.	50 mA
from backplane bus DC 5 V, max.	80 mA
Power loss, typ.	1.1 W
Connection point	
required front connectors	20-pin
Digital inputs	
Number of NAMUR inputs	4
Cable length	
• Cable length unshielded, max.	200 m
Input voltage	
• Rated value, DC	8.2 V; from internal power circuit supply
Input current	
• on wire break, max.	0.1 mA
• on short-circuit, max.	8.5 mA
• for NAMUR encoders	
- for signal "0"	0.35 to 1.2 mA
- for signal "1"	2.1 to 7 mA
Input delay (for rated value of input voltage)	
• Input frequency (with 0.1 ms delay), max.	2 kHz
• for NAMUR inputs	
- programmable	Yes; 0.1 / 0.5 / 3 / 15 / 20 ms (plus 0.25 ms preparation time)
Encoder supply	
Output voltage	via the inputs

	6ES7 321-7RD00-0AB0
Encoder	
Connectable encoders	
• NAMUR encoder	Yes; Two-wire connection
Ex(i) characteristics	
Max. values of input circuits (per channel)	
• Co (permissible external capacity), max.	3 µF
• Io (chort-circuit current), max.	14.1 mA
• Lo (permissible external inductivity), max.	100 mH
• Po (power of load), max.	33.7 mW
• Uo (output no-load voltage), max.	10 V
Status information/ alarms/diagnostics	
Diagnoses	
• Diagnostic information readable	Yes
Isolation	
Galvanic isolation, digital inputs	
• galvanic isolation, digital inputs	Yes
• between the channels, in groups of	1
Standards, approvals, certificates	
Type of protection to EN 50020 (CENELEC)	[EEx ib] IIC
Type of protection to FM	CL.2, DIV 2, GP A,B,C,D T4
Test number PTB	Ex-96.D.2094X
Weights	
Weight, approx.	230 g

Ex digital input/output modules

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Technical specifications (continued)

	6ES7 322-5SD00-0AB0	6ES7 322-5RD00-0AB0
Voltages and currents		
Load voltage L+		
• Rated value (DC)	24 V	24 V
Current consumption		
from load voltage L+ (without load), max.	160 mA	160 mA
from backplane bus DC 5 V, max.	70 mA	70 mA
Power loss, typ.	3 W	3 W
Connection point		
required front connectors	20-pin	20-pin
Digital outputs		
Number of digital outputs	4	4
Cable length unshielded, max.	200 m	200 m
Short-circuit protection of the output	Yes; electronic	Yes; electronic
• Response threshold, typ.	Output current with short-circuit protection, min. 10 mA + 10 %	Output current with short-circuit protection, min. 20.5 mA + 10 %
Output voltage		
• Rated value (DC)	24 V	15 V
Output current		
• for signal "1" permissible range for 0 to 60 °C, max.	10 mA; +/- 10%	20 mA; +/- 10%
Switching frequency		
• with resistive load, max.	100 Hz	100 Hz
Load impedance range		
• upper limit	390 Ω; Two-wire connection	200 Ω; Two-wire connection

	6ES7 322-5SD00-0AB0	6ES7 322-5RD00-0AB0
Ex(i) characteristics		
Max. values of output circuits (per channel)		
• Co (permissible external capacity), max.	90 nF	500 nF
• Io (chort-circuit current), max.	70 mA	85 mA
• Lo (permissible external inductivity), max.	6.7 mH	5 mH
• Po (power of load), max.	440 mW	335 mW
• Uo (output no-load voltage), max.	25.2 V	15.75 V
Status information/ alarms/diagnostics		
Diagnoses		
• Diagnostic information readable	Yes	Yes
• Short circuit	Yes	Yes
• Group error	Yes	Yes
Isolation		
Isolation, digital outputs		
• Galvanic isolation, digital outputs	Yes	Yes
• between the channels, in groups of	1	1
Type of protection to EN 50020 (CENELEC)		
Type of protection to FM	[EEx ib] IIC	[EEx ib] IIC
Test number PTB	CL I, DIV 2, GP A,B,C,D T4	AIS CL.1, DIV 1, GP A,B,C,D; CL.I, DIV 2, GP A,B,C,D T4
Weights	Ex-96.D.2093X	Ex-96.D.2102X
Weight, approx.		
Type of protection to EN 50020 (CENELEC)	230 g	230 g

Ordering data

		Order No.
Ex digital input module		
4 inputs, isolated, NAMUR		**6ES7 321-7RD00-0AB0**
Ex digital output modules		
4 outputs, isolated, 24 V DC, 10 mA		**6ES7 322-5SD00-0AB0**
4 outputs, isolated, 15 V DC, 20 mA		**6ES7 322-5RD00-0AB0**
Front connectors		
20-pin, with screw contacts		
• 1 piece		**6ES7 392-1AJ00-0AA0**
• 100 pieces		**6ES7 392-1AJ00-1AB0**
Front door, elevated design		
e.g. for 32 channel modules; enables connection of 1.3 mm^2/16 AWG wires	A)	**6ES7 328-0AA00-7AA0**
LK 393 cable guide		**6ES7 393-4AA00-0AA0**
Mandatory for operation in Ex-hazard areas		
Labeling strips		**6ES7 392-2XX00-0AA0**
10 pieces (spare part), for modules with 20-pin front connector		
Label cover		**6ES7 392-2XY00-0AA0**
10 pieces (spare part), for modules with 20-pin front connector		
S7 SmartLabel		**2XV9 450-1SL01-0YX0**
Software for automatic labeling of modules based on data of the STEP 7 project		

		Order No.
Labeling sheets for machine inscription		
For 16-channel signal modules, DIN A4, for printing with laser printer; 10 pieces		
petrol		**6ES7 392-2AX00-0AA0**
light-beige		**6ES7 392-2BX00-0AA0**
yellow		**6ES7 392-2CX00-0AA0**
red		**6ES7 392-2DX00-0AA0**
SIMATIC Manual Collection	D)	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: S7-200, S7-300, C7, S7-400, SIMATIC DP (Distributed I/O), SIMATIC PC, SIMATIC PG, STEP 7, Engineering Tools, Runtime Software, SIMATIC PCS 7, SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication), SIMATIC Machine Vision, SIMATIC Sensors		
SIMATIC Manual Collection update service for 1 year	D)	**6ES7 998-8XC01-8YE2**
Current S7 Manual Collection DVD and the three subsequent updates		
Reference manual Ex I/O station S7-300, ET 200M		
German		**6ES7 398-8RA00-8AA0**
English		**6ES7 398-8RA00-8BA0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

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

Ex analog input/output modules

Overview

- I/O modules for applications within potentially explosive chemical plants
- For connecting sensors and actuators from zones 1 and 2 in hazardous area installations
- Associated electrical equipment [EEx ib] IIC in accordance with DIN 50020
- For isolation of non-IS circuits of the automation system and the IS circuits from the process

Technical specifications

	6ES7 331-7RD00-0AB0	6ES7 331-7SF00-0AB0
Voltages and currents		
Load voltage L+		
• Rated value (DC)	24 V	24 V
Voltage supply to the transducers		
• present	Yes	
• Rated value (DC)	13 V; at 22 mA	
• No-load voltage (DC)	25.2 V	
Current consumption		
from backplane bus DC 5 V, max.	60 mA	120 mA
from supply voltage L+, max.	150 mA	
Power loss, typ.	3 W	0,6 W
Connection point		
required front connectors	20-pin	20-pin
Analog inputs		
Number of analog inputs	4	8; 8 x thermocouples, 4 x RTD thermistors
Cable length, shielded, max.	200 m	200 m; HTC:50 m
permissible input current for current input (destruction limit), max.	40 mA	
Input ranges (rated values), currents		
• 0 to 20 mA	Yes	
• 4 to 20 mA	Yes	
Input ranges (rated values), thermoelements		
• Type B		Yes
• Type E		Yes
• Type J		Yes
• Type K		Yes

	6ES7 331-7RD00-0AB0	6ES7 331-7SF00-0AB0
Input ranges (rated values), thermoelements		
• Type L		Yes
• Type N		Yes
• Type R		Yes
• Type S		Yes
• Type T		Yes
• Type U		Yes
Input ranges (rated values), resistance thermometers		
• Ni 100		Yes
• Pt 100		Yes
• Pt 200		Yes
Analog value creation		
Measurement principle	SIGMA-DELTA	SIGMA-DELTA
Integrations and conversion time/ resolution per channel		
• Resolution with overload area (bit including sign), max.	16 Bit; 10 to 15 bit + sign	16 Bit; 10 to 15 bit + sign
• Integration time, parameterizable	Yes; 2.5 to 100 ms	Yes; 2.5 to 100 ms
• Interference voltage suppression for interference frequency f1 in Hz	10 to 400 Hz	10 to 400 Hz
Encoder		
Connection of signal encoders		
• for current measurement as 2-wire transducer	Yes	Yes
• for current measurement as 4-wire transducer	Yes	Yes

Technical specifications (continued)

	6ES7 331-7RD00-0AB0	6ES7 331-7SF00-0AB0
Ex(i) characteristics		
Max. values of input circuits (per channel)		
• Co (permissible external capacity), max.	90 nF	60 µF
• Io (chort-circuit current),	68.5 mA	28,8 mA
• Lo (permissible external inductivity), max.	7.5 mH	40 mH
• Po (power of load), max.	431 mW	41.4 mW
• Ri, max.	50 Ω	
• Uo (output no-load voltage), max.	25.2 V	5.9 V
Errors/accuracies		
Operational limit in overall temperature range		
• Current, relative to input area	+/- 0.45 %	
Basic error limit (operational limit at 25 °C)		
• Current, relative to input area	+/- 0.1 %	
• Resistance-type thermometer, relative to input area		+/- 0.1 %
Interference voltage suppression for f = n x (fl +/- 1 %), fl = interference frequency		
• Series mode interference (peak value of interference < rated value of input range), min.	60 dB	60 dB
• common mode voltage, min.	130 dB	130 dB
Status information/ alarms/diagnostics		
Diagnoses		
• Diagnostic information readable	Yes	Yes
• Overrange	Yes	Yes
• Wire break in signal encoder cable	Yes	Yes
• Short circuit of the signal encoder cable	Yes	Yes
Isolation		
Isolation, analog inputs		
• Isolation, analog inputs	Yes	Yes

	6ES7 331-7RD00-0AB0	6ES7 331-7SF00-0AB0
Permissible potential difference		
between the inputs (UCM)	60 V DC	60 V DC
between inputs and MANA (UCM)	60 V DC	60 V DC
Standards, approvals, certificates		
Type of protection to EN 50020 (CENELEC)	[EEx ib] IIC	[EEx ib] IIC
Type of protection to FM	CL.I, DIV 2, GP A,B,C,D T4	CL.I, DIV 2, GP A,B,C,D T4
Test number PTB	Ex-96.D.2092X	Ex-96.D.2108X
Weights		
Weight, approx.	290 g	210 g

	6ES7 332-5RD00-0AB0
Voltages and currents	
Load voltage L+	
• Rated value (DC)	24 V
Current consumption	
from load voltage L+ (without load), max.	180 mA
from backplane bus DC 5 V, max.	80 mA
Power loss, typ.	4 W
Connection point	
required front connectors	20-pin
Analog outputs	
Number of analg outputs	4
Cable length, shielded, max.	200 m
Voltage output, short-circuit protection	Yes
Voltage output, short-circuit current, max..	70 mA
Current output, no-load voltage, max.	14 V
Output ranges, current	
• 0 to 20 mA	Yes
• 4 to 20 mA	Yes
Connection of actuators	
• for current output 2-conductor connection	Yes
Load impedance (in rated range of output)	
• with current outputs, max.	500 Ω
Analog value creation	
Integrations and conversion time/resolutionper channel	
• Resolution with overload area (bit including sign), max.	15 Bit
• Basic conversion time, ms	2.5 ms

Ex analog input/output modules

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Technical specifications (continued)

	6ES7 332-5RD00-0AB0
Ex(i) characteristics	
Max. values of output circuits (per channel)	
• Co (permissible external capacity), max.	850 nF
• Io (chort-circuit current), max.	70 mA
• Lo (permissible external inductivity), max.	6.6 mH
• Po (power of load), max.	440 mW
• Uo (output no-load voltage), max.	14 V
Errors/accuracies	
Operational limit in overall temperature range	
• Current, relative to output area	+/- 0.55 %
Basic error limit (operational limit at 25 °C)	
• Current, relative to output area	+/- 0.2 %

	6ES7 332-5RD00-0AB0
Status information/ alarms/diagnostics	
Diagnoses	
• Diagnostic information readable	Yes
• Overrange	Yes
• Wire break in acutator cable	Yes
• Group error	Yes
Isolation	
Isolation, analog outputs	
• Galvanic isolation, analog outputs	Yes
Permissible potential difference	
between outputs and MANA (UCM)	DC 60 V / AC 30 V
between the outputs (UCM)	DC 60 V / AC 30 V
Standards, approvals, certificates	
Type of protection to EN 50020 (CENELEC)	[EEx ib] IIC
Type of protection to FM	CL.I, DIV 2, GP A,B,C,D T4
Test number PTB	Ex-96.D.2026X
Weights	
Weight, approx.	280 g

Ordering data

		Order No.
Ex analog input modules		
4 inputs, isolated, 0/4 to 20 mA, 15 bit		**6ES7 331-7RD00-0AB0**
8/4 inputs, isolated, for thermo-couples and Pt100, Pt200, Ni100		**6ES7 331-7SF00-0AB0**
Ex analog output module		
4 outputs, isolated, 0/4 to 20 mA		**6ES7 332-5RD00-0AB0**
Front connectors		
20-pin, with screw contacts		
• 1 piece		**6ES7 392-1AJ00-0AA0**
• 100 pieces		**6ES7 392-1AJ00-1AB0**
Front door, elevated design		
e.g. for 32 channel modules; enables connection of 1.3 mm^2/16 AWG wires	A)	**6ES7 328-0AA00-7AA0**
LK 393 cable guide		**6ES7 393-4AA00-0AA0**
Mandatory for operation in Ex-hazard areas		
Labeling strips		**6ES7 392-2XX00-0AA0**
10 pieces (spare part), for modules with 20-pin front connector		

		Order No.
Label cover		**6ES7 392-2XY00-0AA0**
10 pieces (spare part), for modules with 20-pin front connector		
S7 SmartLabel		**2XV9 450-1SL01-0YX0**
Software for automatic labeling of modules based on data of the STEP 7 project		
Labeling sheets for machine inscription		
For 16-channel signal modules, DIN A4, for printing with laser printer; 10 pieces		
petrol		**6ES7 392-2AX00-0AA0**
light-beige		**6ES7 392-2BX00-0AA0**
yellow		**6ES7 392-2CX00-0AA0**
red		**6ES7 392-2DX00-0AA0**
SIMATIC Manual Collection	D)	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year	D)	**6ES7 998-8XC01-8YE2**
Reference manual Ex-Periph-erals S7-300, ET 200M		
German		**6ES7 398-8RA00-8AA0**
English		**6ES7 398-8RA00-8BA0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

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

Overview

- One-channel intelligent counter module for simple counting tasks
- For direct connection of incremental encoders
- Comparison function with 2 specifiable comparison values
- Integrated digital outputs to output the response upon reaching the comparison value.
- Operating modes:
  - Continuous counting
  - One-shot counting
  - Periodic counting
- Special functions:
  - Set counter
  - Latch counter
- Start/stop counter with gate function

Note:

Incremental encoders and pre-assembled connecting cables for counting and positioning functions are offered under SIMODRIVE Sensor or Motion Connect 500.

Additional information is available in the Internet under:

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

Technical specifications

	6ES7 350-1AH03-0AE0
Voltages and currents	
Aux. voltage 1L+, load voltage 2 L+	
• Rated value (DC)	24 V
• Permissible range (ripple included)	
- dynamic, lower limit (DC)	18.5 V
- dynamic, upper limit (DC)	30.2 V
- static, lower limit (DC)	20.4 V
- static, upper limit (DC)	28.8 V
• non-periodic skip	
- Duration	500 ms
- Recovery time	50 s
- Value	35 V
Current consumption	
from load voltage 1L+ (without load), max.	40 mA
from backplane bus DC 5 V, max.	160 mA
Power loss, typ.	4.5 W
Connection point	
required front connectors	1 x 20-pin
Digital inputs	
Number of digital inputs	3
Functions	1 for gate start, 1 for gate stop, 1 for setting the counter
Input voltage	
• for signal "0"	-28.8 to 5 V
• for signal "1"	+11 to +28.8 V
Input current	
• for signal "1", typ.	9 mA

	6ES7 350-1AH03-0AE0
Digital outputs	
Number of digital outputs	2
Short-circuit protection of the output	Yes; clocked electronically
Limitation of inductive shutdown voltage to	2L+ (-39 V)
Output voltage	
• for signal "0" (DC), max.	3 V
• for signal "1", min.	2L+ (-1,5 V)
Output current	
• for signal "1" rated value	0.5 A
• for signal "1" permissible range for 0 to 60 °C, min.	5 mA
• for signal "1" permissible range for 0 to 60 °C, max.	0.6 A
Output delay with resistive load	
• "0" to "1", max.	300 µs
Encoder supply	
5 V encoder supply	
• 5 V	Yes; 5.2 V +/-2%
• Output current, max.	300 mA
24 V encoder supply	
• 24 V	Yes; 1L+ (-3V)
• Output current, max.	400 mA
Encoder	
Connectable encoders	
• Incremental encoder (symmetrical)	Yes; with 2 pulse series offset by 90°
• Incremental encoder (asymmetrical)	Yes
• 24 V initiator	Yes
• 24 V directional element	Yes; 1 pulse train, 1 direction level

FM 350-1 counter module

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Technical specifications (continued)

	6ES7 350-1AH03-0AE0
Counters	
Number of counter inputs	1
Counting range, description	32 bit or +/-31 bit
Minimum pulse width, adjustable	Yes; 2.5 µs or 25 µs
Counter input 5 V	
• Type	RS 422
• Terminating resistor	220 Ω
• Differential input voltage	1.3 V
• Counter frequency, max.	500 kHz
Counter input 24 V	
• Input voltage, for signal "0"	-28.8 to +5 V
• Input voltage, for signal "1"	+11 to +28.8 V
• Input current, for signal "1", typ.	9 mA
• Counter frequency, max.	200 kHz
• Minimum pulse width	2.5 µs
Isolation	
Isolation checked with	500 V

	6ES7 350-1AH03-0AE0
Isolation	
Isolation, digital outputs	
• between the channels and the backplane bus	Yes; Optocoupler
Galvanic isolation, digital inputs	
• between the channels and the backplane bus	Yes; Optocoupler
Isolation counter	
• between the channels and the backplane bus	Yes; Optocoupler
Permissible potential difference	
between different circuits	500 V DC
Dimensions and weight	
Width	40 mm
Height	125 mm
Depth	120 mm
Weights	
Weight, approx.	250 g

Ordering data	Order No.
FM 350-1 counter module with 1 channel, max. 500 kHz; for incremental encoder	**6ES7 350-1AH03-0AE0**
Coding plug - Range card for analog inputs Spare part	**6ES7 974-0AA00-0AA0**
Front connector	
20-pin, with screw contacts	
• 1 unit	**6ES7 392-1AJ00-0AA0**
• 100 units	**6ES7 392-1AJ00-1AB0**
20-pin, with cage clamp terminals	
• 1 unit	**6ES7 392-1BJ00-0AA0**
• 100 units	**6ES7 392-1BJ00-1AB0**
Bus connectors 1 piece (spare part)	**6ES7 390-0AA00-0AA0**
Labeling strips 10 pieces (spare part)	**6ES7 392-2XX00-0AA0**
S7 SmartLabel Software for automatic labeling of modules based on data of the STEP 7 project	**2XV9 450-1SL01-0YX0**
Labeling sheets for machine inscription	See "Accessories", page 4/240
Slot number label Spare part	**6ES7 912-0AA00-0AA0**
Shield connection element 80 mm wide, with 2 rows for 4 terminals each	**6ES7 390-5AA00-0AA0**
Terminal elements 2 pieces	
For 2 cables with 2 mm to 6 mm diameter	**6ES7 390-5AB00-0AA0**
For 1 cable with 3 mm to 8 mm diameter	**6ES7 390-5BA00-0AA0**
For 1 cable with 4 mm to 13 mm diameter	**6ES7 390-5CA00-0AA0**

	Order No.
Connectable incremental encoder 6FX2 001-2...	Refer to A&D Mall under SIMODRIVE Sensor or Motion Connect 500 (see also www.siemens.com/simatic-technology)
Signal cable	
Preassembled for HTL and TTL encoder, without Sub-D connector, UL/DESINA	**6FX5 002-2CA12-** ■■■**0**
Length code:	
0 m	**1**
100 m	**2**
200 m	**3**
0 m	**A**
10 m	**B**
20 m	**C**
30 m	**D**
40 m	**E**
50 m	**F**
60 m	**G**
70 m	**H**
80 m	**J**
90 m	**K**
0 m	**A**
1 m	**B**
2 m	**C**
3 m	**D**
4 m	**E**
5 m	**F**
6 m	**G**
7 m	**H**
8 m	**J**
9 m	**K**

FM 350-2 counter module

Overview

- 8-channel intelligent counter module for universal counter and measurement tasks
- For direct connection of 24 V incremental encoders, directional elements, initiators or NAMUR sensors
- Compare function with programmable comparison values (number depends on operating mode).
- Integrated digital outputs to output the response upon reaching the comparison value.
- Operating modes:
  - Continuous/one-shot/periodic counting
  - Frequency/speed control
  - Period measurement
  - Proportioning

Note:

SIMODRIVE Sensor/Motion Connect 500 feature incremental encoders and preassembled connecting cables for counting and positioning functions.

Additional information is available in the Internet under:

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

Technical specifications

	6ES7 350-2AH00-0AE0
Voltages and currents	
Aux. voltage 1L+, load voltage 2 L+	
• Rated value (DC)	24 V
• permissible range, lower limit (DC)	20.4 V
• permissible range, upper limit (DC)	28.8 V
Current consumption	
from load voltage L+ (without load), max.	150 mA
from backplane bus DC 5 V, max.	100 mA
Power loss, typ.	10 W
Connection point	
required front connectors	1 x 40-pin
Digital inputs	
Number of digital inputs	8
Functions	1 each for gate start/ gate stop
Cable length	
• Cable length, shielded, max.	100 m
Input voltage	
• for signal "0"	-3 to 5 V
• for signal "1"	11 to 30.2 V
Input current	
• for signal "0", max. (permissible quiescent current)	2 mA
• for signal "1", typ.	9 mA
Input delay (for rated value of input voltage)	
• for standard inputs	
- at "0" to "1", max.	50 µs

	6ES7 350-2AH00-0AE0
Digital outputs	
Number of digital outputs	8
Cable length, shielded, max.	600 m
Cable length unshielded, max.	100 m
Short-circuit protection of the output	Yes
Limitation of inductive shutdown voltage to	L+ (-40 V)
Output voltage	
• for signal "1", min.	L+ (-0,8 V)
Output current	
• for signal "1" rated value	0.5 A
• for signal "0" residual current, max.	0.5 mA
Output delay with resistive load	
• "0" to "1", max.	300 µs
Switching frequency	
• with resistive load, max.	500 Hz
• with inductive load, max.	0.5 Hz
Aggregate current of the outputs (per group)	
• horizontal installation	
- up to 40 °C, max.	4 A
- up to 60 °C, max.	2 A
• all other mounting positions	
- up to 40 °C, max.	2 A
Encoder supply	
Output voltage	NAMUR-encoder supply: 8.2 V +/-2%
Output current, rated value	200 mA
Short-circuit protection	Yes

Technical specifications (continued)

	6ES7 350-2AH00-0AE0
Encoder	
Connectable encoders	
• Incremental encoder (asymmetrical)	Yes
• 24 V initiator	Yes
• 24 V directional element	Yes
• NAMUR encoder	Yes
• 2-wire BEROS	Yes
NAMUR encoder	
• Number of NAMUR inputs	8
• Input signal	to DIN 19 234
• Input current, for signal "0", max.	1.2 mA
• Input current, for signal "1", min.	2.1 mA
• Input delay, max.	50 µs
• Input frequency, max.	20 kHz
• Cable length, shielded, max.	100 m
Counters	
Counter input 24 V	
• Number	8; 32 bit or +/-31 bit
• Input voltage, for signal "0"	-3 to 5 V
• Input voltage, for signal "1"	11 V to 30.2 V
• Input current, for signal "0", max.. (permissible idle current)	2 mA
• Input current, for signal "1", typ.	9 mA
• Input delay, max.,	50 µs
• Counter frequency, max.	20 kHz; 24 V incremental encoder: 10 kHz,; 24 V directional element: 20 kHz,; 24 V initiator: 20 kHz,; NAMUR sensor: 20 kHz
• Cable length, max.	100 m
Status information/ alarms/diagnostics	
Alarms	
• Diagnostic alarm	Yes; parameterizable
• Process alarm	Yes; parameterizable
Diagnoses	
• Diagnostic functions	Yes; Diagnostic information readable
Isolation	
Isolation, digital outputs	
• between the channels and the backplane bus	Yes; and shielding
Galvanic isolation, digital inputs	
• between the channels and the backplane bus	Yes; and shielding
• between the channels and the backplane bus (NAMUR)	Yes, against backplane bus and shielding
Isolation counter	
• between the channels and the backplane bus	Yes; and shielding
Dimensions and weight	
Width	80 mm
Height	125 mm
Depth	120 mm
Weights	
Weight, approx.	460 g

Ordering data

	Order No.
FM 350-2 counter module	**6ES7 350-2AH00-0AE0**
With 8 channels, max. 20 kHz; for 24 V incremental encoders and NAMUR encoders; incl. configuration package and electronic documentation on CD	
Front connector	
40-pin, with screw contacts	
• 1 unit	**6ES7 392-1AM00-0AA0**
• 100 units	**6ES7 392-1AM00-1AB0**
40-pin, with cage clamp terminals	
• 1 unit	**6ES7 392-1BM01-0AA0**
• 100 units	**6ES7 392-1BM01-1AB0**
Bus connectors	**6ES7 390-0AA00-0AA0**
1 piece (spare part)	
Labeling strips	**6ES7 392-2XX00-0AA0**
10 pieces (spare part)	
S7 SmartLabel	**2XV9 450-1SL01-0YX0**
Software for automatic labeling of modules based on data of the STEP 7 project	
Labeling sheets for machine inscription	See "Accessories", page 4/240
Slot number label	**6ES7 912-0AA00-0AA0**
Spare part	
Shield connection element	**6ES7 390-5AA00-0AA0**
80 mm wide, with 2 rows for 4 terminals each	
Terminal elements	
2 pieces	
For 2 cables with 2 mm to 6 mm diameter	**6ES7 390-5AB00-0AA0**
For 1 cable with 3 mm to 8 mm diameter	**6ES7 390-5BA00-0AA0**
For 1 cable with 4 mm to 13 mm diameter	**6ES7 390-5CA00-0AA0**
Signal cable	
Preassembled for HTL and TTL encoder, without Sub-D connector, UL/DESINA	**6FX5 002-2CA12-■■■0**
Length code	see FM 350-1, page 4/149

SIPLUS FM 350-2 counter module

Overview

- 8-channel intelligent counter module for universal counter and measurement tasks
- For direct connection of 24 V incremental encoders, direction encoders, initiators or NAMUR sensors
- Compare function with programmable comparison values (number depends on operating mode)
- Integrated digital outputs to output the response upon reaching the comparison value
- Operating modes:
  - Continuous/one-shot/periodic counting
  - Frequency/speed control
  - Period measurement
  - Proportioning

Note:

SIMODRIVE Sensor/Motion Connect 500 feature incremental encoders and preassembled connecting cables for counting and positioning functions.

Additional information is available in the Internet under:

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

	SIPLUS FM 350-2
Order No.	**6AG1 350-2AH00-4AE0**
Order No. based on	**6ES7 350-2AH00-0AE0**
Ambient temperature range	-25 ... +60 °C, condensation permissible
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).
Technical data	The technical data are identical with the technical data of the based on modules.

Ordering data

	Order No.
SIPLUS FM 350-2 counter module (extended temperature range and medial load) With 8 channels, max. 20 kHz; for 24 V incremental encoders and NAMUR encoders; incl. configuration package and electronic documentation on CD	**6AG1 350-2AH00-4AE0**
Accessories	see S7-300 FM 350-2 counter module, page 4/151

Overview

- Two-channel positioning module for rapid-traverse/creep-speed drives
- 4 digital outputs per channel for motor control
- Incremental or synchro-serial position decoding

Note:

SIMODRIVE Sensor/Motion Connect 500 feature position-measuring systems and preassembled connecting cables for counting and positioning functions.

Additional information is available in the Internet under:

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

Technical specifications

	6ES7 351-1AH01-0AE0
Supply voltages	
Rated value	
• DC 24 V	Yes
Current consumption	
Current consumption, max.	350 mA
Connection point	
required front connectors	1 x 20-pin
Digital inputs	
Number of digital inputs	8
Functions	Reference cams, reversing cams, flying actual value setting, start/stop positioning
Input voltage	
• Rated value, DC	24 V
• for signal "0"	-3 to 5 V
• for signal "1"	11 to 30 V
Input current	
• for 2-wire BERO	
- for signal "0", typ.	2 mA
- for signal "1", typ.	6 mA
Digital outputs	
Number of digital outputs	8
Functions	Rapid traverse, creep, run right, run left
Short-circuit protection of the output	Yes
Output voltage	
• Rated value (DC)	24 V
• for signal "1", min.	UP - 0.8 V
Output current	
• for signal "1" permissible range for 0 to 60 °C, min.	5 mA; with UPmax
• for signal "1" permissible range for 0 to 60 °C, max.	600 mA; with UPmax
• for signal "0" residual current, max.	0.5 mA
Encoder supply	
5 V encoder supply	
• 5 V	Yes

	6ES7 351-1AH01-0AE0
5 V encoder supply (cont.)	
• Output current, max.	350 mA
• Cable length, max.	32 m
24 V encoder supply	
• 24 V	Yes
• Output current, max.	400 mA; per channel
• Cable length, max.	100 m
Encoder	
Connectable encoders	
• Incremental encoder (symmetrical)	Yes
• Incremental encoder (asymmetrical)	Yes
• Absolute encoder (SSI)	Yes
• 2-wire BEROS	Yes
• permissible quiescent current (2-wire BEROS), max.	2 mA; on signal "0", max. 2 mA; on signal "1", max. 6 mA
Encoder signals, incremental encoder (symmetrical)	
• Trace mark signals	A, notA, B, notB
• Zero mark signal	N, notN
• Input signal	5 V difference signal (phys. RS 422)
• Input frequency, max.	0.5 MHz
Encoder signals, incremental encoder (asymmetrical)	
• Trace mark signals	A, B
• Zero mark signal	N
• Input voltage	24 V
• Input frequency, max.	50 kHz; 50 kHz for 25 m cable length, 25 kHz for 100 m cable length
Encoder signals, absolute encoder (SSI)	
• Input signal	5 V difference signal (phys. RS 422)
• Data signal	DATA, notDATA
• Clock signal	CL, notCL
• Telegram length	13 or 25 bit

FM 351 positioning module

Technical specifications (continued)

	6ES7 351-1AH01-0AE0
• Clock frequency, max.	1 MHz
• Gray code	Yes
• Cable length, shielded, max.	300 m; at max. 125 kHz
Isolation	
Isolation, digital outputs	
• Galvanic isolation, digital outputs	Yes
Galvanic isolation, digital inputs	
• galvanic isolation, digital inputs	Yes
Dimensions and weight	
Width	80 mm
Height	125 mm
Depth	120 mm
Weights	
Weight, approx.	550 g

Ordering data

	Order No.
FM 351 positioning module	**6ES7 351-1AH01-0AE0**
for rapid traverse and creep speed drives	
Sub D connector	**6ES5 750-2AA21**
15-pin, male	
Front connector	
20-pin, with screw contacts	
• 1 unit	**6ES7 392-1AJ00-0AA0**
• 100 units	**6ES7 392-1AJ00-1AB0**
20-pin, with cage clamp terminals	
• 1 unit	**6ES7 392-1BJ00-0AA0**
• 100 units	**6ES7 392-1BJ00-1AB0**
Bus connectors	**6ES7 390-0AA00-0AA0**
1 unit (spare part)	
Labeling strips	**6ES7 392-2XX00-0AA0**
10 units (spare part)	
Slot number label	**6ES7 912-0AA00-0AA0**
S7 SmartLabel	**2XV9 450-1SL01-0YX0**
Software for automatic labeling of modules based on data of the STEP 7 project	
Labeling sheets for machine inscription	See "Accessories", page 4/240
Spare part	
Shield connection element	**6ES7 390-5AA00-0AA0**
80 mm wide, with 2 rows for 4 terminals each	
Terminal elements	
2 units	
For 2 cables with 2 mm to 6 mm diameter	**6ES7 390-5AB00-0AA0**
For 1 cable with 3 mm to 8 mm diameter	**6ES7 390-5BA00-0AA0**
For 1 cable with 4 mm to 13 mm diameter	**6ES7 390-5CA00-0AA0**

	Order No.
Signal cables	
Pre-assembled for HTL encoder, UL/DESINA	**6FX5 0■2-2AL00-■■■■**
Pre-assembled for SSI absolute encoder, UL/DESINA	**6FX5 0■2-2CC11-■■■■**
Pre-assembled for TTL encoder 6FX2001-1, UL/DESINA	**6FX5 0■2-2CD11-■■■■**
Pre-assembled for TTL encoder 24 V, UL/DESINA	**6FX5 0■2-2CD24-■■■■**
Not crimped	**0**
Module end crimped, connector case supplied	**1**
Motor end crimped, connector case supplied	**4**
0 m	**1**
100 m	**2**
200 m	**3**
0 m	**A**
10 m	**B**
20 m	**C**
30 m	**D**
40 m	**E**
50 m	**F**
60 m	**G**
70 m	**H**
80 m	**J**
90 m	**K**
0 m	**A**
1 m	**B**
2 m	**C**
3 m	**D**
4 m	**E**
5 m	**F**
6 m	**G**
7 m	**H**
8 m	**J**
9 m	**K**
0.0 m	**0**
0.1 m	**1**
0.2 m	**2**
0.3 m	**3**
0.4 m	**4**
0.5 m	**5**
0.6 m	**6**
0.7 m	**7**
0.8 m	**8**

Overview

- Extremely high-speed electronic cam controller
- Low-cost alternative to mechanical cam controllers
- 32 cam tracks, 13 onboard digital outputs for direct output of actions
- Incremental or synchro-serial position decoding

Note:

SIMODRIVE Sensor/Motion Connect 500 feature position-measuring systems and preassembled connecting cables for counting and positioning functions.

Additional information is available in the Internet under:

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

Technical specifications

	6ES7 352-1AH01-0AE0
Supply voltages	
Rated value	
• DC 24 V	Yes
Current consumption	
from load voltage L+ (without load), max.	200 mA
from backplane bus DC 5 V, max.	100 mA
Connection point	
required front connectors	1 x 20-pin
Digital inputs	
Number of digital inputs	4
Functions	Reference point switch, flying actual value setting/length measurement, brake release, enable track output No. 3
Input voltage	
• Rated value, DC	24 V
• for signal "0"	-3 to 5 V
• for signal "1"	11 to 30 V
Input current	
• for 2-wire BERO	
- for signal "0", typ.	2 mA
- for signal "1", typ.	9 mA
Digital outputs	
Number of digital outputs	13
Functions	Cam track
Short-circuit protection of the output	Yes
Output voltage	
• Rated value (DC)	24 V
• for signal "1", min.	UP - 0,8 V

	6ES7 352-1AH01-0AE0
Output current	
• for signal "1" permissible range for 0 to 60 °C, min.	5 mA; with UPmax
• for signal "1" permissible range for 0 to 60 °C, max.	600 mA; with UPmax
• for signal "0" residual current, max.	0.5 mA
Encoder supply	
5 V encoder supply	
• 5 V	Yes
• Output current, max.	300 mA
• Cable length, max.	32 m
24 V encoder supply	
• 24 V	Yes
• Output current, max.	300 mA
• Cable length, max.	100 m
Encoder	
Connectable encoders	
• Incremental encoder (symmetrical)	Yes
• Incremental encoder (asymmetrical)	Yes
• Absolute encoder (SSI)	Yes
• 2-wire BEROS	Yes
• permissible quiescent current (2-wire BEROS), max.	2 mA; on signal "0", max. 2 mA; on signal "1", max. 9 mA
Encoder signals, incremental encoder (symmetrical)	
• Trace mark signals	A, notA, B, notB
• Zero mark signal	N, notN
• Input signal	5 V difference signal (phys. RS 422)
• Input frequency, max.	1 MHz

FM 352 cam controller

Technical specifications (continued)

	6ES7 352-1AH01-0AE0
Encoder signals, incremental encoder (asymmetrical)	
• Trace mark signals	A, B
• Zero mark signal	N
• Input voltage	24 V
• Input frequency, max.	50 kHz; 50 kHz for 25 m cable length, 25 kHz for 100 m cable length
Encoder signals, absolute encoder (SSI)	
• Data signal	DATA, notDATA
• Clock signal	CL, notCL
• Telegram length	13 or 25 bit
• Clock frequency, max.	1 MHz
• Gray code	Yes
• Cable length, shielded, max.	320 m; at max. 125 kHz

	6ES7 352-1AH01-0AE0
Isolation	
Isolation, digital outputs	
• Galvanic isolation, digital outputs	No
Galvanic isolation, digital inputs	
• galvanic isolation, digital inputs	No
Dimensions and weight	
Width	80 mm
Height	125 mm
Depth	120 mm
Weights	
Weight, approx.	550 g

Ordering data

	Order No.
FM 352 electronic cam controller	**6ES7 352-1AH01-0AE0**
Sub-D connector	**6ES5 750-2AA21**
15-pin, male	
Front connector	
20-pin, with screw contacts	
• 1 unit	**6ES7 392-1AJ00-0AA0**
• 100 units	**6ES7 392-1AJ00-1AB0**
20-pin, with cage clamp terminals	
• 1 unit	**6ES7 392-1BJ00-0AA0**
• 100 units	**6ES7 392-1BJ00-1AB0**
Bus connectors	**6ES7 390-0AA00-0AA0**
1 piece (spare part)	
Labeling strips	**6ES7 392-2XX00-0AA0**
10 pieces (spare part)	
S7 SmartLabel	**2XV9 450-1SL01-0YX0**
Software for automatic labeling of modules based on data of the STEP 7 project	
Labeling sheets for machine inscription	See "Accessories", page 4/240
Slot number label	**6ES7 912-0AA00-0AA0**
Spare part	

	Order No.
Shield connection element	**6ES7 390-5AA00-0AA0**
80 mm wide, with 2 rows for 4 terminals each	
Terminal elements	
2 pieces	
For 2 cables with 2 mm to 6 mm diameter	**6ES7 390-5AB00-0AA0**
For 1 cable with 3 mm to 8 mm diameter	**6ES7 390-5BA00-0AA0**
For 1 cable with 4 mm to 13 mm diameter	**6ES7 390-5CA00-0AA0**
Signal cable	
Pre-assembled for HTL encoder, UL/DESINA	**6FX5 0■2-2AL00-■■■■**
Pre-assembled for SSI absolute encoder, UL/DESINA	**6FX5 0■2-2CC11-■■■■**
Pre-assembled for TTL encoder 6FX2001-1, UL/DESINA	**6FX5 0■2-2CD01-■■■■**
Pre-assembled for TTL encoder 24 V, UL/DESINA	**6FX5 0■2-2CD24-■■■■**
Length code	see FM 351, page 4/154

FM 352-5 high speed Boolean processor

Overview

- The FM 352-5 High-speed Boolean processor offers an extremely fast binary control and some of the quickest switching procedures ever possible (cycle duration: 1 µs)
- Programming with LAD or FBD is possible
- The instruction set available includes bit instructions (instruction subset of STEP 7), timers, counters, frequency dividers, frequency generators, and shift registers.
- 12 integrated DI/8 integrated DO
- 2 versions: Current sinking or current sourcing digital outputs
- 1 channel for connecting a 24 V incremental encoder, a 5 V incremental encoder (RS422) or a serial interface absolute encoder

A micro memory card is required for operation of the FM 352-5

Note:

SIMODRIVE Sensor/Motion Connect 500 feature position-measuring systems and preassembled connecting cables for counting and positioning functions.

Additional information is available in the Internet under:

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

Technical specifications

	6ES7 352-5AH00-0AE0	6ES7 352-5AH10-0AE0
Supply voltages		
Rated value		
• DC 24 V	Yes	Yes
Voltages and currents		
Load voltage L+		
• Rated value (DC)	24 V	24 V
• reverse polarity protection	Yes	Yes
• permissible range, lower limit (DC)	20.4 V	20.4 V
• permissible range, upper limit (DC)	28.8 V	28.8 V
Current consumption		
from load voltage1L+, max.	150 mA; typ. 60 mA	150 mA; typ. 60 mA
from load voltage 2L+ (without load), max.	200 mA; typ. 60 mA, DI/DO supply	200 mA; typ. 60 mA, DI/DO supply
from load voltage 3L+ (with encoder), max.	600 mA; typ. 80 mA plus encoder supply	600 mA; typ. 80 mA plus encoder supply
from load voltage 3L+ (without encoder), max.	200 mA; typ. 80 mA	200 mA; typ. 80 mA
from backplane bus DC 5 V, max.	100 mA; typically	1100 mA; typically
Power loss, typ.	6.5 W	6.5 W
Memory		
Memory		
• Memory Card, RAM	128 KByte; required for operation, MMC	128 KByte; required for operation, MMC
Interfaces		
Updating time	PLC interface: 5ms (2.6 ms typ)	PLC interface: 5ms (2.6 ms typ)

	6ES7 352-5AH00-0AE0	6ES7 352-5AH10-0AE0
Connection point		
required front connectors	1 x 40-pin	1 x 40-pin
CPU/programming		
Program cycle time (scan)	1 µs	1 µs
Digital inputs		
Number of digital inputs	8; standard and up to 12 at 24 V DC encoder inputs as digital inputs	8; standard and up to 12 at 24 V DC encoder inputs as digital inputs
Cable length		
• Cable length, shielded, max.	600 m; shielded cable recommended if filtering set in 1.6 ms frame.	600 m; shielded cable recommended if filtering set in 1.6 ms frame.
• Cable length unshielded, max.	100 m	100 m
Input voltage		
• Rated value, DC	24 V	24 V
• for signal "0"	-30 V to 5 V	-30 V to 5 V
• for signal "1"	11 to 30 V	11 to 30 V
Input current		
• for signal "0", max. (permissible quiescent current)	1.5 mA	1.5 mA
• for signal "1", typ.	3.8 mA	3.8 mA

FM 352-5 high speed Boolean processor

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Technical specifications (continued)

	6ES7 352-5AH00-0AE0	6ES7 352-5AH10-0AE0
Input delay (for rated value of input voltage)		
• Input frequency (with 0.1 ms delay), max.	200 kHz	200 kHz
• Programmable digital filter delay	None, 5µs, 10µs, 15µs, 20µs, 50µs, 1.5ms	None, 5µs, 10µs, 15µs, 20µs, 50µs, 1.5ms
• Minimum pulse width for program reactions	1µs, 5µs, 10µs, 15µs, 20µs, 50µs, 1.6ms	1µs, 5µs, 10µs, 15µs, 20µs, 50µs, 1.6ms
• for standard inputs - at "0" to "1", max.	3 µs; typ. 1.5 µs	3 µs; typ. 1.5 µs
Digital outputs		
Number of digital outputs	8	8
M-switching	Yes	
P-switching		Yes
Cable length, shielded, max.	600 m	600 m
Cable length unshielded, max.	100 m	100 m
Short-circuit protection of the output	Yes; Overvoltage protection, thermal protection	Yes; Overvoltage protection, thermal protection
• Response threshold, typ.	1.7 A to 3.5 A	1.7 A to 3.5 A
Limitation of inductive shutdown voltage to	2M +45 V typ, (40 to 55 V) Note: no protection against inductive kickback >55mJ	2M +45 V typ, (40 to 55 V) Note: no protection against inductive kickback >55mJ
Lamp load, max.	5 W	5 W
Controlling a digital input	No	No
Output voltage		
• Rated value (DC)	24 V	24 V
• for signal "0" (DC), max.	28.8 V	28.8 V
• for signal "1" (DC), max.	0.5 V	0.5 V
Output current		
• for signal "1" rated value	0.5 A; at 60 °C	0.5 A; at 60 °C
• for signal "1" permissible range for 0 to 60 °C, min.	5 mA	5 mA
• for signal "1" permissible range for 0 to 60 °C, max.	600 mA	600 mA
• for signal "0" residual current, max.	1 mA	1 mA
Output delay with resistive load		
• "0" to "1", max.	1 µs; 0.6 µs 50 mA / 1.0 µs 0.5 Amp	1 µs; 0.6 µs 50 mA / 1.0 µs 0.5 Amp
• "1" to "0", max.	1.5 µs; 1.7µs 50 mA / 1.5µs 0.5 Amp	1.5 µs; 1.7µs 50 mA / 1.5µs 0.5 Amp
Parallel switching of 2 outputs		
• for increased power	Yes; 2	Yes; 2

	6ES7 352-5AH00-0AE0	6ES7 352-5AH10-0AE0
Switching frequency		
• with resistive load, max.	100 kHz; 20 kHz at 0.5 A; 100 kHz at 0.25 A	100 kHz; 20 kHz at 0.5 A; 100 kHz at 0.25 A
• with inductive load, max.	2 Hz; 2 Hz at 0.5 A with external commutator diodes; 0.5 Hz at 0.5 A without external commutator diodes	2 Hz; 2 Hz at 0.5 A with external commutator diodes; 0.5 Hz at 0.5 A without external commutator diodes
• on lamp load, max.	10 Hz	10 Hz
Encoder supply		
5 V encoder supply		
• 5 V	Yes	Yes
• Short-circuit protection	Yes; Electronic overload. No protection on applying a normal or counter voltage.	Yes; Electronic overload. No protection on applying a normal or counter voltage.
• Output current, max.	250 mA	250 mA
24 V encoder supply		
• 24 V	Yes	Yes
• Short-circuit protection	Yes; Overvoltage and overheating protection if overloaded. Diagnostics if output reaches temperature limit. No protection when setting up a normal or counter voltage	Yes; Overvoltage and overheating protection if overloaded. Diagnostics if output reaches temperature limit. No protection when setting up a normal or counter voltage
• Output current, max.	400 mA	400 mA
Encoder		
Connectable encoders		
• Incremental encoder (symmetrical)	Yes	Yes
• Incremental encoder (asymmetrical)	Yes	Yes
• Absolute encoder (SSI)	Yes	Yes
• 2-wire BEROS	Yes; typ. 1 A	Yes; typ. 1 A
• permissible quiescent current (2-wire BEROS), max.	1.5 mA	1.5 mA
Encoder signals, incremental encoder (symmetrical)		
• Trace mark signals	A, notA, B, notB	A, notA, B, notB
• Zero mark signal	N, notN	N, notN
• Input signal	5 V difference signal (phys. RS 422)	5 V difference signal (phys. RS 422)
• Input frequency, max.	1 MHz	1 MHz

Technical specifications (continued)

	6ES7 352-5AH00-0AE0	6ES7 352-5AH10-0AE0
Encoder signals, incremental encoder (symmetrical) (continued)		
• Cable length, shielded, max.	100 m; Cable length, RS-422 (5V) incremental encoder, Siemens type 6FX201-2, 5V supply: 500kHz, 32 m, shielded, max.; Cable length, RS 422 (5V) incremental encoder, Siemens type 6FX201-2, 24V supply: 500 kHz, 100 m, shielded, max.	100 m; Cable length, RS-422 (5V) incremental encoder, Siemens type 6FX201-2, 5V supply: 500kHz, 32 m, shielded, max.; Cable length, RS 422 (5V) incremental encoder, Siemens type 6FX201-2, 24V supply: 500 kHz, 100 m, shielded, max.
Encoder signals, incremental encoder (asymmetrical)		
• Trace mark signals	A, B	A, B
• Zero mark signal	N	N
• Input voltage	24 V	24 V
• Input frequency, max.	200 kHz	200 kHz
• cable length, shielded, max.	50 m; Cable length, HTL incremental encoder, Siemens, type 6FX2001-4: 50kHz, 25 m shielded, max., 25kHz, 50 m shielded, max.	50 m; Cable length, HTL incremental encoder, Siemens, type 6FX2001-4: 50kHz, 25 m shielded, max., 25kHz, 50 m shielded, max.
Encoder signals, absolute encoder (SSI)		
• Data signal	DATA, notDATA	DATA, notDATA
• Clock signal	CK, notCK	CK, notCK
• Telegram length	13 or 25 bit	13 or 25 bit
• Clock frequency, max.	1 MHz; 125 kHz, 250 kHz, 500 kHz, or 1 MHz	1 MHz; 125 kHz, 250 kHz, 500 kHz, or 1 MHz
• Cable length, shielded, max.	320 m; Cable length, RS-422 SSI absolute encoder, Siemens Type 6FX201-5, 24V supply: 125 kHz, 320 m, shielded, max.; 250kHz, 160 meter shielded, max., 500kHz, 60 m shielded, max., 1MHz, 20 m shielded, max.	320 m; Cable length, RS-422 SSI absolute encoder, Siemens Type 6FX201-5, 24V supply: 125 kHz, 320 m, shielded, max.; 250kHz, 160 meter shielded, max., 500kHz, 60 m shielded, max., 1MHz, 20 m shielded, max.
• Monoflop time	adjustable: 16/32/48/64 µs	adjustable: 16/32/48/64 µs
• Listening mode	Yes; one or two stations	Yes; one or two stations
• Multiturn	Yes; 25 bit message frame	Yes; 25 bit message frame

	6ES7 352-5AH00-0AE0	6ES7 352-5AH10-0AE0
Encoder signal evaluation		
• Counting direction, forward	Yes	Yes
• Counting direction, backward	Yes	Yes
Reaction times		
Input and output reaction timet	5V input to 24V output, 0-filter: 1 to 4µs (typ.); 24V input to 24V output, 0-filter: 2 to 6µs (typ.)	5V input to 24V output, 0-filter: 1 to 4µs (typ.); 24V input to 24V output, 0-filter: 2 to 6µs (typ.)
Counters		
Counting range, Description	Counter range (16-bit counter): -32768 to 32767 (user-specific within this range); counter range (32-bit counter): -2,147,483,648 to 2,147,483,647 (user-specific within this range)	Counter range (16-bit counter): -32768 to 32767 (user-specific within this range); counter range (32-bit counter): -2,147,483,648 to 2,147,483,647 (user-specific within this range)
Counting range, lower limit	-2147483648	-2147483648
Counting range, upper limit	2,147,483,647	2,147,483,647
Counting mode		
• Counting mode, individual	Yes	Yes
• Counting mode, continuous	Yes	Yes
• Counting mode, periodic	Yes	Yes
Status information/ alarms/diagnostics		
Alarms		
• Diagnostic alarm	Yes; 1L, 2L, 3L missing; MMC error; output overload (8); encoder supply overload; differential wire break; parameterization errror; SSI message frame overflow	Yes; 1L, 2L, 3L missing; MMC error; output overload (8); encoder supply overload; differential wire break; parameterization errror; SSI message frame overflow
• Process alarm	Yes; 8 available; for generation by user program	Yes; 8 available; for generation by user program
Diagnoses		
• Wire break in signal encoder cable	Yes	Yes
• Overflow/underflow	Yes	Yes
• missing load voltage	Yes	Yes

FM 352-5 high speed Boolean processor

Technical specifications (continued)

	6ES7 352-5AH00-0AE0	6ES7 352-5AH10-0AE0
Isolation		
between 1L and 2L and 3L	Yes; 75 V DC / 60 V AC	Yes; 75 V DC / 60 V AC
between digital I/O & 2L and encoder I/O & 3L	Yes (75 V DC, 60 V AC)	Yes (75 V DC, 60 V AC)
between backplane bus and digital & encoder I/O & 1L & 2L & 3L	Yes (75 V DC, 60 V AC)	Yes (75 V DC, 60 V AC)
Galvanic isolation, digital inputs		
• galvanic isolation, digital inputs	Yes	Yes

	6ES7 352-5AH00-0AE0	6ES7 352-5AH10-0AE0
Dimensions and weight		
Width	80 mm	80 mm
Height	125 mm	125 mm
Depth	120 mm	120 mm
Weights		
Weight, approx.	434 g	434 g

Ordering data

		Order No.
FM 352-5 high-speed Boolean processor		
with current sinking digital outputs	A)	**6ES7 352-5AH00-0AE0**
with current sourcing digital outputs	A)	**6ES7 352-5AH10-0AE0**
Configuring software for FM 352-5	E)	**6ES7 352-5AH00-7XG0**
5 languages En., Ge., Fr., Sp., It.; executes under Windows 98/ Me/NT 4.0 SP 3 and higher / 2000 Professional SP 1 and higher		
Micro Memory Card		
128 KB		**6ES7 953-8LG11-0AA0**
512 KB		**6ES7 953-8LJ11-0AA0**
2 MB		**6ES7 953-8LL11-0AA0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

E) Subject to export regulations: AL: N and ECCN: EAR99S

	Order No.
Front connector	
40-pin, with screw contacts	
• 1 unit	**6ES7 392-1AM00-0AA0**
• 100 units	**6ES7 392-1AM00-1AB0**
40-pin, with cage clamp terminals	
• 1 unit	**6ES7 392-1BM01-0AA0**
• 100 units	**6ES7 392-1BM01-1AB0**
Signal cables	
To HTL and TTL encoders, preassembled, without Sub-D connector	**6FX5 002-2CA12-■■■0**
To SSI absolute encoders 6FX2 001-5, preassembled, without Sub-D connector	**6FX5 002-2CC12-■■■■**
Length code:	see FM 351, page 4/154

Overview

- Positioning module for stepper motors in machines with high clock pulse rates
- Can be used for point-to-point positioning tasks and for complex traversing patterns

Technical specifications

	6ES7 353-1AH01-0AE0
Supply voltages	
Rated value	
• DC 24 V	Yes
• permissible range, lower limit (DC)	20.4 V
• permissible range, upper limit (DC)	28.8 V
Current consumption	
Current consumption, max.	300 mA
Connection point	
required front connectors	1 x 20-pin
Digital inputs	
Number of digital inputs	4; (+ 1 input for message signal)
Functions	Reference cams, flying actual value setting, flying measurement, start/stop positioning , external block change
Input voltage	
• Rated value, DC	24 V
• for signal "0"	-3 to 5 V
• for signal "1"	11 to 30 V
Input current	
• for signal "0", max. (permissible quiescent current)	2 mA
• for signal "1", typ.	6 mA; 6 to 15 mA
Digital outputs	
Number of digital outputs	4
Functions	Position reached: stop, axis travels forward, axis travels back, change M-function M97, change M-function M98, start enable, direct output via data record
Short-circuit protection of the output	Yes

	6ES7 353-1AH01-0AE0
Output voltage	
• Rated value (DC)	24 V
• for signal "1", min.	UP - 3 V
Output current	
• for signal "1" permissible range for 0 to 55 °C, max.	0.6 A; with UPmax
• for signal "0" residual current, max.	2 mA
Drive interface	
Signal input I	
• Function	"Power section ready"
Signal output I	
• Type	5 V difference signal (phys. RS 422)
• Function	Direction , enable, clock pulse, current control
• Differential output voltage, min.	2 V; RL = 100 Ohm
• Differential output voltage for signal "0", max.	1 V; Io = 20 mA
• Differential output voltage, for signal "1", min.	3.7 V; Io = -20 mA
• Cable length, max.	35 m
Isolation	
Isolation, digital outputs	
• Galvanic isolation, digital outputs	No
Galvanic isolation, digital inputs	
• galvanic isolation, digital inputs	No
Dimensions and weight	
Width	80 mm
Height	125 mm
Depth	118 mm
Weights	
Weight, approx.	500 g

FM 353 positioning module

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Ordering data	Order No.
FM 353 positioning module For stepper motors; incl. configuration package on CD-ROM (Ge, En, Fr, It) comprising • FM 353 manual, electronic • Standard function blocks (STEP 7 interface software) • Screen form-based configuration software for FM 353 • Standard interactive screen forms for OP7/OP17	**6ES7 353-1AH01-0AE0**
FM 353 manual	
German	**6ES7 353-1AH01-8AG0**
English	**6ES7 353-1AH01-8BG0**
French	**6ES7 353-1AH01-8CG0**
Italian	**6ES7 353-1AH01-8EG0**
Edit FM Program editor for editing, loading and saving NC programs with the standard programming device/PC; German/English, on CD-ROM	**6FC5 263-0AA03-0AB0**
Connecting cables	
To stepper motor power section	**6FX8 0.2-3AC02-....**
Length code	see FM 351, page 4/154
Connecting cables and encoders	see catalog NC 60, CA 01 or in the A&D Mall
Sub D connector 15-pin, socket	**6ES5 750-2AB21**

	Order No.
Front connector	
20-pin, with screw contacts	
• 1 unit	**6ES7 392-1AJ00-0AA0**
• 100 units	**6ES7 392-1AJ00-1AB0**
20-pin, with cage clamp terminals	
• 1 unit	**6ES7 392-1BJ00-0AA0**
• 100 units	**6ES7 392-1BJ00-1AB0**
Bus connectors 1 unit (spare part)	**6ES7 390-0AA00-0AA0**
Labeling strips 10 units (spare part)	**6ES7 392-2XX00-0AA0**
S7 SmartLabel Software for automatic labeling of modules based on data of the STEP 7 project	**2XV9 450-1SL01-0YX0**
Labeling sheets for machine inscription	see "Accessories", page 4/240
Slot number label Spare part	**6ES7 912-0AA00-0AA0**
Shield connection element 80 mm wide, with 2 rows for 4 terminals each	**6ES7 390-5AA00-0AA0**
Terminal elements	
2 units	
For 2 cables with 2 mm to 6 mm diameter	**6ES7 390-5AB00-0AA0**
For 1 cable with 3 mm to 8 mm diameter	**6ES7 390-5BA00-0AA0**
For 1 cable with 4 mm to 13 mm diameter	**6ES7 390-5CA00-0AA0**

Overview

- Positioning module for servo motors in machines with high clock pulse rates
- Can be used for point-to-point positioning tasks and for complex traversing patterns

Note:

SIMODRIVE Sensor/Motion Connect 500 feature position-measuring systems and preassembled connecting cables for counting and positioning functions.

Additional information is available in the Internet under:

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

Technical specifications

	6ES7 354-1AH01-0AE0
Supply voltages	
Rated value	
• DC 24 V	Yes
Current consumption	
Current consumption, max.	350 mA
Connection point	
required front connectors	1 x 20-pin
Digital inputs	
Number of digital inputs	4
Functions	Reference cams, flying actual value setting, flying measurement, start/stop positioning , external block change
Input voltage	
• Rated value, DC	24 V
• for signal "0"	-3 to 5 V
• for signal "1"	11 to 30 V
Input current	
• for signal "0", max. (permissible quiescent current)	2 mA
• for signal "1", typ.	6 mA; 6 to 15 mA
Digital outputs	
Number of digital outputs	4
Functions	Position reached: stop, axis travels forward, axis travels back, change M-function M97, change M-function M98, start enable, direct output via data record
Short-circuit protection of the output	Yes

	6ES7 354-1AH01-0AE0
Output voltage	
• Rated value (DC)	24 V
• for signal "1", min.	UP - 3 V
Output current	
• for signal "1" permissible range for 0 to 55 °C, max.	0.6 A; with UPmax
• for signal "0" residual current, max.	2 mA
Encoder supply	
5 V encoder supply	
• 5 V	Yes
• Output current, max.	220 mA
• Cable length, max.	35 m
24 V encoder supply	
• 24 V	Yes
• Output current, max.	300 mA
• Cable length, max.	100 m
Encoder	
Connectable encoders	
• Incremental encoder (symmetrical)	Yes
• Absolute encoder (SSI)	Yes
Encoder signals, incremental encoder (symmetrical)	
• Trace mark signals	A, notA, B, notB
• Zero mark signal	N, notN
• Input signal	5 V difference signal (phys. RS 422)
• Input frequency, max.	1 MHz

FM 354 positioning module

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Technical specifications (continued)

	6ES7 354-1AH01-0AE0
Encoder signals, absolute encoder (SSI)	
• Input signal	5 V difference signal (phys. RS 422)
• Data signal	DATA, notDATA
• Clock signal	CL, notCL
• Telegram length	13, 21 or 25 bit
• Cable length, shielded, max.	100 m; 10 m at 1.25 Mbit/s, 100 m at max. 125 kbit/s
Drive interface	
Signal input I	
• Type	Input loop controller message, isolated (optocoupler)
• Function	"Drive ready"
• Input voltage, rated value (DC)	24 V
• Input voltage, for signal "0"	-3 to 5 V
• Input voltage, for signal "1"	15 to 30 V
• Input current, for signal "1"	2 mA to 6 mA
Signal output II	
• Type	Output closed-loop controller enable (contact)
• Function	Drive disconnection for operation via contact relay
• Load	1 A/50 V/30 VA DC

	6ES7 354-1AH01-0AE0
Signal output III	
• Type	Analog output
• Function	Setpoint output for drive
• Output voltage	-10 to +10 V
• Output current	-3 to +3 mA
• Cable length, max.	35 m
Isolation	
Isolation, digital outputs	
• Galvanic isolation, digital outputs	No
Galvanic isolation, digital inputs	
• galvanic isolation, digital inputs	No
Dimensions and weight	
Width	80 mm
Height	125 mm
Depth	118 mm
Weights	
Weight, approx.	550 g

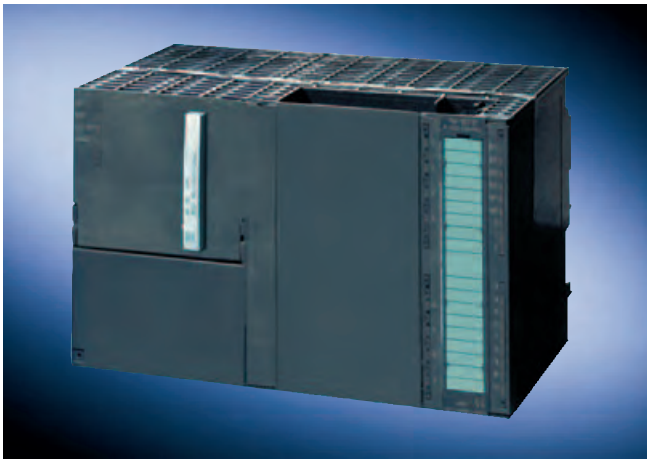
Ordering data		Order No.
FM 354 positioning module	B)	**6ES7 354-1AH01-0AE0**
for servo motors, incl. configuration package on CD-ROM (Ge, En, Fr, It) comprising • FM 354 manual, electronic • Standard function blocks (STEP 7 interface software) • Screen form-based configuration software for FM 354 • Standard interactive screen forms for OP7/OP17		
FM 354 manual		
German		**6ES7 354-1AH01-8AG0**
English		**6ES7 354-1AH01-8BG0**
French		**6ES7 354-1AH01-8CG0**
Italian		**6ES7 354-1AH01-8EG0**
Edit FM		**6FC5 263-0AA03-0AB0**
Program editor for editing, loading and saving NC programs with the standard programming device/PC; German/English, on CD-ROM		
Connecting cables		
To SSI absolute encoders 6FX2 001-5, preassembled		**6FX5 0■2-2CC11-■■■■**
To incremental encoders 6FX2 001-1, preassembled		**6FX5 0■2-2CD01-■■■■**
For 24 V incremental encoders, preassembled		**6FX5 0■2-2CD24-■■■■**
To ROD 320 built-in encoders, preassembled		**6FX5 0■2-2CE02-■■■■**
To SIMODRIVE 611A, preassembled		**6FX5 0■2-2CJ00-■■■■**
To SIMODRIVE 611U, preassembled		**6FX5 0■2-2CJ10-■■■■**
To SSI absolute encoders 6FX2 001-5, preassembled, without Sub-D connector		**6FX5 002-2CC12-■■■■**
To SSI absolute encoders 6FX2 001-5, preassembled, suitable for trailing		**6FX8 0■2-2CC11-■■■■**
To incremental encoders 6FX2 001-2, preassembled, suitable for trailing		**6FX8 0■2-2CD01-■■■■**
To ROD 320 built-in encoders, preassembled, suitable for trailing		**6FX8 0■2-2CE02-■■■■**
Length code		see FM 351, page 4/154

	Order No.
To SIMODRIVE 611A, preassembled, suitable for trailing	**6FX8 0■2-2CJ00-■■■■**
To SIMODRIVE 611U, preassembled, suitable for trailing, 1 free end	**6FX8 0■2-2CJ10-■■■■**
To SIMODRIVE 611A, preassembled, suitable for trailing, free ends	**6FX8 0■2-3AB01-■■■■**
Length code	see FM 351, page 4/154
Encoders	see catalogs NC 60, CA 01 or in the A&D Mall
Sub D connector	
15-pin, male	**6ES5 750-2AA21**
9-pin, female	**6ES5 750-2AB11**
Front connector	
20-pin, with screw contacts	
• 1 unit	**6ES7 392-1AJ00-0AA0**
• 100 units	**6ES7 392-1AJ00-1AB0**
20-pin, with cage clamp terminals	
• 1 unit	**6ES7 392-1BJ00-0AA0**
• 100 units	**6ES7 392-1BJ00-1AB0**
Bus connectors	**6ES7 390-0AA00-0AA0**
1 unit (spare part)	
Labeling strips	**6ES7 392-2XX00-0AA0**
10 units (spare part)	
S7 SmartLabel	**2XV9 450-1SL01-0YX0**
Software for automatic labeling of modules based on data of the STEP 7 project	
Labeling sheets for machine inscription	see "Accessories", page 4/240
Slot number label	**6ES7 912-0AA00-0AA0**
Spare part	
Shield connection element	**6ES7 390-5AA00-0AA0**
80 mm wide, with 2 rows for 4 terminals each	
Terminal elements	
2 units	
For 2 cables with 2 mm to 6 mm diameter	**6ES7 390-5AB00-0AA0**
For 1 cable with 3 mm to 8 mm diameter	**6ES7 390-5BA00-0AA0**
For 1 cable with 4 mm to 13 mm diameter	**6ES7 390-5CA00-0AA0**

B) Subject to export regulations: AL: N and ECCN: 4A994

FM 357-2 positioning module

Overview



- Path and positioning control for intelligent motion control of up to 4 axes
- Covers a wide spectrum from independent individual positioning axes through to interpolatory multi-axis continuous-path control
- For the control of stepper motors and controlled servo-drive axes
- User-friendly startup through easy-to-use parameterization tool
- Interface for SIMODRIVE 611U and MASTERDRIVES MC via the isochronous PROFIBUS (not for FM 357-2H in combination with HT6)

Note:

SIMODRIVE Sensor/Motion Connect 500 feature position-measuring systems and preassembled connecting cables for counting and positioning functions.

Additional information is available in the Internet under:

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

Technical specifications

	6ES7 357-4AH01-0AE0
Supply voltages	
Rated value	
• DC 24 V	Yes
Voltages and currents	
Power consumption	
• Power consumption, typ.	24 W
Current consumption	
from backplane bus DC 5 V, max.	100 mA
Memory	
Memory	
• NC program memory	750 KByte
Connection point	
required front connectors	1 x 40-pin
Digital inputs	
Number of digital inputs	18
Functions	4 Bero, 2 probes, 12 for any use
Input voltage	
• Rated value, DC	24 V
• for signal "0"	-3 to 5 V
• for signal "1"	11 to 30 V
Input current	
• for signal "0", max. (permissible quiescent current)	2 mA
• for signal "1", typ.	6 mA; 6 to 30 mA
Digital outputs	
Number of digital outputs	8
Functions	8 for any use
Output voltage	
• Rated value (DC)	24 V
• for signal "1", min.	UP - 3 V
• for signal "1" permissible range for 0 to 55 °C, max.	0.5 A; with UPmax

	6ES7 357-4AH01-0AE0
Output current	
• for signal "0" residual current, max.	2 mA
Encoder supply	
5 V encoder supply	
• 5 V	Yes
• Output current, max.	210 mA
• Cable length, max.	35 m
24 V encoder supply	
• 24 V	Yes
• Output current, max.	300 mA
• Cable length, max.	100 m
Encoder	
Connectable encoders	
• Incremental encoder (symmetrical)	Yes
• Absolute encoder (SSI)	Yes
Encoder signals, incremental encoder (symmetrical)	
• Trace mark signals	A, notA, B, notB
• Zero mark signal	N, notN
• Input signal	5 V difference signal (phys. RS 422)
• Input frequency, max.	1 MHz
Encoder signals, absolute encoder (SSI)	
• Input signal	5 V difference signal (phys. RS 422)
• Data signal	DATA, notDATA
• Clock signal	CL, notCL
• Telegram length	13, 21 or 25 bit
• cable length, shielded, max.	250 m; at max. 187.5 kBit/s

Technical specifications (continued)

	6ES7 357-4AH01-0AE0
Positioning	
Programmable traverse speed, max.	1,000 m/min
Drive interface	
Signal output I	
• Type	5 V difference signal (phys. RS 422)
• Function	Direction, enable, clock pulse
• Differential output voltage, min.	2 V; RL = 100 Ohm
• Differential output voltage for signal "0", max.	1 V; Io = 20 mA
• Differential output voltage, for signal "1", min.	3.7 V; Io = -20 mA
• Pulse frequency	750 kHz
• Cable length, max.	50 m; 35 m in hybrid mode with servo axes
Signal output II	
• Type	Controller release (contact), FM-READY output (contact)
• Function	Drive disconnection for operation via contact relay, Data set ready for link with Emergency STOP
• Load	1 A/50 V/30 VA DC

	6ES7 357-4AH01-0AE0
Signal output III	
• Type	Analog output
• Function	Drive interface for analog drives: setpoint output for drive
• Output voltage	-10 to +10 V
• Output current	-3 to +3 mA
• Cable length, max.	35 m
Isolation	
Isolation, digital outputs	
• Galvanic isolation, digital outputs	Yes
Galvanic isolation, digital inputs	
• galvanic isolation, digital inputs	Yes
Dimensions and weight	
Width	200 mm
Height	125 mm
Depth	118 mm
Weights	
Weight, approx.	1,200 g

Ordering data

	Order No.
FM 357-2 positioning module B)	**6ES7 357-4AH01-0AE0**
Basic unit	
System firmware	
incl. configuration package on CD-ROM, German, English, French, Italian, consisting of equipment manual (electronic), configuring software (parameterization screenforms, standard blocks, operator control and monitoring screenforms for OP17/OP27)	
FM 357-2L system firmware	**6ES7 357-4AH03-3AE0**
On memory card	
FM 357-2LX system firmware	**6ES7 357-4BH03-3AE0**
With additional functions; on memory card	
FM 357-H system firmware	**6ES7 357-4CH03-3AE0**
With additional functions for the handling sector; on memory card	
FM 357-2 manual	
German	**6ES7 357-4AH00-8AG0**
English	**6ES7 357-4AH00-8BG0**
French	**6ES7 357-4AH00-8CG0**
Italian	**6ES7 357-4AH00-8EG0**

	Order No.
Edit FM	**6FC5 263-0AA03-0AB0**
Program editor for editing, loading and saving NC programs with the standard programming device/PC; German/English, on CD-ROM	
Connecting cables and encoders	see catalogs NC 60, CA 01 or in the A&D Mall
Front connector	
40-pin, with screw contacts	
• 1 unit	**6ES7 392-1AM00-0AA0**
• 100 units	**6ES7 392-1AM00-1AB0**
40-pin, with cage clamp terminals	
• 1 unit	**6ES7 392-1BM01-0AA0**
• 100 units	**6ES7 392-1BM01-1AB0**
Back-up battery	**6ES7 971-1AA00-0AA0**
Li-Ion, 3.6 V/0.95 Ah	
Signal cable	
Pre-assembled for SSI absolute encoder, UL/DESINA	**6FX5 0■2-2CC11-■■■■**
Pre-assembled for TTL encoder 6FX2001-1, UL/DESINA	**6FX5 0■2-2CD01-■■■■**
Pre-assembled for TTL encoder 24 V, UL/DESINA	**6FX5 0■2-2CD24-■■■■**
Length code	see FM 351, page 4/154

B) Subject to export regulations: AL: N and ECCN: 4A994

Power section FM STEPDRIVE

Overview

The FM STEPDRIVE Power Module controls the motion of the stepper motors in the SIMOSTEP 1FL3 series with the utmost precision. In combination with the SINUMERIK 802S base line/802S manual machine controls and SIMOTION C230-2 or FM 353 and FM 357-2 Function Modules as well as the SIMATIC ET 200S Stepper Modules 1 STEP, it performs highly accurate positioning tasks in the lower output range up to 600 W.

The FM STEPDRIVE can be used for stepper motors with torques in the 2 Nm (1.5 lb-ft) to 15 Nm (11 lb-ft) range.

Technical specifications

	6SN1227-2ED10-0HA0
Product name	FM STEPDRIVE
Supply voltage	115/230 V AC ±20% selectable
Input current, max.	11/5.5 A
Frequency	47 ... 63 Hz
Supply voltage (signals)	24 V DC (20.4 ... 28.8 V)
Input current, max.	1.5 A
DC link voltage	325 V
Pulse interface	5 V signals [1] 15-pin sub D socket, standard cable
Signal interface	24 V, I/O signals [1]
Motor connection	3 x 325 V (connected to supply system)
Phase current	1.7 ... 6.8 A (adjustable on unit)
Max. cable length	50 m (164 ft) with 1.5 mm^2 30 m (98.43 ft) with 0.75 mm^2
Terminals for max.	2.5 mm^2
Number of steps/revolution	Adjustable to: 500, 1000, 5000, 10000
Degree of protection EN 60529 (IEC 60529)	IP20, must be installed in cabinet
Condensation	not permissible
Ambient temperature	
• Storage	-40 ... +70 °C (-40 ... 158 °F)
• Transport	-40 ... +70 °C (-40 ... 158 °F)
• Operation	0 ... 60 °C (32 °F ... 140 °F) with derating and dependent on mounting position
Weight, approx.	0.85 kg (1.87 lb)
Dimensions	
• Width	80 mm (3.15 in)
• Height	125 mm (4.92 in)
• Depth	118 mm (4.65 in)

1) Enable signal (enabling of power section), either 5 V via pulse interface or 24 V via signal interface.

Ordering data

	Order No.
FM STEPDRIVE Power section for SIMOSTEP stepper motors	**6SN1227-2ED10-0HA0**
Sub D connector (3 units) 15-pin socket (mating connector)	**6FC9348-7HX**
Accessories	
Filter [2]	RS Components GmbH
• 115 V single-phase with neutral conductor; type: B84142-B16-R	**213-8400**
• 230 V single-phase with neutral conductor; type: B84142-B16-R	**213-8400**
• 115 V three-phase with neutral conductor; type: B84299-K55	**213-8090**
• 230 V three-phase with neutral conductor; type: B84299-K53	**213-8084**
• 230 V three-phase without neutral conductor; type: B84143-B8-R	**213-8270**

2) Can be ordered from RS Components GmbH.

Overview

Stepper motors are functionally simple servomotors. In terms of performance and economy, these motors are the ideal supplement to the position controlled motors 1FT and 1FK. The applications in automation systems are varied, and are not restricted to machine tools.

The SIMOSTEP stepper motor can be operated via the FM STEPDRIVE power section. This converts the stepping and direction signals of the upstream controller into exact angular movements by appropriate current feeding to the motor windings.

SIMOSTEP 1FL3 with holding brake (optional)

The holding brake normally fixes the position after the motor current has been switched off. In emergencies, such as after power failure or EMERGENCY STOP, it stops the drive and thus helps to maintain safety. Fixing is mainly required in case of torque load resulting from weight forces, e.g. Z axes in robotics (vertical axis).

Technical specifications

SIMOSTEP 1FL3	
Type of motor	3-phase stepper motor
Motor voltage	325 V
Insulation EN 60034-1 (IEC 60034-1)	Temperature class F for a winding overheating of ΔT = 100 K at an ambient temperature of +40 °C (104 °F).
Type DIN 42950	IM B5 (IM V1, IM V3)
Degree of protection IEC 60529	IP56; IP41 at shaft outlet
Cooling	Natural cooling
Permissible ambient temperature	
• Storage and transport	-40 ... +70 °C (-40 ... +158 °F)
• Operation	0 ... +40 °C (32 ... 104 °F)
Max. pulse frequency	5.3 kHz (with 1FL3 04.)
Number of steps/revolution	4.3 kHz (with 1FL3 06.)
Max. speed	500/1000/5000/10000 adjustable via FM STEPDRIVE
Step angle in degrees	6000 rpm
Systematic angle tolerance (measured at 1000 steps/revolution)	0.72°/0.36°/0.072°/0.036°
Shaft end	± 6 per step
Permissible dynamic shaft load	Plain shaft with 1FL304. Fitted key with 1FL306.
• Axial ,approx.	60 N (13.49 lbf)
• Radial, approx.	(on half-shaft output, engaged from the motor flange) 100 N (22.48 lbf) (with 1FL3041, 1FL3042) 110 N (24.73 lbf) (with 1FL3043) 300 N (67.44 lbf) (with 1FL3061,1FL3062)

SIMOSTEP 1FL3	
Rotational accuracy, concentricity, and linear movement DIN 42955 (IEC 60072-1)	Tolerance N (Normal)
Vibration severity EN 60034-14 (IEC 60034-14)	Grade N (Normal)
Max. sound pressure level EN ISO 1680	1FL3041: 65 dB(A) 1FL3042: 72 dB(A) 1FL3043: 75 dB(A) 1FL3061: 69 dB(A) 1FL3062: 72 dB(A)
Shock load DIN 40046, T7	1FL304.: 50 g (1.76 oz) 1FL306.: 50 g (1.76 oz)
Paint finish	Black
Type of connection	Terminal box

Holding brake		
Motor type	1FL304.	1FL306.
Rated voltage	24 V	
Minimum holding voltage for released brake	10 V (at the earliest 130 ms after excitation)	
Electrical pickup power	24 W	32 W
Switching times		
• Release brake	35 ms	65 ms
• Close brake	15 ms	15 ms
Type of connection	Connector (mating connector in scope of supply)	

1FL3 stepper motors

Selection and ordering data

Maximum torque	Holding torque		1FL3 stepper motors SIMOSTEP	Rated current Supply cable	Resis-tance (winding)	Rotor moment of inertia		Weight	
	Motor	Brakes				without	with	without	with
						holding brake		holding brake	
M_{max}	M_H	M_H	Order No.	I	R	J	J	m	m
Nm (lb-in)	Nm (lb-in)	Nm (lb-in)		A	W	kgcm^2	kgcm^2	kg (lb)	kg (lb)
2 (17.70)	2.26 (20.00)	–	**1FL3 041-0AC31-0BK0**	1.75	6.5	1.1	-	2.05	-
2 (17.70)	2.26 (20.00)	6 (53.10)	**1FL3 041-0AC31-0BJ0**	1.75	6.5	-	1.3	-	3.4
4 (35.40)	4.52 (40.01)	–	**1FL3 042-0AC31-0BK0**	2	5.8	2.2	-	3.1	-
4 (35.40)	4.52 (40.01)	6 (53.10)	**1FL3 042-0AC31-0BJ0**	2	5.8	-	2.4	-	4.45
6 (53.10)	6.78 (60.01)	–	**1FL3 043-0AC31-0BG0**	2.25	6.5	3.3	-	4.2	-
6 (53.10)	6.78 (60.01)	6 (53.10)	**1FL3 043-0AC31-0BH0**	2.25	6.5	-	3.5	-	5.55
10 (88.51)	11.3 (100.01)	–	**1FL3 061-0AC31-0BG0**	4.1	1.8	10.5	-	8	-
10 (88.51)	11.3 (100.01)	16 (141.61)	**1FL3 061-0AC31-0BH0**	4.1	1.8	-	10.85	-	10.2
15 (132.76)	16.95 (150.02)	–	**1FL3 062-0AC31-0BG0**	4.75	1.9	16	-	11	-
15 (132.76)	16.95 (150.02)	16 (141.61)	**1FL3 062-0AC31-0BH0**	4.75	1.9	-	16.35	-	13.2

For length code as well as power and signal cables, see "MOTION-CONNECT cables and connections".

Ordering data	Order No.
1FL3 stepper motors SIMOSTEP	
• 2 Nm, shaft diameter 12 mm	**1FL3 041-0AC31-0BK0**
• 4 Nm, shaft diameter 12 mm	**1FL3 042-0AC31-0BK0**
• 6 Nm	**1FL3 043-0AC31-0BG0**
• 10 Nm	**1FL3 061-0AC31-0BG0**
• 15 Nm	**1FL3 062-0AC31-0BG0**
with holding brake	
• 2 Nm, shaft diameter 12 mm	**1FL3 041-0AC31-0BJ0**
• 4 Nm, shaft diameter 12 mm	**1FL3 042-0AC31-0BJ0**
• 6 Nm	**1FL3 043-0AC31-0BH0**
• 10 Nm	**1FL3 061-0AC31-0BH0**
• 15 Nm	**1FL3 062-0AC31-0BH0**
Motor cable	**6FX5 008-1BB11-1FA0**
Power cable, 4 x 1.5 C UL/CSA; sold by the meter, max. 50 m	

Order No.

Overview

- 4-channel closed-loop control module for universal closed-loop control tasks
- Used for temperature, pressure, flowrate and fill-level control loops
- User-friendly online self-optimization for temperature controls
- Preprogrammed controller structures
- 2 control algorithms
- 2 versions:
  - FM 355 C as continuous-action controller;
  - FM 355 S as step or pulse controller
- With 4 analog outputs (FM 355 C) or 8 digital outputs (FM 355 S) for direct control of the most common types of actuator
- Continued operation of the control loop is possible even after a CPU stop or failure

Technical specifications

	6ES7 355-0VH10-0AE0	6ES7 355-1VH10-0AE0
Voltages and currents		
Load voltage L+		
• Rated value (DC)	24 V	24 V
• permissible range, lower limit (DC)	20.4 V	20.4 V
• permissible range, upper limit (DC)	28.8 V	28.8 V
Current consumption		
from load voltage L+ (without load), max.	310 mA; typ. 260 mA	270 mA; typ. 220 mA
from backplane bus DC 5 V, max.	75 mA; typ. 50 mA	75 mA; typ. 50 mA
Power loss, max.	7.8 W	6.9 W
Power loss, typ.	6.5 W	5.5 W
Connection point		
required front connectors	2 x 20-pin	2 x 20-pin
Digital inputs		
Number of digital inputs	8	8
Cable length		
• Cable length, shielded, max.	1,000 m	1,000 m
• Cable length unshielded, max.	600 m	600 m
Input characteristic curve to IEC 1131, type 2	Yes	Yes
Input voltage		
• Rated value, DC	24 V	24 V
• for signal "0"	-3 to 5 V	-3 to 5 V
• for signal "1"	13 to 30 V	13 to 30 V
Input current		
• for signal "1", typ.	7 mA	7 mA
Digital outputs		
Number of digital outputs		8
Cable length, shielded, max.		1,000 m

	6ES7 355-0VH10-0AE0	6ES7 355-1VH10-0AE0
Cable length unshielded, max.		600 m
Short-circuit protection of the output		Yes; electronic
Limitation of inductive shutdown voltage to		L+ (-1.5 V)
Lamp load, max.		5 W
Controlling a digital input		Yes
Output voltage		
• for signal "1", min.		L+ (-2.5 V)
Output current		
• for signal "1" rated value		100 mA
• for signal "1" permissible range for 0 to 60 °C, min.		5 mA
• for signal "1" permissible range for 0 to 60 °C, max.		150 mA
• for signal "0" residual current, max.		0.5 mA
Parallel switching of 2 outputs		
• for logic links		Yes
Switching frequency		
• with resistive load, max.		100 Hz
• with inductive load, max.		0.5 Hz
• on lamp load, max.		100 Hz
Aggregate current of the outputs (per group)		
• up to 60 °C, max.		400 mA
Load impedance range		
• lower limit		240 Ω
• upper limit		4 kΩ

FM 355 closed-loop control module

Technical specifications (continued)

	6ES7 355-0VH10-0AE0	6ES7 355-1VH10-0AE0
Analog inputs		
Number of analog inputs	4	4
Cable length, shielded, max.	200 m; 50m at 80 mV and thermocouples	200 m; 50m at 80 mV and thermocouples
permissible input frequency for voltage input (destruction limit), max.	30 V	30 V
permissible input current for current input (destruction limit), max.	40 mA	40 mA
Input ranges (rated values), voltages		
• 0 to +10 V	Yes	Yes
• -1.75 to +11.75 V	Yes	Yes
• -80 mV to +80 mV	Yes	Yes
Input ranges (rated values), currents		
• 0 to 20 mA	Yes	Yes
• 0 to 23.5 mA	Yes	Yes
• -3.5 to +23.5 mA	Yes	Yes
• 4 to 20 mA	Yes	Yes
Input ranges (rated values), thermoelements		
• Type B	Yes	Yes
• Type J	Yes	Yes
• Type K	Yes	Yes
• Type R	Yes	Yes
• Type S	Yes	Yes
Input ranges (rated values), resistance thermometers		
• Pt 100	Yes	Yes
Characteristic linearization		
• programmable	Yes	Yes
• for thermoelements	Type B, J, K, R, S	Type B, J, K, R, S
• for thermoresistor	Pt 100 (Standard)	Pt 100 (Standard)
Temperature compensation		
• external temperature compensation with Pt100	Yes	Yes
• internal temperature compensation	Yes	Yes
Analog outputs		
Number of analg outputs	4	
Cable length, shielded, max.	200 m; 50m at 80 mV and thermocouples	
Voltage output, short-circuit protection	Yes	
Voltage output, short-circuit current, max..	25 mA	

	6ES7 355-0VH10-0AE0	6ES7 355-1VH10-0AE0
Current output, no-load voltage, max.	18 V	
Output ranges, voltage		
• 0 to 10 V	Yes	
• -10 to +10 V	Yes	
Output ranges, current		
• 0 to 20 mA	Yes	
• 4 to 20 mA	Yes	
Connection of actuators		
• for voltage output 2-conductor connection	Yes	
• for current output 2-conductor connection	Yes	
Load impedance (in rated range of output)		
• with voltage outputs, min.	1 kΩ	
• with voltage outputs, capacitive load, max.	1 µF	
• with current outputs, max.	500 Ω	
• with current outputs, inductive load, max.	1 mH	
Analog value creation		
Measurement principle	integrating	integrating
Integrations and conversion time/resolutionper channel		
• Resolution with overload area (bit including sign), max.	14 Bit; 12 or 14 bit, parameterizable	14 Bit; 12 or 14 bit, parameterizable
• Conversion time (per channel)	16.67 ms; for 12 bit: 16 2/3 ms for 60 Hz, 20 ms for 50 Hz; for 14 bit: 100 ms for 50 and 60 Hz	16.67 ms; for 12 bit: 16 2/3 ms for 60 Hz, 20 ms for 50 Hz; for 14 bit: 100 ms for 50 and 60 Hz
Settling time		
• for resistive load	0.2 ms	0.1 ms
• for capacitive load	3.3 ms	3.3 ms
• for inductive load	0.5 ms	0.5 ms
Encoder		
Connection of signal encoders		
• for voltage measurement	Yes	Yes
• for current measurement as 4-wire transducer	Yes	Yes
Connectable encoders		
• 2-wire BEROS	Yes	Yes
• permissible quiescent current (2-wire BEROS), max.	1.5 mA	1.5 mA

Technical specifications (continued)

	6ES7 355-0VH10-0AE0	6ES7 355-1VH10-0AE0
Errors/accuracies		
Linearity error (relative to output area)	+/- 0.05 %	
Linearity error (relative to input area)	+/- 0.05 %	+/- 0.05 %
Temperature error (relative to output area)	+/- 0.02 %/K	
Temperature error (relative to input areas)	+/- 0.005 %/K	+/- 0.005 %/K
Operational limit in overall temperature range		
• Voltage, relative to output area	+/- 0.5 %	
• Current, relative to output area	+/- 0.6 %	
• Voltage, relative to input area	+/- 0.6 %; +/- 0.6 to +/-1%	+/- 0.6 %; +/- 0.6 to +/-1%
• Current, relative to input area	+/- 0.6 %; +/- 0.6 to +/-1%	+/- 0,6 %; +/- 0.6 to +/-1%
• Resistance-type thermometer, relative to input area	+/- 0.6 %; +/- 0.6 to +/-1%	+/- 0.6 %; +/- 0.6 to +/-1%
Basic error limit (operational limit at 25 °C)		
• Voltage, relative to output area	+/- 0.3 %	
• Current, relative to output area	+/- 0.5 %	
• Voltage, relative to input area	+/- 0.4 %; 80 mV +/- 0.6% ; from 250 to 1000 mV +/- 0.4% ; from 2.5 to 10 V +/- 0.6%; from 3.2 to 20 mA +/-0.5%	+/- 0.4 %; 80 mV +/- 0.6% ; from 250 to 1000 mV +/- 0.4% ; from 2.5 to 10 V +/- 0.6%; from 3.2 to 20 mA +/-0.5%
• Resistance-type thermometer, relative to input area	+/- 0.4 %; +/-0.4 to +/-0.6%	+/- 0.4 %; +/-0.4 to +/-0.6%

	6ES7 355-0VH10-0AE0	6ES7 355-1VH10-0AE0
Interference voltage suppression for f = n x (fl +/- 1 %), fl = interference frequency		
• Series mode interference (peak value of interference < rated value of input range), min.	40 dB	40 dB
• common mode voltage (USS < 2.5 V) , min.	70 dB	70 dB
Control technology		
Number of closed loop controllers	4	4
Status information/ alarms/diagnostics		
Substitute values connectable	Yes; parameterizable	Yes; parameterizable
Isolation		
Isolation checked with	500 V DC	500 V DC
Isolation		
Isolation, controller		
• between the channels	No	No
• between the channels and the backplane bus	Yes; Optocoupler	Yes; Optocoupler
Permissible potential difference		
between inputs and MANA (UCM)	2.5 V DC	2.5 V DC
between M internal and the inputs	75 V DC/ 60 V AC	75 V DC/ 60 V AC
Dimensions and weight		
Width	80 mm	80 mm
Height	125 mm	125 mm
Depth	120 mm	120 mm
Weights		
Weight, approx.	470 g	470 g

Ordering data

	Order No.
FM 355 C closed-loop control module	**6ES7 355-0VH10-0AE0**
With 4 analog outputs for 4 continuous-action controllers	
FM 355 S closed-loop control module	**6ES7 355-1VH10-0AE0**
With 8 digital outputs for 4 sequence or pulse controllers	
Front connector	
20-pole, screw-type contacts	
• 1 unit	**6ES7 392-1AJ00-0AA0**
• 100 units	**6ES7 392-1AJ00-1AB0**
20-pin, with cage clamp terminals	
• 1 unit	**6ES7 392-1BJ00-0AA0**
• 100 units	**6ES7 392-1BJ00-1AB0**
Bus connector	**6ES7 390-0AA00-0AA0**
1 units (spare part)	
Labeling strips	**6ES7 392-2XX00-0AA0**
10 units (spare part)	

	Order No.
S7 SmartLabel	**2XV9 450-1SL01-0YX0**
Software for labeling modules mechanically directly in the STEP 7 project	
Sheets of labels for machine inscription	see "Accessories", page 4/240
Mounting location number plate	**6ES7 912-0AA00-0AA0**
Spare part	
Shield connecting element	**6ES7 390-5AA00-0AA0**
80 mm wide, with 2 rows of 4 terminals	
Terminal elements	
2 items	
For 2 cables of 2 to 6 mm in diameter	**6ES7 390-5AB00-0AA0**
For 1 cable of 3 to 8 mm in diameter	**6ES7 390-5BA00-0AA0**
For 1 cable of 4 to 13 mm in diameter	**6ES7 390-5CA00-0AA0**

FM 355-2 temperature control module

Overview

- 4-channel closed-loop controller module specifically for temperature controls
- Including integrated and easy-to-use online self-optimization
- Heating and cooling controllers as well as combined controllers with heating and active cooling function feasible
- Ready-to-use controller structures
- 2 versions:
  - FM 355-2 C as a continuous controller;
  - FM 355-2 S as step or pulse controllers
- With 4 analog outputs (FM 355-2 C) or 8 digital inputs (FM 355-2 S) to directly control the most common final control elements
- It is possible to continue closed-loop control operation even if the CPU stops or fails

Technical specifications

	6ES7 355-2CH00-0AE0	6ES7 355-2SH00-0AE0
Voltages and currents		
Load voltage L+		
• Rated value (DC)	24 V	24 V
• permissible range, lower limit (DC)	20.4 V	20.4 V
• permissible range, upper limit (DC)	28.8 V	28.8 V
Current consumption		
from load voltage L+ (without load), max.	310 mA; typ. 260 mA	270 mA; typ. 220 mA
from backplane bus DC 5 V, max.	75 mA; typ. 50 mA	75 mA; typ. 50 mA
Power loss, max.	7.8 W	6.9 W
Power loss, typ.	6.5 W	5.5 W
Connection point		
required front connectors	2 x 20-pin	2 x 20-pin
Digital inputs		
Number of digital inputs	8	8
Cable length		
• Cable length, shielded, max.	1,000 m	1,000 m
• Cable length unshielded, max.	600 m	600 m
Input characteristic curve to IEC 1131, type 2	Yes	Yes
Input voltage		
• Rated value, DC	24 V	24 V
• for signal "0"	-3 to 5 V	-3 to 5 V
• for signal "1"	13 to 30 V	13 to 30 V
Input current		
• for signal "1", typ.	7 mA	7 mA
Digital outputs		
Number of digital outputs		8
Cable length, shielded, max.		1,000 m
Cable length unshielded, max.		600 m

	6ES7 355-2CH00-0AE0	6ES7 355-2SH00-0AE0
Short-circuit protection of the output		Yes; electronic
Limitation of inductive shutdown voltage to		L+ (-1.5 V)
Lamp load, max.		5 W
Controlling a digital input		Yes
Output voltage		
• for signal "1", min.		L+ (-2.5 V)
Output current		
• for signal "1" rated value		0.1 A
• for signal "1" for 0 to 60 °C, min.		5 mA
• for signal "1" permissible range for 0 to 60 °C, max.		150 mA
• for signal "0" residual current, max.		0.5 mA
Parallel switching of 2 outputs		
• for logic links		Yes
Switching frequency		
• with resistive load, max.		100 Hz
• with inductive load, max.		0.5 Hz
• on lamp load, max.		100 Hz
Aggregate current of the outputs (per group)		
• up to 60 °C, max.		400 mA
Load impedance range		
• lower limit		240 Ω
• upper limit		4 kΩ
Analog inputs		
Number of analog inputs	4	4
Cable length, shielded, max.	200 m; 50m at 80 mV and thermocouples	200 m; 50m at 80 mV and thermocouples

Technical specifications (continued)

	6ES7 355-2CH00-0AE0	6ES7 355-2SH00-0AE0
permissible input frequency for voltage input (destruction limit), max.	20 V	20 V
permissible input current for current input (destruction limit), max.	40 mA	40 mA
Input ranges (rated values), voltages		
• 0 to +10 V	Yes	Yes
• -1.75 to +11.75 V	Yes	Yes
Input ranges (rated values), currents		
• 0 to 20 mA	Yes	Yes
• 0 to 23.5 mA	Yes	Yes
• -3.5 to +23.5 mA	Yes	Yes
• 4 to 20 mA	Yes	Yes
Input ranges (rated values), thermoelements		
• Type B	Yes	Yes
• Type E	Yes	Yes
• Type J	Yes	Yes
• Type K	Yes	Yes
• Type R	Yes	Yes
• Type S	Yes	Yes
Input ranges (rated values), resistance thermometers		
• Pt 100	Yes	Yes
Characteristic linearization		
• programmable	Yes	Yes
• for thermoelements	Type B, E, J, K, R, S	Type B, E, J, K, R, S
• for thermoresistor	Pt 100 (Standard)	Pt 100 (Standard)
Temperature compensation		
• external temperature compensation with Pt100	Yes	Yes
• internal temperature compensation	Yes	Yes
Analog outputs		
Number of analog outputs	4	
Cable length, shielded, max.	200 m; 50m at 80 mV and thermocouples	
Voltage output, short-circuit protection	Yes	
Voltage output, short-circuit current, max..	25 mA	
Current output, no-load voltage, max.	18 V	
Output ranges, voltage		
• 0 to 10 V	Yes	
• -10 to +10 V	Yes	

	6ES7 355-2CH00-0AE0	6ES7 355-2SH00-0AE0
Output ranges, voltage		
• 0 to 10 V	Yes	
• -10 to +10 V	Yes	
Connection of actuators		
• for voltage output 2-conductor connection	Yes	
• for current output 2-conductor connection	Yes	
Load impedance (in rated range of output)		
• with voltage outputs, min.	1 kΩ	
• with voltage outputs, capacitive load, max.	1 µF	
• with current outputs, max.	500 Ω	
• with current outputs, inductive load, max.	1 mH	
Analog value creation		
Measurement principle	integrating	integrating
Integrations and conversion time/resolutionper channel		
• Resolution with overload area (bit including sign), max.	14 Bit	14 Bit
• Conversion time (per channel)	100 ms; at 50 and 60 Hz	100 ms; at 50 and 60 Hz
Settling time		
• for resistive load	0.2 ms	0.1 ms
• for capacitive load	3.3 ms	3.3 ms
• for inductive load	0.5 ms	0.5 ms
Encoder		
Connection of signal encoders		
• for voltage measurement	Yes	Yes
• for current measurement as 4-wire transducer	Yes	Yes
Connectable encoders		
• 2-wire BEROS	Yes	Yes
• permissible quiescent current (2-wire BEROS), max.	1.5 mA	1.5 mA
Errors/accuracies		
Linearity error (relative to output area)	+/- 0.05 %	
Linearity error (relative to input area)	+/- 0.05 %	+/- 0.05 %
Temperature error (relative to output area)	+/- 0.02 %/K	
Temperature error (relative to input areas)	+/- 0.005 %/K	+/- 0.005 %/K
Operational limit in overall temperature range		
• Voltage, relative to output area	+/- 0.5 %	

FM 355-2 temperature control module

Technical specifications (continued)

	6ES7 355-2CH00-0AE0	6ES7 355-2SH00-0AE0
Operational limit in overall temperature range		
• Current, relative to output area	+/- 0.6 %	
• Voltage, relative to input area	+/- 0.6 %; +/-0.6 to +/-0.7%	+/- 0.06 %; +/-0.06 to +/-0.7%
• Current, relative to input area	+/- 0.6 %; +/-0.6 to +/-0.7%	+/- 0,06 %; +/-0.06 to +/-0.7%
• Resistance-type thermometer, relative to input area	+/- 0.6 %; +/-0.6 to +/-0.7%	+/- 0.06 %; +/-0.06 to +/-0.7%
Basic error limit (operational limit at 25 °C)		
• Voltage, relative to output area	+/- 0.4 %	
• Current, relative to output area	+/- 0.5 %	
• Voltage, relative to input area	+/- 0.04 %; +/-0.04 to +/-0.5%	+/- 0.04 %; +/-0.04 to +/-0.5%
• Current, relative to input area	+/- 0.04 %; +/-0.04 to +/-0.5%	+/- 0.04 %; +/-0.04 to +/-0.5%
• Resistance-type thermometer, relative to input area	+/- 0.04 %; +/-0.04 to +/-0.5%	+/- 0.04 %; +/-0.04 to +/-0.5%
Interference voltage suppression for f = n x (fl +/- 1 %), fl = interference frequency		
• Series mode interference (peak value of interference < rated value of input range), min.	40 dB	40 dB
• common mode voltage (USS < 2.5 V) , min.	70 dB	70 dB

	6ES7 355-2CH00-0AE0	6ES7 355-2SH00-0AE0
Control technology		
Number of closed loop controllers	4	4
Status information/ alarms/diagnostics		
Substitute values connectable	Yes; parameterizable	Yes; parameterizable
Isolation		
Isolation checked with	500 V DC	500 V DC
Isolation		
Isolation, controller		
• between the channels	No	No
• between the channels and the backplane bus	Yes; Optocoupler	Yes; Optocoupler
Permissible potential difference		
between inputs and MANA (UCM)	2.5 V DC	2.5 V DC
between M internal and the inputs	75 V DC/ 60 V AC	75 V DC/ 60 V AC
Dimensions and weight		
Width	80 mm	80 mm
Height	125 mm	125 mm
Depth	120 mm	120 mm
Weights		
Weight, approx	470 g	470 g

Ordering data

	Order No.
FM 355-2 C temperature controller module	**6ES7 355-2CH00-0AE0**
With 4 analog outputs for 4 continuous-action controllers	
FM 355-2 S temperature controller module	**6ES7 355-2SH00-0AE0**
With 8 digital outputs for 4 step or pulse controllers	
Front connector	
20-pin, with screw-type terminals	
• 1 unit	**6ES7 392-1AJ00-0AA0**
• 100 units	**6ES7 392-1AJ00-1AB0**
20-pin, with cage clamp terminals	
• 1 unit	**6ES7 392-1BJ00-0AA0**
• 100 units	**6ES7 392-1BJ00-1AB0**
Bus connector	**6ES7 390-0AA00-0AA0**
1 unit (spare part)	
Labeling strip	**6ES7 392-2XX00-0AA0**
10 units (spare part)	

	Order No.
S7-SmartLabel	**2XV9 450-1SL01-0YX0**
Software for machine labeling of modules directly from the STEP 7 project	
Labeling sheets for machine labeling	see "Accessories", page 4/240
Slot number label	**6ES7 912-0AA00-0AA0**
Spare part	
Shield connecting element	**6ES7 390-5AA00-0AA0**
80 mm wide, with 2 rows for 4 terminal elements each	
Terminal elements	
2 units	
For 2 cables with 2 to 6 mm diameter	**6ES7 390-5AB00-0AA0**
For 1 cable with 3 to 8 mm diameter	**6ES7 390-5BA00-0AA0**
For 1 cable with 4 to 13 mm diameter	**6ES7 390-5CA00-0AA0**

Overview

- Interface between a maximum of 3 absolute position encoders (SSI) and the CPU.
- To provide the position-encoder values for subsequent processing in the STEP 7 program.
- Enables the programmable controller's direct response to encoder values in moving systems.

Note:

SIMODRIVE Sensor/Motion Connect 500 feature position-measuring systems and preassembled connecting cables for counting and positioning functions.

Additional information is available in the Internet under:

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

Technical specifications

	6ES7 338-4BC01-0AB0
Voltages and currents	
Load voltage L+	
• Rated value (DC)	24 V
• permissible range, lower limit (DC)	20.4 V
• permissible range, upper limit (DC)	28.8 V
Current consumption	
from load voltage L+ (without load), max.	10 mA
from backplane bus DC 5 V, max.	160 mA
Power loss, typ.	3 W
Connection point	
required front connectors	20-pin
Digital inputs	
Cable length	
• Cable length, shielded, max.	600 m
Input voltage	
• for signal "0"	-3 to 5 V
• for signal "1"	11 to 30.2 V
Input current	
• for signal "0", max. (permissible quiescent current)	2 mA
• for signal "1", typ.	9 mA
Input delay (for rated value of input voltage)	
• for standard inputs - at "0" to "1", min.	300 µs

	6ES7 338-4BC01-0AB0
Encoder supply	
24 V encoder supply	
• 24 V	Yes; L+ (-0.8 V)
• Output current, max.	900 mA
Encoder	
Number of connectable encoders, max.	3
Connectable encoders	
• Absolute encoder (SSI)	Yes
• 2-wire BEROS	Yes
Encoder signals, absolute encoder (SSI)	
• Cable length, shielded, max.	320 m; 320 m at 125 kHz, 160 m at 250 kHz, 60 m at 500 kHz, 20 m at 1 MHz
Status information/ alarms/diagnostics	
Alarms	
• Diagnostic alarm	Yes
Isolation	
Galvanic isolation	No
Dimensions and weight	
Width	40 mm
Height	125 mm
Depth	120 mm
Weights	
Weight, approx.	235 g

SM 338 POS input module

4

Ordering data		Order No.
SM 338 POS input module		**6ES7 338-4BC01-0AB0**
For position sensing with ultra-sonic encoders with Start/Stop interface		
Front connector		
20-pin, with screw contacts		
• 1 unit		**6ES7 392-1AJ00-0AA0**
• 100 units		**6ES7 392-1AJ00-1AB0**
20-pin, with cage clamp terminals		
• 1 unit		**6ES7 392-1BJ00-0AA0**
• 100 units		**6ES7 392-1BJ00-1AB0**
Front door, elevated design	A)	**6ES7 328-0AA00-7AA0**
e.g. for 32-channel modules; for connecting 1.3 mm^2/16 AWG conductors		
SIMATIC Manual Collection	D)	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: S7-200, S7-300, C7, S7-400, SIMATIC DP (Distributed I/O), SIMATIC PC, SIMATIC PG (Programming device), STEP 7, Engineering Tools, Runtime Software, SIMATIC PCS 7, SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication), SIMATIC Machine Vision, SIMATIC Sensors		

		Order No.
SIMATIC Manual Collection update service for 1 year	D)	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		
S7-300 manual		
Design, CPU data, module data, instruction list		
German		**6ES7 398-8FA10-8AA0**
English		**6ES7 398-8FA10-8BA0**
French		**6ES7 398-8FA10-8CA0**
Spanish		**6ES7 398-8FA10-8DA0**
Italian		**6ES7 398-8FA10-8EA0**
Signal cable		
Pre-assembled for SSI absolute encoder 6FX2001-5, without Sub-D connector, UL/DESINA		**6FX5 002-2CC12-■■■■**
Length code		see FM 351, page 4/154

A) Subject to export regulations: AL: N and ECCN: EAR99H

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

Overview

- For connecting up to 4 drives with analog setpoint interface or pulse-direction interface to a motion control
- Operation with isochronous PROFIBUS DP
- Connectable drives:
  - electrical drives
  - hydraulic drives
  - stepper drives
- Can be used with SIMATIC CPU 31xT-2 DP, SIMATIC Microbox 420-T, SIMOTION C230-2, SIMOTION P350, SIMOTION D4x5
- Can also be used with external encoders

Technical specifications

	6ES7 174-0AA00-0AA0
Supply voltages	
Rated value	
• DC 24 V	Yes
• permissible range, lower limit (DC)	20.4 V
• permissible range, upper limit (DC)	28.8 V
Current consumption	
Current consumption, max.	500 mA
Power loss, typ.	12 W
Connection point	
required front connectors	40-pin
Isochronous mode	
Isochronouos mode	Yes
shortest clock pulse	1.5 ms
Digital inputs	
Number of digital inputs	10
Cable length	
• Cable length, shielded, max.	100 m
Input voltage	
• for signal "0"	-3 to 5 V
• for signal "1"	15 to 30 V
Input current	
• for signal "0", max. (permissible quiescent current)	3 mA
• for signal "1", typ.	6 mA
Input delay (for rated value of input voltage)	
• for standard inputs - at " to "1", min.	15 µs
Digital outputs	
Number of digital outputs	8
Cable length, shielded, max.	600 m
Short-circuit protection of the output	Yes

	6ES7 174-0AA00-0AA0
Switching capacity of the outputs	
• with resistive load, max.	0.5 A
• on lamp load, max.	5 W
Output voltage	
• Rated value (DC)	24 V; L+
• for signal "1", min.	L+ (-3 V)
• for signal "1" (DC), max.	24 V; max. value is equal to feed L+
Output current	
• for signal "1" permissible range for 0 to 60 °C, min.	5 mA
• for signal "1" permissible range for 0 to 60 °C, max.	500 mA
• for signal "0" residual current, max.	0.4 mA
Output delay with resistive load	
• "0" to "1", max.	500 µs
Switching frequency	
• with resistive load, max.	100 Hz
• with inductive load, max.	1 Hz
Relay outputs	
Number of operating cycles	500,000
Switching capacity of the contacts	
• with resistive load, max.	1 A
Analog outputs	
Number of anlog outputs	4
Output ranges, voltage	
• -10 to +10 V	Yes
Analog value creation	
Integrations and conversion time/resolutionper channel	
• Resolution with overload area (bit including sign), max.	15 Bit

IM 174 PROFIBUS module

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Technical specifications (continued)

	6ES7 174-0AA00-0AA0
Encoder supply	
5 V encoder supply	
• 5 V	Yes
• Output current, max.	1.2 A
24 V encoder supply	
• 24 V	Yes
• Output current, max.	1.4 A
Absolute encoder (SSI) encoder supply	
• Absolute encoder (SSI)	Yes
• Short-circuit protection	Yes
Encoder	
Number of connectable encoders, max.	4
Connectable encoders	
• Incremental encoder (symmetrical)	Yes
• Absolute encoder (SSI)	Yes
Encoder signals, incremental encoder (symmetrical)	
• Trace mark signals	A, notA, B, notB
• Zero mark signal	N, notN
• Input signal	5 V difference signal (phys. RS 422)
• Input frequency, max.	1 MHz
• Cable length, shielded, max.	35 m; 35 m at max. 500 kHz; 10 m at max. 1 MHz

	6ES7 174-0AA00-0AA0
Encoder signals, absolute encoder (SSI)	
• Input signal	5 V difference signal (phys. RS 422)
• Data signal	DATA, notDATA
• Clock signal	CLS, notCLS
• Telegram length	13, 21, 25 bit
• Clock frequency, max.	3 MHz; 187.5 KHz to 3.0 MHz (parameterizable)
• Gray code	Yes
• Cable length, shielded, max.	250 m; 250 m at 187.5 kHz, 10 m at 1.5 MHz
Isolation	
Isolation, digital outputs	
• Galvanic isolation, digital outputs	Yes
Galvanic isolation, digital inputs	
• galvanic isolation, digital inputs	Yes
Dimensions and weight	
Width	160 mm
Height	125 mm
Depth	118 mm
Weights	
Weight, approx.	1 kg

Ordering data

		Order No.
IM 174 PROFIBUS module	A)	**6ES7 174-0AA00-0AA0**
PROFIBUS module for connecting analog drives and stepper drives to motion controllers		

A) Subject to export regulations: AL: N and ECCN: EAR99H

Overview

SIWAREX U weighing electronics

SIWAREX U is a versatile weighing module for all simple weighing and force measuring tasks. The compact module is easy to install in all SIMATIC automation systems. Complete data access is then possible via the SIMATIC.

Technical specifications

SIWAREX U	
Integration in automation systems:	
• S5-95U/DP (PROFIBUS master)	Via ET 200M
• S5-115U/-135U/-155U	Via ET 200M
• S7-300	Direct integration
• S7-400	Via ET 200M
• PCS 7	Via ET 200M
• M7-300	Direct integration
• M7-400	Via ET 200M
• C7	Via IM or ET 200M
• Automation systems from other vendors	Via ET 200M
• Stand-alone (without SIMATIC CPU)	Possible with IM 153-1
Communication interfaces	• SIMATIC S7 (P bus) • RS 232 • TTY
Connection of remote indicators (through TTY serial interface)	Gross, channel 1, 2 or default value 1, 2
Adjustment of scales settings	Using SIMATIC S5/S7/M7/C7 (P bus) or SIWATOOL U parameterization software (RS 232)
Measuring properties	
• Error limit according to DIN 1319-1 of full-scale value at 20 °C ± 10 K	0.05 %
• Internal resolution Data format of weight values	65.535 2 byte (fixed-point)
Number of measurements/second	50
Digital filter	0.05 - 5 Hz (in 7 steps), mean-value filter
Weighing functions	
• Weight values	Gross
• Limits	2 (min./max.)
• Zero setting function	Per command
Load cells	Strain gauges in 4-wire or 6-wire system

SIWAREX U	
Load cell powering	
• Supply voltage Us (rated value)	10.3 V DC
• Max. supply current	≤ 240 mA single-channel ≤ 120 mA two-channel
• Permissible load resistance (per weighing channel)	
- R_{Lmin}	> 41 Ω single-channel > 82 Ω two-channel
- R_{Lmax}	< 4010 Ω
-	With Ex(i) interface:
- R_{Lmin}	> 87 Ω
- R_{Lmax}	< 4010 Ω
Permissible load cell characteristic	Up to 4 mV/V
Permissible range of measuring signal (at greatest set characteristic)	-1.5 to +42.5 mV
Max. distance of load cells	1000 m (300 m in Ex area (up to 1000 m, depending on the gas group))
Intrinsically-safe load cell powering	Optional (Ex interface)
Supply voltage 24 V DC	
• Rated voltage	24 V DC
• Max. current consumption	220 mA
Voltage supply from backplane bus	typ. 100 mA
Certification	UL, CSA, FM
IP degree of protection to DIN EN 60 529; IEC 60 529	IP20
Climatic requirements	
$T_{min\ (IND)}$ to $T_{max\ (IND)}$) (operating temperature)	
• Vertical installation	0 ... +60 °C
• Horizontal installation	0 ... +40 °C
EMC requirements according to	NAMUR NE21, Part 1 89/386/EEC

SIWAREX U

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Ordering data		Order No.
SIWAREX U for SIMATIC S7 and ET 200M, incl. bus connector, weight 0.3 kg		
• Single-channel version for connecting one scale	A)	**7MH4 601-1AA01**
• Two-channel version for connecting two scales	A)	**7MH4 601-1BA01**
SIWAREX U Manual		
• German, English, French		
Free download on the Internet at: www.siemens.com/weighing-technology		
SIWAREX U configuration package for SIMATIC S5/S7 version 5.1 or higher		**7MH4 683-3AA63**
on CD-ROM		
• SIWATOOL U PC parameterization software (German/English/French/Italian)		
• Example programs		
• SIWAREX U manual on CD (in German and English)		
• Setup for incorporation of SIWAREX U into STEP 7		
SIWAREX U configuration package for PCS 7, version 5.2		**7MH4 683-3BA63**
SIWAREX U configuration package for PCS 7, version 6.x in German and English on CD-ROM Block for the CFC and faceplate		**7MH4 683-3BA64**
SIWATOOL cable from SIWAREX U/CS with serial PC interface, for 9-pin PC interfaces (RS 232), 3 m long	A)	**7MH4 607-8CA**
Installation material (mandatory)		
20-pin front plug with screw contacts (required for each SIWAREX module)		**6ES7 392-1AJ00-0AA0**
Shield contact element Sufficient for two SIWAREX U modules		**6ES7 390-5AA00-0AA0**
Shield connection terminal		**6ES7 390-5CA00-0AA0**
Contents: 2 units (suitable for cable with diameter 4 to 13 mm)		
Note: one shield connection terminal is required each for:		
• Scale connection		
• RS 485 interface		
• RS 232 interface		
S7 DIN rail		
• 160 mm		**6ES7 390-1AB60-0AA0**
• 480 mm		**6ES7 390-1AE80-0AA0**
• 530 mm		**6ES7 390-1AF30-0AA0**
• 830 mm		**6ES7 390-1AJ30-0AA0**
• 2000 mm		**6ES7 390-1BC00-0AA0**

	Order No.
Accessories (optional)	
PS 307 load power supplies (only required if DC 24 V is not available)	
120/230 V AC; 24 V DC, incl. power connector	
PS 307-1B; 2 A	**6ES7 307-1BA00-0AA0**
PS 307-1E; 5 A	**6ES7 307-1EA00-0AA0**
PS 307-1K; 10 A	**6ES7 307-1KA00-0AA0**
Labeling strips (10 units, spare part)	**6ES7 392-2XX00-0AA0**
Remote displays (option)	
The digital remote displays can be connected directly to SIWAREX U through a TTY interface.	
The following remote displays can be used:	
S102, S302	
Siebert Industrieelektronik GmbH *P.O. Box 1180* *D-66565 Eppelborn* *Tel.: +49 6806/980-0* *Fax: +49 6806/980-999* *Internet: http://www.siebert.de*	
Detailed information available from manufacturer.	
SIWAREX JB junction box, aluminium housing	**7MH4 710-1BA**
for connecting up to 4 load cells in parallel, and for connecting several junction boxes	
SIWAREX JB junction box, stainless steel housing	**7MH4 710-1EA**
for connecting up to 4 load cells in parallel	
Ex interface, type SIWAREX Pi With UL and FM approvals, but **without ATEX approval**, for intrinsically-safe connection of load cells, suitable for the SIWAREX U, M, FTA, FTC, CS and P weighing modules. Use in the EC is not possible.	**7MH4 710-5AA**
Manual for Ex interface type SIWAREX Pi	**C71000-T5974-C29**
SIWAREX IS Ex interface With ATEX approval, but **without UL and FM approvals**, for intrinsically-safe connection of load cells, including Manual, suitable for the SIWAREX U, M, FTA, FTC, CS and P weighing modules. Use in the EC is possible.	
• With short-circuit current < 199 mA DC	**7MH4 710-5BA**
• With short-circuit current < 137 mA DC	**7MH4 710-5CA**
Cable (optional)	

A) Subject to export regulations: AL: N and ECCN: EAR99H

Ordering data (continued)

	Order No.
Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, orange sheath to connect SIWAREX U, M, P, FTA, FTC, CS, MS and CF to the junction box (JB), extension box (EB) or Ex interface (Ex-I) or between two JBs, for fixed laying, occasional bending is possible, 10.8 mm outer diameter, for ambient temperature –40 to +80 °C	**7MH4 702-8AG**
Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, blue sheath to connect the junction box (JB) or extension box (EB) in a potentially explosive atmosphere to the Ex interface (Ex-I), for fixed laying, occasional bending is possible, blue PVC insulating sheath, approx. 10.8 mm outer diameter, for ambient temperature –40 to +80 °C	**7MH4 702-8AF**
Cable LiYCY 4 x 2 x 0.25 mm² A) for TTY (connect 2 pairs of conductors in parallel), for connection of a remote indicator	**7MH4 407-8BD0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

SIWAREX FTA

Overview

SIWAREX FTA weighing module

The SIWAREX FTA (Flexible Technology, Automatic Weighing Instrument) is a versatile and flexible weighing module for industrial use. It can be used for automatic and non-automatic weighing, e.g. for the production of mixtures, filling, loading, monitoring and bagging.

It has been assigned appropriate scale approvals and is also suitable for calibration plants.

The SIWAREX FTA function module is integrated in SIMATIC S7/PCS7, and uses the features of this modern automation system, such as integral communication, diagnostics and configuration tools.

Technical specifications

SIWAREX FTA	
Use in automation systems	
• S7-300	Directly or via ET 200M
• S7-400 (H)	Via ET 200M
• PCS 7 (H)	Via ET 200M
Communication interfaces	SIMATIC S7, RS 232, RS 485
Module parameterization	Using SIMATIC S7
	Using SIWATOOL FTA software (RS 232)
Measuring properties	
• EC type approval as non-automatic weighing machine, trade class III	3 x 6000 d ≥ 0.5 µV/e
• Internal resolution	16 million parts
• Internal/external updating rate	400/100 Hz
Several parameterizable digital filters	Critically dampened, Bessel, Butterworth (0.05 ... 20 Hz), mean value filter
Weighing functions	
• Non-automatic weighing machine	OIML R76
• Automatic weighing machine	OIML R51, R61, R107
Load cells	Strain gauges in 4-wire or 6-wire system
• 3 characteristic value ranges	1, 2 or 4 mV/V
Load cell powering	
• Supply voltage U_S (rated value)	10.3 V DC
• Max. supply current	184 mA
• Permissible load cell resistance	
- R_{Lmin}	> 56 Ω > 87 Ω with Ex interface
- R_{Lmax}	≤ 4010 Ω

Max. distance of load cells	
When using the recommended cable:	
• Standard	1000 m (500 m legal-for-trade)
• In hazardous area [1])	
- For gases of group IIC	300 m
- For gases of group IIB	1000 m
Connection to load cells in Ex zone 1	Optionally via SIWAREX IS Ex interface
Ex approvals zone 2 and safety	ATEX 100a, FM, UL, cUL_{US} Haz. Loc.
Power supply	
• Rated voltage	24 V DC
• Max. current consumption	500 mA
• Current consumption from backplane bus	Typ. 55 mA
Inputs/outputs	
• Digital inputs	7 DI electrically isolated
• Digital outputs	8 DO electrically isolated
• Counter input	Up to 10 kHz
• Analog output	
- Current range	0/4 to 20 mA
- Updating rate	100 Hz
Approvals	EC type approval (CE, OIML R76) OIML R51, R61, R107
Degree of protection to DIN EN 60529; IEC 60529	IP20
Climatic requirements	
($T_{min\ (IND)}$ ... $T_{max\ (IND)}$) (operating temperature)	
• Vertical installation	-10 ... 60 °C
• Horizontal installation	-10 ... 40 °C
EMC requirements	EN 61326, EN 45501, NAMUR NE21, Part 1
Dimensions in mm	80 x 125 x 130
Weight	600 g

1) For details, refer to SIWAREX IS data sheet

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Ordering data	Order No.
SIWAREX FTA Legal-for-trade weighing electronics for automatic scales for S7-300 and ET 200M. EC type approval 3 x 6000 d Applications: dosing, filling, bagging, loading. Note: observe approval conditions for applications with obligation of verification. It is recommendable to use the calibration set and contact the SIWAREX hotline.	**7MH4 900-2AA01**
SIWAREX FTA Manual • German • English • Italian • Spanish • French Free download from the Internet at: www.siemens.com/weighing-technology	
SIWAREX FTA "Getting started" Example software for easy acquaintance with scale programming in STEP 7. Free download from the Internet at: www.siemens.com/weighing-technology	
SIWAREX FTA configuration package for SIMATIC S7 on CD-ROM • SETUP for S7 link with STEP 7 V5.2 or later • S7 function block • SIWATOOL FTA commissioning software • Manual	**7MH4 900-2AK01**
SIWAREX FTA configuration package for PCS 7 V6.x on CD-ROM • SETUP for S7 link • Function block for CFC • Faceplate • SIWATOOL FTA commissioning software • Manual	**7MH4 900-2AK61**
SIWAREX FTA configuration package for PCS 7 V5.1 and V5.2 On request	on request
Calibration set for SIWAREX FTA For verification of up to 5 scales comprising: • 1x inscription foil for labeling • 1x protection foil • 10x EC verification marks (black M on green background) • Guidelines for verification, verification certificates and approvals, adaptable label • SIWAREX FTA Manual	**7MH4 900-2AY10**

	Order No.
SIWAREX Multiscale STEP 7 software for SIWAREX FTA. Control of one or more scales for a scalable number of components and any number of recipes. Applications: batching plants, mixers in production process, CD-ROM	**7MH4 900-2AL01**
SIWAREX Multifill STEP 7 software for SIWAREX FTA. Control of filling and bagging processes for one or more filling stations and any number of materials, CD-ROM	**7MH4 900-2AM01**
SIWATOOL cable from SIWAREX FTA with serial PC interface, for 9-pin PC interfaces (RS 232)	
• 2 m long	**7MH4 702-8CA**
• 5 m long	**7MH4 702-8CB**
40-pin front plug with screw contacts (required for each SIWAREX module), alternatively with spring-loaded contacts	**6ES7 392-1AM00-0AA0**
40-pin front plug with spring-loaded contacts (required for each SIWAREX module), alternatively with screw contacts	**6ES7 392-1BM00-0AA0**
Shield contact element Sufficient for one SIWAREX FTA module	**6ES7 390-5AA00-0AA0**
Shield connection terminal Contents: 2 units (suitable for cable with diameter 4 ... 13 mm) Note: one shield connection terminal is required each for: • Scale connection • RS 485 interface • RS 232 interface	**6ES7 390-5CA00-0AA0**
S7 DIN rail	
• 160 mm	**6ES7 390-1AB60-0AA0**
• 480 mm	**6ES7 390-1AE80-0AA0**
• 530 mm	**6ES7 390-1AF30-0AA0**
• 830 mm	**6ES7 390-1AJ30-0AA0**
• 2000 mm	**6ES7 390-1BC00-0AA0**
PS 307 load power supply (only required if DC 24 V is not available) 120/230 V AC; 24 V DC	
• PS 307-1B; 2 A	**6ES7 307-1BA00-0AA0**
• PS 307-1E; 5 A	**6ES7 307-1EA00-0AA0**
• PS 307-1K; 10 A	**6ES7 307-1KA00-0AA0**
MMC memory for data recording up to 16 MB	**6ES7 953-8LF11-0AA0**

SIWAREX FTA

Ordering data (continued)

	Order No.
Remote display (option) The Siebert S102 and S302 remote digital display can be directly connected to the SIWAREX FTA via an RS 485 interface. Siebert Industrieelektronik GmbH P.O. Box 1180 D-66565 Eppelborn Tel.: +49 6806/980-0 Fax: +49 6806/980-999 Internet: http://www.siebert.de Detailed information available from manufacturer.	
SIWAREX JB junction box, aluminium housing for connecting up to 4 load cells in parallel, and for connecting several junction boxes	**7MH4 710-1BA**
SIWAREX JB junction box, stainless steel housing for connecting up to 4 load cells in parallel	**7MH4 710-1EA**
Ex interface, type SIWAREX Pi With UL and FM approvals, but **without ATEX approval** for intrinsically-safe connection of load cells, suitable for the SIWAREX U, M, FTA, FTC, CS and P weighing modules. Use in the EC is not possible.	**7MH4 710-5AA**
Manual for Ex interface type SIWAREX Pi	**C71000-T5974-C29**
Ex interface, type SIWAREX IS With ATEX approval, but **without UL and FM approvals** for intrinsically-safe connection of load cells, including Manual, suitable for the SIWAREX U, M, FTA, FTC, CS and P weighing modules. Use in the EC is possible.	
• With short-circuit current < 199 mA DC	**7MH4 710-5BA**
• With short-circuit current < 137 mA DC	**7MH4 710-5CA**

	Order No.
Cable (optional)	
Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, orange sheath to connect SIWAREX U, M, P, FTA, FTC, CS, MS and CF to the junction box (JB), extension box (EB) or Ex interface (Ex-I) or between two JBs, for fixed laying, occasional bending is possible, 10.8 mm outer diameter, for ambient temperature –40 to +80 °C	**7MH4 702-8AG**
Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, blue sheath to connect the junction box (JB) or extension box (EB) in a potentially explosive atmosphere to the Ex interface (Ex-I), for fixed laying, occasional bending is possible, blue PVC insulating sheath, approx. 10.8 mm outer diameter, for ambient temperature –40 to +80 °C	**7MH4 702-8AF**
Cable LiYCY 4 x 2 x 0.25 mm² A) for TTY (connect 2 pairs of conductors in parallel), for connection of a remote indicator	**7MH4 407-8BD0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

Overview

SIWAREX FTC weigh module

The SIWAREX FTC (Flexible Technology for Continuous Weighing) is a versatile and flexible weigh module for conveyor scales, differential proportioning weighers and bulk flow meters. It can also be used to record weights and measure force. The SIWAREX FTC function module is integrated in SIMATIC S7/PCS7, and uses the features of this modern automation system, such as integral communication, diagnostics and configuration tools.

Technical specifications

SIWAREX FTC	
Use in automation systems	
• S7-300	Directly or via ET 200M
• S7-400 (H)	Via ET 200M
• PCS 7 (H)	Via ET 200M
Communications interfaces	SIMATIC S7, RS 232, RS 485
Module parameterization	Using SIMATIC S7
	Using SIWATOOL FTC software (RS 232)
Measuring properties	
• EC type approval as non-automatic weighing machine, trade class III	3 x 6000 d ≥ 0.5 µV/e
• Internal resolution	+/- 8 million parts
• Internal/external updating rate	400/100 Hz
Several parameterizable digital filters	Critically dampened, Bessel, Butterworth (0.05 ... 20 Hz), mean value filter
Weighing functions	
• Non-automatic weighing machine, force measurement	
• Conveyor scale	
Load cells	Strain gages in 4-wire or 6-wire system
• 3 characteristic value ranges	1, 2 or 4 mV/V
Load cell powering	
• Supply voltage U_S (rated value)	10.3 V DC
• Max. supply current	184 mA
• Permissible load cell resistance	
- R_{Lmin}	> 56 Ω > 87 Ω with Ex interface
- R_{Lmax}	≤ 4010 Ω

Max. distance of load cells	
When using the recommended cable:	
• Standard	1000 m (500 m legal-for-trade)
• In hazardous area [1])	
- For gases of group IIC	300 m
- For gases of group IIB	1000 m
Connection to load cells in Ex zone 1	Optionally via SIWAREX IS Ex interface
Ex approvals zone 2 and safety	ATEX 100a, FM, UL, cUL_{US} Haz. Loc. (all available soon)
Power supply	
• Rated voltage	24 V DC
• Max. current consumption	500 mA
• Current consumption from backplane bus	Typ. 55 mA
Inputs/outputs	
• Digital inputs	7 DI electrically isolated
• Digital outputs	8 DO electrically isolated
• Counter input	Up to 10 kHz
• Analog output	
- Current range	0/4 to 20 mA
- Updating rate	100 Hz
Approvals	
For NAWI mode	EC type approval, OIML-R76
Degree of protection to DIN EN 60529; IEC 60529	IP20
Climatic requirements	
($T_{min\ (IND)}$ ... $T_{max\ (IND)}$) (operating temperature)	
• Vertical installation	-10 ... 60 °C
• Horizontal installation	-10 ... 40 °C
EMC requirements	EN 61326, EN 45501, NAMUR NE21, Part 1
Dimensions in mm	80 x 125 x 130
Weight	600 g

1) For details, refer to SIWAREX IS data sheet

SIWAREX FTC

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Ordering data	Order No.
SIWAREX FTC Weighing electronics for conveyor scales for S7-300 and ET 200M. Applications: Force measurement, conveyor scales	**7MH4 900-3AA01**
SIWAREX FTC Manual German, English, Italian, Spanish, French Free download from the Internet at: www.siemens.com/weighing-technology	
SIWAREX FTC "Getting started" Example software for easy acquaintance with scale programming in STEP 7. Free download from the Internet at: www.siemens.com/weighing-technology	
SIWAREX FTC configuration package for SIMATIC S7 on CD-ROM • SETUP for S7 link with STEP 7 V5.2 • S7 function block • SIWATOOL FTC commissioning software • Manual	**7MH4 900-3AK01**
SIWAREX FTC configuration package for PCS 7 V6.x on CD-ROM • SETUP for S7 link • Function block for CFC • Faceplate • SIWATOOL FTC commissioning software • Manual	**7MH4 900-3AK61**
SIWATOOL cable from SIWAREX FTC with serial PC interface, for 9-pin PC interfaces (RS 232)	
• 2 m long	**7MH4 702-8CA**
• 5 m long	**7MH4 702-8CB**
40-pin front plug with screw contacts (required for each SIWAREX module), alternatively with spring-loaded contacts	**6ES7 392-1AM00-0AA0**
40-pin front plug with spring-loaded contacts (required for each SIWAREX module), alternatively with screw contacts	**6ES7 392-1BM00-0AA0**
Shield contact element Sufficient for one SIWAREX FTC module	**6ES7 390-5AA00-0AA0**
Shield connection terminal Contents: 2 units (suitable for cable with diameter 4 ... 13 mm) Note: one shield connection terminal is required each for: • Scale connection • RS 485 interface • RS 232 interface	**6ES7 390-5CA00-0AA0**

	Order No.
S7 DIN rail	
• 160 mm	**6ES7 390-1AB60-0AA0**
• 480 mm	**6ES7 390-1AE80-0AA0**
• 530 mm	**6ES7 390-1AF30-0AA0**
• 830 mm	**6ES7 390-1AJ30-0AA0**
• 2000 mm	**6ES7 390-1BC00-0AA0**
PS 307 load power supply (only required if DC 24 V is not available) 120/230 V AC; 24 V DC	
• PS 307-1B; 2 A	**6ES7 307-1BA00-0AA0**
• PS 307-1E; 5 A	**6ES7 307-1EA00-0AA0**
• PS 307-1K; 10 A	**6ES7 307-1KA00-0AA0**
MMC memory for data recording up to 16 MB	**6ES7 953-8LF11-0AA0**
Remote display (option) The Siebert S102 and S302 remote digital display can be directly connected to the SIWAREX FTC via an RS 485 interface. (not suitable for mode "Conveyor scale") Siebert Industrieelektronik GmbH P.O. Box 1180 D-66565 Eppelborn Tel.: +49 6806/980-0 Fax: +49 6806/980-999 Internet: http://www.siebert.de Detailed information available from manufacturer.	
SIWAREX JB junction box, aluminium housing for connecting up to 4 load cells in parallel, and for connecting several junction boxes	**7MH4 710-1BA**
SIWAREX JB junction box, stainless steel housing for connecting up to 4 load cells in parallel	**7MH4 710-1EA**
Ex interface, type SIWAREX Pi With UL and FM approvals, but **without ATEX approval** for intrinsically-safe connection of load cells, suitable for the SIWAREX U, M, FTA, FTC, CS and P weighing modules. Use in the EC is not possible.	**7MH4 710-5AA**
Manual for Ex interface type SIWAREX Pi	**C71000-T5974-C29**
SIWAREX IS Ex interface With ATEX approval, but **without UL and FM approvals** for intrinsically-safe connection of load cells, including Manual, suitable for the SIWAREX U, M, FTA, FTC, CS and P weighing modules. Use in the EC is possible.	
• With short-circuit current < 199 mA DC	**7MH4 710-5BA**
• With short-circuit current < 137 mA DC	**7MH4 710-5CA**
Cable (optional)	see SIWAREX U, page 4/183

Overview

SIWAREX M is a legal-for-trade weighing module for exact weighing and proportioning, and can be used in SIMATIC automation systems without problem. The module controls the proportioning of individual setpoints independent of the cycle time of the automation system, and therefore achieves a high proportioning accuracy.

Technical specifications

SIWAREX M	
Main applications	• Platform scales • Fill level (containers/bins) • Proportioning and batching scales • Scales with verification capability
Intrinsically-safe load cell powering	Optional (Ex-I)
Stand-alone (without SIMATIC)	Yes
Integration in:	
• S5-90/-95U/-100U	Via RS 232/TTY + CP
• S5-95U/DP (PROFIBUS master)	Via RS 232/TTY + CP
• S5-115U/-135U/-155U	Via ET 200M
• S7-300	Direct integration
• S7-400	Via ET 200M
• PCS 7	Via ET 200M
• C7	Via IM or ET 200M
• TELEPERM M (AS 388/488/TM)	Via ET 200M
Communication interfaces	SIMATIC S7 (P bus) RS 232, TTY
Process interfaces	
• Digital inputs	3 (assignable)
• Digital outputs	4 (assignable)
• Analog output/analog input	Yes / No
Remote display connection (via serial interface)	Yes (verification capability) Gross/net/setpoint Remote display with operator control
Printer connection	Yes (verification capability)
Measuring properties	
EU type approval for medium accuracy weighing machines Class III (with verification capability)	6000 d
Error limit according to DIN 1319-1 of full-scale value at 20 °C ± 10 K	0,01 %
n_{ind} in acc. with EN 45 501	6000
Min. measuring signal Δu_{min} per d	0.5 µV
Internal resolution	± 524.288
Data format for weight values	4 byte (fixed-point)

SIWAREX M	
Number of measurements/second	50
Filter	Exponent filter: 0.05 ... 5 Hz Mean value filter
Weighing functions	
• Weight values	Gross/net/tare
• Limits	4 (min./max./empty/overfill)
• Scale standstill	Yes
• Zero setting function	Via command or automatically
Proportioning functions	• Control of coarse/fine flow valves • Tolerance monitoring • Material flow monitoring • Autom. proportioning optimization • Autom. reproportioning • Inching mode
Module parameterization	Via SIMATIC S5/S7/C7 or SIWATOOL M PC parameterization software
UL/CSA/FM certification	Yes
IP degree of protection to DIN EN 60529; IEC 60529	In S7 frame: IP20 Stand-alone: IP10
Load cell powering	
• Supply voltage U_s (rated value)	10.2 V DC
• Max. supply current	≤ 180 mA
• Permissible load resistance:	
- R_{Lmin}	> 60 Ω
- R_{Lmax}	< 4010 Ω
	With Ex(i) interface:
- R_{Lmin}	> 87 Ω
- R_{Lmax}	< 4010 Ω
Permissible load cell characteristic	Up to 4 mV/V
Permissible range of measuring signal (at greatest set characteristic)	-41.5 ... 41.5 mV DC
Max. distance of load cells	1000 m (300 m in Ex area[1])

1) Up to 1000 m, depending on the gas group.

SIWAREX M

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Technical specifications (continued)

SIWAREX M	
Supply voltage 24 V DC	
• Rated voltage	24 V DC
• Max. current consumption	300 mA
Voltage supply from backplane bus	typ. 50 mA
Serial port 1	RS 232:
• Baud rate	2400/9600 baud
• Parity	Even/odd
• No. of data bits/stop bits	8/1
• Signal level	In acc. with EIA-RS 232
• Protocols	SIWAREX protocol 3964R XON/XOFF (printer) 2)
Serial port 2	TTY:
• Baud rate	9600 baud
• Parity	straight
• No. of data bits/stop bits	8/1
• Signal level	Active/passive (floating)
• Protocols	Remote display protocol SIWAREX protocol 3964R

SIWAREX M	
Binary inputs	Number: 3 Rated voltage: 24 V Switching frequency: 10 Hz
Binary outputs	Number: 4 (digital) Rated voltage: 24 V Rated current: 0.5 A Total max.: 1 A Electrical isolation: 500 V
Analog output	
• Output range	0/4 ... 20 mA
• Total error at 25 °C	0.15 %
• Updating rate	Approx. 350 ms
• Resolution	16 bits (0 ... 20 mA)
• Burden including line resistance	≤ 600 Ω
Climatic requirements Tmin(IND) ... Tmax(IND) (operating temperature)	
• Vertical installation	-10 ... +60 °C
• Horizontal installation/ with verification capability	-10 ... +40 °C
MTBF (SN 29500)	172,000 h at +40 °C

2) Serial printer, ANSI-, EPSON-, IBM-compatible

Ordering data

	Order No.
SIWAREX M Medium accuracy weighing machine Class III, 6000 d, for the SIMATIC S7 and ET 200M, incl. bus connector, weight 0.6 kg Note: In the case of applications with obligation of verification, observe the conditions for approval! It is recommended to contact the SIWAREX hotline.	**7MH4 553-1AA41**
SIWAREX M Manual • German, English Free download on the Internet at: www.siemens.com/weighing-technology	
SIWAREX M configuration package for SIMATIC S5/S7 version 5.1 or higher in German and English on CD-ROM • SIWATOOL PC parameterization software • SIMATIC S7 function blocks • SIMATIC S5 function blocks • SIWAREX M Manual on CD • Setup for incorporation of SIWAREX M into STEP 7	**7MH4 583-3FA63**
SIWAREX M configuration package for PCS 7, version 5.2 in German and English on CD-ROM Block for the CFC and faceplate	**7MH4 583-3EA63**

	Order No.
SIWAREX M configuration package for PCS 7, version 6.x in German and English on CD-ROM Block for the CFC and faceplate	**7MH4 583-3EA64**
SIWAREX Batch Recipe control for proportioning processes with SIWAREX M modules • STEP 7 program for SIMATIC S7 (CPU 314 or better) • Example programs for GUI for OP7 and OP27 (configuration with ProTool) • Documentation in German and English	**7MH4 553-4GS01**
SIWAREX Batch secondary license Connection of SIWAREX M to serial PC interface	**7MH4 583-4KL01**
• for 9-pin PC interface, 2 m long	**7MH4 702-8CA**
• for 9-pin PC interface, 5 m long	**7MH4 702-8CB**
Installation material (mandatory)	
Front connector for SIWAREX M 20-pin, with screw contacts (required for each SIWAREX module)	**6ES7 392-1AJ00-0AA0**

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Ordering data (continued)

	Order No.
Shield contact element A shield contact element is sufficient for one SIWAREX M module	**6ES7 390-5AA00-0AA0**
Shield connection terminal Contents: 2 units (suitable for 1 cable with diameter 4 to 13 mm) **Note:** one shield connection terminal is required each for the • Scale connection • TTY interface • RS 232 interface • Analog output • Digital inputs/outputs	**6ES7 390-5CA00-0AA0**
S7 DIN rail	
• 160 mm	**6ES7 390-1AB60-0AA0**
• 480 mm	**6ES7 390-1AE80-0AA0**
• 530 mm	**6ES7 390-1AF30-0AA0**
• 830 mm	**6ES7 390-1AJ30-0AA0**
• 2000 mm	**6ES7 390-1BC00-0AA0**
Accessories (optional)	
PS 307 load power supplies 120/230 V AC; 24 V DC, incl. power connector	
PS 307-1B; 2 A	**6ES7 307-1BA00-0AA0**
PS 307-1E; 5 A	**6ES7 307-1EA00-0AA0**
PS 307-1K; 10 A	**6ES7 307-1KA00-0AA0**
Labeling strips (10 units, spare part)	**6ES7 392-2XX00-0AA0**
Cables and connectors (optional)	
Sub-D connector, 9-pin (female) Quantity: 1 unit, for PC interface (RS 232)	**6ES5 750-2AB11**
Sub-D connector, 9-pin (male) Quantity: 1 unit, for RS 232 interface of SIWAREX M	**6ES5 750-2AA11**
Sub-D connector, 15-pin (male) Quantity: 1 unit, for TTY interface of SIWAREX M	**6ES5 750-2AA21**
Sub-D connector, 25-pin (male) • Quantity: 1 unit, for printer interface (RS 232)	**6ES5 750-2AA31**
Sub-D connector, 25-pin (female) • Quantity: 1 unit, for PC interface (RS 232)	**6ES5 750-2AB31**

	Order No.
Remote displays (option)	
Remote displays The digital remote displays can be connected directly to SIWAREX M through a TTY interface. The following remote displays can be used: S102 and S302 Siebert Industrieelektronik GmbH P.O. Box 1180 D-66565 Eppelborn Tel.: +49 6806/980-0 Fax: +49 6806/980-999 Internet: http://www.siebert.de Detailed information available from manufacturer.	
Accessories for remote displays	
Legal-for-trade memory The OmniScale legal-for-trade memory can be connected to the SIWAREX M instead of the printer. There are 2 device versions: • for mounting rails - Horizontal, part number 522 201 - Vertical, part number 522 202 CSM GmbH Raiffeisenstr. 34 D-70794 Filderstadt Tel.: +49 711/77964-20 Fax: +49 711/77964-40 Internet: http://www.csm.de Detailed information available from manufacturer.	
Printers (optional)	
T 2240/24 printer Needle matrix printer, 24 needles, DIN A4 and continuous form **Note** An RS 232 interface must be ordered in addition.	**6GF6 520-1LM**
RS 232 interface for T 2240/24 See Catalog KT61 for further printers	**6GF6 520-2HA**
Printer accessories	
Connection of SIWAREX M to serial printer interface (RS 232, 25-pin) • 5 m long • 10 m long	**7MH4 702-8CH** **7MH4 702-8CK**
Accessories for SIWAREX M	
SIWAREX JB junction box, aluminium housing for connecting up to 4 load cells in parallel, and for connecting several junction boxes	**7MH4 710-1BA**
SIWAREX JB junction box, stainless steel housing for connecting up to 4 load cells in parallel	**7MH4 710-1EA**

SIWAREX M

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Ordering data (continued)

	Order No.
Ex interface, type SIWAREX Pi With UL and FM approvals, but **without ATEX approval**, for intrinsically-safe connection of load cells, suitable for the SIWAREX U, M, FTA, FTC, CS and P weighing modules. Use in the EC is not possible.	**7MH4 710-5AA**
Manual for Ex interface type SIWAREX Pi	**C71000-T5974-C29**
SIWAREX IS Ex interface With ATEX approval, but **without UL and FM approvals**, for intrinsically-safe connection of load cells, including Manual, suitable for the SIWAREX U, M, FTA, FTC, CS and P weighing modules. Use in the EC is possible.	
• With short-circuit current < 199 mA DC	**7MH4 710-5BA**
• With short-circuit current < 137 mA DC	**7MH4 710-5CA**

	Order No.
Cable (optional)	
Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, orange sheath to connect SIWAREX U, M, P, FTA, FTC, CS, MS and CF to the junction box (JB), extension box (EB) or Ex interface (Ex-I) or between two JBs, for fixed laying, occasional bending is possible, 10.8 mm outer diameter, for ambient temperature –40 to +80 °C	**7MH4 702-8AG**
Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, blue sheath to connect the junction box (JB) or extension box (EB) in a potentially explosive atmosphere to the Ex interface (Ex-I), for fixed laying, occasional bending is possible, blue PVC insulating sheath, approx. 10.8 mm outer diameter, for ambient temperature –40 to +80 °C	**7MH4 702-8AF**
Cable LiYCY 4 x 2 x 0.25 mm² A) for TTY (connect 2 pairs of conductors in parallel), for connection of a remote indicator	**7MH4 407-8BD0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

Overview

SIWAREX P weighing electronics

SIWAREX P is a weighing and force measuring system for simple tasks. It can be used for all kinds of industrial measurements. SIWAREX P has the design of the SIMATIC S5-100U programmable controllers and can be used as a stand-alone device or also integrated directly in a SIMATIC S5-90U, -95U or -100U programmable controller.

Note:

Bus module available as spare part.

Technical specifications

SIWAREX P	
Main applications	• Load measurement on cranes • Overload protection • Belt tensioning devices • Platform scales • Fill level (containers/bins)
Intrinsically-safe load cell powering	Optional (Ex-I)
Stand-alone (without SIMATIC)	Yes
Integration in:	
• S5-90/-95U/-100U	Direct integration
• S5-95U/DP (PROFIBUS master)	Through ET 200U
• S5-115U/-135U/-155U	Through ET 200U
• S7-300	Through ET 200U
• S7-400	Through ET 200U
• M7-300	Through ET 200U
• M7-400	Through ET 200U
• C7	Through ET 200U
Communication interfaces	SIMATIC S5 bus TTY
Process interfaces	
• Digital outputs	2 limits/fault
• Analog output/analog input	Yes / No
Remote display connection	Yes
(via serial interface)	Gross
Measuring properties	
Error limit according to DIN 1319-1 of full-scale value at 20 °C ± 10 K	0.1 %
Internal resolution	20.000
Data format for weight values	2 byte (fixed-point)
Number of measurements/second	10
Filter	0.0625 -2 Hz
Weighing functions	
• Weight values	Gross
• Limits	2 (min./max.)

SIWAREX P	
Integral display and operator panel	Yes
Module parameterization	Built-in LCD + Membrane keyboard
IP degree of protection to DIN 60 529; IEC 60 529	IP20
Load cell powering	
• Supply voltage U_s (rated value)	10 V ± 0.5 V DC
• Max. supply current	≤ 160 mA or ≤ 115 mA (Ex area)
• Permissible load resistance:	
- R_{Lmin}	> 60 Ω
- R_{Lmax}	< 4010 Ω
	With Ex(i) interface:
- R_{Lmin}	> 87 Ω
- R_{Lmax}	< 4010 Ω
Permissible load cell characteristic	Up to 3 mV/V
Permissible range of measuring signal (at greatest set characteristic)	0 to 33 mV
Max. distance of load cells	500 m (300 m in Ex area)
Supply voltage 24 V DC	
• Rated voltage	24 V DC
• Max. current consumption	300 mA
Serial port 1	TTY (serial 20 mA):
• Baud rate	9600 baud
• Parity	straight
• No. of data bits/stop bits	8/1
• Signal level	Passive, floating
• Protocols	3964R / RK512 (send only on request)
Binary outputs	Number: 2 (relay) Max. switching voltage: 120 V DC 50 V AC Max. current: 1 A (resistive load)

SIWAREX P

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Technical specifications (continued)

SIWAREX P	
Analog output	
• Output range	0/4 … 20 mA
• Total error at 25°C	0.45 %
• Updating rate	100 ms
• Resolution	10 bits (0 … 20 mA)
• Burden including line resistance	≤ 500 Ω

SIWAREX P	
Climatic requirements Tmin(IND) to Tmax(IND) (operating temperature)	0 … +55 °C in wall housing: 0 … +45 °C
EMC requirements according to	EN 50081-2 EN 50082-2

Ordering data

	Order No.
SIWAREX P	
• For stand-alone operation without SIMATIC	**7MH4 205-1AB01**
• For operation within a SIMATIC S5-90U/-95U/-100U and ET 200U programmable controller	**7MH4 205-1AC01**
SIWAREX P Manual • German, English Free download on the Internet at: www.siemens.com/weighing-technology	
Data handling block for communication between the SIWAREX P weighing and force measuring system and a SIMATIC S5-90U/-95U/-100U programmable controller, including description in German and English	**7MH4 811-5AP41**
Bus module Terminal block for screw connection (required for each SIWAREX P)	**6ES5 700-8MA11**
SITOP SMART 60W power supply for 115/230 V AC, 24 V DC; 2 A	**6EP1 332-2BA10**
Wall housing for max. two SIWAREX P weighing and force measuring systems and one PS931 power supply module	**7MH4 215-8AA**
S102 remote display The digital remote display can be connected directly to the SIWAREX P through the TTY interface. The following remote displays can be connected: **S102-05/25/0R-000/0B-TM** Siebert Industrieelektronik GmbH P.O. Box 1180 D-66565 Eppelborn Tel.: +49 6806/980-0 Fax: +49 6806/980-999 Internet: http://www.siebert.de Detailed information available from manufacturer.	
Accessories	
SIWAREX JB junction box, aluminium housing for connecting up to 4 load cells in parallel, and for connecting several junction boxes	**7MH4 710-1BA**
SIWAREX JB junction box, stainless steel housing for connecting up to 4 load cells in parallel	**7MH4 710-1EA**
Ex interface, type SIWAREX Pi With UL and FM approvals, but **without ATEX approval**, for intrinsically-safe connection of load cells, suitable for the SIWAREX U, M, FTA, FTC, CS and P weighing modules. Use in the EC is not possible.	**7MH4 710-5AA**
Manual for Ex interface type SIWAREX Pi	**C71000-T5974-C29**
SIWAREX IS Ex interface With ATEX approval, but **without UL and FM approvals**, for intrinsically-safe connection of load cells, including Manual, suitable for the SIWAREX U, M, FTA, FTC, CS and P weighing modules. Use in the EC is possible.	
• With short-circuit current < 199 mA DC	**7MH4 710-5BA**
• With short-circuit current < 137 mA DC	**7MH4 710-5CA**
Cable (optional)	
Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, orange sheath to connect SIWAREX U, M, P, FTA, FTC, CS, MS and CF to the junction box (JB), extension box (EB) or Ex interface (Ex-I) or between two JBs, for fixed laying, occasional bending is possible, 10.8 mm outer diameter, for ambient temperature –40 to +80 °C	**7MH4 702-8AG**
Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, blue sheath to connect the junction box (JB) or extension box (EB) in a potentially explosive atmosphere to the Ex interface (Ex-I), for fixed laying, occasional bending is possible, blue PVC insulating sheath, approx. 10.8 mm outer diameter, for ambient temperature –40 to +80 °C	**7MH4 702-8AF**
Cable LiYCY 4 x 2 x 0.25 mm² A) for TTY (connect 2 pairs of conductors in parallel), for connection of a remote indicator	**7MH4 407-8BD0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

Radio clock module SIPLUS DCF 77

Overview

The sychronisation of the real-time clock for the automation systems SIMATIC S7-200, S7-300 and S7-400 with the official time of day of the time signal transmitter DCF 77 of the Physikalisch-Technische Bundesanstalt Braunschweig is made by this module.

The time receipt occurs via a DCF transmitter (antenna with solid-state) which is connected to the the SIMATIC and SIPLUS PLC via two digital inputs and a software driver included in the scope of supply (function block FB).
The function blocks can be downloaded under:
http://www.siemens.com/siplus - Support - Tools & Downloads!

Technical specifications

Radio clock module SIPLUS DCF 77	
Radio frequency	77,5 Hz
Power supply	DC 24 V (DC 20,4 ... 28, 8)
Power consumption, typ.	50 mA
Dimensions (W x H x D)	75 x 125 [1] x 75

1) Additionally 25 mm (0.98 in) for heavy duty threaded joint and bending radius for cables

Ordering data

		Order No.
Radio clock module SIPLUS DCF 77 For sychronisation of SIMATIC S7-200, S7-300 and S7-400 with the official time of day of the time signal transmitter DCF 77 of the Physikalisch-Technische Bundesanstalt Braunschweig	A)	**6AG1 057-1AA03-0AA0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

IQ-Sense sensor module

Overview

- Intelligent 8-channel electronics module for S7-300/ET 200M
- For the connection of up to 8 IQ-Sense sensors:
  - Optoelectronic sensors
  - Ultrasound sensors
- With standard function blocks for the various sensor technologies for simplified handling on a SIMATIC S7
- Conventional sensors cannot be operated.

Technical specifications

	6ES7 338-7XF00-0AB0
Voltages and currents	
Load voltage L+	
• Rated value (DC)	24 V
Current consumption	
from load voltage L+ (without load), max.	1 A
from backplane bus DC 5 V, max.	150 mA; typically
Connection point	
required front connectors	20-pin
Digital inputs	
Number of digital inputs	8
Cable length	
• Cable length unshielded, max.	50 m
Encoder	
Connectable encoders	
• Description	photoelectronic proximity switches and ultrasonic sensors with IQ-Sense, cycle time 2.88 to 6 ms
Status information/ alarms/diagnostics	
Diagnostics indication LED	
• Status indicator digital input (green)	Yes
Isolation	
Isolation checked with	500 V DC
Isolation	
Galvanic isolation, digital inputs	
• between the channels	No
• between the channels and the backplane bus	Yes
Dimensions and weight	
Width	40 mm
Height	125 mm
Depth	120 mm
Weights	
Weight, approx.	250 g

Ordering data

	Order No.
8x IQ-Sense sensor module	**6ES7 338-7XF00-0AB0**
Sensors for connecting to the sensor module	
Diffuse sensors	
Model C40 IQ-Sense	**3SF7 240-3JQ00**
Model K80 IQ-Sense	**3SF7 210-3JQ00**
with background fading, model K80 IQ-Sense	**3SF7 214-3JQ00**
Diffuse barrier	
Model C40 IQ-Sense	**3SF7 241-3JQ00**
Model K80 IQ-Sense	**3SF7 211-3JQ00**
Ultrasound sensor	
Model M18 IQ-Sense; Range 6-30 cm	**3SF6 232-3JA00**
Model M18 IQ-Sense; Range 15-100 cm	**3SF6 233-3JA00**

Overview

Opto proximity switch with IQ-Sense, C40 design

Opto proximity switch with IQ-Sense, K80 design

The photoelectric proximity switches react to changes in the received quantity of light. The light beam emitted from the emitter diode is interrupted or reflected by the object to be detected.

These sensors detect all objects regardless of their composition, whether metal, wood or plastic.

Depending on the proximity switch type, the interruption or reflection of the light beam is evaluated. The following operating

- Diffuse sensors (energetic)
- Diffuse sensors with background suppression
- Retroreflective sensors.

Features:

- C 40 IQ Sense and K 80 IQ Sense forms
- IntelliTeach functionality
- Integral anti-interference function
- Advanced failure signal (contamination/maladjustment)

Technical specifications

Design		C40 IQ-Sense	K80 IQ-Sense
Diffuse sensor (energetic sensor)			
Sensing range	m	0.7	2
Standard target	mm	200 × 200 (white)	
Emitter (type of light)	nm	660 (red LED)	880 (IR LED)
Current input	mA	50	
Response time	ms	1	
LEDs		Switching display (yellow), surplus light (green)	
Enclosure material		ABS + PBTP	PBTP
Degree of protection		IP67	
Dimensions	mm	40 × 40 × 53	83 × 65 × 25
Diffuse sensor with background suppression			
Sensing range	m	–	0.2 ... 1
Standard target	mm	–	200 × 200 (white)
Emitter (type of light)	nm	–	880 (IR LED)
Current input	mA	–	50
Response time	ms	–	2
LEDs		–	Switching display (yellow), surplus light (green)
Enclosure material		–	PBTP
Degree of protection		–	IP67
Dimensions	mm	–	83 × 65 × 25

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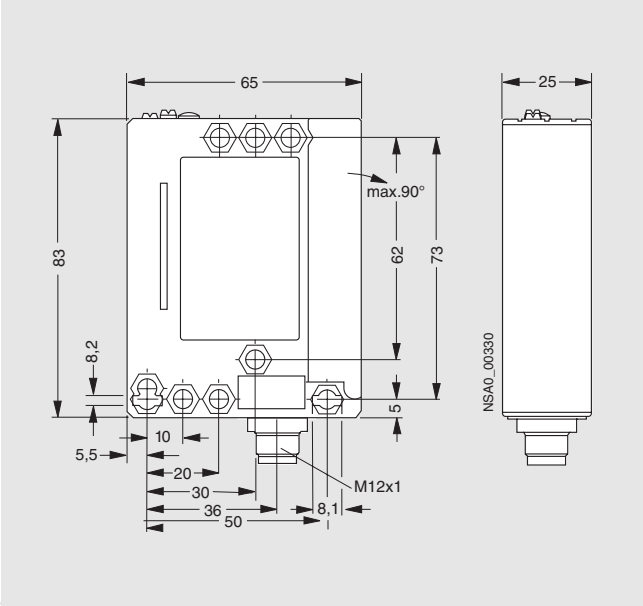
Technical specifications (continued)

Design		C40 IQ-Sense	K80 IQ-Sense
Retroreflective sensor			
Sensing range	m	6	8
Reflector		Type D84, 3RX7916	
Emitter (type of light)	nm	660 (red LED, polarized)	
Current input	mA	50	
Response time	ms	1	
LEDs		Switching display (yellow), surplus light (green)	
Enclosure material		ABS + PBTP	PBTP
Degree of protection		IP67	
Dimensions	mm	40 × 40 × 53	83 × 65 × 25

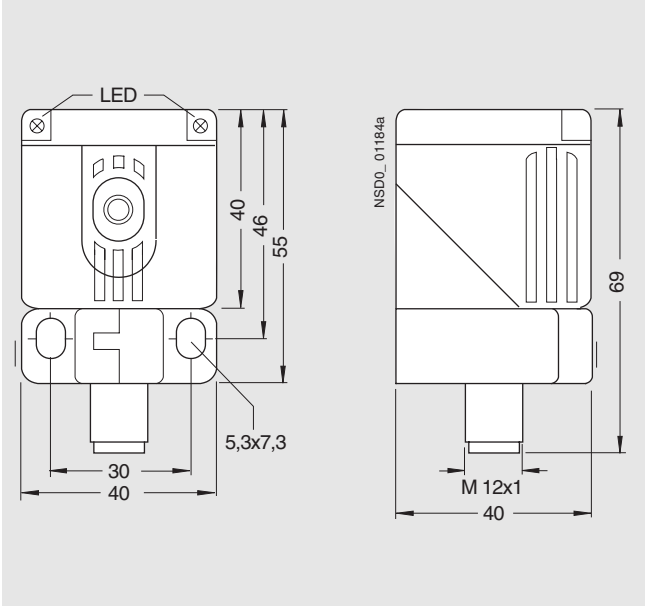
Selection and ordering data

Version	Design	Type	Order No.
Opto proximity switches for connection to the 4 IQ Sense sensor module	C40 IQ-Sense	Diffuse sensor	**3SF7 240-3JQ00**
		Retroreflective sensor	**3SF7 241-3JQ00**
	K80 IQ-Sense	Diffuse sensor	**3SF7 210-3JQ00**
		Diffuse sensor with background suppression	**3SF7 214-3JQ00**
		Retroreflective sensor	**3SF7 211-3JQ00**

Dimension drawings



Opto proximity switch with IQ-Sense, K80 design



Opto proximity switch with IQ-Sense, C40 design

Overview

The communications-capable sonar proximity switches of the M18 IQ compact range are all-in-one units ready for connection, and have a cylindrical M 18 enclosure for connection to the S7-300/ET 200M IQ Sense module SM338, 8×IQ Sense

- 5 operating modes
  - Operation as a measuring sensor ("Analog signal"),
  - Diffuse sensor with background suppression,
  - Diffuse sensor with large differential travel,
  - Diffuse sensor with foreground and background suppression,
  - Retroreflective sensor.
- Static setting of parameters using STEP 7
- Dynamic setting of parameters using an S7 function block
- Measured distance from object is always transmitted
- Synchronization capability, multiplex operation
- Temperature compensation
- Connection through M12 connector
- Non-polarized two-wire system (protected against polarity
- reversal)
- Channel-specific system diagnostics (e.g. wire break, short-circuit, parameterization faults).

Technical specifications

Type		3SF62 32-3JA00	3SF62 33-3JA00
Sensing range			
• Rated value	cm	5 ... 30	15 ... 100
• Maximum value	cm	5 ... 50	15 ... 150
Standard target	mm	10 × 10	20 × 20
Differential travel H (adjustable)	mm	3 ... 30	10 ... 100
Repeat accuracy *R*	mm	1	2
Operational voltage (DC)		From IQ-Sense	
Rated operating current I_e		From IQ-Sense	
LNo-load supply current I_0		From IQ-Sense	
Adjustment/parameterization		Start and end of the switching range using IQ Sense (IntelliTeach) or local teach-in using potentiometer	

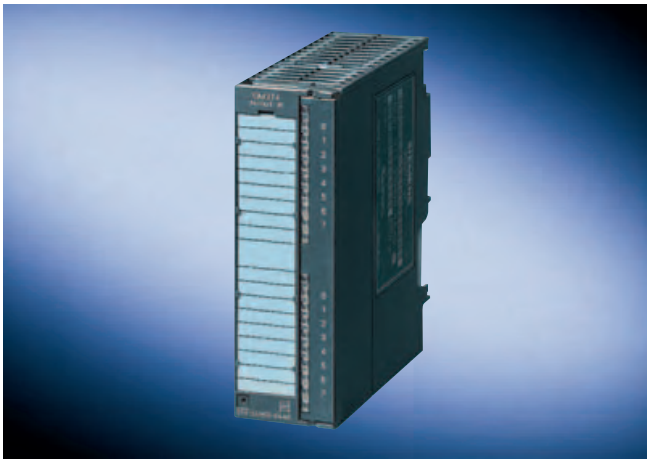
Type		3SF62 32-3JA00	3SF62 33-3JA00
Ultrasonic frequency	kHz	400	200
Switching frequency *f*	Hz	8	4
Response time	ms	54	110
Measuring time	ms	13.44	26.88
Status display		LED gelb	
Enclosure material		Brass, nickel-plated, CRASTIN converter cover; epoxy resin converter surface	
Degree of protection		IP67	
Ambient temperature			
• Operation	°C	–25 ... +70	
• Storage	°C	–40 ... +85	

Selection and ordering data

Version	Design	Sensing range	Order No.
Sonar proximity switches for connection to IQ Sense	M18 IQ-Sense	5 ... 30 cm	**3SF62 32–3JA00**
		15 ... 100 cm	**3SF62 33–3JA00**

Simulator SM 374

Overview



- Simulator module for testing programs during startup and operation
- For simulation of sensor signals using switches
- For indicating signal statuses at the outputs using LEDs

Technical specifications

	6ES7 374-2XH01-0AA0
Current consumption	
from backplane bus DC 5 V, max.	80 mA
Power loss, typ.	0.35 W
Digital inputs	
Number of digital inputs	16; Switch
Digital outputs	
Number of digital outputs	16; LEDs
Isolation	
Isolation, digital outputs	
• between the channels and the backplane bus	No

	6ES7 374-2XH01-0AA0
Galvanic isolation, digital inputs	
• between the channels and the backplane bus	No
Dimensions and weight	
Width	40 mm
Height	125 mm
Depth	120 mm
Weights	
Weight, approx.	190 g

Ordering data

		Order No.
SM 374 simulator module	A)	**6ES7 374-2XH01-0AA0**
Including bus connector and labeling strip		
Bus connector		**6ES7 390-0AA00-0AA0**
1 unit (spare part)		
Labeling strip		**6ES7 392-2XX00-0AA0**
10 units (spare part)		
S7-SmartLabel		**2XV9 450-1SL01-0YX0**
Software for machine labeling of modules directly from the STEP 7 project		

	Order No.
Labeling sheets for machine labeling	
for 16-channel signal modules, DIN A4, for printing using laser printer; 10 units	
• Petrol	**6ES7 392-2AX00-0AA0**
• Light beige	**6ES7 392-2BX00-0AA0**
• Yellow	**6ES7 392-2CX00-0AA0**
• Red	**6ES7 392-2DX00-0AA0**
Label cover	**6ES7 392-2XY00-0AA0**
10 units (spare part)	

A) Subject to export regulations: AL: N and ECCN: EAR99H

Overview

- Dummy module for reserving slots for non-parameterized signal modules
- Structure and address allocation is retained when replaced with a signal module

Technical specifications

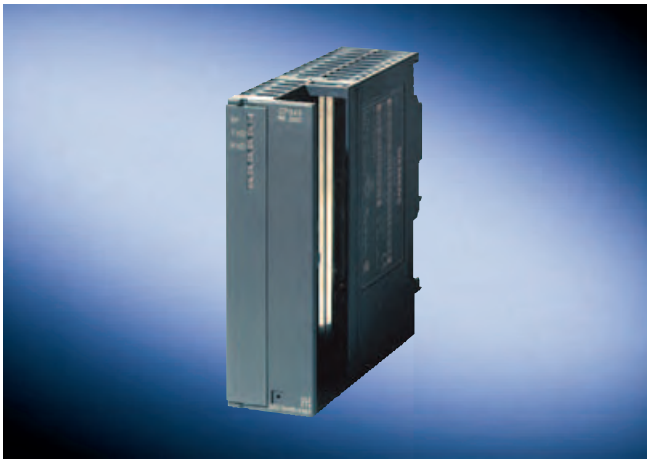
	6ES7 370-0AA01-0AA0
Current consumption	
from backplane bus DC 5 V, max.	5 mA
Power loss, max.	0.03 W
Dimensions and weight	
Width	40 mm
Height	125 mm
Depth	120 mm
Weights	
Weight, approx.	180 g

Ordering data

	Order No.
DM 370 dummy module	**6ES7 370-0AA01-0AA0**
Including bus connector and labeling strip	
Bus connector	**6ES7 390-0AA00-0AA0**
1 unit (spare part)	
Labeling strip	**6ES7 392-2XX00-0AA0**
10 units (spare part)	
S7-SmartLabel	**2XV9 450-1SL01-0YX0**
Software for machine labeling of modules directly from the STEP 7 project	
Labeling sheets for machine labeling	
for 16-channel signal modules, DIN A4, for printing using laser printer; 10 units	
Petrol	**6ES7 392-2AX00-0AA0**
Light beige	**6ES7 392-2BX00-0AA0**
Yellow	**6ES7 392-2CX00-0AA0**
Red	**6ES7 392-2DX00-0AA0**
Label cover	**6ES7 392-2XY00-0AA0**
10 units (spare part)	

CP 340

Overview



- The economical complete solution for serial communication via point-to-point links.
- 3 versions with different transmission interfaces:
  - RS 232C (V.24)
  - 20 mA (TTY)
  - RS 422/RS 485 (X.27)
- Implemented protocols:
  - ASCII
  - 3964 (R) (not for RS 485)
  - Printer driver
- Simple parameterization via a parameterization tool integrated into STEP 7

Technical specifications

	6ES7 340-1AH02-0AE0	6ES7 340-1BH02-0AE0	6ES7 340-1CH02-0AE0
Supply voltages			
Rated value			
• DC 24 V	No; Power supply via backplane bus 5V	No; Power supply via backplane bus 5V	No; Power supply via backplane bus 5V
Current consumption			
from backplane bus DC 5 V, max.	165 mA	190 mA	165 mA
Power loss, max.	0.85 W	0.95 W	0.85 W
Power loss, typ.	0.6 W	0.85 W	0.6 W
Interfaces			
Number of interfaces	1; electrically isolated	1; electrically isolated	1; electrically isolated
interface physics, 20mA (TTY)		Yes	
interface physics, RS 232C (V.24)	Yes		
interface physics, RS 422/RS 485 (X.27)			Yes
Transmission speed, max.	19.2 kBit/s	19.2 kBit/s	19.2 kBit/s
Transmission speed, min.	2.4 kBit/s	2.4 kBit/s	2.4 kBit/s
Connection point			
PtP	9-pin. D-sub male connector	9-pin D-sub female connector	15-pin D-sub female connector
Voltage supply	over backplane bus	over backplane bus	over backplane bus
Point-to-point			
Cable length, max.	15 m	1,000 m; (100 m active, 1000 m passive)	1,200 m
supported printers	HP-Deskjet, HP-Laserjet, IBM-Proprinter, user-defined	HP-Deskjet, HP-Laserjet, IBM-Proprinter, user-defined	HP-Deskjet, HP-Laserjet, IBM-Proprinter, user-defined
Integrated protocol driver			
• 3964 (R)	Yes	Yes	Yes
• ASCII	Yes	Yes	Yes
• customer-specific drivers reloadable	No	No	No
• RK512	No	No	No
Telegram length, max.			
• 3964 (R)	1,024 Byte	1,024 Byte	1,024 Byte
• ASCII	1,024 Byte	1,024 Byte	1,024 Byte

4

Technical specifications (continued)

	6ES7 340-1AH02-0AE0	6ES7 340-1BH02-0AE0	6ES7 340-1CH02-0AE0
Transmission speed, 20 mA (TTY)			
• with 3964 (R) protocol, max.		19.2 kBit/s	
• with ASCII protocol, max.		9.6 kBit/s	
• with printer driver, max.,		9.6 kBit/s	
Transmission speed, RS 422/485			
• with 3964 (R) protocol, max.			19.2 kBit/s
• with ASCII protocol, max.			9.6 kBit/s
• with printer driver, max.			9.6 kBit/s
Transmission speed, RS232			
• with 3964 (R) protocol, max.	19.2 kBit/s		
• with ASCII protocol, max.	9.6 kBit/s		
• with printer driver, max.,	9.6 kBit/s		
Software			
Block			
• FB length in RAM, max.	2,700 Byte; Data communication, sending and receiving	2,700 Byte; Data communication, sending and receiving	2,700 Byte; Data communication, sending and receiving
Dimensions and weight			
Width	40 mm	40 mm	40 mm
Height	125 mm	125 mm	125 mm
Depth	120 mm	120 mm	120 mm
Weights			
Weight, approx.	300 g	300 g	300 g

Ordering data

	Order No.
CP 340 communications module	**6ES7 340-1AH02-0AE0**
With one RS 232 C (V.24) interface	
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 340 communications module	**6ES7 340-1BH02-0AE0**
With one 20 mA (TTY) interface	

	Order No.
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 340 communications module	**6ES7 340-1CH02-0AE0**
With one RS 422/485 (X.27) interface	
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**

SIPLUS CP 340

Overview

- The economical complete solution for serial communications via point-to-point links
- RS 232C (V.24) and RS 422/485 (X.27)
- Implemented protocols:
  - ASCII,
  - 3964 (R) (not for RS 485)
  - Printer driverr
- Simple parameterization by means of a parameterization tool integrated in STEP7

SIPLUS CP 340 version	RS 422/485 (X.27)	RS 232 (V.24)
Order No.	**6AG1 340-1CH02-2AE0**	**6AG1 340-1AH02-2AE0**
Order No. based on	**6ES7 340-1CH02-0AE0**	**6ES7 340-1AH02-0AE0**
Ambient temperature range	-25 °C to +60 °C, condensation permissible	
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).	
Technical data	The technical data are identical with the technical data of the based on modules.	

