

Products for Totally Integrated Automation and Micro Automation

Catalog ST 70 • 2009



SIMATIC

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SIMATIC

Products for Totally Integrated Automation and Micro Automation

Catalog ST 70 · 2009



The products and systems described in this catalog are manufactured/distributed under application of a certified quality management system in accordance with DIN EN ISO 9001 (Certified Registration No. 1323-QM). The certificate is recognized by all IQNet countries.

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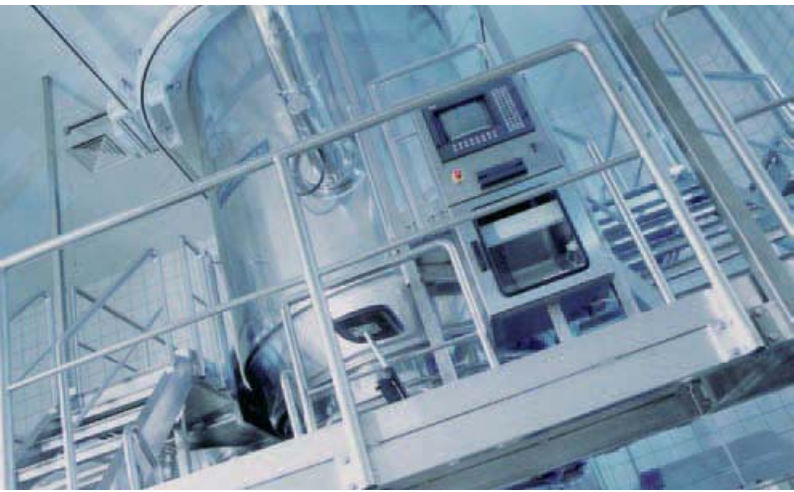
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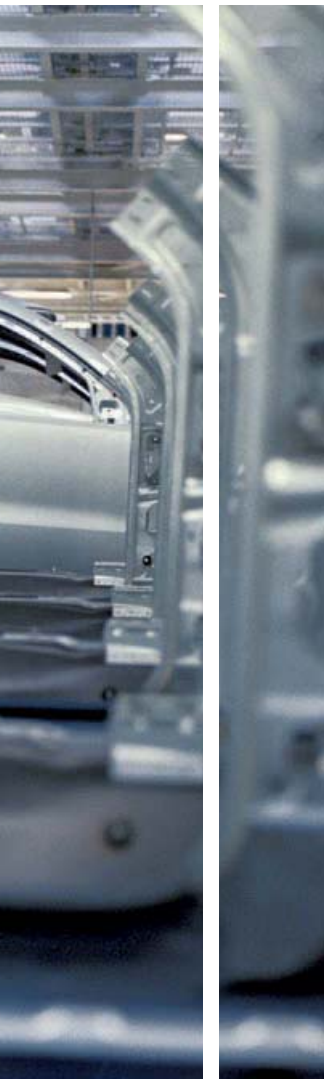
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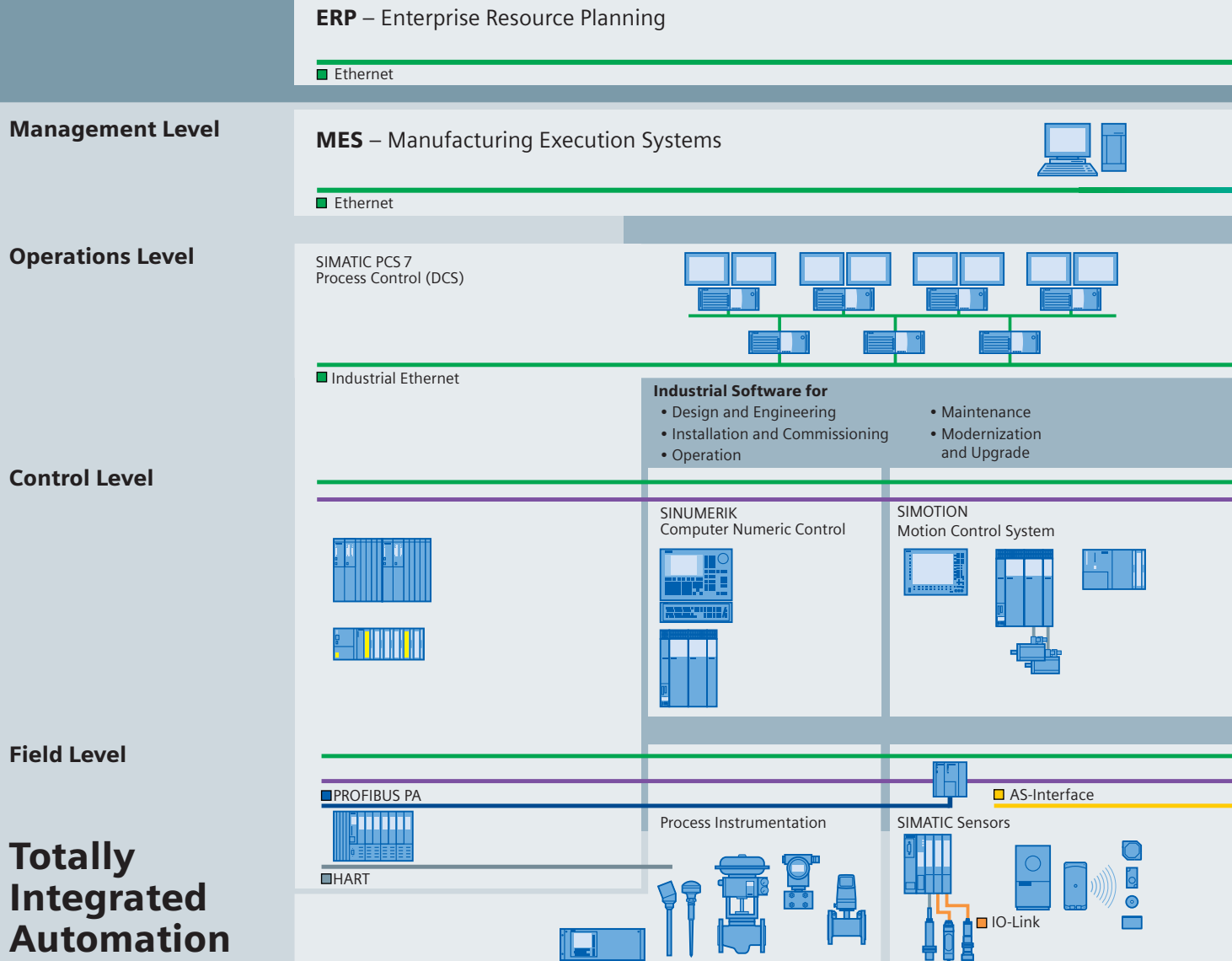
Answers for Industry.

Siemens Industry answers the challenges in the manufacturing and the process industry as well as in the building automation business. Our drive and automation solutions based on Totally Integrated Automation (TIA) and Totally Integrated Power (TIP) are employed in all kinds of industry. In the manufacturing and the process industry. In industrial as well as in functional buildings.

Siemens offers automation, drive, and low-voltage switching technology as well as industrial software from standard products up to entire industry solutions. The industry software enables our industry customers to optimize the entire value chain – from product design and development through manufacture and sales up to after-sales service. Our electrical and mechanical components offer integrated technologies for the entire drive train – from couplings to gear units, from motors to control and drive solutions for all engineering industries. Our technology platform TIP offers robust solutions for power distribution.

The high quality of our products sets industry-wide benchmarks. High environmental aims are part of our eco-management, and we implement these aims consistently. Right from product design, possible effects on the environment are examined. Hence many of our products and systems are RoHS compliant (Restriction of Hazardous Substances). As a matter of course, our production sites are certified according to DIN EN ISO 14001, but to us, environmental protection also means most efficient utilization of valuable resources. The best example are our energy-efficient drives with energy savings up to 60 %.

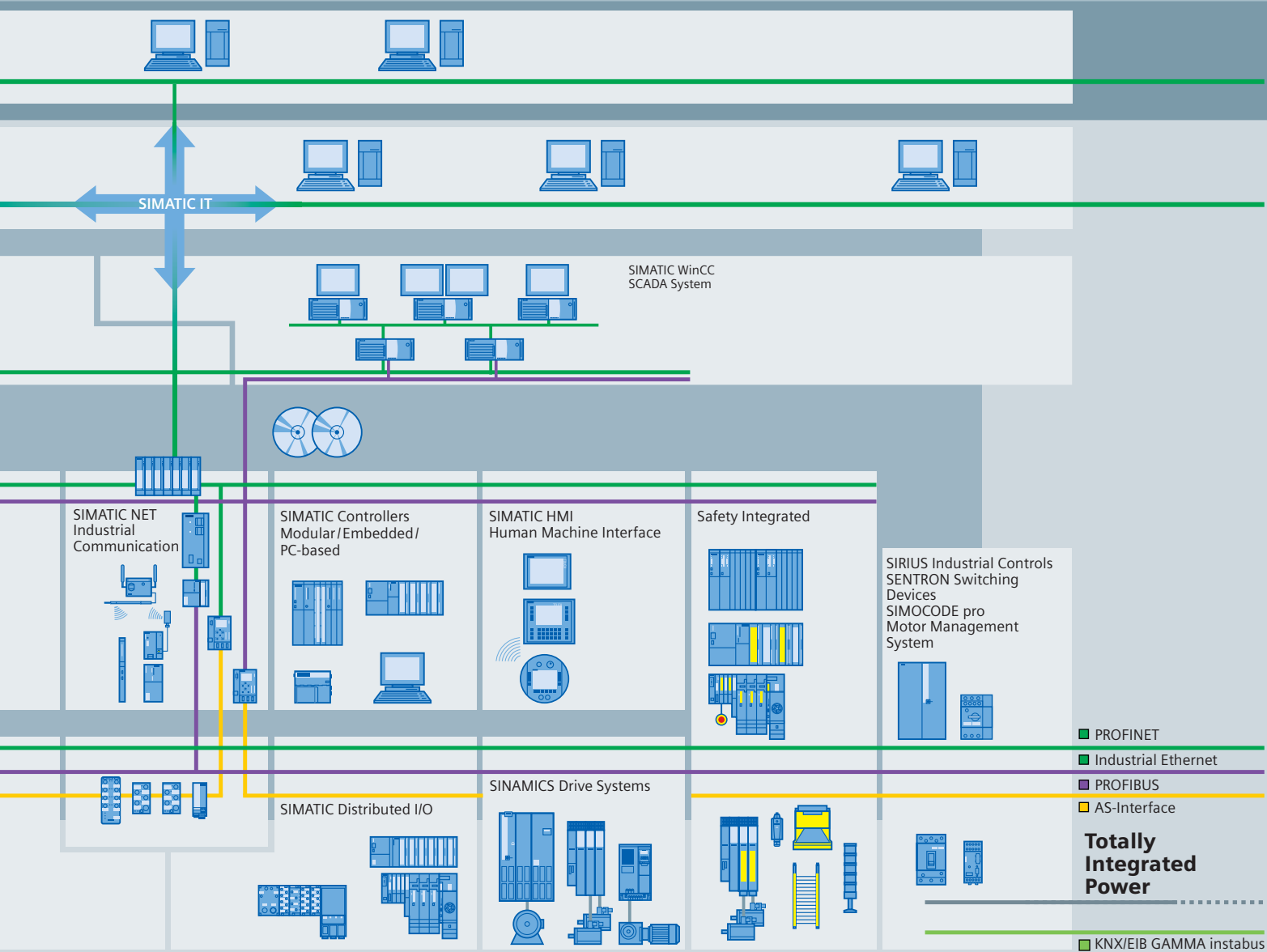
Check out the opportunities our automation and drive solutions provide. And discover how you can sustainably enhance your competitive edge with us.



Setting standards in productivity and competitiveness.

Totally Integrated Automation.

Thanks to Totally Integrated Automation, Siemens is the only provider of an integrated basis for implementation of customized automation solutions – in all industries from inbound to outbound.



TIA is characterized by its unique continuity.

It provides maximum transparency at all levels with reduced interfacing requirements – covering the field level, production control level, up to the corporate management level. With TIA you also profit throughout the complete life cycle of your plant – starting with the initial planning steps through operation up to modernization, where we offer a high measure of investment security resulting from continuity in the further development of our products and from reducing the number of interfaces to a minimum.

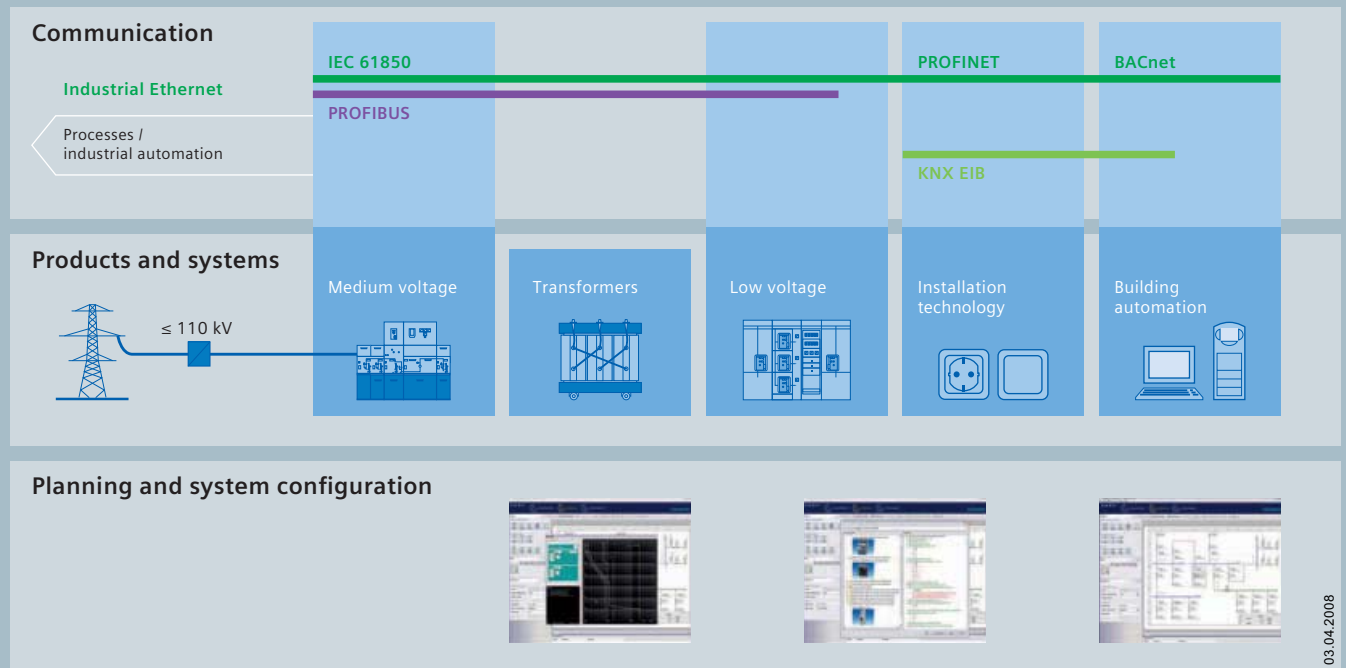
The unique continuity is already a defined characteristic at the development stage of our products and systems.

The result: maximum interoperability – covering the controller, HMI, drives, up to the process control system. This reduces the complexity of the automation solution in your plant. You will experience this, for example, in the engineering phase of the automation solution in the form of reduced time requirements and cost, or during operation using the continuous diagnostics facilities of Totally Integrated Automation for increasing the availability of your plant.



Integrated power distribution from one source.

Totally Integrated Power.



Electrical power distribution in buildings requires integrated solutions. Our response: Totally Integrated Power. This means innovative and integrated, interface-optimized products and systems which have been optimally coordinated and complemented with communication and software modules that link power distribution to building automation or industrial automation. Totally Integrated Power accompanies power distribution projects from one end to the other. From A to Z. From the planning to the building's use: Totally Integrated Power offers significant advantages in every project stage and to everyone involved in the project – the investors, electrical planning engineers, electricians, users and building facility managers.

Our portfolio comprises everything from engineering tools to the matching hardware: from switchgear and distribution systems for medium voltage to transformers, from switching and circuit-protection devices to low-voltage switchgear and busbar trunking systems, as far as to the small distribution board and the wall outlet. It goes without saying that both the medium-voltage switchgear, which requires no maintenance, and the low-voltage switchgear are type-tested, and their busbar connections, too. Comprehensive protection systems ensure the safety of man and machine at any time.

Introduction

Micro Automation

LOGO!:

Technology with a future which simplifies many things

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 (4 can be used as analog inputs)	8 (4 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. 80h		
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 (W x H x D)	72 x 90 x 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

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/simatic-s7-200>



SIMATIC S7-200, CPU	221	222	224	224 XP, 224 XPsi	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				
Bit memories	256				
Counters	256				
Timers	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)			2 x PPI (point-to-point)	
Networking	—	AS-Interface, PROFIBUS DP, Ethernet, Internet, Modem			
Real-time clock	optional	optional	integrated	integrated	integrated

— = can be used/available

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Introduction

SIMATIC Controllers

SIMATIC S7-300:

The modular PLC for innovative system solutions in the manufacturing industry

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	256 KB 84 K	1024 KB 340 K
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	0.05/0.2/0.2/1	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 Analog channels	256/1024 64/256	1024 256	1024 256	1024 256	256 64	256 64
Interfaces DP master sys. intern./CP 342-5 DP slaves PtP communication PROFINET	—/● — — —	●/— ● — ● ²⁾	●/● ● — ● ²⁾	●/● ● — ●	●/● ● — —	●/● ● — —
Integrated I/O DI/DO AI/AO	— —	— —	— —	— —	4/8 —	4/8 —
Integrated functions Counter/frequency meter Pulse outputs Controlling/positioning	— — —/—	— — —/—	— — —/—	— — —/—	Technological functions, e. g. Gearbox/curve synchronism, Travel to fixed stop, Travel/time-dependent cam switching, Position-controlled positioning	
Mounting dim. WxHxD (mm)	40x125x130	40/80x125x130	80x125x130	120x125x130	160x125x130	160x125x130

— = can be used/available

● = can not be used/not available

1) CPU 314

2) CPU 31x-2 PN/DP

- In addition, the Micro Memory Card allows simple program or firmware updates without the need for a programming device. The Micro Memory Card can be used during operation for storing and accessing data, e.g. for measured value archiving or recipe processing.
- In addition to standard automation, safety technology and motion control can also be integrated into an S7-300 PLC.
- 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/ 314C-2 DP	315F-2 DP/ 315F-2 PN/DP	317F-2 DP/ 317F-2 PN/DP	319F-3 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 inst.)	1,4 MB 280 K (F inst.)
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	0,01/0,02/0,02/ 0,04
Timers/counters	128/128 256/256 ¹⁾	256/256	256/256	256/256	512/512	2048/2048
Address areas Digital channels Analog channels	266/1016 64/253	1008 248	1016 253	1024 256	1024 256	1024 256
Interfaces DP master sys. intern./CP 342-5 DP slaves PtP communication PROFINET	—/● — — —	—/● (●/●) ²⁾ — (●) ²⁾ ASCII, RK512, 3964R ³⁾ —	—/● (●/●) ²⁾ — (●) ²⁾ ASCII, RK512, 3964R ³⁾ —	●/● ● — ● ⁴⁾	●/● ● — ● ⁴⁾	●/● ● — ●
Integrated I/O DI/DO AI/AO	10/6 (24/16) ¹⁾ 4/2 ¹⁾	16/16 —	24/16 4/2	— —	— —	— —
Integrated functions Counter/frequency meter Pulse outputs Controlling/positioning	2 (10 kHz)/3 (30 kHz) 2 (2,5 kHz)/3 (2,5 kHz) ●/—	3 (30 kHz) 3 (2,5 kHz) ●/—	4 (60 kHz) 4 (2,5 kHz) ●/●	— — —	— — —	— — —
Mounting dim. WxHxD (mm)	80/120x125x130	120x125x130	120x125x130	40/80x125x130	80x125x130	120x125x130

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 ● = 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 Controllers

SIMATIC S7-400:

The Power Controller for system solutions in the manufacturing and process industries

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 communication-power 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	288/512 ¹⁾ KB	1 MB	2,8 MB	2,8 MB	5,6 MB	11,2 MB
Instructions	48/84 ¹⁾ K	170 K	460 K	460 K	920 K	1840 K
Execution times (µs)						
Bit/word/fixed pt./floating pt.	75/75/75/225	45/45/45/135	45/45/45/135	45/45/45/135	30/30/30/90	30/30/30/90
Timers/counters	2048/2048	2048/2048	2048/2048	2048/2048	2048/2048	2048/2048
Address areas						
Digital channels	32768/32768	65536/65536	65536/65536	65536/65536	131072/131072	131072/131072
Analog channels	2048/2048	4096/4096	4096/4096	4096/4096	8192/8192	8192/8192
DP interfaces						
Number of DP interfaces	1(MPI/DP) / 1 ¹⁾	1	2	1	1	2
Number of DP slaves	32/64	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 with IRT	—	—	—	●	—	—
PROFINET CBA	—	—	—	●	—	—
TCP/IP	—	—	—	●	—	—
UDP	—	—	—	●	—	—
Webserver	—	—	—	●	—	—
ISO-on-TCP (RFC 1006)	—	—	—	●	—	—
Data record gateway	—	—	—	●	—	—
Mounting dim. WxHxD (mm)	25x290x219	25x290x219	50x290x219	25x290x219	25x290x219	50x290x219

— = can be used/available

● = can not be used/not available

1) CPU 412-2

- 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	412-3H	414-4H	417-4H	416F-2	416F-3 PN/DP
Memory Instructions	11.2 MB 1840 K	30 MB 5 M	768 KB 128 K	2.8 MB 460 K	30 MB 5 M	5.6 MB 560 K (F inst.)	11.2 MB 1120 K (F inst.)
Execution times (µs) Bit/word/fixed pt./floating pt.	30/30/30/90	18/18/18/54	75/75/75/225	45/45/45/135	18/18/18/54	30/30/30/90	30/30/30/90
Timers/counters	2048/2048	2048/2048	2048/2048	2048/2048	2048/2048	2048/2048	2048/2048
Address areas Digital channels Analog channels	131072/131072 8192/8192	131072/131072 8192/8192	65536/65536 4096/4096	65536/65536 4096/4096	131072/131072 8192/8192	131072/131072 8192/8192	131072/131072 8192/8192
DP interfaces Number of DP interfaces Number of DP slaves Plug-in interface modules	1 125 each 1 x DP	3 125 each 2 x DP	1 (MPI/DP) — 2 x Sync ¹⁾	1 — 2 x Sync ¹⁾	1 — 2 x Sync ¹⁾	1 125 —	1 125 each 1 x DP
PN interfaces Number of PN-interfaces PROFINET IO PROFINET with IRT PROFINET CBA TCP/IP UDP Webserver ISO-on-TCP (RFC 1006) Data record gateway	1 (2 Ports) ● ● ● ● ● ● ● ● ●	— — — — — — — — —	— — — — — — — — —	— — — — — — — — —	— — — — — — — — —	— — — — — — — — —	1 (2 Ports) ● ● ● ● ● ● ● ● ●
Mounting dim. WxHxD (mm)	50x290x219	50x290x219	50x290x219	50x290x219	50x290x219	25x290x219	50x290x219

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● = can not be used/not available

1) Sync module

Introduction

SIMATIC Programming Devices

Field PG M2: the ideal industrial notebook

SIMATIC programming devices are the first choice when it comes to configuring and programming SIMATIC software. The SIMATIC Field PG M2 is distinguished by wireless technology, powerful Intel Core 2 Duo processor, large display and integrated data backup concept. In addition, the new device has a long battery life, large working memory and all common interfaces for industrial applications.

A further decisive advantage of the SIMATIC Field PG M2 is its ruggedness and the preinstalled STEP 7 Professional and WinCC flexible 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 M2 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 Core 2 Duo processor offers maximum performance with a low power consumption.
- The lithium ion battery can power the Field PG M2 for up to five hours.
- 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 x 2 GB DDR2 RAM and a 667 MHz clock cycle permits fast execution and parallel processing of several applications.



- The replaceable 160 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 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 M2 and can be enabled with a license key.
- Every Field PG M2 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>

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.com/simatic-pc>

	Rack PC	Box PC	Panel PC	
8xx-Series High Industrial Maximum expandibility Rugged High performance	 Rack PC 847B	 Box PC 827B		+ Benefit from an identical mainboard design + Identical system software and drivers due to identical processors and chipsets + Reduced cost and effort for evaluation if using different SIMATIC PCs + Reduced supply of spare parts (e.g. RAM, hard disks)
6xx-Series High Industrial Compact Rugged High performance		 Box PC 627B	 Panel PC 677B	
5xx-Series Industrial High to maximum performance Expandable Cost-effective	 Rack PC 547B		 Panel PC 577B	
4xx-Series Embedded Ultra-compact Highly rugged Maintenance-free		 Microbox PC 427B	 Panel PC 477B	
			Same Mainboard basis with Intel Core2 Duo Same Mainboard basis with Intel Pentium M	⌚ Long-term availability and defined development ⌚ Siemens develops and produces mainboards in Germany ¹⁾ ⌚ Long-term availability of 3 to 5 years ⌚ 5 years of Repair and spare part service 1) SIMATIC Rack PC 547B is also developed and produced in Germany.

Introduction

SIMATIC 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.
- Transferability of user software as result of common engineering environment for modular controllers, embedded automation and PC-based Control.
- 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.

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>

Embedded/PC-based Automation

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 S7-mEC RTX:**
Embedded controller in S7-300 design
- **SIMATIC Microbox 427B-RTX, 427B-HMI/RTX:**
Turnkey, rail-mounted PC with software PLC
- **SIMATIC Panel PC 477-HMI/RTX:**
Turnkey Panel PC with software PLC and visualization software
- **SIMATIC WinAC MP 277/377:**
Software PLC on multifunctional platform

SIMATIC PC-based Controller

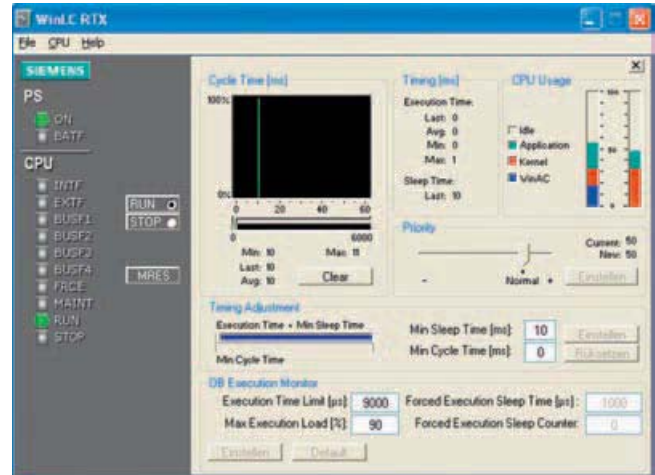
SIMATIC WinAC supplements SIMATIC S7 with PC-based controls. It is used when different tasks, such as data processing, communication, visualization and technology, are to be integrated on one PC.

SIMATIC WinAC is available as:

- **SIMATIC WinAC Software PLC** for tasks that require high flexibility and openness.

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

SIMATIC WinAC 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.

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

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 in the CPUs of the PLCs. 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.

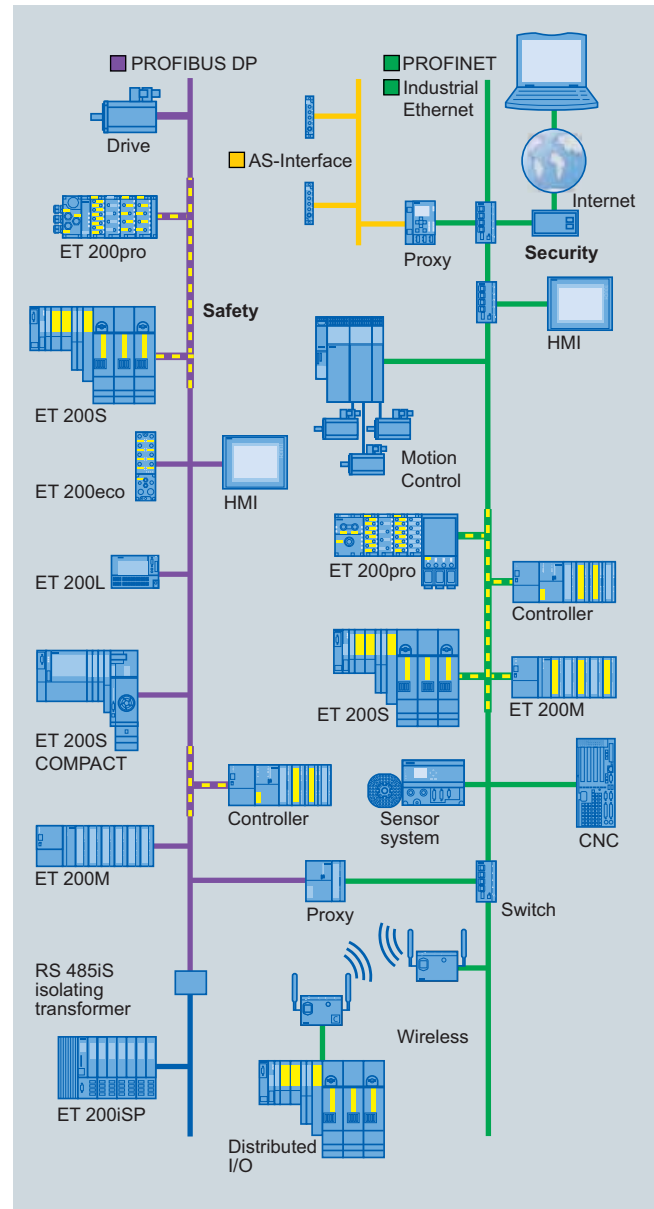
The System is **flexible**:

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 in S7-300 design.
- 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: digital block I/O.
- ET 200pro: modular and multifunctional.
- ET 200R: rugged for robots.