Ordering data

	Order No.
SIPLUS CP 340 communications processor (extended temperature range and medial load) With one RS 232 C (V.24) interface	**6AG1 340-1AH02-2AE0**
SIPLUS CP 340 communications processor (extended temperature range and medial load) With one RS 422/485 (X.27) interface	**6AG1 340-1CH02-2AE0**
Accessories	see CP 340, page 4/203

Overview

- For powerful, high-speed serial communication via point-to-point links
- 3 versions with different physical properties:
  - RS 232C (V.24)
  - 20 mA (TTY),
  - RS 422/RS 485 (X.27)
- Implemented protocols: ASCII, 3964 (R), RK 512, customer-specific protocols (reloadable)
- Simple parameterization via a parameterization tool integrated into STEP 7

Technical specifications

	6ES7 341-1AH01-0AE0	6ES7 341-1BH01-0AE0	6ES7 341-1CH01-0AE0
Supply voltages			
Rated value			
• DC 24 V	Yes	Yes	Yes
Current consumption			
from backplane bus DC 5 V, max.	70 mA	70 mA	70 mA
from supply voltage L+, max.	200 mA	200 mA	240 mA
Power loss, max.	4.8 W	4.8 W	5.8 W
interfaces			
Number of interfaces	1; electrically isolated	1; electrically isolated	1; electrically isolated
interface physics, 20mA (TTY)		Yes	
interface physics, RS 232C (V.24)	Yes		
interface physics, RS 422/RS 485 (X.27)			Yes
Transmission speed, max.	76.8 kBit/s	19.2 kBit/s	76.8 kBit/s
Transmission speed, min.	0.3 kBit/s	0.3 kBit/s	0.3 kBit/s
Connection point			
PtP	9-pin Sub-D connector	9-pin Sub-D connector	15-pin sub-D connector
Voltage supply	3 screw terminals: L+, M, GND	3 screw terminals: L+, M, GND	3 screw terminals: L+, M, GND
Point-to-point			
Cable length, max.	15 m	1,000 m	1,200 m
Integrated protocol driver			
• 3964 (R)	Yes	Yes	Yes; not with RS 485
• ASCII	Yes	Yes	Yes
• customer-specific drivers reloadable	Yes	Yes	Yes
• RK512	Yes	Yes	Yes; not with RS 485
Telegram length, max.			
• 3964 (R)	1,024 Byte	1,024 Byte	1,024 Byte
• ASCII	1,024 Byte	1,024 Byte	1,024 Byte
• RK 512	1,024 Byte	1,024 Byte	1,024 Byte

Technical specifications (continued)

	6ES7 341-1AH01-0AE0	6ES7 341-1BH01-0AE0	6ES7 341-1CH01-0AE0
Transmission speed, 20 mA (TTY)			
• with 3964 (R) protocol, max.		76.8 kBit/s	
• with ASCII protocol, max.		76.8 kBit/s; 0.3; 0.6; 1.2; 2.4; 4.8; 9.6; 19.2; 38.4; 57.6 and 76.8 kbps (76.8 kbps only achievable with half duplex)	
• with RK 512 protocol, max.		76.8 kBit/s	
Transmission speed, RS 422/485			
• with 3964 (R) protocol, max.			76.8 kBit/s
• with ASCII protocol, max.			76.8 kBit/s; 0.3; 0.6; 1.2; 2.4; 4.8; 9.6; 19.2; 38.4; 57.6 and 76.8 kbps (76.8 kbps only achievable with half duplex)
• with RK 512 protocol, max.			76.8 kBit/s
Transmission speed, RS232			
• with 3964 (R) protocol, max.	76.8 kBit/s		
• with ASCII protocol, max.	76.8 kBit/s; 0.3; 0.6; 1.2; 2.4; 4.8; 9.6; 19.2; 38.4; 57.6 and 76.8 kbps (76.8 kbps only achievable with half duplex)		
• with RK 512 protocol, max.	76.8 kBit/s		
Software			
Block			
• FB length in RAM, max.	5,500 Byte; Data communication, sending and receiving	5,500 Byte; Data communication, sending and receiving	5,500 Byte; Data communication, sending and receiving
Dimensions and weight			
Width	40 mm	40 mm	40 mm
Height	125 mm	125 mm	125 mm
Depth	120 mm	120 mm	120 mm
Weights			
Weight, approx.	300 g	300 g	300 g

Ordering data

	Order No.
CP 341 communications module	**6ES7 341-1AH01-0AE0**
With one RS 232 C (V.24) interface	
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 module	**6ES7 341-1BH01-0AE0**
With one 20 mA (TTY) interface	
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 module	**6ES7 341-1CH01-0AE0**
With one RS 422/485 (X.27) interface	
RS 422/485 connecting cable	
For linking to SIMATIC S7	
5 m	**6ES7 902-3AB00-0AA0**
10 m	**6ES7 902-3AC00-0AA0**
50 m	**6ES7 902-3AG00-0AA0**
Loadable drivers for CP 341	
MODBUS master (RTU format)	
• Single license	**6ES7 870-1AA01-0YA0**
• Single license, without software or documentation	**6ES7 870-1AA01-0YA1**
MODBUS slave (RTU format)	
• Single license	**6ES7 870-1AB01-0YA0**
• Single license, without software or documentation	**6ES7 870-1AB01-0YA1**
Data highway (DF1 protocol)	
• Single license	**6ES7 870-1AE00-0YA0**
• Single license, without software or documentation	**6ES7 870-1AE00-0YA1**

Overview

- For powerful, high-speed serial communication via point-to-point links
- 3 versions with different physical properties:
  - RS 232C (V.24)
  - 20 mA (TTY),
- RS 422/RS 485 (X.27)
- Implemented protocols: ASCII, 3964 (R), RK 512, customer-specific protocols (reloadable)
- Simple parameterization via a parameterization tool integrated into STEP 7

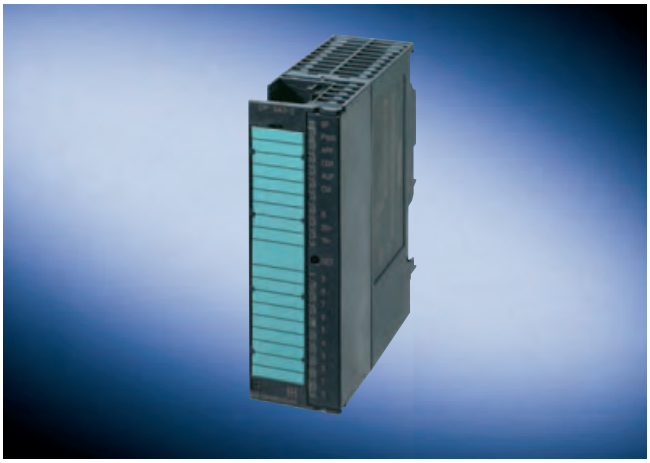
SIPLUS CP 341 version	**RS 422/485 (X.27)**
Order No.	**6AG1 341-1CH01-2AE0**
Order No. based on	**6ES7 341-1CH01-0AE0**
Ambient temperature range	-25 °C to +60 °C, condensation permissible
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).
Technical data	The technical data are identical with the technical data of the based on modules.

Ordering data

	Order No.
SIPLUS CP 341 communications module (extended temperature range and medial load) With one RS 422/485 (X.27) interface	**6AG1 341-1CH01-2AE0**
Accessories	see CP 341, page 4/206

CP 343-2

Overview



The CP 343-2 is the AS-Interface master for the SIMATIC S7-300 programmable controller and the ET 200 M distributed I/O station. The functions of the communications processor are as follows:

- Up to 62 AS-Interface slaves can be connected and integrated analog value transfer (according to the extended AS-Interface specification V2.1)
- Supports all AS-Interface master functions in accordance with the extended AS-Interface specification V2.1
- Status displays for operating states and display of the functional readiness of connected slaves with LEDs in the front panel
- Indication of errors (incl. AS-Interface voltage errors, configuration errors) with LEDs in the front panel
- Compact enclosure designed to match the SIMATIC S7-300

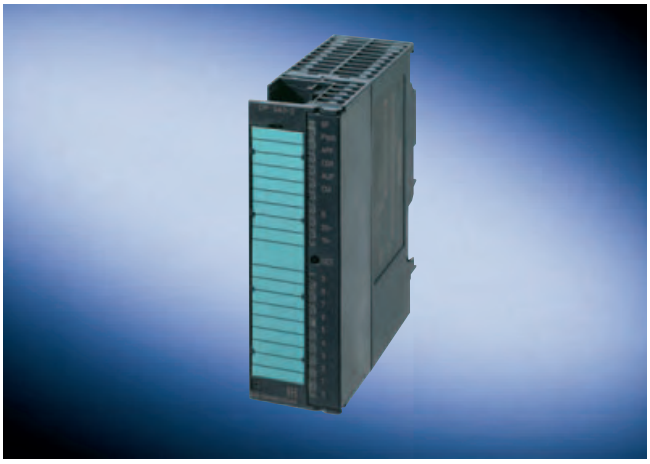
Technical specifications

	CP 343-2
AS-Interface Specification	V 2.1
Bus cycle time	5 ms for 31 slaves 10 ms for 62 slaves
Interfaces	
• Assignment of analog address space in the PLC	16 byte I/O and P-bus S7-300
• AS-Interface connection	S7-300 front connector with terminal
Supply voltage	+5 V DC through backplane bus
Current consumption	
• Through backplane bus	Typ. 200 mA at 5 V DC
• Through AS-Interface from the AS-Interface shaped cables	Max. 100 mA
Power loss	2 W
Perm. environmental conditions	
• Operating temperature	0°C to +60°C
• Transport/storage temperature	-40 °C to +70 °C
• Relative humidity, max.	95% at +25 °C
Design	
• Module format	S7-300 design
• Dimensions (W x H x D) in mm	40 x 125 x 120
• Weight	Approx. 190 g
• Space required	1 slot

Ordering data

	Order No.
CP 343-2 communications processor For connection of SIMATIC S7-300 and ET 200M to the AS-Interface; without front connector	**6GK7 343-2AH00-0XA0**
Front connector 20-pin, with screw contacts	**6ES7 392-1AJ00-0AA0**
CP 343-2 and CP 343-2 P manual including software (FC) and examples paper version	
• German	**6GK7 343-2AH00-8AA0**
• English	**6GK7 343-2AH00-8BA0**
• French	**6GK7 343-2AH00-8CA0**
• Spanish	**6GK7 343-2AH00-8DA0**
• Italian	**6GK7 343-2AH00-8EA0**
Electronic manuals Communication systems, logs, products on CD-ROM German/English	**6GK1 975-1AA00-3AA0**

Overview



The CP 343-2 P is the AS-Interface master for the SIMATIC S7-300 programmable controller and the ET 200M distributed I/O station. The functions of the communications processor are as follows:

- **It supports configuration of the AS-Interface network with STEP 7 V5.2 and higher**
- Up to 62 AS-Interface slaves can be connected and integrated analog value transfer (according to the extended AS-Interface specification V2.1)
- Supports all AS-Interface master functions in accordance with the extended AS-Interface specification V2.1
- Indication of errors (incl. AS-Interface voltage errors, configuration errors) with LEDs in the front plate
- Compact enclosure designed to match the SIMATIC S7-300

Technical specifications

	CP 343-2 P
AS-Interface specification	V 2.1
Bus cycle time	5 ms for 31 slaves 10 ms for 62 slaves
Interfaces	
• Allocation of analog address space in the PLC	16 byte I/O and P-Bus S7-300
• AS-Interface connection	S7-300 front connector with terminal connection
Supply voltage	+5 V DC via backplane bus
Current consumption	
• Through backplane bus	Typ. 200 mA for 5 V DC
• Via AS-Interface from the AS-Interface shaped cables	max. 100 mA
Power loss	2 W
Perm. ambient conditions	
• Operating temperature	0 °C … +60 °C
• Transport/storage temperature	-40 °C … +70 °C
• Relative humidity, max.	95% at +25 °C
Construction	
• Module format	S7-300 construction
• Dimensions (W x H x D) in mm	40 x 125 x 120
• Weight	approx. 190 g
• Space requirements	1 slot
Configuring software	Optional: STEP 7 V5.2 and higher

Ordering data

	Order No.
CP 343-2 P communications processor For connection of SIMATIC S7-300 and ET 200M to the AS-Interface; without front connector	**6GK7 343-2AH10-0XA0**
Front connector 20-pin, with screw contacts	**6ES7 392-1AJ00-0AA0**
CP 343-2 and CP 343-2 P manual including software (FC) and examples paper version	
• German	**6GK7 343-2AH00-8AA0**
• English	**6GK7 343-2AH00-8BA0**
• French	**6GK7 343-2AH00-8CA0**
• Spanish	**6GK7 343-2AH00-8DA0**
• Italian	**6GK7 343-2AH00-8EA0**
Electronic manuals Communication systems, logs, products on CD-ROM German/English	**6GK1 975-1AA00-3AA0**

CP 342-5

Overview

DP-M	DP-S	PG	S7	S5	FMS
■	■	■	■	■	

- PROFIBUS DP master or slave with electrical interface for connecting the SIMATIC S7-300 and the SIMATIC C7 to PROFIBUS at up to 12 Mbit/s (including 45.45 kbit/s)
- Communication services:
  - PROFIBUS DP-V0
  - PG/OP communication (OP multiplexing)
  - S7 communication (client, server)
  - S5-compatible communication (SEND/RECEIVE)
- Easy configuration and programming over PROFIBUS
- Cross-network programming device communication through S7 routing
- Modules can be replaced without the need for a PG

Technical specifications

	CP 342-5
Data transmission rate	9.6 Kbps to 12 Mbps
Interfaces	
• Connection to PROFIBUS	9-pin Sub-D socket (RS 485)
• Connection to supply voltage	4-pin terminal block
Voltage supply	24 V DC
Current consumption	
• from the backplane bus	150 mA
• from 24 V	250 mA
Power loss	6.75 W
Perm. ambient conditions	
• Operating temperature	0 °C … +60 °C
• Transport/storage temperature	-40 °C … +70 °C
• Relative humidity	max. 95% at +25°C
Construction	
• Module format	Compact module
• Dimensions (W x H x D) in mm	40 x 125 x 120
• Weight	Approx. 300 g
Number of CPs per S7-300	4
Performance data	
S7 communication	
• Number of connections that can be used	max. 16

	CP 342-5
S5-compatible communication (SEND/RECEIVE)	
• Number of connections that can be used	max. 16
• Useful data / connection	max. 240 byte (SEND and RECEIVE)
Multi-protocol operation	
• Number of connections that can be used	max. 32 (without DP); max. 28 (with DP)
• Volume of DP data per connected DP slave	max. 240 byte
DP master function	
• DP master	DP-V0
• Number of operable DP slaves	124
• Size of DP data areas overall	
- DP input area	2160 byte
- DP output range	2160 byte
• Size of DP data areas per connected slave	
- DP input area	244 byte
- DP output range	244 byte
DP slave function	
• DP slave	DP-V0
• Size of DP data areas overall	
- DP input area	240 byte
- DP output range	240 byte
PG/OP communication	
• Number of operable OP connections (acyclic services)	16

Ordering data	Order No.
CP 342-5 communications processor Communications processor for electrical connection of SIMATIC S7-300 to PROFIBUS to 12 Mbit/s with electronic manual on CD-ROM	**6GK7 342-5DA02-0XE0**
NCM S7 configuration software for PROFIBUS Configuration software for PROFIBUS CPs for SIMATIC S7	Delivered with STEP 7 Version 5
• V5.1 and newer executable under STEP 7 V5.1; with electronic manual on CD-ROM English, French, German, Italian and Spanish	
"NCM S7 for PROFIBUS" manual Paper version for V5.x (STEP 7 V5.x)	
• German	**6GK7 080-5AA04-8AA0**
• English	**6GK7 080-5AA04-8BA0**
• French	**6GK7 080-5AA04-8CA0**
• Spanish	**6GK7 080-5AA04-8DA0**
• Italian	**6GK7 080-5AA04-8EA0**

	Order No.
PROFIBUS FastConnect RS 485 bus connector With 90° cable outlet; With insulation displacement method, max. data transmission rate 12 Mbit/s	
• without PG interface	**6ES7 972-0BA50-0XA0**
• with PG interface	**6ES7 972-0BB50-0XA0**
PROFIBUS bus connector IP20 For connection to PPI, MPI, PROFIBUS	
• without PG interface	**6ES7 972-0BA12-0XA0**
• with PG interface	**6ES7 972-0BB12-0XA0**
PROFIBUS 12M bus terminal Bus terminal for connecting PROFIBUS stations up to 12 Mbit/s with connecting cable	**6GK1 500-0AA10**
SIMATIC S7-300 DM 370 Dummy module; used during module replacement	**6ES7 370-0AA01-0AA0**
"Communication with SIMATIC" manual	
• German	**6ES7 398-8EA00-8AA0**
• English	**6ES7 398-8EA00-8BA0**
• French	**6ES7 398-8EA00-8CA0**
• Spanish	**6ES7 398-8EA00-8DA0**
• Italian	**6ES7 398-8EA00-8EA0**

CP 342-5 FO

Overview

DP-M	DP-S	PG	S7	S5	FMS
■	■	■	■	■	

- PROFIBUS DP master or slave with optical interface for connecting the SIMATIC S7-300 and the SIMATIC C7 to PROFIBUS at up to 12 Mbit/s (including 45.45 kbit/s)
- Direct connection to the optical PROFIBUS network over the integrated fiber-optic interface for plastic and PCF fiber-optic cables
- Communication services:
  - PROFIBUS DP-V0
  - PG/OP communication (OP multiplexing)
  - S7 communication (client, server)
  - S5-compatible communication (SEND/RECEIVE)
- Easy configuration and programming over PROFIBUS
- Cross-network programming device communication through S7 routing
- Modules can be replaced without the need for a PG

Technical specifications

	CP 342-5 FO
Data transmission rates	9.6 kbit/s to 12 Mbit/s (exception: 3 and 6 Mbit/s)
Interfaces	
• Connection to PROFIBUS	2 x duplex socket
• Connection to supply voltage	4-pin terminal block
Voltage supply	24 V DC
Current consumption	
• from the backplane bus	150 mA
• from 24 V DC	250 mA
Power loss	6.75 W
Maximum distance between two neighboring stations	
• Plastic fiber optic cables	max. 50 m
• PCF fiber optic cable	max. 300 m
Perm. ambient conditions	
• Operating temperature	0 °C … +60 °C
• Transport/storage temperature	-40 °C … +70 °C
• Relative humidity	max. 95% at +25°C
Construction	
• Module format	Compact module
• Dimensions (W x H x D) in mm	40 x 125 x 120
• Weight	approx. 300 g
• Number of CPs per S7-300	4
Performance data	
S7 communication	
• Number of connections that can be used	max. 16

	CP 342-5 FO
S5-compatible communication (SEND/RECEIVE)	
• Number of connections that can be used	max. 16
• Useful data / connection	max. 240 byte (Send and Receive)
Multi-protocol operation	
• Number of connections that can be used	32 (without DP); max. 28 (with DP)
DP master function	
• DP master	DP-V0
• Number of operable DP slaves	124
• Size of DP data areas overall	
- DP input area	2160 byte
- DP output range	2160 byte
• Size of DP data areas per connected slave	
- DP input area	244 byte
- DP output range	244 byte
• Volume of DP data per connected DP slave	Max. 240 byte
DP slave function	
• DP slave	DP-V0
• Size of DP data areas overall	
- DP input area	240 byte
- DP output range	240 byte
PG/OP communication	
• Number of operable OP connections (acyclic services)	16

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Ordering data	Order No.
CP 342-5 FO communications processor Communication processor for optical connection of SIMATIC S7-300 to PROFIBUS to 12 Mbit/s with electronic manual on CD-ROM	**6GK7 342-5DF00-0XE0**
Configuring software NCM S7 for PROFIBUS Configuring software for PROFIBUS-CPs for SIMATIC S7 from V5.1, runs under STEP 7 V5.1; including Service Pack 3; with electronic manual on CD-ROM, German, English, French, Spanish, Italian	Delivered with STEP 7 Version 5
Manual NCM S7 for PROFIBUS Paper version for V5.x (STEP 7 V5.x)	
• German	**6GK7 080-5AA04-8AA0**
• English	**6GK7 080-5AA04-8BA0**
• French	**6GK7 080-5AA04-8CA0**
• Spanish	**6GK7 080-5AA04-8DA0**
• Italian	**6GK7 080-5AA04-8EA0**

	Order No.
Manual for PROFIBUS networks Paper version Network architecture, components (OLM (V3), OBT, ILM), configuring and installation	
• German	**6GK1 970-5CA20-0AA0**
• English	**6GK1 970-5CA20-0AA1**
PROFIBUS Plastic Fiber Optic, Simplex Connector/Polishing Set A) 100 simplex connectors and 5 polishing sets for assembling PROFIBUS plastic fiber optic cables for the optical PROFIBUS DP	**6GK1 901-0FB00-0AA0**
PROFIBUS Plastic Fiber Optic, Stripping Tool Set A) Tools for removing the outer sheath or core sheath of Plastic Fiber Optic cables	**6GK1 905-6PA10**
Plug-in adapter For assembling the plastic Simplex connector in combination with CP 342-5 FO, IM 467 FO, IM 153-2 FO and IM 151 FO 50 units	**6ES7 195-1BE00-0XA0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

CP 343-5

Overview

DP-M	DP-S	PG	S7	S5	FMS
		■	■	■	■

Connection of SIMATIC S7-300 and SIMATIC C7 to PROFIBUS at up to 12 Mbit/s (including 45.45 kbit/s)

- Communication services:
  - PG/OP communication
  - S7 communication
  - S5-compatible communication (SEND/RECEIVE)
  - PROFIBUS FMS
- Easy configuration and programming over PROFIBUS
- Can be easily integrated into the S7-300 system
- Cross-network programming device communication through S7 routing
- Modules can be replaced without the need for a PG

Technical specifications

	CP 343-5
Data transmission rate	9.6 Kbps to 12 Mbps
Interfaces	
• Connection to PROFIBUS	9-pin Sub-D socket (RS 485)
• Connection to supply voltage	4-pin terminal block
Voltage supply	24 V DC
Current consumption	
• from the backplane bus	150 mA
• from 24 V	250 mA
Power loss	6.75 W
Perm. ambient conditions	
• Operating temperature	0 °C … +60 °C
• Transport/storage temperature	-40 °C … +70 °C
• Relative humidity	max. 95% at +25°C
Construction	
• Module format	Compact module
• Dimensions (W x H x D) in mm	40 x 125 x 120
• Weight	approx. 300 g
Number of CPs per S7-300	4

	CP 343-5
Performance data	
S7 communication	
• Number of connections that can be used	max. 16 [1]
S5-compatible communication (SEND/RECEIVE)	
• Number of connections that can be used	max. 16
• Useful data / connection	max. 240 byte (SEND and RECEIVE)
FMS function	
• Number of connections that can be used	max. 16
Variable length for READ	237 byte
Variable length for WRITE and REPORT	233 byte
Configurable server variables	256
Variables that can be loaded from partners	256
Multi-protocol operation	
• Number of connections that can be used	max. 48

1) Dependent on the CPU used

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Ordering data

	Order No.
CP 343-5 communications processor Communication processor for connecting S7-300 to PROFIBUS, FMS, S5-compatible communication, PG/OP and S7 communication; with electronic manual on CD-ROM	**6GK7 343-5FA01-0XE0**
NCM S7 configuration software for PROFIBUS Configuration software for PROFIBUS CPs for SIMATIC S7 V5.x, executable under STEP 7 V5.x; with electronic manual on CD-ROM English, French, German, Italian and Spanish	Delivered with STEP 7 Version 5
"NCM S7 for PROFIBUS" manual Paper version for V5.x (STEP 7 V5.x)	
• German	**6GK7 080-5AA04-8AA0**
• English	**6GK7 080-5AA04-8BA0**
• French	**6GK7 080-5AA04-8CA0**
• Spanish	**6GK7 080-5AA04-8DA0**
• Italian	**6GK7 080-5AA04-8EA0**

	Order No.
PROFIBUS FastConnect RS 485 bus connector With 90° cable outlet; With insulation displacement method, max. data transmission rate 12 Mbit/s	
• without PG interface	**6ES7 972-0BA50-0XA0**
• with PG interface	**6ES7 972-0BB50-0XA0**
PROFIBUS bus connector IP20 For connection to PPI, MPI, PROFIBUS	
• without PG interface	**6ES7 972-0BA12-0XA0**
• with PG interface	**6ES7 972-0BB12-0XA0**
PROFIBUS 12M bus terminal Bus terminal for connecting PROFIBUS stations up to 12 Mbit/s with connecting cable	**6GK1 500-0AA10**
"Communication with SIMATIC" manual	
• German	**6ES7 398-8EA00-8AA0**
• English	**6ES7 398-8EA00-8BA0**
• French	**6ES7 398-8EA00-8CA0**
• Spanish	**6ES7 398-8EA00-8DA0**
• Italian	**6ES7 398-8EA00-8EA0**
SIMATIC S7-300 DM 370 Dummy module; used during module replacement	**6ES7 370-0AA01-0AA0**

CP 343-1 Lean

Overview

PN	ISO	TCP/IP	UDP	PG	S7	S5	IT	FTP
■		■	■	■	■	■		

- Interface for the SIMATIC S7-300 to Industrial Ethernet
  - 2 x RJ45 connection for 10/100 Mbit/s full/half duplex connection (with Autosensing for automatic switchover and autocrossover function)
  - integral 2-port real-time switch ERTEC 200
  - multi-protocol operation with TCP and UDP transport protocol and PROFINET IO
  - Keep Alive function
- Communication services:
  - open IE communication (TCP/IP and UDP)
  - PG/OP communication
  - S7 communication (server)
  - S5 compatible communication
- Multicast for UDP
- Remote programming and initial start-up is possible exclusively over Industrial Ethernet
- Integration into network management through SNMP
- Configuration with NCM S7 for Industrial Ethernet (integrated into STEP 7)
- Cross-network programming device/operator panel communication through S7 routing

Technical specifications

	CP 343-1 Lean
Data transmission rate	10/100 Mbit/s autosensing
Interfaces	
• Communication connection, electrical	2 x RJ45 sockets (10/100 Mbit/s; TP)
• Connection for supply voltage	1 x 2-pin plug-in terminal block
Voltage supply	+24 VDC (permissible range: +20.4 V to +28.8 V)
Current consumption	
• from the backplane bus	max. 200 mA
• from 24 V DC external	typ. 160 mA max. 200 mA
Power loss	5.8 W
Permissible ambient conditions	
• Operating temperature	0 °C … +60 °C
• Transport/storage temperature	-40 °C … +70 °C
• Relative humidity	max. 95% at +25 °C
Design	
• Module format	Compact module S7-300, single width
• Dimensions (W x H x D) in mm	40 x 125 x 120
• Weight	approx. 200 g
Configuring software	NCM S7 for Industrial Ethernet (supplied with STEP 7)

	CP 343-1 Lean
Performance data	
Open IE/S5-compatible communication (SEND/RECEIVE)	
• Sum of all simultaneously operable TCP/UDP connections	max. 8
• Useful data	
- TCP	8 KB
- UDP	2 KB
S7 communication	
• Number of connections	max. 4
PG/OP communication	
• Number of operable OP connections (acyclic services)	max. 4
Multi-protocol operation	
• Sum of all simultaneously operable connections	max. 12
Multicast	8
PROFINET communication (PN IO-Device)	
• Size of I/O data areas overall	
- I/O input area	512 byte
- I/O output area	512 byte
• Size of I/O data areas per connected sub-module	
- inputs	max. 240 byte
- outputs	max. 240 byte
• Number of sub-modules	max. 32

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Ordering data

	Order No.
CP 343-1 Lean communications processor A)	**6GK7 343-1CX10-0XE0**
For connecting SIMATIC S7-300 to Industrial Ethernet through TCP/IP and UDP Multicast, S7 communication, S5-compatible communication with SEND/RECEIVE, FETCH/WRITE, PROFINET IO device, integrated 2-port switch ERTEC 200, diagnostic expansions, replacement of devices without PG, SNMP, initial start-up over LAN 10/100 Mbit/s; with electronic manual on CD-ROM	
NCM S7 configuration software for Industrial Ethernet	
NCM S7 configuration software version 5.4 for Industrial Ethernet CPs; in addition hardware support package (HSP) for CP 343-1 Lean[1]. To use the known functions of the CP 343-1 Lean (..-0CX00-..), the new version of the CP 343-1 Lean (..-0CX10-..) can be configured as a CP 343-1 (..-0CX00-..) similar to the handling of the CP as a spare part; (configuring software NCM S7 V5.2 SP3 or higher for Industrial Ethernet CPs, running under STEP 7 V5.2 and HSP); for execution under STEP 7 V5.4; on CD-ROM, with electronic manual in English, German, French, Spanish and Italian	Delivered with STEP 7 V5.4

1) The HSP for CP 343-1 Lean (..-0CX10-..) can be loaded and installed directly from the Internet by means of STEP 7. It is a part of STEP 7 V5.4 SP1 or higher.

	Order No.
IE FC RJ45 Plug 180	
RJ45 plug-in connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 piece	**6GK1 901-1BB10-2AA0**
• 1 pack = 10 pieces	**6GK1 901-1BB10-2AB0**
• 1 pack = 50 pieces	**6GK1 901-1BB10-2AE0**
Documentation S7-CPs/NCM S7	
For Industrial Ethernet and PROFIBUS; manual package for configuring S7-CPs, IE/PB link and PC stations (STEP 7 V5.3)	
• German	**6GK7 080-0AA01-8AA0**
• English	**6GK7 080-0AA01-8BA0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

CP 343-1

Overview

PN	ISO	TCP/IP	UDP	PG	S7	S5	IT	FTP
■	■	■	■	■	■	■		

- Connection of SIMATIC S7-300 to Industrial Ethernet
  - 10/100 Mbit/s full/half duplex connection with autosensing
  - connection for RJ45
  - multi-protocol operation with TCP and UDP transport protocol
  - adjustable Keep Alive function
- Communication services:
  - open IE communication (TCP/IP and UDP)
  - PROFINET IO Controller
  - PROFINET CBA
  - Programming device/operator panel communication: Cross-network by means of S7 routing
  - S7 communication (client, server, multiplexing)
  - S5-compatible communication
- Multicast for UDP
- IP address assignment via DHCP, simple PC tool or via the user program (e.g. HMI)
- Access protection by means of configurable access list
- Remote programming and initial startup via the network
- Automatic setting of the CPU clock via Ethernet with NTP or SIMATIC procedure
- SNMP MIB2 diagnostics information for network management systems

Technical specifications

	CP 343-1
Data transmission rate	10/100 Mbit/s autosensing
Interfaces	
• Communication connection, electrical	1 x RJ45 (10/100 Mbit/s; TP)
• Connection for supply voltage	1 x 2-pin plug-in terminal block
Slot for the swap medium	C-PLUG
Voltage supply	+5 V DC (±5%) and b+24 V DC (±5%)
Current consumption	
• from the backplane bus	200 mA
• from 24 V DC external	typ. 160 mA max. 200 mA
Power loss	5.8 W
Permissible ambient conditions	
• Operating temperature	0 °C … +60 °C
• Transport/storage temperature	-40 °C … +70 °C
• Relative humidity	max. 95% at +25 °C
Design	
• Module format	Compact module S7-300, double width
• Dimensions (W x H x D) in mm	80 x 125 x 120
• Weight	approx. 600 g
Configuring software	STEP 7 V5.3 SP2 and higher

	CP 343-1
Performance data	
Open IE/S5-compatible communication (SEND/RECEIVE)	
• Sum of all simultaneously operable TCP/UDP connections	max. 16
• Useful data	
- TCP	8 KB
- UDP	2 KB
S7 communication	
• Number of connections	max. 16
PG/OP communication	
• Number of operable OP connections (acyclic services)	16
Multi-protocol operation	
• Sum of all simultaneously operable connections	max. 48
Multicast	16
PROFINET communication	
PROFINET IO Controller	
• Number of operable PN IO-Devices	125
• Size of IO data areas overall	
- I/O input area	2160 byte
- I/O output area	2160 byte
• Size of I/O data areas per connected PN IO device	
- I/O input area	max. 128 byte
- I/O output area	max. 128 byte

Technical specifications (continued)

	CP 343-1
PROFINET CBA	
• Number of remote interconnecting partners	64
• Sum of all connections	1000
• Data length of all incoming connections	8192 Byte
• Data length of all outgoing connections	8192 Byte
• Data length for arrays and structures (acyclic interconnection), max.	8192 Byte
• Data length for arrays and structures (cyclic interconnection), max.	450 Byte
• Data length for arrays and structures (local interconnection), max.	2400 Byte
• Remote interconnections with acyclic transmission	
• Scan rate: Sampling time, min. Possible settings: 100, 200, 500 and 1000 ms	100 ms
• Number of incoming interconnections, max.	128
• Number of outgoing interconnections, max.	128
• Data length of all incoming interconnections	8192 Byte
• Data length of all outgoing interconnections	8192 Byte

	CP 343-1
Remote interconnections with cyclic transmission	
• Transmission frequency: Transmission time, min. Possible settings: 10, 20, 50, 100, 200, 500 and 1000 ms	10 ms
• Number of incoming interconnections, max.	200
• Number of outgoing interconnections, max.	200
• Data length of all incoming interconnections	2000 Byte
• Data length of all outgoing interconnections	2000 Byte
HMI variables via PROFINET (acyclic)	
• Number of stations for HMI variables that can connect (PN OPC/iMap); stations are 2 x PN OPC and 1 x SIMATIC iMap	3
• Update HMI variables, min.	500 ms
• Number of HMI variables, max.	200
• Data length of all HMI variables	8192 Byte
Internal device interconnections	
• Number of internal interconnections	256
• Data length of all internal interconnections	2400 Byte
Interconnections with constants	
• Number of interconnections with constants, max.	200
• Data lengths of all interconnections with constants.	4096 Byte
PROFIBUS proxy functionality	No
Access to S7extended variables	
• Maximum number of S7 connections for access to variables with the PROFINET attribute "S7extended", max.	32

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Ordering data		Order No.
CP 343-1 communications processor For connection of SIMATIC S7-300 to Industrial Ethernet; PROFINET IO Controller, PROFINET CBA, TCP/IP and UDP, S7 communication, S5-compatible communication (SEND/RECEIVE), FETCH/WRITE, with and without RFC 1006, diagnostic expansions, multicast, CPU clock synchronization via SIMATIC procedure and NTP, access protection through IP access list, SNMP, DHCP, initialization over LAN 10/100 Mbit/s; with electronic manual on CD-ROM		**6GK7 343-1EX21-0XE0**
C-PLUG Swap medium for simple replacement of devices in the event of a fault; for storing configuration or engineering and application data; can be used for SIMATIC NET products with C-PLUG slot	A)	**6GK1 900-0AB00**
IE FC RJ45 Plug 180 RJ45 plug-in connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface		
• 1 pack = 1 unit		**6GK1 901-1BB10-2AA0**
• 1 pack = 10 units		**6GK1 901-1BB10-2AB0**
• 1 pack = 50 units		**6GK1 901-1BB10-2AE0**
SOFTNET-S7 Edition 2005 for Industrial Ethernet Software for S7 and S5-compatible communication, incl. OPC server, PG/OP communication and NCM PC; up to 64 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, 2000 Professional/Server; German/English		**6GK1 704-1CW63-3AA0**
SOFTNET-S7 Lean Edition 2005 for Industrial Ethernet Software for S7 and S5-compatible communication, incl. OPC server, PG/OP communication and NCM PC; up to 8 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, 2000 Professional/Server; German/English		**6GK1 704-1LW63-3AA0**
S7-1613 Edition 2005 Software for S7 and S5 communication, incl. PG/OP communication, OPC server and NCM PC; up to 120 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, Windows 2000 Professional/Server; for CP 1613/CP 1613 A2 German/English		**6GK1 716-1CB63-3AA0**
NCM S7 configuration software for Industrial Ethernet for Industrial Ethernet CPs for SIMATIC S7 V5.3 SP2, operating under STEP 7 V5.3; on CD-ROM with electronic manual in German, English, French, Spanish, Italian		Delivered with STEP 7 V5.3
Documentation S7-CPs/NCM for Industrial Ethernet and PROFIBUS for V5.x (STEP 7 V5.x); paper version		
• German		**6GK7 080-0AA01-8AA0**
• English		**6GK7 080-0AA01-8BA0**
SIMATIC iMap V3.0 for configuring PROFINET CBA, *Requirement:* Windows 2000 Prof. with Service Pack 4 or later or Windows XP Prof. with Service Pack 1 or later or Windows 2003 Server with Service Pack 1 or later; on PG or PC with Pentium processor, min. 1 GHz; STEP 7 V5.3 or later with Service Pack 3, PN OPC Server V6.3 or later *Type of supply:* German, English with electronic documentation		
• Single license	D)	**6ES7 820-0CC04-0YA5**
• Software Update Service	D)	**6ES7 820-0CC01-0YX2**
• Upgrade to V3.0, single license	D)	**6ES7 820-0CC04-0YE5**

A) Subject to export regulations: AL: N and ECCN: EAR99H

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

Overview

PN	ISO	TCP/IP	UDP	PG	S7	S5	IT	FTP
■	■	■	■	■	■	■	■	■

- Connection of SIMATIC S7-300 to Industrial Ethernet
  - 10/100 Mbit/s full/half duplex connection with autosensing
  - Connection for RJ45
  - Multi-protocol operation with TCP and UDP transport protocol
  - Adjustable Keep Alive function
- Communication services:
  - Open IE communication (TCP/IP and UDP): Multicast for UDP
  - PROFINET IO controller
  - PROFINET CBA
  - Programming device/operator panel communication: Cross-network by means of S7 routing
  - S7 communication (client, server, multiplexing)
  - S5-compatible communication
  - IT communication: HTTP communication supports access to process data through Web browsers; FTP communication supports program-controlled FTP client communication, Access to data blocks through FTP server, Data handling for own file system through FTP, E-mail
- IP address assignment via DHCP, simple PC tool or via program block (e.g. for HMI)
- Access protection by means of configurable access list
- Module replacement without programming device; all information is stored on the C-PLUG (also file system for IT functions).
- Extensive diagnostic functions for all modules in the rack
- Integration into network management systems through the support of SNMP V1 MIB-II

Technical specifications

	CP 343-1 Advanced
Data transmission rate	10/100 Mbit/s
Interfaces	
• Communication connection, electrical	1 x RJ45 (10/100 Mbit/s; TP) Autosensing/Autocrossover/ Autonegotiation
• Connection for supply voltage	1 x 2-pin plug-in terminal block
• Slot for the swap medium	C-PLUG
Voltage supply	+5 V DC (±5%) and +24 V DC (±5%)
Current consumption	
• from the backplane bus	200 mA
• from 24 V DC external	typ. 160 mA max. 200 mA
Power loss	5.8 W
Perm. ambient conditions	
• Operating temperature	0 °C … +60 °C
• Transport/storage temperature	-40 °C … +70 °C
• Relative humidity	Max. 95% at +25 °C
Construction	
• Module format	Compact module S7-300, double width
• Dimensions (W x H x D) in mm	80 x 125 x 120
• Weight	Approx. 600 g
Configuring software	STEP 7 V5.3 SP3 and higher

	CP 343-1 Advanced
Performance data	
Open IE/S5-compatible communication (SEND/RECEIVE)	
• Sum of all simultaneously operable TCP/UDP connections	max. 16
• Useful data	
- TCP	8 KByte
- UDP	2 KByte
S7 communication	
• Number of connections	max. 16
PG/OP communication	
• Number of operable OP connections (acyclic services)	16
Multi-protocol operation	
• Sum of all simultaneously operable connections	max. 48
Multicast	16
FTP communication	
• Number of client connections	max. 10
• Number of server connections	max. 2
IT communication	
Number of connections to an Email server	max. 1
Memory capacity	
• Flash memory file system	30 MByte
• RAM memory	30 MByte

CP 343-1 Advanced

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Technical specifications (continued)

	CP 343-1 Advanced
Service life of the Flash Memory cells	Approx. 100000 write cycles
PROFINET communication	
PROFINET IO Controller	
• Number of operable PN IO-Devices	125
• Size of IO data areas overall	
- I/O input area	2160 Byte
- I/O output area	2160 Byte
• Size of I/O data areas per connected PN IO device	
- I/O input area	max. 128 Byte
- I/O output area	max. 128 Byte
PROFINET CBA	
Number of remote interconnecting partners	64
Swapped connectors	1000
Data length of all incoming connections	8192 Byte
Data length of all outgoing connections	8192 Byte
Data length for arrays and structures (acyclic interconnection), max.	8192 Byte
Data length for arrays and structures (cyclic interconnection), max.	450 Byte
Data length for arrays and structures (local interconnection), max.	2400 Byte
Remote interconnections with acyclic transmission	
• Scan rate: Sampling time, min. Possible settings: 100, 200, 500 and 1000 ms	100 ms
• Number of incoming interconnections, max.	128
• Number of outgoing interconnections, max.	128
• Data length of all incoming interconnections	8192 Byte
• Data length of all outgoing interconnections	8192 Byte

	CP 343-1 Advanced
Remote interconnections with cyclic transmission	
• Transmission frequency: Transmission time, min. Possible settings: 10, 20, 50, 100, 200, 500 and 1000 ms	10 ms
• Number of incoming interconnections, max.	200
• Number of outgoing interconnections, max.	200
• Data length of all incoming interconnections	2000 Byte
• Data length of all outgoing interconnections	2000 Byte
HMI variables via PROFINET (acyclic)	
• Number of stations for HMI variables that can connect (PN OPC/iMap); stations are 2 x PN OPC and 1 x SIMATIC iMap	3
• Update HMI variables, min.	500 ms
• Number of HMI variables, max.	200
• Data length of all HMI variables	8192 Byte
Internal device interconnections	
• Number of internal interconnections	256
• Data length of all internal interconnections	2400 Byte
Interconnections with constants	
• Number of interconnections with constants, max.	200
• Data lengths of all interconnections with constants.	4096 Byte
PROFIBUS proxy functionality	No
Access to S7extended variables	
• Maximum number of S7 connections for access to variables with the PROFINET attribute "S7extended", max.	32

4

Ordering data

	Order No.
Communications processor CP 343-1 Advanced For the connection of SIMATIC S7-300 to Industrial Ethernet; PROFINET IO Controller, PROFINET CBA, TCP/IP and UDP, S7 communication, S5-compatible communication (SEND/RECEIVE), FETCH/WRITE, with and without RFC 1006, diagnostics expansions, multicast, Web server, HTML diagnostics, FTP server, FTP client, E-mail client, setting of CPU's clock using SIMATIC and NTP procedures, access protection through IP access list, SNMP, DHCP, initialization over LAN 10/100 Mbit/s; with electronic manual on CD-ROM	**6GK7 343-1GX21-0XE0**
C-PLUG A) Swap medium for simple replacement of devices in the event of a fault; for storing configuration or engineering and application data; can be used for SIMATIC NET products with C-PLUG slot	**6GK1 900-0AB00**
SOFTNET-S7 Edition 2005 for Industrial Ethernet Software for S7 and S5-compatible communication, incl. OPC server, PG/OP communication and NCM PC; up to 64 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, 2000 Professional/Server; German/English	**6GK1 704-1CW63-3AA0**
SOFTNET-S7 Lean Edition 2005 for Industrial Ethernet Software for S7 and S5-compatible communication, incl. OPC server, PG/OP communication and NCM PC; up to 8 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, 2000 Professional/Server; German/English	**6GK1 704-1LW63-3AA0**
S7-1613 Edition 2005 Software for S7 and S5 communication, incl. PG/OP communication, OPC server and NCM PC; up to 120 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, Windows 2000 Professional/Server; for CP 1613/CP 1613 A2 German/English	**6GK1 716-1CB63-3AA0**
NCM S7 configuration software for Industrial Ethernet Configuration software for Industrial Ethernet CPs for SIMATIC S7 V5.3 SP2, operating under STEP 7 V5.3; on CD-ROM with electronic manual in German, English, French, Spanish, Italian	Delivered with STEP 7 V5.3
Documentation S7-CPs/NCM for Industrial Ethernet and PROFIBUS for V5.x (STEP 7 V5.x); paper version	
• German	**6GK7 080-0AA01-8AA0**
• English	**6GK7 080-0AA01-8BA0**
SIMATIC iMap V3.0 for configuring PROFINET CBA, *Prerequisite:* Windows 2000 Prof. with Service Pack 4 or later or Windows XP Prof. with Service Pack 1 or later or Windows 2003 Server with Service Pack 1 or later; on PG or PC with Pentium processor, min. 1 GHz; STEP 7 V5.3 or later with Service Pack 3, PN OPC Server V6.3 or later *Type of deilvery:* German, English with electronic documentation	
• Single license D)	**6ES7 820-0CC04-0YA5**
• Software Update Service D)	**6ES7 820-0CC01-0YX2**
• Upgrade to V3.0, single license D)	**6ES7 820-0CC04-0YE5**

A) Subject to export regulations: AL: N and ECCN: EAR99H

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

Front connectors

4

Overview

- For simple and user-friendly connection of sensors and actuators
- For retaining the wiring when replacing modules
- With coding to avoid mistakes when replacing modules

Ordering data

		Order No.
Front connectors		
20-pin, with screw contacts		
• 1 unit		**6ES7 392-1AJ00-0AA0**
• 100 units		**6ES7 392-1AJ00-1AB0**
20-pin, with cage clamp terminals		
• 1 unit		**6ES7 392-1BJ00-0AA0**
• 100 units		**6ES7 392-1BJ00-1AB0**
40-pin, with screw contacts		
• 1 unit		**6ES7 392-1AM00-0AA0**
• 100 units		**6ES7 392-1AM00-1AB0**
40-pin, with cage clamp terminals		
• 1 unit		**6ES7 392-1BM01-0AA0**
• 100 units		**6ES7 392-1BM01-1AB0**
Front door, elevated design	A)	**6ES7 328-0AA00-7AA0**
e.g. for 32 channel modules; enables connection of 1.3 mm^2/16 AWG wires		

A) Subject to export regulations: AL: N and ECCN: EAR99H

Overview

The fully modular connection is the standard connection for the SIMATIC S7-300/400. The fully modular connection facilitates convenient, fast, and correct connection of the I/O to the SIMATIC S7-300/400.

- Easy plugging in of front connector module, connecting cable and connection module
- Fast and low-cost wiring
- Supply voltage connectable to front connector module or connection module for digital and analog signals
- Reduction in wiring errors, clear control cabinet wiring
- Distribution of digital signals by byte or by double-byte
- Each component can be replaced individually.
- Every cable length can be configured without cutting, or pre-assembled cables can be used

Connecting cables

The connection cable is the linking element between the front connector module and the connection module. It transmits 8 signals and the supply voltage. The maximum bridgeable distance is 30 m. The connecting cable is available in two different versions:

- The pre-assembled round cable
- The round-sheath ribbon cable assembled by the user

Basic modules

In the case of the basic module, the connection modules are used with basic functionality. Here, the I/O signal is connected quickly and simply from the field to the module or from the module to the field.

The connection terminals for the I/O signals are designed as screw terminals or spring terminals. The connection modules are available for digital and analog signals.

Signal modules

In the case of the signal module, the digital connection modules with LED are used. The yellow LEDs indicate the "active high" signal of the individual channels. This makes commissioning easier for you, and you always have an overview of the signal states of your I/O. At the same time, a green LED indicates when the 24 V DC is applied.

The connection terminals for the I/O signals are designed as screw terminals or spring terminals. The connection modules are available for digital signals.

Fully modular connection

Overview (continued)

Function modules

Function modules are implemented with digital connection modules fitted with relays or optocouplers.

If other voltage or power levels are required in the field, the connection module for output signals TPRo is used. This converts the 24 V DC output signal simply and reliably to another voltage or power level. If 230 V AC input signals have to be transmitted to the controller in the field, a connection module with relay TPRi is available that converts the 230 V AC signal simply to 24 V DC. This means you always have the same voltage level on the module side.

Technical specifications front connector modules

Technical data of front connector module	
Rated operating voltage	**DC 24 V**
Max. permissible operating voltage	**DC 60 V**
Max. permissible continuous current • per connector pin	1 A
Max. permissible summation current	4 A/Byte
Permissible ambient temperature	0 to + 60°C
Test voltage	0.5 kV, 50 Hz, 60 sec.
Air gaps and creepage distances	IEC 664 (1980), IEC 664 A (1981), in accordance with DIN VDE 0110 (01.89), overvoltage class II, pollution degree 2

	Front connector module SIMATIC TOP connect, connection for potential infeed **Modules up to 4 connections**	
	Spring connection	Screw connection
Connectable cable cross-sections		
solid cables	No	
flexible cables with/without wire end ferrule	0.25 to 1.5 mm^2	
Number of wires per connection	1 or a combination of 2 conductors up to 1.5 mm^2 (total) in a common wire end ferrule	
Max. diameter of the cable insulation	3.1 mm	
Stripping length of the cables		
• without insulating collar	6 mm	
• with insulating collar	-	
Wire-end ferrules in acc. with DIN 46228		
• without insulating collar	Form A; 5 to 7 mm long	
• with insulating collar 0.25 to 1.0 mm^2	-	
• with insulating collar 1.5 mm^2	-	

	Front connector module SIMATIC TOP connect, connection for potential infeed **Modules up to 4 connections**	
	Spring connection	Screw connection
Blade width of the screwdriver	3.5 mm (cylindrical shape)	
Tightening torque for connecting the cables	-	0.4 to 0.7 Nm

	Front connector module SIMATIC TOP connect, connection for potential infeed **Modules up to 8 connections**	
	Spring connection	Screw connection
Connectable cable cross-sections		
solid cables	No	
flexible cables with/without wire end ferrule	0.25 to 0.75 mm^2	
Number of cables per connection	1 or a combination of 2 wires up to 0.75 mm^2 (total) in a common wire end ferrule	
Max. diameter of the cable insulation	2.0 mm	
Stripping length of the cables		
• without insulating collar	6 mm	
• with insulating collar	-	
Wire-end ferrules in acc. with DIN 46228		
• without insulating collar	Form A; 5 to 7 mm long	
• with insulating collar 0.25 to 1.0 mm^2	-	
• with insulating collar 1.5 mm^2	-	
Blade width of the screwdriver	3.5 mm (cylindrical shape)	
Tightening torque for connecting the cables	-	0.4 to 0.7 Nm

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Technical specifications connection cables

Technical data of connecting cable from SIMATIC S7 to connection module	
Operating voltage	**60 V DC**
Continuous current per signal conductor	1 A
Max. summation current	4 A/byte
Operating temperature	0 to +60°C
Outer diameter of pre-assembled round cable in mm, unshielded/shielded	Approx. 6.5/7.0
Outer diameter of round-sheath ribbon cable in mm , 16-pole/2 x 16-pole	Approx. 9.5/11.5

Technical specifications basic modules

Connection module TP1, TP3 and TPK	
Max. operating voltage	**60 V DC**
Continuous current per signal	1 A
Max. summation current (voltage infeed)	4 A/byte
Operating temperature	0 to + 60°C
Mounting position	Any
Air gaps and creepage distances	IEC Report 664, IEC 664 A, IEC 1131 T2, CSA C22.2 No 142 UL 508, VDE 0160 (12.90), overvoltage category II, pollution degree 3
Dimensions (W x H x D) in mm	
• 1-wire connection 6ES7924-0AA10-0A_0	Approx. 55 x 43.2 x 63
• for 3-wire initiators 6ES7924-0CA10-0A_0	Approx. 68 x 43.2 x 80
• for 2 x 8 signals 6ES7924-1AA10-0A_0	Approx. 100 x 43.2 x 80

Connection module TP2	
Max. operating voltage	**60 V DC**
Continuous current signal conductor	2 A
Operating temperature	0 to + 60°C
Mounting position	Any
Air gaps and creepage distances	IEC Report 664, IEC 664 A, IEC 1131 T2, CSA C22.2 No 142 UL 508, VDE 0160 (12.90), overvoltage category II, pollution degree 3
Dimensions (W x H x D) in mm	
• for 2 ampere modules 6ES7924-0BB10-0A_0	Approx. 68 x 43.2 x 80

Technical specifications basic modules (continued)

Connection module TPA	
Max. operating voltage	**60 V DC**
Continuous current signal conductor	1 A
Operating temperature	0 to + 60 °C
Mounting position	Any
Air gaps and creepage distances	IEC Report 664, IEC 664 A, IEC 1131 T2, CSA C22.2 No 142 UL 508, VDE 0160 (12.90), overvoltage category II, pollution degree 3
Dimensions (W x H x D) in mm	
• for 2 analog modules 6ES7924-0CC10-0A_0	Approx. 68 x 43.2 x 80

Connection module TPA, TP1, TP2, TP3, TPK		
	Spring connection	Screw connection
Connectable cable cross-sections		
• solid cables	No	
• flexible cables without wire end ferrule	0.5 to 2.5 mm^2	
• flexible cables with wire end ferrule in accordance with DIN 46228/1	0.5 to 1.5 mm^2	0.5 to 2.5 mm^2 (2.5 mm^2 with a crimp in accordance with EN 60947-1)
• flexible cables with wire end ferrule and plastic collar in accordance with DIN 46228/4	0.5 to 1.5 mm^2	
Number of cables per connection	1 or a combination of 2 cables up to the cross-sections specified above (total) in a shared wire end ferrule	
Blade width of the screwdriver	3.5 mm (cylindrical shape)	
Tightening torque for connecting the cables	-	0.4 to 0.7 Nm

Fully modular connection

4

Technical specifications signal modules

Connection module TP1, TP3 and TPK with LED	
Max. operating voltage	**24 V DC**
Continuous current per signal	1 A
Max. summation current (voltage infeed)	4 A/byte
Operating temperature	0 to + 60 °C
Mounting position	Any
Air gaps and creepage distances	IEC Report 664, IEC 664 A, IEC 1131 T2, CSA C22.2 No 142 UL 508, VDE 0160 (12.90), overvoltage category II, pollution degree 3
Dimensions (W x H x D) in mm	
• 1-wire connection with LED 6ES7924-0AA10-0B_0	Approx. 55 x 43.2 x 63
• for 3-wire initiators with LED 6ES7924-0CA10-0B_0	Approx. 68 x 43.2 x 80
• for 2 x 8 signals with LED 6ES7924-1AA10-0B_0	Approx. 100 x 43.2 x 80

Connection module TP2 with LED	
Max. operating voltage	**24 V DC**
Continuous current per signal conductor	2 A
Operating temperature	0 to + 60 °C
Mounting position	Any
Air gaps and creepage distances	IEC Report 664, IEC 664 A, IEC 1131 T2, CSA C22.2 No 142 UL 508, VDE 0160 (12.90), overvoltage category II, pollution degree 3
Dimensions (W x H x D) in mm	
• for 2-ampere modules with LED 6ES7924-0BB10-0B_0	Approx. 68 x 43.2 x 80

Connection module TP1 LED, TPK LED, TP2 LED, TP3 LED		
	Spring connection	Screw connection
Connectable cable cross-sections		
• solid cables	No	
• flexible cables without wire end ferrule	0.5 to 2.5 mm^2	
• flexible cables with wire end ferrule in accordance with DIN 46228/1	0.5 to 1.5 mm^2	0.5 to 2.5 mm^2 (2.5 mm^2 with a crimp in accordance with EN 60947-1)
• flexible cables with wire end ferrule and plastic collar in accordance with DIN 46228/4	0.5 to 1.5 mm^2	
Number of wires per connection	1 or a combination of 2 conductors up to the cross-sections specified above (total) in a shared wire end ferrule	
Blade width of the screw-driver	3.5 mm (cylindrical shape)	
Tightening torque for connecting the cables	-	0.4 to 0.7 Nm

Technical specifications function modules

Connection module with relay for outputs (TPRo)	
Energizing side	
Operating voltage for coil	**24 V DC**
Input circuit	Reverse polarity protection and freewheeling diodes
Contact side	
Number of relay outputs	8 (NO contacts)
Contact design	Single contact, 1 NO contact
Switching capacity (resistive load)	max. 4 A/250 V AC, max. 3 A/30 V DC max. 0.6 A/48 V DC max. 0.4 A/60 V DC recommended minimum load ≥ 10 mA
Switching frequency	20 cycles/minute
Service life	
• mechanical	5 x 10^6 operating cycles
• electrical	3 x 10^4 operating cycles at 230 V AC/2 A/ cos φ = 1
Operating temperature	0 to +60 °C
Mounting position	Any
Air gaps and creepage distances	Basic standard IEC 60664-1; UL 508; CuI (Reference CSA C22.2 No. 142) overvoltage category III pollution degree 2
Dimensions (W x H x D) in mm	
6ES7924-0BD10-0B_0	Approx. 100 x 45 x 80

Connection module with relay for inputs (TPRi)	
Energizing side	
Operating voltage for coil	**230 V AC**
	from 207 – 280 V AC
Input circuit	Varistors
Contact side	
Number of relay outputs	8 (NO contacts)
Contact design	Single contact, 1 NO contact
Switching capacity (resistive load)	max. 50 mA/24 V AC, max. 50 mA/48 V DC max. 50 mA/60 V DC recommended minimum load ≥ 5 mA
Switching frequency	200 cycles/minute
Service life	
• mechanical	10 x 10^6 operating cycles
• electrical	3 x 10^6 operating cycles at 230 V AC/50 mA/ cos φ = 1
Operating temperature	0 to +60 °C
Mounting position	Any
Air gaps and creepage distances	Basic standard IEC 60664-1; UL 508; CuI (Reference CSA C22.2 No. 142) overvoltage category III pollution degree 2
Dimensions (W x H x D) in mm	
6ES7924-0BE10-0B_0	Approx. 120 x 45 x 80

Technical specifications function modules (continued)

Connection modules TPRo and TPRi

	Spring connection	Screw connection
Connectable cable cross-sections		
• Solid cables	No	
• flexible cables without wire end ferrule	0.5 to 2.5 mm^2	
• flexible cables with wire end ferrule in accordance with DIN 46228/1	0.5 to 1.5 mm^2	0.5 to 2.5 mm^2 (2.5 mm^2 with a crimp in accordance with EN 60947-1)
• flexible cables with wire end ferrule and plastic collar in accordance with DIN 46228/4	0.5 to 1.5 mm^2	
Number of wires per connection	1 or a combination of 2 conductors up to the cross-sections specified above (total) in a shared wire end ferrule	
Blade width of the screwdriver	3.5 mm (cylindrical shape)	
Tightening torque for connecting the cables	-	0.4 to 0.7 Nm

Ordering data front connectors Order No.

		Order No.
Front connector module (Compact CPU 312C)		
Voltage infeed via		
• Spring terminals		**6ES7 921-3AJ20-0AA0**
• Screw terminals		**6ES7 921-3AK20-0AA0**
Front connector module (Compact CPU 313C/ 314C-2PtP/314C-2DP), slot X1		
Voltage infeed via		
• Spring terminals		**6ES7 921-3AL20-0AA0**
• Screw terminals		**6ES7 921-3AM20-0AA0**
Front connector module (digital 2 x 8 I/O)		
Voltage infeed via		
• Spring terminals		**6ES7 921-3AA00-0AA0**
• Screw terminals		**6ES7 921-3AB00-0AA0**
Front connector module (digital 4 x 8 I/O)		
Voltage infeed via		
• Spring terminals		**6ES7 921-3AA20-0AA0**
• Screw terminals	A)	**6ES7 921-3AB20-0AA0**
Front connector module (1 x 8 outputs) for 2 ampere digital outputs		
Voltage infeed via		
• Spring terminals		**6ES7 921-3AC00-0AA0**
• Screw terminals		**6ES7 921-3AD00-0AA0**
Front connector module 20-pole (analog)		
Voltage infeed via		
• Spring terminals		**6ES7 921-3AF00-0AA0**
• Screw terminals		**6ES7 921-3AG00-0AA0**
Front connector module 40-pole (analog)		
Voltage infeed via		
• Spring terminals		**6ES7 921-3AF20-0AA0**
• Screw terminals		**6ES7 921-3AG20-0AA0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

Fully modular connection

Ordering data conn. cables	Order No.
Pre-assembled round cable	
16-pole, 0.14 mm ^{2}	
unshielded	
• 0.5 m	**6ES7 923-0BA50-0CB0**
• 1.0 m	**6ES7 923-0BB00-0CB0**
• 1.5 m	**6ES7 923-0BB50-0CB0**
• 2.0 m	**6ES7 923-0BC00-0CB0**
• 2.5 m	**6ES7 923-0BC50-0CB0**
• 3.0 m	**6ES7 923-0BD00-0CB0**
• 4.0 m	**6ES7 923-0BE00-0CB0**
• 5.0 m	**6ES7 923-0BF00-0CB0**
shielded	
• 1.0 m	**6ES7 923-0BB00-0DB0**
• 2.0 m	**6ES7 923-0BC00-0DB0**
• 2.5 m	**6ES7 923-0BC50-0DB0**
• 3.0 m	**6ES7 923-0BD00-0DB0**
• 4.0 m	**6ES7 923-0BE00-0DB0**
• 5.0 m	**6ES7 923-0BF00-0DB0**
Round-sheath ribbon cable	
16-pole, 0.14 mm ^{2}	
unshielded	
• 30 m	**6ES7 923-0CD00-0AA0**
• 60 m A)	**6ES7 923-0CG00-0AA0**
shielded	
• 30 m	**6ES7 923-0CD00-0BA0**
• 60 m	**6ES7 923-0CG00-0BA0**
Round-sheath ribbon cable	
2 x 16-pole, 0.14 mm ^{2}	
unshielded	
• 30 m	**6ES7 923-2CD00-0AA0**
• 60 m	**6ES7 923-2CG00-0AA0**
8 connectors (16-pole)	**6ES7 921-3BE10-0AA0**
Insulation displacement system with 8 cable grips	
Accessories	
Crimping tool	**6ES7 928-0AA00-0AA0**
For processing the connectors (female ribbon cable connector)	

Ordering data basic modules	Order No.
Connection module TP1	
for 1-wire initiators	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-0AA10-0AB0**
• Screw terminals	**6ES7 924-0AA10-0AA0**
Connection module TP3	
for 3-wire initiators	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-0CA10-0AB0**
• Screw terminals	**6ES7 924-0CA10-0AA0**
Connection module TPK	
for 2 x 8 signals	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-1AA10-0AB0**
• Screw terminals	**6ES7 924-1AA10-0AA0**
Connection module TP2	
for 2 A modules	
for 2-wire initiators	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-0BB10-0AB0**
• Screw terminals	**6ES7 924-0BB10-0AA0**
Connection module TPA	
for analog signals	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-0CC10-0AB0**
• Screw terminals	**6ES7 924-0CC10-0AA0**
Accessories	
Labeling plates for connection modules	
Insertable labeling plate PU = 200 units	**6ES7 928-2AB00-0AA0**
Self-adhesive labeling plate PU = 200 units	**6ES7 928-2BB00-0AA0**
Shield plate	**6ES7 928-1BA00-0AA0**
for analog connection module (4 units)	
Shield connection terminal	
for shield plate, 2 units, with cable diameter	
• 2 to 6 mm (2 cables)	**6ES7 390-5AB00-0AA0**
• 3 to 8 mm	**6ES7 390-5BA00-0AA0**
• 4 to 13 mm	**6ES7 390-5CA00-0AA0**

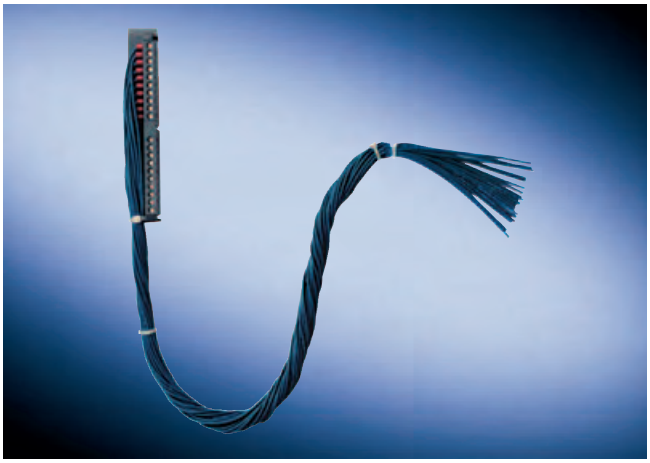
A) Subject to export regulations: AL: N and ECCN: EAR99H

Ordering data signal modules	Order No.
Connection module TP1 with LED	
for 1-wire initiators	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-0AA10-0BB0**
• Screw terminals	**6ES7 924-0AA10-0BA0**
Connection module TP3 with LED	
for 3-wire initiators	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-0CA10-0BB0**
• Screw terminals	**6ES7 924-0CA10-0BA0**
Connection module TPK with LED	
for 2 x 8 signals	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-1AA10-0BB0**
• Screw terminals	**6ES7 924-1AA10-0BA0**
Connection module TP2 with LED	
for 2 A modules	
for 2-wire initiators	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-0BB10-0BB0**
• Screw terminals	**6ES7 924-0BB10-0BA0**
Accessories	
Labeling plates for connection modules	
Insertable labeling plate PU = 200 units	**6ES7 928-2AB00-0AA0**
Self-adhesive labeling plate PU = 200 units	**6ES7 928-2BB00-0AA0**

Ordering data function mod.	Order No.
Connection module TPRo for output signals	
for 2-wire connection	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-0BD10-0BB0**
• Screw terminals	**6ES7 924-0BD10-0BA0**
Connection module TPRi for input signals	
for 2-wire connection	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-0BE10-0BB0**
• Screw terminals	**6ES7 924-0BE10-0BA0**
Accessories	
Labeling plates for connection modules	
Insertable labeling plate PU = 200 units	**6ES7 928-2AB00-0AA0**
Self-adhesive labeling plate PU = 200 units	**6ES7 928-2BB00-0AA0**
Replacement relay for relay connection module PU = 4 units	
Replacement relay for TPRi	**6ES7 928-3BA00-4AA0**
Replacement relay for TPRo	**6ES7 928-3AA00-4AA0**
Optocoupler DC alternative for relay in the case of TPRo PU = 4 units	**6ES7 928-3DA00-4AA0**
Optocoupler DC alternative for relay in the case of TPRo PU = 4 units	**6ES7 928-3CA00-4AA0**

Flexible connection

Overview



The flexible connection guarantees a fast and direct connection from the input/output modules of the SIMATIC S7-300/400 to the individual elements in the cabinet.

Already attached single cores reduce the wiring effort.

The core cross-sections of 0.5 mm^2 also allow higher currents.

Technical specifications

Front connector with single cores 16 channels	
Rated operating voltage	24 V DC
Permissible continuous current with simultaneous load on all cores, max.	1.5 A
Permissible ambient temperature	0 to +60°C
Core type	H05V-K or with UL 1007/1569; CSA TR64
Number of single cores	20
Core cross-section	0.5 mm^2; Cu
Bundle diameter in mm	Approx. 15
Color of core	Blue, RAL 5010
Designation of cores	Numbered from 1 to 20 (front connector contact = core number)
Fabrication	Screw or crimp contacts

Front connector with single cores 32 channels	
Rated operating voltage	24 V DC
Permissible continuous current with simultaneous load of all wires, max.	1.5 A
Permissible ambient temperature	0 to +60°C
Core type	H05V-K or with UL 1007/1569; CSA TR64
Number of single cores	40
Core cross-section	0.5 mm^2; Cu
Bundle diameter in mm	Approx. 17
Color of core	Blue, RAL 5010
Designation of cores:	Numbered from 1 to 40 (front connector contact = core number)
Fabrication	Screw or crimp contacts

Ordering data	Order No.		Order No.
Front connector with single cores for 16-channel digital modules SIMATIC S7-300, 20 x 0.5 mm²		**Front connector with single cores for 32-channel digital modules SIMATIC S7-300, 40 x 0.5 mm²**	
Core type H05V-K		**Core type H05V-K**	
Screw version		Screw version	
Packaging unit (1 unit) Length:		Packaging unit (1 unit) Length:	
• 2.5 m	**6ES7 922-3BC50-0AB0**	• 2.5 m	**6ES7 922-3BC50-0AC0**
• 3.2 m	**6ES7 922-3BD20-0AB0**	• 3.2 m	**6ES7 922-3BD20-0AC0**
• 5 m	**6ES7 922-3BF00-0AB0**	• 5.0 m	**6ES7 922-3BF00-0AC0**
• Special lengths	on request	• Special lengths	on request
Packaging unit (5 units) Length:		Packaging unit (5 units) Length:	
• 2.5 m	**6ES7 922-3BC50-5AB0**	• 2.5 m	**6ES7 922-3BC50-5AC0**
• 3.2 m	**6ES7 922-3BD20-5AB0**	• 3.2 m	**6ES7 922-3BD20-5AC0**
• 5.0 m	**6ES7 922-3BF00-5AB0**	• 5.0 m	**6ES7 922-3BF00-5AC0**
Crimp version		Crimp version	
Packaging unit (1 unit) Length:		Packaging unit (1 unit) Length:	
• 2.5 m	**6ES7 922-3BC50-0AF0**	• 2.5 m	**6ES7 922-3BC50-0AG0**
• 3.2 m	**6ES7 922-3BD20-0AF0**	• 3.2 m	**6ES7 922-3BD20-0AG0**
• 5.0 m	**6ES7 922-3BF00-0AF0**	• 5.0 m	**6ES7 922-3BF00-0AG0**
• Special lengths	on request	• Special lengths	on request
Core type UL/CSA-certified		**Core type UL/CSA-certified**	
Screw-type version		Screw version	
Packaging unit (1 unit) Lenth:		Packaging unit (1 unit) Length:	
• 3.2 m	**6ES7 922-3BD20-0UB0**	• 3.2 m	**6ES7 922-3BD20-0UC0**
• 5.0 m	**6ES7 922-3BF00-0UB0**	• 5.0 m	**6ES7 922-3BF00-0UC0**

IM 360/-361/-365 interface modules

Overview

- For connecting the racks in multitier SIMATIC S7-300 configurations
- IM 365: For configuring a central controller and up to one expansion rack
- IM 360/IM 361: For configuring a central controller and up to three expansion racks

Technical specifications

	6ES7 360-3AA01-0AA0	6ES7 361-3CA01-0AA0	6ES7 365-0BA01-0AA0
Supply voltages			
Rated value			
• DC 24 V		Yes	
Current consumption			
from backplane bus DC 5 V, max.	350 mA		100 mA
from supply voltage L+, max.		500 mA	
Power loss, typ.	2 W	5 W	0,5 W
Hardware config.			
Number of interfaces per CPU, max.	1	3	1; 1 pair
Dimensions and weight			
Width	40 mm	80 mm	40 mm
Height	125 mm	125 mm	125 mm
Depth	120 mm	120 mm	120 mm
Weights			
Weight, approx.	225 g	505 g	580 g

Ordering data

	Order No.
IM 360 interface module	**6ES7 360-3AA01-0AA0**
for expanding the S7-300 with max. 3 EUs; can be plugged into CC	
IM 361 interface module	**6ES7 361-3CA01-0AA0**
for expanding the S7-300 with max. 3 EUs; can be plugged into EU	
Connecting cable	
between IM 360 and IM 361 or IM 361 and IM 361	
1 m	**6ES7 368-3BB01-0AA0**
2.5 m	**6ES7 368-3BC51-0AA0**
5 m	**6ES7 368-3BF01-0AA0**
10 m	**6ES7 368-3CB01-0AA0**

		Order No.
IM 365 interface module		**6ES7 365-0BA01-0AA0**
for expanding the S7-300 with max. 1 EU; 2 modules with permanent connecting cable (1 m)		
SIMATIC Manual Collection	D)	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year	D)	**6ES7 998-8XC01-8YE2**
S7-300 manual		
Design, CPU data, module data, instruction list		
German		**6ES7 398-8FA10-8AA0**
English		**6ES7 398-8FA10-8BA0**
French		**6ES7 398-8FA10-8CA0**
Spanish		**6ES7 398-8FA10-8DA0**
Italian		**6ES7 398-8FA10-8EA0**

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

Overview

- SIPLUS IM 365: for configuring 1 central controller and no more than 1 expansion rack

Interface module	SIPLUS IM 365
Order No.	**6AG1 365-0BA01-2AA0**
Order No. based on	**6ES7 365-0BA01-0AA0**
Ambient temperature range	-25 °C to +60 °C, condensation permissible
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).
Technical data	The technical data are identical with the technical data of the based on modules.

Ordering data

	Order No.
SIPLUS IM 365 interface module (extended temperature range and medial load) for expansion of S7-300 with max. 1 EU; 2 modules with fixed connection cable (1 m)	**6AG1 365-0BA01-2AA0**
Accessories	see IM 365, page 4/234

Power supplies

Overview

- Load current supplies for S7-300/ET 200M
- To convert the line voltage to the required operating voltage (24V DC)
- Output current 2 A, 5 A or 10 A

Technical specifications

Power supply, type	**2 A**	**2 A**	**5 A**	**5 A**	**10 A**
Order No.	**6ES7 307-1BA00-0AA0**	**6ES7 305-1BA80-0AA0**	**6ES7 307-1EA00-0AA0**	**6ES7 307-1EA80-0AA0**	**6ES7 307-1KA01-0AA0**
Order No. SIPLUS		**6AG1 305-1BA80-2AA0** 1)		**6AG1 307-1EA80-2AA0** 1)	
Input	Single-phase AC	DC voltage	Single-phase AC	Single-phase AC	Single-phase AC
Rated voltage $V_{in\ rated}$	**120/230 V AC** Set via switch on device	**24 V … 110 V DC** Wide-range input	**120/230 V AC** Set via switch on device	**120/230 V AC** Set via switch on device	**120/230 V AC** Set via switch on device
Voltage range	85 … 132 V AC/ 170 … 264 V AC	16.8 … 138 V DC	85 … 132 V AC/ 170 … 264 V AC	93 … 132 V AC/ 187 … 264 V AC	85 … 132 V AC/ 170 … 264 V AC
Overvoltage resistance	2.3 x $V_{in\ rated}$, 1.3 ms	154 V; 0.1 s	2.3 x $V_{inrated}$, 1.3 ms	2.3 x $V_{inrated}$, 1.3 ms	2.3 x $V_{inrated}$, 1.3 ms
Line buffering at $I_{out\ rated}$	> 20 ms at V_{in} = 93/187 V	> 10 ms at $V_{in\ rated}$	> 20 ms at V_{in} = 93/187 V	> 20 ms at V_{in} = 93/187 V	> 20 ms at V_{in} = 93/187 V
Rated line frequency; rated line-frequency range	50/60 Hz, 47 to 63 Hz	-	50/60 Hz; 47 Hz to 63 Hz	50/60 Hz, 47 Hz to 63 Hz	50/60 Hz, 47 Hz to 63 Hz
Rated current $I_{in\ rated}$	0.9/0.6 A	2.7 … 0.6 A (4 … 0.9 A)	2.1/1.3 A	2.1/1.2 A	4.1/1.8 A
Switch-on current limit (+25 °C)	< 20 A, < 3 ms	< 20 A, < 10 ms	< 45 A, < 3 ms	< 45 A, < 3 ms	< 55 A, < 3 ms
I^2t	< 1.0 A^2s	< 5 A^2s	< 1.2 A^2s	< 1.8 A^2s (typ. 1.2 A^2s)	< 3.3 A^2s
Built-in line-side fuse	T 1.6 A/250 V (inaccessible)	T 6.3 A/250 V (inaccessible)	F 4 A/250 V (inaccessible)	T 3.15 A/250 V (inaccessible)	T 6.3 A/250 V (inaccessible)
Recommended miniature circuit-breaker (IEC 898) in the supply line	3 A, Characteristic C	At and above 10 A, C characteristic, suitable for DC	At and above 6 A, C characteristic	at and above 10 A, Characteristic C or at and above 6 A, Characteristic D	At and above 10 A, C characteristic
Output	Controlled, isolated DC voltage	Controlled, isolated DC voltage	Controlled, isolated DC voltage	Controlled, isolated DC voltage	Controlled, isolated DC voltage
Rated voltage $V_{out\ rated}$	**24 V DC**	**24 V DC**	**24 V DC**	**24 V DC**	**24 V DC**
Total tolerance	± 3 %	± 3 %	± 3 %	± 3 %	± 3 %
• Static line smoothing	approx. 0.1 %	approx. 0.2 %	approx. 0.1 %	approx. ± 0.2 %	approx. 0.1%
• Static load smoothing	approx. 0.2 %	approx. 0.4 %	approx. 0.2 %	approx. ± 0.4 %	approx. 0.5%
Ripple content (clock frequency: approx. 50 kHz; approx. 70 kHz with 6ES7 307-1BA00-0AA0)	< 150 mV_{pp} (typ. < 20 mV_{pp})	< 150 mV_{pp} (typ. < 30 mV_{pp})	< 150 mV_{pp} (typ. 40 mV_{pp})	< 150 mV_{pp} (typ. 40 mV_{pp})	< 150 mV_{pp} (typ. 40 mV_{pp})
Spikes (bandwidth: 20 MHz)	< 240 mV_{pp} (typ. < 150 mV_{pp})	< 240 mV_{pp} (typ. < 150 mV_{pp})	< 240 mV_{pp} (typ. 90 mV_{pp})	< 240 mV_{pp} (typ. 90 mV_{pp})	< 240 mV_{pp} (typ. 100 mV_{pp})
Adjustment range	-	-	-	-	-

1) SIPLUS module for temperature range -25 … +60°C and use under medial load (e.g. sulphur chloride atmosphere).
This SIPLUS power supply conforms with standards for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).

Technical specifications (continued)

Order No.	6ES7 307-1BA00-0AA0	6ES7 305-1BA80-0AA0	6ES7 307-1EA00-0AA0	6ES7 307-1EA80-0AA0	6ES7 307-1KA01-0AA0
Order No. SIPLUS		**6AG1 305-1BA80-2AA0** [1]		**6AG1 307-1EA80-2AA0** [1]	
Status indicator	Green LED for 24 V OK	Green LED for 24 V OK	Green LED for 24 V OK	Green LED for 24 V OK	Green LED for 24 V OK
Response on activation/deactivation	No overshoot of V_{out} (soft start)	No overshoot of V_{out} (soft start)	No overshoot of V_{out} (soft start)	No overshoot of V_{out} (soft start)	No overshoot of V_{out} (soft start)
Startup delay/ voltage rise	< 3 s/typ.60 ms	< 3 s (typ.7 ms)/ typ. 5 ms	< 2 s (typ.60 ms)	< 3 s/typ.100 ms	< 1.5 s/typ.80 ms
Rated current $I_{out\ rated}$	**2 A**	**2 A (3 A with Vin > 24 V)**	**5 A**	**5 A**	**10 A**
Current range					
• Up … +45 °C	0 A … 2 A	0 … 2 A (3 A)	0 A … 5 A	0 A … 5 A	0 A … 10 A
• Up … +60 °C	0 A … 2 A	0 … 3 A (3 A)	0 A … 5 A	0 A … 5 A	0 A … 10 A
Dynamic V/I at					
• Power-up on short-circuit	typ. 10 A for 90 ms	typ. 9 A for 270 ms	typ. 20 A for 75 ms	typ. 20 A for 180 ms	typ. 35 A for 80 ms
• Short-circuit during operation	typ. 10 A for 90 ms	typ. 9 A for 270 ms	typ. 20 A for 75 ms	typ. 20 A for 80 ms	typ. 35 A for 150 ms
Parallel switching for enhanced performance	not permissible	Yes, 2 units	not permissible	not permissible	not permissible
Efficiency					
Efficiency at $V_{out\ rated}$, $I_{out\ rated}$	approx. 83 %	approx. 75 %	approx. 87 %	approx. 84 %	approx. 87 %
Power loss at $V_{out\ rated}$, $I_{out\ rated}$	approx. 10 W	approx. 16 W (24 W)	approx. 18 W	approx. 23 W	approx. 34 W
Closed-loop control					
Dynamic line smoothing ($V_{in\ rated}$ ±15 %)	±0.3 % V_{out}	±0.3 % V_{out}	±0.3 % V_{out}	±0.3 % V_{out}	±0.3 % V_{out}
Dynamic load smoothing (I_{out}: 50/100/50 %)	±0.8 % V_{out}	±2.5 % V_{out}	±2.5 % V_{out}	±3 % V_{out}	±2.5 % V_{out}
Load-step settling time					
• 50 at 100 %	< 5 ms (typ. 2.5 ms)	< 5 ms (typ. 2.5 ms)	typ. 0.1 ms	< 5 ms (typ. 0.2 ms)	< 5 ms
• 100 at 50%	< 5 ms (typ. 2.5 ms)	< 5 ms (typ. 2.5 ms)	Typ. 0.1 ms	< 5 ms (typ. 0.2 ms)	< 5 ms
Protection and monitoring					
Output overvoltage protection	Additional control loop, shutdown at approx. 30 V, automatic restart	Additional control loop, shutdown at approx. 30 V, automatic restart	Additional control loop, shutdown at approx. 30 V, automatic restart	Additional control loop, shutdown at approx. 30 V, automatic restart	Additional control loop, shutdown at approx. 30 V, automatic restart
Current limit	2.2 A … 2.6 A	3.3 A … 3.9 A	5.5 A … 6.5 A	5.5 A … 6.5 A	11 A … 12 A
Short-circuit protection	Electronic shutdown, automatic restart	Electronic shutdown, automatic restart	Electronic shutdown, automatic restart	Electronic shutdown, automatic restart	Electronic shutdown, automatic restart
Sustained-short-circuit-current rms value	< 4 A	< 2 A	< 9 A	< 5 A	< 10 A
Overload/short-circuit indicator	-	-	-	-	-
Safety					
Primary/secondary galvanic isolation	Yes, safety extra-low output voltage V_{out} to EN 60950 and EN 50178	Yes, safety extra-low output voltage V_{out} to EN 60950 and EN 50178, creepages and clearances > 5 mm	Yes, safety extra-low output voltage V_{out} to EN 60950 and EN 50178	Yes, safety extra-low output voltage V_{out} to EN 60950 and EN 50178, creepages and clearances > 8 mm	Yes, safety extra-low output voltage V_{out} to EN 60950 and EN 50178
Protection class	Class I	Class I	Class I	Class I	Class I
Leakage current	< 3.5 mA (typ. 0.7 mA)	< 3.5 mA (typ. 0.7 mA)	< 3.5 mA (typ. 0.3 mA)	< 3.5 mA (typ. 0.3 mA)	< 3.5 mA (typ. 0.5 mA)

1) SIPLUS module for temperature range -25 … +60°C and use under medial load (e.g. sulphur chloride atmosphere).
This SIPLUS power supply conforms with standards for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).

Power supplies

Technical specifications (continued)

Order No.	6ES7 307-1BA00-0AA0	6ES7 305-1BA80-0AA0	6ES7 307-1EA00-0AA0	6ES7 307-1EA80-0AA0	6ES7 307-1KA01-0AA0
Order No. SIPLUS		6AG1 305-1BA80-2AA0 [1]		6AG1 307-1EA80-2AA0 [1]	
German Technical Inspectorate approval	Yes	Yes	Yes	Yes	Yes
CE label	Yes	Yes	Yes	Yes	Yes
UL/cUL (CSA) approval	Yes, UL-listed (UL 508) File E143289, CSA (CSA22.2 No. 14-95)	Yes, UL-listed (UL 508), file E143289, CSA (CSA22.2 no. 14-95)	Yes, UL-listed (UL 508), file E143289, CSA (CSA 22.2 no. 14-95)	Yes, UL-Listed (UL 508) File E143289, CSA (CSA22.2 No. 14-95)	Yes, UL-listed (UL 508), file E143289, CSA (CSA22.2 no. 14-95)
FM approval	Yes, Class I Div. 2 Group A, B, C, D T4	-	Yes, Class I Div. 2 Group A, B, C, D, T 4	-	Yes, Class I Div. 2, A, B, C, D, T4
Marine type approval	in S7-300 system	Yes, GL, LRS	in S7-300 system	Yes, GL, LRS	in S7-300 system
Degree of protection (EN 60529)	IP20	IP20	IP20	IP20	IP20
EMC					
Emitted interference	EN 55022 Class B	EN 55011 Class A	EN 55022 Class B	EN 55011 Class A	EN 55022 Class B
Supply-harmonics limitation	Not applicable	Not applicable	EN 61000-3-2	-	EN 61000-3-2
Noise immunity	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2
Operating data					
Ambient temperature range	0°C … +60°C with natural convection	-25°C … +70°C with natural convection	0°C … +60°C with natural convection	-25°C … +70°C with natural convection	0°C … +60°C with natural convection
Transport/storage temperature range	-40 °C … +85 °C	- 40 … + 85 °C	-40 °C … +85 °C	- 40 … + 85 °C	- 40 … + 85 °C
Humidity class	Climate class 3K3 to EN 60721, no condensation	Climate class 3K5 to EN 60721, transient condensation permitted	Climate class 3K3 to EN 60721, no condensation	Climate class 3K5 to EN 60721, transient condensation permitted	Climate class 3K3 to EN 60721, no condensation
Mechanical system					
Ports					
• Supply input L, N, PE (DC input: L+1, M1, PE)	Solid/finely-stranded per screw-type terminal for 0.5 mm to 2.5 mm^2	Solid/finely-stranded per screw-type terminal for 0.5 mm to 2.5 mm^2	Solid/finely-stranded per screw-type terminal for 0.5 mm to 2.5 mm^2	Solid/finely-stranded per screw-type terminal for 0.5 mm to 2.5 mm^2	Solid/finely-stranded per screw-type terminal for 0.5 mm to 2.5 mm^2
• Output L+	2 screw-type terminals for 0.5 mm to 2.5 mm^2	3 screw-type terminals for 0.5 mm to 2.5 mm^2	3 screw-type terminals for 0.5 mm to 2.5 mm^2	3 screw-type terminals for 0.5 mm to 2.5 mm^2	4 screw-type terminals for 0.5 mm to 2.5 mm^2
• Output M	2 screw-type terminals for 0.5 mm to 2.5 mm^2	3 screw-type terminals for 0.5 mm to 2.5 mm^2	3 screw-type terminals for 0.5 mm to 2.5 mm^2	3 screw-type terminals for 0.5 mm to 2.5 mm^2	4 screw-type terminals for 0.5 mm to 2.5 mm^2
Dimensions (W x H x D) in mm	50 x 125 x 120	80 x 125 x 120	80 x 125 x 120	80 x 125 x 120	120 x 125 x 120
Weight, approx.	0.42 kg	0.75 kg	0.74 kg	0.57 kg	1.1 kg
Assembly	Snaps onto S7 busbar	Snaps onto S7 busbar	Snaps onto S7 busbar	Snaps onto S7 busbar	Snaps onto S7 busbar
Accessories	Mounting adapter for DIN rail and PS-CPU power connector	Mounting adapter for DIN rail and PS-CPU power connector	Mounting adapter for DIN rail and power connector	Mounting adapter for DIN rail and power connector	Mounting adapter for DIN rail and PS-CPU power connector

1) SIPLUS module for temperature range -25 … +60°C and use under medial load (e.g. sulphur chloride atmosphere).
This SIPLUS power supply conforms with standards for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).

Power supplies

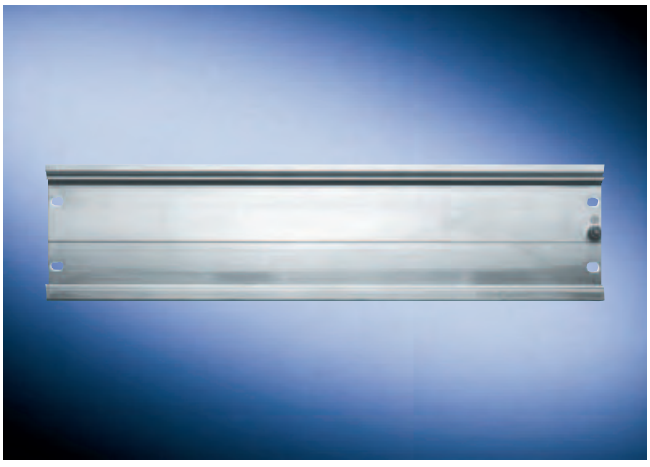
Ordering data

	Order No.
PS 305/307 load power supply	
incl. power connector	
120/230 V AC / 24 V DC; 2 A	**6ES7 307-1BA00-0AA0**
24 … 110 V DC / 24 V DC; 2 A, for extended temperature range	**6ES7 305-1BA80-0AA0**
120/230 V AC / 24 V DC; 5 A	**6ES7 307-1EA00-0AA0**
120/230 V AC / 24 V DC; 5 A, for extended temperature range	**6ES7 307-1EA80-0AA0**
120/230 V AC / 24 V DC; 10 A	**6ES7 307-1KA01-0AA0**

	Order No.
SIPLUS load power supply PS 305/307	
for temperature range -25 … +60°C and use under medial load (e.g. sulphur chloride atmosphere). Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	
24 … 110 V DC / 24 V DC; 2 A	**6AG1 305-1BA80-2AA0**
120/230 V AC / 24 V DC; 5 A	**6AG1 307-1EA80-2AA0**
Installation adapter	**6ES7 390-6BA00-0AA0**
For snapping the PS 307 onto a 35 mm DIN rail (EN 50022)	
PS-CPU power connector	**6ES7 390-7BA00-0AA0**
Spare part	

DIN Rail

Overview



- The mechanical mounting rack of the SIMATIC S7-300
- For accommodating the modules
- Can be screwed onto the wall

Ordering data

	Order No.
DIN rail	
160 mm	**6ES7 390-1AB60-0AA0**
482 mm	**6ES7 390-1AE80-0AA0**
530 mm	**6ES7 390-1AF30-0AA0**
830 mm	**6ES7 390-1AJ30-0AA0**
2000 mm	**6ES7 390-1BC00-0AA0**

Labeling sheets

Overview

Labeling sheets

- Film sheets for application-specific labeling of SIMATIC S7-300 I/O modules with commercial laser printers
- Single-color films, tear-resistant, dirt-resistant
- Easy handling:
  - Pre-perforated labeling sheets in DIN A4 format to allow easy separation of the labeling strips
  - The separated strips can be inserted directly into the I/O modules
- Different colors for distinction between module types or preferred areas of application:
  The labeling sheets are available in the colors teal, light beige, red and yellow. Yellow is reserved for failsafe systems.

Labeling strips.

- Teal-colored writable plastic strips
- For insertion in the front connector
- Spare part, 10 items

Label cover

- Teal-colored film
- To cover and hold user-made labeling strips on normal paper
- Accessories, 10 items

Technical specifications

	Labeling sheets for S7-300
Dimensions	DIN A4
Labeling strips per sheet, pre-perforated	10
Weight, approx.	0.1 kg

Ordering data

	Order No.
Labeling sheets	
for 16-channel signal modules, DIN A4, for printing with laser printer; 10 pieces	
petrol	**6ES7 392-2AX00-0AA0**
light-beige	**6ES7 392-2BX00-0AA0**
yellow	**6ES7 392-2CX00-0AA0**
red	**6ES7 392-2DX00-0AA0**
for 32-channel signal modules, DIN A4, for printing with laser printer; 10 pieces	
petrol	**6ES7 392-2AX10-0AA0**
light-beige	**6ES7 392-2BX10-0AA0**
yellow	**6ES7 392-2CX10-0AA0**
red	**6ES7 392-2DX10-0AA0**
Labeling strips	
10 pieces (spare part)	
for modules with 20-pin front connector	**6ES7 392-2XX00-0AA0**
for modules with 40-pin front connector	**6ES7 392-2XX10-0AA0**
Label cover	
10 pieces (spare part)	
for modules with 20-pin front connector	**6ES7 392-2XY00-0AA0**
for modules with 40-pin front connector	**6ES7 392-2XY10-0AA0**

SIMATIC S7-400

5

Brochures

For brochures serving as selection guides for SIMATIC products refer to:

http://www.siemens.com/simatic/printmaterial

S7-400 / S7-400H / S7-400F/FH

Overview

- The power PLC for medium to upper performance ranges
- The solution for even the most demanding tasks
- With a comprehensive range of modules and performance-graded CPUs for optimal adaptation to the automation task
- Flexible in use through simple implementation of distributed structures; convenient connection method
- Ideal communication and networking options
- Convenient system as result of user-friendly handling and uncomplicated, fan-free configuration
- Can be expanded without problems when the tasks increase
- Multicomputing:
  Simultaneous operation of a number of CPUs in a single S7-400 central controller.
  Multicomputing segments the overall power of an S7-400. For example, complex tasks can be divided according to technology (open-loop control, closed-loop control or communication) and assigned to different CPUs, thereby allocating each CPU its own local I/O.
- Modularity:
  The high-performance backplane bus on the S7-400 and the communication interfaces, which can be inserted directly into the CPU, provide the conditions for numerous communication lines to function efficiently. This enables a separate communication line to be set up for HMI and programming tasks, one for high-performance equidistant motion-control components and one "standard" I/O fieldbus. Additional connections to MES/ERP systems or the Internet that might be required can also be set up.
- Engineering and diagnostics:
  In particular in complex automation solutions with an increased engineering component, the S7-400 can be programmed and configured very efficiently in conjunction with the SIMATIC engineering tools. Available features include high-level languages such as SCL and graphics-based engineering tools for sequence control systems, state graphs and function charts.

For brochures serving as selection guides for SIMATIC products refer to:

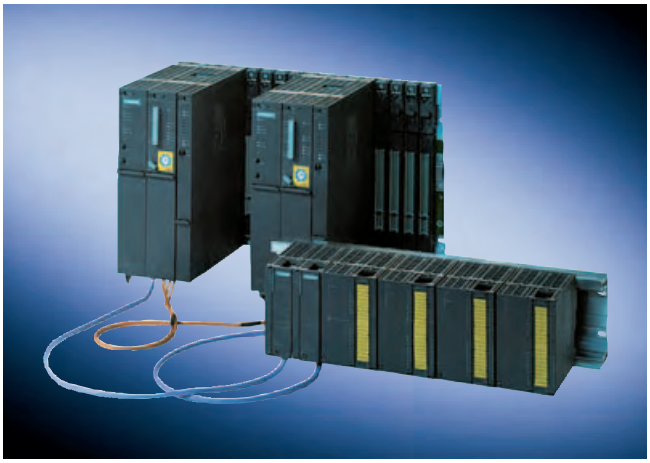
http://www.siemens.com/simatic/printmaterial

S7-400H

- Fault-tolerant automation system with redundant configuration
- For applications with high failure safety requirements
  Processes with high restart costs, expensive downtimes, little supervision, and few maintenance options
- Redundant central functions
- Increases availability of I/O: Switched-I/O configuration
- Also possible to use standard-availability I/Os: Single-sided configuration
- Hot standby: Automatic reaction-free switching to the standby unit in the event of a fault
- Configuration with 2 separate or one divided central controller
- Connection of switched I/O via redundant PROFIBUS DP

Overview (continued)

S7-400F/FH



- Failsafe automation system for plant with high safety requirements
- Complies with safety requirements up to SIL 3 to IEC 61508, AK6 to DIN V 19250 and Cat. 4 to EN 954-1
- If required, also fault tolerant through redundant configuration
- Without additional wiring of the failsafe I/O:
  Failsafe communication via PROFIBUS DP with *PROFI*Safe profile.
- Based on S7-400H and ET 200M, includes failsafe modules
- Standard modules for non-safety-related applications can also be used in the automation system
- Isolating module for common use of failsafe and standard modules in safety operation on an ET 200M

Technical specifications

General technical specifications	
Degree of protection	IP20
Ambient temperature	0°C to +60 °C
Relative humidity	5 to 95%, no condensation
Atmospheric pressure	860 to 1080 hPa
Electromagnetic compatibility	EU Directive 89/336/EWG; • per EN 50082-2 (noise immunity), testing per : IEC 61000-4-2, IEC 61000-4-4, IEC 61000-4-3, IEC 61000-4-6, IEC 61000-4-5; Emitted interference to EN 50081-2, limit values according to EN 55011, Class A, Group 1
Mechanical tolerance	
• Vibration, tested per/with	IEC 68, Part 2-6/10 to 58 Hz; constant amplitude 0.075 mm; 58 to 150 Hz; constant acceleration 1 g; Duration of vibrations: 10 frequency cycles per axis in the direction of each of the three mutually normal axes
• Impact, tested per/with	IEC 68, Part 2-27/semi-sinusoidal: impact 15 g (peak value), duration 11 ms

CPU 412-1, CPU 412-2

Overview

- The low-cost starter solution for the medium performance range
- Can be used in small and medium-sized systems with requirements of the medium performance range

Technical specifications

	6ES7 412-1XF04-0AB0	6ES7 412-2XG04-0AB0
Product status		
Firmware version	V 4.0	V 4.0
associated programming package	STEP7 V 5.2 SP1 or higher HF3 with HW-update	STEP7 V 5.2 SP1 or higher HF3 with HW-update
Supply voltages		
Rated value		
• DC 24 V	Yes	Yes
Voltages and currents		
Feeding of external buffer voltage to CPU	5 to 15 V DC	5 to 15 V DC
Current consumption		
from backplane bus DC 5 V, max.	0.7 A	1.2 A
Power loss, typ.	3 W	4.5 W
Backup battery		
• Buffer current, typ.	350 µA	350 µA
• Buffer current, max.	890 µA	890 µA
Memory		
Memory		
• RAM		
- integrated (for program)	72 KByte	128 KByte
- integrated (for data)	72 KByte	128 KByte
- expandable	No	No
• Load memory		
- expandable FEPROM	Yes; with Memory card (FLASH)	Yes; with Memory card (FLASH)
- expandable FEPROM, max.	64 MByte	64 MByte
- integrated RAM, max.	256 KByte	256 KByte
- expandable RAM	Yes; with Memory Card (RAM)	Yes; with Memory Card (RAM)
- expandable RAM, max.	16 MByte	16 MByte
Backup		
• present	Yes	Yes
• with battery	Yes; all data	Yes; all data
• without battery	No	No

	6ES7 412-1XF04-0AB0	6ES7 412-2XG04-0AB0
CPU/blocks		
DB		
• Number, max.	512; DB 0 reserved	512; DB 0 reserved
• Size, max.	64 KByte	64 KByte
FB		
• Number, max.	256	256
• Size, max.	64 KByte	64 KByte
FC		
• Number, max.	256	256
• Size, max.	64 KByte	64 KByte
OB		
• Size, max.	64 KByte	64 KByte
Nesting depth		
• per priority class	24	24
• additional within an error OB	1	1
CPU/processing times		
for bit operations, min.	0.1 µs	0.1 µs
for word operations, min.	0.1 µs	0.1 µs
for fixed point arithmetic, min.	0.1 µs	0.1 µs
for floating point arithmetic, min.	0.3 µs	0.3 µs
Times/counters and their remanence		
S7 counter		
• Number	2,048	2,048
• Remanence		
- adjustable	Yes	Yes
- lower limit	0	0
- upper limit	2,047	2,047
- preset	Z 0 to Z 7	Z 0 to Z 7
• Counting range		
- lower limit	0	0
- upper limit	999	999

Technical specifications (continued)

	6ES7 412-1XF04-0AB0	6ES7 412-2XG04-0AB0
Times/counters and their remanence		
IEC counter		
• present	Yes	Yes
• Type	SFB	SFB
S7 times		
• Number	2,048	2,048
• Remanence		
- adjustable	Yes	Yes
- lower limit	0	0
- upper limit	2,047	2,047
- preset	no timers retentive	no timers retentive
• Time range		
- lower limit	10 ms	10 ms
- upper limit	9,990 s	9,990 s
IEC timer		
• present	Yes	Yes
• Type	SFB	SFB
Data areas and their remanence		
remanent data area, total	total working and load memory (with backup battery)	total working and load memory (with backup battery)
Flag		
• Number, max.	4 KByte	4 KByte
• Remanence available	Yes; from MB 0 to MB 4095	Yes; from MB 0 to MB 4095
• Number of clock memories	8; (1 memory byte)	8; (1 memory byte)
Address area		
I/O address area		
• Inputs	4 KByte	4 KByte
• Outputs	4 KByte	4 KByte
• of which, distributed		
- MPI/DP interface, inputs	2 KByte	2 KByte
- MPI/DP interface, outputs	2 KByte	2 KByte
- DP interface, inputs		4 KByte; (For each line that is operated in isochronous mode, i.e. to which an OB 61 to 62 has been assigned, the distributed IO address areas are halved)
- DP interface, outputs		4 KByte; (For each line that is operated in isochronous mode, i.e. to which an OB 61 to 62 has been assigned, the distributed IO address areas are halved)

	6ES7 412-1XF04-0AB0	6ES7 412-2XG04-0AB0
Address area		
Process image		
• Inputs, adjustable	4 KByte	4 KByte
• Outputs, adjustable	4 KByte	4 KByte
• Inputs, preset	128 Byte	128 Byte
• Outputs, preset	128 Byte	128 Byte
• consistent data, max.	244 Byte	244 Byte
• Access to consistent data in process image	Yes	Yes
Subprocess images		
• Number of subprocess images, max.	15	15
Digital channels		
• Inputs	32,768	32,768
• Outputs	32,768	32,768
• Inputs, of which central	32,768	32,768
• Outputs, of which central	32,768	32,768
Analog channels		
• Inputs	2,048	2,048
• Outputs	2,048	2,048
• Inputs, of which central	2,048	2,048
• Outputs, of which central	2,048	2,048
Hardware config.		
Connectable OPs	15 without message processing, 8 with message processing	15 without message processing, 8 with message processing
Central devices, max.	1	1
Expansion devices, max.	21; (of which 6 ER with K-bus)	21; (of which 6 ER with K-bus)
Multicomputing	Yes; max. 4 CPUs (with UR1 or UR2)	Yes; max. 4 CPUs (with UR1 or UR2)
IM		
• Number of connectable IMs (total), max.	6	6
• Number of connectable IM 460s, max.	6	6
• Number of connectable IM 463s, max.	4; IM 463-2	4; IM 463-2
Number of DP masters		
• integrated	1	2
• via IM 467	4	4
• via CP	10; CP 443-5 Ext.	10; CP 443-5 Ext.
• Mixed mode IM + CP permitted	No; IM467 cannot be used jointly with CP 443-5 Ext.	No; IM467 cannot be used jointly with CP 443-5 Ext.
• via interface module	0	0
• Number of pluggable S5 modules (via adapter capsule in central device), max.	6	6

CPU 412-1, CPU 412-2

Technical specifications (continued)

	6ES7 412-1XF04-0AB0	6ES7 412-2XG04-0AB0
Hardware config.		
Number of operable FMs and CPs (recommended)		
• PROFIBUS and Ethernet CPs	14; incl. CP 443-5 Extended and IM 467	14; incl. CP 443-5 Ext. and IM 467
Time		
Clock		
• Hardware clock (real-time clock)	Yes	Yes
• Battery backed and synchronized	Yes	Yes
• Resolution	1 ms	1 ms
Operating hours counter		
• Number	8	8
Clock synchronization		
• supports	Yes	Yes
• to MPI, Master	Yes	Yes
• to MPI, Slave	Yes	Yes
• to DP, Master	Yes	Yes
• to DP, Slave	Yes	Yes
• in AS, Master	Yes	Yes
• in AS, Slave	Yes	Yes
S7 message functions		
Number of login stations for message functions, max.	8	8
Symbol-related messages	Yes	Yes
Number of messages		
• overall, max.	512	512
Block related messages	Yes	Yes
Alarm 8-blocks	Yes	Yes
Instrumentation & control messages	Yes	Yes
Test commissioning functions		
Status/control		
• Status/control variable	Yes	Yes
Monitoring functions		
Forcing		
• Forcing	Yes	Yes
Status block	Yes	Yes
Single step	Yes	Yes
Number of breakpoints	4	4
Diagnostic buffer		
• present	Yes	Yes
• Number of entries, max.	200	400
• adjustable	Yes	Yes
• preset	120	120

	6ES7 412-1XF04-0AB0	6ES7 412-2XG04-0AB0
Communication functions		
PG/OP communication	Yes	Yes
Routing	Yes	Yes
Global data communication		
• supported	Yes	Yes
• Size of GD packets, max.	64 Byte	64 Byte
S7 basic communication		
• supported	Yes; in MPI mode: via SFC X_SEND, X_RCV, X_GET and X_PUT; in DP master mode: via SFC I_GET and I_PUT	Yes; in MPI mode: via SFC X_SEND, X_RCV, X_GET and X_PUT; in DP master mode: via SFC I_GET and I_PUT
• Useful data per job, max.	76 Byte	76 Byte
S7 communication		
• supported	Yes	Yes
• as server	Yes	Yes
• as client	Yes	Yes
• Useful data per job, max.	64 KByte	64 KByte
S5-compatible communication		
• supported	Yes; via FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5	Yes; via FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5
• Useful data per job, max.	8 KByte	8 KByte
Standard communication (FMS)		
• supported	Yes; via CP and loadable FB	Yes; via CP and loadable FB
Number of connections		
• overall	16	16
1st interface		
Physics	RS 485/PROFIBUS	RS 485/PROFIBUS
isolated	Yes	Yes
Functionality		
• MPI	Yes	Yes
• DP master	Yes	Yes
• DP slave	Yes	Yes

Technical specifications (continued)

	6ES7 412-1XF04-0AB0	6ES7 412-2XG04-0AB0
1st interface		
MPI		
• Number of connections	16	16
• Services		
- PG/OP communication	Yes	Yes
- Routing	Yes	Yes
- Global data communication	Yes	Yes
- S7 basic communication	Yes	Yes
- S7 communication	Yes	Yes
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s
DP master		
• Number of connections, max.	16	16
• Services		
- PG/OP communication	Yes	Yes
- Routing	Yes	Yes
- S7 basic communication	Yes	Yes
- S7 communication	Yes	Yes
- equidistance support	Yes	Yes
- Activation/deactivation of DP slaves	Yes	Yes
- direct data exchange (cross traffic)	Yes	Yes
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s
• Number of DP slaves, max.	32	32
• Address area		
- Inputs, max.	2 KByte	2 KByte
- Outputs, max.	2 KByte	2 KByte
• Useful data per DP slave		
- Inputs, max.	244 Byte	244 Byte
- Outputs, max.	244 Byte	244 Byte
DP slave		
• Number of connections	16	1
• Services		
- Routing	Yes	Yes
- Status/control	Yes	Yes
- Programming	Yes	Yes
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s
• Transfer memory		
- Inputs	244 Byte	244 Byte
- Outputs	244 Byte	244 Byte
• Address area, max.	32	32
• Useful data per address area, max.	32 Byte	32 Byte
• Useful data per address area, of which consistent, max.	32 Byte	32 Byte

	6ES7 412-1XF04-0AB0	6ES7 412-2XG04-0AB0
2nd interface		
Physics		RS 485/PROFIBUS
isolated		Yes
Functionality		
• DP master		Yes
• DP slave		Yes
DP master		
• Number of connections, max.		16
• Services		
- PG/OP communication		Yes
- Routing		Yes
- S7 basic communication		Yes
- S7 communication		Yes
- equidistance support		Yes
- Activation/deactivation of DP slaves		Yes
- direct data exchange (cross traffic)		Yes
• Transmission speeds, max.		12 Mbit/s
• Number of DP slaves, max.		64
• Address area		
- Inputs, max.		4 KByte
- Outputs, max.		4 KByte
• Useful data per DP slave		
- Inputs, max.		244 Byte
- Outputs, max.		244 Byte
DP slave		
• Services		
- Routing		Yes
- Status/control		Yes
- Programming		Yes
• Transmission speeds, max.		12 Mbit/s
• Transfer memory		
- Inputs		244 Byte
- Outputs		244 Byte
• Address area, max.		32
• Useful data per address area, max.		32 Byte
• Useful data per address area, of which consistent, max.		32 Byte
Isochronous mode		
Useful data per isochronous slave, max.	244 Byte	244 Byte
equidistance	Yes	Yes
shortest clock pulse	1 ms	1 ms

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Technical specifications (continued)

	6ES7 412-1XF04-0AB0	6ES7 412-2XG04-0AB0
CiR configuration in RUN		
CiR synchronization time, basic load	100 ms	100 ms
CiR synchronization time, time per I/O slave	200 µs	200 µs
CPU/programming		
Programming language		
• STEP 7	Yes	Yes
• LAD	Yes	Yes
• FUP	Yes	Yes
• AWL	Yes	Yes
• SCL	Yes	Yes
• CFC	Yes	Yes
• GRAPH	Yes	Yes
• HiGraph	Yes	Yes

	6ES7 412-1XF04-0AB0	6ES7 412-2XG04-0AB0
Nesting levels	8	8
User program protection/password protection	Yes	Yes
Dimensions and weight		
Width	25 mm	25 mm
Height	290 mm	290 mm
Depth	219 mm	219 mm
Required slots	1	1
Weights		
Weight, approx.	720 g	720 g

Ordering data	Order No.
CPU 412-1	**6ES7 412-1XF04-0AB0**
Main memory 144 KB, power supply 24 V DC, MPI/ PROFIBUS DP master interface, slot for memory card, incl. slot number labels	
CPU 412-2	**6ES7 412-2XG04-0AB0**
Main memory 256 KB, power supply 24 V DC, MPI/ PROFIBUS DP master interface, slot for memory card, incl. slot number labels	
Memory Card RAM	
64 KB	**6ES7 952-0AF00-0AA0**
256 KB	**6ES7 952-1AH00-0AA0**
1 MB	**6ES7 952-1AK00-0AA0**
2 MB	**6ES7 952-1AL00-0AA0**
4 MB	**6ES7 952-1AM00-0AA0**
8 MB	**6ES7 952-1AP00-0AA0**
16 MB	**6ES7 952-1AS00-0AA0**
64 MB	**6ES7 952-1AY00-0AA0**
FEPROM memory card	
64 KB	**6ES7 952-0KF00-0AA0**
256 KB	**6ES7 952-0KH00-0AA0**
1 MB	**6ES7 952-1KK00-0AA0**
2 MB	**6ES7 952-1KL00-0AA0**
4 MB	**6ES7 952-1KM00-0AA0**
8 MB	**6ES7 952-1KP00-0AA0**
16 MB	**6ES7 952-1KS00-0AA0**
32 MB	**6ES7 952-1KT00-0AA0**
64 MB	**6ES7 952-1KY00-0AA0**
MPI cable	**6ES7 901-0BF00-0AA0**
For connecting SIMATIC S7 and the PG through MPI; 5 m in length	
Slot number plates	**6ES7 912-0AA00-0AA0**
1 set (spare part)	
Manual "SIMATIC S7-400 programmable controller"	
incl. instruction list	
German	**6ES7 498-8AA04-8AA0**
English	**6ES7 498-8AA04-8BA0**
French	**6ES7 498-8AA04-8CA0**
Spanish	**6ES7 498-8AA04-8DA0**
Italian	**6ES7 498-8AA04-8EA0**
S7-400 operation list	
German	**6ES7 498-8AA04-8AN0**
English	**6ES7 498-8AA04-8BN0**
French	**6ES7 498-8AA04-8CN0**
Spanish	**6ES7 498-8AA04-8DN0**
Italian	**6ES7 498-8AA04-8EN0**

	Order No.
Manual "Communication for SIMATIC S7-300/-400"	
German	**6ES7 398-8EA00-8AA0**
English	**6ES7 398-8EA00-8BA0**
French	**6ES7 398-8EA00-8CA0**
Spanish	**6ES7 398-8EA00-8DA0**
Italian	**6ES7 398-8EA00-8EA0**
SIMATIC Manual Collection D)	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, five languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	
SIMATIC Manual Collection update service for 1 year D)	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates	
Brochure "SIMATIC S7-400 programmable controller - Design and application"	
German	**6ES7 498-8AA00-8AB0**
English	**6ES7 498-8AA00-8BB0**
French	**6ES7 498-8AA00-8CB0**
Spanish	**6ES7 498-8AA00-8DB0**
Italian	**6ES7 498-8AA00-8EB0**
RS 485 bus connector with 90° cable outlet	
Max. transmission rate 12 Mbit/s	
Without PG interface	**6ES7 972-0BA12-0XA0**
With PG interface	**6ES7 972-0BB12-0XA0**
RS 485 bus connector with angled cable outlet	
Max. transmission rate 12 Mbit/s	
Without PG interface	**6ES7 972-0BA41-0XA0**
With PG interface	**6ES7 972-0BB41-0XA0**
RS 485 bus connector with 90° cable outlet for Fast Connect system	
Max. transmission rate 12 Mbit/s	
Without PG interface	**6ES7 972-0BA50-0XA0**
With PG interface	**6ES7 972-0BB50-0XA0**
RS 485 bus connector with axial cable outlet	
For SIMATIC OP, for connection to PPI, MPI, PROFIBUS	**6GK1 500-0EA02**
PROFIBUS FastConnect bus cable	
Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m	**6XV1 830-0EH10**

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

CPU 414-2, CPU 414-3, CPU 414-3 PN/DP

Overview

- CPUs for high demands in the mid-level performance range
- Applicable for plants with additional demands on programming scope and processing speed
- Integrated PROFINET functions in CPU 414-3 PN/DP

Technical specifications

	6ES7 414-2XG04-0AB0	6ES7 414-3XJ04-0AB0	6ES7 414-3EM05-0AB0
Product status			
Firmware version	V 4.0	V 4.0	V5.0
associated programming package	STEP7 V 5.2 SP1 or higher HF3 with HW-update	STEP7 V 5.2 SP1 or higher HF3 with HW-update	STEP7 V 5.4 SP1
Supply voltages			
Rated value			
• DC 24 V	Yes	Yes	Yes
Voltages and currents			
Feeding of external buffer voltage to CPU	5 to 15 V DC	5 to 15 V DC	5 to 15 V DC
Current consumption			
from backplane bus DC 5 V, max.	1.2 A	1.2 A	1.2 A
Power loss, typ.	4.5 W	4.5 W	5.5 W
Backup battery			
• Buffer current, typ.	550 µA	550 µA	125 µA
• Buffer current, max.	1,530 µA	1,530 µA	250 µA
Memory			
Memory			
• RAM			
- integrated (for program)	256 KByte	700 KByte	1.4 MByte
- integrated (for data)	256 KByte	700 KByte	1.4 MByte
- expandable	No	No	No
• Load memory			
- expandable FEPROM	Yes; with Memory card (FLASH)	Yes; with Memory card (FLASH)	Yes; with Memory card (FLASH)
- expandable FEPROM, max.	64 MByte	64 MByte	64 MByte
- integrated RAM, max.	256 KByte	256 KByte	512 KByte
- expandable RAM	Yes; with Memory Card (RAM)	Yes; with Memory Card (RAM)	Yes; with Memory Card (RAM)
- expandable RAM, max.	16 MByte	16 MByte	16 MByte
Backup			
• present	Yes	Yes	Yes
• with battery	Yes; all data	Yes; all data	Yes; all data
• without battery	No	No	No

Technical specifications (continued)

	6ES7 414-2XG04-0AB0	6ES7 414-3XJ04-0AB0	6ES7 414-3EM05-0AB0
CPU/blocks			
DB			
• Number, max.	4,095; DB 0 reserved	4,095; DB 0 reserved	6,000
• Size, max.	64 KByte	64 KByte	64 KByte
FB			
• Number, max.	2,048	2,048	3,000
• Size, max.	64 KByte	64 KByte	64 KByte
FC			
• Number, max.	2,048	2,048	3,000
• Size, max.	64 KByte	64 KByte	64 KByte
OB			
• Size, max.	64 KByte	64 KByte	64 KByte
Nesting depth			
• per priority class	24	24	24
• additional within an error OB	1	1	1
CPU/processing times			
for bit operations, min.	0.06 µs	0.06 µs	45 ns
for word operations, min.	0.06 µs	0.06 µs	45 ns
for fixed point arithmetic, min.	0.06 µs	0.06 µs	45 ne
for floating point arithmetic, min.	0.18 µs	0.18 µs	135 ns
Times/counters and their remanence			
S7 counter			
• Number	2,048	2,048	2,048
• Remanence			
- adjustable	Yes	Yes	Yes
- lower limit	0	0	0
- upper limit	2,047	2,047	2,047
- preset	From Z 0 to Z 7	From Z 0 to Z 7	From Z 0 to Z 7
• Counting range			
- lower limit	0	0	0
- upper limit	999	999	999
IEC counter			
• present	Yes	Yes	Yes
• Type	SFB	SFB	SFB
S7 times			
• Number	2,048	2,048	2,048
• Remanence			
- adjustable	Yes	Yes	Yes
- lower limit	0	0	0
- upper limit	2,047	2,047	2,047
- preset	no timers retentive	no timers retentive	no timers retentive
• Time range			
- lower limit	10 ms	10 ms	10 ms
- upper limit	9,990 s	9,990 s	9,990 s
IEC timer			
• present	Yes	Yes	Yes
• Type	SFB	SFB	SFB

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Technical specifications (continued)

	6ES7 414-2XG04-0AB0	6ES7 414-3XJ04-0AB0	6ES7 414-3EM05-0AB0
Data areas and their remanence			
remanent data area, total	total working and load memory (with backup battery)	total working and load memory (with backup battery)	total working and load memory (with backup battery)
Flag			
• Number, max.	8 KByte	8 KByte	8 KByte
• Remanence available	Yes; from MB 0 to MB 8191	Yes; from MB 0 to MB 8191	Yes; from MB 0 to MB 16383
• Number of clock memories	8; (1 memory byte)	8; (1 memory byte)	8; (1 memory byte)
Address area			
I/O address area			
• Inputs	8 KByte	8 KByte	8 KByte
• Outputs	8 KByte	8 KByte	8 KByte
• of which, distributed			
- MPI/DPinterface, inputs	2 KByte	2 KByte	2 KByte
- MPI/DP interface, outputs	2 KByte	2 KByte	2 KByte
- DP interface, inputs	6 KByte; (For each line that is operated in isochronous mode, i.e. to which an OB 61 to 62 has been assigned, the distributed IO address areas are halved)	6 KByte; (For each line that is operated in isochronous mode, i.e. to which an OB 61to 63 has been assigned, the distributed IO address areas are halved)	8 KByte
- DP interface, outputs	6 KByte; (For each line that is operated in isochronous mode, i.e. to which an OB 61 to 62 has been assigned, the distributed IO address areas are halved)	6 KByte; (For each line that is operated in isochronous mode, i.e. to which an OB 61 to 63 has been assigned, the distributed IO address areas are halved)	8 KByte
Process image			
• Inputs, adjustable	8 KByte	8 KByte	8 KByte
• Outputs, adjustable	8 KByte	8 KByte	8 KByte
• Inputs, preset	256 Byte	256 Byte	256 Byte
• Outputs, preset	256 Byte	256 Byte	256 Byte
• consistent data, max.	244 Byte	244 Byte	244 Byte
• Access to consistent data in process image	Yes	Yes	Yes
Subprocess images			
• Number of subprocess images, max.	15	15	15
Digital channels			
• Inputs	65,536	65,536	65,536
• Outputs	65,536	65,536	65,536
• Inputs, of which central	65,536	65,536	65,536
• Outputs, of which central	65,536	65,536	65,536
Analog channels			
• Inputs	4,096	4,096	4,096
• Outputs	4,096	4,096	4,096
• Inputs, of which central	4,096	4,096	4,096
• Outputs, of which central	4,096	4,096	4,096
Hardware config.			
connectable OPs	31 without message processing, 8 with message processing	31 without message processing, 8 with message processing	63
Central devices, max.	1	1	2
Expansion devices, max.	21; (of which 6 ER with K-bus)	21; (of which 6 ER with K-bus)	21; (of which 6 ER with K-bus)
Multicomputing	Yes; max. 4 CPUs (with UR1 or UR2)	Yes; max. 4 CPUs (with UR1 or UR2)	Yes; max. 4 CPUs (with UR1 or UR2)

Technical specifications (continued)

	6ES7 414-2XG04-0AB0	6ES7 414-3XJ04-0AB0	6ES7 414-3EM05-0AB0
IM			
• Number of connectable IMs (total), max.	6	6	6
• Number of connectable IM 460s, max.	6	6	6
• Number of connectable IM 463s, max.	4; IM 463-2	4; IM 463-2	4; IM 463-2
Number of DP masters			
• integrated	2	2	2
• via IM 467	4	4	4
• via CP	10; CP 443-5 Ext.	10; CP 443-5 Ext.	10; CP 443-5 Ext.
• Mixed mode IM + CP permitted	No; IM467 cannot be used jointly with CP 443-5 Ext.	No; IM467 cannot be used jointly with CP 443-5 Ext.	No; IM467 cannot be used jointly with CP 443-5 Ext.
• via interface module	0	1; IF 964-DP	1; IF 964-DP
• Number of pluggable S5 modules (via adapter capsule in central device), max.	6	6	6
Number of operable FMs and CPs (recommended)			
• PROFIBUS and Ethernet CPs	14; incl. CP 443-5 Ext. and IM 467	14; incl. CP 443-5 Ext. and IM 467	14; incl. CP 443-5 Ext. and IM 467
Time			
Clock			
• Hardware clock (real-time clock)	Yes	Yes	Yes
• Battery backed and synchronized	Yes	Yes	Yes
• Resolution	1 ms	1 ms	1 ms
Operating hours counter			
• Number	8	8	8
Clock synchronization			
• supports	Yes	Yes	Yes
• to MPI, Master	Yes	Yes	Yes
• to MPI, Slave	Yes	Yes	Yes
• to DP, Master	Yes	Yes	Yes
• to DP, Slave	Yes	Yes	Yes
• to PN via NTP as client	No	No	Yes
• in AS, Master	Yes	Yes	Yes
• in AS, Slave	Yes	Yes	Yes
• to IF 964 DP		Yes; as Master or Slave	Yes; as Master or Slave
S7 message functions			
Number of login stations for message functions, max.	8	8	8
Symbol-related messages	Yes	Yes	Yes
Number of messages			
• overall, max.	512	512	512
Block related messages	Yes	Yes	Yes
Alarm 8-blocks	Yes	Yes	Yes
Instrumentation & control messages	Yes	Yes	Yes
Test commissioning functions			
Status/control			
• Status/control variable	Yes	Yes	Yes

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Technical specifications (continued)

	6ES7 414-2XG04-0AB0	6ES7 414-3XJ04-0AB0	6ES7 414-3EM05-0AB0
Monitoring functions			
Forcing			
• Forcing	Yes	Yes	Yes
Status block	Yes	Yes	Yes
Single step	Yes	Yes	Yes
Number of breakpoints	4	4	4
Diagnostic buffer			
• present	Yes	Yes	Yes
• Number of entries, max.	400	3.200	3.200
• adjustable	Yes	Yes	Yes
• preset	120	120	120
Communication functions			
PG/OP communication	Yes	Yes	Yes
Routing	Yes	Yes	Yes
Global data communication			
• supported	Yes	Yes	Yes
• Size of GD packets, max.	64 Byte	64 Byte	64 Byte
S7 basic communication			
• supported	Yes; in MPI mode: via SFC X_SEND, X_RCV, X_GET and X_PUT; in DP master mode: via SFC I_GET and I_PUT	Yes; in MPI mode via: SFC X_SEND, X_RCV, X_GET and X_PUT; in DP master mode via: SFC I_GET and I_PUT	Yes
• Useful data per job, max.	76 Byte	76 Byte	76 Byte
S7 communication			
• supported	Yes	Yes	Yes
• as server	Yes	Yes	
• as client	Yes	Yes	
• Useful data per job, max.	64 KByte	64 KByte	64 KByte
S5-compatible communication			
• supported	Yes; via FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5	Yes; via FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5	Yes
• Useful data per job, max.	8 KByte	8 KByte	
Standard communication (FMS)			
• supported	Yes; via CP and loadable FB	Yes; via CP and loadable FB	Yes; via CP and loadable FB
Number of connections			
• overall	32	32	32
1st interface			
Physics	RS 485/PROFIBUS	RS 485 / PROFIBUS	RS 485/PROFIBUS
isolated	Yes	Yes	Yes
Functionality			
• MPI	Yes	Yes	Yes
• DP master	Yes	Yes	Yes
• DP slave	Yes	Yes	Yes

Technical specifications (continued)

	6ES7 414-2XG04-0AB0	6ES7 414-3XJ04-0AB0	6ES7 414-3EM05-0AB0
MPI			
• Number of connections	32	32	32
• Services			
- PG/OP communication	Yes	Yes	Yes
- Routing	Yes	Yes	Yes
- Global data communication	Yes	Yes	Yes
- S7 basic communication	Yes	Yes	Yes
- S7 communication	Yes	Yes	Yes
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s	12 Mbit/s
DP master			
• Number of connections, max.	16	16	16
• Services			
- PG/OP communication	Yes	Yes	Yes
- Routing	Yes	Yes	Yes
- S7 basic communication	Yes	Yes	Yes
- S7 communication	Yes	Yes	Yes
- equidistance support	Yes	Yes	Yes
- Activation/deactivation of DP slaves	Yes	Yes	Yes
- direct data exchange (cross traffic)	Yes	Yes	Yes
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s	12 Mbit/s
• Number of DP slaves, max.	32	32	32
• Address area			
- Inputs, max.	2 KByte	2 KByte	2 KByte
- Outputs, max.	2 KByte	2 KByte	2 KByte
• Useful data per DP slave			
- Inputs, max.	244 Byte	244 Byte	244 Byte
- Outputs, max.	244 Byte	244 Byte	244 Byte
DP slave			
• Number of connections	16	16	16
• Services			
- Routing	Yes	Yes	Yes
- Status/control	Yes	Yes	Yes
- Programming	Yes	Yes	Yes
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s	12 Mbit/s
• Transfer memory			
- Inputs	244 Byte	244 Byte	244 Byte
- Outputs	244 Byte	244 Byte	244 Byte
• Address area, max.	32	32	32
• Useful data per address area, max.	32 Byte	32 Byte	32 Byte
• Useful data per address area, of which consistent, max.	32 Byte	32 Byte	32 Byte
2nd interface			
Type of interface	integrated	integrated	PROFINET
Physics	RS 485/PROFIBUS	RS 485 / PROFIBUS	Ethernet
Isolated	Yes	Yes	Yes
Autosensing (10/100 Mbaud)			Yes
Autonegotiation			Yes
Autocrossover			Yes
Switch, number of ports			2

CPU 414-2, CPU 414-3, CPU 414-3 PN/DP

Technical specifications (continued)

	6ES7 414-2XG04-0AB0	6ES7 414-3XJ04-0AB0	6ES7 414-3EM05-0AB0
Functionality			
• PROFINET	No	No	Yes
• MPI	Yes	Yes	No
• PROFIBUS DP	No	No	No
• Point-to-point coupling	No	No	No
• DP slave	Yes	Yes	No
• DP master	Yes	Yes	No
PROFINET IO			
• Number of integrated PROFINET IO controllers			1
• Number of connectable PROFINET IO devices			256
• Max. user data consistency			240 byte
• Update time			1 ms to 512 ms; minimum value depends on the communication part selected for PROFINET IO, on the number of IO devices and on the amount of configured user data
• Send clock times			0.250 ms, 0.5 ms, 1 ms,
• Address area			Max. 8 Kbyte inputs / 8 Kbyte outputs
• Number of subelements			8,192
• Max. quantity structure in the I/O system			Max. 8192 inputs and 8192 outputs (in the case of hybrid modules, inputs and outputs count separately)
• Services			
- PG/OP communication			Yes
- Routing			Yes
- S7 communication			Yes
- Max. configurable connections			32
- PROFINET IO			Yes
- PROFINET CBA			Yes
- Open Industrial Ethernet communication			
- TCP/IP			Yes
- Iso-on-TCP			Yes
- UDP			Yes
DP master			
• Number of connections, max.	16	16	
• Services	Yes	Yes	
- PG/OP communication	Yes	Yes	
- Routing	Yes	Yes	
- S7 basic communication	Yes	Yes	
- S7 communication	Yes	Yes	
- equidistance support	Yes	Yes	
- Activation/deactivation of DP slaves	Yes	Yes	
- direct data exchange (cross traffic)	Yes	Yes	
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s	
• Number of DP slaves, max.	96	96	
• Address area			
- Inputs, max.	6 KByte	6 KByte	
- Outputs, max.	6 KByte	6 KByte	

Technical specifications (continued)

	6ES7 414-2XG04-0AB0	6ES7 414-3XJ04-0AB0	6ES7 414-3EM05-0AB0
2nd interface			
• Useful data per DP slave			
- Inputs, max.	244 Byte	244 Byte	
- Outputs, max.	244 Byte	244 Byte	
DP slave			
• Services			
- Routing	Yes	Yes	
- Status/control	Yes	Yes	
- Programming	Yes	Yes	
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s	
• Transfer memory			
- Inputs	244 Byte	244 Byte	
- Outputs	244 Byte	244 Byte	
• Address area, max.	32	32	
• Useful data per address area, max.	32 Byte	32 Byte	
• Useful data per address area, of which consistent, max.	32 Byte	32 Byte	
3rd interface			
Type of interfaces		Pluggable interface module (IF), Technical data as for 2nd interface	Pluggable interface module (IF), Technical data as for 2nd interface
pluggable interface module		IF 964-DP	IF 964-DP
Isochronous mode			
Useful data per isochronous slave, max.	244 Byte	244 Byte	244 Byte
equidistance	Yes	Yes	Yes
shortest clock pulse	1 ms	1 ms	1 ms
CiR configuration in RUN			
CiR synchronization time, basic load	100 ms	100 ms	100 ms
CiR synchronization time, time per I/O slave	80 µs	80 µs	80 µs
CPU/programming			
Programming language			
• STEP 7	Yes	Yes	Yes
• LAD	Yes	Yes	Yes
• FUP	Yes	Yes	Yes
• AWL	Yes	Yes	Yes
• SCL	Yes	Yes	Yes
• CFC	Yes	Yes	Yes
• GRAPH		Yes	Yes
• HiGraph	Yes	Yes	Yes
Nesting levels	8	8	8
User program protection/password protection	Yes	Yes	Yes
Dimensions and weight			
Width	25 mm	50 mm	
Height	290 mm	290 mm	290 mm
Depth	219 mm	219 mm	219 mm
Required slots	1	2	2
Weights			
Weight, approx.	720 g	1,070 g	900 g

CPU 414-2, CPU 414-3, CPU 414-3 PN/DP

Ordering data		Order No.
CPU 414-2		**6ES7 414-2XG04-0AB0**
Main memory 512 KB, power supply 24 V DC, MPI/PROFIBUS DP master interface, slot for memory card, incl. slot number labels		
CPU 414-3		**6ES7 414-3XJ04-0AB0**
Main memory 1.4 MB, power supply 24 V DC, MPI/PROFIBUS DP master interface, PROFIBUS DP master interface, slot for memory card, module slots for 1 IF module, incl. slot number labels		
CPU 414-3 PN/DP	A)	**6ES7 414-3EM05-0AB0**
Main memory 2.8 MB, power supply 24 V DC, MPI/PROFIBUS DP master interface, PROFINET interface, slot for memory card, module slots for 1 IF submodule, incl. slot number labels		
Memory Card RAM		
64 KB		**6ES7 952-0AF00-0AA0**
256 KB		**6ES7 952-1AH00-0AA0**
1 MB		**6ES7 952-1AK00-0AA0**
2 MB		**6ES7 952-1AL00-0AA0**
4 MB		**6ES7 952-1AM00-0AA0**
8 MB		**6ES7 952-1AP00-0AA0**
16 MB		**6ES7 952-1AS00-0AA0**
64 MB		**6ES7 952-1AY00-0AA0**
FEPROM memory card		
64 KB		**6ES7 952-0KF00-0AA0**
256 KB		**6ES7 952-0KH00-0AA0**
1 MB		**6ES7 952-1KK00-0AA0**
2 MB		**6ES7 952-1KL00-0AA0**
4 MB		**6ES7 952-1KM00-0AA0**
8 MB		**6ES7 952-1KP00-0AA0**
16 MB		**6ES7 952-1KS00-0AA0**
32 MB		**6ES7 952-1KT00-0AA0**
64 MB		**6ES7 952-1KY00-0AA0**
MPI cable		**6ES7 901-0BF00-0AA0**
For connecting SIMATIC S7 and the PG through MPI; 5 m in length		
IF 964-DP interface module		**6ES7 964-2AA04-0AB0**
To connect an additional DP line; for CPU 414-3, CPU 414-3 PN/DP, CPU 416-3, CPU 416-3 PN/DP, CPU 417-4		
Slot number plates		**6ES7 912-0AA00-0AA0**
1 set (spare part)		

		Order No.
Manual "SIMATIC S7-400 programmable controller"		
incl. instruction list		
German		**6ES7 498-8AA04-8AA0**
English		**6ES7 498-8AA04-8BA0**
French		**6ES7 498-8AA04-8CA0**
Spanish		**6ES7 498-8AA04-8DA0**
Italian		**6ES7 498-8AA04-8EA0**
S7-400 operation list		
German		**6ES7 498-8AA04-8AN0**
English		**6ES7 498-8AA04-8BN0**
French		**6ES7 498-8AA04-8CN0**
Spanish		**6ES7 498-8AA04-8DN0**
Italian		**6ES7 498-8AA04-8EN0**
Manual "Communication for SIMATIC S7-300/-400"		
German		**6ES7 398-8EA00-8AA0**
English		**6ES7 398-8EA00-8BA0**
French		**6ES7 398-8EA00-8CA0**
Spanish		**6ES7 398-8EA00-8DA0**
Italian		**6ES7 398-8EA00-8EA0**
SIMATIC Manual Collection	D)	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, five languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET		
SIMATIC Manual Collection update service for 1 year	D)	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		
Brochure "SIMATIC S7-400 programmable controller – Design and application"		
German		**6ES7 498-8AA00-8AB0**
English		**6ES7 498-8AA00-8BB0**
French		**6ES7 498-8AA00-8CB0**
Spanish		**6ES7 498-8AA00-8DB0**
Italian		**6ES7 498-8AA00-8EB0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

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

Ordering data	Order No.
PROFIBUS bus components	
RS 485 bus connector with 90° cable outlet	
Max. transmission rate 12 Mbit/s	
Without PG interface	**6ES7 972-0BA12-0XA0**
With PG interface	**6ES7 972-0BB12-0XA0**
RS 485 bus connector with angled cable outlet	
Max. transmission rate 12 Mbit/s	
Without PG interface	**6ES7 972-0BA41-0XA0**
With PG interface	**6ES7 972-0BB41-0XA0**
RS 485 bus connector with 90° cable outlet for Fast Connect system	
Max. transmission rate 12 Mbit/s	
Without PG interface	**6ES7 972-0BA50-0XA0**
With PG interface	**6ES7 972-0BB50-0XA0**
RS 485 bus connector with axial cable outlet	
For SIMATIC OP, for connection to PPI, MPI, PROFIBUS	**6GK1 500-0EA02**
PROFIBUS FastConnect bus cable	
Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m	**6XV1 830-0EH1**
RS 485 repeater for PROFIBUS	**6ES7 972-0AA01-0XA0**
Data transfer rate up to 12 Mbit/s; 24 V DC; IP 20 housing	

	Order No.
PROFINET bus components	
IE FC TP standard cable GP 2x2	**6XV1 840-2AH10**
4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug; PROFINET-compatible; with UL approval;	
Sold by the meter	
FO Standard Cable GP (50/125)	**6XV1 873-2A**
Standard cable, splittable, UL approval, sold by the meter	
SCALANCE X204-2 Industrial Ethernet switch	**6GK5 204-2BB00-2AA3**
Industrial Ethernet switches with integral SNMP access, Web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbit/s RJ45 ports and two FO ports	
IE FC RJ45 Plug 180	
RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet	
1 item	**6GK1 901-1BB10-2AA0**
10 items	**6GK1 901-1BB10-2AB0**
50 items	**6GK1 901-1BB10-2AE0**
PROFIBUS/PROFINET bus components	see Catalogs IK PI, CA 01
For establishing MPI/PROFIBUS/PROFINET communication	

CPU 416-2, CPU 416-3, CPU 416-3 PN/DP

Overview

- High-performance CPUs in the high-end performance range
- Applicable for plants with high requirements in the high-end performance range
- Integrated PROFINET functions in CPU 416-3 PN/DP

Technical specifications

	6ES7 416-2XK04-0AB0	6ES7 416-3XL04-0AB0	6ES7 416-3ER05-0AB0
Product status			
Firmware version	V 4.0	V 4.0	V5.0
associated programming package	STEP7 V 5.2 SP1 HF3 with HW-update or higher	STEP7 V 5.2 SP1 HF3 with HW-update or higher	STEP7 V 5.4 SP1 or higher
Supply voltages			
Rated value			
• DC 24 V	Yes	Yes	Yes
Voltages and currents			
Feeding of external buffer voltage to CPU	5 to 15 V DC	5 to 15 V DC	5 to 15 V DC
Current consumption			
from backplane bus DC 5 V, max.	1.2 A	1.4 A	1.2 A
Power loss, typ.	4.5 W	5 W	5.5 W
Backup battery			
• Buffer current, typ.	550 µA	550 µA	125 µA
• Buffer current, max.	1,539 µA	1,530 µA	250 µA
Memory			
Memory			
• RAM			
- integrated (for program)	1,400 KByte	2,800 KByte	5.6 MByte
- integrated (for data)	1,400 KByte	2,800 KByte	5.6 MByte
- expandable	No	No	No
• Load memory			
- expandable FEPROM	Yes; with Memory card (FLASH)	Yes; with Memory card (FLASH)	Yes; with Memory card (FLASH)
- expandable FEPROM, max.	64 MByte	64 MByte	64 MByte
- integrated RAM, max.	256 KByte	256 KByte	1 MByte
- expandable RAM	Yes; with Memory Card (RAM)	Yes; with Memory Card (RAM)	Yes; with Memory Card (RAM)
- expandable RAM, max.	16 MByte	64 MByte	64 MByte
Backup			
• present	Yes	Yes	Yes
• with battery	Yes; all data	Yes; all data	Yes; all data
• without battery	No	No	No
CPU/blocks			
DB			
• Number, max.	4,095; DB 0 reserved	4,095; DB 0 reserved	10,000
• Size, max.	64 KByte	64 KByte	64 KByte

Technical specifications (continued)

	6ES7 416-2XK04-0AB0	6ES7 416-3XL04-0AB0	6ES7 416-3ER05-0AB0
CPU/blocks			
FB			
• Number, max.	2,048	2,048	5,000
• Size, max.	64 KByte	64 KByte	64 KByte
FC			
• Number, max.	2,048	2,048	5,000
• Size, max.	64 KByte	64 KByte	64 KByte
OB			
• Size, max.	64 KByte	64 KByte	64 KByte
Nesting depth			
• per priority class	24	24	24
• additional within an error OB	2	2	1
CPU/processing times			
for bit operations, min.	0.04 µs	0.04 µs	0.030 µs
for word operations, min.	0.04 µs	0.04 µs	0.030 µs
for fixed point arithmetic, min.	0.04 µs	0.04 µs	0.030 µs
for floating point arithmetic, min.	0.12 µs	0.12 µs	0.090 µs
Times/counters and their remanence			
S7 counter			
• Number	2,048	2,048	2,048
• Remanence			
- adjustable	Yes	Yes	Yes
- lower limit	0	0	0
- upper limit	2,047	2,047	2,047
- preset	From Z 0 to Z 7	From Z 0 to Z 7	From Z 0 to Z 7
• Counting range			
- lower limit	0	0	0
- upper limit	999	999	999
IEC counter			
• present	Yes	Yes	Yes
• Type	SFB	SFB	SFB
S7 times			
• Number	2,048	2,048	2,048
• Remanence			
- adjustable	Yes	Yes	Yes
- lower limit	0	0	0
- upper limit	2,047	2,047	2,047
- preset	no timers retentive	no timers retentive	no timers retentive
• Time range			
- lower limit	10 ms	10 ms	10 ms
- upper limit	9,990 s	9,990 s	9,990 s
IEC timer			
• present	Yes	Yes	Yes
• Type	SFB	SFB	SFB
Data areas and their remanence			
remanent data area, total	total working and load memory (with backup battery)	total working and load memory (with backup battery)	total working and load memory (with backup battery)
Flag			
• Number, max.	16 KByte	16 KByte	16 KByte
• Remanence available	Yes; MB 0 to MB 16383	Yes; MB 0 to MB 16383	Yes; MB 0 to MB 16383
• Number of clock memories	8; (1 memory byte)	8; (1 memory byte)	8; (1 memory byte)

CPU 416-2, CPU 416-3, CPU 416-3 PN/DP

Technical specifications (continued)

	6ES7 416-2XK04-0AB0	6ES7 416-3XL04-0AB0	6ES7 416-3ER05-0AB0
Address area			
I/O address area			
• Inputs	16 KByte	16 KByte	16 KByte
• Outputs	16 KByte	16 KByte	16 KByte
• of which, distributed			
- MPI/DPinterface, inputs	2 KByte	2 KByte	2 KByte
- MPI/DP interface, outputs	2 KByte	2 KByte	2 KByte
- DP interface, inputs	8 KByte; (For each line that is operated in isochronous mode, i.e. to which an OB 61to 62 has been assigned, the distributed IO address areas are halved)	8 KByte; (For each line that is operated in isochronous mode, i.e. to which an OB 61to 62 has been assigned, the distributed IO address areas are halved)	8 KByte; (For each line that is operated in isochronous mode, i.e. to which an OB 61to 62 has been assigned, the distributed IO address areas are halved)
- DP interface, outputs	8 KByte; (For each line that is operated in isochronous mode, i.e. to which an OB 61 to 62 has been assigned, the distributed IO address areas are halved)	8 KByte; (For each line that is operated in isochronous mode, i.e. to which an OB 61 to 62 has been assigned, the distributed IO address areas are halved)	8 KByte; (For each line that is operated in isochronous mode, i.e. to which an OB 61 to 62 has been assigned, the distributed IO address areas are halved)
Process image			
• Inputs, adjustable	16 KByte	16 KByte	16 KByte
• Outputs, adjustable	16 KByte	16 KByte	16 KByte
• Inputs, preset	512 Byte	512 Byte	512 Byte
• Outputs, preset	512 Byte	512 Byte	512 Byte
• consistent data, max.	244 Byte	244 Byte	244 Byte
• Access to consistent data in process image	Yes	Yes	Yes
Subprocess images			
• Number of subprocess images, max.	15	15	15
Digital channels			
• Inputs	131,072	131,072	131,072
• Outputs	131,072	131,072	131,072
• Inputs, of which central	131,072	131,072	131,072
• Outputs, of which central	131,072	131,072	131,072
Analog channels			
• Inputs	8,192	8,192	8,192
• Outputs	8,192	8,192	8,192
• Inputs, of which central	8,192	8,192	8,192
• Outputs, of which central	8,192	8,192	8,192
Hardware config.			
connectable OPs	63 without message processing, 12 with message processing	63 without message processing, 12 with message processing	63
Central devices, max.	1	1	2
Expansion devices, max.	21; (of which 6 ER with K-bus)	21; (of which 6 ER with K-bus)	21; (of which 6 ER with K-bus)
Multicomputing	Yes; max. 4 CPUs (with UR1 or UR2)	Yes; max. 4 CPUs (with UR1 or UR2)	Yes; max. 4 CPUs (with UR1 or UR2)
IM			
• Number of connectable IMs (total), max.	6	6	6
• Number of connectable IM 460s, max.	6	6	6
• Number of connectable IM 463s, max.	4; IM 463-2	4; IM 463-2	4; IM 463-3

Technical specifications (continued)

	6ES7 416-2XK04-0AB0	6ES7 416-3XL04-0AB0	6ES7 416-3ER05-0AB0
Address area			
Number of DP masters			
• integrated	2	2	2
• via IM 467	4	4	4
• via CP	10; CP 443-5 Ext.	10; CP 443-5 Ext.	10; CP 443-5 Ext.
• Mixed mode IM + CP permitted	No; IM 467 cannot be used jointly with CP 443-5 Ext.	No; IM 467 cannot be used with CP 443-5 Ext.; IM 467 cannot be used with CP 443-1 EX40 in PN IO mode	No; IM 467 cannot be used with CP 443-5 Ext.
• via interface module		1; IF 964-DP	1; IF 964-DP
• Number of pluggable S5 modules (via adapter capsule in central device), max.	6	6	6
Number of operable FMs and CPs (recommended)			
• PROFIBUS and Ethernet CPs	14; incl. CP 443-5 Ext. and IM 467	14; incl. CP 443-5 Ext. and IM 467	14; incl. CP 443-5 Ext. and IM 467
Time			
Clock			
• Hardware clock (real-time clock)	Yes	Yes	Yes
• Battery backed and synchronized	Yes	Yes	Yes
• Resolution	1 ms	1 ms	1 ms
Operating hours counter			
• Number	8	8	8
Clock synchronization			
• supports	Yes	Yes	Yes
• to MPI, Master	Yes	Yes	Yes
• to MPI, Slave	Yes	Yes	Yes
• to DP, Master	Yes	Yes	Yes
• to DP, Slave	Yes	Yes	Yes
• to PN via NTP as client	No	No	Yes
• in AS, Master	Yes	Yes	Yes
• in AS, Slave	Yes	Yes	Yes
• to IF 964 DP		Yes; as Master or Slave	Yes; as Master or Slave
S7 message functions			
Number of login stations for message functions, max.	12	12	12
Symbol-related messages	Yes	Yes	Yes
Number of messages			
• overall, max.	1,024	1,024	1,024
Block related messages	Yes	Yes	Yes
Alarm 8-blocks	Yes	Yes	Yes
Instrumentation & control messages	Yes	Yes	Yes
Test commissioning functions			
Status/control			
• Status/control variable	Yes	Yes	Yes
Monitoring functions			
Forcing			
• Forcing	Yes	Yes	Yes
Status block	Yes	Yes	Yes
Single step	Yes	Yes	Yes

CPU 416-2, CPU 416-3, CPU 416-3 PN/DP

Technical specifications (continued)

	6ES7 416-2XK04-0AB0	6ES7 416-3XL04-0AB0	6ES7 416-3ER05-0AB0
Monitoring functions			
Number of breakpoints	4	4	4
Diagnostic buffer			
• present	Yes	Yes	Yes
• Number of entries, max.	3,200	3,200	3,200
• adjustable	Yes	Yes	Yes
• preset	120	120	120
Communication functions			
PG/OP communication	Yes	Yes	Yes
Routing	Yes		Yes
Global data communication			
• supported	Yes	Yes	Yes
• Size of GD packets, max.	64 Byte	64 Byte	64 Byte
S7 basic communication			
• supported	Yes; in MPI mode: via SFC X_SEND, X_RCV, X_GET and X_PUT; in DP master mode: via SFC I_GET and I_PUT	Yes; in MPI mode: via SFC X_SEND, X_RCV, X_GET and X_PUT; in DP master mode: via SFC I_GET and I_PUT	Yes
• Useful data per job, max.	76 Byte	76 Byte	76 Byte
S7 communication			
• supported	Yes	Yes	Yes
• as server	Yes	Yes	
• as client	Yes	Yes	
• Useful data per job, max.	64 KByte	64 KByte	64 KByte
S5-compatible communication			
• supported	Yes; via FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5	Yes; via FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5	Yes
• Useful data per job, max.	8 KByte	8 KByte	
Standard communication (FMS)			
• supported	Yes; via CP and loadable FB	Yes; via CP and loadable FB	Yes; via CP and loadable FB
Number of connections			
• overall	64	64	64
1st interface			
Physics	RS-485 / PROFIBUS	RS-485 / PROFIBUS	RS-485 / PROFIBUS
isolated	Yes	Yes	Yes
Functionality			
• MPI	Yes	Yes	Yes
• DP master	Yes	Yes	Yes
• DP slave	Yes	Yes	Yes
MPI			
• Number of connections	44	44	44
• Services			
- PG/OP communication	Yes	Yes	Yes
- Routing	Yes	Yes	Yes
- Global data communication	Yes	Yes	Yes
- S7 basic communication	Yes	Yes	Yes
- S7 communication	Yes	Yes	Yes
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s	12 Mbit/s

Technical specifications (continued)

	6ES7 416-2XK04-0AB0	6ES7 416-3XL04-0AB0	6ES7 416-3ER05-0AB0
1st interface			
DP master			
• Number of connections, max.	32; if a diagnostic repeater is used on the line, the number of connection resources on the line is reduced by 1	32; if a diagnostic repeater is used on the line, the number of connection resources on the line is reduced by 1	32; if a diagnostic repeater is used on the line, the number of connection resources on the line is reduced by 1
• Services			
- PG/OP communication	Yes	Yes	Yes
- Routing	Yes	Yes	Yes
- S7 basic communication	Yes	Yes	Yes
- S7 communication	Yes	Yes	Yes
- equidistance support	Yes	Yes	Yes
- Activation/deactivation of DP slaves	Yes	Yes	Yes
- direct data exchange (cross traffic)	Yes	Yes	Yes
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s	12 Mbit/s
• Number of DP slaves, max.	32	32	32
• Address area			
- Inputs, max.	2 KByte	2 KByte	2 KByte
- Outputs, max.	2 KByte	2 KByte	2 KByte
• Useful data per DP slave			
- Inputs, max.	244 Byte	244 Byte	244 Byte
- Outputs, max.	244 Byte	244 Byte	244 Byte
DP slave			
• Number of connections			16
• Services			
- Routing	Yes	Yes	Yes
- Status/control	Yes	Yes	Yes
- Programming	Yes	Yes	Yes
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s	12 Mbit/s
• Transfer memory			
- Inputs	244 Byte	244 Byte	244 Byte
- Outputs	244 Byte	244 Byte	244 Byte
• Address area, max.	32	32	32
• Useful data per address area, max.	32 Byte	32 Byte	32 Byte
• Useful data per address area, of which consistent, max.	32 Byte	32 Byte	32 Byte
2nd interface			
Type of interface	Integrated	Integrated	PROFINET
Physics	RS-485 / PROFIBUS	RS-485 / PROFIBUS	Ethernet
Isolated	Yes	Yes	Yes
Autosensing (10/100 Mbaud)			Yes
Autonegotiation			Yes
Autocrossover			Yes
Switch, number of ports			2
Functionality			
• PROFINET	No	No	Yes
• MPI	Yes	Yes	No
• PROFIBUS DP	No	No	No
• Point-to-point coupling	No	No	No
• DP master	Yes	Yes	No
• DP slave	Yes	Yes	No

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Technical specifications (continued)

	6ES7 416-2XK04-0AB0	6ES7 416-3XL04-0AB0	6ES7 416-3ER05-0AB0
2nd interface			
PROFINET IO			
• Number of integrated PROFINET IO controllers			1
• Number of PROFINET IO devices			256
• Max. user data consistency			240 bytes
• Update time			1 ms to 512 ms; minimum value depends on the communication part selected for PROFINET IO, on the number of IO devices and on the amount of configured user data
• Send clock times			0.250 ms, 0.5 ms, 1 ms,
• Address area			Max. 8 Kbyte inputs / 8 Kbyte outputs
• Number of subelements			8,192
• Max. quantity structure in the I/O system			Max. 8192 inputs and 8192 outputs (in the case of hybrid modules, inputs and outputs count separately)
• Services			
- PG/OP communication			Yes
- Routing			Yes
- S7 communication			Yes
- Max. configurable connections			32
- PROFINET IO			Yes
- PROFINET CBA			Yes
- Open Industrial Ethernet communication			
- TCP/IP			Yes
- Iso-on-TCP			Yes
- UDP			Yes
DP master			
• Number of connections, max.	32; if a diagnostic repeater is used on the line, the number of connection resources on the line is reduced by 1	32; if a diagnostic repeater is used on the line, the number of connection resources on the line is reduced by 1	
• Services	Yes	Yes	
- PG/OP communication	Yes	Yes	
- Routing	Yes	Yes	
- S7 basic communication	Yes	Yes	
- S7 communication	Yes	Yes	
- equidistance support	Yes	Yes	
- Activation/deactivation of DP slaves	Yes	Yes	
- direct data exchange (cross traffic)	Yes	Yes	
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s	
• Number of DP slaves, max.	125	125	
• Address area			
- Inputs, max.	8 KByte	8 KByte	
- Outputs, max.	8 KByte	8 KByte	
• Useful data per DP slave			
- Inputs, max.	244 Byte	244 Byte	
- Outputs, max.	244 Byte	244 Byte	
DP slave			
• Services			
- Routing	Yes	Yes	
- Status/control	Yes	Yes	
- Programming	Yes	Yes	

Technical specifications (continued)

	6ES7 416-2XK04-0AB0	6ES7 416-3XL04-0AB0	6ES7 416-3ER05-0AB0
2nd interface			
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s	
• Transfer memory			
- Inputs	244 Byte	244 Byte	
- Outputs	244 Byte	244 Byte	
• Address area, max.	32	32	
• Useful data per address area, max.	32 Byte	32 Byte	
• Useful data per address area, of which consistent, max.	32 Byte	32 Byte	
3rd interface			
Type of interface		Pluggable interface module (IF), Technical data as for 2nd interface	Pluggable interface module (IF), Technical data as for 2nd interface
pluggable interface module		IF 964-DP	IF 964-DP
Isochronous mode			
Useful data per isochronous slave, max.	244 Byte	244 Byte	244 Byte
equidistance	Yes	Yes	Yes
shortest clock pulse	1 ms	1 ms	1 ms
CiR configuration in RUN			
CiR synchronization time, basic load	100 ms	100 ms	100 ms
CiR synchronization time, time per I/O slave	40 µs	40 µs	40 µs
CPU/programming			
Programming language			
• STEP 7	Yes	Yes	Yes
• LAD	Yes	Yes	Yes
• FUP	Yes	Yes	Yes
• AWL	Yes	Yes	Yes
• SCL	Yes	Yes	Yes
• CFC	Yes	Yes	Yes
• GRAPH	Yes	Yes	Yes
• HiGraph	Yes	Yes	Yes
Nesting levels	8	8	8
User program protection/ password protection	Yes	Yes	Yes
Dimensions and weight			
Width	25 mm	50 mm	50 mm
Height	290 mm	290 mm	290 mm
Depth	219 mm	219 mm	219 mm
Required slots	1	2	2
Weights			
Weight, approx.	720 g	1.070 g	900 g

CPU 416-2, CPU 416-3, CPU 416-3 PN/DP

Ordering data		Order No.
CPU 416-2		**6ES7 416-2XK04-0AB0**
Main memory 2.8 MB, power supply 24 V DC, MPI/PROFIBUS DP master interface, PROFIBUS DP master interface, slot for memory card, incl. slot number labels		
CPU 416-3		**6ES7 416-3XL04-0AB0**
Main memory 5.6 MB, power supply 24 V DC, MPI/PROFIBUS DP master interface, PROFIBUS DP master interface, module slot for 1 IF submodule, slot for memory card, incl. slot number labels		
CPU 416-3 PN/DP	A)	**6ES7 416-3ER05-0AB0**
Main memory 11.2 MB, power supply 24 V DC, MPI/PROFIBUS DP master interface, PROFINET interface, module slot for 1 IF submodule, slot for memory card, incl. slot number labels		
Memory Card RAM		
64 KB		**6ES7 952-0AF00-0AA0**
256 KB		**6ES7 952-1AH00-0AA0**
1 MB		**6ES7 952-1AK00-0AA0**
2 MB		**6ES7 952-1AL00-0AA0**
4 MB		**6ES7 952-1AM00-0AA0**
8 MB		**6ES7 952-1AP00-0AA0**
16 MB		**6ES7 952-1AS00-0AA0**
64 MB		**6ES7 952-1AY00-0AA0**
FEPROM memory card		
64 KB		**6ES7 952-0KF00-0AA0**
256 KB		**6ES7 952-0KH00-0AA0**
1 MB		**6ES7 952-1KK00-0AA0**
2 MB		**6ES7 952-1KL00-0AA0**
4 MB		**6ES7 952-1KM00-0AA0**
8 MB		**6ES7 952-1KP00-0AA0**
16 MB		**6ES7 952-1KS00-0AA0**
32 MB		**6ES7 952-1KT00-0AA0**
64 MB		**6ES7 952-1KY00-0AA0**
MPI cable		**6ES7 901-0BF00-0AA0**
For connecting SIMATIC S7 and the PG through MPI; 5 m in length		
IF 964-DP interface module		**6ES7 964-2AA04-0AB0**
To connect an additional DP line; for CPU 414-3, CPU 414-3 PN/DP, CPU 416-3, CPU 416-3 PN/DP, CPU 417-4		
Slot number plates		**6ES7 912-0AA00-0AA0**
1 set (spare part)		

		Order No.
Manual "SIMATIC S7-400 programmable controller"		
incl. instruction list		
German		**6ES7 498-8AA04-8AA0**
English		**6ES7 498-8AA04-8BA0**
French		**6ES7 498-8AA04-8CA0**
Spanish		**6ES7 498-8AA04-8DA0**
Italian		**6ES7 498-8AA04-8EA0**
S7-400 operation list		
German		**6ES7 498-8AA04-8AN0**
English		**6ES7 498-8AA04-8BN0**
French		**6ES7 498-8AA04-8CN0**
Spanish		**6ES7 498-8AA04-8DN0**
Italian		**6ES7 498-8AA04-8EN0**
Manual "Communication for SIMATIC S7-300/-400"		
German		**6ES7 398-8EA00-8AA0**
English		**6ES7 398-8EA00-8BA0**
French		**6ES7 398-8EA00-8CA0**
Spanish		**6ES7 398-8EA00-8DA0**
Italian		**6ES7 398-8EA00-8EA0**
SIMATIC Manual Collection	D)	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, five languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET		
SIMATIC Manual Collection update service for 1 year	D)	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		
Brochure "SIMATIC S7-400 programmable controller - Design and application"		
German		**6ES7 498-8AA00-8AB0**
English		**6ES7 498-8AA00-8BB0**
French		**6ES7 498-8AA00-8CB0**
Spanish		**6ES7 498-8AA00-8DB0**
Italian		**6ES7 498-8AA00-8EB0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

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

Ordering data	Order No.
PROFIBUS bus components	
RS 485 bus connector with 90° cable outlet	
Max. transmission rate 12 Mbit/s	
Without PG interface	**6ES7 972-0BA12-0XA0**
With PG interface	**6ES7 972-0BB12-0XA0**
RS 485 bus connector with angled cable outlet	
Max. transmission rate 12 Mbit/s	
Without PG interface	**6ES7 972-0BA41-0XA0**
With PG interface	**6ES7 972-0BB41-0XA0**
RS 485 bus connector with 90° cable outlet for Fast Connect system	
Max. transmission rate 12 Mbit/s	
Without PG interface	**6ES7 972-0BA50-0XA0**
With PG interface	**6ES7 972-0BB50-0XA0**
RS 485 bus connector with axial cable outlet	
For SIMATIC OP, for connection to PPI, MPI, PROFIBUS	**6GK1 500-0EA02**
PROFIBUS FastConnect bus cable	
Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m	**6XV1 830-0EH10**
RS 485 repeater for PROFIBUS	**6ES7 972-0AA01-0XA0**
Data transfer rate up to 12 Mbit/s; 24 V DC; IP 20 housing	

	Order No.
PROFINET bus components	
IE FC TP standard cable GP 2x2	**6XV1 840-2AH10**
4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug; PROFINET-compatible; with UL approval;	
Sold by the meter	
FO Standard Cable GP (50/125)	**6XV1 873-2A**
Standard cable, splittable, UL approval, sold by the meter	
SCALANCE X204-2 Industrial Ethernet switch	**6GK5 204-2BB00-2AA3**
Industrial Ethernet switches with integral SNMP access, Web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbit/s RJ45 ports and two FO ports	
IE FC RJ45 Plug 180	
RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet	
1 item	**6GK1 901-1BB10-2AA0**
10 items	**6GK1 901-1BB10-2AB0**
50 items	**6GK1 901-1BB10-2AE0**
PROFIBUS/PROFINET bus components	see Catalogs IK PI, CA 01
For establishing MPI/PROFIBUS/PROFINET communication	

CPU 417-4

Overview

- The most powerful SIMATIC S7-400 CPU
- Can be used in the most sophisticated installations in the upper performance range
- With two slots for IF modules

Technical specifications

	6ES7 417-4XL04-0AB0
Product status	
Firmware version	V 4.0
associated programming package	STEP 7 V 5.2 SP1 or higher HF3 with HW-update
Supply voltages	
Rated value	
• DC 24 V	Yes
Voltages and currents	
Feeding of external buffer voltage to CPU	5 to 15 V DC
Current consumption	
from backplane bus DC 5 V, max.	1.7 A
Power loss, typ.	6 W
Backup battery	
• Buffer current, typ.	600 µA
• Buffer current, max.	1,810 µA
Memory	
Memory	
• RAM	
- integrated (for program)	10 MByte
- integrated (for data)	10 MByte
- expandable	No
• Load memory	
- expandable FEPROM	Yes; with Memory card (FLASH)
- expandable FEPROM, max.	64 MByte
- integrated RAM, max.	256 KByte
- expandable RAM	Yes; with Memory Card (RAM)
- expandable RAM, max.	16 MByte
Backup	
• present	Yes
• with battery	Yes; all data
• without battery	No

	6ES7 417-4XL04-0AB0
CPU/blocks	
DB	
• Number, max.	8,192; DB 0 reserved
• Size, max.	64 KByte
FB	
• Number, max.	6,144
• Size, max.	64 KByte
FC	
• Number, max.	6,144
• Size, max.	64 KByte
OB	
• Size, max.	64 KByte
Nesting depth	
• per priority class	24
• additional within an error OB	2
CPU/processing times	
for bit operations, min.	0.03 µs
for word operations, min.	0.03 µs
for fixed point arithmetic, min.	0.03 µs
for floating point arithmetic, min.	0.09 µs
Times/counters and their remanence	
S7 counter	
• Number	2,048
• Remanence	
- adjustable	Yes
- lower limit	0
- upper limit	2,047
- preset	From Z 0 to Z 7
• Counting range	
- lower limit	0
- upper limit	999