Further information can be found at:

<http://www.siemens.com/et200>

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**. 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.

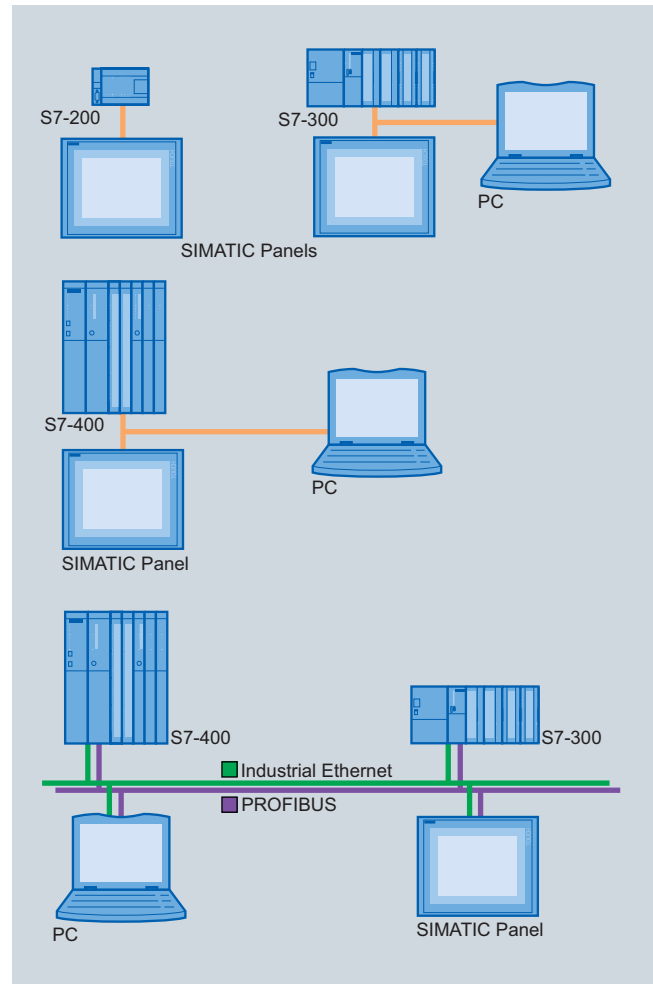
Event-triggered forwarding of emails, diagnostic functions, remote operation of local control stations over the intranet/Internet, as well as service and maintenance functions accelerate the entire process sequence from the disturbance to fault clearance.

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. 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. 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) 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.

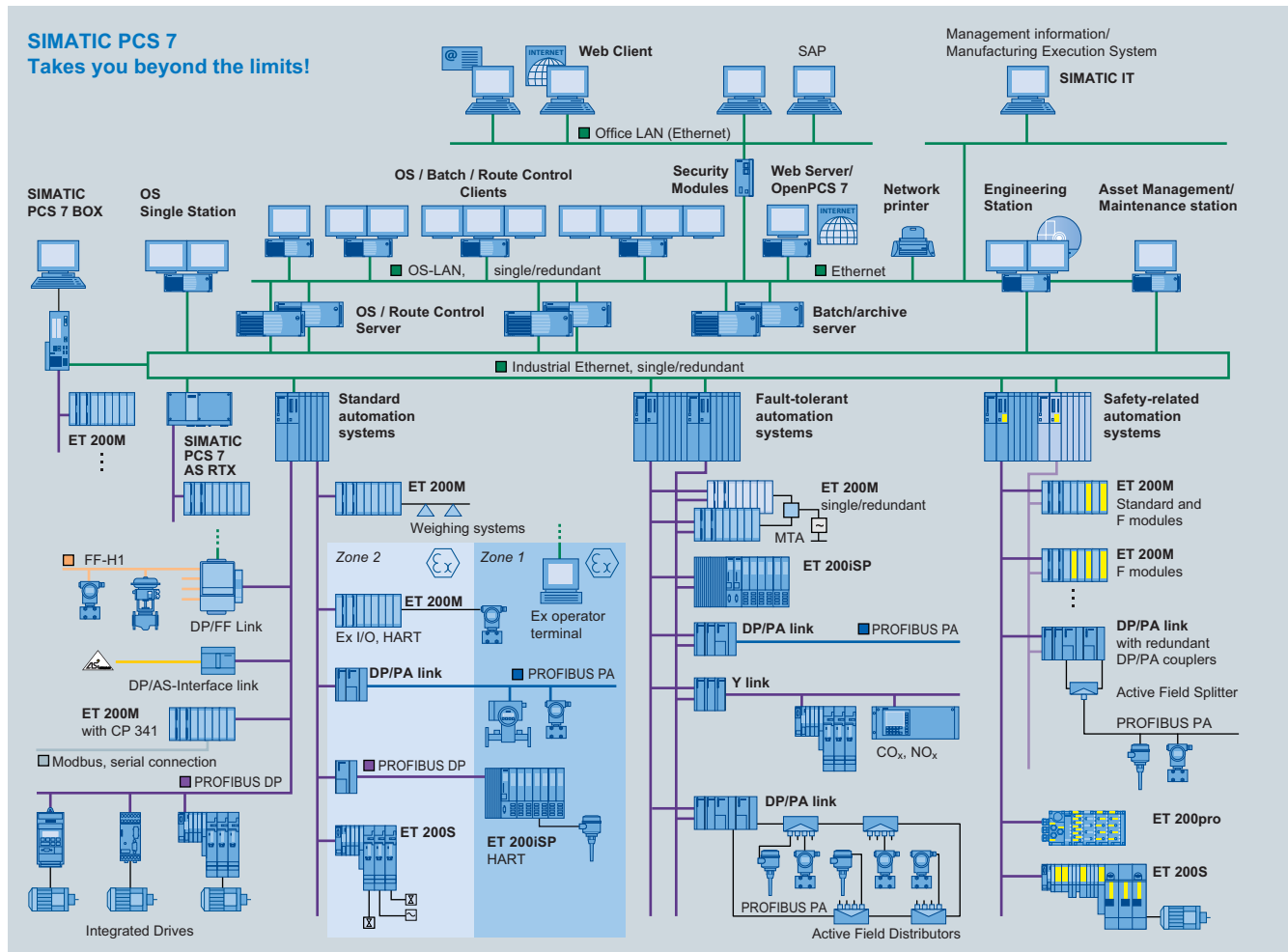
Thanks to the Windows-compliant operator interface, fast and easy configuring is possible, e.g. integration of existing standard and application programs. Online configuring permits modifications on site without interrupting the ongoing operator control and monitoring process.

Further information can be found at:

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

Introduction

SIMATIC PCS 7



The process control system for all automation applications

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

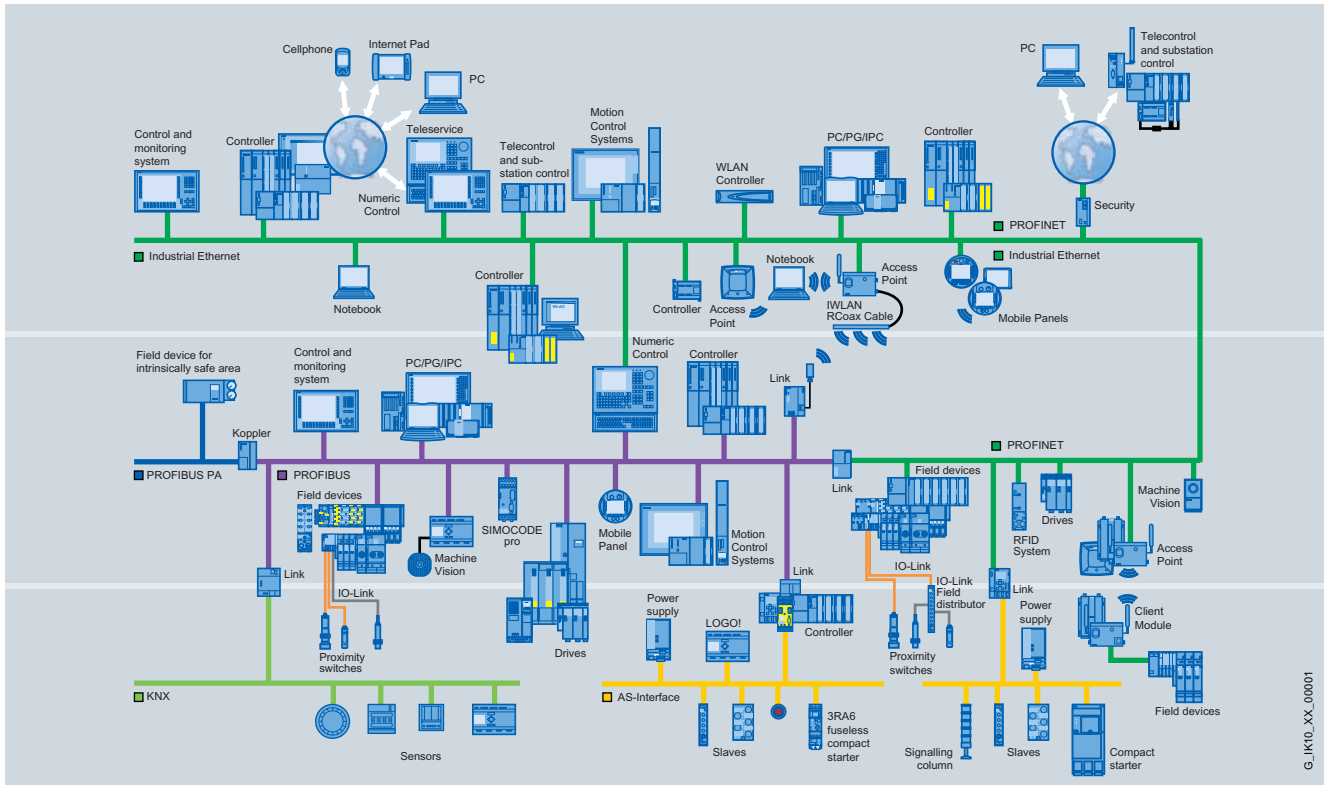
With its pioneering design, modular and open architecture based on state-of-the-art SIMATIC technology, consistent application of industrial standards, and the I&C functionality paired with high-performance, the SIMATIC PCS 7 process control system allows cost-effective implementation and economical operation of I&C plants in all phases of their lifecycle and with consideration of all aspects: from planning, engineering, commissioning, training, through operation, maintenance and repair, up to expansion and refurbishment. In the process, SIMATIC PCS 7 combines high-performance and reliability with simple and safe operation and maximum convenience.

You primarily profit from Totally Integrated Automation with the SIMATIC PCS 7 process control system through:

- Calculable development, implementation and lifecycle costs
- Minimization of engineering overhead
- Facilities for process optimization
- Adaptability to changing requirements
- Advantages resulting from the use of standard SIMATIC 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
 - Global availability
 - Savings in logistics, maintenance and training costs

Introduction

SIMATIC NET



Networking for Industry

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 and 802.3u) – 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 **PROFINET** international standard (IEC 61158/61784) uses Industrial Ethernet, and permits real-time communication down to the field level, but also incorporates the enterprise level. With full utilization of existing IT standards, PROFINET also allows isochronous motion control applications, efficient cross-vendor engineering, and high machine and plant availability on the Industrial Ethernet.

PROFINET supports distributed automation (also controller-to-controller communication) and permits fail-safe applications.

PROFIBUS (IEC 61158/61784) – 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.

IO-Link – the standard for intelligent interfacing of sensors and actuators from the field level up to the operations management level.

Further information can be found at:

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

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LOGO! logic module



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	modular pure versions
2/15	LOGO! modular expansion modules
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	modular expansion modules
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	communication module
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2/24	LOGO!Power
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Brochures

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

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

LOGO! logic module

Introduction

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 extremely harsh environmental conditions
- With enhanced temperature range from -25 °C to +70 °C or -40 °C to +70 °C for selected types
- Use in environments with pollutant gases (corrosive gas atmospheres)
- Occasional short-term condensation and enhanced mechanical stress permissible
- With the proven PLC technology of LOGO!
- Easy handling, programming, maintenance and service
- Ideal for use in automobile construction, environmental technology, mining, chemical plants, conveying technology, food & beverages industry etc.

Accessories:

- The front panel mounting set also allows simple and reliable installation of the logic modules in front panels; IP65 protection is thus possible.
- In order to ensure dependable operation of SIPLUS devices supplied by the battery in conjunction with combustion engines, it is necessary to put in a SIPLUS upmiter upstream device between the battery and the SIPLUS LOGO!.

For more information, go to:

<http://www.siemens.com/siplus>

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

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

Technical specifications SIPLUS LOGO!

Climatic environmental conditions

Temperature	Horizontal installation: -25 °C to +70 °C Vertical installation: -25 °C to +50 °C or Horizontal installation: -40 °C to +70 °C Vertical installation: -40 °C to +50 °C
Relative humidity	5 to 95 %; short-term condensation permissible, corresponds to relative humidity (RH) load 2 according to IEC 1131-2 and IEC 721 3-3 Cl. 3K5
Short-term ice formation	-40/-25 °C to 0 °C IEC 721 3-3 Cl. 3K5
Air pressure	1080 to 795 hPa corresponds to an altitude of -1000 to 2000 m
Contaminant concentration	According to: ISA-S71.04 severity level G1; G2; G3 (with exception of NH ₃ , only level G2 in this case) EN 60068-2-60 Ke4 CS ₂ : max. 30 mg/m ³ H ₂ S: max. 15 mg/m ³ H ₂ SO ₄ : traces of aerosols

Mechanical environmental conditions

Vibrations	Type of vibration: Frequency sweeps with a rate of change of 1 octave/minute. 2 Hz ≤ f ≤ 9 Hz, constant Amplitude 3.0 mm, 9 Hz ≤ f ≤ 150 Hz, constant acceleration 1 g, duration of oscillation: 10 frequency cycles per axis in each of the three mutually perpendicular axes Vibration tests according to IEC 68 Part 2-6 (sine wave) and IEC 721 3-3, Class 3M4
Shock	Type of shock: Half-sine, intensity of shock: 15 g peak value, 11 ms duration, direction: 3 shocks each in +/- direction in each of the 3 perpendicular axes Shock testing in accordance with IEC 68 Part 2-27

Overview



- The space-saving basic versions
- 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
- With connection option for LOGO! TD text display (can be connected to all LOGO! 0BA6 basic versions)

2

Technical specifications

	6ED1 052-1CC00-0BA6	6ED1 052-1MD00-0BA6	6ED1 052-1HB00-0BA6	6ED1 052-1FB00-0BA6
Supply voltages				
Rated value				
• DC 12 V		Yes		
• DC 24 V	Yes	Yes	Yes	
• DC 115 V				Yes
• DC 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
• AC 24 V			Yes	
• AC 115 V				Yes
• AC 230 V				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 Hours	80 Hours	80 Hours
Digital inputs				
Number of digital inputs	8; of which 4 can be used as analog (0...10V)	8; of which 4 can be used as analog (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
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

LOGO! logic module

LOGO! modular

LOGO! modular basic versions

Technical specifications (continued)

	6ED1 052-1CC00-0BA6	6ED1 052-1MD00-0BA6	6ED1 052-1HB00-0BA6	6ED1 052-1FB00-0BA6
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 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				
Dimensions				
• 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.	Order No.
LOGO! logic module 24 24 V DC power supply, 8x 24 V DC digital inputs, of which 4 can be used in analog mode (0 to 10 V), 4x 24 V DC digital outputs, 0.3 A; 200 function blocks can be inter- linked, modular expansion capability	6ED1 052-1CC00-0BA6	LOGO! PROM B7 6AG1 057-1AA01-0BA6 Programming device used to simultaneously reproduce program module contents on up to 8 program modules
LOGO! logic module 12/24RC 12/24 V DC power supply, 8x 12/24 V DC digital inputs, of which 4 can be used in analog mode (0 to 10 V), 4x 10 A relay outputs, integral time switch; 200 function blocks can be inter- linked, modular expansion capability	6ED1 052-1MD00-0BA6	LOGO!Soft Comfort V6.0 B8 6ED1 058-0BA02-0YA0 For programming on the PC in LAD/FBD; executes on Windows 98 SE and higher, Linux, MAC OSX; on CD-ROM
LOGO! logic module 24RC 24 V AC/DC power supply, 8x 24 V AC/DC digital inputs, 4x 10 A relay outputs, integral time switch; 200 function blocks can be inter- linked, modular expansion capability	6ED1 052-1HB00-0BA6	LOGO!Soft Comfort V6.0 upgrade 6ED1 058-0CA02-0YE0 Upgrade from V1.0 to V6.0
LOGO! logic module 230RC 115/230 V AC/DC power supply, 8x 115/230 V AC/DC digital inputs, 4x 10 A relay outputs, integral time switch; 200 function blocks can be inter- linked, modular expansion capability	6ED1 052-1FB00-0BA6	LOGO! PC cable 6ED1 057-1AA00-0BA0 For program transfer between LOGO! and the PC
Accessories		LOGO! USB PC cable B9 6ED1 057-1AA01-0BA0 For transferring the program between LOGO! and PC, including driver on CD-ROM
LOGO! TD text display 4-line text display, can be connected to all LOGO! 0BA6 Basic and Pure versions, including connecting cable	6ED1 055-4MH00-0BA0	LOGO! modem cable 6ED1 057-1CA00-0BA0 Adapter cable for analog modem communication
LOGO! manual German English French Spanish Italian Chinese	6ED1 050-1AA00-0AE7 6ED1 050-1AA00-0BE7 6ED1 050-1AA00-0CE7 6ED1 050-1AA00-0DE7 6ED1 050-1AA00-0EE7 6ED1 050-1AA00-0KE7	Front panel mounting set Width 4 width units 6AG1 057-1AA00-0AA0 Width 4 width units, with keys 6AG1 057-1AA00-0AA3 Width 8 width units 6AG1 057-1AA00-0AA1 Width 8 width units, with keys 6AG1 057-1AA00-0AA2
LOGO! Memory Card Program module for copying, with know-how protection	6ED1 056-1DA00-0BA0	LOGO! News Box, 12/24 V Contains LOGO! 12/24RC, LOGO! USB PC cable, LOGO!Soft Comfort V6.0, manual, screwdriver, information material German B9 6ED1 057-3BA00-0AA5 English B9 6ED1 057-3BA00-0BA5
LOGO! battery card Battery module for backing up the integral real-time clock (not LOGO! 24)	6ED1 056-6XA00-0BA0	LOGO! News Box, 230 V Contains LOGO! 230RC, LOGO! USB PC cable, LOGO!Soft Comfort V6.0, manual, screwdriver, information material German B9 6ED1 057-3AA02-0AA0 English B9 6ED1 057-3AA02-0BA0
LOGO! memory/battery card Combined program and battery module, with know-how protection and for backing up the integral real-time clock (not LOGO! 24)	6ED1 056-7DA00-0BA0	LOGO! TD News Box, 12/24 V Contains LOGO! 12/24RCo, LOGO! TD, LOGO! USB PC cable, LOGO! Soft Comfort V6.0, manual, screwdriver, information material German B9 6ED1 057-3BA10-0AA0 English B9 6ED1 057-3BA10-0BA0

B7: Subject to export regulations: AL: N and ECCN: EAR99H

B8: Subject to export regulations: AL: N and ECCN: EAR99S

B9: Subject to export regulations: AL: N and ECCN: EAR99T

LOGO! logic module

LOGO! modular

SIPLUS LOGO! modular basic versions

Overview

2



- 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 ... + 70 °C - 25 ... +55 °C (for applications with cUL approval), condensation permissible			
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere)			
Approvals	CE, cUL			
Technical data	The technical data are identical with those of the based-on modules.			

Technical specifications

	6AG1 052-1CC00-2BA5	6AG1 052-1MD00-2BA5	6AG1 052-1HB00-2BA5	6AG1 052-1FB00-2BA5
Supply voltages				
Rated value				
• DC 12 V		Yes		
• DC 24 V	Yes	Yes	Yes	
• DC 115 V				Yes
• DC 230 V				Yes
• permissible range, lower limit (DC)	20.4 V	10.8 V	20.4 V	100 V
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• AC 24 V			Yes	
• AC 115 V				Yes
• AC 230 V				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 Hours	80 Hours	80 Hours
Digital inputs				
Number of digital inputs	8; of which 2 can be used as analog (0...10V)	8; of which 2 can be used as analog (0...10V)	8	8

Technical specifications (continued)

	6AG1 052-1CC00-2BA5	6AG1 052-1MD00-2BA5	6AG1 052-1HB00-2BA5	6AG1 052-1FB00-2BA5
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
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 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				
Dimensions				
• 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

LOGO! logic module

LOGO! modular

SIPLUS LOGO! modular basic versions

2

Ordering Data	Order No.	Order No.
SIPLUS LOGO! 24 (extended temperature range and medial exposure) 24 V DC power supply, eight 24 V DC digital inputs, of which two can be used in analog mode (0 to 10 V), four 24 V DC digital outputs, 0.3 A; 130 function blocks can be inter-linked, modular expansion capability	6AG1 052-1CC00-2BA5	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 6ED1 056-5CA00-0BA0 For copying, with know-how protection LOGO!Soft Comfort V5.0 6ED1 058-0BA01-0YA0 For programming on the PC in LAD/FBD; executes on Windows 95 and higher, Linux, MAC OSX; on CD-ROM LOGO!Soft Comfort Upgrade B8 6ED1 058-0CA01-0YE0 From V1.0 or higher to V4.0 LOGO! PC cable 6ED1 057-1AA00-0BA0 For program transfer between LOGO! and the PC LOGO! PROM B7 6AG1 057-1AA01-0BA5 Programming device for modules LOGO! Mounting set For use in a front panel with plexiglass pane and gasket • Mounting set 4 WM 6AG1 057-1AA00-0AA0 • Mounting set 4 WM with keys 6AG1 057-1AA00-0AA3 • Mounting set 8 WM 6AG1 057-1AA00-0AA1 • Mounting set 8 WM with keys 6AG1 057-1AA00-0AA2 SIPLUS upmiter power supply unit 6AG1 053-1AA00-2AA0 for dependable operation of SIPLUS devices supplied by the battery of internal combustion engines
SIPLUS LOGO! 12/24RC (extended temperature range and medial exposure) 12/24 V DC power supply, eight 12/24 V DC digital inputs, of which two can be used in analog mode (0 to 10 V), four relay outputs 10 A, integral time switch; 130 function blocks can be inter-linked, modular expansion capability	6AG1 052-1MD00-2BA5	
SIPLUS LOGO! 24RC (extended temperature range and medial exposure) 24 V AC/DC power supply, eight 24 V AC/DC digital inputs, four relay outputs 10 A, integral time switch; 130 function blocks can be inter-linked, modular expansion capability	6AG1 052-1HB00-2BA5	
SIPLUS LOGO! 230RC (extended temperature range and medial exposure) 115/230 V AC/DC power supply, eight 115/230 V AC/DC digital inputs, four relay outputs 10 A, integral time switch; 130 function blocks can be inter-linked, modular expansion capability	6AG1 052-1FB00-2BA5	

B7: Subject to export regulations: AL: N and ECCN: EAR99H

B8: Subject to export regulations: AL: N and ECCN: EAR99S

Overview



- The cost-optimized basic versions
- 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
- With connection option for LOGO! TD text display (can be connected to all LOGO! 0BA6 basic versions)

2

Technical specifications

	6ED1 052-2CC00-0BA6	6ED1 052-2MD00-0BA6	6ED1 052-2HB00-0BA6	6ED1 052-2FB00-0BA6
Supply voltages				
Rated value				
• DC 12 V		Yes		
• DC 24 V	Yes	Yes	Yes	
• DC 115 V				Yes
• DC 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
• AC 24 V			Yes	
• AC 115 V				Yes
• AC 230 V				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 Hours	80 Hours	80 Hours
Digital inputs				
Number of digital inputs	8; of which 4 can be used as analog (0...10V)	8; of which 4 can be used as analog (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
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

LOGO! logic module

LOGO! modular

LOGO! modular pure versions

Technical specifications (continued)

	6ED1 052-2CC00-0BA6	6ED1 052-2MD00-0BA6	6ED1 052-2HB00-0BA6	6ED1 052-2FB00-0BA6
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 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				
Dimensions				
• 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.	Order No.
LOGO! logic module 24o 24 V DC power supply, 8 digital inputs 24 V DC, of which 4 can be used in analog mode (0 to 10 V), 4 digital outputs 24 V DC, 0.3 A; without display and keyboard; 200 function blocks can be inter- linked, modular expansion capability	6ED1 052-2CC00-0BA6	LOGO! Memory Card Program module for copying, with know-how protection 6ED1 056-1DA00-0BA0
LOGO! logic module 12/24RCo 12/24 V DC power supply, 8 digital inputs 12/24 V DC, of which 4 can be used in analog mode (0 to 10 V), 4 relay outputs 10 A, integral time switch; without display and keyboard; 200 function blocks can be inter- linked, modular expansion capability	6ED1 052-2MD00-0BA6	LOGO! battery card Battery module for backing up the integral real-time clock (not LOGO! 24o) 6ED1 056-6XA00-0BA0
LOGO! logic module 24RCo 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; 200 function blocks can be inter- linked, modular expansion capability	6ED1 052-2HB00-0BA6	LOGO! memory/battery card Combined program and battery module, with know-how protection and for backing up the integral real-time clock (not LOGO! 24o) 6ED1 056-7DA00-0BA0
LOGO! logic module 230RCo 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; 200 function blocks can be inter- linked, modular expansion capability	6ED1 052-2FB00-0BA6	LOGO! PROM B7 6AG1 057-1AA01-0BA6 Programming device used to simultaneously reproduce program module contents on up to 8 program modules
Accessories		LOGO!Soft Comfort V6.0 B8 6ED1 058-0BA02-0YA0 For programming on the PC in LAD/FBD; executes on Windows 98 SE and higher, Linux, MAC OSX; on CD-ROM
LOGO! TD text display 4-line text display, can be connected to all LOGO! 0BA6 Basic and Pure versions, including connecting cable	6ED1 055-4MH00-0BA0	LOGO!Soft Comfort V6.0 upgrade 6ED1 058-0CA02-0YE0 Upgrade from V1.0 to V6.0
LOGO! manual German English French Spanish Italian Chinese	6ED1 050-1AA00-0AE7 6ED1 050-1AA00-0BE7 6ED1 050-1AA00-0CE7 6ED1 050-1AA00-0DE7 6ED1 050-1AA00-0EE7 6ED1 050-1AA00-0KE7	LOGO! PC cable 6ED1 057-1AA00-0BA0 For program transfer between LOGO! and the PC
		LOGO! USB PC cable B9 6ED1 057-1AA01-0BA0 For transferring the program between LOGO! and PC, including driver on CD-ROM
		LOGO! modem cable 6ED1 057-1CA00-0BA0 Adapter cable for analog modem communication

B7: Subject to export regulations: AL: N and ECCN: EAR99H

B8: Subject to export regulations: AL: N and ECCN: EAR99S

B9: Subject to export regulations: AL: N and ECCN: EAR99T

LOGO! logic module

LOGO! modular

SIPLUS LOGO! modular pure versions

Overview

2



- 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.
- Ambient temperature range -40 °C to +70 °C with 3 types

	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 ... +70 °C -25 ... +55 °C (for applications with cUL approval), condensation permissible			
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere)			
Approvals	CE, cUL			
Technical data	The technical data are identical with those 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 ... +70 °C -25 ... +55 °C (for applications with cUL approval), condensation permissible		
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere)		
Approvals	CE, cUL (available soon)		
Technical data	The technical data are identical with those of the based-on modules.		

Technical specifications

	6AG1 052-2CC00-2BA5 6AG1 052-2CC00-2BY5	6AG1 052-2MD00-2BA5	6AG1 052-2HB00-2BA5 6AG1 052-2HB00-2BY5	6AG1 052-2FB00-2BA5 6AG1 052-2FB00-2BY5
Supply voltages				
Rated value				
• DC 12 V		Yes		
• DC 24 V	Yes	Yes	Yes	
• DC 115 V				Yes
• DC 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
• AC 24 V			Yes	
• AC 115 V				Yes
• AC 230 V				Yes
• permissible range, lower limit (AC)			20.4 V	85 V
• permissible range, upper limit (AC)			26.4 V	265 V

Technical specifications (continued)

	6AG1 052-2CC00-2BA5 6AG1 052-2CC00-2BY5	6AG1 052-2MD00-2BA5	6AG1 052-2HB00-2BA5 6AG1 052-2HB00-2BY5	6AG1 052-2FB00-2BA5 6AG1 052-2FB00-2BY5
Time				
Time switching clocks				
• Number		8	8	8
• Power reserve		80 Hours	80 Hours	80 Hours
Digital inputs				
Number of digital inputs	8; of which 2 can be used as analog (0...10V)	8; of which 2 can be used as analog (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
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 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				
Dimensions				
• 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

LOGO! logic module

LOGO! modular

SIPLUS LOGO! modular pure versions

2

Ordering Data

Order No.