Technical specifications (continued)

	6ES7 417-4XL04-0AB0
IEC counter	
• present	Yes
• Type	SFB
S7 times	
• Number	2,048
• Remanence	
- adjustable	Yes
- lower limit	0
- upper limit	2,047
- preset	no timers retentive
• Time range	
- lower limit	10 ms
- upper limit	9,990 s
IEC timer	
• present	Yes
• Type	SFB
Data areas and their remanence	
remanent data area, total	total working and load memory (with backup battery)
Flag	
• Number, max.	16 KByte
• Remanence available	Yes; MB 0 to MB 16383
• Number of clock memories	8; 1 memory byte
Address area	
I/O address area	
• Inputs	16 KByte
• Outputs	16 KByte
• of which, distributed	
- MPI/DPinterface, inputs	2 KByte
- MPI/DP interface, outputs	2 KByte
- DP interface, inputs	8 KByte; (For each line that is operated in isochronous mode, i.e. to which an OB 61 to 64 has been assigned, the distributed IO address areas are halved)
- DP interface, outputs	8 KByte; (For each line that is operated in isochronous mode, i.e. to which an OB 61 to 64 has been assigned, the distributed IO address areas are halved)
Process image	
• Inputs, adjustable	16 KByte
• Outputs, adjustable	16 KByte
• Inputs, preset	1,024 Byte
• Outputs, preset	1,024 Byte
• consistent data, max.	244 Byte
• Access to consistent data in process image	Yes

	6ES7 417-4XL04-0AB0
Subprocess images	
• Number of subprocess images, max.	15
Digital channels	
• Inputs	131.072
• Outputs	131.072
• Inputs, of which central	131.072
• Outputs, of which central	131.072
Analog channels	
• Inputs	8.192
• Outputs	8.192
• Inputs, of which central	8.192
• Outputs, of which central	8.192
Hardware config.	
connectable OPs	63 without message processing, 16 with message processing
Central devices, max.	1
Expansion devices, max.	21; (of which 6 ER with K-bus)
Multicomputing	Yes; max. 4 CPUs (with UR1 or UR2)
IM	
• Number of connectable IMs (total), max.	6
• Number of connectable IM 460s, max.	6
• Number of connectable IM 463s, max.	4; IM 463-2
Number of DP masters	
• integrated	2
• via IM 467	4
• via CP	10; via CP 443-5 Ext.
• Mixed mode IM + CP permitted	No; IM 467 cannot be used with CP 443-5 Ext. ; IM 467 cannot be used with CP 443-1 EX40 in PN IO mode
• via interface module	2; IF 964-DP
• Number of pluggable S5 modules (via adapter capsule in central device), max.	6
Number of operable FMs and CPs (recommended)	
• PROFIBUS and Ethernet CPs	14; incl. CP 443-5 Ext. and IM 467
Time	
Clock	
• Hardware clock (real-time clock)	Yes
• Battery backed and synchronized	Yes
• Resolution	1 ms

CPU 417-4

Technical specifications (continued)

	6ES7 417-4XL04-0AB0
Operating hours counter	
• Number	8
Clock synchronization	
• supports	Yes
• to MPI, Master	Yes
• to MPI, Slave	Yes
• to DP, Master	Yes
• to DP, Slave	Yes
• in AS, Master	Yes
• in AS, Slave	Yes
• to IF 964 DP	Yes; as Master or Slave
S7 message functions	
Number of login stations for message functions, max.	16
Symbol-related messages	Yes
Number of messages	
• overall, max.	1,024
Block related messages	Yes
Alarm 8-blocks	Yes
Instrumentation & control messages	Yes
Test commissioning functions	
Status/control	
• Status/control variable	Yes
Monitoring functions	
Forcing	
• Forcing	Yes
Status block	Yes
Single step	Yes
Number of breakpoints	4
Diagnostic buffer	
• present	Yes
• Number of entries, max.	3,200
• adjustable	Yes
• preset	120
Communication functions	
PG/OP communication	Yes
Routing	Yes
Global data communication	
• supported	Yes
• Size of GD packets, max.	64 Byte
S7 basic communication	
• supported	Yes; in MPI mode: via SFC X_SEND, X_RCV, X_GET and X_PUT; in DP master mode: via SFC I_GET and I_PUT
• Useful data per job, max.	76 Byte

	6ES7 417-4XL04-0AB0
S7 communication	
• supported	Yes
• as server	Yes
• as client	Yes
• Useful data per job, max.	64 KByte
S5-compatible communication	
• supported	Yes; via FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5
• Useful data per job, max.	8 KByte
Standard communication (FMS)	
• supported	Yes; via CP and loadable FB
Number of connections	
• overall	64
1st interface	
Physics	RS 485 / PROFIBUS
isolated	Yes
Functionality	
• MPI	Yes
• DP master	Yes
• DP slave	Yes
MPI	
• Number of connections	44
• Services	
- PG/OP communication	Yes
- Routing	Yes
- Global data communication	Yes
- S7 basic communication	Yes
- S7 communication	Yes
• Transmission speeds, max.	12 Mbit/s
DP master	
• Number of connections, max.	32; if a diagnostic repeater is used on the line, the number of connection resources on the line is reduced by 1
• Services	
- PG/OP communication	Yes
- Routing	Yes
- S7 basic communication	Yes
- S7 communication	Yes
- equidistance support	Yes
- Activation/deactivation of DP slaves	Yes
- direct data exchange (cross traffic)	Yes
• Transmission speeds, max.	12 Mbit/s
• Number of DP slaves, max.	32
• Address area	
- Inputs, max.	2 KByte
- Outputs, max.	2 KByte

Technical specifications (continued)

	6ES7 417-4XL04-0AB0
• Useful data per DP slave	
- Inputs, max.	244 Byte
- Outputs, max.	244 Byte
DP slave	
• Services	
- Routing	Yes
- Status/control	Yes
- Programming	Yes
• Transmission speeds, max.	12 Mbit/s
• Transfer memory	
- Inputs	244 Byte
- Outputs	244 Byte
• Address area, max.	32
• Useful data per address area, max.	32 Byte
• Useful data per address area, of which consistent, max.	32 Byte
2nd interface	
Physics	RS 485 / PROFIBUS
isolated	Yes
Functionality	
• DP master	Yes
• DP slave	Yes
DP master	
• Number of connections, max.	32; if a diagnostic repeater is used on the line, the number of connection resources on the line is reduced by 1
• Services	
- PG/OP communication	Yes
- Routing	Yes
- S7 basic communication	Yes
- S7 communication	Yes
- equidistance support	Yes
- Activation/deactivation of DP slaves	Yes
- direct data exchange (cross traffic)	Yes
• Transmission speeds, max.	12 Mbit/s
• Number of DP slaves, max.	125
• Address area	
- Inputs, max.	8 KByte
- Outputs, max.	8 KByte
• Useful data per DP slave	
- Inputs, max.	244 Byte
- Outputs, max.	244 Byte
DP slave	
• Services	
- Routing	Yes
- Status/control	Yes
- Programming	Yes

	6ES7 417-4XL04-0AB0
• Transmission speeds, max.	12 Mbit/s
• Transfer memory	
- Inputs	244 Byte
- Outputs	244 Byte
• Address area, max.	32
• Useful data per address area, max.	32 Byte
• Useful data per address area, of which consistent, max.	32 Byte
3rd interface	
Type of interfaces	Pluggable interface module (IF), Technical data as for 2nd interface
pluggable interface module	IF 964-DP
4th interface	
Type of interface	Pluggable interface module (IF), Technical data as for 2nd interface
pluggable interface modules	IF 964-DP
Isochronous mode	
Useful data per isochronous slave, max.	244 Byte
equidistance	Yes
shortest clock pulse	1 ms
CiR configuration in RUN	
CiR synchronization time, basic load	100 ms
CiR synchronization time, time per I/O slave	40 µs
CPU/programming	
Programming language	
• STEP 7	Yes
• LAD	Yes
• FUP	Yes
• AWL	Yes
• SCL	Yes
• CFC	Yes
• GRAPH	Yes
• HiGraph	Yes
Nesting levels	8
User program protection/password protection	Yes
Dimensions and weight	
Width	50 mm
Height	290 mm
Depth	219 mm
Required slots	2
Weights	
Weight, approx.	1,070 g

CPU 417-4

Ordering data	Order No.
CPU 417-4	**6ES7 417-4XL04-0AB0**
Main memory 20 MB, power supply 24 V DC, MPI/PROFIBUS DP master interface, PROFIBUS DP master interface, module slots for 3/4 IF modules, slot for memory card, incl. slot number labels	
Memory Card RAM	
64 KB	**6ES7 952-0AF00-0AA0**
256 KB	**6ES7 952-1AH00-0AA0**
1 MB	**6ES7 952-1AK00-0AA0**
2 MB	**6ES7 952-1AL00-0AA0**
4 MB	**6ES7 952-1AM00-0AA0**
8 MB	**6ES7 952-1AP00-0AA0**
16 MB	**6ES7 952-1AS00-0AA0**
64 MB	**6ES7 952-1AY00-0AA0**
FEPROM memory card	
64 KB	**6ES7 952-0KF00-0AA0**
256 KB	**6ES7 952-0KH00-0AA0**
1 MB	**6ES7 952-1KK00-0AA0**
2 MB	**6ES7 952-1KL00-0AA0**
4 MB	**6ES7 952-1KM00-0AA0**
8 MB	**6ES7 952-1KP00-0AA0**
16 MB	**6ES7 952-1KS00-0AA0**
32 MB	**6ES7 952-1KT00-0AA0**
64 MB	**6ES7 952-1KY00-0AA0**
MPI cable	**6ES7 901-0BF00-0AA0**
For connecting SIMATIC S7 and the PG through MPI; 5 m in length	
IF 964-DP interface module	**6ES7 964-2AA04-0AB0**
To connect an additional DP line; for CPU 414-3, CPU 414-3 PN/DP, CPU 416-3, CPU 416-3 PN/DP, CPU 417-4	
Slot number plates	**6ES7 912-0AA00-0AA0**
1 set (spare part)	
Manual "SIMATIC S7-400 programmable controller"	
incl. instruction list	
German	**6ES7 498-8AA04-8AA0**
English	**6ES7 498-8AA04-8BA0**
French	**6ES7 498-8AA04-8CA0**
Spanish	**6ES7 498-8AA04-8DA0**
Italian	**6ES7 498-8AA04-8EA0**
S7-400 operation list	
German	**6ES7 498-8AA04-8AN0**
English	**6ES7 498-8AA04-8BN0**
French	**6ES7 498-8AA04-8CN0**
Spanish	**6ES7 498-8AA04-8DN0**
Italian	**6ES7 498-8AA04-8EN0**

	Order No.
Manual "Communication for SIMATIC S7-300/-400"	
German	**6ES7 398-8EA00-8AA0**
English	**6ES7 398-8EA00-8BA0**
French	**6ES7 398-8EA00-8CA0**
Spanish	**6ES7 398-8EA00-8DA0**
Italian	**6ES7 398-8EA00-8EA0**
SIMATIC Manual Collection D)	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, five languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	
SIMATIC Manual Collection update service for 1 year D)	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates	
Brochure "SIMATIC S7-400 programmable controller - Design and application"	
German	**6ES7 498-8AA00-8AB0**
English	**6ES7 498-8AA00-8BB0**
French	**6ES7 498-8AA00-8CB0**
Spanish	**6ES7 498-8AA00-8DB0**
Italian	**6ES7 498-8AA00-8EB0**
RS 485 bus connector with 90° cable outlet	
Max. transmission rate 12 Mbit/s	
Without PG interface	**6ES7 972-0BA12-0XA0**
With PG interface	**6ES7 972-0BB12-0XA0**
RS 485 bus connector with angled cable outlet	
Max. transmission rate 12 Mbit/s	
Without PG interface	**6ES7 972-0BA41-0XA0**
With PG interface	**6ES7 972-0BB41-0XA0**
RS 485 bus connector with 90° cable outlet for Fast Connect system	
Max. transmission rate 12 Mbit/s	
Without PG interface	**6ES7 972-0BA50-0XA0**
With PG interface	**6ES7 972-0BB50-0XA0**
RS 485 bus connector with axial cable outlet	
For SIMATIC OP, for connection to PPI, MPI, PROFIBUS	**6GK1 500-0EA02**
PROFIBUS FastConnect bus cable	
Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m	**6XV1 830-0EH10**

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

Overview CPU 414-4H

- CPU for SIMATIC S7-400H and S7-400F/FH.
- Can be used in high availability S7-400H systems
- Can be used with F-runtime license and F-compatible CPU in failsafe S7-400F/FH systems
- With integrated PROFIBUS DP master interface
- With 2 slots for sync modules

Overview CPU 417-4H

- CPU for SIMATIC S7-400H and S7-400F/FH.
- Can be used in high availability S7-400H systems
- Can be used with F-runtime license and F-compatible CPU in failsafe S7-400F/FH systems
- With integrated PROFIBUS DP master interface
- With 2 slots for sync modules

Technical specifications

	6ES7 414-4HJ04-0AB0	6ES7 417-4HL04-0AB0
Supply voltages		
Rated value		
- 24 V DC	Yes	Yes
Voltages and currents		
• Incoming supply of external backup voltage to the CPU	5 to 15 V DC	5 to 15 V DC
Current consumption		
• from backplane bus 5 V DC, max.	2 A	1.7 A
• Power dissipation, typical	4.5 W	6 W
- Backup current, typical	550 µA	600 µA
- Backup current, max.	1,530 µA	1,810 µA
Memory		
• Working memory		
- integrated (for program)	700 KByte	
- integrated (for data)	700 KByte	
- expandable	No	No
• Load memory		
- expandable FEPROM	Yes; with Memory Card (FLASH)	Yes; with Memory Card (FLASH)
- expandable FEPROM, max.	64 MByte	64 MByte
- integral RAM, max.	256 KByte	256 KByte
- expandable RAM	Yes; with Memory Card (RAM)	Yes; with Memory Card (RAM)
- expandable RAM, max	16 MByte	16 MByte
Backup		
- available	Yes	Yes
- with battery	Yes; all data	Yes; all data
- without battery	No	No

	6ES7 414-4HJ04-0AB0	6ES7 417-4HL04-0AB0
CPU/blocks		
DB		
- Number, max.	4,095; DB 0 reserved	8,192; DB 0 reserved
- Size, max.	64 KByte	
FB		
- Number, max.	2,048	6,144
- Size, max.	64 KByte	64 KByte
FC		
- Number, max.	2,048	6,144
- Size, max.	64 KByte	64 KByte
OB		
- Number, max.	See instruction list	See instruction list
- Size, max.	64 KByte	64 KByte
Nesting depth		
- per priority class	24	24
- additional levels within an error OB		2
CPU/processing times		
• for bit instruction, min.	0.06 µs	0.03 µs
• for word instruction, min.	0.06 µs	0.03 µs
• for integer math, min.	0.06 µs	0.03 µs
• for floating-point math, min.	0.18 µs	0.09 µs
Timers/counters and their retentive characteristics		
S7 counter		
- Number	2,048	2,048

CPU 414-4H, CPU 417-4H

Technical specifications (continued)

	6ES7 414-4HJ04-0AB0	6ES7 417-4HL04-0AB0
• Retentivity		
- adjustable	Yes	Yes
- lower limit	0	0
- upper limit	2,047	2,047
- preset	from Z 0 to Z 7	from Z 0 to Z 7
• Counting range		
- lower limit	0	1
- upper limit	999	999
IEC counter		
- available	Yes	Yes
- Type	SFB	SFB
S7 times		
- Number	2.048	2.048
• Timing range		
- lower limit	10 ms	10 ms
- upper limit	9,990 s	9,990 s
IEC timer		
- available	Yes	Yes
- Type	SFB	SFB
Data areas and their retentive characteristics		
Flags		
- Number	8 KByte	16 KByte
- Retentivity	Yes; MB 0 to MB 8191	Yes; MB 0 to MB 16383
Address area		
I/O address area		
- Inputs	8 KByte	16 KByte
- Outputs	8 KByte	16 KByte
• of which distributed		
- MPI/DP interface, inputs	2 KByte	2 KByte
- MPI/DP interface, outputs	2 KByte	2 KByte
- DP interface, inputs	6 KByte	8 KByte
- DP interface, outputs	6 KByte	8 KByte
Process image		
- Inputs, adjustable	8 KByte	16 KByte
- Outputs, adjustable	8 KByte	16 KByte
- Inputs, preset	1.024 Byte	1.024 Byte
- Outputs, preset	1.024 Byte	1.024 Byte
- Number of component process images, max.	8	8
Digital channels		
- Inputs	65,536	131,072
- Outputs	65,536	131,072
- Inputs, of which central	65,536	131,072
- Outputs, of which central	65,536	131,072
Analog channels		
- Inputs	4,096	8,192
- Outputs	4,096	8,192
- Inputs, of which central	4,096	8,192
- Outputs, of which central	4,096	8,192
Configuration		
• Central units, max.	1	1
• Expansion units, max.	21	21
• Multi-computing	No	No

	6ES7 414-4HJ04-0AB0	6ES7 417-4HL04-0AB0
IM		
- Number of pluggable IMs (overall), max.	6	6
- Number of pluggable IM 460s, max.	6	6
- Number of pluggable IM 463s, max.	6; IM 463-2	6; IM 463-2
Number of DP masters		
- integral	2	2
- via IM 467	0	0
- via CP	10	10
- Mixed mode of IM + CP permitted	No; IM467 cannot be used externally together with CP443-5	No; IM467 cannot be used externally together with CP443-5!
- via interface module	0	0
Number of FMs and CPs that can be operated (recommendation)		
- FM	32; limited by the number of slots and by the number of connections	64; limited by the number of slots and by the number of connections
- CP, point-to-point	32; limited by the number of slots and by the number of connections	64; limited by the number of slots and by the number of connections
- CP, LAN	32; limited by the number of slots and by the number of connections	64; limited by the number of slots and by the number of connections
Time		
- Hardware clock (realtime clock)	Yes	Yes
- Battery backed and synchronized	Yes	Yes
Run-time meter		
- Quantity	8	8
Time synchronization		
- supported	Yes	Yes
S7 message functions		
• Number of stations that can log on for message functions, max.	8	16
Test and startup functions		
Diagnostic buffer		
- available	Yes	
- Number of inputs, max.	3,200	
- adjustable	Yes	
- preset	120	
Communication functions		
• PG/OP communication	Yes	Yes
Global data communication		
- supported	No	No
S7 basic communication		
- supported	No	No

Technical specifications (continued)

	6ES7 414-4HJ04-0AB0	6ES7 417-4HL04-0AB0
S7 communication		
- supported	Yes	Yes
- as server	Yes	Yes
- as client	Yes	Yes
- User data per job, max.	64 KByte	64 KByte
S5 compatible communication		
- supported	Yes; via CP and loadable FC	Yes; via CP and loadable FC
- User data per job, max.	8 KByte	8 KByte
Standard communication (FMS)		
- Supported	Yes; via CP and loadable FB	Yes; via CP and loadable FB
- User data per job, max.	depending on the CP	depending on the CP
Number of connections		
- overall	32	64
1st interface		
• Physical	RS 485/PROFIBUS	RS 485/PROFIBUS
• Isolated	Yes	Yes
Functionality		
- MPI	Yes; Default setting	Yes; Default setting
- DP master	Yes	Yes
- DP slave	No	No
MPI		
- Number of connections	32	44
• Services		
- PG/OP communication	Yes	Yes
- Global data communication	No	No
- S7 basic communication	No	No
- S7 communication	Yes	Yes
- Transmission rates, max.	12 Mbit/s	12 Mbit/s
DP master		
- Number of connections, max.	32	32
• Services		
- PG/OP communication	Yes	Yes
- S7 basic communication	No	No
- S7 communication	No	No
- S7 communication, as client	No	No
- S7 communication, as server	No	No
- Equidistance support	No	No
- Activate/deactivate DP slaves	Yes	No
- Direct data exchange (lateral communication)	No	No
- Transmission rates, max.	12 Mbit/s	12 Mbit/s
- Number of DP slaves, max.	32; Number of slots, max. 512	32; Number of slots, max. 512
• Address area		
- Inputs, max.	2 KByte	2 KByte
- Outputs, max.	2 KByte	2 KByte

	6ES7 414-4HJ04-0AB0	6ES7 417-4HL04-0AB0
• User data per DP Slave		
- Inputs, max.	244 Byte	244 Byte
- Outputs, max.	244 Byte	244 Byte
2nd interface		
• Physical	RS 485/PROFIBUS	RS 485/PROFIBUS
• Isolated	Yes	Yes
Functionality		
- DP master	Yes; Default setting	Yes
- DP slave	No	No
- Point-to-point connection	No	No
DP master		
- Number of connections, max.	32	16
- Number of connections (of which reserved), max.	1 for PG, 1 for OP	1 for PG, 1 for OP
• Services		
- PG/OP communication	Yes	Yes
- S7 basic communication	No	No
- S7 communication	No	No
- S7 communication, as client	No	No
- S7 communication, as server	No	No
- Equidistance support	No	No
- Activate/deactivate DP slaves	No	No
- Direct data exchange (lateral communication)	No	No
- Transmission rates, max.	12 Mbit/s	12 Mbit/s
- Number of DP slaves, max.	96	125; Number of slots, max. 2048
• Address area		
- Inputs, max.	8 KByte	8 KByte
- Outputs, max.	8 KByte	8 KByte
• User data per DP Slave		
- Inputs, max.	244 Byte	244 Byte
- Outputs, max.	244 Byte	244 Byte
CPU/ programming		
Programming language		
- STEP 7	Yes; V5.0 SP2	Yes; V5.0 SP2
- KOP	Yes	Yes
- FUP	Yes	Yes
- AWL	Yes	Yes
- SCL	Yes	Yes
- CFC	Yes	Yes
- GRAPH	Yes	Yes
- HiGraph	Yes	Yes
• User program protection/password protection	Yes	Yes
Dimensions and weight		
• Width	50 mm	50 mm
• Height	290 mm	290 mm
• Depth	219 mm	219 mm
• Required slots	2	2
• Weight, approx.	1,070 g	1,070 g

CPU 414-4H, CPU 417-4H

Ordering data	Order No.
CPU 414-4H	
For S7-400H and S7-400F/FH; MPI/PROFIBUS DP master interface, 2 slots for Sync modules, slot for memory card, incl. slot number labels, 2 keys	
Main memory 1,4 MB	**6ES7 414-4HJ04-0AB0**
CPU 417-4H	
For S7-400H and S7-400F/FH; MPI/PROFIBUS DP master interface, 2 slots for Sync modules, slot for memory card, incl. slot number labels, 2 keys	
Main memory 20 MB	**6ES7 417-4HL04-0AB0**
Memory Card RAM	
1 MB	**6ES7 952-1AK00-0AA0**
2 MB	**6ES7 952-1AL00-0AA0**
4 MB	**6ES7 952-1AM00-0AA0**
8 MB	**6ES7 952-1AP00-0AA0**
16 MB	**6ES7 952-1AS00-0AA0**
64 MB	**6ES7 952-1AY00-0AA0**
FEPROM memory card	
1 MB	**6ES7 952-1KK00-0AA0**
2 MB	**6ES7 952-1KL00-0AA0**
4 MB	**6ES7 952-1KM00-0AA0**
8 MB	**6ES7 952-1KP00-0AA0**
16 MB	**6ES7 952-1KS00-0AA0**
32 MB	**6ES7 952-1KT00-0AA0**
64 MB	**6ES7 952-1KY00-0AA0**
MPI cable	**6ES7 901-0BF00-0AA0**
For connecting SIMATIC S7 and the PG through MPI; 5 m in length	
Slot number plates	**6ES7 912-0AA00-0AA0**
1 set (spare part)	
S7 F Systems option pack	**6ES7 833-1CC00-0YX0**
For programming fail-safe user programs, with F block library	
F runtime license	**6ES7 833-1CC00-6YX0**
For using fail-safe programs in CPU 417-4H; 1 license required for each S7-400F/FH system	
Manual "SIMATIC S7-400H programmable controller"	
German	**6ES7 988-8HA11-8AA0**
English	**6ES7 988-8HA11-8BA0**
French	**6ES7 988-8HA11-8CA0**
Spanish	**6ES7 988-8HA11-8DA0**
Italian	**6ES7 988-8HA11-8EA0**

		Order No.
Manual "Communication for SIMATIC S7-300/-400"		
German		**6ES7 398-8EA00-8AA0**
English		**6ES7 398-8EA00-8BA0**
French		**6ES7 398-8EA00-8CA0**
Spanish		**6ES7 398-8EA00-8DA0**
Italian		**6ES7 398-8EA00-8EA0**
SIMATIC Manual Collection	D)	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, five languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET		
SIMATIC Manual Collection update service for 1 year	D)	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		
Brochure "SIMATIC S7-400 programmable controller - Design and application"		
German		**6ES7 498-8AA00-8AB0**
English		**6ES7 498-8AA00-8BB0**
French		**6ES7 498-8AA00-8CB0**
Spanish		**6ES7 498-8AA00-8DB0**
Italian		**6ES7 498-8AA00-8EB0**
RS 485 bus connector with 90° cable outlet		
Max. transmission rate 12 Mbit/s		
Without PG interface		**6ES7 972-0BA12-0XA0**
With PG interface		**6ES7 972-0BB12-0XA0**
RS 485 bus connector with angled cable outlet		
Max. transmission rate 12 Mbit/s		
Without PG interface		**6ES7 972-0BA41-0XA0**
With PG interface		**6ES7 972-0BB41-0XA0**
Max. transmission rate 1.5 Mbit/s		
Without PG interface		**6ES7 972-0BA30-0XA0**
RS 485 bus connector with 90° cable outlet for Fast Connect system		
Max. transmission rate 12 Mbit/s		
Without PG interface		**6ES7 972-0BA50-0XA0**
With PG interface		**6ES7 972-0BB50-0XA0**
RS 485 bus connector with axial cable outlet		
For SIMATIC OP, for connection to PPI, MPI, PROFIBUS		**6GK1 500-0EA02**
PROFIBUS FastConnect bus cable		
Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m		**6XV1 830-0EH10**

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

Overview

- For design of a fail-safe automation system for plants with increased safety requirements
- High-performance CPU in the high-end performance range
- With 2 interfaces (1x DP/MPI, 1x DP)
- Complies with safety requirements up to SIL 3 to IEC 61508 and Cat. 4 according to EN 954-1
- Standard as well as safety-relevant tasks can be solved with just one CPU
- Multi-processor mode is possible
- Safety-related communication with distributed I/O stations over PROFIBUS DP with the *PROFI*safe profile
- Distributed fail-safe I/O modules can be connected over the integral PROFIBUS DP interfaces and/or over communications modules (CP443-5 Ext. and CP443-1 Adv.)
- Central and distributed use of standard modules for non-safety-relevant applications

Technical specifications

	6ES7 416-2FK04-0AB0
Product status	
Firmware version	V 4.0
associated programming package	STEP 7 V 5.2 SP1 or higher HF3 with HW-update
Supply voltages	
Rated value	
• DC 24 V	Yes
Voltages and currents	
Feeding of external buffer voltage to CPU	5 to 15 V DC
Current consumption	
from backplane bus DC 5 V, max.	1.6 A
Power loss, typ.	4.5 W
Backup battery	
• Buffer current, typ.	550 µA
• Buffer current, max.	1,539 µA
Memory	
Memory	
• RAM	
- integrated (for program)	1,400 KByte
- integrated (for data)	1,400 KByte
- expandable	No
• Load memory	
- expandable FEPROM	Yes; with Memory card (FLASH)
- expandable FEPROM, max.	64 MByte
- integrated RAM, max.	256 KByte
- expandable RAM	Yes; with Memory Card (RAM)
- expandable RAM, max.	64 MByte
Backup	
• present	Yes
• with battery	Yes; all data
• without battery	No

	6ES7 416-2FK04-0AB0
CPU/blocks	
DB	
• Number, max.	4,095; DB 0 reserved
• Size, max.	64 KByte
FB	
• Number, max.	2,048
• Size, max.	64 KByte
FC	
• Number, max.	2,048
• Size, max.	64 KByte
OB	
• Size, max.	64 KByte
Nesting depth	
• per priority class	24
• additional within an error OB	2
CPU/processing times	
for bit operations, min.	0.04 µs
for word operations, min.	0.04 µs
for fixed point arithmetic, min.	0.04 µs
for floating point arithmetic, min.	0.12 µs
Times/counters and their remanence	
S7 counter	
• Number	2,048
• Remanence	
- adjustable	Yes
- lower limit	0
- upper limit	2,047
- preset	From Z 0 to Z 7
• Counting range	
- lower limit	0
- upper limit	999

CPU 416F-2

Technical specifications (continued)

	6ES7 416-2FK04-0AB0
IEC counter	
• present	Yes
• Type	SFB
S7 times	
• Number	2,048
• Remanence	
- adjustable	Yes
- lower limit	0
- upper limit	2,047
- preset	no timers retentive
• Time range	
- lower limit	10 ms
- upper limit	9,990 s
IEC timer	
• present	Yes
• Type	SFB
Data areas and their remanence	
remanent data area, total	total working and load memory (with backup battery)
Flag	
• Number, max.	16 KByte
• Remanence available	Yes; MB 0 to MB 16383
• Number of clock memories	8; (1 memory byte)
Address area	
I/O address area	
• Inputs	16 KByte
• Outputs	16 KByte
• of which, distributed	
- MPI/DPinterface, inputs	2 KByte
- MPI/DP interface, outputs	2 KByte
- DP interface, inputs	8 KByte; (For each line that is operated in isochronous mode, i.e. to which an OB 61 to 62 has been assigned, the distributed IO address areas are halved)
- DP interface, outputs	8 KByte; (For each line that is operated in isochronous mode, i.e. to which an OB 61 to 62 has been assigned, the distributed IO address areas are halved)
Process image	
• Inputs, adjustable	16 KByte
• Outputs, adjustable	16 KByte
• Inputs, preset	512 Byte
• Outputs, preset	512 Byte
• consistent data, max.	244 Byte
• Access to consistent data in process image	Yes

	6ES7 416-2FK04-0AB0
Subprocess images	
• Number of subprocess images, max.	15
Digital channels	
• Inputs	131,072
• Outputs	131,072
• Inputs, of which central	131,072
• Outputs, of which central	131,072
Analog channels	
• Inputs	8,192
• Outputs	8,192
• Inputs, of which central	8,192
• Outputs, of which central	8,192
Hardware config.	
connectable OPs	63 without message processing, 12 with message processing
Central devices, max.	1
Expansion devices, max.	21; (of which 6 ER with K-bus)
Multicomputing	Yes; max. 4 CPUs (with UR1 or UR2)
IM	
• Number of connectable IMs (total), max.	6
• Number of connectable IM 460s, max.	6
• Number of connectable IM 463s, max.	4; IM 463-2
Number of DP masters	
• integrated	2
• via IM 467	4
• via CP	10; CP 443-5 Ext.
• Mixed mode IM + CP permitted	No; IM 467 cannot be used jointly with CP 443-5 Ext.
• Number of pluggable S5 modules (via adapter capsule in central device), max.	6
Number of operable FMs and CPs (recommended)	
• PROFIBUS and Ethernet CPs	14; incl. CP 443-5 Ext. and IM 467
Time	
Clock	
• Hardware clock (real-time clock)	Yes
• Battery backed and synchronized	Yes
• Resolution	1 ms
Operating hours counter	
• Number	8

Technical specifications (continued)

	6ES7 416-2FK04-0AB0
Clock synchronization	
• supports	Yes
• to MPI, Master	Yes
• to MPI, Slave	Yes
• to DP, Master	Yes
• to DP, Slave	Yes
• in AS, Master	Yes
• in AS, Slave	Yes
S7 message functions	
Number of login stations for message functions, max.	12
Symbol-related messages	Yes
Number of messages	
• overall, max.	1,024
Block related messages	Yes
Alarm 8-blocks	Yes
Instrumentation & control messages	Yes
Test commissioning functions	
Status/control	
• Status/control variable	Yes
Monitoring functions	
Forcing	
• Forcing	Yes
Status block	Yes
Single step	Yes
Number of breakpoints	4
Diagnostic buffer	
• present	Yes
• Number of entries, max.	3,200
• adjustable	Yes
• preset	120
Communication functions	
PG/OP communication	Yes
Global data communication	
• supported	Yes
• Size of GD packets, max.	64 Byte
Clock synchronization	
• supports	Yes; in MPI mode: via SFC X_SEND, X_RCV, X_GET and X_PUT; in DP master mode: via SFC I_GET and I_PUT
• Useful data per job, max.	76 Byte
S7 communication	
• supported	Yes
• as server	Yes
• as client	Yes
• Useful data per job, max.	64 KByte

	6ES7 416-2FK04-0AB0
S5-compatible communication	
• supported	Yes; via FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5
• Useful data per job, max.	8 KByte
Standard communication (FMS)	
• supported	Yes; via CP and loadable FB
Number of connections	
• overall	64
1st interface	
Physics	RS-485 / PROFIBUS
isolated	Yes
Functionality	
• MPI	Yes
• DP master	Yes
• DP slave	Yes
MPI	
• Number of connections	44
• Services	
- PG/OP communication	Yes
- Routing	Yes
- Global data communication	Yes
- S7 basic communication	Yes
- S7 communication	Yes
• Transmission speeds, max.	12 Mbit/s
DP master	
• Number of connections, max.	32; if a diagnostic repeater is used on the line, the number of connection resources on the line is reduced by 1
• Services	
- PG/OP communication	Yes
- Routing	Yes
- S7 basic communication	Yes
- S7 communication	Yes
- equidistance support	Yes
- Activation/deactivation of DP slaves	Yes
- direct data exchange (cross traffic)	Yes
• Transmission speeds, max.	12 Mbit/s
• Number of DP slaves, max.	32
• Address area	
- Inputs, max.	2 KByte
- Outputs, max.	2 KByte
• Useful data per DP slave	
- Inputs, max.	244 Byte
- Outputs, max.	244 Byte

CPU 416F-2

Technical specifications (continued)

	6ES7 416-2FK04-0AB0
DP slave	
• Services	
- Routing	Yes
- Status/control	Yes
- Programming	Yes
• Transmission speeds, max.	12 Mbit/s
• Transfer memory	
- Inputs	244 Byte
- Outputs	244 Byte
• Address area, max.	32
• Useful data per address area, max.	32 Byte
• Useful data per address area, of which consistent, max.	32 Byte
2nd interface	
Physics	RS 485 / PROFIBUS
isolated	Yes
Functionality	
• DP master	Yes
• DP slave	Yes
DP master	
• Number of connections, max.	32; if a diagnostic repeater is used on the line, the number of connection resources on the line is reduced by 1
• Services	
- PG/OP communication	Yes
- Routing	Yes
- S7 basic communication	Yes
- S7 communication	Yes
- equidistance support	Yes
- Activation/deactivation of DP slaves	Yes
- direct data exchange (cross traffic)	Yes
• Transmission speeds, max.	12 Mbit/s
• Number of DP slaves, max.	125
• Address area	
- Inputs, max.	8 KByte
- Outputs, max.	8 KByte
• Useful data per DP slave	
- Inputs, max.	244 Byte
- Outputs, max.	244 Byte

	6ES7 416-2FK04-0AB0
DP slave	
• Services	
- Routing	Yes
- Status/control	Yes
- Programming	Yes
• Transmission speeds, max.	12 Mbit/s
• Transfer memory	
- Inputs	244 Byte
- Outputs	244 Byte
• Address area, max.	32
• Useful data per address area, max.	32 Byte
• Useful data per address area, of which consistent, max.	32 Byte
Isochronous mode	
Useful data per isochronoous slave, max.	244 Byte
equidistance	Yes
shortest clock pulse	1 ms; 0.5 ms without use of SFC 126, 127
CiR configuration in RUN	
CiR synchronization time, basic load	100 ms
CiR synchronization time, time per I/O slave	40 µs
CPU/programming	
Programming language	
• STEP 7	Yes
• LAD	Yes
• FUP	Yes
• AWL	Yes
• SCL	Yes
• CFC	Yes
• GRAPH	Yes
• HiGraph	Yes
Nesting levels	8
User program protection/password protection	Yes
Dimensions and weight	
Width	25 mm
Height	290 mm
Depth	219 mm
Required slots	1
Weights	
Weight, approx.	720 g

Ordering data	Order No.
CPU 416-2F	**6ES7 416-2FK04-0AB0**
For configuring safety-related automation systems; main memory 2.8 MB, 24 V DC power supply, MPI/PROFIBUS DP master interface, PROFIBUS DP master/slave interface, slot for memory card, incl. slot number labels, 2 keys	
Option package S7 F Distributed Safety V5.4	
for generating fail-safe programs for the S7-300F	
Floating license	**6ES7 833-1FC02-0YA5**
Upgrade from V5.x to V5.4	**6ES7 833-1FC02-0YE5**
Software Update Service	**6ES7 833-1FC00-0YX2**
Memory Card RAM	
64 KB	**6ES7 952-0AF00-0AA0**
256 KB	**6ES7 952-1AH00-0AA0**
1 MB	**6ES7 952-1AK00-0AA0**
2 MB	**6ES7 952-1AL00-0AA0**
4 MB	**6ES7 952-1AM00-0AA0**
8 MB	**6ES7 952-1AP00-0AA0**
16 MB	**6ES7 952-1AS00-0AA0**
64 MB	**6ES7 952-1AY00-0AA0**
FEPROM memory card	
64 KB	**6ES7 952-0KF00-0AA0**
256 KB	**6ES7 952-0KH00-0AA0**
1 MB	**6ES7 952-1KK00-0AA0**
2 MB	**6ES7 952-1KL00-0AA0**
4 MB	**6ES7 952-1KM00-0AA0**
8 MB	**6ES7 952-1KP00-0AA0**
16 MB	**6ES7 952-1KS00-0AA0**
32 MB	**6ES7 952-1KT00-0AA0**
64 MB	**6ES7 952-1KY00-0AA0**
MPI cable	**6ES7 901-0BF00-0AA0**
For connecting SIMATIC S7 and the PG through MPI; 5 m in length	
IF 964-DP interface module	**6ES7 964-2AA04-0AB0**
For connecting an additional DP line	
Slot number plates	**6ES7 912-0AA00-0AA0**
1 set (spare part)	
Manual "SIMATIC S7-400 programmable controller"	
incl. instruction list	
German	**6ES7 498-8AA04-8AA0**
English	**6ES7 498-8AA04-8BA0**
French	**6ES7 498-8AA04-8CA0**
Spanish	**6ES7 498-8AA04-8DA0**
Italian	**6ES7 498-8AA04-8EA0**

	Order No.
S7-400 operation list	
German	**6ES7 498-8AA04-8AN0**
English	**6ES7 498-8AA04-8BN0**
French	**6ES7 498-8AA04-8CN0**
Spanish	**6ES7 498-8AA04-8DN0**
Italian	**6ES7 498-8AA04-8EN0**
Manual "Communication for SIMATIC S7-300/-400"	
German	**6ES7 398-8EA00-8AA0**
English	**6ES7 398-8EA00-8BA0**
French	**6ES7 398-8EA00-8CA0**
Spanish	**6ES7 398-8EA00-8DA0**
Italian	**6ES7 398-8EA00-8EA0**
SIMATIC Manual Collection D)	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, five languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	
SIMATIC Manual Collection update service for 1 year D)	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates	
Brochure "SIMATIC S7-400 programmable controller - Design and application"	
German	**6ES7 498-8AA00-8AB0**
English	**6ES7 498-8AA00-8BB0**
RS 485 bus connector with 90° cable outlet	
Max. transmission rate 12 Mbit/s	
Without PG interface	**6ES7 972-0BA12-0XA0**
With PG interface	**6ES7 972-0BB12-0XA0**
RS 485 bus connector with angled cable outlet	
Max. transmission rate 12 Mbit/s	
Without PG interface	**6ES7 972-0BA41-0XA0**
With PG interface	**6ES7 972-0BB41-0XA0**
RS 485 bus connector with 90° cable outlet for Fast Connect system	
Max. transmission rate 12 Mbit/s	
Without PG interface	**6ES7 972-0BA50-0XA0**
With PG interface	**6ES7 972-0BB50-0XA0**
RS 485 bus connector with axial cable outlet	
For SIMATIC OP, for connection to PPI, MPI, PROFIBUS	**6GK1 500-0EA02**
PROFIBUS FastConnect bus cable	
Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m	**6XV1 830-0EH10**

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

Sync module for connecting the CPU 41x-4H

Overview

- For connecting the two 414-4H/417-4H CPUs in the S7-400H subunits
- Can be plugged directly into the CPU

Technical specifications

	6ES7 960-1AA04-0XA0	6ES7 960-1AB04-0XA0
Current consumption		
from CPU, max.	210 mA	250 mA
Power loss, typ.	1.1 mW	1.3 mW
Dimensions and weight		
Width	25 mm	25 mm
Height	53 mm	53 mm
Depth	140 mm	140 mm
Weights		
Weight, approx.	65 g	65 g

Ordering data

		Order No.
Sync module		
For linking the two CPUs 414-4H/417-4H with S7-400H/F/FH; two modules required per CPU;		
For 6ES7 414-4HJ04-0AA0 and 6ES7 417-4HL04-0AA0; for patch cable, can be used with fiber-optic cables of max. 10 m		**6ES7 960-1AA04-0XA0**
For 6ES7 414-4HJ04-0AA0 and 6ES7 417-4HL04-0AA0; for patch cable and installation cable, can be used with fiber-optic cables of max. 10 km	A)	**6ES7 960-1AB04-0XA0**
Fiber-optic connecting cable		
For Sync module 6ES7 960-1Ax04-0XA0		
• 1 m		**6ES7 960-1AA04-5AA0**
• 2 m		**6ES7 960-1AA04-5BA0**
• 10 m		**6ES7 960-1AA04-5KA0**
For Sync module 6ES7 960-1AB04-0XA0; Fiber-optic monomode LC/LC duplex crossed 9/125 µ (max. 10 km)		On request

A) Subject to export regulations: AL: N and ECCN: EAR99H

IF-964 DP PROFIBUS module

Overview

- For connecting distributed I/Os using PROFIBUS DP
- Transmission rate max. 12 Mbit/s
- Electrically isolated RS 485 interface
- Connection through a 9-pin Sub-D socket
- One or two PROFIBUS modules can be plugged into each S7-400 CPU:
  - CPU 414-3/416-3: 1 module
  - CPU 417-4: 2 modules

Note:

Only for use with CPUs 6ES7 414-3XJ04-0AB0, 6ES7 414-3EM05-0AB0, 6ES7 416-3XL04-0AB0, 6ES7 416-3ER05-0AB0 and 6ES7 417-4XL04-0AB0.

Technical specifications

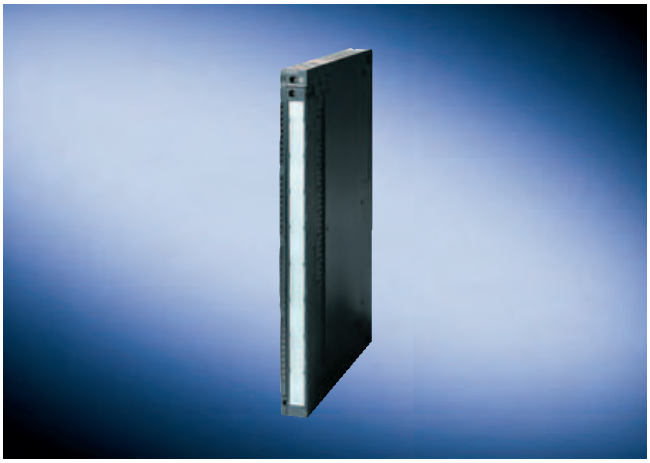
	6ES7 964-2AA04-0AB0
Current consumption	
from CPU, max.	150 mA; Current consumption from S7-400 bus: the module does not take up current at 24 V, it merely makes this voltage available at the DP interface. Total current consumption of the components connected to the DP interface, to a maximum of 150 mA; current carrying capacity of potential-free 5 V (P5ext) max. 90 mA; current carrying capacity at 24 V max. 150 mA
Power loss, typ.	1 W
PROFIBUS DP	
Cable length, max.	1,200 m; at 9.6 kbits/s: max. 1200 m; at 12 Mbits/s: max. 100 m
1st interface	
Physics	RS 485
isolated	Yes
Functionality	
• DP master	Yes; Default setting
• DP slave	Yes
DP master	
• Services	
- PG/OP communication	Yes
- equidistance support	Yes
- SYNC/FREEZE	Yes
- direct data exchange (cross traffic)	Yes
• Transmission speeds, max.	12 Mbit/s
• Transmission speeds, min.	9.6 kBit/s
• Number of DP slaves, max.	125; depending on the CPU used
• Useful data per DP slave	
- Inputs, max.	244 Byte
- Outputs, max.	244 Byte
Dimensions and weight	
Width	26 mm
Height	54 mm
Depth	130 mm
Weights	
Weight, approx.	65 g

Ordering data

	Order No.
IF-964 DP interface module	**6ES7 964-2AA04-0AB0**
Interface module with integral PROFIBUS DP master interface	

SM 421 digital input module

Overview



- Digital inputs for the SIMATIC S7-400
- For connecting standard switches and two-wire proximity switches (BERO)

Technical specifications

	6ES7 421-7BH01-0AB0	6ES7 421-1BL01-0AA0	6ES7 421-1EL00-0AA0	6ES7 421-1FH20-0AA0	6ES7 421-7DH00-0AB0
Voltages and currents					
Load voltage L+					
• Rated value (DC)	24 V				
• permissible range, lower limit (DC)	20.4 V				
• permissible range, upper limit (DC)	28.8 V				
Current consumption					
from backplane bus DC 5 V, max.	130 mA	20 mA	200 mA	80 mA	150 mA
from supply voltage L+, max.	120 mA				
Power loss, max.	5 W	6 W	16 W	12 W	8 W
Digital inputs					
Number of digital inputs	16	32	32	16	16
Number of simultaneously controllable inputs					
• Number of simultaneously controllable inputs, up to 40 °C	16	32	32	16	16
• Number of simultaneously controllable inputs, up to 60 °C	16	32	32	16	16
Cable length					
• Cable length, shielded, max.	1,000 m; 1000 m/3 ms; 70 m/0.5 ms; 30 m/0.1 ms; 30 m/0.05 ms	1,000 m	1,000 m	1,000 m	1,000 m
• Cable length unshielded, max.	600 m; 600 m/3 ms; 50 m/0.5 ms; 20 m/0.1 ms; 20 m/0.05 ms	600 m	600 m	600 m	600 m; 600m / 3, 10, 20 ms; 100m / 0.5ms

Technical specifications (continued)

	6ES7 421-7BH01-0AB0	6ES7 421-1BL01-0AA0	6ES7 421-1EL00-0AA0	6ES7 421-1FH20-0AA0	6ES7 421-7DH00-0AB0
Input voltage					
• Rated value, DC	24 V	24 V			
• Rated value, UC			120 V	230 V; UC 120/230 V	24 V; UC 24 to 60 V
• for signal "0"	-30 to 5 V DC	-30 to 5 V DC	UC 0 to 20 V	0 to 40 V AC / -40 to +40 V DC	-6 to V DC; 0 to 5 V AC
• for signal "1"	11 to 30 V DC	13 to 30 V DC	79 to 132 V AC; 80 to 132 V DC	74 to 264 V AC; 80 to 264 V DC, -80 to -264 V	DC 15...72 V;DC -15...-72 V; AC 15...60 V
• Frequency range			47 to 63 Hz	47 to 63 Hz	47 to 63 Hz AC / DC
Input current					
• for signal "0", max. (permissible quiescent current)		1.3 mA	1 mA	6 mA; AC: 6 mA, DC: 2 mA	
• for signal "1", typ.	6 mA; 6 to 8 mA	7 mA	2 mA; 2 to 5 mA	10 mA; at 120 V: 10 mA AC, 1.8 mA DC at 230 V: 14 mA AC, 2 mA DC	4 mA; 4 to 10 mA
Input delay (for rated value of input voltage)					
• for standard inputs					
- programmable	Yes				Yes
- Rated value					0.5 ms; 0.5 / 3 / 10 / 20 ms
Encoder					
Connectable encoders					
• 2-wire BEROS	Yes	Yes	Yes	Yes	Yes
• permissible quiescent current (2-wire BEROS), max.	3 mA	1.5 mA	1 mA	5 mA; AC: 5 mA	0.5 mA; 0.5 to 2 mA
Status information/ alarms/diagnostics					
Alarms					
• Diagnostic alarm	Yes; parameterizable				Yes; parameterizable
• Process alarm	Yes; parameterizable				Yes; parameterizable
Diagnoses					
• Diagnostics	Yes; internal/ external fault				Yes; internal/ external fault
Isolation					
Isolation checked with	500 V DC	500 V DC	1500 V AC	1500 V AC	1500 V AC
Isolation					
Galvanic isolation, digital inputs					
• between the channels, in groups of	8	32	8	4	1
• between the channels and the backplane bus	Yes	Yes	Yes	Yes	Yes
Dimensions and weight					
Width	25 mm	25 mm	25 mm	25 mm	25 mm
Height	290 mm	290 mm	290 mm	290 mm	290 mm
Depth	210 mm	210 mm	210 mm	210 mm	210 mm
Weights					
Weight, approx.	600 g	500 g	600 g	650 g	600 g

SM 421 digital input module

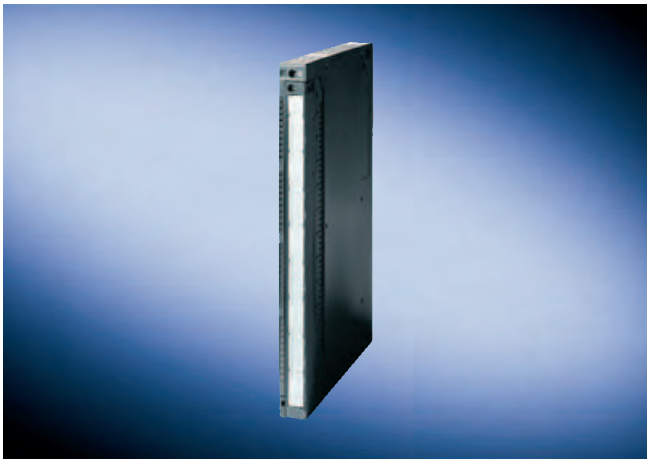
Ordering data		Order No.
SM 421 Digital Input Modules		
16 inputs, 24 V DC, with process/diagnostics interrupt		**6ES7 421-7BH01-0AB0**
32 inputs, 24 V DC		**6ES7 421-1BL01-0AA0**
32 inputs, 120 V AC/DC		**6ES7 421-1EL00-0AA0**
16 inputs, 120/230 V AC/DC, inputs according to IEC 1131-2 Type 2		**6ES7 421-1FH20-0AA0**
16 inputs, 24 to 60 V AC/DC, with process/diagnostics interrupt		**6ES7 421-7DH00-0AB0**
Front connectors		
48-pin		
• With screw contacts, 1 unit		**6ES7 492-1AL00-0AA0**
• With screw contacts, 84 units		**6ES7 492-1AL00-1AB0**
• With spring-loaded clamps, 1 unit		**6ES7 492-1BL00-0AA0**
• With crimp contacts, 1 unit	A)	**6ES7 492-1CL00-0AA0**
• With crimp contacts, 84 units		**6ES7 492-1CL00-1AB0**
SIMATIC TOP connect		See page 5/104; Information about which components can be used for the respective module, see A&D Mall or Catalog KT 10.2
Cover film for labeling strips		**6ES7 492-2XX00-0AA0**
Spare part		
S7 SmartLabel		**2XV9 450-1SL01-0YX0**
Software for automatic labeling of modules based on data of the STEP 7 project		

		Order No.
Labeling sheets for machine inscription		
DIN A4, for printing using laser printer; pack of 10		
Petrol		**6ES7 492-2AX00-0AA0**
Light-beige		**6ES7 492-2BX00-0AA0**
Yellow		**6ES7 492-2CX00-0AA0**
Red		**6ES7 492-2DX00-0AA0**
SIMATIC Manual Collection	D)	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, five languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET		
SIMATIC Manual Collection maintenance service for 1 year	D)	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		
Manual "SIMATIC S7-400 programmable controller"		
incl. instruction list		
German		**6ES7 498-8AA04-8AA0**
English		**6ES7 498-8AA04-8BA0**
French		**6ES7 498-8AA04-8CA0**
Spanish		**6ES7 498-8AA04-8DA0**
Italian		**6ES7 498-8AA04-8EA0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

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

Overview



- Digital outputs for the SIMATIC S7-400
- For connecting solenoid valves, contactors, low-power motors, lamps and motor starters

Technical specifications

	6ES7 422-1FH00-0AA0	6ES7 422-1HH00-0AA0	6ES7 422-1BH11-0AA0	6ES7 422-1BL00-0AA0	6ES7 422-7BL00-0AB0
Voltages and currents					
Load voltage L+					
• Rated value (DC)		60 V	24 V	24 V	24 V
• permissible range, lower limit (DC)		1 V	20.4 V	20.4 V	20.4 V
• permissible range, upper limit (DC)		60 V	28.8 V	28.8 V	28.8 V
Load voltage L1					
• Rated value (AC)	230 V; 120/230 V AC	230 V			
• permissible range, lower limit (AC)	79 V	2 V			20.4 V
• permissible range, upper limit (AC)	264 V	264 V			28.8 V
Current consumption					
from load voltage L+ (without load), max.	1.5 mA		30 mA	30 mA	120 mA
from load voltage L1 (without load), max.	6 mA				
from backplane bus DC 5 V, max.	400 mA	1 A	160 mA	200 mA	200 mA
Power loss, max.	16 W	25 W	7 W	4 W	8 W
Digital outputs					
Number of digital outputs	16	16; Relay	16	32	32
Cable length, shielded, max.	1,000 m	1,000 m	1,000 m	1,000 m	1,000 m
Cable length unshielded, max.	600 m	600 m	600 m	600 m	600 m
Short-circuit protection of the output	Yes; Fuse, 8 A / 250 V (per group)		Yes; clocked electronically	Yes; clocked electronically	Yes; clocked electronically
Limitation of inductive shutdown voltage to			-30 V	-27 V	L+ (-45 V)
Lamp load, max.	50 W	60 W	10 W	5 W	5 W
Output voltage					
• for signal "1", min.	L1 (-18.1 V)		L+ (-0.5 V)	L+ (-0.3 V)	L+ (-0.8 V)

SM 422 digital output module

Technical specifications (continued)

	6ES7 422-1FH00-0AA0	6ES7 422-1HH00-0AA0	6ES7 422-1BH11-0AA0	6ES7 422-1BL00-0AA0	6ES7 422-7BL00-0AB0
Output current					
• for signal "1" rated value	2 A		2 A	0.5 A	0.5 A
• for signal "1" permissible range for 0 to 60 °C, min.	10 mA		5 mA	5 mA	5 mA
• for signal "1" permissible range for 0 to 60 °C, max.			2.4 A	0.6 A	0.6 A
• for signal "0" residual current, max.	2.6 mA		0.5 mA	0.3 mA	0.5 mA
Switching frequency					
• with resistive load, max.	10 Hz	10 Hz	100 Hz	100 Hz	100 Hz
• with inductive load, max.	0.5 Hz		0.1 Hz	0.5 Hz	2 Hz
Aggregate current of the outputs (per group)					
• up to 60 °C, max.	2 A; 5 A with fan assembly, per 4 adjacent outputs	5 mA; 10 A with fan subassembly	2 A; 2 adjacent outputs each	2 A; 8 adjacent outputs each	2 A
Relay outputs					
Number of operating cycles		100,000; 100,000 (AC 15 / DC 13); 3,000,000 mechanical			
Switching capacity of the contacts					
• with inductive load, max.		5 A; 5 A (30 V DC), 5 A (230 V AC)			
• with resistive load, max.		5 A; 5 A (DC 30 V), 5 A (AC 230 V), 1.2 A (DC 60 V), 0.2 A (DC 125 V)			
Status information/alarms/ diagnostics					
Alarms					
• Diagnostic alarm					Yes; parameterizable
Diagnoses					
• Diagnostics					Yes; internal/ external fault
Isolation					
Isolation checked with	1500 V AC	1500 V AC	500 V DC	500 V DC	500 V DC
Isolation					
Isolation, digital outputs					
• between the channels, in groups of	4	2	8	32	8
• between the channels and the backplane bus	Yes	Yes	Yes	Yes	Yes
Dimensions and weight					
Width	25 mm	25 mm	25 mm	25 mm	25 mm
Height	290 mm	290 mm	290 mm	290 mm	290 mm
Depth	210 mm	210 mm	210 mm	210 mm	210 mm
Weights					
Weight, approx.	800 g	700 g	600 g	600 g	600 g

Ordering data

		Order No.
SM 422 Digital Output Modules		
16 outputs, 24 V DC; 2 A		**6ES7 422-1BH11-0AA0**
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, 120/230 V AC; 2 A		**6ES7 422-1FH00-0AA0**
16 outputs, relay contacts		**6ES7 422-1HH00-0AA0**
Front connectors		
48-pin		
• With screw contacts, 1 unit		**6ES7 492-1AL00-0AA0**
• With screw contacts, 84 units		**6ES7 492-1AL00-1AB0**
• With spring-loaded clamps, 1 unit		**6ES7 492-1BL00-0AA0**
• With crimp contacts, 1 unit	A)	**6ES7 492-1CL00-0AA0**
• With crimp contacts, 84 units		**6ES7 492-1CL00-1AB0**
SIMATIC TOP connect		See page 5/104; Information about which components can be used for the respective module, see A&D Mall or Catalog KT 10.2
Cover film for labeling strips		**6ES7 492-2XX00-0AA0**
Spare part		
Fuse cover		**6ES7 422-0XX00-7AA0**
Spare part, 4 units		
S7 SmartLabel		**2XV9 450-1SL01-0YX0**
Software for automatic labeling of modules based on data of the STEP 7 project		

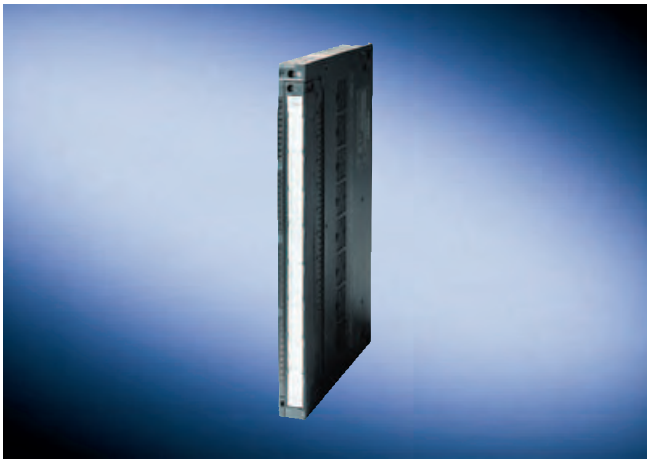
A) Subject to export regulations: AL: N and ECCN: EAR99H

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

		Order No.
Labeling sheets for machine inscription		
DIN A4, for printing using laser printer; pack of 10		
Petrol		**6ES7 492-2AX00-0AA0**
Light-beige		**6ES7 492-2BX00-0AA0**
Yellow		**6ES7 492-2CX00-0AA0**
Red		**6ES7 492-2DX00-0AA0**
SIMATIC Manual Collection	D)	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, five languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET		
SIMATIC Manual Collection maintenance service for 1 year	D)	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		
Manual "SIMATIC S7-400 programmable controller"		
incl. instruction list		
German		**6ES7 498-8AA04-8AA0**
English		**6ES7 498-8AA04-8BA0**
French		**6ES7 498-8AA04-8CA0**
Spanish		**6ES7 498-8AA04-8DA0**
Italian		**6ES7 498-8AA04-8EA0**

SM 431 analog input module

Overview



- Analog inputs for the SIMATIC S7-400
- For connection of voltage and current sensors, thermocouples, resistors and resistance thermometers
- Resolution from 13 to 16 bit

Technical specifications

	6ES7 431-0HH00-0AB0	6ES7 431-1KF00-0AB0	6ES7 431-1KF10-0AB0	6ES7 431-1KF20-0AB0
Voltages and currents				
Load voltage L+				
• Rated value (DC)	24 V; only required for supplying 2-wire transmitters		24 V; only required for supplying 2-wire transmitters	24 V; only required for supplying 2-wire transmitters
• reverse polarity protection	Yes		Yes	Yes
Current consumption				
from load voltage L+ (without load), max.	400 mA; for 16 connected, fully controlled 2-wire transmitters		200 mA	200 mA; for 8 connected, fully controlled 2-wire transmitters
from backplane bus DC 5 V, max.	100 mA	350 mA	600 mA	1,000 mA
Power loss, typ.	2 W	1.8 W	3.5 W	4.9 W
Analog inputs				
Number of analog inputs	16	8	8	8
Number of analog inputs for voltage/current measurement	16	8	8	8
Number of analog inputs for resistance measurement		4	4	4
Cable length, shielded, max.	200 m	200 m	200 m; 50 m with thermocouples and input ranges <= 80 mV	200 m
permissible input frequency for voltage input (destruction limit), max.	20 V; 20 V continuous, 75 V for max. 1s (mark to space ratio 1:20)	50 V	18 V; 18 V continuous, 75 V for 1 ms (mark to space ratio 1:20)	18 V; 18 V continuous, 75 V for 1 ms (mark to space ratio 1:20)
permissible input current for current input (destruction limit), max.	40 mA	50 mA; 40 mA continuous	40 mA; permanent	40 mA; permanent
Input ranges (rated values), voltages				
• 1 to 5 V	Yes	Yes	Yes	Yes
• -1 V to +1 V	Yes	Yes	Yes	Yes
• -10 V to +10 V	Yes	Yes	Yes	Yes
• -2.5 V to +2.5 V			Yes	
• -250 mV to +250 mV			Yes	
• -5 V to +5 V			Yes	
• -500 mV to +500 mV			Yes	
• -80 mV to +80 mV			Yes	

Technical specifications (continued)

	6ES7 431-0HH00-0AB0	6ES7 431-1KF00-0AB0	6ES7 431-1KF10-0AB0	6ES7 431-1KF20-0AB0
Input ranges (rated values), currents				
• 0 to 20 mA			Yes	
• -20 to +20 mA	Yes	Yes		Yes
• 4 to 20 mA	Yes	Yes	Yes	Yes
Input ranges (rated values), thermoelements				
• Type B			Yes	
• Type E			Yes	
• Type J			Yes	
• Type K			Yes	
• Type L			Yes	
• Type N			Yes	
• Type R			Yes	
• Type S			Yes	
• Type T			Yes	
• Type U			Yes	
Input ranges (rated values), resistors				
• 0 to 150 Ohm			Yes	
• 0 to 300 Ohm			Yes	
• 0 to 48 Ohm			Yes	
• 0 to 600 Ohm		Yes	Yes	Yes
• 0 to 6000 Ohm			Yes; usable up to 5000 ohms	
Input ranges (rated values), resistance thermometers				
• Ni 100			Yes	
• Ni 1000			Yes	
• Pt 100			Yes	
• Pt 1000			Yes	
• Pt 10000			Yes	
• Pt 200			Yes	
• Pt 500			Yes	
Characteristic linearization				
• programmable			Yes	
• for thermoelements			Type B, R, S, T, E, J, K, N, U, L	
• for thermoresistor			Pt 100, Pt 200, Pt 500, Pt 1000, Ni 100, Ni 1000	
Temperature compensation				
• external temperature compensation with compensations socket			Yes	
• external temperature compensation with Pt100			Yes	
• internal temperature compensation			No	
• dynamic reference temperature value			Yes	

SM 431 analog input module

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Technical specifications (continued)

	6ES7 431-0HH00-0AB0	6ES7 431-1KF00-0AB0	6ES7 431-1KF10-0AB0	6ES7 431-1KF20-0AB0
Analog value creation				
Integrations and conversion time/resolutionper channel				
• Resolution with overload area (bit including sign), max.	13 Bit	13 Bit	14 Bit; with activated smoothing: 16 Bit	14 Bit; 14/14/14
• Integration time, parameter-izable	Yes	Yes	Yes	Yes
• Integration time, ms	110 / 130 ms	16.7 / 20 ms	16.7 / 20 ms	
• Basic conversion time, ms	55 / 65 ms	23 / 25 ms	20.1 / 23.5 ms	52 µs
• additional conversion time for wire break monitoring			4.3 ms	
• additional conversiont time for wire break monitoring and resistance measurement			5.5 ms	
• additional conversion time for resistance measurement			40.2 / 47 ms	
• Interference voltage suppression for interference frequency f1 in Hz	60 / 50 Hz	60 / 50 Hz	60 / 50 Hz	none / 400 / 60 / 50 Hz
Encoder				
Connection of signal encoders				
• for current measurement as 2-wire transducer		Yes; with external transmitter supply	Yes	Yes
• for current measurement as 4-wire transducer	Yes	Yes	Yes	Yes
• for resistance measurement with 2-conductor connection		Yes; Line resistances are also measured	Yes; Line resistances are also measured	Yes; Line resistances are also measured
• for resistance measurement with 3-conductor connection		Yes; Line resistances are also measured	Yes	Yes; Line resistances are also measured
• for resistance measurement with 4-conductor connection		Yes	Yes	Yes
Errors/accuracies				
Operational limit in overall temperature range				
• Voltage, relative to input area	+/- 0,65 %; 1.0 % at 1 to 5 V; 0.65 % at +/- 1 V, +/- 10 V	+/- 1 %; +/- 1.0 % at +/- 1 V; +/- 0.6 and at +/- 10 V; +/- 0.7 % at 1 to 5 V	+/- 0,38 %; +/-0.38 % at +/- 80 mV; +/-0.35 % at +/-250 mV, +/- 500mV, +/- 1 V, +/- 2.5 V, +/- 5 V, 1...5 V, +/- 10 V	+/- 0,7 %; +/- 0.7 % at +/- 1 V; +/- 0.9 % at +/- 10 V, 1 to 5 V
• Current, relative to input area	+/- 0,65 %	+/- 1 %; at +/- 20 mA, 4...20 mA	+/- 0,35 %; 0 to 20 mA, +/- 20 mA, 4 to 20 mA	+/- 0,8 %; at +/- 20 mA, 4...20 mA
• Impedance, relative to input area		+/- 1,25 %; 0 to 500 Ohm (4-conductor measurement, in range of 600 Ohm)	+/- 0,5 %	+/- 1 %
• Resistance-type thermometer, relative to input area			+/- 0,5 %	
Basic error limit (operational limit at 25 °C)				
• Voltage, relative to input area	+/- 0,25 %; 0.5% at 1 to 5 V; 0.25 % at +/- 1 V, +/- 10 V	+/- 0,7 %; 0.7 % at +/- 1 V; 0.4 % at +/- 10 V; 0.5 % at 1 to 5 V	+/- 0,15 %; +/-0.15 % (+/-250mV, +/- 500 mV, +/- 1 V, +/- 2.5 V, +/- 5 V, 1 to 5 V, +/- 10 V); +/-0.17 % (+/- 80mV);	+/- 0,6 %; 0.6 % at +/- 1 V; 0.75 % at +/- 10 V, 1 to 5 V
• Current, relative to input area	+/- 0,25 %; at +/ - 20 mA, 4...20 mA	+/- 0,7 %; at +/- 20 mA, 4...20 mA	+/- 0,15 %; 0 to 20 mA, +/- 20 mA, 4 to 20 mA	+/- 0,7 %; at +/- 20 mA, 4...20 mA

Technical specifications (continued)

	6ES7 431-0HH00-0AB0	6ES7 431-1KF00-0AB0	6ES7 431-1KF10-0AB0	6ES7 431-1KF20-0AB0
Basic error limit (operational limit at 25 °C)				
• Impedance, relative to input area		+/- 0,8 %; 0 to 500 Ohm (4-conductor measurement, in range of 600 Ohm)	+/- 0,15 %; +/- 0.15 % at 0 to 48 Ohm (4-conductor measurement), 0 to 150 Ohm (4-conductor measurement), 0 to 300 Ohm (4-conductor measurement), 0 to 600 Ohm (4-conductor measurement), 0 to 5000 Ohm (4-conductor measurement, in range of 6000 Ohm); +/- 0.3 % at 0 to 300 Ohm (3-conductor measurement), 0 to 600 Ohm (3-conductor measurement), 0 to 5000 Ohm (3-conductor measurement, in range of 6000 Ohm)	+/- 0,7 %; 0 to 600 Ohm
• Resistance-type thermometer, relative to input area			+/- 0,3 %	
Isolation				
Isolation checked with	500 V DC between bus and local ground	2120 V DC between bus and analog part; 500 V DC between bus and local ground; 2120 V DC between analog part and local ground	2120 V DC between bus and L+/M; 2120 V DC between bus and analog part; 500 V DC between bus and local ground; 707 V DC between analog part and L+/M; 2120 V DC between analog part and local ground; 2120 V DC between L+/M and local ground	2120 V DC between bus and analog part; 500 V DC between bus and local ground; 707 V DC between analog part and L+/M; 2120 V DC between analog part and local ground; 2120 V DC between L+/M and local ground
Isolation				
Isolation, analog inputs				
• Isolation, analog inputs	No	Yes	Yes	Yes
• between the channels	No	No	No	No
Permissible potential difference				
between the inputs (UCM)	2 V DC / 2 Vpp AC	30 V AC	120 V AC	8 V AC
Dimensions and weight				
Width	25 mm	25 mm	25 mm	25 mm
Height	290 mm	290 mm	290 mm	290 mm
Depth	210 mm	210 mm	210 mm	210 mm
Required slots	1	1	1	1
Weights				
Weight, approx.	500 g	500 g	500 g	500 g

SM 431 analog input module

Technical specifications (continued)

	6ES7 431-7QH00-0AB0	6ES7 431-7KF00-0AB0	6ES7 431-7KF10-0AB0
Voltages and currents			
Load voltage L+			
• Rated value (DC)	24 V; only required for supplying 2-wire transmitters		
• reverse polarity protection	Yes		
Current consumption			
from load voltage L+ (without load), max.	400 mA	400 mA	400 mA
from backplane bus DC 5 V, max.	700 mA	1,200 mA	650 mA
Power loss, typ.	4.5 W	4.6 W	3.3 W
Analog inputs			
Number of analog inputs	16	8	8
Number of analog inputs for voltage/current measurement	16	8	
Number of analog inputs for resistance measurement	8		8
Cable length, shielded, max.	200 m; 50 m with thermocouples and input ranges <= 80 mV	200 m	200 m; 50 m with thermocouples and input ranges +/- 80 mV
permissible input frequency for voltage input (destruction limit), max.	18 V; 18 V continuous, 75 V for 1 ms (mark to space ratio 1:20)	35 V; 35 V continuous, 75 V for max. 1 s (mark to space ratio 1:20)	35 V; 35 V continuous, 75 V for max. 1 s (mark to space ratio 1:20)
permissible input current for current input (destruction limit), max.	40 mA	32 mA	
Input ranges (rated values), voltages			
• 1 to 5 V	Yes	Yes	
• -1 V to +1 V	Yes	Yes	
• -10 V to +10 V	Yes	Yes	
• -100 mV to +100 mV		Yes	
• -2.5 V to +2.5 V	Yes	Yes	
• -20 mV to +20 mV		Yes	
• -25 mV to +25 mV	Yes		
• -250 mV to +250 mV	Yes	Yes	
• -5 V to +5 V	Yes	Yes	
• -50 mV to +50 mV	Yes	Yes	
• -500 mV to +500 mV	Yes	Yes	
• -80 mV to +80 mV	Yes	Yes	
Input ranges (rated values), currents			
• 0 to 20 mA	Yes	Yes	
• -10 to +10 mA	Yes	Yes	
• -20 to +20 mA	Yes	Yes	
• -3.2 to +3.2 mA		Yes	
• 4 to 20 mA	Yes	Yes	
• -5 to +5 mA	Yes	Yes	

Technical specifications (continued)

	6ES7 431-7QH00-0AB0	6ES7 431-7KF00-0AB0	6ES7 431-7KF10-0AB0
Input ranges (rated values), thermoelements			
• Type B	Yes	Yes	
• Type E	Yes	Yes	
• Type J	Yes	Yes	
• Type K	Yes	Yes	
• Type L	Yes	Yes	
• Type N	Yes	Yes	
• Type R	Yes	Yes	
• Type S	Yes	Yes	
• Type T	Yes	Yes	
• Type U	Yes	Yes	
Input ranges (rated values), resistors			
• 0 to 150 Ohm	Yes		
• 0 to 300 Ohm	Yes		
• 0 to 48 Ohm	Yes		
• 0 to 600 Ohm	Yes		
• 0 to 6000 Ohm	Yes; usable up to 5000 ohms		
Input ranges (rated values), resistance thermometers			
• Ni 100	Yes		Yes
• Ni 1000	Yes		Yes; different characteristics selectable: Europe/US
• Pt 100	Yes		Yes
• Pt 1000	Yes		Yes
• Pt 200	Yes		Yes
• Pt 500	Yes		Yes
Characteristic linearization			
• programmable	Yes	Yes	Yes
• for thermoelements	Type B, R, S, T, E, J, K, N, U, L	Type B, N, E, R, S, J, L, T, K, U	
• for thermoresistor	Pt 100, Pt 200, Pt 500, Pt 1000, Ni 100, Ni 1000		Pt 100, Pt 200, Pt 500, Pt 1000, Ni 100, Ni 1000 various characteristics selectable (Europe/US)
Temperature compensation			
• external temperature compensation with compensations socket	Yes	Yes	
• external temperature compensation with Pt100	Yes		
• internal temperature compensation		Yes	
• dynamic reference temperature value	Yes	Yes	

SM 431 analog input module

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Technical specifications (continued)

	6ES7 431-7QH00-0AB0	6ES7 431-7KF00-0AB0	6ES7 431-7KF10-0AB0
Analog value creation			
Integrations and conversion time/resolutionper channel			
• Resolution with overload area (bit including sign), max.	16 Bit; 16/16/16	16 Bit	16 Bit
• Integration time, parameter-izable	Yes	Yes	Yes
• Integration time, ms	2.5 / 16.7 / 20 ms	2.5 / 16.7 / 20 / 100 ms	20 ms at 50 Hz (faulty module incl. wire break)
• Basic conversion time, ms	6 / 20.1 / 23.5 ms	10 / 16.7 / 20 / 100	8 / 23 / 25 ms
• additional conversion time for wire break monitoring	4.3 / 4.3 / 4.3 ms		110 ms / 4 ms
• additional conversion time for wire break monitoring and resistance measurement	5.5 ms	1 ms (module)	none
• additional conversiontime for resistance measurement	12 / 40.2 / 47 ms		
• Interference voltage suppression for interference frequency f1 in Hz	400 / 60 / 50 Hz	400 / 60 / 50 / 10 Hz	none/ 60 / 50 Hz
Encoder			
Connection of signal encoders			
• for current measurement as 2-wire transducer	Yes		
• for current measurement as 4-wire transducer	Yes	Yes	
• for resistance measurement with 2-conductor connection	Yes; Line resistances are also measured		
• for resistance measurement with 3-conductor connection	Yes		Yes
• for resistance measurement with 4-conductor connection	Yes	Yes	Yes
Errors/accuracies			
Operational limit in overall temperature range			
• Voltage, relative to input area	+/- 0,3 %; +/- 0.3 % at +/- 250 mV, +/- 500 mV, +/- 1 V, +/- 2.5 V, +/- 5 V, 1 to 5 V, +/- 10 V; +/- 0.31 % at +/- 80 mV; +/- 0.32 % at +/- 50 mV; +/- 0.35 % at +/- 25 mV;	+/- 0,3 %	
• Current, relative to input area	+/- 0,3 %; at 0 to 20 mA, +/- 5 mA, +/-10 mA, +/-20 mA, 4 to 20 mA	+/- 0,5 %	
• Impedance, relative to input area	+/- 0,3 %; +/- 0.3 % at 0 to 48 Ohm (4-conductor measurement), 0 to 150 Ohm (4-conductor measurement), 0 to 300 Ohm (4-conductor measurement), 0 to 600 Ohm (4-conductor measurement), 0 to 5000 Ohm (4-conductor measurement, in range of 6000 Ohm); +/- 0.4 % at 0 to 300 Ohm (3-conductor measurement), 0 to 600 Ohm (3-conductor measurement), 0 to 5000 Ohm (3-conductor measurement, in range of 6000 Ohm);		
• Resistance-type thermometer, relative to input area	+/- 0,4 %		

	6ES7 431-7QH00-0AB0	6ES7 431-7KF00-0AB0	6ES7 431-7KF10-0AB0
Basic error limit (operational limit at 25 °C)			
• Voltage, relative to input area	+/- 0,15 %; +/- 0.15 % at +/- 250 mV, +/- 500 mV, +/- 1 V, +/- 2.5 V, +/- 5 V, 1to 5 V, +/- 10 V; +/- 0.17 % at +/- 80 mV; +/- 0.19 % at +/- 50 mV; +/- 0.23 % at +/- 25 mV;	+/- 0,1 %	
• Current, relative to input area	+/- 0,15 %; at 0...20 mA, +/- 5 mA, +/-10 mA, +/-20 mA, 4...20 mA	+/- 0,17 %	
• Impedance, relative to input area	+/- 0,15 %; +/- 0.15 % at 0 to 48 Ohm (4-conductor measurement), 0 to 150 Ohm (4-conductor measurement), 0 to 300 Ohm (4-conductor measurement), 0 to 5000 Ohm (4-conductor measurement, in region of 6000 Ohm); +/- 0.3 % at 0 to 300 Ohm (3-conductor measurement), 0 to 600 Ohm (3-conductor measurement), 0 to 5000 Ohm (3-conductor measurement, in region of 6000 Ohm)		
• Resistance-type thermometer, relative to input area	+/- 0,3 %		
Status information/alarms/ diagnostics			
Alarms			
• Diagnostic alarm	Yes; parameterizable	Yes; parameterizable	Yes; parameterizable
• Limit value alarm	Yes; parameterizable	Yes	Yes
Diagnoses			
• Diagnostics	Yes; parameterizable	Yes	Yes
Isolation			
Isolation checked with	2120 V DC between bus and L+/M; 2120 V D between bus and analog part; 500 V DC between bus and local ground; 707 V DC between analog part and L+/M; 2120 V DC between analog part and local ground; 2120 V DC between L+/M and local ground	1500 V DC	1500 V DC
Isolation			
Isolation, analog inputs			
• Isolation, analog inputs	Yes	Yes	Yes
• between the channels	No	Yes	No
Permissible potential difference			
between the inputs (UCM)	120 V AC	120 V AC	none

SM 431 analog input module

Technical specifications (continued)

	6ES7 431-7QH00-0AB0	6ES7 431-7KF00-0AB0	6ES7 431-7KF10-0AB0
Dimensions and weight			
Width	25 mm	25 mm	25 mm
Height	290 mm	290 mm	290 mm
Depth	210 mm	210 mm	210 mm
Required slots	1	1	1
Weights			
Weight, approx.	500 g	650 g	650 g

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Ordering data

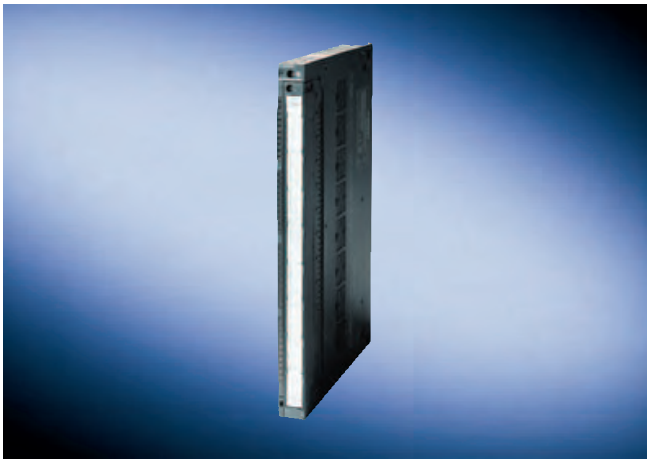
		Order No.
SM 431 analog input modules		
16 inputs, non-floating, 13 bit		**6ES7 431-0HH00-0AB0**
8 inputs, floating, 13 bit		**6ES7 431-1KF00-0AB0**
8 inputs, floating, 14 bit, with linearization		**6ES7 431-1KF10-0AB0**
8 inputs, floating, 14 bit		**6ES7 431-1KF20-0AB0**
16 inputs, floating, 16 bit, process interrupt capability		**6ES7 431-7QH00-0AB0**
8 inputs, floating, 16 bit, process interrupt capability, for thermocouples (current, voltage)		**6ES7 431-7KF00-0AB0**
8 inputs, floating, 16 bit, process interrupt capability, for thermal resistors		**6ES7 431-7KF10-0AB0**
Front connectors		
48-pin		
• With screw contacts, 1 unit		**6ES7 492-1AL00-0AA0**
• With screw contacts, 84 units		**6ES7 492-1AL00-1AB0**
• With spring-loaded clamps, 1 unit		**6ES7 492-1BL00-0AA0**
• With crimp contacts, 1 unit	A)	**6ES7 492-1CL00-0AA0**
• With crimp contacts, 84 units		**6ES7 492-1CL00-1AB0**
• 1 unit; for 6ES7 431-7KF00-0AB0; spare part, included in scope of delivery of module		**6ES7 431-7KF00-6AA0**
SIMATIC TOP connect		See page 5/104; Information about which components can be used for the respective module, see A&D Mall or Catalog KT 10.2
Range card for analog inputs		**6ES7 974-0AA00-0AA0**
1 card for 2 inputs (spare part)		
Cover foil for labeling strip		**6ES7 492-2XX00-0AA0**
Spare part		

		Order No.
S7-SmartLabel		**2XV9 450-1SL01-0YX0**
Software for machine labeling of modules directly from the STEP 7 project		
Labeling sheets for machine labeling		
DIN A4, for printing using laser printer; 10 units		
Petrol		**6ES7 492-2AX00-0AA0**
Light beige		**6ES7 492-2BX00-0AA0**
Yellow		**6ES7 492-2CX00-0AA0**
Red		**6ES7 492-2DX00-0AA0**
SIMATIC Manual Collection	D)	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, in 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET		
SIMATIC Manual Collection Maintenance service for 1 year	D)	**6ES7 998-8XC01-8YE2**
Current Manual Collection DVD as well as the three following updates		
Manual "SIMATIC S7-400 programmable controller"		
incl. operation list		
German		**6ES7 498-8AA04-8AA0**
English		**6ES7 498-8AA04-8BA0**
French		**6ES7 498-8AA04-8CA0**
Spanish		**6ES7 498-8AA04-8DA0**
Italian		**6ES7 498-8AA04-8EA0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

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

Overview



- Analog outputs for the SIMATIC S7-400
- For the connection of analog actuators

Technical specifications

	6ES7 432-1HF00-0AB0
Voltages and currents	
Load voltage L+	
• Rated value (DC)	24 V
Current consumption	
from backplane bus DC 5 V, max.	150 mA
from supply voltage L+, max.	400 mA
Power loss, max.	9 W
Analog outputs	
Number of analg outputs	8
Cable length, shielded, max.	200 m
Voltage output, Short-circuit protection	Yes
Voltage output, short-circuit current, max..	30 mA
Current output, no-load voltage, max.	19 V
Output ranges, voltage	
• 0 to 10 V	Yes
• 1 to 5 V	Yes
• -10 to +10 V	Yes
Output ranges, current	
• 0 to 20 mA	Yes
• -20 to +20 mA	Yes
• 4 to 20 mA	Yes
Load impedance (in rated range of output)	
• with voltage outputs, min.	1 kΩ
• with voltage outputs, capacitive load, max.	1 µF
• with current outputs, max.	500 Ω; 600 Ohm if common-mode-voltage reduced to <1 V

	6ES7 432-1HF00-0AB0
Analog value creation	
Integrations and conversion time/resolution per channel	
• Resolution with overload area (bit including sign), max.	13 Bit
• Conversion time (per channel)	420 µs; 420 µs in the ranges 1 to 5 V and 4 to 20 mA; 300 µs in all ranges
Settling time	
• for resistive load	0.1 ms
• for capacitive load	3.5 ms
• for inductive load	0.5 ms
Errors/accuracies	
Operational limit in overall temperature range	
• Voltage, relative to output area	+/- 0,5 %; +/- 10 V, 0 to 10 V, 1 to 5 V
• Current, relative to output area	+/- 1 %; +/- 20 mA, 4...20 mV
Basic error limit (operational limit at 25 °C)	
• Voltage, relative to output area	+/- 0,5 %; +/- 10 V, 0 to 10 V, 1 to 5 V
• Current, relative to output area	+/- 0,5 %; +/- 20 mA, 0 to 20 mA
Status information/ alarms/diagnostics	
Substitute values connectable	No

SM 432 analog output module

Technical specifications (continued)

	6ES7 432-1HF00-0AB0
Isolation	
Isolation checked with	2120 V DC between bus and L+/M; 2120 V DC between bus and analog part; 500 V DC between bus and local ground; 707 V DC between analog part and L+/M; 2120 V DC between analog part and local ground; 2120 V DC between L+/M and local ground
Isolation	
Isolation, analog outputs	
• between the channels and the backplane bus	Yes
Dimensions and weight	
Width	25 mm
Height	290 mm
Depth	210 mm
Required slots	1
Weights	
Weight, approx.	650 g

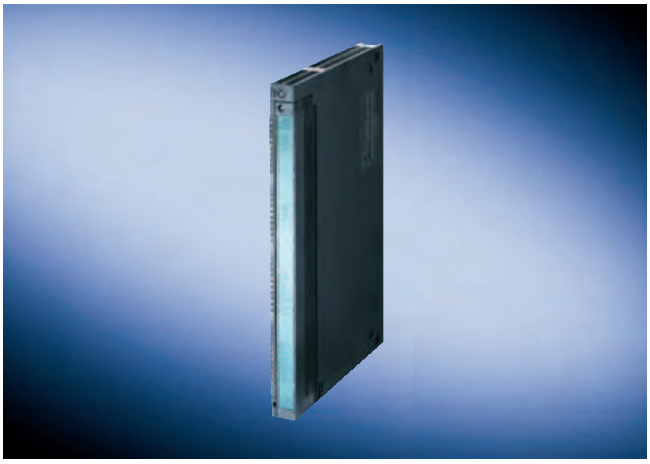
Ordering data

		Order No.
SM 432 analog output module		**6ES7 432-1HF00-0AB0**
8 outputs, floating, 13 bit		
Front connector		
48-pin		
• With screw contacts, 1 unit		**6ES7 492-1AL00-0AA0**
• With screw contacts, 84 units		**6ES7 492-1AL00-1AB0**
• With spring-loaded clamps, 1 unit		**6ES7 492-1BL00-0AA0**
• With crimp contacts, 1 unit	A)	**6ES7 492-1CL00-0AA0**
• With crimp contacts, 84 units		**6ES7 492-1CL00-1AB0**
SIMATIC TOP connect		See page 5/104; Information about which components can be used for the respective module, see A&D Mall or Catalog KT 10.2
Cover foil for labeling strip		**6ES7 492-2XX00-0AA0**
Spare part		
S7-SmartLabel		**2XV9 450-1SL01-0YX0**
Software for machine labeling of modules directly from the STEP 7 project		
Labeling sheets for machine labeling		
DIN A4, for printing using laser printer; 10 units		
Petrol		**6ES7 492-2AX00-0AA0**
Light beige		**6ES7 492-2BX00-0AA0**
Yellow		**6ES7 492-2CX00-0AA0**
Red		**6ES7 492-2DX00-0AA0**
SIMATIC Manual Collection	D)	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, in 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET		
SIMATIC Manual Collection Maintenance service for 1 year	D)	**6ES7 998-8XC01-8YE2**
Current Manual Collection DVD as well as the three following updates		
Manual "SIMATIC S7-400 programmable controller"		
incl. operation list		
German		**6ES7 498-8AA04-8AA0**
English		**6ES7 498-8AA04-8BA0**
French		**6ES7 498-8AA04-8CA0**
Spanish		**6ES7 498-8AA04-8DA0**
Italian		**6ES7 498-8AA04-8EA0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

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

Overview



- Two-channel intelligent counter module for simple counting tasks
- For direct connection of incremental encoders
- Comparison function with 2 specifiable comparison values
- Integrated digital outputs for outputting the response when the comparison values are reached

Note

SIMODRIVE Sensor/Motion Connect 500 feature incremental encoders and preassembled connecting cables for counting and positioning functions.

Additional information is available in the Internet under:

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

Technical specifications

	6ES7 450-1AP00-0AE0
Voltages and currents	
Aux. voltage 1L+, load voltage 2 L+	
• Rated value (DC)	24 V
• permissible range, lower limit (DC)	20.4 V; dynamic 18.5 V
• permissible range, upper limit (DC)	28.8 V; dynamic 30.2 V
• non-periodic skip	
- Duration	500 ms
- Recovery time	50 s
- Value	35 V
Load voltage 1L+	
• Reverse polarity protection	Yes
Load voltage 2L+	
• Reverse polarity protection	Yes
Current consumption	
from load voltage 1L+ (without load), max.	40 mA
from backplane bus DC 5 V, max.	450 mA
Power loss, typ.	9 W
Connection point	
required front connectors	1 x 48-pin
Digital inputs	
Number of digital inputs	6
Functions	1 for gate start, 1 for gate stop, 1 for setting the counter
Input voltage	
• for signal "0"	-28.8 to 5 V
• for signal "1"	+11 to +28.8 V
Input current	
• for signal "1", typ.	9 mA

	6ES7 450-1AP00-0AE0
Input delay (for rated value of input voltage)	
• Input frequency (with 0.1 ms delay), max.	200 kHz
• for standard inputs	
- programmable	Yes
- at "0" to "1", max.	2.5 µs; >= 2.5 µs (200 kHz); <= 25 µs (20 kHz)
Digital outputs	
Number of digital outputs	6
Short-circuit protection of the output	Yes; clocked electronically
Limitation of inductive shutdown voltage to	2L+ (-39 V)
Output voltage	
• for signal "0" (DC), max.	3 V
• for signal "1", min.	2L+ (-1.5 V)
Output current	
• for signal "1" rated value	0,5 A
• for signal "1" permissible range for 0 to 60 °C, min.	5 mA
• for signal "1" permissible range for 0 to 60 °C, max.	0.6 A
Output delay with resistive load	
• "0" to "1", max.	300 µs
Encoder supply	
5 V encoder supply	
• 5 V	Yes; 5.2 V +/-2%
• Short-circuit protection	Yes
• Output current, max.	300 mA
24 V encoder supply	
• 24 V	Yes; 1L+ (-3V)
• Short-circuit protection	Yes
• Output current, max.	300 mA

FM 450-1 counter module

Technical specifications (continued)

	6ES7 450-1AP00-0AE0
Encoder	
Connectable encoders	
• Incremental encoder (symmetrical)	Yes; with 2 pulse series offset by 90°
• Incremental encoder (asymmetrical)	Yes
• 24 V initiator	Yes
• 24 V directional element	Yes; 1 pulse train, 1 direction level
Counters	
Number of counter inputs	2; 32 bit or +/-31 bit
Counter input 5 V	
• Type	RS 422
• Terminating resistor	220 Ω
• Differential input voltage	min. 0.5 V
• Counter frequency, max.	500 kHz
Counter input 24 V	
• Input voltage, for signal "0"	-30 to +5V
• Input voltage, for signal "1"	+11 to +30 V
• Input current, for signal "1", typ.	9 mA
• Counter frequency, max.	200 kHz
Parameter	
Remark	Occupied binary addresses: 64 byte/64 byte
Isolation	
Isolation checked with	500 V
Isolation	
Isolation, digital outputs	
• between the channels and the backplane bus	Yes; Optocoupler
Galvanic isolation, digital inputs	
• between the channels and the backplane bus	Yes; Optocoupler
Isolation counter	
• between the channels and the backplane bus	Yes; Optocoupler
Permissible potential difference	
between different circuits	DC 75 V / AC 60 V
Dimensions and weight	
Width	25 mm
Height	290 mm
Depth	210 mm
Weights	
Weight, approx.	650 g

Ordering data

		Order No.
FM 450-1 counter module		**6ES7 450-1AP00-0AE0**
with 2 channels, max. 500 kHz; for incremental encoder		
Front connector		
48-pin		
• With screw contacts, 1 unit		**6ES7 492-1AL00-0AA0**
• With screw contacts, 84 units		**6ES7 492-1AL00-1AB0**
• With spring-loaded clamps, 1 unit		**6ES7 492-1BL00-0AA0**
• With crimp contacts, 1 unit	A)	**6ES7 492-1CL00-0AA0**
• With crimp contacts, 84 units		**6ES7 492-1CL00-1AB0**
Front covers for CPU and function modules		**6ES7 492-1XL00-0AA0**
Spare part		

A) Subject to export regulations: AL: N and ECCN: EAR99H

Overview

- Three-channel positioning module for rapid traverse/ creep speed drives
- 4 digital outputs per channel for motor control
- Incremental or synchro-serial position decoding

Note

SIMODRIVE Sensor/Motion Connect 500 feature position-measuring systems and preassembled connecting cables for counting and positioning functions.

Additional information is available in the Internet under:

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

Technical specifications

	6ES7 451-3AL00-0AE0
Supply voltages	
Rated value	
• DC 24 V	Yes
Current consumption	
Current consumption, max.	550 mA
Connection point	
required front connectors	1 x 48-pin
Digital inputs	
Number of digital inputs	12; 4 per axis
Functions	Reference cams, reversing cams, flying actual value setting, start/stop positioning
Input voltage	
• Rated value, DC	24 V
• for signal "0"	-3 to 5 V
• for signal "1"	11 to 30 V
Input current	
• for signal "1", typ.	6 mA
• for 2-wire BERO	
- for signal "1", typ.	30 mA
Digital outputs	
Number of digital outputs	12; 4 per axis
Functions	Rapid traverse, creep, run right, run left
Short-circuit protection of the output	Yes
Output voltage	
• for signal "1", min.	UP -3 V
Output current	
• for signal "1" permissible range for 0 to 55 °C, max.	600 mA; with UPmax
• for signal "0" residual current,max.	0.5 mA
Encoder supply	
5 V encoder supply	
• 5 V	Yes
• Output current, max.	210 mA
• Cable length, max.	35 m; at max. 210 mA

	6ES7 451-3AL00-0AE0
24 V encoder supply	
• 24 V	Yes
• Output current, max.	300 mA
• Cable length, max.	300 m; at max.156 kbit/s
Absolute encoder (SSI) encoder supply	
• Absolute encoder (SSI)	Yes
• Output voltage	24 V DC
• Output current, max.	300 mA
• Cable length, max.	300 m; at max.156 kbit/s
Encoder	
Connectable encoders	
• Incremental encoder (symmetrical)	Yes
• Incremental encoder (asymmetrical)	Yes
• Absolute encoder (SSI)	Yes
Encoder signals, incremental encoder (symmetrical)	
• Trace mark signals	A, notA, B, notB
• Zero mark signal	N, notN
• Input signal	5 V difference signal (phys. RS 422)
• Input frequency, max.	1 MHz
Encoder signals, incremental encoder (asymmetrical)	
• Trace mark signals	A, B
• Zero mark signal	N
• Input voltage	24 V
• Input frequency, max.	50 kHz; for 25 m cable length, 25 kHz for 100 m cable length
• Cable length, shielded, max.	100 m

FM 451 positioning module

Technical specifications (continued)

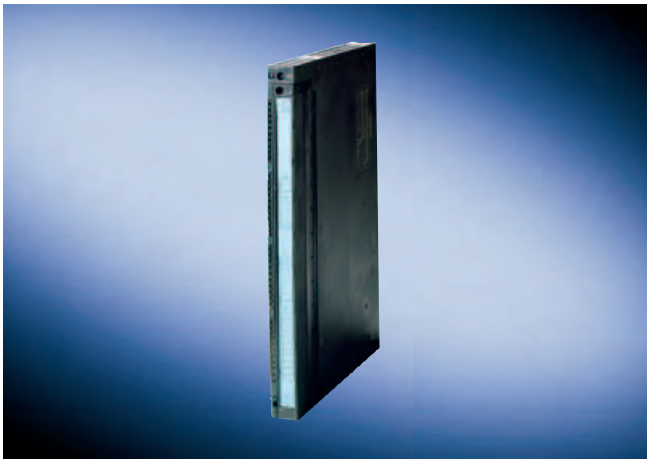
	6ES7 451-3AL00-0AE0
Encoder signals, absolute encoder (SSI)	
• Input signal	5 V difference signal (phys. RS 422)
• Data signal	DATA, notDATA
• Clock signal	CL, notCL
• Telegram length	13 or 25 bit serial
• Clock frequency, max.	1.25 MHz
• Gray code	Yes
• Cable length, shielded, max.	300 m; at max. 156 kBit/s
Isolation	
Isolation, digital outputs	
• Galvanic isolation, digital outputs	Yes
Galvanic isolation, digital inputs	
• galvanic isolation, digital inputs	Yes
Environmental requirements	
Operating termperature	
• min.	0 °C
• max.	55 °C
Storage/transport temperature	
• min.	-40 °C
• max.	70 °C
Relative humidity	
• Humidity class F	Yes
Degree and class of protection	
• IP 20	Yes
Dimensions and weight	
Width	50 mm
Height	290 mm
Depth	210 mm
Weights	
Weight, approx.	1,300 g

A) Subject to export regulations: AL: N and ECCN: EAR99H

Ordering data

Ordering data	Order No.
FM 451 positioning module	**6ES7 451-3AL00-0AE0**
for rapid traverse and creep speed drives	
Sub D connector	**6ES5 750-2AA21**
15-pole, pins	
Front connector	
48-pin	
• With screw contacts, 1 unit	**6ES7 492-1AL00-0AA0**
• With screw contacts, 84 units	**6ES7 492-1AL00-1AB0**
• With spring-loaded clamps, 1 unit	**6ES7 492-1BL00-0AA0**
• With crimp contacts, 1 unit A)	**6ES7 492-1CL00-0AA0**
• With crimp contacts, 84 units	**6ES7 492-1CL00-1AB0**
Front covers for CPU and function modules	**6ES7 492-1XL00-0AA0**
Spare part	
Signal cable	
Pre-assembled for HTL encoder, UL/DESINA	**6FX5 0■2-2AL00-■■■■**
Pre-assembled for SSI absolute encoder, UL/DESINA	**6FX5 0■2-2CC11-■■■■**
Pre-assembled for TTL encoder 6FX2001-1, UL/DESINA	**6FX5 0■2-2CD11-■■■■**
Pre-assembled for TTL encoder 24 V, UL/DESINA	**6FX5 0■2-2CD24-■■■■**
Not crimped	**0**
Module end crimped, connector case supplied	**1**
Motor end crimped, connector case supplied	**4**
0 m	**1**
100 m	**2**
200 m	**3**
0 m	**A**
10 m	**B**
20 m	**C**
30 m	**D**
40 m	**E**
50 m	**F**
60 m	**G**
70 m	**H**
80 m	**J**
90 m	**K**
0 m	**A**
1 m	**B**
2 m	**C**
3 m	**D**
4 m	**E**
5 m	**F**
6 m	**G**
7 m	**H**
8 m	**J**
9 m	**K**
0,0 m	**0**
0,1 m	**1**
0,2 m	**2**
0,3 m	**3**
0,4 m	**4**
0,5 m	**5**
0,6 m	**6**
0,7 m	**7**
0,8 m	**8**

Overview



- Extremely high-speed electronic cam controller
- Low-cost alternative to mechanical cam controllers
- 32 cam tracks, 16 onboard digital outputs for direct output of actions
- Incremental or synchro-serial position decoding

Note:

SIMODRIVE Sensor/Motion Connect 500 feature position-measuring systems and preassembled connecting cables for counting and positioning functions.

Additional information is available in the Internet under:

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

Technical specifications

	6ES7 452-1AH00-0AE0
Supply voltages	
Rated value	
• DC 24 V	Yes
Current consumption	
Current consumption, max.	500 mA
Connection point	
required front connectors	1 x 48-pin
Digital inputs	
Number of digital inputs	11
Functions	Reference point switch, flying actual value setting/length measurement, brake release, enable track output No. 3-10
Input voltage	
• Rated value, DC	24 V
• for signal "0"	-28.8 to 5 V
• for signal "1"	11 to 28.8 V
Input current	
• for signal "0", max. (permissible quiescent current)	2 mA
• for 2-wire BERO - for signal "1", typ.	9 mA
Digital outputs	
Number of digital outputs	16
Functions	Cam tracks
Short-circuit protection of the output	Yes
Output voltage	
• Rated value (DC)	24 V
• for signal "1", min.	UP - 0.8 V
Output current	
• for signal "1" permissible range for 0 to 55 °C, max.	600 mA; with UPmax
• for signal "0" residual current, max.	0.5 mA

	6ES7 452-1AH00-0AE0
Encoder supply	
5 V encoder supply	
• 5 V	Yes
• Output current, max.	300 mA
• Cable length, max.	32 m
24 V encoder supply	
• 24 V	Yes
• Output current, max.	300 mA
• Cable length, max.	100 m
Encoder	
Connectable encoders	
• Incremental encoder (symmetrical)	Yes
• Incremental encoder (asymmetrical)	Yes
• Absolute encoder (SSI)	Yes
• 2-wire BEROS	Yes
Encoder signals, incremental encoder (symmetrical)	
• Trace mark signals	A, notA, B, notB
• Zero mark signal	N, notN
• Input signal	5 V difference signal (phys. RS 422)
• Input frequency, max.	1 MHz
Encoder signals, incremental encoder (asymmetrical)	
• Trace mark signals	A, B
• Zero mark signal	N
• Input voltage	24 V
• Input frequency, max.	50 kHz; 50 kHz for 25 m cable length, 25 kHz for 100 m cable length

FM 452 cam controller

Technical specifications (continued)

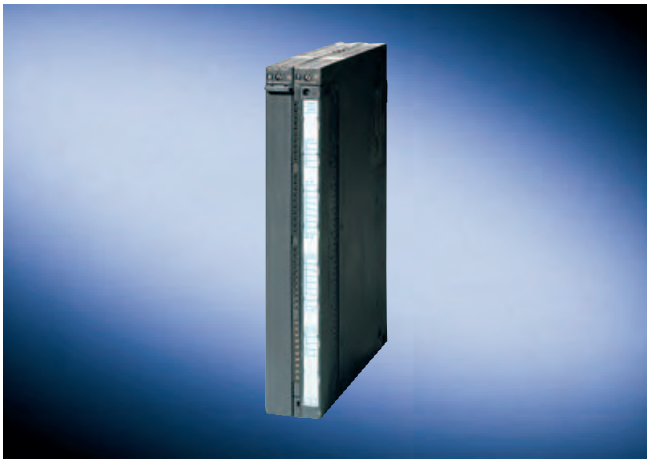
	6ES7 452-1AH00-0AE0
Encoder signals, absolute encoder (SSI)	
• Input signal	5 V difference signal (phys. RS 422)
• Data signal	DATA, notDATA
• Clock signal	CL, notCL
• Telegram length	13 or 25 bit serial
• Clock frequency, max.	1 MHz
• Gray code	Yes
• Cable length, shielded, max.	300 m; at max. 125 kHz
Isolation	
Isolation, digital outputs	
• Galvanic isolation, digital outputs	No
Galvanic isolation, digital inputs	
• galvanic isolation, digital inputs	No
Environmental requirements	
Operating termperature	
• min.	0 °C
• max.	55 °C
Storage/transport temperature	
• min.	-40 °C
• max.	70 °C
Relative humidity	
• Humidity class F	Yes
Degree and class of protection	
• IP 20	Yes
Dimensions and weight	
Width	25 mm
Height	290 mm
Depth	210 mm
Weights	
Weight, approx.	650 g

Ordering data

		Order No.
FM 452 electronic cam controller		**6ES7 452-1AH00-0AE0**
Front covers for CPU and function modules		**6ES7 492-1XL00-0AA0**
Spare part		
Front connector		
48-pin		
• With screw contacts, 1 unit		**6ES7 492-1AL00-0AA0**
• With screw contacts, 84 units		**6ES7 492-1AL00-1AB0**
• With spring-loaded clamps, 1 unit		**6ES7 492-1BL00-0AA0**
• With crimp contacts, 1 unit	A)	**6ES7 492-1CL00-0AA0**
• With crimp contacts, 84 units		**6ES7 492-1CL00-1AB0**
Signal cable		
Pre-assembled for HTL and TTL encoder, without Sub-D connector, UL/DESINA		**6FX5 002-2CA12-■■■■**
Pre-assembled for SSI absolute encoder 6FX2001-5, without Sub-D connector, UL/DESINA		**6FX5 002-2CC12-■■■■**
Length code		see FM 451, page 5/66

A) Subject to export regulations: AL: N and ECCN: EAR99H

Overview



- Positioning module for servo and/or stepper motors in machines with high clock pulse rates
- Can be used for point-to-point positioning tasks and for complex traversing patterns
- Up to 3 independent motors can be controlled

Note:

SIMODRIVE Sensor/Motion Connect 500 feature position-measuring systems and preassembled connecting cables for counting and positioning functions.

Additional information is available in the Internet under:

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

Technical specifications

	6ES7 453-3AH00-0AE0
Voltages and currents	
Aux. voltage 1L+ to 4L+	
• Rated value (DC)	24 V
• dynamic range	18.5 to 30.2 V
• static area	20.4 to 28.8 V
Current consumption	
from load voltage1L+, max.	1 A; with 24 V position encoder; 1 A for 5 V position encoder
from load voltage 2L+ to 4L+, max.	2 A; per channel
from backplane bus DC 5 V, max.	1.6 A; Rated current
Power loss, max.	8 W
Connection point	
required front connectors	1 x 48-pin
Digital inputs	
Number of digital inputs	6; for each channel/axis
Functions	configurable
Input voltage	
• Rated value, DC	24 V
• for signal "0"	-3 to 5 V (max. 3 mA)
• for signal "1"	11 to 30 V (max. 7 mA)
Input delay (for rated value of input voltage)	
• for standard inputs	
- at "0" to "1", max.	15 µs; via input voltage range, 8 µs at DC 24 V
- at "1" to "0", max.	45 µs; via input voltage range
Digital outputs	
Number of digital outputs	4; for each channel/axis
Functions	configurable
Short-circuit protection of the output	Yes
Output voltage	
• Rated value (DC)	24 V
• for signal "1", min.	UP - 0,3 V

	6ES7 453-3AH00-0AE0
Output current	
• for signal "1" rated value	0.5 A; at 40 °C, 0.1 A at 60 °C
• for signal "1" permissible range for 0 to 40 °C, min.	5 mA
• for signal "1" permissible range for 0 to 40 °C, max.	0.6 A
• for signal "1" permissible range for 40 to 60 °C, min.	5 mA
• for signal "1" permissible range for 40 to 60 °C, max.	0.12 A
• for signal "0" residual current, max.	2 mA
Switching frequency	
• with resistive load, max.	100 Hz
• with inductive load, max.	0.25 Hz
Encoder supply	
5 V encoder supply	
• 5 V	Yes
• Output current, max.	300 mA
• Cable length, max.	35 m; at max. 210 mA; 25 m at max. 300 mA
24 V encoder supply	
• 24 V	Yes
• Cable length, max.	100 m; at max. 300 mA
Encoder	
Connectable encoders	
• Incremental encoder (symmetrical)	Yes
• Absolute encoder (SSI)	Yes
Encoder signals, incremental encoder (symmetrical)	
• Input signal	5 V difference signal (phys. RS 422)
• Input frequency, max.	1 MHz; for 10 m cable length; 0.5 MHz for 35 m cable length
Encoder signals, absolute encoder (SSI)	
• Input signal	5 V difference signal (phys. RS 422)
• Cable length, shielded, max.	250 m; at max. 156 kBit/s

FM 453 positioning module

Technical specifications (continued)

	6ES7 453-3AH00-0AE0
Drive interface	
Signal input I	
• Type	Drive interface step, signal input "READY 1"
• Function	"Power section ready" where Ui < 1 V, Ii = 2mA
Signal output I	
• Type	5 V (phys. RS 422)
• Function	Clock pulse, direction, enable, current control
• Differential output voltage, min.	2 V; RL = 100 Ohm
• Differential output voltage for signal "0", max.	1.1 V; Io = 30 mA
• Differential output voltage, for signal "1", min.	3.7 V; Io = -30 mA
• Load impedance	55 Ω
• Pulse frequency	200 kHz; 500 kHz available soon
• Cable length, max.	35 m; 35 m for symm. transmission, 10 m for asymm. transmission
Signal output II	
• Type	Contact relay
• Function	Drive disconnection for operation
• Load	1 A/50 V/30 VA DC

	6ES7 453-3AH00-0AE0
Drive interface	
Signal output III	
• Type	Analog output
• Function	Drive interface Servo: Setpoint output for drive
• Output voltage	-10 to +10 V
• Output current	-3 to +3 mA
• Cable length, max.	30 m
Isolation	
Isolation, digital outputs	
• Galvanic isolation, digital outputs	Yes
Galvanic isolation, digital inputs	
• galvanic isolation, digital inputs	Yes
Environmental requirements	
Operating termperature	
• min.	0 °C
• max.	55 °C
Storage/transport temperature	
• min.	-40 °C
• max.	70 °C
Relative humidity	
• Humidity class F	No
Degree and class of protection	
• IP 20	Yes
Dimensions and weight	
Width	50 mm
Height	290 mm
Depth	210 mm
Weights	
Weight, approx.	1,620 g

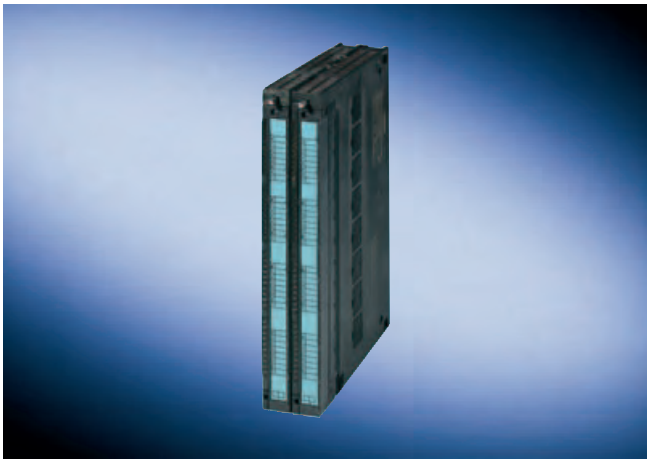
Ordering data

	Order No.
FM 453 positioning module	**6ES7 453-3AH00-0AE0**
with 3 channels/axes	
Setpoint connecting cable	
for 3 servo motors	**6FX2 002-3AD01-1■■■**
for 3 stepper motors	**6FX2 002-3AB04-■■■■**
for 2 servo motors / 1 stepper motor	**6FX2 002-3AB02-■■■■**
for 1 servo motor / 2 stepper motors	**6FX2 002-3AB03-■■■■**
Length code	see FM 451, page 5/66
Front connector	
48-pin	
• With screw contacts, 1 unit	**6ES7 492-1AL00-0AA0**
• With screw contacts, 84 units	**6ES7 492-1AL00-1AB0**
• With spring-loaded clamps, 1 unit	**6ES7 492-1BL00-0AA0**
• With crimp contacts, 1 unit A)	**6ES7 492-1CL00-0AA0**
• With crimp contacts, 84 units	**6ES7 492-1CL00-1AB0**

	Order No.
Front covers for CPU and function modules	**6ES7 492-1XL00-0AA0**
Spare part	
Signal cable	
Pre-assembled for SSI absolute encoder, UL/DESINA	**6FX5 0■2-2CC11-■■■■**
Pre-assembled for TTL encoder 6FX2001-1, UL/DESINA	**6FX5 0■2-2CD01-■■■■**
Pre-assembled for TTL encoder 24 V, UL/DESINA	**6FX5 0■2-2CD24-■■■■**
Length code	see FM 451, page 5/66

A) Subject to export regulations: AL: N and ECCN: EAR99H

Overview



- 16-channel closed-loop control module for universal closed-loop control tasks
- Suitable for temperature, pressure, and flow control systems
- User-friendly online self-optimization for temperature controls
- Preprogrammed controller structures
- 2 control algorithms
- 2 versions:
  - FM 455 C as continuous-action controller
  - FM 455 S as step controller or pulse controller
- With 16 analog outputs (FM 455 C) or
  32 digital outputs (FM 455 S) for actuators

Technical specifications

	6ES7 455-0VS00-0AE0	6ES7 455-1VS00-0AE0
Voltages and currents		
Load voltage L+		
• Rated value (DC)	24 V	24 V
• permissible range, lower limit (DC)	20.4 V	20.4 V
• permissible range, upper limit (DC)	28.8 V	28.8 V
Current consumption		
from load voltage L+ (without load), max.	440 mA; typ. 370 mA	400 mA; typ. 330 mA
Power loss, max.	17.3 W	16.2 W
Power loss, typ.	12 W	10.7 W
Connection point		
required front connectors	2 x 48-pin	2 x 48-pin
Digital inputs		
Number of digital inputs	16	16
Cable length		
• Cable length, shielded, max.	1,000 m	1,000 m
• Cable length unshielded, max.	600 m	600 m
Input characteristic curve to IEC 1131, type 2	Yes	Yes
Input voltage		
• Rated value, DC	24 V	24 V
• for signal "0"	-3 to 5 V	-3 to 5 V
• for signal "1"	13 to 30 V	13 to 30 V
Input current		
• for signal "1", typ.	7 mA	7 mA
Digital outputs		
Number of digital outputs		32
Cable length, shielded, max.		1,000 m
Cable length unshielded, max.		600 m
Short-circuit protection of the output		Yes; electronic
Limitation of inductive shutdown voltage to		L+ (-1.5 V)
Lamp load, max.		5 W
Controlling a digital input		Yes
Output voltage		
• for signal "1", min.		L+ (-2.5 V)
Output current		
• for signal "1" rated value		0.1 A
• for signal "1" permissible range for 0 to 60 °C, min.		5 mA
• for signal "1" permissible range for 0 to 60 °C, max.		150 mA
• for signal "0" residual current, max.		0.5 mA
Parallel switching of 2 outputs		
• for logic links		Yes
Switching frequency		
• with resistive load, max.		100 Hz
• with inductive load, max.		0.5 Hz
• on lamp load, max.		100 Hz
Load impedance range		
• lower limit		240 Ω
• upper limit		4 kΩ
Analog inputs		
Number of analog inputs	16; with thermocouples or 2-wire connection, 8 with Pt 100 or 4-wire connection	16; with thermocouples or 2-wire connection, 8 with Pt 100 or 4-wire connection
Cable length, shielded, max.	200 m; 50m at 80 mV and thermocouples	200 m; 50m at 80 mV and thermocouples

FM 455 closed-loop control module

Technical specifications (continued)

	6ES7 455-0VS00-0AE0	6ES7 455-1VS00-0AE0
Analog inputs		
permissible input frequency for voltage input (destruction limit), max.	20 V	20 V
permissible input current for current input (destruction limit), max.	40 mA	40 mA
Input ranges (rated values), voltages		
• 0 to +10 V	Yes	Yes
• -1.75 to +11.75 V	Yes	Yes
• -80 mV to +80 mV	Yes	Yes
Input ranges (rated values), currents		
• 0 to 20 mA	Yes	Yes
• 0 to 23.5 mA	Yes	Yes
• -3.5 to +23.5 mA	Yes	Yes
• 4 to 20 mA	Yes	Yes
Input ranges (rated values), thermoelements		
• Type B	Yes	Yes
• Type J	Yes	Yes
• Type K	Yes	Yes
• Type R	Yes	Yes
• Type S	Yes	Yes
Input ranges (rated values), resistance thermometers		
• Pt 100	Yes	Yes
Characteristic linearization		
• programmable	Yes	Yes
• for thermoelements	Typ B, J, K, R, S	Typ B, J, K, R, S
• for thermoresistor	Pt 100 (Standard)	Pt 100 (Standard)
Temperature compensation		
• external temperature compensation with Pt100	Yes; parametrizable	Yes; parametrizable
• internal temperature compensation	Yes; parametrizable	Yes; parametrizable
Analog outputs		
Number of analog outputs	16	
Cable length, shielded, max.	200 m; 50m at 80 mV and thermocouples	
Voltage output, short-circuit protection	Yes	
Voltage output, short-circuit current, max.	25 mA	
Current output, no-load voltage, max.	18 V	

	6ES7 455-0VS00-0AE0	6ES7 455-1VS00-0AE0
Output ranges, voltage		
• 0 to 10 V	Yes	
• -10 to +10 V	Yes	
Output ranges, current		
• 0 to 20 mA	Yes	
• -20 to +20 mA	Yes	
• 4 to 20 mA	Yes	
Connection of actuators		
• for voltage output 2-conductor connection	Yes	
• for current output 2-conductor connection	Yes	
Load impedance (in rated range of output)		
• with voltage outputs, min.	1 kΩ	
• with voltage outputs, capacitive load, max.	1 µF	
• with current outputs, max.	500 Ω	
• with current outputs, inductive load, max.	1 mH	
Analog value creation		
Measurement principle	integrating	integrating
Integrations and conversion time/resolutionper channel		
• Resolution with overload area (bit including sign), max.	14 Bit; 12 or 14 bit, parameterizable	14 Bit; 12 or 14 bit, parameterizable
• Conversion time (per channel)	16.67 ms; at 12 bits: 16 2/3 ms at 60 Hz, 20 ms at 50 Hz; at 14 bits: 100 ms at 50 and 60 Hz	16.67 ms; at 12 bits: 16 2/3 ms at 60 Hz, 20 ms at 50 Hz; at 14 bits: 100 ms at 50 and 60 Hz
Settling time		
• for resistive load	0.2 ms	0.1 ms
• for capacitive load	3.3 ms	3.3 ms
• for inductive load	0.5 ms	0.5 ms
Encoder		
Connection of signal encoders		
• for voltage measurement	Yes	Yes
• for current measurement as 4-wire transducer	Yes	Yes
Connectable encoders		
• 2-wire BEROS	Yes	Yes
• permissible quiescent current (2-wire BEROS), max.	1.5 mA	1.5 mA

Technical specifications (continued)

	6ES7 455-0VS00-0AE0	6ES7 455-1VS00-0AE0
Errors/accuracies		
Linearity error (relative to output area)	± 0,05 %	
Linearity error (relative to input area)	± 0,05 %	± 0,05 %
Temperature error (relative to output area)	± 0,02 %/K	
Temperature error (relative to input areas)	± 0,005 %/K	± 0,005 %/K
Operational limit in overall temperature range		
• Voltage, relative to output area	± 0,5 %	
• Current, relative to output area	± 0,6 %	
Basic error limit (operational limit at 25 °C)		
• Voltage, relative to output area	± 0,4 %	
• Current, relative to output area	± 0,5 %	
Interference voltage suppression for f = n x (fl +/- 1 %), fl = interference frequency		
• Series mode interference (peak value of interference < rated value of input range), min.	40 dB	40 dB
• common mode voltage (USS < 2.5 V) , min.	70 dB	70 dB

	6ES7 455-0VS00-0AE0	6ES7 455-1VS00-0AE0
Control technology		
Number of closed loop controllers	16	16
Status information/ alarms/diagnostics		
Substitute values connectable	Yes; parameterizable	Yes; parameterizable
Isolation		
Isolation checked with	500 V DC	500 V DC
Isolation		
Isolation, controller		
• between the channels	No	No
• between the channels and the backplane bus	Yes; Optocoupler	Yes; Optocoupler
Permissible potential difference		
between inputs and MANA (UCM)	2.5 V DC	2.5 V DC
between M internal and the inputs	75 V DC/ 60 V AC	75 V DC/ 60 V AC
Dimensions and weight		
Width	50 mm	50 mm
Height	290 mm	290 mm
Depth	210 mm	210 mm
Weights		
Weight, approx.	1,400 g	1,400 g

Ordering data

	Order No.
FM 455 C closed-loop control module With 16 analog outputs for 16 continuous-action controllers	**6ES7 455-0VS00-0AE0**
FM 455 S closed-loop control module With 32 digital outputs for 16 sequence or pulse controllers	**6ES7 455-1VS00-0AE0**

		Order No.
Front connector		
48-pin		
• With screw contacts, 1 unit		**6ES7 492-1AL00-0AA0**
• With screw contacts, 84 units		**6ES7 492-1AL00-1AB0**
• With spring-loaded clamps, 1 unit		**6ES7 492-1BL00-0AA0**
• With crimp contacts, 1 unit	A)	**6ES7 492-1CL00-0AA0**
• With crimp contacts, 84 units		**6ES7 492-1CL00-1AB0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

FM 458-1 DP application module

Overview

SIMATIC FM 458-1 DP integrated into SIMATIC S7-400

- Designed for high-performance and freely-configurable control tasks in the SIMATIC S7-400
- Can be adapted as required to individual requirements, e.g.: open-loop control, closed-loop control, computing and motion control. Therefore highly flexible for many different applications.
- Extensive library with approx. 300 function blocks: These include simple functions such as AND, ADD and OR up to complex GMC (General Motion Control) blocks such as virtual master or gearbox functions.
- User-friendly graphic configuring with the SIMATIC engineering tool CFC (Continuous Function Chart): Optimum code generation by compiler, therefore SCL is not required.
- PROFIBUS DP interface onboard

SIMATIC FM 458-1 DP is based on more than 15 years experience with high-performance control systems, and combines this know-how with the advantages of SIMATIC – the global leader in automation systems for decades already. In contrast to other function modules with static structures/functions, the FM 458-1 DP application module can be flexibly configured according to individual requirements.

Overview

- Basic module for handling computing, open-loop control and closed-loop control tasks
- PROFIBUS DP interface for linking of distributed I/O and drive engineering
- Modular configuration with expansion modules for I/O and communication

Technical specifications

	6DD1 607-0AA2
Supply voltages	
Rated value	
• DC 5 V	Yes
• DC 24 V	Yes
Current consumption	
Current consumption, max.	3 A
Current consumption, typ.	1.5 A
Backup battery	
Battery op.	Yes
• Buffer current, max.	15 µA
Memory	
Backup	
• present	Yes; SRAM
Time	
Clock	
• Hardware clock (real-time clock)	Yes
• Resolution	500 ms
PROFIBUS DP	
equidistance	Yes; with connection to interrupt tasks
Digital inputs	
Number of digital inputs	8; Connectors X2
Input voltage	
• Rated value, DC	24 V
• for signal "0"	-1 V bis 6 V
• for signal "1"	13.5V bis 33V

	6DD1 607-0AA2
Digital inputs	
Input current	
• for signal "0", max. (permissible quiescent current)	0 mA
• for signal "1", typ.	3 mA; at 24 V
Input delay (for rated value of input voltage)	
• for standard inputs - at "0" to "1", max.	5 µs
Status information/ alarms/diagnostics	
Alarms	
• Alarms	Yes
Isolation	
Galvanic isolation, digital inputs	
• galvanic isolation, digital inputs	No
Dimensions and weight	
Required slots	1
Weights	
Weight, approx.	1,000 g

FM 458-1 DP basic module

Ordering data	Order No.
Application module FM 458-1 DP	**6DD1 607-0AA2**
Basic module for computing, closed-loop control and open-loop control tasks; with PROFIBUS DP interface	
Micro Memory Card	
for FM 458-1 DP basic module	
2 MB	**6ES7 953-8LL11-0AA0**
4 MB	**6ES7 953-8LM11-0AA0**
FM 458-1 DP user manual A)	**6DD1 904-0AE1**
German	
SC 64 interface cable	**6DD1 684-0GE0**
To connect FM 458-1 to the serial port of a programming device/ PC	
SB10 interface module	**6DD1 681-0AE2**
To connect 8 binary I/Os to FM 458-1 DP	
SB61 interface module	**6DD1 681-0EB3**
To connect 8 binary I/Os to FM 458-1 DP, input voltage: 24/48 V DC	
SU12 interface module	**6DD1 681-0AJ1**
To connect 10 signals to FM 458-1 DP	

	Order No.
RS 485 bus connector with 90° cable outlet	
Max. transmission rate 12 Mbit/s	
Without PG interface	**6ES7 972-0BA12-0XA0**
With PG interface	**6ES7 972-0BB12-0XA0**
RS 485 bus connector with angled cable outlet	
Max. transmission rate 12 Mbit/s	
Without PG interface	**6ES7 972-0BA41-0XA0**
With PG interface	**6ES7 972-0BB41-0XA0**
RS 485 bus connector with 90° cable outlet for Fast Connect system	
Max. transmission rate 12 Mbit/s	
Without PG interface	**6ES7 972-0BA50-0XA0**
With PG interface	**6ES7 972-0BB50-0XA0**
PROFIBUS FastConnect bus cable	
Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m	**6XV1 830-0EH10**
Preferred lengths:	
20 m	**6XV1 830-0EN20**
50 m	**6XV1 830-0EN50**
100 m	**6XV1 830-0ET10**

A) Subject to export regulations: AL: N and ECCN: EAR99H

EXM 438-1 input/output expansion module

Overview

- Optional plug-in expansion module for the FM 458-1 DP basic module
- For input and output of time-critical signals
- With digital and analog inputs/outputs
- Incremental and absolute value encoders can be connected
- 4 high-resolution analog outputs
- Fan-free operation up to 40°C

Technical specifications

	6DD1 607-0CA1
Supply voltages	
Rated value	
• DC 5 V	Yes
• DC 24 V	Yes; to be set up externally
Current consumption	
Current consumption, typ.	1.5 A
Digital inputs	
Number of digital inputs	16
Input voltage	
• Rated value, DC	24 V
• for signal "0"	-1 to +6 V or input open
• for signal "1"	+13 to +33 V
Input current	
• for signal "0", max. (permissible quiescent current)	0 mA
• for signal "1", typ.	3 mA
Input delay (for rated value of input voltage)	
• for standard inputs - at "0" to "1", max.	200 µs
Digital outputs	
Number of digital outputs	8
Short-circuit protection of the output	Yes; electronic/thermal
• Response threshold, typ.	250 mA
Limitation of inductive shutdown voltage to	Supply voltage + 1 V
Output voltage	
• for signal "0" (DC), max.	3 V
Digital outputs	
Output current	
• for signal "1" rated value	50 mA

	6DD1 607-0CA1
Digital outputs	
• for signal "1" permissible range for 0 to 40 °C, min.	100 mA
• for signal "0" residual current, max.	20 µA
Output delay with resistive load	
• "0" to "1", max.	15 µs
Analog inputs	
Number of analog inputs	5; Differential inputs
Input ranges (rated values), voltages	
• -10 V to +10 V	Yes; -10 V +/- 4 LSB to +10 V +/- 4 LSB (1 LSB = 4.88 mV)
• Input resistance (-10 V to +10 V)	470 kΩ
Analog outputs	
Number of analg outputs	8; 4 outputs 16 bit; 4 outputs12 bit
Voltage output, Short-circuit protection	Yes; relative to frame
Output ranges, voltage	
• -10 to +10 V	Yes
Encoder supply	
Output voltage	about 14 V (non-isolated)
Output current, rated value	100 mA
Short-circuit protection	Yes; electronic
Encoder	
Number of connectable encoders, max.	12; 8 incremental encoders (synchronizable), 4 absolute encoders
Weight, approx.	1 kg

EXM 438-1 input/output expansion module

Technical specifications (continued)

	6DD1 607-0CA1
Encoder	
Number of connectable encoders, max.	
Connectable encoders	Yes
• Incremental encoder (symmetrical)	Yes
• Incremental encoder (asymmetrical)	Yes; Single- or multiturn-encoder with SSI (synchronous serial) or EnDat interface
• Absolute encoder (SSI)	
Encoder signals, incremental encoder (symmetrical)	
• Trace mark signals	1.) for tracks A and B (90° out of phase), poss. with zero pulse N; 2.) for separate forward and backward track
• Input signal	at 0-signal: -5 V to 0 V; at 1-signal: +3 V to + 5 V; permissible input voltage range: differential voltage -5 V to +5 V; max. input voltage: 15 mA (NOTE: not limited by module!)
• Input frequency, max.	2.5 MHz
Encoder signals, incremental encoder (asymmetrical)	
• Trace mark signals	Track A and B (phase-shifted by 90 degrees), possibly with zero pulse N
• Input voltage	on 0-signal: -30 V to +4 V (with 15 mA loading); on 1-signal: +8 V to + 30 V (with 15 mA loading); permissible input voltage range: differential voltage -30 V to +30 V
• Input frequency, max.	1 MHz; Track frequency
Encoder signals, absolute encoder (SSI)	
• Input signal	5 V to RS 422
• Data signal	Dual-, Gray-, Gray-Excess-Code
• Clock frequency, max.	2 MHz; 100 kHz to 2 MHz (depending on cable length)
Isolation	
Isolation, analog outputs	
• Galvanic isolation, analog outputs	No
Isolation, analog inputs	
• Isolation, analog inputs	No
Isolation, digital outputs	
• Galvanic isolation, digital outputs	No
Galvanic isolation, digital inputs	
• galvanic isolation, digital inputs	No
Dimensions and weight	
Required slots	1

Ordering data

	Order No.
EXM 438-1 input/output expansion module For the direct exchange of digital and analog signals between the FM 458-1 DP and the system	**6DD1 607-0CA1**
SB10 interface module For connecting 8 binary inputs or outputs to FM 458-1 DP	**6DD1 681-0AE2**
SB61 interface module For connecting 8 binary inputs to FM 458-1 DP, 24/48 V DC input voltage	**6DD1 681-0EB3**
SB71 interface module For connecting 8 binary outputs to FM 458-1 DP, 24/48 V DC output voltage	**6DD1 681-0DH1**
SU12 interface module For connecting 10 signals to FM 458-1 DP	**6DD1 681-0AJ1**
SU13 interface module For connecting 50 signals to FM 458-1 DP	**6DD1 681-0GK0**
SC 62 interface cable For connecting EXM 438-1 to up to 5 SBxx or SU12	**6DD1 684-0GC0**
SC 63 interface cable For connecting EXM 438-1 to one SU13	**6DD1 684-0GD0**
User Manual for FM 458-1 DP A) German	**6DD1 904-0AE1**

A) Subject to export regulations: AL: N and ECCN: EAR99H

EXM 448
Universal communications expansion module

Overview

- Optional plug-in expansion module for the FM 458-1 DP basic module
- For fast communication via PROFIBUS DP or SIMOLINK
- EXM 448: With vacant slot for a MASTERDRIVES option module

Technical specifications

	6DD1 607-0EA0
Supply voltages	
Rated value	
• DC 5 V	Yes
Current consumption	
Current consumption, typ.	0.8 A
Dimensions and weight	
Required slots	1
• Weight, approx.	0.8 kg

Ordering data

		Order No.
EXM 448 communications expansion module		**6DD1 607-0EA0**
For fast communication, for example, with drives; with free slot for MASTERDRIVES option module		
FM 458-1 DP user manual	A)	**6DD1 904-0AE1**
German		

A) Subject to export regulations: AL: N and ECCN: EAR99H

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EXM 448-2
Universal communications expansion

Overview

- Optional plug-in expansion module for the FM 458-1 DP basic module
- For high-speed communication over up to 2 SIMOLINK interfaces
- For coupling several FM 458-1 DP application modules in synchronism with the sampling time

Technical specifications

	6DD1 607-0EA2
Supply voltages	
Rated value	
• DC 5 V	Yes
Current consumption	
Current consumption, typ.	0.6 A
Dimensions and weight	
Required slots	1
Weights	
Weight, approx.	0.9 kg

Ordering data

		Order No.
EXM 448-2 universal communications expansion module For fast communication with drives; for constructing two SIMOLINK fiber-optic connections		**6DD1 607-0EA2**
FM 458-1 DP user manual German	A)	**6DD1 904-0AE1**

A) Subject to export regulations: AL: N and ECCN: EAR99H

Overview SC64 interface cable

- For connecting the FM 458-1 DP to an SBxx or SU12 interface module
- To use the digital inputs of the FM 458-1 DP with interrupt capability

Overview SC63 interface cable

This cable is used to connect the SIMATIC TDC SM500 peripheral (I/O) module or the SIMATIC S7-400 EXM 438-1 expansion module to a SU13 interface module.

Overview SC62 interface cable

This cable is used to connect the SIMATIC TDC SM500 peripheral module (I/O) or the SIMATIC S7-400 EXM 438-1 expansion module to up to 5 interface modules SB10, SB60, SB70, SB61 SB71 and/ or SU12.

Overview SB10 interface module

The interface module is used to connect 8 digital inputs or outputs.

Accessories for FM 458-1 DP

Overview SB61 interface module

It is used to connect 8 digital inputs with conversion from 24/48 V DC to 24 V DC.

Overview SB71 interface module

The interface module is used to connect 8 digital outputs with conversion of the 24 V DC voltage on the module side to a max. of 24/48 V DC/AC on the plant side using transistors.

Overview SU12 interface module

The interface module is used to connect 10 signals; there is no electronic conversion.

Overview SU13 interface module

This interface module can be used to connect 50 signals; there is no electronic conversion.

Technical specifications

Technical specifications SB10 interface module	
Number of digital inputs or outputs	8
Electrical isolation	No
Max. cable cross-section	1.5 mm^2
Dimensions (W x H x D) in mm	45 x 130 x 156
Weight	0.3 kg
Technical specifications SB61 interface module	
Number of digital inputs for	8
• Input voltage	24/48 V DC
Electrical isolation	Yes, via optocoupler
Max. cable cross-section	1.5 mm^2
Dimensions (W x H x D) in mm	45 x 130 x 156
Weight	0.32 kg
Technical specifications SB71 interface module	
Number of digital outputs	8
• Output voltage, max	24/48 V DC
Output current, max.	40 mA, short-circuit proof
Electrical isolation	Yes, via optocoupler
Max. cable cross-section	1.5 mm^2
Dimensions (W x H x D) in mm	45 x 130 x 156
Weight	0.32 kg
Technical specifications SU12 interface module	
Number of signal cables which can be connected	10
Signal amplitude per signal, max.	60 V, 0.5 A
Electrical isolation	No
Max. cable cross-section	1.5 mm^2
Dimensions (W x H x D) in mm	45 x 130 x 156
Weight	0.28 kg
Technical specifications SU13 interface module	
Number of signal cables which can be connected	50
Signal amplitude per signal, max.	60 V, 0.5 A
Electrical isolation	No
Max. cable cross-section	1.5 mm^2
Dimensions (W x H x D) in mm	45 x 130 x 156
Weight	0.3 kg

Ordering data

	Order No.
SC 64 interface cable for connection of FM 458-1 to the serial port of a PG/PC	**6DD1 684-0GE0**
SC62 interface cable between the SM500 or EXM 438-1 module and a max. of 5 interface moduls SB10, SB60, SB70, SB61 SB71 and/or SU12, 2 m long	**6DD1 684-0GC0**
SC63 interface cable between an SM500 or EXM 438-1 module and SU13 interface module, 2 m long	**6DD1 684-0GD0**
SB10 interface module 8 digital inputs/outputs, 24 V DC	**6DD1 681-0AE2**
SB61 interface module 8 digital inputs, 24/48 V DC	**6DD1 681-0EB3**
SB71 interface module 8 digital outputs with transistors, 24/48 V DC	**6DD1 681-0DH1**
SU12 interface module with plug-in terminal, 10-pin	**6DD1 681-0AJ1**
SU13 interface modul with screw-plug-in terminal	**6DD1 681-0GK0**

Radio clock module SIPLUS DCF 77

Overview

The sychronisation of the real-time clock for the automation systems SIMATIC S7-200, S7-300 and S7-400 with the official time of day of the time signal transmitter DCF 77 of the Physikalisch-Technische Bundesanstalt Braunschweig is made by this module.

The time receipt occurs via a DCF transmitter (antenna with solid-state) which is connected to the the SIMATIC and SIPLUS PLC via two digital inputs and a software driver included in the scope of supply (function block FB). The function blocks can be downloaded under:
http://www.siemens.com/siplus - Support - Tools & Downloads!

Technical specifications

Radio clock module SIPLUS DCF 77	
Radio frequency	77.5 Hz
Power supply	24 V DC (20.4 to 28.8 DC)
Power consumption, typ.	50 mA
Dimensions (W x H x D)	75 mm x 125 mm[1)] x 75 mm (2.95 in x 4.92 in x 2.95 in)

1) Additionally 25 mm (0.98 in) for heavy duty threaded joint and bending radius for cables

Ordering data

		Order No.
Radio clock module SIPLUS DCF 77 For sychronisation of SIMATIC S7-200, S7-300 and S7-400 with the official time of day of the time signal transmitter DCF 77 of the Physikalisch-Technische Bundesanstalt Braunschweig	A)	**6AG1 057-1AA03-0AA0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

Overview

- For high-performance transmission of messages via point-to-point connections (high message rate)
- Physical interface: RS 422/RS 485 (X.27)
- Up to 32 nodes
- Protocol implemented: ASCII, 3964 (R)
- Simple parameterization via a parameterization tool integrated into STEP 7

Technical specifications

	6ES7 440-1CS00-0YE0
Supply voltages	
Rated value	
• DC 5 V	Yes
• DC 24 V	Yes
Current consumption	
from backplane bus DC 5 V, max.	360 mA
Power loss, typ.	1.7 W
Memory	
Memory	
• Memory requirements per interface in CompactFlash Card of S7-CPU	1 to 5 kBytes for parameters, 0 to 55 kBytes for message texts
interfaces	
Number of interfaces	1
interface physics, RS 422/RS 485 (X.27)	Yes
RS 422/485, cable length, shielded, max.	1,200 m
Point-to-point	
Integrated protocol driver	
• 3964 (R)	Yes
• ASCII	Yes
Transmission speed, RS 422/485	
• with 3964 (R) protocol, max.	115.2 kBit/s
• with ASCII protocol, max.	115.2 kBit/s
CPU/programming	
Configuration software	
• STEP 7	Yes; own parameter assignment forms
Dimensions and weight	
Width	25 mm
Height	290 mm
Depth	210 mm
Weights	
Weight, approx.	600 g

Ordering data

	Order No.
CP 440 communications processor	**6ES7 440-1CS00-0YE0**
with one RS 422/485 (X.27) interface	
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 441-1, CP 441-2

Overview

- For powerful, high-speed serial communication via point-to-point connections
- 2 versions:
  - CP 441-1 with 1 variable interface for simple point-to-point connection
  - CP 441-2 with 2 variable interfaces for powerful point-to-point connection
- Plug-in interface modules for different transmission interfaces: RS 232C (V.24) , 20 mA (TTY) or RS 422/RS 485 (X.27)
- Implemented protocols: ASCII, 3964 (R), printer drivers; CP 441-2 additionally has RK 512 and customized protocols (retrofittable)
- Simple parameterization via a parameterization tool integrated into STEP 7

Technical specifications

	6ES7 441-1AA04-0AE0	6ES7 441-2AA04-0AE0
Supply voltages		
Rated value		
• DC 5 V	Yes	Yes
• DC 24 V	Yes	Yes
Current consumption		
from backplane bus DC 5 V, max.	600 mA; without interface module	600 mA; without interface module
Power loss, typ.	0.3 W	0.3 W
Memory		
Memory		
• Memory requirements per interface in CompactFlash Card of S7-CPU	1 to 5 KB for parameters,; 0 to 55 KB for message texts	1 to 5 KB for parameters,; 0 to 55 KB for message texts; 0 to 64 KB for loadable drivers
Interfaces		
Number of interfaces	1; variable	2; variable
interface physics, 20mA (TTY)	Yes	Yes
interface physics, RS 232C (V.24)	Yes	Yes
interface physics, RS 422/RS 485 (X.27)	Yes	Yes
20mA (TTY), cable length, shielded, max.	1,000 m	1,000 m
RS 232, cable length, shielded, max.	10 m	10 m
RS 422/485, cable length, shielded, max.	1,200 m	1,200 m
interface module		
• 20 mA (TTY), power consumption from 5 V/24 V, max.	100 mA; 100 mA from 5 V; 45 mA from 24 V	300 mA at 5 V; 45 mA at 24 V
• RS 422/485 (X.27), power consumption from 5 V, max.	250 mA; from 5V	300 mA
• RS 232C (V.24), power consumption from 5 V, max.	100 mA; from 5V	300 mA

	6ES7 441-1AA04-0AE0	6ES7 441-2AA04-0AE0
Point-to-point		
supported printers	HP-Deskjet, HP-Laserjet, IBM-Proprinter, user-defined	HP-Deskjet, HP-Laserjet, IBM-Proprinter, user-defined
Transmission speed, max.	38.4 kBit/s	115.2 kBit/s; distributed on both interfaces
Integrated protocol driver		
• 3964 (R)	Yes	Yes
• ASCII	Yes	Yes
• Printer	Yes	Yes
• customer-specific drivers reloadable	No	Yes
• RK512	No	Yes
Transmission speed, 20 mA (TTY)		
• with 3964 (R) protocol, max.	19.2 kBit/s	19.2 kBit/s
• with ASCII protocol, max.	19.2 kBit/s	19.2 kBit/s
• with printer driver, max.,	19.2 kBit/s	19.2 kBit/s
• with RK 512 protocol, max.		19.2 kBit/s
Transmission speed, RS 422/485		
• with 3964 (R) protocol, max.	38.4 kBit/s	115.2 kBit/s
• with ASCII protocol, max.	38.4 kBit/s	115.2 kBit/s
• with printer driver, max.	38.4 kBit/s	115.2 kBit/s
• with RK 512 protocol, max.		115.2 kBit/s
Transmission speed, RS232		
• with 3964 (R) protocol, max.	38.4 kBit/s	115.2 kBit/s
• with ASCII protocol, max.	38.4 kBit/s	115.2 kBit/s
• with printer driver, max.,	38.4 kBit/s	115.2 kBit/s
• with RK 512 protocol, max.		115.2 kBit/s

Technical specifications (continued)

	6ES7 441-1AA04-0AE0	6ES7 441-2AA04-0AE0
CPU/programming		
Configuration software		
• STEP 7	Yes; own parameter assignment forms	Yes; own parameter assignment forms

	6ES7 441-1AA04-0AE0	6ES7 441-2AA04-0AE0
Dimensions and weight		
Width	25 mm	25 mm
Height	290 mm	290 mm
Depth	210 mm	210 mm
Weights		
Weight, approx.	800 g	720 g

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Ordering data

		Order No.
CP 441-1 communications module	A)	**6ES7 441-1AA04-0AE0**
With 1 variable interface for interface submodules; including configuration package on CD		
CP 441-2 communications module	A)	**6ES7 441-2AA04-0AE0**
With 2 variable interfaces for interface submodules; including configuration package on CD		
Interface submodules		
RS 232C (V.24)		**6ES7 963-1AA00-0AA0**
20 mA (TTY)		**6ES7 963-2AA00-0AA0**
RS 422/485 (X.27)		**6ES7 963-3AA00-0AA0**
RS 232 connecting cable		
5 m		**6ES7 902-1AB00-0AA0**
10 m		**6ES7 902-1AC00-0AA0**
TTY connecting cable		
5 m		**6ES7 902-2AB00-0AA0**
10 m		**6ES7 902-2AC00-0AA0**
50 m		**6ES7 902-2AG00-0AA0**

	Order No.
RS 422/485 connecting cable	
5 m	**6ES7 902-3AB00-0AA0**
10 m	**6ES7 902-3AC00-0AA0**
50 m	**6ES7 902-3AG00-0AA0**
CP 441-1, CP 441-2 manual	
German	**6ES7 441-2AA00-8AA0**
English	**6ES7 441-2AA00-8BA0**
French	**6ES7 441-2AA00-8CA0**
Italian	**6ES7 441-2AA00-8EA0**
Loadable drivers for CP 441-2	
MODBUS master (RTU format)	
• Single license	**6ES7 870-1AA01-0YA0**
• Single license, without software or documentation	**6ES7 870-1AA01-0YA1**
MODBUS slave (RTU format)	
• Single license	**6ES7 870-1AB01-0YA0**
• Single license, without software or documentation	**6ES7 870-1AB01-0YA1**
Data highway (DF1 protocol)	
• Single license	**6ES7 870-1AE00-0YA0**
• Single license, without software or documentation	**6ES7 870-1AE00-0YA1**

A) Subject to export regulations: AL: N and ECCN: EAR99H

CP 443-5 Basic

Overview

- Connection of the S7-400 to PROFIBUS
- Communication services:
  - PG/OP communication
  - S7 communication
  - S5-compatible communication (SEND/RECEIVE)
  - PROFIBUS FMS
- Time synchronization
- Easy programming and configuration over PROFIBUS
- Cross-network programming device communication through S7 routing
- Can be easily integrated into the SIMATIC S7-400 system
- Modules can be replaced without the need for a PG
- SIMATIC H system operation for redundant S7 communication

DP-M	DP-S	PG	S7	S5	FMS
		■	■	■	■

Technical specifications

	CP 443-5 Basic
Data transmission rate	9.6 Kbps to 12 Mbps
Interface	
• Connection to PROFIBUS	9-pin Sub-D socket (RS 485)
Voltage supply	5 V DC ± 5%
Current input from 5 V DC	1,2 A
Power loss	6.5 W
Perm. ambient conditions	
• Operating temperature	0 °C … +60 °C
• Transport/storage temperature	-40 °C … +70 °C
• Relative humidity	max. 95% at +25°C
Construction	
• Dimensions (W x H x D) in mm	25 x 290 x 210
• Weight	approx. 700 g

	CP 443-5 Basic
Performance data	
S7 communication	
• Number of connections that can be used	16 to 48[1)]
S5-compatible communication (SEND/RECEIVE)	
• Number of connections that can be used	max. 32
• Useful data / connection	max. 240 byte (SEND and RECEIVE)
FMS function	
• Number of connections that can be used	max. 48
• Variable length READ	max. 237 byte
• Variable length WRITE	max. 233 byte
• Configurable server variables	512
• Variables that can be loaded from partners	2640
Multi-protocol operation	
• Number of connections that can be used (2 of which are reserved for PG/OP communication)	max. 59

1) Dependent on CPU type

Ordering data	Order No.
CP 443-5 communications processor Communications processor for connection of S7-400 to PROFIBUS, FMS, S5-compatible communication, PG/OP and S7 communication; with electronic manual on CD-ROM	**6GK7 443-5FX01-0XE0**
Configuring software NCM S7 for PROFIBUS Configuring software for PROFIBUS-CPs for SIMATIC S7 V5.x, runs under STEP 7 V5.x; with electronic manual on CD-ROM, German, English, French, Spanish, Italian	Delivered with STEP 7 Version 5
Manual NCM S7 for PROFIBUS Paper version for V5.x (STEP 7 V5.x)	
• German	**6GK7 080-5AA04-8AA0**
• English	**6GK7 080-5AA04-8BA0**
• French	**6GK7 080-5AA04-8CA0**
• Spanish	**6GK7 080-5AA04-8DA0**
• Italian	**6GK7 080-5AA04-8EA0**

	Order No.
PROFIBUS FastConnect bus connector RS 485 With 90° cable outlet; insulation displacement technology, max. transmission rate 12 Mbit/s	
• Without PG interface	**6ES7 972-0BA50-0XA0**
• With PG interface	**6ES7 972-0BB50-0XA0**
PROFIBUS bus connector IP20 With connection to PPI, MPI, PROFIBUS	
• Without PG interface	**6ES7 972-0BA12-0XA0**
• With PG interface	**6ES7 972-0BB12-0XA0**
PROFIBUS bus terminal 12M Bus terminal for connection of PROFIBUS stations up to 12 Mbit/s with plug-in cable	**6GK1 500-0AA10**
Communication with SIMATIC Manual	
• German	**6ES7 398-8EA00-8AA0**
• English	**6ES7 398-8EA00-8BA0**
• French	**6ES7 398-8EA00-8CA0**
• Spanish	**6ES7 398-8EA00-8DA0**
• Italian	**6ES7 398-8EA00-8EA0**

CP 443-5 Extended

Overview

DP-M	DP-S	PG	S7	S5	FMS
■		■	■	■	

- DP-V1 master connection of the S7-400 on PROFIBUS
- For setting up additional PROFIBUS DP lines
- Communication services:
  - PROFIBUS DP
  - PG/OP communication
  - S7 communication
  - S5-compatible communication (SEND/RECEIVE)
- Time synchronization
- Easy programming and configuration over PROFIBUS
- Cross-network programming device communication through S7 routing
- Can be easily integrated into the SIMATIC S7-400 system
- Module replacement without PG
- SIMATIC H system operation for redundant S7 communication or DP master communication
- Data record routing (PROFIBUS DP)
- Adding or modifying distributed I/O during operation

Technical specifications

	CP 443-5 Extended
Data transmission rate	9.6 Kbps to 12 Mbps
Interfaces	
• Connections	9-pin Sub-D socket (RS 485)
Voltage supply	5 V DC ± 5% 24 V DC ±5%
Current input from 5 V DC	1.3 A
Power loss	6.5 W
Perm. ambient conditions	
• Operating temperature	0 °C … +60 °C
• Transport/storage temperature	-40 °C … +70 °C
• Relative humidity	Max. 95% at +25°C
Construction	
• Dimensions (W x H x D) in mm	25 x 290 x 210
• Weight	approx. 700 g
Number of external DP-lines in one central rack	10
Performance data	
DP master function	
• DP master	DP-V1
• Number of operable DP slaves	max. 125
• Size of DP data areas overall	
- DP input area	max. 4 KB
- DP output range	max. 4 KB
• Size of DP data areas per connected DP slave	
- DP input area	max. 244 byte
- DP output range	max. 244 byte

	CP 443-5 Extended
Performance data	
S7 communication	
• Number of connections that can be used	16 to 48[1)]
S5-compatible communication (SEND/RECEIVE)	
• Number of connections that can be used	max. 32
• Useful data / connection	max. 240 byte (SEND and RECEIVE)
Multi-protocol operation	
• Number of connections that can be used (2 of which are reserved for PG/OP communication)	
- without DP	max. 59
- with DP	max. 55

1) Dependent on CPU type

Ordering data

	Order No.
CP 443-5 Extended communications processor	
For connecting SIMATIC S7-400 to PROFIBUS	
Extended version for PROFIBUS DP; with electronic manual, on CD-ROM	**6GK7 443-5DX04-0XE0**
Configuring software NCM S7 for PROFIBUS	Delivered with STEP 7 Version 5
Configuring software for PROFIBUS-CPs for SIMATIC S7	
V5.1, runs under STEP 7 V5.1; with electronic manual on CD-ROM, German, English, French, Spanish, Italian	
Manual NCM S7 for PROFIBUS	
Paper version	
for V5.x (STEP 7 V5.x)	
• German	**6GK7 080-5AA04-8AA0**
• English	**6GK7 080-5AA04-8BA0**
• French	**6GK7 080-5AA04-8CA0**
• Spanish	**6GK7 080-5AA04-8DA0**
• Italian	**6GK7 080-5AA04-8EA0**

	Order No.
PROFIBUS FastConnect bus connector RS 485	
With 90° cable outlet; insulation displacement technology, max. transmission rate 12 Mbit/s	
• Without PG interface	**6ES7 972-0BA50-0XA0**
• With PG interface	**6ES7 972-0BB50-0XA0**
PROFIBUS bus connector IP20	
With connection to PPI, MPI, PROFIBUS	
• Without PG interface	**6ES7 972-0BA12-0XA0**
• With PG interface	**6ES7 972-0BB12-0XA0**
PROFIBUS bus terminal 12M	**6GK1 500-0AA10**
Bus terminal for connection of PROFIBUS stations up to 12 Mbit/s with plug-in cable	
Communication with SIMATIC Manual	
• German	**6ES7 398-8EA00-8AA0**
• English	**6ES7 398-8EA00-8BA0**
• French	**6ES7 398-8EA00-8CA0**
• Spanish	**6ES7 398-8EA00-8DA0**
• Italian	**6ES7 398-8EA00-8EA0**

CP 443-1

Overview

PN	ISO	TCP/IP	UDP	PG	S7	S5	IT	FTP
	■	■	■	■	■	■		

- Connection of SIMATIC S7-400 to Industrial Ethernet
  - 10/100 Mbit/s full/half duplex connection with autosensing for automatic switchover between AUI, ITP and RJ45 interface
  - Universal connection options for ITP, RJ45 and AUI
  - Multi-protocol operation with ISO, TCP/IP and UDP transport protocol
  - Adjustable Keep Alive function
- Communication services:
  - Open IE communication via TCP/IP and UDP
  - PG/OP communication
  - S7 communication
  - S5-compatible communication
- Multicast for UDP
- Cross-network programming device/operator panel communication through S7 routing
- Remote programming and initial startup via the network
- Access protection by means of configurable access list

Technical specifications

	CP 443-1
Data transmission rate	10/100 Mbit/s autosensing
Interfaces	
• Communication connection, electrical	1 x 15-pin Sub-D socket (10 Mbit/s AUI; 10/100 Mbit/s ITP) 1 x RJ45 (10/100 Mbit/s; TP)
Current consumption	
• from +5 V DC (±5%)	Approx. 1.4 A
• from 24 V DC (±5%)	typ. 220 mA, max. 350 mA (depending on the interface used)
Power loss	8.6 W
Perm. ambient conditions	
• Operating temperature	0 °C … +60 °C
• Transport/storage temperature	-40 °C … +70 °C
• Relative humidity	Max. 95% at +25 °C
Construction	
• Module format	Compact module S7-400, single width
• Dimensions (W x H x D) in mm	25 x 290 x 210
• Weight	Approx. 700 g
Configuring software	NCM S7 for Industrial Ethernet (included in the scope of delivery of STEP 7 V5.x).

	CP 443-1
Performance data	
Open IE/S5-compatible communication (SEND/RECEIVE)	
• Sum of all simultaneously operable ISO/TCP/UDP connections	Max. 64
• Volume of user data ISO or TCP/IP	Max. 8 KB
• Volume of user data UDP	Max. 2 KB
S7 communication	
• Number of connections[1)]	Max. 48
Multi-protocol operation	
• Sum of all simultaneously operable connections	Max. 64

1) Utilization depends on performance of S7-CPU/FM used.

Ordering data

	Order No.
CP 443-1 communications processor For connecting SIMATIC S7-400 to Industrial Ethernet through TCP/IP, ISO and UDP; for S7 communication, S5-compatible communication (SEND/RECEIVE) with FETCH/WRITE with and without RFC 1006, diagnostic expansions, multicast, access protection over IP access list, with electronic manual on CD-ROM	**6GK7 443-1EX11-0XE0**
IE FC RJ45 Plug 180 RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1 901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1 901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1 901-1BB10-2AE0**
SOFTNET-S7 Edition 2005 for Industrial Ethernet Software for S7 and S5-compatible communication, incl. OPC server, PG/OP communication and NCM PC; up to 64 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, 2000 Professional/Server; German/English	**6GK1 704-1CW63-3AA0**
SOFTNET-S7 Lean Edition 2005 for Industrial Ethernet Software for S7 and S5-compatible communication, incl. OPC server, PG/OP communication and NCM PC; up to 8 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, 2000 Professional/Server; German/English	**6GK1 704-1LW63-3AA0**
S7-1613 Edition 2005 Software for S7 and S5 communication, incl. PG/OP communication, OPC server and NCM PC; up to 120 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, Windows 2000 Professional/Server; for CP 1613/CP 1613 A2 German/English	**6GK1 716-1CB63-3AA0**
NCM S7 configuration software for Industrial Ethernet Configuration software for Industrial Ethernet-CPs for SIMATIC S7;	
V5.x, operating under STEP 7 V5.x; on CD-ROM with electronic manual in German, English, French, Spanish, Italian	Delivered with STEP 7 V5.x
Documentation S7-CPs/NCM S7 For Industrial Ethernet and PROFIBUS; manual package for configuring S7-CPs, IE/PB link and PC stations (STEP 7 V5.3)	
• German	**6GK7 080-0AA01-8AA0**
• English	**6GK7 080-0AA01-8BA0**

CP 443-1 Advanced

Overview

PN	ISO	TCP/IP	UDP	PG	S7	S5	IT	FTP
☐	☐	☐	☐	☐	☐	☐	☐	☐

- Connection of SIMATIC S7-400 to Industrial Ethernet
  - 10/100 Mbit/s full/half duplex connection with autosensing
  - connection via RJ45
  - multi-protocol operation for ISO, TCP/IP and UDP
  - adjustable Keep Alive function
- Communication services:
  - Open IE communication (TCP/IP and UDP): Multicast for UDP
  - PROFINET IO Controller
  - PROFINET CBA
  - Programming device/operator panel communication: Cross-network by means of S7 routing
  - S7 communication
  - S5-compatible communication
  - IT communication: HTTP communication supports access to process data through Web browsers; FTP communication supports program-controlled FTP client communication, Access to data blocks through FTP server, Data handling for own file system through FTP, E-mail
- IP address assignment via DHCP, simple PC tool or via the user program (e.g. HMI)
- Access protection by means of configurable access list
- Single-width module with integrated 4-port switch saves space in the rack and control cabinet. Thanks to the integrated autocrossing function, the CP 443-1 Advanced is very well suited for establishing small local networks.
- Module replacement without programming device; all information is stored on the C-PLUG (also file system for IT functions).
- Extensive diagnostic functions for all modules in the rack
- Integration into network management systems through the support of SNMP V1 MIB-II

Technical specifications

	CP 443-1 Advanced
Data transmission rate	10/100 Mbit/s autosensing
Interfaces	
• Communication connection, electrical	4x RJ45 (10/100 Mbit/s; TP)
• Slot for the swap medium	C-PLUG
Voltage supply	DC +5 V (+/- 5%) from the backplane bus
Current consumption	
• from the backplane bus	max. 1.8 A
Power loss	7.25 W
Permissible ambient conditions	
• Operating temperature	0 °C … +60 °C
• Transport/storage temperature	-40 °C … +70 °C
• Relative humidity	max. 95% at +25 °C
Design	
• Module format	Compact module S7-400, single width
• Dimensions (W x H x D) in mm	25 x 290 x 217
• Weight	approx. 750 g
Configuring software	STEP 7 V5.3 + SP1 or higher[1) 2)]

	CP 443-1 Advanced
Performance data	
Open IE/S5-compatible communication (SEND/RECEIVE)	
• Sum of all simultaneously operable TCP/UDP connections	max. 64
• Useful data	
- ISO or TCP/IP	max. 8 KB
- UDP	max. 2 KB
- E-Mail	max. 2 KB
S7 communication	
• Number of connections	max. 128
PG/OP communication	
• Number of PG connections	max. 2
• Number of OP connections	max. 30
Multi-protocol operation	
• Sum of all simultaneously operable connections	max. 128
FTP communication	
• Number of client connections	max. 10
• Number of server connections	max. 2

1) For configuring PROFINET IO
2) For configuring PROFINET CBA, iMap V 2.0 is also required

Technical specifications (continued)

	CP 443-1 Advanced
Performance data	
IT communication	
Memory capacity	
• Flash memory file system	32 MB, approx. 30 MB of which is freely available to the user
• RAM	32 MB, max. 16 MB of which is freely available to the user; additional 512 KB buffered via central backup battery
HTTP communication	
• Number of server connections	max. 4
PROFINET communication	
PROFINET IO Controller	
• Number of operable PN IO-Devices	max. 125
• Number of external IO-lines in one central rack	max. 4
• Size of IO data areas overall	
- I/O input area	max. 4 KB
- I/O output area	max. 4 KB
• Size of I/O data areas per connected PN IO device:	
- I/O input area	max. 244 byte
- I/O output area	max. 244 byte
PROFINET CBA	
• Number of remote interconnecting partners	64
• Sum of all connections	600
• Data length of all incoming connections	8192 byte
• Data length of all outgoing connections	8192 byte
• Data length for arrays and structures (acyclic interconnection), max.	8192 byte
• Data length for arrays and structures (cyclic interconnection), max.	450 byte
• Data length for arrays and structures (local interconnection), max.	2400 byte
• Remote interconnections with acyclic transmission	
- scan rate: Sampling time, min. Possible settings: 100, 200, 500 and 1000 ms	100 ms
- number of incoming interconnections, max.	150
- number of outgoing interconnections, max.	150
- data length of all incoming interconnections	8192 byte
- data length of all outgoing interconnections	8192 byte

	CP 443-1 Advanced
Performance data	
• Remote interconnections with cyclic transmission	
- transmission frequency: Transmission time, min. Possible settings: 10, 20, 50, 100, 200, 500 and 1000 ms	10 ms
- number of incoming interconnections, max.	250
- number of outgoing interconnections, max.	250
- data length of all incoming interconnections	2000 byte
- data length of all outgoing interconnections	2000 byte
HMI variables via PROFINET (acyclic)	
• Number of stations for HMI variables that can connect (PN OPC/iMap); stations are 2 x PN OPC and 1 x SIMATIC iMap	
• Remote interconnections with cyclic transmission	3
• Update HMI variables, min.	500 ms
• Number of HMI variables, max.	200
• Data length of all HMI variables	8192 byte
Internal device interconnections	
• Number of internal interconnections	300
• Data length of all internal interconnections	2400 byte
Interconnections with constants	
• Number of interconnections with constants, max.	500
• Data lengths of all interconnections with constants.	4000 byte
PROFIBUS proxy functionality	No
Access to S7extended variables	
• Maximum number of S7 connections for access to variables with the PROFINET attribute "S7extended", max.	32

CP 443-1 Advanced

Ordering data		Order No.
CP 443-1 Advanced communications processor For the connection of SIMATIC S7-400 to Industrial Ethernet over PROFINET IO; PROFINET IO-Controller, PROFINET CBA, TCP/IP, ISO and UDP; for S7 communication, S5-compatible communication (SEND/RECEIVE) with FETCH/WRITE, with and without RFC 1006, diagnostic expansions, multicast, clock synchronization via SIMATIC procedure or NTP, access protection via IP access list, FTP client/server, HTTP server, HTML diagnostics, SNMP, DHCP, e-mail, data storage on C-PLUG, 4-port switch on board, initialization via LAN 10/100 Mbit/s; with electronic manual on CD-ROM		
• For use with SIMATIC S7-400-CPU u to V4.x	H)	**6GK7 443-1EX40-0XE0**
• For use with SIMATIC S7-400-CPU from V5.0	H)	**6GK7 443-1EX41-0XE0**
C-PLUG Swap medium for simple replacement of devices in the event of a fault; for storing configuration or engineering and application data; can be used for SIMATIC NET products with C-PLUG slot	A)	**6GK1 900-0AB00**
SOFTNET-S7 Edition 2005 for Industrial Ethernet Software for S7 and S5-compatible communication, incl. OPC server, PG/OP communication and NCM PC; up to 64 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, 2000 Professional/Server; German/English		**6GK1 704-1CW63-3AA0**
SOFTNET-S7 Lean Edition 2005 for Industrial Ethernet Software for S7 and S5-compatible communication, incl. OPC server, PG/OP communication and NCM PC; up to 8 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, 2000 Professional/Server; German/English		**6GK1 704-1LW63-3AA0**
S7-1613 Edition 2005 Software for S7 and S5 communication, incl. PG/OP communication, OPC server and NCM PC; up to 120 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, Windows 2000 Professional/Server; for CP 1613/CP 1613 A2 German/English		**6GK1 716-1CB63-3AA0**
IE FC RJ45 Plug 180 RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface		
• 1 pack = 1 unit		**6GK1 901-1BB10-2AA0**
• 1 pack = 10 units		**6GK1 901-1BB10-2AB0**
• 1 pack = 50 units		**6GK1 901-1BB10-2AE0**
Configuring software NCM S7 for Industrial Ethernet CPs for SIMATIC S7; V5.x, operating under STEP 7 V5.x; with electronic manual on CD-ROM,		
German, English, French, Spanish, Italian		Included in the STEP 7 V5.x package
Documentation S7-CPs/NCM For Industrial Ethernet and PROFIBUS; manual package for configuring S7-CPs, IE/PB link and PC stations (STEP 7 V5.3)		
• German		**6GK7 080-0AA01-8AA0**
• English		**6GK7 080-0AA01-8BA0**
SIMATIC iMap V3.0 for configuring PROFINET CBA, *Requirement:* Windows 2000 Prof. with Service Pack 4 or later or Windows XP Prof. with Service Pack 1 or later or Windows 2003 Server with Service Pack 1 or later; on PG or PC with Pentium processor, min. 1 GHz; STEP 7 V5.3 or later with Service Pack 3, PN OPC Server V6.3 or later *Type of supply:* German, English with electronic documentation		
Single license	D)	**6ES7 820-0CC04-0YA5**
Software Update Service	D)	**6ES7 820-0CC01-0YX2**
Upgrade to V3.0, single license	D)	**6ES7 820-0CC04-0YE5**

A) Subject to export regulations: AL: N and ECCN: EAR99H

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

H) Subject to export regulations: AL: N and ECCN: 5A991

Overview

- Transceiver for the transition from a redundant PROFIBUS DP master system to a single-channel PROFIBUS DP master system
- To connect devices with a single PROFIBUS DP interface to the redundant PROFIBUS DP master system of the SIMATIC S7-400H

Technical specifications

IM 153-2	6ES7 153-2BA01-0XB0
Supply voltages	
Rated value	
• DC 24 V	Yes
• permissible range (ripple included), lower limit (DC)	20.4 V
• permissible range (ripple included), upper limit (DC)	28.8 V
Power supply and voltage jumpering	
• Mains/voltage failure jumpering	5 ms
Voltages and currents	
external protection for supply cables (recommendation)	2.5A
Current consumption	
Inrush current, typ.	3.5 A
I^2t	0.08 A^2s
Current consumption, max.	470 mA
Power loss, typ.	4 W
Address area	
Adressing volume	
• Outputs	128 Byte
• Inputs	128 Byte
Hardware config.	
Number of modules per DP slave interface, max.	8
Communication functions	
Bus protocol/transmission protocol	PROFIBUS DP
Interfaces	
PROFIBUS DP, Output current, max.	70 mA
interface physics, RS 485	Yes
Connection point	
PROFIBUS DP	9-pin SUB-D

IM 153-2	6ES7 153-2BA01-0XB0
PROFIBUS DP	
Transmission procedure	RS 485
Transmission speed, max.	12 Mbit/s
Node addresses	1 ... 125
automatic detection of transmission speed	Yes
SYNC capability	Yes
FREECE capability	Yes
direct data exchange (cross traffic)	Yes; only with F- DO
1st interface	
DP slave	
• GSD file	SI03801E.GSG
• automatic baud rate search	Yes
CPU/programming	
Configuration software	
• STEP 7	Yes
Time stamping	
Accuracy	1 ms
Number of message buffers	15
Number of stampable digital inputs, max.	128
Time format	RFC 1119 Internet ISP
Time resolution	0.466 ns
Time stamp on signal change	Yes
Environmental requirements	
Operating termperature	
• min.	0 °C
• max.	60 °C
Air pressure	
• Operating height above sea level, max.	3,500 m
Degree and class of protection	
• IP 20	Yes

Y link for S7-400H

Technical specifications (continued)

	6ES7 153-2BA01-0XB0
General information	
Vendor identification (VendorID)	801E
Dimensions and weight	
Width	40 mm
Height	125 mm
Depth	117 mm
Weights	
Weight, approx.	350 g

Y coupler	**6ES7 197-1LB00-0XA0**
System	
Demands on DP master system	
• Length of parameter assignment message	244 Byte
Supply voltages	
Description	via bus module
Protocols	
PROFIBUS DP protocol	Yes
PROFIBUS DP	
Properties of the lower level DP master systems	
• Transmission speed, max.	12 Mbit/s; 45.45 Kbit/s to 12 Mbit/s
• Termination of lower-level DP master system	Active terminating resistor (Bus Terminator)
• Use of OLM/OBT	Yes
• Use of RS 485 repeaters, max.	9
• Maximum number of DP slaves	31; 64 when using RS 485 repeaters or OLM/OBT
Status information/ alarms/diagnostics	
Status indicator	No
Alarms	
• Alarms	No
Diagnoses	
• Diagnostic functions	Yes
Isolation	
to lower-level DP master system	Yes
Dimensions and weight	
Width	40 mm
Height	125 mm
Depth	130 mm
Weights	
Weight, approx.	200 g

Ordering data

		Order No.
Y-Link	A)	**6ES7 197-1LA03-0XA0**
To connect single-channel DP slaves to SIMATIC S7-400H; comprising 2 IM 153-2 interfaces, 1 Y coupler, 1 BM IM/IM bus module, 1 BM Y coupler bus module		

A) Subject to export regulations: AL: N and ECCN: EAR99H

Overview

- For connecting the ET 200M as a slave to the optical PROFIBUS
- Optical expansion to IM 153-2 (High Feature) (RS 485)
- Integral fiber-optic interface for plastic and PCF cables
- Redundancy capability
- With time stamping functionality and time synchronization

Technical specifications

	6ES7 153-2BB00-0XB0
Power supply	
Output voltage	
• Rated value (DC)	5 V
Output current	
• for backplane bus (DC 5 V), max.	1 A
Supply voltages	
Rated value	
• DC 24 V	Yes
• permissible range (ripple included), lower limit (DC)	20.4 V
• permissible range (ripple included), upper limit (DC)	28.8 V
Voltages and currents	
external protection for supply cables (recommendation)	not necessary
Current consumption	
Inrush current, typ.	3.5 A
I^2t	0.1 A^2s
Current consumption, max.	500 mA
Power loss, typ.	4.5 W
Address area	
Adressing volume	
• Outputs	128 Byte
• Inputs	128 Byte
Interfaces	
interface physics, LWL	Yes
Connection point	
PROFIBUS DP	optical, 2 x duplex sockets
PROFIBUS DP	
Transmission procedure	LWL, wavelength 660 nm
Transmission speed, max.	12 Mbit/s; 9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 kBaud 1.5 / 12 Mbaud

	6ES7 153-2BB00-0XB0
PROFIBUS DP	
Node addresses	1 to 125 permitted
automatic detection of transmission speed	Yes
SYNC capability	Yes
FREECE capability	Yes
direct data exchange (cross traffic)	Yes; Sender
1st interface	
DP slave	
• GSD file	(for DPV1) SIEM8071.GSD; SI018071.GSG (for IM 153-2AB0x); SI028071.GSG (for IM 153-2BB0x)
• automatic baud rate search	Yes
CPU/programming	
Configuration software	
• STEP 7	Yes; STEP 7 / COM PROFIBUS/ non-Siemens tools via GSD file
Time stamping	
Accuracy	10 ms; 10 ms / 3 ms
Number of message buffers	15
Messages per message buffer	20
Number of stampable digital inputs, max.	128
Time format	RFC 1119 Internet (ISP)
Time resolution	1 ms
Time interval for transmitting the message buffer if a message is present	1,000 ms
Time stamp on signal change	rising / falling edge as signal entering or exiting state

IM 153-2 FO

Technical specifications (continued)

	6ES7 153-2BB00-0XB0
Isolation	
Isolation checked with	Isolation voltage 500 V
Environmental requirements	
Operating temperature	
• min.	0 °C
• max.	60 °C
Air pressure	
• Operating height above sea level, max.	3,000 m
Degree and class of protection	
• IP 20	Yes

	6ES7 153-2BB00-0XB0
Dimensions and weight	
Weight, approx.	360 g
Width	40 mm
Height	125 mm
Depth	117 mm
General information	
Vendor identification (VendorID)	8071h

Ordering data

		Order No.
IM 153-2 FO interface module	A)	**6ES7 153-2BB00-0XB0**
High Feature for max. 8 S7-300 modules, redundancy capable, with integrated FOC interface for assembling an optical line		
IM 153/IM 153 active bus module		**6ES7 195-7HD10-0XA0**
For 2 IM 153-2 FO for assembling redundant systems		
Bus module for ET 200M		
• For accommodating an SV and an IM 153 for hot swapping incl. bus module cover		**6ES7 195-7HA00-0XA0**
• For accommodating two 40 mm wide I/O modules for hot swapping		**6ES7 195-7HB00-0XA0**
• For accommodating one 80 mm wide I/O module for hot swapping		**6ES7 195-7HC00-0XA0**
Accessories		
PROFIBUS plastic fiber-optic connector / polishing kit	A)	**6GK1 901-0FB00-0AA0**
100 Simplex plugs and 5 polishing kits, for assembling PROFIBUS plastic fiber-optic cables for the optical PROFIBUS DP; for 25 modules		
PROFIBUS plastic fiber-optic stripping tool set	A)	**6GK1 905-6PA10**
To remove the external or core sleeve of plastic fiber-optic cables		

		Order No.
Connection adapters		**6ES7 195-1BE00-0XA0**
Packet of 50 for using Simplex plugs in integrated FO interfaces; for 25 modules		
SIMATIC DP profile rail for ET 200M		
For accommodating max. 5 bus modules for		
• Length 483 mm		**6ES7 195-1GA00-0XA0**
• Length 530 mm		**6ES7 195-1GF30-0XA0**
SIMATIC S7-300 profile rail		
• Length 160 mm		**6ES7 390-1AB60-0AA0**
• Length 480 mm		**6ES7 390-1AE80-0AA0**
• Length 530 mm		**6ES7 390-1AF30-0AA0**
• Length 830 mm		**6ES7 390-1AJ30-0AA0**
• Length 2000 mm		**6ES7 390-1BC00-0AA0**
S7 Manual Collection	D)	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication)		
S7 Manual Collection - Maintenance service for 1 year	D)	**6ES7 998-8XC01-8YE2**
Scope of supply: DVD containing the current S7 Manual Collection and the three subsequent updates		

A) Subject to export regulations: AL: N and ECCN: EAR99H

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

Overview

- Supports mixed operation of fail-safe signal modules in safety mode and S7-300 standard modules in an ET 200M when Cat. 4 or SIL 3 has to be achieved.
- The isolation module is not required if the safety class or safety category to be achieved is less than SIL 3 or Cat. 4, respectively.

When Cat. 4/SIL 3 is required, the isolation module must be implemented in the following situations:

Application	Isolation module must be used
Central use after CPU 31xF-2 DP or CPU 31xF-2 PN/DP	
• Only fail-safe modules in the tier	Yes, behind the CPU
• Standard and fail-safe modules in the tier	Yes, after the last standard module and before the first fail-safe module
Central use after CPU 31xF-2 DP or CPU 31xF-2 PN/DP in an expansion rack	
• Only fail-safe modules in the tier	Yes, after the IM 36x
• Standard and fail-safe modules in the tier	Yes, after the last standard module and before the first fail-safe module
Distributed behind the IM 153-2 with copper connection	
• Only fail-safe modules in the station	Yes, after the IM 153-2
• Standard and fail-safe modules in the station	Yes, after the last standard module and before the first fail-safe module
Distributed behind the IM 153-2 with fiber-optic connection	
• Only fail-safe modules in the station	No
• Standard and fail-safe modules in the station	Yes, after the last standard module and before the first fail-safe module

Technical specifications

	6ES7 195-7KF00-0XA0
Weights	
Weight, approx.	10 g

Ordering data

	Order No.
Isolating module for simultaneous operation of fail-safe and standard modules in an ET 200M	**6ES7 195-7KF00-0XA0**
Isolating bus module for accommodating the isolating module in an ET 200M	**6ES7 195-7HG00-0XA0**

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SIPLUS isolating module

Overview

- Supports mixed operation of fail-safe signal modules in safety mode and S7-300 standard modules in an ET 200M

Information about safety class and safety category see isolating module, page 5/101.

Technical specifications

	SIPLUS S7-300 isolating module
Order No.	**6AG1 195-7KF00-2XA0**
Order No. based on	**6ES7 195-7KF00-0XA0**
Ambient temperature range	-25 °C to +60 °C, condensation permissible
Ambient conditions	Suitable for extraordinary medial load (for example by chloric and sulphuric atmospheres).
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1).	Yes
Technical data	The technical data are identical with the technical data of the based on modules.

Ordering data

		Order No.
Isolating module	A)	**6AG1 195-7KF00-2XA0**
(extended temperature range and medial load)		
for simultaneous operation of fail-safe and standard modules in an ET 200M		
Accessories		see isolating module, page 5/101

A) Subject to export regulations: AL: N and ECCN: EAR99H

Failsafe input/output modules

Overview

- Failsafe input/output modules for use with the SIMATIC S7-400F/FH
- With integrated safety functions
- Can only be plugged into the ET 200M
- Achievable safety classes in safety operation: SIL 2, SIL 3 to IEC 61508, AK 4, AK 6 to DIN V 19250, Category 3, 4 to EN 954-1
- Use in standard mode with high diagnostics requirements
- Also suitable for redundant operation

For further information see section 4, page 4/130

Overview

- For simple and user-friendly connection of sensors and actuators
- For retaining the wiring when replacing modules
- With coding to avoid mistakes when replacing modules

Ordering data

		Order No.
Front connectors		
48-pin for signal modules, function modules; 1 unit		
• With screw contacts		**6ES7 492-1AL00-0AA0**
• With spring-loaded clamps		**6ES7 492-1BL00-0AA0**
• With crimp contacts	A)	**6ES7 492-1CL00-0AA0**
48-pin for signal modules, function modules; 84 units per pack		
• With screw contacts		**6ES7 492-1AL00-1AB0**
• With crimp contacts		**6ES7 492-1CL00-1AB0**
for 6ES7 431-7KF00-0AB0; spare part, included in scope of delivery ; 1 piece		**6ES7 431-7KF00-6AA0**
Crimp contacts		**6XX3 070**
250 units		
Crimping tool		**6XX3 071**
for crimping the contacts		
Front cover for front connector		**6ES7 492-2XL00-0AA0**
6 units		
Connection terminal for modules		**6ES7 490-1BA00-0AA0**
6 units		

		Order No.
Manual "SIMATIC S7-400 automation system"		
incl. instruction list		
German		**6ES7 498-8AA04-8AA0**
English		**6ES7 498-8AA04-8BA0**
French		**6ES7 498-8AA04-8CA0**
Spanish		**6ES7 498-8AA04-8DA0**
Italian		**6ES7 498-8AA04-8EA0**
SIMATIC Manual Collection	D)	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, five languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET		
SIMATIC Manual Collection update service for 1 year	D)	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		

A) Subject to export regulations: AL: N and ECCN: EAR99H

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

Fully modular connection

Overview

The fully modular connection is the standard connection for the SIMATIC S7-300/400. The fully modular connection facilitates convenient, fast, and correct connection of the I/O to the SIMATIC S7-300/400.

- Easy plugging in of front connector module, connecting cable and connection module
- Fast and low-cost wiring
- Supply voltage connectable to front connector module or connection module for digital and analog signals
- Reduction in wiring errors, clear control cabinet wiring
- Distribution of digital signals by byte or by double-byte
- Each component can be replaced individually.
- Every cable length can be configured without cutting, or pre-assembled cables can be used

Connecting cables

The connection cable is the linking element between the front connector module and the connection module. It transmits 8 signals and the supply voltage. The maximum bridgeable distance is 30 m. The connecting cable is available in two different versions:

- The pre-assembled round cable
- The round-sheath ribbon cable assembled by the user

Basic modules

In the case of the basic module, the connection modules are used with basic functionality. Here, the I/O signal is connected quickly and simply from the field to the module or from the module to the field.

The connection terminals for the I/O signals are designed as screw terminals or spring terminals. The connection modules are available for digital and analog signals.

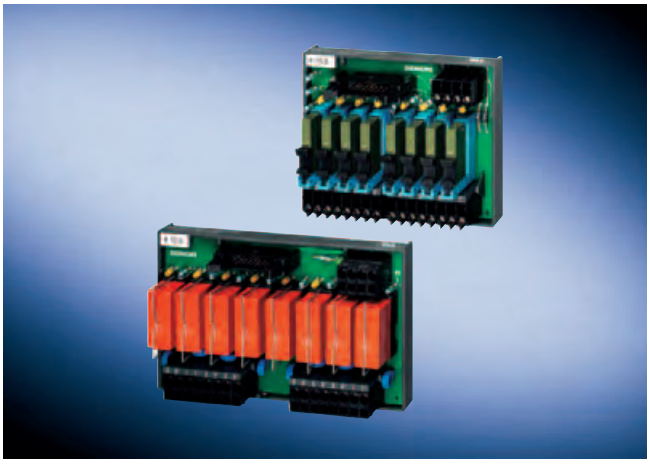
Signal modules

In the case of the signal module, the digital connection modules with LED are used. The yellow LEDs indicate the "active high" signal of the individual channels. This makes commissioning easier for you, and you always have an overview of the signal states of your I/O. At the same time, a green LED indicates when the 24 V DC is applied.

The connection terminals for the I/O signals are designed as screw terminals or spring terminals. The connection modules are available for digital signals.

Overview (continued)

Function modules



Function modules are implemented with digital connection modules fitted with relays or optocouplers.

If other voltage or power levels are required in the field, the connection module for output signals TPRo is used. This converts the 24 V DC output signal simply and reliably to another voltage or power level. If 230 V AC input signals have to be transmitted to the controller in the field, a connection module with relay TPRi is available that converts the 230 V AC signal simply to 24 V DC. This means you always have the same voltage level on the module side.

Technical specifications front connector modules

Technical data of front connector module	
Rated operating voltage	24 V DC
Max. permissible operating voltage	60 V DC
Max. permissible continuous current	
• per connector pin	1 A
Max. permissible summation current	4 A/byte (power supply))
Permissible ambient temperature	0 to + 60 °C
Test voltage	0.5 kV, 50 Hz, 60 s
Air gaps and creepage distances	IEC 664 (1980), IEC 664 A (1981), in accordance with DIN VDE 0110 (01.89), overvoltage class II, pollution degree 2

	Front connector module SIMATIC TOP connect, connection for potential supply
	Modules up to 4 connections
	Screw connection
Connectable cable cross-sections	
• solid cables	No
• flexible cables with/without wire end ferrule	0.25 to 1.5 mm^2
Number of cables per connection	1 or a combination of 2 conductors up to 1.5 mm^2 (total) in a common wire end ferrule
Max. diameter of the cable insulation	3.1 mm
Stripping length of the cables	
• without insulating collar	6 mm
• with insulating collar	-
Wire-end ferrules to DIN 46228	
• without insulating collar	Form A; 5 to 7 mm long
• with insulating collar 0.25 to 1.0 mm^2	-
• with insulating collar 1.5 mm^2	-

	Front connector module SIMATIC TOP connect, connection for potential supply
	Modules up to 4 connections
	Screw connection
Blade width of the screwdriver	3.5 mm (cylindrical shape)
Tightening torque for connecting the cables	0.4 to 0.7 Nm

	Front connector module SIMATIC TOP connect, connection for potential supply
	Modules up to 6 connections
	Screw connection
Connectable cable cross-sections	
solid cables	No
• flexible cables with/without wire end ferrule	0.25 to 0.75 mm^2
Number of cables per connection	1 or a combination of 2 conductors up to 0.75 mm^2 (total) in a common wire end ferrule
Max. diameter of the cable insulation	2.0 mm
Stripping length of the wires	
• without insulating collar	6 mm
• with insulating collar	-
Wire-end ferrules to DIN 46228	
• without insulating collar	Form A; 5 to 7 mm long
• with insulating collar 0.25 to 1.0 mm^2	-
• with insulating collar 1.5 mm^2	-
Blade width of the screwdriver	3.5 mm (cylindrical shape)
Tightening torque for connecting the cables	0.4 to 0.7 Nm

Fully modular connection

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Technical specifications connection cables

Technical data of connecting cable from SIMATIC S7 to connection module	
Operating voltage	60 V DC
Continuous current per signal conductor	1 A
Max. summation current	4 A/byte
Operating temperature	0 to +60°C
Outer diameter of pre-assembled round cable in mm, unshielded/shielded	Approx. 6.5/7.0
Outer diameter of round-sheath ribbon cable in mm , 16-pole/2 x 16-pole	Approx. 9.5/11.5

Technical specifications basic modules

Connection module TP1, TP3 and TPK	
Max. operating voltage	**DC 60 V**
Continuous current per signal	1 A
Max. summation current (voltage infeed)	4 A/Byte
Operating temperature	0 to + 60°C
Mounting position	Any
Air gaps and creepage distances	IEC Report 664, IEC 664 A, IEC 1131 T2, CSA C22.2 No 142 UL 508, VDE 0160 (12.90), overvoltage category II, pollution degree 3
Dimensions (W x H x D) in mm	
• 1-wire connection 6ES7924-0AA10-0A_0	Approx. 55 x 43.2 x 63
• for 3-wire initiators 6ES7924-0CA10-0A_0	Approx. 68 x 43.2 x 80
• for 2 x 8 signals 6ES7924-1AA10-0A_0	Approx. 100 x 43.2 x 80

Connection module TP2	
Max. operating voltage	**DC 60 V**
Continuous current signal conductor	2 A
Operating temperature	0 to + 60°C
Mounting position	Any
Air gaps and creepage distances	IEC Report 664, IEC 664 A, IEC 1131 T2, CSA C22.2 No 142 UL 508, VDE 0160 (12.90), overvoltage category II, pollution degree 3
Dimensions (W x H x D) in mm	
• for 2 ampere modules 6ES7924-0BB10-0A_0	Approx. 68 x 43.2 x 80

Technical specifications basic modules (continued)

Connection module TPA	
Max. operating voltage	**DC 60 V**
Continuous current signal conductor	1 A
Operating temperature	0 to + 60°C
Mounting position	Any
Air gaps and creepage distances	IEC Report 664, IEC 664 A, IEC 1131 T2, CSA C22.2 No 142 UL 508, VDE 0160 (12.90), overvoltage category II, pollution degree 3
Dimensions (W x H x D) in mm	
• for 2 analog modules 6ES7924-0CC10-0A_0	Approx. 68 x 43.2 x 80

Connection module TPA, TP1, TP2, TP3, TPK

	Spring connection	Screw connection
Connectable cable cross-sections		
• solid cables	No	
• flexible cables without wire end ferrule	0.5 to 2.5 mm^2	
• flexible cables with wire end ferrule in accordance with DIN 46228/1	0.5 to 1.5 mm^2	0.5 to 2.5 mm^2 (2.5 mm^2 with a crimp in accordance with EN 60947-1)
• flexible cables with wire end ferrule and plastic collar in accordance with DIN 46228/4	0.5 to 1.5 mm^2	
Number of cables per connection	1 or a combination of 2 cables up to the cross-sections specified above(total) in a shared wire end ferrule	
Blade width of the screwdriver	3.5 mm (cylindrical shape)	
Tightening torque for connecting the cables	-	0.4 to 0.7 Nm

Technical specifications signal modules

Connection module TP1, TP3 and TPK with LED	
Max. operating voltage	24 V DC
Continuous current per signal	1 A
Max. summation current (voltage infeed)	4 A/byte
Operating temperature	0 to + 60 °C
Mounting position	Any
Air gaps and creepage distances	IEC Report 664, IEC 664 A, IEC 1131 T2, CSA C22.2 No 142 UL 508, VDE 0160 (12.90), overvoltage category II, pollution degree 3
Dimensions (W x H x D) in mm	
• 1-wire connection with LED 6ES7924-0AA10-0B_0	Approx. 55 x 43.2 x 63
• for 3-wire initiators with LED 6ES7924-0CA10-0B_0	Approx. 68 x 43.2 x 80
• for 2 x 8 signals with LED 6ES7924-1AA10-0B_0	Approx. 100 x 43.2 x 80

Connection module TP2 with LED	
Max. operating voltage	24 V DC
Continuous current per signal conductor	2 A
Operating temperature	0 to + 60 °C
Mounting position	Any
Air gaps and creepage distances	IEC Report 664, IEC 664 A, IEC 1131 T2, CSA C22.2 No 142 UL 508, VDE 0160 (12.90), overvoltage category II, pollution degree 3
Dimensions (W x H x D) in mm	
• for 2-ampere modules with LED 6ES7924-0BB10-0B_0	Approx. 68 x 43.2 x 80

Connection module TP1 LED, TPK LED, TP2 LED, TP3 LED		
	Spring connection	Screw connection
Connectable cable cross-sections		
• solid cables	No	
• flexible cables without wire end ferrule	0.5 to 2.5 mm^2	
• flexible cables with wire end ferrule in accordance with DIN 46228/1	0.5 to 1.5 mm^2	0.5 to 2.5 mm^2 (2.5 mm^2 with a crimp in accordance with EN 60947-1)
• flexible cables with wire end ferrule and plastic collar in accordance with DIN 46228/4	0.5 to 1.5 mm^2	
Number of wires per connection	1 or a combination of 2 conductors up to the cross-sections specified above (total) in a shared wire end ferrule	
Blade width of the screwdriver	3.5 mm (cylindrical shape)	
Tightening torque for connecting the cables	-	0.4 to 0.7 Nm

Technical specifications function modules

Connection module with relay for outputs (TPRo)	
Energizing side	
Operating voltage for coil	24 V DC
Input circuit	Reverse polarity protection and freewheeling diodes
Contact side	
Number of relay outputs	8 (NO contacts)
Contact design	Single contact, 1 NO contact
Switching capacity (resistive load)	max. 4 A/250 V AC, max. 3 A/30 V DC max. 0.6 A/48 V DC max. 0.4 A/60 V DC recommended minimum load ≥ 10 mA
Switching frequency	20 cycles/minute
Service life	
• mechanical	5 x 10^6 operating cycles
• electrical	3 x 10^4 operating cycles at 230 V AC/2 A/ cos φ = 1
Operating temperature	0 to +60 °C
Mounting position	Any
Air gaps and creepage distances	Basic standard IEC 60664-1; UL 508; CuI (Reference CSA C22.2 No. 142) overvoltage category III pollution degree 2
Dimensions (W x H x D) in mm	
6ES7924-0BD10-0B_0	Approx. 100 x 45 x 80

Connection module with relay for inputs (TPRi)	
Energizing side	
Operating voltage for coil	230 VAC from 207 – 280 V AC
Input circuit	Varistors
Contact side	
Number of relay outputs	8 (NO contacts)
Contact design	Single contact, 1 NO contact
Switching capacity (resistive load)	max. 50 mA/24 V AC, max. 50 mA/48 V DC max. 50 mA/60 V DC recommended minimum load ≥ 5 mA
Switching frequency	200 cycles/minute
Service life	
• mechanical	10 x 10^6 operating cycles
• electrical	3 x 10^6 operating cycles at 230 V AC/50 mA/ cos φ = 1
Operating temperature	0 to +60 °C
Mounting position	Any
Air gaps and creepage distances	Basic standard IEC 60664-1; UL 508; CuI (Reference CSA C22.2 No. 142) overvoltage category III pollution degree 2
Dimensions (W x H x D) in mm	
6ES7924-0BE10-0B_0	Approx. 120 x 45 x 80

Fully modular connection

Technical specifications function modules (continued)

Connection modules TPRo and TPRi	Spring connection	Screw connection
Connectable cable cross-sections		
• Solid cables	No	
• flexible cables without wire end ferrule	0.5 to 2.5 mm^2	
• flexible cables with wire end ferrule in accordance with DIN 46228/1	0.5 to 1.5 mm^2	0.5 to 2.5 mm^2 (2.5 mm^2 with a crimp in accordance with EN 60947-1)
• flexible cables with wire end ferrule and plastic collar in accordance with DIN 46228/4	0.5 to 1.5 mm^2	
Number of wires per connection	1 or a combination of 2 conductors up to the cross-sections specified above (total) in a shared wire end ferrule	
Blade width of the screwdriver	3.5 mm (cylindrical shape)	
Tightening torque for connecting the cables	-	0.4 to 0.7 Nm

Ordering data Front connectors

	Order No.
Front connector module (digital 4 x 8 I/O)	
Voltage infeed via	
• Screw terminals	**6ES7 921-4AB00-0AA0**
Front connector module (2 x 8 outputs) for 2 ampere digital outputs	
Voltage infeed via	
• Screw terminals	**6ES7 921-4AD00-0AA0**
Front connector module (analog)	
Voltage infeed via	
• Screw terminals	**6ES7 921-4AG00-0AA0**

Ordering data Conn. cables

		Order No.
Pre-assembled round cable 16-pole, 0.14 mm^2		
unshielded		
0.5 m		**6ES7 923-0BA50-0CB0**
1.0 m		**6ES7 923-0BB00-0CB0**
1.5 m		**6ES7 923-0BB50-0CB0**
2.0 m		**6ES7 923-0BC00-0CB0**
2.5 m		**6ES7 923-0BC50-0CB0**
3.0 m		**6ES7 923-0BD00-0CB0**
4.0		**6ES7 923-0BE00-0CB0**
5.0 m		**6ES7 923-0BF00-0CB0**
shielded		
1.0 m		**6ES7 923-0BB00-0DB0**
2.0 m		**6ES7 923-0BC00-0DB0**
2.5 m		**6ES7 923-0BC50-0DB0**
3.0 m		**6ES7 923-0BD00-0DB0**
4.0 m		**6ES7 923-0BE00-0DB0**
5.0 m		**6ES7 923-0BF00-0DB0**
Round-sheath ribbon cable 16-pole, 0.14 mm^2		
unshielded		
30 m		**6ES7 923-0CD00-0AA0**
60 m	A)	**6ES7 923-0CG00-0AA0**
shielded		
30 m		**6ES7 923-0CD00-0BA0**
60 m		**6ES7 923-0CG00-0BA0**
Round-sheath ribbon cable 2 x 16-pole, 0.14 mm^2		
unshielded		
30 m		**6ES7 923-2CD00-0AA0**
60 m		**6ES7 923-2CG00-0AA0**
8 connectors (16-pole)		**6ES7 921-3BE10-0AA0**
Insulation displacement system with 8 cable grips		
Accessories		
Crimping tool		**6ES7 928-0AA00-0AA0**
For processing the connectors (female ribbon cable connector)		

A) Subject to export regulations: AL: N and ECCN: EAR99H

Ordering data Basic modules	Order No.
Connection module TP1	
for 1-wire initiators	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-0AA10-0AB0**
• Screw terminals	**6ES7 924-0AA10-0AA0**
Connection module TP3	
for 3-wire initiators	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-0CA10-0AB0**
• Screw terminals	**6ES7 924-0CA10-0AA0**
Connection module TPK	
for 2 x 8 signals	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-1AA10-0AB0**
• Screw terminals	**6ES7 924-1AA10-0AA0**
Connection module TP2	
for 2 A modules	
for 2-wire initiators	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-0BB10-0AB0**
• Screw terminals	**6ES7 924-0BB10-0AA0**
Connection module TPA	
for analog signals	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-0CC10-0AB0**
• Screw terminals	**6ES7 924-0CC10-0AA0**
Accessories	
Labeling plates for connection modules	
Insertable labeling plate PU = 200 units	**6ES7 928-2AB00-0AA0**
Self-adhesive labeling plate PU = 200 units	**6ES7 928-2BB00-0AA0**
Shield plate for analog connection module (4 units)	**6ES7 928-1BA00-0AA0**
Shield connection terminal	
for shield plate, 2 units, with cable diameter	
• 2 to 6 mm (2 cables)	**6ES7 390-5AB00-0AA0**
• 3 to 8 mm	**6ES7 390-5BA00-0AA0**
• 4 to 13 mm	**6ES7 390-5CA00-0AA0**

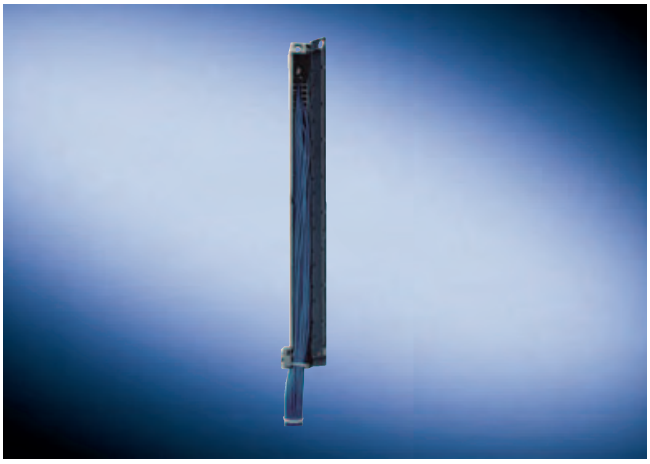
Ordering data Signal modules	Order No.
Connection module TP1 with LED	
for 1-wire initiators	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-0AA10-0BB0**
• Screw terminals	**6ES7 924-0AA10-0BA0**
Connection module TP3 with LED	
for 3-wire initiators	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-0CA10-0BB0**
• Screw terminals	**6ES7 924-0CA10-0BA0**
Connection module TPK with LED	
for 2 x 8 signals	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-1AA10-0BB0**
• Screw terminals	**6ES7 924-1AA10-0BA0**
Connection module TP2 with LED	
for 2 A modules	
for 2-wire initiators	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-0BB10-0BB0**
• Screw terminals	**6ES7 924-0BB10-0BA0**
Accessories	
Labeling plates for connection modules	
Insertable labeling plate PU = 200 units	**6ES7 928-2AB00-0AA0**
Self-adhesive labeling plate PU = 200 units	**6ES7 928-2BB00-0AA0**

Fully modular connection

Ordering data Function mod.	Order No.
Connection module TPRo for output signals	
for 2-wire connection	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-0BD10-0BB0**
• Screw terminals	**6ES7 924-0BD10-0BA0**
Connection module TPRi for input signals	
for 2-wire connection	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-0BE10-0BB0**
• Screw terminals	**6ES7 924-0BE10-0BA0**

	Order No.
Accessories	
Labeling plates for connection modules	
Insertable labeling plate PU = 200 units	**6ES7 928-2AB00-0AA0**
Self-adhesive labeling plate PU = 200 units	**6ES7 928-2BB00-0AA0**
Replacement relay for relay connection module PU = 4 units	
Replacement relay for TPRi	**6ES7 928-3BA00-4AA0**
Replacement relay for TPRo	**6ES7 928-3AA00-4AA0**
Optocoupler DC alternative for relay in the case of TPRo PU = 4 units	**6ES7 928-3DA00-4AA0**
Optocoupler AC alternative for relay in the case of TPRo PU = 4 units	**6ES7 928-3CA00-4AA0**

Overview



The flexible connection guarantees a fast and direct connection from the input/output modules of the SIMATIC S7-300/400 to the individual elements in the cabinet.

Already attached single cores reduce the wiring effort.

The core cross-sections of 0,5 mm^2 also allow higher currents.

Technical specifications

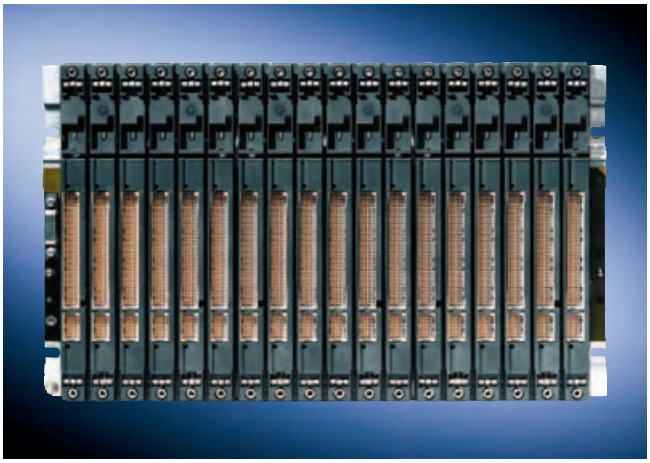
Front connector with single cores	
Rated operating voltage	24 V DC
Max. permissible continuous current with simultaneous load on all cores	1.0 A
Permissible ambient temperature	0 to +60 °C
Core type	H05V-K or with UL style 1007/1569 CSA TR64
Number of cores	46
Core cross-section	0.5 mm^2, Cu
Bundle diameter in mm	Approx. 17
Color of core	Blue, RAL 5010
Designation of cores	Numbered from 3 to 48 (adapter contact = core number)
Fabrication	Screw or crimp contacts

Ordering data

	Order No.
Front connector with single cores for 32-channel digital modules SIMATIC S7-400, 46 x 0.5 mm^2	
Core type H05V-K	
Screw version	
Packaging unit (1 unit) Length:	
• 2.5 m	**6ES7 922-4BC50-0AD0**
• 3.2 m	**6ES7 922-4BD20-0AD0**
• 5 m	**6ES7 922-4BF00-0AD0**
• Special lengths	on request
Packaging unit (5 units) Length:	
• 2.5 m	**6ES7 922-4BC50-5AD0**
• 3.2 m	**6ES7 922-4BD20-5AD0**
• 5 m	**6ES7 922-4BF00-5AD0**
Crimp version	
Packaging unit (1 unit) Length:	
• 2.5 m	**6ES7 922-4BC50-0AE0**
• 3.2 m	**6ES7 922-4BD20-0AE0**
• 5 m	**6ES7 922-4BF00-0AE0**
• Special lengths	on request
Packaging unit (5 units)	
• 2.5 m	**6ES7 922-4BC50-5AE0**
• 3.2 m	**6ES7 922-4BD20-5AE0**
• 5 m	**6ES7 922-4BF00-5AE0**
Core type UL/CSA-certified	
Screw version	
Packaging unit (1 unit) Length:	**6ES7 922-4BD20-0UD0**
• 3.2 m	**6ES7 922-4BF00-0UD0**
• 5 m	on request

Racks

Overview



- The basic mechanical framework of the SIMATIC S7-400/ S7-400H
- For accommodating the modules, supplying them with operating voltage and connecting them via the backplane bus
- Several versions for configuring central controllers and expansion racks

UR1 (universal rack)

- For configuring central controllers and expansion units
- For up to 18 modules
- Also suitable for S7-400H

UR2 (universal rack)

- For configuring central controllers and expansion units
- For up to 9 modules
- Also suitable for S7-400H
- Also available in aluminum

CR2 (central rack)

- For configuring central controllers
- For up to 18 modules
- Segmented racks:
  For operating two independent S7-400 CPUs without S7-400 Multicomputing, but with communication between the CPUs via the backplane bus (C bus). Both CPUs can address local, separate I/O modules (segmented P bus).

CR3 (central rack)

- For configuring central controllers
- Optimized for decentralized automation tasks thanks to support of up to 4 modules

UR2-H

- For setting up a complete S7-400H system in a single mounting rack
- Also suitable for S7-400H:
  Operation of 2 separate CPUs with their own I/O (own P and C bus)
- Can also be used as expansion unit
- For up to 18 modules
- Also available in aluminum

ER1 (expansion rack)

- For cost-effective configuration of expansion units
- For up to 18 modules with restricted functionality
- Also suitable for S7-400H

ER2 (expansion rack)

- For cost-effective configuration of expansion units
- For up to 9 modules with restricted functionality
- Also suitable for S7-400H

Technical specifications

	6ES7 400-1TA01-0AA0	6ES7 400-1JA01-0AA0	6ES7 400-1JA11-0AA0	6ES7 401-2TA01-0AA0	6ES7 401-1DA01-0AA0
Hardware config.					
Number of single-width slots, max.	18	9	9	18; 2 segments with 8 or 10 slots	4
Rack					
• K bus	Yes	Yes	Yes	Yes	Yes
• P bus	Yes	Yes	Yes	Yes	Yes
Dimensions and weight					
Width	482.5 mm	257.5 mm	257.5 mm	482.5 mm	130 mm
Height	290 mm	290 mm	290 mm	290 mm	290 mm
Depth	27.5 mm	27.5 mm	27.5 mm	27.5 mm	27.5 mm
Weights					
Weight, approx.	4,200 g	2,200 g	1,500 g	4,200 g	750 g

Technical specifications (continued)

	6ES7 400-2JA00-0AA0	6ES7 400-2JA10-0AA0	6ES7 403-1TA01-0AA0	6ES7 403-1JA01-0AA0
Hardware config.				
Number of single-width slots, max.	18	18	18	9
Rack				
• K bus	Yes	Yes		
• P bus	Yes	Yes	Yes	Yes
Dimensions and weight				
Width	482.5 mm	482.5 mm	482.5 mm	257.5 mm
Height	290 mm	290 mm	290 mm	290 mm
Depth	27.5 mm	27.5 mm	27.5 mm	27.5 mm
Weights				
Weight, approx.	4,200 g	3,000 g	4,200 g	2,200 g

Ordering data

	Order No.
UR1 rack for central controllers and expansion racks, 18 slots	**6ES7 400-1TA01-0AA0**
UR2 rack for central controllers and expansion racks, 9 slots	**6ES7 400-1JA01-0AA0**
UR2 aluminum rack for central controllers and expansion racks, 9 slots	**6ES7 400-1JA11-0AA0**
CR2 rack for segmented central controllers, 18 slots, 2 local segments	**6ES7 401-2TA01-0AA0**
CR3 rack for central controllers and expansion racks, 4 slots; optimized for distributed automation solutions	**6ES7 401-1DA01-0AA0**

	Order No.
UR2-H rack for split CCs, 18 slots	**6ES7 400-2JA00-0AA0**
UR2 aluminum rack for split CCs, 18 slots	**6ES7 400-2JA10-0AA0**
ER1 rack for expansion racks, P bus only, 18 slots	**6ES7 403-1TA01-0AA0**
ER2 rack for expansion racks, P bus only, 9 slots	**6ES7 403-1JA01-0AA0**
Slot cover 10 unit (spare part)	**6ES7 490-1AA00-0AA0**

Fan subassembly

Overview

- Fans for the SIMATIC S7-400
- Necessary when using modules that generate an extremely large amount of heat

Technical specifications

	6ES7 408-1TA01-0XA0	6ES7 408-1TB00-0XA0
Supply voltages		
Rated value		
• DC 24 V	Yes	
• permissible range, lower limit (DC)	19.2 V	
• permissible range, upper limit (DC)	30 V	
• AC 120 V		Yes
• AC 230 V		Yes
• permissible frequency range, lower limit		47 Hz
• permissible frequency range, upper limit		63 Hz
Current consumption		
Inrush current, typ.	0.9 A; at 24 V	
Power loss, max.	11 W	20 W
Relay outputs		
Rated input voltage of relay L+ (DC)	24 V	24 V
Switching capacity of the contacts		
• with resistive load, max.	200 mA	200 mA
Dimensions and weight		
Width	482.5 mm	482.5 mm
Height	109.5 mm	109.5 mm
Depth	235 mm	235 mm
Weights		
Weight, approx.	1.6 kg	2 kg

Ordering data

	Order No.
Fan subassembly	
for all racks; Supply voltage	
24 V DC	**6ES7 408-1TA01-0XA0**
120 / 230 V AC	**6ES7 408-1TB00-0XA0**
Dust filter	**6ES7 408-1TA00-7AA0**
10 pieces	
Replacement fan	**6ES7 408-1TA00-6AA0**
Spare part	
Cable duct	**6ES7 408-0TA00-0AA0**
Same design as fan subassembly, but without fans or electronic units	

Overview

- SIMATIC S5 expansion racks for distributed expansion of the SIMATIC S7-400
- For connection to existing SIMATIC S5 systems

The following components can be connected to the SIMATIC S7-400:

- Expansion racks ER 701-2 and ER 701-3 from the SIMATIC S5-115U series.
- Expansion racks EG 183U and EG 185U from the SIMATIC S5-135U/-155U series.

Suitable SIMATIC S5 modules

Expansion rack	ER 701-2, ER 701-3	EG 183U, EG 185 U
Digital input modules	6ES5 420-7LA11	6ES5 420-4UA14
	6ES5 430-7LA12	6ES5 430-4UA14
	6ES5 431-7LA11	6ES5 431-4UA12
	6ES5 432-7LA11	6ES5 432-4UA12
	6ES5 434-4UA12	6ES5 434-4UA12
	6ES5 434-7LA12	6ES5 436-4UA12
	6ES5 435-7LA11	
	6ES5 435-7LB11	
	6ES5 435-7LC11	
	6ES5 436-7LA11	
	6ES5 436-7LB11	
	6ES5 436-7LC11	
Digital output modules	6ES5 441-7LA13	6ES5 441-4UA14
	6ES5 451-7LA21	6ES5 451-4UA14
	6ES5 453-7LA11	6ES5 453-4UA12
	6ES5 454-7LA12	6ES5 454-4UA14
	6ES5 454-7LB11	6ES5 455-4UA12
	6ES5 455-7LA11	6ES5 456-4UA12
	6ES5 456-7LA11	6ES5 457-4UA12
	6ES5 456-7LB11	6ES5 458-4UA13
	6ES5 457-7LA11	6ES5 458-4UC11
	6ES5 458-7LA11	
	6ES5 458-7LB11	
	6ES5 458-7LC11	
Digital input/output modules	6ES5 482-7LA11	6ES5 482-4UA20
	6ES5 482-7LF11	
	6ES5 482-7LF21	
	6ES5 482-7LF31	

Expansion rack	ER 701-2, ER 701-3	EG 183U, EG 185 U
Analog input modules	6ES5 460-7LA13	6ES5 460-4UA13
	6ES5 463-4UA12	6ES5 463-4UA13
	6ES5 463-4UB12	6ES5 465-4UA13
	6ES5 465-7LA13	6ES5 466-4UA11
	6ES5 466-4UA11	
Analog output modules	6ES5 470-7LA13	6ES5 470-4UA13
	6ES5 470-7LB13	6ES5 470-4UB13
	6ES5 470-7LC13	6ES5 470-4UC13
Interface modules	6ES5 306-7LA11	6ES5 300-3AB11
	6ES5 314-3UA11	6ES5 300-5CA11

IM 460-0

Overview

- Send interface module for central expansion to 5 m
- Transmission of P and K bus
- Can be plugged into the central controller
- Up to 8 expansion racks can be connected (up to 4 per interface)
- Can be used exclusively with IM 461-0

Technical specifications

	6ES7 460-0AA01-0AB0
Current consumption	
from backplane bus DC 5 V, max.	140 mA
Power loss, max.	700 mW
Hardware config.	
Cable length between adjacent interface modules, max.	5 m
Dimensions and weight	
Width	25 mm
Height	290 mm
Depth	217 mm
Weights	
Weight, approx.	600 g

Ordering data

	Order No.
IM 460-0 interface module	**6ES7 460-0AA01-0AB0**
Send interface module for central connection up to 5 m; with C bus transmission	
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**

Overview

- Receive interface for centralized expansion up to 5 m
- Transmission of P and K bus
- Can be plugged into expansion rack
- To be used exclusively with IM 460-0

Technical specifications

	6ES7 461-0AA01-0AA0
Current consumption	
from backplane bus DC 5 V, max.	290 mA
Power loss, max.	1,450 mW
Hardware config.	
Cable length between adjacent interface modules, max.	5 m
Dimensions and weight	
Width	25 mm
Height	290 mm
Depth	217 mm
Weights	
Weight, approx.	610 g

Ordering data

	Order No.
IM 461-0 interface module	**6ES7 461-0AA01-0AA0**
Receive interface module for central connection up to 5 m; with C bus transmission	
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**
Terminating connector	**6ES7 461-0AA00-7AA0**
for IM 461-0	

IM 460-1

Overview

- Send interface module for central expansion to 1.5 m
- Transmission of P bus
- With voltage supply for expansion units
- Can be plugged into the central controller
- Up to 2 expansion racks can be connected (up to 1 per interface)
- Can be used exclusively with IM 461-1

Technical specifications

	6ES7 460-1BA01-0AB0
Current consumption	
from backplane bus DC 5 V, max.	85 mA
Power loss, max.	425 mW
Hardware config.	
Cable length between adjacent interface modules, max.	1.5 m
Dimensions and weight	
Width	25 mm
Height	290 mm
Depth	217 mm
Weights	
Weight, approx.	600 g

Ordering data

	Order No.
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, without C bus transmission	
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

- Receive interface for central expansion up to 1.5 m
- Transmission of P bus
- With voltage supply for expansion racks
- Can be plugged into expansion rack
- Can be used exclusively with IM 460-1

Technical specifications

	6ES7 461-1BA01-0AA0
Current consumption	
from backplane bus DC 5 V, max.	120 mA
Power loss, max.	600 mW
Hardware config.	
Cable length between adjacent interface modules, max.	1.5 m
Dimensions and weight	
Width	25 mm
Height	290 mm
Depth	217 mm
Weights	
Weight, approx.	610 g

Ordering data

	Order No.
IM 461-1 interface module	**6ES7 461-1BA01-0AA0**
Receive IM for central coupling up to max. 1.5 m; without C bus transfer	
468-3 connecting cable	
For connecting IM 460-1 and IM 461-1	
0.75 m	**6ES7 468-3AH50-0AA0**
1.5 m	**6ES7 468-3BB50-0AA0**

IM 460-3

Overview

- Send interface module for distributed expansion to 102 m
- Transmission of K and P bus
- Can be plugged into the central controller
- Up to 8 expansion racks can be connected (up to 4 per interface)
- Can be used exclusively with IM 461-3

Technical specifications

	6ES7 460-3AA01-0AB0
Current consumption	
from backplane bus DC 5 V, max.	1,550 mA
Power loss, max.	7,750 mW
Hardware config.	
Cable length between adjacent interface modules, max.	102 m
Dimensions and weight	
Width	25 mm
Height	290 mm
Depth	217 mm
Weights	
Weight, approx.	630 g

Ordering data

	Order No.
IM 460-3 interface module	**6ES7 460-3AA01-0AB0**
Send interface module for distributed connection up to 102 m; with C bus transmission	
468-1 connecting cable	
between 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**
10 m	**6ES7 468-1CB00-0AA0**
25 m	**6ES7 468-1CC50-0AA0**
50 m	**6ES7 468-1CF00-0AA0**
100 m	**6ES7 468-1DB00-0AA0**

Overview

- Receive interface for distributed expansion up to 102 m
- Transmission of data from the P-bus and C-bus
- Can be plugged into expansion rack
- To be used exclusively with IM 460-3

Technical specifications

	6ES7 461-3AA01-0AA0
Current consumption	
from backplane bus DC 5 V, max.	620 mA
Power loss, max.	3,100 mW
Hardware config.	
Cable length between adjacent interface modules, max.	102 m
Dimensions and weight	
Width	25 mm
Height	290 mm
Depth	217 mm
Weights	
Weight, approx.	620 g

Ordering data

	Order No.
IM 461-3 interface module	**6ES7 461-3AA01-0AA0**
Receive interface module for distributed connection up to 102 m; with C bus transmission	
468-1 connecting cable	
between 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**
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 461-3AA00-7AA0**
for IM 461-3	

IM 463-2

Overview

- Send interface for distributed expansion with SIMATIC S5 expansion racks up to 600 m
- Can be plugged into the central controller
- Up to 8 SIMATIC S5 expansion racks can be connected (up to 4 per interface)
- Can be used exclusively with IM 314

Technical specifications

	6ES7 463-2AA00-0AA0
Current consumption	
from backplane bus DC 5 V, max.	1,320 mA
Power loss, max.	6,600 mW
Hardware config.	
Cable length between first and last interface module, max.	600 m
Dimensions and weight	
Width	25 mm
Height	290 mm
Depth	217 mm
Weights	
Weight, approx.	360 g

Ordering data

	Order No.
IM 463-2 interface module	**6ES7 463-2AA00-0AA0**
Receiving IM for distributed coupling of SIMATIC S5-EUs up to max. 600 m	

Overview

- For connection of the S7-400 as a master to PROFIBUS DP
- For setting up further PROFIBUS DP lines
- PROFIBUS DP communication services and PG/OP communication
- Simple programming and configuring via PROFIBUS
- Interfaces: RS 485 (IM 467) or integrated FO interface (IM 467 FO)

Technical specifications

	6ES7 467-5GJ02-0AB0	6ES7 467-5FJ00-0AB0
Supply voltages		
Rated value		
• DC 5 V	Yes; ± 5 %	Yes; ± 5 %
• DC 24 V	Yes; ± 5 %	Yes; ± 5 %
Current consumption		
from backplane bus DC 5 V, max.	1,300 mA	1,300 mA
Hardware config.		
Number of modules per CPU	10 in the CR (depening on CPU type)	10 in the CR (depening on CPU type)
1st interface		
Type of interface	9-pin-D-sub female connector	2 x Duplex socket
Physics	RS 485	FOC/Lambda = 660 nm
Functionality		
• DP master	Yes	Yes
DP master		
• Number of connections, max.	32; depending on CPU-Type	32; depending on CPU-Type
• Services		
- equidistance support	Yes	Yes
- direct data exchange (cross traffic)	Yes	Yes
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s; not 3 or 6 Mbit/s
• Transmission speeds, min.	9.6 kBit/s	9.6 kBit/s

	6ES7 467-5GJ02-0AB0	6ES7 467-5FJ00-0AB0
1st interface		
• Number of DP slaves, max.	96	96
• Address area		
- Inputs, max.	4 KByte	4 KByte
- Outputs, max.	4 KByte	4 KByte
• Useful data per DP slave		
- Inputs, max.	244 Byte	244 Byte
- Outputs, max.	244 Byte	244 Byte
Environmental requirements		
Operating termperature		
• min.	0 °C	0 °C
• max.	60 °C	60 °C
Storage/transport temperature		
• min.	-40 °C	-40 °C
• max.	70 °C	70 °C
Air pressure		
• Operating height above sea level, max.	3,000 m	3,000 m
Relative humidity		
• Operation, max.	95%; at 26 °C	95%; at 26 °C
Dimensions and weight		
Width	25 mm	25 mm
Height	290 mm	290 mm
Depth	210 mm	210 mm
Weights		
Weight, approx.	700 g	700 g

IM 467, IM 467 FO

Ordering data	Order No.
IM 467 interface module for connection to PROFIBUS DP; RS 485	**6ES7 467-5GJ02-0AB0**
IM 467 FO interface module for connection to PROFIBUS DP; fiber-optic interface	**6ES7 467-5FJ00-0AB0**
RS 485 bus terminal connector with 90° outgoing feeder cable for FastConnect system Max. data transmission rate 12 Mbit/s	
Without PG interface	**6ES7 972-0BA50-0XA0**
With PG interface	**6ES7 972-0BB50-0XA0**
Connection adapters pack of 50, for use of the simplex plugs with the IM 467 FO	**6ES7 195-1BE00-0XA0**

	Order No.
Manual "SIMATIC S7-400 programmable controller" incl. operation list	
German	**6ES7 498-8AA04-8AA0**
English	**6ES7 498-8AA04-8BA0**
French	**6ES7 498-8AA04-8CA0**
Spanish	**6ES7 498-8AA04-8DA0**
Italian	**6ES7 498-8AA04-8EA0**
Manual "Communication for SIMATIC S7-300/-400"	
German	**6ES7 398-8EA00-8AA0**
English	**6ES7 398-8EA00-8BA0**
French	**6ES7 398-8EA00-8CA0**
Spanish	**6ES7 398-8EA00-8DA0**
Italian	**6ES7 398-8EA00-8EA0**

Overview

- Power supplies for the SIMATIC S7-400
- For conversion of AC or DC network voltages into the required 5 V and 24 V DC operating voltages
- Output current 4 A, 10 A and 20 A

Technical specifications

	6ES7 405-0DA02-0AA0	6ES7 405-0KA02-0AA0	6ES7 405-0KR02-0AA0	6ES7 405-0RA01-0AA0
Power supply				
Input voltage				
• Rated value, DC 24 V	Yes	Yes	Yes	Yes
• Rated value, DC 48 V	Yes	Yes	Yes	Yes
• Rated value, DC 60 V	Yes	Yes	Yes	Yes
• permissible range, lower limit (DC)	19.2 V; dynamic 18.5 V	static 19.2 V; dynamic 18.5 V	19.2 V; dynamic 18.5 V	
• permissible range, upper limit (DC)	72 V; dynamic 75.5 V	static 72 V; dynamic 75.5 V	72 V; dynamic 75.5 V	
Input current				
• Rated value at DC 24 V	2 A	4 A	4 A	7.3 A
• Rated value at DC 48 V	1,000 mA	2 A	2 A	3.45 A
• Rated value at DC 60 V	800 mA	1.6 A	1.6 A	2.75 A
• Inrush current, max.	18 A; "Half value width 20ms"	18 A; Full width at half maximum 20 ms	18 A; Full width at half maximum 20 ms	56 A; Full width at half maximum 1.5 ms
Output voltage				
• Rated value, DC 5 V	Yes	Yes	Yes	Yes
• Rated value, DC 24 V	Yes	Yes	Yes	Yes
Output current				
• for backplane bus (DC 5 V), max.	4 A	10 A; 200 mA base load required	10 A; no base load required	20 A; 200 mA base load required
• for backplane bus (DC 24 V), max.	0,5 A	1 A; idling-proof	1 A; idling-proof	1 A; idling-proof
• Short-circuit protection	Yes	Yes	Yes	Yes
Supply voltages				
Power supply and voltage jumpering				
• Mains/voltage failure jumpering	20 ms	20 ms	20 ms	20 ms
• Mains/power failure jumper to NAMUR recommendation	Yes	Yes	Yes	Yes
Voltages and currents				
Power consumption				
• Power consumption, typ.	48 W	95 W	95 W	175 W
Current consumption				
Power loss, typ.	16 W	20 W	20 W	51 W

Power supply PS 405/407

Technical specifications (continued)

	6ES7 405-0DA02-0AA0	6ES7 405-0KA02-0AA0	6ES7 405-0KR02-0AA0	6ES7 405-0RA01-0AA0
Backup battery				
• Backup battery (optional)	Yes; 1 x Lithium AA; 3.6 V/2.3 Ah	Yes; 2 x Lithium AA; 3.6 V/1.9 Ah	Yes; 2 x Lithium AA; 3.6 V/2.3 Ah	Yes; 2 x Lithium AA; 3.6 V/1.9 Ah
Connection point				
Connecting cables/cross sections	3 x 1.5 mm^2 solid or stranded wire with end sleeve, external diameter 3 to 9 mm	3 x 1.5 mm^2 solid or stranded wire, external diameter 3 to 9 mm	3 x 1.5 mm^2 solid or stranded wire with end sleeve, external diameter 3 to 9 mm	3 x 1.5 mm^2 solid or stranded wire, external diameter 3 to 9 mm
Isolation				
primary/secondary	Yes	Yes	Yes	Yes
EMC				
Observance of line harmonic distortion to IEC 61000-3-2, IEC 61000-3-3			Yes	
Environmental requirements				
Degree and class of protection				
• Class of protection	1	1	1	1
Standards, approvals, certificates				
FM approval	Yes; Ta: 0°C to 60°C T4	Yes; up to 60 °C: T4	Yes; Ta: 0°C to 60°C T4	Yes; up to 40 °C: T4
Dimensions and weight				
Width	25 mm	50 mm	50 mm	75 mm
Height	290 mm	290 mm	290 mm	290 mm
Depth	217 mm	217 mm	217 mm	217 mm
Required slots	1	2	2	3
Weights				
Weight, approx.	760 g	1,200 g	1,200 g	2,200 g

	6ES7 407-0DA02-0AA0	6ES7 407-0KA02-0AA0	6ES7 407-0KR02-0AA0	6ES7 407-0RA02-0AA0
Power supply				
Input voltage				
• Rated value, DC 110 V	Yes; Rated value, 120V DC	Yes; Rated value, 120V DC	Yes; Rated value, 120V DC	Yes; Rated value, 120V DC
• Rated value, DC 230 V	Yes	Yes	Yes	Yes
• permissible range, lower limit (DC)	88 V	88 V	88 V	88 V
• permissible range, upper limit (DC)	300 V	300 V	300 V	300 V
• Rated value, AC 120 V	Yes	Yes	Yes	Yes
• Rated value, AC 230 V	Yes	Yes	Yes	Yes
• permissible range, lower limit (AC)	85 V	85 V	85 V	85 V
• permissible range, upper limit (AC)	264 V	264 V	264 V	264 V
• Mains frequency				
- Rated value 50 Hz	Yes	Yes	Yes	Yes
- Rated value 60 Hz	Yes	Yes	Yes	Yes
- permissible range, lower limit	47 Hz	47 Hz	47 Hz	47 Hz
- permissible range, upper limit	63 Hz	63 Hz	63 Hz	63 Hz
Input current				
• Rated value at DC 110 V	350 mA; at 120V DC	1 A; at 120V DC	1 A; at 120V DC	1.4 A
• Rated value at DC 230 V	190 mA	0.5 A	0.5 A	0.7 A

Technical specifications (continued)

	6ES7 407-0DA02-0AA0	6ES7 407-0KA02-0AA0	6ES7 407-0KR02-0AA0	6ES7 407-0RA02-0AA0
Input current (continued)				
• Rated value at AC 120 V	0.42 A	0.9 A	0.9 A	1.4 A
• Rated value at AC 230 V	0.22 A	0.5 A	0.5 A	0.7 A
• Inrush current, max.	8.25 A; Full width at half maximum 5 ms	63 A; Full width at half maximum 1 ms	63 A; Full width at half maximum 1 ms	88 A; Full width at half maximum 1.1 ms
Output voltage				
• Rated value, DC 5 V	Yes	Yes		
• Rated value, DC 24 V	Yes	Yes		
Output current				
• for backplane bus (DC 5 V), max.	4 A; no base load required	4 A; no base load required	10 A; no base load required	20 A; no base load required
• for backplane bus (DC 24 V), max.	0.5 A	1 A; idling-proof	1 A; idling-proof	1 A; Idling-proof
• Short-circuit protection	Yes	Yes	Yes	Yes
Supply voltages				
Power supply and voltage jumpering				
• Mains/voltage failure jumpering	20 ms	20 ms	20 ms	20 ms
• Mains/power failure jumper to NAMUR recommendation	Yes	Yes	Yes	Yes
Voltages and currents				
Power consumption				
• Power consumption, typ.	52 W	95 W	95 W	158 W
Current consumption				
Power loss, typ.	20 W	20 W	20 W	35 W
Backup battery				
• Backup battery (optional)	Yes; 1 x lithium AA; 3.6 V /2.3 Ah	Yes; 2 x Lithium AA; 3.6 V/2.3 Ah	Yes; 2 x Lithium AA; 3.6 V/2.3 Ah	Yes; 2 x Lithium AA; 3.6 V/2.3 Ah
Connection point				
Connecting cables/ cross sections	3 x 1.5 mm^2 solid or stranded wire with end sleeve, external diameter 3 to 9 mm	3 x 1.5 mm^2 solid or stranded wire with end sleeve, external diameter 3 to 9 mm	3 x 1.5 mm^2 solid or stranded wire with end sleeve, external diameter 3 to 9 mm	3 x 1.5 mm^2 solid or stranded wire with end sleeve, external diameter 3 to 9 mm
Isolation				
primary/secondary	Yes	Yes	Yes	Yes
EMC				
Observance of line harmonic distortion to IEC 61000-3-2, IEC 61000-3-3	Yes	Yes	Yes	Yes
Environmental requirements				
Degree and class of protection				
• Class of protection	1	1	1	1
Standards, approvals, certificates				
FM approval	Yes; Ta: 0°C to 60°C T4	Yes; Ta: 0°C to 60 °C T4	Yes; Ta: 0°C to 60°C T4	Yes; Ta: 0°C to 60°C T4
Dimensions and weight				
Width	25 mm	50 mm	50 mm	50 mm
Height	290 mm	290 mm	290 mm	290 mm
Depth	217 mm	217 mm	217 mm	217 mm
Required slots	1	2	2	2
Weights				
Weight, approx.	760 g	1,200 g	1,200 g	1,300 g

Power supply PS 405/407

Ordering data		Order No.
PS 405 power supply modules		
24 V DC; 5 V DC, 24 V DC		
4 A	A)	**6ES7 405-0DA02-0AA0**
10 A, wide range		**6ES7 405-0KA02-0AA0**
10 A, redundant, wide range	A)	**6ES7 405-0KR02-0AA0**
20 A, wide range		**6ES7 405-0RA01-0AA0**
Power plug for PS 405		**6ES7 490-0AA00-0AA0**
Spare part		
Backup battery		**6ES7 971-0BA00**
Type AA, 1.9 Ah		

		Order No.
PS 407 power supply modules		
120/230 V AC; 5 V DC, 24 V DC		
4 A	A)	**6ES7 407-0DA02-0AA0**
10 A	A)	**6ES7 407-0KA02-0AA0**
10 A, redundant	A)	**6ES7 407-0KR02-0AA0**
20 A	A)	**6ES7 407-0RA02-0AA0**
Power plug for PS 407		**6ES7 490-0AB00-0AA0**
Spare part		
Backup battery		**6ES7 971-0BA00**
Type AA, 1.9 Ah		

A) Subject to export regulations: AL: N and ECCN: EAR99H

Overview

Labeling sheets

- Film sheets for application-specific labeling of SIMATIC S7-400 I/O modules with commercial laser printers
- Single-color films, tear-resistant, dirt-resistant
- Easy handling:
  - pre-perforated labeling sheets in DIN A4 format to allow easy separation of the labeling strips
  - the separated strips can be inserted directly into the I/O modules
- Different colors for distinction between module types or preferred areas of application:
  The labeling sheets are available in the colors teal, light beige, red and yellow. Yellow is reserved for failsafe systems.

Label cover

- Film to cover and hold user-made labeling strips on normal paper
- Accessories, 10 pieces

Technical specifications

	6ES7 492-2AX00-0AA0	6ES7 492-2BX00-0AA0	6ES7 492-2CX00-0AA0	6ES7 492-2DX00-0AA0	6ES7 492-2XX00-0AA0
Weights					
Weight, approx.	2 g	2 g	2 g	2 g	72 g

Ordering data

	Order No.
Labeling sheets	
DIN A4, for printing using laser printer; 10 pieces	
Petrol	**6ES7 492-2AX00-0AA0**
Light beige	**6ES7 492-2BX00-0AA0**
Yellow	**6ES7 492-2CX00-0AA0**
Red	**6ES7 492-2DX00-0AA0**

Labeling sheets	**6ES7 492-2XX00-0AA0**
DIN A4, for printing using laser printer; 10 pieces	

Spare parts

Overview

Cover film for labeling strips

- Petrol-colored film for covering and fixing user-created labeling strips.
- On standard paper
- Spare part

Measuring range module for analog input modules

- Plug-in module for selecting the input ranges for analog modules
- 1 module for 2 inputs
- Spare part

Module slot cover

- Cover plates for unassigned slots in module mounting racks
- Spare part, 10 items

Power plug

- Plug for connecting the PS 405 and PS 407 power supply modules to the line supply
- Spare part

Exchangeable fan

- Fan unit for installation in the fan subassembly
- Spare part

Exchangeable monitoring unit

- Electronic monitoring unit for the fan subassembly
- Spare part

Exchangeable power supply unit

- Power supply unit for installation in the fan subassembly
- Spare part

Ordering data

Ordering data	Order No.
Cover foil for labeling strip 10 units (spare part)	**6ES7 492-2XX00-0AA0**
Range card for analog input modules 1 card for 2 inputs; 2 units (spare part)	**6ES7 974-0AA00-0AA0**
Slot covers for racks; 10 units (spare part)	**6ES7 490-1AA00-0AA0**
Power plug for PS 405 Spare part	**6ES7 490-0AA00-0AA0**
Power plug for PS 407 Spare part	**6ES7 490-0AB00-0AA0**
Replacement fan Spare part	**6ES7 408-1TA00-6AA0**

SIMATIC C7

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Brochures

For brochures serving as selection guides for SIMATIC products refer to:

http://www.siemens.com/simatic/printmaterial

SIMATIC C7

Overview

- Compact control systems for the low-end performance range
- Combines the SIMATIC S7-300 programmable controller and SIMATIC operator panel in one unit
- The complete machine control with minimum space requirements
- Highly suited for industrial environments
- User-friendly operation, simple fan-free design and reduced installation effort
- Easily adaptable to increasing requirements through the use of the extensive range of S7-300 modules

For brochures serving as selection guides for SIMATIC products refer to:

http://www.siemens.com/simatic/printmaterial

Overview

- The low-cost entry point in the world of SIMATIC C7 control systems
- For all applications which require fast PLC performance and easy to use human-machine interface functionality
- With user-friendly, onboard I/O for space-saving implementation at the machine level
- Integrated technology functions for counting, frequency measurement and closed-loop control

A micro memory card and connector set are required for C7 operation.

Technical specifications

	6ES7 613-1CA02-0AE3
Supply voltages	
Rated value	
• DC 24 V	Yes
• permissible range, lower limit (DC)	20.4 V
• permissible range, upper limit (DC)	28.8 V
Current consumption	
Digital inputs	
• from load voltage L+ (without load), max.	70 mA
Digital outputs	
• from load voltage L+, max.	100 mA
Power loss, typ.	14 W
Memory	
Memory	
• RAM	
- integrated	64 KByte; for program and data, less the display data
- expandable	No
• Load memory	
- pluggable (MMC)	Yes
- pluggable (MMC), max.	8 MByte
Backup	
• present	Yes; Guaranteed by MMC (maintenance-free)
• without battery	Yes; Program and data
CPU/blocks	
DB	
• Number, max.	511; Number band: 1 to 511
• Size, max.	16 KByte
FB	
• Number, max.	1,024; Number band: 0 to 2047
• Size, max.	16 KByte
FC	
• Number, max.	1,024; Number band: 0 to 2047
• Size, max.	16 KByte

	6ES7 613-1CA02-0AE3
OB	
• Size, max.	16 KByte
Nesting depth	
• per priority class	8
• additional within an error OB	4
CPU/processing times	
for bit operations, min.	0.1 µs
for bit operations, max.	0.2 µs
for word operations, min.	0.2 µs
for fixed point arithmetic, min.	2 µs
for floating point arithmetic, min.	3 µs
Times/counters and their remanence	
S7 counter	
• Number	256
• of which remanent without battery	
- adjustable	Yes
- lower limit	0
- upper limit	255
• Remanence	
- adjustable	Yes
- preset	8
• Counting range	
- lower limit	0
- upper limit	999
IEC counter	
• present	Yes
• Type	SFB
S7 times	
• Number	256
• of which remanent without battery	
- adjustable	Yes
- lower limit	0
- upper limit	255
• Remanence	
- adjustable	Yes
- preset	no retentivity

Technical specifications (continued)

	6ES7 613-1CA02-0AE3
• Time range	
- lower limit	10 ms
- upper limit	9,990 s
IEC timer	
• present	Yes
• Type	SFB
Data areas and their remanence	
Flag	
• Number, max.	256 Byte
• Remanence available	Yes; MB 0 to MB 255
• Remanence preset	MB 0 to MB 15
• Number of clock memories	8; 1 memory byte
Data blocks	
• Number, max.	511; from DB1 to DB511
• Size, max.	16 KByte
Local data	
• per priority class, max.	510 Byte
Address area	
I/O address area	
• Inputs	1 KByte
• Outputs	1 KByte
Process image	
• Inputs	128 Byte
• Outputs	128 Byte
Digital channels	
• integrated channels (DI)	24
• integrated channels (DO)	16
• Inputs	1,016
• Outputs	1,008
• Inputs, of which central	1,016
• Outputs, of which central	1,008
Analog channels	
• Number of integrated channels (AO)	2
• Inputs	253
• Outputs	250
• Inputs, of which central	253
• Outputs, of which central	250
Hardware config.	
Racks, max.	4
Modules per rack, max.	8; 511; from DB1 to DB511
Number of DP masters	
• via CP	4
Number of operable FMs and CPs (recommended)	
• FM	8
• CP, point-to-point	8
• CP, LAN	6

	6ES7 613-1CA02-0AE3
Time	
Clock	
• Hardware clock (real-time clock)	Yes
• Battery backed and synchronized	Yes
• Backup time	6 w; at 40°C ambient temperature
• Deviation per day, max.	10 s
Operating hours counter	
• Number	1
• Number/Number range	0
• Range of values	2^31 hours (when using the SFC 101)
• Granularity	1 hour
• remanent	Yes; must be restarted at each warm restart
Clock synchronization	
• supports	Yes
• to MPI, Master	Yes
• to MPI, Slave	Yes
• in AS, Master	Yes
S7 message functions	
Number of login stations for message functions, max.	8; depending on the configured connections for PG-/ OP- and S7-basic commmunication
Process diagnostic messages	Yes
simultaneously active Alarm-S blocks, max.	20
Test commissioning functions	
Status/control	
• Status/control variable	Yes
• Variables	Inputs, outputs, memory bits, DB, times, counters
Monitoring functions	
• Number of variables, max.	30
• of which status variable, max.	30
• of which control variable, max.	14
Forcing	
• Forcing	Yes
• Force, variables	Inputs, outputs
• Forcing, number of variables, max.	10
Status block	Yes
Single step	Yes
Number of breakpoints	2
Diagnostic buffer	
• present	Yes
• Number of entries, max.	100

Technical specifications (continued)

	6ES7 613-1CA02-0AE3
Communication functions	
PG/OP communication	Yes
Routing	No
Global data communication	
• supported	Yes
• Number of GD loops, max.	4
• Number of GD packets, max.	4
• Number of GD packets, transmitter, max.	4
• Number of GD packets, receiver, max.	4
• Size of GD packets, max.	22 Byte
• Size of GD packet (of which consistent), max.	22 Byte
S7 basic communication	
• supported	Yes
• Useful data per job, max.	76 Byte
• Useful data per job (of which consistent) max.	76 Byte; 76 bytes (with X_SEND or X_RCV); 64 bytes (with X_PUT or X_GET as server)
S7 communication	
• supported	Yes
• as server	Yes
• as client	Yes; via CP and loadable FB
• Useful data per job, max.	180 Byte
• Useful data per job, of which consistent, max.	64 Byte
S5-compatible communication	
• supported	Yes; via CP and loadable FC
Number of connections	
• overall	8
• usable for PG communication	7
• reserved for PG communication	1
• adjustable for PG communication, min.	1
• adjustable for PG communication, max.	7
• usable for OP communication	7
• reserved for OP communication	1
• adjustable for OP communication, min.	1
• adjustable for OP communication, max.	7
• usable for S7 basic communication	4
• reserved for S7-Basic communication	4
• adjustable for S7-Basic communication, min.	0
• adjustable for S7-Basic communication, max.	4

	6ES7 613-1CA02-0AE3
1st interface	
Type of interface	integrated RS 422/ 485 interface
Physics	RS 485
isolated	No
Power supply to interface (15 to 30 V DC), max.	200 mA
Functionality	
• MPI	Yes
• DP master	No
• DP slave	No
• Point-to-point coupling	No
MPI	
• Number of connections	8
• Services	
- PG/OP communication	Yes
- Routing	No
- Global data communication	Yes
- S7 basic communication	Yes
- S7 communication	Yes
- S7 communication, as client	No
- S7 communication, as server	Yes
• Transmission speeds, max.	187.5 kBit/s
CPU/programming	
Programming language	
• LAD	Yes
• FUP	Yes
• AWL	Yes
• SCL	Yes
• GRAPH	Yes
• HiGraph	Yes
Software libraries	
Operational stocks	see Instruction List
Nesting levels	8
User program protection/password protection	Yes
System functions (SFC)	see Instruction List
System function blocks (SFB)	see Instruction List
Integrated inputs/outputs	
Default addresses of the integrated channels	
• Digital inputs	124.0 to 126.7
• Digital outputs	124.0 to 125.7
• Analog inputs	752 to 761
• Analog outputs	752 to 755
Digital inputs	
Number of digital inputs	24
• of which, inputs usable for technological functions	12

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Technical specifications (continued)

	6ES7 613-1CA02-0AE3
Number of simultaneously controllable inputs	
• vertical installation	
- up to 40 °C, max.	12
• horizontal installation	
- up to 40 °C, max.	24
- up to 60 °C, max.	12
Cable length	
• Cable length, shielded, max.	1,000 m; 100 m for technological functions
• Cable length unshielded, max.	600 m; For technological functions: No
• Technological functions	
- shielded, max.	100 m
• Standard-DI	
- schielded, max.	1,000 m
- unshielded, max.	600 m
Input characteristic curve to IEC 1131, type 1	Yes
Input voltage	
• Rated value, DC	24 V
• for signal "0"	-3 to 5 V
• for signal "1"	15 to 30 V
Input current	
• for signal "1", typ.	9 mA
Input delay (for rated value of input voltage)	
• for standard inputs	
- programmable	Yes; 0.1 / 0.3 / 3 / 15 ms
- Rated value	3 ms
• for counter/technological functions	
- at "0" to "1", max.	16 µs
Digital outputs	
Number of digital outputs	16
• of which, high-speed outputs	4
Cable length, shielded, max.	1,000 m
Cable length unshielded, max.	600 m
Short-circuit protection of the output	Yes; clocked electronically
• Response threshold, typ.	1 A
Limitation of inductive shutdown voltage to	L+ (-48 V)
Lamp load, max.	5 W
Controlling a digital input	Yes
Output voltage	
• for signal "1", min.	L+ (-0.8 V)
Output current	
• for signal "1" rated value	500 mA
• for signal "1" permissible range, min.	5 mA
• for signal "1" permissible range, max.	0.6 A
• for signal "1" minimum load current	5 mA
• for signal "0" residual current, max.	0.5 mA

	6ES7 613-1CA02-0AE3
Parallel switching of 2 outputs	
• for increased power	No
• for redundant control of a load	Yes
Switching frequency	
• with resistive load, max.	100 Hz
• with inductive load, max.	0.5 Hz
• on lamp load, max.	100 Hz
• of the pulse outputs, with resistive load, max.	2.5 kHz
Aggregate current of the outputs (per group)	
• vertical installation	
- up to 40 °C, max.	2 A
• horizontal installation	
- up to 40 °C, max.	3 A
Load impedance range	
• lower limit	48 Ω
• upper limit	4 kΩ
Analog inputs	
Number of analog inputs for voltage/current measurement	4
Number of analog inputs for resistance/temperature measurement	1
Cable length, shielded, max.	100 m
permissible input frequency for voltage input (destruction limit), max.	30 V; permanent
permissible input frequency for current input (destruction limit), max.	2.5 V; permanent
permissible input current for voltage input (destruction limit), max.	0.5 mA; permanent
permissible input current for current input (destruction limit), max.	50 mA; permanent
technical unit for temperature measurement, adjustable	Yes; Degrees Celsius / degrees Fahrenheit / Kelvin
Input ranges (rated values), voltages	
• 0 to +10 V	Yes
• -10 V to +10 V	Yes
Input ranges (rated values), currents	
• 0 to 20 mA	Yes
• -20 to +20 mA	Yes
• 4 to 20 mA	Yes
Input ranges (rated values), resistors	
• No-load voltage, typ.	2.5 V
• Measured current, typ.	1.8 mA to 3.3 mA
• 0 to 600 Ohm	Yes

Technical specifications (continued)

	6ES7 613-1CA02-0AE3
Input ranges (rated values), resistance thermometers	
• Pt 100	
Characteristic linearization	Yes
• programmable	Yes; by software
• for thermoresistor	Pt 100
Temperature compensation	
• programmable	No
Analog outputs	
Number of analg outputs	2
Cable length, shielded, max.	200 m
Voltage output, short-circuit protection	Yes
Voltage output, short-circuit current, max.	55 mA
Current output, no-load voltage, max.	17 V
Output ranges, voltage	
• 0 to 10 V	Yes
• -10 to +10 V	Yes
Output ranges, current	
• 0 to 20 mA	Yes
• -20 to +20 mA	Yes
• 4 to 20 mA	Yes
Connection of actuators	
• for voltage output 2-conductor connection	Yes; without compensation of the line resistances
• for voltage output 4-conductor connection	No
• for current output 2-conductor connection	Yes
Load impedance (in rated range of output)	
• with voltage outputs, min.	1 kΩ
• with voltage outputs, capacitive load, max.	0.1 µF
• with current outputs, max.	300 Ω
• with current outputs, inductive load, max.	0.1 mH
Destruction limits against externally applied voltages and currents	
• Voltages at the outputs towards M_{ANA}	16 V; permanent
• Current, max.	50 mA; permanent

	6ES7 613-1CA02-0AE3
Analog value creation	
Measurement principle	Actual value encryption (successive approximation)
Integrations and conversion time/resolutionper channel	
• Resolution with overload area (bit including sign), max.	12 Bit
• Integration time, parameterizable	Yes; 2.5 / 16.6 / 20 ms
• permissible input frequency, max.	400 Hz
• Conversion time (per channel)	1 ms
• Time constant of the input filter	0.38 ms
• Basic execution time of the module (all channels released)	1 ms
Settling time	
• for resistive load	0.6 ms
• for capacitive load	1 ms
• for inductive load	0.5 ms
Encoder	
Connection of signal encoders	
• for voltage measurement	Yes
• for current measurement as 2-wire transducer	Yes; with external supply
• for current measurement as 4-wire transducer	Yes
• for resistance measurement with 2-conductor connection	Yes; without compensation of the line resistances
• for resistance measurement with 3-conductor connection	No
• for resistance measurement with 4-conductor connection	No
Connectable encoders	
• 2-wire BEROS	Yes
• permissible quiescent current (2-wire BEROS), max.	1.5 mA
Errors/accuracies	
Operational limit in overall temperature range	
• Voltage, relative to output area	+/- 1 %
• Current, relative to output area	+/- 1 %
• Voltage, relative to input area	+/- 1 %
• Current, relative to input area	+/- 1 %
• Impedance, relative to input area	+/- 5 %

Technical specifications (continued)

	6ES7 613-1CA02-0AE3
Basic error limit (operational limit at 25 °C)	
• Voltage, relative to output area	+/- 0,7 %
• Current, relative to output area	+/- 0,7 %
• Voltage, relative to input area	+/- 0,7 %; Linearity error +/- 0.06%
• Current, relative to input area	+/- 0,7 %; Linearity error +/- 0.06%
• Impedance, relative to input area	+/- 3 %; Linearity error +/- 0.2%
• Resistance-type thermometer, relative to input area	+/- 3 %
Interference voltage suppression for f = n x (fl +/- 1 %), fl = interference frequency	
• Series mode interference (peak value of interference < rated value of input range), min.	30 dB
• common mode voltage, min.	40 dB
Integrated Functions	
Number of counters	3; 3 channels (see "Technological Functions" manual)
Counter frequency (counter) max.	30 kHz
Frequency measurement	Yes
Number of frequency meters	3; 3 channels up to max. 30 kHz (see "Technological Functions" manual)
Controlled positioning	No
Integrated function blocks (closed-loop control)	Yes; PID controller (see "Technological Functions" manual)
PID controller	Yes
Number of pulse outputs	3; 3 channels pulse width modulation up to 2.5 kHz (see Manual "Technological Functions")
Limit frequency (pulse)	2.5 kHz
Isolation	
Isolation checked with	500 V DC

	6ES7 613-1CA02-0AE3
Isolation	
Isolation, analog outputs	
• Galvanic isolation, analog outputs	Yes
• between the channels	No
• between the channels and the backplane bus	Yes
Isolation, analog inputs	
• Isolation, analog inputs	Yes
• between the channels	No
• between the channels and the backplane bus	Yes
Isolation, digital outputs	
• Galvanic isolation, digital outputs	Yes
• between the channels	Yes
• between the channels, in groups of	8
• between the channels and the backplane bus	Yes
Galvanic isolation, digital inputs	
• galvanic isolation, digital inputs	Yes
• between the channels	No
• between the channels and the backplane bus	Yes
Permissible potential difference	
between different circuits	75 V DC/ 60 V AC
Dimensions and weight	
Width	120 mm
Height	125 mm
Depth	130 mm
Weights	
Weight, approx.	660 g

Ordering Data		Order No.
C7-613 control system	A)	**6ES7 613-1CA02-0AE3**
64 KB RAM (PLC) 24 DI, 16 DO, 5 AI, 2 AO integrated; backlit LCD (4 lines, 20 characters/line); with mounting accessories		
Micro Memory Card		
essential for operation		
64 KB		**6ES7 953-8LF11-0AA0**
128 KB		**6ES7 953-8LG11-0AA0**
512 KB		**6ES7 953-8LJ11-0AA0**
2 MB		**6ES7 953-8LL11-0AA0**
4 MB		**6ES7 953-8LM11-0AA0**
8 MB		**6ES7 953-8LP11-0AA0**
Connector set		
For I/O and power supply; essential for operation		
with screw terminals		**6ES7 635-0AA00-4AA0**
With spring-loaded clamps		**6ES7 635-0AA00-4BA0**
C7-613 configuration tools		**6ES7 613-0CA00-7AA0**
Standard function blocks for configuration of HMI functions; on CD-ROM		
Manual pack for C7-613		
C7-613 manual and S7-300 manual		
German		**6ES7 613-1CA00-8AA0**
English		**6ES7 613-1CA00-8BA0**
French		**6ES7 613-1CA00-8CA0**
Spanish		**6ES7 613-1CA00-8DA0**
Italian		**6ES7 613-1CA00-8EA0**
C7-613 manual		
German		**6ES7 613-1CA00-8AB0**
English		**6ES7 613-1CA00-8BB0**
French		**6ES7 613-1CA00-8CB0**
Spanish		**6ES7 613-1CA00-8DB0**
Italian		**6ES7 613-1CA00-8EB0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

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

		Order No.
Accessories		
I/O set		
For expanding the C7-613/ C7-635/C7-636 with max. 4 modules; mounted on rear of device		
For 2 modules, flat mounting		**6ES7 635-0AA00-6AA0**
For 4 modules, deep mounting		**6ES7 635-0AA00-6BA0**
I/O expansion cable		**6ES7 635-0AA00-6CA0**
For external expansion of SIMATIC C7-613/C7-635/C7-636 by max. 4 modules; 1.5 m in length		
SIMATIC Manual Collection	D)	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual		
SIMATIC Manual Collection update service for 1 year	D)	**6ES7 998-8XC01-8YE2**
Current S7 Manual Collection DVD and the three subsequent updates		
Spare part		
Service pack		**6ES7 635-0AA00-3AA0**
3 gaskets, 10 holders, for all SIMATIC C7-613, C7-635 and C7-636		
Grounding bar		**6ES7 635-0AA00-6EA0**
with shield terminals for analog I/O		

C7-635

Overview

- Control systems for advanced applications
- With onboard I/O for use at machine level
- With integrated PROFIBUS DP connection for distributed structures
- Variant with context-sensitive touch functionality
- Graphical visualization and operator support for particularly convenient use

A micro memory card and connector set are required for C7 operation.

6

Technical specifications

	6ES7 635-2EC02-0AE3	6ES7 635-2EB02-0AE3
Supply voltages		
Rated value		
• DC 24 V	Yes	Yes
• permissible range, lower limit (DC)	20.4 V	20,4 V
• permissible range, upper limit (DC)	28.8 V	28,8 V
Current consumption		
Digital inputs		
• from load voltage L+ (without load), max.	70 mA	70 mA
Digital outputs		
• from load voltage L+, max.	100 mA	100 mA
Power loss, typ.	14 W	14 W
Memory		
Memory		
• RAM		
- integrated	96 KByte; for program and data, less the display data	96 KByte; for program and data, less the display data
- expandable	No	No
• Load memory		
- pluggable (MMC)	Yes	Yes
- pluggable (MMC), max.	8 MByte	8 MByte
Backup		
• present	Yes; Guaranteed by MMC (maintenance-free)	Yes; Guaranteed by MMC (maintenance-free)
• without battery	Yes; Program and data	Yes; Program and data
CPU/blocks		
DB		
• Number, max.	511; Number band: 1 to 511	511; Number band: 1 to 511
• Size, max.	16 KByte	16 KByte

	6ES7 635-2EC02-0AE3	6ES7 635-2EB02-0AE3
FB		
• Number, max.	1,024; Number band: 0 to 2047	1,024; Number band: 0 to 2047
• Size, max.	16 KByte	16 KByte
FC		
• Number, max.	1,024; Number band: 0 to 2047	1,024; Number band: 0 to 2047
• Size, max.	16 KByte	16 KByte
OB		
• Size, max.	16 KByte	16 KByte
Nesting depth		
• per priority class	8	8
• additional within an error OB	4	4
CPU/processing times		
for bit operations, min.	0.1 µs	0.1 µs
for bit operations, max.	0.2 µs	0.2 µs
for word operations, min.	0.2 µs	0.2 µs
for fixed point arithmetic, min.	2 µs	2 µs
for floating point arithmetic, min.	3 µs	3 µs
Times/counters and their remanence		
S7 counter		
• Number	256	256
• of which remanent without battery		
- adjustable	Yes	Yes
- lower limit	0	0
- upper limit	255	255
• Remanence		
- adjustable	Yes	Yes
- preset	8	8

Technical specifications (continued)

	6ES7 635-2EC02-0AE3	6ES7 635-2EB02-0AE3
• Counting range		
- lower limit	0	0
- upper limit	999	999
IEC counter		
• present	Yes	Yes
• Type	SFB	SFB
S7 times		
• Number	256	256
• of which remanent without battery		
- adjustable	Yes	Yes
- lower limit	0	0
- upper limit	255	255
• Remanence		
- adjustable	Yes	Yes
- preset	no retentivity	no retentivity
• Time range		
- lower limit	10 ms	10 ms
- upper limit	9,990 s	9,990 s
IEC timer		
• present	Yes	Yes
• Type	SFB	SFB
Data areas and their remanence		
Flag		
• Number, max.	256 Byte	256 Byte
• Remanence available	Yes; MB 0 to MB 255	Yes; MB 0 to MB 255
• Remanence preset	from MB 0 to MB 15	from MB 0 to MB 15
• Number of clock memories	8; 1 memory byte	8; 1 memory byte
Data blocks		
• Number, max.	511	511
• Size, max.	16 KByte	16 KByte
Local data		
• per priority class, max.	510 Byte	510 Byte
Address area		
I/O address area		
• Inputs	1 KByte	1 KByte
• Outputs	1 KByte	1 KByte
Process image		
• Inputs	128 Byte	128 Byte
• Outputs	128 Byte	128 Byte
Digital channels		
• integrated channels (DI)	24	24
• integrated channels (DO)	16	16
• Inputs	8,192	8,192
• Outputs	8,192	8,192
• Inputs, of which central	1,016	1,016
• Outputs, of which central	1,008	1,008

	6ES7 635-2EC02-0AE3	6ES7 635-2EB02-0AE3
Analog channels		
• Number of integrated channels (AO)	2	2
• Inputs	512	512
• Outputs	512	512
• Inputs, of which central	253	253
• Outputs, of which central	250	250
Hardware config.		
Racks, max.	4	4
Modules per rack, max.	8; in rack 3 max. 7	8; in rack 3 max. 7
Number of DP masters		
• integrated	1	1
• via CP	4	4
Number of operable FMs and CPs (recommended)		
• FM	8	8
• CP, point-to-point	8	8
• CP, LAN	10	10
Time		
Clock		
• Hardware clock (real-time clock)	Yes	Yes
• Battery backed and synchronized	Yes	Yes
• Backup time	6 w; at 40°C ambient temperature	6 w; at 40°C ambient temperature
• Deviation per day, max.	10 s	10 s
Operating hours counter		
• Number	1	1
• Number/Number range	0	0
• Range of values	2^31 hours (when using the SFC 101)	2^31 hours (when using the SFC 101)
• Granularity	1 hour	1 hour
• remanent	Yes; must be restarted at each warm restart	Yes; must be restarted at each warm restar
Clock synchronization		
• supports	Yes	Yes
• to MPI, Master	Yes	Yes
• to MPI, Slave	Yes	Yes
• in AS, Master	Yes	Yes
S7 message functions		
Number of login stations for message functions, max.	12; depending on the configured connections for PG-/ OP- and S7-basic commmunication	12; depending on the configured connections for PG-/ OP- and S7-basic commmunication

Technical specifications (continued)

	6ES7 635-2EC02-0AE3	6ES7 635-2EB02-0AE3
Process diagnostic messages	Yes	Yes
simultaneously active Alarm-S blocks, max.	40	40
Test commissioning functions		
Status/control		
• Status/control variable	Yes	Yes
• Variables	Inputs, outputs, memory bits, DB, times, counters	Inputs, outputs, memory bits, DB, times, counters
Monitoring functions		
• Number of variables, max.	30	30
• of which status variable, max.	30	30
• of which control variable, max.	14	14
Forcing		
• Forcing	Yes	Yes
• Force, variables	Inputs, outputs	Inputs, outputs
• Forcing, number of variables, max.	10	10
Status block	Yes	Yes
Single step	Yes	Yes
Number of breakpoints	2	2
Diagnostic buffer		
• present	Yes	Yes
• Number of entries, max.	100	100
Communication functions		
PG/OP communication	Yes	Yes
Routing	Yes	Yes
Global data communication		
• supported	Yes	Yes
• Number of GD loops, max.	4	4
• Number of GD packets, max.	4	4
• Number of GD packets, transmitter, max.	4	4
• Number of GD packets, receiver, max.	4	4
• Size of GD packets, max.	22 Byte	22 Byte
• Size of GD packet (of which consistent), max.	22 Byte	22 Byte
S7 basic communication		
• supported	Yes	Yes
• Useful data per job, max.	76 Byte	76 Byte
• Useful data per job (of which consistent) max.	76 Byte; 76 bytes (with X_SEND or X_RCV); 64 bytes (with X_PUT or X_GET as server)	76 Byte; 76 bytes (with X_SEND or X_RCV); 64 bytes (with X_PUT or X_GET as server)

	6ES7 635-2EC02-0AE3	6ES7 635-2EB02-0AE3
S7 communication		
• supported	Yes	Yes
• as server	Yes	Yes
• as client	Yes; via CP and loadable FB	Yes; via CP and loadable FB
• Useful data per job, max.	180 KByte; at PUT/GET	180 KByte; at PUT/GET
• Useful data per job, of which consistent, max.	64 Byte	64 Byte
S5-compatible communication		
• supported	Yes; via CP and loadable FC	Yes; via CP and loadable FC
Number of connections		
• overall	12	12
• usable for PG communication	11	11
• reserved for PG communication	1	1
• adjustable for PG communication, min.	1	1
• adjustable for PG communication, max.	11	11
• usable for OP communication	11	11
• reserved for OP communication	1	1
• adjustable for OP communication, min.	1	1
• adjustable for OP communication, max.	11	11
• usable for S7 basic communication	8	8
• reserved for S7-Basic communication	8	8
• adjustable for S7-Basic communication, min.	0	0
• adjustable for S7-Basic communication, max.	8	8
• usable for routing	4; max.	4; max.
1st interface		
Type of interface	integrated RS 422/ 485 interface	integrated RS 422/ 485 interface
Physics	RS 485	RS 485
isolated	No	No
Power supply to interface (15 to 30 V DC), max.	200 mA	200 mA
Functionality		
• MPI	Yes	Yes
• DP master	No	No
• DP slave	No	No
• Point-to-point coupling	No	No

Technical specifications (continued)

	6ES7 635-2EC02-0AE3	6ES7 635-2EB02-0AE3
MPI		
• Number of connections	12	12
• Services		
- PG/OP communication	Yes	Yes
- Routing	Yes	Yes
- Global data communication	Yes	Yes
- S7 basic communication	Yes	Yes
- S7 communication	Yes	Yes
- S7 communication, as client	No	No
- S7 communication, as server	Yes	Yes
• Transmission speeds, max.	187.5 kBit/s	187.5 kBit/s
2nd interface		
Type of interface	integrated RS 422/ 485 interface	integrated RS 422/ 485 interface
Physics	RS 485	RS 485
isolated	Yes	Yes
Power supply to interface (15 to 30 V DC), max.	200 mA	200 mA
Number of connection resources	12	12
Functionality		
• MPI	No	No
• DP master	Yes	Yes
• DP slave	Yes	Yes
• Point-to-point coupling	No	No
DP master		
• Number of connections, max.	12; for PG/OP communication	12; for PG/OP communication
• Number of connections (of which reserved), max.	1 for PG, 1 for OP	1 for PG, 1 for OP
• Services		
- PG/OP communication	Yes	Yes
- Routing	Yes	Yes
- Global data communication	No	No
- S7 basic communication	Yes	Yes
- S7 communication	Yes	Yes
- S7 communication, as client	No	No
- S7 communication, as server	Yes	Yes
- equidistance support	Yes	Yes
- SYNC/FREEZE	Yes	Yes
- Activation/deactivation of DP slaves	Yes	Yes
- direct data exchange (cross traffic)	Yes	Yes
- DPV1	Yes	Yes

	6ES7 635-2EC02-0AE3	6ES7 635-2EB02-0AE3
DP-Master (continued)		
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s
• Number of DP slaves, max.	32	32
• Address area		
- Inputs, max.	1 KByte	1 KByte
- Outputs, max.	1 KByte	1 KByte
• Useful data per DP slave		
- Inputs, max.	244 Byte	244 Byte
- Outputs, max.	244 Byte	244 Byte
DP slave		
• Number of connections	12	12
• Services		
- PG/OP communication	Yes	Yes
- Routing	Yes; only when interface active	Yes; only when interface active
- Global data communication	No	No
- S7 basic communication	Yes	Yes
- S7 communication	Yes	Yes
- direct data exchange (cross traffic)	Yes	Yes
- DPV1	No	No
• GSD file	You can obtain the current GSD file from http://www.ad.siemens.de/support in the Product Support area	You can obtain the current GSD file from http://www.ad.siemens.de/support in the Product Support area
• Transmission speeds, max.	12 kBit/s	12 kBit/s
• Transfer memory		
- Inputs	244 Byte	244 Byte
- Outputs	244 Byte	244 Byte
• Address area, max.	32	32
• Useful data per address area, max.	32 Byte	32 Byte
CPU/programming		
Programming language		
• LAD	Yes	Yes
• FUP	Yes	Yes
• AWL	Yes	Yes
• SCL	Yes	Yes
• CFC	Yes	Yes
• GRAPH	Yes	Yes
• HiGraph	Yes	Yes
Software libraries		
Operational stocks	see Instruction List	see Instruction List
Nesting levels	8	8
User program protection/password protection	Yes	Yes
System functions (SFC)	see Instruction List	see Instruction List
System function blocks (SFB)	see Instruction List	see Instruction List

Technical specifications (continued)

	6ES7 635-2EC02-0AE3	6ES7 635-2EB02-0AE3
Integrated inputs/outputs		
Default addresses of the integrated channels		
• Digital inputs	124.0 to 126.7	124.0 to 126.7
• Digital outputs	124.0 to 125.7	124.0 to 125.7
• Analog inputs	752 to 761	752 to 761
• Analog outputs	752 to 755	752 to 755
Digital inputs		
Number of digital inputs	24	24
• of which, inputs usable for technological functions	16	16
Number of simultaneously controllable inputs		
• vertical installation		
- up to 40 °C, max.	12	12
• horizontal installation		
- up to 40 °C, max.	24	24
- up to 60 °C, max.	12	12
Cable length		
• Cable length, shielded, max.	1,000 m; 50 m for technological functions	1,000 m; 50 m for technological functions
• Cable length unshielded, max.	600 m; For technological functions: No	600 m; For technological functions: No
• Technological functions		
- shielded, max.	50 m	50 m
• Standard-DI		
- shielded, max.	1,000 m	1,000 m
- unshielded, max.	600 m	600 m
Input characteristic curve to IEC 1131, type 1	Yes	Yes
Input voltage		
• Rated value, DC	24 V	24 V
• for signal "0"	-3 to 5 V	-3 to 5 V
• for signal "1"	15 to 30 V	15 to 30 V
Input current		
• for signal "1", typ.	9 mA	9 mA
Input delay (for rated value of input voltage)		
• for standard inputs		
- programmable	Yes; 0.1 / 0.3 / 3 / 15 ms	Yes; 0.1 / 0.3 / 3 / 15 ms
- Rated value	3 ms	3 ms
• for counter/technological functions		
- at "0" to "1", max.	8 µs	8 µs

	6ES7 635-2EC02-0AE3	6ES7 635-2EB02-0AE3
Digital outputs		
Number of digital outputs	16	16
• of which, high-speed outputs	4	4
Cable length, shielded, max.	1,000 m	1,000 m
Cable length unshielded, max.	600 m	600 m
Short-circuit protection of the output	Yes; clocked electronically	Yes; clocked electronically
• Response threshold, typ.	1 A	1 A
Limitation of inductive shutdown voltage to	L+ (-48 V)	L+ (-48 V)
Lamp load, max.	5 W	5 W
Controlling a digital input	Yes	Yes
Output voltage		
• for signal "1", min.	L+ (-0.8 V)	L+ (-0.8 V)
Output current		
• for signal "1" rated value	500 mA	500 mA
• for signal "1" permissible range, min.	5 mA	5 mA
• for signal "1" permissible range, max.	0.6 A	0.6 A
• for signal "1" minimum load current	5 mA	5 mA
• for signal "0" residual current, max.	0.5 mA	0.5 mA
Parallel switching of 2 outputs		
• for increased power	No	No
• for redundant control of a load	Yes	Yes
Switching frequency		
• with resistive load, max.	100 Hz	100 Hz
• with inductive load, max.	0.5 Hz	0.5 Hz
• on lamp load, max.	100 Hz	100 Hz
• of the pulse outputs, with resistive load, max.	2.5 kHz	2.5 kHz
Aggregate current of the outputs (per group)		
• vertical installation		
- up to 40 °C, max.	2 A	2 A
• horizontal installation		
- up to 40 °C, max.	3 A	3 A
Load impedance range		
• lower limit	48 Ω	48 Ω
• upper limit	4 kΩ	4 kΩ

Technical specifications (continued)

	6ES7 635-2EC02-0AE3	6ES7 635-2EB02-0AE3
Analog inputs		
Number of analog inputs for voltage/current measurement	4	4
Number of analog inputs for resistance/temperature measurement	1	1
Cable length, shielded, max.	100 m	100 m
permissible input frequency for voltage input (destruction limit), max.	30 V; permanent	30 V; permanent
permissible input frequency for current input (destruction limit), max.	2.5 V; permanent	2.5 V; permanent
permissible input current for voltage input (destruction limit), max.	0.5 mA; permanent	0.5 mA; permanent
permissible input current for current input (destruction limit), max.	50 mA; permanent	50 mA; permanent
technical unit for temperature measurement, adjustable	Yes; Degrees Celsius / degrees Fahrenheit / Kelvin	Yes; Degrees Celsius / degrees Fahrenheit / Kelvin
Input ranges (rated values), voltages		
• 0 to +10 V	Yes	Yes
• -10 V to +10 V	Yes	Yes
Input ranges (rated values), currents		
• 0 to 20 mA	Yes	Yes
• -20 to +20 mA	Yes	Yes
• 4 to 20 mA	Yes	Yes
Input ranges (rated values), resistors		
• No-Load voltage, typ.	2.5 V	2.5 V
• Measured current, typ.	1.8 mA to 3.3 mA	1.8 mA to 3.3 mA
• 0 to 600 Ohm	Yes	Yes
Input ranges (rated values), resistance thermometers		
• Pt 100	Yes	Yes
Characteristic linearization		
• programmable	Yes; by software	Yes; by software
• for thermoresistor	Pt 100	Pt 100
Temperature compensation		
• programmable	No	No

	6ES7 635-2EC02-0AE3	6ES7 635-2EB02-0AE3
Analog outputs		
Number of analog outputs	2	2
Cable length, shielded, max.	200 m	200 m
Voltage output, Short-circuit protection	Yes	Yes
Voltage output, short-circuit current, max.	55 mA	55 mA
Current output, no-load voltage, max.	17 V	17 V
Output ranges, voltage		
• 0 to 10 V	Yes	Yes
• -10 to +10 V	Yes	Yes
Output ranges, current		
• 0 to 20 mA	Yes	Yes
• -20 to +20 mA	Yes	Yes
• 4 to 20 mA	Yes	Yes
Connection of actuators		
• for voltage output 2-conductor connection	Yes; without compensation of the line resistances	Yes; without compensation of the line resistances
• for voltage output 4-conductor connection	No	No
• for current output 2-conductor connection	Yes	Yes
Load impedance (in rated range of output)		
• with voltage outputs, min.	1 kΩ	1 kΩ
• with voltage outputs, capacitive load, max.	0.1 µF	0.1 µF
• with current outputs, max.	300 Ω	300 Ω
• with current outputs, inductive load, max.	0.1 mH	0.1 mH
Destruction limits against externally applied voltages and currents		
• Voltages at the outputs towards MANA	16 V; permanent	16 V; permanent
• Current, max.	50 mA; permanent	50 mA; permanent

Technical specifications (continued)

	6ES7 635-2EC02-0AE3	6ES7 635-2EB02-0AE3
Analog value creation		
Measurement principle	Actual value encryption (successive approximation)	Actual value encryption (successive approximation)
Integrations and conversion time/resolutionper channel		
• Resolution with overload area (bit including sign), max.	12 Bit	12 Bit
• Integration time, parameterizable	Yes; 2.5 / 16.6 / 20 ms	Yes; 2.5 / 16.6 / 20 ms
• permissible input frequency, max.	400 Hz	400 Hz
• Conversion time (per channel)	1 ms	1 ms
• Time constant of the input filter	0.38 ms	0.38 ms
• Basic execution time of the module (all channels released)	1 ms	1 ms
Settling time		
• for resistive load	0.6 ms	0.6 ms
• for capacitive load	1 ms	1 ms
• for inductive load	0.5 ms	0.5 ms
Encoder		
Connection of signal encoders		
• for voltage measurement	Yes	Yes
• for current measurement as 2-wire transducer	Yes; with external supply	Yes; with external supply
• for current measurement as 4-wire transducer	Yes	Yes
• for resistance measurement with 2-conductor connection	Yes; without compensation of the line resistances	Yes; without compensation of the line resistances
• for resistance measurement with 3-conductor connection	No	No
• for resistance measurement with 4-conductor connection	No	No
Connectable encoders		
• 2-wire BEROS	Yes	Yes
• permissible quiescent current (2-wire BEROS), max.	1.5 mA	1.5 mA
Errors/accuracies		
Operational limit in overall temperature range		
• Voltage, relative to output area	+/- 1 %	+/- 1 %
• Current, relative to output area	+/- 1 %	+/- 1 %
• Voltage, relative to input area	+/- 1 %	+/- 1 %
• Current, relative to input area	+/- 1 %	+/- 1 %
• Impedance, relative to input area	+/- 5 %	+/- 5 %

	6ES7 635-2EC02-0AE3	6ES7 635-2EB02-0AE3
Basic error limit (operational limit at 25 °C)		
• Voltage, relative to output area	+/- 0,7 %	+/- 0,7 %
• Current, relative to output area	+/- 0,7 %	+/- 0,7 %
• Voltage, relative to input area	+/- 0,7 %; Linearity error +/- 0.06%	+/- 0,7 %; Linearity error +/- 0.06%
• Current, relative to input area	+/- 0,7 %; Linearity error +/- 0.06%	+/- 0,7 %; Linearity error +/- 0.06%
• Impedance, relative to input area	+/- 3 %; Linearity error +/- 0.2%	+/- 3 %; Linearity error +/- 0.2%
• Resistance-type thermometer, relative to input area	+/- 3 %	+/- 3 %
Interference voltage suppression for f = n x (fl +/- 1 %), fl = interference frequency		
• Series mode interference (peak value of interference < rated value of input range), min.	30 dB	30 dB
• common mode voltage, min.	40 dB	40 dB
Integrated Functions		
Number of counters	4; see "Technological Functions" manual	4; see "Technological Functions" manual
Counter frequency (counter) max.	60 kHz	60 kHz
Frequency measurement	Yes	Yes
Number of frequency meters	4; up to 60 kHz (see "Technological Functions" manual)	4; up to 60 kHz (see "Technological Functions" manual)
controlled positioning	Yes	Yes
PID controller	Yes	Yes
Number of pulse outputs	4; Pulse width modulation up to 2.5 kHz (see "Technological Functions" Manual)	4; Pulse width modulation up to 2.5 kHz (see "Technological Functions" Manual)
Limit frequency (pulse)	2.5 kHz	2.5 kHz
Isolation		
Isolation checked with	500 V DC	500 V DC
Isolation		
Isolation, analog outputs		
• Galvanic isolation, analog outputs	Yes	Yes
• between the channels	No	No
• between the channels and the backplane bus	Yes	Yes

Technical specifications (continued)

	6ES7 635-2EC02-0AE3	6ES7 635-2EB02-0AE3
Isolation, analog inputs		
• Isolation, analog inputs	Yes	Yes
• between the channels	No	No
• between the channels and the backplane bus	Yes	Yes
Isolation, digital outputs		
• Galvanic isolation, digital outputs	Yes	Yes
• between the channels	Yes	Yes
• between the channels, in groups of	8	8
• between the channels and the backplane bus	Yes	Yes

	6ES7 635-2EC02-0AE3	6ES7 635-2EB02-0AE3
Galvanic isolation, digital inputs		
• galvanic isolation, digital inputs	Yes	Yes
• between the channels	No	No
• between the channels and the backplane bus	Yes	Yes
Permissible potential difference		
between different circuits	75 V DC/ 60 V AC	75 V DC/ 60 V AC
Dimensions and weight		
Width	120 mm	120 mm
Height	125 mm	125 mm
Depth	130 mm	130 mm
Weights		
Weight, approx.	676 g	676 g

C7-635

Ordering Data		Order No.
Compact control system C7-635 Key 96 KB RAM (PLC) 24 DI, 16 DO, 5 AI, 2 AO integrated; with integral operator panel: 512 KB Flash EPROM for HMI data, STN LC display, CCFL backlit (320 x 240 pixels); with mounting accessories	F)	**6ES7 635-2EC02-0AE3**
Compact control system C7-635 Touch 96 KB RAM (PLC) 24 DI, 16 DO, 5 AI, 2 AO integrated; with integral touch panel: 512 KB Flash EPROM for HMI data, STN LC display, CCFL backlit (320 x 240 pixels); with mounting accessories	F)	**6ES7 635-2EB02-0AE3**
Micro Memory Card essential for operation		
64 KB		**6ES7 953-8LF11-0AA0**
128 KB		**6ES7 953-8LG11-0AA0**
512 KB		**6ES7 953-8LJ11-0AA0**
2 MB		**6ES7 953-8LL11-0AA0**
4 MB		**6ES7 953-8LM11-0AA0**
8 MB		**6ES7 953-8LP11-0AA0**
Connector set For I/O and power supply; essential for operation		
with screw terminals		**6ES7 635-0AA00-4AA0**
with spring-loaded clamps		**6ES7 635-0AA00-4BA0**
CF card, 16 MB		**6AV6 574-2AC00-2AA0**
Manual pack for C7-635 C7-635 manual, S7-300 manual and OP 170B equipment manual		
German		**6ES7 635-1EA00-8AA0**
English		**6ES7 635-1EA00-8BA0**
French		**6ES7 635-1EA00-8CA0**
Spanish		**6ES7 635-1EA00-8DA0**
Italian		**6ES7 635-1EA00-8EA0**
C7-635 manual		
German		**6ES7 635-1AA00-8AA0**
English		**6ES7 635-1AA00-8BA0**
French		**6ES7 635-1AA00-8CA0**
Spanish		**6ES7 635-1AA00-8DA0**
Italian		**6ES7 635-1AA00-8EA0**

		Order No.
Accessories		
I/O set For expanding the C7-613/ C7-635/C7-636 with max. 4 modules; mounted on rear of device		
For 2 modules, flat mounting		**6ES7 635-0AA00-6AA0**
For 4 modules, deep mounting		**6ES7 635-0AA00-6BA0**
I/O expansion cable For external expansion of SIMATIC C7-613/-635/-636 by max. 4 modules; 1.5 m in length		**6ES7 635-0AA00-6CA0**
SIMATIC Manual Collection Electronic manuals on DVD, multilingual	D)	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year Current S7 Manual Collection DVD and the three subsequent updates	D)	**6ES7 998-8XC01-8YE2**
Protective foil To protect the touch screen against dirt and scratches; 10 items in packet; for SIMATIC C7-635 Touch		**6AV6 574-1AD00-4DX0**
Spare parts		
Service pack 3 seals, 10 holders and label strips for all SIMATIC C7-613, C7-635 Key, C7-635 Touch and C7-636 Key		**6ES7 635-0AA00-3AA0**
Grounding bar with shield terminals for analog I/O		**6ES7 635-0AA00-6EA0**

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

F) Subject to export regulations: AL: N and ECCN: 5D002ENC3

Overview

- Compact units for comprehensive applications
- The CPU with medium to large program memory and quantity framework for the use, if required, of SIMATIC Engineering Tools
- High processing performance in binary and floating-point arithmetic
- C7-636 Key: Pixel graphics 5.7" STN display, color (256 colors), with 36 system keys, 24 user-configurable function keys which can be labeled as required (18 with a LED)
- C7-636 Touch: Pixel graphics 10“ STN display, color (256 colors) with context-sensitive touch capability
- With integral I/O for use at machine level
- With integral PROFIBUS DP connection for distributed structures
- Graphical and color visualization and operator support for particularly user-friendly use

For operation of the C7, a micro memory card and connector set are necessary.

Technical specifications

	6ES7 636-2EC00-0AE3	6ES7 636-2EB00-0AE3
Supply voltages		
Rated value		
• DC 24 V	Yes	Yes
• permissible range, lower limit (DC)	20.4 V	20.4 V
• permissible range, upper limit (DC)	28.8 V	28.8 V
Current consumption		
Inrush current, max.	3 A; 3 A for 10 ms, then 2 A for 70 ms	3 A; 3 A for 10 ms, then 2 A for 70 ms
Current consumption, max.	1.3 A	1.5 A
Current consumption, typ.	450 mA	650 mA
Digital inputs		
• from load voltage L+ (without load), max.		70 mA
Digital outputs		
• from load voltage L+, max.		20 mA; per group
Power loss, typ.	19 W	24 W
Backup battery		
• Backup battery (optional)	Yes	Yes
Memory		
Memory		
• Micro Memory Card	Yes	Yes
• RAM		
- integrated	128 KByte	128 KByte
- expandable	No	No
• Load memory		
- pluggable (MMC)	Yes	Yes
- pluggable (MMC), max.	8 MByte	8 MByte
• User memory		
- integrated	2 MByte; (Flash) for configuration of the panel	2 MByte; (Flash) for configuration of the panel

	6ES7 636-2EC00-0AE3	6ES7 636-2EB00-0AE3
Backup		
• present	Yes; Guaranteed by MMC (maintenance-free)	Yes; Guaranteed by MMC (maintenance-free)
• with battery	Yes; Option for the panel	Yes; Option for the panel
• without battery	Yes; Program and data of the CPU	Yes; Program and data of the CPU
CPU/blocks		
DB		
• Number, max.	1,023; DB 0 reserved	1,023; DB 0 reserved
• Size, max.	16 KByte	16 KByte
FB		
• Number, max.	2,048; See Operation List	2,048; See Operation List
• Size, max.	16 KByte	16 KByte
FC		
• Number, max.	2.048; See Operation List	2,048; See Operation List
• Size, max.	16 KByte	16 KByte
OB		
• Size, max.	16 KByte	16 KByte
Nesting depth		
• per priority class	8	8
• additional within an error OB	4	4
CPU/processing times		
for bit operations, min.	0.1 µs	0.1 µs
for word operations, min.	0.2 µs	0.2 µs
for fixed point arithmetic, min.	2 µs	2 µs
for floating point arithmetic, min.	3 µs	3 µs

Technical specifications (continued)

	6ES7 636-2EC00-0AE3	6ES7 636-2EB00-0AE3
Times/counters and their remanence		
S7 counter		
• Number	256	256
• of which remanent without battery		
- adjustable	Yes	Yes
- lower limit	0	0
- upper limit	256	256
• Remanence		
- adjustable	Yes	Yes
- preset	Z 0 to Z 7	Z 0 to Z 7
• Counting range		
- lower limit	0	0
- upper limit	999	999
IEC counter		
• present	Yes	Yes
• Type	SFB	SFB
S7 times		
• Number	256	256
• of which remanent without battery		
- adjustable	Yes; Default: no retentivity	Yes; Default: no retentivity
- lower limit	0	0
- upper limit	256	256
• Remanence		
- adjustable	Yes	Yes
- preset	No retentivity	No retentivity
• Time range		
- lower limit	10 ms	10 ms
- upper limit	9,990 s	9,990 s
IEC timer		
• present	Yes	Yes
• Type	SFB	SFB
Data areas and their remanence		
Flag		
• Number, max.	2,048 Byte	2,048 Byte
• Remanence available	Yes; MB 0 to MB 255	Yes; MB 0 to MB 255
• Remanence preset	MB 0 to MB 15	MB 0 to MB 15
• Number of clock memories	8; 1 memory byte	8; 1 memory byte
Data blocks		
• Number, max.	1.023	1.023
• Size, max.	16 KByte	16 KByte
Local data		
• per priority class, max.	1,024 Byte; max. 510 bytes per block	1,024 Byte; max. 510 bytes per block

	6ES7 636-2EC00-0AE3	6ES7 636-2EB00-0AE3
Address area		
I/O address area		
• Inputs	2 KByte	2 KByte
• Outputs	2 KByte	2 KByte
Process image		
• Inputs	128 Byte	128 Byte
• Outputs	128 Byte	128 Byte
Digital channels		
• integrated channels (DI)	24	24
• integrated channels (DO)	16	16
• Inputs	16,384	16,384
• Outputs	16,384	16,384
• Inputs, of which central	992	992
• Outputs, of which central	992	992
Analog channels		
• Number of integrated channels (AI)	4; + 1 AI	4; + 1 AI
• Number of integrated channels (AO)	2	2
• Inputs	1,024	1,024
• Outputs	1,024	1,024
• Inputs, of which central	248	248
• Outputs, of which central	248	248
Hardware config.		
Number of modules per system, max.	23	23
Racks, max.	4	4
Modules per rack, max.	8; Modules in subrack 0: max. 4; Modules in subracks 1 and 2: max. 8; Modules in subrack 3: max. 7	8; Modules in subrack 0: max. 4; Modules in subracks 1 and 2: max. 8; Modules in subrack 3: max. 7
Rack, number of rows, max.	4	4
Number of DP masters		
• integrated	1	1
• via CP	1	1
Number of operable FMs and CPs (recommended)		
• FM	8	8
• CP, point-to-point	8	8
• CP, LAN	10	10
Expansion modules		
• Number of expansion modules, max.	4; max. 2 flat structure, max. 4 deep structure	4; max. 2 flat arrangement, max. 4 deep arrangement, max. 23 via IM

Technical specifications (continued)

	6ES7 636-2EC00-0AE3	6ES7 636-2EB00-0AE3
Time		
Clock		
• Hardware clock (real-time clock)	Yes	Yes
• Battery backed and synchronized	Yes	Yes
• Backup time	6 w; at 40 °C ambient temperature	6 w; at 40 °C ambient temperature
• Deviation per day, max.	10 s	10 s
Operating hours counter		
• Number	1	1
• Number/Number range	0	0
• Range of values	0 to 2^31 hours (when using SFC101)	0 to 2^31 hours (when using SFC101)
• Granularity	1 hour	1 hour
• remanent	Yes; must be restarted at each warm restart	Yes; must be restarted at each warm restart
Clock synchronization		
• supports	Yes	Yes
• to MPI, Master	Yes	Yes
• to MPI, Slave	Yes	Yes
• in AS, Master	Yes	Yes
S7 message functions		
Number of login stations for message functions, max.	16	16
Process diagnostic messages	Yes	Yes
simultaneously active Alarm-S blocks, max.	40	40
Test commissioning functions		
Status/control		
• Status/control variable	Yes	Yes
• Variables	Inputs, outputs, memory bits, DB, times, counters	Inputs, outputs, memory bits, DB, times, counters
Monitoring functions		
• Number of variables, max.	30	30
• of which status variable, max.	30	30
• of which control variable, max.	14	14
Forcing		
• Forcing	Yes	Yes
• Force, variables	Inputs, outputs	Inputs, outputs
• Forcing, number of variables, max.	10	10
Status block	Yes	Yes
Single step	Yes	Yes
Number of breakpoints	2	2

	6ES7 636-2EC00-0AE3	6ES7 636-2EB00-0AE3
Diagnostic buffer		
• present	Yes	Yes
• Number of entries, max.	100	100
• adjustable	No	No
Communication functions		
PG/OP communication	Yes	Yes
Global data communication		
• supported	Yes	Yes
• Number of GD packets, max.	8	8
• Number of GD packets, transmitter, max.	8	8
• Number of GD packets, receiver, max.	8	8
• Size of GD packets, max.	22 Byte	22 Byte
• Size of GD packet (of which consistent), max.	22 Byte	22 Byte
S7 basic communication		
• supported	Yes	Yes
• Useful data per job, max.	76 Byte	76 Byte
• Useful data per job (of which consistent) max.	76 Byte; 76 bytes (for X_SEND or X_RCV); 64 bytes (for X_PUT or X_GET as server)	76 Byte; 76 bytes (for X_SEND or X_RCV); 64 bytes (for X_PUT or X_GET as server)
S7 communication		
• supported	Yes	Yes
• as server	Yes	Yes
• as client	Yes; via CP and loadable FB	Yes; via CP and loadable FB
• Useful data per job, max.	180 Byte; at PUT/GET	180 Byte; at PUT/GET
• Useful data per job, of which consistent, max.	64 Byte	64 Byte
S5-compatible communication		
• supported	Yes; via CP and loadable FC	Yes; via CP and loadable FC
Standard communication (FMS)		
• supported	No	No
Number of connections		
• overall	16	16
• usable for PG communication	15	15
• reserved for PG communication	1	1
• adjustable for PG communication, min.	1	1
• adjustable for PG communication, max.	15	15
• usable for OP communication	15	15
• reserved for OP communication	1	1

Technical specifications (continued)

	6ES7 636-2EC00-0AE3	6ES7 636-2EB00-0AE3
Number of connections		
• adjustable for OP communication, min.	1	1
• adjustable for OP communication, max.	15	15
• usable for S7 basic communication	12	12
• reserved for S7-Basic communication	12	12
• adjustable for S7-Basic communication, min.	0	0
• adjustable for S7-Basic communication, max.	12	12
Interfaces		
Number of printer interfaces	1; serial	1; serial, USB for panel
1st interface		
Type of interface	Integral RS 485 interface	Integral RS 485 interface
Physics	RS 485	RS 485
isolated	No	No
Power supply to interface (15 to 30 V DC), max.	200 mA	200 mA
Functionality		
• MPI	Yes	Yes
• DP master	No	No
• DP slave	No	No
MPI		
• Number of connections	16	16
• Services		
- PG/OP communication	Yes	Yes
- Routing	Yes	Yes
- Global data communication	Yes	Yes
- S7 basic communication	Yes	Yes
- S7 communication	Yes	Yes
- S7 communication, as client	Yes; via CP and loadable FB	Yes; via CP and loadable FB
- S7 communication, as server	Yes	Yes
• Transmission speeds, max.	187.5 kBit/s	187.5 kBit/s
2nd interface		
Type of interface	Integral RS 485 interface	Integral RS 485 interface
Physics	RS 485	RS 485
isolated	Yes	Yes
Power supply to interface (15 to 30 V DC), max.	200 mA	200 mA
Number of connection resources	16	16

	6ES7 636-2EC00-0AE3	6ES7 636-2EB00-0AE3
Functionality		
• MPI	No	No
• DP master	Yes	Yes
• DP slave	Yes	Yes
DP master		
• Number of connections, max.	16; for PG/OP communication	16; for PG/OP communication
• Number of connections (of which reserved), max.	1 for PG, 1 for OP	1 for PG, 1 for OP
• Services		
- PG/OP communication	Yes	Yes
- Routing	Yes	Yes
- Global data communication	No	No
- S7 basic communication	No	No
- S7 communication	No	No
- S7 communication, as client	No	No
- S7 communication, as server	No	No
- equidistance support	Yes	Yes
- SYNC/FREEZE	Yes	Yes
- Activation/deactivation of DP slaves	Yes	Yes
- direct data exchange (cross traffic)	Yes	Yes
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s
• Number of DP slaves, max.	125	125
• Address area		
- Inputs, max.	244 Byte	244 Byte
- Outputs, max.	244 Byte	244 Byte
DP slave		
• Number of connections	16	16
• Services		
- PG/OP communication	Yes	Yes
- Routing	Yes	Yes
- Global data communication	No	No
- S7 basic communication	No	No
- S7 communication	No	No
- direct data exchange (cross traffic)	Yes	Yes
- DPV1		Yes
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s
• Transfer memory		
- Inputs	244 Byte	244 Byte
- Outputs	244 Byte	244 Byte
• Address area, max.	32	32
• Useful data per address area, max.	32 Byte	32 Byte

Technical specifications (continued)

	6ES7 636-2EC00-0AE3	6ES7 636-2EB00-0AE3
CPU/programming		
Configuration software		
• STEP 7	Yes; as of V5.2 SP1 and HSP	Yes; as of V5.2 SP1 and HSP
• ProTool	Yes; Version 6.0 SP2 or higher and Setup C7-636	Yes; as of version 6.0 SP3 and setup C7-636
• ProTool/Lite	Yes; Version 6.0 SP2 or higher and Setup C7-636	Yes; as of version 6.0 SP3 and setup C7-636
• ProTool/Pro	Yes; Version 6.0 SP2 or higher and Setup C7-636	Yes; as of version 6.0 SP3 and setup C7-636
• WinCC flexible Compact	Yes	Yes
• WinCC flexible Standard	Yes	Yes
• WinCC flexible Advanced	Yes	Yes
Programming language		
• LAD	Yes	Yes
• FUP	Yes	Yes
• AWL	Yes	Yes
• SCL	Yes	Yes
• CFC	Yes	Yes
• GRAPH	Yes	Yes
• HiGraph	Yes	Yes
Software libraries		
Operational stocks	see Instruction List	see Instruction List
Nesting levels	8	8
User program protection/password protection	Yes	Yes
System functions (SFC)	see Instruction List	see Instruction List
System function blocks (SFB)	see Instruction List	see Instruction List
Integrated inputs/outputs		
Default addresses of the integrated channels	124.0 to 126.7	124.0 to 126.7
• Digital inputs	124.0 to 125.7	124.0 to 125.7
• Digital outputs	752	752
• Analog inputs	761	761

	6ES7 636-2EC00-0AE3	6ES7 636-2EB00-0AE3
Digital inputs		
Number of digital inputs	24	24
• of which, inputs usable for technological functions	16	16
Number of simultaneously controllable inputs		
• vertical installation - up to 40 °C, max.	18	18
• horizontal installation - up to 40 °C, max.	12	12
Cable length		
• Cable length, shielded, max.	1,000 m; 100 m for technological functions	1,000 m; 100 m for technological functions
• Cable length unshielded, max.	600 m	600 m
• Technological functions - shielded, max.	50 m; at maximum count frequency	50 m; at maximum count frequency
• Standard-DI - schielded, max.	1,000 m	1,000 m
- unshielded, max.	600 m	600 m
Input characteristic curve to IEC 1131, type 1	Yes	Yes
Input voltage		
• Rated value, DC	24 V	24 V
• for signal "0"	-3 to 5 V	-3 to 5 V
• for signal "1"	15 to 30 V	15 to 30 V
Input current		
• for signal "1", typ.	7 mA	7 mA
Input delay (for rated value of input voltage)		
• for standard inputs - programmable	Yes; 0.1 / 0.3 / 3 / 15 ms	Yes; 0.1 / 0.3 / 3 / 15 ms
- Rated value	3 ms	3 ms
• for counter/technological functions - at "0" to "1", max.	8 µs	8 µs

Technical specifications (continued)

	6ES7 636-2EC00-0AE3	6ES7 636-2EB00-0AE3
Digital outputs		
Number of digital outputs	16	16
• of which, high-speed outputs	4	4
Cable length, shielded, max.	1,000 m	1,000 m
Cable length unshielded, max.	600 m	600 m
Short-circuit protection of the output	Yes; clocked electronically	Yes; clocked electronically
• Response threshold, typ.	1 A	1 A
Limitation of inductive shutdown voltage to	L+ (-48 V)	L+ (-48 V)
Lamp load, max.	5 W	5 W
Controlling a digital input	Yes	Yes
Output voltage		
• for signal "1", min.	L+ (-0.8 V)	L+ (-0.8 V)
Output current		
• for signal "1" rated value	0.5 A	0.5 A
• for signal "1" permissible range, min.	5 mA	5 mA
• for signal "1" permissible range, max.	0.6 A	0.6 A
• for signal "1" permissible range for 0 to 40 °C, max.	0.5 A	0.5 A
• for signal "1" permissible range for 40 to 60 °C, max.	0.5 A; up to max. 50°C	0.5 A; up to max. 50°C
• for signal "1" minimum load current	5 mA	5 mA
• for signal "0" residual current, max.	0.5 mA	0.5 mA
Parallel switching of 2 outputs		
• for increased power	No	No
• for redundant control of a load	Yes	Yes
Switching frequency		
• with resistive load, max.	100 Hz	100 Hz
• with inductive load, max.	0.5 Hz	0.5 Hz
• on lamp load, max.	100 Hz	100 Hz
• of the pulse outputs, with resistive load, max.	2.5 kHz	2.5 kHz
Aggregate current of the outputs (per group)		
• vertical installation - up to 40 °C, max.	3 A	3 A
• horizontal installation - up to 40 °C, max.	2 A	2 A
• up to 40 °C, max.	3 A	3 A
• up to 60 °C, max.	2 A; up to max. 50°C	2 A; up to max. 50°C

	6ES7 636-2EC00-0AE3	6ES7 636-2EB00-0AE3
Load impedance range		
• lower limit	48 Ω	48 Ω
• upper limit	4 kΩ	4 kΩ
Analog inputs		
Number of analog inputs	4	4
Number of analog inputs for voltage/current measurement	4	4
Number of analog inputs for resistance/temperature measurement	1	1
Cable length, shielded, max.	100 m	100 m
permissible input frequency for voltage input (destruction limit), max.	30 V; permanent	30 V; permanent
permissible input frequency for current input (destruction limit), max.	2.5 V; max. 2.5 V permanent; max. 24 V for short time	2.5 V; max. 2.5 V permanent; max. 24 V for short time
permissible input current for voltage input (destruction limit), max.	0.5 mA; permanent	0.5 mA; permanent
permissible input current for current input (destruction limit), max.	50 mA; permanent	50 mA; permanent
technical unit for temperature measurement, adjustable	Yes; Degrees Celsius / degrees Fahrenheit / Kelvin	Yes; Degrees Celsius / degrees Fahrenheit / Kelvin
Input ranges (rated values), voltages		
• 0 to +10 V	Yes	Yes
• -10 V to +10 V	Yes	Yes
Input ranges (rated values), currents		
• 0 to 20 mA	Yes	Yes
• -20 to +20 mA	Yes	Yes
• 4 to 20 mA	Yes	Yes
Input ranges (rated values), resistors		
• Nol-load voltage, typ.	2.5 V	2.5 V
• Measured current, typ.	1.8 mA to 3.3 mA	1.8 mA to 3.3 mA
• 0 to 600 Ohm	Yes	Yes
Input ranges (rated values), resistance thermometers		
• Pt 100	Yes	Yes
Characteristic linearization		
• programmable	Yes; by software	Yes; by software
• for thermoresistor	Pt 100	Pt 100
Temperature compensation		
• programmable	No	No

Technical specifications (continued)

	6ES7 636-2EC00-0AE3	6ES7 636-2EB00-0AE3
Analog outputs		
Number of analog outputs	2	2
Cable length, shielded, max.	200 m	200 m
Voltage output, short-circuit protection	Yes	Yes
Voltage output, short-circuit current, max.	55 mA	55 mA
Current output, no-load voltage, max.	17 V	17 V
Output ranges, voltage		
• 0 to 10 V	Yes	Yes
• -10 to +10 V	Yes	Yes
Output ranges, current		
• 0 to 20 mA	Yes	Yes
• -20 to +20 mA	Yes	Yes
• 4 to 20 mA	Yes	Yes
Connection of actuators		
• for voltage output 2-conductor connection	Yes; without compensation of the line resistances	Yes; without compensation of the line resistances
• for voltage output 4-conductor connection	No	No
• for current output 2-conductor connection	Yes	Yes
Load impedance (in rated range of output)		
• with voltage outputs, min.	1 kΩ	1 kΩ
• with voltage outputs, capacitive load, max.	0.1 µF	0.1 µF
• with current outputs, max.	300 Ω	300 Ω
• with current outputs, inductive load, max.	0.1 mH	0.1 mH
Destruction limits against externally applied voltages and currents		
• Voltages at the outputs towards MANA	16 V; permanent	16 V; permanent
• Current, max.	50 mA; permanent	50 mA; permanent

	6ES7 636-2EC00-0AE3	6ES7 636-2EB00-0AE3
Analog value creation		
Measurement principle	Measurement principle momentary value encoding (successive approximation)	Measurement principle momentary value encoding (successive approximation)
Integrations and conversion time/resolutionper channel		
• Resolution with overload area (bit including sign), max.	12 Bit	12 Bit
• Integration time, parameterizable	Yes; 2.5 / 16.6 / 20 ms	Yes; 2.5 / 16.6 / 20 ms
• permissible input frequency, max.	400 Hz	400 Hz
• Conversion time (per channel)	1 ms	1 ms
• Time constant of the input filter	0.38 ms	0.38 ms
• Basic execution time of the module (all channels released)	1 ms	1 ms
Settling time		
• for resistive load	0.6 ms	0.6 ms
• for capacitive load	1 ms	1 ms
• for inductive load	0.5 ms	0.5 ms
Encoder		
Connectable encoders		
• 2-wire BEROS	Yes	Yes
• permissible quiescent current (2-wire BEROS), max.	1.5 mA	1.5 mA
Errors/accuracies		
Operational limit in overall temperature range		
• Voltage, relative to output area	+/- 1 %	+/- 1 %
• Current, relative to output area	+/- 1 %	+/- 1 %
• Voltage, relative to input area	+/- 1 %	+/- 1 %
• Current, relative to input area	+/- 1 %	+/- 1 %
• Impedance, relative to input area	+/- 5 %	+/- 5 %

Technical specifications (continued)

	6ES7 636-2EC00-0AE3	6ES7 636-2EB00-0AE3
Basic error limit (operational limit at 25 °C)		
• Voltage, relative to output area	+/- 0.7 %	+/- 0.7 %
• Current, relative to output area	+/- 0.7 %	+/- 0.7 %
• Voltage, relative to input area	+/- 0.7 %	+/- 0.7 %
• Current, relative to input area	+/- 0.7 %	+/- 0.7 %
• Impedance, relative to input area	+/- 3 %	+/- 3 %
• Resistance-type thermometer, relative to input area	+/- 3 %	+/- 3 %
Interference voltage suppression for f = n x (fl +/- 1 %), fl = interference frequency		
• Series mode interference (peak value of interference < rated value of input range), min.	30 dB	30 dB
• common mode voltage, min.	40 dB	40 dB
Integrated Functions		
Number of counters	4; 4 channels in total	4; 4 channels in total
Counter frequency (counter) max.	60 kHz	60 kHz
Frequency meter	Yes	Yes
Frequency measurement	Yes	Yes
Number of frequency meters	4; 4 channels in total	4; 4 channels in total
controlled positioning	Yes	Yes
integrated function blocks (closed-loop control)	Yes	Yes
PID controller	Yes	Yes
Pulse outputs	Yes	Yes
Number of pulse outputs	4; 4 channels in total	4; 4 channels in total
Limit frequency (pulse)	2.5 kHz	2.5 kHz
Status information/ alarms/diagnostics		
Alarms		
• Alarms	Yes; - No interrupts when used as standard I/O. ; - When using the technological functions; see the S7-300 Automation System manual,; CPU31xC Technological Functions.	Yes; No interrupts when used as standard I/O. ; - When using the technological functions; see the S7-300 Automation System manual,; CPU31xC Technological Functions.
Diagnoses		
• Diagnostic functions	No; - No diagnostics when using as standard I/O; - When using the technological functions; see the S7-300 Automation System manual,; CPU31xC Technological Functions.	No; - No diagnostics when using as standard I/O; - When using the technological functions; see the S7-300 Automation System manual,; CPU31xC Technological Functions.
Operator control and monitoring		
Process images	Yes	Yes
Graphics object	Yes	Yes
Text elements	Yes	Yes
Info texts	Yes	Yes
Messages	Yes; Fault messages, operating messages	Yes; Fault messages, operating messages
Number of process images	300	300
Number of variables per image, max.	200	200
Number of variables in message text, max.	8	8
Password protection	Yes	Yes
Password levels	10	10
Keyboard		
• Type	Membrane keyboard	Touch
• Number of function keys	24; 18 with LED	
• Number of softkeys	14	
Display		
• Type	CSTN, CCFL backlit, 5.7" color (256 colors)	CSTN, CCFL backlit, 10.4" color (256 colors)
• Backlighting MTBF (at 20 °C)	40,000 h	60,000 h
Resolution (pixels)		
• Width	320	640
• Height	240	480
Operating/fault messages		
• Operating messages	Yes	Yes
• Fault messages	Yes	Yes
Recipes		
• Number of recipes, max.	300	300
• Data records per recipe, max.	500	500
• Entries per data record, max.	1,000	1,000

Technical specifications (continued)

	6ES7 636-2EC00-0AE3	6ES7 636-2EB00-0AE3
Isolation		
Isolation checked with	500 V DC	500 V DC
Isolation		
Isolation, analog outputs		
• Galvanic isolation, analog outputs	Yes	Yes
• between the channels	No	No
• between the channels and the backplane bus	Yes	Yes
Isolation, analog inputs		
• Isolation, analog inputs	Yes	Yes
• between the channels	No	No
• between the channels and the backplane bus	Yes	Yes
Isolation, digital outputs		
• Galvanic isolation, digital outputs	Yes	Yes
• between the channels	Yes	Yes
• between the channels, in groups of	8	8
• between the channels and the backplane bus	Yes	Yes
Galvanic isolation, digital inputs		
• galvanic isolation, digital inputs	Yes	Yes
• between the channels	No	No
• between the channels and the backplane bus	Yes	Yes
Permissible potential difference		
between different circuits	75 V DC/ 60 V AC	75 V DC/ 60 V AC
Environmental requirements		
Environmental conditions	Not suitable for open-air use	Not suitable for open-air use

	6ES7 636-2EC00-0AE3	6ES7 636-2EB00-0AE3
Operating termperature		
• 45 degree installation, min.	0 °C	0 °C
• 45 degree installation, max.	45 °C	45 °C
• vertical installation, min.	0 °C	0 °C
• vertical installation, max.	50 °C	50 °C
• horizontal installation, min.	0 °C	0 °C
• horizontal installation, max.	40 °C	40 °C
Air pressure		
• Operation, min.	795 hPa	795 hPa
• Operation, max.	1,080 hPa	1,080 hPa
• Storage/transport, min.	660 hPa	660 hPa
• Storage/transport, max.	1,080 hPa	1,080 hPa
• permissible range, min.	795 hPa	795 hPa
• permissible range, max.	1,080 hPa	1,080 hPa
Relative humidity		
• Operation, min.	5%	5%
• Operation, max.	85%; at <40 °C (no condensation)	85%; at <40 °C (no condensation)
• Storage/transport, max.	85%; at <40 °C (no condensation)	85%; at <40 °C (no condensation)
Degree and class of protection		
• IP 20	Yes; Housing	Yes; Housing
• IP 65	Yes; Front	Yes; Front
Operating systems		
Operating system		
• Windows CE	Yes	Yes
Online languages		
Number	5	5
Dimensions and weight		
Width	260 mm	335 mm
Height	274 mm	275 mm
Depth	80 mm	100 mm
Mounting cutout, width	231 mm; Tolerance: +1 mm	310 mm; Tolerance: +1 mm
Mounting cutout, height	257 mm; Tolerance: +1 mm	248 mm; Tolerance: +1 mm
Weights		
Weight, approx.	1,750 g	3,980 g

C7-636

Ordering Data		Order No.
Compact control system C7-636 Key 128 KB RAM (PLC) 24 DI, 16 DO, 5 AI, 2 AO integrated; with integral operator panel: 2048 KB Flash EPROM for HMI data, STN LC display, CCFL backlit (320 x 240 pixels); with mounting accessories	F)	**6ES7 636-2EC00-0AE3**
Compact control system C7-636 Touch 128 KB RAM (PLC) 24 DI, 16 DO, 5 AI, 2 AO integrated; with integral touch panel: 2048 KB Flash EPROM for HMI data, 10" STN color display (640 x 480 pixels); with analog resistive touch; with mounting accessories	F)	**6ES7 636-2EB00-0AE3**
Micro Memory Card		
essential for operation		
64 KB		**6ES7 953-8LF11-0AA0**
128 KB		**6ES7 953-8LG11-0AA0**
512 KB		**6ES7 953-8LJ11-0AA0**
2 MB		**6ES7 953-8LL11-0AA0**
4 MB		**6ES7 953-8LM11-0AA0**
8 MB		**6ES7 953-8LP11-0AA0**
Connector set		
For I/O and power supply; essential for operation		
with screw terminals		**6ES7 635-0AA00-4AA0**
with spring clamps		**6ES7 635-0AA00-4BA0**
CF card, 16 MB		**6AV6 574-2AC00-2AA0**
Manual pack for C7-636		
C7-636 manual, S7-300 documentation pack and OP 270B equipment manual		
German		**6ES7 636-1EA00-8AA0**
English		**6ES7 636-1EA00-8BA0**
French		**6ES7 636-1EA00-8CA0**
Spanish		**6ES7 636-1EA00-8DA0**
Italian		**6ES7 636-1EA00-8EA0**

	Order No.
C7-636 manual	
German	**6ES7 636-1AA00-8AA0**
English	**6ES7 636-1AA00-8BA0**
French	**6ES7 636-1AA00-8CA0**
Spanish	**6ES7 636-1AA00-8DA0**
Italian	**6ES7 636-1AA00-8EA0**
Accessories	
I/O set For expanding the C7-613/ C7-635/C7-636 with max. 4 modules; mounted on rear of device	
For 2 modules, flat mounting	**6ES7 635-0AA00-6AA0**
For 4 modules, deep mounting	**6ES7 635-0AA00-6BA0**
I/O expansion cable For external expansion of SIMATIC C7-613/-635/-636 by max. 4 modules; 1.5 m in length	**6ES7 635-0AA00-6CA0**
SIMATIC Manual Collection D) Electronic manuals on DVD, multilingual	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year D) Current "S7 Manual Collection" DVD and the three subsequent updates	**6ES7 998-8XC01-8YE2**
Protective film To protect the touch screen against dirt and scratches; 10 items in packet; for SIMATIC C7-636 Touch	**6AV6 574 1AD00-4CX0**
Replacement parts	
Service pack 3 seals, 10 holders and label strips for all SIMATIC C7-613, C7-635 Key, C7-635 Touch and C7-636 Key	**6ES7 635-0AA00-3AA0**
Service pack Seal, 10 holders, or SIMATIC C7-636 Touch	**6AV6 574-1AA00-2CX0**
Grounding bar with shield terminals for analog I/O	**6ES7 635-0AA00-6EA0**

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

F) Subject to export regulations: AL: N and ECCN: 5D002ENC3

Customer-specific design

Overview

- Custom design for the SIMATIC C7
- Free choice of company logo, selectable color specifications for the unit front panel and keyboard labeling
- For control systems to be integrated into customers' plants

Ordering Data

	Order No.
Company logo in two colors	on request
Company logo in two colors and a special membrane color	on request
Company logo in two colors, special membrane color, and specific key labeling	on request
Additional color (for logo and key labeling)	on request
Bezel in special color (extra charge per unit)	on request

SIMATIC Industrial Software

Brochures

For brochures serving as selection guides for SIMATIC products refer to:

http://www.siemens.com/simatic/printmaterial

Software for SIMATIC S7/C7/WinAC

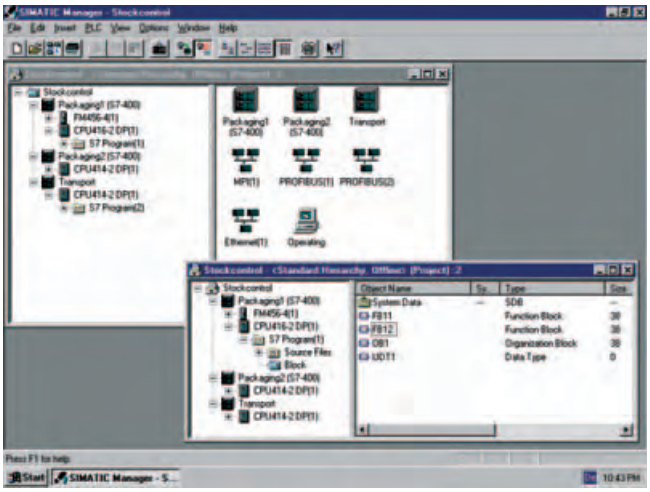
Overview

- System of seamlessly integrated software tools for SIMATIC S7 and PC-based Control SIMATIC WinAC
- User-friendly functions for all phases of an automation project
- Consists of:
  - Standard tools:
    Basis for the SIMATIC hardware
  - Engineering tools:
    High-level programming languages and technology-oriented software
  - Runtime software:
    Ready-to-use runtime software for the production process
  - Human Machine Interface:
    Software specifically for operator control and monitoring

For brochures serving as selection guides for SIMATIC products refer to:

http://www.siemens.com/simatic/printmaterial

Overview



- STEP 7 basic software:
  The standard tool for the SIMATIC S7, SIMATIC C7 and SIMATIC WinAC automation systems.
- Makes use of the full performance capabilities of the systems
- User-friendly functions for all phases of an automation project:
  - Configuring and parameterizing the hardware
  - Definition of communication
  - Programming
  - Testing, commissioning and service
  - Documentation, archiving
  - Operating, diagnostics functions

Components for connecting a PC to MPI and PROFIBUS

The components described below are used to connect programming devices and PCs (incl. notebooks) to PROFIBUS and to the multipoint SIMATIC S7 MPI interface in conjunction with STEP 7.

PC adapter USB

- To connect a PC to the SIMATIC S7 programmable controller via the USB port.
- Connectable to USB 1.1 and 2.0 ports.
- Applicable for SIMATIC S7-200, S7-300, S7-400 and C7.
- Supports routing.
- Automatic transmission rates and profile search.
- Noticeably improved performance (up to three times faster than the PC adapter via RS 232).
- Including subsequently updatable firmware (e.g. for function expansions or troubleshooting).
- Applicable in Windows 2000, Windows XP Home and Windows XP Professional.
- Scope of delivery:
  - PC adapter USB.
  - CD "SIMATIC Software PC Adapter USB" including software and documentation.
  - USB cable, 5 m.
  - MPI cable, 0.3 m.

CP 5512

- For programming devices/ PCs/notebooks with PCMCIA slot.
- PCMCIA slot Type II (32 bit cardbus).
- Incl. adapter with 9-pin sub-D socket for connection to PROFIBUS.

CP 5611/CP 5611-MPI

- For programming devices/PCs with PCI slot
- Short PCI card (32 bit).
- CP 5611-MPI including MPI cable.

Components for connecting the PC to Industrial Ethernet

The PC modules described below are used to connect programming devices and AT-compatible PCs/notebooks to Industrial Ethernet in conjunction with STEP 7 and SOFTNET-PG (as of V6.0).

CP 1512

- For programming devices/ PCs/notebooks with PCMCIA slot.
- PCMCIA slot Type II (32 bit cardbus); 10/100 Mbit/s.
- Incl. adapter with RJ45 socket for connection to Industrial Ethernet.

CP 1612

- For programming devices/PCs with PCI slot
- Short PCI card (32 bit); 10/100 Mbit/s
- Incl. RJ45 socket for connection to Industrial Ethernet.

Please refer to the respective product catalog for technical information regarding product versions and supported operating systems.

You will find additional information about the online connection of PCs and SIMATIC S7/C7 controllers under "SIMATIC NET Communication Systems".

Technical specifications PC adapter USB

	6ES7 972-0CB20-0XA0
Supply voltages	
Rated value	
- 24 V DC	Yes
Current consumption	
• Current consumption, typical	100 mA
EMC	
• Emitted interference to comply with EN 55022, class B	Yes
• Interference immunity on signal lines to comply with IEC 61000-4-4	Yes; 1 kV (to IEC 61000-4-4; burst; length < 3 m); 2 kV (to IEC 61000-4-4; burst; length > 3 m)
Interference immunity to the discharge of static electricity	
- To comply with IEC 61000-4-2	Yes; 6 kV, contact discharge (to IEC 61000-4-2); 8 kV, air discharge (to IEC 61000-4-2)
• Interference immunity to RF conduction to comply with IEC 61000-4-6	Yes; 10 V, 9 kHz - 80 MHz (to IEC 61000-4-6)
• Interference immunity to RF irradiation to comply with IEC 61000-4-3	Yes; 10 V/m, 80 - 1000 MHz (to IEC 61000-4-3); 10 V/m, 900 MHz, 1.89 GHz, 50% ED (to IEC 61000-4-3)
Interference immunity to conducted interference	
- On supply lines to comply with IEC 61000-4-4	Yes; 2 kV (to IEC 61000-4-4, burst)
- On supply lines to comply with IEC 61000-4-5	Yes; 1 kV (to IEC 61000-4-5; surge symm.); 2 kV (to IEC 61000-4-5; surge unsymm.)
• Interference immunity to magnetic fields at 50 Hz	30 A/m; to IEC 61000-4-8

	6ES7 972-0CB20-0XA0
Environmental requirements	
Operating temperature	
- min.	5 °C
- max.	40 °C
- Permitted temperature change	10 °C/h; Operation: 10 K/h; Storage/transport: 20 K/h
Storage/transportation temperature	
- min.	-20 °C
- max.	60 °C
Relative humidity	
- Operation, min.	5%
- Operation, max.	80%; at 25°C (no condensation)
- Storage/transportation, min.	5%
- Storage/transportation, max.	95%; at 25°C (no condensation)
Vibration	
- Operation, tested to IEC 60068-2-6	Yes; 10 to 58 Hz, amplitude 0.075 mm; 58 to 500 Hz, acceleration 9.8 m/s2
- Transportation, tested to IEC 60068-2-6	Yes; (packed) 5 to 9 Hz, amplitude 3.5 mm; 9 to 500 Hz, acceleration 9.8 m/s2
Surge withstand capability test	
- Description	Tested to DIN IEC 60068-2-2; Operation: 950 m/s2 (10 g), 30 ms, 100 shocks; Transport (packed): 250 m/s2 (25 g), 6 ms, 1000 shocks
Dimensions and weight	
• Width	105 mm
• Height	58 mm
• Depth	26 mm
• Weight, approx.	100 g

Ordering data	Order No.
STEP 7 Version 5.4	
Target system: SIMATIC S7-300/400, SIMATIC C7, SIMATIC WinAC *Requirements:* Windows 2000 Prof./XP Prof. *Delivery package:* German, English, French, Spanish, Italian; incl. 3.5" authorization diskette, without documentation	
Floating license on CD	**6ES7 810-4CC08-0YA5**
Rental license for 50 hours	**6ES7 810-4CC08-0YA6**
Software Update Service on CD	**6ES7 810-4BC01-0YX2**
Upgrade Floating License 3.x/4.x/5.x to V5.4; on CD	**6ES7 810-4CC08-0YE5**
Powerpack STEP 7 Lite V2.0 to STEP 7 V5.4; Floating License on CD	**6ES7 810-4CC08-0YC5**
Trial License STEP 7 V5.4; on CD, 14 day trial	**6ES7 810-4CC08-0YA7**
STEP 7 Version 5.3 Japanese	
Target system: SIMATIC S7-300/400, SIMATIC C7, SIMATIC WinAC *Requirements:* Windows XP Professional Japanese *Delivery package:* English, Japanese; incl. 3.5" automation disk, without documentation	
Floating license, Japanese, on CD	**6ES7 810-4CC07-0JA5**
Rental license for 50 hours	**6ES7 810-4CC07-0JA6**
Upgrade Floating License, Japanese, from 3.x/4.x/5.x to V5.3; on CD	**6ES7 810-4CC07-0JE5**
STEP 7 Version 5.3, Chinese	
Target system: SIMATIC S7-300/400, SIMATIC C7, SIMATIC WinAC *Requirements:* Windows XP Professional Chinese *Delivery package:* English, Chinese; incl. 3.5" authorization disk, without documentation	
Floating license, Chinese, on CD	**6ES7 810-4CC07-0KA5**
Rental license for 50 hours	**6ES7 810-4CC07-0KA6**
Upgrade Floating License Chinese from 3.x/4.x/5.x to V5.3; on CD	**6ES7 810-4CC07-0KE5**
Documentation package STEP 7 basic information	
Comprising Getting Started, hardware configuration manual, programming manual, migration manual	
German	**6ES7 810-4CA08-8AW0**
English	**6ES7 810-4CA08-8BW0**
French	**6ES7 810-4CA08-8CW0**
Spanish	**6ES7 810-4CA08-8DW0**
Italian	**6ES7 810-4CA08-8EW0**

	Order No.
STEP 7 reference manuals	
Consisting of STL, LAD and FBD manuals as well as a reference manual for standard and system functions for SIMATIC S7-300/400	
German	**6ES7 810-4CA08-8AW1**
English	**6ES7 810-4CA08-8BW1**
French	**6ES7 810-4CA08-8CW1**
Spanish	**6ES7 810-4CA08-8DW1**
Italian	**6ES7 810-4CA08-8EW1**
SIMATIC Manual Collection D)	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, five languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	
SIMATIC Manual Collection update service for 1 year D)	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates	
EPROM programming device, USB prommer	**6ES7 792-0AA00-0XA0**
For programming SIMATIC memory cards and EPROM modules	
MPI cable	**6ES7 901-0BF00-0AA0**
For linking SIMATIC S7 and CP through MPI (5 m)	
Components for connecting a PC to MPI and PROFIBUS	
For PCs with a free PCI slot:	
CP 5611 A)	**6GK1 561-1AA01**
CP 5611 MPI A)	**6GK1 561-1AM01**
incl. MPI cable (5 m)	
For PCs with a free PCMCIA slot:	
CP 5512	**6GK1 551-2AA00**
For Windows XP Professional	
For PCs without a free PCI slot:	
PC adapter USB	**6ES7 972-0CB20-0XA0**
For connecting a PC to S7-300/ -400/C7 through a USB interface; with USB cable (5 m)	
Components for connecting the PC to Industrial Ethernet	
For PCs with a free PCI slot:	
Layer 2 Ethernet cards	
For PCs with a free PCMCIA slot:	
SOFTNET-PG Edition 2005	**6GK1 704-1PW63-3AA0**

A) Subject to export regulations: AL: N and ECCN: EAR99H
D) Subject to export regulations: AL: N and ECCN: 5D992B1

STEP 7 Professional

Overview

STEP 7 Professional supports all IEC languages.

In addition to the languages recognized by STEP 7

- LAD
- FBD
- IL

the following are also available:

- "Sequential Function Chart"
- "Structured Text"

An offline simulation of programs created with these languages is included. STEP 7 Professional thus replaces the combination of the individual packages STEP 7, S7-GRAPH, S7-SCL and S7-PLCSIM.

A POWERPACK is offered to customers who use STEP 7 already and wish to change. A valid STEP 7 license is required for purchasing the POWERPACK. A separate update service is available for STEP 7 Professional.

Ordering data

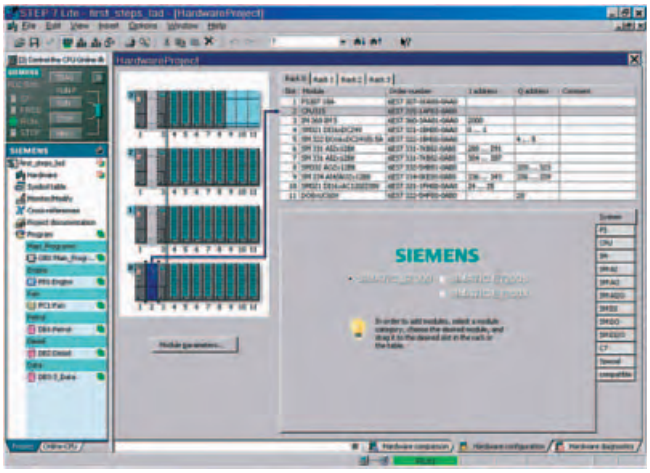
	Order No.
STEP 7 Professional Edition 2006	
Target system: SIMATIC S7-300/400, SIMATIC C7, SIMATIC WinAC *Requirements:* Windows 2000 Prof./XP Prof. *Delivery package:* German, English, French, Spanish, Italian; incl. 3.5" authorization diskette, without documentation	
Floating license	**6ES7 810-5CC10-0YA5**
Rental license for 50 hours	**6ES7 810-5CC10-0YA6**
Software Update Service	**6ES7 810-5CC04-0YE2**
Upgrade of Floating License to Edition 2006	**6ES7 810-5CC10-0YE5**
Powerpack Floating License for upgrading from STEP 7 to STEP 7 Professional	**6ES7 810-5CC10-0YC5**
Trial License STEP 7 Professional Edition 2006; on CD, runs for 14 days	**6ES7 810-5CC10-0YA7**
Documentation package STEP 7 basic information	
Comprising Getting Started, hardware configuration manual, programming manual, migration manual	
German	**6ES7 810-4CA08-8AW0**
English	**6ES7 810-4CA08-8BW0**
French	**6ES7 810-4CA08-8CW0**
Spanish	**6ES7 810-4CA08-8DW0**
Italian	**6ES7 810-4CA08-8EW0**
STEP 7 reference manuals	
Consisting of STL, LAD and FBD manuals as well as a reference manual for standard and system functions for SIMATIC S7-300/400	
German	**6ES7 810-4CA08-8AW1**
English	**6ES7 810-4CA08-8BW1**
French	**6ES7 810-4CA08-8CW1**
Spanish	**6ES7 810-4CA08-8DW1**
Italian	**6ES7 810-4CA08-8EW1**

		Order No.
SIMATIC Manual Collection	D)	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, five languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET		
SIMATIC Manual Collection update service for 1 year	D)	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		
EPROM programming device, USB prommer		**6ES7 792-0AA00-0XA0**
For linking SIMATIC S7 and CP through MPI (5 m)		
MPI cable		**6ES7 901-0BF00-0AA0**
For linking SIMATIC S7 and CP through MPI (5 m)		
Components for connecting a PC to MPI and PROFIBUS		
For PCs with a free PCI slot:		
CP 5611	A)	**6GK1 561-1AA01**
CP 5611 MPI	A)	**6GK1 561-1AM01**
incl. MPI cable (5 m)		
For PCs with a free PCMCIA slot:		
CP 5512		**6GK1 551-2AA00**
For Windows XP Professional		
For PCs without a free PCI slot:		
PC adapter USB		**6ES7 972-0CB20-0XA0**
For connecting a PC to S7-300/ -400/C7 through a USB interface; with USB cable (5 m)		
Components for connecting the PC to Industrial Ethernet		
For PCs with a free PCI slot:		
Layer 2 Ethernet cards		
For PCs with a free PCMCIA slot:		
SOFTNET-PG Edition 2005		**6GK1 704-1PW63-3AA0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

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

Overview



- Programming software for creating stand-alone systems with SIMATIC S7-300, SIMATIC C7, ET 200S and ET 200X
- Operation is simple and intuitive
- Projects created with STEP 7/STEP 7 Professional can still be used

STEP 7 Lite is available for *free download* as of immediately. Additional information is available on the Internet at:

http://support.automation.siemens.com/WW/view/en/22764848

Ordering data

		Order No.
STEP 7 Lite V3.0		
Target system: SIMATIC S7-300, SIMATIC C7, ET 200S, ET 200X *Requirements:* Windows 2000 Prof./XP Home/ XP Prof. *Delivery package:* German, English, French, Spanish, Italian; incl. 3.5" authorization diskette		
Floating license		**6ES7 810-3CC07-0YA5**
Software Update Service		**6ES7 810-3BC01-0YX2**
SIMATIC Manual Collection	D)	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, five languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET		
SIMATIC Manual Collection update service for 1 year	D)	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		
EPROM programming device, USB prommer		**6ES7 792-0AA00-0XA0**
For linking SIMATIC S7 and CP through MPI (5 m)		
MPI cable		**6ES7 901-0BF00-0AA0**
For linking SIMATIC S7 and CP through MPI (5 m)		
Engineering Software for use with STEP 7 Lite		
S7-PLCSIM		see page 7/16
TeleService		see page 7/17
Components for connecting a PC to MPI and PROFIBUS		
For PCs with a free PCI slot:		
CP 5611	A)	**6GK1 561-1AA01**
CP 5611 MPI	A)	**6GK1 561-1AM01**
incl. MPI cable (5 m)		
For PCs with a free PCMCIA slot:		
CP 5512		**6GK1 551-2AA00**
For Windows XP Professional		
For PCs without a free PCI slot:		
PC adapter USB		**6ES7 972-0CB20-0XA0**
For connecting a PC to S7-300/ -400/C7 through a USB interface; with USB cable (5 m)		

A) Subject to export regulations: AL: N and ECCN: EAR99H

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

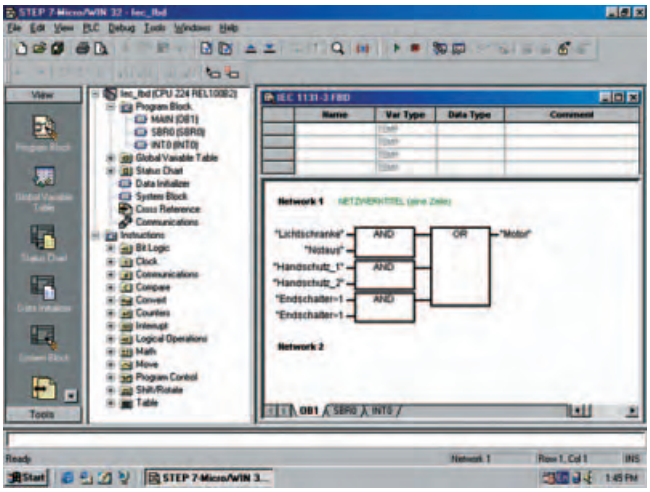
7

STEP 7, STEP 7 Professional, STEP 7 Lite

STEP 7 selection assistance

	STEP 7 Lite	STEP 7	STEP 7 Professional
Configuration			
Target systems	S7-300/C7	S7-300/S7-400/C7/WinAC	
Boards	Digital, analog I/O, IFM only central	Digital, analog I/O, IFM, FM, CP central and distributed (DP)	
Network/communication	No	Time-based, cyclic data transmission between automation components; MPI, PROFIBUS or Industrial Ethernet	
Distributed I/Os	No	Yes	
Message configuration (HMI display)	No	Yes	
Read from/write on MMC	Yes, only in CPU	Yes, in CPU and directly on PG/PC (updating of AS operating system possible)	
Export/import	Program, symbols	Program, symbols, HW configuration	
Documentation function	Included	Included; option DOCPRO for standardized documentation of the S7 project	
Multilingual project documentation	Yes	Yes	
Multi-user engineering	No	Yes	
Programming			
Languages	KOP/FUP/AWL	LAD/FBD/IL and IL source	Like STEP 7 plus S7-GRAPH (sequencer)/ S7-SCL (textual high-language)
Structured/symbolic programming	Yes/yes	Yes/yes	
Checking/establishing program consistently	Yes/yes	Yes/yes	
Standard/user libraries	Yes/no	Yes/yes	
Online functions			
Online access	MPI	MPI, PROFIBUS, option: Industrial Ethernet	
Test functions	Monitoring, control, forcing	Monitoring, control, forcing, single step (debugging)	
Offline/online comparison functions	Program, HW configuration	Program	
Diagnostics	System diagnostics	System diagnostics, signaling of system faults, integrated process fault diagnostics with S7-GRAPH	
Option packages			
Optional programming languages	None	S7-GRAPH, S7-SCL, S7-HiGraph, CFC	S7-HiGraph, CFC
Options for simulation, documentation, diagnostics and remote maintenance	S7-PLCSIM, S7-Teleservice	S7-PLCSIM, S7-DOCPRO, TeleService, S7-PDIAG	DOCPRO, TeleService, S7-PDIAG (S7-PLCSIM included in scope of delivery)

Overview



- The simple, easy to learn programming software under Windows 2000/XP for the SIMATIC S7-200
- A large number of wizards support the programming even of difficult automation tasks
- For fast startup and timesaving programming
- With large scope of functions
- Based on standard Windows software (user interface similar to standard applications, such as Microsoft Word, Outlook)
- With 3 standard editors STL, LAD and CSF; you can switch between these editors at any time
- Generation, exporting and importing of user-specific libraries (including standard commands and user-defined subroutines)
- Documentation CD with manuals, software tools and example programs as support

Ordering data

		Order No.
STEP 7-Micro/WIN V4 programming software		
Target system: All CPUs of the SIMATIC S7-200 *Prerequisite:* Windows 2000/XP on PG or PC *Type of delivery:* German, English, French, Spanish, Italian, Chinese; with online documentation		
Single license	E)	**6ES7 810-2CC03-0YX0**
Upgrade Single License[1]	E)	**6ES7 810-2CC03-0YX3**
To be ordered separately:		
Intelligent RS 232/PPI multi-master cable For connecting devices with an RS 232 interface to SIMATIC S7-200 or the PPI network; master in the multi-master PPI network	A)	**6ES7 901-3CB30-0XA0**
Intelligent USB/PPI multi-master cable For connecting devices with an USB interface to SIMATIC S7-200 or the PPI network; master in the multi-master PPI network	A)	**6ES7 901-3DB30-0XA0**
System manual for S7-22x CPUs		
German		**6ES7 298-8FA24-8AH0**
English		**6ES7 298-8FA24-8BH0**
French		**6ES7 298-8FA24-8CH0**
Spanish		**6ES7 298-8FA24-8DH0**
Italian		**6ES7 298-8FA24-8EH0**
Chinese		**6ES7 298-8FA24-8FH0**
Components for connecting a PC to MPI and PROFIBUS		
For PCs with a free PCI slot:		
CP 5611	A)	**6GK1 561-1AA01**
CP 5611 MPI incl. MPI cable (5 m)	A)	**6GK1 561-1AM01**
For PCs with a free PCMCIA slot:		
CP 5512 For Windows XP Professional		**6GK1 551-2AA00**
For PCs without a free PCI slot:		
PC adapter USB For connecting a PC to S7-300/ -400/C7 through a USB interface; with USB cable (5 m)		**6ES7 972-0CB20-0XA0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

E) Subject to export regulations: AL: N and ECCN: EAR99S

1) Upgrade for all previous STEP 7-Micro/WIN and STEP 7-Micro/DOS versions

7

STEP 7-Micro/WIN instruction library

Overview

- Additional instruction libraries for STEP 7 Micro/WIN V3.2:
  - USS protocol library
  - MODBUS protocol library

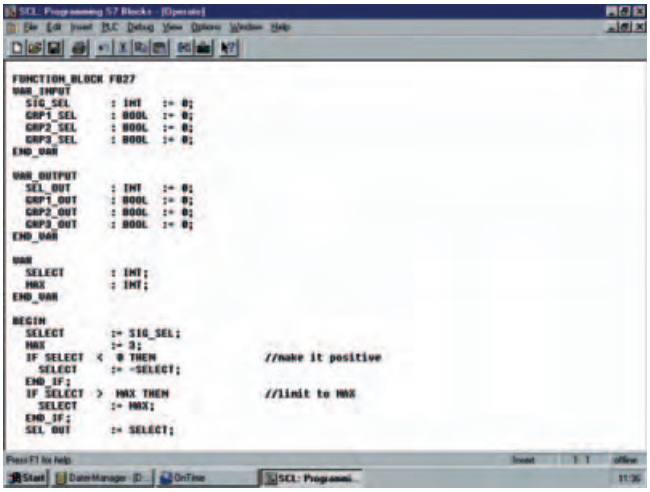
Ordering data

	Order No.
STEP 7-Micro/Win command library V1.1 Protocol libraries for USS and MODBUS protocols; can be used with STEP 7-Micro/Win32 V3.2; including documentation, on CD-ROM	**6ES7 830-2BC00-0YX0**

Technical specifications Standard Tools

Standard tools	STEP 7 Professional	STEP 7	STEP 7 Lite	STEP 7- Micro/WIN
License form	Floating license	Floating license	Floating license	Single license
Software class	A	A	A	A
Current version	Edition 2006	V 5.4	V 3.0	V 4.0
Target system	SIMATIC S7-300 SIMATIC S7-400 SIMATIC C7	SIMATIC S7-300 SIMATIC S7-400 SIMATIC C7	SIMATIC S7-300 SIMATIC C7	SIMATIC S7-200
Operating system	Windows 2000 Professional Windows XP Professional	Windows 2000 Professional Windows XP Professional	Windows XP Home Windows 2000 Professional Windows XP Professional	Windows 2000 Windows XP
Main memory expansion in programming device / PC, min.	Depends on Microsoft Windows operating system used. Recommendation: 256 MB	Depends on Microsoft Windows operating system used. Recommendation: 256 MB	Depends on Microsoft Windows operating system used. Recommendation: 128 MB	32 Mbyte
Hard drive requirement in programming device / PC	depending on scope of installation, 200 to 430 MB	depending on scope of installation, 200 to 380 MB	depending on scope of installation, 90 to 250 MB.	50 Mbyte
Size of user program in the CPU	approx. factor 1.5 compared with STEP 5 with AWL (STL - instruction list), KOP (LAD - ladder diagram), FUP (FBD - function block diagram)	approx. factor 1.5 compared with STEP 5 with AWL (STL - instruction list), KOP (LAD - ladder diagram), FUP (FBD - function block diagram)	approx. factor 1.5 compared with STEP 5 with AWL (STL - instruction list), KOP (LAD - ladder diagram), FUP (FBD - function block diagram)	approx. factor 1.0 compared with STEP 5 with AWL (STL - instruction list), KOP (LAD - ladder diagram)
Comment	Includes all 5 IEC programming languages KOP (LAD - ladder diagram), FUP (FBD - function block diagram), AWL (STL - instruction list), SCL (structured control language), GRAPH and the PLC simulation software S7-PLCSIM		For stand-alone applications with centralized I/O.	