SIPLUS LOGO! 24o

(extended temperature range and medial exposure)

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 inter-
linked, 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

(extended temperature range and medial exposure)

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 inter-
linked, modular expansion
capability

6AG1 052-2MD00-2BA5

SIPLUS LOGO! 24RCo

(extended temperature range and medial exposure)

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 inter-
linked, 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 exposure)

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 inter-
linked, modular expansion
capability

Temperature range -25 ... +70 °C

6AG1 052-2FB00-2BA5

Temperature range -40 ... +70 °C

6AG1 052-2FB00-2BY5

Accessories

LOGO! Manual

German

6ED1 050-1AA00-0AE5

English

6ED1 050-1AA00-0BE5

French

6ED1 050-1AA00-0CE5

Spanish

6ED1 050-1AA00-0DE5

Italian

6ED1 050-1AA00-0EE5

LOGO! Memory card

6ED1 056-5CA00-0BA0

For copying, with know-how
protection

LOGO!Soft Comfort V5.0

6ED1 058-0BA01-0YA0

For programming on the PC in
LAD/FBD; executes on
Windows 95 and higher, Linux,
MAC OSX; on CD-ROM

LOGO!Soft Comfort Upgrade

B8

6ED1 058-0CA01-0YE0

From V1.0 or higher to V4.0

LOGO! PC cable

6ED1 057-1AA00-0BA0

For program transfer between
LOGO! and the PC

SIPLUS LOGO! PROM

B7

6AG1 057-1AA01-0BA5

Programming device for modules

SIPLUS upmiter power supply unit

6AG1 053-1AA00-2AA0

for dependable operation of
SIPLUS devices supplied by the
battery of internal combustion
engines

B7: Subject to export regulations: AL: N and ECCN: EAR99H

B8: Subject to export regulations: AL: N and ECCN: EAR99S

Overview



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

2

Technical specifications

	6ED1 055-1CB00-0BA0	6ED1 055-1HB00-0BA0	6ED1 055-1MB00-0BA1	6ED1 055-1FB00-0BA1
Supply voltages				
Rated value				
• DC 12 V			Yes	
• DC 24 V	Yes	Yes	Yes	
• DC 115 V				Yes
• DC 230 V				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
• AC 24 V		Yes		
• AC 115 V				Yes
• AC 230 V				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 outputs	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

LOGO! logic module

LOGO! modular

LOGO! modular expansion modules

Technical specifications (continued)

	6ED1 055-1CB00-0BA0	6ED1 055-1HB00-0BA0	6ED1 055-1MB00-0BA1	6ED1 055-1FB00-0BA1
Environmental requirements				
Operating temperature				
• min.	0 °C	0 °C	0 °C	0 °C
• max.	55 °C	55 °C	55 °C	55 °C
Degree 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				
Dimensions				
• 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			
• DC 24 V	Yes	Yes	
• DC 115 V			Yes
• DC 230 V			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
• AC 115 V			Yes
• AC 230 V			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

	6ED1 055-1CB10-0BA0	6ED1 055-1NB10-0BA0	6ED1 055-1FB10-0BA0
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
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

Technical specifications (continued)

	6ED1 055-1CB10-0BA0	6ED1 055-1NB10-0BA0	6ED1 055-1FB10-0BA0
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	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
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		

	6ED1 055-1CB10-0BA0	6ED1 055-1NB10-0BA0	6ED1 055-1FB10-0BA0
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 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			
Dimensions			
• 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
• Width	72 mm; 4 TE	72 mm; 4 TE	72 mm; 4 TE
• 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		
• DC 12 V	Yes	Yes
• DC 24 V	Yes	Yes
Analog inputs		
Number of analog inputs	2	2
• Voltage	Yes	
• Current	Yes	
• Resistance thermometer		Yes

	6ED1 055-1MA00-0BA0	6ED1 055-1MD00-0BA0
Input ranges (rated values), voltages		
• 0 to +10 V	Yes	
Input ranges (rated values), currents		
• 0 to 20 mA	Yes	
Input ranges (rated values), resistance thermometers		
• Pt 100		Yes

LOGO! logic module

LOGO! modular

LOGO! modular expansion modules

Technical specifications (continued)

	6ED1 055-1MA00-0BA0	6ED1 055-1MD00-0BA0
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 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		
Dimensions		
• 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

	6ED1 055-1MM00-0BA0
Supply voltages	
Rated value	
• DC 12 V	No
• DC 24 V	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
Degree 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	
Dimensions	
• Mounting	on 35 mm DIN rail, 2 spacing units wide
• Width	36 mm
• Height	90 mm
• Depth	55 mm

Ordering Data	Order No.	Accessories	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! manual	
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	German	6ED1 050-1AA00-0AE7
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	English	6ED1 050-1AA00-0BE7
LOGO! DM8 24R 24 V AC/DC supply voltage, 4 digital inputs 24 V AC/DC, 4 relay outputs 5 A	6ED1 055-1HB00-0BA0	French	6ED1 050-1AA00-0CE7
LOGO! DM16 24R 24 V DC supply voltage, 8 digital inputs 24V DC, 8 relay outputs 5 A	6ED1 055-1NB10-0BA0	Spanish	6ED1 050-1AA00-0DE7
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	Italian	6ED1 050-1AA00-0EE7
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	Chinese	6ED1 050-1AA00-0KE7
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! memory card	6ED1 056-1DA00-0BA0
LOGO! AM2 PT 100 12/24 V DC supply voltage, 2 Pt100 analog inputs, tempe- rature range -50 °C to 200 °C	6ED1 055-1MD00-0BA0	For copying, with know-how protection	
LOGO! AM2 AQ 24 V DC supply voltage, 2 analog outputs 0 to 10 V	6ED1 055-1MM00-0BA0	LOGO!Soft Comfort V6.0 B8	6ED1 058-0BA02-0YA0
		For programming on the PC in LAD/FBD; executes on Windows 98 SE and higher, Linux, MAC OSX; on CD-ROM	
		LOGO!Soft Comfort V6.0 upgrade	6ED1 058-0CA02-0YE0
		Upgrade from V1.0 to V6.0	
		LOGO! PC cable	6ED1 057-1AA00-0BA0
		For transferring programs between LOGO! and the PC	
		LOGO! USB PC cable B9	6ED1 057-1AA01-0BA0
		For transferring the program between LOGO! and PC, including driver on CD-ROM	
		LOGO! News Box, 12/24 V	
		Contains LOGO! 12/24RC, LOGO! USB PC cable, LOGO!Soft Comfort V6.0, manual, screwdriver, information material	
		German B9	6ED1 057-3BA00-0AA5
		English B9	6ED1 057-3BA00-0BA5
		LOGO! News Box, 230 V	
		Contains LOGO! 230RC, LOGO! USB PC cable, LOGO!Soft Comfort V6.0, manual, screwdriver, information material	
		German B9	6ED1 057-3AA02-0AA0
		English B9	6ED1 057-3AA02-0BA0
		LOGO! TD News Box, 12/24 V	
		Contains LOGO! 12/24RCo, LOGO! TD, LOGO! USB PC cable, LOGO! Soft Comfort V6.0, manual, screwdriver, information material	
		German B9	6ED1 057-3BA10-0AA0
		English B9	6ED1 057-3BA10-0BA0

B8: Subject to export regulations: AL: N and ECCN: EAR99S

B9: Subject to export regulations: AL: N and ECCN: EAR99T

LOGO! logic module

LOGO! modular

SIPLUS LOGO! modular expansion modules

Overview

2



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

	SIPLUS LOGO! DM8 24	SIPLUS LOGO! DM8 12/24	SIPLUS LOGO! DM8 24R	SIPLUS LOGO! DM8 12/24R	SIPLUS LOGO! DM8 230R
Order No.	6AG1 055-1CB00-2XB0	6AG1 055-1PB00-2XB0 12/24 V DC power supply	6AG1 055-1HB00-2XB0	6AG1 055-1MB00-2XB1	6AG1 055-1FB00-2XB1
Order No. based on	6ED1 055-1CB00-0BA0	6ED1 055-1CB00-0BA0	6ED1 055-1HB00-0BA0	6ED1 055-1MB00-0BA1	6ED1 055-1FB00-0BA1
Ambient temperature range	-25 ... +70 °C -25 ... +55 °C (for applications with cUL approval), condensation permissible				
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere)				
Approvals	CE, cUL				
Technical data	The technical data are identical with those 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 ... +70 °C -40 ... +55 °C (for applications with cUL approval), condensation permissible				
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere)				
Approvals	CE, cUL (available soon)				
Technical data	The technical data are identical with those of the based-on modules.				

SIPLUS LOGO! modular expansion modules

2

Ordering Data	Order No.		Order No.
SIPLUS LOGO! DM8 24 (extended temperature range and medial exposure) 24 V DC power supply, four 24 V DC digital inputs, four 24 V DC digital outputs, 0.3 A Temperature range -25 ... +70 °C B7 Temperature range -40 ... +70 °C	6AG1 055-1CB00-2XB0 6AG1 055-1CB00-2BY0	SIPLUS LOGO! DM8 12/24R (extended temperature range and medial exposure) 12/24 V DC power supply, four 12/24 V DC digital inputs, four 5 A relay outputs Temperature range -25 ... +70 °C B7 Temperature range -40 ... +70 °C	6AG1 055-1MB00-2XB1 6AG1 055-1MB00-2BY1
SIPLUS LOGO! DM8 12/24 (extended temperature range and medial exposure) 12/24 V DC power supply, four 12/24 V DC digital inputs, four 24 V DC digital outputs, 0.3 A	6AG1 055-1PB00-2XB0	SIPLUS LOGO! DM8 230R (extended temperature range and medial exposure) 115/230 V AC/DC power supply, four 115/230 V AC/DC digital inputs, four 5 A relay outputs Temperature range -25 ... +70 °C A5 Temperature range -40 ... +70 °C	6AG1 055-1FB00-2XB1 6AG1 055-1FB00-2BY1
SIPLUS LOGO! DM8 24R (extended temperature range and medial exposure) 24 V AC/DC power supply, four 24 V AC/DC digital inputs, four 5 A relay outputs Temperature range -25 ... +70 °C A5 Temperature range -40 ... +70 °C	6AG1 055-1HB00-2XB0 6AG1 055-1HB00-2BY0	SIPLUS LOGO! AM2 (extended temperature range and medial exposure) 12/24 V DC power supply, two analog inputs 0 ... 10 V or 0 ... 20 mA, 10 bit resolution Temperature range -25 ... +70 °C B7 Temperature range -40 ... +70 °C	6AG1 055-1MA00-2XB0 6AG1 055-1MA00-2BY0
		Accessories	see LOGO! modular expansion modules, page 2/19

A5: Subject to export regulations: AL: N and ECCN: 4A994X
 B7: Subject to export regulations: AL: N and ECCN: EAR99H

LOGO! logic module

LOGO! modular

LOGO! CM EIB/KNX communication module

Overview

2



- 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 ... +55°C
RI specification	To EN 55 011 (limit class B)
Degree of protection	IP20
Certification	On DIN rail 35 mm, 2 module widths wide
Mounting	On DIN rail 35 mm, 2 module widths wide
Dimensions (W x H x D) in mm	36 (2 TE) × 90 × 55

Ordering Data

Order No.

Communications module B7 **6BK1 700-0BA00-0AA1**
LOGO! CM EIB KNX

For connecting to *EIB*, 24 V DC
 supply voltage

Accessories

LOGO! manual

German **6ED1 050-1AA00-0AE7**
 English **6ED1 050-1AA00-0BE7**
 French **6ED1 050-1AA00-0CE7**
 Spanish **6ED1 050-1AA00-0DE7**
 Italian **6ED1 050-1AA00-0EE7**
 Chinese **6ED1 050-1AA00-0KE7**

B7: Subject to export regulations: AL: N and ECCN: EAR99H

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	<table><tr><th>LED</th><th>Status</th></tr><tr><td>Green</td><td>OK</td></tr><tr><td>Red</td><td>No data traffic</td></tr><tr><td>Flashes red/yellow</td><td>Zero address</td></tr></table>	LED	Status	Green	OK	Red	No data traffic	Flashes red/yellow	Zero address
LED	Status								
Green	OK								
Red	No data traffic								
Flashes red/yellow	Zero address								

Ordering Data

Order No.

AS-Interface connection for LOGO!	B6	3RK1 400-0CE10-0AA2

B6: Subject to export regulations: AL: N and ECCN: EAR99

LOGO! logic module

LOGO!Power

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 range. A 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

	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 $V_{in \text{ rated}}$	100-240 V AC wide-range input	100-240 V AC wide-range input
Voltage range	85 ... 264 V AC	85 ... 264 V AC
Overvoltage resistance	$2.3 \times V_{in \text{ rated}}/1.3 \text{ ms}$	$2.3 \times V_{in \text{ rated}}/1.3 \text{ ms}$
Mains buffering at $I_{out \text{ rated}}$	> 40 ms at $V_{in} = 187 \text{ V}$	> 40 ms at $V_{in} = 187 \text{ V}$
Rated line frequency, rated line-frequency range	50/60 Hz; 47 ... 63 Hz	50/60 Hz; 47 ... 63 Hz
Rated current $I_{in \text{ rated}}$	0.53 ... 0.3 A	1.13 ... 0.61 A
Switch-on current limit (+25 °C)	< 15 A	< 30 A
$I^2 t$	< 0.8 A ² s	< 3 A ² s
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	Controlled, isolated DC voltage	Controlled, isolated DC voltage
Rated voltage $V_{out \text{ rated}}$	12 V DC	12 V DC
Total tolerance, static	±3 %	±3 %
• Static mains compensation	Approx. 0.2 %	Approx. 0.1 %
• Static load smoothing	Approx. 1.5 %	Approx. 1.5 %
Residual ripple	< 200 mV _{pp} (typ. 10 mV _{pp})	< 200 mV _{pp} (typ. 10 mV _{pp})
Spikes (bandwidth approx. 20 MHz)	< 300 mV _{pp} (typ. 30 mV _{pp})	< 300 mV _{pp} (typ. 40 mV _{pp})
Adjustment range	10.5 ... 16.1 V	10.5 ... 16.1 V
Status display	Green LED for output voltage OK	Green LED for output voltage OK
Response on activation/deactivation	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)

	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 to +55 °C	0 ... 1.9 A	0 ... 4.5 A
Parallel switching for enhanced performance	Yes	Yes
Efficiency		
Efficiency at $V_{\text{outrated}}, I_{\text{out rated}}$	Typ. 80 %	Typ. 85 %
Power loss at $V_{\text{outrated}}, I_{\text{out rated}}$	Typ. 5 W	Typ. 10 W
Closed-loop control		
Dyn. mains compensation ($V_{\text{out rated}} \pm 15 \%$)	< 0.2 % V_{out}	< 0.2 % V_{out}
Dyn. load smoothing ($I_{\text{out}}: 10/90/10 \%$)	Typ. $\pm 3 \%$ V_{out}	Typ. $\pm 4.2 \%$ V_{out}
Load step settling time		
• 10 to 90 %	Typ. 20 ms	Typ. 20 ms
• 90 to 10 %	Typ. 20 ms	Typ. 20 ms
Protection and monitoring		
Current limit	Typ. 2.5 A	Typ. 5.9 A
Short-circuit protection	Constant current characteristic	Constant current characteristic
Sustained short-circuit current rms value	< 4 A	< 8 A
Overload/short-circuit indicator	-	-
Safety		
Primary/secondary electrical 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
Protection class	Class II (without PE conductor)	Class II (without PE conductor)
CE marking	Yes	Yes
UL/cUL (CSA) approval	cULus-Listed (UL 508, CSA C22.2 No. 14), File E197259; cURus-Recognized (UL 60950, CSA C22.2 No. 60950), File E151273	cULus-Listed (UL 508, CSA C22.2 No. 14), File E197259; cURus-Recognized (UL 60950, CSA C22.2 No. 60950), File E151273
FM approval	Class I Div. 2, Group A, B, C, D T4	Class I Div. 2, Group A, B, C, D T4
Marine approval	GL, ABS	GL, ABS
Degree of protection (EN 60529)	IP20	IP20
EMC		
Emitted interference	EN 55022 Class B	EN 55022 Class B
Supply-harmonics limitation	Not applicable	Not applicable
Noise immunity	EN 61000-6-2	EN 61000-6-2
Operating data		
Ambient temperature range	-20 ... +55 °C with natural convection	-20 ... +55 °C with natural convection
Transport/storage temperature range	-40 ... +70 °C	-40 ... +70 °C
Humidity class	Climatic class 3K3 to EN 60721, no condensation	Climatic class 3K3 to EN 60721, no condensation
Mechanics		
Connections		
• Supply input L1, N	One screw-type terminal each for 0.5 ... 2.5 mm ² single-core/finely stranded	One screw-type terminal each for 0.5 ... 2.5 mm ² single-core/finely stranded
• Output +		
• Output -	2 screw-type terminals each for 0.5 ... 2.5 mm ²	2 screw-type terminals each for 0.5 ... 2.5 mm ²
Dimensions (W x H x D) in mm	54 x 90 x 55	72 x 90 x 55
Weight, approx.	Approx. 0.17 kg	Approx. 0.25 kg
Installation	Snaps onto DIN rail EN 60715 35x7,5/15	Snaps onto DIN rail EN 60715 35x7,5/15

LOGO! logic module

LOGO!Power

LOGO!Power

Technical specifications LOGO!Power 24 V

	24 V/1.3 A	24 V/2.5 A	24 V/4 A
Order No.	6EP1 331-1SH02	6EP1 332-1SH42	6EP1 332-1SH51
Input	Single-phase AC	Single-phase AC	Single-phase AC
Rated voltage $V_{in rated}$	100-240 V AC wide-range input	100-240 V AC wide-range input	100-240 V AC wide-range input
Voltage range	85 ... 264 V AC	85 ... 264 V AC	85 V to 264 V AC
Overvoltage resistance	$2.3 \times V_{in rated} / 1.3 \text{ ms}$	$2.3 \times V_{in rated} / 1.3 \text{ ms}$	$2.3 \times V_{in rated} / 1.3 \text{ ms}$
Mains buffering at $I_{out rated}$	> 40 ms at $V_{in} = 187 \text{ V}$	> 40 ms at $V_{in} = 187 \text{ V}$	> 40 ms at $V_{in} = 187 \text{ V}$
Rated line frequency, rated line-frequency range	50/60 Hz; 47 ... 63 Hz	50/60 Hz; 47 ... 63 Hz	50/60 Hz; 47 ... 63 Hz
Rated current $I_{in rated}$	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
$I^2 t$	< 0.8 A ² s	< 3 A ² s	< 2.5 A ² s
Built-in line-side fuse	Internal	Internal	Internal
Recommended miniature circuit breaker (IEC 898) in the mains power input	From 16 A, Characteristic B or from 10 A, Characteristic C	From 16 A, Characteristic B or from 10 A, Characteristic C	From 16 A, Characteristic B or from 10 A, Characteristic C
Output	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
Total tolerance, static	±3 %	±3 %	±3 %
• Static mains compensation	Approx. 0.1 %	Approx. 0.1 %	Approx. 0.1 %
• Static load smoothing	Approx. 1.5 %	Approx. 1.5 %	Approx. 1.5 %
Residual ripple	< 200 mV _{pp} (typ. 10 mV _{pp})	< 200 mV _{pp} (typ. 10 mV _{pp})	< 200 mV _{pp} (typ. 10 mV _{pp})
Spikes (bandwidth approx. 20 MHz)	< 300 mV _{pp} (typ. 20 mV _{pp})	< 300 mV _{pp} (typ. 40 mV _{pp})	< 300 mV _{pp} (typ. 80 mV _{pp})
Adjustment range	22.2 V to 26.4 V	22.2 V to 26.4 V	22.2 V to 26.4 V
Status display	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 V_{out} (soft start)	No overshoot of V_{out} (soft start)	No overshoot of V_{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 $I_{out rated}$	1.3 A	2.5 A	4 A
Current range to +55 °C	0 ... 1.3 A	0 ... 2.5 A	0 ... 4 A
Parallel switching for enhanced performance	Yes	Yes	Yes
Efficiency			
Efficiency at $V_{out rated}$, $I_{out rated}$	Typ. 82 %	Typ. 87 %	Typ. 89 %
Power loss at $V_{out rated}$, $I_{out rated}$	Typ. 7 W	Typ. 9 W	Typ. 12 W
Closed-loop control			
Dynamic line smoothing ($V_{in rated} \pm 15 \%$)	< 0.2 % V_{out}	< 0.2 % V_{out}	< 0.2 % V_{out}
Dynamic load smoothing (I_{out} : 10/90/10 %)	±1.5 % V_{out}	±1.5 % V_{out}	±1.5 % V_{out}
Load-step settling time			
• 10 at 90 %	Typ. 20 ms	Typ. 20 ms	Typ. 20 ms
• 90 at 10 %	Typ. 20 ms	Typ. 20 ms	Typ. 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)

	24 V/1.3 A	24 V/2.5 A	24 V/4 A
Power supply, type	6EP1 331-1SH02	6EP1 332-1SH42	6EP1 332-1SH51
Input	Single-phase AC	Single-phase AC	Single-phase AC
Safety			
Primary/secondary electrical 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	Yes, safety extra-low output voltage V_{out} to EN 60950 and EN 50178
Protection class	Class II (without protective conductor)	Class II (without protective conductor)	Class II (without protective conductor)
German Technical Inspectorate approval	Yes; CB scheme	Yes; CB scheme	Yes; CB scheme
CE marking	Yes	Yes	Yes
UL/cUL (CSA) approval	cULus-Listed (UL 508, CSA C22.2 No. 14), File E197259; cURus-Recognized (UL 60950, CSA C22.2 No. 60950), File E151273	cULus-Listed (UL 508, CSA C22.2 No. 14), File E197259; cURus-Recognized (UL 60950, CSA C22.2 No. 60950), File E151273	cULus-Listed (UL 508, CSA C22.2 No. 14), File E197259; cURus-Recognized (UL 60950, CSA C22.2 No. 60950), File E151273
FM approval	Class I Div. 2, Group A, B, C, D T4	Class I Div. 2, Group A, B, C, D T4	Class I Div. 2, Group A, B, C, D T4
Marine approval	GL, ABS	GL, ABS	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 ... +55 °C with natural convection	-20 ... +55 °C with natural convection	-20 ... +55 °C with natural convection
Transport/storage temperature range	-40 ... +70 °C	-40 ... +70 °C	-40 ... +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
Mechanics			
Supply input connections L1, N	Solid/finely-stranded per screw-type terminal for 0.5 mm ... 2.5 mm ²	Solid/finely-stranded per screw-type terminal for 0.5 mm ... 2.5 mm ²	Solid/finely-stranded per s screw-type terminal for 0.5 mm ... 2.5 mm ²
Connections			
• Output +	Per 2 screw-type terminals for 0.5 mm ... 2.5 mm ²	Per 2 screw-type terminals for 0.5 mm ... 2.5 mm ²	Per 2 screw-type terminals for 0.5 mm ... 2.5 mm ²
• Output -			
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	Approx. 0.17 kg	Approx. 0.25 kg	Approx. 0.34 kg
Installation	Snaps onto DIN rail 60715 35x7,5/15	Snaps onto DIN rail EN 60715 35x7,5/15	Snaps onto DIN rail EN 60715 35x7,5/15

Ordering Data

Ordering Data	Order No.	Ordering Data	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

LOGO! logic module

LOGO!Contact, LOGO! Software

LOGO!Contact

Overview



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

Technical specifications

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

Ordering Data

LOGO!Contact

Module for direct switching of resistive consumers up to 20 A and motors up to 4 kW

Switching voltage 24 V

Switching voltage 230 V

Order No.

6ED1 057-4CA00-0AA0

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

The connection between LOGO! and the PC is made using the LOGO! PC cable (serial interface) or the LOGO! USB PC cable (USB interface).

Minimum system requirements

Windows 98 SE, NT 4.0, ME, 2000, XP or Vista (not 64-bit)

- PC Pentium
- 90 MB free disk capacity
- 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 with Caldera OpenLinux 2.4)

- Runs on all Linux distributions on which the Java 2 SDK Version 1.3.1 runs.
- Please refer to your relevant Linux distribution for the necessary hardware requirements.

Ordering Data

LOGO!Soft Comfort V6.0

For programming on the PC in LAD/FBD; executes under Windows 98 SE and higher, Linux, MAC OSX; on CD-ROM

LOGO!Soft Comfort V6.0 upgrade

Upgrade from V1.0 to V6.0

Order No.

6ED1 058-0BA02-0YA0

6ED1 058-0CA02-0YE0

B8: Subject to export regulations: AL: N and ECCN: EAR99S

SIMATIC S7-200



3/2	Introduction
3/4 3/4	Central processing units CPU 221, CPU 222, CPU 224, CPU 224 XP, CPU 224 XPSi, CPU 226
3/20 3/20	SIPLUS Central processing units SIPLUS CPU 221, CPU 222, CPU 224, CPU 224 XP, CPU 226
3/23 3/23	Digital modules EM 221, EM 222, EM 223
3/31 3/31	SIPLUS digital modules SIPLUS EM 221, EM 222, EM 223
3/33 3/33 3/37 3/39	Analog modules EM 231, EM 232, EM 235 EM 231 thermocouple module EM 231 RTD module
3/41 3/41 3/42	SIPLUS analog modules SIPLUS EM 231, EM 232, EM 235 SIPLUS EM 231 RTD module
3/43 3/43 3/45 3/47	Function modules EM 253 positioning module SIWAREX MS SIPLUS DCF 77 radio clock module
3/48 3/48 3/49 3/50 3/51 3/52 3/54 3/56 3/58 3/59	Communication EM 241 modem EM 277 PROFIBUS DP module SIPLUS EM 277 PROFIBUS DP module CP 243-2 CP 243-1 CP 243-1 IT GSM/GPRS MD720-3 modem ANT794-4MR GSM/GPRS antenna SINAUT MICRO SC
3/60	Power supplies
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3/76 3/76 3/77	Accessories PPI cable SIPLUS cable 901

Brochures

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

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

SIMATIC S7-200

Introduction

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 extremely harsh environmental conditions
- With enhanced temperature range from -25 °C to +70 °C
- Use in environments with pollutant gases (corrosive gas atmospheres)
- Occasional short-term condensation and enhanced mechanical stress permissible
- With the proven PLC technology of the S7-200
- Easy handling, programming, maintenance and service
- Ideal for use in automobile construction, environmental technology, mining, chemical plants, conveying technology, food & beverages industry etc.
- The substitute for expensive special solutions

For more information, go to:

<http://www.siemens.com/siplus>

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

<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 - With vertical mounting - Transport and storage - with 95 % relative humidity	0 ... 55 °C 0 ... 45 °C -40 ... +70 °C 25 ... 55 °C
Isolation	
5/24 V DC circuits 115/230 V AC circuits to ground 115/230 V AC circuits to 115/230 V AC circuits 230 V AC circuits to 5/24 V DC circuits 115 V AC circuits to 5/24 V DC circuits	Test voltage 500 V AC Test voltage 1500 V AC Test voltage 1500 V AC Test voltage 1500 V AC Test voltage 1500 V AC
Electromagnetic compatibility	Requirements of EMC law
- Noise immunity to EN 50082-2 - Emitted interference according to EN 50081-1 and EN 50081-2	Tested according to: IEC 801-2, IEC 801-3, IEC 801-4, EN 50141, EN 50204, IEC 801-5, VDE 0160 Tested according to EN 55011, Class A, Group 1 and EN 55011, Class B, Group 1
Mechanical rating	
- Vibrations, tested according to/tested with - Shock, tested according to/tested with	IEC 68, Part 2-6: 10 to 57 Hz; constant amplitude 0.3 mm; 58 ... 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 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 installation: -25 °C to 70 °C vertical installation: -25 °C to 50 °C
Relative humidity	5 to 95%; short-term condensation permissible, corresponds to relative humidity (RH) load 2 according to IEC 1131-2 and IEC 721 3-3 Cl. 3K5
Short-term ice formation	-25 °C to 0 °C IEC 721 3-3 Cl. 3K5
Air pressure	1080 to 795 hPa corresponds to an altitude of -1000 to 2000 m
Contaminant concentration	SO ₂ : < 0.5 ppm; relative humidity < 60% test: 10 ppm, 4 days H ₂ S: < 0.1 ppm; relative humidity < 60% test: 1 ppm, 4 days (to IEC 721 3-3; Class 3C3)
Mechanical environmental conditions	
Vibrations	Type of vibration: Frequency sweeps with a rate of change of 1 octave/minute. 2 Hz ≤ 9 Hz, constant amplitude 3.0 mm, 9 Hz ≤ 150 Hz, constant acceleration 1 g, duration of oscillation: 10 frequency cycles per axis in each of the three mutually perpendicular axes Vibration tests according to IEC 68 Part 2-6 (sine wave) and IEC 721 3-3, Class 3M4
Shock	Type of shock: Half-sine, intensity of shock: 15 g peak value, 11 ms duration, direction: 3 shocks each in +/- direction in each of the 3 perpendicular axes Shock testing in accordance with IEC 68 Part 2-27
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	Yes ¹⁾

¹⁾ Does not apply to:
 6AG1 214-2AD23-2XB0, 6AG1 214-2BD23-2XB0,
 6AG1 232-0HB22-2XB0, 6AG1 235-0KD22-2XB0,
 6AG1 231-7PB22-2XA0, 6AG1 901-3CB30-2XA0

SIMATIC S7-200

Central processing units

CPU 221, CPU 222, CPU 224, CPU 224 XP,
CPU 224 XPSi, 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 / CPU 224 XPSi



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

SIMATIC S7-200

Central processing units

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

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

3

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
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

SIMATIC S7-200

Central processing units

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

Technical specifications (continued)