Overview



- PASCAL-type high-level language
- Optimized for programming programmable controllers
- With PLCopen Base Level certificate
- For use in SIMATIC S7-300 (recommended for CPU 314 and CPU 312C or higher), S7-400, C7 and WinAC

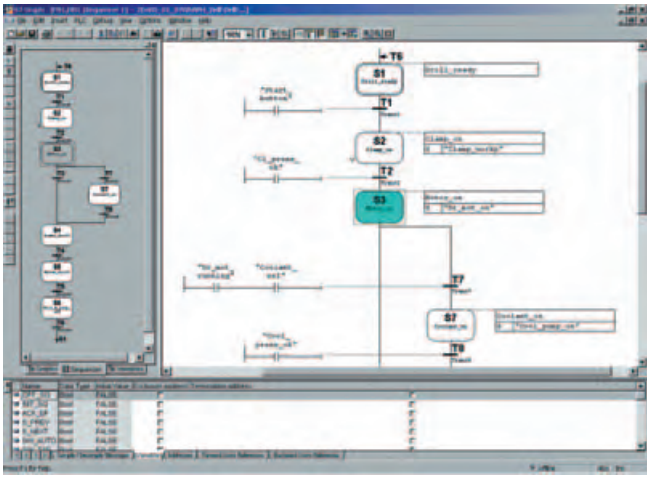
Ordering data

		Order No.
SIMATIC S7-SCL, Version 5.3 *Task:* High-level programming language programming *Target system:* SIMATIC S7-300 (CPU 314 or later), SIMATIC S7-400, SIMATIC C7, SIMATIC WinAC *Prerequisite:* STEP 7 V5.3 or later *Delivery type:* on CD German, English, French, Spanish, Italian; incl. authorization disk, with electronic documentation		
Floating License		**6ES7 811-1CC05-0YA5**
Software update service		**6ES7 811-1CA01-0YX2**
Upgrade floating on V5.3		**6ES7 811-1CC05-0YE5**
SIMATIC Manual Collection Electronic manuals on DVD, 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, Engineering Software, Runtime Software, PCS 7, SIMATIC HMI, SIMATIC NET	D)	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year Up-to-date Manual Collection DVD as well as the three subsequent updates	D)	**6ES7 998-8XC01-8YE2**

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

S7-GRAPH

Overview



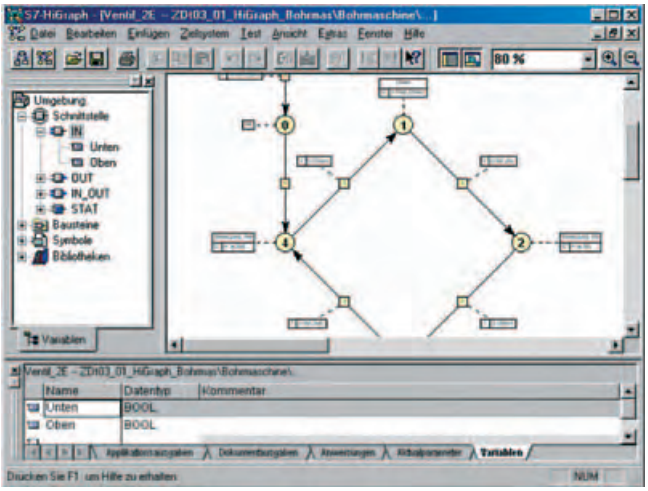
- For configuring and programming sequential processes using sequencers
- Standardized representation to DIN EN 1131-3
- Clearly comprehensible program thanks to structuring of the process into separate steps
- With extensive diagnostics functions, integrated into the SIMATIC diagnostics concept
- With PLCopen Base Level certificate
- For use in SIMATIC S7-300 (recommended for CPU 315 and CPU 312C or higher), S7-400, C7 and WinAC

Ordering data

		Order No.
SIMATIC S7-GRAPH, Version 5.3 *Task:* Configuration and programming of execution sequences *Target system:* SIMATIC S7-300, SIMATIC S7-400, SIMATIC C7, SIMATIC WinAC *Prerequisite:* STEP 7 V5.3 or later *Delivery type:* on CD German, English, French, Spanish, Italian; incl. authorization disk, with electronic documentation		
Floating License		**6ES7 811-0CC06-0YA5**
Software update service		**6ES7 811-0CA01-0YX2**
Upgrade floating license on V5.3		**6ES7811-0CC06-0YE5**
SIMATIC Manual Collection Electronic manuals on DVD, 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, Engineering Software, Runtime Software, PCS 7, SIMATIC HMI, SIMATIC NET	D)	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year Up-to-date Manual Collection DVD as well as the three subsequent updates	D)	**6ES7 998-8XC01-8YE2**

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

Overview



- For graphic description of asynchronous processes using state graphs
- Also particularly suitable for machine constructors (technologists), commissioning engineers and service engineers
- Extremely flexible using freely-positionable graphic elements
- With integrated monitoring and signaling functions
- Can be used in SIMATIC S7-300, S7-400, C7 and WinAC

Ordering data

		Order No.
SIMATIC S7-HiGraph, Version 5.3 *Task:* Programming of status graphs *Target system:* SIMATIC S7-300, SIMATIC S7-400, SIMATIC C7, SIMATIC WinAC *Prerequisite:* STEP 7 V5.3 or later *Delivery type:* on CD German, English, French, Spanish, Italian; incl. authorization disk, with electronic documentation		
Floating license		**6ES7 811-3CC05-0YA5**
Software update service		**6ES7 811-3BA01-0YX2**
Upgrade floating license on V5.3		**6ES7 811-3CC05-0YE5**
SIMATIC Manual Collection Electronic manuals on DVD, 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, Engineering Software, Runtime Software, PCS 7, SIMATIC HMI, SIMATIC NET	D)	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year Up-to-date Manual Collection DVD as well as the three subsequent updates	D)	**6ES7 998-8XC01-8YE2**

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

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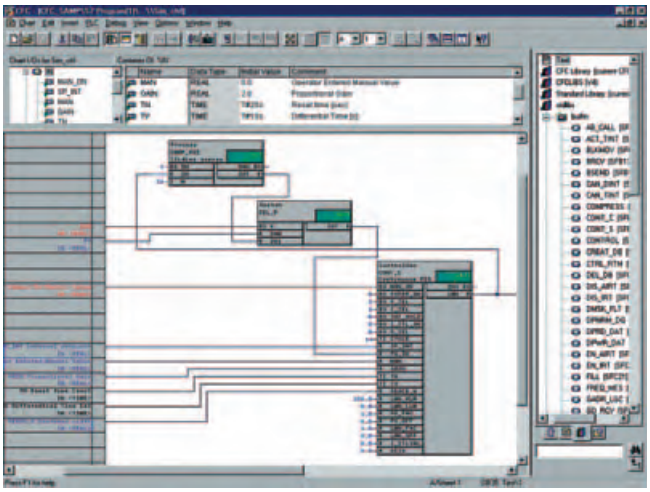
CFC

Overview



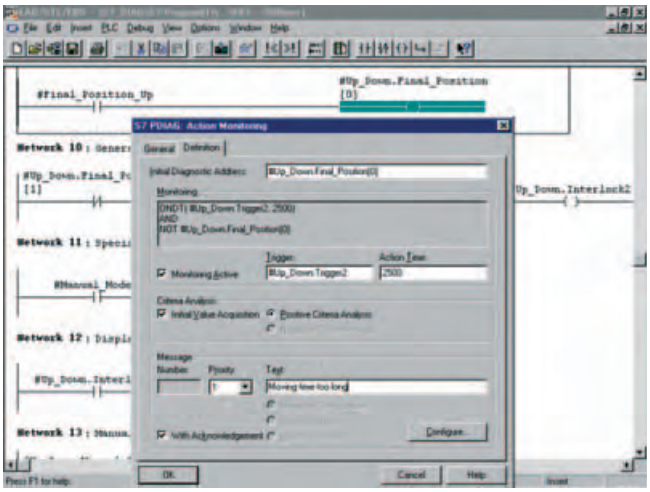
- For creating automation programs by drawing a function chart
- With extensive libraries of prefabricated function blocks to which function blocks created by the user can be added
- Reduced costs and fewer mistakes by simply interconnecting read-to-use function blocks
- Optimized integration in the world of automation, for example, through guaranteed compatibility with all STEP 7 tools
- Can be used for SIMATIC S7-300 (recommended for CPU 316 or CPU 314C or higher), SIMATIC S7-400, SIMATIC WinAC and D7-SYS

Ordering data

		Order No.
SIMATIC CFC, Version 6.1 *Task:* Graphic configuring and programming of automation applications in the form of technology-oriented diagrams *Target system:* SIMATIC S7-300/400, SIMATIC WinAC, D7-SYS *Requirements:* STEP 7 V5.3 and higher, also S7-SCL V5.1 SP3 and higher *Delivery form:* Engineering software and electronic documentation on CD-ROM, License Key Disk, Emergency Key Disk, Certificate of License, Terms and Conditions		
Floating license		**6ES7 658-1EX16-2YA5**
Upgrade to floating license V6.1		**6ES7 658-1EX16-2YE5**
Software Update Service		**6ES7 658-1EX00-2YL8**
SIMATIC Manual Collection Electronic manuals on DVD, five languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	D)	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	D)	**6ES7 998-8XC01-8YE2**

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

Overview



- For configuration of process diagnostics with SIMATIC S7
- Increases the availability of machines and production plants and supports with fault analysis and elimination on site
- For use on the SIMATIC S7-300, S7-400

Ordering data

		Order No.
S7-PDIAG, Version 5.3 *Task:* Configuring of process diagnostics for LAD/FBD/STL *Target system:* SIMATIC S7-300 (CPU 314 and higher); SIMATIC S7-400 *Requirement:* STEP 7 V5.3 SP3 and higher *Delivery package:* on CD; German, English, French, Spanish, Italian; incl. authorization diskette, with electronic documentation		
Floating license		**6ES7 840-0CC04-0YA5**
Software Update Service		**6ES7 840-0CA01-0YX2**
Upgrade to V5.3		**6ES7 840-0CC04-0YE5**
SIMATIC Manual Collection Electronic manuals on DVD, five languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	D)	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	D)	**6ES7 998-8XC01-8YE2**

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

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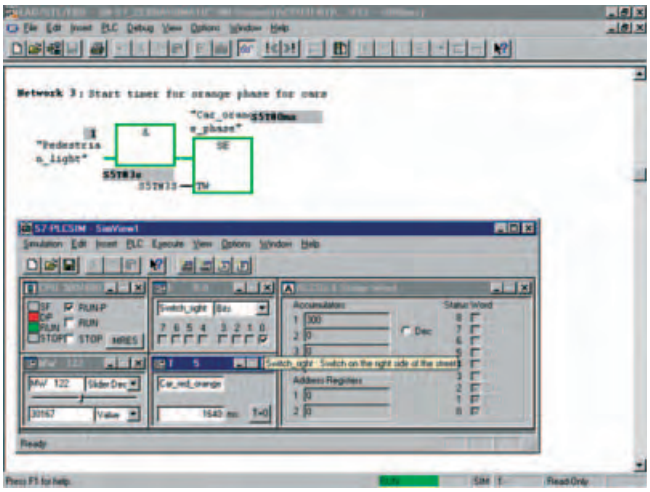
S7-PLCSIM

Overview



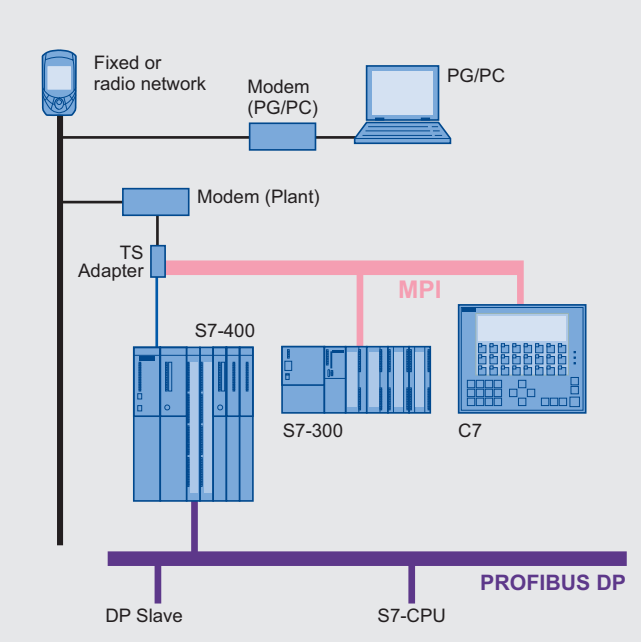
- For functional testing of the generated SIMATIC S7 user blocks on the PG/PC, independent of the availability of the target hardware
- To transfer detection and elimination of program faults to an early phase of program development
- Permits accelerated, cost-reduced initial commissioning, and an increase in program quality
- Can be used for LAD, FBD, STL, S7-GRAPH, S7-HiGraph, S7-SCL, CFC, S7-PDIAG, WinCC (local installation)

Ordering data

		Order No.
S7-PLCSIM, Version 5.3 *Task:* Functional testing of SIMATIC S7 application blocks on a PG/PC *Target system:* SIMATIC S7-300, SIMATIC S7-400, SIMATIC C7 *Prerequisite:* for STEP 7 V5.3 or later *Delivery package:* on CD German, English, French, Spanish, Italian; incl. authorization disk, with electronic documentation		
Floating License		**6ES7 841-0CC04-0YA5**
Software update service		**6ES7 841-0CA01-0YX2**
Upgrade floating license on V5.3		**6ES7 841-0CC04-0YE5**
SIMATIC Manual Collection Electronic manuals on DVD, 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, Engineering Software, Runtime Software, PCS 7, SIMATIC HMI, SIMATIC NET	D)	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year Up-to-date Manual Collection DVD as well as the three subsequent updates	D)	**6ES7 998-8XC01-8YE2**

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

Overview



- For remote maintenance of SIMATIC S7/C7 automation systems using a wired or radio network
- Functions:
  - Access to remote plants (*remote maintenance*): Distributed systems can be centrally managed, controlled and monitored using remote connections (can be used in SIMATIC S7-300 and S7-400).
  - Establishment of connection from/to remote plants (*PG-AS remote coupling*).
  - Data exchange between plants (*AS-AS remote coupling*): Exchange of process data between two SIMATIC automation systems over the telephone network.
  - Sending a *text message*: A SIMATIC automation system can send a text message via a GSM radio modem.
- For use on the SIMATIC S7-300, S7-400, C7

Technical specifications

See "Engineering Tools" for technical specifications of TeleService.

	TS Adapter II
Dimensions (W x H x D) in mm	125 x 110 x 40
Weight, approx.	250 g
Ports	
• To S7/C7	RS 485 (max. 12 Mbit/s)
• to PC	USB 1.1 (12 Mbit/s)
• to external modem	RS 232 (max. 115 Kbaud)
• to analog telephone system	RJ12
• to ISDN telephone system	RJ45

Technical specifications (continued)

	TS Adapter II
Voltage is supplied externally or through MPI interface	24 V DC
Current consumption	60 mA (typ.) / 120 mA (max.)
Max. inrush current	0.7 A; 8 µs
Degree of protection	IP20
Temperature	
• Operation	± 0 °C to +60 °C
• Storage/transport	-40 °C to +70 °C

Ordering data

		Order No.
TeleService, Version 6.0 *Task:* Remote maintenance of SIMATIC S7/C7 by means of wired or radio network *Target system:* SIMATIC S7-200, SIMATIC S7-300, SIMATIC S7-400, SIMATIC C7 *Requirement:* TS Adapter (STEP 7 not required) *Delivery package:* on CD, German, English, French, Spanish, Italian; with electronic documentation		
Floating license	E)	**6ES7 842-0CC10-0YA5**
Floating License Upgrade (from each previous version)	E)	**6ES7 842-0CC10-0YE5**
Software Update Service		**6ES7 842-0CA01-0YX2**
TS Adapter II Analog With MPI connection and RS 232; 9-pin, male (modem side)		**6ES7 972-0CB35-0XA0**
TS Adapter II ISDN With MPI connection and RS 232; 9-pin, male (modem side)		**6ES7 972-0CC35-0XA0**
Connecting cable for TS adapter RS232 / null-modem cable, 5 m		**6ES7 901-1BF00-0XA0**
SIMATIC Manual Collection Electronic manuals on DVD, five languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	D)	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	D)	**6ES7 998-8XC01-8YE2**

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

E) Subject to export regulations: AL: N and ECCN: EAR99S

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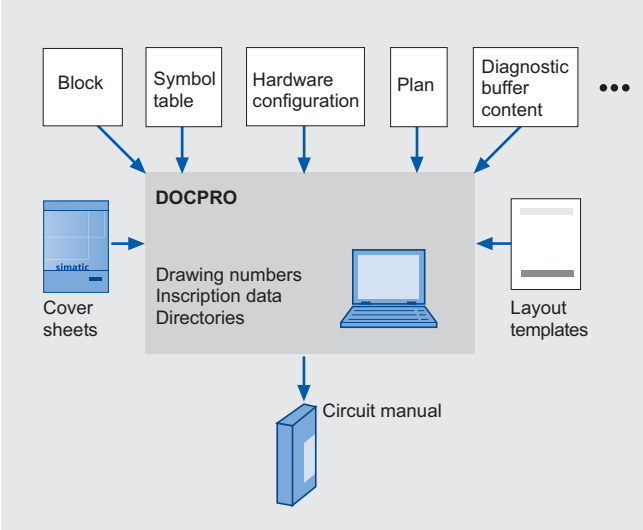
DOCPRO

Overview



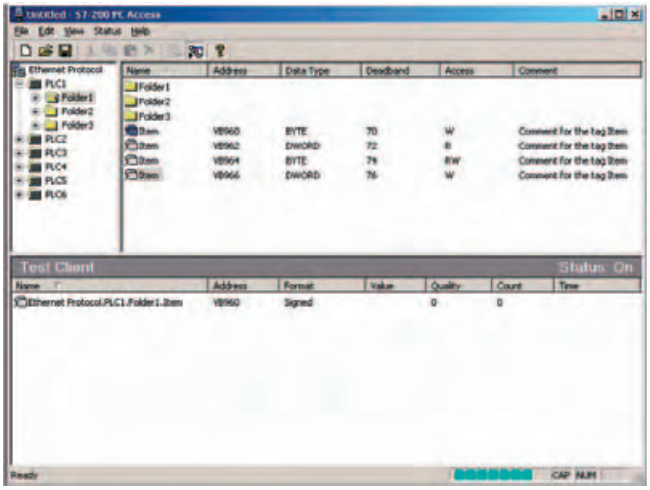
- For creating and managing plant documentation
- Permits structuring of project data, the preparation in the form of wiring manuals, and the printout in a unified print image.
- For use in SIMATIC S7-300, S7-400 and C7

Ordering data

		Order No.
DOCPRO, Version 5.1		
Function: Creation of circuit manuals for system document management *Target system:* SIMATIC S7-300, SIMATIC S7-400, SIMATIC C7 *Requirements:* STEP 7 V3.2 or newer; *Type of delivery:* on CD; German, English, French, Spanish, Italian; including authorization diskette, with electronic documentation		
Single license		**6ES7 803-0CC02-0YE0**
Software Update Service		**6ES7 803-0CA01-0YX2**
Upgrade of single license to V5.1		**6ES7 803-0CC02-0YE4**
SIMATIC Manual Collection	D)	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, five languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET		
SIMATIC Manual Collection update service for 1 year	D)	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		

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

Overview



- OPC server as the bridge between the SIMATIC S7-200 and the PC world
- For processing and visualizing data from the S7-200 with standard Windows applications
- Database applications, human/machine interfaces (HMIs), tools for statistical evaluations with Excel, for instance, or calculation modules for complex requirements are examples of what can be created.

Ordering data

		Order No.
S7-200 PC Access V1.0 *Task:* OPC server for SIMATIC S7-200. *Target system:* SIMATIC S7-22x. *Requirements:* Windows 2000/XP; on PG or PC; STEP 7-Micro/Win V4. *Delivery package:* German, English, French, Spanish, Italian, Chinese; with electronic documentation		
Single license	E)	**6ES7 840-2CC01-0YX0**
Multi Copy License for 15 installations	E)	**6ES7 840-2CC01-0YX1**
Intelligent RS 232/PPI multi-master cable For connecting devices with an RS 232 interface to SIMATIC S7-200 or the PPI network; master in the multi-master PPI network	A)	**6ES7 901-3CB30-0XA0**
Intelligent USB/PPI multi-master cable For connecting devices with an USB interface to SIMATIC S7-200 or the PPI network; master in the multi-master PPI network	A)	**6ES7 901-3DB30-0XA0**
CP 5512 PC card (CardBus, 32-bit) for connecting a programming device or Notebook computer to PROFIBUS or MPI, with 32-bit Windows XP Professional (Windows 2000 Professional available soon), executable under 32-bit Windows 2000 Professional and Windows XP Professional in conjunction with STEP 7 V5.2 German/English		**6GK1 551-2AA00**
CP 5611 PCI card for connecting a PC to the CPU interface or PROFIBUS DP module (187.5 Kbit/s or 12 Mbit/s) over an MPI cable	A)	**6GK1 561-1AA01**

A) Subject to export regulations: AL: N and ECCN: EAR99H

E) Subject to export regulations: AL: N and ECCN: EAR99S

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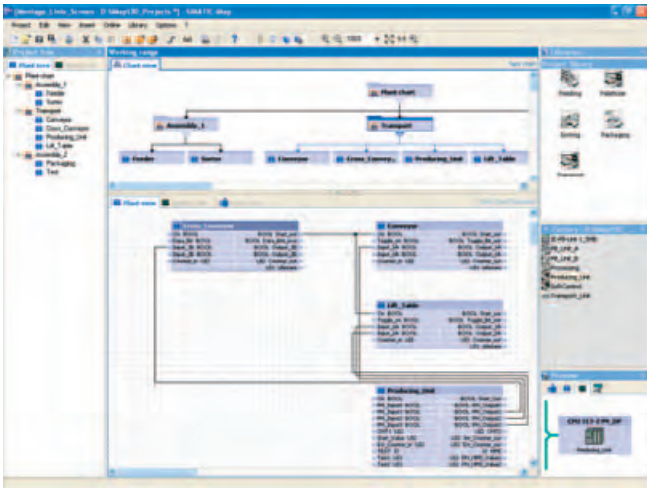
SIMATIC iMap

Overview



- Component-based software tool for configuring the communication in distributed automation solutions
- For easy graphical configuration of the communication between subsystems and machine-to-machine communication in the production line
- Based on the PROFINET standard
- Open for PROFINET devices from various manufacturers on Industrial Ethernet
- Runs under Windows 2000, Windows XP Professional and Windows 2003 Server

7

Technical specifications

Engineering tool	SIMATIC iMap
Current version	V3.0
Software class	A
Applications	
Keyword	SIMATIC iMap is an engineering tool for configuring communication between automation and field devices in distributed automation solutions.
Marketing message	"Time and cost savings in modular machine and plant construction with Component based Automation." "Modularization and machine-to-machine communication along the production line."
Advantages	• Open component-based engineering tool to the PROFINET standard. • Simple communication between intelligent automation and field devices on PROFIBUS DP and on Ethernet. • Graphical configuration of communication on PROFIBUS DP and on Ethernet • Extremely high reusability of software components (technology modules) • Graphical structuring of the plant using "chart-in-chart" function • Convenient navigation through the project tree • Easy creation and structuring of technology libraries • PROFIBUS and Ethernet in the overview of the network view • Fast start-up thanks to downloading and testing directly on Ethernet (also of PROFIBUS slaves)

Engineering Tool	SIMATIC iMap
Advantages (continued)	• Online display of values of the technology modules on the interfaces and in the variable table
Sectors	• Diagnosis of communication in the diagnostics window • Automotive industry (especially in assembly, conveyor systems and in the paint shop) • Complex food and packaging machines • Conveyor systems based on PROFIBUS DP • Production lines with several interlinked machines
Target systems	• SIMATIC S7 CPU 31x-2 PN/DP and SIMATIC S7 CPU 319-3 PN/DP (with integrated PROFINET interface. This can be used as a proxy function for the devices of a complete PROFIBUS segment, one line only) • SIMATIC WinAC PN (can be used as a proxy function for the devices of a complete PROFIBUS segment, one line only) • SIMATIC NET IE/PB Link (can be used as a proxy function for the devices of a complete PROFIBUS segment) • SIMATIC NET CP 343-1 and CP 343-1 Advanced (for connecting SIMATIC S7-300 to Ethernet), CP443-1 Advanced (for connecting SIMATIC S7-400 to Ethernet)

Technical specifications (continued)

Engineering Tool	SIMATIC iMap
Target systems (continued)	• Distributed I/O stations with separate CPU (all intelligent field devices on PROFIBUS such as SIMATIC CPU 313C-2DP, CPU 314C-2DP, CPU 315-2DP, CPU 316-2DP, ET 200 IM 151 CPU, ET 200S BM 147 CPU), • PROFINET CBA OPC Server (for access from PC applications to data in PROFINET devices) • Devices on Industrial Ethernet based on the PROFINET CBA standard • SIMATIC OPs (within the components) • SIMATIC ProTool/Pro, WinCC or any other visualization system with OPC client function
System requirements	
Operating system	Windows 2000 Professional Service Pack 4 and higher or Windows XP Prof. Service Pack 1 and higher or Windows 2003 Server Service Pack 1 and higher; PC administration rights are required for installation
PG/PC hardware	Pentium processor, 1 GHz or higher
Recommended expansion of main memory in PG/PC	RAM: 512 MB or more
Hard disk space required in PG/PC	Approx. 200 MB
Software required	• STEP 7 V5.3 Service Pack 3 or higher • PN OPC server V6.3 or higher The following software must be installed before iMap (included in the iMap package): • MS Internet Explorer V6.0 Service Pack 1 and higher • Adobe Acrobat Reader V5.0
Delivery format	
Languages	English, German, French, Italian and Spanish
Single License (SL)	Yes
Upgrade License (UL)	Yes, from V2.0 to V3.0
Paper manuals	Electronically on CD
Authorization/licenses	
Authorization	Yes
Single License (SL)	Yes
Upgrade License (UL)	Yes
Software Update Service	Yes
Unlock Copy License	No

Ordering data

		Order No.
SIMATIC iMap V3.0		
Target system: CPU 31x-2 PN/DP, CPU 319-3 PN/DP, SIMATIC WinAC PN, SIMATIC NET IE/PB Link, SIMATIC NET CP 343-1, SIMATIC NET CP 343-1 Advanced, SIMATIC NET CP 443-1 Advanced, distributed I/O devices with own CPU, PROFINET CBA OPC server, devices on the Industrial Ethernet based on the PROFINET CBA standard, SIMATIC OPs, SIMATIC ProTool/Pro *Requirements:* Windows 2000 Prof. with Service Pack 4 or later or Windows XP Prof. with Service Pack 1 or later or Windows 2003 Server with Service Pack 1 or later; on PG or PC with Pentium processor, min. 1 GHz; STEP 7 V5.3 or later with Service Pack 3, PN OPC Server V6.3 or later *Delivery form:* German, English, with electronic documentation		
Single license	D)	**6ES7 820-0CC04-0YA5**
Software Update Service	D)	**6ES7 820-0CC01-0YX2**
Upgrade to V3.0, single license	D)	**6ES7 820-0CC04-0YE5**

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

7

S7-Technology

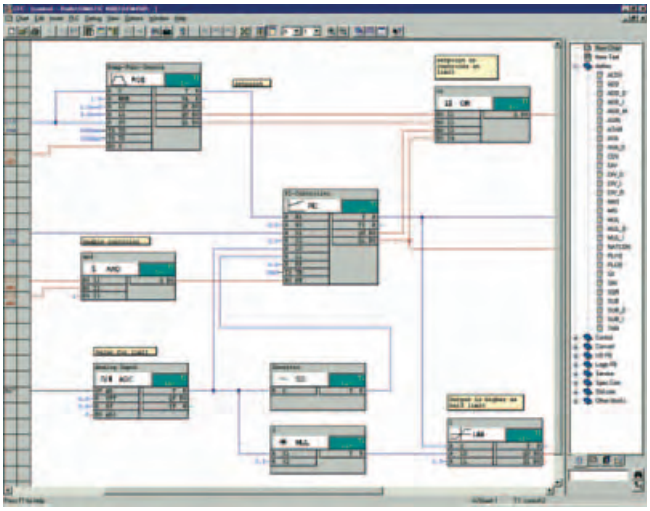
Overview

- Option package for creating motion control tasks for CPU 31xT-2 DP
- Optimal embedding in the automation world thanks to total integration in the STEP 7 tools
- Programming in the standard SIMATIC programming languages LAD, FBD and STL
- Additional Engineering Tools such as S7-SCL or S7-GRAPH can be used

Ordering data

	Order No.
S7 Technology V3.0 *Task:* Option package for configuring and programming technology tasks with SIMATIC S7 CPU 31xT-2 DP *Requirement:* STEP 7 V5.3 SP3 or higher *Delivery package:* on CD; incl. documentation for CPU 31xT-2 DP (included on CD)	**6ES7 864-1CC30-0YX0**

Overview



- Add-on for STEP 7/CFC/SFC for programming control and automation tasks with T400, FM 458, SIMADYN D or SIMATIC TDC
- Contains function blocks for every application
- For customers who do not own STEP 7 software: *D7-ES*, comprising D7-SYS, STEP 7, CFC and, as an option, SFC
- *D7-FB-Gen*, function block generator for generating own function blocks

Ordering data

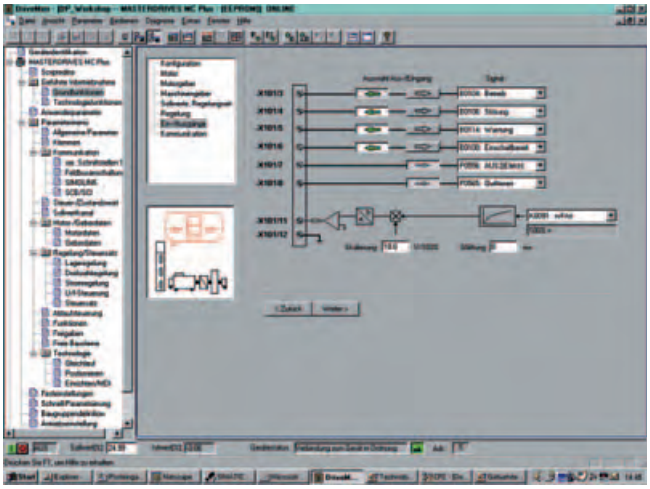
		Order No.
SIMATIC D7-SYS V6.2		
Task: Function block library for configuring closed-loop control and automation tasks *Target system:* SIMATIC S7-400/FM 458 *Requirement:* Windows 2000/XP *Delivery package:* on CD, German, English, with electronic documentation		
Floating license		**6ES7 852-0CC00-0YA5**
Upgrade License V5.x and higher		**6ES7 852-0CC00-0YE5**
SIMATIC D7 SYS SFC V6.2		
Task: Function block library for configuring closed-loop control and automation tasks; incl. sequence generator *Target system:* SIMATIC S7-400/FM 458 *Requirement:* Windows 2000/XP *Delivery package:* on CD, German, English, with electronic documentation		
Floating license		**6ES7 852-1CC00-0YA5**
Upgrade License V6.x and higher		**6ES7 852-1CC00-0YE5**
SIMATIC D7 ES V6.2		
Complete package comprising STEP 7, CFC and D7 SYS; executable on Windows 2000/XP		
Floating license		**6ES7 852-2CC00-0YA5**
SIMATIC D7 ES SFC V6.2		
Complete package comprising STEP 7, CFC, D7 SYS and SFC; executable on Windows 2000/XP		
Floating license		**6ES7 852-3CC00-0YA5**
SIMATIC D7 FB Gen V2.1	E)	**6DD1 805-5DA0**
Function block generator		
SIMATIC Manual Collection	D)	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, five languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET		
SIMATIC Manual Collection update service for 1 year	D)	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		

D) Subject to export regulations: AL: N and ECCN: 5D992B1
E) Subject to export regulations: AL: N and ECCN: EAR99S

7

Drive ES engineering software

Overview



Drive ES is the engineering system used to integrate Siemens drive technology into the SIMATIC automation world easily, efficiently and cost-effectively in terms of communication, configuration and data management.

It is based on the operator interface of the STEP 7 Manager, the essential element when it comes to engineering.

Various software packages are available for selection.

- Drive ES Basic -
  For entry into the world of Totally Integrated Automation and the capability of routing beyond network boundaries and the use of the SIMATIC teleservice.
- Drive ES Graphic -
  for convenient configuring of free drive functions for SIMOVERT MASTERDRIVES and SIMOREG DC MASTER.
- Drive ES SIMATIC -
  for simply assigning parameters in the STEP 7 communication software instead of programming.
- Drive ES PCS7 - integrates drives with PROFIBUS interface into the SIMATIC PCS7 process control system.

Ordering data

	Order No.
Drive ES Basic V5.4 • Configuring software for integration of drives in Totally Integrated Automation • Requirement: STEP 7 from V5.3, SP 3 • Delivery form: on CD-ROM Ger, En, Fr, Sp, It with electronic documentation	
Single license	**6SW1 700-5JA00-4AA0**
Copy license, qty: 60	**6SW1 700-5JA00-4AA1**
Update service for single license	**6SW1 700-0JA00-0AB2**
Update service for copy license	**6SW1 700-0JA00-1AB2**
Upgrade from V 5.x to V 5.3	**6SW1 700-5JA00-4AA4**
Drive ES Graphic V6.0 • Option for Drive ES Basic, in conjunction with SIMATIC tool CFC for graphical configuring the functions available in SIMOVERT MASTERDRIVES • Requirement: Drive ES Basic from V 5 and CFC from V 5.1, SP 2 • Delivery form: on CD-ROM Ger, En, Fr, Sp, It with electronic documentation	
Single license V6.0	**6SW1 700-6JB00-0AA0**
Upgrade from V5.x to V6.0	**6SW1 700-6JB00-0AA4**
Drive ES SIMATIC V5.4 • Block library for SIMATIC for parameterizing communication with the drives • Requirement: STEP 7 from V 5.3, SP 3 • Delivery form: on CD-ROM Ger, En, Fr, Sp, It with electronic documentation	
Single license, incl. 1 runtime license	**6SW1 700-5JC00-4AA0**
Runtime license	**6SW1 700-5JC00-1AC0**
Update service for single license	**6SW1 700-0JC00-0AB2**
Upgrade from V 5.x to V 5.4	**6SW1 700-5JC00-4AA4**
Drive ES PCS7 V6.1 • Block library for PCS 7 for integration of drives • Requirement: PCS 7 from V6.1 • Delivery form: on CD-ROM Ger, En, Fr, Sp, It with electronic documentation	
Single license, incl. 1 runtime license	**6SW1 700-6JD00-1AA0**
Runtime license	**6SW1 700-5JD00-1AC0**
Update service for single license	**6SW1 700-0JD00-0AB2**
Upgrade from V5.x to V6.1	**6SW1 700-6JD00-1AA4**

Overview

- For creating safety-oriented automation applications with SIMATIC S7 in LAD or FBD (STEP 7 required)
- Implementation of safety functions by making simple connections between function blocks
- With preconfigured function block library
- User-defined blocks can be created
- Optimum embedding in the automation world due to guaranteed integration with STEP 7 tools
- Scope of supply:
  - Distributed Safety editor
  - Code generator
  - Debugger
  - Libraries of standard blocks

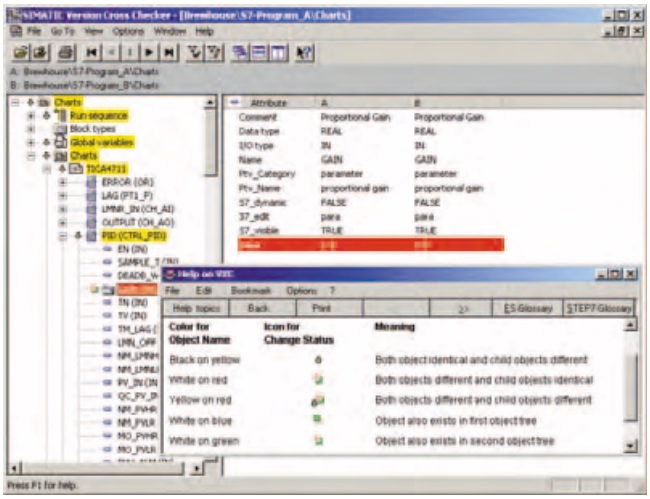
Ordering data

	Order No.
Distributed Safety V5.4 programming tool *Task:* Software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, ET 200S *Requirement:* STEP 7 V5.3 SP3 and higher	
Floating license	**6ES7 833-1FC02-0YA5**
Software Update Service	**6ES7 833-1FC00-0YX2**
Distributed Safety Upgrade	
From V5.x to V5.4; Floating license for 1 user	**6ES7 833-1FC02-0YE5**
Engineering License for the fail-safe library "Function blocks for burner management systems" FFB-V 1.2	**9AL3 100-1AD12**
License for one controller	

7

Version Cross Checker

Overview



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

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

Upgrade from V6.0

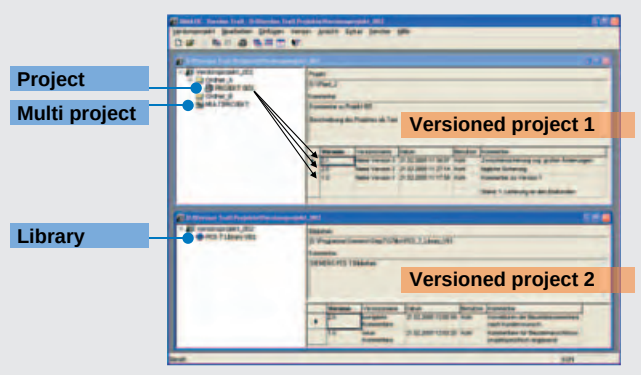
For SIMATIC PCS 7 users, the engineering software upgrade package already includes an upgrade of the version cross-checker from V6.0 to V6.1.

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

Ordering data

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

Overview



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

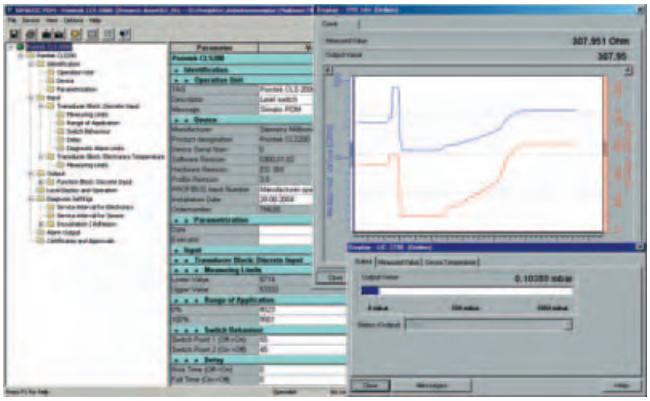
Ordering data

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

7

SIMATIC PDM

Overview



PDM lifelist with status and diagnostics display

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

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

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

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

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

Technical specifications

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

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

SIMATIC PDM

Ordering data	Order No.
Predefined SIMATIC PDM V6.0 product configurations for special applications	
SIMATIC PDM Service V6.0 Complete package for stand-alone users in servicing, with • SIMATIC PDM Basic V6.0 • Option "128 TAGs" 5 languages (German, English, French, Italian and Spanish), executes with Windows 2000 Professional or Windows XP Professional, floating license for 1 user Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions; 2 CDs with SIMATIC PDM V6.0 and device library as well as supplementary DVD with Microsoft ServicePacks and tools	**6ES7 658-3JX06-0YA5**
SIMATIC PDM S7 V6.0 Complete package for use in a SIMATIC S7 configuration environment, with • SIMATIC PDM Basic V6.0 • Option "Integration in STEP 7/ PCS 7" • Option "128 TAGs" 5 languages (German, English, French, Italian and Spanish), executes with Windows 2000 Professional or Windows XP Professional, floating license for 1 user Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions; 2 CDs with SIMATIC PDM V6.0 and device library as well as supplementary DVD with Microsoft ServicePacks and tools	**6ES7 658-3KX06-0YA5**
SIMATIC PDM PCS 7 V6.0 Complete package for integration in the engineering toolset of the SIMATIC PCS 7 engineering system Floating license for 1 user, with • SIMATIC PDM Basic • Option "Integration in STEP 7/ PCS 7" • Option "Routing through S7-400" • Option "128 TAGs" 5 languages (German, English, French, Spanish, Italian), executes with Windows 2000 Professional or Windows XP Professional Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions; 2 CDs with SIMATIC PDM V6.0 and device library as well as supplementary DVD with Microsoft ServicePacks and tools	**6ES7 658-3LX06-0YA5**

	Order No.
Demo software	
SIMATIC PDM Demo V6.0 Without online communication and save functionality 5 languages (German, English, French, Spanish, Italian), executes with Windows 2000 Professional or Windows XP Professional Type of delivery: 2 CDs with SIMATIC PDM V6.0 and device library as well as supplementary DVD with Microsoft ServicePacks and tools	**6ES7 658-3GX06-0YC8**
SIMATIC PDM upgrade/update service	
SIMATIC PDM Upgrade from V5.x to V6.0 For all product versions and combinations 5 languages (German, English, French, Italian and Spanish), executes with Windows 2000 Professional or Windows XP Professional, floating license for 1 user Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions; 2 CDs with SIMATIC PDM V6.0 and device library as well as supplementary DVD with Microsoft ServicePacks and tools	**6ES7 651-5CX06-0YE5**
SIMATIC PDM Software Update Service Subscription for 1 year with automatic extension Precondition: current software version	**6ES7 658-3XX00-0YL8**

Technical specifications

Engineering tool	S7-SCL	S7-GRAPH
Current version	V5.3	V5.3
Software class	A	A
Applications		
Can be used for:	Text-based high-level language programming of simple and complex calculations, CASE, loop, jump and compare functions	Graphical programming of sequential control systems and sequencers
Marketing message	Programming of algorithms and calculations made easy!	The fast and elegant way to program sequential processes in a simple and clear manner!
Advantages	• Easy-to-read and straightforward programs • Functional module-oriented programming • CASE instruction replaces a large number of jump and compare functions • Simple change for PLC programmers, since the programming philosophy of LAD, FBD, and STL is retained • Easy switching to PLC programming for PC programmers • Interchangeability (porting) of subprograms as specified in IEC 61131-3 • Less time required for engineering compared to LAD, FBD, and STL: up to 20 % with simple programs; at least 50 % with demanding program structures	• Ready for optimum use already during the design phase • Less configuration effort thanks to graphical structuring and programming • Rapid and easy familiarization • Precise error locating by means of integrated diagnostics combined with ProAgent for ProTool/Pro and WinCC • Less time required for engineering compared to LAD, FBD, and STL: Approximately 40% to 70%
Industries	• Labeling machines • Chemical plants (e.g. oxygen production, evaluation of measured values) • Rubber and plastics machines • Woodworking machinery • Warehouse systems and logistics • Paper and printing machinery • Punching and cutting machines • Water industry • Coilers	• Automobile production (e.g. body-in-white, final assembly) • Electrical equipment manufacture • Rubber and plastics machines • Pick-and-place machines • Woodworking machinery • Metalworking machinery • Paper and printing machinery • Testing machines • Rolling mills • Coilers • Leisure and entertainment facilities
Target systems		
Suitable for use on	S7-300 (CPU 313 and CPU 312C and higher recommended) S7-400 C7 (recommended for C7-626) WinAC	S7-300 (CPU 314 and CPU 312C and higher recommended) S7-400 C7 (recommended for C7-626) WinAC
System requirements		
Operating system	Windows 2000 Professional Windows XP Professional	Windows 2000 Professional Windows XP Professional
Hard disk memory requirements in PG/PC approx.	8 MB	15 MB
Software required	STEP 7 V5.3	STEP 7 V5.3
Features		
Monitor tags	Yes	Yes
Controlling variables	Yes	Yes
Single-step processing	Yes	Yes
Integration in CFC	Yes	-
Program execution times		
For S7-300 (typically)	Similar to LAD, FBD and STL	3 ms per block + 1 ms per active step
For S7-400 (typically)	Similar to LAD, FBD and STL	0.4 ms per block + 0.06 ms per active step

Technical specifications

Technical specifications

Engineering Tool	S7-SCL	S7-GRAPH
Diagnostics		
Integration of diagnostic data in ProAgent	-	Yes
Integration of diagnostic data in ProTool/Pro	-	Using ProAgent
Integration of diagnostic data in WinCC	-	Using ProAgent
Supported standards		
IEC 61131-3	PLCopen certification • Base level ST present • Conformity and reusability level ST (available soon)	PLCopen certification • Base level SFC present
Status of the PLCopen activities	Test profile is available for conformity and reusability level ST	-
Order variants/licenses		
Floating license	CD-ROM with • Tool • Electronic manual • Getting Started • Examples • Authorization diskette • Certificate of License • Product information sheet	CD-ROM with • Tool • Electronic manual • Getting Started • Examples • Authorization diskette • Certificate of License • Product information sheet
Upgrade (floating license) Software Update Service (SUS)	CD-ROM with • Tool • Electronic manual • Getting Started • Examples • Authorization diskette • Certificate of License • Product information sheet	CD-ROM with • Tool • Electronic manual • Getting Started • Examples • Authorization diskette • Certificate of License • Product information sheet
Also included in		
STEP 7 Professional	Yes	Yes
S7 Trainer Package	Yes	Yes
PCS 7	Yes	-
D7 SYS	-	-

Engineering tool	S7-HiGraph	CFC
Current version	V5.3	V6.1
Software class	A	A
Applications		
Can be used for:	Graphical and flexible state description of functional units and coordination functions	Graphical creation, interconnection and parameterization of (preconfigured) blocks and functions
Marketing message	A common language for technologists, programmers, commissioning engineers, operators and maintenance technicians!	Interconnection and parameterization instead of programming!

Technical specifications

EngineringTool	S7-HiGraph	CFC
Advantages	• Ready for optimum use already during the design phase • Overview of mechanical functions made easy • Less configuration effort thanks to graphical programming • High degree of reusability of previously described functions, such as the response of valves, motors, clamping devices, etc. • Rapid and easy familiarization • Short program execution times • Precise error locating by means of integrated diagnostics combined with ProAgent for ProTool/Pro • Less time required for engineering compared to LAD, FBD, and STL: Up to 50%	• Ready for optimum use already during the design phase • Less configuration effort thanks to graphical interconnection • High degree of reusability of previously created charts • Rapid and easy familiarization • Rapid and transparent interconnection of preassembled functions • Process-oriented creation of the overall program • Clear presentation of control engineering structures • Short commissioning time • High plant availability • Less time required for engineering compared to LAD, FBD, and STL: Up to 50%
Industries	• Automobile production (e.g. engine building, axle production, gearbox production) • Chemical plants (e.g. oxygen production) • Rubber and plastics machines • Food and beverage machines • Packaging machines • Machine tools • Coilers • Special machines	• Automobile production (e.g. temperature controls, processes involved in tire production) • Chemical industry • Power engineering and supply • Rubber and plastics machines • Metalworking machinery • Food and beverage machines • Petrochemicals • Rolling mills • Water industry • Coilers
Target systems		
Suitable for use on	S7-300 S7-400 C7 WinAC	S7-300 S7-400 F/H systems WinAC
System requirements		
Operating system	Windows 2000 Professional Windows XP Professional	Windows 2000 Professional SP3 and higher, Windows XP Professional SP1 or SP1a
Hard disk memory requirements in PG/PC approx.	10 Mbyte	Approx. 60 MB
Software required	STEP 7 V5.3	STEP 7 as of V5.3 S7-SCL V5.1 SP 3 and higher
Features		
Monitor tags	Yes	Yes
Controlling variables	Yes	Yes
Single-step processing	-	-
Integration in CFC	Yes	Yes
Program execution times		
For S7-300 (typically)	0.1 ms per graph group + 0.1 ms per state diagram	Depends on interconnected blocks
For S7-400 (typically)	0.1 ms per graph group + 0.01 ms per state diagram	Depends on interconnected blocks
Diagnostics		
Integration of diagnostic data in ProAgent	Yes	-
Integration of diagnostic data in ProTool/Pro	Using ProAgent	-
Integration of diagnostic data in WinCC	Using ProAgent (in preparation)	-

Technical specifications

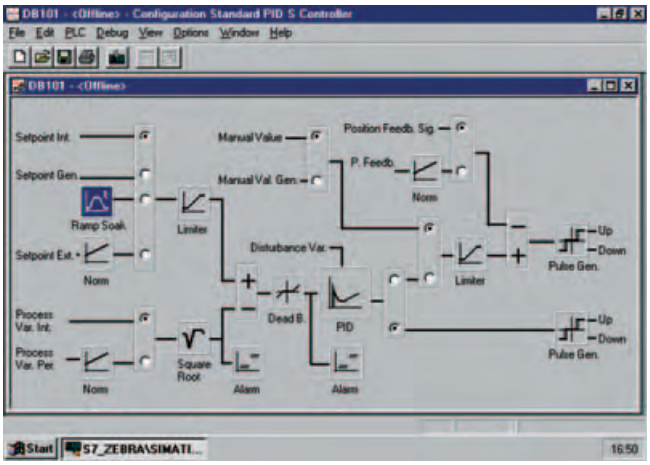
Technical specifications

EngineringTool	S7-HiGraph	CFC
Supported standards		
IEC 61131-3	Compatible expansion to IEC standard	Based on IEC standard
Status of the PLCopen activities	-	-
Order variants/licenses		
Floating license (S7-HiGraph) or single license (CFC)	CD-ROM with • Tool • Electronic manual • Getting Started • Examples • Authorization diskette • Certificate of License	CD-ROM with • Tool • Electronic manual • Getting Started • Examples • License Key Disk • Terms and Conditions • Certificate of License
Upgrade (floating license (S7-HiGraph) or single license (CFC))	CD-ROM with • Tool • Electronic manual • Getting Started • Examples • Authorization diskette • Certificate of License • Product information sheet	CD-ROM with • Tool • Electronic manual • Getting Started • Examples • License Key Disk • Emergency Key Disk • Certificate of License • Terms and Conditions • Product information sheet
Software Update Service (SUS)		
Also included in		
STEP 7 Professional	-	-
S7 Trainer Package	Yes	-
PCS 7	-	Yes
D7 SYS	-	Yes

Engineering tool	S7-PDIAG	S7-PLCSIM
License form	Floating License	Floating License
Software class	A	A
Current version	V5.3	V5.3
Target system (recommended)	SIMATIC S7-300 (CPU 314 and higher) SIMATIC S7-400	SIMATIC S7-300 SIMATIC S7-400 SIMATIC C7
Operating system	Windows 2000 Professional Windows XP Professional	Windows 2000 Professional Windows XP Professional
Required software packages	STEP 7 V5.3 SP3 and higher	STEP 7 as of V5.3
Disk space required in PG/PC	6 MB	5 MB

Engineering tool	TeleService	DOCPRO
Software class	A	A
Current version	V6.0	V5.1
Target system (recommended)	SIMATIC S7-300/400 SIMATIC C7	SIMATIC S7-300/400 SIMATIC C7
Operating system	Windows 2000 Windows XP Home Windows XP Professional	Win 95/98/Me/NT4.0/2000 Professional/ XP Professional
Required software packages	-	STEP 7 V5.1 or V5.2
Disk space required in PG/PC	2 MB	5 MB

Overview



- For integrating continuous PID controllers, pulse controllers and step controllers in the application program
- Reduces engineering costs thanks to space-saving parameterization and optimization of the controller
- For use in SIMATIC S7-300 (CPU 313 or higher), S7-400 and C7

Technical specifications

Parameterization tool data	
Requirements	STEP 7 V5.2 or newer

Standard function blocks	**PID_CP (FB 1)**		**PID_ES (FB 2)**		**LP_SCHED (FC 1)**	
Memory requirements	Load memory	RAM	Load memory	RAM	Load memory	RAM
• FB length in memory	8956 byte	7796 byte	9104 byte	7982 byte	1064 byte	976 byte
• DB length in memory	1168 byte	510 byte	1124 byte	484 byte	184 byte[2)]	100 byte[2)]
Runtimes						
• in S7-300/C7[1)]	0.18 - 4.4 ms		0.2 - 5.1 ms		0.03 - 0.3 ms	
• in S7-400[1)]	0.13 – 0.35 ms		0.16 - 0.35 ms		0.03 - 0.08 ms	
Target system	SIMATIC S7-300, S7-400, C7					

1) Dependent on CPU

2) With 5 control loops

Ordering data

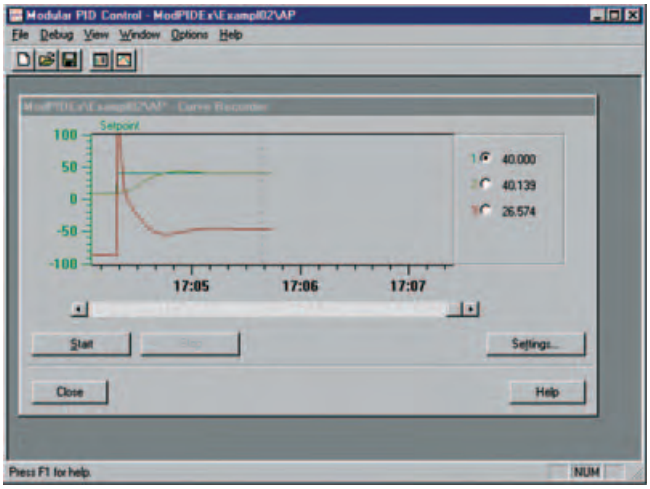
Parameterization tool Standard PID Control, V5.1	**Order No.**
Task: Parameterization tool for standard controls *Requirements:* STEP 7 V5.2 or newer *Delivery package:* With el. manual/Getting Started Ger, Eng; incl. authorization diskette	
Single license	**6ES7 830-2AA21-0YX0**
Software update service	**6ES7 830-2AA00-0YX2**
Upgrade single license from V5.0 to V5.1	**6ES7 830-2AA21-0YX4**

Standard function blocks Standard PID Control, V5.1		**Order No.**
Task: Standard FBs for standard controllers *Target system:* SIMATIC S7-300 (from CPU 313), S7-400, C7 *Delivery type:* With el. manual/Getting Started Ger, Eng		
Single license		**6ES7 860-2AA21-0YX0**
Single license without software and documentation		**6ES7 860-2AA21-0YX1**
SIMATIC Manual Collection	D)	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year	D)	**6ES7 998-8XC01-8YE2**

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

Modular PID Control

Overview



- For creating complex closed-loop control structures
- Preferred for implementation in closed-loop control equipment in mid-range and high-end applications and in process engineering
- For use in SIMATIC S7-300 (CPU 313 or newer), S7-400 and C7

7

Technical specifications

Startup software	
Requirements	STEP 7 V3.1 and newer
Main memory expansion	16 Mbyte
Processor, at least	486
Windows swap area, approx	20 MB (largest possible)

Standard Function Blocks	**A_DEAD_B**		**CRP_IN**		**CRP_OUT**	
Memory requirements	Load memory	RAM	Load memory	RAM	Load memory	RAM
• FB length in memory	898 byte	692 byte	182 byte	70 byte	206 byte	96 byte
• DB length in memory	186 byte	44 byte	122 byte	20 byte	114 byte	14 byte
Runtimes in S7-300/C7	0.13 to 0.17 ms		0.06 ms		0.18 to 0.22 ms	
Runtimes in S7-400	0.01 to 0.03 ms		0.01 bis 0.02 m		0.01 to 0.04 ms	
Target system	SIMATIC S7-300 (from CPU 313), S7-400, C7		SIMATIC S7-300 (from CPU 313), S7-400, C7		SIMATIC S7-300 (from CPU 313), S7-400, C7	

Standard Function Blocks	**DEAD_T**		**DEAD_BAND**		**DIF**	
Memory requirements	Load memory	RAM	Load memory	RAM	Load memory	RAM
• FB length in memory	532 byte	394 byte	232 byte	120 byte	410 byte	268 byte
• DB length in memory	142 byte	22 byte	114 byte	16 byte	158 byte	30 byte
Runtimes in S7-300/C7	0.26 to 0.33 ms		0.16 to 0.21 ms		0.55 to 0.71 ms	
Runtimes in S7-400	0.02 to 0.06 m		0.01 to 0.03 ms		0.03 to 0.09 ms	
Target system	SIMATIC S7-300 (from CPU 313), S7-400, C7		SIMATIC S7-300 (from CPU 313), S7-400, C7		SIMATIC S7-300 (from CPU 313), S7-400, C7	

Technical specifications (continued)

Standard Function Blocks	ERR_MON		INTEG		LAG1ST	
Memory requirements	Load memory	RAM	Load memory	RAM	Load memory	RAM
• FB length in memory	558 byte	360 byte	488 byte	314 byte	534 byte	368 byte
• DB length in memory	206 byte	52 byte	168 byte	36 byte	156 byte	30 byte
Runtimes in S7-300/C7	0.27 to 0.35 ms		0.40 to 0.51 ms		0.52 to 0.67 ms	
Runtimes in S7-400	0.01 to 0.05 ms		0.02 to 0.07 ms		0.03 to 0.09 ms	
Target system	SIMATIC S7-300 (from CPU 313), S7-400, C7		SIMATIC S7-300 (from CPU 313), S7-400, C7		SIMATIC S7-300 (from CPU 313), S7-400, C7	

Standard Function Blocks	LAG2ND		LIMALARM		LIMITER	
Memory requirements	Load memory	RAM	Load memory	RAM	Load memory	RAM
• FB length in memory	690 byte	516 byte	390 byte	240 byte	262 byte	140 byte
• DB length in memory	190 byte	46 byte	152 byte	28 byte	124 byte	20 byte
Runtimes in S7-300/C7	0.88 to 1.14 ms		0.47 to 0.61 ms		0.14 to 0.17 ms	
Runtimes in S7-400	0.04 to 0.16 ms		0.02 to 0.07 ms		0.03 to 0.01 ms	
Target system	SIMATIC S7-300 (from CPU 313), S7-400, C7		SIMATIC S7-300 (from CPU 313), S7-400, C7		SIMATIC S7-300 (from CPU 313), S7-400, C7	

Standard Function Blocks	LMNGEN_C		LMNGEN_S		NONLIN	
Memory requirements	Load memory	RAM	Load memory	RAM	Load memory	RAM
• FB length in memory	1576 byte	1280 byte	2578 byte	2152 byte	826 byte	672 byte
• DB length in memory	276 byte	80 byte	360 byte	110 byte	138 byte	18 byte
Runtimes in S7-300/C7	0.32 to 0.41 ms		1.16 to 1.47 ms		0.32 to 0.41 ms	
Runtimes in S7-400	0.02 to 0.06 ms		0.06 to 0.18 ms		0.02 to 0.07 ms	
Target system	SIMATIC S7-300 (from CPU 313), S7-400, C7		SIMATIC S7-300 (from CPU 313), S7-400, C7		SIMATIC S7-300 (from CPU 313), S7-400, C7	

Standard Function Blocks	NORM		OVERRIDE		PARA_CTL	
Memory requirements	Load memory	RAM	Load memory	RAM	Load memory	RAM
• FB length in memory	234 byte	122 byte	362 byte	214 byte	406 byte	232 byte
• DB length in memory	130 byte	24 byte	146 byte	28 byte	234 byte	82 byte
Runtimes in S7-300/C7	0.33 to 0.43 ms		0.15 to 0.18 ms		0.12 to 0.15 ms	
Runtimes in S7-400	0.02 to 0.07 ms		0.01 to 0.04 ms		0.01 to 0.03 ms	
Target system	SIMATIC S7-300 (from CPU 313), S7-400, C7		SIMATIC S7-300 (from CPU 313), S7-400, C7		SIMATIC S7-300 (from CPU 313), S7-400, C7	

Standard Function Blocks	PID		PULSEGEN		RMP_SOAK	
Memory requirements	Load memory	RAM	Load memory	RAM	Load memory	RAM
• FB length in memory	1560 byte	1242 byte	1110 byte	872 byte	1706 byte	1500 byte
• DB length in memory	340 byte	98 byte	190 byte	34 byte	212 byte	62 byte
Runtimes in S7-300/C7	1.15 to 1.46 ms		0.17 to 0.20 ms		0.16 to 0.20 ms	
Runtimes in S7-400	0.06 to 0.18 ms		0.01 to 0.05 ms		0.01 to 0.04 ms	
Target system	SIMATIC S7-300 (from CPU 313), S7-400, C7		SIMATIC S7-300 (from CPU 313), S7-400, C7		SIMATIC S7-300 (from CPU 313), S7-400, C7	

Modular PID Control

Technical specifications (continued)

Standard Function Blocks	ROC_LIM		SCALE		SP_GEN	
Memory requirements	Load memory	RAM	Load memory	RAM	Load memory	RAM
• FB length in memory	1242 byte	980 byte	136 byte	32 byte	658 byte	484 byte
• DB length in memory	222 byte	50 byte	114 byte	16 byte	164 byte	40 byte
Runtimes in S7-300/C7	0.53 to 0.68 ms		0.10 to 0.13 ms		0.27 to 0.35 ms	
Runtimes in S7-400	0.02 to 0.09 ms		0.01 to 0.02 ms		0.02 to 0.06 ms	
Target system	SIMATIC S7-300 (from CPU 313), S7-400, C7		SIMATIC S7-300 (from CPU 313), S7-400, C7		SIMATIC S7-300 (from CPU 313), S7-400, C7	

Standard Function Blocks	SPLT_RAN		SWITCH			
Memory requirements	Load memory	RAM	Load memory	RAM	Load memory	RAM
• FB length in memory	304 byte	180 byte	238 byte	116 byte	1104 byte	972 byte[1)]
• DB length in memory	138 byte	28 byte	118 byte	18 byte	234 byte	64 byte[1)]
Runtimes in S7-300/C7	0.09 to 0.11 ms		0.07 to 0.09 ms		0.28 to 0.34 ms	
Runtimes in S7-400	0.01 to 0.02 ms		0.01 to 0.03 ms		0.03 to 0.08 ms	
Target system	SIMATIC S7-300 (from CPU 313), S7-400, C7		SIMATIC S7-300 (from CPU 313), S7-400, C7		SIMATIC S7-300 (from CPU 313), S7-400, C7	

1) With 5 control loops

Ordering data

	Order No.
Commissioning tool Modular PID Control, V4.0 for SIMATIC S7 and C7 *Task:* Commissioning tool for modular PID controls *Prerequisite:* STEP 7 V3.1 or later *Delivery package:* with electronic manual in German and English; incl. authorization diskette	
Single license	**6ES7 830-1AA10-0YX0**
Software update service	**6ES7 830-1AA00-0YX2**
Standard function blocks Modular PID Control, V4.1 *Task:* Standard FBs for modular PID controls *Target system:* SIMATIC S7-300 (from CPU 313), S7-400, C7 *Delivery type:* German, English; with electronic manual	
Single license	**6ES7 860-1AA10-0YX0**
Single license, without software and documentation	**6ES7 860-1AA10-0YX1**

		Order No.
SIMATIC Manual Collection Electronic manuals on DVD, 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, Engineering Software, Runtime Software, PCS 7, SIMATIC HMI, SIMATIC NET	D)	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year Up-to-date Manual Collection DVD as well as the three subsequent updates	D)	**6ES7 998-8XC01-8YE2**

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

Overview

- PID Self-Tuner: For extending existing PID controllers into self-setting PI or PID controllers.
- Optimization of PI or PID controllers with 3-step action (HEATING – OFF – COOLING)
- Convenient online initial setting and online adaptation during operation
- Ideal application is in temperature controllers, but also suitable for level and flow controllers
- Used with SIMATIC S7-300 (CPU 313 upwards), SIMATIC S7-400 and SIMATIC C7; in combination with PID Control (integrated in STEP 7), standard PID Control, modular PID Control, FM 355, FM 455 as well as with any PID algorithm

Technical specifications

PID Self-Tuner	TUN_EC		TUN_ES	
Memory requirements	Load memory	RAM	Load memory	RAM
• FB length in memory	ca. 6542 byte	ca. 5956 byte	6332 byte	5714 byte
• DB length in the memory	644 byte	294 byte	638 byte	288 byte
Runtimes				
• in S7-300, C7	1.0 to 1.5 ms[1)]		1.0 to 1.5 ms[1)]	
• in S7-400	0.6 to 0.9 ms[1)]		0.06 to 0.19 ms[1)]	

1) Dependent on CPU

Ordering data

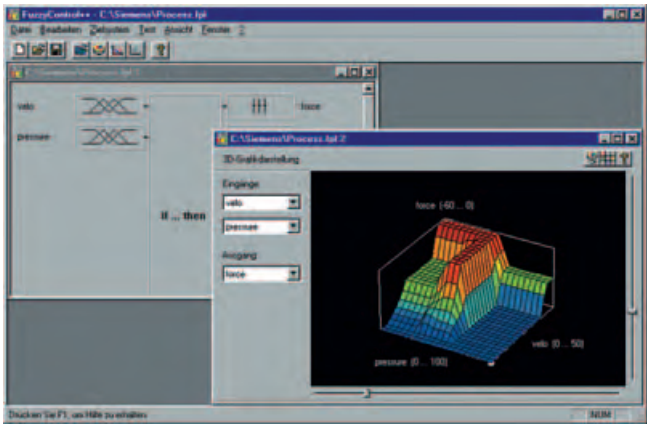
	Order No.
PID Self Tuner V5.0	
Function: Online optimization for PID controllers *Target system:* SIMATIC S7-300 (CPU 313 or higher), S7-400, C7 *Type of delivery:* Standard function blocks, electronic manual and Getting Started in German/English	
Single license	**6ES7 860-4AA01-0YX0**
Single license, without software or documentation	**6ES7 860-4AA01-0YX1**

		Order No.
SIMATIC Manual Collection	D)	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, in 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET		
SIMATIC Manual Collection maintenance service for 1 year	D)	**6ES7 998-8XC01-8YE2**
Current Manual Collection DVD as well as the three following updates		

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

Fuzzy Control

Overview



- For creating Fuzzy systems for SIMATIC S7 and SIMATIC WinCC
- For use at all levels of automation from the standalone controller through to plant optimization
- Can be combined with classical PID controllers to utilize the advantages of both systems for optimized closed-loop control

Technical specifications

Technical specifications for the configuring tool	
Processor	PC or PG with 80486 processor (or higher)
Main memory, min.	16 MB RAM
Hard disk	5 MB free storage space on the hard disk
Operating system	Windows 95 or Windows NT 4.0

Technical specifications for standard function blocks

	FUZZY_4K (FB 30)	**FUZZY_20K (FB 31)**	**FUZZY_WinCC**
Target system	SIMATIC S7-300 from CPU 314, SIMATIC S7-400	SIMATIC S7-400	SIMATIC WinCC
Communication between PC/PG and S7	MPI bus, SOFTNET S7 for PROFIBUS	MPI bus, SOFTNET S7 for PROFIBUS	Not required
Runtimes	Depending on the number of rules, inputs and outputs: 13 to 180 ms (S7-300) 1.8 to 22 ms (S7-400)	Depending on the number of rules, inputs and outputs: 1.8 to 150 ms (S7-400)	Cannot be measured
Memory requirements			
• FB	1524 byte	1524 byte	Cannot be measured
• DB	4228 byte	20612 byte	
Number of inputs	8 with up to 7 membership functions each	8 with up to 7 membership functions each	8 with up to 7 membership functions each
Number of outputs	4 with up to 9 membership functions each	4 with up to 9 membership functions each	4 with up to 9 membership functions each
Number of rules, max.	200	2000	2000

Ordering data

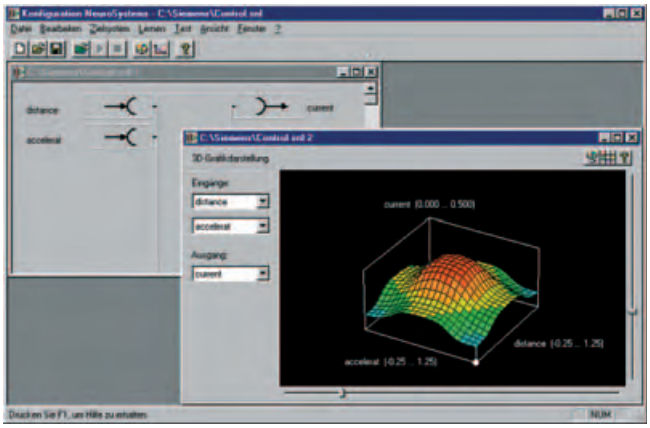
		Order No.
Fuzzy Control++ configuration tool		
Function blocks for S7-300/400 CPU 314 and higher, incl. Smart-Object for SIMATIC WinCC, manual; single license		
Basic license	E)	**2XV9 450-1WC10-0AA0**
Copy license	E)	**2XV9 450-1WC11-4XA0**

		Order No.
SIMATIC Manual Collection	D)	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, in 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET		
SIMATIC Manual Collection maintenance service for 1 year	D)	**6ES7 998-8XC01-8YE2**
Current Manual Collection DVD as well as the three following updates		

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

E) Subject to export regulations: AL: N and ECCN: EAR99S

Overview



- For creating and teaching neuronal networks
- For use with problems whose structure and solution are only partially known
- Applications:
  - Data-based optimization
  - Identification of characteristics or processes
  - Filtering of data
  - Data evaluation and interpretation
  - Non-linear single and multiple-variable closed-loop control
  - Pattern recognition and diagnostics

Technical specifications

Configuring tool	Requirements
Processor	PC or PG with 80486 processor (or higher)
Main memory, min.	16 MB RAM
Hard disk	5 MB free storage space on the hard disk
Operating system	Windows 95 or Windows NT 4.0

Function blocks	NEURO_4K (FB 100)	NEURO_20K (FB 101)	NEURO_WinCC
Target system	SIMATIC S7-300 from CPU 314, SIMATIC S7-400	SIMATIC S7-400	SIMATIC WinCC
Communication PC/PG – S7	MPI bus, SOFTNET S7 for PROFIBUS	MPI bus, SOFTNETS7 for PROFIBUS	Not required
Runtimes	Depending on the number of inputs, outputs and neurons: 6.5 to 270 ms (S7-300) 3.3 to 140 ms (S7-400)	Depending on the number of rules, inputs and outputs: 3.3 to 260 ms (S7-400)	Cannot be measured
Memory requirements			
• FB	2246 byte	2210 byte	Cannot be measured
• DB	4278 byte	20612 byte	
Number of inputs, max.	4	100	10
Number of outputs, max.	4	10	10
Types of network	MLP, RBF, Neuro-fuzzy	MLP, RBF, Neuro-fuzzy	MLP, RBF, Neuro-fuzzy

Ordering data

		Order No.
NeuroSystems configuration tool		
Function blocks for S7-300/400 CPU 314 and higher, incl. Smart-Object for SIMATIC single license		
Basic license	E)	**2XV9 450-1WC15-0AA0**
Copy license	E)	**2XV9 450-1WC16-4XA0**

		Order No.
SIMATIC Manual Collection	D)	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, in 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET		
SIMATIC Manual Collection maintenance service for 1 year	D)	**6ES7 998-8XC01-8YE2**
Current Manual Collection DVD as well as the three following updates		

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

E) Subject to export regulations: AL: N and ECCN: EAR99S

Loadable drivers for CP 441-2 and CP 341

Overview

- Driver for MODBUS protocol with RTU message format; communication as master or slave
- Driver for full-duplex protocol for Data Highway Asynchronous Link from Allen Bradley
- Loadable on CP 341 and CP 441-2 (6ES7 441-2AA03-0AE0)

Technical specifications

MODBUS master	• MODBUS protocol with RTU format • Master/slave coupling: SIMATIC S7 is master • Implemented function codes: 01, 02, 03, 04, 05, 06, 07, 08, 11,12,15,16 • No V.24 control and signaling lines • CRC polynomial: X16 + x15 + x2 +1 • Interfaces: TTY (20 mA); V.24 (RS 232 C); X.27 (RS 422/485) two-wire or four-wire • Inbox specified on BRCV • Delay time 3.5 characters or multiple thereof • Broadcast message possible
Adjustable parameters	• Data transmission rate 300 bit/s up to 76800 bit/s; (TTY to 19200 bit/s) • Character frame • With/without RS 485 mode for two-wire connections • With/without modem mode (ignore scratch character) • Response timer 100 ms to 25.5 s in steps of 100 ms • Factor for character delay time 1-10 • Default input of receive line when using X.27 interface module
MODBUS slave	• MODBUS protocol with RTU format • Master/slave coupling: SIMATIC S7 is slave • Implemented function codes: 01, 02, 03, 04, 05, 06, 08, 15, 16 • No V.24 control and signaling line • CRC polynomial X16 + x15 + x2 + 1
MODBUS slave (continued)	• Interfaces: TTY (20 mA), V.24 (RS 232C), X.27 (RS 422/485) two-wire or four-wire • Communication FB 180, instance DB 180 (use of a multi-instance) • Conversion of MODBUS data address to S7 data areas. Processed data areas: DB, bit memories, outputs, inputs, timers, counters • Delay time 3.5 characters or multiple thereof
Adjustable parameters	• Data transmission rate 300 bit/s up to 76800 bit/s; (TTY to 19200 bit/s) • Character frame • Slave address of CP (1 to 255) • With/without RS 485 mode for two-wire connection • With/without modem mode (ignore scratch character) • Factor for character delay time 1-10 • Number of work DB (for FB processing) • Enabling of memory areas for writing by master • Default input of receive line when using X.27 interface module • Conversion of MODBUS addresses to S7 data areas
Data highway	• Data highway full duplex (DF1) protocol • Interfaces: TTY (20 mA), V.24 (RS 232C), RS 422/485 (four-wire) • No “embedded responses”
Adjustable parameters	• Data transmission rate 300 bit/s up to 76800 bit/s; (TTY to 19200 bit/s) • Character frame: 7/8 bit; 1/2 stop bits; even/odd/no parity • Inbox DB and data word • Timeout for acknowledgment character: 30 ms to 10 s • Number of repeats with NAK: 0 to 5 • Number of ENQ prompts: 0 to 5 • Duplicate message transmission detection: On or Off • Acknowledgment of CP immediately following receipt or only following transfer to CPU

Ordering data	Order No.
MODBUS master V3.1	
Function: Communication using MODBUS protocol with RTU format, SIMATIC S7 as the master *Requirements:* CP 341 or CP 441-2; STEP 7 V4.02 or newer *Type of delivery:* Driver program/documentation, German, English, French	
Single license	**6ES7 870-1AA01-0YA0**
Single license, without software or documentation	**6ES7 870-1AA01-0YA1**
MODBUS slave V3.1	
Function: Communication using MODBUS protocol with RTU format, SIMATIC S7 as the slave *Requirements:* CP 341 or CP 441-2; STEP 7 V4.02 or newer *Type of delivery:* Driver program/documentation, German, English, French	
Single license	**6ES7 870-1AB01-0YA0**
Single license, without software or documentation	**6ES7 870-1AB01-0YA1**

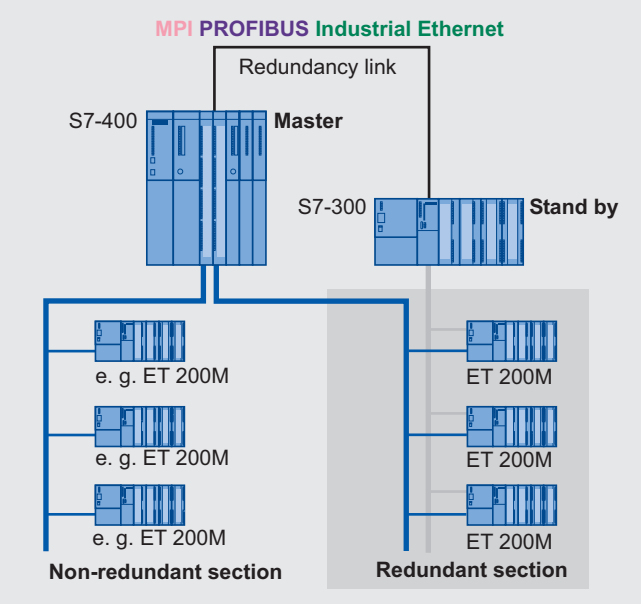
	Order No.
Data Highway V1.0	
Function: Communication over data highway asynchronous link with DF1 protocol *Requirements:* CP 341 or CP 441-2; STEP 7 V4.02 or newer *Type of delivery:* Driver program/documentation, German, English, French	
Single license	**6ES7 870-1AE00-0YA0**
Single license, without software or documentation	**6ES7 870-1AE00-0YA1**
SIMATIC Manual Collection D)	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, in 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	
SIMATIC Manual Collection maintenance service for 1 year D)	**6ES7 998-8XC01-8YE2**
Current Manual Collection DVD as well as the three following updates	

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

7

Software redundancy

Overview



- Software package for assembling fault-tolerant control systems based on software
- Designed for control systems with single-channel distributed I/O
- For use in applications with low demands on changeover speed, such as the control of hydroelectric power plants, cooling circuits, traffic flows, level control, measured data acquisition
- Inexpensive thanks to the use of standard S7-300 and S7-400 components
- I/O linking with PROFIBUS DP in redundant configuration
- Optional control via WinCC operator station

Technical specifications

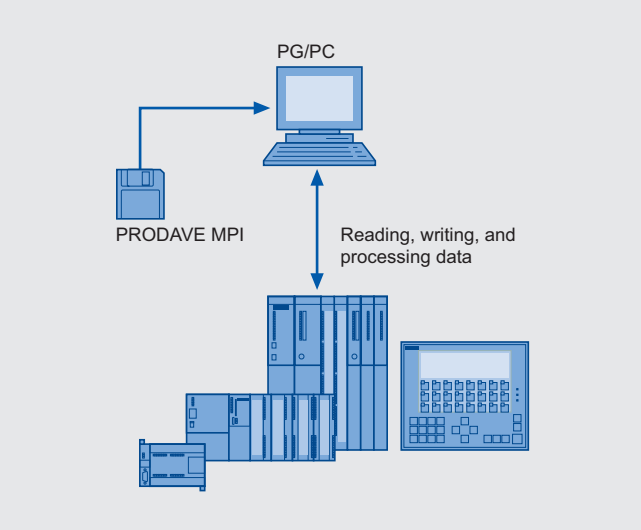
Hardware requirements	
CPU	S7-300: CPU 313C-2 DP, 314C-2 DP, 315-2 DP, 316-2 DP, 318-2 DP S7-400: all CPUs
Redundancy link of the CPUs	MPI, PROFIBUS, Industrial Ethernet; existing connections can also be used.
Suitable modules for ET 200M	IM 153-2; all DI/O, AI/O for ET 200M; FM 350-1 counter module CP 341
Software requirements	
Configuring/programming	STEP 7 V4.0
Communication configuration for redundant PROFIBUS DP	NCM S7 for PROFIBUS

Ordering data

		Order No.
Software Redundancy V1.2 program package		
Function: To configure a redundant control Target system: SIMATIC S7-300, S7-400 *Requirements:* STEP 7 V5.2, NCM S7 for PROFIBUS *Type of delivery:* incl. electronic documentation (German, English, French, Spanish, Italian), 4 application examples and picture block for WinCC, on CD-ROM		
Single license (for 2 CPUs)		**6ES7 862-0AC01-0YA0**
Single license, without software or documentation		**6ES7 862-0AC01-0YA1**
SIMATIC Manual Collection	D)	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, in 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET		
SIMATIC Manual Collection maintenance service for 1 year	D)	**6ES7 998-8XC01-8YE2**
DVD containing the current collection of manuals and the three subsequent updates		

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

Overview



- The toolbox for exchange of process data between SIMATIC S7, SIMATIC M7, SIMATIC C7 and a PG/PC
- For autonomous handling of data traffic over MPI/PPI, PROFIBUS and Industrial Ethernet

Ordering data

		Order No.
PRODAVE MPI/IE V6.0 for Windows 95/98/ME/NT 4.0/ 2000 Prof./XP Prof. *Task:* Data link between PG/PC and SIMATIC S7/C7 via MPI (S7-200 via PPI) or Industrial Ethernet *Requirements:* Windows 2000 Prof./XP Prof.; CP 5611, integrated MPI or PC adapter *Delivery package:* CD incl. electr. documentation (German, English)		
Single license	E)	**6ES7 807-4BA01-0YA0**
Copy license, without software and documentation	E)	**6ES7 807-4BA01-0YA1**
PRODAVE MPI Mini V6.0 for Windows 95/98/ME/NT 4.0/ 2000 Prof./XP Prof. *Task:* Data link between PG/PC and SIMATIC S7/C7 over MPI (S7-200 over PPI); with reduced functional scope) *Requirements:* Windows 95/98/ME/NT 4.0/2000 Prof./XP Prof.; CP 5611, integrated MPI or PC adapter *Delivery package:* CD incl. electr. documentation (German, English)		
Single license	E)	**6ES7 807-3BA01-0YA0**
Copy license, without software and documentation	E)	**6ES7 807-3BA01-0YA1**
SIMATIC Manual Collection Electronic manuals on DVD, five languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	D)	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	D)	**6ES7 998-8XC01-8YE2**

D) Subject to export regulations: AL: N and ECCN: 5D992B1
E) Subject to export regulations: AL: N and ECCN: EAR99S

Easy Motion Control

Overview

- Low-cost package for simple positioning control and simple gearbox synchronism
- For use with any variable-speed standard drive, e.g., frequency converter, servo drive.
- For incremental and absolute sensor

Changes in Version 2.0:

- Reduction in runtimes of function blocks
- Modification of FB names in conformance with PLCopen 1.0
- Gearbox synchronism (MC_GearIn)
- Driver for CPU 314C (CPU FW Version 2.0 or newer)
- PROFIBUS DP driver for MM4

Technical specifications

Supported hardware

Easy Motion Control executes on the following CPUs:

- S7-300 with CPU 314 or higher
- S7-400
- C7 with C7-633 or higher
- WinAC.

Supported modules for actual-value sensing:

- CPU 314C (CPU with FW version 2.0 or newer)
- ET 200S 1 Count 5V/500 kHz
- ET 200S 1 Count 24V/100 kHz
- ET 200S 1SSI
- SM 338.
- FM 350-1, FM 450-1
- SIMODRIVE sensor with PROFIBUS DP
- Other actual-value sensing modules (using free drivers)

Supported modules for setpoint output:

- ET 200S 2AO U
- SM 332
- SM 432
- Other setpoint output modules (using free drivers)

Drives supported via PROFIBUS DP:

- MM4

Memory requirements

Required RAM in byte

Block	Required RAM per block	Additionally required RAM per invocation
MC_Init	1086	-
MC_MoveAbsolute	3924	112
MC_MoveRelative	2982	110
MC_MoveJog	3110	110
MC_Home	2886	104
MC_StopMotion	1114	70
MC_Control	1756	58
MC_Simulation	410	64
MC_GearIn	3476	128
Input drivers	1416 ... 2654	76 ... 128
Output drivers	384 ... 1242	52 ... 68
Axle data block	-	294

Runtime load

Typical runtimes of blocks in µs

Block	CPU 416-2 DP 6ES7 416-2XK02-AB0	CPU 314C 6ES7 314-6CF00-0AB0	CPU 315-2 DP 6ES7 315-2AF03-0AB0	WinLC RTX 3.1 on AMD, 1333 MHz
MC_Init	53	967	2203	21
MC_MoveAbsolute 1)	67	908	2138	18
MC_MoveRelative 1)	67	911	2143	18
MC_MoveJog 1)	48	605	1387	15
MC_Home 1)	49	592	1332	15
MC_StopMotion 1)	23	309	696	8
MC_Control	27	343	819	11
MC_Simulation	23	259	584	6
MC_GearIn	66	931	2130	21
Input drivers	50	662	1323	44
Output drivers	20	223	413	31

1) The identified motion blocks require more runtime when starting a traverse. You will find further information on this subject in the manual.

Ordering data	Order No.		Order No.
Easy Motion Control V2.0			
Function: Position-controlled positioning with variable-speed standard drives *Requirements:* Windows 95/98/NT 4.0/ 2000 Prof./XP Prof. *Type of delivery:* including documentation (German, English)			
Single license	**6ES7 864-0AC01-0YX0**		
Single license, without software or documentation	**6ES7 864-0AF01-0YX0**		

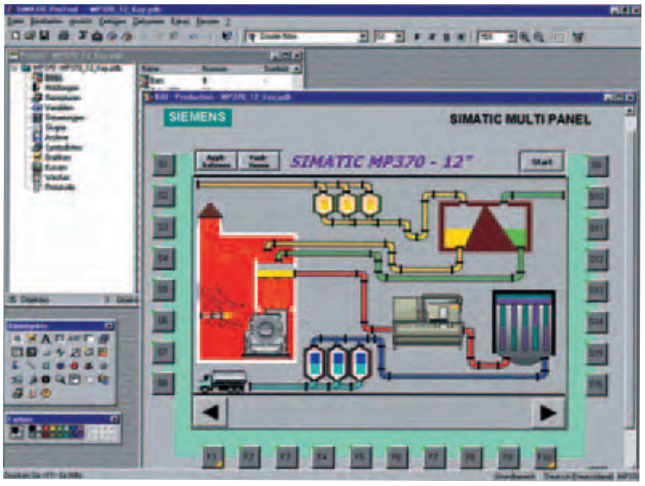
Technical specifications

Technical specifications

Parameterization software	Standard PID Control	Modular PID Control	PID Self-Tuner	Fuzzy Control++
License form	Single license	Single license	-	Single license
Software class	A	A	-	
Current version	V 5.1	V 4.0	-	
Target system	SIMATIC S7-300 (CPU 313 and higher) SIMATIC S7-400 SIMATIC C7	SIMATIC S7-300 (CPU 313 and higher) SIMATIC S7-400 SIMATIC C7	-	SIMATIC S7-300 (CPU 314 and higher) SIMATIC S7-400
Required software packages	STEP 7 V5.2 or higher	STEP 7 V3.1/V3.2 or higher	-	Windows 95 / NT
Main memory configuration in PG/PC	16 MB	16 MB	-	
Disk space required in PG/PC	1.85 MB	1.85 MB	-	16 MB
Standard FBs			-	5 MB
Required libraries	Standard PID Control-FBs V5.1	Modular PID Control FBs V4.0	PID Self-Tuner FBs V5.0	
License types	Single license and 1 runtime license; 1 runtime license	Single license and 1 runtime license; 1 runtime license	-	Fuzzy Control++ FBs
Software class	A	A	A	Single license
Current version	V 5.0	V 4.1	V5.0	A
Target system	SIMATIC S7-300 (CPU 313 and higher) SIMATIC S7-400 SIMATIC C7	SIMATIC S7-300 (CPU 313 and higher) SIMATIC S7-400 SIMATIC C7	SIMATIC S7-300 (CPU 313 and higher) SIMATIC S7-400 SIMATIC C7	V 4.0
Required software packages	STEP 7 V5.2 or higher	STEP 7 V3.1/V3.2 or higher	STEP 7 V3.2 or higher	SIMATIC S7-300 (CPU 314 and higher) SIMATIC S7-400
Main memory configuration in PG/PC	16 MB	16 MB	-	Windows 95 / NT
Disk space required in PG/PC	1.85 MB	1.85 MB	-	

Parameterization software	Neuro Systems	Loadable drivers for CP 441-2 and CP 341	Software redundancy	PRODAVE MPI
License form	Single license	Single license, copy license	Single license, copy license	Single license, copy license
Software class				A
Current version				V6.0
Target system	SIMATIC S7-300 (CPU 314 and higher) SIMATIC S7-400	SIMATIC CP 341, SIMATIC CP 441-2	SIMATIC S7-300 (CPU 315-2 DP only), SIMATIC S7-400	SIMATIC S7-200 SIMATIC S7-300 SIMATIC S7-400 SIMATIC C7
Operating system	Windows 95 / NT			Windows 2000 Prof./XP
Required software packages			STEP 7 V4.0	-
Main memory configuration in PG/PC	16 MB			8 MB on PG/PC
Disk space required in PG/PC	5 MB			2 MB
Standard FBs				
Required libraries	Neuro Systems FBs			-
License types	Single license			
Software class				
Current version				
Target system	SIMATIC S7-300 (CPU 314 and higher) SIMATIC S7-400			
Operating system	Windows 95 / NT			
Required software packages				
Main memory configuration in PG/PC	16 MB on PG/PC			
Disk space required in PG/PC	5 MB			

Overview



- Uniform **configuration software** for SIMATIC operator panels and for the HMI component of SIMATIC C7
- Executable under Windows 98 SE/ME and Windows NT 4.0/2000/XP Professional
- Current versions:
  - SIMATIC ProTool/Lite V6.0 + SP3
  - SIMATIC ProTool V6.0 + SP3

Ordering data

		Order No.
SIMATIC ProTool V6.0 + SP3 configuring software including ProAgent V6.0 + SP3 [1]	D)	**6AV6 581-3BX06-0DX0**
(ProAgent for OP; ProAgent/MP), language versions: DE/EN/FR/IT/ES, incl. native drivers on CD-ROM; electronic documentation (.pdf/.chm) in English, French, German, Italian, Spanish on CD-ROM		
SIMATIC ProTool/Lite V6.0 + SP3 configuring software	D)	**6AV6 580-3BX06-0DX0**
Language versions: DE/EN/FR/IT/ES, incl. native drivers on CD-ROM; electronic documentation (.pdf/.chm) in English, French, German, Italian, Spanish on CD-ROM		
Power Pack		
• ProTool/Lite to ProTool V6.0 + SP3	D)	**6AV6 571-3AB06-0DX0**
Upgrade		
• ProTool/Lite to ProTool/Lite V6.0 + SP3	D)	**6AV6 580-3BX06-0DX4**
• ProTool to ProTool V6.0 + SP3	D)	**6AV6 581-3BX06-0DX4**

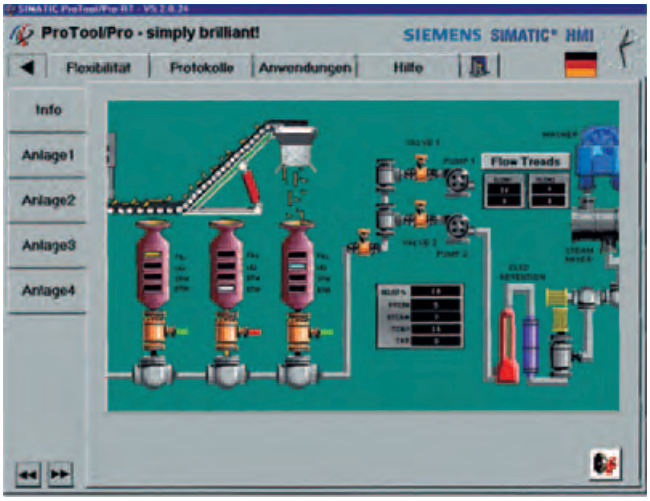
D) Subject to export regulations: AL: N and ECCN: 5D992B1
E) Subject to export regulations: AL: N and ECCN: EAR99S

1) The runtime licenses for ProAgent must be purchased separately

Documentation	
ProTool User Manual for configuring line-oriented displays	
• German	**6AV6 594-1AA06-0AA0**
• English	**6AV6 594-1AA06-0AB0**
• French	**6AV6 594-1AA06-0AC0**
• Italian	**6AV6 594-1AA06-0AD0**
• Spanish	**6AV6 594-1AA06-0AE0**
ProTool User Manual for configuring graphics devices	
• German	**6AV6 594-1BA06-0AA0**
• English	**6AV6 594-1BA06-0AB0**
• French	**6AV6 594-1BA06-0AC0**
• Italian	**6AV6 594-1BA06-0AD0**
• Spanish	**6AV6 594-1BA06-0AE0**
ProTool User Manual for configuring Windows-based systems	
• German	**6AV6 594-1MA06-1AA0**
• English	**6AV6 594-1MA06-1AB0**
• French	**6AV6 594-1MA06-1AC0**
• Italian	**6AV6 594-1MA06-1AD0**
• Spanish	**6AV6 594-1MA06-1AE0**
Communication User Manual	
Instructions for connecting TD/OP/TP to the controller	
• German	**6AV3 991-1BC05-1AA0**
• English	**6AV3 991-1BC05-1AB0**
• French	**6AV3 991-1BC05-1AC0**
• Italian	**6AV3 991-1BC05-1AD0**
• Spanish	**6AV3 991-1BC05-1AE0**
Communication User Manual	
Instructions for connecting Windows-based systems to the controller	
• German	**6AV6 596-1MA06-0AA0**
• English	**6AV6 596-1MA06-0AB0**
• French	**6AV6 596-1MA06-0AC0**
• Italian	**6AV6 596-1MA06-0AD0**
• Spanish	**6AV6 596-1MA06-0AE0**
SIMATIC HMI Manual Collection E)	**6AV6 691-1SA01-0AX0**
Electronic documentation, on DVD	
5 languages (English, French, German, Italian and Spanish); contains all currently available user manuals, manuals and communication manuals for SIMATIC HMI	

SIMATIC ProTool/Pro

Overview



- **PC-based HMI solution for single-user systems** directly at the machine
- SIMATIC ProTool/Pro comprises:
  - SIMATIC ProTool/Pro RT runtime software for PC-based systems
  - SIMATIC ProTool/Pro Configuration (CS) configuration software for configuring PC-based systems and for configuring of SIMATIC operator panels
- Executable under Windows 98 SE/ME and Windows NT4.0/2000/XP Professional
- **Current version:**
  - SIMATIC ProTool/Pro Configuration V6.0 + SP3
  - SIMATIC ProTool/Pro Runtime V6.0 + SP3

7

Technical specifications

Type	SIMATIC ProTool/Pro Runtime
	The specifications are maximum values
Operating system	MS Windows 98 SE/ME (ME not for ASIA version), MS Windows NT 4.0/2000/XP Professional
Messages	4,000
• Message text (number of characters)	70
• Size of message buffer	1,024
• Pending message events	500
Archive (number)	100
• Archivable data	Process values (max. 100), messages
• Max. number of entries per archive (incl. sequence archive)	500,000
• Archive types	Short-term archive, sequence archive (max. 40 per archive)
• Data storage format	CSV (**C**omma **S**eparated **V**ariable) and interface to ODBC database (database not included in scope of delivery)
Recipes	1,000
• Entries per recipe	2,000 3)
• Data records	5,000 2)
Displays	300
• Fields per screen	400
• Variables per screen	400
• Static text	30,000
• Graphics objects	2,000
• Complex objects per display (e.g., bars)	40
• Trends	800
• Graphics lists 1)	500
• Text lists 1)	500
• Number of entries in symbol tables	3,500

Type	SIMATIC ProTool/Pro Runtime
Variables	2.048 3)
Password protection	
• Password levels	10 (0 ... 9)
• Number of passwords	50
Visual Basic scripts	50
• Number of lines	100
Online languages, max.	5
Communication	
SIMATIC S7 MPI interface/ PROFIBUS DP interface	
• Number of connectable stations, max.	Depending on the scope of the configuration (communication) from the point of view of ProTool/Pro, up to 8 connections are possible
SIMATIC S7 PPI interface	
• Number of connectable stations, max.	1 from the point of view of ProTool/Pro
SIMATIC S5 loop-through operation	No
SIMATIC S5 PROFIBUS DP interface	
• Number of connectable stations, max.	1 from the point of view of ProTool/Pro

1) Together only 500 text and graphics lists
2) Dependent on memory medium used
3) Dependent on number of licensed PowerTags

Ordering data		Order No.
SIMATIC ProTool/Pro Configuration V6.0 + SP3 incl. ProAgent V6.0 + SP3 [2]	D)	**6AV6 582-2BX06-0DX0**
Language versions: DE/EN/FR/IT/ES on CD-ROM, containing:		
• ProTool/Pro Configuration (CS) V6.0 + SP3		
• Simulation software for Mobile Panel 170, TP 170A/B, OP 170B, TP 270, OP 270, MP 270, MP 270B 10", MP 370 and ProTool/Pro Runtime		
• Native drivers		
• Electronic documentation (.pdf/.chm) in English, French, German, Spanish, Italian		
SIMATIC ProTool/Pro Runtime V6.0 + SP3 for PC systems incl. ProAgent V6.0 + SP3 [2]		
on CD-ROM with license (single license) for		
• 128 PowerTags (RT 128)	D)	**6AV6 584-1AB06-0DX0**
• 256 PowerTags (RT 256)	D)	**6AV6 584-1AC06-0DX0**
• 512 PowerTags (RT 512)	D)	**6AV6 584-1AD06-0DX0**
• 2048 PowerTags (RT 2048)	D)	**6AV6 584-1AF06-0DX0**
Upgrade		
• ProTool/Pro to ProTool/Pro V6.0 + SP3 [1]	D)	**6AV6 582-2BX06-0DX4**
• ProTool/Pro RT to ProTool/Pro RT V6.0 + SP3	D)	**6AV6 584-3AX06-0DX4**
Power Packs		
SIMATIC ProTool/Pro RT PowerTags from		
• 128 to 256 PowerTags	D)	**6AV6 570-1BC00-0AX0**
• 128 to 512 PowerTags	D)	**6AV6 570-1BD00-0AX0**
• 128 to 2048 PowerTags	D)	**6AV6 570-1BF00-0AX0**
• 256 to 512 PowerTags	D)	**6AV6 570-1CD00-0AX0**
• 256 to 2048 PowerTags	D)	**6AV6 570-1CF00-0AX0**
• 512 to 2048 PowerTags	D)	**6AV6 570-1DF00-0AX0**
• SIMATIC ProTool/Lite to ProTool/Pro V6.0 + SP3	D)	**6AV6 571-2AC06-0DX0**
• SIMATIC ProTool to ProTool/Pro V6.0 + SP3	D)	**6AV6 571-2BC06-0DX0**
Versions for China/Taiwan/Korea/Japan		
SIMATIC ProTool/Pro Configuration V6.0 + SP2 ASIA	D)	**6AV6 582-2BX06-0CV0**
Language/script versions: English/simplified and traditional Chinese/Korean/Japanese; containing:		
• ProTool/Pro Configuration (CS) V6.0 + SP2 ASIA		
• Simulation software for Mobile Panel 170, TP 170A/B, OP 170B, TP 270, OP 270, MP 270, MP 270B 10", MP 370 and ProTool/Pro Runtime		
• Electronic documentation (.pdf/.chm) in: Chinese (traditional and simplified), English, Japanese and Korean		

		Order No.
SIMATIC ProTool/Pro Runtime V6.0 + SP2 ASIA for PC systems		
on CD-ROM with license (single license) for		
• 128 PowerTags (RT 128)	D)	**6AV6 584-1AB06-0CV0**
• 256 PowerTags (RT 256)	D)	**6AV6 584-1AC06-0CV0**
• 512 PowerTags (RT 512)	D)	**6AV6 584-1AD06-0CV0**
• 2048 PowerTags (RT 2048)	D)	**6AV6 584-1AF06-0CV0**
Communication via Industrial Ethernet		
CP 1613-A2	A)	**6GK1 161-3AA01**
PCI card (32-bit) for connecting a PG/PC to Industrial Ethernet (communications software must be ordered separately)		
S7-1613 Edition 2005		**6GK1 716-1CB63-3AA0**
Software for S7 and S5 communication, incl. PG/OP communication, OPC server and NCM PC; up to 120 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, Windows 2000 Professional/Server; for CP 1613/CP 1613-A2 German/English		
SOFTNET-S7 Edition 2005		**6GK1 704-1CW63-3AA0**
Software for S7 and S5-compatible communication, incl. OPC server, PG/OP communication and NCM PC; up to 64 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, 2000 Professional/Server; German/English		
SOFTNET S7 Lean Edition 2005		**6GK1 704-1LW63-3AA0**
Software for S7 and S5-compatible communication, incl. OPC server, PG/OP communication and NCM PC; up to 8 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, 2000 Professional/Server; German/English		

A) Subject to export regulations: AL: N and ECCN: EAR99H
D) Subject to export regulations: AL: N and ECCN: 5D992B1

1) Upgrade for configuration station (CS) as well as runtime (RT) station
2) The runtime licenses for ProAgent/PC must be purchased separately for each target system.

SIMATIC ProTool/Pro

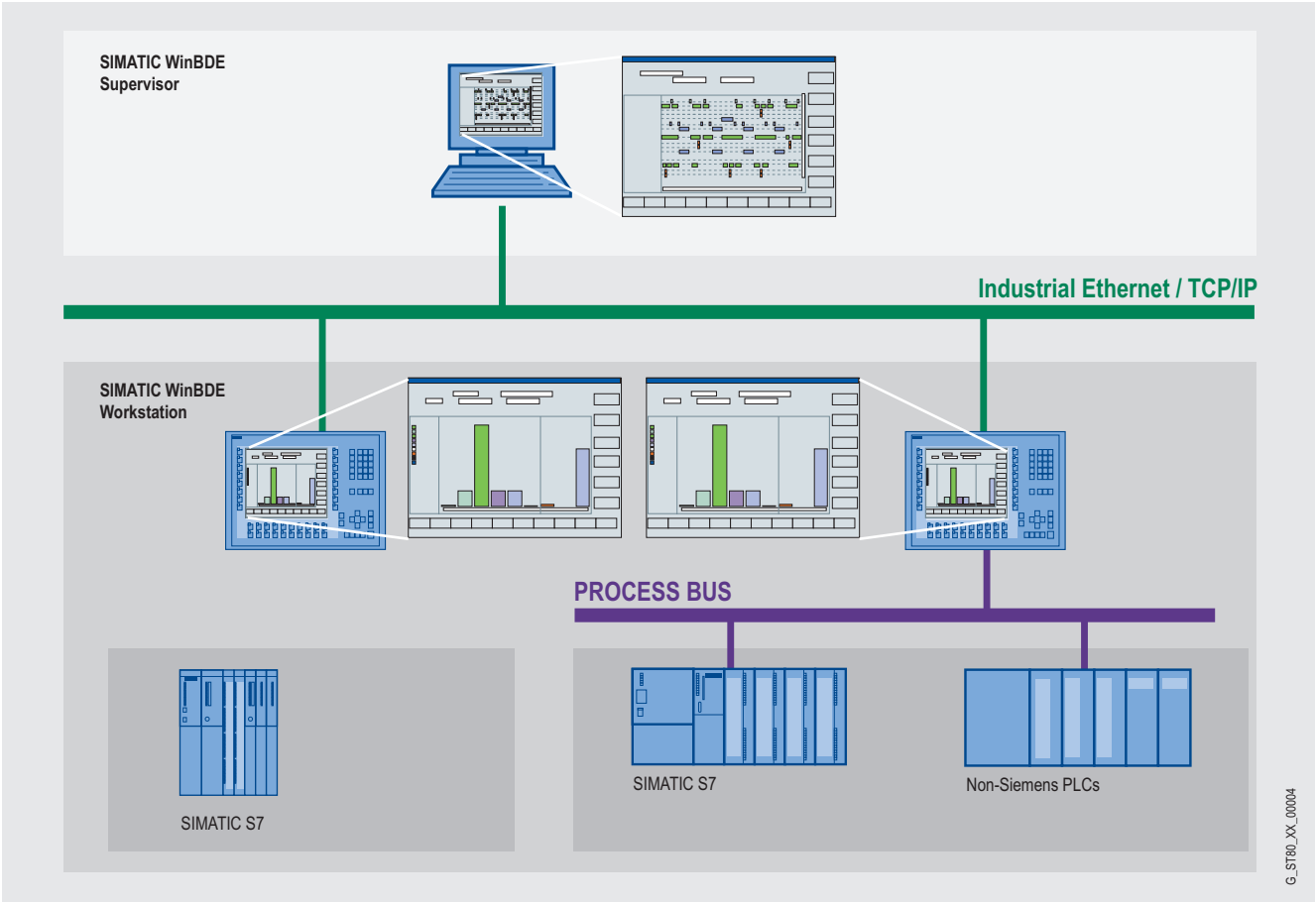
Ordering data (continued)

	Order No.
Communication via PROFIBUS	
CP 5613-A2 PCI card (32-bit) for connecting a PC to PROFIBUS (communications software must be ordered separately).	**6GK1 561-3AA01**
CP 5614-A2 PCI card (32-bit) for connecting a PC to PROFIBUS (communications software must be ordered separately).	**6GK1 561-4AA01**
S7-5613 Edition 2005 Software for S7 communication, incl. PG and FDL protocol, OPC server and NCM PC; single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional; 2003 Server, 2000 Professional/Server, for CP 5613, CP 5613 A2, CP 5613 FO, CP 5614, CP 5614-A2, CP 5614 FO; German/English	**6GK1 713-5CB63-3AA0**
DP-5613 Edition 2005 Software for DP protocol incl. PG/OP communication, FDL, DP-OPC server, for 32-bit Windows XP Professional; 2003 Server, 2000 Professional/Server; German/English	**6GK1 713-5DB63-3AA0**
FMS-5613 Edition 2005 Software for FMS-Protokoll incl. PG/OP communication, FDL, FMS-OPC server, for 32-bit Windows XP Professional; 2003 Server, 2000 Professional/Server; German/English	**6GK1 713-5FB63-3AA0**
CP 5512 PCMCIA card (CARDBUS 32-bit) for connecting a PG/Notebook to PROFIBUS or MPI (communications software included in ProTool/Pro)	**6GK1 551-2AA00**
CP 5611 A2 A) PCI card (32-bit) for connecting a PG/PC to PROFIBUS (communications software included in ProTool/Pro)	**6GK1 561-1AA01**
CP 5611 MPI A) Comprising of PCI card CP 5611-A2 (32-bit) and MPI cable, 5 m	**6GK1 561-1AM01**
PC/PPI adapter A) RS 232, 9-pin; male with RS 232/PPI converter, max. 19.2 kbit/s	**6ES7 901-3CB30-0XA0**
PC/MPI adapter RS 232, 9-pin; male with RS 232/MPI converter, max. 19.2 kbit/s	**6ES7 972-0CA23-0XA0**
PC adapter USB For use with Windows 2000/XP	**6ES7 972-0CB20-0XA0**
Documentation (must be ordered separately)	
ProTool/Pro Runtime User Manual	
• German	**6AV6 594-1CA06-0AA0**
• English	**6AV6 594-1CA06-0AB0**
• French	**6AV6 594-1CA06-0AC0**
• Italian	**6AV6 594-1CA06-0AD0**
• Spanish	**6AV6 594-1CA06-0AE0**
ProTool User Manual for configuring Windows-based systems	
• German	**6AV6 594-1MA06-1AA0**
• English	**6AV6 594-1MA06-1AB0**
• French	**6AV6 594-1MA06-1AC0**
• Italian	**6AV6 594-1MA06-1AD0**
• Spanish	**6AV6 594-1MA06-1AE0**
Communication User Manual for Windows-based systems	
• German	**6AV6 596-1MA06-0AA0**
• English	**6AV6 596-1MA06-0AB0**
• French	**6AV6 596-1MA06-0AC0**
• Italian	**6AV6 596-1MA06-0AD0**
• Spanish	**6AV6 596-1MA06-0AE0**
SIMATIC HMI Manual Collection E) Electronic documentation, on DVD 5 languages (English, French, German, Italian and Spanish); contains: all currently available user manuals, manuals and communication manuals for SIMATIC HMI	**6AV6 691-1SA01-0AX0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

E) Subject to export regulations: AL: N and ECCN: EAR99S

Overview



- SIMATIC WinBDE is the machine data management software program for the acquisition, evaluation and analysis of machine data.
- The operator panel becomes the central acquisition and control terminal for machine data, either directly at the machine (workstation) or plant-wide (supervisor).

- **Current version:**
  - SIMATIC WinBDE Workstation V7.2 + SP2
  - SIMATIC WinBDE Supervisor V7.2 + SP2

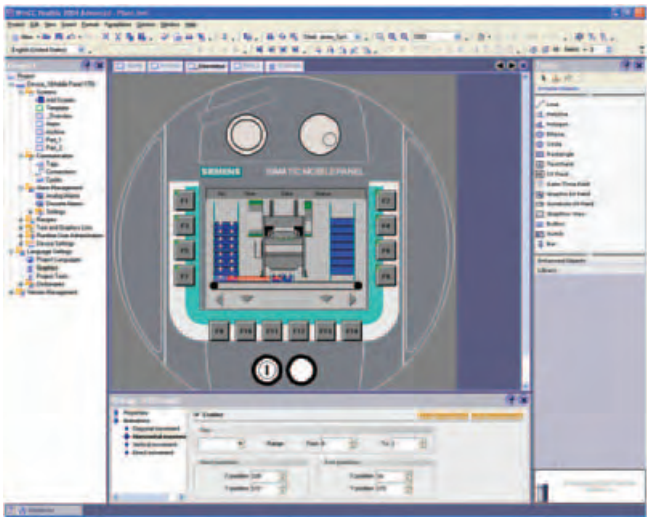
Ordering data

	Order No.
SIMATIC WinBDE V7.2 + SP2	
Complete packages (runtime incl. configuration software) on CD-ROM	
Machine data management workstation	
License for the connection of:	
• 1 machine/unit of equipment	**6AV6 371-1EW06-0AX0**
• 8 machines/units of equipment	**6AV6 371-1EW06-0CX0**
• 32 machines/units of equipment	**6AV6 371-1EW06-0EX0**

	Order No.
Machine data management supervisor	
License for the connection of:	
• 64 machines/units of equipment	**6AV6 371-1EW06-0GX0**
• 128 machines/units of equipment	**6AV6 371-1EW06-0HX0**
WinBDE Terminal Server licenses	
• for workstation	**6AV6 371-1EW06-0LX0**
• for supervisor	**6AV6 371-1EW06-0MX0**

SIMATIC WinCC flexible ES

Overview



- Uniform family of **engineering tools** for configuring SIMATIC HMI Operator Panels, the operator control part of SIMATIC C7 units, SIMOTION/SINUMERIK Panel PCs as well as the PC-based visualization software WinCC flexible Runtime
- Executable under Windows 2000/XP Professional
- **Current version:**
  - SIMATIC WinCC flexible 2005 SP1 Advanced
  - SIMATIC WinCC flexible 2005 SP1 Standard
  - SIMATIC WinCC flexible 2005 SP1 Compact
  - SIMATIC WinCC flexible 2005 SP1 Micro

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Ordering data

		Order No.
WinCC flexible 2005 SP1 Advanced	D)	**6AV6 613-0AA01-1CA5**
Floating license, on CD-ROM incl. license key, includes: • Engineering software for configuring WinCC flexible Runtime as well as Micro Panels and 70/170/270/370 series Panels incl. C7-635/636 • SW for WinCC flexible/ChangeControl engineering option [1] • Simulation software [5] for WinCC flexible Runtime as well as Micro Panels and 70/170/270/370 series Panels incl. C7-635/636 • Native drivers • Electronic documentation (.pdf) in English, German, French, Italian, Spanish		
WinCC flexible 2005 SP1 Standard	D)	**6AV6 612-0AA01-1CA5**
Floating license, on CD-ROM incl. license key, includes: • Engineering software for configuring Micro Panels and 70/170/270/370 series Panels incl. C7-635/636 • SW for WinCC flexible/ChangeControl engineering option [1] • Simulation software [5] • Native drivers • Electronic documentation (.pdf) in English, German, French, Italian, Spanish		
WinCC flexible 2005 SP1 Compact	D)	**6AV6 611-0AA01-1CA5**
Floating license, on CD-ROM incl. license key, includes: • Engineering software for configuring Micro Panels and 70/170 series Panels incl. C7-635 • SW for WinCC flexible/ChangeControl engineering option [1] • Simulation software [5] • Native drivers • Electronic documentation (.pdf) in English, German, French, Italian, Spanish		
WinCC flexible 2005 SP1 Micro	D)	**6AV6 610-0AA01-1CA8**
Floating license, on CD-ROM w/o license key, includes: • Engineering software for configuring Micro Panels • Electronic documentation (.pdf) in English, German, French, Italian, Spanish		
WinCC flexible/ChangeControl for WinCC flexible 2005 Compact/Standard/Advanced [4]	D)	**6AV6 613-6AA01-1AB5**
Floating license, option, license key only		

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

1) A separate license for WinCC flexible/ChangeControl must be purchased for each engineering station.

4) The ChangeControl option has not been released for integrated operation with STEP 7.

5) Not valid for: OP73micro, TP177micro, OP73, OP77A, TP177A.

Note:

Service Pack 1 is also available for download free of charge on the Internet (http://support.automation.siemens.com/WW/view/en/23059737); Service Pack CD available on request

Ordering data (continued)

		Order No.
Power Packs		
SIMATIC WinCC flexible Power Packs		
Single license, authorization only		
• WinCC flexible 2005 Standard to 2005 Advanced	D)	**6AV6 613-2CD01-1AD5**
• WinCC flexible 2005 Compact to 2005 Advanced	D)	**6AV6 613-2BD01-1AD5**
• WinCC flexible 2005 Standard to 2005 Standard	D)	**6AV6 612-2BC01-1AD5**
Software Update Service		
Software Update Service SIMATIC WinCC flexible [3]		
• WinCC flexible Advanced	D)	**6AV6 613-0AA00-0AL0**
• WinCC flexible Standard	D)	**6AV6 612-0AA00-0AL0**
• WinCC flexible Compact	D)	**6AV6 611-0AA00-0AL0**
Upgrades		
SIMATIC ProTool to SIMATIC WinCC flexible 2005 SP1		
• ProTool/Lite to WinCC flexible 2005 SP1 Compact	D)	**6AV6 611-3AA01-1CE5**
• ProTool to WinCC flexible 2005 SP1 Standard	D)	**6AV6 612-3AA01-1CE5**
• ProTool/Pro to WinCC flexible 2005 SP1 Advanced	D)	**6AV6 613-3AA01-1CE5**
SIMATIC WinCC flexible 2004 to SIMATIC WinCC flexible 2005 SP1		
• WinCC flexible 2004 Compact to WinCC flexible 2005 SP1 Compact	D)	**6AV6 611-0AA01-1CE5**
• WinCC flexible 2004 Standard to WinCC flexible 2005 SP1 Standard	D)	**6AV6 612-0AA01-1CE5**
• WinCC flexible 2004 Advanced to WinCC flexible 2005 SP1 Advanced, incl. ChangeControl option [1]	D)	**6AV6 613-0AA01-1CE5**
Versions for China/Taiwan/Korea/Japan		
WinCC flexible 2005 SP1 ASIA Standard	D)	**6AV6 612-0AA11-1CA5**
Floating license, on CD-ROM incl. license key, includes:		
• Engineering software for configuring Micro Panels and 70/170/270/370 series Panels incl. C7-635/636		
• Simulation software [5] for Micro Panels and Panels 70/170/270/370 series Panels incl. C7-635/636		
• Native drivers		
• Electronic documentation (.pdf) in English, Japanese, Korean, simplified Chinese, traditional Chinese		
WinCC flexible 2005 SP1 ASIA Advanced	D)	**6AV6 613-0AA11-1CA5**
Floating license, on CD-ROM incl. license key, includes:		
• Engineering software for configuring WinCC flexible Runtime as well as 70/170/270/370 Series Micro Panels and Panels incl. C7-635/636		
• SW for WinCC flexible/ChangeControl engineering option [1]		
• Simulation software [5] for WinCC flexible Runtime as well as Micro Panels and 70/170/270/370 series Panels incl. C7-635/636		
• Native drivers		
• Electronic documentation (.pdf) in English, simplified Chinese, traditional Chinese, Korean, Japanese		
Documentation (must be ordered separately)		
User Manual WinCC flexible Communication		
• German		**6AV6 691-1CA01-0AA0**
• English		**6AV6 691-1CA01-0AB0**
User Manual WinCC flexible Compact/ Standard/Advanced		
• German		**6AV6 691-1AB01-0AA0**
• English		**6AV6 691-1AB01-0AB0**
• French		**6AV6 691-1AB01-0AC0**
• Italian		**6AV6 691-1AB01-0AD0**
• Spanish		**6AV6 691-1AB01-0AE0**
SIMATIC HMI Manual Collection	E)	**6AV6 691-1SA01-0AX0**
Electronic documentation, on DVD		
5 languages (English, French, German, Italian, Spanish); contains: all currently available user manuals, manuals and communication manuals for SIMATIC HMI		

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

E) Subject to export regulations: AL: N and ECCN: EAR99S

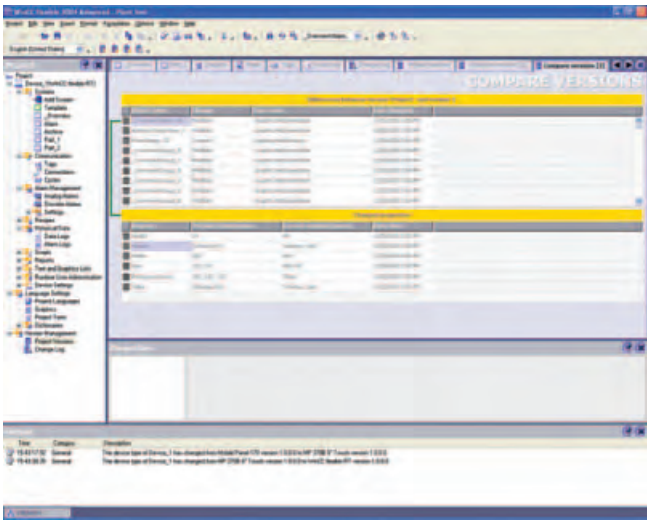
1) A separate license for WinCC flexible/ChangeControl must be purchased for each engineering station.

3) For a period of 12 months and for a fixed price, the customer is automatically provided with all upgrades and service packs for each installed WinCC flexible engineering system or option. The contract is automatically extended by a further year unless canceled up to 12 weeks prior to expiry.

5) Not valid for: OP73micro, TP177micro, OP73, OP77A, TP177A.

WinCC flexible/ChangeControl

Overview



- Options for the versioning of configuration data and for tracing configuration changes (e.g. as verification in regulated sectors)
- For the engineering tool SIMATIC WinCC flexible Compact/Standard/Advanced
- One license is required for each configuration computer

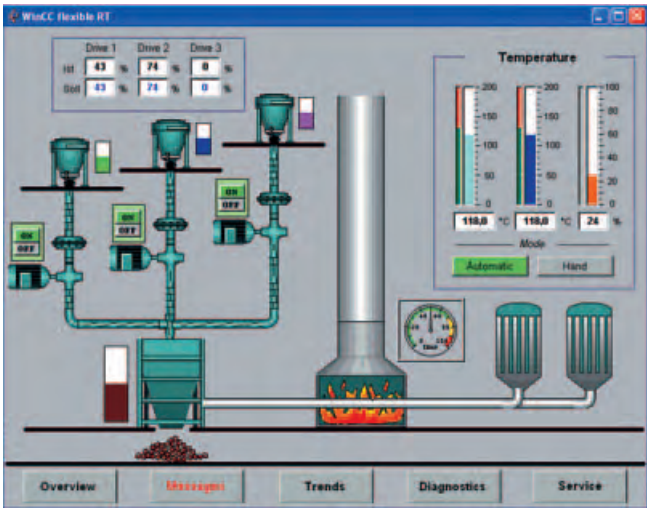
Ordering data

		Order No.
WinCC flexible/ChangeControl for WinCC flexible 2005 Compact/Standard/Advanced [1]		
Floating license, option, license key only	D)	**6AV6 613-6AA01-1AB5**

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

1) The ChangeControl option has not been released for integrated operation with STEP 7.

Overview



- **PC-based visualization software** for single-user systems directly at the machine
- Executable under Windows 2000/XP Professional
- **Current version:**
  - SIMATIC WinCC flexible 2005 SP1 Runtime with 128, 512 or 2048 PowerTags

Note:
Service Pack 1 is also available for download free of charge in the Internet (http://support.automation.siemens.com/WW/view/en/23059737); CD available on request

Technical specifications

Type	SIMATIC WinCC flexible Runtime
	The specifications are maximum values
Displays	500
• Fields per screen	400
• Variables per screen	400
• Static text	30000
• Graphics objects	2000
• Complex objects per display (e.g. bars)	40
• Trends	800
• Graphics lists [1]	500
• Text lists [1]	500
• Number of entries in symbol tables	3500
Variables	2048 [3]
Messages bit-triggered / analog	4000 / 500
• Message text (number of characters)	80
• Number of process values per message	8
• Size of message buffer	1024
• Pending message events	500
Archives [4]	100
• Archivable data	Process values (max. 100), messages
• Max. number of entries per archive (incl. sequence archive)	500000
• Archive types	Short-term archive, sequence archive (max. 400 per archive)
• Data storage format	CSV (**C**omma **S**eparated **V**ariable) and interface to ODBC database (database not included in scope of delivery)
Recipes[4]	1000
• Elements per recipe	2000 [3]
• Data records per recipe	5000 [2]

Type	SIMATIC WinCC flexible Runtime
Password protection	
• User rights	32
• Number of user groups	10
Visual Basic scripts	200
Online languages, max.	16
Communication	
SIMATIC S7 MPI interface/ PROFIBUS DP interface	
• Number of connectable stations, max.	Depending on the scope of the configuration (communication) from the point of view of WinCC flexible Runtime, as many as 8 connections are possible
SIMATIC S7 PPI interface	
• Number of connectable stations, max.	1 from viewpoint of WinCC flexible Runtime
SIMATIC S5 PROFIBUS DP interface	
• Number of connectable stations, max.	1 from viewpoint of WinCC flexible Runtime
Multi-protocol operation	Yes, OPC Client or SIMATIC HMI HTTP protocol are additive, i.e. can be used in conjunction with other PLC links

1) Together only 500 text and graphics lists
2) Dependent on memory medium used
3) Dependent on number of licensed PowerTags
4) Options for SIMATIC WinCC flexible Runtime

SIMATIC WinCC flexible RT

Ordering data		Order No.
SIMATIC WinCC flexible 2005 SP1 Runtime		
for PC systems; incl. SW for PC systems options [1] Single license, on CD-ROM incl. authorization, for:		
• 128 PowerTags (RT 128)	D)	**6AV6 613-1BA01-1CA0**
• 512 PowerTags (RT 512)	D)	**6AV6 613-1DA01-1CA0**
• 2048 PowerTags (RT 2048)	D)	**6AV6 613-1FA01-1CA0**
Power Packs		
SIMATIC WinCC flexible 2005 Runtime		
Single license, only authorization for PowerTags, from		
• 128 to 512 PowerTags	D)	**6AV6 613-4BD01-1AD0**
• 128 to 2048 PowerTags	D)	**6AV6 613-4BF01-1AD0**
• 512 to 2048 PowerTags	D)	**6AV6 613-4DF01-1AD0**
Software Update Service		
Software Update Service SIMATIC WinCC flexible [3]		
• WinCC flexible Advanced	D)	**6AV6 613-0AA00-0AL0**
Upgrade		
SIMATIC ProTool/Pro RT to SIMATIC WinCC flexible 2005 SP1		
• ProTool/Pro Runtime 128 PowerTags to WinCC flexible 2005 SP1 Runtime 128 PowerTags [2]	D)	**6AV6 613-3BB01-1CE0**
• ProTool/Pro Runtime 256 PowerTags to WinCC flexible 2005 SP1 Runtime 512 PowerTags [2]	D)	**6AV6 613-3CD01-1CE0**
• ProTool/Pro Runtime 512 PowerTags to WinCC flexible 2005 SP1 Runtime 512 PowerTags [2]	D)	**6AV6 613-3DD01-1CE0**
• ProTool/Pro Runtime 2048 PowerTags to WinCC flexible 2005 SP1 Runtime 2048 PowerTags [2]	D)	**6AV6 613-3FF01-1CE0**
SIMATIC WinCC flexible 2004 Runtime to SIMATIC WinCC flexible 2005 Runtime		
• SIMATIC WinCC flexible RT 2004 to WinCC flexible RT 2005 SP1; PowerTags incl. Runtime options for:	D)	**6AV6 613-1XA01-1CE0**
- WinCC flexible /Sm@rtAccess		
- Sm@rtService		
- OPC server		
- Logs		
- Recipes		
- ProAgent		

		Order No.
Panel options: WinCC flexible 2004 to WinCC flexible 2005		
SIMATIC Panel options for WinCC flexible 2005:	D)	**6AV6 618-7XX01-1AF0**
• WinCC flexible /Sm@rtAccess for SIMATIC Panel		
• WinCC flexible /Sm@rtService for SIMATIC Panel		
• WinCC flexible OPC server for SIMATIC Multi Panel		
• WinCC flexible ProAgent for SIMATIC Panel		
Versions for China/Taiwan/Korea/Japan		
SIMATIC WinCC flexible 2005 SP1 ASIA Runtime		
for PC systems; incl. SW for options for PC systems [1]		
Single license, on CD-ROM incl. authorization, for:		
• 128 PowerTags (RT 128)	D)	**6AV6 613-1BA11-1CA0**
• 512 PowerTags (RT 512)	D)	**6AV6 613-1DA11-1CA0**
• 2048 PowerTags (RT 2048)	D)	**6AV6 613-1FA11-1CA0**
Documentation (must be ordered separately)		
User Manual WinCC flexible Runtime		
• German		**6AV6 691-1BA01-0AA0**
• English		**6AV6 691-1BA01-0AB0**
• French		**6AV6 691-1BA01-0AC0**
• Italian		**6AV6 691-1BA01-0AD0**
• Spanish		**6AV6 691-1BA01-0AE0**
User Manual WinCC flexible Communication		
• German		**6AV6 691-1CA01-0AA0**
• English		**6AV6 691-1CA01-0AB0**
SIMATIC HMI Manual Collection	E)	**6AV6 691-1SA01-0AX0**
Electronic documentation, on DVD		
5 languages (English, French, German, Italian, Spanish); contains: all currently available user manuals, manuals and communication manuals for SIMATIC HMI		

D) Subject to export regulations: AL: N and ECCN: 5D992B1
E) Subject to export regulations: AL: N and ECCN: EAR99S
1) Runtime licenses for WinCC flexible Runtime options must be purchased separately for each target system.
2) each including a single license WinCC flexible /Archives and WinCC flexible /Recipes

Note:

Service Pack 1 is also available for download free of charge on the Internet (Service Pack CD available on request)

Ordering data (continued)

	Order No.
Communication via Industrial Ethernet	
CP 1613 A2 A) PCI card (32 bits) for connecting a PG/PC to Industrial Ethernet (communications software must be ordered separately)	**6GK1 161-3AA01**
S71613 Edition 2005 Software for S7 and S5 communication, incl. PG/OP communication, OPC server and NCM PC; up to 120 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, Windows 2000 Professional/Server; for CP 1613/CP 1613 A2 German/English	**6GK1 716-1CB63-3AA0**
SOFTNET S7 Lean Edition 2005 Software for S7 and S5-compatible communication, incl. OPC server, PG/OP communication and NCM PC; up to 8 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, 2000 Professional/Server; German/English	**6GK1 704-1LW63-3AA0**
Communication via PROFIBUS	
CP 5613 A2 PCI card (32-bit) for connecting a PC to PROFIBUS (communications software must be ordered separately).	**6GK1 561-3AA01**
CP 5614 A2 PCI card (32-bit) for connecting a PC to PROFIBUS (communications software must be ordered separately).	**6GK1 561-4AA01**
S7-5613 Edition 2005 Software for S7 communication, incl. PG and FDL protocol, OPC server and NCM PC; single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional; 2003 Server, 2000 Professional/Server, for CP 5613, CP 5613 A2, CP 5613 FO, CP 5614, CP 5614 A2, CP 5614 FO; German/English	**6GK1 713-5CB63-3AA0**
DP-5613 Edition 2005 Software for DP protocol incl. PG/OP communication, FDL, DP-OPC server, for 32-bit Windows XP Professional; 2003 Server, 2000 Professional/Server; German/English	**6GK1 713-5DB63-3AA0**
FMS-5613 Edition 2005 Software for FMS-Protokoll incl. PG/OP communication, FDL, FMS-OPC server, for 32-bit Windows XP Professional; 2003 Server, 2000 Professional/Server; German/English	**6GK1 713-5FB63-3AA0**
CP 5512 PCMCIA card (32-bit CARDBUS) for connecting a PG/Notebook to PROFIBUS or MPI (communications software included in WinCC flexible).	**6GK1 551-2AA00**
CP 5611 A2 A) PCI card (32-bit) for connecting a PG/PC to PROFIBUS (communications software included in WinCC flexible basic package)	**6GK1 561-1AA01**
CP 5611 MPI A) Comprising CP 5611 A2 (32-bit) and MPI cable, 5 m	**6GK1 561-1AM01**
PC/PPI adapter RS 232, 9-pin; male with RS 232/PPI converter, max. 19.2 kbit/s	**6ES7 901-3CB30-0XA0**
PC/MPI adapter RS 232, 9-pin; male with RS 232/MPI converter	**6ES7 972-0CA23-0XA0**
PC adapter USB For Windows 2000/XP	**6ES7 972-0CB20-0XA0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

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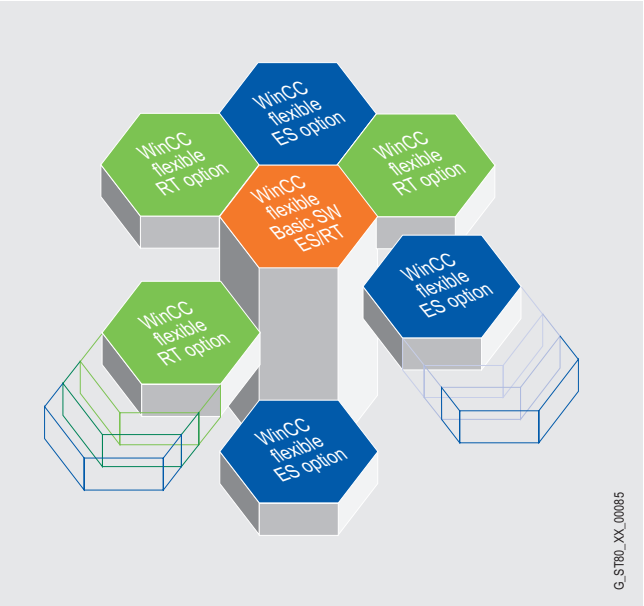
SIMATIC WinCC flexible RT options

Overview



Options for SIMATIC WinCC flexible Runtime

SIMATIC WinCC flexible/Archives

- Option for SIMATIC WinCC flexible Runtime for archiving process values and messages
- Archiving of process values and messages supports the acquisition and processing of process data from an industrial plant or machine. Evaluation of the archived process data provides information about the operating states of the plant or machine.
- One license is required for each operator station.

SIMATIC WinCC flexible /Recipes

- Option for SIMATIC WinCC flexible Runtime for managing data records in recipes that contain related machine or production data.
- The data in a data set can be transferred, for example, from the control unit to the PLC to switch production to a different product variant.
- One license is required for each operator station.

WinCC flexible /Audit

- Option for SIMATIC WinCC flexible Runtime as well as SIMATIC Panels for recording operations in an audit trail, and electronic signature
- An easy-to-use configuration feature, included as standard in WinCC flexible 2005, enables you to set:
  - The operator actions to be recorded in the audit trail during runtime
  - The important operator actions requiring electronic signature/comment during runtime
- The audit option combined with the ChangeControl option supports the user with plant validation.
- Available for the following SIMATIC HMI systems: OP270, TP270, MP270B, MP370, WinCC flexible Runtime
- A runtime license is required for every operator control unit (Panel/PC)

SIMATIC WinCC flexible /OPC-Server

- Option for SIMATIC WinCC flexible Runtime as well as Multi Panels for communication with applications from different vendors (e.g., MES, ERP, or applications in the office sector)
- Available for the following SIMATIC HMI systems:
  - MP 270B, MP 277, MP 370 (use of OPC based on XML)
  - WinCC flexible Runtime (use of OPC based on DCOM)
- One license is required for each operator station.

SIMATIC WinCC flexible /Sm@rtService

- Option for SIMATIC WinCC flexible Runtime and SIMATIC Panels for remote maintenance and servicing of machines/plant via the Internet/intranet
- Event-driven sending of e-mails
- System diagnostics visualized via device-specific html pages
- Available for the following SIMATIC HMI systems:
  - Mobile Panel 177 PN, Mobile Panel 277
  - TP 177B PN/DP, OP 177B PN/DP
  - TP 270, TP 277, OP 270, OP 277
  - MP 270B, MP 277, MP 370
  - WinCC flexible Runtime
- One license is required for each operator station.

SIMATIC WinCC flexible /Sm@rtAccess

- Option for SIMATIC WinCC flexible Runtime plus SIMATIC Panels for communication between various SIMATIC HMI systems.
- Available for the following SIMATIC HMI systems:
  - Mobile Panel 177 PN, Mobile Panel 277
  - TP 177B PN/DP, OP 177B PN/DP
  - TP 270, TP 277, OP 270, OP 277
  - MP 270B, MP 277, MP 370
  - WinCC flexible Runtime
- Communication between HMI systems is established on the basis of Ethernet networks, or via the intranet/Internet:
  - Read and write access to variables;
    WinCC flexible Runtime or SIMATIC Panels make data (variables) available to other SIMATIC HMI systems or Office applications.
  - A SIMATIC HMI system can be used to control or monitor another system remotely;
    entry level for client/server configurations for distributed operator stations or for solutions with headend or control room.
- Local operation, visualization and data processing is as possible as plant-wide access to information or central archiving of process data. Integrated information flows ensure an overview of the status of all processes.
- One license is required for each operator station.

SIMATIC WinCC flexible /ProAgent

- Precise and rapid process fault diagnostics in plant and machines for SIMATIC S7 and SIMATIC HMI
- Standardized diagnostics concept for various SIMATIC components
- No further configuration overhead for diagnostics functionality
- Frees up PLC capacity with regard to memory and program execution time

Overview (continued)

SIMATIC WinBDE

- With the SIMATIC WinBDE machine data management system, the operator panel becomes the central acquisition and control unit for machine data, permitting comprehensive analyses to be carried out directly at the machine.
- The result is transparency, quick countermeasures in the event of faults, an increase in machine runtimes and proof of the availability of production facilities and production units.

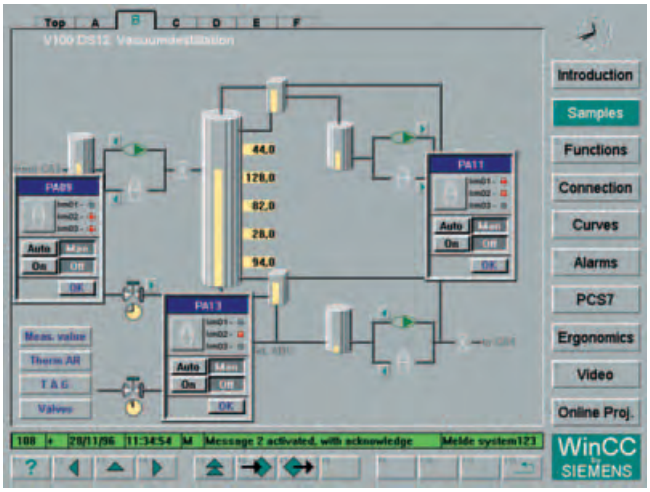
Options for SIMATIC WinCC flexible Engineering System

WinCC flexible /ChangeControl

- Versioning of configuration data and tracking of configuration changes (e.g. as verification in regulated sectors)
- One license is required for each configuration station.

SIMATIC WinCC

Overview



- PC-based operator control and monitoring system for visualizing and operating processes, production flows, machines and plants in all sectors – with the simple single-user station through to distributed multi-user systems with redundant servers and cross-location solutions with Web clients. WinCC is the information hub for corporation-wide vertical integration.
- The basic system configuration (WinCC basic software) includes industry-standard functions for signaling and acknowledging events, archiving of messages and measured values, logging of all process and configuration data, user administration and visualization.
- The WinCC basic software forms the core of a wide range of different applications. Based on the open programming interfaces, a wide range of WinCC options (from Siemens A&D) and WinCC add-ons have been developed (by Siemens-internal and external partners).
- Current versions:
  - **SIMATIC WinCC V6.0 SP4:**
    Runs under Windows XP Professional/Windows 2003 Server and Windows 2000
  - **SIMATIC WinCC V5.1 SP2:**
    Runs under Windows NT 4.0/2000

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Technical specifications

Type	SIMATIC WinCC V5.1 SP2	SIMATIC WinCC V6.0 SP4
Operating system	Windows NT4.0, Windows 2000	Windows XP Professional SP1 or SP2, Windows 2000 Professional SP4, Windows 2000 Server SP4, Windows Server 2003 SP1
	Additional WebClient: Windows 98, Windows ME, Windows 2000 terminal services	WebClient/Dat@Monitor Client also: Windows NT 4.0 SP6a, Windows XP Home SP1 or SP2, Windows 2000 Server terminal services, Windows Server 2003 terminal services
PC hardware requirements		
Processor type [1]		
• Minimum	Pentium II, 400 MHz	Single-user station/server: Pentium III, 800 MHz Central archive server: Pentium 4, 2 GHz Client: Pentium III, 300 MHz WebClient/Dat@Monitor Client: Pentium III, 300 MHz
• Recommended	Pentium III, 400 MHz	Single-user station/server: Pentium 4, 1400 MHz Central archive server: Pentium 4, 2.5 GHz Client: Pentium III, 800 MHz WebClient/Dat@Monitor Client: Pentium III, 800 MHz
RAM		
• Minimum	≥ 128/256 MB (single-user station/server), ≥ 128 MB (client) [2]	Single-user station/server: 512 MB Central archive server: 1 GB Client: 256 MB WebClient/Dat@Monitor Client: 128 MB
• Recommended	≥ 256 MB (single-user station/server), ≥ 256 MB (client) [2]	Single-user station/server: 1 GB Central archive server: ≥ 1 GB Client: 512 MB WebClient/Dat@Monitor Client: 256 MB

1) An AMD system with comparable performance can also be used
2) Online configuration requires at least another 32 MB.

Technical specifications (continued)

Type	SIMATIC WinCC V5.1 SP2	SIMATIC WinCC V6.0 SP4
Graphics card		
• Minimum	SVGA (4 MB), 800 x 600	SVGA (16 MB), 800 x 600
• Recommended	XGA (8 MB), 1024 x 768	SXGA (32 MB), 1280 x 1024
Hard disk drive		
• Minimum	> 3 GB	Single-user station/server: 20 GB
		Client: 5 GB
		WebClient/Dat@Monitor Client: 5 GB
• Recommended	> 3 GB	Single-user station/server: 80 GB
		Client: 20 GB
		WebClient/Dat@Monitor Client: 10 GB
• Hard disk (free memory space for installation)		
- Minimum	650 MB	Server: 1 GB
		Client: 700 MB
- Recommended	≥ 650 MB	Server: > 10 GB
		Client: > 1.5 GB
CD-ROM/DVD-ROM/diskette drive	for software installation	for software installation

Type	SIMATIC WinCC V5.1 SP2	SIMATIC WinCC V6.0 SP4
Functionality/Quantity framework		
Messages (number)	50,000	50,000
• Message text (number of characters)	10 x 256	10 x 256
• Alarm log	> 500,000 messages [1]	> 500,000 messages [1]
• Process values per message	10	10
• Continuous number of messages, max.	2/s	Central archive server: 100/sec Server/single-user station: 10/sec
• Burst of messages, max.	2,000 in 10 minutes	Central archive server 15,000/10 sec every 5 min Server/single-user station: 2,000/10 sec every 5 min
Archives		
• Archive data points	Max. 30,000 per server	Max. 80,000 per server [2]
• Archive types	Short-term, sequence archives	Short-term archive with and without long-term archiving
• Data storage format	Sybase SQL 7 or Dbase III [3]	Microsoft SQL Server 2000
• Measured values per second, max.	Server/single-user station: 360/sec (500/sec dBase III)	Central archive server: 10,000/sec
		Server/single-user station: 5,000/sec
User archive		
• Archives (recipes)	500	System-limited [1]
• Data records per user archive	65,536 [4]	65,536 [4]
• Fields per user archive	500 [4]	500 [4]
Graphics system		
• Number of screens	System-limited [1]	System-limited [1]
• Number of objects per screen	System-limited [1]	System-limited [1]
• Number of controllable fields per screen	System-limited [1]	System-limited [1]
Process variables	64 K [5]	64 K [5]
Trends		
• Curve windows per image	8	25
• Curves per curve window	15	80

1) Dependent on available memory space

2) Dependent on number of licensed archive variables

3) Dbase III only with TagLogging short-term archives

4) The sum of the number of fields and number of data sets must not exceed a value of 320,000

5) Dependent on number of licensed PowerTags

Technical specifications (continued)

Type	SIMATIC WinCC V5.1 SP2	SIMATIC WinCC V6.0 SP4
• User groups		
• Number of users	28	128
• Authorization groups	128	128
• User groups	999	999
Runtime languages	> 9 per project	> 9 per project
Configuration languages	5 European (Eng, Fre, Ger, Ita, Spa), 4 Asian (simpl.+trad. Chi/Kor/Jpn)	5 European (Eng, Fre, Ger, Ita, Spa), 4 Asian (simpl.+trad. Chi/Kor/Jpn)
Protocols		
• Message sequence reports (concurrent)	1 per server/single-user station	1 per server/single-user station
• Message archive reports (concurrent)	1	3
• User reports	System-limited [1)]	System-limited [1)]
• Report lines per group	66	66
• Variables per report	300 [6)]	300 [6)]
Multi-user station		
• Server	6	12
• Clients for server with operator station	3	4
• Clients for server without operator station	16	32 clients + 3 WebClients or 50 WebClients + 1 client

1) Dependent on available memory space

6) The number of variables per report is dependent on process communication performance

Ordering data	Order No.
SIMATIC WinCC system software V5.1 SP2	
Runtime packages on CD-ROM	
Language versions: DE/EN/FR/IT/ES; with license for	
• 128 PowerTags (RT 128)	**6AV6 381-1BC05-1CX0**
• 256 PowerTags (RT 256)	**6AV6 381-1BD05-1CX0**
• 1024 PowerTags (RT 1024)	**6AV6 381-1BE05-1CX0**
• 64K PowerTags (RT Max)	**6AV6 381-1BF05-1CX0**
Complete packages on CD-ROM	
Language versions: DE/EN/FR/IT/ES; with license for	
• 128 PowerTags (RC 128)	**6AV6 381-1BM05-1CX0**
• 256 PowerTags (RC 256)	**6AV6 381-1BN05-1CX0**
• 1024 PowerTags (RC 1024)	**6AV6 381-1BP05-1CX0**
• 64 K PowerTags (RC Max)	**6AV6 381-1BQ05-1CX0**
SIMATIC WinCC system software V5.1 ASIA	
Runtime packages on CD-ROM	
Language/script versions: English/simplified and traditional Chinese/Korean/Japanese; with license for	
• 128 PowerTags (RT 128)	**6AV6 381-1BC05-1AV0**
• 256 PowerTags (RT 256)	**6AV6 381-1BD05-1AV0**
• 1024 PowerTags (RT 1024)	**6AV6 381-1BE05-1AV0**
• 64 K PowerTags (RT Max)	**6AV6 381-1BF05-1AV0**
Complete packages on CD-ROM	
Language/script versions: English/simplified and traditional Chinese/Korean/Japanese; with license for	
• 128 PowerTags (RC 128)	**6AV6 381-1BM05-1AV0**
• 256 PowerTags (RC 256)	**6AV6 381-1BN05-1AV0**
• 1024 PowerTags (RC 1024)	**6AV6 381-1BP05-1AV0**
• 64 K PowerTags (RC Max)	**6AV6 381-1BQ05-1AV0**
SIMATIC WinCC V5.1 Power Packs	
For upgrading from:	
Runtime packages	
• 128 to 256 PowerTags	**6AV6 371-1BD05-0AX0**
• 128 to 1024 PowerTags	**6AV6 371-1BE05-0AX0**
• 128 to 64 K PowerTags	**6AV6 371-1BF05-0AX0**
• 256 to 1024 PowerTags	**6AV6 371-1BG05-0AX0**
• 256 to 64 K PowerTags	**6AV6 371-1BH05-0AX0**
• 1024 to 64 K PowerTags	**6AV6 371-1BJ05-0AX0**
Complete packages	
• 128 to 256 PowerTags	**6AV6 371-1BD15-0AX0**
• 128 to 1024 PowerTags	**6AV6 371-1BE15-0AX0**
• 128 to 64 K PowerTags	**6AV6 371-1BF15-0AX0**
• 256 to 1024 PowerTags	**6AV6 371-1BG15-0AX0**
• 256 to 64 K PowerTags	**6AV6 371-1BH15-0AX0**
• 1024 to 64 K PowerTags	**6AV6 371-1BJ15-0AX0**

	Order No.
SIMATIC WinCC system software V6.0 SP4	
Runtime packages on CD-ROM	
Language/script versions: DE/EN/FR/IT/ES; with license for	
• 128 PowerTags (RT 128)	**6AV6 381-1BC06-0EX0**
• 256 PowerTags (RT 256)	**6AV6 381-1BD06-0EX0**
• 1024 PowerTags (RT 1024)	**6AV6 381-1BE06-0EX0**
• 8 K PowerTags (RT 8K)	**6AV6 381-1BH06-0EX0**
• 64 K PowerTags (RT Max)	**6AV6 381-1BF06-0EX0**
Incl. 512 archive tags each	
Complete packages on CD-ROM	
Language versions: DE/EN/FR/IT/ES; with license for	
• 128 PowerTags (RC 128)	**6AV6 381-1BM06-0EX0**
• 256 PowerTags (RC 256)	**6AV6 381-1BN06-0EX0**
• 1024 PowerTags (RC 1024)	**6AV6 381-1BP06-0EX0**
• 8 K PowerTags (RC 8K)	**6AV6 381-1BS06-0EX0**
• 64 K PowerTags (RC Max)	**6AV6 381-1BQ06-0EX0**
Incl. 512 archive tags each	
SIMATIC WinCC system software V6.0 SP3 ASIA	
Runtime packages on CD-ROM	
Language versions: English/simplified and traditional Chinese/Korean/Taiwanese/ Japanese; with license for	
• 128 PowerTags (RT 128)	**6AV6 381-1BC06-0DV0**
• 256 PowerTags (RT 256)	**6AV6 381-1BD06-0DV0**
• 1024 PowerTags (RT 1024)	**6AV6 381-1BE06-0DV0**
• 8 K PowerTags (RT 8K)	**6AV6 381-1BH06-0DV0**
• 64 K PowerTags (RT Max)	**6AV6 381-1BF06-0DV0**
Incl. 512 archive tags each	
Complete packages on CD-ROM	
Language versions: English/simplified and traditional Chinese/Korean/Taiwanese, Japanese; with license for	
• 128 PowerTags (RC 128)	**6AV6 381-1BM06-0DV0**
• 256 PowerTags (RC 256)	**6AV6 381-1BN06-0DV0**
• 1024 PowerTags (RC 1024)	**6AV6 381-1BP06-0DV0**
• 8 K PowerTags (RC 8K)	**6AV6 381-1BS06-0DV0**
• 64 K PowerTags (RC Max)	**6AV6 381-1BQ06-0DV0**
Incl. 512 archive tags each	

SIMATIC WinCC

Ordering data (continued)

	Order No.
SIMATIC WinCC V6.0 SP3 and SP4 Powerpacks	
For upgrading from:	
Runtime packages	
• 128 to 256 PowerTags	**6AV6 371-1BD06-0DX0**
• 128 to 1024 PowerTags	**6AV6 371-1BE06-0DX0**
• 128 to 8 K PowerTags	**6AV6 371-1BK06-0DX0**
• 128 to 64 K PowerTags	**6AV6 371-1BF06-0DX0**
• 256 to 1024 PowerTags	**6AV6 371-1BG06-0DX0**
• 256 to 8 K PowerTags	**6AV6 371-1BL06-0DX0**
• 256 to 64 K PowerTags	**6AV6 371-1BH06-0DX0**
• 1024 to 8 K PowerTags	**6AV6 371-1BM06-0DX0**
• 1024 to 64 K PowerTags	**6AV6 371-1BJ06-0DX0**
• 8 K to 64 K PowerTags	**6AV6 371-1BN06-0DX0**
Complete packages	
• 128 to 256 PowerTags	**6AV6 371-1BD16-0DX0**
• 128 to 1024 PowerTags	**6AV6 371-1BE16-0DX0**
• 128 to 8 K PowerTags	**6AV6 371-1BK16-0DX0**
• 128 to 64 K PowerTags	**6AV6 371-1BF16-0DX0**
• 256 to 1024 PowerTags	**6AV6 371-1BG16-0DX0**
• 256 to 8 K PowerTags	**6AV6 371-1BL16-0DX0**
• 256 to 64 K PowerTags	**6AV6 371-1BH16-0DX0**
• 1024 to 8 K PowerTags	**6AV6 371-1BM16-0DX0**
• 1024 to 64 K PowerTags	**6AV6 371-1BJ16-0DX0**
• 8 K to 64 K PowerTags	**6AV6 371-1BN16-0DX0**
SIMATIC WinCC V6.0 SP3 and SP4 Archive Powerpacks	
For upgrading archiving from:	
• 512 to 1500 archive tags	**6AV6 371-1DQ06-0AX3**
• 512 to 5000 archive tags	**6AV6 371-1DQ06-0BX3**
• 512 to 30000 archive tags	**6AV6 371-1DQ06-0EX3**
• 512 to 80000 archive tags	**6AV6 371-1DQ06-0GX3**
• 1500 to 5000 archive tags	**6AV6 371-1DQ06-0AB3**
• 1500 to 30000 archive tags	**6AV6 371-1DQ06-0AE3**
• 1500 to 80000 archive tags	**6AV6 371-1DQ06-0AG3**
• 5000 to 30000 archive tags	**6AV6 371-1DQ06-0BE3**
• 5000 to 80000 archive tags	**6AV6 371-1DQ06-0BG3**
• 30000 to 80000 archive tags	**6AV6 371-1DQ06-0EG3**
SIMATIC WinCC Upgrade/Comprehensive Support	
WinCC V5 Upgrade [1]	
For upgrading RT and RC software packages and stations to the latest version	
• V4.x to V5.1 SP2	**6AV6 381-1AA05-1CX4**
• V5.x to V5.1 SP2	**6AV6 381-1AA05-1CX3**
• V4.x/V5.x ASIA to V5.1 ASIA	**6AV6 381-1AA05-1AV3**

		Order No.
WinCC V5 Upgrade [1]		
For upgrading the RT version:		
• from V5.x to V6.0 SP4	E)	**6AV6 381-1AA06-0EX4**
• from V5.x ASIA to V6.0 SP3 ASIA		**6AV6 381-1AA06-0DV4**
For upgrading the RC version:		
• from V5.x to V6.0 SP4	E)	**6AV6 381-1AB06-0EX4**
• from V5.x ASIA to V6.0 SP3 ASIA		**6AV6 381-1AB06-0DV4**
WinCC Comprehensive Support [2]		
contains current updates/upgrades for WinCC basic software und options:		
• 1 license		**6AV6 381-1AA00-0AX5**
• 3 licenses		**6AV6 381-1AA00-0BX5**
• 10 licenses		**6AV6 381-1AA00-0CX5**
SIMATIC WinCC documentation (to be ordered separately)		
SIMATIC WinCC V5 basic documentation in a slipcase		
Includes the WinCC Manual and software protection description		
• German		**6AV6 392-1XA05-0AA0**
• English		**6AV6 392-1XA05-0AB0**
• French		**6AV6 392-1XA05-0AC0**
SIMATIC WinCC V5 Configuration & Communication Manual		
Comprising: Configuration Manual + CD with examples, Communication Manual, Getting Started		
• German		**6AV6 392-1CA05-0AA0**
• English		**6AV6 392-1CA05-0AB0**
• French		**6AV6 392-1CA05-0AC0**
SIMATIC WinCC V6 Communication Manual		
Communication manual for process communication and OPC communication from WinCC V6		
• German		**6AV6 392-1CA06-0AA0**
• English		**6AV6 392-1CA06-0AB0**
Basic documentation SIMATIC WinCC V6		
Includes the WinCC Manual and software protection description		
• German		**6AV6 392-1XA06-0AA0**
• English		**6AV6 392-1XA06-0AB0**
• French		**6AV6 392-1XA06-0AC0**
• Italian		**6AV6 392-1XA06-0AD0**
• Spanish		**6AV6 392-1XA06-0AE0**

E) Subject to export regulations: AL: N and ECCN: EAR99S

1) In accordance with license stipulations, 1 upgrade package must be ordered for each WinCC station.

2) Comprehensive support runs for one year. The contract is automatically extended by a further year unless canceled 3 months prior to expiration. In accordance with license stipulations, 1 comprehensive support package must be ordered for each WinCC station.

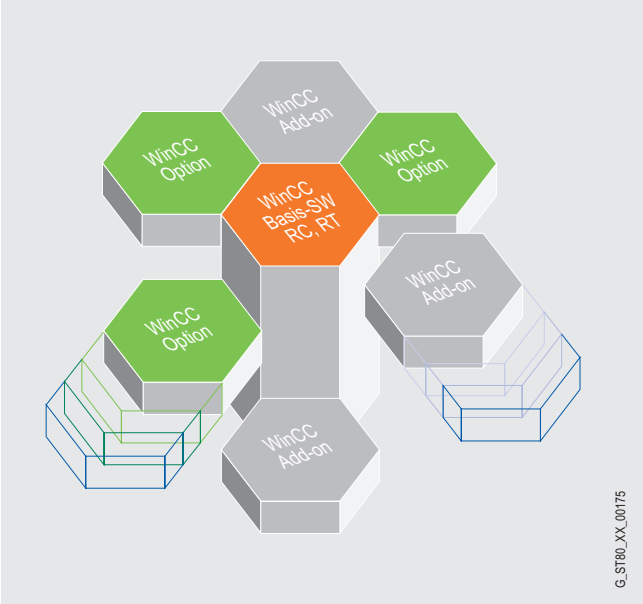
Ordering data (continued)

	Order No.
Communication via Industrial Ethernet	
SOFTNET-S7 Edition 2005 Software for S7 and S5-compatible communication, incl. OPC server, PG/OP communication and NCM PC; up to 64 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, 2000 Professional/Server; German/English	**6GK1 704-1CW63-3AA0**
SOFTNET-S7 Lean Edition 2005 Software for S7 and S5-compatible communication, incl. OPC server, PG/OP communication and NCM PC; up to 8 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, 2000 Professional/Server; German/English	**6GK1 704-1LW63-3AA0**
CP 1613 A2 A) PCI card (32 bit) for connecting a PG/PC to Industrial Ethernet (communications software must be ordered separately)	**6GK1 161-3AA01**
S7-1613 Edition 2005 Software for S7 and S5 communication, incl. PG/OP communication, OPC server and NCM PC; up to 120 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, Windows 2000 Professional/Server; for CP 1613/CP 1613 A2 German/English	**6GK1 716-1CB63-3AA0**
Channel DLL SIMATIC S5 PMC Ethernet Layer 4 (only for WinCC V5.1) Additional software packages required for S5-PMC • PMC/LS-B message functions • PMC/LS-B Status, standard displays from V4.3 upwards • Parameterization software PMC Pro from V2.2 upwards, German • Parameterization software PMC Pro from V2.2 upwards, English	**6AV6 371-1CD05-0PX0**

	Order No.
Communication via PROFIBUS	
CP 5611 A2 A) PCI card (32 bit) for connecting a PG/PC to PROFIBUS (communications software included in the WinCC basic package)	**6GK1 561-1AA01**
CP 5611 MPI A) Comprising CP 5611 A2 (32 bit) and MPI cable, 5 m	**6GK1 561-1AM01**
CP 5512 PCMCIA card (CARDBUS 32 bit) for connecting a PG/Notebook to PROFIBUS or MPI (communications software included in the WinCC basic package)	**6GK1 551-2AA00**
PC/MPI adapter RS 232, 9-pin; male with RS 232/MPI converter, max. 19.2 kbit/s	**6ES7 972-0CA23-0XA0**
CP 5613 A2 PCI card (32 bit) for connecting a PC to PROFIBUS (communications software must be ordered separately).	**6GK1 561-3AA01**
S7-5613 Edition 2005 Software for S7 communication incl. PG/OP protocol, OPC server, for 32 bit Windows XP Professional, 2003 Server, 2000 Professional/Server; English/German	**6GK1 713-5CB63-3AA0**
DP-5613 Edition 2005 Software for DP protocol incl. PG/OP communication, FDL, DP OPC server, for 32 bit Windows XP Professional, 2003 Server, 2000 Professional/Server; English/German	**6GK1 713-5DB63-3AA0**
FMS-5613 Edition 2005 Software for FMS protocol incl. PG/OP communication, FDL, FMS OPC server, for 32 bit Windows XP Professional, 2003 Server, 2000 Professional/Server; English/German	**6GK1 713-5FB63-3AA0**
Channel DLL SIMATIC S5 PMC PROFIBUS (only for WinCC V5.1) Additional software packages required for S5-PMC • PMC/LS-B message functions • PMC/LS-B Status, standard displays from V4.3 upwards • Parameterization software PMC Pro from V2.2 upwards, German • Parameterization software PMC Pro from V2.2 upwards, English	**6AV6 371-1CD05-0NX0**

WinCC Options

Overview



- The universal WinCC basic software is the basis for modular expansions. These functional expansions can be obtained in the form of WinCC options and as WinCC add-ons.
- WinCC options are created by WinCC Development and are Siemens Automation & Drives products. You can obtain support from our Advisory Services and via the central hotline.