	6ES7 211-0AA23-0XB0	6ES7 211-0BA23-0XB0	6ES7 212-1AB23-0XB0	6ES7 212-1BB23-0XB0
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
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 (5 V DC) 340 mA		140 mA; 20 to 70 mA (240 V); 40 to 140 mA (120 V); output current for expansion modules (5 V DC) 340 mA
Backup battery				
• Backup time, max.	50 Hours; (min. 8 h at 40 °C); 200 days (typ.) with optional battery module	50 Hours; (min. 8 h at 40 °C); 200 days (typ.) with optional battery module	50 Hours; (min. 8 h at 40 °C); 200 days (typ.) with optional battery module	50 Hours; (min. 8 h at 40 °C); 200 days (typ.) with optional battery module
Memory				
Type of storage				
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 Kibyte	2 Kibyte	2 Kibyte	2 Kibyte
• Program memory, max.	4 Kibyte	4 Kibyte	4 Kibyte	4 Kibyte
Backup				
• present	Yes; Program: Entire program maintenance-free on integral EEPROM, programmable via CPU; data: Entire DB 1 loaded from PG/PC maintenance- free on integral EEPROM, current values of DB 1 in RAM, retentive memory bits, timers, counters, etc. maintenance-free via high- performance capacitor; optional battery for long- term buffering	Yes; Program: Entire program maintenance-free on integral EEPROM, programmable via CPU; data: Entire DB 1 loaded from PG/PC maintenance- free on integral EEPROM, current values of DB 1 in RAM, retentive memory bits, timers, counters, etc. maintenance-free via high- performance capacitor; optional battery for long- term buffering	Yes; Program: Entire program maintenance-free on integral EEPROM, programmable via CPU; data: Entire DB 1 loaded from PG/PC maintenance- free on integral EEPROM, current values of DB 1 in RAM, retentive memory bits, timers, counters, etc. maintenance-free via high- performance capacitor; optional battery for long- term buffering	Yes; Program: Entire program maintenance-free on integral EEPROM, programmable via CPU; data: Entire DB 1 loaded from PG/PC maintenance- free on integral EEPROM, current values of DB 1 in RAM, retentive memory bits, timers, 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

SIMATIC S7-200

Central processing units

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

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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				
• 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
• Time range				
- lower limit	1 ms	1 ms	1 ms	1 ms
- upper limit	54 min; 4 timers: 1 ms to 30 s; 16 timers: 10 ms to 5 min; 236 timers: 100 ms to 54 min	54 min; 4 timers: 1 ms to 30 s; 16 timers: 10 ms to 5 min; 236 timers: 100 ms to 54 min	54 min; 4 timers: 1 ms to 30 s; 16 timers: 10 ms to 5 min; 236 timers: 100 ms to 54 min	54 min; 4 timers: 1 ms to 30 s; 16 timers: 10 ms to 5 min; 236 timers: 100 ms to 54 min
Data areas and their remanence				
Flag				
• Number, max.	32 byte	32 byte	32 byte	32 byte
• Remanence available	Yes; M 0.0 to M 31.7	Yes; M 0.0 to M 31.7	Yes; M 0.0 to M 31.7	Yes; M 0.0 to M 31.7
• 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 config.				
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 can be used. Due to the limited output current, the use of expansion modules may be limited.	2; Only expansion modules of the S7-22x series can be used. Due to the limited output current, the use of expansion modules may be limited.
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			
• 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 freely programmable interface with interrupt facility for serial data exchange with third-party devices with ASCII protocol transfer rates: 1.2 / 2.4 / 4.8 / 9.6 / 19.2 / 38.4 / 57.6 / 115.2 Kbit/s; the PC/PPI cable can also be used as RS232/RS485 converter			

SIMATIC S7-200

Central processing units

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

Technical specifications (continued)

	6ES7 211-0AA23-0XB0	6ES7 211-0BA23-0XB0	6ES7 212-1AB23-0XB0	6ES7 212-1BB23-0XB0
MPI				
• Transmission speeds, max.	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
CPU/programming				
Programming language				
• LAD	Yes	Yes	Yes	Yes
• FUP	Yes	Yes	Yes	Yes
• AWL	Yes	Yes	Yes	Yes
Operational stacks	Bit logic instructions, compare instructions, timer instructions, counter instructions, clock instructions, transmissions instructions, table instructions, logic instructions, shift and rotate instructions, conversion instructions, program control instructions, interrupt and communications instructions, logic stack instructions, integer maths, floating-point math instructions, numerical functions	Bit logic instructions, compare instructions, timer instructions, counter instructions, clock instructions, transmissions instructions, table instructions, logic instructions, shift and rotate instructions, conversion instructions, program control instructions, interrupt and communications instructions, logic stack instructions, integer maths, floating-point math instructions, numerical functions	Bit logic instructions, compare instructions, timer instructions, counter instructions, clock instructions, transmissions instructions, table instructions, logic instructions, shift and rotate instructions, conversion instructions, program control instructions, interrupt and communications instructions, logic stack instructions, integer maths, floating-point math instructions, numerical functions	Bit logic instructions, compare instructions, timer instructions, counter instructions, clock instructions, transmissions instructions, table instructions, logic instructions, shift and rotate instructions, conversion instructions, program control instructions, interrupt and communications instructions, logic stack instructions, integer maths, floating-point math instructions, numerical functions
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)	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
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
m/p-reading	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
• 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 "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; I 0.0 to I 0.3	Yes; I 0.0 to I 0.3	Yes; I 0.0 to I 0.3	Yes; I 0.0 to I 0.3
• 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
Cable length				
• cable length, shielded, max.	500 m; Standard input: 500 m, high-speed counters: 50 m	500 m; Standard input: 500 m, high-speed counters: 50 m	500 m; Standard input: 500 m, high-speed counters: 50 m	500 m; Standard input: 500 m, high-speed counters: 50 m
• 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

SIMATIC S7-200

Central processing units

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

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Technical specifications (continued)

	6ES7 211-0AA23-0XB0	6ES7 211-0BA23-0XB0	6ES7 212-1AB23-0XB0	6ES7 212-1BB23-0XB0
Digital outputs				
Number of digital outputs	4; Transistor	4; Relay	6; Transistor	4; Relay
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	30 W DC; 200 W AC	5 W	30 W DC; 200 W AC
Output voltage				
• for signal "1", min.	20 V DC	L+ / L1	DC 20 V	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. (Q0.2 to Q0.3) 15 µs; of the pulse outputs, max. (Q0.0 to Q0.1) 2 µs	10 ms; all outputs	15 µs; of the standard outputs, max. (Q0.2 to Q0.5) 15 µs; of the pulse outputs, max. (Q0.0 to Q0.1) 2 µs	10 ms; all outputs
• "1" to "0", max.	130 µs; of the standard outputs, max. (Q0.2 to Q0.3) 100 µs; of the pulse outputs, max. (Q0.0 to Q0.1) 10 µs	10 ms; all outputs	130 µs; of the standard outputs, max. (Q0.2 to Q0.5) 100 µs; of the pulse outputs, max. (Q0.0 to Q0.1) 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; Q 0.0 to Q 0.1		20 kHz; Q 0.0 to Q 0.1	
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
• cable length, shielded, max.	500 m	500 m	500 m	500 m
• Cable length unshielded, max.	150 m	150 m	150 m	150 m
Relay outputs				
Number of operating cycles		1E7; mechanically 10 million, at rated load voltage 100,000		1E7; 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	Yes; permissible range: 15.4 to 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 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

SIMATIC S7-200

Central processing units

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

Technical specifications (continued)

	6ES7 211-0AA23-0XB0	6ES7 211-0BA23-0XB0	6ES7 212-1AB23-0XB0	6ES7 212-1BB23-0XB0
Encoder				
Connectable encoders				
• 2-wire BEROs - permissible quiescent current (2-wire BEROs), max.	Yes 1 mA	Yes 1 mA	Yes 1 mA	Yes 1 mA
Integrated Functions				
Number of counters	4; High-speed counters (30 kHz each), 32 bits (incl. sign), can be used as up/down counters or for connecting 2 incremental encoders with 2 pulse trains offset by 90° (max. 20 kHz (A/B counters)); parameterizable enable and reset input; interrupt facilities (incl. call of subroutine with any content) when the setpoint is reached; reversal in 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			
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	
Limit frequency (pulse)	20 kHz		20 kHz	
Isolation				
Galvanic isolation, digital inputs				
• between the channels • between the channels, in groups of	Yes 2 and 4	Yes 2 and 4	Yes 4	Yes 4
Isolation, digital outputs				
• between the channels • between the channels, in groups of	Yes; Optocoupler 4	Yes; Relay 1 and 3	Yes; Optocoupler 6	Yes; Relay 3
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"			
Operating temperature				
• 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%			
• Operation, max.	95%; RH class 2 in accordance with IEC 1131-2			
Degree of protection				
IP20	Yes	Yes	Yes	Yes
Dimensions				
Dimensions				
• 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

SIMATIC S7-200

Central processing units

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

Technical specifications (continued)

	6ES7 214-1AD23-0XB0	6ES7 214-1BD23-0XB0	6ES7 214-2AD23-0XB0	6ES7 214-2BD23-0XB0	6ES7 214-2AS23-0XB0	6ES7 216-2AD23-0XB0	6ES7 216-2BD23-0XB0
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	
• 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
Load voltage L+							
• Rated value (DC)	24 V	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	20.4 V	5 V
• permissible range, upper limit (DC)	28.8 V	30 V	28.8 V	30 V	28.8 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			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	12 A; at 28.8 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		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 (5 V DC) 600 mA		220 mA; 35 to 100 mA (240 V); 70 to 220 mA (120 V); output current for expansion modules (5 V DC) 600 mA			320 mA; 40 to 160 mA (240 V); 80 to 320 mA (120 V); output current for expansion modules (5 V DC) 1000 mA

SIMATIC S7-200

Central processing units

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

Technical specifications (continued)

	6ES7 214-1AD23-0XB0	6ES7 214-1BD23-0XB0	6ES7 214-2AD23-0XB0	6ES7 214-2BD23-0XB0	6ES7 214-2AS23-0XB0	6ES7 216-2AD23-0XB0	6ES7 216-2BD23-0XB0
Backup battery							
• Backup time, max.	100 Hours; (min. 70 h at 40 °C); 200 days (typ.) with optional battery module						
Memory							
Type of storage							
Number of memory modules (optional)	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 Kibyte	8 Kibyte	10 Kibyte	10 Kibyte	10 Kibyte	10 Kibyte	10 Kibyte
• Program memory, max.	12 Kibyte; 8 KB on active run-time edit	12 Kibyte; 8 KB on active run-time edit	16 Kibyte; 12 KB for active run-time edit	16 Kibyte; 12 KB for active run-time edit	16 Kibyte; 12 KB for active run-time edit	24 Kibyte; 16 KB with active run-time edit	24 Kibyte; 16 KB with active run-time edit
Backup							
• present	Yes; Program: Entire program maintenance-free on integral EEPROM, programmable via CPU; data: Entire DB 1 loaded from PG/PC maintenance-free on integral EEPROM, current values of DB 1 in RAM, retentive memory bits, timers, 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	0.22 µs
Times/counters and their remanence							
S7 counter							
• Number	256	256	256	256	256	256	256
• of which remanent with battery							
- adjustable	Yes; via high-performance capacitor or battery						
- lower limit	1						
- upper limit	256						
• Counting range							
- lower limit	0	0	0	0	0	0	0
- upper limit	32 767	32 767	32 767	32 767	32 767	32 767	32 767
S7 times							
• Number	256	256	256	256	256	256	256
• of which remanent with battery							
- adjustable	Yes; via high-performance capacitor or battery						
- upper limit	64						
• Time range							
- lower limit	1 ms						
- upper limit	54 min; 4 timers: 1 ms to 30 s; 16 timers: 10 ms to 5 min; 236 timers: 100 ms to 54 min						
Data areas and their remanence							
Flag							
• Number, max.	32 byte						
• Remanence available	Yes; M 0.0 to M 31.7						
• of which remanent with battery	0 to 255, via high-performance capacitor or battery, adjustable						
• of which remanent without battery	0 to 112 in EEPROM, adjustable						
Hardware config.							
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	SIMATIC PG/PC, standard PC
Expansion devices, max.	7; Only expansion modules of the S7-22x series can be used. Due to the limited output current, the use of expansion modules may be limited.						

SIMATIC S7-200

Central processing units

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

Technical specifications (continued)

	6ES7 214-1AD23-0XB0	6ES7 214-1BD23-0XB0	6ES7 214-2AD23-0XB0	6ES7 214-2BD23-0XB0	6ES7 214-2AS23-0XB0	6ES7 216-2AD23-0XB0	6ES7 216-2BD23-0XB0
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; 2 onboard inputs and 1 output, also max. 28 inputs and 7 outputs (EM) or max. 0 inputs and 14 outputs (EM)	38; 2 onboard inputs and 1 output, also max. 28 inputs and 7 outputs (EM) or max. 0 inputs and 14 outputs (EM)	38; 2 onboard inputs and 1 output, also 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)	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)	62; AS-Interface A/B slaves (CP 243-2)
Connection point							
pluggable I/O terminals	Yes	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	Integral RS 485 interface
Physics	RS 485	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 freely programmable interface with interrupt facility for serial data exchange with third-party devices with ASCII protocol transfer rates: 1.2 / 2.4 / 4.8 / 9.6 / 19.2 / 38.4 / 57.6 / 115.2 Kbit/s; the PC/PPI cable can also be used as RS232/RS485 converter						
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	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	19.2 kBit/s
2nd interface							
Type of 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
Functionality							
• MPI	Yes; as MPI slave for data exchange with MPI masters (S7-300/S7-400-CPU's, 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: 1.2/2.4/4.8/9.6/19.2/38.4/57.6/115.2 kbit/s; the PC/PPI cable can be used as an RS232/RS485 converter						

SIMATIC S7-200

Central processing units

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

Technical specifications (continued)

	6ES7 214-1AD23-0XB0	6ES7 214-1BD23-0XB0	6ES7 214-2AD23-0XB0	6ES7 214-2BD23-0XB0	6ES7 214-2AS23-0XB0	6ES7 216-2AD23-0XB0	6ES7 216-2BD23-0XB0
MPI							
• Transmission speed, max.			187.5 kBit/s	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	19.2 kBit/s
CPU/programming							
Programming language							
• LAD	Yes	Yes	Yes	Yes	Yes	Yes	Yes
• FUP	Yes	Yes	Yes	Yes	Yes	Yes	Yes
• AWL	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Operational stacks	Bit logic instructions, compare instructions, timer instructions, counter instructions, clock instructions, transmissions instructions, table instructions, logic instructions, shift and rotate instructions, conversion instructions, program control instructions, interrupt and communications instructions, logic stack instructions, integer maths, floating-point math instructions, numerical functions						
User program protection/password protection	Yes; 3-stage password protection						
Program processing	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						
Number of subroutines, max.	64	64	64	64	64	64	64
Digital inputs							
Number of digital inputs	14	14	14	14	14	24	24
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	Yes; optionally, per group
Input voltage							
• Rated value, DC	24 V	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 1 V (I 0.3 to I 0.5)	0 to 5 V; 0 to 1 V (I 0.3 to I 0.5)	0 to 5 V; 0 to 1 V (I 0.3 to I 0.5)	0 to 5 V	0 to 5 V
• for signal "1"	min. 15 V	min. 15 V	min. 15 V; min. 4 V (I 0.3 to I 0.5)	min. 15 V; min. 4 V (I 0.3 to I 0.5)	min. 15 V; min. 4 V (I 0.3 to I 0.5)	min. 15 V	min. 15 V
Input current							
• for signal "1", typ.	2.5 mA	2.5 mA	2.5 mA; 8 mA for I 0.3 to I 0.5	2.5 mA; 8 mA for I 0.3 to I 0.5	2.5 mA; 8 mA for I 0.3 to I 0.5	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	Yes; all
- at "1", min.	0.2 ms	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	12.8 ms
• for interrupt inputs							
- programmable	Yes; I 0.0 to I 0.3	Yes; I 0.0 to I 0.3	Yes; I 0.0 to I 0.3	Yes; I 0.0 to I 0.3	Yes; I 0.0 to I 0.3	Yes; I 0.0 to I 0.3	Yes; I 0.0 to I 0.3
• 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) up to 200 kHz	Yes; (E0.0 to E1.5) 30 kHz	Yes; (E0.0 to E1.5) 30 kHz
Cable length							
• cable length, shielded, max.	500 m; Standard input: 500 m, high-speed counters: 50 m						
• cable length unshielded, max.	300 m; not for high-speed signals						

SIMATIC S7-200

Central processing units

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

Technical specifications (continued)

	6ES7 214-1AD23-0XB0	6ES7 214-1BD23-0XB0	6ES7 214-2AD23-0XB0	6ES7 214-2BD23-0XB0	6ES7 214-2AS23-0XB0	6ES7 216-2AD23-0XB0	6ES7 216-2BD23-0XB0
Digital outputs							
Number of digital outputs	10; Transistor	10; Relay	10; Transistor	10; Relay	10; Transistor current sinking	16; Transistor	16; Relay
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	No; to be provided externally
Limitation of inductive shutdown voltage to	1 W		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	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	5 W	200 W; 30 W DC; 200 W AC
Output voltage							
• for signal "1", min.	20 V DC	L+/L1	L+ (-0.4 V (5 V / 20.4 V for A 0.0 to A 0.4; 20.4 V A 0.5 to A 1.1))	L+/L1	1M -0.4 V	20 VDC	L+/L1
Output current							
• for signal "1" rated value	750 mA	2 A	750 mA	2 A	750 mA	750 mA	2 A
• for signal "0" residual current, max.	10 µA	0 mA	10 µA	0 mA	10 µA	10 µA	0 mA
Output delay with resistive load							
• "0" to "1", max.	15 µs; of the standard outputs, max. (Q0.2 to Q1.1) 2 µs; of the pulse outputs, max. (Q0.0 to Q0.1) 2 µs	10 ms; all outputs	15 µs; of the standard outputs, max. (Q0.2 to Q1.1) 15 µs; of the pulse outputs, max. (Q0.0 to Q0.1) 0.5 µs	10 ms; all outputs	15 µs; of the standard outputs, max. (Q0.2 to Q1.1) 15 µs; of the pulse outputs, max. (Q0.0 to Q0.1) 0.5 µs	15 µs; of the standard outputs, max. (Q0.2 to Q1.1) 2 µs; of the pulse outputs, max. (Q0.0 to Q0.1) 2 µs	10 ms; all outputs
• "1" to "0", max.	130 µs; of the standard outputs, max. (Q0.2 to Q1.1) 10 µs; of the pulse outputs, max. (Q0.0 to Q0.1) 10 µs	10 ms; all outputs	130 µs; of the standard outputs, max. (Q0.2 to Q1.1) 130 µs; of the pulse outputs, max. (Q0.0 to Q0.1) 1.5 µs	10 ms; all outputs	130 µs; of the standard outputs, max. (Q0.2 to Q1.1) 130 µs; of the pulse outputs, max. (Q0.0 to Q0.1) 1.5 µs	130 µs; of the standard outputs, max. (Q0.2 to Q1.1) 10 µs; of the pulse outputs, max. (Q0.0 to Q0.1) 10 µs	10 ms; all outputs
Parallel switching of 2 outputs							
• for increased power	Yes	No	Yes	No	Yes	Yes	No
Switching frequency							
• of the pulse outputs, with resistive load, max.	20 kHz; Q 0.0 to Q 0.1	1 Hz	100 kHz; Q 0.0 to Q 0.1	1 Hz	100 kHz; Q 0.0 to Q 0.1	20 kHz; Q 0.0 to Q 0.1	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	3.75 A	6 A	10 A
• up to 40 °C, max.	6 A	10 A	3,75 A	10 A	3.75 A	6 A	10 A
• cable length, shielded, max.	500 m	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	150 m

SIMATIC S7-200

Central processing units

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

Technical specifications (continued)

	6ES7 214-1AD23-0XB0	6ES7 214-1BD23-0XB0	6ES7 214-2AD23-0XB0	6ES7 214-2BD23-0XB0	6ES7 214-2AS23-0XB0	6ES7 216-2AD23-0XB0	6ES7 216-2BD23-0XB0
Relay outputs							
Number of operating cycles		1E7; mechanically 10 million, at rated load voltage 100,000		1E7; mechanically 10 million, at rated load voltage 100,000			1E7; mechanically 10 million, at rated load voltage 100,000
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	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: 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 280 mA	Yes; electronic at 400 mA	Yes; electronic at 400 mA
• Output current, max.	280 mA	280 mA	280 mA	280 mA	280 mA	400 mA	400 mA
Encoder							
Connectable encoders							
• 2-wire BEROs - permissible quiescent current (2-wire BEROs), max.	Yes 1 mA	Yes 1 mA	Yes 1 mA	Yes 1 mA	Yes 1 mA	Yes 1 mA	Yes 1 mA
Integrated Functions							
Number of counters	6; High-speed counters (30 kHz each), 32 bits (incl. sign), can be used as up/down counters or for connecting 2 incremental encoders with 2 pulse trains offset by 90° (max. 20 kHz (A/B counters)); parameterizable enable and reset input; interrupt facilities (incl. call of subroutine with any content) when the setpoint is reached; reversal in counting direction, etc.	6; High-speed counters (30 kHz each), 32 bits (incl. sign), can be used as up/down counters or for connecting 2 incremental encoders with 2 pulse trains offset by 90° (max. 20 kHz (A/B counters)); parameterizable enable and reset input; interrupt facilities (incl. call of subroutine with any content) when the setpoint is reached; reversal in counting direction, etc.	6; High-speed counters (2 to 200 kHz and 4 to 30 kHz), 32 bits (incl. sign), can be used as up/down counters or for connecting 2 incremental encoders with 2 pulse trains offset by 90° (max. 1 to 100 kHz and 3 to 20 kHz (A/B counters)); parameterizable enable and reset input; interrupt facilities (incl. call of subroutine with any content) when the setpoint is reached; reversal in counting direction, etc.	6; High-speed counters (2 to 200 kHz and 4 to 30 kHz), 32 bits (incl. sign), can be used as up/down counters or for connecting 2 incremental encoders with 2 pulse trains offset by 90° (max. 1 to 100 kHz and 3 to 20 kHz (A/B counters)); parameterizable enable and reset input; interrupt facilities (incl. call of subroutine with any content) when the setpoint is reached; reversal in counting direction, etc.	6; High-speed counters (2 to 200 kHz and 4 to 30 kHz), 32 bits (incl. sign), can be used as up/down counters or for connecting 2 incremental encoders with 2 pulse trains offset by 90° (max. 1 to 100 kHz and 3 to 20 kHz (A/B counters)); parameterizable enable and reset input; interrupt facilities (incl. call of subroutine with any content) when the setpoint is reached; reversal in counting direction, etc.	6; High-speed counters (30 kHz each), 32 bits (incl. sign), can be used as up/down counters or for connecting 2 incremental encoders with 2 pulse trains offset by 90° (max. 20 kHz (A/B counters)); parameterizable enable and reset input; interrupt facilities (incl. call of subroutine with any content) when the setpoint is reached; reversal in counting direction, etc.	6; High-speed counters (30 kHz each), 32 bits (incl. sign), can be used as up/down counters or for connecting 2 incremental encoders with 2 pulse trains offset by 90° (max. 20 kHz (A/B counters)); parameterizable enable and reset input; interrupt facilities (incl. call of subroutine with any content) when the setpoint is reached; reversal in counting direction, etc.
Counter frequency (counter) max.	30 kHz	30 kHz	200 kHz	200 kHz	200 kHz	30 kHz	30 kHz

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Central processing units

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

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Technical specifications (continued)

	6ES7 214-1AD23-0XB0	6ES7 214-1BD23-0XB0	6ES7 214-2AD23-0XB0	6ES7 214-2BD23-0XB0	6ES7 214-2AS23-0XB0	6ES7 216-2AD23-0XB0	6ES7 216-2BD23-0XB0
Number of alarm inputs	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							
Galvanic isolation, digital inputs							
• between the channels	Yes	Yes	Yes	Yes	Yes	Yes	Yes; Optocoupler
• between the channels, in groups of	6 and 8	6 and 8	6 and 8	6 and 8	6 and 8	13 and 11	13 and 11
Isolation, digital outputs							
• between the channels	Yes; Optocoupler	Yes; Relay	Yes; Optocoupler	Yes; Relay	Yes; Optocoupler	Yes; Optocoupler	Yes; Relay
• between the channels, in groups of	5	3 and 4	5	3 and 4	10	8 and 8	4, 5 and 7
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	500 V DC between 24 V DC and 5 V DC
Environmental requirements							
Environmental conditions	For further environmental conditions, see "Automation System S7-200, System Manual"						
Operating temperature							
• vertical installation, min.	0 °C	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	45 °C
• horizontal installation, min.	0 °C	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	55 °C
Air pressure							
• permissible range, min.	860 hPa	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	1 080 hPa
Relative humidity							
• Operation, min.	5%						
• Operation, max.	95%; RH class 2 in accordance with IEC 1131-2						
Degree of protection							
IP 20	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dimensions							
Dimensions							
• Width	120,5 mm	120,5 mm	140 mm	140 mm	140 mm	196 mm	196 mm
• Height	80 mm	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	62 mm
Weights							
• Weight, approx.	360 g	410 g	390 g	440 g	390 g	550 g	660 g

SIMATIC S7-200

Central processing units

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

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Ordering Data	Order No.	Order No.
CPU 221 Compact CPU, main memory 4 KB, power supply 24 V DC, 6 DI/4 DO integrated Compact CPU, main memory 4 KB, power supply 100 V to 230 V AC, 6 DI/4 DO integrated, relay outputs	6ES7 211-0AA23-0XB0 6ES7 211-0BA23-0XB0	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 B9 6ES7 298-0AA20-0AA3 English B9 6ES7 298-0AA20-0BA3
CPU 222 Compact CPU, expandable, main memory 4 KB, power supply 24 V DC, 8 DI/6 DO integrated Compact CPU, expandable, main memory 4 KB, power supply 100 V to 230 V AC, 8 DI/6 DO integrated, relay outputs	6ES7 212-1AB23-0XB0 6ES7 212-1BB23-0XB0	MC 291 memory module, EEPROM for CPU 221/222//224/224 XP/226 64 KB 6ES7 291-8GF23-0XA0 256 KB 6ES7 291-8GH23-0XA0
CPU 224 Compact CPU, expandable, main memory 8/12 KB program, 8 KB data, power supply 24 V DC, 14 DI/10 DO integrated 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	6ES7 214-1AD23-0XB0 6ES7 214-1BD23-0XB0	Ground terminal 10 units 6ES5 728-8MA11
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 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	6ES7 214-2AD23-0XB0 6ES7 214-2BD23-0XB0	Front flap set contains various cover flaps for CPUs and EMs; spare part 6ES7 291-3AX20-0XA0
CPU 224 XPsi Compact CPU, with current-sinking outputs, expandable, main memory 12/16 KB program, 10 KB data, power supply 24 V DC, 14 DI/10 DO/ 2 AI/1 AO integrated	6ES7 214-2AS23-0XB0	SIM 274 simulator (optional) with 8 terminals for CPU 221/222 6ES7 274-1XF00-0XA0 with 14 terminals for CPU 224/224 XP 6ES7 274-1XH00-0XA0 with 24 terminals for CPU 226 6ES7 274-1XK00-0XA0
CPU 226 Compact CPU, expandable, main memory 16/24 KB program, 10 KB data, power supply 24 V DC, 24 DI/16 DO integrated 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	6ES7 216-2AD23-0XB0 6ES7 216-2BD23-0XB0	Pluggable terminal block (spare part) With 12 terminals (for CPU 22x) B7 6ES7 292-1AE20-0AA0 With 18 terminals (for CPU 224/224 XP) B7 6ES7 292-1AG20-0AA0 With 14 terminals (for CPU 226) B7 6ES7 292-1AF20-0AA0
		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 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 6ES7 901-3DB30-0XA0
		MPI cable 5 m; for connecting the S7-200 to MPI 6ES7 901-0BF00-0AA0
		Backplane bus expansion cable B7 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 6ES7 291-8BA20-0XA0
		Optional combined clock and battery module 6ES7 297-1AA23-0XA0 only for CPU 221/222

B7: Subject to export regulations: AL: N and ECCN: EAR99H

B9: Subject to export regulations: AL: N and ECCN: EAR99T

SIMATIC S7-200

Central processing units

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

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Ordering Data (continued)		Order No.	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	B3	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	B3	6ES7 998-8XC01-8YE2	
Current "Manual Collection" DVD and the three subsequent updates			
STEP 7-Micro/WIN V4 programming software			
<i>Target system:</i> All CPUs of the SIMATIC S7-200			
<i>Prerequisite:</i> Windows 2000/XP on programming device or PC			
<i>Type of delivery:</i> German, English, French, Spanish, Italian, Chinese; with online documentation			
Single license	B8	6ES7 810-2CC03-0YX0	
Upgrade Single License ¹⁾	B8	6ES7 810-2CC03-0YX3	
PROFIBUS bus connector, IP20 with 90° cable outlet			
• Without PG connection		6ES7 972-0BA12-0XA0	
• With PG connection		6ES7 972-0BB12-0XA0	
PROFIBUS bus connector, IP20 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	

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

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

B8: Subject to export regulations: AL: N and ECCN: EAR99S

SIMATIC S7-200

SIPLUS Central processing units

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

Overview SIPLUS CPU 221



- The clever compact solution
- With 10 input/outputs on board
- Cannot be expanded

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 ... +70 °C; -25 to +55 °C (for applications with cUL approval), condensation permissible	
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere).	
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	Yes	Yes
Approvals	CE, cUL	
Technical specifications	The technical data are identical with those of the based-on modules.	

Overview SIPLUS CPU 222



- The superior compact solution
- With 14 input/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 ... +70 °C; -25 to +55 °C (for applications with cUL approval), condensation permissible	
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere).	
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	Yes	Yes
Approvals	CE, cUL	
Technical specifications	The technical data are identical with those of the based-on modules.	