Options for scalable plant configurations

- WinCC/Server
  - To set up a powerful client/server system
- WinCC/Web Navigator
  - To control and monitor plants via the Internet, in-house intranet or LAN

Options to increase availability

- WinCC/Redundancy;
  - For increased system availability through redundancy
- WinCC/ProAgent
  - For reliable process diagnostics
- WinCC/Messenger (for WinCC V5.1 only)
  - For the automatic or manual sending of text, voice and image data via e-mail directly from WinCC
- WinCC/Guardian (for WinCC V5.1 only)
  - For the integration of live camera images into WinCC images, video monitoring and storage of video sequences in a database

Options for IT and Business Integration

- WinCC/Dat@Monitor (for WinCC V6.0 only)
  - For display and analysis of current process states and historical data on office PCs with standard tools
- WinCC/Connectivity Pack (for WinCC V6.0 only)
  - Access to WinCC archive via OPC HDA, OPC A&E, OPC XML Server and WinCC OLE-DB/OLE-DB
- WinCC/IndustrialDataBridge
  - Configurable link to databases and IT systems
- SIMATIC WinBDE
  - Machine data acquisition and evaluation
- WinCC/Client Access license (for WinCC V6.0 only)
  - Access from (office) PCs to WinCC archive data

Options for SCADA expansions

- WinCC/User Archives
  - To manage data sets in user archives
- WinCC/Storage (for WinCC V5.1 only; WinCC V6.0 features a comparable functionality in the basic system)
  - For the long-term acquisition of process data, messages and protocols

Options for process control

- WinCC/Basic Process Control (for WinCC V5.1 only; standard feature in WinCC V6.0 basic system)
  - With functional expansions for instrumentation and control

Options for industry-specific expansions (FDA-compliant)

- WinCC/Advanced User Administrator (for WinCC V5.1)
  - Central management of WinCC users, plant-wide (to CFR 21 Part 11)
- SIMATIC Logon Service (for WinCC V6.0)
  - Central management of WinCC users, plant-wide (to CFR 21 Part 11)
- WinCC/Audit (for WinCC V6.0) change management
  - Generation of audit trails for engineering and runtime

Options for individual system expansions

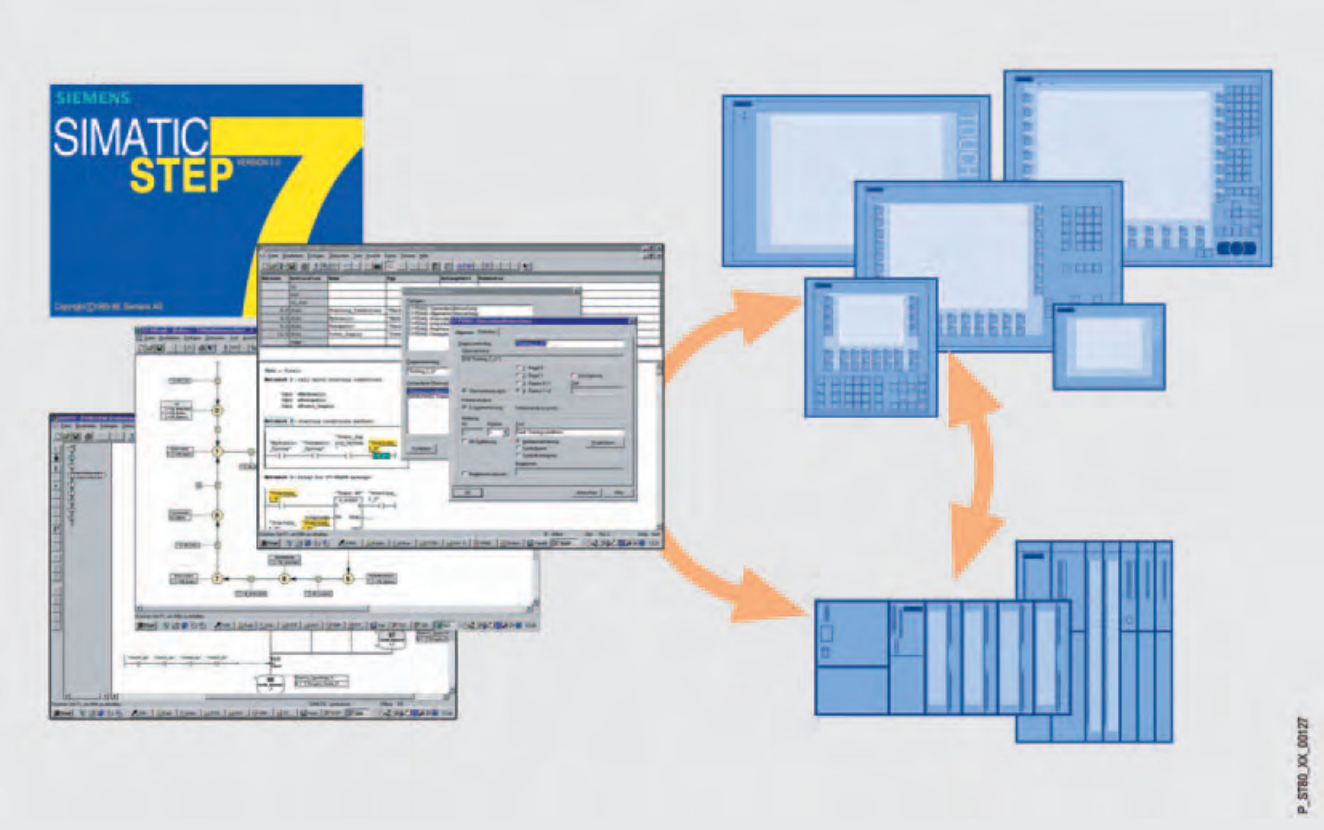
- WinCC/IndustrialX
  - For the creation of customized WinCC Active-X objects in a VB development environment
- WinCC/ODK
  - For the use of open programming interfaces (Open Development Kit)

Options for comprehensive support

- WinCC/Comprehensive Support
  - Comprehensive support package; contains current updates/upgrades for WinCC basic software and options and the WinCC Knowledge Base CD

Overview

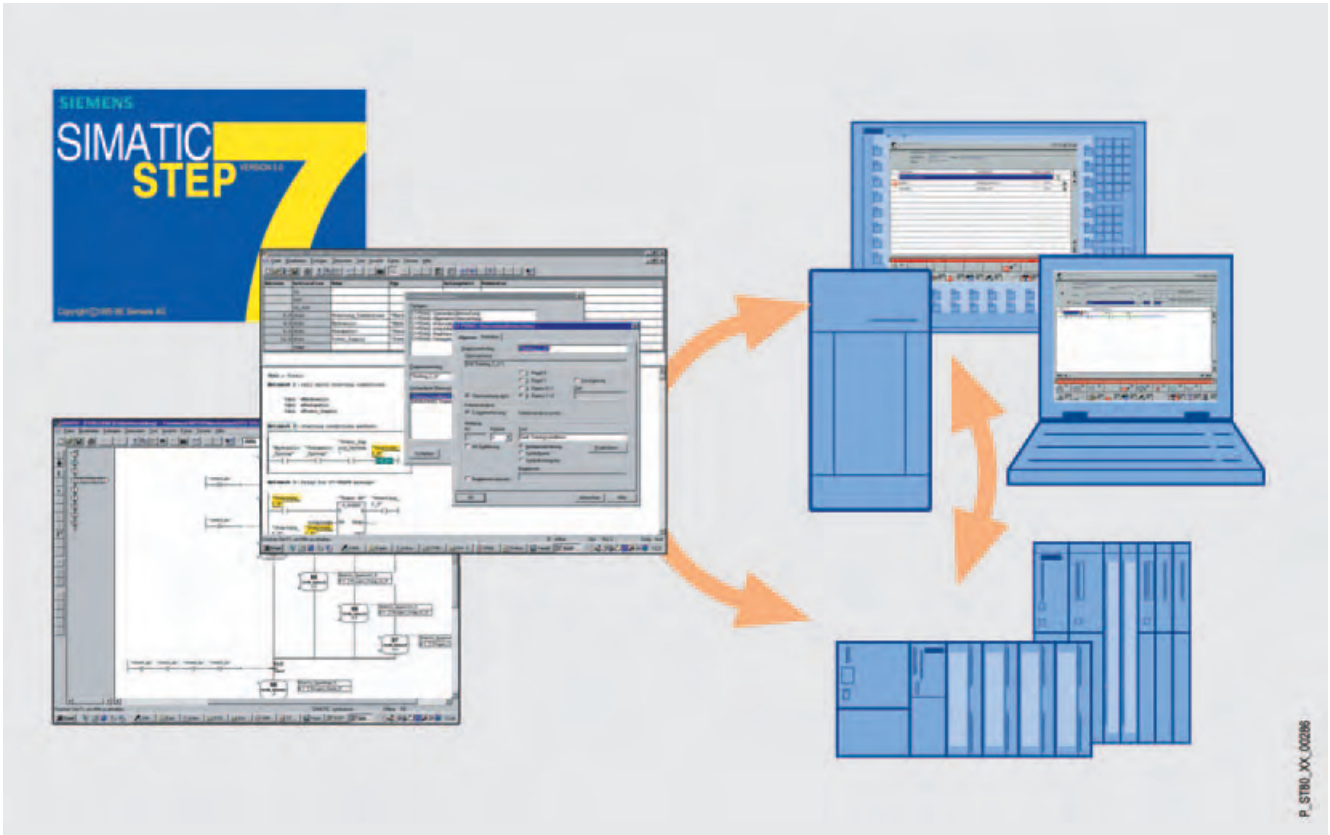
- Process diagnostics software for quick, selective fault diagnostics in plants and machines for SIMATIC S7 and SIMATIC HMI
- A standardized diagnostics concept for various SIMATIC components:
  Optimum interaction between STEP 7 engineering tools and SIMATIC HMI
- Standard user interface



Process fault diagnostics with ProAgent for ProTool and WinCC flexible/ProAgent as well as the STEP 7 engineering tools

SIMATIC ProAgent

Overview



Process fault diagnostics with WinCC/ProAgent and the STEP 7 engineering tools

Technical specifications

	ProAgent for OP	ProAgent/MP	ProAgent/PC	WinCC/ProAgent	WinCC flexible /ProAgent
Interfaces					
• Can be used in conjunction with programmable controllers	SIMATIC S7: S7-300/S7-400	SIMATIC S7: S7-300/S7-400	SIMATIC S7: S7-300/S7-400, WinAC	SIMATIC S7: S7-300/S7-400; WinAC	SIMATIC S7: S7-300/S7-400; WinAC
• Types of connection	SIMATIC S7 Protocol Suite: MPI, PROFIBUS DP	SIMATIC S7 Protocol Suite: MPI, PROFIBUS DP	SIMATIC S7 Protocol Suite: MPI, PROFIBUS DP, Industrial Ethernet, TCP/IP (V6.0 SP2 and higher)	SIMATIC S7 Protocol Suite: MPI, PROFIBUS DP, Industrial Ethernet, TCP/IP	SIMATIC S7 Protocol Suite: MPI, PROFIBUS DP, Industrial Ethernet, TCP/IP
Display units					
Standard images for:					Standard displays for easy embedding in user displays; example project for OP 270
• Device/resolution in pixels/display	OP27/320 x 240/ monochrome	TP 270/OP 270, 6"	PC/1024 x 768	PC/1024 x 768	
	OP27/320 x 240/ color	MP 270B, 10" Key/Touch	PC/800 x 600		
	OP37/640 x 480/ color	MP 370, Key/Touch	Panel PC 15"/1024 x 768, Key/Touch	Panel PC 677/877 15"/1024 x 768, Key/Touch	
	TP27-6/320 x 240/ monochrome		Panel PC 12"/800 x 600, Key/Touch		
	TP27-6/320 x 240/ color		Panel PC, 10"/640 x 480		

Technical specifications (continued)

	ProAgent for OP	ProAgent/MP	ProAgent/PC	WinCC/ProAgent	WinCC flexible /ProAgent
• Device/resolution in pixels/display (continued)	TP27-10/640 x 480/ color TP27-10/640 x 480/ color TP37/640 x 480/ color C7-626/320 x 240/ monochrome		Panel PC 577; 15“/1024 x 768, Touch Panel PC 577; 15“/1024 x 768, Touch FI45/1024 x 768	FI45/1024 x 768	
Number of languages for online language selection	5 (de/en/fr/it/es)	5 (de/en/fr/it/es)	5 (de/en/fr/it/es)	3 (de/en/fr)	5 (de/en/fr/it/es)
Functionality					
Unit overview	No	No	No	WinCC/ProAgent V6.0 and higher	No
Message display	Yes	Yes	Yes	Yes	Yes
Sequencer operating display	Yes	Yes	Yes	Yes	Yes
Diagnostics detail display	No	Yes	Yes	Yes	Yes
• Display STL/LAD/signal list	Yes	Yes	Yes	Yes	Yes
• Display of operands with symbol and comment	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
Criteria analysis	OP27, C7-626, TP27-6: Default setting symbols	Yes	Yes	Yes	Yes
Motion display	When fault occurs/current status	When fault occurs/current status	When fault occurs/current status/	When fault occurs/current status/can be archived	When fault occurs/current status
• Number of viewable movements					
• Directions of motion	OP27, C7-626, TP27-6: 4; OP37, TP27-10, TP37: 5	6	6	6	6
• Number of viewable end positions per movement	2	2	2	2	2
Unit overview	8	16	16	16	16
Documentation					
In electronic format	de/en/fr/it/es; included in scope of delivery	de/en/fr/it/es; included in scope of delivery	de/en/fr/it/es; included in scope of delivery	de/en/fr; included in scope of delivery	de/en/fr/it/es; included in scope of delivery
Requirements					
HMI software	ProTool V6.0	ProTool V6.0	ProTool/Pro V6.0	WinCC V5.1 (ProAgent V5.6)/ WinCC V6.0 + SP3 (ProAgent V6.0 + SP2)	WinCC flexible 2005
Operating system: Configuration	Windows 98SE/ME, Windows NT + SP6, Windows 2000 + SP2, Windows XP (ProTool V6.0 + SP2 and higher)	Windows 98SE/ME, Windows NT + SP6, Windows 2000 + SP2, Windows XP (ProTool V6.0 + SP2 and higher)	Windows 98SE/ME, Windows NT + SP6, Windows 2000 + SP2, Windows XP (ProTool V6.0 + SP2 and higher)	*WinCC/ProAgent V5.6:* Windows NT + SP6a, Windows 2000 + SP2; *WinCC/ProAgent V6.0:* Windows 2000 + SP3, Windows XP	Windows 2000 + SP3, Windows XP + SP1,
Operating system Runtime	Runtime Operator Panel	Windows CE 3.0	Windows NT + SP6, Windows 2000 + SP2, Windows XP (ProTool V6.0 + SP2 and higher)	*WinCC/ProAgent V5.6:* Windows NT + SP6a, Windows 2000 + SP2 *WinCC/ProAgent V6.0:* Windows 2000 + SP3, Windows XP	*WinCC flexible/ ProAgent for SIMATIC Panels:* Windows CE 3.0 *WinCC flexible/ ProAgent for WinCC flexible Runtime:* Windows 2000 + SP3 Windows XP + SP1

SIMATIC ProAgent

Technical specifications (continued)

	ProAgent for OP	ProAgent/MP	ProAgent/PC	WinCC/ProAgent	WinCC flexible /ProAgent
STEP 7	V5.0 and higher	V5.0 and higher	V5.0 and higher	*WinCC/ProAgent V5.6*: V5.1 + SP2 and higher *WinCC/ProAgent V6.0 + SP1:* V5.3 and higher	V5.3 and higher
• S7-GRAPH	V5.0 and higher	V5.0 and higher	V5.0 and higher	V5.0 and higher	V5.2 + SP3 and higher
• S7-PDIAG	V4.02 and higher	V4.02 and higher	V4.02 and higher	*WinCC/ProAgent V5.6:* V5.0 and higher *WinCC/ProAgent V6.0:* V5.1 and higher	V5.1 and higher
• S7-HiGraph	No	V5.0 and higher	V5.0 and higher	No	V5.3 and higher
Type of delivery (one license is required for each target hardware)	License key	Runtime license	Runtime license	CD-ROM/ Runtime license	Runtime license

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Ordering data

SIMATIC ProAgent

Software option package for process diagnostics based on S7-GRAPH, S7-PDIAG and S7-HiGraph[1], can be loaded with SIMATIC ProTool configuring software V6.0 and higher[2]; functional enhancement for ProTool, electronic documentation in English, French, German, Italian and Spanish

		Order No.
• **SIMATIC ProAgent for OP** Functions and standard screens for use on an OP27/OP37, TP27/TP37 or C7-626 in English, French, German, Italian and Spanish, runtime license (single license)	E)	**6AV3 681-1AB06-0AX0**
• **SIMATIC ProAgent/MP** Functions and standard screens for use on an OP 270/TP 270 and MP 270/MP 370 (Key) in English, French, German, Italian and Spanish, runtime license (single license)	E)	**6AV3 681-1CB06-0AX0**
• **SIMATIC ProAgent/PC** Functions and standard screens for use on a Panel PC 670/870 10", 12" and 15" Key, FI45, PC (resolutions 640 x 480, 800 x 600 and 1024 x 768 pixels) in English, French, German, Italian and Spanish, runtime license (single license)	E)	**6AV3 681-1BB06-0AX0**

E) Subject to export regulations: AL: N and ECCN: EAR99S

SIMATIC WinCC/ProAgent

Software option package for process error diagnosis based on S7 GRAPH V5 and higher and S7 PDIAG V5 and higher, functional enhancement for SIMATIC WinCC, electronic documentation in English, French and German; functions and standard screens for use on an FI45, PC (resolution 1024 x 768 pixels) and Panel PC 577/677/877 15" (resolution 1024 x 768 pixels) in English, French and German, runtime license (single license)

	Order No.
WinCC version:	
• V5.1 (ProAgent V5.6)	**6AV6 371-1DG05-6AX0**
• V6.0 SP4 (ProAgent V6.0 SP3)	**6AV6 371-1DG06-0DX0**
Upgrade	
• to V5.6	**6AV6 371-1DG05-6AX4**
• to V6.0 (SP3)	**6AV6 371-1DG06-0DX4**

1) Only in combination with ProAgent/MP and ProAgent/PC
2) Configuring software included on ProTool CD V6

Ordering data (continued)

	Order No.
SIMATIC WinCC flexible/ProAgent	
Software option package for process error diagnosis based on S7 PDIAG V5.1 and higher, S7 GRAPH V5.2 + SP3 and higher; S7 HiGRAPH V5.3 and higher. Functional enhancement for SIMATIC WinCC flexible; electronic documentation in English, French, German, Italian and Spanish	
• **WinCC flexible /ProAgent for SIMATIC Panels** D) Runtime license (single license) executable on TP/OP 270, MP 270B and MP 370	**6AV6 618-7DB01-1AB0**
• **WinCC flexible /ProAgent for WinCC flexible Runtime** D) Runtime license (single license)	**6AV6 618-7DD01-1AB0**

Documentation (must be ordered separately)	Order No.
SIMATIC HMI Manual Collection E) Electronic documentation, on CD-ROM 5 languages (English, French, German, Italian, Spanish); contains: all currently available user manuals, manuals and communication manuals for SIMATIC HMI	**6AV6 691-1SA01-0AX0**

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

E) Subject to export regulations: AL: N and ECCN: EAR99S

Premium Studio

Overview

- Contains the most important engineering and runtime software packages for SIMATIC S7/C7, SIMATIC HMI, SIMATIC NET and SINUMERIK on one data medium (DVD)
- Permits the simultaneous, automatic installation of several software packages
- Permits the automatic updating of installed software packages
- Considerably reduces installation costs
- With specific setup for general settings, e.g. languages to be installed, installation paths etc.

Note:
The Premium Studio does not contain any licenses. These must be ordered separately, either by means of existing licenses for the corresponding version or by the separate ordering of new licenses.

Ordering data

		Order No.
Premium Studio 2006		
Task: Installation/updating of software packages for engineering and runtime for SIMATIC S7/C7, SIMATIC HMI, SIMATIC NET and SINUMERIK; without licenses; *Target system:* Windows XP Professional *Requirements:* PCU, S7-300/-400, C7 *Delivery form:* on DVD; without licenses for the software packages		
DVD	E)	**6ES7 815-8CD02-0YA7**
Software Update Service	E)	**6ES7 815-8CD00-0YL7**

E) Subject to export regulations: AL: N and ECCN: EAR99S

Overview

With ADDM, you are completely in control of the SIMATIC and SINUMERIK controllers – around the clock and with any program version. This tool is indispensable in a modern production area and ensures user-friendly backup, comparison and management of control data.

Ordering data

		Order No.
ADDM software package		
Languages: English, German		
ADDM Single User		
• Single license with CD-ROM of current software version	G)	**6BQ3030-1AA30-3AB0**
• Trial license with CD-ROM of current software version	E)	**6BQ3030-1AA70-3AB0**
ADDM Client		
• Single license without data carrier	G)	**6BQ3030-1AA20-1AB0**
• Single license with CD-ROM of current software version	G)	**6BQ3030-1AA10-0AB0**
• Software update service		**6BQ3030-1AB10-8AB0**
ADDM Server		
• Single license with CD-ROM of current software version	G)	**6BQ3030-1AA00-3AB0**
• Software update service	G)	**6BQ3030-1AB00-8AB0**
ADDM Agent		
• Single license with CD-ROM of current software version	G)	**6BQ3030-3AA00-0AA0**
• Software update service		**6BQ3030-3AA10-0AA0**

E) Subject to export regulations: AL: N and ECCN: EAR99S
G) Subject to export regulations: AL: N and ECCN: 5D992B2

Technical product data for CAx applications

Overview

- Technical product data for S7-300, S7-400 and ET 200
- For in use in CAD/CAE applications
- Consists of:
  - Component data as per ECAD component standard
  - Dimensioned drawings for CAD/CAE systems
  - Macros/Macro libraries

Ordering data

		Order No.
Technical product data for CAx applications		
Task: Product data for use in CAD/CAE applications		
One Off License		**6ES7 991-0CD01-0YX0**
Software Update Service	E)	**6ES7 991-0CC00-0YX2**

E) Subject to export regulations: AL: N and ECCN: EAR99S

7

External prommer

Overview

- External EPROM programming device
- For programming SIMATIC memory cards, SIMATIC micro memory cards as well as SIMATIC EPROM and EEPROM modules
- For connection to the PC via the USB interface

For further information see section 8, page 8/5.

HVAC Lite Library runtime software

Overview

The HVAC Lite Library runtime software features STEP 7 functions for all aspects of building automation, in particular for heating, ventilation, air conditioning and sanitary facilities as well as for the supply and distribution of media.

HVAC Lite Library provides users with the following features:

- Future-oriented thanks to constant updates and expansions
- Modifications in line with new SIMATIC components
- Use of all SIMATIC signal modules (input/output modules)
- Use of the new SIMATIC S7-300 central controller modules with Micro Memory Card (CPU 313 or later)
- Openness thanks to standardized and documented interfaces
- Expansion capability and flexibility thanks to bit-modular block concept
- Safety thanks to tested quality-assured software blocks
- Standardized software structure for easy expansion and modification
- Engineering guideline to support structured software generation
- Predefined safety and operating philosophy
- Documented block functionality
- Protection of user engineering through runtime license

Additional information is available in the Internet under:

http://www.siemens.com/industrial-hvac

Technical specifications

	HVAC Lite Library
Basic hardware	
SIMATIC S7	S7-300
Central processing units CPUs	CPU 313...317 (with MMC card and flag memory area 0...255)
Signal modules	All
Communication modules	PROFIBUS, Ethernet, AS-Interface

	HVAC Lite Library
Functionality	
Input/output functions	Yes
Open-loop and closed-loop control functions	Yes
Optimization functions	Time switching
Human machine interface	
SIMATIC HMI	Yes
Via S7 functions	
• WinCC	Yes
• SCADA systems	Yes
• Operator control and monitoring via S7 OPC server	Yes
Communication	
PROFIBUS DP as master	Yes
AS-Interface as master	Yes
PROFIBUS DP as slave	Yes
SR via Ethernet FDL via PROFIBUS	(optional instead of operator control and monitoring)
S7 functions via MPI, PROFIBUS, Ethernet	Yes
Engineering	
Automation software	STEP 7 STL (LAD/CSF)
HMI software	SIMATIC ProTool/WinCC flexible/ WinCC

Ordering data

	Order No.
HVAC Lite Library	
STEP 7 functions for building automation, e.g. for heating, ventilation, air-conditioning and sanitation engineering	
• HVAC Lite Engineering Set; Module library, examples, documentation; license for 40 data points	**6FL4 214-4ND47-0AA0**
• Runtime license for 1 SIMATIC-CPU; max 40 data points	**6FL4 214-4ND40-0AB0**
• Runtime license for 1 SIMATIC-CPU; max. 125 data points	**6FL4 214-4ND41-0AB0**
• Runtime license for 1 SIMATIC-CPU; unlimited data points	**6FL4 214-4ND42-0AB0**
• Powerpack for 1 SIMATIC CPU; 40 to 125 data points	**6FL4 214-4ND43-0AD0**
• Powerpack for 1 SIMATIC CPU; 125 data points and above	**6FL4 214-4ND44-0AD0**
• Powerpack for 1 SIMATIC CPU; 40 data points and above	**6FL4 214-4ND45-0AD0**

Programming devices

8

Brochures

For brochures serving as selection guides for SIMATIC products refer to:

http://www.siemens.com/simatic/printmaterial

Programming devices

Field PG M

Overview

- The mobile, industry-compatible programming device with the powerful Intel Pentium M processor.
- It is ideal for start-up, servicing and maintaining automation systems.
- Industrial notebook with wireless technology, large display, slow battery discharge, high-speed RAM and integrated data backup concept.
- With all the usual interfaces for industrial applications.

For brochures serving as selection guides for SIMATIC products refer to:

http://www.siemens.com/simatic/printmaterial

Technical specifications

	SIMATIC Field PG M
General features	
Design	Notebook
Processor	Pentium Mobile 1.6 GHz or 2.0 GHz Dothan processor; Intel Mobile chip set 915 GM
Main memory	512 MB or 1 GB DDR2 memory with 533 MHz Frontsidebus
Free expansion slots	PC card/PCMCIA: 1 x Type III or 2 x Type I
Graphic	Intel GMA 900 with DualView (e.g. desktop across 2 screens)
Display	15" display; XGA resolution (1024 x 768) or SXGA+ (1400 x 1050)
Loudspeaker	Integrated stereo loudspeakers
Pointing device	Touch pad
Operating system	Windows XP SP2 MUI (Eng., Ger.,Fr., It., Sp.; further languages can be installed separately)
Power supply	Wide-range power supply unit 100 to 240 V, 50 to 60 Hz, high-performance lithium ion rechargeable battery 73 Wh (runtime over 4 hours)
Guarantee	24 months on hardware components (battery 6 months)
Drives	
Hard disk	Serial ATA with 60 GB or 80 GB; for easy swapping
DVD/CD	DVD ROM /CD RW or multi-standard DVD RW / CD RW
Floppy disk	1.44 MB; 3.5"

	SIMATIC Field PG M
Ports	
PROFIBUS DP/MPI	CP 5611-compatible
COM 1	V.24/TTY (for SIMATIC S5)
Programming interface	For memory cards, micro memory cards and S5 EPROM modules (using an adapter)
Ethernet	10/100 Mbit/s Fast Ethernet
USB 2.0	2 x 2 (1 A / pair)
PC card (PCMCIA)	1 x Type III or 2 x Type II
VGA	1 x (for connecting an external monitor)
COM 2 (serial)	9-pin Sub-D male; V.24; over I-Cable
Parallel (LPT)	ECP
WLAN[1)]	Integrated, IEEE802.11 a,b,g
Modem	Analog, V.92-compatible
Headphones	1 x (stereo)
Microphone	1 x (stereo)
Ambient conditions	
Degree of protection EN 60529	IP30 at the front with unit closed
Vibrations	Tested to DIN IEC 68-2-6
• Operation	10 to 58 Hz: 0.01875 mm, 58 Hz to 500 Hz: 4,9 m/s^2
• Transport	5 to 9 Hz: 3,5 mm; 9 Hz to 500 Hz: 9,8 m/s^2
Resistance to shock	tested to DIN IEC 68-2-29
• Operation	50 m/s^2, 30 ms, 100 shocks
• Storage/transport	250 m/s^2, 6 ms, 1000 shocks

1) The integrated wireless LAN (2.4 GHz band) and modem is approved for operation in Europe. In the 5 GHz band, the wireless LAN is approved for operation in Germany, France, Italy, Spain, UK and Austria. Please adhere to the relevant local regulations when operating the device outside these countries.

Technical specifications (continue)

	SIMATIC Field PG M
Electromagnetic compatibility (EMC)	
• Emitted interference	EN 55022 Class B
• Immunity to conducted interference on the supply lines	± 2 kV (according to IEC 1000-4-4; 1995; Burst) ± 1 kV; (according to IEC 1000-4-5; 1995; Surge sym) ± 2 kV (according to IEC 1000-4-5; 1995; Surge asym)
• Immunity to interference on signal lines	± 1 kV (according to IEC 1000-4-4; 1995; Burst; length < 3 m) ± 2 kV (according to IEC 1000-4-4; 1995; Burst; length > 3 m) ± 1 kV (according to IEC 1000-4-4; 1995; Surge sym; length > 3 m) ± 2 kV (according to IEC 1000-4-4; 1995; Surge asym, length > 3 m))
• Immunity to static discharge	± 4 kV contact discharge (according to IEC 1000-4-2: 1995) ± 8 kV air discharge (according to IEC 1000-4-2: 1995)
• Immunity to radio frequency emission	10 V/m; 80 MHz to 1000 MHz, 80% AM (according to ENV 50140): 1993) 10 V/m; 900 MHz; 50% load factor (according to ENV 50204): 1995)
• Immunity to high-frequency current feed	10 V; 9 kHz to 80 MHz
• Immunity to magnetic fields	30 A/m; 50 Hz

	SIMATIC Field PG M
Temperature	Tested to DIN EN 60068-2-2: 1994, DIN IEC 68-2-1, DIN IEC 68-2-14
• Operation [2]	+ 5 to + 40 °C
• Storage/transport	- 20 to + 60 °C
• Max. gradient	10 °C/h (no condensation)
Relative humidity	Tested to DIN IEC 68-2-3, DIN IEC 68-2-30, DIN IEC 68-2-56
• Operation	5% to 80% at 25° C (no condensation)
• Storage/transport	5% to 95% at 25° C (no condensation)
Dimensions and weights	
Dimensions (W x H x D) in mm	330 x 300 x 52
Weight, approx.	3,9 kg

2) Battery recharging and CD/DVD writing is only possible up to a temperature of 35 °C

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Programming devices

Field PG M

Ordering data		Order No.
Programming device Field PG M		
Field PG standard: 1.6 GHz Pentium M processor (730), DVD ROM/CD-RW combined drive, 15" XGA display (1024x768), 60 GB S-ATA hard disk, 1x1 GB DDR2 RAM	D)	6ES7 712-0AA0■-0■■3
Field PG Premium: 2 GHz Pentium M processor (760), Dual Layer Multi Standard DVD-RW, 15" SXGA+ display (1400x1050), 80 GB S-ATA hard disk, 1x1 GB DDR2 RAM	D)	6ES7 712-1BB1■-0■■3
Power cable (required)		
• for Germany, France, the Netherlands, Spain, Belgium, Austria, Sweden, Finland		0
• For Great Britain		1
• For Switzerland		2
• for the U.S.A., Japan		3
• For Italy		4
• for Germany, France, the Netherlands, Spain, Belgium, Austria, Sweden, Finland; Keyboard with country-specific labeling for France, Belgium and Switzerland		5
• For Switzerland; Keyboard with country-specific labeling for France, Belgium, Switzerland		6
Operating system		
• Windows XP MUI Ger.,En.,Fr.,Sp.,It.		A
• Windows 2000 English MUI (Fr., Sp., It., Ger. stored on HD as image)		B
• Windows 2000 German (Fr., Sp., It., En. stored on HD as image)		C
Licenses for the SIMATIC software		
• Trial license for STEP 7 Professional, WinCC flexible Advanced		A
• Upgrade license for STEP 7, STEP 5, WinCC flexible Advanced (requires STEP 7/STEP 5 license (V3.0 or higher))		B
• Upgrade license for STEP 7 Professional, STEP 5, WinCC flexible Advanced (requires license for STEP 7 Professional / STEP 5 (1/2000 or later))		C
• License for STEP 7, STEP 7 Micro/WIN, WinCC flexible Advanced		D
• License STEP 7, STEP 5, STEP 7-Micro/WIN, WinCC flexible Advanced; incl. EPROM adapter and S5-CC cable		E
• License for STEP 7 Professional, STEP 7 Micro/WIN, WinCC flexible Advanced		F
• License STEP 7 Professional, STEP 5, STEP 7-Micro/WIN, WinCC flexible Advanced; incl. EPROM adapter and S5-CC cable		G

		Order No.
Memory expansion		
512 MB DDR2-RAM 533	A)	**6ES7 648-2AG30-0GA0**
1 GB DDR2-RAM 533	A)	**6ES7 648-2AG40-0GA0**
USB mouse (PS/2-compatible)	A)	**6ES7 790-0AA01-0XA0**
AC/DC power supply unit		**6ES7 798-0GA00-0XA0**
Power cable		
for Germany, France, the Netherlands, Spain, Belgium, Austria, Sweden, Finland		**6ES7 900-5AA00-0XA0**
For Great Britain		**6ES7 900-5BA00-0XA0**
For Switzerland		**6ES7 900-5CA00-0XA0**
for the U.S.A., Japan		**6ES7 900-5DA00-0XA0**
For Italy		**6ES7 900-5EA00-0XA0**
Spare battery (lithium ion, 6.6 Ah)[1)]		**6ES7 798-0AA05-0XA0**
MPI cable		**6ES7 901-0BF00-0AA0**
for connecting a PG and SIMATIC S7 via MPI; 5 m		
EPROM programming adapter		**6ES7 798-0CA00-0XA0**
for SIMATIC S5 EPROM programming using the Field PG		
Hard disk kit	A)	**6ES7 791-2BA00-0AA0**
Swappable hard disk 80 GB S-ATA; with protective pocket and Torx screwdriver		
Rucksack for Field PG		**6ES7 798-0DA00-0XA0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

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

1) The capacity of the battery decreases for technological reasons with each charging/discharging operation and also as the result of being stored at excessively high or low temperatures. The running time per charge decreases therefore in the course of time. In normal use the battery can be charged and discharged over a period of six months from when the field PG is purchased.
Capacity loss is not covered by the warranty. For the battery's operation we grant a warranty of six months. We recommend replacing the battery with an original Siemens battery at the end of these six months if there is a significant drop in performance.

Overview

- External EPROM programming device
- For programming SIMATIC memory cards, SIMATIC micro memory cards as well as SIMATIC EPROM and EEPROM modules
- For connection to the PC via the USB interface

Technical specifications

	6ES7 792-0AA00-0XA0
Power supply	
Description	90 to 264 V; 47 to 63 Hz; wide range power supply unit
Environmental requirements	
Operating termperature	
• min.	5 °C
• max.	40 °C
Storage/transport temperature	
• min.	-20 °C
• max.	60 °C
Dimensions and weight	
Width	172 mm
Height	40 mm
Depth	121 mm
Weights	
Weight, approx.	400 g

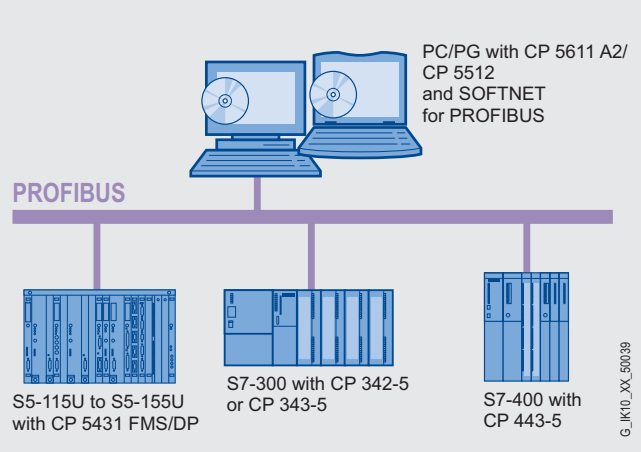
Ordering data

	Order No.
EPROM programming device USB-Prommer for programming SIMATIC memory cards and EPROM modules	**6ES7 792-0AA00-0XA0**

8

SOFTNET for PROFIBUS

Overview



DP-M	DP-S	PG	S7	S5	FMS	OPC
■	■	■	■	■		■

- Software for coupling PCs/programming devices and notebooks to programmable controllers
- Can be used together with CP 5512 (PC card, CardBus 32 bit). CP 5611 A2 (PCI) and integral PROFIBUS interface of the SIMATIC PG/PC
- Communication services:
  - PROFIBUS DP master Class 1 and 2 with acyclic expansions
  - PROFIBUS DP slave
  - PG/OP communication
  - S7 communication
  - S5-compatible communication (SEND/RECEIVE based on the FDL interface)
- The appropriate OPC servers are included in the scope of supply of the respective communication software

Technical specifications

Performance data	CP 5511 [2]	CP 5611 A2/ CP 5512
Mono protocol mode		
Number of connectable DP slaves	≤ 32 [1]	max. 60
Number of FDL tasks waiting	max. 32	max. 100
Number of PG/OP and S7 connections	max. 8	max. 8
• DP master	DP-V0, DP-V1 with SOFTNET-DP	
• DP slave	DP-V0, DP-V1 with SOFTNET-DP slave	

1) Depends on memory available in the adapter area of the notebook

2) Predecessor module (16-bit PCMCIA) is no longer available

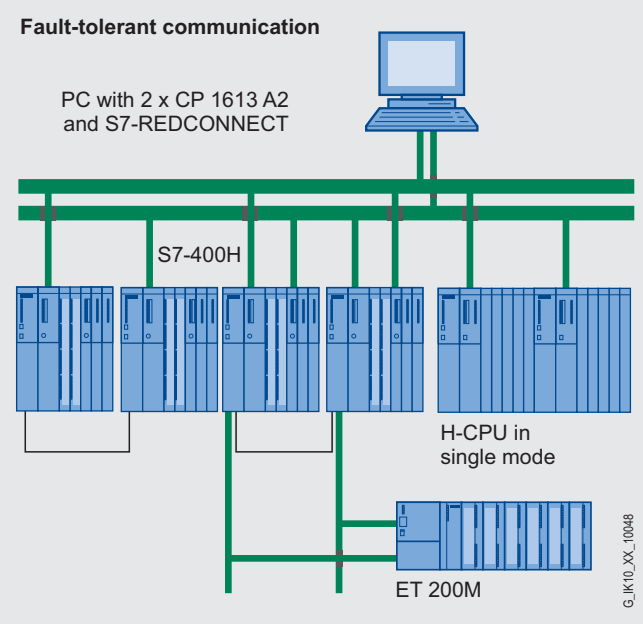
Ordering data

		Order No.
SOFTNET-S7 Edition 2005 Software for S7 communication incl. FDL protocol with OPC server and NCM PC single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows 2000 Professional/Server, Windows XP Professional, 2003 Server, for CP 5512, CP 5611 A2 German/English		**6GK1 704-5CW63-3AA0**
SOFTNET-DP Edition 2005 Software for DP protocol (Master Classes 1 and 2), incl. FDL protocol with OPC server and NCM PC; single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows 2000 Professional/Server, Windows XP Professional, 2003 Server, for CP 5512, CP 5611 German/English		**6GK1 704-5DW63-3AA0**
SOFTNET-DP Slave Edition 2005 Software for DP slave, with DP OPC server and NCM PC, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows 2000 Professional/Server, Windows XP Professional, 2003 Server, for CP 5512, CP 5611 A2 German/English		**6GK1 704-5SW63-3AA0**
SIMATIC NET Software Update Service For Industrial Ethernet, PROFIBUS, OPC server, for one year warranty incl. manuals on CD-ROM Prerequisite: SIMATIC NET PC/Windows products German/English	D)	**6GK1 704-0AA00-3AA2**

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

Overview

- For interfacing PCs over redundant Industrial Ethernet to the SIMATIC S7-400H
- Protected from communication failures arising from a fault in the double bus or in redundant rings
- For redundantly configured Industrial Ethernet
- Can also be implemented in non-redundant networks
- No additional programming overhead for the PC and in H systems
- The appropriate OPC server and configuration tools are included in the scope of supply of the respective communication software
- Enhanced redundancy over 4-way communication (STEP 7 V5.1 + SP4 and higher)



System configuration for S7-REDCONNECT

PN	ISO	TCP/IP	UDP	OPC	PG	S7	S5	IT	FTP
	■			■	■	■			

Ordering data

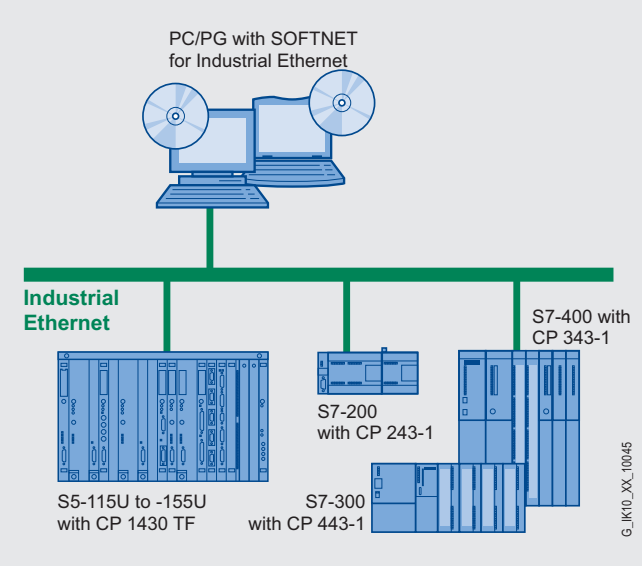
	Order No.
S7-REDCONNECT Edition 2005 Software for failsafe S7 communication over redundant networks incl. S7-OPC server, S7-1613 2005, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, Windows 2000 Professional/Server; for CP 1613/CP 1613 A2 German/English	**6GK1 716-0HB63-3AA0**
Upgrade S7-REDCONNECT Edition 2005 For expanding S7-1613 2005 to S7-REDCONNECT, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, Windows 2000 Professional/ Server; for CP 1613/CP 1613 A2 German/English	**6GK1 716-0HB63-3AA4**

8

SOFTNET for Industrial Ethernet

Overview

- For coupling programming devices/PCs/workstations to programmable controllers
- Communication services:
  - PG/OP communication
  - S7 communication
  - S5-compatible communication (SEND/RECEIVE)
- Can be used with
  - Layer 2 Ethernet card (PCI)
  - CP 7515 (PC Card CardBus)
  - Integrated Industrial Ethernet interface
  - Modem (Remote Access Service RAS)
- Complete protocol stack as a software package
- The appropriate OPC server and configuration tools are included in the scope of supply of the respective communication software



System configuration SOFTNET for Industrial Ethernet

PN	ISO	TCP/IP	UDP	OPC	PG	S7	S5	IT	FTP
	■	■		■					

Technical specifications

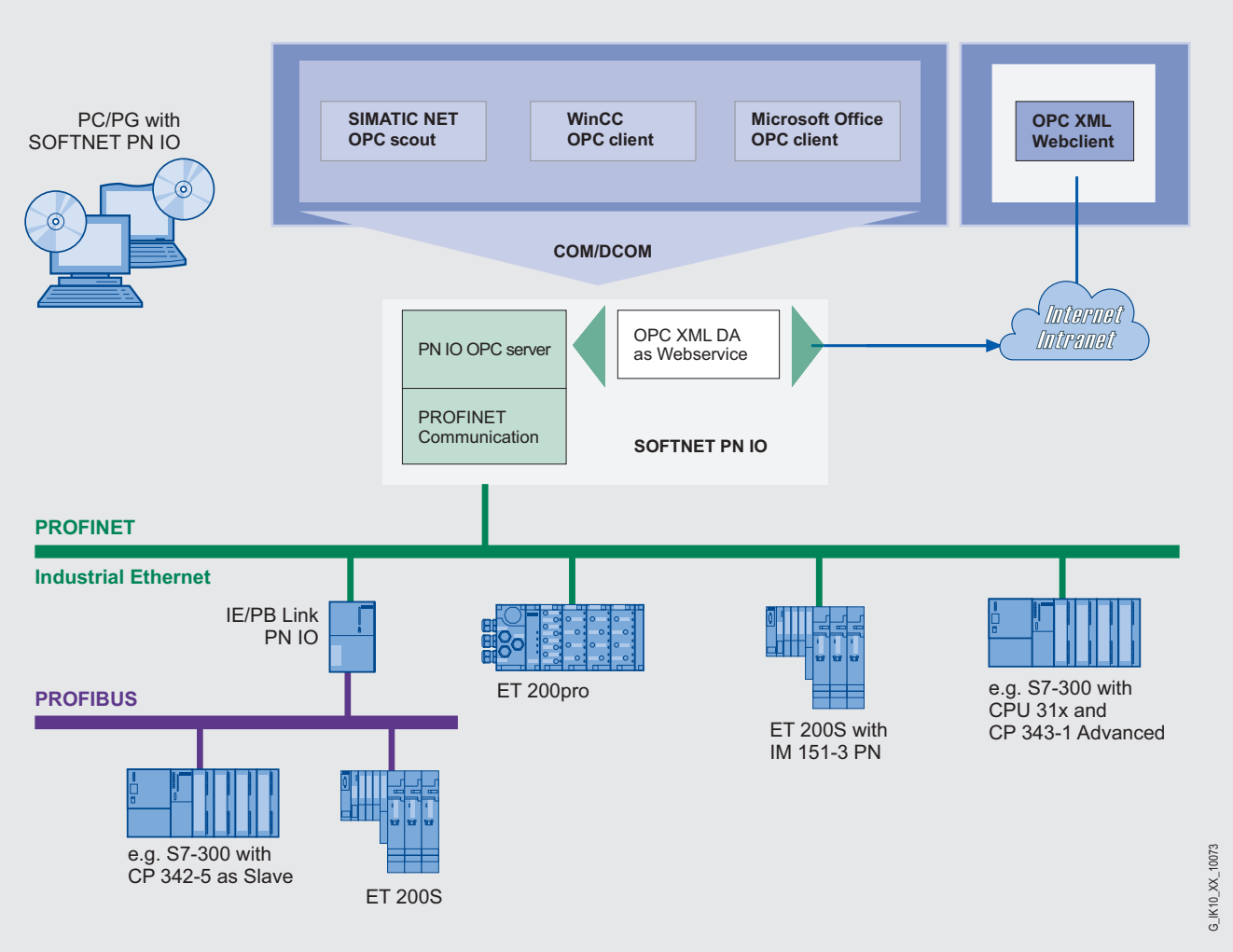
Performance data	
S7 and PG/OP communication (number of operable connections)	
• SOFTNET-S7	Max. 64
• SOFTNET-S7 Lean	Max. 8

Ordering data

	Order No.
SOFTNET-S7 Edition 2005 for Industrial Ethernet Software for S7 and S5-compatible communication, incl. OPC server, PG/OP communication and NCM PC; up to 64 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, 2000 Professional/Server; German/English	**6GK1 704-1CW63-3AA0**
SOFTNET-PG Edition 2005 for Industrial Ethernet Software for PG/OP communication, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, 2000 Professional/Server; German/English	**6GK1 704-1PW63-3AA0**
SOFTNET-S7 Lean Edition 2005 for Industrial Ethernet Software for S7 and S5-compatible communication, incl. OPC server, PG/OP communication and NCM PC; up to 8 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, 2000 Professional/Server; German/English	**6GK1 704-1LW63-3AA0**
SIMATIC NET Software Update Service D) For Industrial Ethernet, PROFIBUS, OPC server, for one year service incl. manuals on CD-ROM; prerequisite: SIMATIC NET PC/Windows products German/English	**6GK1 704-0AA00-3AA2**

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

Overview



PC with SOFTNET PN IO as PROFINET IO Controller

PN	ISO	TCP/IP	UDP	OPC	PG	S7	S5	IT	FTP
■		■		■					

- Software with PROFINET IO Controller function for coupling PG/PC and IPC with PROFINET IO Devices
- Possible applications:
  - PC-based control systems
  - HMI systems
  - test applications
- Communication services:
  - PROFINET IO Controller
- Can be used with
  - integrated interfaces of SIMATIC PG/PC
  - you can find more information about the environment of use at www.siemens.com/simatic-net/ik-info
- Cost-effective solution for the low-end performance range
  - OPC server for I/O interfacing over PROFINET included in scope of supply

SOFTNET PN IO

Technical specifications

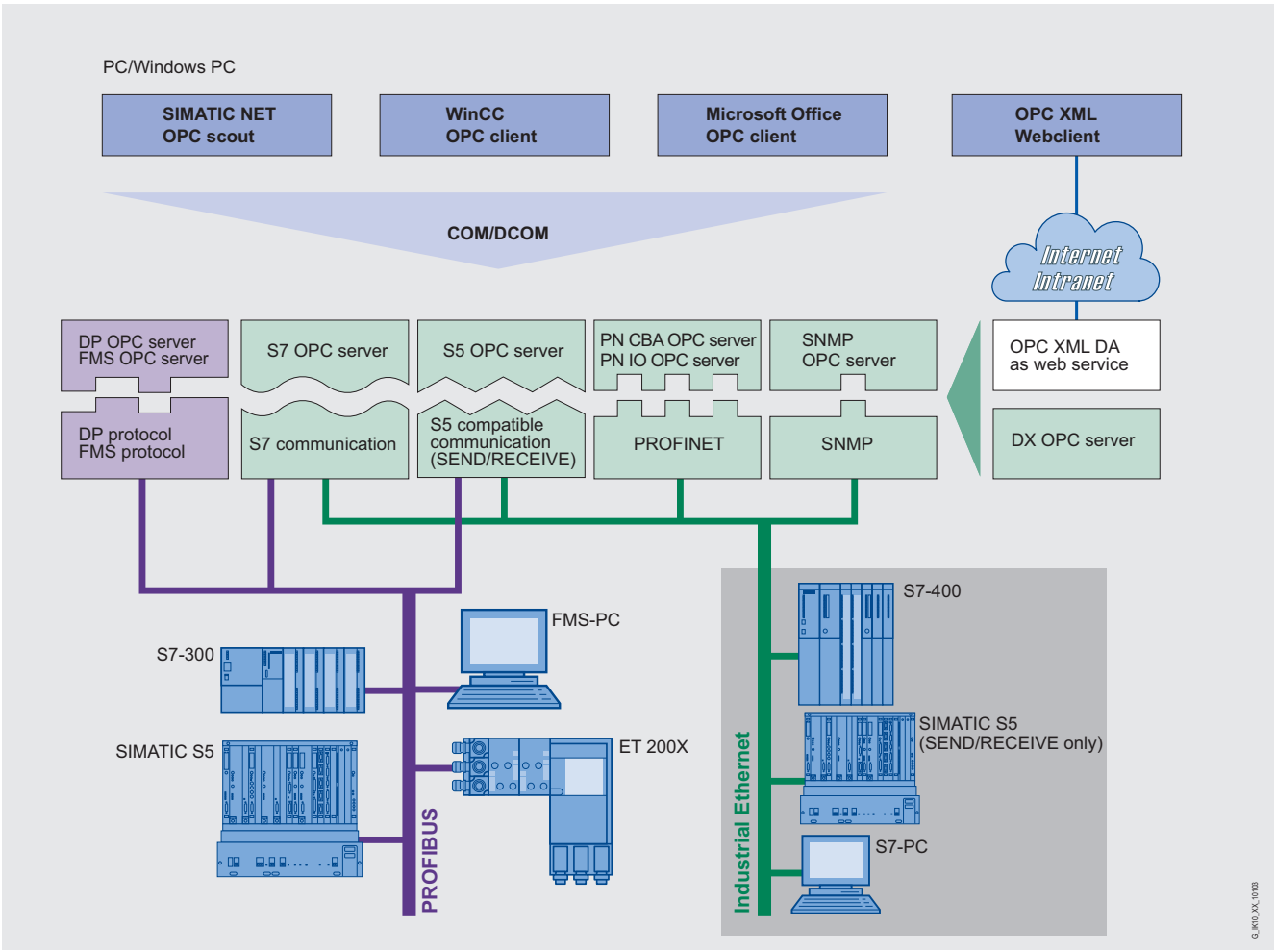
	SOFTNET PN IO
Performance data	
• Number of operable IO devices	max. 64
• Number of external IO-lines in one central rack	max. 1
• Size of IO data areas overall	
- I/O input area	max. 2 kByte
- I/O output area	max. 2 kByte
• Size of I/O data area per connected I/O device	
- I/O input area	max. 1440 Byte
- I/O output area	max. 1440 Byte

Ordering data

	Order No.
SOFTNET PN IO Edition 2005 Software for PROFINET I/O controller with OPC server and NCM PC; single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 server; Windows 2000 Professional, German/English	**6GK1 704-1HW63-3AA0**

Overview

- The appropriate OPC servers are included in the scope of supply of the respective communication software
- Standardized, open, manufacturer-independent interface
- Interfacing of OPC-capable Windows applications to S7-communication and S5-compatible communication functions (SEND/RECEIVE), PROFINET and SNMP
- OPC Scout with browser functions as OPC client and OCX Data Control



System integration with the OPC server

OPC server for Industrial Ethernet

Technical specifications

Programming	• Synchronous and asynchronous reading and writing of variables • Monitoring of variables using the OPC server with a signal to the client when a change occurs • Use of quantity operations; so a large amount of data can be processed in a short time.
Interfaces	• Custom Interface (C++, NET) for high OPC performance • Automation Interface (VB, Excel, Access, Delphi, ...) for ease-of-use • Graphics with OCX for configuring instead of programming • OPC XML-Interface for Data Access • DX interface with methods for controlling the runtime behavior of the DX OPC server.

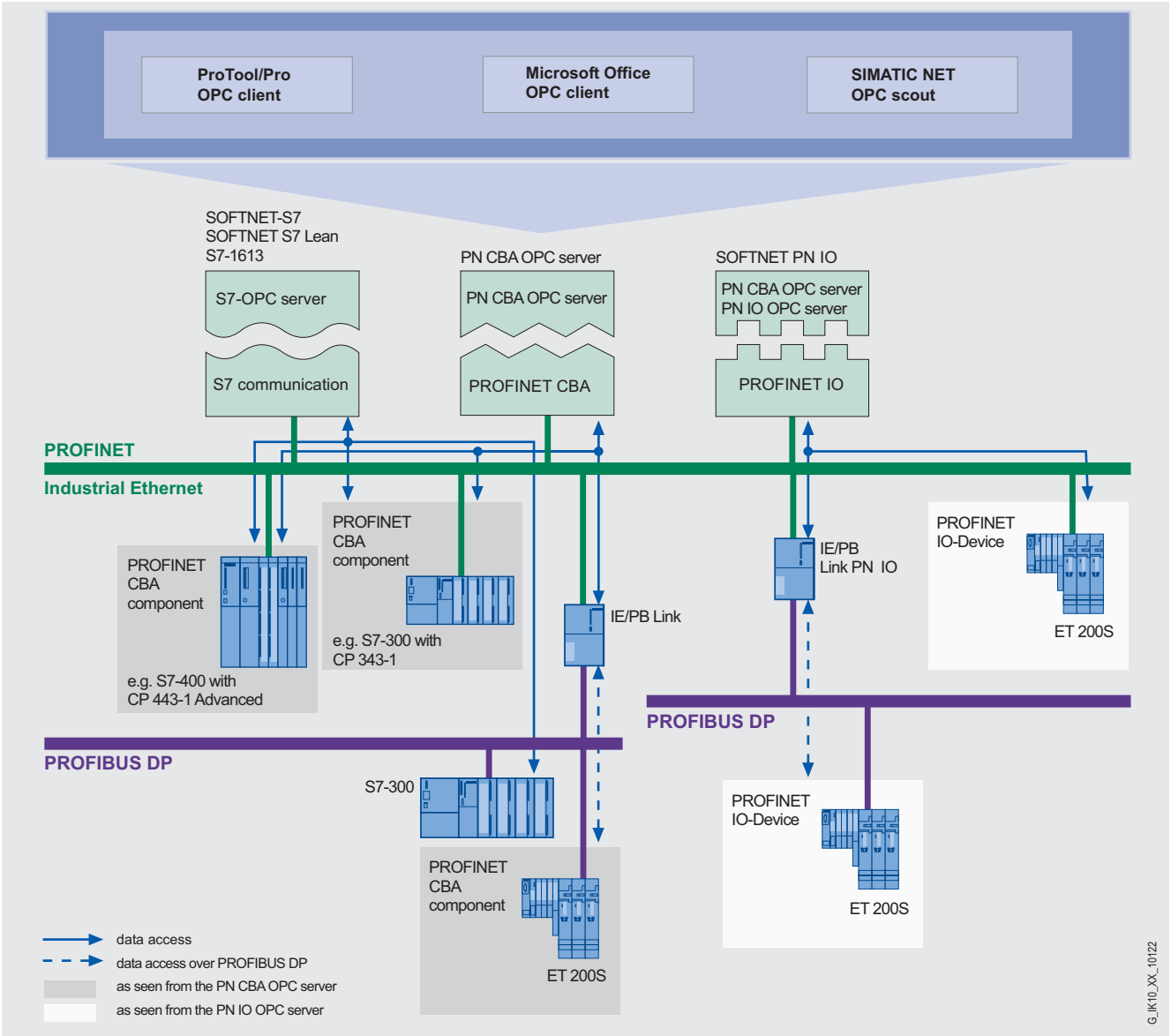
Products	**include OPC servers for:**
Industrial Ethernet	
• S7-1613, SOFTNET-S7 for Industrial Ethernet, SOFTNET-S7 Lean	S7-OPC server for S7 communication, XML-DA
	S5-OPC server for S5 compatible communication, XML-DA
	SNMP OPC server for SNMP protocol access; XML-DA
PROFINET	
• SOFTNET PN IO	PN IO OPC server for PROFINET IO communication; XML-DA
• PN CBA OPC server	PN CBA OPC server for access to CBA components; XML-DA
	Horizontal communication between OPC servers
PROFIBUS	
• DP-5613, SOFTNET-DP, SOFTNET-DP slave	DP-OPC server for PROFIBUS DP communication; XML-DA
• FMS-5613	FMS-OPC server for PROFIBUS FMS communication; XML-DA
Others	
• DX OPC server	DX OPC server for simple data exchange even between different OPC servers from different companies

Ordering data

	Order No.
DX OPC server Edition 2005 DX OPC server upgrade; single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, 2000 Professional/Server; requirement: SIMATIC NET IE PC / Windows product Edition 2005 with OPC interface; German/English	**6GK1 706-0XW63-3AA0**
PN CBA OPC server Edition 2005 PROFINET OPC server for CBA; single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2000 Professional/Server; German/English	**6GK1 706-0HB63-3AA0**
SNMP OPC server Edition 2005 Including MIB compiler; single license for 1 installation of the runtime software, software and electronic manual on CD-ROM; license key on diskette, for 32-bit Windows XP Professional, 2003 Server, 2000 Professional WS/Server; for CP 1613 German/English	
• **Basic** Administration of up to 20 IP addresses	**6GK1 706-1NW63-3AA0**
• **Extended** Administration of up to 200 IP addresses	**6GK1 706-1NX63-3AA0**
• **Power Pack** Upgrade from SNM OPC Server Basic to SNM OPC Server Extended	**6GK1 706-1NW63-3AA4**

Overview

- Access to variables in PROFINET CBA components over the OPC interface
- Use of the objects and symbols defined using the PROFINET engineering tool SIMATIC iMap and STEP 7
- Adding PROFINET functionality to existing installations. This enables it to be used in parallel with other communication protocols such as S7 communication with SOFTNET-S7 for Industrial Ethernet.
- OPC Scout as an OPC client with browser functions for the variables of the PROFINET CBA components



System integration with the PN CBA OPC server

PN CBA OPC server

Technical specifications

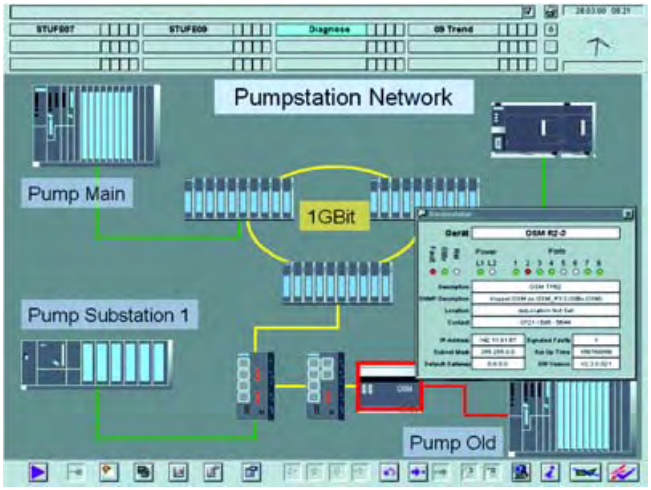
	PN CBA OPC server
Programming	• Open and standardized • Synchronous and asynchronous reading and writing of variables • Monitoring of variables using the OPC server with a signal to the client when a change occurs • Use of quantity operations; so a large amount of data can be processed in a short time.
Interfaces	• Custom Interface (C++, .NET) • Automation Interface (Visual Basic, Excel, Access,...) • OPC Data Control • OPC XML-Interface for Data Access
Protocols	• DCOM protocol
Configuring	Configuring software for PROFINET SIMATIC iMap
PROFINET communication (CBA)	
• Number of communication partners	Max. 288
• Number of interconnections	Max. 10.000

Ordering data

		Order No.
PN CBA OPC server Edition 2005 PROFINET OPC server for CBA; single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2000 Professional/Server; German/English		**6GK1 706-0HB63-3AA0**
Software iMap V3.0 for configuring PROFINET CBA *Requirement:* Windows 2000 Prof. with Service Pack 4 or later or Windows XP Prof. with Service Pack 1 or later or Windows 2003 Server with Service Pack 1 or later; on PG or PC with Pentium processor, min. 1 GHz; STEP 7 V5.3 or later with Service Pack 3, PN OPC Server V6.3 or later *Type of supply:* German, English with electronic documentation		
• Single license	D)	**6ES7 820-0CC04-0YA5**
• Software Update Service	D)	**6ES7 820-0CC01-0YX2**
• Upgrade to V3.0, single license	D)	**6ES7 820-0CC04-0YE5**
SIMATIC NET Software Update Service For Industrial Ethernet, PROFIBUS, OPC server, for one year service incl. manuals on CD-ROM; prerequisite: SIMATIC NET PC/Windows products German/English	D)	**6GK1 704-0AA00-3AA2**

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

Overview



- Status monitoring and network management of SNMP-capable devices in any OPC client systems; e.g. SIMATIC HMI/SCADA, office application
- Easy access to SNMP-capable devices over the OPC interface
- Devices without SNMP agents can be monitored using the ping mechanism
- Complete integration in the SIMATIC NET OPC server environment
- SNMP can be implemented in parallel with other communications protocols such as PROFINET or S7 communication
- Configuring with STEP 7 or NCM PC
- Autodiscovery function for integrating accessible Ethernet devices (STEP 7 V5.3+SP3 or higher)

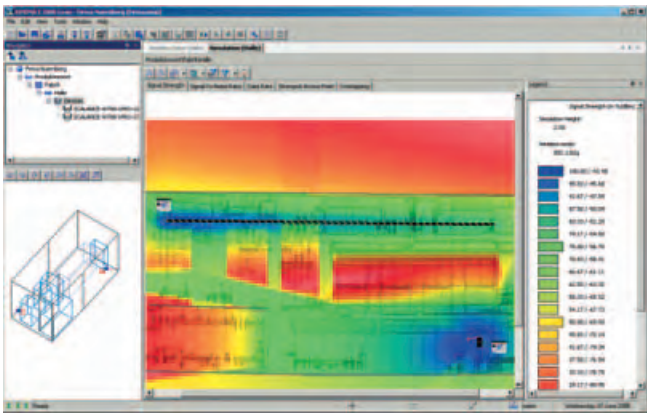
Ordering data

	Order No.
SNMP OPC server Edition 2005 Including MIB compiler; single license for 1 installation of the runtime software, software and electronic manual on CD-ROM; license key on diskette, for 32-bit Windows XP Professional, 2003 Server, 2000 Professional WS/Server; for CP 1512/CP 1612/CP 1613 German/English	
• **Basic** Administration of up to 20 IP addresses	**6GK1 706-1NW63-3AA0**
• **Extended** Administration of up to 200 IP addresses	**6GK1 706-1NX63-3AA0**
• **Power Pack** Upgrade from SNM OPC Server Basic to SNMP OPC Server Extended	**6GK1 706-1NW63-3AA4**

8

SINEMA E Lean

Overview



- Planning, simulation and configuration software for Industrial Wireless LAN (IWLAN) applications according to standard 802.11 a/b/g
- Visualization of IWLAN networks e.g. according to coverage, data transfer rate, signal/noise ratio and overlapping with consideration of environmental and device characteristics
- Configuration of single and multiple devices as well as uploading/downloading of IWLAN device parameters
- Integrated and expandable catalog entries for WLAN devices, antennas and radio hindrances as well as standard graphics formats for importing layout plans
- Report function for documentation of configured IWLAN environment and device characteristics

Ordering data

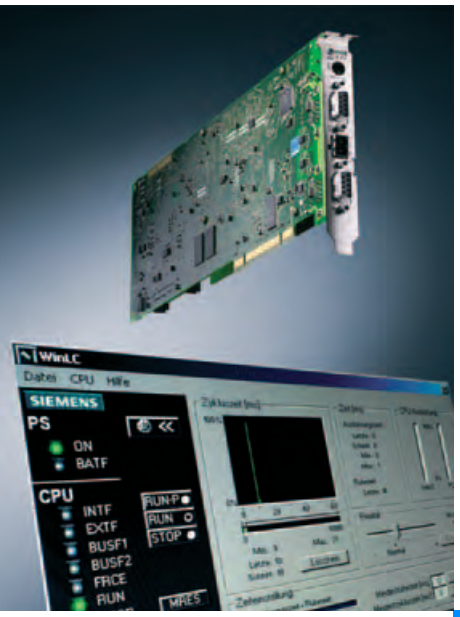
		Order No.
SINEMA E 2006 Lean Engineering software for planning, simulating and configuring industrial WLAN applications on PG/PC in accordance with 802.11 a/b/g standard; software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional +SP2; German/English	D)	**6GK1 781-0AA00-6AA0**

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

8

PC-based Automation

9



Brochures

For brochures serving as selection guides for SIMATIC products refer to:

http://www.siemens.com/simatic/printmaterial

Logic Control

Overview

Siemens has developed a broad palette of perfectly interacting hardware and software components for PC-based Automation.

The hub: SIMATIC PC-based Control with SIMATIC WinAC, the open, flexible and reliable controller for your PC-based automation solution.

On the PC, all the tasks involved in automation, such as open-loop and closed-loop control, operator control and visualization and motion control can be implemented on the same platform. Whenever PC applications have to be implemented in addition to the classical PLC applications, PC-based Automation is the first choice.

In addition: SIMATIC Embedded Control. The product spectrum of SIMATIC PC-based Automation has been expanded with SIMATIC WinAC MP that transfers the advantages of PC-based Automation in processing large quantities of data and demanding visualization tasks to the rugged SIMATIC MP370 platform for installation at the machine.

Additional information is available in the Internet under:

http://www.pcbasedautomation.de

For brochures serving as selection guides for SIMATIC products refer to:

http://www.siemens.com/simatic/printmaterial

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SIMATIC PC-based Control

Overview

- Adds PC-based controllers to the SIMATIC S7 controller family
- Especially suitable where a variety of tasks such as data processing, communication, visualization, technology and control have to be integrated in one PC.

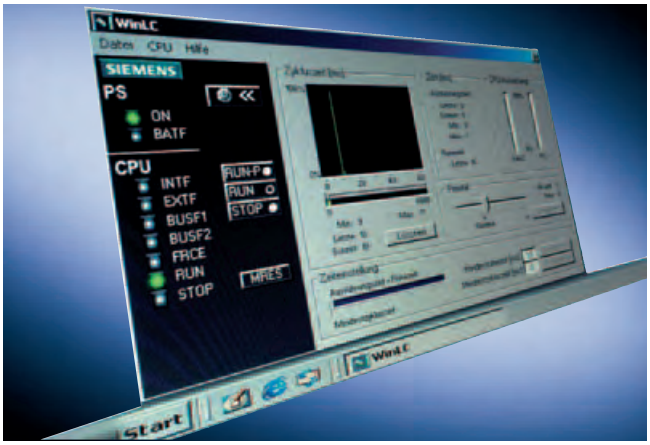
Versions

- **SIMATIC WinAC Software PLCs**
  for tasks requiring a high level of flexibility and integration capability.
- **SIMATIC WinAC Slot PLCs**
  for tasks where high operational reliability and availability are a priority.
- **SIMATIC WinAC ODK**
  allows PC solutions for technological tasks to be integrated flexibly and powerfully into the controller.

Properties:

- Runs on standard PCs under Windows 2000 or Windows XP Professional.
- Code-compatible with SIMATIC S7:
  programmed with SIMATIC industrial software, programs can also be used for SIMATIC S7.
- Uses standard interfaces for integration into the office environment.
- Open interfaces for the integration of solution-specific technological hardware and software.

Overview



- SIMATIC WINAC RTX:
  optimized for applications that demand a high level of flexibility and integration.
- The software solution for tasks that demand hard deterministics and high performance.
- With real-time expansion for guaranteeing deterministic behavior for the control component.

SIMATIC WinAC RTX comprises the following components:

- Windows Logic Controller (WinLC RTX).
- SIMATIC NET OPC server.
- Real-time drivers for PROFIBUS-CPs
- Ardence RTX real-time core for guaranteeing real time and deterministics.

Optional:

- CP for connection to PROFIBUS DP:
  - CP 5611 and integral PROFIBUS interface of the SIMATIC PC
  - CP 5613 A2.
- WinAC Open Development Kit (ODK):
  - for linking C/C++ code in WinAC RTX.
  - for integrating external software (technological programs) or PC components (e.g. scanner, PC cards for measured value acquisition).

Technical specifications

	6ES7 671-0RC05-0YA0
Memory	
Memory	
• RAM	
- integrated	PC work memory can be used (non-paged memory)
• Load memory	
- integrated RAM, max.	PC work memory can be used (non-paged memory)
CPU/blocks	
DB	
• Number, max.	Limited only by available PC work memory
• Size, max.	64 KByte
FB	
• Number, max.	Limited only by available PC work memory
• Size, max.	64 KByte
FC	
• Number, max.	Limited only by available PC work memory
• Size, max.	64 KByte
OB	
• Size, max.	64 KByte
Nesting depth	
• per priority class	24
• additional within an error OB	24
CPU/processing times	
Reference platform	Pentium IV, 2.4 GHz

	6ES7 671-0RC05-0YA0
Times/counters and their remanence	
S7 counter	
• Number	512
• Remanence	
- adjustable	Yes
- lower limit	0
- upper limit	511
- preset	8
• Counting range	
- adjustable	Yes
- lower limit	0
- upper limit	999
IEC counter	
• present	Yes
• Type	SFB
S7 times	
• Number	512
• Remanence	
- lower limit	0
- upper limit	511
- preset	0
• Time range	
- lower limit	10 ms
- upper limit	9,990 s
IEC timer	
• present	Yes
• Type	SFB

9

Technical specifications (continued)

	6ES7 671-0RC05-0YA0
Data areas and their remanence	
Remanence without UPS and PS Extension Board	none
Remanence with UPS	all data
Flag	
• Number, max.	16 KByte
• of which remanent	MB 0 - MB 16383
• Remanence preset	MB 0 - MB 15
• Number of clock memories	8
Address area	
I/O address area	
• Inputs	16 KByte
• Outputs	16 KByte
• of which, distributed	
- DP interface, inputs	16 KByte
- DP interface, outputs	16 KByte
Process image	
• Inputs, adjustable	8 KByte
• Outputs, adjustable	8 KByte
• Inputs, preset	512 Byte
• Outputs, preset	512 Byte
Subprocess images	
• Number of subprocess images, max.	15
Digital channels	
• Outputs	128,000
Analog channels	
• Inputs	8,000
• Outputs	8,000
Hardware config.	
Submodules	
• Number of submodules, max	4
• of which PROFIBUS, max.	4; CP 5611, CP 5611-A2, integrated PB interface of the SIMATIC PC, CP 5613 CP, 5613-A2
• FM	FM distributed: FM 350-1/350-2, FM 351, FM 352, FM 353, FM 354, FM 355, FM 355-2
• CP, point to point	CP 340, CP 341 distributed
• CP, LAN	over PC CP
Time	
Clock	
• Hardware clock (real-time clock)	Yes
• Battery backed and synchronized	Yes
Clock synchronization	
• supports	Yes
• to PC-CP, Slave	Yes
S7 message functions	
SCAN procedure	No
Process diagnostic messages	Yes; Alarm_S
Alarm 8-blocks	Yes
Instrumentation & control messages	No

	6ES7 671-0RC05-0YA0
Test commissioning functions	
Status/control	
• Status/control variable	Yes
Monitoring functions	
Forcing	
• Forcing	No
Status block	Yes
Single step	Yes
Diagnostic buffer	
• present	Yes
• Number of entries, max.	3,200
• preset	120
Communication functions	
PG/OP communication	Yes
Global data communication	
• supported	No
S7 basic communication	
• supported	No
S7 communication	
• as server	Yes
• as client	Yes
Number of connections	
• overall	64
• reserved for PG communication	1
• reserved for OP communication	1
1st interface	
Type of interface	CP5611, CP 5611-A2, integrated PB interface of SIMATIC PC
Number of simult. operable CPs, max.	1
Physics	RS 485 / PROFIBUS
isolated	Yes
Functionality	
• MPI	No
• DP master	Yes
• DP slave	No
DP master	
• Number of connections, max.	8
• Services	
- PG/OP communication	Yes
- Routing	Yes
- Global data communication	No
- S7 basic communication	No
- S7 communication	Yes
- SYNC/FREEZE	Yes
- Activation/deactivation of DP slaves	Yes
- direct data exchange (cross traffic)	Yes
- DPV0	Yes
- DPV1	Yes

Technical specifications (continued)

	6ES7 671-0RC05-0YA0
• Transmission speeds, max.	12 Mbit/s
• Number of DP slaves, max.	64
• Address area	
- Inputs, max.	16 KByte
- Outputs, max.	16 KByte
• Useful data per DP slave	
- Inputs, max.	244 Byte
- Outputs, max.	244 Byte
2nd interface	
Type of interface	CP 5613, CP 5613-A2
Number of simult. operable CPs, max.	4
Physics	RS 485 / PROFIBUS
isolated	Yes
Functionality	
• MPI	No
• DP master	Yes
• DP slave	No
• PROFINET CBA	No
• PROFINET CBA-SRT	No
• PROFINET IO controller	No
DP master	
• Number of connections, max.	50
• Services	
- PG/OP communication	Yes
- Routing	Yes
- Global data communication	No
- S7 basic communication	No
- S7 communication	Yes
- equidistance support	Yes
- SYNC/FREEZE	Yes
- Activation/deactivation of DP slaves	Yes
- direct data exchange (cross traffic)	Yes
- DPV0	Yes
- DPV1	Yes
• Transmission speeds, max.	12 Mbit/s
• Number of DP slaves, max.	125
• Address area	
- Inputs, max.	16 KByte
- Outputs, max.	16 KByte
• Useful data per DP slave	
- Inputs, max.	244 Byte
- Outputs, max.	244 Byte

	6ES7 671-0RC05-0YA0
Isochronous mode	
Isochronouos mode	Yes
Number of DP masters with isochronous mode	2
Useful data per isochronous slave, max.	128 Byte
equidistance	Yes
shortest clock pulse	2.2 ms; 2.2 ms without partial process image; 2.2 ms with partial process image
CPU/programming	
Programming language	
• STEP 7	Yes; as of V5.3, SP2, Engineering Tools (optional)
• LAD	Yes
• FUP	Yes
• AWL	Yes
• SCL	Yes
• CFC	Yes
• GRAPH	Yes
• HiGraph	Yes
Software libraries	
• Easy Motion Control	Yes
Nesting levels	8
User program protection/password protection	No
Open development interfaces	
• CCX (Custom Code Extension)	Yes; with WinAC ODK V4.1
• SMX (Shared Memory Extension)	Yes; with WinAC ODK V4.1
- Inputs	4 KByte
- Outputs	4 KByte
• CMI (Controller Management Interface)	Yes; with WinAC ODK V4.1
Hardware requirements	
Hardware required	PC with color monitor, keyboard, mouse or pointing device for Windows
Required memory on hard disk, min.	100 MByte
Processor	Intel Pentium 400 MHz
• Multi-processor system	Yes; Dual Pentium
• Hyperthreading	Yes
Operating systems	
Operating system	
• Windows NT 4.0	No
• Windows 2000	Yes; Professional, >=SP3
• Windows XP	Yes; Professional, SP1 and SP2

SIMATIC WinAC Software PLC

Ordering data		Order No.
SIMATIC WinAC RTX 2005 Software-based PC-based control system for applications requiring a strictly deterministic response; CD-ROM with electronic documentation in English, French and German; Single license, for Windows 2000/XP	E)	**6ES7 671-0RC05-0YA0**
SIMATIC WinAC RTX 2005 Upgrade For upgrading from Basic/RTX V3.x, V4.0, V4.1 to 2005; single license, for Windows 2000/XP	E)	**6ES7 671-0RC05-0YE0**
CP 5611 A2 communications processor PCI card (32-bit) for connection of a programming device or PC to PROFIBUS	A)	**6GK1 561-1AA01**
CP 5613 A2 communications processor PCI card (32-bit; 3.3 V/5 V) for connection to PROFIBUS incl. DP-Base software with NCM PC; DP-RAM interface for DP master, incl. PG and FDL protocol; single license for 1 installation, runtime software, software and electronic manual on CD-ROM, Class A, for 32-bit Windows 2000 Professional/Server, Windows XP Professional, German/English		**6GK1 561-3AA01**

A) Subject to export regulations: AL: N and ECCN: EAR99H
E) Subject to export regulations: AL: N and ECCN: EAR99S

Overview

- WinAC Slot 412/416:
  Slot PLCs for PC-based applications requiring deterministic features, availability and high operational safety.
- Independent operation of PC from an external 24 V supply and backup battery

Products

- WinAC Slot 412:
  - PC-based controller as PCI board based on CPU 412-2 PCI
  - PROFIBUS DP and PROFIBUS DP/MPI interface onboard
- WinAC Slot 416:
  - PC-based controller as PCI board based on CPU 416-2 PCI
  - PROFIBUS DP and PROFIBUS DP/MPI interface onboard

Technical specifications

	6ES7 673-2CC40-0YA0	6ES7 673-6CC40-0YA0
Supply voltages		
Rated value		
• DC 24 V	Yes; Safety extra low voltage SELV	Yes; Safety extra low voltage SELV
• permissible range, lower limit (DC)	20.4 V	20.4 V
• permissible range, upper limit (DC)	28.8 V	28.8 V
• permissible range (ripple included), lower limit (DC)	18.5 V	18.5 V
• permissible range (ripple included), upper limit (DC)	30.2 V	30.2 V
Voltages and currents		
Power consumption		
• with external supply, max.	19 W	19 W
• with supply from the PC, max.	10 W	10 W
Current consumption		
from external supply (DC 24 V), max.	1 A	1 A
from PCI interface (DC 5 V), max.	0.8 A	0.8 A
from PCI interface (DC 12 V), max.	0.4 A	0.4 A
Power loss, max.	11 W	11 W
Backup battery		
• Voltage	3.6 V; Lithium	3.6 V
• Buffer current, typ.	500 µA	900 µA
• Buffer current, max.	1,300 µA	1,950 µA
• Backup time, min.	1,110 h	740 h
• Backup time, typ.	2,900 h	1,610 h

	6ES7 673-2CC40-0YA0	6ES7 673-6CC40-0YA0
Memory		
Memory		
• RAM		
- integrated	384 KByte	
- integrated (for program)	192 KByte	1,6 MByte
- integrated (for data)	192 KByte	1,6 MByte
• Load memory		
- expandable FEPROM	Yes; Memory card (FLASH)	Yes
- expandable FEPROM, max.	64 MByte	64 MByte
- integrated RAM, max.	256 KByte	356 KByte
- expandable RAM	Yes; Memory card (FLASH)	Yes
- expandable RAM, max.	64 MByte	64 MByte
CPU/blocks		
DB		
• Number, max.	511	4,095
• Size, max.	64 KByte	64 KByte
FB		
• Number, max.	256	2,048
• Size, max.	64 KByte	64 KByte
FC		
• Number, max.	256	2,048
• Size, max.	64 KByte	64 KByte
OB		
• Size, max.	64 KByte	64 KByte
Nesting depth		
• per priority class	24	24
• additional within an error OB	1	2

Technical specifications (continued)

	6ES7 673-2CC40-0YA0	6ES7 673-6CC40-0YA0
CPU/processing times		
for bit operations, min.	0.1 µs	0.04 µs
for fixed point arithmetic, min.	0.1 µs	0.04 µs
for floating point arithmetic, min.	0.3 µs	0.12 µs
Times/counters and their remanence		
S7 counter		
• Number	2,048	2,048
• Remanence		
- adjustable	Yes	Yes
- lower limit	0	0
- upper limit	2,047	2,047
- preset	Z 0 to Z 7	Z 0 to Z 7
• Counting range		
- adjustable	Yes	Yes
- upper limit	999	999
IEC counter		
• present	Yes	Yes
• Type	SFB	SFB
S7 times		
• Number	2,048	2,048
• Remanence		
- lower limit	0	0
- upper limit	2,047	2,047
- preset	no timers retentive	no timers retentive
• Time range		
- lower limit	10 ms	10 ms
- upper limit	9,990 s	9,990 s
IEC timer		
• present	Yes	Yes
• Type	SFB	SFB
Data areas and their remanence		
Remanence without UPS and PS Extension Board		none
Remanence with UPS		none
Remanence with PS extension board and battery	total working and load memory	total working and load memory (with backup battery)
Flag		
• Number, max.	4 KByte	16 KByte
• of which remanent	MB 0 to MB 4095	MB 0 - MB 16383
• Remanence preset	MB 0 to MB 15	MB 0 - MB 15
• Number of clock memories	8	8

	6ES7 673-2CC40-0YA0	6ES7 673-6CC40-0YA0
Address area		
I/O address area		
• Inputs	4 KByte	16 KByte
• Outputs	4 KByte	16 KByte
• of which, distributed		
- MPI/DPinterface, inputs	2 KByte	2 KByte
- MPI/DP interface, outputs	2 KByte	2 KByte
- DP interface, inputs	4 KByte; (For each line that is operated in isochronous mode, i.e. to which an OB 61 to 62 has been assigned, the distributed IO address areas are halved)	8 KByte
- DP interface, outputs	4 KByte; (For each line that is operated in isochronous mode, i.e. to which an OB 61 to 62 has been assigned, the distributed IO address areas are halved)	8 KByte
Process image		
• Inputs, adjustable	4 KByte	16 KByte
• Outputs, adjustable	4 KByte	16 KByte
• Inputs, preset	128 Byte	512 Byte
• Outputs, preset	128 Byte	512 Byte
Subprocess images		
• Number of subprocess images, max.	15	15
Digital channels		
• Inputs	32.000	
• Outputs	32.000	
Analog channels		
• Inputs	2.000	
• Outputs	2.000	
Hardware config.		
Number of DP masters		
• overall	2	2
• integrated	2	2
Number of operable FMs and CPs (recommended)		
• FM	FM distributed: FM 350-1/350-2, FM 351, FM 352, FM 353, FM 354, FM 355, FM 355-2	FM distributed: FM 350-1/350-2, FM 351, FM 352, FM 353, FM 354, FM 355, FM 355-2
• CP, point to point	CP 340, CP 341 distributed	CP 340, CP 341 distributed
• CP, LAN	over PC CP	over PC CP

Technical specifications (continued)

	6ES7 673-2CC40-0YA0	6ES7 673-6CC40-0YA0
Time		
Clock		
• Hardware clock (real-time clock)	Yes	Yes
• Battery backed and synchronized	Yes	Yes
Operating hours counter		
• Number	8	8
Clock synchronization		
• supports	Yes	Yes
• to PC-CP, Slave	Yes	Yes
• to MPI, Master	Yes	Yes
• to MPI, Slave	Yes	Yes
S7 message functions		
Number of login stations for message functions, max.	8	12
SCAN procedure	Yes	Yes
Process diagnostic messages	Yes; (Alarm_S)	Yes
Alarm 8-blocks	Yes	Yes
Instrumentation & control messages	Yes	Yes
Test commissioning functions		
Status/control		
• Status/control variable	Yes	Yes
Monitoring functions		
Forcing		
• Forcing	Yes	Yes
Status block	Yes	Yes
Single step	Yes	Yes
Diagnostic buffer		
• present	Yes	Yes
• Number of entries, max.	400	3,200
• preset	120	120
Communication functions		
PG/OP communication	Yes	Yes
Global data communication		
• supported	Yes	Yes
S7 basic communication		
• supported	Yes	Yes
S7 communication		
• as server	Yes	Yes
• as client	Yes	Yes

	6ES7 673-2CC40-0YA0	6ES7 673-6CC40-0YA0
Number of connections		
• overall	16	64
• reserved for PG communication	1	1
• reserved for OP communication	1	1
1st interface		
Type of interface	RS 485 / PROFIBUS	RS 485 / PROFIBUS
Physics	RS 485	RS 485
isolated	Yes	Yes
Functionality		
• MPI	Yes	Yes
• DP master	Yes	Yes
• DP slave	Yes	Yes
MPI		
• Number of connections	16	44
• Services		
- PG/OP communication	Yes	Yes
- Routing	Yes	Yes
- Global data communication	Yes	Yes
- S7 basic communication	Yes	Yes
- S7 communication	Yes	Yes
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s
DP master		
• Number of connections, max.	16	32
• Services		
- PG/OP communication	Yes	Yes
- Routing	Yes	Yes
- Global data communication		No
- S7 basic communication	Yes	Yes
- S7 communication	Yes	Yes
- equidistance support	Yes	Yes
- SYNC/FREEZE	Yes	Yes
- Activation/deactivation of DP slaves	Yes	Yes
- direct data exchange (cross traffic)	Yes	Yes
- DPV0	Yes	Yes
- DPV1	Yes	Yes
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s
• Number of DP slaves, max.	32	32
• Address area		
- Inputs, max.	2 KByte	2 KByte
- Outputs, max.	2 KByte	2 KByte
• Useful data per DP slave		
- Inputs, max.	244 Byte	244 Byte
- Outputs, max.	244 Byte	244 Byte

Technical specifications (continued)

	6ES7 673-2CC40-0YA0	6ES7 673-6CC40-0YA0
DP slave		
• Services		
- PG/OP communication	Yes	Yes
- Routing	Yes	Yes
- Status/control	Yes	Yes
- Programming	Yes	Yes
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s
• Transfer memory		
- Inputs	244 Byte	244 Byte
- Outputs	244 Byte	244 Byte
• Address area, max.	32	32
• Useful data per address area, max.	32 Byte	32 Byte
• Useful data per address area, of which consistent, max.	32 Byte	32 Byte
2nd interface		
Type of interface	RS 485 / PROFIBUS	RS 485 / PROFIBUS
Physics	RS 485	RS 485
isolated	Yes	Yes
Functionality		
• MPI	No	No
• DP master	Yes	Yes
• DP slave	Yes	Yes
DP master		
• Number of connections, max.	16	32; if a diagnostic repeater is used on the line, the number of connection resources on the line is reduced by 1
• Services		
- PG/OP communication	Yes	Yes
- Routing	Yes	Yes
- Global data communication	No	No
- S7 basic communication	Yes	Yes
- S7 communication	Yes	Yes
- equidistance support	Yes	Yes
- SYNC/FREEZE	Yes	Yes
- Activation/deactivation of DP slaves	Yes	Yes
- direct data exchange (cross traffic)	Yes	Yes
- DPV0	Yes	Yes
- DPV1	Yes	Yes
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s
• Number of DP-Slaves, max.		125
• Address area		
- Inputs, max.	4 KByte	8 KByte
- Outputs, max.	4 KByte	8 KByte

	6ES7 673-2CC40-0YA0	6ES7 673-6CC40-0YA0
• Useful data per DP slave		
- Inputs, max.	244 Byte	244 Byte
- Outputs, max.	244 Byte	244 Byte
DP slave		
• Services		
- PG/OP communication	Yes	Yes
- Routing	Yes	Yes
- Status/control	Yes	Yes
- Programming	Yes	Yes
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s
• Transfer memory		
- Inputs	244 Byte	244 Byte
- Outputs	244 Byte	244 Byte
• Address area, max.	32	32
• Useful data per address area, max.	32 Byte	32 Byte
• Useful data per address area, of which consistent, max.	32 Byte	32 Byte
Isochronous mode		
Isochronouos mode	Yes	Yes
Number of DP masters with isochronous mode	2	2
Useful data per isochronoous slave, max.	244 Byte	244 Byte
equidistance	Yes	Yes
CPU/programming		
Programming language		
• STEP 7	Yes; V5.3 SP2 or higher	Yes; V5.3 SP2 or higher
• LAD	Yes	Yes
• FUP	Yes	Yes
• AWL	Yes	Yes
• SCL	Yes	Yes
• CFC	Yes	Yes
• GRAPH	Yes	Yes
• HiGraph	Yes	Yes
Software libraries		
User program protection/password protection	Yes	Yes
Open development interfaces		
• CCX (Custom Code Extension)	No	No
• SMX (Shared Memory Extension)	Yes; with WinAC ODK V4.1	Yes
- Inputs	4 KByte	4 KByte
- Outputs	4 KByte	4 KByte
• CMI (Controller Management Interface)	Yes; with WinAC ODK V4.1	Yes

Technical specifications (continued)

	6ES7 673-2CC40-0YA0	6ES7 673-6CC40-0YA0
Hardware requirements		
Hardware required	PC with color monitor, keyboard, mouse or pointing device for Windows	PC with color monitor, keyboard, mouse or pointing device for Windows
Required memory on hard disk, min.	60 MByte	60 MByte
Main memory, min.	256 MByte	128 MByte
Processor		Intel Pentium 800 MHz
• Multi-processor system	Yes	
• Hyperthreading	Yes	
Operating systems		
Operating system		
• Windows NT 4.0	No	No
• Windows 2000	Yes; Professional, as of SP3	Yes; SP3 or higher
• Windows XP	Yes; Professional, SP1 and SP2	Yes; SP1 and SP2
Dimensions and weight		
Width	98 mm	98 mm
Height	288 mm	288 mm
Required slots	1; PCI, PCI format: 3/4	1; PCI, PCI format: 3/4
Weight		
Weight, appr.		300 g

Ordering data

		Order No.
SIMATIC WinAC Slot 412 V4.0	C)	**6ES7 673-2CC40-0YA0**
PC-based control system with Slot-PLC CPU 412-2 PCI, 384 KB RAM; with electronic documentation (German, English, French) and software on CD-ROM; single license, executes with Windows 2000/XP Professional		
SIMATIC WinAC Slot 416 V4.0	C)	**6ES7 673-6CC40-0YA0**
PC-based control system with Slot-PLC CPU 416-2 PCI, 3.2 MB RAM; with electronic documentation (German, English, French) and software on CD-ROM; single license, executes with Windows 2000/XP Professional		
Additional components		
Backup battery		**6ES7 971-2BA00-0AA0**
for WinAC Slot 412/416		
RAM memory card		
Long design		
64 KB		**6ES7 952-0AF00-0AA0**
256 KB		**6ES7 952-1AH00-0AA0**
1 MB		**6ES7 952-1AK00-0AA0**
2 MB		**6ES7 952-1AL00-0AA0**
FEPROM memory card		
Long design, 5 V Flash-EPROM		
64 KB		**6ES7 952-0KF00-0AA0**
256 KB		**6ES7 952-0KH00-0AA0**
1 MB		**6ES7 952-1KK00-0AA0**
2 MB		**6ES7 952-1KL00-0AA0**
4 MB		**6ES7 952-1KM00-0AA0**
8 MB		**6ES7 952-1KP00-0AA0**
16 MB		**6ES7 952-1KS00-0AA0**
32 MB	A)	**6ES7 952-1KT00-0AA0**
64 MB	A)	**6ES7 952-1KY00-0AA0**

A) Subject to export regulations: AL: N and ECCN: EAR99H
C) Subject to export regulations: AL: N and ECCN: EAR99T

9

SIMATIC WinAC ODK

Overview

- SIMATIC WinAC Software PLCs and SIMATIC WinAC Slot PLCs support powerful interfaces which allow the control task to be closely integrated with PC-based applications.
- WinAC ODK allows users to develop new applications or to integrate existing applications into the control task.
- New with WinAC ODK V4.1:
  WinAC ODK V4.1 also allows the development of applications for WinAC Slot and replaces WinAC Slot T-Kit.

Technical specifications

	6ES7 806-1CC02-0BA0
CPU/programming	
Open development interfaces	
• CCX (Custom Code Extension)	Yes; C/C++, Unmanaged Code
• SMX (Shared Memory Extension)	Yes; C/C++, Unmanaged Code
• CMI (Controller Management Interface)	Yes; C/C++, C#, VB
Hardware requirements	
Hardware required	PC with color monitor, keyboard, mouse or pointing device for Windows
Required memory on hard disk, min.	10 MByte
Main memory, min.	256 MByte
Processor	Intel Pentium 800 MHz
Software requirement	
Software required	MS Visual Developers Studio, V6.0 >= SP 3; MS Visual Developers Studio .net 2003; VenturCom SDK V6.0 (only for real time applications with WinAC RTX)
Operating systems	
Operating system	
• Windows NT 4.0	No
• Windows 2000	Yes; Professional, as of SP 3
• Windows XP	Yes; Professional, SP 1
Software	
Configuration software	
• Description	WinAC product support for: WinAC Basis V4.1; WinAC RTX V4.1; WinAC Slot V3.4

Ordering data

		Order No.
SIMATIC WinAC ODK V4.1		
for using C/C++ code in WinAC PLCs, runs under Windows NT 2000/XP; CD-ROM with electronic documentation in English		
Single license	E)	**6ES7 806-1CC02-0BA0**

E) Subject to export regulations: AL: N and ECCN: EAR99S

Overview

- Quick start in automation solutions with embedded PC platforms.
  - SIMATIC WinAC RTX pre-installed and ready to use on Microbox PC 420
  - PROFIBUS and Industrial Ethernet completely configured for use in a SIMATIC environment
  - Configuring and programming with SIMATIC STEP 7 via Industrial Ethernet or PROFIBUS
- Robust operation
  - Diskless operation based on Compact Flash card (CF card) and Windows XP embedded
  - Operation without fan
- Flexibility of a PC-based automation environment
  - Free memory space available on CF card for further PC applications
  - Use of WinAC ODK with SIMATIC WinAC RTX
  - Connectivity for USB devices, flat-panel monitor or screen
  - PC104+ cards pluggable
- Data retentivity for WinAC RTX even without uninterruptible power supply (UPS)

Technical specifications

	6ES7 675-1BB30-0PA0
Power supply	
Input voltage	
• Rated value, DC 24 V	Yes
• permissible range, lower limit (DC)	20.4 V
• permissible range, upper limit (DC)	28.8 V
Input current	
• Rated value at DC 24 V	2,500 mA
Supply voltages	
Power supply and voltage jumpering	
• Mains/voltage failure jumpering	5 ms
Interfaces	
Graphics interface	combined VGA/ DVI port
serial interface	COM1 (RS232)
PROFIBUS/MPI	Integr. CP 5611 interface
USB	2x USB 2.0 high speed/high current; 2x USB 2.0 high speed/low current
Ethernet	2x VIA VT6105LOM, 10/100MBit/s with RJ45
Dimensions and weight	
Width	262 mm
Height	133 mm
Depth	47 mm
Weights	
Weight	2 kg

Ordering data

		Order No.
SIMATIC Microbox 420-RTX PC-based Control system with SIMATIC WinAC RTX 2005 and SIMATIC SOFTNET PG, installed for instant use on a SIMATIC Microbox PC 420 with Celeron processor (400 MHz, 512 Mbyte RAM, 1 Gbyte CF card), integral PROFIBUS DP interface, Windows XP embedded	F)	**6ES7 675-1BB30-0PA0**

F) Subject to export regulations: AL: N and ECCN: 5D002ENC3

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SIMATIC Microbox 420-T

Overview

- A quick start in automation solutions with embedded PC platforms
  - SIMATIC WinAC RTX with integrated technology and motion control preinstalled ready for use on Microbox PC 420
  - PROFIBUS and Industrial Ethernet completely configured for use in a SIMATIC environment
  - configuring and programming with SIMATIC STEP 7 via Industrial Ethernet or PROFIBUS
- Robust operation
  - diskless operation based on Compact Flash card (CF card) and Windows XP embedded
  - fanless operation
- Flexibility of a PC-based automation environment
  - free memory space available on CF card for additional PC applications
  - use of WinAC ODK with SIMATIC WinAC RTX
  - connectivity for USB devices, flat-panel monitor or screen.
- Data retentivity for WinAC RTX and integrated technology even without uninterruptible power supply (UPS)

Technical specifications

	6ES7 675-3AG30-0PA0
Product version	
HW version	V1
Firmware version	V1.0
System configuration	
Computer platform	Microbox PC 420
Processor selection	P III 933 MHz
Main memory	512 Mbyte RAM
Compact Flash	1 Gbyte
Operating systems	Win XP embedded
Power supply	
Input voltage	
• Rated value, 24 V DC	Yes; See detail / Microbox PC 420
• Permissible range, lower limit (DC)	20.4 V; See detail / Microbox PC 420
• Permissible range, upper limit (DC)	28.8 V; See detail / Microbox PC 420
Input current	
• Rated value at 24 V DC	2,500 mA; See detail / Microbox PC 420
Supply voltages	
Mains buffering	
• Mains buffering	5 ms; See detail / Microbox PC 420
Voltages and currents	
Power consumption	
• Power consumption, max.	61 W; See detail / Microbox PC 420
Back-up battery	
Accumulator operation	
• Backup time, max.	5 years

	6ES7 675-3AG30-0PA0
CPU/ Blocks	
Number of blocks (total)	
• DBs	
- Number, max.	65535
- Size, max.	64 Kbytes
• FBs	
- Number, max.	65535
- Size, max.	64 Kbytes
• FCs	
- Number, max.	65535
- Size, max.	64 Kbytes
• OBs	
- Number, max.	30
- Size, max.	64 Kbytes
- Number of free cycle OBs	1
- Number of time-of-day-interrupt OBs	1
- Number of delay interrupt OBs	1
- Number of time interrupts	9
- Number of process interrupt OBs	1
- Number of startup OBs	1
- Number of asynchronous error OBs	7
- Number of synchronous error OBs	2
- Number of diagnostic interrupts	1
• Nesting depth	
- per priority class	24
- add. nesting depth within error OB	2
CPU/ Execution times	
for bit instructions, min.	0.004 µs
for fixed-point arithmetic, min.	0.003 µs
for floating-point arithmetic, min.	0.004 µs

Technical specifications (continued)

	6ES7 675-3AG30-0PA0
Timers/counters and their retentive address areas	
S7 counters	
• Number	512
• Retentive address areas	
- configurable	Yes
- lower limit	0
- upper limit	512
- preset	8
• Counting range	
- configurable	Yes
- lower limit	0
- upper limit	999
IEC counters	
• Available	Yes
• Type	SFB
S7 timers	
• Number	512
• Retentive address areas	
- configurable	Yes
- lower limit	0
- upper limit	512
- preset	0
• Timer range	
- lower limit	10 ms
- upper limit	6390 s
IEC timers	
• Available	Yes
• Type	SFB
Data areas and their retentive address areas	
Retentive data area, in total	30 Kbyte
Retentive data area, in total (including timers, counters, flags), max.	30 Kbyte
Flags	
• Number, max.	16384 byte
• Number of clock bit memories	8
Data blocks	
• Number, max.	65535
• Size, max.	64 Kbyte
• Retentive address areas configurable	Yes
• Retentive address areas preset	Yes
Local data	
• Configurable, max.	16 Kbyte
• Default	256 byte
• per priority class, max.	20 byte
Address area	
I/O address area	
• Inputs	2000 byte
• Outputs	2048 byte

	6ES7 675-3AG30-0PA0
Process image	
• Inputs	2048 bytes
• Outputs	2048 bytes
• Inputs, configurable	2048 Kbytes
• Outputs, configurable	2048 Kbytes
• Inputs, default	512 bytes
• Outputs, default	512 bytes
Partial process images	
• Number of partial process images, max.	15
Digital channels	
• Integrated channels (DI)	0
• Integrated channels (DO)	8
• Inputs	16000
• Outputs	16376
• Inputs, centralized	0
• Outputs, centralized	0
Analog channels	
• Number of integrated channels (AI)	0
• Number of integrated channels (AO)	0
• Inputs	1000
• Outputs	1023
• Inputs, centralized	0
• Outputs, centralized	0
Addressing ranges	
• Outputs	2048 bytes
• Inputs	2048 bytes
Address space per module	
• Address space per module, max.	244 bytes
Time of day	
Clock	
• Hardware clock (real-time clock)	Yes
• Battery-backed and synchronized	No
• Backup time	5 years
• Deviation per day, max.	5 s
Run-time meter	
• Quantity	8
• Number	0 to 7
• Range of values	32767
• Granularity	1 hour
• Retentive	Yes
Time synchronization	
• Supported	No
• on PC-CP, slave	No
• on MPI, master	No
• on MPI, slave	No
• in AS, master	No
• in AS, slave	No
• on Ethernet via NTP	No

SIMATIC Microbox 420-T

Technical specifications (continued)

	6ES7 675-3AG30-0PA0
S7 message functions	
No. of stations that can be logged on for signaling functions, max.	32
Process diagnostics messages	Yes
Simultaneously active alarm-S blocks, max.	200
Test and startup functions	
Status/control	
• Status/control variables	Yes
• Variables	Inputs/outputs/flags/DB/timers/ counters
Monitoring functions	
Force	
• Force	No
Block status	Yes
Single step	Yes
Number of breakpoints	20
Diagnostic buffer	
• Available	Yes
• Number of entries, max.	120
• Configurable	Yes
• Default	120
Communication functions	
PG/OP communication	Yes
Routing	Yes
Global data communication	
• Supported	No
S7 basic communication	
• Supported	No
S7 communication	
• Supported	Yes
• as server	Yes
• as client	Yes
• User data per job, max.	64 Kbytes
• User data per job (of which consistent), max.	64 Kbytes
S5-compatible communication	
• Supported	No
Standard communication (FMS)	
• Supported	No
Open IE communication	
• TCP/IP	No
• ISO-on-TCP (RFC1006)	No
• UDP	No
Number of connections	
• Total	64
• Usable for PG communication	63
• Reserved for PG communication	1

	6ES7 675-3AG30-0PA0
• Usable for OP communication	63
• Reserved for OP communication	1
• Usable for S7 basic communi-cation	0
• Usable for S7 communication	62
• Usable for routing	62
1st interface	
Physical	RS485
Isolated	Yes
Functionality	
• MPI	No
• DP master	Yes
• DP slave	No
• Point-to-point connection	No
DP master	
• Number of connections, max.	14
• Services	
- PG/OP communication	Yes
- Routing	Yes
- Global data communication	No
- S7 basic communication	No
- S7 communication	Yes
- S7 communication, as client	Yes
- S7 communication, as server	Yes
- Equidistance support	No
- SYNC/FREEZE	Yes
- Activation/deactivation of DP slaves	Yes
- Direct data exchange (lateral communication data exchange broadcast)	Yes
- DPV1	Yes
• Transmission speed, max.	12 Mbit/s
• Number of DP slaves, max.	32
• User data per DP slave	
- User data per DP slave, max.	244 bytes
- Inputs, max.	244 bytes
- Outputs, max.	244 bytes
2nd interface	
Physical	RS485
Isolated	Yes
Automatic determination of trans-mission rate	Yes
Number of connection resources	
Functionality	
• MPI	No
• DP master	Yes
• DP slave	No
• Point-to-point connection	No
• PROFINET CBA	No
• PROFINET IO controller	No

Technical specifications (continued)

	6ES7 675-3AG30-0PA0
DP master	
• Number of connections, max.	0
• Number of connections (of which reserved), max.	0
• Services	
- PG/OP communication	No
- Routing	Yes
- Global data communication	No
- S7 basic communication	No
- S7 communication	No
- S7 communication, as client	No
- S7 communication, as server	No
- Equidistance support	Yes
- SYNC/FREEZE	No
- Activation/deactivation of DP slaves	No
- Direct data exchange (lateral communication)	No
- DPV1	Yes
• Transmission rate, max.	12 Mbit/s
• Number of DP slaves, max.	32
• User data per DP slave	
- User data per DP slave, max.	244 bytes
- Inputs, max.	244 bytes
- Outputs, max.	244 bytes
CPU/ programming	
Programming language	
• STEP 7	Yes; As of STEP 7 V5.3 + SP3 and option package S7-Technology V3.0 SP1
• LAD	Yes
• FBD	Yes
• STL	Yes
• SCL	Yes
• CFC	Yes
• GRAPH	Yes
• HiGraph	Yes
Software libraries	
• Process diagnostics	Yes
• Software controller	Yes
Operation set	See Operation list
Nesting levels	8
User program protection/password protection	Yes
System functions (SFC)	See manual
System function blocks (SFB)	See manual

	6ES7 675-3AG30-0PA0
Cycle time monitoring	
• Lower limit	1 ms
• Upper limit	6000 ms
• Configurable	Yes
• Default	6000 ms
Installed software	
Controller	WinAC T V1.0
Technology objects	
• Total	64 (axes, cams, external encoders)
• Axes	32 axes (virtual or real axes)
• Output cams	32
• Cams	32 cams
• Measuring inputs	16 measuring inputs
• External encoders	16 external encoders
Communication	SOFTNET PG for IE / SIMATIC NET 2005 V3.0.1
Integrated inputs/outputs	
Default addresses of the integrated channels	
• Digital outputs	66
Digital outputs	
Number of digital outputs	8
• of which fast outputs	8
Functions	For technological functions "rapid cam switching signals"
Length of cable, shielded, max.	25 m
Length of cable, unshielded, max.	25 m
Output short-circuit protection	Yes
Lamp load, max.	5 W
Output voltage	
• for "0" signal (DC), max.	3 V
Output current	
• for "1" signal, rated value	0.5 A
• for "1" signal, permissible range, min.	5 mA
• for "1" signal, permissible range, max.	0.6 A
Parallel switching of 2 outputs	
• to increase power	No
• to redundantly control a load	No

SIMATIC Microbox 420-T

Technical specifications (continued)

	6ES7 675-3AG30-0PA0
Switching frequency	
• at resistive load, max.	100 Hz
• at inductive load, max.	0.2 Hz
• at lamp load, max.	10 Hz
Load impedance range	
• lower limit	48 Ω
• upper limit	4 Ω
Status information/ interrupts/ diagnostics	
Interrupts	
• Alarms	No
Diagnostics	
• Diagnostic functions	No
Diagnostic display LED	
• Status display digital output (green)	No
• Status display digital input (green)	No
Environmental requirements	
Operating temperature	
• min.	0 °C; See detail / Microbox PC 420
• max.	50 °C; See detail / Microbox PC 420
Storage/transportation temperature	
• min.	-20 °C; See detail / Microbox PC 420
• max.	60 °C; See detail / Microbox PC 420
Vibration testing	
• During operation, tested according to IEC 60068-2-6	Yes; 10 to 58 Hz: 0.075 mm, 58 to 500 Hz: 9.8 m/s^2
• During transportation, tested according to IEC 60068-2-6	Yes; 5 to 9 Hz: 3.5 mm, 9 to 500 Hz: 9.8 m/s^2

	6ES7 675-3AG30-0PA0
Impact testing	
• Tested according to IEC 60068-2-27	Yes; 150 m/s^2, 11 ms
• Tested according to IEC 60068-2-29	Yes; 150 m/s^2, 11 ms
Shock testing	
• Tested according to IEC 60068-2-29	Yes; 150 m/s^2, 11 ms
• Operation, tested according to IEC 60068-2-29	Yes; 150 m/s^2, 11 ms
Degree of protection and class of protection	
• IP20	Yes
Standards, approvals, certification	
CE-marking	Yes; See detail / Microbox PC 420
CSA approval	Yes; See detail / Microbox PC 420
C-Tick	Yes; See detail / Microbox PC 420
cULus	Yes; See detail / Microbox PC 420
FM approval	No; See detail / Microbox PC 420
Interfaces	
Graphical interface	DVI VGA / DVI integrated
Serial interface	COM1 (RS232)
PROFIBUS/MPI	PC104 Plus Isochrone PROFIBUS module
USB	2 x USB 2.0 high curr./ 2 x USB 2.0 low curr.
Ethernet	2x VUA VT6105L OM/VT6106S, 10/100Mbit/s with RJ45
Dimensions	
Width	262 mm
Height	133 mm
Depth	65 mm
Weight	
Weight	2.5 kg

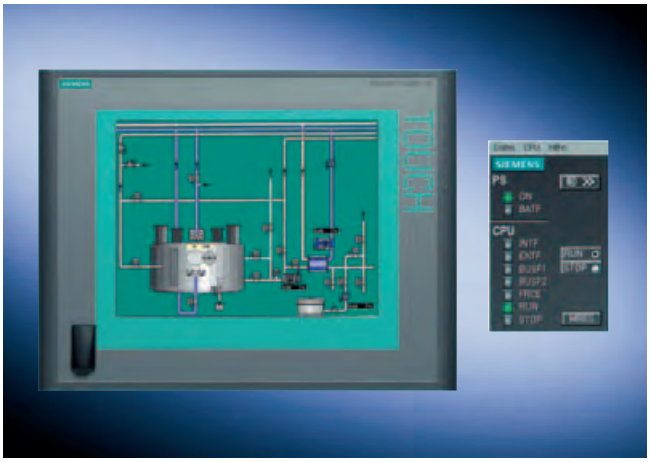
Ordering data

		Order No.
SIMATIC Microbox 420-T	D)	**6ES7 675-3AG30-0PA0**
PC-based Control system with SIMATIC WinAC RTX 2005, integrated technology and motion control and SIMATIC SOFTNET PG, installed ready for use on a SIMATIC Microbox PC 420 with Intel PIII 933 MHz processor, 512 MB RAM, 1 GB CF card, PROFIBUS DP interface, isochronous PROFIBUS DP (DRIVE) interface, Windows XP embedded		

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

Overview

SIMATIC Panel PC 477 HMI and HMI/RTX



Quick start in automation solutions with embedded automation
- SIMATIC WinCC flexible RT preinstalled and ready-to-run (Panel PC 477-HMI) or SIMATIC WinCC flexible and SIMATIC WinAC RTX preinstalled and ready-to-run (Panel PC 477-HMI/RTX)
- PROFIBUS and Industrial Ethernet completely configured for use in a SIMATIC environment
- configuration and programming with SIMATIC WinCC flexible ES and SIMATIC STEP 7 via Industrial Ethernet or PROFIBUS

- Robust operation
  - diskless operation based on Compact Flash card (1 GB CF card) and Windows XP embedded
  - fanless operation
- Flexibility of a PC-based automation environment
  - open for additional PC applications
  - expandable with PC/104+ cards
  - connectivity for USB devices, flat-panel monitor or screen
  - use of WinAC ODK with SIMATIC WinAC RTX
- Data retentivity for WinAC RTX even without uninterruptible power supply (UPS)

Ordering data

		Order No.
SIMATIC Panel PC 477 embedded	D)	**6AV7 84■-0■■10-0■B0**
Fronts with USB 2.0 interface; 512 MB SDRAM main memory; Windows XP embedded operating system		
Front panels		
• 12" TFT Touch		**1**
• 12" TFT Key		**2**
• 15" TFT Touch		**3**
• 15" TFT Key		**4**
Power supply		
• 24 V DC		**A**
• 110/230 V AC, power cable for Europe		**B**
Processor/PROFIBUS		
• Intel Celeron 650 MHz		**C**
• Intel Celeron 650 MHz, PROFIBUS DP 12 (on-board)		**D**
• Intel Pentium 3, 933 MHz		**E**
• Intel Pentium 3, 933 MHz, PROFIBUS DP 12 (on-board)		**F**

		Order No.
SIMATIC Panel PC 477 embedded	D)	**6AV7 84■-0■■10-0■B0**
Mass storage		
With operating system (Windows XP embedded preinstalled)		
• CompactFlash 512 MB		**B**
• CompactFlash 1 GB		**C**
With HMI CompactFlash 1 GB, Windows XP embedded preinstalled and HMI (archives / recipes preinstalled)		
• WinCC flexible preinstalled, RT 128 PT		**F**
• WinCC flexible preinstalled, RT 512 PT		**G**
• WinCC flexible preinstalled, RT 2048 PT		**H**
With HMI/RTX (only together with PROFIBUS DP 12 CPUs) CompactFlash 1 GB, Windows XP embedded preinstalled and HMI/RTX (archives / recipes preinstalled and Win AC RTX preinstalled and configured)		
• WinCC flexible preinstalled, RT 128 PT		**L**
• WinCC flexible preinstalled, RT 512 PT		**M**
• WinCC flexible preinstalled, RT 2048 PT		**N**

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

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SIMATIC Panel PC 477-HMI, -HMI/RTX

Ordering data		Order No.
Delivery versions (ex stock)		
12" TFT Touch 24 V DC power supply Celeron 650 MHz with PROFIBUS DP12 512 MB RAM 1 GB Compact Flash with Windows XP embedded	D)	**6AV7 841-0AD10-0CB0**
12" TFT Touch 24 V DC power supply Pentium P3 933 MHz with PROFIBUS DP12 512 MB RAM 1 GB CompactFlash with Windows XP embedded	D)	**6AV7 841-0AF10-0CB0**
12" TFT Key 24 V DC power supply Pentium P3 933 MHz with PROFIBUS DP12 512 MB RAM 1 GB CompactFlash with Windows XP embedded	D)	**6AV7 842-0AF10-0CB0**
15" TFT Touch 24 V DC power supply Celeron 650 MHz 512 MB RAM 1 GB CompactFlash with Windows XP embedded	D)	**6AV7 843-0AC10-0CB0**
15" TFT Touch 24 V DC power supply Pentium P3 933 MHz 512 MB RAM 1 GB CompactFlash with Windows XP embedded	D)	**6AV7 843-0AE10-0CB0**
15" TFT Touch 24 V DC power supply Pentium P3 933 MHz with PROFIBUS DP12 512 MB RAM 1 GB CompactFlash with Windows XP embedded	D)	**6AV7 843-0AF10-0CB0**
15" TFT Touch 110/230 V AC power supply Pentium P3 933 MHz with PROFIBUS DP12 512 MB RAM 1 GB CompactFlash with Windows XP embedded	D)	**6AV7 843-0BF10-0CB0**
15" TFT Key 24 V DC power supply Pentium P3 933 MHz with PROFIBUS DP12 512 MB RAM 1 GB CompactFlash with Windows XP embedded	D)	**6AV7 844-0AF10-0CB0**

		Order No.
Accessories		
Cover foil for Panel PCs 477/577/677/877 For protecting the touch screen from dirt/scratches		
• for 12" Touch		**6AV7 671-2BA00-0AA0**
• for 15" Touch		**6AV7 671-4BA00-0AA0**
Labeling strips for Panel PCs 477/577/677/877 For labeling softkeys and function keys, blank, supplied in sets of 10		**6AV7 672-0DA00-0AA0**
Non-heating apparatus cable for SIMATIC Box and Panel PC SIMATIC PC power cable, 230 V AC, angled, 3 m, for:		
• Germany		**6ES7 900-1AA00-0XA0**
• United Kingdom		**6ES7 900-1BA00-0XA0**
• Switzerland		**6ES7 900-1CA00-0XA0**
• USA		**6ES7 900-1DA00-0XA0**
• Italy		**6ES7 900-1EA00-0XA0**
Expansion components		
SIMATIC PC/PG DiagMonitor V2.2 Software tool for monitoring SIMATIC PCs, incl. manual, on CD-ROM (English/German)	A)	**6ES7 648-6CA02-2YX0**
SIMATIC PC/PG Image & Partition Creator Software tool for data backup and hard-disk partitioning for SIMATIC PCs, incl. manual, on CD-ROM (Eng/Ger/Fr/Sp/It)	A)	**6ES7 648-6AA03-0YX0**
3.5" disk drive, USB with 1 m connecting cable	A)	**6FC5 235-0AA05-1AA2**
Compact Flash Card		
• 256 MB	A)	**6ES7 648-2BF01-0XC0**
• 512 MB	A)	**6ES7 648-2BF01-0XD0**
• 1 GB	A)	**6ES7 648-2BF01-0XE0**
SIMATIC PC USB FlashDrive 512 MB, USB 2.0, metal enclosure, boot capability	A)	**6ES7 648-0DC20-0AA0**
Expansion kit PC/104 For integration of PC/104 modules (pack contains 6 expansion frames)	A)	**6AG4 070-0BA00-0XA0**
Industrial HUB 4 4 x USB 2.0, IP65 for cabinet door or DIN rail	A)	**6AV6 671-3AH00-0AX0**

A) Subject to export regulations: AL: N and ECCN: EAR99H
D) Subject to export regulations: AL: N and ECCN: 5D992B1

9

Overview

- The software PLC which runs under Windows CE and can be installed on the multifunctional platform MP 370 12" and MP 370 15“
- The cost-optimized solution for deterministic processes in conjunction with a rugged hardware platform. At the same time it is ideal for applications in which large amounts of data are processed.
- Ideal for tasks directly at the machine when a user-friendly user interface is extremely important or the control task demand large programs and extensive data memory.

Technical specifications

	SIMATIC WinAC MP V3.1
User memory	
• Flash memory (integrated)	5 MB
• Working memory (integrated)	1 MB
• Load memory (integrated)	1 MB
• Bit memories	2 KB
• Counters	512
• Timers	512
• Retentive data	Yes with UPS
Number of blocks	
• FB/FC/OB/DB/SDB	max. 2500
I/O	
• I/O address space	each 16 KB I/O
• Number of inputs/outputs	each 1 KB I/O
• Connection of the I/O	PROFIBUS DP up to 12 Mbit/s (MP 370 on board)
• Number of PROFIBUS DP slaves	32
Execution times	
• Bit operations (typ.)	0.2 µs
• Mathematical operations, typ.	0.15 µs
Technology	
• SIMATIC FMs	FM 350, FM 351, FM 352
• Easy Motion Control	Yes

	SIMATIC WinAC MP V3.1
System requirements	
• Hardware	SIMATIC MP 370 12" Touch, MP 370 12" Key or MP 370 15" Touch
• Operating system	Windows CE 3.0 (included on MP 370)
• PLC programming software	STEP 7, Version 5.2 or higher
• Visualization configuration software	ProTool, Version 6.0, SP2 or higher
• Communication software for Industrial Ethernet (only required on the programming device)	SOFTNET PG for IE
Communication functions	
Connections, total	24
• Ethernet, max.	22
• PROFIBUS, max.	4
• Reserved OS connections	1
• Reserved PG connection	1
PG/OP communication	Yes
Global data communication	No
S7 basic communication	No
S7 communication	
• As server	Yes
• As client	Yes

Ordering data

		Order No.
SIMATIC WinAC MP V3.1		
Software-based PC-based control system under Windows CE; CD-ROM with electronic documentation (G, E, F)		
Single license	E)	**6ES7 671-0EC02-0YA0**

E) Subject to export regulations: AL: N and ECCN: EAR99S

9

SIMATIC MP 370

Overview

- Like operator panels, Multi Panels are used for controlling and monitoring machines locally.
- Their functionality can be expanded by the installation of additional Windows CE applications (Multi Panel and Panel options)
- SIMATIC MP 370 devices on the basis of Windows CE combine the ruggedness of Operator Panels with the flexibility of PCs
- Pixel-graphics 12.1" or 15.1" TFT display, color (256 colors)
- The MP 370 15" Touch is also available with a stainless steel front (DIN EN 1672-2). The stainless steel front is appropriate e.g. for the increased demands of the food and beverages industry.
- *MP 370 12" Keys:*
  38 system keys, 36 user-configurable and freely-inscribable function keys (36 with LEDs)
  MP 370 12" and MP 370 15" Touch:
  Touchscreen (analog/resistive)
- All interfaces (e.g., MPI, PROFIBUS DP, USB, Ethernet, serial) are on-board

Technical specifications

	6AV6 545-0DA10-0AX0	6AV6 542-0DA10-0AX0	6AV6 545-0DB10-0AX0
Supply voltage			
Supply voltage	24 V DC	24 V DC	24 V DC
permissible range	+20,4 to +28,8 V DC	+20,4 to +28,8 V DC	+20,4 to +28,8 V DC
Rated current	1.15 A	1.15 A	1.8 A
Power	28 W	28 W	41 W
Backup battery	optional 3.6 V optional	optional 3.6 V optional	optional 3.6 V optional
Memory			
Type	Flash / RAM	Flash / RAM	Flash / RAM
Memory usable for project data / options	7168 kByte user memory / 5689 kByte memory for options	7168 kByte user memory / 5689 kByte memory for options	7168 kByte user memory / 5689 kByte memory for options
Clock			
• Type	Hardware clock	Hardware clock	Hardware clock
Configuration			
Configuration tool	ProTool as of Version 5.2 SP 3 or WinCC flexible Standard as of Version 2004 (must be ordered separately)	ProTool as of Version 5.2 SP 3 or WinCC flexible Standard as of Version 2004 (must be ordered separately)	ProTool as of Version 6 SP 2 or WinCC flexible Standard as of Version 2004 (must be ordered separately)
Display			
Display type	TFT, 256 Colors	TFT, 256 Colors	TFT, 256 Colors
Size	12.1 " (246 mm x 184 mm)	12.1 " (248 mm x 187 mm)	15.1 " (308 mm x 232 mm)
Resolution (W x H in pixels)	800 x 600	800 x 600	1024 x 768
MTBF backlighting (at 25 °C)	approx. 50000 h	approx. 50000 h	approx. 50000 h
Operating mode			
Operating elements	Touchscreen	Touchscreen	Touchscreen
Function keys, programmable	none	36 Function keys, 36 with LEDs	none
Membrane keyboard	No	Yes	No
System keys	0	38	0
Touchscreen	analog, resistive	No	analog, resistive
Numeric/alphabetical input	Yes / Yes	Yes / Yes	Yes / Yes
Connection for mouse/keyboard/barcode reader	USB / USB / USB	USB / USB / USB	USB / USB / USB

Technical specifications (continued)

	6AV6 545-0DA10-0AX0	6AV6 542-0DA10-0AX0	6AV6 545-0DB10-0AX0
Degree of protection			
Front	IP 65	IP 65	IP 65
Rear	IP 20	IP 20	IP 20
Certifications & Standards			
Certifications	CE, FM Class I Div. 2, cULus, EX zone 2/22	CE, FM Class I Div. 2, cULus, EX zone 2/22	CE, FM Class I Div. 2, cULus, EX zone 2/22, C-TICK
Ambient conditions			
Mounting position	vertical	vertical	vertical
maximum permissible angle of incliniation without external ventilation	+/- 35°	+/- 35°	+/- 35°
max. relative humidity (in %)	85%	85%	85%
Temperature			
• Operation (vertical installation)	0 to +50°C	0 to +50°C	0 to +50°C
• Operation (max. tilt angle)	0 to +35°C	0 to +35°C	0 to +35°C
• Transport, storage	-20 to +60°C	-20 to +60°C	-20 to +60°C
IO/applications/options			
I/O devices	Printer, Barcode reader	Printer, Barcode reader	Printer, Barcode reader
Type of output			
LED colors	none	green	none
Acoustics	Buzzer	Buzzer	Buzzer
Interfaces	1 x TTY, 2 x RS-232, 1 x RS-422, 1 x RS-485 (max. 12 Mbit/s)	1 x TTY, 2 x RS-232, 1 x RS-422, 1 x RS-485 (max. 12 Mbit/s)	1 x TTY, 2 x RS-232, 1 x RS-422, 1 x RS-485 (max. 12 Mbit/s)
PC card slot	1 x PC card slot	1 x PC card slot	1 x PC card slot
CF card slot	1 x CF card slot	1 x CF card slot	1 x CF card slot
Multi Media Card-Slot	No	No	No
USB	1 x USB	1 x USB	1 x USB
Ethernet	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)
Operating systems			
Operating system	Windows CE	Windows CE	Windows CE
Functionality under ProTool			
Applications/options	ProAgent, Internet Explorer, ThinClient, Soft PLC	ProAgent, Internet Explorer, Soft PLC	ProAgent, Internet Explorer, ThinClient, Soft PLC
Visual Basic Script	Number = 50 / Number of lines per script = 100	Number = 50 / Number of lines per script = 100	Number = 50 / Number of lines per script = 100
Alarm	Yes	Yes	Yes
Password protection (number of levels)	10	10	10
Help system	Yes	Yes	Yes
Status/control	with SIMATIC S5/S7	with SIMATIC S5/S7	with SIMATIC S5/S7
Message system			
• Event messages	2,000	2,000	2,000
• Alarm messages	2,000	2,000	2,000
• System messages	Yes	Yes	Yes
• Message length (lines x characters)	1 x 70	1 x 70	1 x 70
• Number of process values in messages	8	8	8
• Message buffer	Circulating buffer (n x 1024 Entries)	Circulating buffer (n x 1024 Entries)	Circulating buffer (n x 1024 Entries)

Technical specifications (continued)

	6AV6 545-0DA10-0AX0	6AV6 542-0DA10-0AX0	6AV6 545-0DB10-0AX0
Recipes			
• Recipes	500	500	500
• Data records per recipe	1,000	1,000	1,000
• Entry/data record	1,000	1,000	1,000
• Recipe memory	128 kByte integrated Flash, expandable	128 kByte integrated Flash, expandable	128 kByte integrated Flash, expandable
Quantity			
• Process pictures	300	300	300
Image elements			
• Text objects	30000 Text elements	30000 Text elements	30000 Text elements
• Graphics object	Bitmaps, Icons, Vector graphics	Bitmaps, Icons, Vector graphics	Bitmaps, Icons, Vector graphics
• dynamic objects	Diagrams, Bar, Slider, Analog display, Invisible buttons	Diagrams, Bar, Slider, Analog display, Invisible buttons	Diagrams, Bar, Slider, Analog display, Invisible buttons
Archiving			
• Number of archives per project	50	50	50
• Number of measuring points per archive	50	50	50
• Number of entries per archive	50,000	10,000	10,000
• Archiving types	Sequential archive, Short-term archive, Message archive, Process value archive	Sequential archive, Short-term archive, Message archive, Process value archive	Sequential archive, Short-term archive, Message archive, Process value archive
• Memory location	PC card, CF card, Ethernet	PC card, CF card, Ethernet	PC card, CF card, Ethernet
• Data storage format	csv file, readable,. e.g. with MS Excel, MS Access	csv file, readable,. e.g. with MS Excel, MS Access	csv file, readable,. e.g. with MS Excel, MS Access
• external evaluation	readable,. e.g. with MS Excel, MS Access etc.	readable,. e.g. with MS Excel, MS Access etc.	readable,. e.g. with MS Excel, MS Access etc.
• Size of archive	depending on free memory on ext. card/stick or on free hard disk space via network drive	depending on free memory on ext. card/stick or on free hard disk space via network drive	depending on free memory on ext. card/stick or on free hard disk space via network drive
• Online evaluation	via trends	via trends	via trends
Logging/printer driver			
• Print functions	Messages, shift log, Color print, Hardcopy	Messages, shift log, Color print, Hardcopy	Messages, shift log, Color print, Hardcopy
• Printer driver	ESC/P2, PCL3/PCL6	ESC/P2, PCL3/PCL6	ESC/P2, PCL3/PCL6
Fonts			
• Keyboard character sets	US American	US American	US American
Languages			
• Online languages	5	5	5
• Configuration languages	D, GB, F, I, E, CHN "traditional", CHN "simplified", DK, FIN, GR, J, KP/ROK, NL, N, PL, P, RUS, S, CZ/SK, TR, H	D, GB, F, I, E, CHN "traditional", CHN "simplified", DK, FIN, GR, J, KP/ROK, NL, N, PL, P, RUS, S, CZ/SK, TR, H	D, GB, F, I, E, CHN "traditional", CHN "simplified", DK, FIN, GR, J, KP/ROK, NL, N, PL, P, RUS, S, CZ/SK, TR, H
• Fonts	Tahoma, Arial, Courier New, Pro Tool Standard, Ideographic languages, 4 other character sets can be loaded, all freely scalable	Tahoma, Arial, Courier New, Pro Tool Standard, Ideographic languages, 4 other character sets can be loaded, all freely scalable	Tahoma, Arial, Courier New, Pro Tool Standard, Ideographic languages, 4 other character sets can be loaded, all freely scalable

Technical specifications (continued)

	6AV6 545-0DA10-0AX0	6AV6 542-0DA10-0AX0	6AV6 545-0DB10-0AX0
Transfer (Upload/Download)			
• Transfer of configuration	MPI/PROFIBUS DP (where available), serial, USB, Ethernet, using external storage medium	MPI/PROFIBUS DP (where available), serial, USB, Ethernet, using external storage medium	MPI/PROFIBUS DP (where available), serial, USB, Ethernet, using external storage medium
Expandability/openness			
• ActiveX controls	Yes	Yes	Yes
Functionality under WinCC flexible			
Applications/options	ProAgent, Internet Explorer, ThinClient, Sm@rt Service , Sm@rt Access	ProAgent, Internet Explorer, Sm@rt Service , Sm@rt Access	ProAgent, Internet Explorer, ThinClient, Sm@rt Service , Sm@rt Access
Visual Basic script	Number = 100	Number = 100	Number = 100
Task planner	Yes	Yes	Yes
Help system	Yes	Yes	Yes
Status/control	with SIMATIC S5/S7	with SIMATIC S5/S7	with SIMATIC S5/S7
Message system			
• Number of messages	4,000	4,000	4,000
• Bit messages	Yes	Yes	Yes
• Analog messages	Yes	Yes	Yes
• Message buffer	Circulating buffer (n x 1024 Entries), not retentive	Circulating buffer (n x 1024 Entries), not retentive	Circulating buffer (n x 1024 Entries), not retentive
Recipes			
• Recipes	500	500	500
• Data records per recipe	1,000	1,000	1,000
• Entries per data record	1,000	1,000	1,000
• Recipe memory	128 kByte integrated Flash, expandable	128 kByte integrated Flash, expandable	128 kByte integrated Flash, expandable
Process pictures/number			
• Process images	500	500	500
• Tags	2,048	2,048	2,048
• Limit values	Yes	Yes	Yes
• Multiplexing	Yes	Yes	Yes
Image elements			
• Text objects	30000 Text elements	30000 Text elements	30000 Text elements
• Graphics object	Bitmaps, Icons, Vector graphics	Bitmaps, Icons, Vector graphics	Bitmaps, Icons, Vector graphics
• dynamic objects	Diagrams, Bar, Slider, Analog display, Invisible buttons	Diagrams, Bar, Slider, Analog display, Invisible buttons	Diagrams, Bar, Slider, Analog display, Invisible buttons
Lists			
• Text lists	500	500	500
• Graphics list	500	500	500
• Libraries	Yes	Yes	Yes

Technical specifications (continued)

	6AV6 545-0DA10-0AX0	6AV6 542-0DA10-0AX0	6AV6 545-0DB10-0AX0
Archiving			
• Number of archives per project	50	50	50
• Number of measuring points per project	50	50	50
• Number of entries per archive	50,000	50,000	50,000
• Archiving types	Long-term archive, short-term archive, message archive, process value archive	Long-term archive, short-term archive, message archive, process value archive	Long-term archive, short-term archive, message archive, process value archive
• Memory location	PC card, CF card, Ethernet	PC card, CF card, Ethernet	PC card, CF card, Ethernet
• Data storage format	CSV file, readable,. e.g. with MS Excel, MS Access	CSV file, readable,. e.g. with MS Excel, MS Access	CSV file, readable,. e.g. with MS Excel, MS Access
• external evaluation	readable,. e.g. with MS Excel, MS Access etc.	readable,. e.g. with MS Excel, MS Access etc.	readable,. e.g. with MS Excel, MS Access etc.
• Size of archive	depending on free memory on ext. card/stick or on free hard disk space via network drive	depending on free memory on ext. card/stick or on free hard disk space via network drive	depending on free memory on ext. card/stick or on free hard disk space via network drive
• Online evaluation	Using trends	Using trends	Using trends
Security			
• Number of user groups	10	10	10
• Number of user rights	32	32	32
• Passwords exportable	Yes	Yes	Yes
Logging/printer driver			
• Printing/logging	Messages, report/log, color print, hardcopy	Messages, report/log, color print, hardcopy	Messages, report/log, color print, hardcopy
• Printer driver	ESC/P2, PCL3/PCL6	ESC/P2, PCL3/PCL6	ESC/P2, PCL3/PCL6
Fonts			
• Keyboard fonts	US American (English)	US American (English)	US American (English)
Languages			
• Online languages	5	5	5
• Configuration languages	D, GB, F, I, E, CHN "traditional", CHN "simplified", DK, FIN, GR, J, KP/ROK, NL, N, PL, P, RUS, S, CZ/SK, TR, H	D, GB, F, I, E, CHN "traditional", CHN "simplified", DK, FIN, GR, J, KP/ROK, NL, N, PL, P, RUS, S, CZ/SK, TR, H	D, GB, F, I, E, CHN "traditional", CHN "simplified", DK, FIN, GR, J, KP/ROK, NL, N, PL, P, RUS, S, CZ/SK, TR, H
• Fonts	Tahoma, Arial, Courier New, Ideographic languages, 4 other character sets can be loaded, all freely scalable	Tahoma, Arial, Courier New, Ideographic languages, 4 other character sets can be loaded, all freely scalable	Tahoma, Arial, Courier New, Ideographic languages, 4 other character sets can be loaded, all freely scalable
Transfer (Upload/Download)			
• Transfer of configuration	MPI/PROFIBUS DP, serial, USB, Ethernet, using external storage medium, Automatic transfer recognition	MPI/PROFIBUS DP, serial, USB, Ethernet, using external storage medium, Automatic transfer recognition	MPI/PROFIBUS DP, serial, USB, Ethernet, using external storage medium, Automatic transfer recognition
Expandability/openness			
• OPP	Yes	Yes	Yes
Dimensions			
Front panel W x H (mm)	335 mm x 275 mm	483 mm x 310 mm	400 mm x 310 mm
Mounting cutout/ depth W x H x D (mm)	310 mm x 248 mm / 59 mm Device depth	310 mm x 248 mm / 59 mm Device depth	368 mm x 290 mm / 69 mm Device depth
Weight	4.5 kg	5.1 kg	5.7 kg

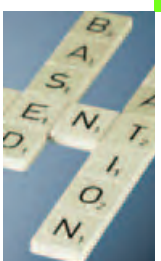
Ordering data		Order No.
SIMATIC MP 370		
Multi Panel with		
• 12" color TFT display, Touch	F)	**6AV6 545-0DA10-0AX0**
• 12" color TFT display, Keyboard	F)	**6AV6 542-0DA10-0AX0**
• 15" color TFT display, Touch	F)	**6AV6 545-0DB10-0AX0**
• 15" color TFT display, Touch with stainless steel front	F)	**6AV6 545-8DB10-0AA0**
incl. mounting accessories		
Configuration		
with SIMATIC ProTool and ProTool/Pro		See Section 7, pages 7/49, 7/50
with SIMATIC WinCC flexible		See Section 7, page 7/54
MP 370 configuration set	D)	**6AV6 622-0BA01-0AA0**
Consisting of:		
• WinCC flexible Standard engineering software		
• Documentation DVD, 5 languages (English, French, German, Italian, Spanish)		
• RS 232 cable (5 m)		
• MPI cable, 5 m		
Applications/options		
When configuring with ProTool		
• SIMATIC ProAgent/MP		See catalog ST 80
• SIMATIC WinAC MP		See page 9/21
• SIMATIC ThinClient/MP		See catalog ST 80
When configuring with WinCC flexible		
• SIMATIC ThinClient/MP		See catalog ST 80
• WinCC flexible/ProAgent		See catalog ST 80
• WinCC flexible/Sm@rtAccess		See catalog ST 80
• WinCC flexible/Sm@rtService		See catalog ST 80
• WinCC flexible/OPC Server		See catalog ST 80
Documentation (to be ordered separately)		
Operating Instructions MP 370 (WinCC flexible)		
• German		**6AV6 691-1DE01-0AA0**
• English		**6AV6 691-1DE01-0AB0**
• French		**6AV6 691-1DE01-0AC0**
• Italian		**6AV6 691-1DE01-0AD0**
• Spanish		**6AV6 691-1DE01-0AE0**
User Manual WinCC flexible Compact/ Standard/Advanced		
• German		**6AV6 691-1AB01-0AA0**
• English		**6AV6 691-1AB01-0AB0**
• French		**6AV6 691-1AB01-0AC0**
• Italian		**6AV6 691-1AB01-0AD0**
• Spanish		**6AV6 691-1AB01-0AE0**
User Manual WinCC flexible Communication		
• German		**6AV6 691-1CA01-0AA0**
• English		**6AV6 691-1CA01-0AB0**
MP 370 Manual (ProTool)		
• German		**6AV6 591-1DB10-2AA0**
• English		**6AV6 591-1DB10-2AB0**
• French		**6AV6 591-1DB10-2AC0**
• Italian		**6AV6 591-1DB10-2AD0**
ProTool User Manual for configuring Windows-based systems		
• German		**6AV6 594-1MA06-1AA0**
• English		**6AV6 594-1MA06-1AB0**
• French		**6AV6 594-1MA06-1AC0**
• Italian		**6AV6 594-1MA06-1AD0**
• Spanish		**6AV6 594-1MA06-1AE0**
User Manual Communication for Windows-Based Systems (ProTool)		
• German		**6AV6 596-1MA06-0AA0**
• English		**6AV6 596-1MA06-0AB0**
• French		**6AV6 596-1MA06-0AC0**
• Italian		**6AV6 596-1MA06-0AD0**
• Spanish		**6AV6 596-1MA06-0AE0**
SIMATIC HMI Manual Collection	E)	**6AV6 691-1SA01-0AX0**
Electronic documentation, on DVD		
5 languages (English, French, German, Italian and Spanish); contains: all currently available user manuals, manuals and communication manuals for SIMATIC HMI		
Accessories for supplementary ordering		
Key labeling strips (service packets)		See catalog ST 80
Cover foil		See catalog ST 80
Memory card		See catalog ST 80
Service packages		See catalog ST 80
Connectors		See catalog ST 80
Configuration cable		See catalog ST 80
Backup battery		See catalog ST 80
Converters		See catalog ST 80
Connecting cables		See catalog ST 80
System interfaces		See catalog ST 80

D) Subject to export regulations: AL: N and ECCN: 5D992B1
E) Subject to export regulations: AL: N and ECCN: EAR99S
F) Subject to export regulations: AL: N and ECCN: 5D002ENC3

9

Component Based Automation

10



Brochures

For brochures serving as selection guides for SIMATIC products refer to:

http://www.siemens.com/simatic/printmaterial

Component based Automation

Overview

- Automation concept for implementing applications with "distributed intelligence"
- Simple data exchange between intelligent devices makes modularization of machines and plants easy
- Central, plant-wide engineering makes communication configuration easy
- Integration of Ethernet and fieldbus
- Support of vertical integration thanks to the use of IT standards in automation
- Use of the Ethernet standard PROFINET specified by PROFIBUS International (PI):
  Problem-free integration of standard-compliant devices from various manufacturers

For brochures serving as selection guides for SIMATIC products refer to:

http://www.siemens.com/simatic/printmaterial

Design

A configuration with Component Based Automation comprises a number of components:

- Bus systems:
  - Industrial Ethernet (obligatory)
  - PROFIBUS, e.g. for real-time tasks (optional)
- Industrial Ethernet stations
- PROFIBUS stations

Industrial Ethernet stations require PROFINET communication mechanisms. The following Ethernet devices and software products are available:

- SIMATIC WinAC PN PC-based Control with software PLC
- PROFINET-compatible CP 343-1 PN
  for connecting the S7-300 to Ethernet
- PROFINET OPC server for access to data on PROFINET devices from PC applications and visualization systems
- Visualization via OPC:
  Any visualization product that can function as an OPC client can be used, e.g. SIMATIC ProTool/Pro, SIMATIC WinCC, third-party HMI. SIMATIC iMap features specific integration of SIMATIC ProTool/Pro.

PROFIBUS segments are connected to Industrial Ethernet via a PROFINET proxy. These devices operate as masters on PROFIBUS. They are available as:

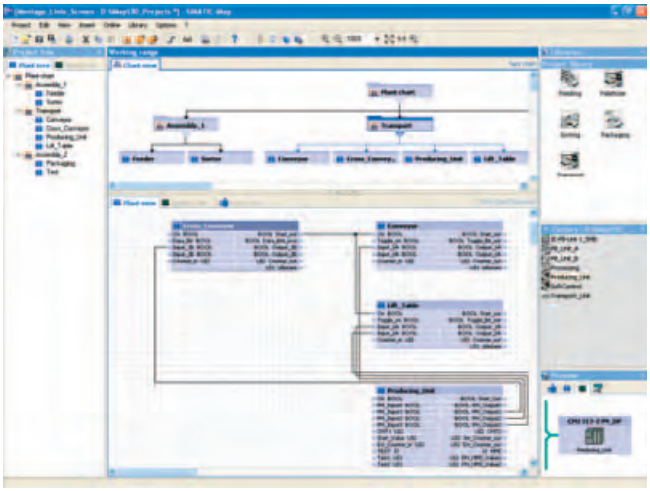
- SIMATIC WinAC PN PC-based Control with software PLC
- SIMATIC NET IE/PB Link,
  compact gateway between Industrial Ethernet and PROFIBUS

The following can be used as PROFIBUS nodes:

- SIMATIC ET 200X and ET 200S with separate CPU as intelligent field devices on PROFIBUS
- SIMATIC S7-300 CPUs with integrated PROFIBUS DP interface as intelligent slaves on PROFIBUS,
  e.g., compact CPUs CPU 313C-2 DP and CPU 314-2 DP
- All current standard slaves
  with GSD file to PROFIBUS DP standard

Even existing system sections networked with PROFIBUS can be integrated into Component Based Automation systems. For this purpose, an Industrial Ethernet interface with PROFINET function must be added to the PROFIBUS master.

Overview



- Component-based software tool for configuring the communication in distributed automation solutions
- For easy graphical configuration of the communication between subsystems and machine-to-machine communication in the production line
- Based on the PROFINET standard
- Open for PROFINET devices from various manufacturers on Industrial Ethernet
- Runs under Windows 2000, Windows XP Professional and Windows 2003 Server

Technical specifications

See section 7, page 7/20

Ordering data

		Order No.
SIMATIC iMap V3.0		
Target system: CPU 31x-2 PN/DP, CPU 319-3 PN/DP, SIMATIC WinAC PN, SIMATIC NET IE/PB Link, SIMATIC NET CP 343-1, SIMATIC NET CP 343-1 Advanced, SIMATIC NET CP 443-1 Advanced, distributed I/O devices with own CPU, PROFINET CBA OPC server, devices on the Industrial Ethernet based on the PROFINET CBA standard, SIMATIC OPs, SIMATIC ProTool/Pro *Requirements:* Windows 2000 Prof. with Service Pack 4 or later or Windows XP Prof. with Service Pack 1 or later or Windows 2003 Server with Service Pack 1 or later; on PG or PC with Pentium processor, min. 1 GHz; STEP 7 V5.3 or later with Service Pack 3, PN OPC Server V6.3 or later *Delivery form:* German, English, with electronic documentation		
Single license	D)	**6ES7 820-0CC04-0YA5**
Software Update Service	D)	**6ES7 820-0CC01-0YX2**
Upgrade to V3.0, single license	D)	**6ES7 820-0CC04-0YE5**

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

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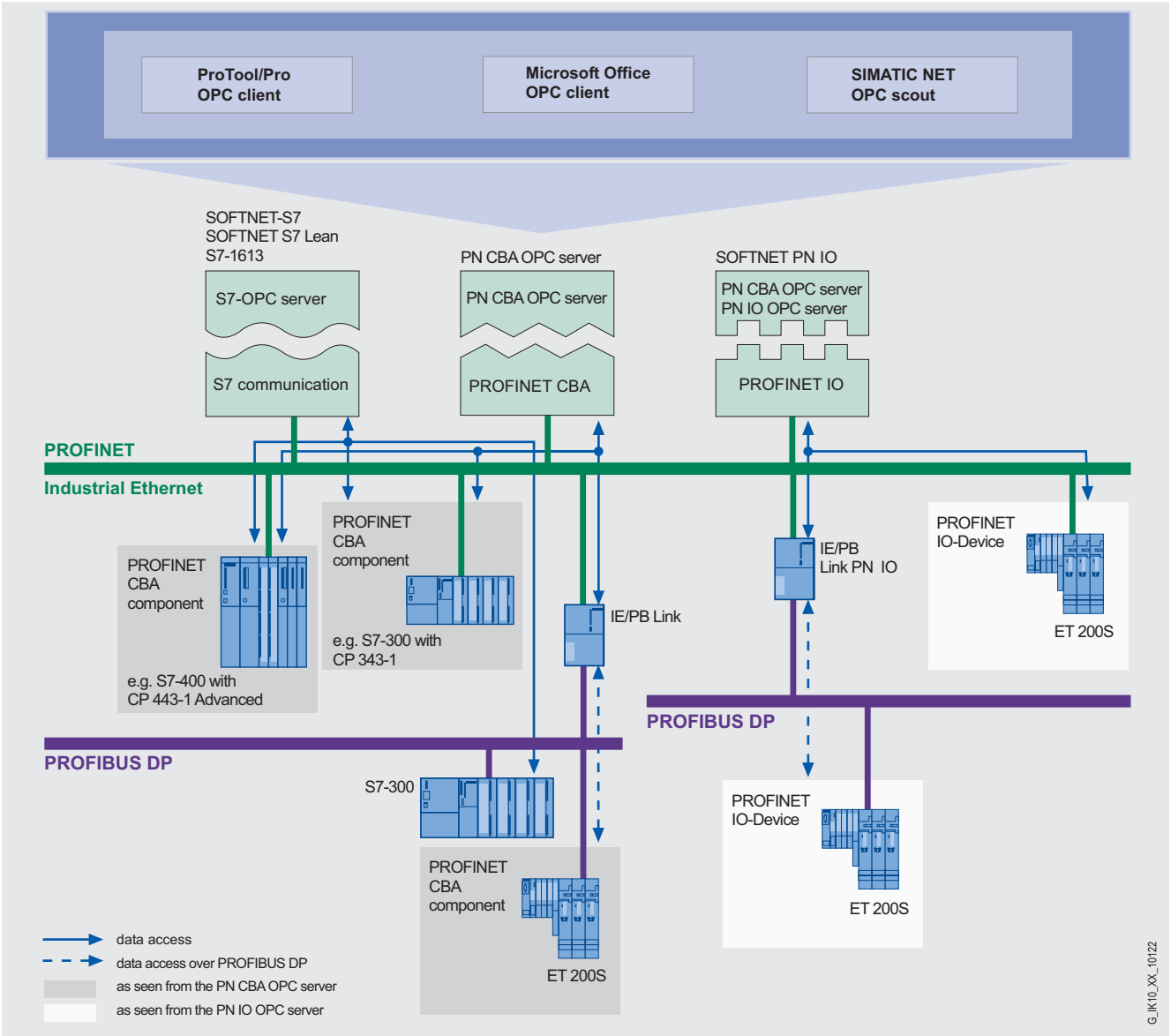
PN CBA OPC server

Overview

- Access to variables in PROFINET CBA components over the OPC interface
- Use of the objects and symbols defined using the PROFINET engineering tool SIMATIC iMap and STEP 7
- Adding PROFINET functionality to existing installations. This enables it to be used in parallel with other communication protocols such as S7 communication with SOFTNET-S7 for Industrial Ethernet.
- OPC Scout as an OPC client with browser functions for the variables of the PROFINET CBA components



System integration with the PN CBA OPC server

Technical specifications

See section 8, page 8/14

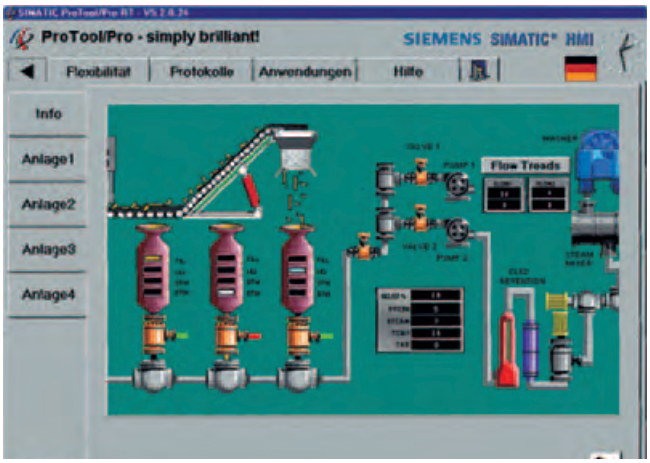
Ordering data

		Order No.
PN CBA OPC server Edition 2005 PROFINET OPC server for CBA; single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2000 Professional/Server; German/English		**6GK1 706-0HB63-3AA0**
Software iMap V3.0 for configuring PROFINET CBA *Requirement:* Windows 2000 Prof. with Service Pack 4 or later or Windows XP Prof. with Service Pack 1 or later or Windows 2003 Server with Service Pack 1 or later; on PG or PC with Pentium processor, min. 1 GHz; STEP 7 V5.3 or later with Service Pack 3, PN OPC Server V6.3 or later *Type of supply:* German, English with electronic documentation		
• Single license	D)	**6ES7 820-0CC04-0YA5**
• Software Update Service	D)	**6ES7 820-0CC01-0YX2**
• Upgrade to V3.0, single license	D)	**6ES7 820-0CC04-0YE5**
SIMATIC NET Software Update Service For Industrial Ethernet, PROFIBUS, OPC server, for one year service incl. manuals on CD-ROM; prerequisite: SIMATIC NET PC/Windows products German/English	D)	**6GK1 704-0AA00-3AA2**

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

SIMATIC ProTool/Pro

Overview



- **PC-based HMI solution for single-user systems** directly at the machine
- SIMATIC ProTool/Pro comprises:
  - SIMATIC ProTool/Pro RT runtime software for PC-based systems
  - SIMATIC ProTool/Pro Configuration (CS) configuration software for configuring PC-based systems and for configuring of SIMATIC operator panels [1]
- Executable under Windows 98 SE/ME and Windows NT4.0/2000/XP Professional
- **Current version:**
  - SIMATIC ProTool/Pro Configuration V6.0 + SP3
  - SIMATIC ProTool/Pro Runtime V6.0 + SP3

Technical specifications

See section 7, page 7/50

Ordering data

		Order No.
SIMATIC ProTool/Pro Configuration V6.0 + SP3 incl. ProAgent V6.0 + SP3 [2] Language versions: DE/EN/FR/IT/ES on CD-ROM, containing: • ProTool/Pro Configuration (CS) V6.0 + SP3 • Simulation software for Mobile Panel 170, TP 170A/B, OP 170B, TP 270, OP 270, MP 270, MP 270B 10", MP 370 and ProTool/Pro Runtime • Native drivers • Electronic documentation (.pdf/.chm) in English, French, German, Spanish, Italian	D)	**6AV6 582-2BX06-0DX0**

Ordering data (continued)

		Order No.
SIMATIC ProTool/Pro Runtime V6.0 + SP3 for PC systems incl. ProAgent V6.0 + SP3 [2] on CD-ROM with license (single license) for		
• 128 PowerTags (RT 128)	D)	**6AV6 584-1AB06-0DX0**
• 256 PowerTags (RT 256)	D)	**6AV6 584-1AC06-0DX0**
• 512 PowerTags (RT 512)	D)	**6AV6 584-1AD06-0DX0**
• 2048 PowerTags (RT 2048)	D)	**6AV6 584-1AF06-0DX0**
Upgrade		
• ProTool/Pro to ProTool/Pro V6.0 + SP3 [1]	D)	**6AV6 582-2BX06-0DX4**
• ProTool/Pro RT to ProTool/Pro RT V6.0 + SP3	D)	**6AV6 584-3AX06-0DX4**
Power Packs		
SIMATIC ProTool/Pro RT PowerTags from		
• 128 to 256 PowerTags	D)	**6AV6 570-1BC00-0AX0**
• 128 to 512 PowerTags	D)	**6AV6 570-1BD00-0AX0**
• 128 to 2048 PowerTags	D)	**6AV6 570-1BF00-0AX0**
• 256 to 512 PowerTags	D)	**6AV6 570-1CD00-0AX0**
• 256 to 2048 PowerTags	D)	**6AV6 570-1CF00-0AX0**
• 512 to 2048 PowerTags	D)	**6AV6 570-1DF00-0AX0**
• SIMATIC ProTool/Lite to ProTool/Pro V6.0 + SP3	D)	**6AV6 571-2AC06-0DX0**
• SIMATIC ProTool to ProTool/Pro V6.0 + SP3	D)	**6AV6 571-2BC06-0DX0**
Versions for China/Taiwan/Korea/Japan		
SIMATIC ProTool/Pro Configuration V6.0 + SP2 ASIA Language/script versions: English/simplified and traditional Chinese/Korean/Japanese; containing: • ProTool/Pro Configuration (CS) V6.0 + SP2 ASIA • Simulation software for Mobile Panel 170, TP 170A/B, OP 170B, TP 270, OP 270, MP 270, MP 270B 10", MP 370 and ProTool/Pro Runtime • Electronic documentation (.pdf/.chm) in: Chinese (traditional and simplified), English, Japanese and Korean	D)	**6AV6 582-2BX06-0CV0**
SIMATIC ProTool/Pro Runtime V6.0 + SP2 ASIA for PC systems on CD-ROM with license (single license) for		
• 128 PowerTags (RT 128)	D)	**6AV6 584-1AB06-0CV0**
• 256 PowerTags (RT 256)	D)	**6AV6 584-1AC06-0CV0**
• 512 PowerTags (RT 512)	D)	**6AV6 584-1AD06-0CV0**
• 2048 PowerTags (RT 2048)	D)	**6AV6 584-1AF06-0CV0**

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

1) Upgrade for configuration station (CS) as well as runtime (RT) station

2) The runtime licenses for ProAgent/PC must be purchased separately for each target system.

Ordering data (continued)

		Order No.
Communication via Industrial Ethernet		
CP 1613-A2	A)	**6GK1 161-3AA01**
PCI card (32-bit) for connecting a PG/PC to Industrial Ethernet (communications software must be ordered separately)		
S7-1613 Edition 2005		**6GK1 716-1CB63-3AA0**
Software for S7 and S5 communication, incl. PG/OP communication, OPC server and NCM PC; up to 120 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, Windows 2000 Professional/Server; for CP 1613/CP 1613-A2 German/English		
SOFTNET-S7 Edition 2005		**6GK1 704-1CW63-3AA0**
Software for S7 and S5-compatible communication, incl. OPC server, PG/OP communication and NCM PC; up to 64 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, 2000 Professional/Server; German/English		
SOFTNET S7 Lean Edition 2005		**6GK1 704-1LW63-3AA0**
Software for S7 and S5-compatible communication, incl. OPC server, PG/OP communication and NCM PC; up to 8 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, 2000 Professional/Server; German/English		
Communication via PROFIBUS		
CP 5613-A2		**6GK1 561-3AA01**
PCI card (32-bit) for connecting a PC to PROFIBUS (communications software must be ordered separately).		
CP 5614-A2		**6GK1 561-4AA01**
PCI card (32-bit) for connecting a PC to PROFIBUS (communications software must be ordered separately).		

		Order No.
Communication via PROFIBUS		
S7-5613 Edition 2005		**6GK1 713-5CB63-3AA0**
Software for S7 communication, incl. PG and FDL protocol, OPC server and NCM PC; single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional; 2003 Server, 2000 Professional/Server, for CP 5613, CP 5613 A2, CP 5613 FO, CP 5614, CP 5614-A2, CP 5614 FO; German/English		
DP-5613 Edition 2005		**6GK1 713-5DB63-3AA0**
Software for DP protocol incl. PG/OP communication, FDL, DP-OPC server, for 32-bit Windows XP Professional; 2003 Server, 2000 Professional/Server; German/English		
FMS-5613 Edition 2005		**6GK1 713-5FB63-3AA0**
Software for FMS-Protokoll incl. PG/OP communication, FDL, FMS-OPC server, for 32-bit Windows XP Professional; 2003 Server, 2000 Professional/Server; German/English		
CP 5512		**6GK1 551-2AA00**
PCMCIA card (CARDBUS 32-bit) for connecting a PG/Notebook to PROFIBUS or MPI (communications software included in ProTool/Pro)		
CP 5611 A2	A)	**6GK1 561-1AA01**
PCI card (32-bit) for connecting a PG/PC to PROFIBUS (communications software included in ProTool/Pro)		
CP 5611 MPI	A)	**6GK1 561-1AM01**
Comprising of PCI card CP 5611-A2 (32-bit) and MPI cable, 5 m		
PC/PPI adapter	A)	**6ES7 901-3CB30-0XA0**
RS 232, 9-pin; male with RS 232/PPI converter, max. 19.2 kbit/s		
PC/MPI adapter		**6ES7 972-0CA23-0XA0**
RS 232, 9-pin; male with RS 232/MPI converter, max. 19.2 kbit/s		
PC adapter USB		**6ES7 972-0CB20-0XA0**
For use with Windows 2000/XP		

A) Subject to export regulations: AL: N and ECCN: EAR99H

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Ordering data (continued)

	Order No.
Documentation (must be ordered separately)	
ProTool/Pro Runtime User Manual	
• German	**6AV6 594-1CA06-0AA0**
• English	**6AV6 594-1CA06-0AB0**
• French	**6AV6 594-1CA06-0AC0**
• Italian	**6AV6 594-1CA06-0AD0**
• Spanish	**6AV6 594-1CA06-0AE0**
ProTool User Manual for configuring Windows-based systems	
• German	**6AV6 594-1MA06-1AA0**
• English	**6AV6 594-1MA06-1AB0**
• French	**6AV6 594-1MA06-1AC0**
• Italian	**6AV6 594-1MA06-1AD0**
• Spanish	**6AV6 594-1MA06-1AE0**
Communication User Manual for Windows-based systems	
• German	**6AV6 596-1MA06-0AA0**
• English	**6AV6 596-1MA06-0AB0**
• French	**6AV6 596-1MA06-0AC0**
• Italian	**6AV6 596-1MA06-0AD0**
• Spanish	**6AV6 596-1MA06-0AE0**
SIMATIC HMI Manual Collection E)	**6AV6 691-1SA01-0AX0**
Electronic documentation, on DVD 5 languages (English, French, German, Italian and Spanish); contains: all currently available user manuals, manuals and communication manuals for SIMATIC HMI	

E) Subject to export regulations: AL: N and ECCN: EAR99S

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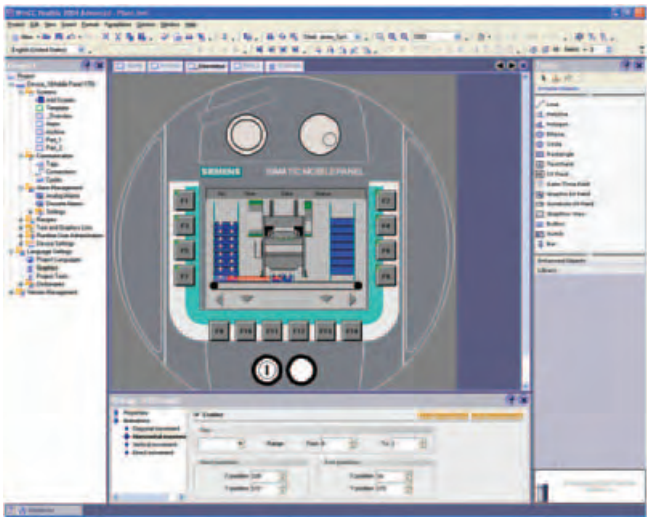
Overview



- Uniform family of **engineering tools** for configuring SIMATIC HMI Operator Panels, the operator control part of SIMATIC C7 units, SIMOTION/SINUMERIK Panel PCs as well as the PC-based visualization software WinCC flexible Runtime
- Executable under Windows 2000/XP Professional
- **Current version:**
  - SIMATIC WinCC flexible 2005 SP1 Advanced
  - SIMATIC WinCC flexible 2005 SP1 Standard
  - SIMATIC WinCC flexible 2005 SP1 Compact
  - SIMATIC WinCC flexible 2005 SP1 Micro

Ordering data

		Order No.
WinCC flexible 2005 SP1 Advanced Floating license, on CD-ROM incl. license key, includes: • Engineering software for configuring WinCC flexible Runtime as well as Micro Panels and 70/170/270/370 series Panels incl. C7-635/636 • SW for WinCC flexible/ChangeControl engineering option [1] • Simulation software [5] for WinCC flexible Runtime as well as Micro Panels and 70/170/270/370 series Panels incl. C7-635/636 • Native drivers • Electronic documentation (.pdf) in English, German, French, Italian, Spanish	D)	**6AV6 613-0AA01-1CA5**
WinCC flexible 2005 SP1 Standard Floating license, on CD-ROM incl. license key, includes: • Engineering software for configuring Micro Panels and 70/170/270/370 series Panels incl. C7-635/636 • SW for WinCC flexible/ChangeControl engineering option [1] • Simulation software [5] • Native drivers • Electronic documentation (.pdf) in English, German, French, Italian, Spanish	D)	**6AV6 612-0AA01-1CA5**
WinCC flexible 2005 SP1 Compact Floating license, on CD-ROM incl. license key, includes: • Engineering software for configuring Micro Panels and 70/170 series Panels incl. C7-635 • SW for WinCC flexible/ChangeControl engineering option [1] • Simulation software [5] • Native drivers • Electronic documentation (.pdf) in English, German, French, Italian, Spanish	D)	**6AV6 611-0AA01-1CA5**
WinCC flexible 2005 SP1 Micro Floating license, on CD-ROM w/o license key, includes: • Engineering software for configuring Micro Panels • Electronic documentation (.pdf) in English, German, French, Italian, Spanish	D)	**6AV6 610-0AA01-1CA8**
WinCC flexible/ChangeControl for WinCC flexible 2005 Compact/Standard/Advanced [4] Floating license, option, license key only	D)	**6AV6 613-6AA01-1AB5**

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

1) A separate license for WinCC flexible/ChangeControl must be purchased for each engineering station.

4) The ChangeControl option has not been released for integrated operation with STEP 7.

5) Not valid for: OP73micro, TP177micro, OP73, OP77A, TP177A.

Note:

Service Pack 1 is also available for download free of charge on the Internet (http://support.automation.siemens.com/WW/view/en/23059737); Service Pack CD available on request

SIMATIC WinCC flexible ES

Ordering data (continued)

		Order No.
Power Packs		
SIMATIC WinCC flexible Power Packs		
Single license, authorization only		
• WinCC flexible 2005 Standard to 2005 Advanced	D)	**6AV6 613-2CD01-1AD5**
• WinCC flexible 2005 Compact to 2005 Advanced	D)	**6AV6 613-2BD01-1AD5**
• WinCC flexible 2005 Standard to 2005 Standard	D)	**6AV6 612-2BC01-1AD5**
Software Update Service		
Software Update Service SIMATIC WinCC flexible [3]		
• WinCC flexible Advanced	D)	**6AV6 613-0AA00-0AL0**
• WinCC flexible Standard	D)	**6AV6 612-0AA00-0AL0**
• WinCC flexible Compact	D)	**6AV6 611-0AA00-0AL0**
Upgrades		
SIMATIC ProTool to SIMATIC WinCC flexible 2005 SP1		
• ProTool/Lite to WinCC flexible 2005 SP1 Compact	D)	**6AV6 611-3AA01-1CE5**
• ProTool to WinCC flexible 2005 SP1 Standard	D)	**6AV6 612-3AA01-1CE5**
• ProTool/Pro to WinCC flexible 2005 SP1 Advanced	D)	**6AV6 613-3AA01-1CE5**
SIMATIC WinCC flexible 2004 to SIMATIC WinCC flexible 2005 SP1		
• WinCC flexible 2004 Compact to WinCC flexible 2005 SP1 Compact	D)	**6AV6 611-0AA01-1CE5**
• WinCC flexible 2004 Standard to WinCC flexible 2005 SP1 Standard	D)	**6AV6 612-0AA01-1CE5**
• WinCC flexible 2004 Advanced to WinCC flexible 2005 SP1 Advanced, incl. ChangeControl option [1]	D)	**6AV6 613-0AA01-1CE5**
Versions for China/Taiwan/Korea/Japan		
WinCC flexible 2005 SP1 ASIA Standard	D)	**6AV6 612-0AA11-1CA5**
Floating license, on CD-ROM incl. license key, includes:		
• Engineering software for configuring Micro Panels and 70/170/270/370 series Panels incl. C7-635/636		
• Simulation software [5] for Micro Panels and 70/170/270/370 series Panels incl. C7-635/636		
• Native drivers		
• Electronic documentation (.pdf) in English, Japanese, Korean, simplified Chinese, traditional Chinese		

		Order No.
WinCC flexible 2005 SP1 ASIA Advanced	D)	**6AV6 613-0AA11-1CA5**
Floating license, on CD-ROM incl. license key, includes:		
• Engineering software for configuring WinCC flexible Runtime as well as 70/170/270/370 Series Micro Panels and Panels incl. C7-635/636		
• SW for WinCC flexible/ChangeControl engineering option [1]		
• Simulation software [5] for WinCC flexible Runtime as well as Micro Panels and 70/170/270/370 series Panels incl. C7-635/636		
• Native drivers		
• Electronic documentation (.pdf) in English, simplified Chinese, traditional Chinese, Korean, Japanese		
Documentation (must be ordered separately)		
User Manual WinCC flexible Communication		
• German		**6AV6 691-1CA01-0AA0**
• English		**6AV6 691-1CA01-0AB0**
User Manual WinCC flexible Compact/ Standard/Advanced		
• German		**6AV6 691-1AB01-0AA0**
• English		**6AV6 691-1AB01-0AB0**
• French		**6AV6 691-1AB01-0AC0**
• Italian		**6AV6 691-1AB01-0AD0**
• Spanish		**6AV6 691-1AB01-0AE0**
SIMATIC HMI Manual Collection	E)	**6AV6 691-1SA01-0AX0**
Electronic documentation, on DVD		
5 languages (English, French, German, Italian, Spanish); contains: all currently available user manuals, manuals and communication manuals for SIMATIC HMI		

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

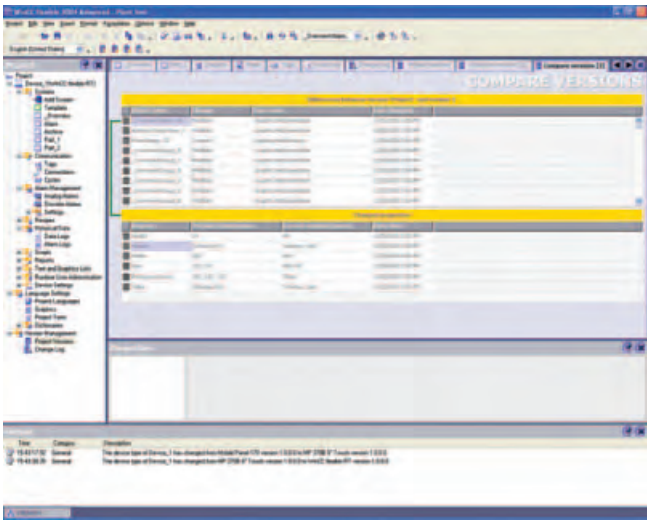
E) Subject to export regulations: AL: N and ECCN: EAR99S

1) A separate license for WinCC flexible/ChangeControl must be purchased for each engineering station.

3) For a period of 12 months and for a fixed price, the customer is automatically provided with all upgrades and service packs for each installed WinCC flexible engineering system or option. The contract is automatically extended by a further year unless canceled up to 12 weeks prior to expiry.

5) Not valid for: OP73micro, TP177micro, OP73, OP77A, TP177A.

Overview



- Options for the versioning of configuration data and for tracing configuration changes (e.g. as verification in regulated sectors)
- For the engineering tool SIMATIC WinCC flexible Compact/Standard/Advanced
- One license is required for each configuration computer

Ordering data

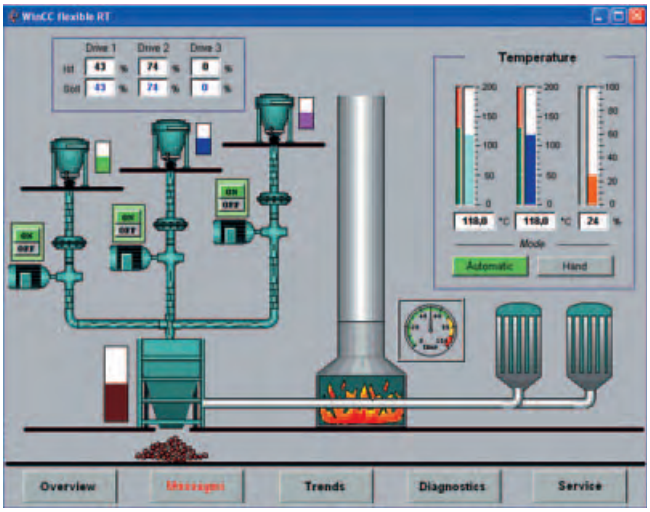
		Order No.
WinCC flexible/ChangeControl for WinCC flexible 2005 Compact/Standard/Advanced [1]		
Floating license, option, license key only	D)	**6AV6 613-6AA01-1AB5**

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

1) The ChangeControl option has not been released for integrated operation with STEP 7.

SIMATIC WinCC flexible RT

Overview



- **PC-based visualization software** for single-user systems directly at the machine
- Executable under Windows 2000/XP Professional
- **Current version:**
  - SIMATIC WinCC flexible 2005 SP1 Runtime with 128, 512 or 2048 PowerTags

Note:
Service Pack 1 is also available for download free of charge in the Internet (http://support.automation.siemens.com/WW/view/en/23059737); CD available on request

Technical specifications

See section 7, page 7/57

Ordering data

		Order No.
SIMATIC WinCC flexible 2005 SP1 Runtime		
for PC systems; incl. SW for PC systems options [1] Single license, on CD-ROM incl. authorization, for:		
• 128 PowerTags (RT 128)	D)	**6AV6 613-1BA01-1CA0**
• 512 PowerTags (RT 512)	D)	**6AV6 613-1DA01-1CA0**
• 2048 PowerTags (RT 2048)	D)	**6AV6 613-1FA01-1CA0**
Power Packs		
SIMATIC WinCC flexible 2005 Runtime		
Single license, only authorization for PowerTags, from		
• 128 to 512 PowerTags	D)	**6AV6 613-4BD01-1AD0**
• 128 to 2048 PowerTags	D)	**6AV6 613-4BF01-1AD0**
• 512 to 2048 PowerTags	D)	**6AV6 613-4DF01-1AD0**
Software Update Service		
Software Update Service SIMATIC WinCC flexible [3]		
• WinCC flexible Advanced	D)	**6AV6 613-0AA00-0AL0**

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

Ordering data (continued)

		Order No.
Upgrade		
SIMATIC ProTool/Pro RT to SIMATIC WinCC flexible 2005 SP1		
• ProTool/Pro Runtime 128 PowerTags to WinCC flexible 2005 SP1 Runtime 128 PowerTags [2]	D)	**6AV6 613-3BB01-1CE0**
• ProTool/Pro Runtime 256 PowerTags to WinCC flexible 2005 SP1 Runtime 512 PowerTags [2]	D)	**6AV6 613-3CD01-1CE0**
• ProTool/Pro Runtime 512 PowerTags to WinCC flexible 2005 SP1 Runtime 512 PowerTags [2]	D)	**6AV6 613-3DD01-1CE0**
• ProTool/Pro Runtime 2048 PowerTags to WinCC flexible 2005 SP1 Runtime 2048 PowerTags [2]	D)	**6AV6 613-3FF01-1CE0**
SIMATIC WinCC flexible 2004 Runtime to SIMATIC WinCC flexible 2005 Runtime		
• SIMATIC WinCC flexible RT 2004 to WinCC flexible RT 2005 SP1; PowerTags incl. Runtime options for:	D)	**6AV6 613-1XA01-1CE0**
- WinCC flexible /Sm@rtAccess		
- Sm@rtService		
- OPC server		
- Logs		
- Recipes		
- ProAgent		
Panel options: WinCC flexible 2004 to WinCC flexible 2005		
SIMATIC Panel options for WinCC flexible 2005:	D)	**6AV6 618-7XX01-1AF0**
• WinCC flexible /Sm@rtAccess for SIMATIC Panel		
• WinCC flexible /Sm@rtService for SIMATIC Panel		
• WinCC flexible OPC server for SIMATIC Multi Panel		
• WinCC flexible ProAgent for SIMATIC Panel		
Versions for China/Taiwan/Korea/Japan		
SIMATIC WinCC flexible 2005 SP1 ASIA Runtime		
for PC systems; incl. SW for options for PC systems [1] Single license, on CD-ROM incl. authorization, for:		
• 128 PowerTags (RT 128)	D)	**6AV6 613-1BA11-1CA0**
• 512 PowerTags (RT 512)	D)	**6AV6 613-1DA11-1CA0**
• 2048 PowerTags (RT 2048)	D)	**6AV6 613-1FA11-1CA0**

1) Runtime licenses for WinCC flexible Runtime options must be purchased separately for each target system.
2) each including a single license WinCC flexible /Archives and WinCC flexible /Recipes

Ordering data (continued)

	Order No.
Documentation (must be ordered separately)	
User Manual WinCC flexible Runtime	
• German	**6AV6 691-1BA01-0AA0**
• English	**6AV6 691-1BA01-0AB0**
• French	**6AV6 691-1BA01-0AC0**
• Italian	**6AV6 691-1BA01-0AD0**
• Spanish	**6AV6 691-1BA01-0AE0**
User Manual WinCC flexible Communication	
• German	**6AV6 691-1CA01-0AA0**
• English	**6AV6 691-1CA01-0AB0**
SIMATIC HMI Manual Collection E)	**6AV6 691-1SA01-0AX0**
Electronic documentation, on DVD 5 languages (English, French, German, Italian, Spanish); contains: all currently available user manuals, manuals and communication manuals for SIMATIC HMI	
Communication via Industrial Ethernet	
CP 1613 A2 A)	**6GK1 161-3AA01**
PCI card (32 bits) for connecting a PG/PC to Industrial Ethernet (communications software must be ordered separately)	
S71613 Edition 2005	**6GK1 716-1CB63-3AA0**
Software for S7 and S5 communication, incl. PG/OP communication, OPC server and NCM PC; up to 120 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, Windows 2000 Professional/Server; for CP 1613/CP 1613 A2 German/English	
SOFTNET S7 Lean Edition 2005	**6GK1 704-1LW63-3AA0**
Software for S7 and S5-compatible communication, incl. OPC server, PG/OP communication and NCM PC; up to 8 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, 2000 Professional/Server; German/English	

A) Subject to export regulations: AL: N and ECCN: EAR99H
E) Subject to export regulations: AL: N and ECCN: EAR99S

	Order No.
Communication via PROFIBUS	
CP 5613 A2	**6GK1 561-3AA01**
PCI card (32-bit) for connecting a PC to PROFIBUS (communications software must be ordered separately).	
CP 5614 A2	**6GK1 561-4AA01**
PCI card (32-bit) for connecting a PC to PROFIBUS (communications software must be ordered separately).	
S7-5613 Edition 2005	**6GK1 713-5CB63-3AA0**
Software for S7 communication, incl. PG and FDL protocol, OPC server and NCM PC; single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional; 2003 Server, 2000 Professional/Server, for CP 5613, CP 5613 A2, CP 5613 FO, CP 5614, CP 5614 A2, CP 5614 FO; German/English	
DP-5613 Edition 2005	**6GK1 713-5DB63-3AA0**
Software for DP protocol incl. PG/OP communication, FDL, DP-OPC server, for 32-bit Windows XP Professional; 2003 Server, 2000 Professional/Server; German/English	
FMS-5613 Edition 2005	**6GK1 713-5FB63-3AA0**
Software for FMS-Protokoll incl. PG/OP communication, FDL, FMS-OPC server, for 32-bit Windows XP Professional; 2003 Server, 2000 Professional/Server; German/English	
CP 5512	**6GK1 551-2AA00**
PCMCIA card (32-bit CARDBUS) for connecting a PG/Notebook to PROFIBUS or MPI (communications software included in WinCC flexible).	
CP 5611 A2 A)	**6GK1 561-1AA01**
PCI card (32-bit) for connecting a PG/PC to PROFIBUS (communications software included in WinCC flexible basic package)	
CP 5611 MPI A)	**6GK1 561-1AM01**
Comprising CP 5611 A2 (32-bit) and MPI cable, 5 m	
PC/PPI adapter	**6ES7 901-3CB30-0XA0**
RS 232, 9-pin; male with RS 232/PPI converter, max. 19.2 kbit/s	
PC/MPI adapter	**6ES7 972-0CA23-0XA0**
RS 232, 9-pin; male with RS 232/MPI converter	
PC adapter USB	**6ES7 972-0CB20-0XA0**
For Windows 2000/XP	

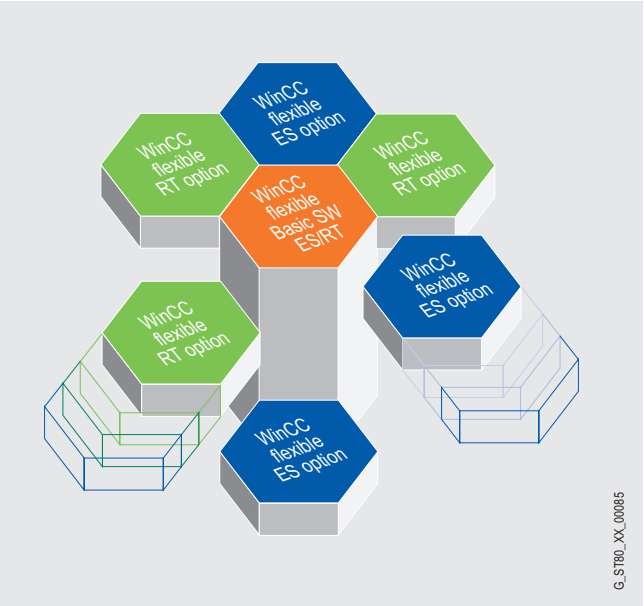
Note:

Service Pack 1 is also available for download free of charge on the Internet (Service Pack CD available on request)

10

SIMATIC WinCC flexible RT options

Overview



Options for SIMATIC WinCC flexible Runtime

SIMATIC WinCC flexible/Archives

- Option for SIMATIC WinCC flexible Runtime for archiving process values and messages
- Archiving of process values and messages supports the acquisition and processing of process data from an industrial plant or machine. Evaluation of the archived process data provides information about the operating states of the plant or machine.
- One license is required for each operator station.

SIMATIC WinCC flexible /Recipes

- Option for SIMATIC WinCC flexible Runtime for managing data records in recipes that contain related machine or production data.
- The data in a data set can be transferred, for example, from the control unit to the PLC to switch production to a different product variant.
- One license is required for each operator station.

WinCC flexible /Audit

- Option for SIMATIC WinCC flexible Runtime as well as SIMATIC Panels for recording operations in an audit trail, and electronic signature
- An easy-to-use configuration feature, included as standard in WinCC flexible 2005, enables you to set:
  - The operator actions to be recorded in the audit trail during runtime
  - The important operator actions requiring electronic signature/comment during runtime
- The audit option combined with the ChangeControl option supports the user with plant validation.
- Available for the following SIMATIC HMI systems: OP270, TP270, MP270B, MP370, WinCC flexible Runtime
- A runtime license is required for every operator control unit (Panel/PC)

SIMATIC WinCC flexible /OPC-Server

- Option for SIMATIC WinCC flexible Runtime as well as Multi Panels for communication with applications from different vendors (e.g., MES, ERP, or applications in the office sector)
- Available for the following SIMATIC HMI systems:
  - MP 270B, MP 277, MP 370 (use of OPC based on XML)
  - WinCC flexible Runtime (use of OPC based on DCOM)
- One license is required for each operator station.

SIMATIC WinCC flexible /Sm@rtService

- Option for SIMATIC WinCC flexible Runtime and SIMATIC Panels for remote maintenance and servicing of machines/plant via the Internet/intranet
- Event-driven sending of e-mails
- System diagnostics visualized via device-specific html pages
- Available for the following SIMATIC HMI systems:
  - Mobile Panel 177 PN, Mobile Panel 277
  - TP 177B PN/DP, OP 177B PN/DP
  - TP 270, TP 277, OP 270, OP 277
  - MP 270B, MP 277, MP 370
  - WinCC flexible Runtime
- One license is required for each operator station.

SIMATIC WinCC flexible /Sm@rtAccess

- Option for SIMATIC WinCC flexible Runtime plus SIMATIC Panels for communication between various SIMATIC HMI systems.
- Available for the following SIMATIC HMI systems:
  - Mobile Panel 177 PN, Mobile Panel 277
  - TP 177B PN/DP, OP 177B PN/DP
  - TP 270, TP 277, OP 270, OP 277
  - MP 270B, MP 277, MP 370
  - WinCC flexible Runtime
- Communication between HMI systems is established on the basis of Ethernet networks, or via the intranet/Internet:
  - Read and write access to variables;
    WinCC flexible Runtime or SIMATIC Panels make data (variables) available to other SIMATIC HMI systems or Office applications.
  - A SIMATIC HMI system can be used to control or monitor another system remotely;
    entry level for client/server configurations for distributed operator stations or for solutions with headend or control room.
- Local operation, visualization and data processing is as possible as plant-wide access to information or central archiving of process data. Integrated information flows ensure an overview of the status of all processes.
- One license is required for each operator station.

SIMATIC WinCC flexible /ProAgent

- Precise and rapid process fault diagnostics in plant and machines for SIMATIC S7 and SIMATIC HMI
- Standardized diagnostics concept for various SIMATIC components
- No further configuration overhead for diagnostics functionality
- Frees up PLC capacity with regard to memory and program execution time

Overview (continued)

SIMATIC WinBDE

- With the SIMATIC WinBDE machine data management system, the operator panel becomes the central acquisition and control unit for machine data, permitting comprehensive analyses to be carried out directly at the machine.
- The result is transparency, quick countermeasures in the event of faults, an increase in machine runtimes and proof of the availability of production facilities and production units.

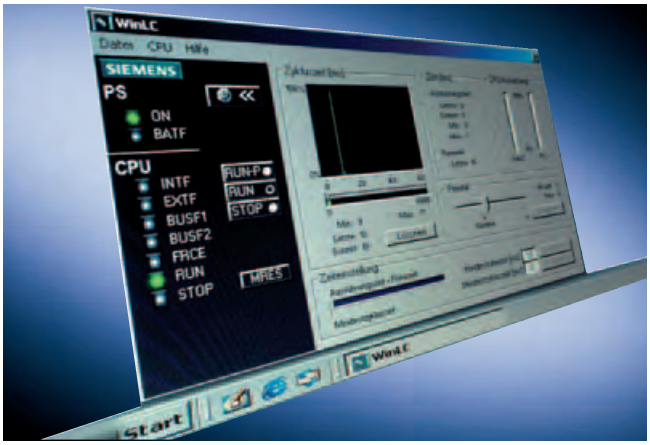
Options for SIMATIC WinCC flexible Engineering System

WinCC flexible /ChangeControl

- Versioning of configuration data and tracking of configuration changes (e.g. as verification in regulated sectors)
- One license is required for each configuration station.

SIMATIC WinAC Software PLC

Overview



- SIMATIC WINAC RTX:
  optimized for applications that demand a high level of flexibility and integration.
- The software solution for tasks that demand hard deterministics and high performance.
- With real-time expansion for guaranteeing deterministic behavior for the control component.

SIMATIC WinAC RTX comprises the following components:

- Windows Logic Controller (WinLC RTX).
- SIMATIC NET OPC server.
- Real-time drivers for PROFIBUS-CPs
- Ardence RTX real-time core for guaranteeing real time and deterministics.

Optional:

- CP for connection to PROFIBUS DP:
  - CP 5611 and integral PROFIBUS interface of the SIMATIC PC
  - CP 5613 A2.
- WinAC Open Development Kit (ODK):
  - for linking C/C++ code in WinAC RTX.
  - for integrating external software (technological programs) or PC components (e.g. scanner, PC cards for measured value acquisition).

Technical specifications

See section 9, page 9/3

Ordering data

		Order No.
SIMATIC WinAC RTX 2005 Software-based PC-based control system for applications requiring a strictly deterministic response; CD-ROM with electronic documentation in English, French and German; Single license, for Windows 2000/XP	E)	**6ES7 671-0RC05-0YA0**
SIMATIC WinAC RTX 2005 Upgrade For upgrading from Basic/RTX V3.x, V4.0, V4.1 to 2005; single license, for Windows 2000/XP	E)	**6ES7 671-0RC05-0YE0**
CP 5611 A2 communications processor PCI card (32-bit) for connection of a programming device or PC to PROFIBUS	A)	**6GK1 561-1AA01**
CP 5613 A2 communications processor PCI card (32-bit; 3.3 V/5 V) for connection to PROFIBUS incl. DP-Base software with NCM PC; DP-RAM interface for DP master, incl. PG and FDL protocol; single license for 1 installation, runtime software, software and electronic manual on CD-ROM, Class A, for 32-bit Windows 2000 Professional/Server, Windows XP Professional, German/English		**6GK1 561-3AA01**

A) Subject to export regulations: AL: N and ECCN: EAR99H

E) Subject to export regulations: AL: N and ECCN: EAR99S

Overview

PN	ISO	TCP/IP	UDP	PG	S7	S5	IT	FTP
■	■	■	■	■	■	■		

- Connection of SIMATIC S7-300 to Industrial Ethernet
  - 10/100 Mbit/s full/half duplex connection with autosensing
  - connection for RJ45
  - multi-protocol operation with TCP and UDP transport protocol
  - adjustable Keep Alive function
- Communication services:
  - open IE communication (TCP/IP and UDP)
  - PROFINET IO Controller
  - PROFINET CBA
  - Programming device/operator panel communication: Cross-network by means of S7 routing
  - S7 communication (client, server, multiplexing)
  - S5-compatible communication
- Multicast for UDP
- IP address assignment via DHCP, simple PC tool or via the user program (e.g. HMI)
- Access protection by means of configurable access list
- Remote programming and initial startup via the network
- Automatic setting of the CPU clock via Ethernet with NTP or SIMATIC procedure
- SNMP MIB2 diagnostics information for network management systems

Technical specifications

See section 4, page 4/218

Ordering data

	Order No.
CP 343-1 communications processor For connection of SIMATIC S7-300 to Industrial Ethernet; PROFINET IO Controller, PROFINET CBA, TCP/IP and UDP, S7 communication, S5-compatible communication (SEND/RECEIVE), FETCH/WRITE, with and without RFC 1006, diagnostic expansions, multicast, CPU clock synchronization via SIMATIC procedure and NTP, access protection through IP access list, SNMP, DHCP, initialization over LAN 10/100 Mbit/s; with electronic manual on CD-ROM	**6GK7 343-1EX21-0XE0**
C-PLUG A) Swap medium for simple replacement of devices in the event of a fault; for storing configuration or engineering and application data; can be used for SIMATIC NET products with C-PLUG slot	**6GK1 900-0AB00**
IE FC RJ45 Plug 180 RJ45 plug-in connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1 901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1 901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1 901-1BB10-2AE0**
SOFTNET-S7 Edition 2005 for Industrial Ethernet Software for S7 and S5-compatible communication, incl. OPC server, PG/OP communication and NCM PC; up to 64 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, 2000 Professional/Server; German/English	**6GK1 704-1CW63-3AA0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

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Ordering data (continued)

	Order No.
SOFTNET-S7 Lean Edition 2005 for Industrial Ethernet Software for S7 and S5-compatible communication, incl. OPC server, PG/OP communication and NCM PC; up to 8 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, 2000 Professional/Server; German/English	**6GK1 704-1LW63-3AA0**
S7-1613 Edition 2005 Software for S7 and S5 communication, incl. PG/OP communication, OPC server and NCM PC; up to 120 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, Windows 2000 Professional/Server; for CP 1613/CP 1613 A2 German/English	**6GK1 716-1CB63-3AA0**
NCM S7 configuration software for Industrial Ethernet for Industrial Ethernet CPs for SIMATIC S7 V5.3 SP2, operating under STEP 7 V5.3; on CD-ROM with electronic manual in German, English, French, Spanish, Italian	Delivered with STEP 7 V5.3

		Order No.
Documentation S7-CPs/NCM for Industrial Ethernet and PROFIBUS for V5.x (STEP 7 V5.x); paper version		
• German		**6GK7 080-0AA01-8AA0**
• English		**6GK7 080-0AA01-8BA0**
SIMATIC iMap V3.0 *Target system:* CPU 31x-2 PN/DP, CPU 319-3 PN/DP, SIMATIC WinAC PN, SIMATIC NET IE/PB Link, SIMATIC NET CP 343-1, SIMATIC NET CP 343-1 Advanced, SIMATIC NET CP 443-1 Advanced, distributed I/O devices with own CPU, PROFINET CBA OPC server, devices on the Industrial Ethernet based on the PROFINET CBA standard, SIMATIC OPs, SIMATIC ProTool/Pro *Requirements:* Windows 2000 Prof. with Service Pack 4 or later or Windows XP Prof. with Service Pack 1 or later or Windows 2003 Server with Service Pack 1 or later; on PG or PC with Pentium processor, min. 1 GHz; STEP 7 V5.3 or later with Service Pack 3, PN OPC Server V6.3 or later *Delivery form:* German, English, with electronic documentation		
Single license	D)	**6ES7 820-0CC04-0YA5**
Software Update Service	D)	**6ES7 820-0CC01-0YX2**
Upgrade to V3.0, single license	D)	**6ES7 820-0CC04-0YE5**

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

10

Overview

PN	ISO	TCP/IP	UDP	PG	S7	S5	IT	FTP
■	■	■	■	■	■	■	■	■

- Connection of SIMATIC S7-300 to Industrial Ethernet
  - 10/100 Mbit/s full/half duplex connection with autosensing
  - Connection for RJ45
  - Multi-protocol operation with TCP and UDP transport protocol
  - Adjustable Keep Alive function
- Communication services:
  - Open IE communication (TCP/IP and UDP): Multicast for UDP
  - PROFINET IO controller
  - PROFINET CBA
  - Programming device/operator panel communication: Cross-network by means of S7 routing
  - S7 communication (client, server, multiplexing)
  - S5-compatible communication
  - IT communication: HTTP communication supports access to process data through Web browsers; FTP communication supports program-controlled FTP client communication, Access to data blocks through FTP server, Data handling for own file system through FTP, E-mail
- IP address assignment via DHCP, simple PC tool or via program block (e.g. for HMI)
- Access protection by means of configurable access list
- Module replacement without programming device; all information is stored on the C-PLUG (also file system for IT functions).
- Extensive diagnostic functions for all modules in the rack
- Integration into network management systems through the support of SNMP V1 MIB-II

Technical specifications

See section 4, page 4/221

Ordering data

Ordering data	Order No.
Communications processor CP 343-1 Advanced For the connection of SIMATIC S7-300 to Industrial Ethernet; PROFINET IO Controller, PROFINET CBA, TCP/IP and UDP, S7 communication, S5-compatible communication (SEND/RECEIVE), FETCH/WRITE, with and without RFC 1006, diagnostics expansions, multicast, Web server, HTML diagnostics, FTP server, FTP client, E-mail client, setting of CPU's clock using SIMATIC and NTP procedures, access protection through IP access list, SNMP, DHCP, initialization over LAN 10/100 Mbit/s; with electronic manual on CD-ROM	**6GK7 343-1GX21-0XE0**
C-PLUG A) Swap medium for simple replacement of devices in the event of a fault; for storing configuration or engineering and application data; can be used for SIMATIC NET products with C-PLUG slot	**6GK1 900-0AB00**
SOFTNET-S7 Edition 2005 for Industrial Ethernet Software for S7 and S5-compatible communication, incl. OPC server, PG/OP communication and NCM PC; up to 64 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, 2000 Professional/Server; German/English	**6GK1 704-1CW63-3AA0**
SOFTNET-S7 Lean Edition 2005 for Industrial Ethernet Software for S7 and S5-compatible communication, incl. OPC server, PG/OP communication and NCM PC; up to 8 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, 2000 Professional/Server; German/English	**6GK1 704-1LW63-3AA0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

CP 343-1 Advanced

Ordering data (continued)

	Order No.
S7-1613 Edition 2005 Software for S7 and S5 communication, incl. PG/OP communication, OPC server and NCM PC; up to 120 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, Windows 2000 Professional/Server; for CP 1613/CP 1613 A2 German/English	**6GK1 716-1CB63-3AA0**
NCM S7 configuration software for Industrial Ethernet Configuration software for Industrial Ethernet CPs for SIMATIC S7 V5.3 SP2, operating under STEP 7 V5.3; on CD-ROM with electronic manual in German, English, French, Spanish, Italian	Delivered with STEP 7 V5.3
Documentation S7-CPs/NCM for Industrial Ethernet and PROFIBUS for V5.x (STEP 7 V5.x); paper version	
• German	**6GK7 080-0AA01-8AA0**
• English	**6GK7 080-0AA01-8BA0**

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

		Order No.
SIMATIC iMap V3.0 *Target system:* CPU 31x-2 PN/DP, CPU 319-3 PN/DP, SIMATIC WinAC PN, SIMATIC NET IE/PB Link, SIMATIC NET CP 343-1, SIMATIC NET CP 343-1 Advanced, SIMATIC NET CP 443-1 Advanced, distributed I/O devices with own CPU, PROFINET CBA OPC server, devices on the Industrial Ethernet based on the PROFINET CBA standard, SIMATIC OPs, SIMATIC ProTool/Pro *Requirements:* Windows 2000 Prof. with Service Pack 4 or later or Windows XP Prof. with Service Pack 1 or later or Windows 2003 Server with Service Pack 1 or later; on PG or PC with Pentium processor, min. 1 GHz; STEP 7 V5.3 or later with Service Pack 3, PN OPC Server V6.3 or later *Delivery form:* German, English, with electronic documentation		
Single license	D)	**6ES7 820-0CC04-0YA5**
Software Update Service	D)	**6ES7 820-0CC01-0YX2**
Upgrade to V3.0, single license	D)	**6ES7 820-0CC04-0YE5**

10

Overview

PN	ISO	TCP/IP	UDP	PG	S7	S5	IT	FTP
	■	■	■	■	■	■		

- Connection of SIMATIC S7-400 to Industrial Ethernet
  - 10/100 Mbit/s full/half duplex connection with autosensing for automatic switchover between AUI, ITP and RJ45 interface
  - Universal connection options for ITP, RJ45 and AUI
  - Multi-protocol operation with ISO, TCP/IP and UDP transport protocol
  - Adjustable Keep Alive function
- Communication services:
  - Open IE communication via TCP/IP and UDP
  - PG/OP communication
  - S7 communication
  - S5compatible communication
- Multicast for UDP
- Cross-network programming device/operator panel communication through S7 routing
- Remote programming and initial startup via the network
- Access protection by means of configurable access list

Technical specifications

See section 5, page 5/92

Ordering data

Ordering data	Order No.
CP 443-1 communications processor For connecting SIMATIC S7-400 to Industrial Ethernet through TCP/IP, ISO and UDP; for S7 communication, S5-compatible communication (SEND/RECEIVE) with FETCH/WRITE with and without RFC 1006, diagnostic expansions, multicast, access protection over IP access list, with electronic manual on CD-ROM	**6GK7 443-1EX11-0XE0**
IE FC RJ45 Plug 180 RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1 901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1 901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1 901-1BB10-2AE0**
SOFTNET-S7 Edition 2005 for Industrial Ethernet Software for S7 and S5-compatible communication, incl. OPC server, PG/OP communication and NCM PC; up to 64 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, 2000 Professional/Server; German/English	**6GK1 704-1CW63-3AA0**
SOFTNET-S7 Lean Edition 2005 for Industrial Ethernet	**6GK1 704-1LW63-3AA0**
S7-1613 Edition 2005	**6GK1 716-1CB63-3AA0**
NCM S7 configuration software for Industrial Ethernet Configuration software for Industrial Ethernet-CPs for SIMATIC S7; V5.x, operating under STEP 7 V5.x; on CD-ROM with electronic manual in German, English, French, Spanish, Italian	Delivered with STEP 7 V5.x
Documentation S7-CPs/NCM S7 For Industrial Ethernet and PROFIBUS; manual package for configuring S7-CPs, IE/PB link and PC stations (STEP 7 V5.3)	
• German	**6GK7 080-0AA01-8AA0**
• English	**6GK7 080-0AA01-8BA0**

CP 443-1 Advanced

Overview

PN	ISO	TCP/IP	UDP	PG	S7	S5	IT	FTP
■	■	■	■	■	■	■	■	■

- Connection of SIMATIC S7-400 to Industrial Ethernet
  - 10/100 Mbit/s full/half duplex connection with autosensing
  - connection via RJ45
  - multi-protocol operation for ISO, TCP/IP and UDP
  - adjustable Keep Alive function
- Communication services:
  - Open IE communication (TCP/IP and UDP): Multicast for UDP
  - PROFINET IO Controller
  - PROFINET CBA
  - Programming device/operator panel communication: Cross-network by means of S7 routing
  - S7 communication
  - S5-compatible communication
  - IT communication: HTTP communication supports access to process data through Web browsers; FTP communication supports program-controlled FTP client communication, Access to data blocks through FTP server, Data handling for own file system through FTP, E-mail
- IP address assignment via DHCP, simple PC tool or via the user program (e.g. HMI)
- Access protection by means of configurable access list
- Single-width module with integrated 4-port switch saves space in the rack and control cabinet. Thanks to the integrated autocrossing function, the CP 443-1 Advanced is very well suited for establishing small local networks.
- Module replacement without programming device; all information is stored on the C-PLUG (also file system for IT functions).
- Extensive diagnostic functions for all modules in the rack
- Integration into network management systems through the support of SNMP V1 MIB-II

Technical specifications

See section 5, page 5/94

Ordering data

		Order No.
CP 443-1 Advanced communications processor For the connection of SIMATIC S7-400 to Industrial Ethernet over PROFINET IO; PROFINET IO-Controller, PROFINET CBA, TCP/IP, ISO and UDP; for S7 communication, S5-compatible communication (SEND/RECEIVE) with FETCH/WRITE, with and without RFC 1006, diagnostic expansions, multicast, clock synchronization via SIMATIC procedure or NTP, access protection via IP access list, FTP client/server, HTTP server, HTML diagnostics, SNMP, DHCP, e-mail, data storage on C-PLUG, 4-port switch on board, initialization via LAN 10/100 Mbit/s; with electronic manual on CD-ROM		
• For use with SIMATIC S7-400-CPU u to V4.x	H)	**6GK7 443-1EX40-0XE0**
• For use with SIMATIC S7-400-CPU from V5.0	H)	**6GK7 443-1EX41-0XE0**
C-PLUG Swap medium for simple replacement of devices in the event of a fault; for storing configuration or engineering and application data; can be used for SIMATIC NET products with C-PLUG slot	A)	**6GK1 900-0AB00**
SOFTNET-S7 Edition 2005 for Industrial Ethernet Software for S7 and S5-compatible communication, incl. OPC server, PG/OP communication and NCM PC; up to 64 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, 2000 Professional/Server; German/English		**6GK1 704-1CW63-3AA0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

H) Subject to export regulations: AL: N and ECCN: 5A991

Ordering data (continued)

	Order No.
SOFTNET-S7 Lean Edition 2005 for Industrial Ethernet Software for S7 and S5-compatible communication, incl. OPC server, PG/OP communication and NCM PC; up to 8 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, 2000 Professional/Server; German/English	**6GK1 704-1LW63-3AA0**
S7-1613 Edition 2005 Software for S7 and S5 communication, incl. PG/OP communication, OPC server and NCM PC; up to 120 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional, 2003 Server, Windows 2000 Professional/Server; for CP 1613/CP 1613 A2 German/English	**6GK1 716-1CB63-3AA0**
IE FC RJ45 Plug 180 RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1 901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1 901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1 901-1BB10-2AE0**
Configuring software NCM S7 for Industrial Ethernet CPs for SIMATIC S7; V5.x, operating under STEP 7 V5.x; with electronic manual on CD-ROM,	
German, English, French, Spanish, Italian	Included in the STEP 7 V5.x package

		Order No.
Documentation S7-CPs/NCM For Industrial Ethernet and PROFIBUS; manual package for configuring S7-CPs, IE/PB link and PC stations (STEP 7 V5.3)		
• German		**6GK7 080-0AA01-8AA0**
• English		**6GK7 080-0AA01-8BA0**
SIMATIC iMap V3.0 *Target system:* CPU 31x-2 PN/DP, CPU 319-3 PN/DP, SIMATIC WinAC PN, SIMATIC NET IE/PB Link, SIMATIC NET CP 343-1, SIMATIC NET CP 343-1 Advanced, SIMATIC NET CP 443-1 Advanced, distributed I/O devices with own CPU, PROFINET CBA OPC server, devices on the Industrial Ethernet based on the PROFINET CBA standard, SIMATIC OPs, SIMATIC ProTool/Pro *Requirements:* Windows 2000 Prof. with Service Pack 4 or later or Windows XP Prof. with Service Pack 1 or later or Windows 2003 Server with Service Pack 1 or later; on PG or PC with Pentium processor, min. 1 GHz; STEP 7 V5.3 or later with Service Pack 3, PN OPC Server V6.3 or later *Delivery form:* German, English, with electronic documentation		
Single license	D)	**6ES7 820-0CC04-0YA5**
Software Update Service	D)	**6ES7 820-0CC01-0YX2**
Upgrade to V3.0, single license	D)	**6ES7 820-0CC04-0YE5**

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

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Central processing units of the S7-300

Overview CPU 313C-2 DP

- The compact CPU with integrated digital I/Os and PROFIBUS DP master/slave interface
- With process-related functions
- For tasks with special functions
- For the connection of standalone I/O devices

Micro memory card required to operate the CPU.

Overview CPU 315-2 DP

- The CPU with medium to large program memory and quantity framework for the use, if required, of SIMATIC Engineering Tools
- High processing performance in binary and floating-point arithmetic
- PROFIBUS DP master/slave interface
- For extensive I/O configurations
- For setting up distributed I/O structures

Micro memory card required for operation of CPU.

Overview CPU 314C-2 DP

- The compact CPU with integrated digital and analog I/Os and PROFIBUS DP master/slave interface
- With process-related functions
- For tasks with special functions
- For the connection of standalone I/O devices

Micro memory card required to operate the CPU.

Technical specifications

See section 4, pages 4/5, 4/23

Ordering data (continued)

		Order No.
CPU 313C-2 DP	A)	**6ES7 313-6CF03-0AB0**
Compact CPU, main memory 64 KB, power supply 24 V DC, 16 DI/16 DO integrated, integrated functions, MPI PROFIBUS DP master/slave interface; MMC is required		
CPU 314C-2 DP	A)	**6ES7 314-6CG03-0AB0**
Compact CPU, main memory 96 KB, power supply 24 V DC, 24DI/16DO/4AI/2AO integrated, integrated functions, MPI; PROFIBUS DP master/slave interface; MMC is required		
CPU 315-2 DP		**6ES7 315-2AG10-0AB0**
Main memory 128 KB, power supply 24 V DC, MPI/PROFIBUS DP master/slave interface, MMC required		
Micro Memory Card		
64 KB		**6ES7 953-8LF11-0AA0**
128 KB		**6ES7 953-8LG11-0AA0**
512 KB		**6ES7 953-8LJ11-0AA0**
2 MB		**6ES7 953-8LL11-0AA0**
4 MB		**6ES7 953-8LM11-0AA0**
8 MB		**6ES7 953-8LP11-0AA0**
MPI cable		**6ES7 901-0BF00-0AA0**
For connecting SIMATIC S7 and the PG through MPI; 5 m in length		
Front connector		
for compact CPUs		
40-pin, with screw contacts		
• 1 unit		**6ES7 392-1AM00-0AA0**
• 100 units		**6ES7 392-1AM00-1AB0**
40-pin with cage clamp contacts		
• 1 unit		**6ES7 392-1BM01-0AA0**
• 100 units		**6ES7 392-1BM01-1AB0**
SIMATIC TOP connect		See page 4/225; Information about which components can be used for the respective module, see A&D Mall or Catalog KT 10.2
Slot number plates		**6ES7 912-0AA00-0AA0**
S7-300 manual		
Design, CPU data, module data, instruction list		
German		**6ES7 398-8FA10-8AA0**
English		**6ES7 398-8FA10-8BA0**
French		**6ES7 398-8FA10-8CA0**
Spanish		**6ES7 398-8FA10-8DA0**
Italian		**6ES7 398-8FA10-8EA0**
SIMATIC Manual Collection	D)	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year	D)	**6ES7 998-8XC01-8YE2**
Power supply connector		**6ES7 391-1AA00-0AA0**
For compact CPUs, innovated standard CPUs and CPU 315F-2 DP (10 units, spare part)		

A) Subject to export regulations: AL: N and ECCN: EAR99H

	Order No.
Labeling strips	**6ES7 392-2XX00-0AA0**
For compact CPUs, standard CPUs as well as CPU 315F-2 DP (10 units, spare part)	
Label cover	**6ES7 392-2XY00-0AA0**
For compact CPUs, standard CPUs as well as CPU 315F-2 DP (10 units, spare part)	
S7 SmartLabel	**2XV9 450-1SL01-0YX0**
Software for automatic labeling of modules based on data of the STEP 7 project	
Labeling sheets for machine inscription	
For 16-channel signal modules, DIN A4, for printing with laser printer;	
10 units	
petrol	**6ES7 392-2AX00-0AA0**
light-beige	**6ES7 392-2BX00-0AA0**
yellow	**6ES7 392-2CX00-0AA0**
red	**6ES7 392-2DX00-0AA0**
For 32-channel signal modules, DIN A4, for printing with laser printer;	
10 units	
petrol	**6ES7 392-2AX10-0AA0**
light-beige	**6ES7 392-2BX10-0AA0**
yellow	**6ES7 392-2CX10-0AA0**
red	**6ES7 392-2DX10-0AA0**
PROFIBUS DP bus connector RS 485	
• With 90° cable outlet, max. transmission rate 12 Mbit/s	
- without PG interface	**6ES7 972-0BA12-0XA0**
- with PG interface	**6ES7 972-0BB12-0XA0**
• With 90° cable outlet for FastConnect connection system, max. transmission rate 12 Mbit/s	
- without PG interface	**6ES7 972-0BA50-0XA0**
- with PG interface	**6ES7 972-0BB50-0XA0**
• With axial cable outlet for SIMATIC OP, for connecting to PPI, MPI, PROFIBUS	**6GK1 500-0EA02**
PROFIBUS Fast Connect bus cable	**6XV1 830-0EH10**
Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m	
RS 485 repeater for PROFIBUS	**6ES7 972-0AA01-0XA0**
Data transfer rate up to 12 Mbit/s; 24 V DC; IP20 housing	
PROFIBUS bus components	see Catalogs IK PI, CA 01
For establishing MPI/PROFIBUS communication	

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

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IM 151-7 CPU interface modules

Overview

- Interface module for SIMATIC ET 200S with integrated S7-CPU
- For high-performance control solutions in ET 200S
- Increases the availability of plants and machinery
- Programming via PROFIBUS DP
- Compact SIMATIC Micro Memory Card (MMC)
- Integrated 12 Mbit/s PROFIBUS DP slave/MPI interface in copper design
- Integrated CPU based on CPU S7-314
- IM 151-7 CPU FO available
- Fail-safe IM 151-7 F-CPU PROFIsafe available

Note:
Micro Memory Card required for operation of CPU.

Technical specifications

	6ES7 151-7AB00-0AB0	6ES7 151-7AA13-0AB0
Product status		
associated programming package		STEP7 V5.3 or higher+ HW update
Voltages and currents		
Mains/voltage failure jumpering, min.		5 ms
Load voltage L+		
• Rated value (DC)		24 V
• Short-circuit protection		Yes
• reverse polarity protection		Yes
• permissible range, lower limit (DC)		20.4 V
• permissible range, upper limit (DC)		28.8 V
Current consumption		
Inrush current, max.	3.5 A	
from supply voltage 1L+, max.		250 mA; 280 mA with DP master module
Power loss, typ.		3.3 W
Current output to backplane bus (DC 5 V), max.		700 mA
Memory		
Memory		
• RAM		
- integrated	48 KByte; as of FW V1.13 48 KB, previously 24 KB	96 KByte; for program and data, less the display data
- expandable		No
• Load memory		
- pluggable (MMC)		Yes
- pluggable (MMC), max.		8 MByte

	6ES7 151-7AB00-0AB0	6ES7 151-7AA13-0AB0
CPU/blocks		
Number of blocks (total)		1,024; (DBs, FCs, FBs) The maximum number of loadable blocks can be reduced by the MMC that you use.
DB		
• Number, max.	127	511; from DB1 to DB511
• Size, max.		16 KByte
FB		
• Number, max.	128	1,024; In number band of FB0 to FB2047
• Size, max.		16 KByte
FC		
• Number, max.	128	1,024; In number band of FC0 to FC2047
• Size, max.		16 KByte
OB		
• Number, max.		see Instruction List
• Size, max.		16 KByte
Nesting depth		
• per priority class	8	8
• additional within an error OB		4
CPU/processing times		
for bit operations, min.	0.1 µs	0.1 µs
for word operations, min.	1 µs	0.2 µs
for fixed point arithmetic, min.	2 µs	2 µs
for floating point arithmetic, min.	20 µs	3 µs

Technical specifications (continued)

	6ES7 151-7AB00-0AB0	6ES7 151-7AA13-0AB0
Times/counters and their remanence		
S7 counter		
• Number	256	256
• Remanence		
- adjustable		Yes
- lower limit		0
- upper limit		255
- preset		From Z 0 to Z 7
• Counting range		
- adjustable	Yes	Yes
- lower limit	1	0
- upper limit	999	999
IEC counter		
• Type		SFB
• Number		Unlimited (limited only by RAM capacity)
S7 times		
• Number	256	256
• Remanence		
- adjustable		Yes
- lower limit		0
- upper limit		255
- preset		no timers retentive
• Time range		
- lower limit	10 ms	10 ms
- upper limit	9,990 s	9,990 s
IEC timer		
• Type		SFB
• Number		Unlimited (limited only by RAM capacity)
Data areas and their remanence		
remanent data area in total (incl. times, counters, flags), max.	4 KByte	64 KByte
Flag		
• Number, max.	256 Byte	256 Byte
• Remanence available		Yes
• Remanence preset		MB 0 to MB 15
• Number of clock memories		8; 1 memory byte
Data blocks		
• Number, max.		511; DB 0 reserved
• Size, max.		16 KByte
Local data		
• per priority class, max.		510 Byte

	6ES7 151-7AB00-0AB0	6ES7 151-7AA13-0AB0
Address area		
I/O address area		
• Inputs		2,048 KByte
• Outputs		2,048 KByte
Process image		
• Inputs		128 Byte; not adjustable
• Outputs		128 Byte; not adjustable
Digital channels		
• Inputs		16,336
• Outputs		16,336
• Inputs, of which central		248
• Outputs, of which central		248
Analog channels		
• Inputs		1,021
• Outputs		1,021
• Inputs, of which central		124
• Outputs, of which central		124
Adressing volume		
• Outputs	244 Byte	
• Inputs	244 Byte	
Hardware config.		
Number of modules per system, max.	63	
Connectable programming devices/PCs	PG/OPs with STEP 7 connectable via PROFIBUS interface	
Time		
Clock		
• Hardware clock (real-time clock)		Yes
• Battery backed and synchronized		Yes
• Backup time		6 w; at 40 °C ambient temperature, typically
• Deviation per day, max.		10 s
Operating hours counter		
• Number		1
• Number/Number range		0
• Range of values		0 to 2^31 hours (when using SFC101)
• Granularity		1 hour
• remanent		Yes; must be restarted at each warm restart

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Technical specifications (continued)

	6ES7 151-7AB00-0AB0	6ES7 151-7AA13-0AB0
Clock synchronization		
• supports		Yes
• to MPI, Master		Yes
• to MPI, Slave		Yes
• in AS, Master		No
• in AS, Slave		No
S7 message functions		
Number of login stations for message functions, max.		12; depending on the connections configured for PG/OP and S7 basic communication
Process diagnostic messages		Yes; ALARM_S, ALARM_SC, ALARM_SQ
simultaneously active Alarm-S blocks, max.		40
Test commissioning functions		
Status/control		
• Status/control variable		Yes
• Variables		Inputs, outputs, memory bits, DB, times, counters
Monitoring functions		
• Number of variables, max.		30
• of which status variable, max.		30
• of which control variable, max.		14
Forcing		
• Forcing		Yes
• Force, variables		Inputs, outputs
• Forcing, number of variables, max.		10
Status block		Yes
Single step		Yes
Number of breakpoints		2
Diagnostic buffer		
• present	Yes	Yes
• Number of entries, max.	100	100
• adjustable		No
Communication functions		
PG/OP communication		Yes
Global data communication		
• supported		Yes
• Number of GD packets, max.		4
• Number of GD packets, transmitter, max.		4
• Number of GD packets, receiver, max.		4
• Size of GD packets, max.		22 Byte
• Size of GD packet (of which consistent), max.		22 Byte

	6ES7 151-7AB00-0AB0	6ES7 151-7AA13-0AB0
S7 basic communication		
• supported		Yes
• Useful data per job, max.		76 Byte
• Useful data per job (of which consistent) max.		76 Byte; 76 bytes (XSEND/XRCV), 64 bytes (XPUT/XGET) as server
S7 communication		
• supported		Yes
• as server		Yes
• as client		No
• Useful data per job, max.		180 Byte
• Useful data per job, of which consistent, max.		64 Byte
S5-compatible communication		
• supported		No
Standard communication (FMS)		
• supported		No
Number of connections		
• overall		12
• usable for PG communication		11
• reserved for PG communication		1
• usable for OP communication		11
• reserved for OP communication		1
• usable for S7 basic communication		10
• reserved for S7-Basic communication		0
• usable for routing		4; as slave only with active interface, with IM 151-7 CPU as DP master
1st interface		
Type of interface		Integral RS 485 interface
Physics		RS 485
isolated		Yes
Power supply to interface (15 to 30 V DC), max.		80 mA
Functionality		
• MPI		Yes
• DP master		No
• DP slave	Yes	Yes; active/passive
• Point-to-point coupling		No

Technical specifications (continued)

	6ES7 151-7AB00-0AB0	6ES7 151-7AA13-0AB0
MPI		
• Number of connections		12; Caution: 12 connections per CPU, not per interface
• Services		
- PG/OP communication		Yes
- Routing		Yes; with master module
- Global data communication		Yes
- S7 basic communication		Yes
- S7 communication		Yes
- S7 communication, as client		No
- S7 communication, as server		Yes
• Transmission speeds, max.		12 Mbit/s
DP slave		
• Number of connections	11	12; Caution: 12 connections per CPU, not per interface
• Services		
- PG/OP communication	Yes	Yes
- Routing		Yes; only when interface active and in master mode
- direct data exchange (cross traffic)	Yes	Yes
- DPV1		No
• GSD file		http://www.ad.siemens.de/csi_e/gsd
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s
• automatic baud rate search		Yes; only with passive interface
• Transfer memory		
- Inputs		244 Byte
- Outputs		244 Byte
• Address area, max.		32
• Useful data per address area, max.		32 Byte; up to max. size of the transfer memory
2nd interface		
Type of interface		External inteface via master module 6ES7138-4HA00-0AB0
Physics		RS 485
isolated		Yes

	6ES7 151-7AB00-0AB0	6ES7 151-7AA13-0AB0
Power supply to interface (15 to 30 V DC), max.		No
Functionality		
• MPI		No
• DP master		Yes
• Point-to-point coupling		No
DP master		
• Number of connections, max.		12; Caution: 12 connections per CPU, not per interface
• Services		
- PG/OP communication		Yes
- Routing		Yes
- Global data communication		No
- S7 basic communication		Yes
- S7 communication		Yes
- S7 communication, as client		No
- S7 communication, as server		Yes
- equidistance support		Yes
- SYNC/FREEZE		Yes
- Activation/deactivation of DP slaves		Yes
- direct data exchange (cross traffic)		Yes
- DPV1		Yes
• Transmission speeds, max.		12 Mbit/s
• Number of DP slaves, max.		32; per station
• Address area		
- Inputs, max.		2 KByte
- Outputs, max.		2 KByte
• Useful data per DP slave		
- Inputs, max.		244 Byte
- Outputs, max.		244 Byte
Isochronous mode		
Isochronouos mode		No
CPU/programming		
Configuration rules		max. 63 peripheral modules per station; Station width <1 m or <2 m; max. 10 A per load group (power module); Master interface module on right next to IM 151-7 CPU (X2-interface)

Technical specifications (continued)

	6ES7 151-7AB00-0AB0	6ES7 151-7AA13-0AB0
Programming language		
• STEP 7		Yes
• LAD		Yes
• FUP		Yes
• AWL		Yes
• SCL	Yes	Yes; optional
• GRAPH		Yes; optional
Operational stocks	Binary links, bracketed operations, result allocation, saving, counting, loading, transferring, comparing, shifting, rotating, complementation, calling blocks, fixed point arithmetic, floating point arithmetic, jump functions.	see Instruction List
Nesting levels	8	8
User program protection/password protection	Yes	Yes
System functions (SFC)	Interrupt and error handling, copying of data, clock functions, diagnostic functions, module parameter assignment, mode changes	see Instruction List
System function blocks (SFB)		see Instruction List

	6ES7 151-7AB00-0AB0	6ES7 151-7AA13-0AB0
Isolation		
Isolation checked with		500 V DC
Isolation		
between load voltage and all other switching components		Yes
between PROFIBUS DP all all other circuits		Yes
Permissible potential difference		
between different circuits		75 V DC/ 60 V AC
Environmental requirements		
Operating termperature		
• min.	0 °C	
• max.	60 °C	
Dimensions and weight		
Width	60 mm	60 mm; DP master module: 35 mm
Height	119.5 mm	119.5 mm
Depth	75 mm	75 mm
Weights		
Weight, approx.	200 g	200 g

Ordering data		Order No.
Interface module IM 151/CPU (48 K) Including termination module	A)	**6ES7 151-7AA13-0AB0**
Interface module IM 151/CPU FO (96 K) Including termination module		**6ES7 151-7AB00-0AB0**
Accessories		
MMC 64 KB [1] for program backup		**6ES7 953-8LF11-0AA0**
MMC 128 KB [1] for program backup		**6ES7 953-8LG11-0AA0**
MMC 512 KB [1] for program backup		**6ES7 953-8LJ11-0AA0**
MMC 2 MB [1] For program backup and/or firmware update		**6ES7 953-8LL11-0AA0**
MMC 4 MB [1] for program backup		**6ES7 953-8LM11-0AA0**
MMC 8 MB [1] for program backup		**6ES7 953-8LP11-0AA0**
External prommer For e.g. MMC with USB interface		**6ES7 792-0AA00-0XA0**
PG (programming device) With integrated MMC interface		on request

1) For operating the CPU, an MMC is essential
A) Subject to export regulations: AL: N and ECCN: EAR99H

	Order No.
Label sheets DIN A4 (10 pieces) Each sheet contains 60 label strips for peripheral modules and 20 label strips for interface modules	
• petrol	**6ES7 193-4BH00-0AA0**
• red	**6ES7 193-4BD00-0AA0**
• yellow	**6ES7 193-4BB00-0AA0**
• light beige	**6ES7 193-4BA00-0AA0**
ET 200S distributed I/O system manuals are available on the Internet as a PDF file: http://www.siemens.com/simatic-docu	
Terminating module as spare part for ET 200S	**6ES7 193-4JA00-0AA0**
SIMATIC S5, 35 mm DIN rail	
• Length: 483 mm for 19" cabinets	**6ES5 710-8MA11**
• Length: 530 mm for 600 mm cabinets	**6ES5 710-8MA21**
• Length: 830 mm for 900 mm cabinets	**6ES5 710-8MA31**
• Length 2 m	**6ES5 710-8MA41**

BM 147/CPU intelligent basic modules

Overview

- Basic modules for exchanging preprocessed I/O data between an ET 200X and a higher level master through PROFIBUS DP
- Two versions:
  - BM147-1 with DP slave functionality and
  - BM147-2 with additional DP master functionality
- CPU for PLC functionality equivalent to S7-314, in other words, distributed intelligence for preprocessing
- For reducing the overhead on the central PLC and PROFIBUS
- With greatly reduced response times to critical signals locally
- Standalone operation, for example it is still possible to operate even if the DP master fails
- Fast, simple and integrated programming of a system with modular programs through STEP 7

Technical specifications

	6ES7 147-1AA11-0XB0	6ES7 147-2AA01-0XB0	6ES7 147-2AB01-0XB0
Supply voltages			
Supply voltage of electronics 1L+			
• Rated value (DC)	24 V; permitted range 20.4 to 28.8 V	24 V; permitted range 20.4 to 28.8 V	24 V; permitted range 20.4 to 28.8 V
• Short-circuit protection	Yes	Yes; internal (thermally reversible); not for looping through	Yes; internal (thermally reversible); not for looping through
• reverse polarity protection	No	No	No
Voltages and currents			
Load voltage 2L+			
• Rated value (DC)	24 V; permitted range 20.4 to 28.8 V	24 V; permitted range 20.4 to 28.8	24 V; permitted range 20.4 to 28.8
• Reverse polarity protection	No	No	No
Current consumption			
Power loss, typ.	3 W	3 W	3 W
Memory			
Memory			
• RAM			
- integrated	64 KByte; 21 K instructions	64 KByte; 21 K instructions	128 KByte; 42 K instructions
- expandable	No	No	No
• Load memory			
- expandable FEPROM, max.	8 MByte; can be plugged in as MMC	8 MByte; can be plugged in as MMC	8 MByte; can be plugged in as MMC
Backup			
• present	Yes; Guaranteed by MMC (maintenance-free)	Yes; Guaranteed by MMC (maintenance-free)	Yes; Guaranteed by MMC (maintenance-free)
CPU/blocks			
Number of blocks (total)	1,024; DBs, FCs, FBs	1,024; DBs, FCs, FBs	1,024; DBs, FCs, FBs
DB			
• Number, max.	511	511	511
• Size, max.	16 KByte	16 KByte	16 KByte
FB			
• Number, max.	512; In number band of FB0 to FB2047	512; In number band of FB0 to FB2047	512; In number band of FB0 to FB2047
• Size, max.	16 KByte	16 KByte	16 KByte

Technical specifications (continued)

	6ES7 147-1AA11-0XB0	6ES7 147-2AA01-0XB0	6ES7 147-2AB01-0XB0
CPU/blocks			
FC			
• Number, max.	512; In number band of FC0 to FC2047	512; In number band of FC0 to FC2047	512; In number band of FC0 to FC2047
• Size, max.	16 KByte	16 KByte	16 KByte
OB			
• Description	see Instruction List	see Instruction List	see Instruction List
• Size, max.	16 KByte	16 KByte	16 KByte
Nesting depth			
• per priority class	8	8	8
• additional within an error OB	4	4	4
CPU/processing times			
for bit operations, min.	0.1 µs	0.1 µs	0.1 µs
for word operations, min.	0.2 µs	0.2 µs	0.2 µs
for fixed point arithmetic, min.	2 µs	2 µs	2 µs
for floating point arithmetic, min.	3 µs	3 µs	3 µs
Times/counters and their remanence			
S7 counter			
• Number	256	256	256
• Remanence			
- adjustable	Yes	Yes	Yes
- preset	From Z 0 to Z 7	From Z 0 to Z 7	From Z 0 to Z 7
• Counting range			
- lower limit	0	0	0
- upper limit	999	999	999
IEC counter			
• present	Yes; Number unlimited (limited only by work memory)	Yes; Number unlimited (limited only by work memory)	Yes; Number unlimited (limited only by work memory)
• Type	SFB	SFB	SFB
S7 times			
• Number	256	256	256
• Remanence			
- adjustable	Yes	Yes	Yes
- preset	no retentivity	no retentivity	no retentivity
• Time range			
- lower limit	10 ms	10 ms	10 ms
- upper limit	9,990 s	9,990 s	9,990 s
IEC timer			
• present	Yes; Number unlimited (limited only by work memory)	Yes; Number unlimited (limited only by work memory)	Yes; Number unlimited (limited only by work memory)
• Type	SFB	SFB	SFB
Data areas and their remanence			
Flag			
• Number, max.	256 Byte	256 Byte	256 Byte
• Remanence available	Yes	Yes	Yes
• Remanence preset	MB 0 to MB 15	MB 0 to MB 15	MB 0 to MB 15
• Number of clock memories	8; 1 memory byte	8; 1 memory byte	8; 1 memory byte
Local data			
• per priority class, max.	510 Byte	510 Byte	510 Byte

Technical specifications (continued)

	6ES7 147-1AA11-0XB0	6ES7 147-2AA01-0XB0	6ES7 147-2AB01-0XB0
Address area			
I/O address area			
• Inputs	1 KByte	1 KByte	1 KByte
• Outputs	1 KByte	1 KByte	1 KByte
Process image			
• Inputs	128 Byte	128 Byte	128 Byte
• Outputs	128 Byte	128 Byte	128 Byte
Hardware configuration			
Expansion modules			
• Number of expansion modules, max.		7	7
• of which motor starters/frequency converters, max.		6	6
• of which, pneumatic interfaces, max.		6	6
Time			
Clock			
• Hardware clock (real-time clock)	Yes	Yes	Yes
• Battery backed and synchronized	Yes; Backup time typically 6 weeks (at 40°C ambient temperature)	Yes; Backup time typically 6 weeks (at 40°C ambient temperature)	Yes; Backup time typically 6 weeks (at 40°C ambient temperature)
• Deviation per day, max.	10 s	10 s	10 s
Operating hours counter			
• Number	1	1	1
• Number/Number range	0	0	0
• Range of values	0 to 2^31 hours (when using SFC101)	0 to 2^31 hours (when using SFC101)	0 to 2^31 hours (when using SFC101)
• Granularity	1 hour	1 hour	1 hour
• remanent	Yes; must be restarted at each warm restart	Yes; must be restarted at each warm restart	Yes; must be restarted at each warm restart
Clock synchronization			
• supports	Yes	Yes	Yes
• to MPI, Slave	Yes	Yes	Yes
• in AS, Master	Yes	Yes	Yes
• in AS, Slave	Yes	Yes	Yes
S7 message functions			
Number of login stations for message functions, max.	12; depending on the configured connections for PG/OP and S7 basic communication	12; depending on the configured connections for PG/OP and S7 basic communication	12; depending on the configured connections for PG/OP and S7 basic communication
Process diagnostic messages	Yes	Yes	Yes
simultaneously active Alarm-S blocks, max.	40	40	40
Test commissioning functions			
Status/control			
• Status/control variable	Yes	Yes	Yes
• Variables	Inputs, outputs, memory bits, DB, times, counters	Inputs, outputs, memory bits, DB, times, counters	Inputs, outputs, memory bits, DB, times, counters
• Number of variables, max.	30	30	30
• of which status variable, max.	30	30	30
• of which control variable, max.	14	14	14
Forcing			
• Forcing	Yes	Yes	Yes
• Force, variables	Inputs, outputs	Inputs, outputs	Inputs, outputs
• Forcing, number of variables, max.	10	10	10

Technical specifications (continued)

	6ES7 147-1AA11-0XB0	6ES7 147-2AA01-0XB0	6ES7 147-2AB01-0XB0
Test commissioning functions			
Status block	Yes	Yes	Yes
Single step	Yes	Yes	Yes
Number of breakpoints	2	2	2
Diagnostic buffer			
• present	Yes	Yes	Yes
• Number of entries, max.	100	100	100
• adjustable	No	No	No
Communication functions			
PG/OP communication	Yes	Yes	Yes
Global data communication			
• supported	Yes	Yes	Yes
• Number of GD packets, max.	4	4	4
• Number of GD packets, transmitter, max.	4	4	4
• Number of GD packets, receiver, max.	4	4	4
• Size of GD packets, max.	22 Byte	22 Byte	22 Byte
• Size of GD packet (of which consistent), max.	22 Byte	22 Byte	22 Byte
S7 basic communication			
• supported	Yes	Yes	Yes
• Useful data per job, max.	76 Byte	76 Byte	76 Byte
• Useful data per job (of which consistent) max.	76 Byte; 76 bytes (for X_SEND or X_RCV), 64 bytes (for X_PUT or X_GET as server)	76 Byte; 76 bytes (for X_SEND or X_RCV), 64 bytes (for X_PUT or X_GET as server)	76 Byte; 76 bytes (for X_SEND or X_RCV), 64 bytes (for X_PUT or X_GET as server)
S7 communication			
• supported	Yes	Yes	Yes
• as server	Yes	Yes	Yes
• as client	No	No	No
• Useful data per job, max.	180 Byte; at PUT/GET	180 Byte; at PUT/GET	180 Byte; at PUT/GET
• Useful data per job, of which consistent, max.	64 Byte	64 Byte	64 Byte
S5-compatible communication			
• supported	No	No	No
Number of connections			
• overall	12	12	12
• reserved for PG communication	1	1	1
• adjustable for PG communication, max.	11	11	11
• reserved for OP communication	1	1	1
• adjustable for OP communication, max.	11	11	11
• reserved for S7-Basic communication	10	10	10
• adjustable for S7-Basic communication, max.	11	11	11
1st interface			
Type of interface	Coexistent, integrated RS 485 interface	Coexistent, integrated RS 485 interface	Coexistent, integrated RS 485 interface
Physics	RS 485	RS 485	RS 485
isolated	Yes	Yes	Yes

Technical specifications (continued)

	6ES7 147-1AA11-0XB0	6ES7 147-2AA01-0XB0	6ES7 147-2AB01-0XB0
1st interface			
Functionality			
• MPI	Yes	Yes	Yes
• DP master	No	Yes	Yes
• DP slave	Yes; active / passive	Yes; active / passive	Yes; active / passive
• Point-to-point coupling	No	No	No
MPI			
• Services			
- PG/OP communication	Yes	Yes	Yes
- Routing	No	Yes	Yes
- Global data communication	Yes	Yes	Yes
- S7 basic communication	Yes	Yes	Yes
- S7 communication	Yes	Yes	Yes
- S7 communication, as server	Yes	Yes	Yes
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s	12 Mbit/s
DP master			
• Services			
- PG/OP communication		Yes	Yes
- Routing		Yes	Yes
- Global data communication		No	No
- S7 basic communication		No	No
- S7 communication		Yes	Yes
- S7 communication, as server		Yes	Yes
- equidistance support		Yes	Yes
- SYNC/FREEZE		Yes	Yes
- Activation/deactivation of DP slaves		Yes	Yes
- direct data exchange (cross traffic)		Yes	Yes
- DPV1		Yes	Yes
• Address area			
- Inputs, max.		1 KByte	1 KByte
- Outputs, max.		1 KByte	1 KByte
• Useful data per DP slave			
- Useful data per DP slave, max.		244 Byte; 244 bytes/244 bytes	244 Byte; 244 bytes/244 bytes
DP slave			
• Number of connections	12	12	12
• Services			
- PG/OP communication	Yes	Yes	Yes
- Routing	No	Yes; when interface active	Yes; when interface active
- S7 communication, as client	No	No	No
- S7 communication, as server	No	No	No
• Transmission speeds, max.	12 Mbit/s	12 Mbit/s	12 Mbit/s
• Transfer memory			
- Inputs	244 Byte	244 Byte	244 Byte
- Outputs	244 Byte	244 Byte	244 Byte
• Address area, max.	32	32	32
• Useful data per address area, max.	32 Byte	32 Byte	32 Byte
CPU/programming			
Programming language			
• STEP 7	Yes; V5.2 SP1	Yes; V5.2 SP1	Yes; V5.2 SP1
Dimensions and weight			
Width	175 mm	175 mm	175 mm
Height	110 mm	110 mm	110 mm
Depth	90 mm	90 mm	90 mm

Ordering data	Order No.
BM 147-1 CPU basic module With integrated PLC functionality, with 64 KB main memory	**6ES7 147-1AA11-0XB0**
BM 147-2 CPU basic module With integrated PLC functionality and additional PROFIBUS master interface	
• With 64 KB main memory	**6ES7 147-2AA01-0XB0**
• With 128 KB main memory	**6ES7 147-2AB01-0XB0**
Accessories	
Manual for ET 200X distributed I/O station	
• German	**6ES7 198-8FA01-8AA0**
• English	**6ES7 198-8FA01-8BA0**
• French	**6ES7 198-8FA01-8CA0**
Cover plates for ET 200X basic modules Protective cover for bus and power supply connections (pack of 10)	**6ES7 194-1JB00-0XA0**
Simple mounting rails for SIMATIC ET 200X (narrow)	
• 400 mm long for basic module + 3 expansion modules (60 mm)	**6ES7 194-1GA00-0XA0**
• 640 mm long for basic module + 7 expansion modules (60 mm)	**6ES7 194-1GA10-0XA0**
• 2000 mm long for customized lengths	**6ES7 194-1GA20-0XA0**
Double mounting rails for SIMATIC ET 200X (wide)	
• 520 mm long for basic module + 1 expansion module (60 mm) + 2 motor starters/frequency converters/ pneumatic interfaces	**6ES7 194-1GB00-0XA0**
• 1000 mm long for basic module + 1 expansion module (60 mm) + 6 motor starters/frequency converters	**6ES7 194-1GB10-0XA0**

	Order No.
Fixing screws M5 x 20, 1 pack = 100 pieces	**6ES7 194-1KC00-0XA0**
Connecting cable for PROFIBUS 12 Mbaud, for PG connection to PROFIBUS DP, pre-assembled with 2 x 9-pole Sub-D connector, 3.0 m	**6ES7 901-4BD00-0XA0**
ECOFAST hybrid cable Pre-assembled with ECOFAST plug connectors	
• 1,5	**6XV1 830-7BH15**
• 3,0	**6XV1 830-7BH30**
• 5,0	**6XV1 830-7BH50**
• 10,0	**6XV1 830-7BN10**
• 15,0	**6XV1 830-7BN15**
ECOFAST terminating resistor	
• Ordering unit 1 piece	**6GK1 905-0DA10**
• Ordering unit 5 pieces	**6GK1 905-0DA00**
ECOFAST plug connector, can be pre-assembled Male contacts; Ordering unit 5 pieces	**6GK1 905-0CA00**
ECOFAST plug connector, can be pre-assembled Female contacts; Ordering unit 5 pieces	**6GK1 905-0CB00**
MMC memory cards up to 8 MB (as for S7-314)	

IE/PB Link

Overview

- Compact network transition between Industrial Ethernet and PROFIBUS
- Connection to Industrial Ethernet with 10/100 Mbit/s full/half duplex connection with autosensing for automatic switchover
- Connection to PROFIBUS with data transmission rates of 9.6 kbit/s to 12 Mbit/s incl. 45.45 kbit/s for PROFIBUS PA
- PROFINET Standard Version V1.0.
- IE/PB Link supports the PROFINET communication services for data communication between the PROFINET devices and is a proxy for PROFIBUS field devices.
- PROFINET defines an engineering model for distributed automation solutions and a model for integrated communication over PROFIBUS and Industrial Ethernet with IT standards.
- Cross-network programming device/operator panel communication by S7 routing, i.e. all S7 stations can be remotely programmed using the programming device on the Industrial Ethernet or PROFIBUS.

Technical specifications

	IE/PB Link
Data transmission rates	
• Industrial Ethernet	10/100 Mbit/s autosensing
• PROFIBUS	9.6 kbit/s to 12 Mbit/s incl. 45.45 kbit/s (PROFIBUS PA)
Interfaces	
• Connection to Industrial Ethernet	
- AUI (10 Mbit/s)	15-pin Sub-D socket
- 10BaseT/100BaseT	RJ45
• Connection to PROFIBUS	9-pin Sub-D socket
• Connection for supply voltage	4-pin terminal block
Supply voltage	24V DC (+/-5%)
Current consumption (at rated voltage)	
• External from 24 V DC, max.	600 mA
Power loss	Approx. 10 W
Perm. ambient conditions	
• Operating temperature	0 °C … + 60 °C
• Transport/storage temperature	- 40 °C … + 70 °C
• Relative humidity, max.	95 % at +25 °C
Construction	
• Module format	S7-300 construction
• Dimensions (W x H x D) in mm	80 x 125 x 120
• Weight	Approx. 600 g
Degree of protection	IP20
Configuration	
Configuration software for PROFINET	Option package SIMATIC iMap V1.2 and higher
Configuring software for additional functions	NCM S7 in STEP 7, V5.1 SP2 or higher
Performance data	
PROFINET communication	
• Number of DP slaves on the IWLAN/PB Link PN IO (PROFINET IO-Devices for PROFINET IO)	max. 64 [1]
• Number of DP inputs	max. 2048 byte
• Number of DP outputs	max. 2048 byte
Additional functionality	
• Number of S7 connections	max. 32
• Number of DSGW connections	max. 32

1) All PROFINET IO Devices (DP slaves) to be connected to the IE/PB Link PN IO must be generated as PROFIBUS-DPV0 (standard slaves) using STEP 7.

Ordering data	Order No.
IE/PB link Network transition between Industrial Ethernet and PROFIBUS, including electronic manual on CD-ROM, German, English, French, Spanish, Italian	**6GK1 411-5AA00**
S7-300 DIN rail	**6ES7 390-1AB60-0AA0**
S7-300 power supply PS 307 24 V DC	**6ES7 307-1BA00-0AA0**
NCM S7 configuration software for Industrial Ethernet	Delivered with STEP 7 V5
Manual for TP and fiber-optic networks Paper version Network architecture, components, configurations, installation guidelines	
• German	**6GK1 970-1BA10-0AA0**
• English	**6GK1 970-1BA10-0AA1**
Manual for PROFIBUS networks Paper version Network architecture, project management, network components, installation	
• German	**6GK1 970-5CA20-0AA0**
• English	**6GK1 970-5CA20-0AA1**

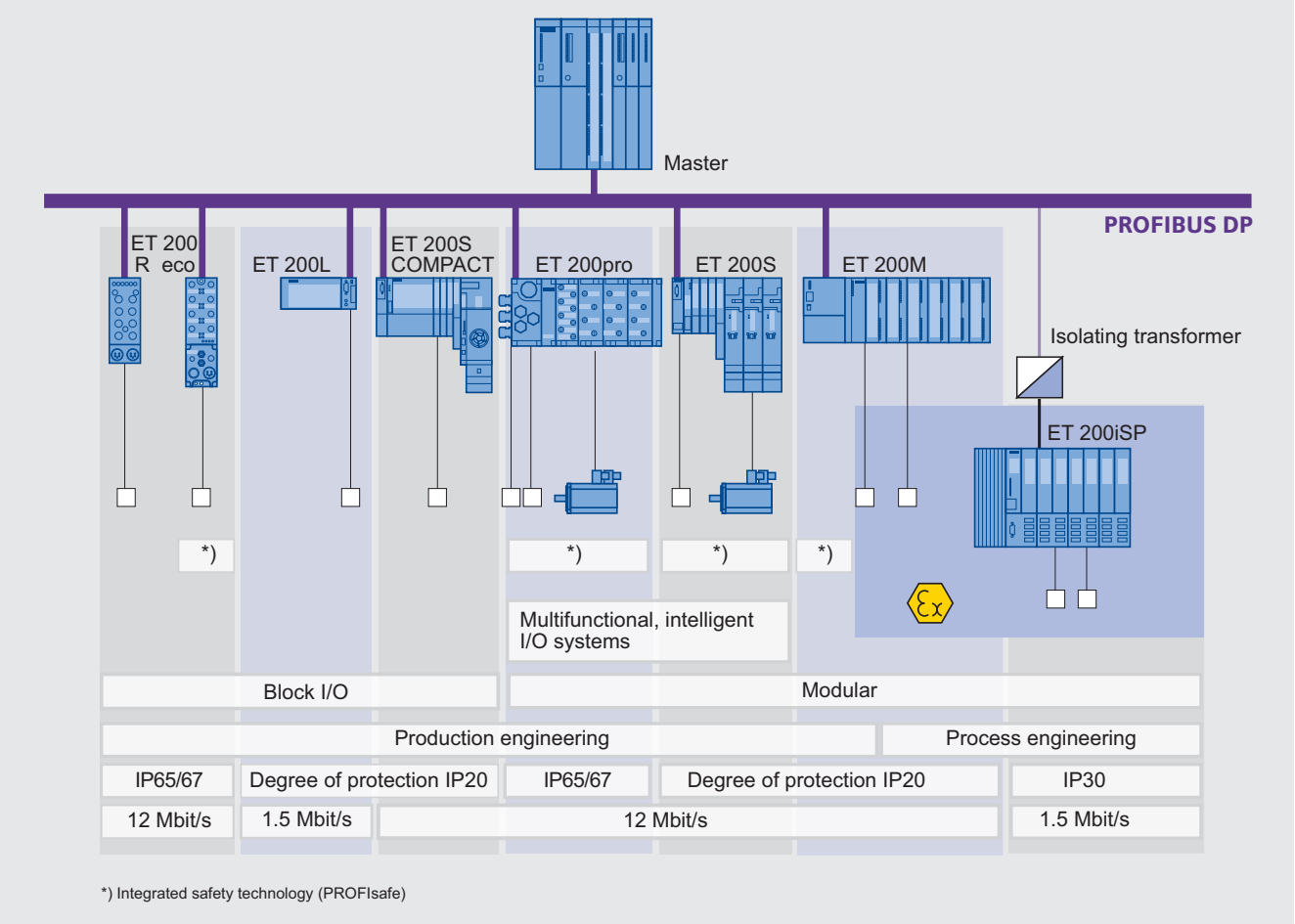
D) Subject to export regulations: AL: N and ECCN: 5D992B1

		Order No.
SIMATIC iMap V3.0 *Target system:* CPU 31x-2 PN/DP, CPU 319-3 PN/DP, SIMATIC WinAC PN, SIMATIC NET IE/PB Link, SIMATIC NET CP 343-1, SIMATIC NET CP 343-1 Advanced, SIMATIC NET CP 443-1 Advanced, distributed I/O devices with own CPU, PROFINET CBA OPC server, devices on the Industrial Ethernet based on the PROFINET CBA standard, SIMATIC OPs, SIMATIC ProTool/Pro *Requirements:* Windows 2000 Prof. with Service Pack 4 or later or Windows XP Prof. with Service Pack 1 or later or Windows 2003 Server with Service Pack 1 or later; on PG or PC with Pentium processor, min. 1 GHz; STEP 7 V5.3 or later with Service Pack 3, PN OPC Server V6.3 or later *Delivery form:* German, English, with electronic documentation		
Single license	D)	**6ES7 820-0CC04-0YA5**
Software Update Service	D)	**6ES7 820-0CC01-0YX2**
Upgrade to V3.0, single license	D)	**6ES7 820-0CC04-0YE5**

Overview

General

Overview



*) Integrated safety technology (PROFIsafe)

- SIMATIC ET 200 distributed I/O devices:
  For direct local connection of sensors and actuators.
- Signal transmission to higher-level control or master system via PROFIBUS or PROFINET.
- Optimum integration of SIMATIC ET 200 devices in Totally Integrated Automation.
- Fully compatible for operation with non-Siemens masters.

Scope of application

SIMATIC ET 200 can provide the ideal distributed solution for all industries and applications:

- It can be used in production technology as well as in process engineering.
- IP65/67 degree of protection (without control cabinet) and IP20 (with control cabinet).
- Low-cost to high-feature.
- Compact to highly-modular design.
- From simple I/O modules to multifunctional systems.
- Motor starters, frequency converters, pneumatic components, technology modules, safety functions or even distributed intelligence (CPU) can be integrated (depending on the device).

Function

Configuration, parameter assignment

SIMATIC ET 200 I/O devices are configured/set up using STEP 7 or COM PROFIBUS. However, as standard PROFIBUS slaves, they are also compatible for use with non-Siemens master devices and their configuration tools via the GSD file.

In order to meet process engineering requirements, the relevant devices are also integrated into SIMATIC PDM, which supports user-friendly parameter assignment and diagnosis. Communication also takes place via the same bus line.

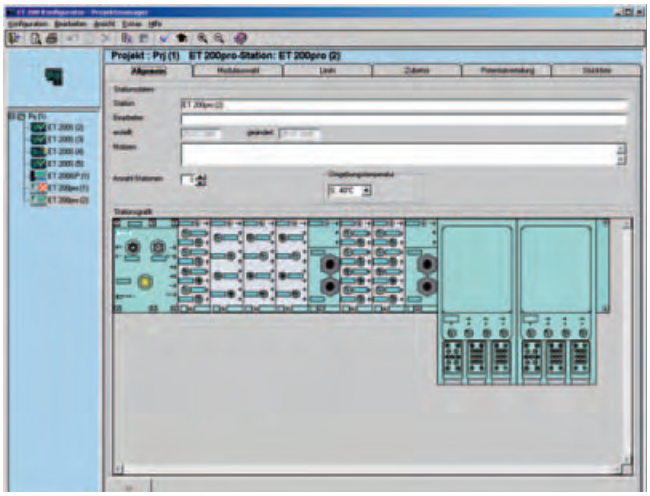
Diagnostics

ET 200 I/O devices provide a variety of diagnostic information to the higher-level control via the bus line, e.g., device diagnostics and error messages in plain text. LEDs for the device, module or even channel complement this information. This speeds up debugging and increases system and machine availability.

Other components such as the BT 200 test device and the diagnostic repeater support system diagnostics on PROFIBUS DP during commissioning and/or active operation.

Function (continued)

ET 200 configuration tool

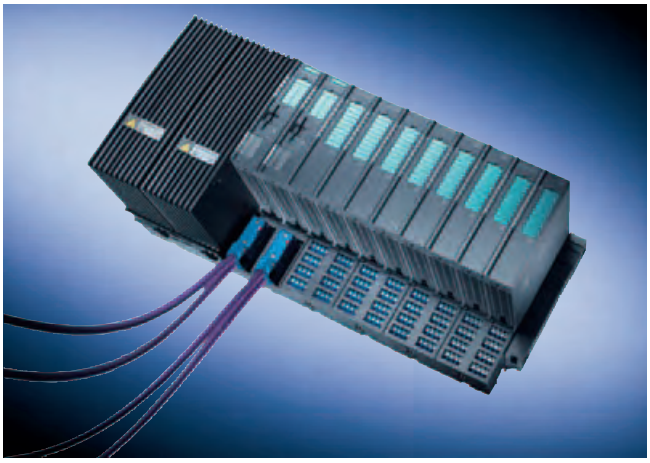


The SIMATIC ET 200 configuration tool already offers perfect support in advance.

The software tool leads you conveniently, simply and comfortably through the configuration, and automatically creates ordering lists including accessories, and also provides support for the observation of load currents, limits etc.

The configurator is available for ET 200iSP, ET 200pro and ET 200S. The tool can be downloaded free of charge at: www.siemens.com/et200

Overview



- Intrinsically-safe distributed I/O system with IP30 degree of protection for use in hazardous gas and dust areas, i.e. in Zones 1, 2, 21 and 22
- Sensors and actuators can be located directly in Zones 0 and 20

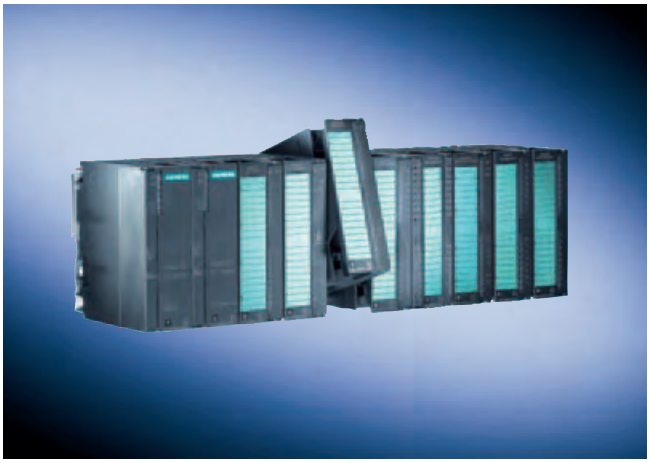
- Individual configuration and flexible expansion through modular design for optimum adaptation to the automation task in hand
- Independent wiring enables prewiring without the electronics connected.
- Optimized for integration into control systems (e.g. SIMATIC PCS 7)
- Can be parameterized using SIMATIC PDM
- Optimum integration of HART field devices (HART transparency)
- Connection to PROFIBUS DP via isolating transformers
- Hot swapping and configuration in run possible
- Comprehensive diagnostics facilities
- Modules resistant to condensation in temperature range -20 °C to +60 °C
- Complete redundancy of PROFIBUS and power supply

Further information:

- Catalogs IK PI, CA 01
- Internet:
  www.siemens.com/et200iSP
  www.siemens.com/et200 (general)

SIMATIC ET 200M

Overview



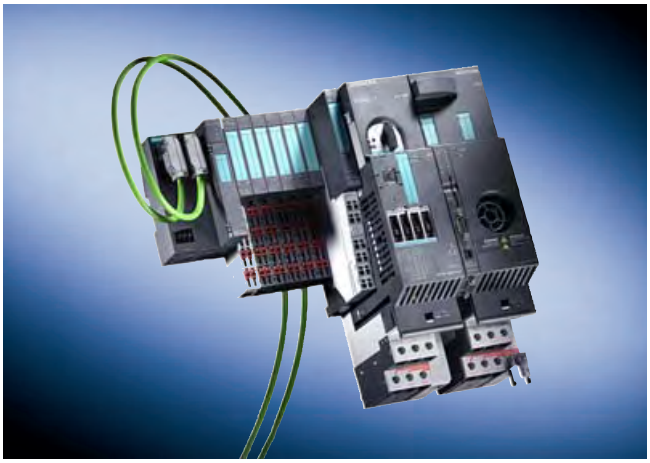
- Modular I/O device with IP20 degree of protection, particularly suitable for individual and complex automation tasks
- Can be expanded with the signal, communications and function modules of the S7-300 automation system
- Compatible Ex analog input and output modules with HART optimize the ET 200M for use in process engineering
- Can be used in redundant systems (S7-400H, S7-400F/FH)
- Comprises a PROFIBUS DP IM 153 interface module, up to eight S7-300 I/O modules (design with bus connectors or active bus modules) and, if applicable, a power supply unit
- Hot swapping possible in the case of active bus modules
- Can be supplied with integrated fiber optic interface if required.
- Baud rate 12 Mbps
- Ex approval according to Cat. 3 for Zone 2 according to ATEX 100a
- Fail-safe digital inputs and outputs as well as analog inputs for safety-related signal processing according to PROFIsafe.

Further information:

- Catalogs IK PI, CA 01
- Internet:
  www.siemens.com/et200m
  www.siemens.com/et200 (general)

SIMATIC ET 200S

Overview



- Distributed I/O system with IP20 degree of protection which requires little wiring, also for extremely time-critical tasks, e.g. fast closed-loop controls
- Bit-modular design for exact adaptation to the automation task in hand.
- Communication using PROFIBUS or PROFINET
- Use of digital and analog input or output modules, technology modules, motor starters and frequency converters for controlling drives up to 7.5 or 4 kW
- Use as mini PLC on PROFIBUS – as master or slave – when the integrated CPU is used
- Hot swapping of modules

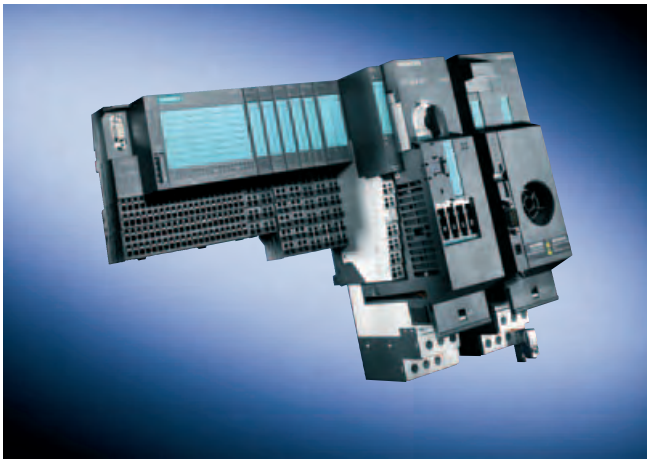
- Channel-specific diagnostics for high availability.
- Can be supplied with integrated fiber optic interface if required.
- Baud rate up to 12 Mbit/s
- FastConnect with stripping-free technique
- Ex approval according to Cat. 3 for Zone 2 according to ATEX 100a
- Slot reservation with standby modules
- PROFIBUS DP master interface module for use as subordinate PROFIBUS master
- Fail-safe modules with safety-related signal processing according to PROFIsafe: DI modules, motor starters, frequency converters
- Independent wiring
- High Density modules permit a more compact design of the I/O with up to 8 channels per module (8 DI or 8 DO)

Further information:

- Catalogs IK PI, CA 01
- Internet:
  www.siemens.com/et200s
  www.siemens.com/et200 (general)

SIMATIC ET 200S COMPACT

Overview



- Block I/O with IP20 degree of protection with 32 channels, comprising terminal block and electronics block
- Can be expanded bit-modular up to 80 channels or max. 12 modules
- Complete ET 200S range of modules can be used (except fail-safe modules)
- The block I/O is based on the ET 200S BASIC interface module
- Separation of connection system and electronics with independent wiring
- Screw-type and spring-loaded connection systems
- Standard terminal block with two-wire system; three-wire and four-wire systems using additional terminals or standard terminal blocks
- Assembly on DIN rail
- Hot swapping of electronics modules possible
- Communication over PROFIBUS
- Up to 100 bytes for inputs and outputs (address area)

Further information:

- Catalogs IK PI, CA 01
- Internet:
  www.siemens.com/et200s
  www.siemens.com/et200 (general)

SIMATIC ET 200L

Overview

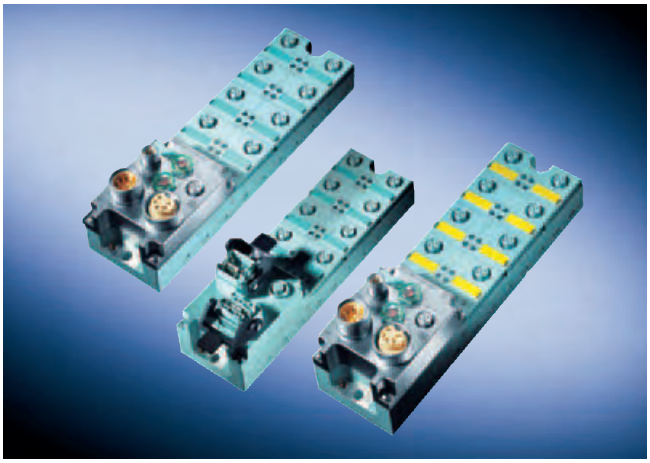
- Small, cost-effective I/O device with IP20 degree of protection for the lower performance range.
- Comprises a terminal block and an electronics block.
- Available in 2 versions:
  - ET 200L block I/O (cannot be expanded).
  - ET 200L-SC modular I/O, can be expanded with a SIMATIC Smart Connect (SC) TB 16 SC terminal block. This block supports the addition of up to 16 digital and analog input/output channels for high modularity.
- Baud rate 1.5 Mbps.

Further information:

- Catalogs IK PI, CA 01
- Internet:
  http://www.siemens.com/et200

SIMATIC ET 200eco

Overview



- Compact, cost-effective
  I/O devices for processing digital signals.
- Design without control cabinet with IP65/67 degree of protection with flexible and fast connections.

- Comprises a basic module and various connection blocks for application-specific implementation options:
  - ECOFAST: 2 x RS 485 hybrid fieldbus interface with identification connector for PROFIBUS address setting
  - M12: 2 x M12 and 2 x 7/8" with 2 rotary coding switches for PROFIBUS address assignment
- Connection block contains T-functionality for PROFIBUS DP and power supply so that during commissioning and service, the modules can be disconnected from and reconnected to the PROFIBUS without interruption.
- Module versions: 8DI, 16DI, 8DI/8DO (1.3 A), 8DI/8DO (2.0 A), 8DO (2.0 A), 16DO (0.5 A)
- Baud rates up to 12 Mbit/s
- Fail-safe DI modules with safety-related signal processing according to PROFIsafe

Further information:

- Catalogs IK PI, CA 01
- Internet:
  www.siemens.com/et200eco
  www.siemens.com/et200 (general)

SIMATIC ET 200pro

Overview

- Distributed I/O system with degree of protection IP65/67 for applications at the machine level without a cabinet
- Compact, multifunctional all-in-one solution:
  Digital inputs/outputs, fail-safe modules, motor starters up to 5.5 kW, etc.

- Communication via PROFIBUS or PROFINET
- Mixed configuration of fail-safe modules and standard modules possible in one and the same station
- Free choice of connection method: Direct, ECOFAST, or M12 7/8"
- Power module for easy implementation of load groups
- Module replacement during normal operation (hot swapping)
- Easy installation as well as independent wiring
- Transmission rate up to 12 Mbit/s
- Extensive diagnostics: Module-specific or channel-specific
- Intelligent motor starters for starting and protecting motors and loads to 5.5 kW
  - Versions: direct starters and reversing starters – standard and high-feature
- Analog electronic modules for connecting of different types temperature probes
- RFID communication module RF 170C for connection of Siemens RFID systems

Further information:

- Catalogs IK PI, CA 01
- Internet:
  www.siemens.com/et200pro
  www.siemens.com/et200 (general)

Overview

- Distributed I/O with IP65 degree of protection, specifically for robot applications.
- Aluminum die-cast housing.
- Integrated repeater.
- Parameterizable inputs/outputs: 8DI/8DO to 16DI.
- Terminal strip on rear for the connection of analog signals for welding transformers.
- Connection via hybrid line to 17-pin M23 connector.

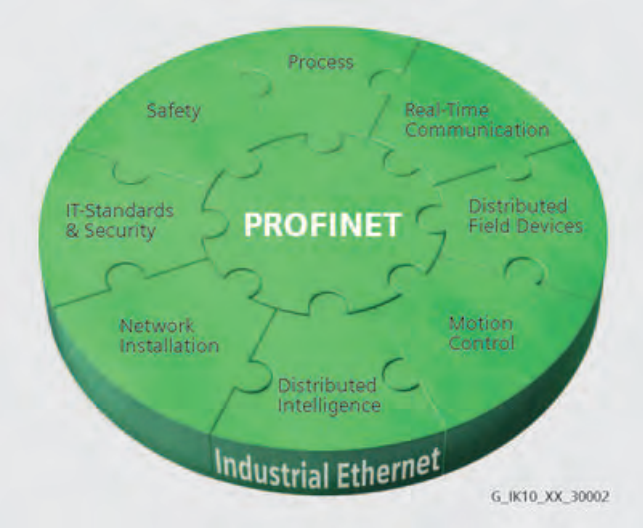
Further information

- Catalogs IK PI, CA 01
- Internet:
  http://www.siemens.com/et200

Introduction

Overview

PROFINET – The open standard for automation



PROFINET is the innovative and open Industrial Ethernet standard (IEC61158) for industrial automation. With PROFINET, devices can be linked up from the field level through to the management level.

PROFINET enables system-wide communication, supports plant-wide engineering and uses the IT standards right down to the field level. Fieldbus systems such as PROFIBUS can be easily integrated without any modification of existing devices. PROFINET takes account of the following aspects:

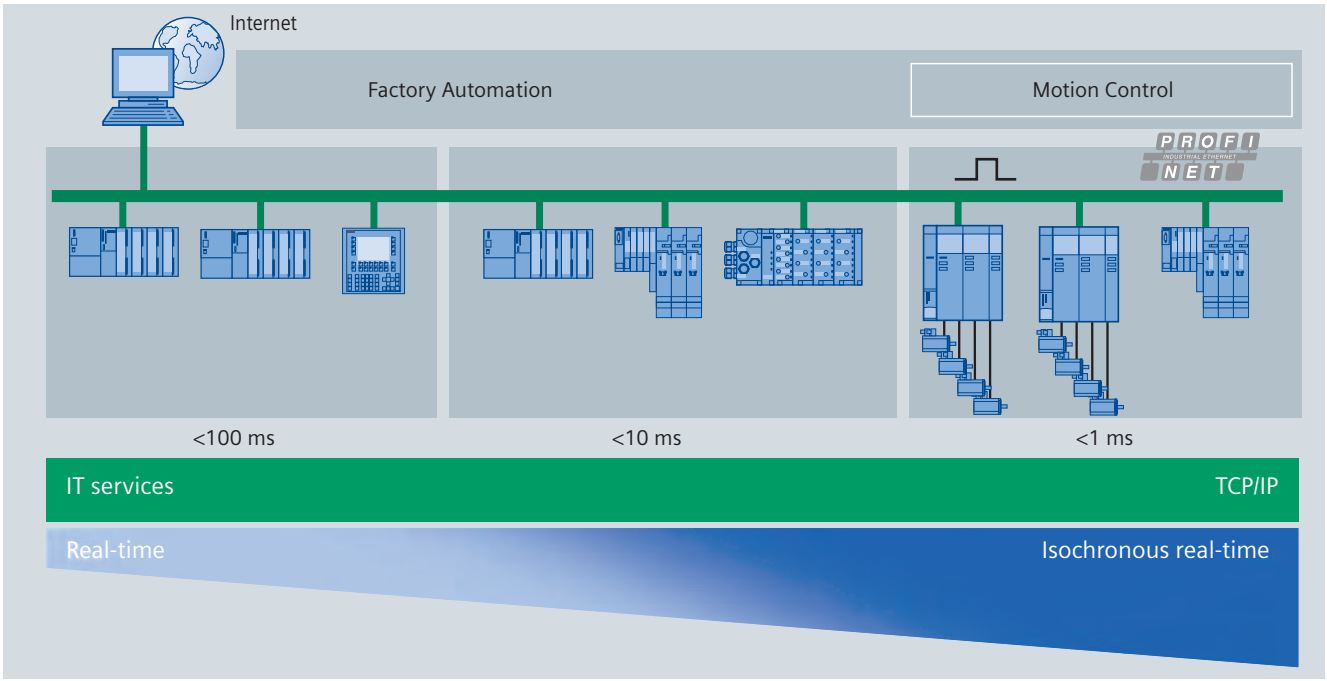
Real-time communication

PROFINET is based on Industrial Ethernet and uses the standard TCP/IP (Transport Control Protocol/Internet Protocol) for parameterization, configuration and diagnosis. Real-time communication for the transmission of useful/process data is performed on the same line. PROFINET devices can support the following real-time properties:

Real-Time (RT) uses the option of prioritizing and optimizing the communication stacks of the stations. This makes high-performance data transmission possible with standard network components in the field of automation.

Isochronous Real-Time (IRT)
For especially demanding tasks, the hardware-supported real-time communication isochronous real-time (IRT) is available – for example, for motion control applications and high-performance applications in factory automation

The ERTEC (Enhanced Real-Time Ethernet Controller) ASICs support both real-time properties This is the basic technology for integrated system solutions using PROFINET. In addition to being integrated into Siemens Products, the ERTEC technology is also made available to other manufacturers. The development of own devices is supported in the form of Development Kits and Competence Centers.



Overview (continued)

Distributed field devices (PROFINET IO)

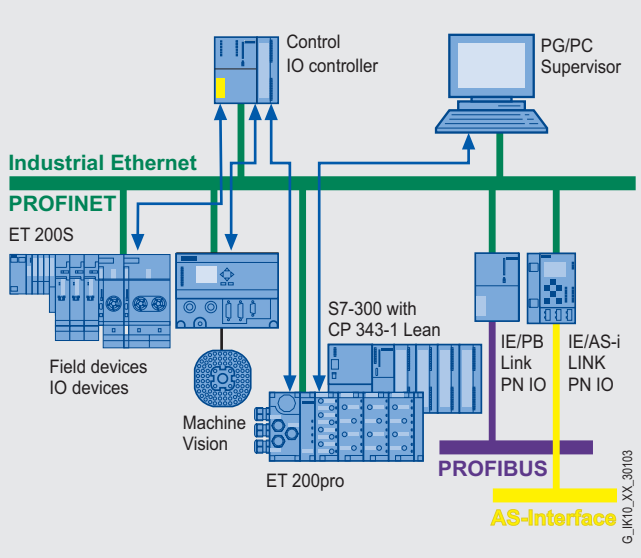
PROFINET IO enables distributed field devices (IO devices such as signal modules) to be connected directly to Industrial Ethernet. During configuration with STEP 7, these field devices are assigned to a central controller (so-called IO-Controller). Existing modules or devices can continue to be used with PROFINET-compatible interfaces or links, which safeguards existing investments by PROFIBUS or AS-Interface users. A configuration with standard and failsafe modules in one station is also possible.

An IO Supervisor serves HMI and diagnostics purposes – as on PROFIBUS – using hierarchical diagnostics dialogs (overview and detailed diagnostics). User data are transferred via real-time communication. Configuration and diagnostics are handled using TCP/IP or IT standards. The simple engineering for PROFINET, field-proven with PROFIBUS, was adopted here. From the viewpoint of programming with STEP 7 there is no difference between PROFIBUS and PROFINET when accessing an I/O device. Users can thus very easily configure field devices on Industrial Ethernet on the basis of the know-how acquired with PROFIBUS.

By retaining the device model of PROFIBUS, the same diagnostics information is available on PROFINET. As well as device diagnostics, module-specific and channel-specific data can also be read out from the devices, enabling simple and fast location of faults.

Alongside the star, tree and ring topologies, PROFINET also consistently supports the line topology shaped by established field-buses. By integrating switch functionality into the devices, as on the S7-300 with CP 343-1, for example, or the SIMATIC ET 200S or ET 200pro distributed field devices, line topologies that are oriented around the machine or plant structure can be formed in the familiar way. This results in savings in cabling overhead and cuts down on components such as external switches.

In addition to the products in degree of protection IP20, a complete portfolio is available for IP65, such as the ET 200pro field device or the SCALANCE X208PRO switch.



PROFINET with distributed field devices

Fieldbus integration

PROFINET permits easy integration of existing fieldbus systems. This requires the use of a proxy, which is a master on the PROFIBUS or AS-Interface system on the one hand and a station on Industrial Ethernet on the other hand and which supports PROFINET communication. This protects the investments of plant operators, mechanical and plant engineers, and device manufacturers.

Motion Control

On the basis of PROFINET and using isochronous real-time (IRT) it is also possible to implement very fast, isochronous drive controls for high-performance motion control applications without any great expense. The standardized drive profile PROFIdrive enables vendor-independent communication between motion controllers and drives, regardless of whether the bus system is Industrial Ethernet or PROFIBUS. Isochronous real-time communication and standard IT communication can be used simultaneously on the same cable without adversely affecting each other.

Distributed intelligence and machine-machine communication (PROFINET CBA)

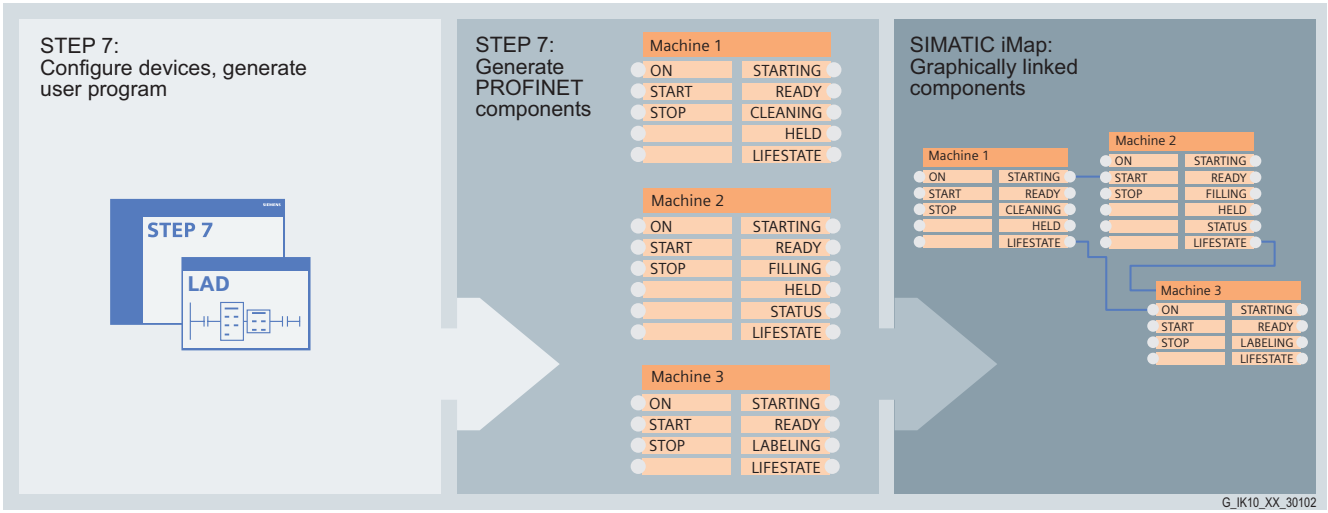
PROFIBUS International has defined a standard for implementing modular plant structures: PROFINET CBA (Component Based Automation). Positive experiences have already been made with modularization for machine and plant construction: Frequently-required parts are ready-made and can be rapidly combined into an individual unit when an order is placed. With PROFINET CBA, modularization can be extended to the automation engineering of the plant with the help of software components.

Software components are understood to be encapsulated, reusable software functions. These can be individual technological functions such as closed-loop controllers, or user programs for entire machines. Like blocks, they can be flexibly combined and easily re-used – regardless of their internal programming. Communication between the software components is carried out exclusively via the component interfaces. On the outside, only those variables are accessible on these interfaces which are required for interaction with other components.

Introduction

Overview (continued)

Software components are created with STEP 7 or other vendor-specific tools. SIMATIC iMap is used for plant-wide configuring of the overall plant using graphical interconnection of the components. The degree of modularization does not determine the number of programmable controllers required. Allocation to one central programmable controller or several distributed controllers allows optimal utilization of the automation hardware



Network installation

PROFINET enables the network to be installed without any specialist knowledge. The open standard based on Industrial Ethernet meets all the requirements relevant to the industrial sector. PROFINET permits the simple construction of the usual network topologies such as star, tree, line and ring for greater reliability and using industry-standard cabling.

The "PROFINET Installation Guide" provides network installation support for manufacturers and users. Symmetrical copper cable or EMI-resistant fiber optic cable is used depending on the application. Devices from different manufacturers are easily connected via standardized and rugged plug connectors (to IP65/IP67).

For address assignment and network diagnostics, PROFINET uses the IT standards DCP (Discovery Configuration Protocol) and SNMP (Simple Network Management Protocol).

PROFINET offers new functions and applications for wireless communication with Industrial Wireless LAN. This enables technologies subject to wear, such as contact wires, to be replaced and permits driverless transport systems or personalized operating or maintenance devices to be used. Industrial WLAN is standard-based but also offers additional functions that permit the high-performance connection of field devices to controllers:

- "Data reservation"
  is used for reserving the bandwidth between an access point and a defined client. This ensures high, reliable performance for this client, regardless of the number of clients operated at the access point.
- "Rapid Roaming"
  for the fast handover of mobile stations between different access points.

These expansions to the standard enable high-performance wireless applications with PROFINET and SCALANCE W right down to the field level.

IT standards & security

In the context of Web integration, the data of PROFINET components is presented in HTML or XML format. Regardless of the tool used, information of the automation level can be accessed from any point with a commercially available Internet browser, thus significantly simplifying startup and diagnostics.PROFINET defines a graded security concept that can be used without specialist knowledge and that largely rules out operator errors, unauthorized access and manipulation, without hindering the production process. For this, the SCALANCE S product range is available with software or hardware modules.

Safety

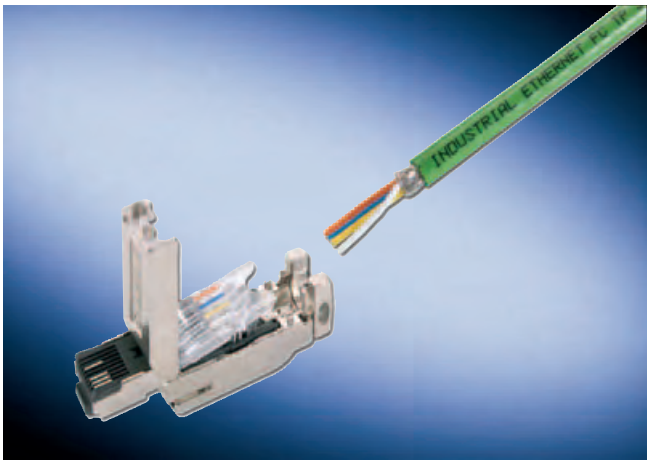
The PROFIsafe safety profile, which has been tried and tested with PROFIBUS and which permits the transmission of standard and safety-related data on a single bus cable, can also be used with PROFINET. Standard switches, proxys and links can also be used for failsafe communication. In addition, failsafe communication is possible via Industrial Wireless LAN (IWLAN). PROFINET thus permits the implementation of standard and failsafe applications with integrated configuration throughout the network – not only when designing new plants, but also when upgrading existing ones

Process

PROFINET is the standard for all applications in automation. By means of the PROFIBUS integration, it also includes the process industry – including hazardous areas

IE FC RJ45 Plug

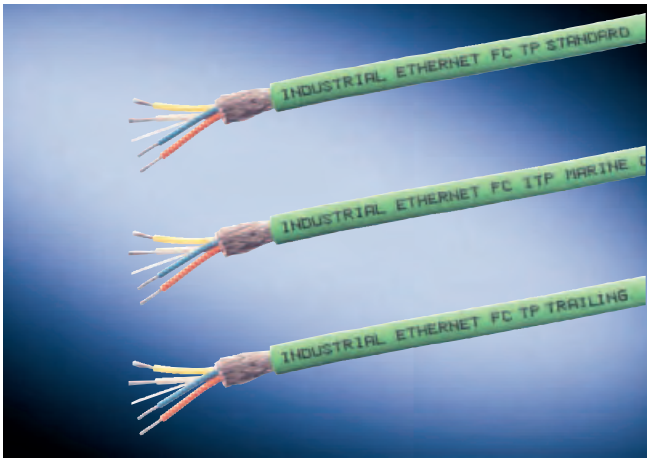
Overview



- Implementation of direct device connections over distances of up to 100 m with Industrial Ethernet FC installation cable 2 x 2 without patching
- Easy connection (insulation displacement contacts) for 4-core Twisted Pair installation cables (100 Mbit/s) without the need for special tools
- Error-preventing connection technique thanks to visible connection area as well as colored blade terminals
- Industry-compatible design (rugged metal housing, no easily lost small parts)
- Excellent EMC shielding and deflection (metal housing)
- Integrated strain-relief for installation cables
- Compatible to the EN 50173 (RJ45) / ISO IEC 11801 standard
- Additional strain and bending relief of plug connector possible through latching of plug on device housing, e.g. with SCALANCE X, SCALANCE S, ET 200S.
- Three design:
  - with 180° (straight) cable outlet ,
  - With 145° (angled) cable outlet (SIMOTION and SINAMICS only)
  - With 90° (angled) cable outlet (for ET 200S)

IE FC TP Cable 2x2

Overview



- For structured cabling in the factory hall; specially designed for fast assembly
- Easy stripping with the FastConnect Stripping Tool; the outer sheath and the braided shield are stripped accurately in one step
- Connection to FastConnect products using insulation displacement
- Exceeds Category 5 (Cat 5e) of the international cabling standards ISO/IEC 11801 and EN 50173
- PROFINET-compatible
- UL approval
- Different variants for different applications :
  - IE FC TP Standard Cable GP
  - IE FC TP Flexible Cable GP
  - IE FC TP Trailing Cable GP
  - IE FC TP Trailing Cable
  - IE TP Torsion Cable
  - IE FC TP Marine Cable
- High interference immunity thanks to double shielding
- Easy length measurement thanks to printed meter markings

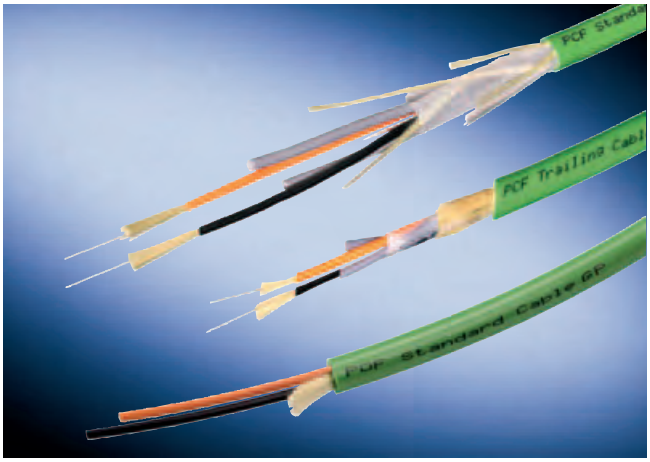
IE FC RJ45 Modular Outlet

Overview

- Simple connection technology (insulation displacement contacts) for 8-core Industrial Ethernet FC twisted pair installation cables (Cat6)
- Safe connection technology thanks to visible connection area
- Industry-standard design
  - robust metal housing
  - Dust covers
- Wall and DIN rail mounting inside or outside control cubicles thanks to IP40 protection
- Good electromagnetic shielding and conduction due to metal housing
- Integral strain relief for 8-core installation cables
- Replaceable inserts for
  - 2 x Fast Ethernet connection
    IE FC RJ45 Modular Outlet Insert 2FE
  - 1 x Gigabit Ethernet connection
    IE FC RJ45 Modular Outlet Insert 1GE
  - 1 x Fast Ethernet connection, 1 x DC 24 V connection
    IE FC RJ45 Modular Outlet Power Insert

POF and PCF fiber-optic cables

Overview



- Electrical isolation of PROFINET/Ethernet devices
- Protection of the transmission path against electromagnetic interference
- Up to 50 m cable length with plastic fiber optic cables and up to 100 m with PCF fiber optic cables
- Rugged fiber-optic standard cables, designed for industrial applications
- Extensive approvals (UL)

POF/PCF FOC termination kit

Overview

- Compact, rugged assembly case for POF and PCF fiber-optic cables
- Special versions for easy assembly of SC RJ plugs on POF and PCF fiber-optic cables
- The quality of the assembly can be checked using the enclosed microscope.

SCALANCE X-200 manged

Overview

- The unmanaged Industrial Ethernet switches of the SCALANCE X-200 product line are optimized for installing Industrial Ethernet networks with 10/100 Mbit/s in a line, star and ring topology
- Electrical or optical connection to stations or network in accordance with the port type of the devices
- Rugged metal housing in S7-300 format for mounting on standard rail, S7-300 standard mounting rail or for direct wall mounting in various positions
- Rugged, industry-standard station connections with PROFINET-compatible plug-in connectors that offer additional strain relief and bending strain relief thanks to latching on the housing
- Redundant power supply
- Diagnostics on the device by means of LEDs (power, link status, data communication)
- Error signaling contact with easy adjustment using the SET button
- The devices feature PROFINET diagnostics, SNMP access, integral Web server and automatic e-mail sending function for remote diagnosis and signaling over the network.

SCALANCE X-200IRT Isochronous Real-Time

Overview

- Especially designed for constructing real-time (RT) and isochronous real-time (IRT) Industrial Ethernet segments in line, star and ring topologies with 10/100Mbit/s (RM integrated); construction of redundant ring connections possible
- Combination of the switching mechanisms "Cut Through“ and "Store and Forward“ for optimized performance
- Electrical or optical connection to stations or network in accordance with the port type of the devices
- Rugged metal housing for space-saving cabinet mounting on standard rails, S7-300 DIN rail or for wall mounting
- Industry-standard compatible station connections with PROFINET-compatible plug-in connectors that offer additional strain relief and bending strain relief thanks to latching on the housing
- Redundant power supply
- Can be used for fault-tolerant applications and can be replaced during normal operation thanks to redundant transmission characteristics
- Diagnostics on the device by means of LEDs (power, link status, data communication)
- Error signaling contact with easy adjustment using the SETbutton
- The devices feature PROFINET diagnostics, SNMP access, integral Web server and automatic e-mail sending function for remote diagnosis and signaling over the network
- Different device versions with copper and fiber-optic interfaces (BFOC, SC RJ)

SCALANCE X101-1POF unmanaged Industrial Ethernet media converter

Overview

- The SCALANCE X101-1POF unmanaged Industrial Ethernet media converter is optimally suitable for converting various transmission media in 10/100 Mbit/s Industrial Ethernet networks with a line, star or ring topology
- Optical connection of stations or network for cabling using POF cables
- Rugged metal enclosure for space-saving installation in control cabinets on standard DIN rail, S7-300 rail or for wall mounting
- Rugged, industry-compatible connection of stations using RJ45 connectors conforming with PROFINET which provide additional protection against tension and bending through latching onto the enclosure
- Redundant power supply
- Diagnostics through LEDs on device (power, link status, data traffic)
- Error message contact with simple setting using SET button

CPUs of the SIMATIC S7-300

Overview

- CPU 315-2 PN/DP:
  see section 4, page 4/21
- CPU 317-2 PN/DP:
  see section 4, page 4/22
- CPU 319-3 PN/DP:
  see section 4, page 4/23
- CPU 315F-2 PN/DP:
  see section 4, page 4/51
- CPU 317F-2 PN/DP:
  see section 4, page 4/52

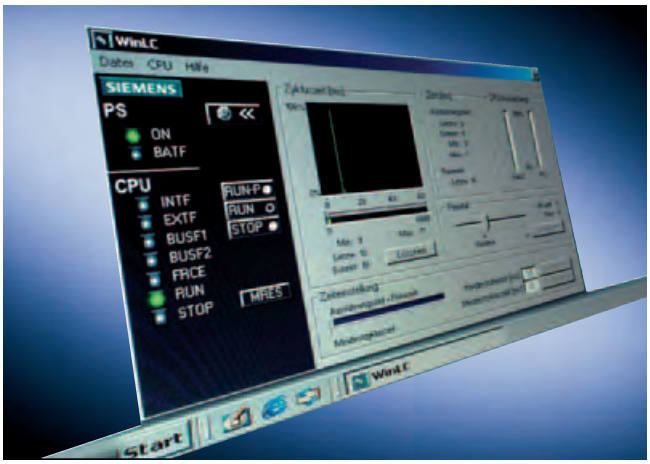
CPUs of the SIMATIC S7-400

Overview

- CPU 414-3 PN/DP:
  see section 5, page 5/10
- CPU 416-3 PN/DP:
  see section 5, page 5/20

SIMATIC WinAC Software PLC

Overview



- SIMATIC WINAC RTX:
  optimized for applications that demand a high level of flexibility and integration.
- The software solution for tasks that demand hard deterministics and high performance.
- With real-time expansion for guaranteeing deterministic behavior for the control component.

SIMATIC WinAC RTX comprises the following components:

- Windows Logic Controller (WinLC RTX).
- SIMATIC NET OPC server.
- Real-time drivers for PROFIBUS-CPs
- Ardence RTX real-time core for guaranteeing real time and deterministics.

Optional:

- CP for connection to PROFIBUS DP:
  - CP 5611 and integral PROFIBUS interface of the SIMATIC PC
  - CP 5613 A2.
- WinAC Open Development Kit (ODK):
  - -for linking C/C++ code in WinAC RTX.
  - -for integrating external software (technological programs) or PC components (e.g. scanner, PC cards for measured value acquisition).

CP 343-1

Overview

PN	ISO	TCP/IP	UDP	PG	S7	S5	IT	FTP
■	■	■	■	■	■	■		

- Connection of SIMATIC S7-300 to Industrial Ethernet
  - 10/100 Mbit/s full/half duplex connection with autosensing
  - connection for RJ45
  - multi-protocol operation with TCP and UDP transport protocol
  - adjustable Keep Alive function
- Communication services:
  - open IE communication (TCP/IP and UDP)
  - PROFINET IO Controller
  - PROFINET CBA
  - Programming device/operator panel communication: Cross-network by means of S7 routing
  - S7 communication (client, server, multiplexing)
  - S5-compatible communication
- Multicast for UDP
- IP address assignment via DHCP, simple PC tool or via the user program (e.g. HMI)
- Access protection by means of configurable access list
- Remote programming and initial startup via the network
- Automatic setting of the CPU clock via Ethernet with NTP or SIMATIC procedure
- SNMP MIB2 diagnostics information for network management systems

CP 343-1 Advanced

Overview

PN	ISO	TCP/IP	UDP	PG	S7	S5	IT	FTP
■	■	■	■	■	■	■		

- Connection of SIMATIC S7-300/SINUMERIK 840D powerline to Industrial Ethernet
  - 10/100 Mbit/s full/half duplex connection with autosensing
  - Connection for RJ45
  - Multi-protocol operation with TCP and UDP transport protocol
  - Adjustable Keep Alive function
- Communication services:
  - Open IE communication (TCP/IP and UDP): Multicast for UDP
  - PROFINET IO controller
  - PROFINET CBA
  - Programming device/operator panel communication: Cross-network by means of S7 routing
  - S7 communication (client, server, multiplexing)
  - S5-compatible communication
  - IT communication:
    HTTP communication supports access to process data through Web browsers;
    FTP communication supports program-controlled FTP client communication,
    Access to data blocks through FTP server,
    Data handling for own file system through FTP,
    E-mail
- IP address assignment via DHCP, simple PC tool or via program block (e.g. for HMI)
- Access protection by means of configurable access list
- Module replacement without programming device; all information is stored on the C-PLUG (also file system for IT functions).
- Extensive diagnostic functions for all modules in the rack
- Integration into network management systems through the support of SNMP V1 MIB-II

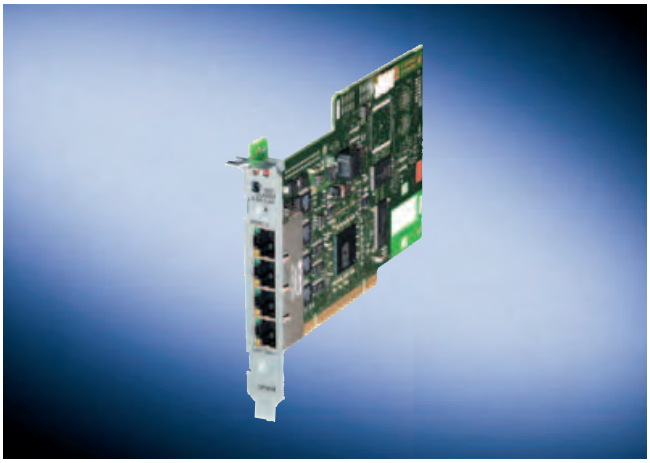
Overview

PN	ISO	TCP/IP	UDP	PG	S7	S5	IT	FTP
■	■	■	■	■	■	■	■	■

- Connection of SIMATIC S7-400 to Industrial Ethernet
  - 10/100 Mbit/s full/half duplex connection with autosensing
  - connection via RJ45
  - multi-protocol operation for ISO, TCP/IP and UDP
  - adjustable Keep Alive function
- Communication services:
  - Open IE communication (TCP/IP and UDP): Multicast for UDP
  - PROFINET IO Controller
  - PROFINET CBA
  - Programming device/operator panel communication: Cross-network by means of S7 routing
  - S7 communication
  - S5-compatible communication
  - IT communication: HTTP communication supports access to process data through Web browsers; FTP communication supports program-controlled FTP client communication, Access to data blocks through FTP server, Data handling for own file system through FTP, E-mail
- IP address assignment via DHCP, simple PC tool or via the user program (e.g. HMI)
- Access protection by means of configurable access list
- Single-width module with integrated 4-port switch saves space in the rack and control cabinet. Thanks to the integrated autocrossing function, the CP 443-1 Advanced is very well suited for establishing small local networks.
- Module replacement without programming device; all information is stored on the C-PLUG (also file system for IT functions).
- Extensive diagnostic functions for all modules in the rack
- Integration into network management systems through the support of SNMP V1 MIB-II

CP 1616

Overview

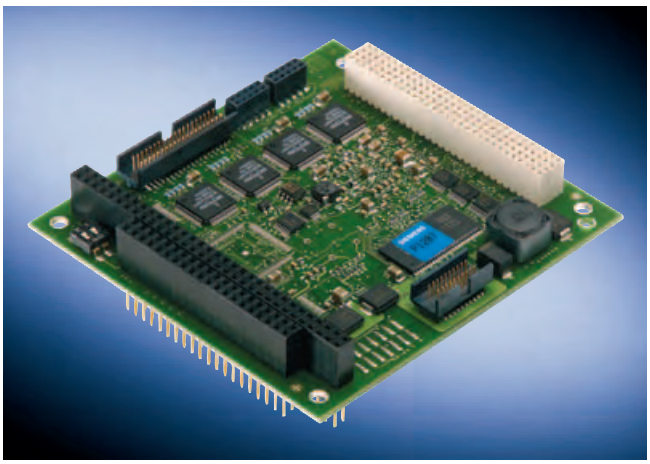


- PCI module for connecting PCs and SIMATIC PGs/PCs to PROFINET IO
- Full-duplex/half-duplex with autonegotiation (universal key 3.3 V and 5 V; 33 MHz / 66 MHz; 32 bit, executes in 64-bit PCI-X systems)
- With Ethernet real-time ASIC ERTEC 400
- Integral 4-port real-time switch
- Communication services:
  - PROFINET IO controller and/or PROFINET IO device (RT)
  - support of IRT in Motion Control applications (available soon)
- High performance through direct memory access
- Integration in network management systems through the support of SNMP I (available soon)
- Comprehensive diagnostics possibilities for installation, start-up and operation of the module
- Powerful configuration tools are included in delivery of module

PN	ISO	TCP/IP	UDP	OPC	PG	S7	S5	IT	FTP
■		■							

CP 1604

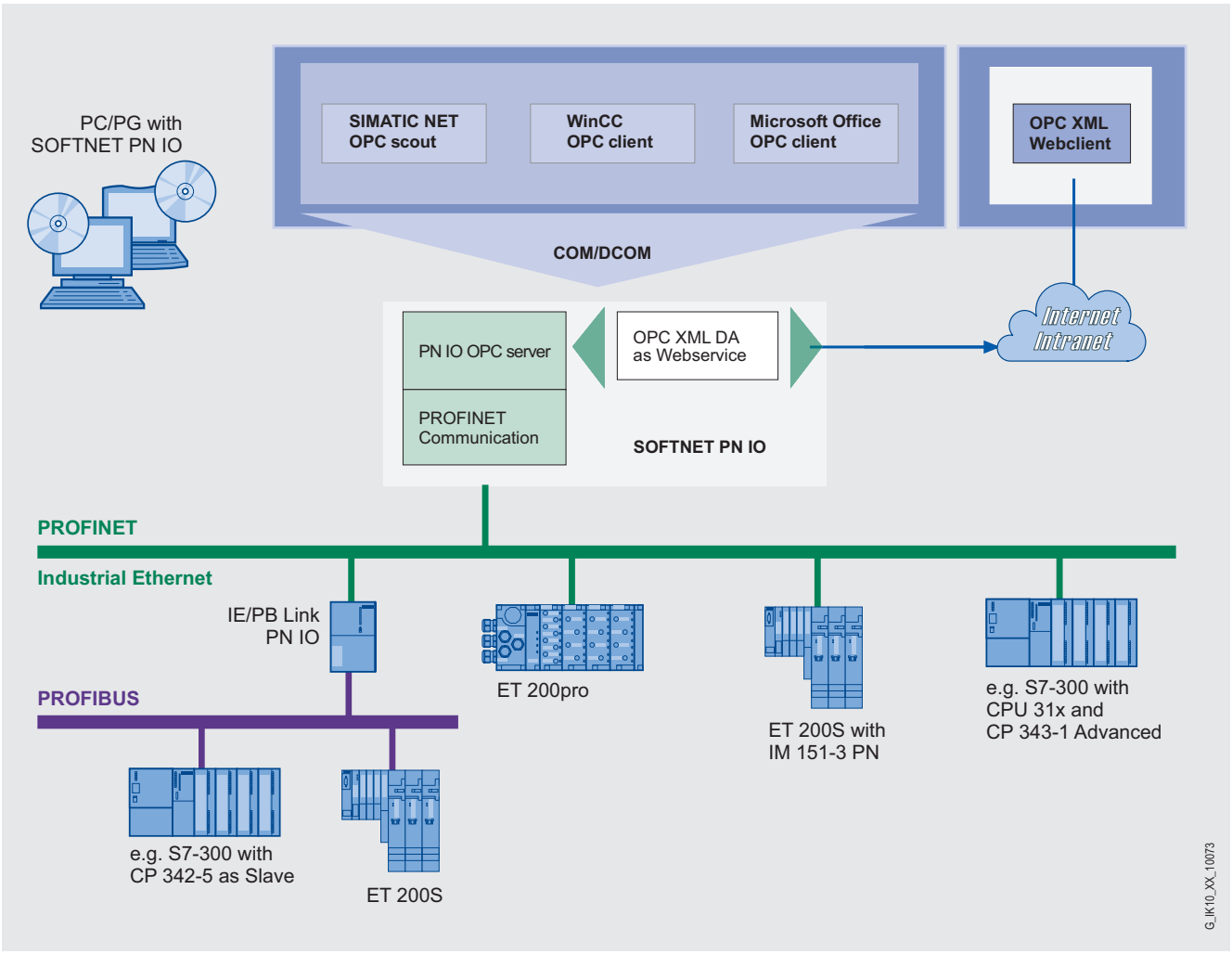
Overview



- PC/104 Plus module for connecting PC/104 Plus systems to PROFINET IO
- Full/half duplex with autonegotiation
- With Ethernet real-time ASIC ERTEC 400
- Integral 4-port real-time switch
- Communication services:
  - PROFINET IO controller and/or PROFINET IO device
  - support of IRT in motion control applications
- High performance through direct memory access
- Integration in network management systems through the support of SNMP
- Comprehensive diagnostics possibilities for installation, start-up and operation of the module
- Powerful configuration tools are included in delivery of module

PN	ISO	TCP/IP	UDP	OPC	PG	S7	S5	IT	FTP
■		■							

Overview



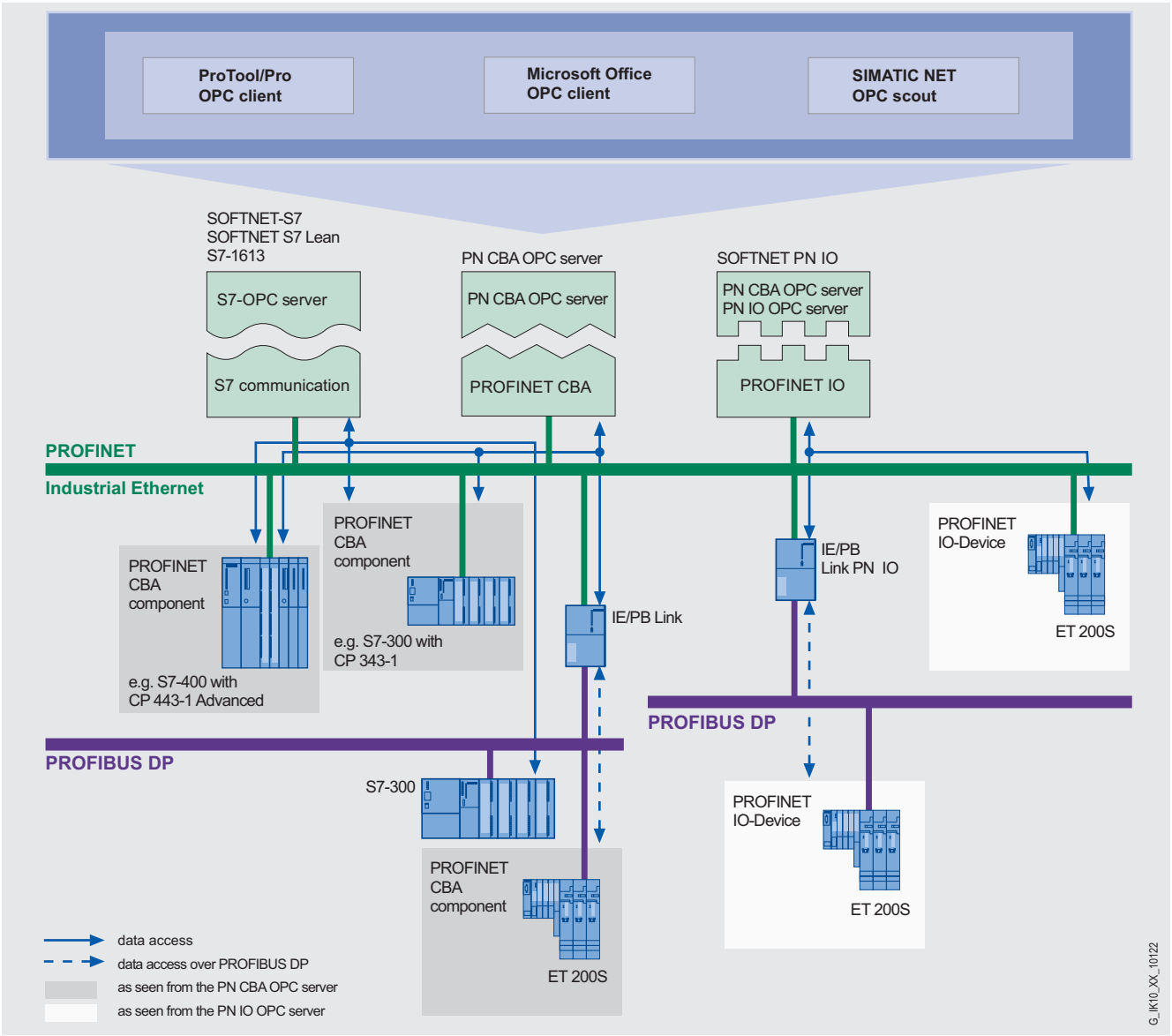
PN	ISO	TCP/IP	UDP	OPC	PG	S7	S5	IT	FTP
■		■		■					

- Software with PROFINET IO-Controller function for coupling PG/PC and IPC with PROFINET IO-Devices
- Possible applications:
  - PC-based control systems
  - HMI systems
  - test applications
- Communication services:
  - PROFINET IO Controller
- Can be used with
  - CP 1612 (PCI)
  - integrated interfaces of SIMATIC PG/PC
  - additional information regarding application can be found in the Internet under: www.siemens.com/simatic-net/ik-info
- Cost-effective solution for the low-end performance range
- OPC server for I/O interfacing over PROFINET included in scope of supply

PN CBA OPC server

Overview

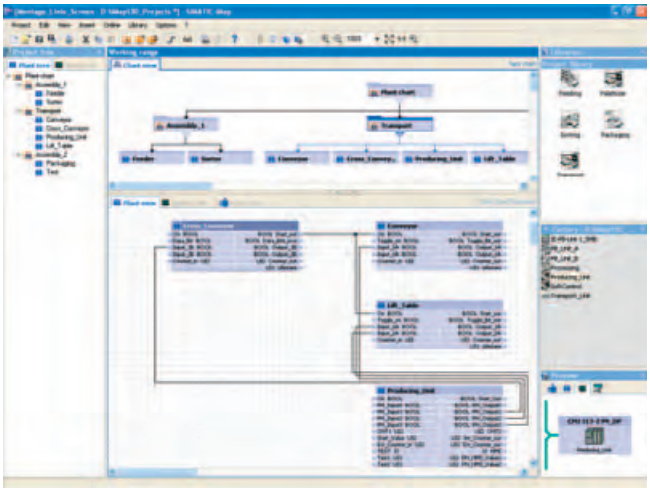
- Access to variables in PROFINET CBA components over the OPC interface
- Use of the objects and symbols defined using the PROFINET engineering tool SIMATIC iMap and STEP 7
- Adding PROFINET functionality to existing installations. This enables it to be used in parallel with other communication protocols such as S7 communication with SOFTNET-S7 for Industrial Ethernet.
- OPC Scout as an OPC client with browser functions for the variables of the PROFINET CBA components



System integration with the PN CBA OPC server

SIMATIC iMap

Overview



- Component-based software tool for configuring the communication in distributed automation solutions
- For easy graphical configuration of the communication between subsystems and machine-to-machine communication in the production line
- Based on the PROFINET standard
- Open for PROFINET devices from various manufacturers on Industrial Ethernet
- Runs under Windows 2000, Windows XP Professional and Windows 2003 Server
- Actual version: SIMATIC iMap V3.0
- Trial-Version on CD-ROM
  „Component Based Automation - Be ahead with modularity“, order no. E20001-W100-M110-X-7400;
  can be ordered under
  www.siemens.com/simatic/printmaterial

IM 151-3 PN interface modules

Overview

- Interface module for linking the ET 200S to PROFINET
- Handles all data exchange with the PROFIBUS I/O Controller
- With integrated 2-port switch for line topology
- 2 versions:
  - IM151-3 PN STANDARD
  - IM151-3 PN HIGH FEATURE (available soon); supports, in contrast to the STANDARD version, the operation of PROFIsafe F modules

Micro Memory Card required for operation of CPU.

IM 154-4 PN interface module

Overview

- Interface module for processing the communication between ET 200pro and a higher-level controller over PROFINET IO.

SIMATIC VS 130-2

Overview

- The SIMATIC VS130-2 vision sensor has been developed especially for reading data matrix codes (DMC) ECC200 in an industrial environment. More 2D codes and 1D codes are also available making the vision sensor into a complete code reader:
- 1D codes (barcodes):
  - code 39,
  - code 128,
  - interleave 2/5,
  - EAN13.
- 2D codes:
  - data matrix code (DMC) according to ECC200,
  - QR (alphanumeric characters; without subversions: truncated, macro, micro),
  - PDF417 (without subversions: Macro, micro),
- SIMATIC VS130-2 reads codes on different construction elements and surfaces, e.g. (incomplete listing):
  - paper or plastic labels,
  - plastic parts,
  - circuit boards,
  - metallic objects.
- SIMATIC VS130-2 reads codes of different types of markings, e.g. (incomplete list):
  - printed,
  - stamped,
  - lasered,
  - drilled.
- No parameter definition for adapting to the various support materials and types of marking is required by the user. "Training" is performed automatically by presenting a readable code pattern. Programming and parameterization are not required.
- Can be used in principle for the following applications:
  - coded information can be read out,
  - the coded information is compared with a defined character sequence,
  - quality assessment of the marking process (exclusively DMC).
- Parameters are set using the web-based operator interface which runs on various platforms with the following requirements: Browser (IE5.5 and higher), JAVA-VM (MS, SUN).
- The web-based operator interface is also used for controlling the device from an HMI device. In this case, the requirements mentioned above also apply with regard to the browser and JAVA VM
- Remote maintenance concept using web-based operator interface.
- Remote controlled with integrated digital inputs, PROFIBUS or PROFINET IO.
- Can be supplied as a complete package in several variations for different object sizes
- The product is available in 6 languages (operator interface, manual and online help are available in German, English, French, Spanish, Italian and Chinese).

IWLAN/PB Link PN IO

Overview

PN	DP-M	DP-S	ASi-M
■	■		

- Compact router between Industrial Wireless LAN and PROFIBUS
- Flexible integration of field level systems into an IWLAN radio infrastructure according to IEEE 802.11b/g and IEEE 802.11a with up to 54 Mbit/s at 2.4 GHz or 5 GHz with SCALANCE W Access Points
- PROFINET IO proxy;
  connection of PROFIBUS DP slaves to PROFINET IO controller according to PROFINET standard:
  - from the viewpoint of the IO-controller, all DP slaves are handled like I/O devices with Ethernet interface, i.e. the IWLAN/PB Link PN IO is their proxy.
  - from the viewpoint of the DP slaves, the IWLAN/PB Link PN IO is the DP master
- Connection of a WLAN antenna or alternatively an antenna for operation with an RCoax cable (radiating cable)
- Communication with programmable controllers in mobile applications such as automated guided vehicles, storage and retrieval systems or monorail overhead conveyors
- Direct substitution of solutions with Power Rail Booster for PROFIBUS with non-contact data transmission technology; Advantages: No wear of sliding contacts
- For installation in the casing of the Power Rail Booster (common with overhead conveyor and automated guided vehicles) to degree of protection IP20
- High, reliable data throughput together with rapid roaming
- High degree of protection against unauthorized access thanks to 128-bit encoding (AES)
- Module replacement without the need for a programming device, using the C-PLUG swap media for backing up the configuration data
- Integration in STEP 7

IE/PB Link PN/IO

Overview

PN	DP-M	DP-S	ASi-M
■	■		

- Compact network transition between Industrial Ethernet and PROFIBUS
- Connection to Industrial Ethernet
  with 10/100 Mbit/s full/half duplex connection with autosensing for automatic switchover
- Connection to PROFIBUS
  with 9.6 kbit/s to 12 Mbit/s incl. 45.45 kbit/s for PROFIBUS PA
- PROFINET IO proxy;
  connection of PROFIBUS DP slaves to PROFINET IO controller via real-time communication (RT) according to PROFINET standard:
  - from the viewpoint of the IO-controller, all DP slaves are handled like I/O devices of the Ethernet interface, i.e. the IE/PB Link PN IO is its proxy.
- Cross-network programming device/operator panel communication by S7 routing,
  i.e. all S7 stations can be remotely programmed by the programming device on the Industrial Ethernet or PROFIBUS.
- Cross-network access to data of S7 stations for visualization by means of S7 OPC server and S7 routing;
  - via the IE/PB Link PN IO access can be made from the PC on the Industrial Ethernet (e.g. for HMI applications with OPC Client interface) by means of S7 OPC server, to all data of the S7 stations on the PROFIBUS.
- Module replacement without the need for a PG, using the C-PLUG swap media for backing up the configuration data

IE/PB Link

Overview

PN	DP-M	DP-S	ASi-M
■			■

- Compact network transition between Industrial Ethernet and PROFIBUS
- Connection to Industrial Ethernet with 10/100 Mbit/s full/half duplex connection with autosensing for automatic switchover
- Connection to PROFIBUS with data transmission rates of 9.6 kbit/s to 12 Mbit/s incl. 45.45 kbit/s for PROFIBUS PA
- PROFINET Standard Version V1.0.
- IE/PB Link supports the PROFINET communication services for data communication between the PROFINET devices and is a proxy for PROFIBUS field devices.
- PROFINET defines an engineering model for distributed automation solutions and a model for integrated communication over PROFIBUS and Industrial Ethernet with IT standards.
- Cross-network programming device/operator panel communication by S7 routing, i.e. all S7 stations can be remotely programmed using the programming device on the Industrial Ethernet or PROFIBUS.

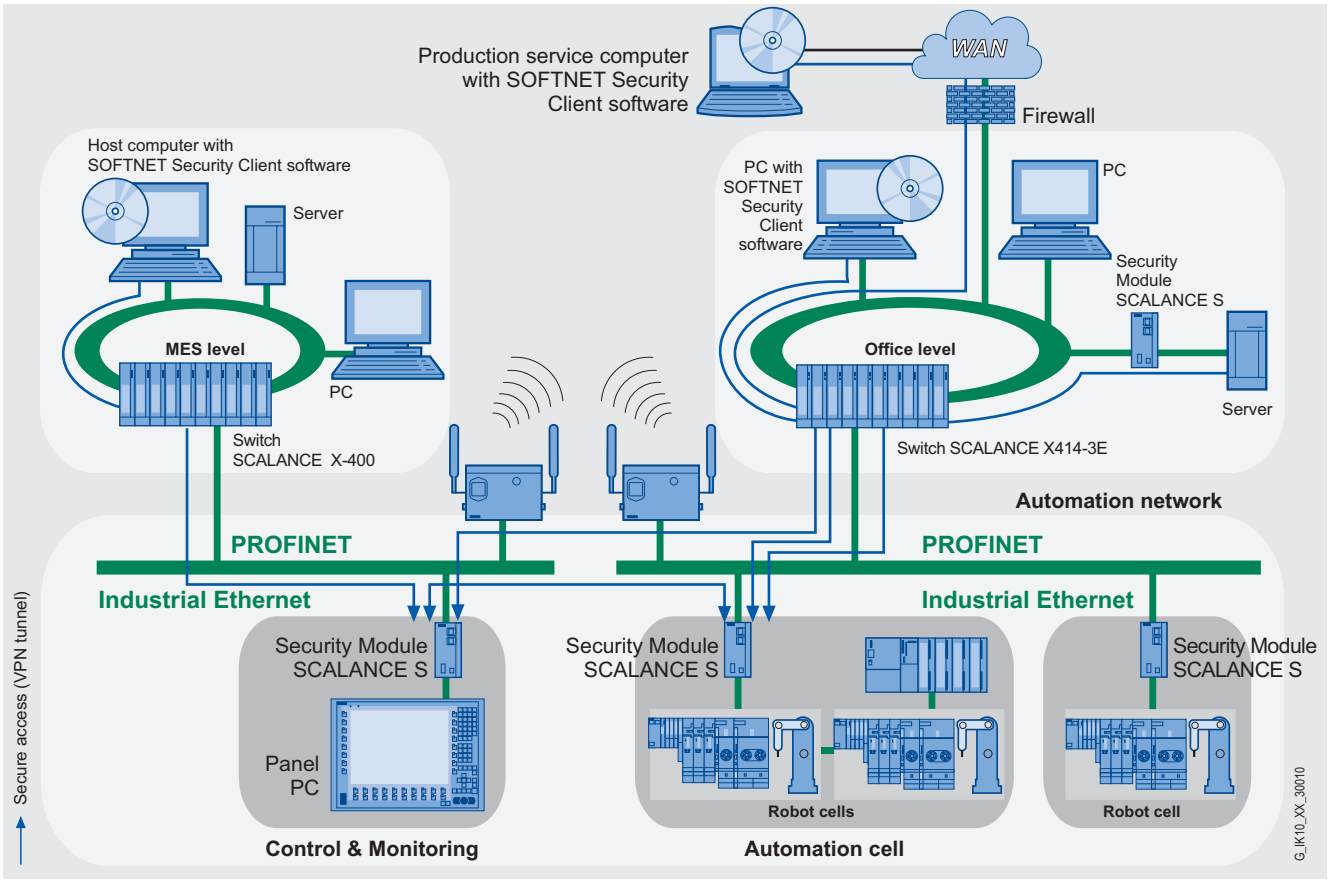
IE/AS-i Link PN IO

Overview

PN	DP-M	DP-S	ASi-M
■			■

- Compact network transition between Industrial Ethernet (PROFINET IO device) and AS-Interface
- Single and dual AS-Interface master (according to AS-Interface specification V3.0) for connecting 62 AS-Interface slaves
- High-performance, integrated analog value transmission
- Integral earth-fault monitoring for the AS-Interface cable
- Simple diagnostics and startup on site using a pixel-graphics display and operator keys or Web interface with standard browser
- Optimum TIA integration through STEP 7, integration in engineering tools from other vendors through PROFINET type file (GSDML)
- Vertical integration (standard Web interface) through Industrial Ethernet
- Power supply from the AS-Interface cable or alternatively with 24 V DC (optional)
- Module replacement without PG by using C-PLUG (optional)

Overview



Secure communication with SCALANCE S

Modern automation technology is based on communication and the trend toward increased networking of individual manufacturing islands. It is becoming more and more important to integrate all the manufacturing components into a uniform network that merges with the office network and the corporate Intranet. There is also a requirement for remote access for servicing, the increasing use of IT mechanisms such as Web servers and e-mail with programmable controllers as well as the use of wireless LANs. In this manner, industrial communication interacts more and more with the IT environment and is now subjected to the same dangers that are well-known from the office and IT environment, such as hackers, viruses, worms and Trojans.

The current security concepts are tailored to the office world and require constant administration and specialist knowledge. They are not usually conversant with the special protocol landscape of industrial communication and are not designed to withstand the harsh environmental conditions.

With its security concept, Siemens offers a safety solution specially designed for industrial automation engineering that satisfies the specific requirements of this application environment.

Advantages of industrial security concept:

- Protection from espionage and data manipulation
- Protection against overloading of the communication system
- Protection against mutual interference
- Protection against addressing mistakes
- User-friendly and simple configuration and administration without specialist knowledge of IT security
- No changes or modification of the existing network structure are necessary
- No changes or modification of the existing applications or network stations are necessary
- Rugged, industry-compatible design

SCALANCE S security modules offer a scaleable security functionality:

- Firewall for protecting the programmable controllers from unauthorized access regardless of the size of the network to be protected.
- Supplementary or alternative VPN (Virtual Private Network) for reliable authentication of the communication partners and encryption of the transmitted data

SOFTNET Security Client for secure access of PCs/notebooks to programmable controllers protected by SCALANCE S.

SCALANCE S

Overview

- Security modules for the protection of automation networks and security during data exchange between automation systems.
- Communication is only possible between authenticated and authorized devices
  - protection against operator mistakes
  - prevention of unauthorized access
  - prevention of faults and communications overload
- Easier handling thanks to minimal configuration and no special knowledge of IT security is required
- No modification or adaptation of the existing network structure, applications or stations is required
- Safeguarding of communication is independent of the protocol (e.g. PROFINET or other Ethernet-based fieldbus solutions)
- Module replacement without the need for a programming device, using the C-PLUG swap media for backing up the configuration data (not included in the scope of supply)

SCALANCE S602

- Basic version with firewall functionality
- In addition to bridge mode, can also be operated in router mode and can therefore also be used directly at IP subnet limits
- Address translation
  - NAT (Network Address Translation) permits the use of private IP addresses in the internal network in that public IP addresses are converted to private ones
  - NAPT (Network Address and Port Translation) permits the use of private IP addresses in the internal network in that frames are converted to private IP addresses depending on the communications port used
- Internal network nodes can receive their IP addresses from the integral DHCP server
- Log files can also be evaluated by the Syslog server
- Simple and fast configuration of the firewall through global firewall rules and symbolic names for IP addresses

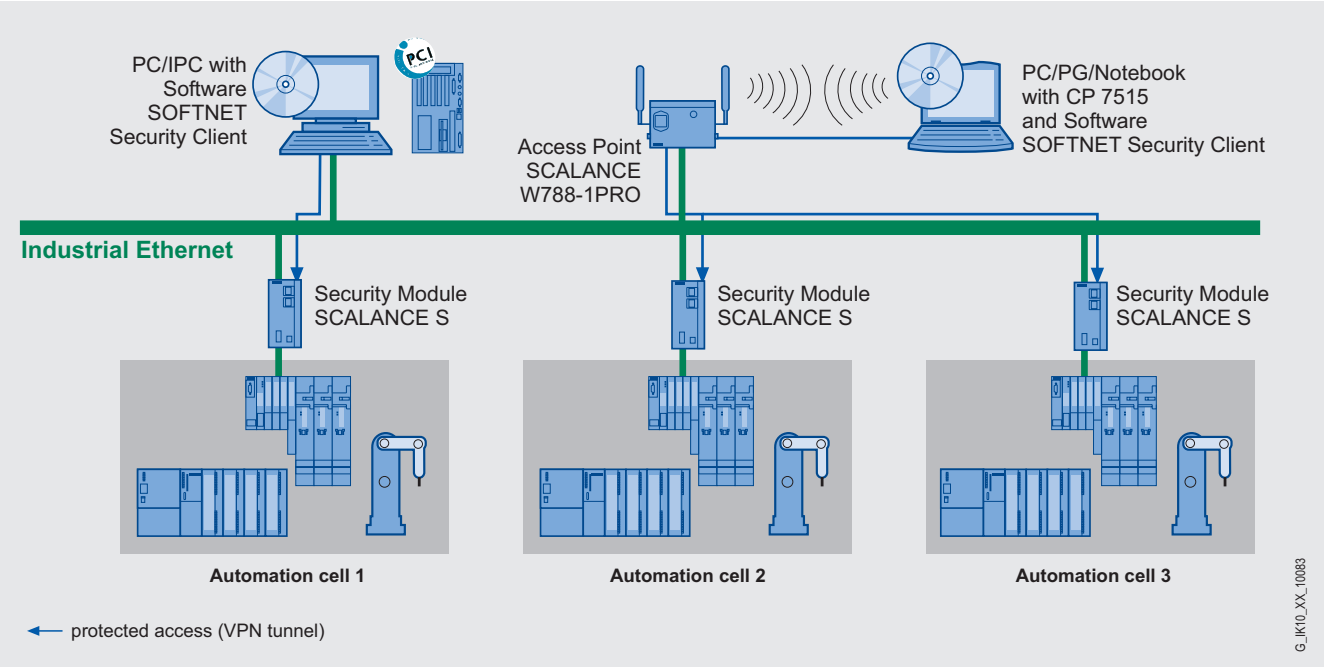
SCALANCE S612 and SCALANCE S613

- Encryption of data transmission
  - protection against espionage
- protection against unauthorized manipulation

SOFTNET Security Client

Overview

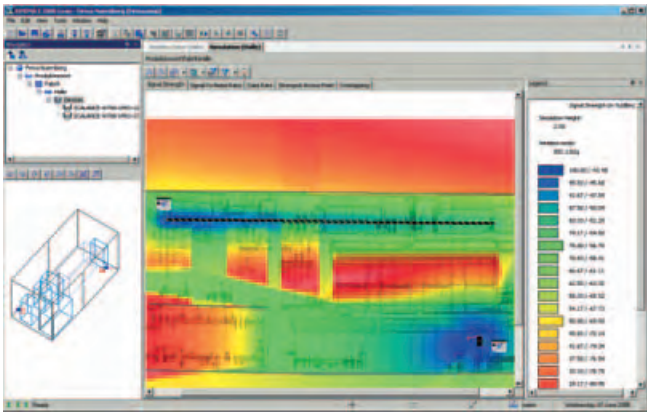
- SOFTNET Security Client is a component part of the industrial security concept for protecting automation devices and for security during data exchange between automation systems.
- VPN client for programming devices, PCs and notebook computers in the industrial environment;
  secure VPN client access is supported through SCALANCE S protected automation systems
- Data transmission is protected against incorrect user operation, listening in, espionage and malignant intervention; communication can only take place between authenticated and authorized devices
- Uses the IPSec mechanisms already tried and tested in the office sector for setting up and operating VPNs.



Secure access to automation cells secured by SCALANCE S612/S613 with SOFTNET Security Client

SINEMA E Lean

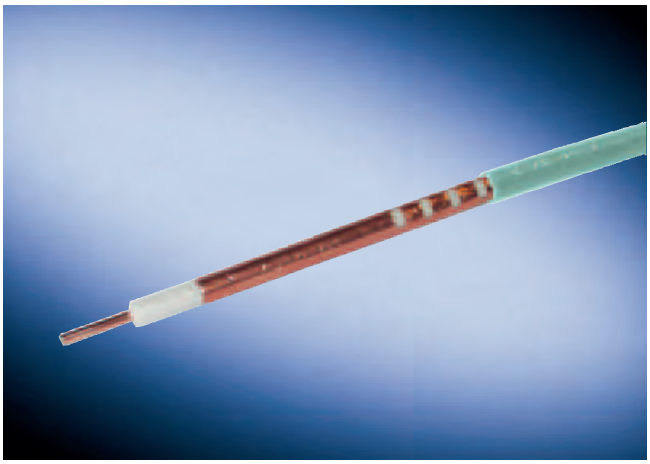
Overview



- Planning, simulation and configuration software for Industrial Wireless LAN (IWLAN) applications according to standard 802.11 a/b/g
- Visualization of IWLAN networks e.g. according to coverage, data transfer rate, signal/noise ratio and overlapping with consideration of environmental and device characteristics
- Configuration of single and multiple devices as well as uploading/downloading of IWLAN device parameters
- Integrated and expandable catalog entries for WLAN devices, antennas and radio hindrances as well as standard graphics formats for importing layout plans
- Report function for documentation of configured IWLAN environment and device characteristics

IWLAN RCoax Cable

Overview



The RCoax cables are radiating cables that function as special antennas for the SCALANCE W Access Points in environments with complex radio coverage. Its design means that a defined, cone-shaped radio field is generated along the RCoax cable. The radiating cables are therefore perfectly suitable for use in environments with complex radio coverage and in any type of track vehicle.

- Rugged coaxial cable which can be easily installed
- Two cables for use in the Industrial Wireless LAN sector with frequency bands 2.4 GHz and 5 GHz
- Supply stations based on the SCALANCE W-780 Access Points
- Mobile stations (e.g. Ethernet Client Module SCALANCE W740, IWLAN/PB Link PN IO)

SCALANCE W-780 Access Points

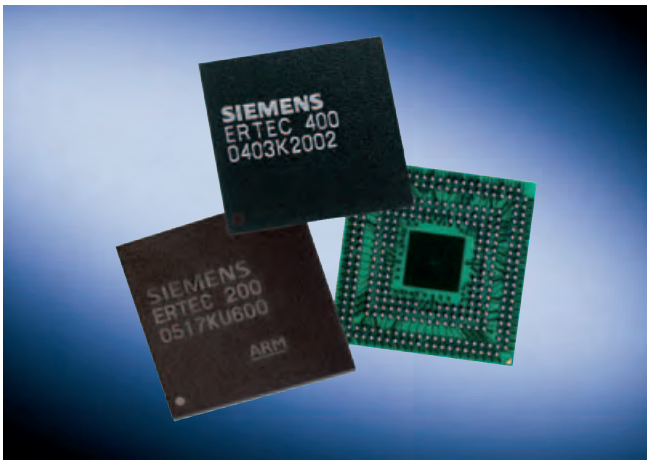
Overview

SCALANCE W-780 Access Points are optimally suitable for designing Industrial Wireless LANs (IWLAN) with reliable communication and for use in the PROFINET environment.

- In conformance with standards by supporting of IEEE 802.11, with additional functional expansions especially for use in industrial environments
- Rugged metal housing and degree of protection IP65 for protection against the ingress of water and dust; also for outdoor use at -20°C to +60°C (resistant to condensation)
- Protection against unauthorized access, espionage, tapping and falsification thanks to WPA2/IEEE 802.11i and 128-bit encoding (AES)
- Optional operation at 2.4 GHz or 5 GHz with data rates of up to 54 Mbit/s in one device
- Several operating modes in one device:
  - set up of wide area wireless networks (infrastructure) with ranges of up to 30 m indoors (about 100 m outdoors)
  - point-to-point connection of Industrial Ethernet segments over large distances (several 100 m)
- Support during configuration provided by wizard and online help.
- Simple management with Web server and SNMP
- Fast replacement of devices in event of failure, by means of optional C-PLUG (configuration plug) switching medium
- Comprehensive accessories with antennae, plugs, cables including RCoax cable (fiber-optic cable) for controlled emittance of the transmitted power

Enhanced Real-Time Ethernet Controller ERTEC

Overview



PROFINET IO uses Fast Switched Ethernet as the communications basis with a transmission rate of 100 Mbit/s. The required functions are supported by hardware ASICs of the ERTEC range (Enhanced Real-Time Ethernet Controller), and high-performance values are achieved. Previously required discrete components have been included in the ERTECs as a system-on-chip.

These high-performance Ethernet controllers with integral real-time switch and 32-bit microprocessor have been specially designed for industrial applications. It is then possible to implement powerful PROFINET connections in the smallest possible space.

The ERTEC 200 is available for simple field devices, and the ERTEC 400 for controllers and network components.
They feature a rugged design, specific automation functions, and openness for the IT world.

- Easy space-saving connection of devices to switched 10/100 Mbit Ethernet
- No need for external network components since the switches are integrated into the device
- Integral high-performance ARM 946 processor for optimum integration of communications and applications
- Specific communication functions for automation technology secure the position of the technology as front runner for time-critical applications through real-time characteristics
- The DK-ERTEC development kits and global technical support help towards implementation

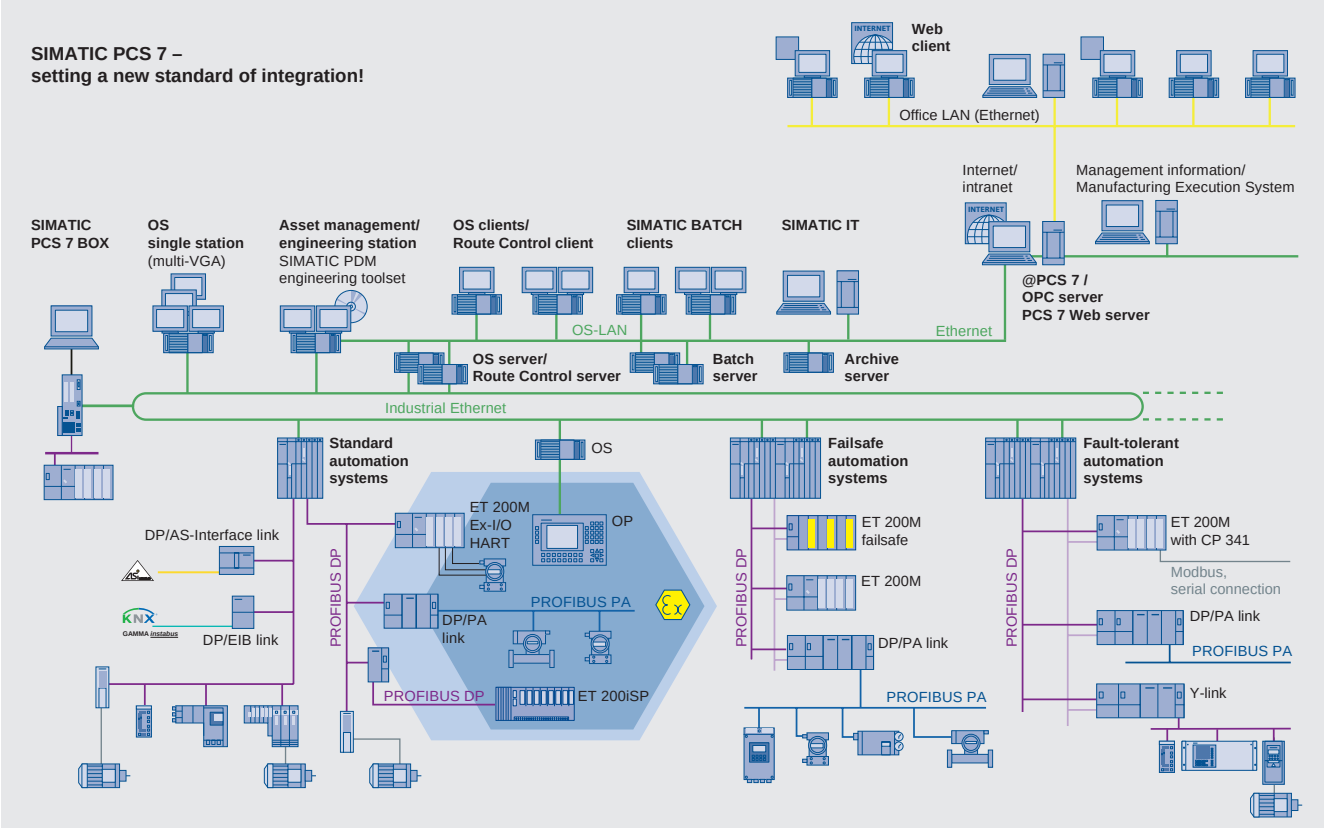
Development Kits for ERTEC

Overview

- The DK-ERTEC 200 PN IO and DK-ERTEC 400 PN IO Development Kits are available for development of PROFINET and Industrial Ethernet devices with integral real-time switch
- Possible applications:
  - development of IO field devices (as PROFINET IO-Device) with a PROFINET interface
  - development of drives with PROFINET
  - development of any other device with an Industrial Ethernet interface

Introduction

Overview



SIMATIC PCS 7 system configuration

Totally Integrated Automation with SIMATIC PCS 7

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

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

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

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

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

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

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

Benefits

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

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

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

Function

A uniform and homogeneous overall system

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

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

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

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

Flexibility and scalability

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

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

Open for the future

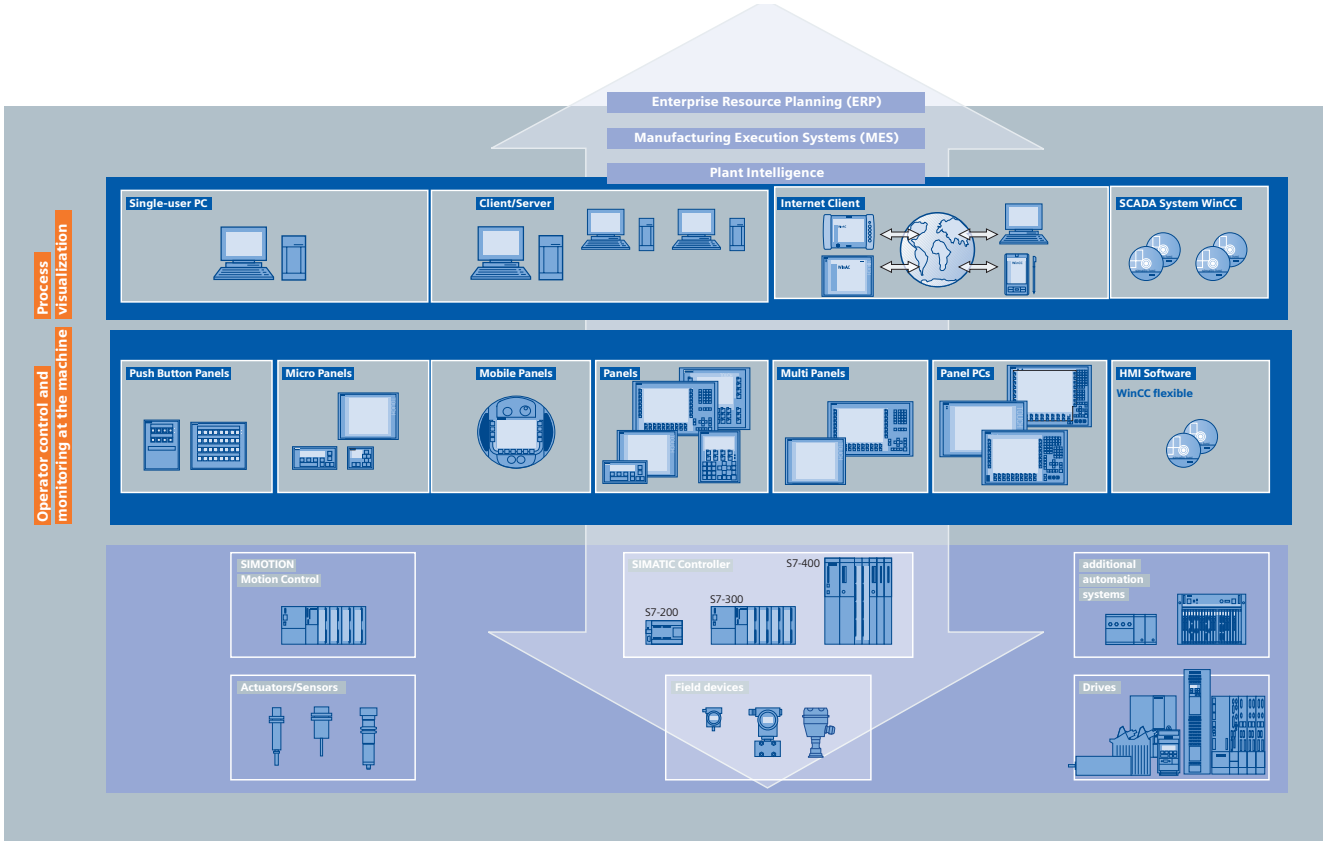
SIMATIC PCS 7 is based on modular hardware and software components, which are perfectly matched to one another due to their conformance with TIA. These components are flexible and expandable, and are open for future enhancements through the use of standard interfaces with long-term stability. This means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

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

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

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

Overview



SIMATIC HMI
Human Machine Interface

The interface between human and machine - the human machine interface or HMI for short - connects the world of automation with the individual requirements of the operator. Operator control and monitoring is about managing the process, about optimizing machine and system operation, about availability, productivity, etc.

Shaping and influencing progress

Processes are becoming more complex and machine and system function requirements are on the increase.

Making the increasingly complex increasingly simple is our incentive whenever we develop new HMI products. Open, standardized hardware and software interfaces support application options all over the world. Beyond the automated process, SIMATIC HMI is an integral part of the company-wide IT landscape.

All the advantages of Totally Integrated Automation

Totally Integrated Automation (TIA) means that Siemens is the only company offering a uniform and integrated range of products and systems for automating the complete production workflow. TIA is characterized by unique uniformity. Its reduced interface requirements provide maximum transparency. The time and costs required for engineering of the automation solution are reduced, and plant availability is increased during runtime.

As part of TIA, SIMATIC WinCC flexible, the uniform engineering tool of the SIMATIC HMI operator panels, uses the same database as STEP 7, the programming software of the SIMATIC controllers. This saves input requirements, and guarantees data consistency at all times.

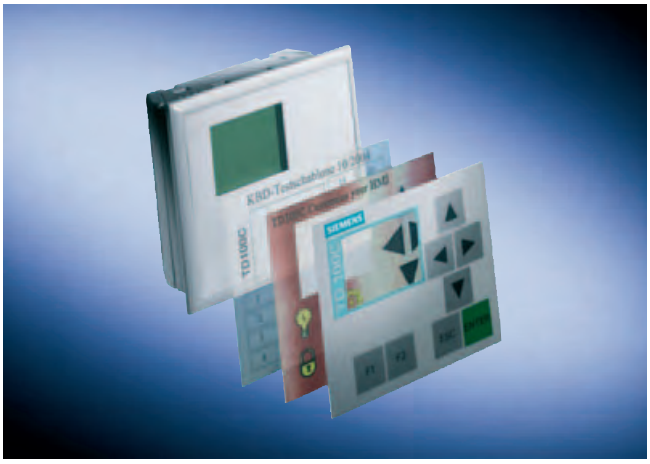
When working together with other SIMATIC components, SIMATIC HMI additionally supports system and process diagnostics during runtime. For example, you can start the STEP 7 diagnostics for comprehensive error diagnostics from the circuit diagram up to the PLC program directly from WinCC. Furthermore, SIMATIC ProAgent can be used to display process diagnostics messages from the PLC on operator panels or visualization systems - without further configuration overhead for the HMI system and without additional diagnostics instruments.

SIMATIC HMI - All you need for operator control and monitoring

SIMATIC HMI offers a complete range of products for the many and varied tasks involved in operator control and monitoring, from simple control units to process visualization systems. Customized solutions are also possible.

SIMATIC TD 100C

Overview



The TD 100C text display is a low-cost solution for simple HMI tasks with the SIMATIC S7-200. The GUI can be printed individually, permitting optimum adaptation of the device to the environment of use.

The TD 100C is simply connected to the PPI interface of the S7-200 using the optional cable. A separate power supply is not required. Several TDs can also be connected to one S7-200.

- Low-cost text display for the S7-200 with individual display
- For operation and monitoring: display of message texts, access to the PLC program, setting of inputs and outputs
- Direct connection to CPU interface
- No separate power supply required
- No separate parameterization software required
- Individual front design possible
- Addressing and setting of contrast using provided menu

Further information:

- Catalog ST 80
- Internet: http://www.siemens.com/panels

Mobile Panel 177 / Mobile Panel 277

Overview

Irrespective of the sector or application, the portable SIMATIC Mobile Panels provide decisive advantages when mobility is required for local operation and monitoring of machines and plants: machine operators or commissioning engineers can move to a position where they have the best possible view of the workpiece or process. Mobile operator panels also enable fast and exact setting up and positioning during the commissioning of large production plants, complex or enclosed machines, long transfer and production lines, and in conveyor technology. They guarantee shorter downtimes during retooling, maintenance or troubleshooting.

Simple and reliable reconnection is possible during runtime, permitting flexible use on a machine or plant:

- Mobile operator panel for direct operation of plants or machines from any position
- Two three-step enabling buttons; optional versions with:
  - STOP button
  - STOP button, handwheel, keyswitch and illuminated pushbutton
- Communication possible using serial, MPI/PROFIBUS or PROFINET/Ethernet link
- Fast system availability following connection to the junction boxes
- The connection to the PLC and power supply is made via the junction box and cable
- Identification of connection point
- Short power-up time following docking. By using an optional battery pack, the power-up of the mobile panel can be avoided following brief disconnection from the terminal box.

SIMATIC Mobile Panel 177

- Pixel graphic 5.7" color STN touchscreen (analog/resistive), 256 colors
- 14 function keys for free configuration and labeling (8 with LED)

SIMATIC Mobile Panel 277

- Brilliant 7.5" TFT touchscreen display, 64k colors and 18 membrane keys with LED
- Externally accessible USB connection

Further information:

- Catalog ST 80
- Internet: http://www.siemens.com/panels

Touch Panel / Operator Panel TP/OP 177B
Touch Panel / Operator Panel TP/OP 277 6"

Overview

Equipped with practice-oriented functionalities and a large user memory, the Touch/Operator Panels can be used wherever local operation and monitoring of machines and plants is important - whether in production, process or building automation.

The TP/OP 177B panels are now available with 4-color blue mode or 256-color STN displays.

The TP/OP 277 6" panel is available with a 256-color TFT display. Even more flexible use is possible for the color version with integral PROFINET I/O interface. A USB interface is standard in both versions. A further highlight is the non-volatile message buffer present as standard which permanently saves the messages without the need for a battery.

The TP 177B PN/DP panel with stainless steel front is specially designed for all industries requiring a stainless steel front. The front panel can be disinfected, and does not influence the quality of e.g. food (regular cleaning as prerequisite). Cleaning can be carried out with water jets at 100 l/min and 1 bar from a distance of 2.5 to 3 m. Liquids on the front panel run off automatically.

The panels of the 170/270 range are available with a pixel graphics display for realistic presentation of sequences (also in color), either as Touch Panels (TP) with a touch-sensitive display or as Operator Panels (OP) with a membrane keyboard.

SIMATIC TP 177B

- Touch Panel with comprehensive functionality for operation and monitoring of machines and plants
- Pixel graphics STN display in blue mode/color with analog touchscreen
- Onboard interfaces for communication with Siemens SIMATIC S7 (e.g. MPI, PROFIBUS DP)
- Onboard PROFINET/Ethernet interface already present with the color version
- Drivers also available for PLCs from other vendors

SIMATIC OP 177B

- Touch/Key Panel with comprehensive functionality for operation and monitoring of machines and plants
- Message buffer contents retained even with panel switched off and without battery
- Pixel graphics STN display in blue mode/color with touch-screen and 32 additional function keys
- Onboard interfaces for communication with Siemens SIMATIC S7 (e.g. MPI, PROFIBUS DP)
- Onboard PROFINET/Ethernet interface with the color version
- Drivers also available for PLCs from other vendors
- Installation compatible with OP17

SIMATIC TP 277 6"

- Touch Panel with comprehensive functionality for operation and monitoring of machines and plants
- Message buffer contents retained even with panel switched off and without battery
- Pixel graphics TFT display with 256 colors and touch screen
- Onboard interfaces for communication with Siemens SIMATIC S7 (e.g. MPI, PROFIBUS DP)
- Onboard PROFINET/Ethernet
- Use of scripts and archives
- Drivers also available for PLCs from other vendors
- Installation compatible with TP 270 6" and MP 270B 6"

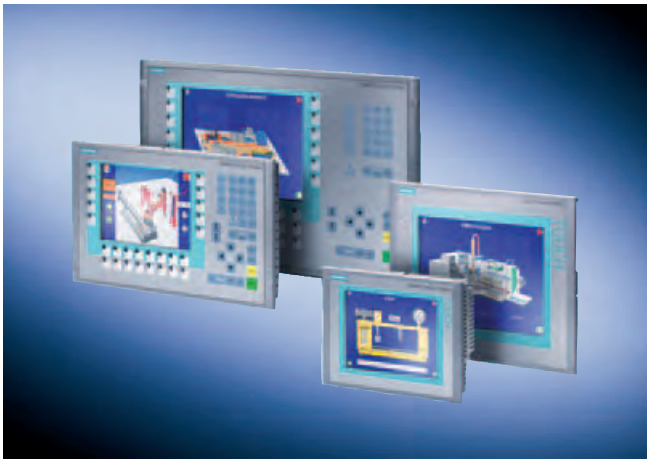
SIMATIC OP 277 6"

- Operator Panel mit comprehensive functionality for operation and monitoring of machines and plants
- Message buffer contents retained even with panel switched off and without battery
- Pixel graphics TFT display with 256 colors
- 36 system keys, 24 function keys for free configuration and labeling (18 with LED)
- Onboard interfaces for communication with Siemens SIMATIC S7 (e.g. MPI, PROFIBUS DP)
- Onboard PROFINET/Ethernet
- Use of scripts and archives
- Drivers also available for PLCs from other vendors
- Installation compatible with OP 270 6"

Further information:

- Catalog ST 80
- Internet: http://www.siemens.com/panels

Overview



The SIMATIC MP 277 Multi Panels can be used wherever local operation and monitoring of machines and plants is important - whether in production, process or building automation. They are used in the widest possible range of industries and applications, and can even be expanded by the Multi Panel options, e.g. display of HTML documents using the MS-Pocket Internet Explorer.

The design without hard disks or fans even permits use where high vibrations or contamination with dust limit the operation of a PC. Short power-up times mean that the Multi Panels are rapidly ready for use.