SIMATIC S7-200

SIPLUS Central processing units

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

Overview SIPLUS CPU 224



- The compact high-performance CPU
- With 24 input/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 ... +70 °C; -25 to +55 °C (for applications with cUL approval), condensation permissible	
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere).	
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	Yes	Yes
Approvals	CE, cUL	
Technical specifications	The technical data are identical with those of the based-on modules.	

Overview SIPLUS CPU 224 XP



- The power CPU
- With 24 digital and 3 analog I/Os 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 ... +70 °C; condensation permitted	
Ambient conditions	Suited for exceptional medial exposure (e. g. by chlorine sulfur atmosphere).	
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	No	No
Certifications and approvals	CE	
Technical data	The technical data are identical with those of the based on modules.	

SIMATIC S7-200

SIPLUS Central processing units

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

Overview SIPLUS CPU 226



- The power packet for larger technical tasks
- With additional PPI connection for even more flexibility and communication facilities
- With 40 input/outputs on board
- Expandable with up to 7 expansion modules

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 ... +70 °C; -25 to +55 °C (for applications with cUL approval), condensation permissible	
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere).	
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	Yes	Yes
Approvals	CE, cUL	
Technical specifications	The technical data are identical with those of the based-on modules.	

Ordering Data

Order No.		Order No.	
SIPLUS CPU 221 (extended temperature and media exposure)		SIPLUS CPU 224 XP (extended temperature and media exposure)	
Compact CPU, main memory 4 KB, power supply 24 V DC, 6 DI/4 DO integrated	B7 6AG1 211-0AA23-2XB0	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, main memory 4 KB, power supply 100 to 230 V AC, 6 DI/4 DO integrated, relay outputs	B7 6AG1 211-0BA23-2XB0	Compact CPU, expandable, main memory 12 KB program, 8 KB data, power supply 100 to 230 V AC, 14 DI/10 DO (relay outputs)/2 AI/1 AO integrated	B7 6AG1 214-2BD23-2XB0
SIPLUS CPU 222 (extended temperature and media exposure)		SIPLUS CPU 226 (extended temperature and media exposure)	
Compact CPU, expandable, main memory 4 KB, power supply 24 V DC, 8 DI/6 DO integrated	B7 6AG1 212-1AB23-2XB0	Compact CPU, expandable, main memory 16/24 KB program, 10 KB data, power supply 24 V DC, 24 DI/16 DO integrated	B7 6AG1 216-2AD23-2XB0
Compact CPU, expandable, main memory 4 KB, power supply 100 to 230 V AC, 8 DI/6 DO integrated, relay outputs	B7 6AG1 212-1BB23-2XB0	Compact CPU, expandable, main memory 16/24 KB program, 10 KB data, power supply 100 to 230 V AC, 24 DI/16 DO integrated, relay outputs	B7 6AG1 216-2BD23-2XB0
SIPLUS CPU 224 (extended temperature and media exposure)		Accessories	
Compact CPU, expandable, main memory 8 KB, power supply 24 V DC, 14 DI/10 DO integrated	B7 6AG1 214-1AD23-2XB0	see SIMATIC S7-200 central processing units, page 3/18	
Compact CPU, expandable, main memory 8 KB, power supply 100 to 230 V AC, 14 DI/10 DO integrated, relay outputs	B7 6AG1 214-1BD23-2XB0		

B7: Subject to export regulations: AL: N and ECCN: EAR99H

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

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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
Current consumption/power loss			
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
m/p-reading	Yes	Yes	
Input characteristic curve to IEC 1131, type 1	Yes		Yes
Input voltage			
• Rated value, AC			230 V; 220/230 V AC (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
Cable length			
• cable length, shielded, max.	500 m	500 m	500 m
• cable length unshielded, max.	300 m	300 m	300 m
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; Optocoupler	Yes; Optocoupler	Yes; Optocoupler
• between the channels, in groups of	4	4	1; (8 groups)

SIMATIC S7-200

Digital modules

EM 221, EM 222, EM 223

Technical specifications EM 221 (continued)

	6ES7 221-1BH22-0XA0	6ES7 221-1BF22-0XA0	6ES7 221-1EF22-0XA0
Dimensions			
Dimensions			
• 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
Supply voltages		
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 backplane bus DC 5 V, max.	40 mA	50 mA
Current consumption/power loss		
Power loss, typ.	3 W	2 W
Connection point		
pluggable I/O terminals	Yes	Yes
Digital outputs		
Number of digital outputs	4	8
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.	20 V DC	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
• cable length, shielded, max.	500 m	500 m
• cable length unshielded, max.	150 m	150 m
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; Optocoupler
• between the channels, in groups of	1	4

Technical specifications EM 222 (continued)

	6ES7 222-1BD22-0XA0	6ES7 222-1BF22-0XA0
Dimensions		
Dimensions		
• 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
Supply voltages			
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			
from backplane bus DC 5 V, max.	30 mA	40 mA	110 mA
Digital outputs			
• from load voltage L+, max.	80 mA; 20 mA per switched output	72 mA; 9 mA per switched output	
Current consumption/power loss			
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
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 S7-00")
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
• cable length, shielded, max.	500 m	500 m	500 m
• cable length unshielded, max.	150 m	150 m	150 m

SIMATIC S7-200

Digital modules

EM 221, EM 222, EM 223

Technical specifications EM 222 (continued)

	6ES7 222-1HD22-0XA0	6ES7 222-1HF22-0XA0	6ES7 222-1EF22-0XA0
Relay outputs			
Number of operating cycles	3E7; mechanically 30 million, at rated load voltage 30,000	1E7; mechanically 10 million, at rated load voltage 100,000	
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 W DC; 200 W AC	60 W
• with resistive load, max.	10 A	2 A	0,5 A
Isolation			
Isolation, digital outputs			
• Galvanic isolation, digital outputs	Yes; Relay	Yes; Relay	Yes; Optocoupler
• between the channels, in groups of	1; 4 groups	4	1; 8 groups
Dimensions			
Dimensions			
• 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	6ES7 223-1BM22-0XA0
Supply voltages				
Load voltage L+				
• Rated value (DC)	24 V	24 V	24 V	24 V
• 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
Current consumption				
from backplane bus DC 5 V, max.	40 mA	80 mA	160 mA	240 mA
from sensor current supply or external current supply (DC 24 V), max.				128 mA; ON: 4 mA/input
Current consumption/power loss				
Power loss, typ.	2 W	3 W	6 W	9 W
Connection point				
pluggable I/O terminals	Yes	Yes	Yes	Yes
Digital inputs				
Number of digital inputs	4	8	16	32
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"	15 to 30 V DC	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	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	4.5 ms

Technical specifications EM 223 (continued)

	6ES7 223-1BF22-0XA0	6ES7 223-1BH22-0XA0	6ES7 223-1BL22-0XA0	6ES7 223-1BM22-0XA0
Digital outputs				
Number of digital outputs	4	8	16	32
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	L+ (-48 V)	L+ (-48 V)	L+ (-48 V)	L+ (-48 V)
Output voltage				
• for signal "0" (DC), max.	0.1 V	0.1 V	0.1 V	0.1 V
• for signal "1", min.	20 V	20 V	20 V	20 V
Output current				
• for signal "1" rated value	750 mA	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	0.75 A; 10 A per group
• cable length, shielded, max.	500 m	500 m	500 m	500 m
• cable length unshielded, max.	150 m	150 m	150 m	150 m
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	0.75 A; each output
• on lamp load, max.	5 W	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	0.75 A; each output
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
Isolation				
Isolation checked with	500 V AC	500 V AC	500 V AC	500 V AC
Isolation				
Galvanic isolation, digital inputs				
• galvanic isolation, digital inputs	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler
• between the channels, in groups of	4	4	4	16; 2 groups with 16 inputs each
Isolation, digital outputs				
• Galvanic isolation, digital outputs	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler
• between the channels, in groups of	4	4	4; 4 / 4 / 8	16; 2 groups with 16 outputs each
Dimensions				
Dimensions				
• Width	46 mm	71.2 mm	137.5 mm	196 mm
• Height	80 mm	80 mm	80 mm	80 mm
• Depth	62 mm	62 mm	62 mm	62 mm
Weights				
• Weight, approx.	160 g	200 g	360 g	500 g

SIMATIC S7-200

Digital modules

EM 221, EM 222, EM 223

Technical specifications EM 223 (continued)

	6ES7 223-1HF22-0XA0	6ES7 223-1PH22-0XA0	6ES7 223-1PL22-0XA0	6ES7 223-1PM22-0XA0
Supply voltages				
Load voltage L+				
• Rated value (DC)	24 V	24 V	24 V	24 V
• permissible range, lower limit (DC)	5 V	5 V	5 V	5 V
• permissible range, upper limit (DC)	30 V	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	230 V; 24 to 230 V AC
• permissible range, lower limit (AC)	5 V	5 V	5 V	5 V
• permissible range, upper limit (AC)	250 V	250 V	250 V	250 V
Current consumption				
from backplane bus DC 5 V, max.	40 mA	80 mA	150 mA	205 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"	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	128 mA
Current consumption/power loss				
Power loss, typ.	2 W	3 W	6 W	13 W
Connection point				
pluggable I/O terminals	Yes	Yes	Yes	Yes
Digital inputs				
Number of digital inputs	4	8	16	32
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"	15 to 30 V DC	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	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	4.5 ms
Digital outputs				
Number of digital outputs	4; Relay	8; Relay	16; Relay	32; Relay
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
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	0.1 V; with 10 kOhm load
• for signal "1", min.	L+/L1	L+/L1	L+/L1	L+/L1
Output current				
• for signal "1" rated value	2 000 mA	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	2 A; 10 A per group
• cable length, shielded, max.	500 m	500 m	500 m	500 m
• cable length unshielded, max.	150 m	150 m	150 m	150 m

Technical specifications EM 223 (continued)

	6ES7 223-1HF22-0XA0	6ES7 223-1PH22-0XA0	6ES7 223-1PL22-0XA0	6ES7 223-1PM22-0XA0
Relay outputs				
Number of operating cycles	1E7; mechanically 10 million, at rated load voltage 100,00	1E7; mechanically 10 million, at rated load voltage 100,000	1E7; mechanically 10 million, at rated load voltage 100,000	1E7; 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	0.75 A; each output
• on lamp load, max.	200 W; 30 W DC; 200 W AC	200 W; 30 W DC; 200 W AC	200 W; 30 W DC; 200 W AC	200 W; 30 W DC; 200 W AC
• with resistive load, max.	0.75 A; each output	0.75 A; each output	0.75 A; each output	2 A; each output
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
Isolation				
Isolation checked with	500 V AC	500 V AC	500 V AC	500 V AC
Isolation				
Galvanic isolation, digital inputs				
• galvanic isolation, digital inputs	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler
• between the channels, in groups of	4	4	8	16
Isolation, digital outputs				
• Galvanic isolation, digital outputs	Yes; Relay	Yes; Relay	Yes; Relay	Yes; Relay
• between the channels, in groups of	4	4	4	11; 11/11/10
Dimensions				
Dimensions				
• Width	46 mm	71.2 mm	137.5 mm	196 mm
• Height	80 mm	80 mm	80 mm	80 mm
• Depth	62 mm	62 mm	62 mm	62 mm
Weights				
• Weight, approx.	160 g	300 g	400 g	580 g

SIMATIC S7-200

Digital modules

EM 221, EM 222, EM 223

3

Ordering Data

Order No.

Order No.

Digital input module EM 221

for CPU 221/222/224/224 XP/226

- 8 inputs, 24 V DC, isolated, current sourcing/sinking
- 16 inputs, 24 V DC, isolated, current sourcing/sinking
- 8 inputs, 120/230 V AC, isolated, B7 current sourcing/sinking

6ES7 221-1BF22-0XA0

6ES7 221-1BH22-0XA0

6ES7 221-1EF22-0XA0

Digital output module EM 222

for CPU 221/222/224/224 XP/226

- 4 outputs, 24 V DC; 5A, isolated B7
- 8 outputs, 24 V DC; 0.75 A, isolated
- 4 outputs, 24 V DC, 24 to 230 V AC; 10 A, isolated, relay outputs B7
- 8 outputs, 24 V DC, 24 to 230 V AC; 2 A, isolated, relay outputs
- 8 outputs, 120/230 V AC; 0.5 A, isolated

6ES7 222-1BD22-0XA0

6ES7 222-1BF22-0XA0

6ES7 222-1HD22-0XA0

6ES7 222-1HF22-0XA0

6ES7 222-1EF22-0XA0

Digital input/output module EM 223

for CPU 221/222/224/224 XP/226

- 4 inputs 24V DC, 4 outputs 24 V DC; 0.75 A, isolated
- 8 inputs, 24V DC, 8 outputs 24 V DC; 0.75 A, isolated
- 16 inputs, 24V DC, 16 outputs 24 V DC; 0.75 A, isolated
- 32 inputs, 24V DC, 32 outputs 24 V DC; 0.75 A, isolated
- 4 inputs, 24 V DC; 4 outputs, relays
- 8 inputs, 24 V DC; 8 outputs, relays
- 16 inputs, 24 V DC; 16 outputs, relays
- 32 inputs, 24 V DC; 32 outputs, relays

6ES7 223-1BF22-0XA0

6ES7 223-1BH22-0XA0

6ES7 223-1BL22-0XA0

6ES7 223-1BM22-0XA0

6ES7 223-1HF22-0XA0

6ES7 223-1PH22-0XA0

6ES7 223-1PL22-0XA0

6ES7 223-1PM22-0XA0

Front flap set

contains various cover flaps for CPUs and EMs; spare part

6ES7 291-3AX20-0XA0

Pluggable terminal block (spare part)

- With 7 terminals (for EM 221/222) B7
- With 12 terminals (for EM 223) B7

6ES7 292-1AD20-0AA0

6ES7 292-1AE20-0AA0

SIM 274 simulator (optional)

with 8 terminals for EM 221 and EM 223

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

B7: 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

3

SIPLUS EM 221 digital input modules for CPU 22x

	8 DI	16 DI
Order No.	6AG1 221-1BF22-2XA0	6AG1 221-1BH22-2XB0
Order No. based on	6ES7 221-1BF22-0XA0	6ES7 221-1BH22-0XA0
Ambient temperature range	-25 ... +70 °C; -25 to +55 °C (for applications with cUL approval), condensation permissible	
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere).	
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	Yes	Yes
Approvals	CE, cUL	
Technical specifications	The technical data are identical with those of the based-on modules.	

SIPLUS EM 222 digital output modules for CPU 22x

	8DO	8RO
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 ... +70 °C; -25 to +55 °C (for applications with cUL approval), condensation permissible	
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere).	
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	Yes	Yes
Approvals	CE, cUL	
Technical specifications	The technical data are identical with those of the based-on modules.	

SIMATIC S7-200

SIPLUS digital modules

SIPLUS EM 221, EM 222, EM 223

Overview (continued)

SIPLUS EM 223 digital 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 ... +70 °C; -25 to +55 °C (for applications with cUL approval), condensation permissible		
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere).		
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	Yes	Yes	Yes
Approvals	CE, cUL		
Technical specifications	The technical data are identical with those of the based-on modules.		

SIPLUS EM 223 digital 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 ... +70 °C; -25 to +55 °C (for applications with cUL approval), condensation permissible		
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere).		
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	Yes	Yes	Yes
Approvals	CE, cUL		
Technical specifications	The technical data are identical with those of the based-on modules.		

Ordering Data

Order No.		Order No.	
Digital input module SIPLUS EM 221 (extended temperature and medial exposure) for CPU 222/224/224 XP/226		Digital input/output module SIPLUS EM 223 (extended temperature and medial exposure) for CPU 222/224/224 XP/226	
• 8 inputs, 24 V DC, isolated, source/sink output	B7 6AG1 221-1BF22-2XB0	• 4 inputs 24 V DC, 4 outputs 24 V DC; 0,75 A, isolated	B7 6AG1 223-1BF22-2XB0
• 16 inputs, 24 V DC, isolated, source/sink output	B7 6AG1 221-1BH22-2XA0	• 8 inputs, 24 V DC, 8 outputs, 24 V DC; 0,75 A, isolated	B7 6AG1 223-1BH22-2XB0
Digital input module SIPLUS EM 222 (extended temperature and medial exposure) for CPU 222/224/224 XP/226		• 16 inputs, 24 V DC, 16 outputs, 24 V DC; 0,75 A, isolated	B7 6AG1 223-1BL22-2XB0
• 8 outputs, 24 V DC; 0,75 A, isolated	B7 6AG1 222-1BF22-2XB0	• 4 inputs 24 V DC, 4 outputs, relay	B7 6AG1 223-1HF22-2XB0
• 8 outputs, 24 V DC/24 to 230 V AC; 2 A, isolated, relay outputs	B7 6AG1 222-1HF22-2XB0	• 8 inputs, 24 V DC, 8 outputs, relay	B7 6AG1 223-1PH22-2XB0
		• 16 inputs, 24 V DC, 16 outputs, relay	B7 6AG1 223-1PL22-2XB0
		Accessories	see S7-200 digital modules, page 3/30

B7: Subject to export regulations: AL: N and ECCN: EAR99H

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

3

Technical specifications EM 231

	6ES7 231-0HC22-0XA0	6ES7 231-0HF22-0XA0
Current consumption		
from load voltage L+ (without load), max.	60 mA	60 mA
from backplane bus DC 5 V, max.	20 mA	20 mA
Current consumption/power loss		
Power loss, typ.	2 W	2 W
Connection point		
pluggable I/O terminals	No	No
Analog inputs		
Number of analog inputs	4; Difference	8; Difference
cable length, shielded, max.	100 m; to the sensor	100 m; to the sensor
Input ranges (rated values), voltages		
• 0 to +5 V	Yes	Yes
• 0 to +10 V	Yes	Yes
• -2.5 V to +2.5 V	Yes	Yes
• -5 V to +5 V	Yes	Yes
• -80 mV to +80 mV		No
Input ranges (rated values), currents		
• 0 to 20 mA	Yes	Yes; for channels 6 and 7 only

	6ES7 231-0HC22-0XA0	6ES7 231-0HF22-0XA0
Input ranges (rated values), thermoelements		
• Type E		No
• Type J		No
• Type K		No
• Type N		No
• Type R		No
• Type S		No
• Type T		No
Input ranges (rated values), resistance thermometers		
• Cu 10		No
• Ni 10		No
• Ni 1000		No
• Ni 120		No
• Pt 100		No
• Pt 1000		No
• Pt 10000		No
• Pt 200		No
• Pt 500		No
Input ranges (rated values), resistors		
• 0 to 150 Ohm		No
• 0 to 300 Ohm		No
• 0 to 600 Ohm		No
• permissible input frequency for voltage input (destruction limit), max.	30 V	30 V
• permissible input current for current input (destruction limit), max.	32 mA	40 mA

SIMATIC S7-200

Analog modules

EM 231, EM 232, EM 235

Technical specifications EM 231 (continued)

	6ES7 231-0HC22-0XA0	6ES7 231-0HF22-0XA0
Characteristic curve linearization		
• for voltage measurement	No	No
• for current measurement	No	No
Temperature compensation		
• programmable	No	No
Analog value creation		
Integration and conversion time/resolution per channel		
• Resolution with overload area (bit including sign), max.	12 Bit	12 Bit
• Interference voltage suppression for interference frequency f_1 in Hz	40 dB, DC to 60 V for interference frequency 50 / 60 Hz	40 dB, DC up to 60 V for interference frequency
• Conversion time (per channel)	250 μ s	250 μ s
Displayable conversion value range		
• bipolar signals	-32,000 to +32,000	-32,000 to +32,000
• unipolar signals	0 to 32,000	0 to 32,000

	6ES7 231-0HC22-0XA0	6ES7 231-0HF22-0XA0
Errors/accuracies		
Interference voltage suppression for $f = n \times (f_1 \pm 1 \%)$, f_1 = interference frequency		
• common mode voltage, max.	12 V	12 V
Isolation		
Isolation, analog inputs		
• Isolation, analog inputs	No	No
Dimensions		
Dimensions		
• Width	71,2 mm	71,2 mm
• Height	80 mm	80 mm
• Depth	62 mm	62 mm
Weights		
• Weight, approx.	183 g	190 g

Technical specifications EM 232

	6ES7 232-0HB22-0XA0	6ES7 232-0HD22-0XA0
Current consumption		
from backplane bus DC 5 V, max.	20 mA	20 mA
from sensor current supply or external current supply (DC 24 V), max.	70 mA	70 mA
Current consumption/power loss		
Power loss, typ.	2 W	2 W
Connection point		
pluggable I/O terminals	No	No
Analog outputs		
Number of analog outputs	2	4
Output ranges, voltage		
• -10 to +10 V	Yes	Yes
Output ranges, current		
• 4 to 20 mA	Yes	Yes
Load impedance (in rated range of output)		
• with voltage outputs, min.	5 k Ω	5 k Ω
• with current outputs, max.	0.5 k Ω	0.5 k Ω

	6ES7 232-0HB22-0XA0	6ES7 232-0HD22-0XA0
Analog value creation		
Integration and conversion time/resolution per channel		
• Resolution (incl. overload area)	V/12 bits, I/11 bits	V/12 bits, I/11 bits
Settling time		
• for voltage output	100 μ s	100 μ s
• for current output	2 ms	2 ms
Displayable conversion value range		
• bipolar signals	-32,000 to +32,000	-32,000 to +32,000
• unipolar signals	0 to 32,000	0 to 32,000
Errors/accuracies		
Operational limit in overall temperature range		
• Voltage, relative to output area	+/- 2 %	+/- 2 %
• Current, relative to output area	+/- 2 %	+/- 2 %
Basic error limit (operational limit at 25 °C)		
• Voltage, relative to output area	+/- 0.5 %	+/- 0.5 %
• Current, relative to output area	+/- 0.5 %	+/- 0.5 %

Technical specifications EM 232 (continued)

	6ES7 232-0HB22-0XA0	6ES7 232-0HD22-0XA0
Isolation		
Isolation, analog outputs		
• Galvanic isolation, analog outputs	No	No

	6ES7 232-0HB22-0XA0	6ES7 232-0HD22-0XA0
Dimensions		
Dimensions		
• Width	46 mm	71.2 mm
• Height	80 mm	80 mm
• Depth	62 mm	62 mm
Weights		
• Weight, approx.	148 g	190 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
Current consumption/power loss	
Power loss, typ.	2 W
Connection point	
pluggable I/O terminals	No
Analog inputs	
Number of analog inputs	4; Difference
• Voltage	Yes
• Current	Yes
Input ranges (rated values), voltages	
• 0 to +50 mV	Yes
• 0 to +100 mV	Yes
• 0 to +500 mV	Yes
• 0 to +1 V	Yes
• 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	
• 0 to 20 mA	Yes
• permissible input frequency for voltage input (destruction limit), max.	30 V
• permissible input current for current input (destruction limit), max.	32 mA

	6ES7 235-0KD22-0XA0
Characteristic curve linearization	
• for voltage measurement	No
• for current measurement	No
Temperature compensation	
• programmable	No
Analog outputs	
Number of analog 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	
Integration and conversion time/resolution per 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 %

SIMATIC S7-200

Analog modules

EM 231, EM 232, EM 235

Technical specifications EM 235 (continued)

6ES7 235-0KD22-0XA0	
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 $f = n \times (fl \pm 1 \%)$, fl = interference frequency	
• common mode voltage, max.	12 V
Isolation	
Isolation, analog inputs	
• Isolation, analog inputs	No
Isolation, analog outputs	
• Galvanic isolation, analog outputs	No
Dimensions	
Dimensions	
• Width	71.2 mm
• Height	80 mm
• Depth	62 mm
Weights	
• Weight, approx.	186 g

Ordering Data

Order No.

Analog input module EM 231

for CPU 221/222/224/224 XP/226

4 inputs, 0 to 10 V,
12 bit resolution

6ES7 231-0HC22-0XA0

8 inputs, 0 to 10 V, of which
max. 2 inputs also 0 to 20 mA,
11/12 bit resolution

6ES7 231-0HF22-0XA0

Analog output module EM 232

for CPU 221/222/224/224 XP/226

2 outputs, ± 10 V, 12 bit resolution

6ES7 232-0HB22-0XA0

4 outputs, ± 10 V, 12-bit resolution

6ES7 232-0HD22-0XA0

Analog input/output module EM 235

for CPU 222/224/224 XP/226;
4 inputs, 1 output, ± 10 V DC,
12 bit resolution

6ES7 235-0KD22-0XA0

Ground terminal

10 units

6ES5 728-8MA11

Front flap set

contains various cover flaps for
CPUs and EMs; spare part

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

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

3

Technical specifications

	6ES7 231-7PD22-0XA0	6ES7 231-7PF22-0XA0
Current consumption		
from load voltage L+ (without load), max.	60 mA	60 mA
from backplane bus DC 5 V, max.	87 mA	87 mA
Current consumption/power loss		
Power loss, typ.	1.8 W	1.8 W
Connection point		
pluggable I/O terminals	No	No
Analog inputs		
Number of analog inputs	4	8
cable length, shielded, max.	100 m; to the sensor	100 m; to the sensor
Loop resistance cable	100 Ω	100 Ω
Updating time (all channels)	405 ms	810 ms
Input ranges (rated values), voltages		
• -80 mV to +80 mV	Yes	Yes
Input ranges (rated values), thermoelements		
• Type E	Yes	Yes
• Type J	Yes	Yes
• Type K	Yes	Yes
• Type N	Yes	Yes
• Type R	Yes	Yes
• Type S	Yes	Yes
• Type T	Yes	Yes
Input ranges (rated values), resistors		
• permissible input frequency for voltage input (destruction limit), max.	30 V	30 V

	6ES7 231-7PD22-0XA0	6ES7 231-7PF22-0XA0
Analog value creation		
Measurement principle	Sigma Delta	Sigma Delta
Integration and conversion time/resolution per channel		
• Resolution with overload area (bit including sign), max.	16 Bit; Temperature 0.1 °C / 0.1 °F	16 Bit; T Temperature 0.1 °C / 0.1 °F
• Interference voltage suppression for interference frequency f1 in Hz	85 dB at 50 / 60 / 400 Hz	85 dB at 50 / 60 / 400 Hz
Displayable conversion value range		
• bipolar signals	-27,648 to +27,648	-27,648 to +27,648
Errors/accuracies		
cold connection point	+/- 1.5 °C	+/- 1.5 °C
Repeat accuracy in settled status at 25 °C (relative to input area)	+/- 0.05 %	+/- 0.05 %
Operational limit in overall temperature range		
• Voltage, relative to output area	+/- 0.1 %	+/- 0.1 %
Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency		
• common mode voltage, max.	120 V; AC	120 V; AC
• common mode voltage, min.	120 db; at 120 V AC	120 db; at 120 V AC

SIMATIC S7-200

Analog modules

EM 231 thermocouple module

Technical specifications (continued)

	6ES7 231-7PD22-0XA0	6ES7 231-7PF22-0XA0
Isolation		
Isolation, analog inputs		
• Isolation, analog inputs	Yes	Yes
Dimensions		
Dimensions		
• Width	71.2 mm	71.2 mm
• Height	80 mm	80 mm
• Depth	62 mm	62 mm
Weights		
• Weight, approx.	210 g	210 g

Ordering Data

Order No.

Thermocouple module EM 231

Inputs +/- 80 mV,
resolution 15 bit + sign,
thermocouples J, K, S, T, R, E, N

4 inputs

6ES7 231-7PD22-0XA0

8 inputs

6ES7 231-7PF22-0XA0

Ground terminal

10 units

6ES5 728-8MA11

Backplane bus expansion cable

B7

6ES7 290-6AA20-0XA0

For interconnection of the two
rows of devices with double-row
configuration,
for CPU 222/224/224 XP/226

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

B7: Subject to export regulations: AL: N and ECCN: EAR99H

Overview



- To measure temperatures easily and with high accuracy
- 2 versions with 2 or 4 inputs
- The latest resistance temperature detectors can be used
- Easy to retrofit in existing systems

3

Technical specifications

	6ES7 231-7PB22-0XA0	6ES7 231-7PC22-0XA0
Current consumption		
from load voltage L+ (without load), max.	60 mA	60 mA
from backplane bus DC 5 V, max.	87 mA	87 mA
Current consumption/power loss		
Power loss, typ.	1.8 W; Sensor: 1 mW	1.8 W; Sensor: 1 mW
Connection point		
pluggable I/O terminals	No	No
Analog inputs		
Number of analog inputs	2	4
cable length, shielded, max.	100 m; to the sensor	100 m; to the sensor
Loop resistance cable	20 Ω max. 2.7 Ohm for Cu	20 Ω max. 2.7 Ohm for Cu
Updating time (all channels)	405 ms; 700 ms with Pt10000	810 ms; 1400 ms with Pt10000
Input ranges (rated values), resistance thermometers		
• Cu 10	Yes	Yes
• Ni 10	Yes	Yes
• Ni 1000	Yes	Yes
• Ni 120	Yes	Yes
• Pt 100	Yes	Yes
• Pt 1000	Yes	Yes
• Pt 10000	Yes	Yes
• Pt 200	Yes	Yes
• Pt 500	Yes	Yes

	6ES7 231-7PB22-0XA0	6ES7 231-7PC22-0XA0
Input ranges (rated values), resistors		
• 0 to 150 Ohm	Yes	Yes
• 0 to 300 Ohm	Yes	Yes
• 0 to 600 Ohm	Yes	Yes
• permissible input frequency for voltage input (destruction limit), max.	30 V; 30 V DC (probe), 5 V DC (source)	30 V; 30 V DC (probe), 5 V DC (source)
Analog value creation		
Measurement principle	Sigma Delta	Sigma Delta
Integration and conversion time/resolution per channel		
• Resolution with overload area (bit including sign), max.	16 Bit; Temperature 0.1 °C / 0.1 °F	16 Bit; Temperature 0.1 °C / 0.1 °F
• Interference voltage suppression for inter- ference frequency f1 in Hz	85 dB at 50 / 60 / 400 Hz	85 dB at 50 / 60 / 400 Hz
Displayable conversion value range		
• bipolar signals	-27,648 to +27,648	-27,648 to +27,648
Errors/accuracies		
Repeat accuracy in settled status at 25 °C (relative to input area)	+/- 0.05 %	+/- 0.05 %
Operational limit in overall temperature range		
• Voltage, relative to output area	+/- 0.1 %	+/- 0.1 %
Interference voltage suppression for f = n x (fl +/- 1 %), fl = interference frequency		
• common mode voltage, max.	0 V	0 V
• common mode voltage, min.	120 db; at 120 V AC	120 db; at 120 V AC

SIMATIC S7-200

Analog modules

EM 231 RTD module

Technical specifications (continued)

	6ES7 231-7PB22-0XA0	6ES7 231-7PC22-0XA0
Isolation		
Isolation, analog inputs		
• Isolation, analog inputs	Yes	Yes
Dimensions		
Dimensions		
• Width	71.2 mm	71.2 mm
• Height	80 mm	80 mm
• Depth	62 mm	62 mm
Weights		
• Weight, approx.	210 g	210 g

Ordering Data

Order No.

RTD module EM 231

2 inputs for resistance temperature detector Pt100/200/500/1000/10000, Ni100/120/1000, Cu10; resistor 150/300/600 Ohm, resolution 15 Bit + sign

6ES7 231-7PB22-0XA0

4 inputs for resistance temperature detector Pt100/200/500/1000/10000, Ni100/120/1000, Cu10; 14 GOST temperature resistance sensors, resistor 150/300/600 ohm, resolution 15 bit + sign

6ES7 231-7PC22-0XA0

Ground terminal

10 units

6ES5 728-8MA11

Backplane bus expansion cable

B7

For interconnection of the two rows of devices with double-row 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

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

B7: Subject to export regulations: AL: N and ECCN: EAR99H

SIMATIC S7-200

SIPLUS analog modules

SIPLUS EM 231, EM 232, EM 235

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

SIPLUS EM 231 analog input module for CPU 22x

	4 AI
Order No.	6AG1 231-0HC22-2XB0
Order No. based on	6ES7 231-0HC22-0XA0
Ambient temperature range	-25 ... +70 °C; -25 to +55 °C (for applications with cUL approval), condensation permissible
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere).
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	Yes
Approvals	CE, cUL
Technical specifications	The technical data are identical with those of the based-on modules.

SIPLUS EM 232 analog output modules for CPU 22x

	2 AO
Order No.	6AG1 232-0HB22-2XB0
Order No. based on	6ES7 232-0HB22-0XA0
Ambient temperature range	-25 ... +70 °C; -25 to +55 °C (for applications with cUL approval), condensation permissible
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere).
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	No
Approvals	CE, cUL
Technical specifications	The technical data are identical with those 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 ... +70 °C; -25 to +55 °C (for applications with cUL approval), condensation permissible
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere).
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	No
Approvals	CE, cUL
Technical specifications	The technical data are identical with those of the based-on modules.

Ordering Data

Order No.

SIPLUS EM 231 analog input module (enhanced temperature range and medial exposure) For CPU 222/224/224 XP/226; 4 inputs, 0 to 10 V, resolution 12 bit	B7	6AG1 231-0HC22-2XB0
SIPLUS EM 232 analog output module (enhanced temperature range and medial exposure) For CPU 222/224/224 XP/226; 2 outputs, ± 10 V, resolution 12 bit	B7	6AG1 232-0HB22-2XB0
SIPLUS EM 235 analog input/output module (enhanced temperature range and medial exposure) For CPU 222/224/224 XP/226; 4 inputs, 1 output, ± 10 V DC, resolution 12 bit	B7	6AG1 235-0KD22-2XB0
Accessories		see S7-200 analog modules, page 3/36

B7: Subject to export regulations: AL: N and ECCN: EAR99H

SIMATIC S7-200

SIPLUS analog modules

SIPLUS EM 231 RTD module

Overview



- To measure temperatures easily and with high accuracy
- 31 common resistance temperature detectors can be used
- Easy to retrofit in existing systems

SIPLUS EM 231 RTD module 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 ... +70 °C; -25 to +55 °C (for applications with cUL approval), condensation permissible	
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere).	
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	No	Yes
Approvals	CE, cUL	
Technical specifications	The technical data are identical with those of the based-on modules.	

Ordering Data

Order No.

SIPLUS EM 231 RTD module B7 **6AG1 231-7PB22-2XA0**
(enhanced temperature range and medial exposure)

2 inputs for
resistance temperature detector
Pt100/200/500/1000/10000,
Ni100/120/1000, Cu10;
resistor 150/300/600 Ohm,
resolution 15 Bit + sign

SIPLUS EM 231 RTD module B7 **6AG1 231-7PB22-2XY0**
(enhanced temperature range and medial exposure)

Conforming to EN 50155;
2 inputs for
resistance temperature detector
Pt100/200/500/1000,
Ni100/120/1000, Cu10;
resistor 150/300/600 Ohm,
resolution 15 bit + sign

Accessories

see S7-200 RTD module,
page 3/40

B7: 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

3

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 226/226XM, max. 3 with CPU 224, max. 1 with CPU 222
Digital inputs	
Number of digital inputs	5
Type	IEC Type 1, active-high
Functions	Stop (STP), reference point switch (RPS), upper limit switch (LMT+), lower limit switch (LMT-), zero point (ZP)
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
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

6ES7 253-1AA22-0XA0	
Encoder	
Connectable encoders	
• 2-wire BEROs - permissible quiescent current (2-wire BEROs), max.	Yes 1 mA
Drive interface	
Signal output I	
• Number	4; optionally RS 422/RS 485 or 5 V DC
• Type	RS 422 / RS 485 (P0+, P0-, P1+, P1-)
• Differential output voltage, min.	2.8 V; RL = 200 ohms
• 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
• between the channels, in groups of	1 (STP, RPS, ZP), 2 (LMT-, LMT+)
Dimensions	
Dimensions	
• Width	71.2 mm
• Height	80 mm
• Depth	62 mm
Weights	
• Weight, approx.	190 g

SIMATIC S7-200

Function modules

EM 253 positioning module

Ordering Data

EM 253 positioning modules

for activating stepper motors or servo drives

Grounding terminal

10 items

Backplane bus expansion cable

for connecting the two equipment tiers in a two-tier configuration, for CPU 222/224/224 XP/226

Order No.

6ES7 253-1AA22-0XA0

6ES5 728-8MA11

B7

6ES7 290-6AA20-0XA0

S7-200 programmable controller, system manual

for CPU 221/222/224/224 XP/226 and STEP 7-Micro/Win V4

German

English

French

Spanish

Italian

Chinese

Order No.

6ES7 298-8FA24-8AH0

6ES7 298-8FA24-8BH0

6ES7 298-8FA24-8CH0

6ES7 298-8FA24-8DH0

6ES7 298-8FA24-8EH0

6ES7 298-8FA24-8FH0

B7: 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.

3

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 displays (through TTY interface)	Weight value (gross, net)
Adjustment of scales settings	Using PC parameterization software SIWATOOL MS (RS 232)
Measuring properties	
Error limit to DIN 1319-1 of full-scale value at 20 °C ± 10 K	0.05 %
- Internal resolution - Data format of weight values	65535 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 - Limit values - Zero setting function - Tare function - Tare specification	Gross, net 2 (min./max.) Per command Per command Per command
Load cells	Strain gages in 4-wire or 6-wire system
Load cell powering	
- Supply voltage U_s (rated value) - Max. supply current	6 V DC typ. ≤150 mA

SIWAREX MS	
Load cell powering (cont.)	
Permissible load impedance	
- R_{Lmin}	> 40 Ω
- R_{Lmax}	< 4010 Ω
- R_{Lmin}	> 87 Ω
- R_{Lmax}	< 4010 Ω
Load cell characteristic	1 mV/V ... 4 mV/V
Permissible range of measuring signal (at greatest set characteristic value)	-2,4 ... +26.4 mV
Max. distance of load cells	500 m
Intrinsically-safe load cell powering	
Connection to load cells in Ex zone 1	Optionally over SIWAREX IS Ex interface or SIWAREX Pi:
Ex approvals and safety	CE, ATEX 95, FM, cUL _{US} Haz. Loc.
Supply voltage 24 V DC	
- Rated voltage - Max. current consumption	24 V DC 130 mA
Supply voltage 5 V DC (from CPU)	
- Rated voltage - Max. current consumption	5 V DC 145 mA
IP degree of protection to 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

SIMATIC S7-200

Function modules

SIWAREX MS

3

Ordering Data	Order No.	Order No.
SIWAREX MS B7 Weighing electronics for scales in SIMATIC S7-200 for applications without obligation of verification	7MH4 930-0AA01	SIWAREX JB junction box, stainless steel housing for connecting up to 4 load cells in parallel 7MH4 710-1EA
SIWAREX MS Manual • available in a range of languages Free download on the Internet at: www.siemens.com/weighing-technology		Ex interface, type SIWAREX Pi With UL and FM approvals, but without ATEX approval for intrinsically safe connection of load cells, suitable for weighing modules SIWAREX U, CS, MS, FTA, FTC and M. Not approved for use in the EU. 7MH4 710-5AA
Configuration package SIWAREX MS on CD-ROM for STEP7 Micro/WIN, version 4.0 SP2 or higher • Software for SIWATOOL MS scale adjustment (in a range of languages) • Manuals available on CD (in a range of languages) • Micro/WIN Library MicroScale for communication with SIWAREX MS	7MH4 930-0AK01	Manual for Ex interface type SIWAREX Pi C71000-T5974-C29
SIWAREX MS "Getting started" Sample software show beginners how to program the scales. Free download on the Internet at: www.siemens.com/weighing-technology		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, CS, MS, FTA, FTC, M and CF weighing modules. Approved for use in the EU. • With short-circuit current < 199 mA DC • With short-circuit current < 137 mA DC 7MH4 710-5BA 7MH4 710-5CA
SIWATOOL cable from SIWAREX M, FTA, FTC, MS with serial PC interface, for 9-pin PC interfaces (RS 232) • 2 m long • 5 m long	7MH4 702-8CA 7MH4 702-8CB	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, CS, MS, FTA, FTC, M and CF to the junction box (JB), extension box (EB) or Ex interface (Ex-I) or between two JB's, for fixed laying, occasional bending permitted, 10.8 mm outer diameter, for ambient temperature -40 to +80 °C 7MH4 702-8AG
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.		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 permitted, blue PVC insulating sheath, approx. 10.8 mm outer diameter, for ambient temperature -40 ... +80 °C 7MH4 702-8AF
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	Cable LiYCY 4 x 2 x 0.25 mm² B7 for TTY (connect 2 pairs of conductors in parallel), for connection of a remote display 7MH4 407-8BD0

B7: Subject to export regulations: AL: N and ECCN: EAR99H

SIMATIC S7-200

Function modules

SIPLUS DCF 77 radio clock module

Overview



This module can be used to synchronize the real-time clock of the SIMATIC S7-200, S7-300 and S7-400 automation systems with the official time of the DCF 77 time signal transmitter of the Physikalisch-Technische Bundesanstalt Braunschweig.

The time is received by means of a DCF receiver (antenna with electronics) which is connected via two digital inputs on the SIMATIC and SIPLUS together with a software driver included in the scope of delivery (function block FB). The function blocks are available on the Internet for downloading.

<http://www.siemens.com/siplus> – Support – Tools and 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.

SIPLUS DCF 77 radio clock module

B7

6AG1 057-1AA03-0AA0

For synchronizing SIMATIC S7-200, S7-300 and S7-400 with the official time of the DCF 77 time signal transmitter of the Physikalisch-Technische Bundesanstalt Braunschweig

B7: Subject to export regulations: AL: N and ECCN: EAR99H

SIMATIC S7-200

Communication

EM 241 modem

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	
Supply voltages	
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
Current consumption/power loss	
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	
Dimensions	
• Width	71,2 mm
• Height	80 mm
• Depth	62 mm
Weights	
• Weight, approx.	190 g

Ordering Data

Order No.

Modem EM 241	B7	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

B7: Subject to export regulations: AL: N and ECCN: EAR99H

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-xxx21-xxxx and higher can be used with CPU

Technical specifications

6ES7 277-0AA22-0XA0	
Supply voltages	
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
Current consumption/ power loss	
Power loss, typ.	2.5 W
Hardware configuration	
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

6ES7 277-0AA22-0XA0	
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	
Dimensions	
• Width	71.2 mm
• Height	80 mm
• Depth	62 mm
Weights	
• Weight, approx.	175 g

Ordering Data

**PROFIBUS DP
EM 277 input module**
for CPU 222/224/224 XP/226,
for connecting to PROFIBUS DP
(slave) and MPI

Order No.

6ES7 277-0AA22-0XA0

SIMATIC S7-200

Communication

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-xxx21-xxxx and higher can be used with CPU

PROFIBUS DP EM 277 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 (e.g. 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

SIPLUS EM 277 PROFIBUS DP module

B7

Order No.

6AG1 277-0AA22-2XA0

(enhanced temperature range
and medial exposure)

for CPU 222/224/224 XP/226,
for connecting to PROFIBUS DP
(slave) and MPI

B7: 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 243-2AX01-0XA0) 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

Order No.	6GK7 243-2AX01-0XA0
Product type description	CP 243-2
Interfaces	
Version of electrical connection of the AS-Interface	Terminal connection
Supply voltage	
Supply voltage from backplane bus	5 V
Current consumption	
• from 5 V DC backplane bus, max.	220 mA
• from AS-Interface cable, max.	100 mA
Effective power loss	
Effective power loss	2 W
Permitted ambient conditions	
Ambient temperature	
• when installed vertically	
- during operation	0 ... 45 °C
• when installed horizontally	
- during operation	0 ... 55 °C

Order No.	6GK7 243-2AX01-0XA0
Product type description	CP 243-2
Permitted ambient conditions (continued)	
Ambient temperature during storage	-40 ... +70 °C
Ambient temperature during transport	-40 ... +70 °C
Maximum relative humidity at 25 °C during operation	95%
Design, dimensions and weight	
Module format	Expansion module in S7-200 design
Width	71 mm
Height	80 mm ¹⁾
Depth	62 mm
Net weight	250 g
Number of slots required	1
Standards and specifications	
Version of the AS-Interface specification	V 2.1
Bus cycle time of the AS-Interface	
• with 31 slaves	5 ms
• with 62 slaves	10 ms
Performance data	
Data volume	
• of the address area of the analog inputs as allocation in the PLC	16 byte
• of the address area of the analog outputs as allocation in the PLC	16 byte
• of the address area of the digital inputs as allocation in the PLC	1 byte
• of the address area of the digital outputs as allocation in the PLC	1 byte

1) Height +16 mm with holes for wall fixing

Ordering Data

Order No.	6GK7 243-2AX01-0XA0
CP 243-2 communications processor	
for connection of the SIMATIC S7-200 to AS-Interface	
Electronic manuals	6GK1 975-1AA00-3AA0
Communication systems, protocols, products on CD-ROM, German/English	
Free download from the Internet at	
http://support.automation.siemens.com/WW/view/com/10805930/133300	

SIMATIC S7-200

Communication

CP 243-1

Overview



ISO	TCP	PN	MRP	IT	IP-R	PG/OP	S7
	●					●	●

- 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. SOFTNET-S7 or S7-1613) allows PLC data to be further processed in PC applications
- Module replacement possible without PG

Technical specifications

Order No.	6GK7 243-1EX00-0XE0
Product type description	CP 243-1
Transfer rate	
Transmission rate at Interface 1	
• Minimum	10 Mbit/s
• Maximum	100 Mbit/s
Interfaces	
Electrical connection version	
• at Industrial Ethernet interface 1	1 x RJ45 (TP)
• for voltage supply	2-pin terminal strip

Order No.	6GK7 243-1EX00-0XE0
Product type description	CP 243-1
Supply voltage	
Type of supply voltage	DC
Supply voltage	24 V
• Relative symmetrical tolerance at 24 V DC	5%
Current consumption	
Current consumed	
• from backplane bus at 24 V DC typical	55 mA
• from external supply voltage at 24 V DC typical	60 mA
Effective power loss	1.75 W
Permitted ambient conditions	
Ambient temperature for vertical installation	
• during operation	0 ... +45 °C
Ambient temperature for horizontal installation	
• during operation	0 ... +55 °C
Ambient temperature during storage	-40 ... +70 °C
Ambient temperature during transport	-40 ... +70 °C
Maximum relative humidity at 25 °C during operation	95%
Design, dimensions and weight	
Module format	Compact module S7-200, double width
• Width	71.2 mm
• Height	80 mm
• Depth	62 mm
Net weight	150 g
Performance data	
S7 communication	
Number of possible connections for S7 communication	
• Maximum	8
• for PG connections, maximum	1
Configuration	
Configuration software for full scope of functions from STEP 7-Micro/WIN V3.2 SP1	Yes

Ordering Data	Order No.	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	B3 6GK7 243-1EX00-0XE0	S7-1613 Edition 2007 Software for S7 and open communication, incl. PG/OP communication, OPC server and NCM PC; up to 120 connections, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2; Windows 2003 Server SP1, R2, SP2, Windows Vista Business/Ultimate; for CP 1613/CP 1613 A2/CP 1623; German/English • Single license for 1 installation B3 6GK1 716-1CB70-3AA0 • Software Update Service for 1 year, with automatic extension; requirement: Current software version B3 6GK1 716-1CB00-3AL0 • Upgrade S7-1613 from V6.4 to 2007 Edition B3 6GK1 716-1CB00-3AE0 • Upgrade S7-1613 from V6.0, V6.1, V6.2 or V6.3 to S7-1613 Edition 2007 B3 6GK1 716-1CB00-3AE1
SOFTNET Edition 2007 for Industrial Ethernet Software for S7 and open communication, incl. OPC server, PG/OP communication and NCM PC, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2; Windows 2003 Server SP1, R2, SP2; Windows Vista Business/Ultimate; German/English		
SOFTNET-S7 Edition 2007 for Industrial Ethernet up to 64 connections • Single license for 1 installation B3 6GK1 704-1CW70-3AA0 • Software Update Service for 1 year, with automatic extension; requirement: Current software version B3 6GK1 704-1CW00-3AL0 • Upgrade from V6.4 to 2007 edition B3 6GK1 704-1CW00-3AE0 • Upgrade from V6.0, V6.1, V6.2 or V6.3 to 2007 Edition B3 6GK1 704-1CW00-3AE1		
SOFTNET-S7 Lean Edition 2007 for Industrial Ethernet up to 8 connections • Single license for 1 installation B3 6GK1 704-1LW70-3AA0 • Software Update Service for 1 year, with automatic extension; requirement: Current software version B3 6GK1 704-1LW00-3AL0 • Upgrade from V6.4 to 2007 Edition B3 6GK1 704-1LW00-3AE0 • Upgrade from V6.0, V6.1, V6.2 or V6.3 to 2007 Edition B3 6GK1 704-1LW00-3AE1		
		STEP 7-Micro/WIN V4 programming software <i>Target system:</i> All CPUs of the SIMATIC S7-200 <i>Prerequisite:</i> Windows 2000/XP on PG or PC <i>Type of delivery:</i> German, English, French, Spanish, Italian, Chinese; with online documentation • Single license B8 6ES7 810-2CC03-0YX0 • Upgrade Single License¹⁾ B8 6ES7 810-2CC03-0YX3
		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, splittable, UL approval, sold by the meter 6XV1 873-2A
		SCALANCE X204-2 Industrial Ethernet switch 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 Plugs RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables 6GK5 204-2BB10-2AA3
		IE FC RJ45 Plug 180 180° cable outlet • 1 unit 6GK1 901-1BB10-2AA0 • 10 units 6GK1 901-1BB10-2AB0 • 50 units 6GK1 901-1BB10-2AE0

B3: Subject to export regulations: AL: N and ECCN: 5D992B1
 B8: Subject to export regulations: AL: N and ECCN: EAR99S

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

SIMATIC S7-200

Communication

CP 243-1 IT

Overview



ISO	TCP	PN	MRP	IT	IP-R	PG/OP	S7
	●			●		●	●

- 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. SOFTNET-S7 or S7-1613) allows PLC data to be further processed in PC applications

Technical specifications

Order No.	6GK7 243-1GX00-0XE0
Product type description	CP 243-1 IT
Transfer rate	
Transmission rate at Interface 1	
• Minimum	10 Mbit/s
• Maximum	100 Mbit/s
Interfaces	
Electrical connection version	
• at Industrial Ethernet interface 1	1 x RJ45 (TP)
• for voltage supply	1 x 2-pin terminal block
Supply voltage	
Type of supply voltage	DC
Supply voltage	24 V
Relative symmetrical tolerance at 24 V DC	5%

Order No.	6GK7 243-1GX00-0XE0
Product type description	CP 243-1 IT
Current consumption	
Current consumed	
• from backplane bus at 24 V DC typical	55 mA
• from external supply voltage at 24 V DC typical	60 mA
Effective power loss	1.75 W
Permitted ambient conditions	
Ambient temperature for vertical installation	
• during operation	0 ... +45 °C
Ambient temperature for horizontal installation	
• during operation	0 ... +55 °C
Ambient temperature during storage	-40 ... +70 °C
Ambient temperature during transport	-40 ... +70 °C
Maximum relative humidity at 25 °C during operation	95%
Design, dimensions and weight	
Module format	Compact module S7-200, doublewidth
• Width	71.2 mm
• Height	80 mm
• Depth	62 mm
Net weight	150 g
Performance data	
S7 communication	
Number of possible connections for S7 communication	
• Maximum	8
• for PG connections, maximum	1
IT functions	
Number of possible connections	
• as client by means of FTP, max.	1
• as server by means of HTTP, max.	4
• to an e-mail server as e-mail client, max.	1
Number of e-mails with 1024 characters of the e-mail client, max.	32
Number of access authorizations of the access protection	8
Memory capacity of the user memory as FLASH memory file system	8 MB
Number of possible write cycles of the flash memory cells	1000000
Configuration	
Configuration software for full scope of functions from STEP 7-Micro/WIN V3.2 SP3	Yes

Ordering Data	Order No.	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	B3	6GK7 243-1GX00-0XE0
SOFTNET Edition 2007 for Industrial Ethernet Software for S7 and open communication, incl. OPC server, PG/OP communication and NCM PC, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2, Windows 2003 Server SP1, R2, SP2, Windows Vista Business/Ultimate; German/English		S7-1613 Edition 2007 Software for S7 and open communication, incl. PG/OP communication, OPC server and NCM PC; up to 120 connections, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2; Windows 2003 Server SP1, R2, SP2, Windows Vista Business/Ultimate; for CP 1613/CP 1613 A2/CP 1623; German/English
SOFTNET-S7 Edition 2007 for Industrial Ethernet up to 64 connections		• Single license for 1 installation • Software Update Service for 1 year, with automatic extension; requirement: Current software version • Upgrade S7-1613 from V6.4 to 2007 Edition • Upgrade S7-1613 from V6.0, V6.1, V6.2 or V6.3 to S7-1613 Edition 2007
• Single license for 1 installation • Software Update Service for 1 year, with automatic extension; requirement: Current software version • Upgrade from V6.4 to 2007 edition • Upgrade from V6.0, V6.1, V6.2 or V6.3 to 2007 Edition	B3	6GK1 704-1CW70-3AA0 6GK1 704-1CW00-3AL0 6GK1 704-1CW00-3AE0 6GK1 704-1CW00-3AE1
SOFTNET-S7 Lean Edition 2007 for Industrial Ethernet up to 8 connections		STEP 7-Micro/WIN V4 programming software <i>Target system:</i> All CPUs of the SIMATIC S7-200 <i>Prerequisite:</i> Windows 2000/XP on PG or PC <i>Type of delivery:</i> German, English, French, Spanish, Italian, Chinese; with online documentation
• Single license for 1 installation • Software Update Service for 1 year, with automatic extension; requirement: Current software version • Upgrade from V6.4 to 2007 Edition • Upgrade from V6.0, V6.1, V6.2 or V6.3 to 2007 Edition	B3	• Single license • Upgrade Single License¹⁾
		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
		FO Standard Cable GP (50/125) Standard cable, splittable, UL approval, sold by the meter
		SCALANCE X204-2 Industrial Ethernet switch 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 Plugs RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables
		IE FC RJ45 Plug 180 180° cable outlet
		• 1 unit • 10 units • 50 units
		6ES7 810-2CC03-0YX0 6ES7 810-2CC03-0YX3 6XV1 840-2AH10 6XV1 873-2A 6GK5 204-2BB10-2AA3
		6GK1 716-1CB70-3AA0 6GK1 716-1CB00-3AL0 6GK1 716-1CB00-3AE0 6GK1 716-1CB00-3AE1

B3: Subject to export regulations: AL: N and ECCN: 5D992B1
B8: Subject to export regulations: AL: N and ECCN: EAR99S

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

SIMATIC S7-200

Communication

GSM/GPRS MD720-3 modem

Overview



- SINAUT mobile radio modem with RS232 interface
 - DIN rail mounting
 - 24 V DC power supply
 - Supports the GSM services CSD *, SMS and GPRS
 - Use with SINAUT MICRO:
Data transmission via GPRS; switchable to CSD for remote maintenance (incoming call only)
 - Use with SINAUT ST7:
Data transmission via CSD, transmission of SMS
- *) CSD – **C**ircuit **S**witched **D**ata (data transmission via GSM dialup connection)

Technical specifications

	MD720-3
Transfer rate	
• RS232	300 bit/s to 57,600 bit/s
• GSM data calls	CSD 9,600 bit/s
• GPRS	
- Up to 2 uplinks	13.4 Kbit/s to 27 Kbit/s gross upload (modem to Internet); net approx. 30 % lower
- Up to 4 downlinks	40 Kbit/s to 54 Kbit/s gross download (Internet to modem); net is approx. 30 % lower
Interfaces	
• RS232	1 x 9-pin Sub-D socket
• Antenna connection	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

	MD720-3
Supply voltage	12 ... 30 V DC
Power loss	typ. 5 W
Permissible 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 using S7-200 program blocks; MC45-compatible AT commands for use with SINAUT ST7 modules
National approvals	Current approvals can be found in the Internet at http://www.siemens.com/simatic-net/ik-info

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B7: Subject to export regulations: AL: N and ECCN: EAR99H
B8: Subject to export regulations: AL: N and ECCN: EAR99S

SIMATIC S7-200

Communication

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.

GSM/GPRS antenna ANT794-4MR antenna

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

GSM/GPRS modem 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 720-3AA00

EGPRS router MD741-1

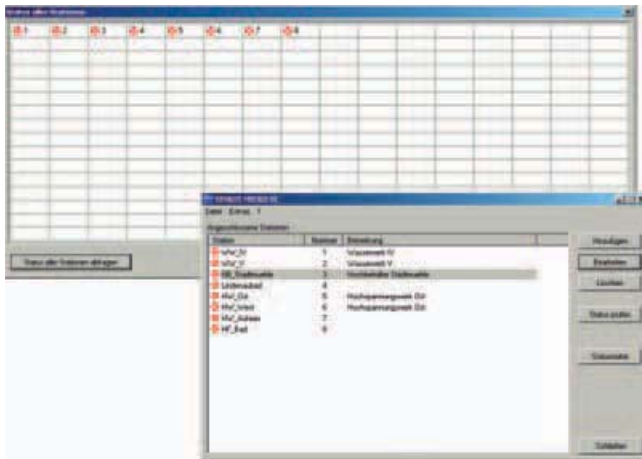
C3

For wireless IP communication by industrial Ethernet-based programmable controllers via GSM mobile radio networks; integrated firewall and VPN router (IPsec); quad band GSM; GPRS Multislot Class 12

6NH9 741-1AA00

C3: Subject to export regulations: AL: 5A002A1A2 and ECCN: 5A002ENC3

Overview



- Software package for PC and SIMATIC S7-200, comprising:
 - *Software for the PC:*
 - OPC server,
 - connection manager
 - *Software for S7-200:*
 - PLC block library
- OPC server for GPRS linking of 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

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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 GPRS; 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 SP2; Microsoft Windows 2003 Server SP1; Microsoft Windows 2000 Professional/Server SP4
Diagnostics	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 for as many as 8, 64 or 256 S7-200 stations; routing for connections between S7-200 stations; connection monitoring; German and English user interface; for Windows XP Professional SP2 or higher, Windows 2003 Server Standard Edition SP1, Windows 2000 Professional/Server SP4; electronic manual in German, English, Chinese, Russian		
• SINAUT MICRO SC8	B8	6NH9 910-0AA10-0AA3
Connection management for 8 S7-200 stations;		
• SINAUT MICRO SC64	B8	6NH9 910-0AA10-0AA6
Connection management for 64 S7-200 stations;		
• SINAUT MICRO SC256	B8	6NH9 910-0AA10-0AA8
Connection management for 256 S7-200 stations;		
Accessories		
GSM/GPRS modem MD720-3		6NH9 720-3AA00
GPRS modem for IP-based data transmission over GSM networks		
ANT794-4MR antenna		6NH9 860-1AA00
Quad band antenna, omnidirectional with 5 m cable		
Alarm Control Center Micro Edition	B3	9AE4 310-3BM01
Remote alarm tool for SINAUT MICRO SC for up to four receivers, message dispatch as acknowledgeable SMS (incl. GSM modem & accessories, without SIM card)		

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

B8: Subject to export regulations: AL: N and ECCN: EAR99S

SIMATIC S7-200

Power supplies

Power supplies

Overview

SITOP modular



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.