SIMATIC MP 277

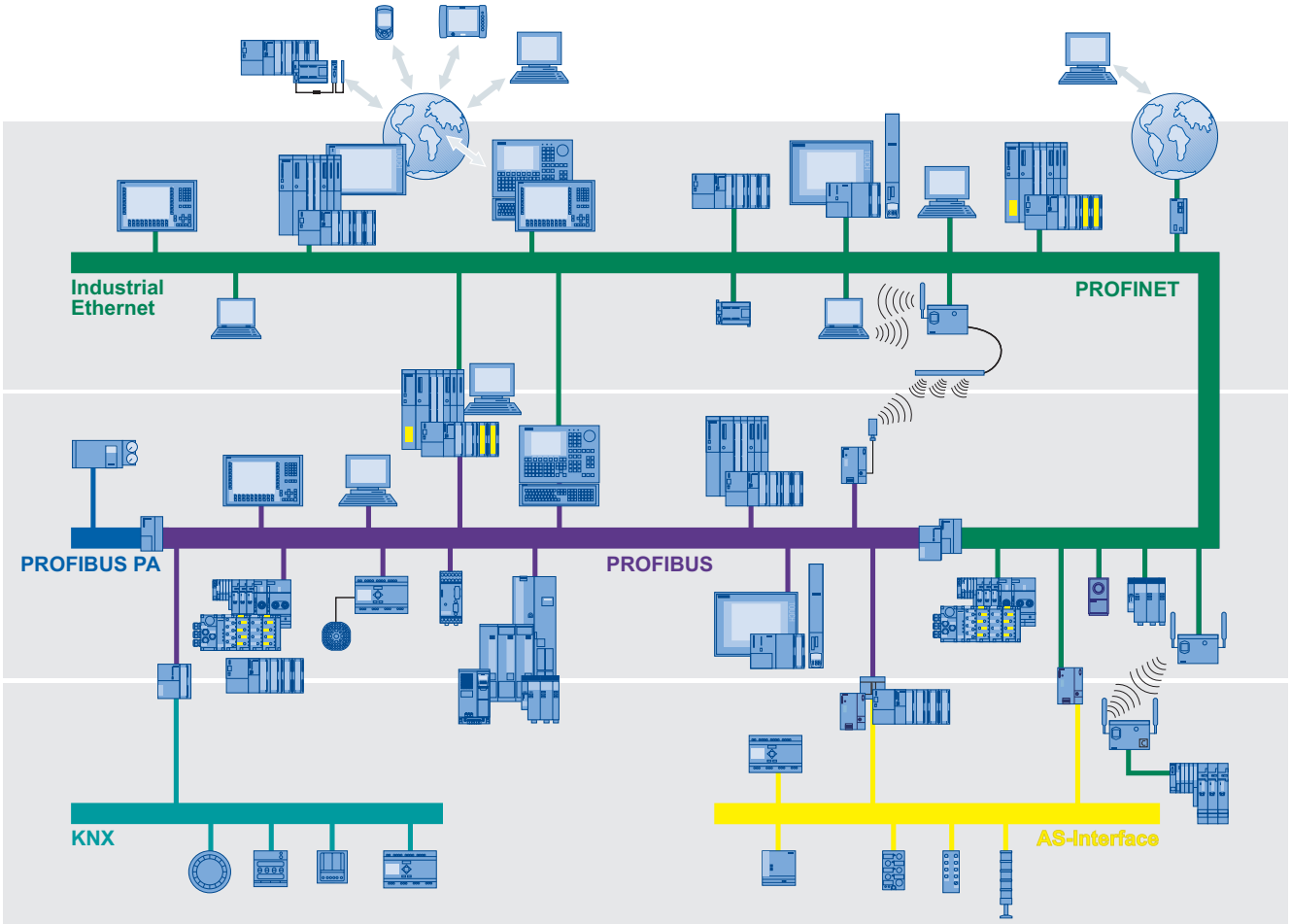
- The SIMATIC MP 277 panels on the basis of Windows CE combine the ruggedness of operator panels with the flexibility of PCs
- Pixel graphics 7.5" or 10.4" TFT display, color (64 k colors)
- MP 277 10" Key:
  38 system keys, 36 function keys for free configuration and labeling (28 with LED)
- MP 277 8" Key:
  38 system keys, 26 function keys for free configuration and labeling (18 with LED)
- MP 277 8" and MP 277 10" Touch:
  touchscreen (analog/resistive)
- All interfaces on board, e.g. MPI, PROFIBUS DP, USB, PROFINET/Ethernet

Further information:

- Catalog ST 80
- Internet: http://www.siemens.com/panels

General

Overview



SIMATC NET stands for industrial communication. SIMATIC NET products can be used to set up solutions for integrated data and information flow from the field level right up to the corporate management level.

The increasing use of Industrial Ethernet in automation is making two subjects within Totally Integrated Automation ever more important: PROFINET and SCALANCE.

PROFINET, the open and cross-vendor Industrial Ethernet standard, supports integrated, company-wide communication. PROFINET also supports the direct connection of distributed field devices to Industrial Ethernet and the solution of Motion Control applications in isochrone mode. PROFINET also supports distributed automation with the assistance of component engineering.

SCALANCE is the name for the new generation of components for setting up integrated networks:

- Conducted or IWLAN (Industrial Wireless LAN).
- In industrial environments and similar.

Three versions:

- SCALANCE S security modules are at the heart of Siemens' ground-breaking security concept for protecting networks and data.
- Based on Industrial Wireless LAN, SCALANCE W supports integrated communication as far as areas that until now have been difficult or even impossible to access.
- SCALANCE X modular switches (active network components) make networks fit for the future.

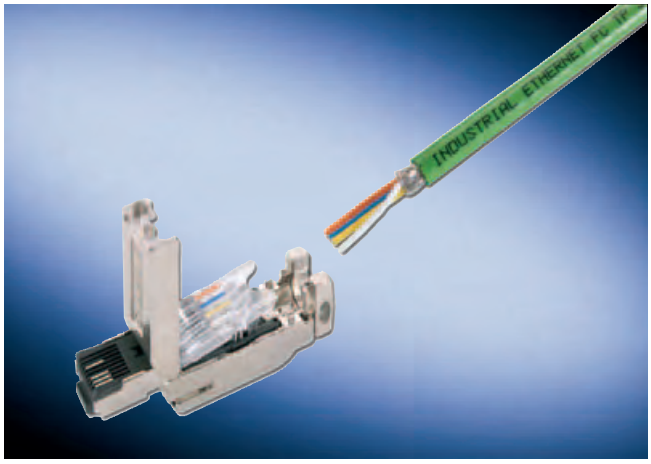
SIMATIC NET supports the Industrial Ethernet, PROFINET, PROFIBUS, AS-Interface and Konnex bus systems.

Further information

- Catalog IK PI
- Catalog CA 01

Overview

Passive components



Industrial Ethernet networks can be designed as electrical or optical networks. Various cables are available for the different topologies, requirements or areas of application, e.g.:

- Patch cables such as TP Cords for connecting stations to network components within a control cabinet
- FastConnect cables for structured cabling permitting direct connection between stations and network components, and for fast and easy assembly
- Hybrid cables for industrial and office environments to connect IE FC RJ45 Modular Outlets and SCALANCE W Access Points
- Fiber-optic cables for indoor and outdoor use, as glass or plastic FOC

Active components

Active network components specifically designed for use in industrial environments can be used for electrical or optical networks with various topologies (line, tree, star, ring), and/or for active passing on of data or for data protection:

- SCALANCE X:
  Industrial Ethernet switches and media converters for design of various topologies, e.g. SCALANCE X005 for the entry level, SCALANCE X-100 unmanaged switches, SCALANCE X-200 managed switches also suitable for real-time, SCALANCE X-400 modular for high-performance networks, and SCALANCE X-101 unmanaged media converters for conversion of different transmission media
- SCALANCE S:
  Security modules protect the network from data espionage and manipulation, from network overloading, or from mutual influencing or faulty addressing; they offer a scalable security functionality by means of firewall for protection of the programmable controllers, alternative or supplementary VPN (Virtual Private Network) for secure authentication of the participants involved in communication
- Routers implement the transition from one bus system to another. They pass on the data from one network to another without further linking.
  The IE/PB Link and the IE/PB Link PN IO permit the transition from Industrial Ethernet to PROFIBUS, the IE/AS-i LINK PN IO permits the transition from Industrial Ethernet to AS-Interface.

Industrial Ethernet/PROFINET

Overview (continued)

Communications processors

Communications processors (CP) with their protocol preprocessing provide a constant data throughput. They provide fast response times at a stable and high level, and rule out fluctuating communication performances.

The CPs offload communication tasks from the data terminal and only use few of its resources.

Various powerful communications processors are available for connection to the SIMATIC S7, and their design is matched to the respective target system – SIMATIC S7-200, S7-300 or S7-400.

The following processors are available for Industrial Ethernet:

- CP 243-1 and CP 243-1 IT for SIMATIC S7-200
- CP 343-1 Lean, CP 343-1 and CP 343-1 Advanced for SIMATIC S7-300
- CP 443-1 and CP 443-1 Advanced for SIMATIC S7-400

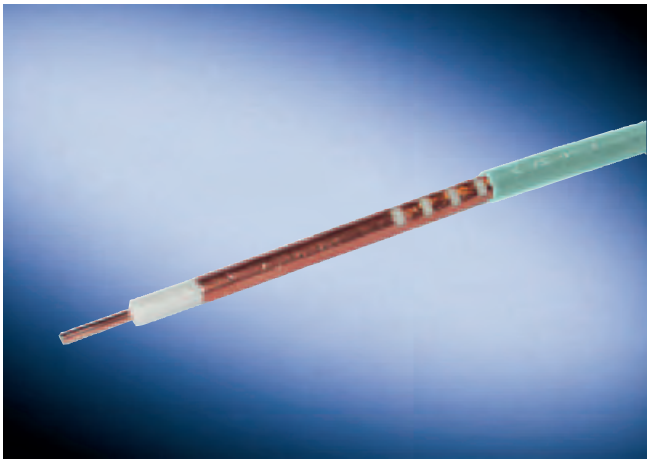
The following processors with different software are available for connecting to programming devices/PCs:

- CP 1613 A2 (PCI) for connecting programming devices/PCs to Industrial Ethernet with 10/100 Mbit/s autosensing/autonegotiation (universal key 3.3 V and 5 V; 33 MHz/66 MHz; 32 bit, execute in 64 bit PCI-X systems)
- CP 1616 (PCI) of PCs and SIMATIC programming devices/PCs to PROFINET IO (universal key 3.3 V and 5 V; 33 MHz/66 MHz; 32 bit, execute in 64 bit PCI-X systems)
- CP 1604 for connecting PC/104-Plus systems to PROFINET IO

Industrial Mobile Communication

Overview

Passive network components



Passive network components for industrial mobile communication are leaky wave RCoax cables or antennas for 2.4 GHz or 5 GHz. They are specifically designed for complex radio applications, e.g. in monorail overhead conveyors, tunnels, trunking, lift shafts etc.

Active network components

Active network components for industrial mobile communication establish a reliable, industry-compatible and secure radio network on the basis of Wireless LAN according to IEEE 802.11. The modules use technologies such as antenna diversity, high-quality receivers and fault-tolerant modulation procedures to improve the signal quality and to thus prevent an interruption in radio traffic.

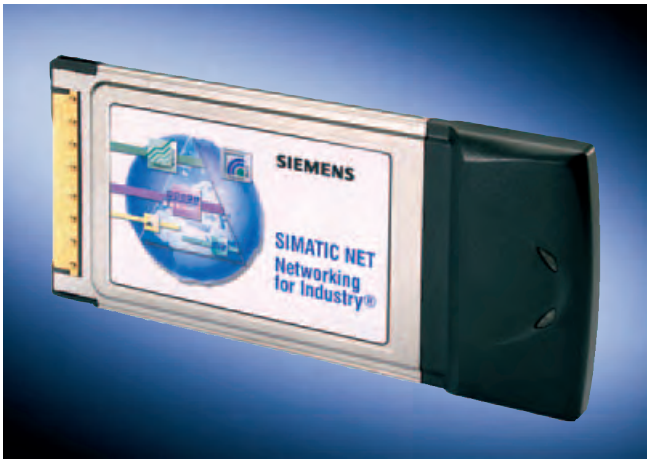
Overview (continued)

Active network components (continued)

It is possible to reserve a data transfer rate for the access points to achieve even more reliable radio connections. This results in a reliability comparable to hardwired connections.

- SCALANCE W: access points and client modules to design radio networks with reliable communication, also for use in a PROFINET environment.
- The IWLAN/PB Link PN IO as a client permits the transition between Industrial Wireless LAN and PROFIBUS with PROFINET functionality.

Communications processors



The CP 7515 (PC Card) communications processor for Industrial Wireless LAN (IWLAN) for operation in a radio network is used for the connection to programming devices/PCs. The CP 7515 has two integral antennas for reliable reception even in complex radio conditions, and can be used in a standard WLAN according to IEEE 802.11a at 2.4 GHz or 5 GHz e.g. in the SIMATIC Field PG.

The CP 7515 can be used both in industrial environments and in office/enterprise areas.

Overview

Passive network components

Passive network components for PROFIBUS can be designed as electrical or optical networks. Various cables are available for the different topologies (line, tree, star, ring), requirements or areas of use, e.g.:

- Bus cables with FastConnect technology (FC) and symmetrical radial design for fast and easy assembly on site.
- ECOFAST cables for connecting stations to PROFIBUS DP in the ECOFAST system.
- Hybrid cables for common transmission of data and power supply.
- Fiber-optic cables for indoor and outdoor use, as glass or plastic FOC.
- Bus connectors for connecting a PROFIBUS station or network components to various designs of PROFIBUS.

Overview (continued)

Active network components

Active network components for PROFIBUS can be used for electrical or optical networks with various topologies (line, tree, star, ring), and/or for active passing on of data, e.g.:

- Bus terminals for electrically connecting a bus station to a PROFIBUS network.
- OLM Optical Link Module for designing optical PROFIBUS networks with line, ring or star topologies. The transmission rate of an FO link is independent of the distance, and can be up to 12 Mbit/s.
- OBT Optical Bus Terminal for connecting PROFIBUS DP stations without integral optical interface or RS485 bus segment to an optical line.
- ILM Infrared Link Module for wireless coupling for all protocols with a range of up to 15 m. Individual stations or slave segments can be coupled with a transmission rate up to 1.5 Mbit/s.
- The DP/AS-i LINK Advanced and DP/AS-i Link 20E routers allow the transition between PROFIBUS DP and AS-Interface, the DP/EIB Link connects PROFINET DP to building automation.

Communications processors

Communications processors (CP) with their protocol preprocessing provide a constant data throughput. They provide fast response times at a stable and high level, and rule out fluctuating communication performances.

The CPs offload communication tasks from the data terminal and only use few of its resources.

Various powerful communications processors are available for connection to the SIMATIC S7, and their design is matched to the respective target system – SIMATIC S7-200, S7-300 or S7-400.

The following processors are available for PROFIBUS:

- CP 342-5 and 342-5 FO for SIMATIC S7-300
- CP 443-5 Basic and CP 443-5 Extended for SIMATIC S7-400

The following processors with different software are available for connecting to programming devices/PCs:

- CP 5613A2 and CP 5613 FO with DP master interface;
  PCI cards (universal key 5 V/3.3 V) with microprocessor for the system connection for PCs and SIMATIC PG/PC to PROFIBUS up to 12 Mbit/s.
- CP 5614 with DP master and slave interfaces;
  PCI card (universal key 5 V/3.3 V) with microprocessor for the system connection for PCs and SIMATIC PG/PC to PROFIBUS up to 12 Mbit/s.

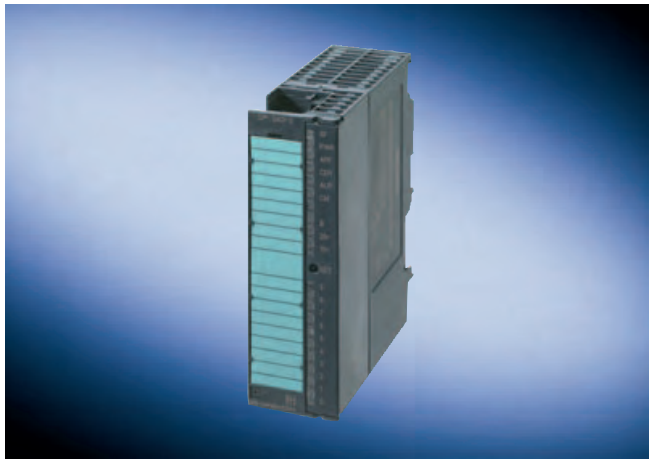
AS-Interface

Overview

Active network components

The active network component for AS-Interface Repeater/Extender is used to extend AS-Interface segments.

Communications processors



Communications processors with different performances and with designs matched to the respective target system are available for connecting to ET 200X and SIMATIC S7:

- CP 142-2 for ET 200X
- CP 243-2 for SIMATIC S7-200
- CP 342-2 and CP 343-2P for SIMATIC S7-300

SINAUT

Overview

Passive network components

Various passive network components are available for SINAUT, and supplement telecontrol with SINAUT, e.g. connecting cables and dedicated line accessories such as line transformers or overvoltage protection.

Active network components

Active network components for SINAUT are suitable for use in industrial environments, e.g.

- Modems of SIMATIC S7-300 design for SINAUT ST7, or the MD720-3 for SIMATIC S7-200 for SINAUT MICRO
- Radio clock components, e.g. GPS components or accessories for DCF77

SINAUT

Overview (continued)

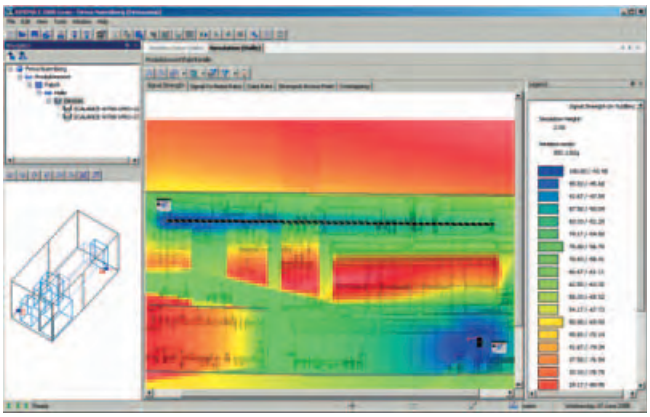
Communications processors

- The SINAUT TIM communications processors are designed for SIMATIC S7-300 and S7-400.
- TIM 3 versions without MPI connection
- TIM 4 versions with MPI connection

Supplementary components

Overview

SINEMA E Lean

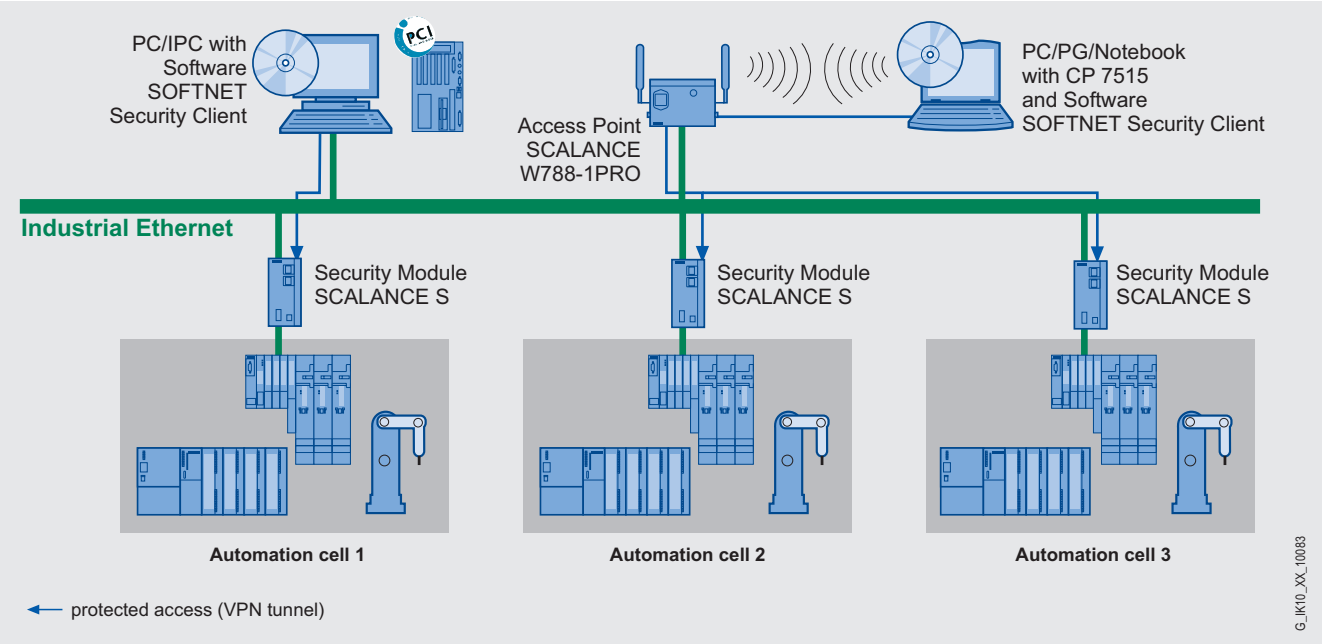


The IWLAN software SINEMA E Lean simplifies the planning and configuration of IWLAN applications according to standard 802.11 a/b/g by providing simulation functions

- for determining the number, locations and parameters of the IWLAN devices,
- for industrial and office environments, including outdoor areas,
- for experts and beginners, e.g. by using the Sales Wizard for producing quotations.

Overview (continued)

Security Client



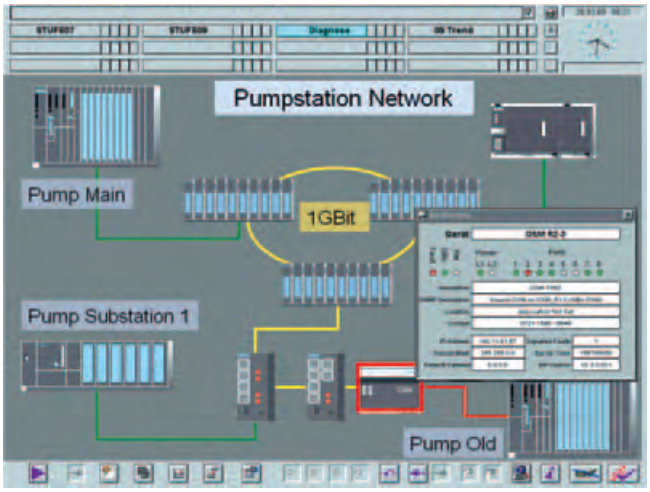
The SOFTNET Security Client software is part of the industrial security concept for protecting PLCs and for providing security when exchanging data between automation systems.

- VPN client for programming devices, PCs and notebooks in industrial environments; permits secure VPN client access to automation systems protected by SCALANCE S
- Protection of data transmission from maloperations, monitoring/espionage and manipulation. Communication can only be carried out between authenticated and authorized devices.
- Applies the IPSec mechanisms already proven in the office sector to design and operate VPNs.

Supplementary components

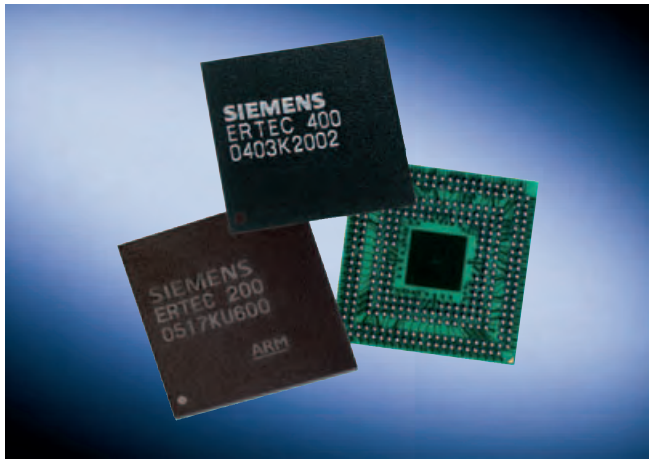
Overview (continued)

OPC servers



- Corresponding OPC servers for SIMATIC NET are included in the scope of delivery of the respective communications software for PROFIBUS and Industrial Ethernet
- Standardized, open, multi-vendor interface
- Linking of OPC-compatible Windows applications to S7 communication, S5-compatible communication (SEND/RECEIVE), PROFINET and SNMP
- OPC scout with browser functionality as OPC client and OCX data control

ASICs



Various ASICs for PROFIBUS and Industrial Ethernet are available for the different functional demands and fields of application. With ASICs, required functions are supported by hardware, and maximum performance values are achieved.

The following ASICs are available for PROFIBUS, e.g.

- ASIC ASPC2 for designing master interface modules
- ASIC LSPM 2/SPM 2 for designing simple slave interface modules
- ASIC SPC 3/DPC 31 / SPC 4-2 for designing intelligent slave interface modules
- ASIC FOCSI - fiber-optic controller for signal conditioning with the optical PROFIBUS

ERTEC is available for Industrial Ethernet to implement real-time communication, e.g.

- ASIC ERTEC 200 as the optimum solution for field devices. This is an Ethernet controller with integral 2-port switch and 32-bit microprocessor.
- ASIC ERTEC 400 as the platform for complex applications. Target systems are automation devices such as PLCs, motion controllers, PC-based systems and network components.

Overview

SIMATIC Rack PCs provide flexible high-availability industrial PC systems for powerful yet compact applications in 19" technology.

Two device classes are available for various requirements:

- SIMATIC Rack PC IL 43 - maximum performance at an affordable price.
- SIMATIC Rack PC 840 - maximum extendibility combined with maximum suitability for industrial applications

Shared industrial functionality

- High EMC: CE mark for industrial applications.
- Overpressure ventilation concept with fan on the front and dust filter.
- Designed for 24-hour continuous operation.
- Integrated parameterizable monitoring functions (temperature, fan, watchdog).
- Service-friendly device design.
- Lockable front cover.
- Prepared for mounting on a telescopic rail.

SIMATIC Rack PC Industrial IL 43

State-of-the-art technology

- State-of-the-art Intel technology
- High performance and scalability
- PCI and PCI-Express slots
- Gigabit Ethernet

Basic industrial capability

- Dust protection
- Service friendliness
- CE mark for industrial and office applications
- Transportation lock for expansion cards
- Monitoring functions

Investment security:

- Guaranteed availability of replacement parts for at least 3 years.

SIMATIC Rack PC 840

Highly suited for industrial environments

- Protected against high vibration and shock load during operation.
- Wide operating temperature range.
- Extremely service-friendly.
- Efficient self-diagnosis (SIMATIC PC DiagMonitor).

Ideal for industrial applications

- ISA and PCI slots
- Components are highly flexible and support expansion.
- Integrated PROFIBUS DP/MPI interface (optional).

High investment security

- High component/design continuity.
- Motherboard from own development and manufacture
- Guaranteed availability of replacement parts for at least 5 years.

Benefits

SIMATIC Rack PC IL 43 - Maximum performance at an affordable price

A SIMATIC Rack PC IL 43 should be your first choice for applications requiring a very powerful industrial PC platform.

Performance

The Rack PC IL 43 is particularly geared to the standard PC world. Combined with high levels of innovation, this device offers a range of outstanding high-performance processors with hyper-threading (HT) technology in the field of industrial PCs.

Integrated interfaces

An onboard Gbit Ethernet interface is available for communication in the office world or at management level. Integrated USB interfaces on the rear and front panels make connecting I/O devices from the PC world (e.g. external hard disks for mobile data backup, keyboard, external mouse for operation) child's play. For advanced graphics applications, a vacant PCI-Express slot or a high-performance graphics card for the connection of two monitors is available.

The price

The Rack PC IL 43 is a high-availability industrial PC at an affordable price.

Options

The SIMATIC Rack PC IL 43 can be ordered in custom configurations and is supplied ready for use. The high system availability by design can be further extended by means of additional data backup options (e.g., RAID1 system, SIMATIC PC ImageCreator).

Benefits (continued)

SIMATIC Rack PC 840 - Maximum extendibility combined with maximum suitability for industrial applications

Thanks to its outstanding ruggedness, the Rack PC 840 is a secure PC platform for use on the machine level.

Rugged design

The overall design aims to achieve maximum safety in case of vibration and shock loads. For example, a special vibration-absorbing suspension of the hard disk ensures absolute operational reliability, even at high mechanical loads. A well-designed ventilation concept ensures that even the maximum configuration can support high operating temperatures - and dust protection is included.

Service-friendly device design

Particular attention was paid to outstanding service friendliness. PC components (e.g., slots, memory modules) are accessible by hand. Fan filters and fans can be replaced without tools even if installed.

Integrated interfaces

An onboard Ethernet interface is available for communication in the office world or at management level. The fieldbus interface is provided by an integrated PROFIBUS/MPI interface, which is available as an option. Integrated USB interfaces on the rear and front panels make connecting I/O devices from the PC world child's play.

Extendibility

With 10 free PC slots, the SIMATIC Rack PC 840 offers maximum leeway for expansions at a minimum mounting depth of 19".

Continuity

Through continuity in the availability of identical components, such as motherboards designed and produced by Siemens, the SIMATIC Rack PC 840 offers high investment security. Long-term functionality is also assured for the hardware (e.g., ISA) and software (Windows NT).

Options

The SIMATIC Rack PC 840 can be ordered in custom configurations and is supplied ready for use. The high system availability by design can be further extended by means of additional data backup options (e.g., RAID1 system, SIMATIC PC/PG ImageCreator) and a highly-efficient SW program for self-diagnosis (SIMATIC PC DiagMonitor).

Overview

SIMATIC Box PC provides particularly rugged industrial PC systems for powerful yet compact applications for builders of machines, systems and control cabinets. Four device classes are available for various requirements:

- SIMATIC Microbox PC 420 - ultra-compact, rugged and maintenance-free.
- SIMATIC Box PC 627 – maximum performance where space is at a premium
- SIMATIC Box PC 840 – powerful and flexible

SIMATIC Microbox PC 420, Box PC 627 and Box PC 840

Highly suited for industrial environments

- High vibration/shock load during operation.
- Wide operating temperature range.
- Extremely service-friendly.
- Outstanding diagnostics.
- Designed for continuous operation
- Operation without fans (Microbox PC 420)

Ideal for industrial applications

- Integrated PROFIBUS/MPI interface (optional).
- ISA and PCI slots or PC/104-Plus slots.
- Components are highly flexible and support expansion.
- Minimum dimensions.
- Maximum performance.

High investment security

- Guaranteed availability of replacement parts for at least 5 years.
- Motherboard from own development and manufacture
- High component/design continuity.
- Long-term availability of PC components from the Intel Embeded range.

Benefits

SIMATIC Microbox PC 420, Box PC 627 and Box PC 840

Compact dimensions

With a maximum mounting depth of 100 mm (80 mm without CD-ROM), the SIMATIC Box PC 627 can be used even in the smallest of spaces. The ultracompact Microbox PC 420 requires even less space: mounting depth 47 mm and upwards.

Rugged design

The overall design aims to achieve maximum safety for vibration and shock loads. For example, a special vibration-absorbing suspension of the hard disk ensures absolute operational reliability, even at high mechanical loads. The Microbox PC 420 has no rotating parts whatsoever, thereby increasing the system availability.

Service-friendly device design

The PC boxes can simply be opened or folded out for speedy component replacement. The inside of the device, where the processor and slots are located, can be accessed easily for subsequent expansions.

Integrated interfaces

On SIMATIC Box PCs, all interfaces are located on one side. Box PCs can be interfaced with the control/cell level via onboard Ethernet interfaces and communicate in the field via an integrated PROFIBUS interface, which is available as an option. External monitors or displays can be connected via a VGA or DVI-I interface (VGA and DVI) and LVDS (Box PC 627/840).

Flexibility

With its 5 free PC slots, the SIMATIC Box PC 840 in particular offers considerable leeway for expansions. The Microbox PC 420 can accommodate up to 3 PC/104-Plus modules (with expansion frame). All Box PCs have CE certification for use in industrial applications and domestic/commercial applications and can therefore be used in building automation or public installations in addition to industrial applications.

Continuity

Through continuity in the availability of identical components, such as motherboards designed and produced by Siemens, SIMATIC Box PCs offer high investment security. Long-term functionality is also assured for the hardware (e.g. ISA, PC/104) and software (e.g. Windows NT). Long-term availability of PC components from the Intel Embedded range is a guarantee for high investment security.

Options

SIMATIC Box PCs can be ordered in custom configurations and are supplied ready for use. The high system availability by design can be further extended by means of additional data bakkup options (e.g., RAID system, SIMATIC PC/PG ImageCreator) and a highly-efficient SW program for self-diagnosis (SIMATIC PC DiagMonitor).

SIMATIC Panel PC

Overview

SIMATIC Panel PCs are suitable for use in control cabinets, consoles and control panels. Typical areas of application can be found in both production and process automation.

SIMATIC Panel PC 477 embedded, 577, 677 and 877 are available for various requirements.

Shared industrial functionality

- IP65 degree of protection
- High EMC: CE mark for industrial applications
- Designed for 24-hour continuous operation
- MTBF backlighting 50,000 hours
- Onboard Ethernet, PC 577 (10/100/1000 Mbit), PC 477, PC 677 (2 x 10/100 Mbit), PC 877 (10/100 Mbit)
- Ambient temperature during operation (with full configuration):
  - 5 °C to 45 °C
  - Panel PC 477/677/877: 5 °C to 50 °C in mounting frame if max. 40 °C at front

SIMATIC Panel PC 477 embedded

Maximum industrial compatibility
- Vibration in operation 1.0 g
- Shock in operation 5.0 g

High investment security
- Guaranteed availability of spare parts for 5 years following end of active marketing
- High continuity of components used
- Service-friendly device design

High industrial functionality
- Onboard PROFIBUS DP/MPI interface as option
- Extremely compact design (mounting depth only 75 mm)
- Maintenance-free (no fan or hard disk)
- High-security through use of Windows XP embedded

High system availability
- SIMATIC PC DiagMonitor – PC diagnostics/signaling software (expansion component)
- SIMATIC PC/PG Image & Partition Creator – software tool for data backup of hard disk contents (expansion component)
- High reliability and security of an embedded platform

Turnkey complete solutions (software already installed and preconfigured)
- HMI: preinstalled WinCC flexible 2005 software including archives and recipes
- HMI/RTX: like HMI plus WinAC RTX 2005 with 25 KB buffered retentive memory

SIMATIC Panel PC 577

High industrial compatibility
- Vibration in operation **0.25 g**[1)]
- Shock in operation **1.0 g**[1)]

Investment security
- Guaranteed availability of spare parts for 3 years following end of active marketing
- State-of-the-art PC technology
- Attractive price

High system availability
- SIMATIC PC/PG Image & Partition Creator – software tool for data backup of hard disk contents (optional)

SIMATIC Panel PC 677 and 877

Maximum industrial compatibility
- Vibration in operation 1.0 g
- Shock in operation 5.0 g

High investment security
- Guaranteed availability of spare parts for 5 years following end of active marketing
- High continuity of components used
- Maximum service friendliness in device design

High industrial functionality
- Integrated PROFIBUS DP/MPI interface
- Low mounting depth (Panel PC 677)
- PCI slots
- ISA slots (Panel PC 877)
- Maximum expansion possibilities (Panel PC 877)
- Distributed design (operator panel and computer unit can be positioned up to 30 m apart)[2)]
- Direct key module (optional)

1) Please also observe our mounting instructions on the Internet and in the device manuals.
https://support.automation.siemens.com
Entry ID: 22216685 (panel cutouts for Panel PC 577)

2) Available using remote kit as accessory for the Panel PC 677/877

Overview (continued)

High system availability

- SIMATIC PC DiagMonitor – PC diagnostics/signaling software (expansion component)
- SIMATIC PC/PG Image & Partition Creator – software tool for data backup of hard disk contents (expansion component)
- Second hard disk
- RAID1 (controller on board with Panel PC 677, optional with Panel PC 877)

The SIMATIC Panel PC 677 is also available as 15" TFT Touch with stainless steel front.

Benefits

SIMATIC Panel PC 477 embedded

The high industrial compatibility

The rugged design offers reliable protection even with high vibrations and shocks.

The continuity

The continuity in the availability of equivalent components, even for long-term machine concepts without renewed engineering overhead, guarantees a high investment security.

The service-friendly device design

USB 2.0 interfaces at the front and rear permit fast and simple connection of additional hardware components. The PC is maintenance-free since it does not contain any rotating parts (fan or hard disk).

The integrated interfaces

The Ethernet interface is already integrated, onboard PROFIBUS DP/MPI interface is optional.

SIMATIC Panel PC 577

Industrial compatibility with high-performance and attractive price

SIMATIC Panel PC 577 is the first choice where applications are involved which require industrial compatibility paired with an extremely high-performance IPC platform.

The integrated interfaces

The integrated Ethernet interface can be used for communication in the office world or at management level. Integrated USB 2.0 interfaces on the rear and front panels make connecting I/O devices from the PC world child's play.

During runtime, it is possible to simply install and operate e.g. an external mouse, keyboard, CD-ROM drive or ZIP drive, as well as a printer, chipcard reader, barcode reader and many other devices. The PCI slots provide space for installation of PC expansion cards, e.g. communications cards for linking to the process.

The price

Panel PC 577 offers industrial compatibility at an attractive price.

SIMATIC Panel PC 677 and 877

Compact, rugged and powerful

The Panel PC 677 and 877 are the panel PCs with complete industrial functionality. Their display sizes of 12", 15" and 19" together with operation using membrane keyboard or touch-screen mean they are suitable for a versatile range of operating concepts.

The rugged design

The overall design aims to achieve maximum safety for vibration and shock loads. For example, a special vibration-absorbing suspension of the hard disk ensures operational reliability, even at high mechanical loads.

The continuity

Continuity in the availability of equivalent components such as motherboards from our own production guarantee a very high investment security for the SIMATIC Panel PC 677 and 877.

The service-friendly device design

Special attention was paid to exceptional service friendliness during the design of the Panel PC 677 and 877 range. For example, the computer unit and operator panel can simply be folded out for speedy component replacement. The interior with processor and slots is readily accessible for subsequent expansions.

The integrated interfaces

The PROFIBUS DP/MPI interface is already integrated on the motherboard of the SIMATIC Panel PC 677 and 877 – without extra charge. The same applies to the Ethernet interfaces for linking to the management level or to the Internet.

The modern servicing/commissioning interface

Modern USB 2.0 (Universal Serial Bus) ports enable simple connection of I/O components at both the front and rear.

The compact design

Its maximum mounting depth of 105/130 mm means that the SIMATIC Panel PC 677 can even be used where space is at a premium.

The expandability

With 5 vacant PC slots, the SIMATIC Panel PC 877 offers great flexibility for expansions.

The options

The SIMATIC Panel PC 677 and 877 offer a special degree of industrial functionality beyond standard PC features. For example, the distributed design using the remote kit means that the computer unit and operator panel can be separated by up to 30 m.

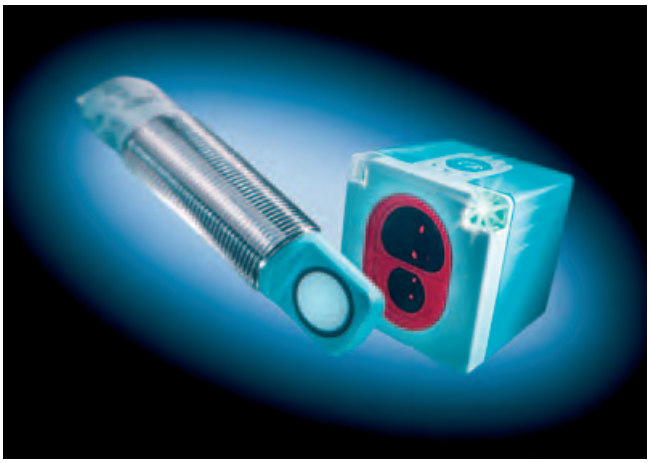
A further component providing operational safety is the optional direct key module. The process can then be operated directly over PROFIBUS DP/MPI independent of the operating system.

General

Overview

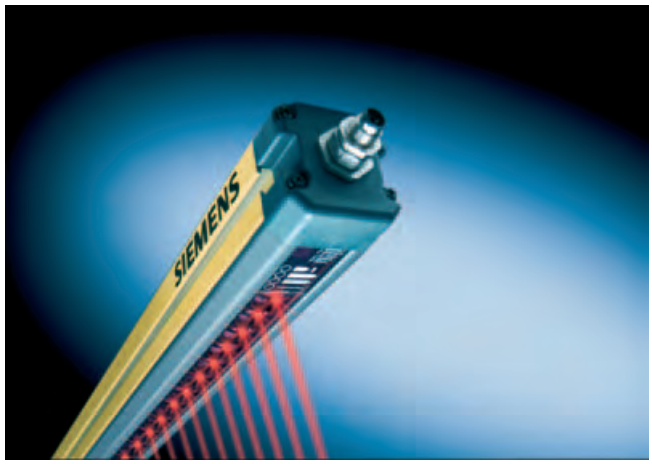
Sensors are the sense organs of machines and systems on which automated production processes are executed. Siemens offers a complete range of sensors for all types of requirements in the production industry:
From simple object detection with contactless proximity switches, product tracking with electronic ID systems and quality control with image processing systems, right up to safety sensors for protecting persons in dangerous areas.

SIMATIC PX proximity switches



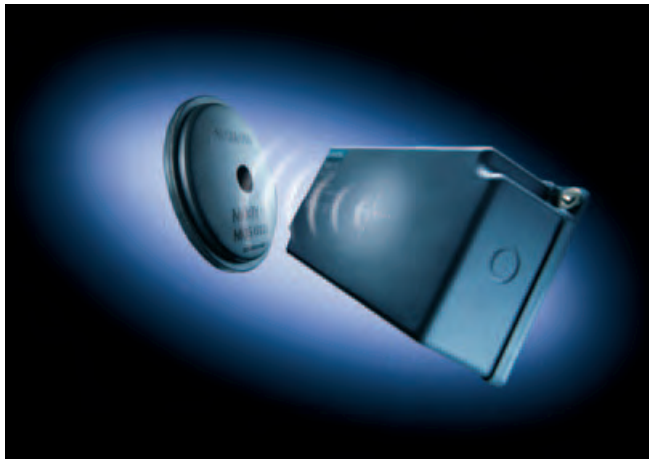
Our proximity switches always sense correctly where the recording, counting, measuring, monitoring or positioning of solid, liquid or powdered substances is concerned. Our clever proximity switches with IQ-Sense are equipped with sharpened senses plus the right amount of intelligence. They combine sensors and controller in one system. This unique concept provides maximum plant availability and freedom from faults covering configuration up to wiring.

SIMATIC FS optical safety sensors



Maximum process safety must be guaranteed in an industrial environment to protect man and machine - not only to prevent damage, but also to achieve maximum plant availability at an economical price. This is a clear case for our optical security sensors. They guarantee safe and reliable complete protection for persons, machines and plants. They are of course integrated in our uniform Safety Integrated concept.

SIMATIC RFID systems



Whether production, logistics or distribution is concerned, our intelligent electronic RFID systems are the right choice if you wish to know everything concerning production processes or the flow of goods at every point. These provide reliable, fast and economical identification, are insensitive to contamination, and save data directly on the product or object. In this matter you can control and optimize material flows, warehouse logistics or consigning.

Overview (continued)

SIMATIC MV image processing systems

Our image processing systems have their eyes everywhere. They control, check and guarantee material flows as well as the quality in your industrial production. More reliable and better than the human eye, they make decisions on the basis of visual information. They therefore significantly contribute toward an optimized and fault-free workflow.

Further information:

- Catalog FS 10
- Catalog CA 01
- Internet: http://www.siemens.com/simatic-sensors

SIMATIC
Control Systems

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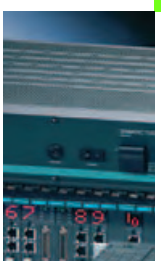

T400 technological module

Overview

The T400 technological module (Drive Based) handles technological tasks directly in the drive:

- The T400 technological module is inserted in the SIMOVERT MASTERDRIVES AC drive inverters and converters or in the SIMOREG DC-Master drive converters
- Using the SRT400 technological box, the T400 can also be used as standalone solution for other drives

Technical specifications

T400 technological module	
Processor	32 Bit RISC withFPU
Program memory (PC-Card)	2 Mbyte Flash
Program code loading	Through serial interface of PC (no plug-in memory module required)
Main memory (program/data)	4 Mbyte DRAM
Cache (Program/data)	4 Kbyte each
Permanent change memory	32 Kbyte NOVRAM
Memory retention at power failure	NOVRAM for 30 configurable values (type real)
Sampling time, rigidly cyclic, for a closed control loop	
• Shortest	0.1 ms
• Typical	0.8 ms to1.6 ms
Typical computation times (REAL)	
• MUL, multiplier	5.5 µs
• PIC, PI-controller	14.3 µs
• RGE, ramp generator	32.9 µs
Networking	Point-to-point, USS, PROFIBUS slave, optionally with CBP2
Power supply/ typ. current consumption	+5 V ±5%: 1.1 A +15 V ±4%: 140 mA + max. 100 mA encoder current -15 V ±3%: 140 mA
Electrical isolation of the inputs/outputs	No
Space requirement	1 slot
Dimensions (WxHxD) in mm	14 x 267 x 140
Weight	0.3 kg
Power supply/ typ. current consumption	+5 V ±5%: 1.1 A +15 V ±4%: 140 mA + max. 100 mA encoder current -15 V ±3%: 140 mA

T400 technological module	
Analog outputs	
Number	2
Output range	±10 V
Short-circuit protection	Yes
Short-circuit current	±10 mA
Resolution	12 bit (4.88 mV)
Accuracy, absolute	± 3 bit
Linearity error	< 1 bit
Voltage rise time	4.2 V/µs
Delay time	3.5 µs
Analog inputs	
Number	2 differential inputs 3 unipolar inputs
Input range	±10 V
Measuring principle	Sampling
Conversion time	12 µs
Input resistance	20 kΩ
Input filter	3 dB transition frequency: 25 kHz
Resolution	12 bit (4.88 mV)
Absolute accuracy	± 3 bit
Linearity error	< 1 bit
Digital outputs	
Number	2 + max. 4 (bi-directional)
External power supply voltage	
• Nominal value	24 V DC
• Permissible range	15 to 33 V DC
• Current drain	20 mA + output currents

Technical specifications (continued)

T400 technological module	
Digital outputs (continued)	
Output voltage	
• For a 0 signal	Max. 0.1 V
• For a 1 signal	Ext. power supply voltage – 0.3 V
Output current	Max. 50 mA/output
Overload protection	Yes (limited to 220 mA)
Switching frequency	
• Ohmic load	5 kHz
Max. switching delay (0 to 24 V)	70 µs
Digital inputs and coarse pulses:	
Number	8 + max. 4 (bidirectional) + max. 2 (coarse pulses)
Input voltage	
• Nominal voltage	24 V DC
• For a 0 signal	-1 to +6 V or open-circuit input
• For a 1 signal	+13 to +33 V
Input current	
• For a 0 signal	0 mA
• For a 1 signal	3 mA typ., 5 mA max.
Delay time	150 µs
Incremental encoder 1	
Encoder signal connection	Converter module (CUx) or T400/terminals 81-83
Signal voltage when connected to T400 (HTL, unipolar)	
• For a 0 signal	< 5 V
• For a 1 signal	> 8 V
Signal voltage when connected to a converter	As for the converter (refer there); 5 V encoders are also possible
Input current	8 mA (max.)
Max. pulse frequency	400 kHz (this depends on the cable length)
Input filter	This can be configured at the function block (NAV)

T400 technological module	
Incremental encoder 2	
Connecting the encoder signals	T400/terminals 62-64, 86-88
Signal voltages (nominal value)	5 V (TTL) or 15 V (HTL) unipolar or bipolar
Signal voltage for RS 422, bipolar:	
• For a 0 signal	< -0.2 V
• For a 1 signal	> 0.2 V
Signal voltage for TTL, unipolar (untyp.):	
• For a 0 signal	< 0.8 V
• For a 1 signal	> 2.3 V
Signal voltage at 15 V (HTL, bipolar):	
• For a 0 signal	- 30 V to 4 V
• For a 1 signal	8 to 30 V
Signal voltage at 15 V (HTL, unipolar):	
• For a 0 signal	< 4 V
• For a 1 signal	> 8 V
Input current	2 mA (max.)
Max. pulse frequency	1.5 MHz (this depends on the cable length)
Input filter	This can be configured at the function block (NAV)
Absolute value encoder	
Number	Max. 2
Encoders which can be connected	Single- or multi-turn encoders with SSI (synchronous-serial) or with EnDat interface
Signal voltage	5 V according to RS 422
Data transfer rate	100 kHz up to 2 MHz
Data representation	Dual-, Gray-, Gray-Excess code

Ordering data

	Order No.
T400 technological module (incl. T400 brief description)	**6DD1 606-0AD0**
SC400 commissioning cable to connect a PC to the T400	**6DD1 684-0GF0**
LBA local bus adapter for MASTERDRIVES and SIMOREG DC-Master	**6SE7 090-0XX84-4HA0**
ADB adapter module	**6SE7 090-0XX84-0KA0**
CBP2 communications module A) for PROFIBUS DP and USS	**6SE7 090-0XX84-6FF5**
CBC communications module A) for CAN	**6SE7 090-0XX84-0FG0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

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SRT400 technological box

Overview

Compact subrack for technologically orientated open-loop and closed-loop control tasks, e.g. for closed-loop controls for two up to four drives with a high dynamic response.

The SRT400 is comparable with the electronics box of SIMOVERT MASTERDRIVES.

The following can be inserted into the SRT400:

- Up to two T400 technological modules, or
- One T400 and one MASTERDRIVES communications module (e.g. CBx, ADB) carrier module for CBP2 submodule and (PROFIBUS DP), CBC).

Technical specifications

	SRT400 technological box
Input	
Input voltage	
• Nominal value	115 V/230 V AC
• Permissible range	± 15 %
Line supply frequency	
• Nominal value	50/60 Hz
• Permissible range	± 2.5 Hz
Line supply failure buffering	10 ms
Input current (nominal value)	
• At 120 V AC	190 mA
• At 230 V AC	140 mA to 320 mA (when the 24 V DC output is loaded)
Output	
Output voltages	
• +5 V	5.05 to 5.15 V
• +15 V	14.25 to 15.75 V
• -15 V	-14.25 to –15.75 V
• +24 V	20 to 30 V
Output currents	
• +5 V	3.0 A
• +15 V	0.5 A
• -15 V	0.5 A
• +24 V	0.6 A
Short-circuit protection	Yes
Electrical isolation	Yes
Power drain for two T400 and max. 24V load	43 W at 115 V 54 W at 230 V
Power loss, typical (without modules)	7 W at 115 V 16 W at 230 V
Dimensions (W x H x D) in mm	90 x 291 x 175
Weight	2 kg

Ordering data

	Order No.
SRT400 technological box	**6DD1 682-0CG0**
Compact subrack with power supply 115 V/230 V AC, 2 vacant slots	

Standard software package: Axial winder with T400 - SPW420

Overview

This standard software package is suitable for use in the following drive units:

- MASTERDRIVES VC/MC
- SIMOREG DC-Master

Ordering data	Order No.
Axial winder with T400 - SPW420 Standard software package, with documentation in German and English	**6DD1 842-0AA0**
Axial winder software on a CD, in German and English, runs under Win 95/98/ME, NT, 2000, in conjunction with STEP 7	**6DD1 843-0AA0**

Standard software package: Angular synchronous control with T400 - SPA440

Overview

The standard software package is suitable for use in the following drive units:

- MASTERDRIVES MC/SC/VC
- SIMOREG DC-Master

Ordering data	Order No.
Angular synchronous control with T400 - SPA440 Standard software package, with documentation in German and English	**6DD1 842-0AB0**
Synchronous angular control software on a CD, in German and English, runs under Win 95/98/ME, NT, 2000, in conjunction with STEP 7	**6DD1 843-0AB0**

Standard software package: Cross-cutter with T400 - SPS450

Overview

The SPS450 standard software package is suitable for use in the following drive units:

- MASTERDRIVES MC/SC/VC
- SIMOREG DC-Master

Ordering data	Order No.
Cross-cutters with T400 - SPS450 Standard software package, with brief description and a documentation CD	**6DD1 842-0AD0**

UR5213 subrack

Overview

The UR5213 subrack, as basis for SIMATIC TDC, has an integrated system power supply and system fan.

Fast data exchange is possible using a high-performance 64-bit backplane bus.

Technical specifications

	UR5213 subrack
Input voltage range	95 – 255 V ~, 47 – 63 Hz
Power failure buffering	Min. 15 ms
Dimensions (W x H x D)	482.6 x 354.9 x 342
Weight	Approx. 20 kg
Degree of protection	IP20
Rated input current	Typ. < 10 A
Inrush current max.	16 A
Recommended fuse/protection	Miniature circuit-breaker: 16 A (type B) Fuse: Slow-acting 16 A
Max. switching voltage of the fault signaling relay	230 V AC
Output voltages	+ 3.3 V 60 A + 5 V 30 A + 12 V 8 A – 12 V 8 A
Operating temperature range	0 °C to + 55 °C
Storage temperature range	-40 °C to + 70 °C

Ordering data

	Order No.
UR5213 subrack	**6DD1 682-0CH2**
Spare part:	
PS5213 power supply	**6DD1 683-0CH0**
with system fan	

SR51 slot cover

Overview

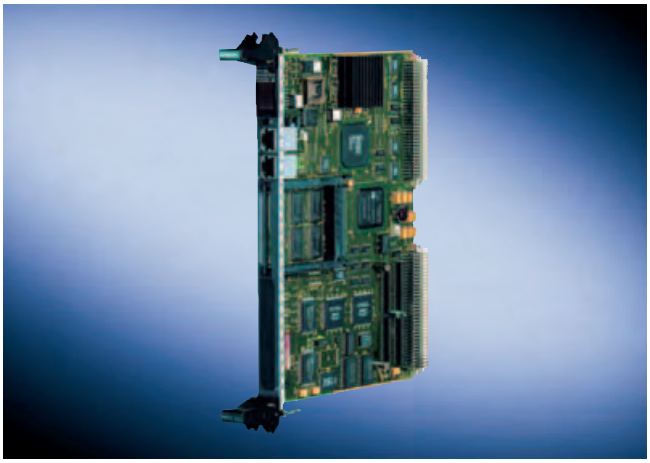
The SR51 slot cover is used to cover subrack slots which are not used. This is required in order to ensure the correct cooling and EMC properties of the system.

Ordering data

	Order No.
SR51 slot cover	**6DD1 682-0DA1**
covers vacant slots in the subrack	

CPU551 processor module

Overview



High-performance CPU module for open and closed-loop control and arithmetic tasks.

Technical specifications

	10
Space requirement/width	1 slot
Weight	0,6 kg
Display	5x7 LED
Interface for local service	Serial RS 232
Sampling times	from 100 µs
SDRAM	32 MByte
Synchronous cache	2 MByte
Clock cycle	266 MHz
CPU	64 Bit RISC CPU with Floating Point Unit
SRAM	256 Kbyte battery-buffered
Power supply	
Voltage/current supply (at 25°C)	+ 3.3 V, typ. 2.0 A + 5 V, typ. 1,5 A + 12 V, typ. 0.04 A – 12 V, typ. 0.04 A
Back-up battery	3.0 V typ. 2.2 µA
Power loss, typ.	15 W
Digital inputs	
Number	8 inputs of which 4 are interrupt-capable
Electrical isolation	Only by optional interface modules
Input voltage	
• Rated voltage	24 V
• For a 0 – signal	-1 V to +6 V
• For a 1 – signal	+13,5 V to +33 V
Input current	
• For a 0-signal	0 mA
• For a 1-signal	3 mA
Delay time	0.1 ms
Real time clock, resolution	0.1 ms

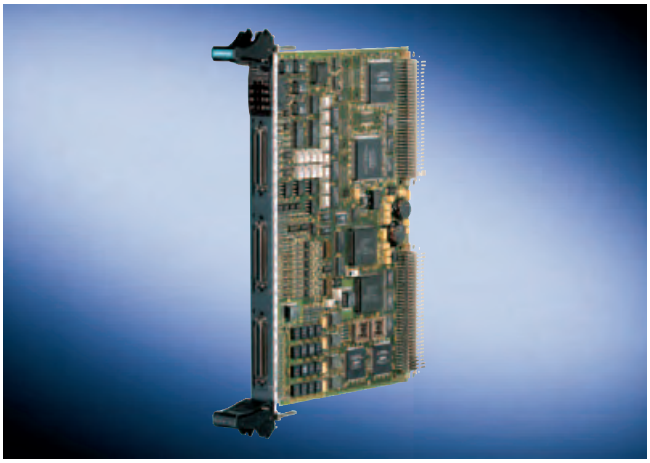
Ordering data

		Order No.
CPU551 processor module		**6DD1 600-0BA1**
MC500 memory module 4 Mbyte	A)	**6DD1 610-0AH4**
MC510 memory module 8 Mbyte	A)	**6DD1 610-0AH6**
MC521 memory module 2 Mbyte	A)	**6DD1 610-0AH3**
SB10 interface module to connect 8 digital inputs/outputs, 24 V DC, to FM 458-1 DP		**6DD1 681-0AE2**
SB60 interface module to connect 8 digital inputs, 115/230 V AC/DC, to FM 458-1 DP		**6DD1 681-0AF4**
SB61 interface module to connect 8 digital inputs/outputs, 24/48 V DC, to FM 458-1 DP		**6DD1 681-0EB3**
SU12 interface module to connect 10 signals to an FM 458-1 DP		**6DD1 681-0AJ1**
SC66 interface cable between the CPU551 and the SB10, SB60, SB61 or SU12 interface module, 2 m long		**6DD1 684-0GG0**
SC67 service cable between CPU551 and PG/PC, 7 m long		**6DD1 684-0GH0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

SM500 I/O module

Overview



The SM500 I/O module provides analog and digital inputs/outputs as well as incremental and absolute value encoder connections.

Technical specifications

Power supply	
Voltage/current supply (at 25°C)	+5 V typ. 1.0 A +3.3 V typ. 0.05 A +12 V typ. 0.3 A –12 V typ. 0.3 A
Typical power loss	12.5 W
Space requirement/width	1 slot
Weight	0.7 kg
Analog outputs	
Number	8
Version	Output with associated ground
Electrical isolation	No
Output voltage range	–10 V to +10 V
Output current	± 10 mA
Resolution	12 bit
Typ. conversion time per channel	4 µs
Accuracy	
• Max. differential linearity error	±1 LSB (monotony maintained)
• Max. gain error	±- 0.3 %
• Max. offset error	±- 24 LSB
Slewrate	Approx. 3.5 V/µs
Voltage output	
• Short-circuit protection to ground	Yes
• Short-circuit current	Appr. 100 mA
Analog inputs	
Number	8
Version	Differential inputs
Electrical isolation	No
Input voltage range	-10 V to +10V

Analog inputs (continued)	
Resolution	12 bit
Max. conversion time per channel	Approx. 20 µs
Accuracy	
• Max. differential linearity error	± 1 LSB (no missing code)
• Max. gain error	± 0.3 %
• Max. offset error	± 5 LSB
Input resistance	20 kOhm
Input filter	34 kHz
Incorrect polarity protection	Yes, as differential inputs are used
Integrating analog inputs (V/Hz)	
Number	4
Version	Differential inputs
Electrical isolation	No
Input voltage range	-10 V to +10 V
Resolution	Dependent on the integration time, e.g.15 bits for a 4 ms integration time
Max. integration time per channel	Can be configured
Accuracy	
• Max. differential linearity error	0.05%
• Max. gain error	1 %
• Max. offset error	± 2 LSB (software calibration)
Input resistance	470 kOhm
Input filter	2 kHz
Incorrect polarity protection	Yes, as differential inputs are used
Digital outputs	
Number	16
Electrical isolation	Only by using the optional interface modules

Technical specifications (continued)

Digital outputs (continued)	
External power supply voltage	
• Rated value	24 V
• Permissible range	20 to 30
• Briefly	35 V, for max. 0,5 s
• Max. current consumption (without load)	40 mA
Output voltage range	
• For a 0-signal, max.	3 V
• For a 1-signal, min.	Ext. power supply voltage. - 2.5 V
Output current	
• For a 0-signal, min.	- 20 µA
• For a 1-signal	
- Rated value	50 mA
- Permissible range, max.	100 mA
Delay time	100 µs
Max. switching frequency of the outputs for an ohmic load	6 kHz
Short-circuit protection to	
• Ground	Yes
• Ext. power supply	No
Max. short-circuit current	250 mA
Summed current of the outputs (to 60 °C)	16 x 50 mA
Limiting of inductive switch-off voltages	External power supply voltage + 1 V
Digital inputs	
Number	16, non-floating
Electrical isolation	Only by using the optional interface modules
Input voltage	
• Rated voltage	24 V
• For a 0 – signal	-1 V to +6 V
• For a 1 – signal	+13.5 V to +33 V
Input current	
• For a 0 – signal	0 mA
• For a 1 – signal	3 mA
Delay time	0.1 ms
Incremental encoder	
Number of encoders	4
Types which can be connected	Incremental encoder with tracks offset through 90° degrees Incremental encoder with forwards and reverse tracks
Version	Differential inputs, can be changed-over between 15 V (HTL) and 5 V (TTL) encoder signals
Track signals	Track A, B with or without zero pulse N Forwards or reverse tracks

Incremental encoder (continued)	
Min. phase difference of the track signals	200 ns
Max. pulse frequency (track frequency)	1 MHz
Input voltage	
• 15 V encoder	
- Rated value	- 30 V to + 30 V
- For a 0-signal	- 30 V to + 4 V
- For a 1-signal	+ 8 V to +30 V
• 5 V encoder	
- Rated value	- 7 V to + 7 V
- For a 0-signal	- 7 V to - 0,7 V
- For a 1-signal	+1.5 V to + 7 V
Input current	
• For 15 V - encoder (typ.,abs.)	5,0 mA
• For 5 V - encoder (typ.,abs.)	1.5 mA
Monitoring output	Not avaible
Monitoring input	Specification, the same as for digital inputs
Interrupt reset output	
• Short-circuit protection to ground	Yes
- Ext. power supply	No
- Max. short-circuit current	20 mA
Interrupt input	
• Input voltage (permissible range)	0 V to 5 V
- 0-signal, max.	< 0,5 V
- 1-signal, min.	> 2.0 V
• Input current	
- 0-signal	- 2.8 mA
- 1-signal	1.6 mA
Power supply voltage for encoders	
Number	1
Electrical isolation	No
Typ. output voltage	13.5 V
Max. output current	150 mA, short-circuit proof to ground, short-circuit current, approx. 250 mA

SM500 I/O module

Technical specifications (continued)

Absolute value encoder inputs	
Number	4
Version	Differential inputs, RS 485 signal level
Signal voltage	5 V, RS485 level
Types which can be connected	Single or multi-turn Encoder
Protocols	SSI, EnDat
Data formats	Gray, binary
Data direction	
• Uni-directional	SSI
• Bi-directional	EnDat
Data bits	SSI: 13+Parity, 25+Parity EnDat: variable
Max. pulse frequency	2 MHz, dependant on the cable length
Input voltage	
• Permissible range	RS 485 signal level

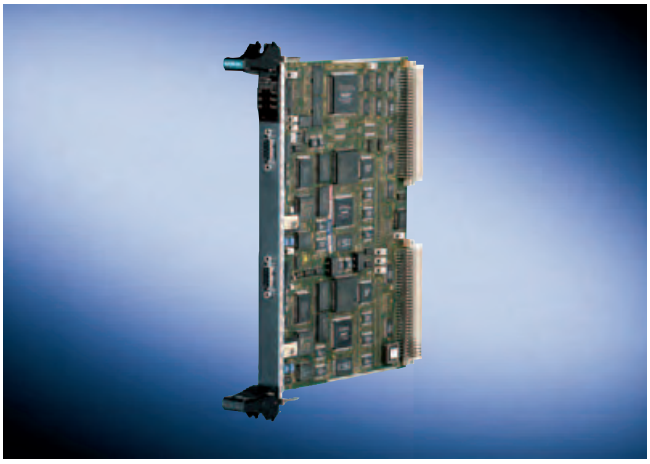
Ordering data

		Order No.
SM500 I/O module	A)	**6DD1 640-0AH0**
SB10 interface module to connect 8 digital inputs/outputs, 24 V DC, to FM 458-1 DP		**6DD1 681-0AE2**
SB60 interface module to connect 8 digital inputs, 115/230 V AC/DC, to FM 458-1 DP		**6DD1 681-0AF4**
SB61 interface module to connect 8 digital inputs/outputs, 24/48 V DC, to FM 458-1 DP		**6DD1 681-0EB3**
SB70 interface module 8 digital outputs with relay		**6DD1 681-0AG2**
SB71 interface module 8 digital outputs with transistors, 24/48 V DC		**6DD1 681-0DH1**
SU12 interface module to connect 10 signals to an FM 458-1 DP		**6DD1 681-0AJ1**
SU13 interface module to connect 50 signals to an FM 458-1 DP		**6DD1 681-0GK0**
SC62 interface cable to connect up to 5 interface modules SBxx and/or SU12, 2 m long		**6DD1 684-0GC0**
SC63 interface cable to connect an SU13 interface module, 2 m long		**6DD1 684-0GD0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

CP50M0 communications module

Overview



The CP50M0 communications module provides two PROFIBUS DP/MPI interfaces and a buffer memory for communications between the CPUs. The interfaces can be used as PROFIBUS DP master, slave, as master and slave simultaneously or as MPI node.

Technical specifications

Connector assignment of the PC - CP50M0 cable		
CP50M0 (RS 232 interface)	PC 9-pin connector male	PC 25-pin connector male
2 (TxD)	2 (RxD)	3 (RxD)
7 (RxD)	3 (TxD)	2 (TxD)
1 (ground)	5 (ground)	7 (ground)

Power supply	
Voltage/current supply	+5 V typ. 1.0 A +12 V typ. 20 mA –12 V typ. 10 mA
Power loss, typical	5.5 W
Space requirement / width	1 slot
Weight	0.6 kg

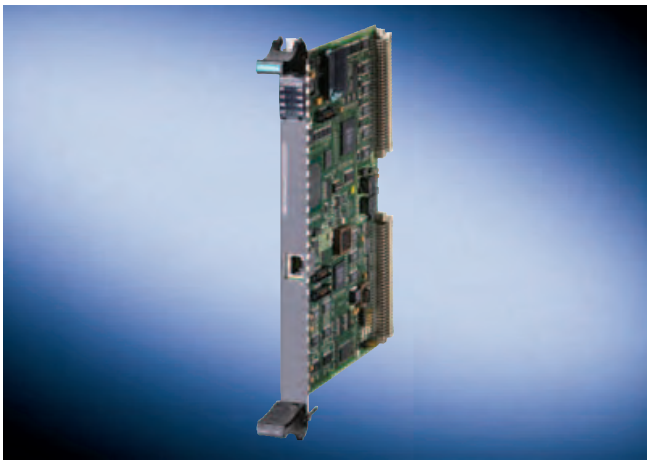
Ordering data

		Order No.
CP50M0 communications module with 8 MByte buffer memory, provides up to 2 MPI interfaces and up to 2 PROFIBUS DP interfaces	A)	**6DD1 661-0AD0**

A) Subject to export regulations: AL: N and ECCN: EAR99H

CP51M1 communications module

Overview



The CP51M1 communications module is an Industrial Ethernet interface for the SIMATIC TDC automation system.

Technical specifications[1)]

Width	**1 slot**
Weight	
Port for Industrial Ethernet	RJ45
Protocols	TCP/IP or/and UDP
Telegram length	Over 2 KByte
Transmission modes	Refresh, handshake, multiple and select
Autosensing	for 10 MBit and/or 100 MBit networks
Default Router	adjustable
Power supply	
Voltage/current supply (maximum values)	
Power loss, typ.	

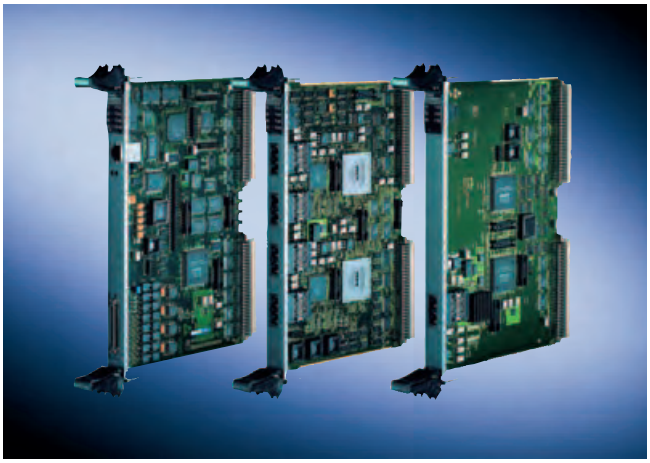
1) Please look up the current technical data from the user documentation, which will be available when the module is deliverable.

Ordering data

	Order No.
CP51M1 communications module	**6DD1 661-0AE1**

GlobalDataMemory

Overview



Data can be exchanged between all of the CPU modules in the system, over all of the networked subracks, using the memory in the GlobalDataMemory (GDM). Up to 44 subracks can be coupled in synchronism through the central memory. This means that a maximum of 836 CPU modules can be used.

Ordering data

	Order No.
CP52M0 memory module with 2 Mbyte SRAM store	**6DD1 660-0BF0**
CP52IO interface module with 4 Interfaces	**6DD1 660-0BG0**
CP52A0 access module for GlobalDataMemory	**6DD1 660-0BH0**

Technical specifications

	CP52M0
Power supply	
Voltage/current supply (at 25 °C)	+5 V typ. 0.4 A +3.3 V typ. 0.7 A +12 V typ. 0.01 A –12 V typ. 0.01 A
Power loss, typical	4.5 W
Space requirement / width	1 slot
Weight	0.6 kg
Digital outputs	
Number	16
Electrical isolation	No
External power supply voltage	
• Rated value	24 V
• Permissible range	20 to 30
• Briefly	35 V, for max. 0.5 s
• Max. current drain (without load)	40 mA
Output voltage range	
• For a 0-signal, max.	3 V
• For a 1-signal min	External power supply -2.5 V
Output current	
• For a 0-signal, min.	-20 µA
• For a 1-signal	
- Nominal value	50 mA
- Permissible range, max.	100 mA
Delay time	100 µs
Max. switching frequency of the outputs for an ohmic load	6 kHz
Short-circuit protection with respect to	
• Ground	Yes
• Ext. power supply	No
Max. short-circuit current	250 mA
Summed current of the outputs (up to 60 °C)	16 x 50 mA
Limiting, of inductive switch-off voltages	

	CP52IO
Power supply	
Voltage/current supply (at 25 °C)	+5 V typ. 3 A +3.3 V typ. 0.8 A
Power loss, typical	18 W
Space requirement / width	1 slot
Weight	0.6 kg

	CP52A0
Power supply	
Voltage/current supply (at 25 °C)	+5 V typ. 1.5 A +3,3 V typ. 0.4 A
Power loss, typical	9 W
Space requirement / width	1 slot
Weight	0.6 kg

Overview SB60 interface module

The interface module is used to connect 8 digital inputs with conversion from 115/230 V DC/AC to 24 V DC

Overview SB70 interface module

The interface module is used to connect 8 digital outputs with conversion of the 24 V DC voltage on the module side to a max. of 120 V DC/AC on the plant side using relays.

Overview SC66 interface cable

Interface cable for the SIMATIC TDC CPU551 processor module and the SB10, SB60, SB61 and SU12 interface modules

Overview SC67 service cable

Service cable for the SIMATIC TDC CPU551 processor module and a local engineering/service PC.

Accessories for SIMATIC TDC

Technical specifications

Technical specifications SB60 interface module	
Number of digital inputs for	8
• Input voltage	115/230 V DC/AC
Electrical isolation	Yes, via optocoupler
Insulation voltage	Separation assured: • Isolation between inputs and outputs assured • 1125 V AC test voltage for input current circuit
Max. cable cross-section	1.5 mm^2
Dimensions (W x H x D) in mm	45 x 130 x 156
Weight	0.31 kg
Technical specifications SB70 interface module	
Number of digital outputs	8
• Output voltage, max	230 V DC/AC
Relay switching current	
• For 120 V AC	2 A
• For 120 V DC	0.2 A
Electrical isolation	Using relay
Isolation voltage	Separation assured: • Isolation between inputs and outputs assured • 1125 V AC test voltage for input current circuits
Max. cable cross-section	1.5 mm^2
Dimensions (W x H x D) in mm	45 x 130 x 156
Weight	0.32 kg

Ordering data

	Order No.
SB60 interface module 8 digital inputs, 120 V AC	**6DD1 681-0AF4**
SB70 interface module 8 digital outputs with relay	**6DD1 681-0AG2**
SC66 interface cable between the CPU551 and the SB10, SB60, SB61 or SU12 interface module, 2 m long	**6DD1 684-0GG0**
SC67 service cable between CPU551 and PG/PC, 7 m long	**6DD1 684-0GH0**

Additional accessories

Overview

For information about interface cables SC62, SC63, SC64 and interface modules SB10, SB61, SB71, SU12 and SU13 see section 5, page 5/81.

Supplementary Components

13

SINAMICS

Overview

The SINAMICS family

- An integrated drive family for every application and every industry sector.
- Broad power spectrum from 0.12 kW up to 30 MVA.
- Wide scope of available functions, from simply V/f control to servo control with high dynamic response.
- Designed for total compatibility with other Siemens automation components.
- Common platform concept with uniform functionality, configuration, installation and operation as well as a standard diagnostics concept and standard communication mechanisms.

SINAMICS G110 –
The versatile drive for the lower power range

- For speed-controlled applications (V/f) in 200 - 240 V systems.
- Power range from 0.12 - 3kW.
- Supplied ready for connection to speed up the installation process.
- Easy to install as supplied ready for connection.
- Available with integrated filter.
- Variants for increased flexibility and various communication modes.
- Can be used in a wide range of applications in industry and business.

Further information:

- Catalog D11.1
- Internet:
  www.siemens.com/sinamics-g110

SINAMICS G120 –
The modular single drive for small to medium powers

- For speed-controlled applications (V/f and vector control with/without encoder) in 380 - 480 V systems
- Power range from 0.37 - 90 kW
- Modular building block system for more flexibility: various types of communication (USS protocol and PROFIBUS DP) and Safety Integrated with fail-safe control units
- Can be used in a wide range of applications in industry and business
- Innovative cooling concepts and high ruggedness through external heat sinks
- Available with integrated line filter

Further information:

- Catalog D11.1 News April 2006
- Internet:
  www.siemens.com/sinamics-g120

SINAMICS G130/G150 –
The universal drive solution for single drives in the medium and upper power range

- For speed-controlled standard applications in the medium and upper performance range.
- SINAMICS G150 standard cabinet ready for connection, SINAMICS G130 rack-mounting units for system-specific installation.
- Power range from 75 – 1500 kW.
- Supplied as standard with a PROFIBUS interface for connection to higher-level controls.
- An ideal and cost-effective solution for pumps, fans, extruders, mixers, etc.

Further information:

- Catalog D11
- Internet:
  www.siemens.com/sinamics-g130
  www.siemens.com/sinamics-g150

SINAMICS S120 –
The flexible, modular drive system for complex single-axis and multiple-axis applications from the lower to the upper performance range

- Specifically for Motion Control and vector-controlled applications in single-axis and multiple-axis applications in all areas of mechanical and system engineering.
- Servo/vector control, V/f.
- Power range from 0.12 – 1200 kW, as cabinet modules up to 4500 kW
- Various designs for different target applications.
- Highly flexible, e.g., thanks to modular system architecture, various cooling methods, support of a wide range of motors/encoders, easy expandability.
- Highly degree of scalability in terms of performance, number of axes, functionality.
- Integrated safety functions.
- Extensive Motion Control functionality.
- Fault-tolerant and highly efficient even in unstable systems.
- Automatic parameter assignment and simple drive installation/optimization.

Further information:

- Catalog D21.1
- Internet:
  www.siemens.com/sinamics-s120

SINAMICS

Overview (continued)

SINAMICS S150 –
The high-quality solution for single drives in the medium and upper power range

- For applications with maximum requirements in terms of precision and dynamics in the medium to upper performance range, such as test bed drives, elevator and crane systems, cross cutters and shears, conveyor belts, presses, cable winches, centrifuges.
- Ready-to-use control cabinet.
- Power range from 75 - 1200 kW.
- Fault-tolerant and highly efficient even in unstable systems.
- Cost-effective operation thanks to energy recovery as standard.
- Reactive-power compensation possible.
- PROFIBUS interface supplied as standard for connection to higher-level controls.

Further information:

- Catalog D21.3
- Internet:
  www.siemens.com/sinamics-s150

SINAMICS GM150 –
The universal solution for single drives in the medium-high voltage range

- Single drive for applications with quadratic and constant load characteristic without regeneration.
- Extremely suitable for economical use of pumps, fans, extruders, mixers etc.
- Voltage range 2.3 to 7.2 kV.
- Power section in HV-IGBT technology for powers up to 10 MVA, alternatively with air or water cooling.
- Power section in IGCT technology for powers from 10 MVA to 28 MVA, water cooling.
- Problem-free integration into automation solutions through standard PROFIBUS interface as well as analog and digital interfaces.

Further information:

- Catalog D12
- Internet:
  www.siemens.com/sinamics-gm150

SINAMICS SM150 –
The high-quality solution for single and multi-motor drives in the medium-high voltage range

- Single or multi-motor drive for regenerative, highly dynamic applications.
- Roller drives (cold, warm), shaft hoisting drives, test bays, conveyor systems.
- Powers from approx. 5 to 28 MVA, voltage 3.3 kV.
- IGCT technology, water cooling.
- Ideal for direct power exchange over the common DC bus for multi-motor drives with regenerative and motorized operation.
- Problem-free integration into automation solutions through standard PROFIBUS interface as well as analog and digital interfaces.

Further information:

- Catalog D12
- Internet:
  www.siemens.com/sinamics-sm150

SIMODRIVE

Overview

- Drive system for connection to machine tools, robots, special machines, manipulators, and production machines.
- Comprising a SIMODRIVE 611 digital/universal converter system as well as control units with analog or digital interface for operation of three-phase motors, e.g. synchronous or induction motors.
- SIMODRIVE POSMO A with PROFIBUS DP connection permit simple integration into SIMATIC using the STEP 7 programming software.
  - SIMODRIVE POSMO A is an intelligent positioning motor with integrated converter power section, motor control, positioning control and program memory.

Drive ES engineering system:
See section 7, Engineering Tools, page 7/24

Further information:

- Catalogs NC 60/DA 65.4
- Internet:
  http://www.siemens.com/drivesolutions

SIMOREG DC MASTER 6RA70

Overview

- Fully digital static converters as compact and cabinet devices for three-phase current connection.
- For armature and field supply of variable-speed DC drives.
- Main areas of application:
  - Main drive for sheet-fed and rotary printing machines
  - Traversing and lift drive in the hoisting industry
  - Lift and ropeway drives
  - Rolling-mill drives
  - Paper-making machines, etc.
- Rated DC current
  - Of devices from 15 to 3000 A
  - With parallel connection up to 18000 A
- Protection against commutation failures with SIMOREG CCP.

Further information:

- Catalogs DA 21.1 and DA 22

Internet:
http://www.siemens.com/automation

SIMOVERT MASTERDRIVES

Overview

- Fully digital frequency converters with IGBT power modules.
- Can be used for single-motor and sectional drives.
- Types of construction: Compact PLUS, compact, rack-mounting, and cabinet units.

- Device versions:
  - Vector Control for demanding continuous processes in all sectors of industry and for all applications. Supply voltages from 380 V to 690 V, 50/60 Hz; power ratings from 0.55 kW to 2300 kW; higher power ratings available as application.
  - Motion Control for all servo applications, even those with the most demanding technological requirements. Voltages from 380 V to 480 V; 50/60 Hz; power ratings from 0.55 kW to 250 kW.
- Version with Active Front End for jerk-free and stable drive technology possible.
- Connection to PROFIBUS DP via communication modules possible.
- Extensive range of accessories and system components

Drive ES engineering system:
See section 7, Engineering Tools, page 7/24

Further information:

- Catalogs DA 65.10/DA 65.11
- Internet:
  http://www.siemens.com/drivesolutions

Overview

Analog interface converters/isolation amplifiers/ transducers 3RS17

Signal conversion is required, for example, whenever a voltage signal has to be converted into a current signal for transmission via a long path or a sensor output and control input are incompatible.

Analog interface converters are particularly suitable for the electrical isolation or conversion of analog signals, potential distribution or EMC and overvoltage protection.

- Microprocessor-controlled and calibrated interface converters starting at an overall width of 6.2 mm.
- Very easy commissioning using the DIP switch and integrated setpoint encoder.
- All terminals are protected against polarity reversal and short circuits and can withstand voltages up to 30 V.

Interface relays 3TX70 and LZX

Plug-in relay connector 3TX701, overall width 6.2 mm:

- Plug-in relays: At the end of its service life, the relay can be replaced without having to disconnect the wiring.
- Wire entry and terminal screw can be accessed easily from the front.

Interface relay 3TX70, overall width starting at 6.2 mm:

- Can be used for contact multiplication, potential matching or as EMC and overvoltage protection.
- Semiconductor variants for applications with high switching frequency or for switching capacitive loads.

Plug-in relay LZX:

- Can be used for contact multiplication, potential matching or to switch small loads.
- Up to 4 changeover contacts in one device.

Monitoring relays 3RS10/11, 3UG3, 3RN1

Temperature monitoring relays 3RS10/11 work in parallel with an enclosed temperature control loop and are used to monitor a preset threshold temperature in solid, liquid or gaseous media.

- DIN 3440 certification as "temperature limiting or monitoring devices".
- Easy to operate without complicated menu guidance or add-on software.

Monitoring relays 3UG3 are used to monitor electrical and non-electrical variables, which cannot be detected directly by an automation system.

- Monitoring of line supplies for overvoltage or undervoltage, direction of rotation or asymmetry.
- Monitoring of loads based on power factor or current.
- Monitoring of fill levels or speeds.

Thermistor motor protection devices 3RN1 monitor the winding temperature of motors, which have an integrated PTC sensor.

- Compliance with ATEX guideline 94/9/EC through agreement with the standards EN 60079-14 and EN 60947-8
- Fast fault diagnosis thanks to the indication of wire-break or short-circuit.
- Electronically-optimized output thanks to hard-gold-plated contacts.

Time-delay relays 3RP15 and 3RP20

The primary task of time-delay relays 3RP15 and 3RP20 is to delay the starting up of the overall system until the automation system has reached a defined state or to control real-time-critical processes such as on a star-delta connection.

- Wide voltage range and multifunction variants.
- Electronically-optimized hard-gold-plated contacts.

Further information:

- Catalog LV 1 chapters 3 and 7
- Product brochure for Sirius relays
- Internet:
  http://www.siemens.com/relays

SIMODRIVE sensor

Overview

- SIMODRIVE sensors are measuring systems for detecting distances, angles of rotation and speeds.
- Can be used on machines in a variety of industry sectors, e.g., production machines, manipulators, machine tools, and special machines.
- Can be connected to SIMATIC, SINAMICS, SINUMERIK, SIMOTION, SIMOVERT MASTERDRIVES and SIMODRIVE.
- Couplings, assembly fittings, cable connectors, and complete preassembled signal cables are available as accessories for SIMODRIVE sensor.
- SIMODRIVE sensor built-on encoders can be supplied as incremental encoders and absolute encoders.
- Incremental encoders:
  - Interfaces RS 422 (TTL), 1 V_{pp} and HTL.
  - Operating voltage 5 V DC or 10 V to 30 V DC.
- Absolute encoders:
  - All absolute encoders are available in single-turn or multiturn versions.
  - SSI (Synchronous Serial Interface) or connection for EnDat, PROFIBUS DP or DRIVE-CLiQ.
  - Encoders with PROFIBUS DP support Class 1 and Class 2 profiles in addition to isochrone mode, internode communication and application-specific miscellaneous functions. They are programmable.
- All measuring systems are available in synchro-flange and clamping-flange versions.

Further information:

- Catalogs NC 60, NC 61, D 21.1, DA 65.3, DA 65.4
- Catalog CA 01
- Internet:
  http://www.siemens.com/simodrive

SIMOTION motion control system

Overview

System SIMOTION

- The SIMOTION system is used primarily on machines on which motion control with servo or hydraulic axes dominates. Its main areas of application are on packaging, printing and plastics machines as well as in the automation of machines in the textiles, metalworking, wood, glass, ceramics and stone sectors.
- Principle of the system: To merge Motion Control with logic and technology functions so that all motions, motion-based logic functions and technology functions such as temperature control, hydraulic or cam functions can be executed in the same system.
- Advantages:
  - No time-critical interfaces between components.
  - No programming overhead for these interfaces.
  - Uniform and transparent programming and diagnostics familiar from PLC systems.
  - Hardware platform can be freely selected: controller, PC or integrated directly in the drive.
  - Simple sequence programming in graphics format with Motion Control Chart.
  - Integrated PLC functionality.
- SIMOTION system components:
  - SCOUT engineering system:
    The features of the engineering system for complete machine automation include:
    MCC (Motion Control Chart) for simple sequence programming in graphics format;
    LAD and CSF for programming PLC tasks,
    ST as text language to simplify the creation of functions and generation of complex calculations
  - Runtime software modules:
    A variety of Motion Control and technology functions. Specific selections can be made to adapt the system flexibly to the machine.
  - Hardware platforms:
    A variety of platforms support adaptation to the machine being used. The compact variant in the drive, the modular variant in S7-300 design, and the open variant as a pure software solution on industrial PC are available for selection.

Overview (continued)

SIMOTION D – Compact and integrated in the drive

- Complete machine automation with drive control, Motion Control, technology and PLC functionality on a SINAMICS S120.
- Particularly fast response times.
- A number of performance variants to support scaling.
- Typical areas of application
  - Compact machines
  - Distributed automation concepts, e.g., on machines with a large number of axes
  - Modular machines, also as add-ons for SIMOTION P or SIMOTION C
  - For time-critical requirements on coupled axes
- PROFINET (optional) via CBE 30 communication board.

SIMOTION C – Modularity and flexibility

- Controller in S7-300 design.
- With integrated drive interfaces for analog or stepper drives and inputs/outputs.
- Can be expanded with SIMATIC S7-300 I/O and function modules.
- With integrated isochronous PROFIBUS interfaces for the distributed connection of drives or communication with operator panels and higher-level controls.
- Typical areas of application:
  - Wherever analog or stepper drives are being used, e.g., during retrofitting.
  - If the range of process signals is very wide.

SIMOTION P – Open for other tasks

- PC-based Motion Control system under Windows XP with real-time expansion.
- Other PC applications may run in addition to the machine application, e.g., engineering system, office applications or process data evaluation.
- Drives connected remotely via isochronous PROFIBUS.
- PROFINET (optional) via MCI-PN communication board.
- Supports the use of a variety of Panel PC variants with displays of various sizes and operation via keyboard/mouse or touch screen.
- Typical areas of application:
  - Openness of the PC is required.
  - Applications with hardware-based control and visualization.
  - Applications with extensive data management, analysis and logging.
  - Advanced requirements in terms of remote diagnostics and remote control.
  - Central control concept for large numbers of axes.

Further information:

- Catalog PM 10
- Catalog CA 01
- Internet:
  http://www.siemens.com/simotion

SINUMERIK CNC automation systems

Overview

SINUMERIK 802

- CNC family for simple applications
- Used primarily in turning and milling applications; solutions in other technologies are also possible.
- SINUMERIK 802S base line with stepper drives for compact and ultra-compact machines. Installation made easy, highly precise even without measuring systems.
- SINUMERIK 802C base line with analog drives for increased dynamics and power. Perfect for retrofitting. Standard drives ±10 V, suitable for universal use, easy to operate and proven technology.
- SINUMERIK 802D/802D base line with digital drives for series machines. Easy start-up, PROFIBUS for all components.

SINUMERIK 810D with SIMODRIVE 611 digital (SINUMERIK powerline)

- The cost-effective introduction to the future-oriented CNC and drive world for machine tools.
- Compact design.
- In addition to user-friendly CNC functions, it also features up to 6 SIMODRIVE 611 digital drive controls and 2 or 3 SIMODRIVE 611 power supply modules.
- Standard version with optional PROFIBUS DP interface (master/slave).

SINUMERIK 840Di

- Fully PC-integrated NC control. Hardware and software openness.
- Used in applications such as simple Motion Control tasks (positioning and linear interpolation), woodworking, handling, assembly, machine tools, and applications in the vicinity of machine tools.
- Comprising an industrial PC, the MCI board and system software.
- The drive and I/O are connected on the MCI board via the PROFIBUS DP interface.
- The HMI programming package, the HMI configuration packages and HMI-Advanced, the standard user interface for machine tools, are all available as optional HMI modules.

SINUMERIK 840D with SIMODRIVE 611 digital (SINUMERIK powerline)

- The digital system for the most complex requirements.
- Can be used in mold and tool making, in complex mass production in job-shop production and for almost any type of technology.
- With up to 10 CNC channels and 31 axes per NCU module, making it suitable for use in the rotary transfer machines and "cyclic machines" (e.g., presses, packaging and printing machines) sector.
- Scalable NCU software with 2/6/12/31 axes for a number of different NCU modules and correspondingly advanced CNC functionality.
- Up to 8 NCUs with up to 248 axes can be connected via NC link.
- Special technology functions (e.g., laser machining, handling) available via compile cycles that can be reloaded in order to support optimum adaptation to the machines and the equipment of integrated machine series.
- All NCUs with optional PROFIBUS DP interface (master/slave).

Further information:

- Catalog NC 60
- Internet:
  http://www.siemens.com/sinumerik

Overview (continued)

SINUMERIK 802D sl

The SINUMERIK 802D sl is an operator panel controller which combines all components of a CNC and the drive control in one unit. Using DRIVE-CLiQ it is possible to connect 6 digital drives.

- CNC for every application
- Turning/milling, or nibbling/grinding
- Simple and rugged installation with minimum wiring requirements
- Processing of programs over network or by CF card

SINUMERIK 840Di sl

The SINUMERIK 840Di sl is a completely PC-integrated numerical control which works together with the SINAMICS S120 drive system. The controller with open hardware and software is particularly suitable for users looking for distributed automation solutions in the area of PLC I/Os and drives and/or prefer a completely PC-integrated controller.

- Rugged industrial PC including MCI2 board with integrated SIMATIC PLC 317-2 DP
- System software for up to 6 or 20 axes
- Flexible communication over USB and Ethernet interfaces
- Uniform openness of operation

The technological area of use of the SINUMERIK 840Di sl covers machine tools, special machines, manipulators up to retrofitting.

SINUMERIK 840D sl

The SINUMERIK 840D sl offers modularity, openness, flexibility, and a uniform structure for operation, programming and visualization. It provides a system platform with pioneering functions for almost all technologies. Integrated in the SINAMICS S120 drive system and supplemented by the SIMATIC S7-300 automation system, the SINUMERIK 840D sl is a new, digital all-in-one control system highly suitable for the medium and upper performance ranges. The SINUMERIK 840D sl is characterized by flexibility, maximum dynamic response, precision and optimum integration in networks. Integrated and certified SINUMERIK Safety Integrated functions are available with SINUMERIK 840D sl. This provides highly effective protection of persons and machines in a simple, economic and practical manner.

- The SINUMERIK 840D sl is a digital CNC system for medium to complex tasks.
- Maximum performance and flexibility especially for complex multi-axis systems (up to 31 axes)
- Uniform openness from operation down to the NC core
- Integrated, certified safety functions for man and machine: SINUMERIK Safety Integrated
- Proven operation and programming software such as ShopMill or ShopTurn and motion control information system products (MCIS products) for the production area.

Further information:

- Catalog NC 61
- Internet: http://www.siemens.com/sinumerik

SICLOCK

Overview

- A modular time distribution system for process synchronization incl. radio receiver for GPS and DCF77.
- Can be used to synchronize individual PCs or even large plants with multiple redundancy.
- Can be connected to SIMATIC S7, S5, PCS 7, PCs, computers, etc. via Ethernet (SIMATIC NET or NTP).
- Individual connections with asynchronous data transmission, pulses and FO connections.
- Comprising the SICLOCK TM and SICLOCK TS plant central clocks, radio synchronization units, pulse converters and driver software for message frame reception.

SICLOCK TM and SICLOCK TS

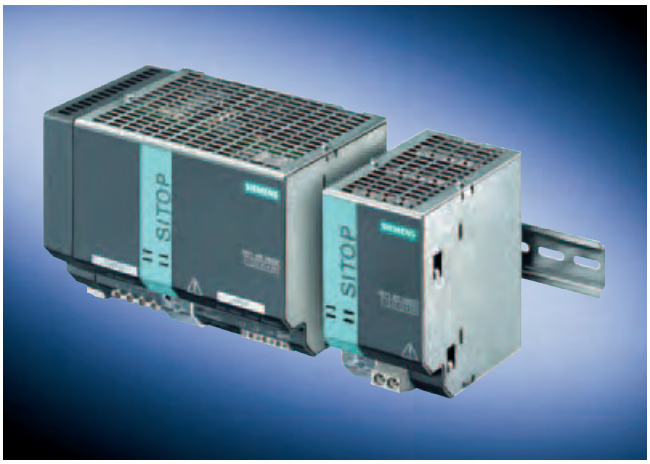
- Plant central clocks for process synchronization.
- Can be adapted to the process quickly and easily by assigning interface and telegram-content parameters via the LCD on the device.
- Radio synchronization via GPS, DCF77, IRIG B, etc.
- Process synchronization via Ethernet (AUI, ITP and twisted pair) and 8 outputs (TTY, RS 232, RS 422 and level 0 up to 15 V) or 3 outputs (TTY and RS422) with message frames, DCF77 simulation and pulses, IRIG A and B (SICLOCK TS only).

Further information:

- Siemens AG, Electronic Design and Manufacturing Services (I&S EDM), Frauenauracher Strasse 98, 91056 Erlangen
  Tel.: 09131/18-82010 (Hotline)
  Fax: 09131/18-80604
  E-mail: siclock@siemens.com
- Internet:
  http://www.siemens.de/siclock
  http://www.siemens.com/siclock

SITOP power power supplies

Overview



- High efficiency of approx. 90%.
- Quick, easy and inexpensive installation.
- Requires little space thanks to high power density.
- Exact output voltage 24 V DC.
- Integrated short-circuit protection, additional fusing not required.
- Safe electrical isolation.
- Meets the requirements of national and international standards.

SITOP smart

- Innovated, single-phase power supply 24 V/ 2.5, 5 and 10 A
- Narrow design
- Superb overload response

SITOP modular

- Single-phase, two-phase and three-phase basic devices 24 V/ 5 to 40 A
- Universal wide-range inputs permit global use
- With comprehensive configuration such as wide-range input, power boost and selectable overload response
- Supplementary modules for flexible expansion

SITOP supplementary modules

- Expand the SITOP power supply units for many different requirements.
- Signaling module, redundancy module, diagnostics module SITOP select, backup module.
- DC UPS modules and 24 V battery modules for power loss ride-through.

LOGO!Power

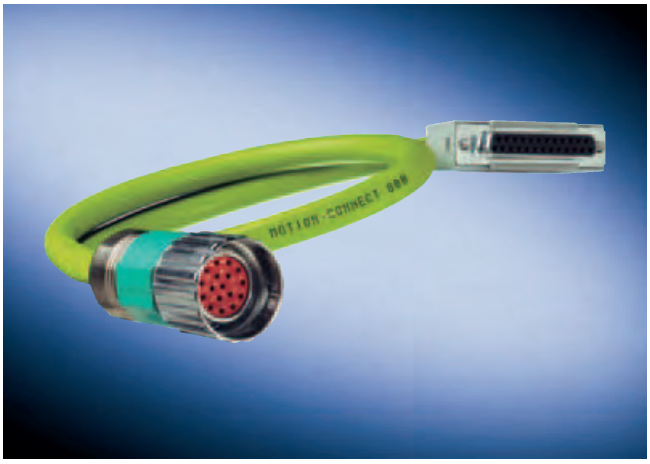
- Compact power supplies based on LOGO! logic module design
- Output voltages 5, 12, 15, 24 V for a wide variety of possible applications.
- Compact with versatile functionality.

Further information:

- Catalog KT 10.1
- Internet:
  http://www.siemens.com/sitop

MOTION-CONNECT cables and connections

Overview



The MOTION-CONNECT cables are suitable for use with a wide range of processing and production machines. The power and signal cables can be ordered by the meter or as preassembled cables.

The use of preassembled cables offers:

- High quality
- Perfect system-tested functioning
- IP67 when in connected condition

The cables can be delivered exact to the meter. Intermediate lengths are also available in 0.1-m steps.

The following products are available:

- MOTION-CONNECT 500, primarily for fixed installation.
- MOTION-CONNECT 500 PLUS, suitable for trailing and resistant to mineral oils (except bio-oils and cutting oils).
- MOTION-CONNECT 700, ideal for linear motors and machines with complex mechanical requirements.
- MOTION-CONNECT 800, meets all requirements for use in cable carriers on machine tools and production machines.

Further information:

- Catalogs NC 60, NC 61, D 21.1, DA 65.3, DA 65.4
- Catalog CA 01
- Internet:
  http://www.siemens.com/automation/mall

SICAM eRTU substation control system

Overview

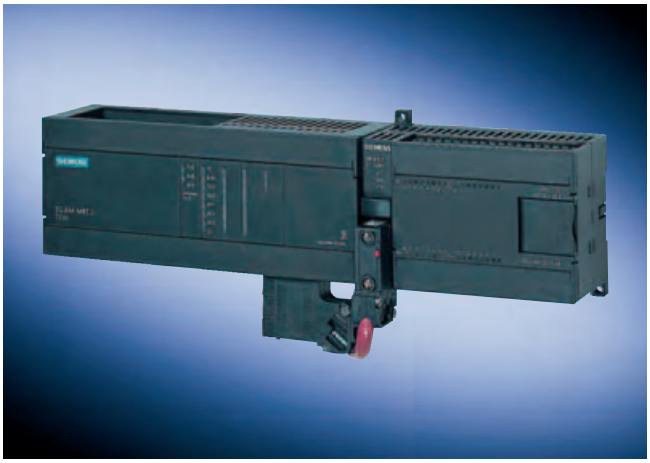
- Telecontrol and substation control unit based on the SIMATIC S7-400 for monitoring and controlling distributed processes.
- Can be used in power transmission and distribution for the automation of medium and high-voltage systems.
- Excellent voltage endurance and electromagnetic compatibility.
- Central process connection with SICAM I/O modules.
- Self-monitoring inputs, protected command outputs.
- Technical specifications:
  - Insulation 2.5 kV
  - Surge voltage 5 kV
  - Wide-range inputs:
    24 V to 60 V DC, 110 V to 125 V DC
- Tested to IEC 255-5.
- Supports multichannel communication with higher-level control systems based on standardized remote control protocols IEC 60870-5-101 and IEC 60870-5-104 as well as SINAUT 8-FW, DNP V3.0, Telegyr 800, Telegyr 8979; with IEC 60870-5-101 and IEC 60870-5-104 also dual-channel/ redundant communication.
- Connection of substations via telecontrol protocols IEC 60870-5-101 and DNP V3.0; medium: RS232, RS485.
- Connection of protection devices and field control stations (in particular SIPROTEC), transformer controllers and digital transducers (SIMEAS T) with the IEC 60870-5-103 protocol; medium: FO, RS232, RS485.
- Connection of additional field devices for power engineering, e.g., via PROFIBUS DP (SIMEAS Q, SIMEAS P, SIMOCODE, SU200) and DNP V3.0 and Modbus.
- Time synchronization for the entire system with DCF77, GPS or telecontrol protocol.
- Real-time detection with 1 ms resolution.
- Web-based diagnostics and testing with SICAM Diamond.
- User-friendly configuration of the power process with SICAM plusTOOLS for eRTU.
- Graphics-based configuration of power process automation (system interlock, switching sequences, automatic functions) with CFC and special system-tested function blocks.

Further information:

- Catalog SICAM 2.4.1
- Internet:
  http://www.ptd.siemens.com

SICAM miniRTU telecontrol units

Overview



- For secure long range data transmission on transmission channels susceptible to interference based on the standardized IEC 60870-5-101 remote control protocol and DNP V3.0, SINAUT 88-FW and TG800.
- Communication with higher-level master terminal via analog telephone network, ISDN and GSM.

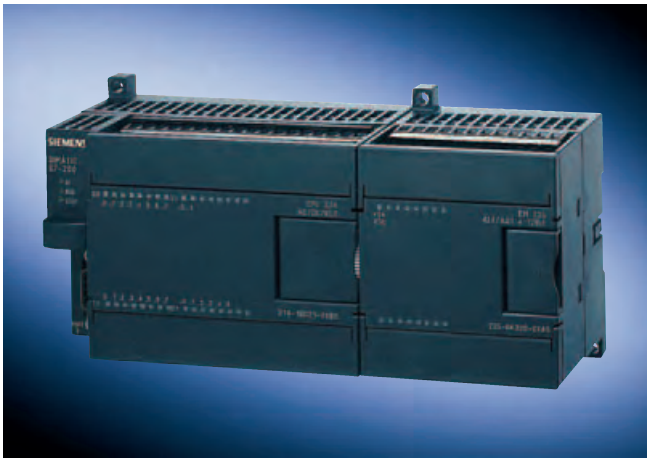
- Modular, high-performance compact telecontrol unit with a functional scope of up to 300 process inputs/outputs.
- Real-time detection with 10 ms resolution.
- Connection of protection devices via IEC 60870-5-103 and MODBUS RTU.
- User-programmable automation functions with STEP 7-micro.
- Functions:
  - Single messages and double messages; transmission of message frames with or without time stamp.
  - Processing of counting pulses (max. 20 Hz).
  - Processing of measured values, threshold values.
  - Command output as pulse commands with 1-in-n monitoring and command deactivation.
  - Analog setpoint output.
  - Time-of-day management with synchronization via message frames from the master terminal.
  - Baud rate can be set between 300 and 9600 bps.

Further information:

- Catalog SICAM 2.2.1
- Internet:
  http://www.ptd.siemens.com

SICAM microRTU telecontrol units

Overview



- Compact telecontrol unit for processing process information and communicating with the power system master terminal via a secure IEC 60870-5-101 telecontrol protocol.

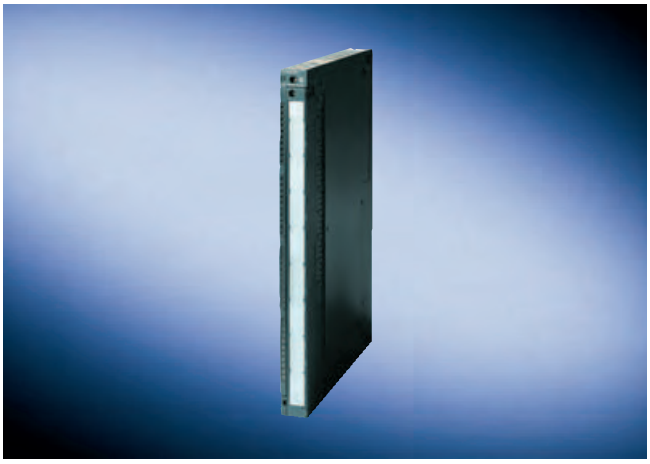
- Up to 50 process inputs/outputs for:
  - Single messages
  - Double messages
  - Measured values
  - Single commands
  - Double commands
  - Counting pulse
- Event detection with 10 ms resolution.
- Functions:
  - Up to 24 single messages
  - Up to 4 counting pulses (max. 20 Hz)
  - Up to 16 measured values
  - Up to 16 command outputs as pulse command or persistent command; output times can be programmed
  - IEC 60870-5-101 protocol, unbalanced mode
  - Baud rate: 300 to 9600 bp

Further information:

- Catalog SICAM 2.3.1
- Internet:
  http://www.ptd.siemens.com

SICAM DI 32 digital input modules

Overview



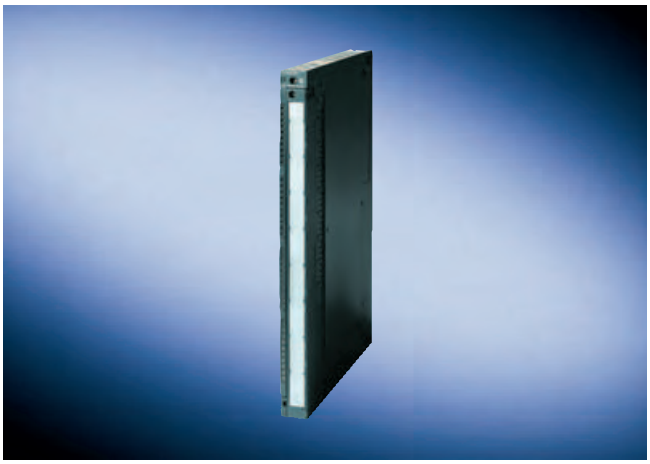
- Digital inputs with interrupt capability for detecting time-critical processes.
- Real-time resolution 1 ms.
- Accuracy +/- 2 ms.
- Buffer memory on module for 200 changes in state with time of day.
- Increased protection against electromagnetic interference (e.g., in the event of lightning strikes or overvoltage).
- Technical specifications
  - Time resolution 1 ms
  - Insulation 2.5 kV
  - Surge voltage 5 kV
  - 32 inputs
  - Input voltage 19 V to 72 V DC or 110 V to 125 V DC
- Configuration using SICAM plusTOOLS

Further information:

- Catalog SICAM 5.2.1
- Internet:
  http://www.ptd.siemens.com

SICAM CO digital output modules

Overview



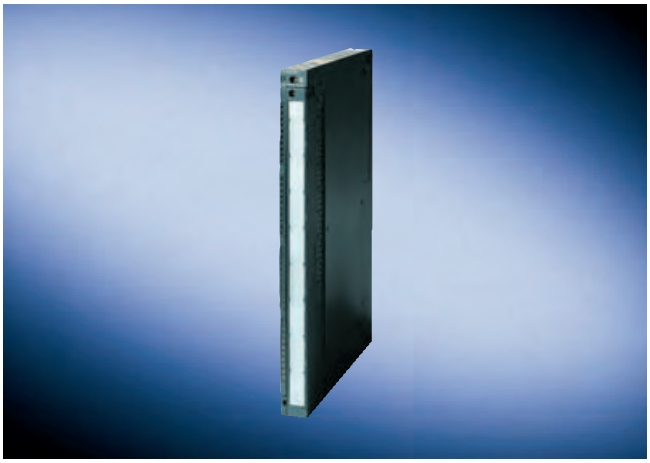
- Isolated digital output for secure command output.
- Relay output.
- Output of pulse commands or persistent outputs, transformer stage commands and digital setpoints.
- Output times can be programmed.
- Single-pole or two-pole output.
- Secure command output with 1-in-n check.
- Technical specifications:
  - Insulation 2.5 kV
  - Surge voltage 5 kV
  - 32 outputs
  - Switching capacity 60 V AC, 5 A; 60 V DC, 1 A
- Configuration using SICAM plusTOOLS.

Further information:

- Catalog SICAM 5.3.1
- Internet:
  http://www.ptd.siemens.com

SICAM AI analog input modules

Overview



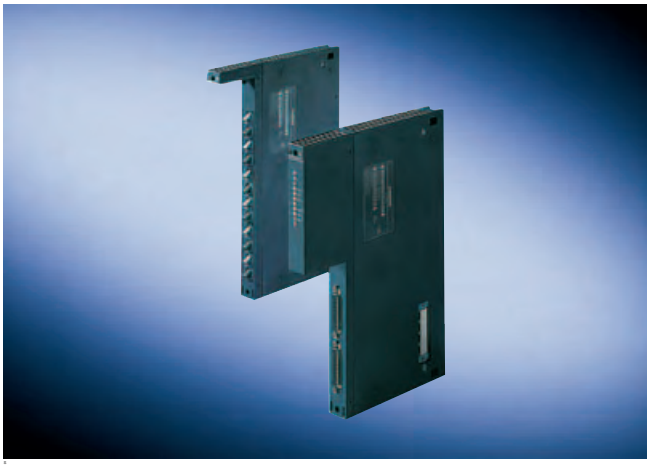
- Isolated analog input with interrupt capability for detecting measured values from transducers.
- Resolution 12 bits + sign.
- Programmable measuring ranges.
- Conversion time 30 ms, effects of line frequency suppressed.
- Technical specifications:
  - Insulation 2.5 kV
  - Surge voltage 5 kV
  - 32 channels
  - Current inputs 0.5 to 24 mA DC
  - Voltage inputs 0.5 V to 10 V DC
- Configuration using SICAM plusTOOLS.

Further information:

- Catalog SICAM 5.2.2
- Internet:
  http://www.ptd.siemens.com

SICAM MCP time synchronization modules

Overview



- For time synchronization in an S7-400.
- Synchronization of CPU and SICAM function modules.
- Setting via DCF77 or GPS time signal receivers.
- Application: e.g., error message detection system together with digital input SICAM DI 32.
- Comprising SICAM MCP module and example FBs for SIMATIC S7-400.
- Configuration using SICAM plusTOOLS

Further information:

- Internet:
  http://www.ptd.siemens.com

Overview

- System power supply with increased demands on availability and noise immunity.
- Wide-range input.
- 20 A short-circuit proof.
- 20 ms bridging if the power supply is interrupted.
- Technical specifications
  - Insulation 2.5 kV
  - Surge voltage 5 kV
  - Input voltage 24 V to 60 V DC or 110 V to 230 V UC
- Configuration using SICAM plusTOOLS.

Further information:

- Catalog SICAM 5.1.1
- Internet:
  http://www.ptd.siemens.com

Appendix

14

Training is decisive for your success

SITRAIN® - the Siemens Training for Automation and Industrial Solutions - provides you with comprehensive support when solving your tasks.

Training by the market leader in automation, plant installation and support permits you to make your decisions with certainty and full command. Especially where the optimum and efficient use of products and plants are concerned. You can eliminate deficiencies in existing plants, and exclude expensive faulty planning right from the beginning.

All in all, this represent an enormous gain for your company: shortened startup times, optimized plant components, faster troubleshooting, reduced down times. In other words, increased profits and lower costs.

Top trainers

Our trainers know their topics in practice, and possess comprehensive didactic experience. Course developers have a direct wire to product development, and directly pass on their knowledge to the trainers.

Practical experience

The practical experience of our trainers makes it possible for them to pass on theoretical matter in a plausible manner. But since it is known that all theory is drab, we attach great importance to practical exercises which can comprise up to half of the course time. You can therefore immediately implement your new knowledge in practice. We train you on state-of-the-art methodically/didactically designed training equipment. You feel absolutely certain when trained in this manner.

Wide variety

With a total of approx. 300 local attendance courses, we train the complete range of A&D products and a large portion of the system solutions from I&S. Telecourses, teach-yourself software and seminars presented on the Web supplement our classical range of courses.

Close to our customers

The distance is short. You can find us approx. 60 times in Germany, and worldwide in 62 countries. You wish to have individual training instead of one of our 300 courses? No problem: we will provide a program tailored exactly to your personal requirements. Training can be carried out in our Training Centers or at your company.

The right mixture: blended learning

Blended learning is understood to be the combination of various training media and sequences. For example, a local attendance course in a Training Center can be optimally supplemented by a teach-yourself program as preparation or follow-up. Furthermore, SITRAIN utilizes supported online training for live instruction on the Internet at agreed times.

The right mixture is the solution. Therefore blended learning can convey complex topics well, and train networked thinking. Additional effect: reduced travelling costs and periods of absence through training sequences independent of location and time.

The international training portal

www.siemens.com/sitrain

All training facilities at a glance: search in the worldwide range of courses at leisure, call up all course dates online, utilize the daily updated display of vacant course spaces - and register directly.

Customer comments on Sitrain

" ... the good course documents, competence and flexibility convinced me."
[Manfred Riek from Festo Systemtechnik, responsible for planning the basic and further training of project engineers]

" ... represents effective training, constructive dialogs, and solutions which provide great help."
[Günter Niedermaier, electrical design manager at AMT, Aalen]

Contact

Visit us on the Internet at:

www.siemens.com/sitrain

or let us advise you personally. You can request our latest training catalog from:

Course office, Infoline Germany:
Tel.: 01805 / 23 56 11 (0.12 €/Min)
Fax: 01805 / 23 56 12

PLC Technician acc. to VDMA/ZVEI

Sitrain uses the VDMA/ZVEI[1)] requirement profiles as basis for the advanced training concept to become a PLC Technician.

These requirement profiles define what experts need to **know** and **know how to** do something - with regard to different manufacturers and from the viewpoint of the user.

Requirement profile (acc. to VDMA/ZVEI)

Tasks

- Professional installation and connection of programmable logic controllers, program modifications, troubleshooting

Skills of a PLC Technician

They must **know** the design and principle of operation of a PLC as well as the basic operations of the relevant programming language. They must **know how to** install and connect PLCs, check the inputs and outputs, and be able to assist with commissioning if instructed.

Siemens Automation Technician

The Siemens Automation Technician builds on the expertise of the PLC Technician. Prerequisite for participating in the test is the prior attendance at the ST-SERV3 or ST-SERV3Plus course.

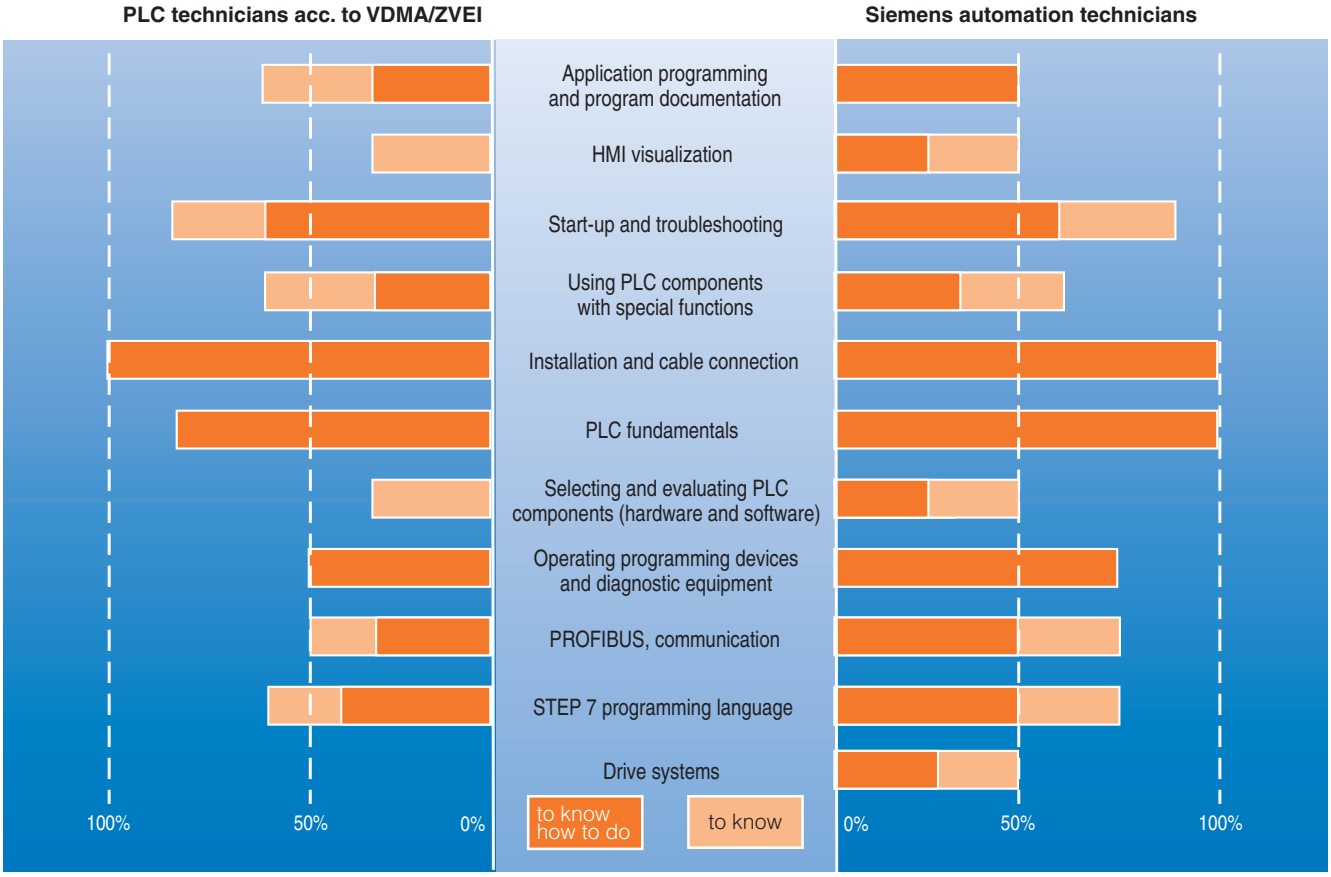
Requirements profile

Tasks

- Professional installation and connection of programmable logic controllers, program modifications, troubleshooting
- Commissioning of distributed I/Os (PROFIBUS DP)
- Commissioning of a drive
- Commissioning of an HMI device (TP 170B)

Skills of a Siemens Automation Technician

They must be familiar with the design and principle of operation of a PLC and **know how to** implement the basic operations of the relevant programming language, as well as install and connect PLCs, check the inputs and outputs, and be able to implement the commissioning procedure.



To know-how to do something: to be familiar with a subject and/or be able to allocate it within a greater context.

Can do something: to apply one's knowledge and skills to solve tasks.

1) „Weiterbildung in der Automatisierungstechnik" (Advanced automation engineering training), published in Frankfurt, Germany, in April 1993 by the German Mechanical and Plant Engineers Association (VDMA) and German Electrical and Electronic Manufacturers Association (ZVEI). The publication can be requested from the business center of the Fachverband Informationstechnik (Lyonerstr.18, 60528 Frankfurt, Tel. 069/6603-543, Fax 069/6603-510).

Certified Automation Competence

Siemens SIMATIC S7 Programmer

The Siemens SIMATIC S7 Programmer concludes the SIMATIC S7 TIA programmer training (see Learning path ST4). Prerequisite for participating in the test is the prior attendance at the STPRO3 or ST-PRO3Plus course.

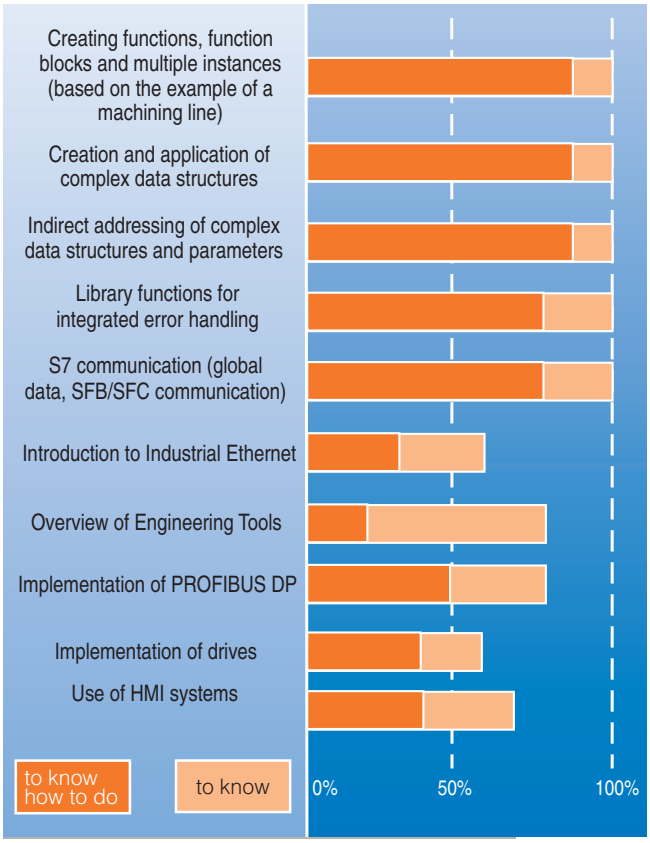
Requirements profile

Tasks

- Engineering tasks required for the complex programming options of SIMATIC S7
- Application of distributed I/Os (PROFIBUS DP / Ethernet)
- Application of drives
- Application of HMI devices (TP 170B/ProTool/Pro)

Skills of a Siemens SIMATIC S7 Programmer

They must **know** the design and principle of operation of a PLC as well as the complex operations of the relevant programming language and **know how to** apply them in complex tasks.



To know something: to be familiar with a subject and/or be able to allocate it within a greater context.

To know how to do something: to apply one's knowledge and skills to solve tasks.

The title "Siemens SIMATIC S7 Programmer" can be obtained by:

- Attending the 5-day course "SIMATIC S7 TIA Programming for Experts" and successfully completing the half-day test to become a SIMATIC S7 Programmer

Contents

Commissioning the hardware of a PLC and the components of Totally Integrated Automation

- Parameterizing the CPU
- Configuring the distributed I/Os
- Configuring Industrial Ethernet
- Configuring a drive
- Configuring an HMI device

Developing and commissioning a complex PLC Programm

- Analysing the task
- Structuring a program using structograms
- Implementing the program taking account of the aspects of reusability, by applying:
  - Functions, function blocks and multi-instances
  - Complex data structures
  - Indirect addressing of the complex data structures
  - Library functions for integrated error handling
  - IEC-compliant system functions and function blocks
- Use of PROFIBUS DP
- Use of Industrial Ethernet
- Use of an HMI device
- Implementing a drive

SIMATIC training courses

The range of SIMATIC training courses provides your employees with the required information and detailed knowledge to be able to configure, commission, operate and maintain SIMATIC PLCs.

For further information regarding the course topics, schedules and prices, please refer to the following Internet address:

http://www.siemens.de/sitrain

SITRAIN Courses Offered

SIMATIC Industrial Automation Systems

Title	Target group: Commissioning engineers, configuring engineers	Programmers	Project managers, project staff	Decision-makers, sales personnel	Service engineers	Operators, users	Maintenance engineers	Duration/ medium	Short title
SIMATIC S7 Totally Integrated Automation									
Production Automation with TIA	✔	✔	✔	✔	✔		✔	4 days	ST-7TIA
SIMATIC TIA for Non-Technicians	✔							2 days	ST-7TIAK
Mastering PLC Basics Using SIMATIC S7 as Example			✔	✔	✔		✔	2 days	ST-SSP704
SIMATIC S7 TIA System Courses									
SIMATIC S7 TIA Programming 1			✔	✔				5 days	ST-PRO1
SIMATIC S7 TIA Programming 1 - Plus			✔	✔				5 days + refresher WBT	ST-PRO1PLUS
SIMATIC S7 TIA Programming 1 - Refresher			✔	✔				Refresher WBT	ST-PRO1REF
SIMATIC S7 TIA Programming 2			✔	✔				5 days	ST-PRO2
SIMATIC S7 TIA Programming 2 - Plus			✔	✔				5 days + refresher WBT	ST-PRO2PLUS
SIMATIC S7 TIA Programming 2 - Refresher			✔	✔				Refresher WBT	ST-PRO2REF
SIMATIC S7 TIA Programming 3			✔	✔				5 days	ST-PRO3
SIMATIC S7 TIA Programming 3 - Plus			✔	✔				5 days + refresher WBT	ST-PRO3PLUS
SIMATIC S7 TIA Programming 3 - Refresher			✔	✔				Refresher WBT	ST-PRO3REF
Test to become a Certified Siemens SIMATIC S7 Programmer			✔	✔				5 hours	ST-PRO3P
SIMATIC S7 TIA Service Training 1					✔	✔	✔	5 days	ST-SERV1
SIMATIC S7 TIA Service Training 1 Plus					✔	✔	✔	5 days + refresher WBT	ST-SERV1PLUS
SIMATIC S7 TIA Service Training 1 Refresher					✔	✔	✔	Refresher WBT	ST-SERV1REF

Courses Offered
SIMATIC Industrial Automation Systems

SIMATIC Industrial Automation Systems (continued)

Commissioning engineers, configuring engineers
Programmers
Service engineers
Project managers, project staff
Operators, users
Decision-makers, sales personnel
Maintenance engineers

Title	Target group							Duration/ medium	Short title
SIMATIC S7 TIA Service Training 2					✔	✔	✔	5 days	ST-SERV2
SIMATIC S7 TIA Service Training 2 Plus					✔	✔	✔	5 days + refresher WBT	ST-SERV2PLUS
SIMATIC S7 TIA Service Training 2 Refresher					✔	✔	✔	Refresher WBT	ST-SERV2REF
SIMATIC S7 TIA Service Training 3					✔	✔	✔	5 days	ST-SERV3
SIMATIC S7 TIA Service Training 3 Plus					✔	✔	✔	5 days + refresher WBT	ST-SERV3PLUS
SIMATIC S7 TIA Service Training 3 Refresher					✔	✔	✔	Refresher WBT	ST-SERV3REF
Test to become a Certified Siemens Automation Technician					✔	✔	✔	5 hours	ST-SERVATP
Siemens Automation Technician / evening course					✔	✔	✔	60 hours	ST-SERVATA
ServiceLAB practical course					✔		✔	2 days	ST-SERLAB
SPS Technician, Siemens Automation Technician and SIMATIC S7 Programmer									
Test to become a Certified Siemens Automation Technician					✔	✔	✔	5 hours	ST-SERVATP
Test to become a Certified Siemens SIMATIC S7 Programmer			✔	✔				5 hours	ST-PRO3P
Siemens Automation Technician / evening course					✔	✔	✔	60 hours	ST-SERVATA
PLC Technician / telecourse according to VDMA/ZVEI					✔	✔	✔	100 hours	ST-SPSTEF
PLC Technician, compact course according to VDMA/ZVEI								11 days	ST-SPSTEK
PLC Technician, preparation and test according to VDMA/ZVEI					✔		✔	3 days	ST-SPSTEP
PLC Technician / evening course VDMA/ZVEI					✔	✔	✔	100 hours	ST-SPSTEA7
SIMATIC S7 Add-on Courses									
Fault Detection with PROFIBUS, Ethernet, PROFINET			✔	✔	✔		✔	5 days	ST-7CPSERV
HIGRAPH Programming SIMATIC S7			✔	✔	✔			3 days	NC-ZSG
Programming of S7-300 Interface Controller			✔	✔	✔			3 days	NC-S7APT
SIMATIC S7 with STEP7 Commissioning				✔	✔			5 days	ST-SSP701
SIMATIC S7 Configuring OP and DP			✔	✔				5 days	ST-7PROJ
SIMATIC S7, Sequential Control with S7-GRAPH			✔	✔	✔		✔	2 days	ST-7GRAPH
SIMATIC S7, Graphic Programming with CFC			✔	✔	✔		✔	2 days	ST-7CFC
SIMATIC S7, PC-Based Control with WinAC	✔	✔	✔	✔				2 days	ST-7WINAC
SIMATIC S7, Programming with SCL			✔	✔	✔		✔	2 days	ST-7SCL
SIMATIC S7, Process diagnostics			✔	✔	✔		✔	2 days	ST-7PDIAG
SIMATIC S7, Point-to-Point Connection			✔	✔	✔		✔	2 days	ST-7PTP
SIMATIC S7-PtP Overview and Principle of Operation			✔	✔				2 days	ST-S7PTP01
SINAMICS S120 with SIMOTION and T-CPU				✔	✔			4 days	DR-SNS-MC
Mastering PLC Faults - SIMATIC for Maintenance Engineers					✔		✔	3 days	ST-IHSPS02
Configuring of Technology CPUs 315T-2DP and 317T-2DP			✔	✔	✔			4 days	MC-T-CPU
SIMATIC S7, Standard PID Control	✔	✔	✔	✔	✔	✔	✔	5 days	ST-RSTA

SIMATIC Industrial Automation Systems (continued)

Commissioning engineers, configuring engineers
Programmers
Service engineers
Project managers, project staff
Operators, users
Decision-makers, sales personnel
Maintenance engineers

Title	Target group							Duration/ medium	Short title
SIMATIC S7, Modular PID Control	✔	✔	✔	✔	✔	✔	✔	5 days	ST-RMOD
SIMATIC S7, Basic Software PID-Control FB41/42+PID-Temperature Control with FB58/59	✔	✔	✔	✔	✔	✔	✔	5 days	ST-RPID
Control Engineering for Beginners	✔	✔	✔	✔	✔	✔	✔	CD-ROM	SM-REGEIN
Introduction to Control Engineering	✔	✔	✔	✔	✔	✔	✔	WBT	WT-REGEIN
SIMATIC S7 H/F System Courses									
Configuring and Programming with Distributed Safety			✔	✔				3 days	ST-PPDS
Configuring and Programming with F-Systems in STEP7 / PCS7 Environment			✔	✔				3 days	ST-PPFS
SIMATIC S7, S7-400 H System Course			✔	✔				3 days	ST-7H400H
SIMATIC S7 Online Courses									
PLC Professional Programming for Beginners			✔	✔	✔		✔	50 hours	ST-OKPPRO1
PLC Professional Programming for Advanced Students			✔	✔				50 hours	ST-OKPPRO2
SIMATIC S7-200 Microautomation									
SINAUT MICRO SC Telecontrol System			✔	✔	✔		✔	2 days	IK-SINAUTMIC
SIMATIC S7, S7-200 System Course			✔	✔	✔	✔	✔	2 days	ST-7MICRO
SIMATIC S7, S7-200 Advanced Course			✔	✔	✔	✔	✔	2 days	ST-7MICROA
Alarm Processing with SIMATIC S7-200			✔	✔	✔	✔	✔	WBT	WT-INTER
SIMATIC FM Modules									
Positioning with FM357-2			✔	✔	✔		✔	3 days	NC-FM357
SIMATIC S5 System Courses									
SIMATIC S5 Service Training					✔	✔	✔	5 days	ST-S5SERV
SIMATIC S5 System Training, Part 1			✔	✔	✔	✔	✔	5 days	ST-S5SYS1
SIMATIC S5 System Training, Part 2			✔	✔	✔	✔	✔	5 days	ST-S5SYS2

PC-based Automation / Embedded Automation

Commissioning engineers, configuring engineers
Programmers
Service engineers
Project managers, project staff
Operators, users
Decision-makers, sales personnel
Maintenance engineers

Title	Target group							Duration/ medium	Short title
SIMATIC S7, PC-Based Control with WinAC	✔	✔	✔	✔				2 days	ST-7WINAC
Configuring of Technology CPUs 315T-2DP and 317T-2DP			✔	✔	✔			4 days	MC-T-CPU
SINAMICS S120 with SIMOTION and T-CPU				✔	✔			4 days	DR-SNS-MC
SIMATIC WinCC flexible, System Course 1	✔	✔	✔	✔	✔	✔	✔	3 days	ST-WCCFSYS1

Courses Offered for SIMATIC HMI, Traffic Engineering, Mechatronics Qualification System

SIMATIC HMI Operator Control and Monitoring Systems

Commissioning engineers, configuring engineers
Programmers
Service engineers
Project managers, project staff
Operators, users
Decision-makers, sales personnel
Maintenance engineers

Title	Target group							Duration/ medium	Short title
SIMATIC ProTool/Pro									
SIMATIC ProTool/Pro System Course			✔	✔	✔	✔	✔	3 days	ST-BPROPRS
Configuring of Operator Panels with Pro Tool			✔	✔	✔			3 days	ST-SSP705
SIMATIC ProTool/Pro	✔	✔	✔	✔	✔	✔	✔	CD-ROM	SM-PROTOO
SIMATIC ProTool/Pro	✔	✔	✔	✔	✔	✔	✔	WBT	WT-PROTOO
SIMATIC WinCC flexible									
SIMATIC WinCC flexible, Converter Workshop	✔	✔	✔	✔	✔	✔	✔	1 day	ST-WCCFWS
SIMATIC WinCC flexible, System Course 1	✔	✔	✔	✔	✔	✔	✔	3 days	ST-WCCFSYS1
SIMATIC WinCC flexible Options			✔	✔	✔			1 day	ST-WCCFO
SIMATIC WinCC flexible	✔	✔	✔	✔	✔	✔	✔	WBT	WT-WCCFLEX
SIMATIC WinCC									
SIMATIC WinCC V6, System Course			✔	✔	✔	✔	✔	5 days	ST-BWINCCS
SIMATIC WinCC V6, Options, Networks, Databases			✔	✔				5 days	ST-BWINOND
ANSI-C in the SIMATIC World, Introduction		✔	✔	✔	✔		✔	5 days	ST-SIMACE
Visual Basic Script in the SIMATIC World		✔	✔	✔	✔		✔	3 days	ST-VBSCR

Traffic Engineering

Commissioning engineers, configuring engineers
Programmers
Service engineers
Project managers, project staff
Operators, users
Decision-makers, sales personnel
Maintenance engineers

Title	Target group							Duration/ medium	Short title
SIBAS									
SIBAS Train Automation System - Introduction			✔	✔				5 days	ST-SIB-32
SIBAS Vehicle Bus MVB - Introduction			✔	✔				3 days	ST-SIB-MVB

Mechatronics Qualification System

Commissioning engineers, configuring engineers
Programmers
Service engineers
Project managers, project staff
Operators, users
Decision-makers, sales personnel
Maintenance engineers

Title	Target group							Duration/ medium	Short title
Planning and Implementation of Complex Mechatronics Systems (Qualification Course 1)		✔		✔	✔	✔	✔	5 days	ST-MECHQ1
System Test, Troubleshooting, Optimization and Maintenance of Complex Mechatronics Systems (Qualification Course 2)		✔		✔	✔	✔	✔	5 days	ST-MECHQ2
Certification Course, Mechatronics Qualification System		✔			✔	✔	✔	2 days	ST-MECHZER

General Automation Engineering

Title	Target group: Commissioning engineers, configuring engineers	Programmers	Project managers, project staff	Decision-makers, sales personnel	Service engineers	Operators, users	Maintenance engineers	Duration/ medium	Short title
Related Topics									
Configuring of SIMATIC TDC/SIMADYN D with D7-SYS and CFC		✔	✔					5 days	SD-TDC
SIMADYN D - Commissioning of DC Drives			✔					5 days	SD-SD3
SIMADYN D / STRUC G - Introduction		✔	✔	✔				5 days	SD-SD2
Cross-Product Training Media									
Automatisieren mit SIMATIC, in German	✔	✔			✔	✔		Techn. book	FB-AUTS7
Automating with SIMATIC, in English	✔	✔			✔	✔		Techn. book	FB-AUTOMAT
Automatisieren mit SIMATIC S5-115U, in German	✔	✔			✔	✔		Techn. book	FB-AUTS5
Automatisieren mit STEP 7 in AWL und SCL, in German	✔	✔			✔	✔		Techn. book	FB-S7AWL
Automating with STEP 7 in STL and SCL, in English	✔	✔			✔	✔		Techn. book	FB-S7STL
Automatisieren mit STEP 7 in KOP und FUP, in German	✔	✔			✔	✔		Techn. book	FB-S7KOP
Automating with STEP 7 in LAD and FBD, in English	✔	✔			✔	✔		Techn. book	FB-S7LAD
Echtzeitprogrammierung in Java, in German	✔	✔						Techn. book	FB-JAVA
Meilensteine der Automatisierung, in German	✔		✔		✔	✔		Techn. book	FB-MAUT
Milestones in Automation, in English	✔		✔		✔	✔		Techn. book	FB-MILAUT
Regeln mit SIMATIC, in German	✔			✔		✔		Techn. book	FB-REGST
Controlling with SIMATIC, in English	✔			✔		✔		Techn. book	FB-CONST
Dictionary of Electrical Engineering, Power Engineering and Automation, Part 1: German-English	✔	✔	✔					Techn. book	FB-WOERET1
Dictionary of Electrical Engineering, Power Engineering and Automation, Part 2, English-German	✔	✔	✔					Techn. book	FB-WOERET2
Dictionary of Electrical Engineering, Power Engineering and Automation (CD-ROM), German-English	✔	✔	✔					Techn. book	FB-WOERET3
Regelungstechnik für Einsteiger, in German	✔	✔	✔	✔	✔	✔	✔	CD-ROM	SM-REGEIN
Einführung in die Regelungstechnik, in German	✔	✔	✔	✔	✔	✔	✔	WBT	WT-REGEIN
SPS-Wissen für Einsteiger, in German	✔	✔	✔	✔	✔	✔	✔	CD-ROM	SM-SPSEIN
SPS-Wissen für Einsteiger, in German	✔	✔	✔	✔	✔	✔	✔	WBT	WT-SPSEIN

SIMATIC S7 Training cases S7-300 TIA, S7-300

Application of training case S7-300 TIA

The training case is used for practicing the programming, operation and commissioning of programmable logic controllers in the context of Totally Integrated Automation.

Design

The training case consists of a SIMATIC S7-300 automation system, a TP 170B operation and monitoring system, and a simulator. The automation system is fitted in a case for transport. This comprises:

- Mounting rail
- PS 307 load power supply
- CPU 315-2DP
- SM 321 digital input module, DI 32 x 24 V DC
- SM 323 digital input/output module, DI 8, DO 8
- SM 322 digital output module, DO 32 x 24 V DC/0.5 A
- SM 331 analog input module, AI 2 x 12 bit plus sign
- Terminal blocks for digital signals
- Terminal/plug block for analog signals
- SIMATIC S7 simulator
- 1 ET 200S with
  - 1 IM151 interface module
  - 1 TM-P 15S23-A1 terminal block
  - 1 PM-E DC 24 V power module
  - 4 TM-E 15S24-A1 terminal blocks
  - 2 digital input modules 4 x 24 V DC
  - 2 digital output modules
  - 1 DI/DO terminal block, 37-contact
- TP170B color
- PROFIBUS DP connection cable for TIA training system

Technical specifications

Degree of protection to DIN VDE 0470 Part 1/EN 60529/IEC 529	IP00
Permissible ambient temperature	0 ... +50 °C
Dimensions in mm (W x H x D)	520 x 410 x 350
Weight	Approx. 18 kg

Ordering data

		Order No.
S7-300 training case with CPU 315-2 DP complete with ET 200S, TP 170B and simulator Abbreviated name: TG-S7-315TIA	F)	**6ZB2 310-0BW00**

B) Subject to export regulations: AL: N and ECCN: 4A994

F) Subject to export regulations: AL: N and ECCN: 5D002ENC3

Application of training case S7-300

The training case is used for practicing the programming, operation and commissioning of programmable logic controllers.

Design

The training case consists of a SIMATIC S7-300 automation system including simulator. The automation system is fitted in a case for transport. This comprises:

- Mounting rail
- PS 307 load power supply
- CPU 314
- SM 321 digital input module, DI 32 x 24 V DC
- SM 323 digital input/output module, DI 8, DO 8
- SM 322 digital output module, DO 32 x 24 V DC/0.5 A
- SM 331 analog input module, AI 2 x 12 bit plus sign
- Terminal blocks for digital signals
- Terminal/plug block for analog signals
- SIMATIC S7 simulator

Technical specifications

Degree of protection to DIN VDE 0470 Part 1/EN 60529/IEC 529	IP00
Permissible ambient temperature	0 ... +60 °C
Dimensions in mm (W x H x D)	520 x 410 x 350
Weight	Approx. 15 kg

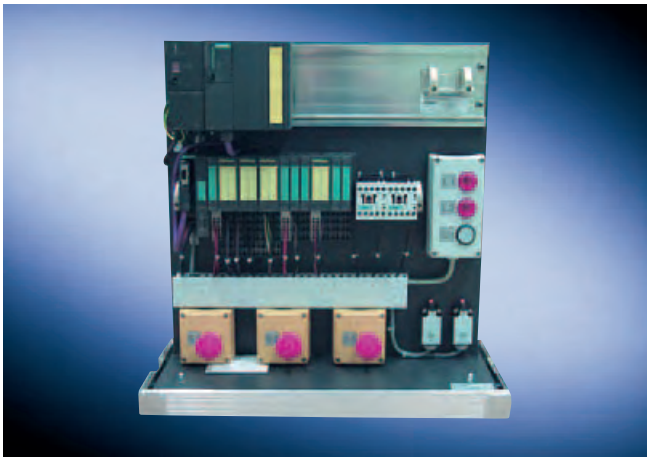
Ordering data

		Order No.
S7-300 training case with CPU 314 complete with simulator Abbreviated name: TG-S7-314	B)	**6ZB2 310-0BF01**
S7-300 training case with CPU 315-2 DP complete with simulator Abbreviated name: TG-S7-315 Equipment as above except: • 1 CPU 315-2DP (instead of CPU 314)	G)	**6ZB2 310-0BM01**

G) Subject to export regulations: AL: N and ECCN: 5D992B2

SIMATIC S7 Training cases S7-300F, S7-400F/H

Application of training case S7-300F



The training case is used for practicing the programming, operation and commissioning of fail-safe programmable logic controllers.

Design

The training case consists of a SIMATIC S7-300F automation system, emergency stop buttons, contactors, door switches and signal annunciators. The automation system is fitted in a case for transport. This comprises:

- SIMATIC S7 mounting rail
- PS 307 power supply
- CPU 315F
- Bus connector
- IM 151 interface module
- Power module including terminal module
- F-DI modules including terminal modules
- F-DO module including terminal module
- F power module
- DI module including terminal module
- DO module including terminal module
- Emergency stop buttons
- Reset
- Contactors
- Mechanical components

Technical specifications

Degree of protection to DIN VDE 0470 Part 1/EN 60529/IEC 529	IP00
Permissible ambient temperature	0 ... +60 °C
Dimensions in mm (W x H x D)	520 x 410 x 350
Weight	Approx. 15 kg

Ordering data

		Order No.
S7-300F training case with CPU 315F complete with emergency stop buttons, contactors, door switches and signal annunciators Abbreviated name: TG-S7-315F	G)	**6ZB2 310-0CA00**

G) Subject to export regulations: AL: N and ECCN: 5D992B2

Application of training case S7-400F/H

The training case is used for practicing the programming, operation and commissioning of fail-safe and fault-tolerant programmable logic controllers.

Design

The training case consists of a SIMATIC S7-400F/H automation system with 2 CPUs. The automation system is fitted in a case for transport. This comprises:

- PS 307 power supplies
- IM 153 interface modules
- DI module including bus module
- DO module including bus module
- F-DI module including bus module
- F-DO module including bus module
- Rack
- PS 407 power supplies
- S7-400 CPUs 417H
- Communications processors
- Communications modules including fiber-optic cables

Technical specifications

Degree of protection to DIN VDE 0470 Part 1/EN 60529/IEC 529	IP00
Permissible ambient temperature	0 ... +60 °C
Dimensions in mm (W x H x D)	665 x 565 x 385
Weight	Approx. 30 kg

Ordering data

		Order No.
S7-400F/H training case with 2 x CPU 417H complete Abbreviated name: TG-S7-417H	G)	**6ZB2 310-0CB00**

Technical books for automation engineering

Overview

Technical books provide sound knowledge in the various sectors of automation engineering. Textbooks, reference books and dictionaries are available, for example.

You can use them to specifically increase your knowledge or to become acquainted with special areas.

Ordering data

	Order No.
Milestones in Automation	
Easy to read and creatively designed, the book offers technicians, engineers and managers a profound look into the development history and possibilities for use of a technology which left its mark like no other on industrial processes and a huge range of technical systems.	
German	**6ZB3 500-0AQ01-0AA0**
English	**6ZB3 500-0AQ02-0AA0**
Automating with SIMATIC	
The book is highly suitable for all those who have no extensive previous experience and who wish to become rapidly acquainted with the field of programmable controllers.	
German	**6ZB3 500-0AE01-0AA0**
English	**6ZB3 500-0AE02-0AA0**
Automating with STEP 7 in STL and SCL	
Now in its third edition, this book introduces Version 5.3 of the programming software STEP 7. It is aimed at all users of SIMATIC S7 controllers.	
German	**6ZB3 500-0AA01-0AA0**
English	**6ZB3 500-0AA02-0AA0**
Automating with STEP 7 in LAD and FBD	
The book describes elements and applications of the graphic-oriented programming languages LAD (ladder diagram) and FBD (function block diagram) for SIMATIC S7-300/400. It is aimed at all users of SIMATIC S7 controllers.	
German	**6ZB3 500-0AB01-0AA0**
English	**6ZB3 500-0AB02-0AA0**
Automatisieren mit SIMATIC S5-115U	
The book is aimed at all users of SIMATIC controllers. Beginners are introduced to the field of programmable controllers, and special applications of the SIMATIC S5-115U are presented for those with practical experience.	
German	**6ZB3 500-0AK01-0AA0**

	Order No.
Controlling with SIMATIC	
This book discusses the practical aspects of control engineering as a subdomain of automation and control using as example the SIMATIC S7 control system.	
German	**6ZB3 500-0AD01-0AA0**
English	**6ZB3 500-0AD02-0AA0**
Decentralization with PROFIBUS-DP/DPV1	
With its practical orientation the book is ideal for PROFIBUS planners, configuration experts and programmers. Its comprehensive description of the fundamentals involved also makes it interesting for students and docents alike.	
German	**6ZB3 500-0AC01-0AA0**
English	**6ZB3 500-0AC02-0AA0**
Automating with PROFINET	
This book serves as an introduction to PROFINET technology. Decision-makers and plant planners, pupils and students are given a compact overview of the concept and the fundamentals. Configuring engineers, commissioning engineers and technicians are provided with the comprehensive knowledge they need to solve their own PROFINET-based automation tasks.	
German	**6ZB3 500-0AP01-0AA0**
English	**6ZB3 500-0AP02-0AA0**
Electrical Feed Drives in Automation	
This book is a comprehensive introduction to the physical and technological fundamentals of automatic control and drive technology with special emphasis on the computation and dimensioning of electrical feed drives for automation.	
German	**6ZB3 500-0AF01-0AA0**
English	**6ZB3 500-0AF02-0AA0**
Technology of Electrical Feed Drives in Production Engineering and Automation	
This book discusses the practical aspects of a few current components for feed drives such as motors and mechanical transmission elements.	
German	**6ZB3 500-0AN01-0AA0**
English	**6ZB3 500-0AN02-0AA0**

Technical books for automation engineering

Ordering data (continued)	Order No.
Echtzeitprogrammierung in Java This book provides an introduction to real-time programming with Java on SICOMP computers to readers who have a basic knowledge of programming with high-level languages.	
German	**6ZB3 500-0AL01-0AA0**
IT in der Industrieautomatisierung This book passes on to plant planners, programmers and commissioning engineers the required basics and terms for use of Ethernet LAN technologies in industrial automation with SIMATIC.	
German	**6ZB3 500-0AM01-0AA0**
Dictionary of Drives The dictionary offers a comprehensive collection of terms from the fields of drives and automation and related fields, completed by entries from business administration, marketing, advertising and technical training.	
German/English	**6ZB3 500-0AG01-0AA0**
German/English, on CD-ROM	**6ZB3 500-0AH01-0AA0**
Dictionary of Electrical Engineering, Power Engineering and Automation This dictionary is the standard work for all those requiring a comprehensive and reliable compilation of terms from the fields of power generation, transmission and distribution, drive engineering, automation, switchgear and installation engineering, power electronics as well as measurement, analysis and test engineering.	
German-English	**6ZB3 500-0AJ01-0AA0**
English-German	**6ZB3 500-0AJ02-0AA0**
German-English/ English-German; on CD-ROM	**6ZB3 500-0AJ03-0AA0**

SIMATIC Manual Collection

Overview

The SIMATIC manual collection brings together the manuals of Totally Integrated Automation in the smallest possible package. It is eminently suitable for startup and service, replaces the space-consuming paper version in the office and provides fast access to the information.

The manual collection contains manuals in 5 languages for

- LOGO!
- SIMATIC S7-200, TD 200
- SIMATIC S7-300, C7
- SIMATIC S7-400
- STEP 7, Engineering Tools, Runtime Software
- SIMATIC DP (Distributed I/O)
- SIMATIC HMI (Human Machine Interface)
- SIMATIC NET (Industrial Communication)
- Machine Vision
- PCS 7 Process Control System

Manuals that are not yet available in all 5 languages will at least be included in English and German.

There is an update contract for the SIMATIC Manual Collection that encompasses supply of the up-to-date collection and three subsequent updates which is valid for one year. If the update contract is not cancelled, it is automatically extended and the list price will be charged to the customer.

Ordering data		Order No.
SIMATIC Manual Collection E) Electronic manuals on DVD, in 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	D)	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year E) Current Manual Collection DVD as well as the three following updates	D)	**6ES7 998-8XC01-8YE2**

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

CE marking

CE marking

The electronic products described in this catalog comply with the requirements and protection objectives of the following EU guidelines and with the harmonized European standards (EN) which have been published for programmable controllers in the official Journal of the European Union:

- 89/336/EWG “Electromagnetic Compatibility” (EMC guideline).
- 73/23/EWG “Electrical Equipment for Use Within Specific Voltage Limits” (low voltage guideline).

We have declarations of conformity available for the responsible authorities.

The SIMATIC products are designed for operation in industrial environments and comply with the following requirements:

Noise emissions: EN 50081-2: 1993
Noise immunity: EN 50082-2: 1995

The products can also be used in the domestic environment (household, business and trade area, small plants) with individual approval:

Emitted interference: Individual approval
Immunity: EN 50082-1: 1992

For household use an individual approval from the respective national authority or testing body is required as far as emitted-interference is concerned. In Germany this approval is issued by the Federal Post and Telecommunications Office and its subsidaries.

For the installation and operation of the products described in this catalog, the installation guidelines described in the manuals and the important notes concerning installation in cabinets and concerning the use of shielded cable must be complied with.

Notes for machine manufacturers

The SIMATIC automation system is not a machine within the context of the EU machine guidelines. For SIMATIC, a conformity declaration with respect to the EU machine guidelines 89/392/EMC is not available.

The EU guideline for machines 89/392/EMC specifies the requirements for a machine. A machine is understood for the purposes of this guideline to be a combination of interconnected parts or mechanisms (see also EN 292-1, Paragraph 3.1).

SIMATIC is part of the electrical equipment of a machine and must therefore be included in the conformity declaration procedure by the machine manufacturer.

The EN 60204-1 standard (safety of machines, general requirements for the electrical equipment of machines) is applicable to the electrical equipment of machines.

The following table should be of assistance with the conformiy declaraton and shows which criteria of EN 60204-1 (as of June 1993) apply for SIMATIC:

EN 60204-1	Topic/criterion	Notes
Paragraph 4	General requirements	The requirements are met when the equipment is assembled/installed in accordance with the installation guidelines. Please note the relevant information in the manuals.
Paragraph 11.2	Digital input/output interfaces	The requirements are met
Paragraph 12.3	Programmable equipment	The requirements are met when the equipment is installed in lockable cabinets to protect against alteration of the memory contents by unauthorized persons
Paragraph 20.4	Voltage tests	The requirements are met

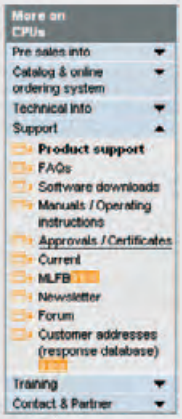
Certificates, authorizations, approbations, declarations of conformity

An overview of the certificates available for SIMATIC products (CE, UL, CSA, FM, shipping authorizations) can be found in the internet at

http://www.siemens.com/simatic/certificates

The lists are continously updated. The data for products which have not yet been included in the overview is continously collected and prepared for the subsequent edition.

You can also find certificates, approbations, verification certificates or characteristic curves by going directly to the Link Box:



Quality management

The quality management system of our A&D division complies with the international standard ISO 9001.

The products and systems described in this catalog are manufactured under application of a quality management system certified by DQS in accordance with DIN EN ISO 9001.

The DQS certificate is recognized in all EQ Net countries.

DQS certificate nos.:

Siemens AG
Automation and Drives

- Industrial Automation Systems
  Reg. No: 001323 QM

Siemens contacts worldwide

Overview

At

http://www.siemens.com/automation/partner

you can find details of Siemens contact partners worldwide responsible for particular technologies.

You can obtain in most cases a contact partner for

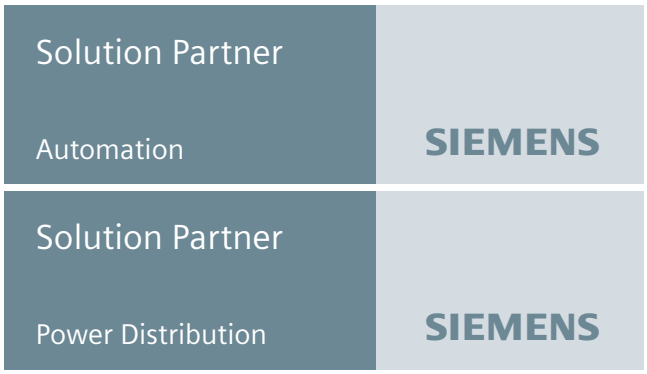
- Technical Support,
- Spare parts/repairs,
- Service,
- Training,
- Sales or
- Consultation/engineering.

You start by selecting a

- Country,
- Product or
- Sector.

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

Overview



Products and systems from Siemens Automation and Drives provide the ideal platform for all automation tasks.

Siemens Solution Partners offer customized future-proof solutions with products and systems from Siemens Automation and Drives. The basis: qualified product and system knowledge coupled with a high degree of solutions and industry-related expertise.

In the Siemens Solution Partner Program you are certain to find the optimum partner for your specific requirements. Since more than 400 companies worldwide belong to the program, you can be sure to get expert support at your location.

The Solution Partner Finder, available to you on the Internet, is a comprehensive database in which all Solution Partners, together with their performance profiles, present themselves.

In addition to the search criteria Technology, Sector and Country, you can also search by Company and ZIP Code. From there it is only a small step to making the first contact.

Call up the Solution Partner Finder as follows:

- CA 01 on CD-ROM:
  On the start page via "Contacts & Partners; Siemens Solution Partner Automation and Power Distribution"
- CA 01 online:
  Go directly to the Solution Partner Finder:
  www.siemens.com/automation/partnerfinder

Additional information about the Siemens Solution Partner Program is available in the Internet at:
www.siemens.com/automation/solutionpartner

Information and Ordering in the Internet and on CD-ROM

A&D in the WWW

A detailed knowledge of the range of products and services available is essential when planning and configuring automation systems. It goes without saying that this information must always be fully up-to-date.

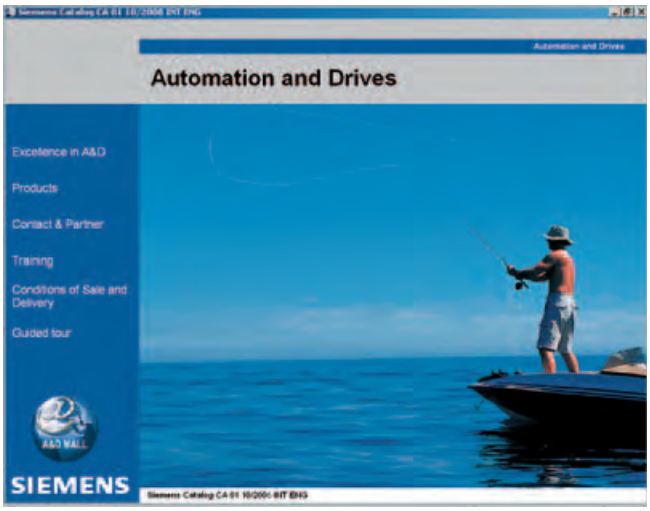
The Siemens Automation and Drives Group (A&D) has therefore built up a comprehensive range of information in the World Wide Web, which offers quick and easy access to all data required.

Under the address

http://www.siemens.com/automation

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

Product Selection Using the Offline Mall of Automation and Drives



Detailed information together with convenient interactive functions:
The Offline Mall CA 01 covers more than 80,000 products and thus provides a full summary of the Siemens Automation and Drives product base.

Here you will find everything that you need to solve tasks in the fields of automation, switchgear, installation and drives.
All information is linked into a user interface which is easy to work with and intuitive.

After selecting the product of your choice you can order at the press of a button, by fax or by online link.

Information on the Offline Mall CA 01 can be found in the Internet under

http://www.siemens.com/automation/ca01

or on CD-ROM or DVD.

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:

http://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

Technical Support

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

Tel.: +49 (0)180 50 50 222
Fax: +49 (0)180 50 50 223
www.siemens.com/automation/support-request

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. 1)

Configuration and Software Engineering

Support in configuring and developing with customer-oriented services from actual configuration to implementation of the automation project. 1)

Service On Site

With Service On Site we offer services for startup and maintenance, essential for ensuring system availability.
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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.
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To enhance productivity and save costs in your project we offer high-quality services in optimization and upgrading. 1)

1) For country-specific telephone numbers go to our Internet site at: http://www.siemens.com/automation/service&support

Knowledge Base on CD-ROM
Automation Value Card

Knowledge Base on CD-ROM

For locations without online connections to the Internet there are excerpts of the free part of the information sources available on CD-ROM (Service & Support Knowledge Base). This CD-ROM contains all the latest product information at the time of production (FAQs, Downloads, Tips and Tricks, Updates) as well as general information on Service and Technical Support.

The CD-ROM also includes a full-text search and our Knowledge Manager for targeted searches for solutions. The CD-ROM will be updated every 4 months.

Just the same as our online offer in the Internet, the Service & Support Knowledge Base on CD comes complete in 5 languages (German, English, French, Italian, Spanish).

You can order the **Service & Support Knowledge Base** CD from your Siemens contact.

Order no. **6ZB5310-0EP30-0BA2**

Orders via the Internet
(with Automation Value Card or credit card) at:

http://www.siemens.com/automation/service&support

in the Shop domain.

Automation Value Card

Small card - great support

The Automation Value Card is an integral component of the comprehensive service concept with which Siemens Automation and Drives will accompany you in each phase of your automation project.

It doesn't matter whether you want just specific services from our Technical Support or want to purchase high-quality Support Tools in our Online Shop, you can always pay with your Automation Value Card. No invoicing, transparent and safe. With your personal card number and associated PIN you can view the state of your account and all transactions at any time.

Services on card. This is how it's done.

Card number and PIN are on the back of the Automation Value Card. When delivered, the PIN is covered by a scratch field, guaranteeing that the full credit is on the card.

By entering the card number and PIN you have full access to the Service & Support services being offered. The charge for the services procured is debited from the credits on your Automation Value Card.

All the services offered are marked in currency-neutral credits, so you can use the Automation Value Card worldwide.

Automation Value Card order numbers	
Credits	Order no.
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500	**6ES7 997-0BB00-0XA0**
1000	**6ES7 997-0BC00-0XA0**
10000	**6ES7 997-0BG00-0XA0**

Detailed information on the services offered is available on our Internet site at:

http://www.siemens.com/automation/service&support

Service & Support à la Card: Examples

Technical Support	
"Priority"	Priority processing for urgent cases
"24 h"	Availability round the clock
„Extended"	Technical consulting for complex questions
Support Tools in the Support Shop	
"System Utilities"	Tools that can be used directly for configuration, analysis and testing
"Applications"	Complete topic solutions including ready-tested software
"Functions & Samples"	Adaptable blocks for accelerating your developments

Overview

Software types

Software requiring a license is categorized into types.
The following software types have been defined:

- Engineering software
- Runtime software

Engineering software

This includes all software products for creating (engineering) user software, e.g. for configuring, programming, parameterizing, testing, commissioning or servicing.

Data generated with engineering software and executable programs can be duplicated for your own use or for use by third-parties free-of-charge.

Runtime software

This includes all software products required for plant/machine operation, e.g. operating system, basic system, system expansions, drivers, etc.

The duplication of the runtime software and executable programs created with the runtime software for your own use or for use by third-parties is subject to a charge.

You can find information about license fees according to use in the ordering data (e.g. in the catalog). Examples of categories of use include per CPU, per installation, per channel, per instance, per axis, per control loop, per variable, etc.

Information about extended rights of use for parameterization/configuration tools supplied as integral components of the scope of delivery can be found in the readme file supplied with the relevant product(s).

License types

Siemens Automation & Drives offers various types of software license:

- Floating license
- Single license
- Rental license
- Trial license

Floating license

The software may be installed for internal use on any number of devices by the licensee. Only the concurrent user is licensed. The concurrent user is the person using the program. Use begins when the software is started.
A license is required for each concurrent user.

Single license

Unlike the floating license, a single license permits only one installation of the software.

The type of use licensed is specified in the ordering data and in the Certificate of License (CoL). Types of use include for example per device, per axis, per channel, etc.

One single license is required for each type of use defined.

Rental license

A rental license supports the "sporadic use" of engineering software. Once the license key has been installed, the software can be used for a specific number of hours (the operating hours do not have to be consecutive).
One license is required for each installation of the software.

Trial license

A trial license supports "short-term use" of the software in a non-productive context, e.g. for testing and evaluation purposes. It can be transferred to another license.

Factory license

With the Factory License the user has the right to install and use the software at one permanent establishment only. The permanent establishment is defined by one address only.The number of hardware devices on which the software may be installed results from the order data or the Certificate of License (CoL).

Certificate of license

The Certificate of License (CoL) is the licensee's proof that the use of the software has been licensed by Siemens. A CoL is required for every type of use and must be kept in a safe place.

Downgrading

The licensee is permitted to use the software or an earlier version/release of the software, provided that the licensee owns such a version/release and its use is technically feasible.

Delivery versions

Software is constantly being updated.
The following delivery versions

- PowerPack
- Upgrade

can be used to access updates.

Existing bug fixes are supplied with the ServicePack version.

PowerPack

PowerPacks can be used to upgrade to more powerful software. The licensee receives a new license agreement and CoL (Certificate of License) with the PowerPack. This CoL, together with the CoL for the original product, proves that the new software is licensed.
A separate PowerPack must be purchased for each original license of the software to be replaced.

Upgrade

An upgrade permits the use of a new version of the software on the condition that a license for a previous version of the product is already held.
The licensee receives a new license agreement and CoL with the upgrade. This CoL, together with the CoL for the previous product, proves that the new version is licensed.
A separate upgrade must be purchased for each original license of the software to be upgraded.

ServicePack

ServicePacks are used to debug existing products.
ServicePacks may be duplicated for use as prescribed according to the number of existing original licenses.

License key

Siemens Automation & Drives supplies software products with and without license keys.

The license key serves as an electronic license stamp and is also the "switch" for activating the software (floating license, rental license, etc.).

The complete installation of software products requiring license keys includes the program to be licensed (the software) and the license key (which represents the license).

Detailed explanations concerning license conditions can be found in the “Terms and Conditions of Siemens AG” or under
http://www.siemens.com/automation/mall
(A&D Mall Online-Help System)

A&D/Software licenses/En 03.08.06

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Catalog improvement suggestions

Fax form

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A&D PT 5
ST 70-2007/ Mr. Fregien
Gleiwitzer Str. 555
D-90475 Nürnberg

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Our catalog should be an important and frequently used document. For this reason we are continuously endeavoring to improve it.

A small request on our part to you:
Please take time to fill in the following form and fax it to us.

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- Do the contents of the catalog live up to your expectations? ☐
- Is the information easy to find? ☐
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Date

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Notes

Notes

Terms and conditions of sale and delivery, Export regulations

Terms and Conditions of Sale and Delivery

By using this catalog you can acquire hardware and software products described therein from Siemens AG subject to the following terms. Please note! The scope, the quality and the conditions for supplies and services, including software products, by any Siemens entity having a registered office outside of Germany, shall be subject exclusively to the General Terms and Conditions of the respective Siemens entity. The following terms apply exclusively for orders placed with Siemens AG.

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The "General Terms of Payment" as well as the "General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry" shall apply.

For software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or registered Office in Germany" shall apply.

For customers with a seat or registered office outside of Germany

The "General Terms of Payment" as well as the "General Conditions for Supplies of Siemens, Automation and Drives for Customers with a Seat or registered Office outside of Germany" shall apply.

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General

The dimensions are in mm. In Germany, according to the German law on units in measuring technology, data in inches only apply to devices for export.

Illustrations are not binding.

Insofar as there are no remarks on the corresponding pages, - especially with regard to data, dimensions and weights given - these are subject to change without prior notice.

The prices are in € (Euro) ex works, exclusive packaging.

The sales tax (value added tax) is not included in the prices. It shall be debited separately at the respective rate according to the applicable legal regulations.

Prices are subject to change without prior notice. We will debit the prices valid at the time of delivery.

Surcharges will be added to the prices of products that contain silver, copper, aluminum, lead and/or gold if the respective basic official prices for these metals are exceeded. These surcharges will be determined based on the official price and the metal factor of the respective product.

The surcharge will be calculated on the basis of the official price on the day prior to receipt of the order or prior to the release order.
The metal factor determines the official price as of which the metal surcharges are charged and the calculation method used. The metal factor, provided it is relevant, is included with the price information of the respective products.

An exact explanation of the metal factor and the text of the Comprehensive Terms and Conditions of Sale and Delivery are available free of charge from your local Siemens business office under the following Order Nos.:

- 6ZB5310-0KR30-0BA1
  (for customers based in Germany)
- 6ZB5310-0KS53-0BA1
  (for customers based outside Germany)

or download them from the Internet
http://www.siemens.com/automation/mall
(Germany: A&D Mall Online-Help System)

Export regulations

The products listed in this catalog / price list may be subject to European / German and/or US export regulations.

Therefore, any export requiring a license is subject to approval by the competent authorities.

According to current provisions, the following export regulations must be observed with respect to the products featured in this catalog / price list:

AL	Number of the German Export List Products marked other than "N" require an export license. In the case of software products, the export designations of the relevant data medium must also be generally adhered to. Goods labeled with an "AL" not equal to "N" are subject to a European or German export authorization when being exported out of the EU.
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Even without a label or with an "AL: N" or "ECCN: N", authorization may be required due to the final destination and purpose for which the goods are to be used.

The deciding factors are the AL or ECCN export authorization indicated on order confirmations, delivery notes and invoices.

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A&D/VuL_ohne MZ/En 05.09.06

Catalogs of the Automation and Drives Group (A&D)

Further information can be obtained from our branch offices listed in the appendix or at www.siemens.com/automation/partner

	Catalog
Automation and Drives	
Interactive catalog on CD-ROM and on DVD	
• The Offline Mall of Automation and Drives	CA 01
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SINUMERIK & SINAMICS	NC 61
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SINAMICS GM150/SINAMICS SM150 Medium-Voltage Converters	D 12
SINAMICS S120 Drive Converter Systems	D 21.1
SINAMICS S150 Drive Converter Cabinet Units	D 21.3
Asynchronous Motors Standardline	D 86.1
Synchronous Motors with Permanent-Magnet Technology, HT-direct	D 86.2
DC Motors	DA 12
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• Converter Systems SIMODRIVE 611/POSMO	
Automation Systems for Machine Tools SINAMICS	NC 61
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• Drive System SINAMICS S120	
Drive and Control Components for Hoisting Equipment	HE 1
Electrical Installation Technology	
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PDF: ALPHA 8HP Molded-Plastic Distribution System	*ET A3*
BETA Low-Voltage Circuit Protection	ET B1
PDF: DELTA Switches and Socket Outlets	*ET D1*
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Human Machine Interface Systems SIMATIC HMI	ST 80

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Controls and Distribution – Technical Information SIRIUS, SENTRON, SIVACON	LV 1 T
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