SITOP smart



Slimline universal power supplies

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 excellent overload behavior. Numerous certifications permit universal use around the world.

LOGO!Power



LOGO!Power supplies are switched mode power supplies that match the functionality and design of the LOGO! logic modules optimally.

Technical specifications SITOP power 3,5 A

Type	3.5 A
Order No.	6EP1 332-1SH31 ¹⁾
Input	Single-phase AC
Rated voltage $V_{in \text{ rated}}$	120/230 V AC Set via wire jumper
Voltage range	93 ... 132 V/187 ... 264 V AC
Overvoltage resistance	$2.3 \times V_{in \text{ rated}}$, 1.3 ms
Mains buffering $I_{out \text{ rated}}$	> 20 ms at $V_{in} = 187 \text{ V}$
Rated line frequency; rated line-frequency range	50/60 Hz; 47 ... 63 Hz
Rated current $I_{n \text{ rated}}$	1.65/0.95 A
Switch-on current limit (+25 °C)	< 33 A, < 3 ms ($V_{in} = 230 \text{ V}$)
$I^2 t$	< 1.0 A ² s
Built-in-line-side fuse	T 2.5 A/250 V (not accessible)
Recommended miniature circuit breaker (IEC 898) in the mains power input	Tc
Output	Controlled, isolated DC voltage
Rated voltage $V_{out \text{ rated}}$	24 V DC
Total tolerance	±5 % (typ. ±2 %)
• Static mains compensation	Approx. ±0.1 %
• Static load smoothing	Approx. ±0.2 %
Residual ripple	< 150 mV _{pp} (typ. 30 mV _{pp})
Spikes (bandwidth: 20 MHz)	< 240 mV _{pp} (typ. 110 mV _{pp})
Adjustment range	-
Status display	-
Response on activation/deactivation	v
Startup delay/voltage rise	< 1 s/typ. 80 ms
Rated current $I_{out \text{ rated}}$	3.5 A
Current range	
• Up to +45 °C	0 ... 3.5 A
• Up to +60 °C	0 ... 3.5 A
Dynamic overcurrent on	
• Power-up on short circuit	Typ. 5 A for 100 ms
• Short-circuit during operation	Typ. 5 A for 100 ms
Parallel switching for enhanced performance	Yes, up to 5 units
Efficiency	
Efficiency at $V_{out \text{ rated}}$, $I_{out \text{ rated}}$	Approx. 84 %
Power loss at $V_{out \text{ rated}}$, $I_{out \text{ rated}}$	Approx. 16 W
Closed-loop control	
Dynamic mains compensation ($V_{in \text{ rated}} \pm 15 \%$)	Typ. ±0.3 % V_{out}
Dynamic load smoothing (I_{out} : 50/100/50 %)	Typ. ±3 % V_{out}
Load-step settling time	
• 50 to 100 %	< 5 ms
• 100 to 50 %	< 5 ms

Type	3,5 A
Protection and monitoring	
Output overvoltage protection	Yes, according to EN 60950
Current limit	3.8 A
Short-circuit protection	Constant current characteristic up to typ. 14 V, electronic shutdown below that, automatic restart
Sustained short-circuit current rms value	< 4 A
Overload/short-circuit indicator	-
Safety	
Primary/secondary galvanic isolation	Yes, safety extra-low output voltage V_{out} to EN 60950
Protective class	Class I
Leakage current	< 3.5 mA
German Technical Inspectorate approval	Yes
CE marking	Yes
UL/cUL (CSA) approval	cULus-Listed (UL 508, CSA C22.2 No. 142), File E143289
Explosion protection	-
Marine approval	-
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	0 ... +60 °C with natural convection
Transport/storage temperature range	-25 ... +85 °C
Humidity class	Climatic class 3K3 to EN 60721, no condensation
Mechanics	
Connections	
• Supply input L, N, PE	One screw terminal each for 0.5 ... 1 mm ² finely stranded, 0.5 ... 1.5 mm ² single-core
• Output +	1 screw terminal for 0.5 ... 1 mm ²
• Output -	2 screw terminals for 0.5 ... 1 mm ²
Dimensions (W x H x D) in mm	160 x 80 x 62
Weight, approx.	0,5 kg
Installation	Snaps onto DIN rail EN 60715 35x7,5/15, wall installation
Accessories	Mounting bracket

1) SIPLUS module 6AG1 203-1SH31-2AA0 for extended temperature range from -25 to + 70 °C and use under medial load (e.g. chlorine-sulphur atmosphere).

SIMATIC S7-200

Power supplies

Power supplies

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	$2.3 \times U_{inrated}/1.3 \text{ ms}$
Line buffering at $I_{out rated}$	$> 40 \text{ ms}$ at $U_{in} = 187 \text{ V}$
Rated line frequency, rated line-frequency range	50/60 Hz; 47 Hz to 63 Hz
Rated current $I_{inrated}$	1,95-0,97 A
Switch-on current limit (+25 °C)	$< 30 \text{ A}$
I^2t	$< 2.5 \text{ A}^2\text{s}$
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	$\pm 3 \%$
• Static line smoothing	Approx. 0.1 %
• Static load smoothing	Approx. 1.5 %
Ripple content (clock frequency approx. 90 kHz)	$< 200 \text{ mV}_{pp}$
Spikes (bandwidth approx. 20 MHz)	$< 300 \text{ mV}_{pp}$
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	$< 0.5 \text{ s/typ. } 35 \text{ ms}$
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 ($U_{in rated} \pm 15 \%$)	$< 0,2 \%$ U_a
Dynamic load smoothing (I_{out} : 10/90/10 %)	$\pm 1.5 \%$ U_{out}
Load-step settling time	
• 10 at 90 %	Typically 20 ms
• 90 at 10 %	Typically 20 ms

Type	24 V/4 A
Order number	6EP1 332-1SH51
Protection and monitoring	
Current limit	Typically 4.7 A
Short-circuit protection	Constant-current characteristic
Sustained-short-circuit-current rms value	$< 10 \text{ A}$
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

Technical specifications SITOP smart

Power supply, type	2.5 A
Order No.	6EP1 332-2BA10
Input	Single-phase AC
Rated voltage $V_{in \text{ rated}}$	120/230 V AC set by means of selector switch
Voltage range	85 ... 132 V/170 ... 264 V AC
Overvoltage resistance	$2.3 \times V_{in \text{ rated}}$, 1.3 ms
Mains buffering at $I_{out \text{ rated}}$	> 20 ms at $V_{in} = 93/187 \text{ V}$
Rated line frequency; rated line-frequency range	50/60 Hz; 47 ... 63 Hz
Rated current $I_{in \text{ rated}}$	1.1/0.65 A
Switch-on current limit (+25°C)	< 27 A, typ. 3 ms
$I^2 t$	< 0.3 A ² s
Built-in line-side fuse	T 2 A/250 V (non accessible)
Recommended miniature circuit breaker (IEC 898) in the mains power input	From 3 A, C characteristic
Output	Controlled, isolated DC voltage
Rated voltage $V_{out \text{ rated}}$	24 V DC
Total tolerance	±3 %
• Static mains compensation	Approx. 0.1 %
• Static load smoothing	Approx. 0.5 %
Residual ripple	< 150 mV _{pp} (typ. 10mV _{pp})
Spikes (bandwidth: 20 MHz)	< 240 mV _{pp} (typ. 50mV _{pp})
Adjustment range	22.8 ... 28.0 V
Status display	Green LED for 24 V OK
Response on activation/deactivation	Overshoot of V_{out} approx. 4 %
Startup delay/voltage rise	< 0.1 s at 230 V AC/typ. 50 ms
Rated current $I_{out \text{ rated}}$	2.5 A
Current range	
• Up to +45°C	0 ... 3 A
• Up to +60°C	0 ... 2.5 A
Dynamic overcurrent on	
• Power-up on short-circuit	Typ. 7 A for 100 ms
• Short-circuit during operation	Typ. 7 A for 200 ms
Parallel switching for enhanced performance	Yes, 2 units
Efficiency	
Efficiency at $V_{out \text{ rated}}$, $I_{out \text{ rated}}$	Approx. 85 %
Power loss at $V_{out \text{ rated}}$, $I_{out \text{ rated}}$	Approx. 9 W
Closed-loop control	
Dynamic mains compensation ($V_{in \text{ rated}} \pm 15 \%$)	Typ. ±0.3 % V_{out}
Dynamic load smoothing (I_{out} : 50/100/50 %)	Typ. ±1 % V_{out}
Load-step settling time	
• 50 at 100 %	Typ. 0.2 ms
• 100 at 50 %	Typ. 0.2 ms

Power supply, type	2.5 A
Order No.	6EP1 332-2BA10
Protection and monitoring	
Output overvoltage protection	< 33 V
Current limit	Typ. 3.2 ... 3.4 A, overload capability 150 % $I_{out \text{ rated}}$... 5 s/min
Short-circuit protection	Constant-current characteristic
Sustained short-circuit current rms value	Approx. 5 A
Overload/short-circuit indicator	-
Safety	
Primary/secondary galvanic isolation	Yes, safety extra-low output voltage V_{out} to EN 60950 and EN 50178
Protection class	Class I 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	cULus-Listed (UL 508, CSA C22.2 No. 14), File E197259, cCSAus (CSA C22.2 No. 60950-1, UL 60950-1)
Explosion protection	ATEX EX II 3G EEx nA II T4 U; UL 1604
Marine approval	GL
Degree of protection (EN 60 529)	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 ... +60 °C with natural convection
Transport/storage temperature range	-40 ... +85 °C
Humidity class	Climate class 3K3 to EN 60721, no condensation
Mechanics	
Connections	
• Supply input L, N, PE	One screw terminal each for 0.5 ... 2.5 mm ² single-core/ finely-stranded
• Output +	2 screw terminals for 0.5 ... 2.5 mm ²
• Output -	2 screw terminals for 0.5 ... 2.5 mm ²
Dimensions (W x H x D) in mm	32.5 x 125 x 125
Weight, approx.	0.32 kg
Installation	Snaps onto DIN rail EN 60715-35x7,5/15
Accessories	-

SIMATIC S7-200

Power supplies

Power supplies

Technical specifications SITOP smart (continued)

Power supply, type	5 A	5 A
Order No.	6EP1 333-2AA01	6EP1 333-2BA01
Input	Single-phase AC	Single-phase AC
Rated voltage $V_{inrated}$	120/230 V AC set by means of selector switch on device	120/230 V AC set by means of selector switch on device
Voltage range	85 ... 132 V/170 ... 264 V AC	85 ... 132 V/170 ... 264 V AC
Overvoltage resistance	$2.3 \times V_{inrated}$, 1.3 ms	$2.3 \times V_{inrated}$, 1.3 ms
Mains buffering at $I_{out rated}$	> 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 ... 63 Hz	50/60 Hz; 47 ... 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
$I^2 t$	< 0.8 A ² s	< 0.8 A ² s
Built-in line-side fuse	T 3.15 A/250 V (not accessible)	T 3.15 A/250 V (not accessible)
Recommended miniature circuit breaker (IEC 898) in mains power input	From 6 A, Characteristic C	From 6 A, Characteristic C
Output	Controlled, isolated DC voltage	Controlled, isolated DC voltage
Rated voltage $V_{outrated}$	24 V DC	24 V DC
Total tolerance	±3 %	±3 %
• Static mains compensation	Approx. 0.1 %	Approx. 0.1 %
• Static load smoothing	Approx. 0.5 %	Approx. 0.5 %
Residual ripple	< 150 mV _{pp} (typ. 50mV _{pp})	< 150 mV _{pp} (typ. 50mV _{pp})
Spikes (bandwidth: 20 MHz)	< 240 mV _{pp} (typ. 150mV _{pp})	< 240 mV _{pp} (typ. 150mV _{pp})
Adjustment range	22.8 ... 28.0 V	22.8 ... 28.0 V
Status display	Green LED for 24 V OK	Green LED for 24 V OK
Response on activation/deactivation	Overshoot of V_{out} approx. 4 %	Overshoot of V_{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 $I_{outrated}$	5 A	5 A
Current range		
• Up to +45 °C	0 ... 6 A	0 ... 6 A
• Up to +60 °C	0 ... 5 A	0 ... 5 A
Dynamic overcurrent on		
• Power-up on short-circuit	Typ. 17 A for 100 ms	Typ. 17 A for 100 ms
• Short-circuit during operation	Typ. 17 A for 200 ms	Typ. 17 A for 200 ms
Parallel switching for enhanced performance	Yes, 2 units	Yes, 2 units
Efficiency		
Efficiency at $V_{outrated}$, $I_{outrated}$	Approx. 87 %	Approx. 87 %
Power loss at $V_{outrated}$, $I_{out rated}$	Approx. 17 W	Approx. 17 W
Closed-loop control		
Dynamic mains compensation ($V_{in rated} \pm 15$ %)	Typ. ±0.3 % V_{out}	Typ. ±0.3 % V_{out}
Dynamic load smoothing (I_{out} : 50/100/50 %)	Typ. ±1 % V_{out}	Typ. ±1 % V_{out}
Load-step settling time		
• 50 to 100 %	Typ. 0.2 ms	Typ. 0.2 ms
• 100 to 50 %	Typ. 0.2 ms	Typ. 0.2 ms

Technical specifications SITOP smart (continued)

Power supply, type	5 A	5 A
Order No.	6EP1 333-2AA01	6EP1 333-2BA01
Protection and monitoring		
Output overvoltage protection	< 33 V	< 33 V
Current limit	Typ. 6.4 ... 6.6 A, overload capability 150 % I_{out} rated up to 5 s/min	Typ. 6.4 ... 6.6 A, overload capability 150 % I_{out} rated up to 5 s/min
Short-circuit protection	Constant-current characteristic	Constant-current characteristic
Sustained short-circuit current rms value	ca. 10 A	ca. 10 A
Overload/short-circuit indicator	-	-
Safety		
Primary/secondary electrical 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
Protection class	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	cULus-Listed (UL 508, CSA C22.2 No. 14), File E197259, cCSAus (CSA C22.2 No. 60950-1, UL 60950-1)	cULus-Listed (UL 508, CSA C22.2 No. 14), File E197259, cCSAus (CSA C22.2 No. 60950-1, UL 60950-1)
Explosion protection	ATEX-Richtlinie 94/9/EG, EX II 3G EEx nA II T4 U; UL 1604	ATEX-Richtlinie 94/9/EG, EX II 3G EEx nA II T4 U; UL 1604
FM approval	-	-
Marine type approval	GL	GL
Degree of protection (EN 60529)	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... +60 °C with natural convection	0 ... +60°C with natural convection
Transportation/storage temperature range	-40 ... +85 °C	-40 ... +85°C
Humidity class	Climate class 3K3 to EN 60721, no condensation	Climate class 3K3 to EN 60721, no condensation
Mechanics		
Connections		
• Supply input L, N, PE	One screw terminal each for 0.5 ... 2.5 mm ² , single-core/finely stranded	One screw terminal each for 0.5 ... 2.5 mm ² , single-core/finely stranded
• Output +	2 screw terminals for 0.5 ... 2.5 mm ²	2 screw terminals for 0.5 ... 2.5 mm ²
• Output -	2 screw terminals for 0.5 ... 2.5 mm ²	2 screw terminals for 0.5 ... 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
Installation	Snaps onto DIN rail EN 60715 35x7,5/15	Snaps onto DIN rail EN 60715 35x7,5/15
Accessoires	-	-
Power supply, type	10 A	10 A
Order No.	6EP1 334-2AA01	6EP1 334-2BA01 ¹⁾
Input		
Rated voltage V_{in} rated	Single-phase AC 120/230 V AC Set by means of selector switch on device	Single-phase AC 120/230 V AC Set by means of selector switch on device
Voltage range	85 ... 132 V/170 ... 264 V AC	85 ... 132 V/170 ... 264 V AC
Overvoltage resistance	2.3 x V_{in} rated, 1.3 ms	2.3 x V_{in} rated, 1.3 ms
Mains buffering at I_{out} rated	> 20 ms at V_{in} = 93/187 V	> 20 ms at V_{in} = 93/187 V

SIMATIC S7-200

Power supplies

Power supplies

Technical specifications SITOP smart (continued)

Power supply, type	10 A	10 A
Order No.	6EP1 334-2AA01	6EP1 334-2BA01 ¹⁾
Rated line frequency; rated line-frequency range	50/60Hz; 47 ... 63Hz	50/60 Hz; 47 ... 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
$I^2 t$	< 3.3 A ² s	< 3.3 A ² s
Built-in line-side fuse	T 6.3 A/250 V (not accessible)	T 6.3 A/250 V (not accessible)
Recommended miniature circuit breaker (IEC 898) in the mains power input	From 10 A, Characteristic C	From 10 A, Characteristic C
Output	Controlled, isolated DC voltage	Controlled, isolated DC voltage
Rated voltage $V_{out rated}$	24 V DC	24 V DC
Total tolerance	±3 %	±3 %
• Stat. mains compensation	Approx. 0.1 %	Approx. 0.1 %
• Static load smoothing	Approx. 0.5 %	Approx. 0.5 %
Residual ripple	< 150 mV _{pp} (typ. 50 mV _{pp})	< 150 mV _{pp} (typ. 50 mV _{pp})
Spikes (bandwidth: 20 MHz)	< 240 mV _{pp} (typ. 150 mV _{pp})	< 240 mV _{pp} (typ. 150 mV _{pp})
Adjustment range	22.8 ... 28 V	22.8 ... 28 V
Status display	Green LED for 24 V OK	Green LED for 24 V OK
Response on activation / deactivation	Overshoot of V_{out} approx. 4 %	Overshoot of V_{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 ... 12 A	0 ... 12 A
• Up to +60 °C	0 ... 10 A	0 ... 10 A
Dynamic overcurrent on		
• Power-up on short-circuit	Typ. 30 A for 100 ms	Typ. 30 A for 100 ms
• Short-circuit during operation	Typ. 33 A for 200 ms	Typ. 33 A for 200 ms
Parallel switching for enhanced performance	Yes, 2 units	Yes, 2 units
Efficiency		
Efficiency at $V_{out rated}$; $I_{out rated}$	Approx. 90 %	Approx. 91 %
Power loss at $V_{out rated}$; $I_{out rated}$	Approx. 27 W	Approx. 24 W
Closed-loop control		
Dyn. mains compensation ($V_{in rated} \pm 15 \%$)	Typ. $\pm 0.3 \%$ V_{out}	Typ. $\pm 0.3 \%$ V_{out}
Dynamic load smoothing (I_{out} : 50/100/50 %)	Typ. $\pm 1 \%$ V_{out}	Typ. $\pm 1 \%$ V_{out}
Load-step settling time		
• 50 to 100 %	Typ. 0.2 ms	Typ. 0.2 ms
• 100 to 50 %	Typ. 0.2 ms	Typ. 0.2 ms
Protection and monitoring		
Output overvoltage protection	< 33 V	< 33 V
Current limitation	Typ. 12.5 to 13.5 A, overload capability 150 % $I_{out rated}$ up to 5 s/min	Typ. 12.5 ... 13.5 A, overload capability 150 % $I_{out rated}$ up to 5 s/min
Short-circuit protection	Constant current characteristic	Constant current characteristic
Sustained short-circuit current rms value	Approx. 16 A	Approx. 16 A
Overload/short-circuit indicator	-	-

1) SIPLUS module 6AG1 334-2BA01-4AA0 for use under medial load (e.g. sulfur chloride atmosphere).

Technical specifications SITOP smart (continued)

Power supply, type	10 A	10 A
Order No.	6EP1 334-2AA01	6EP1 334-2BA01¹⁾
Safety		
Primary/secondary electrical isolation	Safety extra-low output voltage V_{out} to EN 60950 and EN 50178	Safety extra-low output voltage V_{out} to EN 60950 and EN 50178
Protection class	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 certificate)	Notified Body (CB certificate)
CE marking	Yes	Yes
UL/cUL (CSA) approval	Yes, cULus-Listed (UL 508, CSA C22.2 No. 14), File E197259, cCSAus (CSA C22.2 No. 60950-1, UL 60950-1)	Yes, cULus-Listed (UL 508, CSA C22.2 No. 14), File E197259, cCSAus (CSA C22.2 No. 60950-1, UL 60950-1)
Explosion protection	ATEX EX II 3G EEx nA II T4 U; UL 1604	ATEX EX II 3G EEx nA II T4 U; UL 1604
FM approval	-	-
Marine approval	GL	GL
Degree of protection (EN 60529)	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 ... +60 °C with natural convection	0 ... +60 °C with natural convection
Transport/storage temperature range	-40 ... +85 °C	40 ... +85 °C
Humidity class	Climate class 3K3 to EN 60721, no condensation	Climate class 3K3 to EN 60721, no condensation
Mechanics		
Connections		
Supply input L, N, PE	One screw terminal each for 0.5 ... 2.5 mm ² single-core/finely stranded	One screw terminal each for 0.5 ... 2.5 mm ² single-core/finely stranded
Output +	2 screw terminals for 0.5 ... 2.5 mm ²	2 screw terminals for 0.5 ... 2.5 mm ²
Output -	2 screw terminals for 0.5 ... 2.5 mm ²	2 screw terminals for 0.5 ... 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
Installation	Snaps onto DIN rail EN 60715 35x7,5/15	Snaps onto DIN rail EN 60715 35x7,5/15
Accessories	-	-

1) SIPLUS module 6AG1 334-2BA01-4AA0 for use under medial load (e.g. sulfur chloride atmosphere).

Ordering Data	Order No.	Ordering Data	Order No.
Regulated load current supply SITOP power 3.5 A		Regulated load current supply SITOP smart	
120/230 V AC, 24 V DC /3.5 A	6EP1 332-1SH31	120/230 V AC, 24 V DC	
120/230 V AC, 24 V DC /3.5 A; (enhanced temperature range and medial exposure)	6AG1 203-1SH31-2AA00	2.5 A	
Mounting bracket	6EP1 971-1AA01	5 A	
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		5 A, with restriction of the supply harmonics acc. to EN 61000-3-2	6EP1 332-2BA10
Regulated load current supply LOGO!Power 24 V/4 A	6EP1 332-1SH51	10 A	6EP1 333-2AA01
100 ... 240 V AC, 24 V DC/4 A		10 A, with restriction of the supply harmonics acc. to EN 61000-3-2	6EP1 333-2BA01
		10 A, with restriction of the supply harmonics acc. to EN 61000-3-2; medial exposure	6EP1 334-2AA01
			6EP1 334-2BA01
			6AG1 334-2BA01-4AA0

SIMATIC S7-200

Human machine interface

Text Display TD 100C

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 272-1BA10-0YA1	
Power supply	
Input voltage	
• Rated value (DC)	24 V; Supply from S7-200 communication interface
Input current	
• Rated value at DC 24 V	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

6ES7 272-1BA10-0YA1	
Operator control and monitoring	
Display	
• Type	LC display (reflecting)
Operating/fault messages	
• Number of lines	4
• Number of characters per line	12; characters/line: 12 or 16 characters/line: Chinese 8
• 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 of protection	
IP 65	Yes
Dimensions	
Cabinet/switchboard strength	1,5 mm; 1,5 to 4 mm
Dimensions	
Dimensions	
• 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
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	B7 6ES7 272-1BA10-0YA1
Connecting cables	
For connecting TD 100C or TD 200C to S7-200	6ES7 901-3EB10-0XA0
Blank foils	
For printing customized keyboard layouts; 6 perforated foils per sheet; 10 sheets per packing unit	6ES7 272-1BF00-7AA0
Accessories	
Accessories for supplementary ordering	see catalog ST 80

B7: Subject to export regulations: AL: N and ECCN: EAR99H

SIMATIC S7-200

Human machine interface

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 272-0AA30-0YA1	
Power supply	
Input voltage	
• Rated value (DC)	24 V; Power supplied over the S7-200 communications interface or optional external power supply unit; the CPU sensor power supply (24 V DC) is not subjected to load
Input current	
• Rated value at DC 24 V	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

6ES7 272-0AA30-0YA1	
Operator control and monitoring	
Display	
• Type	LCD backlit
Operating/fault messages	
• Number of lines	2
• Number of characters per line	20; Chars/line: ASCII, Cyrillic; 10 chars/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 of protection	Yes; at front
IP 65	
Dimensions	
Cabinet/switchboard strength	0.3 mm; 0.3 to 4 mm
Dimensions	
Dimensions	
• Width	148 mm
• Height	76 mm
• Depth	27 mm
• Mounting cutout, width	138 mm
• Mounting cutout, height	68 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 272-0AA30-0YA1

Connecting cables

For connecting TD 100C or TD 200C to S7-200

6ES7 901-3EB10-0XA0

Accessories

Accessories for supplementary ordering

see catalog ST 80

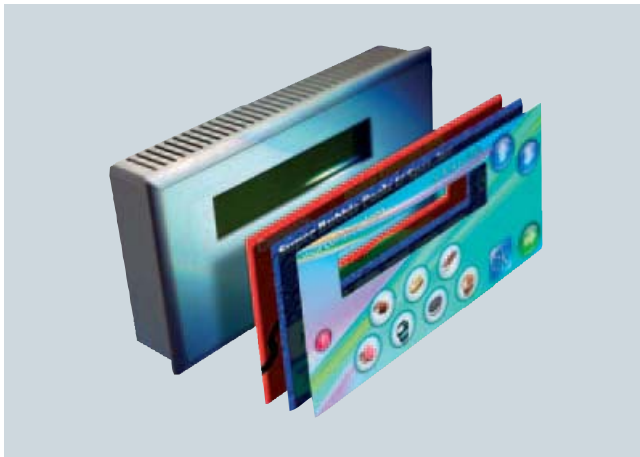
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SIMATIC S7-200

Human machine interface

Text Display TD 200C

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 272-1AA10-0YA1	
Power supply	
Input voltage	
• Rated value (DC)	24 V; Power supplied over the S7-200 communications interface or optional external power supply unit; the CPU sensor power supply (24 V DC) is not subjected to load
Input current	
• Rated value at DC 24 V	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

6ES7 272-1AA10-0YA1	
Operator control and monitoring	
Display	
• Type	LCD backlit
Operating/fault messages	
• Number of lines	2
• Number of characters per line	20; Chars/line: ASCII, Cyrillic; 10 chars/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 of protection	
IP 65	Yes; at front
Dimensions	
Cabinet/switchboard strength	0.3 mm; 0.3 to 4 mm
Dimensions	
Dimensions	
• Width	148 mm
• Height	76 mm
• Depth	28 mm
• Mounting cutout, width	138 mm
• Mounting cutout, height	68 mm
Weights	
• Weight, approx.	200 g

Ordering Data		Order No.
Text Display TD 200C		
With individually configurable control elements on the device front;	B7	6ES7 272-1AA10-0YA1
for connecting to SIMATIC S7-200; for use with STEP 7-Micro/WIN V4 and higher, incl. plug-in cable		
Connecting cables		6ES7 901-3EB10-0XA0
For connecting TD 100C or TD 200C to S7-200		
Blank foils		6ES7 272-1AF00-7AA0
For printing customized keyboard layouts;	B7	
3 perforated faceplates per sheet;		
10 sheets per packing unit		
Accessories		
Accessories for supplementary ordering		see catalog ST 80

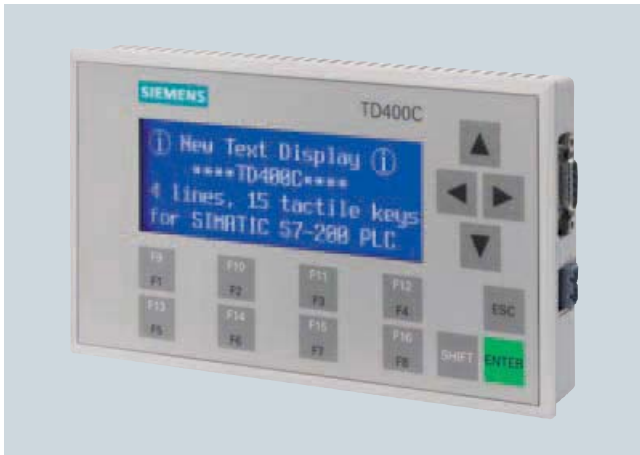
B7: Subject to export regulations: AL: N and ECCN: EAR99H

SIMATIC S7-200

Human machine interface

Text Display TD 400C

Overview



- Multi-screen workstation and extremely good readability thanks to backlit four-line display
- Customizable operator interface with 15 tactile keys
- Acoustic and visual feedback from key operation
- Optimal support of the S7-200:
 - Direct connection to the S7-200 interface via supplied cable
 - No separate power supply required
 - Parameterization with STEP 7-Micro/WIN V4 SP6

Technical specifications

	6AV6 640-0AA00-0AX1
Supply voltage	
Supply voltage	24 V DC
permissible range	DC
Memory	
Type of storage	
• Memory usable for project data/Options	No info
Configuration	
Configuration tool	MicroWin (to be ordered separately)
Display	
Display type	STN, Black/white
Size	3.7"
Resolution (WxH in pixel)	192 x 64
MTBF backlighting (at 25 °C)	about 20,000 hours

	6AV6 640-0AA00-0AX1
Operating mode	
Operating elements	Membrane keyboard
Function keys, programmable	15 function keys
Membrane keyboard	Yes
Ambient conditions	
Temperature	
• Operation	0 °C to +50 °C
• Transport, storage	-20 °C to +60 °C
Degree of protection	
Front	IP65, NEMA 4, NEMA 4x, NEMA 12 (when installed)
Rear	IP20
Certifications & Standards	
Certifications	CE, FM Class I Div. 2, UL, C-TICK, NEMA 4, NEMA 4x, NEMA 12
interfaces	
Interfaces	1 x RS485 (max. 187.5 Mbit/s)
Dimensions	
Weights	
• Weight	0.33 kg

Ordering Data

Order No.

Text Display TD 400C	B7	6AV6 640-0AA00-0AX1
With customizable operator interface on the device front; for connecting to SIMATIC S7-200; can be used from STEP 7-Micro/WIN V4 SP6, incl. connecting cable		
Connecting cables		6ES7 901-3EB10-0XA0
For connecting TD 100C/TD 200C or TD 400C to S7-200		
Blank foils		6AV6 671-0AP00-0AX0
For printing customized keyboard layouts; 2 perforated films per sheet; 10 sheets per pack		
Accessories		
Accessories for supplementary ordering		see catalog ST 80

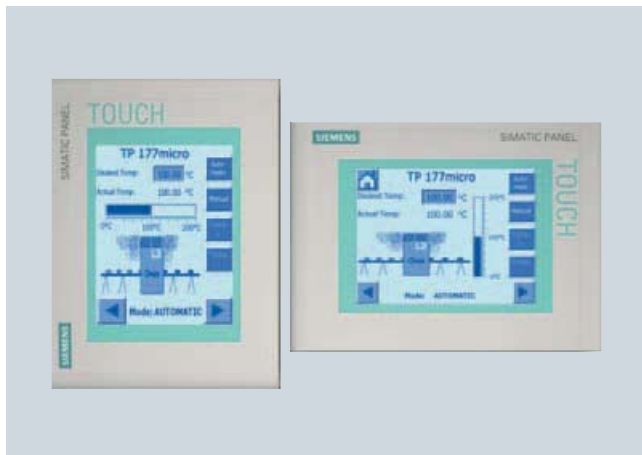
B7: Subject to export regulations: AL: N and ECCN: EAR99H

SIMATIC S7-200

Human machine interface

SIMATIC TP 177micro

Overview



- Touch Panel for operator control and monitoring of small machines and plants
- Low-cost entry-level product in the category of touch panels with graphics capability and all the basic functions required for simple tasks
- Pixel graphics 5.7" STN touch screen (analog/resistive), Bluemode (4 levels)
- Specially for SIMATIC S7-200:
Communication to the PLC through the integrated interface over a point-to-point link
- Connection to the PLC over MPI or PROFIBUS DP cable
- SIMATIC TP 177micro is the innovative successor to the Touch Panels SIMATIC TP 070/TP 170micro

Technical specifications

6AV6 640-0CA11-0AX1	
Supply voltage	
Supply voltage	24 V DC
permissible range	+20.4 V to +28.8 V DC
Rated current	0.24 A
Memory	
Type of storage	Flash
Type	
Memory usable for project data/Options	
Time	
Clock	Software clock, Not battery backed
• Type	
Configuration	
Configuration tool	WinCC flexible Micro Version 2004 SP1, HSP or higher (to be ordered separately)
Display	
Display type	STN, 4 Blue levels
Size	5.7"
Resolution (WxH in pixel)	320 x 240
MTBF backlighting (at 25 °C)	about 50,000 hours
Operating mode	
Operating elements	Touch screen
Function keys, programmable	None
System keys	0
Touchscreen	analog, resistive
Numeric/alphabetical input	Yes / Yes
Ambient conditions	
Mounting position	Vertical
maximum permissible angle of inclination without external ventilation	+/- 35 °
max. relative humidity (in %)	90%

6AV6 640-0CA11-0AX1	
Temperature	
• Operation (vertical installation)	0 °C to +50 °C
• Operation (max. tilt angle)	0 °C to +40 °C
• Transport, storage	-20 °C to +60 °C
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 (available soon), EX-Zone 22 (available soon), C-TICK, NEMA 4x
interfaces	
Interfaces	1 x RS485 (max. 187.5 Mbit/s)
Operating systems	
Operating system	LINUX
Processor	
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	Ring buffer (n x 128 entries)
Number of process images	
• Process images	250
• Variables	250
• Limit values	Yes
• Multiplexing	Yes

SIMATIC S7-200

Human machine interface

SIMATIC TP 177micro

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Technical specifications (continued)

6AV6 640-0CA11-0AX1	
Image elements	
• Text objects	500 text elements
• Graphics object	Bit maps, icons, icon (full-screen), vector graphics
• dynamic objects	Diagrams, bar graphs
Lists	
• Text lists	150
• Graphics list	100
• Libraries	Yes
Security	
• Number of user groups	1
• Passwords exportable	Yes
• Number of users	1
Data medium support	
• Multi Media Card	No
Recording	
• Printer driver	-
Fonts	
• Keyboard fonts	US American (English)
Languages	
• Online languages	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
• Fonts	WinCC flexible Standard, symbol languages
Transfer (Upload/Download)	
• Transfer of configuration	serial
Process coupling	
• Connection to controller	for S7-200, see section on "System interfaces"
Expandability/openness	
• Open Platform Program	No
Dimensions	
Front of enclosure (W x H)	212 mm x 156 mm
Mounting cutout/Device depth (W x H/D) in mm	198 mm x 142 mm / 45 mm device depth
Dimensions	
Weights	0.75 kg

Ordering Data

Order No.

SIMATIC TP 177micro	B9	6AV6 640-0CA11-0AX1
Touch Panel for connection to the SIMATIC S7-200, 5.7" STN display		
TP 177micro starter package	B1	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)		
Configuration		
with SIMATIC WinCC flexible		
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
WinCC flexible Micro User Manual		
• German		6AV6 691-1AA01-3AA0
• English		6AV6 691-1AA01-3AB0
• French		6AV6 691-1AA01-3AC0
• Italian		6AV6 691-1AA01-3AD0
• Spanish		6AV6 691-1AA01-3AE0
SIMATIC HMI Manual Collection	B8	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		
Accessories for supplementary ordering		see catalog ST 80

B1: Subject to export regulations: AL: N and ECCN: 5D002ENC3

B8: Subject to export regulations: AL: N and ECCN: EAR99S

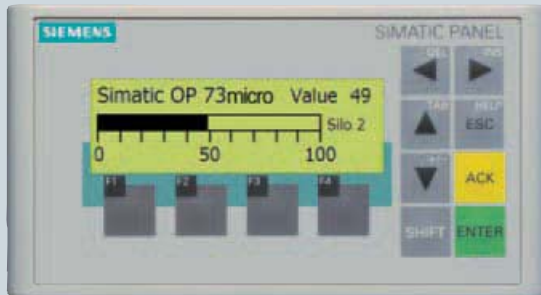
B9: Subject to export regulations: AL: N and ECCN: EAR99T

SIMATIC S7-200

Human machine interface

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
permissible range	+20.4 V to +28.8 V DC
Rated current	0.1 A
Memory	
Type of storage	
Type	Flash
Memory usable for project data/Options	128 KB usable memory for user data
Time	
Clock	
• Type	Software clock, Not battery backed
Configuration	
Configuration tool	WinCC flexible Micro Version 2004 SP1, HSP or higher (to be ordered separately)
Display	
Display type	STN, Black/white
Size	3"
Resolution (WxH in pixel)	160 x 48
MTBF backlighting (at 25 °C)	about 100,000 hours
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	- / - / -

	6AV6 640-0BA11-0AX0
Ambient conditions	
Mounting position	Vertical
maximum permissible angle of inclination without external ventilation	+/- 80 °
max. relative humidity (in %)	90%
Temperature	
• Operation (vertical installation)	0 °C to +50 °C
• Operation (max. tilt angle)	0 °C to +40 °C
• Transport, storage	-20 °C to +60 °C
Degree of protection	
Front	IP65, NEMA 4x, (when installed)
Rear	IP20
Certifications & Standards	
Certifications	CE, GL, ABS, BV, DNV, LRS, UL, CSA, cULus, C-TICK, NEMA 4x
Interfaces	
Interfaces	1 x RS485 (max. 187.5 Mbit/s)
Operating systems	
Operating system	LINUX
Processor	
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	Ring buffer (n x 100 entries)

SIMATIC S7-200

Human machine interface

SIMATIC OP 73micro

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Technical specifications (continued)

6AV6 640-0BA11-0AX0	
Number of process images	
• Process images	250
• Variables	500
• Limit values	Yes
• Multiplexing	Yes
Image elements	
• Text objects	1,000 text elements
• Graphics object	Bit maps, icons, icon (full-screen)
• dynamic objects	Bar graphs
Lists	
• Text lists	150
• Graphics list	0
• Libraries	Yes
Security	
• Number of user groups	1
• Passwords exportable	Yes
• Number of users	1
Data medium support	
• Multi Media Card	No
Recording	
• Printer driver	-
Fonts	
• Keyboard fonts	US American (English)
Languages	
• Online languages	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
• Fonts	WinCC flexible Standard, symbol languages
Transfer (Upload/Download)	
• Transfer of configuration	serial
Process coupling	
• Connection to controller	for S7-200, see section on "System interfaces"
Expandability/openness	
• Open Platform Program	No
Dimensions	
Front of enclosure (W x H)	154 mm x 84 mm
Mounting cutout/Device depth (W x H/D) in mm	138 mm x 68 mm / 28.5 mm device depth
Dimensions	
Weights	
Weight	0.25 kg

Ordering Data

Order No.

SIMATIC OP 73micro	B9	6AV6 640-0BA11-0AX0
Operator panel for connection to the SIMATIC S7-200, with 3" display, monochrome incl. mounting accessories		
OP 73micro starter package	B1	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)		
Configuration		
with SIMATIC WinCC flexible		
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 691-1AA01-3AA0
• English		6AV6 691-1AA01-3AB0
• French		6AV6 691-1AA01-3AC0
• Italian		6AV6 691-1AA01-3AD0
• Spanish		6AV6 691-1AA01-3AE0
SIMATIC HMI Manual Collection B8		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		
Accessories for supplementary ordering		see catalog ST 80

B1: Subject to export regulations: AL: N and ECCN: 5D002ENC3

B8: Subject to export regulations: AL: N and ECCN: EAR99S

B9: Subject to export regulations: AL: N and ECCN: EAR99T

SIMATIC S7-200

Software, Accessories

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

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 Kbit/s; setting: DIP switch; RS 232 not required	187.5 kBit/s; 9.6/19.2/187.5 Kbit/s; setting: not necessary
Status information/alarms/diagnostics		
Diagnostics indication LED		
• Description	Tx (green): RS-232-transmit indication; Rx (green): RS-232-receive indication; PPI (green): RS-485-transmit indication	Tx (green): USB transmit indication; Rx (green): USB receive indication; PPI (green): RS-485-transmit indication

	6ES7 901-3CB30-0XA0	6ES7 901-3DB30-0XA0
Isolation		
Galvanic isolation	1	1
Software requirement		
Software required	STEP 7 Micro/WIN V3.2 SP4 or higher	STEP 7 Micro/WIN V3.2 SP4 or higher
Dimensions		
Weights		
Weight, approx.	300 g	300 g

Ordering Data

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

Order No.

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

Order No.

6ES7 901-3DB30-0XA0

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 (e.g. by chloric and sulphuric atmospheres).
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1).	No
Approvals	CE, cUL (available soon)
Technical data	The technical data are identical with the technical data of the based on modules.

Ordering Data

SIPLUS cable 901

(extended temperature and
medial exposure)

For connecting devices with an
RS 232 interface to SIMATIC
S7-200 or PPI network Master in
multi-master PPI network

Order No.

6AG1 901-3CB30-2XA0

SIMATIC S7-200



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SIMATIC S7-300



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4/4	Central processing units	4/138	SIPLUS FM 350-2 counter module
4/4	Compact CPUs	4/139	FM 351 positioning module
4/20	Standard CPUs	4/141	FM 352 cam controller
4/42	Technology CPUs	4/143	FM 352-5 high-speed Boolean processor
4/49	Fail-safe CPUs	4/147	FM 353 positioning module
4/63	SIPLUS central processing units	4/149	FM 354 positioning module
4/63	SIPLUS compact CPUs	4/152	FM 357-2 positioning module
4/65	SIPLUS standard CPUs	4/155	FM 355 controller module
4/68	SIPLUS fail-safe CPUs	4/159	FM 355-2 temperature controller module
4/71	Digital modules	4/163	SM 338 POS input module
4/71	SM 321 digital input modules	4/165	IM 174 PROFIBUS module
4/77	SM 322 digital output modules	4/168	SIWAREX U
4/84	SM 323/SM 327 digital input/output modules	4/171	SIWAREX FTA
4/88	SIPLUS digital modules	4/174	SIWAREX FTC
4/88	SIPLUS SM 321 digital input modules	4/177	SIWAREX M
4/89	SIPLUS SM 322 digital output modules	4/181	SIFLOW FC070
4/90	SIPLUS SM 323 digital input/output module	4/183	SIPLUS DCF 77 radio clock module
4/91	Analog modules	4/184	IQ-Sense modules and sensors
4/91	SM 331 analog input modules	4/184	IQ-Sense sensor module
4/100	SM 332 analog output modules	4/186	SIMATIC PXO opto proximity switches with IQ-Sense
4/103	SM 334 analog input/output modules	4/188	SIMATIC PXS sonar proximity switches with IQ-Sense
4/106	SM 335 fast analog hybrid module	4/189	Special modules
4/108	SIPLUS analog modules	4/191	Communication
4/108	SIPLUS SM 331 analog input modules	4/191	CP 340
4/109	SIPLUS SM 332 analog output modules	4/193	SIPLUS CP 340
4/110	SIPLUS SM 334 analog input/output modules	4/194	CP 341
4/111	F digital / analog modules	4/197	SIPLUS CP 341
4/111	SM 326 F digital input modules - Safety Integrated	4/198	CP 343-2
4/114	SM 326 F digital output modules - Safety Integrated	4/199	CP 343-2 P
4/117	SM 336 F analog input module - Safety Integrated	4/200	CP 342-5
4/120	Isolation module	4/202	CP 342-5 FO
4/121	SIPLUS F digital-/analog modules	4/204	CP 343-5
4/121	SIPLUS SM 326 F digital input module - Safety Integrated	4/206	CP 343-1 Lean
4/122	SIPLUS SM 326 F digital output module - Safety Integrated	4/209	CP 343-1
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4/124	Ex digital input/output modules	4/217	Front connectors
4/127	Ex analog input/output modules	4/218	Fully modular connection
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4/135	FM 350-2 counter module	4/229	Power supplies
		4/232	Accessories
		<i>Brochures</i>	
			For brochures serving as selection guides for SIMATIC products refer to:
			http://www.siemens.com/simatic/printmaterial

SIMATIC S7-300

Introduction

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 PROFI-safe profile
- Standard modules can be used in addition for non-safety-relevant applications

SIPLUS S7-300

- The PLC for use under extremely harsh environmental conditions
- With enhanced temperature range from -25 °C to +60 °C
- Use in environments with pollutant gases (corrosive gas atmospheres)
- Occasional short-term condensation and enhanced mechanical stress permissible
- With the proven PLC technology of the S7-300
- Easy handling, programming, maintenance and service
- Ideal for use in automobile construction, environmental technology, mining, chemical plants, conveying technology, food & beverages industry etc.
- The substitute for expensive special solutions

For more information, go to:

<http://www.siemens.com/siplus>

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

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

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 ... 60 °C
• With vertical mounting	0 ... 40 °C
Relative humidity	5 to 95 %, no condensation (RH severity level 2 in accordance with IEC 61131-2)
Atmospheric pressure	795 ... 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 data of the SIPLUS S7-300

Climatic environmental conditions

Temperature	Horizontal installation: -25 °C to 60 °C vertical installation: -25 °C to 40 °C
Relative humidity	5 to 95%; short-term condensation permissible, corresponds to relative humidity (RH) load 2 according to IEC 1131-2 and IEC 721 3-3 Cl. 3K5
Short-term ice formation	-25 °C to 0 °C IEC 721 3-3 Cl. 3K5
Air pressure	1080 to 795 hPa corresponds to an altitude of -1000 to 2000 m
Contaminant concentration	SO ₂ : < 0.5 ppm; relative humidity < 60% test: 10 ppm, 4 days H ₂ S: < 0.1 ppm; relative humidity < 60% test: 1 ppm, 4 days (to IEC 721 3-3; Class 3C3)

Mechanical environmental conditions

Vibrations	Type of vibration: Frequency sweeps with a rate of change of 1 octave/minute. 2 Hz ≤ f ≤ 9 Hz, constant Amplitude 3.0 mm, 9 Hz ≤ f ≤ 150 Hz, constant acceleration 1 g, duration of oscillation: 10 frequency cycles per axis in each of the three mutually perpendicular axes Vibration tests according to IEC 68 Part 2-6 (sine wave) and IEC 721 3-3, Class 3M4
Shock	Type of shock: Half-sine, intensity of shock: 15 g peak value, 11 ms duration, direction: 3 shocks each in +/- direction in each of the 3 perpendicular axes Shock testing in accordance with IEC 68 Part 2-27
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	Yes ¹⁾

¹⁾ Does not apply to
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, 6AG1331-7TB00-2AB0

SIMATIC S7-300

Central processing units

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 CPU 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 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.

SIMATIC S7-300

Central processing units

Compact CPUs

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 V5.3 SP2 or higher 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
external protection for supply cables (recommendation)	Miniature circuit breaker, type C; min. 2 A; miniature circuit breaker type B, min. 4 A					
Current consumption						
Current consumption (rated value)	500 mA	700 mA	700 mA	900 mA	800 mA	1 000 mA
Current consumption (in no-load operation), typ.	60 mA	150 mA	100 mA	100 mA	150 mA	150 mA
Inrush current, typ.	11 A	11 A	11 A	11 A	11 A	11 A
I ² t	0.7 A ² · s	0.7 A ² · s	0.7 A ² · s	0.7 A ² · s	0.7 A ² · s	0.7 A ² · s
from supply voltage L+, max.	500 mA	700 mA	700 mA	900 mA	800 mA	1 000 mA
Current consumption/power loss						
Power loss, typ.	6 W	14 W	10 W	10 W	14 W	14 W
Memory						
Type of storage						
RAM						
• integrated	32 Kibyte; For program and data	64 Kibyte; For program and data	64 Kibyte; For program and data	64 Kibyte; For program and data	96 Kibyte; For program and data	96 Kibyte; For program and data
• expandable	No	No	No	No	No	No
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

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Central processing units

Compact CPUs

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
Backup						
• present	Yes; Guaranteed by MMC (maintenance-free)					
• without battery	Yes; Program and data					
CPU/ blocks						
DB						
• Number, max.	511; Number range: 1 to 511					
• Size, max.	16 Kibyte					
FB						
• Number, max.	1 024; Sequence of numbers: 0 to 2047					
• Size, max.	16 Kibyte					
FC						
• Number, max.	1 024; Sequence of numbers: 0 to 2047					
• Size, max.	16 Kibyte					
OB						
• Size, max.	16 Kibyte	16 Kibyte	16 Kibyte	16 Kibyte	16 Kibyte; See instruction	16 Kibyte
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
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

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
S7 times (continued)						
• 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; Number range: 1 to 511	511; Number range: 1 to 511	511; Number range: 1 to 511	511; Number range: 1 to 511
• Size, max.	16 Kibyte					
• Remanence adjustable	Yes; via non-retain property on DB					
• Remanence preset	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 Kibyte	1 Kibyte	1 Kibyte	1 Kibyte	1 Kibyte	1 Kibyte
• Outputs	1 Kibyte	1 Kibyte	1 Kibyte	1 Kibyte	1 Kibyte	1 Kibyte
• of which, distributed						
- Inputs			none	1 006 byte; max.	none	979 byte
- Outputs			none	1 006 byte; max.	none	986 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	8 064	1 016	7 856
• Outputs	262	1 008	1 008	8 064	1 008	7 904
• 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
Analog channels						
• Inputs	64	253	248	503	253	494
• Outputs	64	250	248	503	250	495
• 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

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Technical specifications (continued)

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Number of DP masters						
• integrated	none	none	No	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, point-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					
• buffered and synchronizable	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
• to DP, Master				Yes; on DP slave only time-of-day slave		Yes; on DP slave only time-of-day slave
• to DP, Slave				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 communication	8; Depending on the configured connections for PG/OP and S7 basic communication	8; Depending on the configured connections for PG/OP and S7 basic communication	8	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	Yes	Yes	Yes
simultaneously active Alarm-S blocks, max.	20	20	20	20	40	40
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
• 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

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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
Forcing						
• Forcing	Yes					
• Force, variables	Inputs, outputs					
• Number of variables, max.	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 entries, max.	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					
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	1x 40-pin	2x 40-pin	1x 40-pin	1x 40-pin	2x 40-pin	2x 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	
Integrated protocol driver						
• 3964 (R)						
• ASCII						
• RK512						
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; 1 9.2 Kbit/s full duplex		19.2 kBit/s; 38.4 Kbit/s half duplex; 19.2 Kbit/s full duplex	

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	6ES7 312-5BE03-0AB0	6ES7 313-5BF03-0AB0	6ES7 313-6BF03-0AB0	6ES7 313-6CF03-0AB0	6ES7 314-6BG03-0AB0	6ES7 314-6CG03-0AB0
Transmission speed, RS 422/485 (continued)						
• 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 485 interface	integrated RS 485 interface	integrated RS 485 interface	integrated RS 485 interface	integrated RS 485 interface	integrated RS 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
Functionality						
• MPI			No	No	No	No
• DP master			No	Yes	No	Yes
• DP slave			No	Yes	No	Yes
• PROFINET IO controller			No	No	No	No
• PROFINET CBA			No	No	No	No
• Point-to-point coupling			Yes	No	Yes	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

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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
DP master (continued)						
• Services						
- PG/OP communication				Yes		Yes
- Routing				Yes		Yes
- Global data communication				No		No
- S7 basic communication				Yes; I blocks only		Yes; I blocks only
- S7 communication				Yes		Yes
- S7 communication, as client				No		No
- S7 communication, as server				Yes		Yes
- equidistance support				Yes		Yes
- Isochronous mode				No		No
- 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 Kibyte		1 Kibyte
- Outputs, max.				1 Kibyte		1 Kibyte
• 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				No		No
- S7 communication, as client				No		No
- S7 communication, as server				Yes		Yes
- direct data exchange (cross traffic)				Yes		Yes
- DPV1				No		No
• GSD file				You can obtain the current GSD file from http://www.siemens.com/profibus-gsd		You can obtain the current GSD file from http://www.siemens.de/profibus-gsd
• 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

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Technical specifications (continued)

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CPU/programming						
Programming language						
• STEP 7	Yes; V5.3 SP2 with HW update	Yes; V5.3 SP2 with HW update	Yes; V5.2 SP2 with HW update	Yes; V5.3 SP2 with HW update	Yes; V5.3 SP2 with HW update	Yes; V5.3 SP2 with HW update
• LAD	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
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
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 simultaneously controllable inputs						
• horizontal installation - up to 40 °C, max. - up to 60 °C, max.	10 5	24 12	16 8	16 8	24 12	24 12
• vertical installation - up to 40 °C, max.	5	12	8	8	12	12
• Technological functions - shielded, max. - unshielded, max.	100 m not allowed	100 m not allowed	100 m not allowed	100 m not allowed	50 m not allowed	50 m not allowed
• Standard DI - shielded, max. - unshielded, max.	1 000 m 600 m	1 000 m 600 m	1 000 m 600 m	1 000 m 600 m	1 000 m 600 m	1 000 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 - Rated value	Yes; 0.1 / 0.3 / 3 / 15 ms 3 ms	Yes; 0.1 / 0.3 / 3 / 15 ms 3 ms	Yes; 0.1 / 0.3 / 3 / 15 ms 3 ms	Yes; 0.1 / 0.3 / 3 / 15 ms 3 ms	Yes; 0.1 / 0.3 / 3 / 15 ms 3 ms	Yes; 0.1 / 0.3 / 3 / 15 ms 3 ms
• for counter/technological functions - at "0" to "1", max.	48 µs	16 µs	16 µs	16 µs	8 µs	8 µs

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
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; 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	600 m; For technological functions: No	600 m; For technological functions: No	600 m; For technological functions: No	600 m; For technological functions: No
Digital outputs						
Number of digital outputs	6	16	16	16	16	16
• of which, high-speed outputs	2	4	4	4	4	4
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
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)						
• 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
• vertical installation						
- up to 40 °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
• 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

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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 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 current input (destruction limit), max.		2.5 V; permanent			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	0.5 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
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), resistance thermometers						
• Pt 100		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 to 3.3 mA			1.8 to 3.3 mA	1.8 to 3.3 mA
• 0 to 600 Ohm		Yes			Yes	Yes
• permissible input frequency for voltage input (destruction limit), max.		30 V; permanent			30 V; permanent	30 V; permanent
• permissible input current for current input (destruction limit), max.		50 mA; permanent			50 mA; permanent	50 mA; permanent
Characteristic curve linearization						
• programmable		Yes; by software			Yes; by software	Yes; by 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

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
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 k Ω			1 k Ω	1 k Ω
• with voltage outputs, capacitive load, max.		0.1 μ F			0.1 μ F	0.1 μ F
• with current outputs, max.		300 Ω			300 Ω	300 Ω
• with current outputs, inductive load, max.		0.1 milliH			0.1 milliH	0.1 milliH
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)
Integration and conversion time/resolution per channel						
• Resolution with overload area (bit including sign), max.		12 Bit			12 Bit	12 Bit
• Integration time, parameterizable		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 resistances			Yes; without compensation of the line resistances	Yes; without compensation of the line resistances
• for resistance measurement with 3-conductor connection		No			No	No
• for resistance measurement with 4-conductor connection		No			No	No

SIMATIC S7-300

Central processing units

Compact CPUs

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
Connectable encoders						
• 2-wire BEROs - permissible quiescent current (2-wire BEROs), max.	Yes 1.5 mA	Yes 1.5 mA	Yes 1.5 mA	Yes 1.5 mA	Yes 1.5 mA	Yes 1.5 mA
Errors/accuracies						
Temperature error (relative to input areas)		+/- 0,006 %/K			+/- 0,006 %/K	+/- 0,006 %/K
Crosstalk between the inputs, min.		60 dB			60 dB	60 dB
Repeat accuracy in settled status at 25 °C (relative to input area)		+/- 0,06 %			+/- 0,06 %	+/- 0,06 %
Output ripple (based on output range, bandwidth 0 to 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
Crosstalk between the outputs, 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 %
Operational limit in overall temperature range						
• Voltage, relative to input area		+/- 1 %			+/- 1 %	+/- 1 %
• Current, relative to input area		+/- 1 %			+/- 1 %	+/- 1 %
• Impedance, relative to input area		+/- 5 %			+/- 5 %	+/- 5 %
• Voltage, relative to output area		+/- 1 %			+/- 1 %	+/- 1 %
• Current, relative to output area		+/- 1 %			+/- 1 %	+/- 1 %
Basic error limit (operational limit at 25 °C)						
• 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 %
• Voltage, relative to output area		+/- 0,7 %			+/- 0,7 %	+/- 0,7 %
• Current, relative to output area		+/- 0,7 %			+/- 0,7 %	+/- 0,7 %
Interference voltage suppression for $f = n \times (f_l \pm 1 \%)$, f_l = 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

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 max. 2.5 kHz (see "Technological Functions" manual)	3; 3 channels pulse width modulation up to max. 2.5 kHz (see "Technological Functions" manual)	3; 3 channels pulse width modulation up to max. 2.5 kHz (see "Technological Functions" manual)	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						
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 and the backplane bus	Yes	Yes	Yes	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		8	8	8	8	8
• between the channels and the backplane bus	Yes	Yes	Yes	Yes	Yes	Yes
Isolation, analog inputs						
• Isolation, analog inputs		Yes; common for analog I/O			Yes; common for analog I/O	Yes; common for analog I/O
• between the channels		No			No	No
• between the channels and the backplane bus		Yes			Yes	Yes
Isolation, analog outputs						
• Galvanic isolation, analog outputs		Yes; common for analog I/O			Yes; common for analog I/O	Yes; common for analog I/O
• between the channels		No			No	No
• between the channels and the backplane bus		Yes			Yes	Yes
Dimensions						
Dimensions						
• 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

SIMATIC S7-300

Central processing units

Compact CPUs

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Ordering Data	Order No.		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; MMC is required	6ES7 312-5BE03-0AB0	Front connector (1 unit) for compact CPUs 40-pin, with screw contacts • 1 unit • 100 units 40-pin with spring-loaded contacts • 1 unit • 100 units 40-pin, with FastConnect • 1 unit SIMATIC TOP connect	6ES7 392-1AM00-0AA0 6ES7 392-1AM00-1AB0 6ES7 392-1BM01-0AA0 6ES7 392-1BM01-1AB0 6ES7 392-1CM00-0AA0 See page 4/218 For information about which components can be used for the respective module, see DT/IA Mall or Catalog KT 10.2
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	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	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	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	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	6ES7 314-6CG03-0AB0		
Micro Memory Card 64 KB 128 KB 512 KB 2 MB 4 MB 8 MB	6ES7 953-8LF20-0AA0 6ES7 953-8LG11-0AA0 6ES7 953-8LJ20-0AA0 6ES7 953-8LL20-0AA0 6ES7 953-8LM20-0AA0 6ES7 953-8LP20-0AA0		
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 10 m 50 m	6ES7 902-3AB00-0AA0 6ES7 902-3AC00-0AA0 6ES7 902-3AG00-0AA0		
		Slot number plates S7-300 manual Design, CPU data, module data, instruction list German English French Spanish Italian SIMATIC Manual Collection B3 Electronic manuals on DVD, multilingual: S7-200, S7-300, C7, S7-400, SIMATIC DP (Distributed I/O), SIMATIC PC, SIMATIC PG (Programming Devices), 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 B3 Current "Manual Collection" DVD and the three subsequent updates Power supply connector 10 units, spare part Labeling strips 10 units, spare part Label cover 10 units, spare part S7 SmartLabel B8 Software for automatic labeling of modules direct from the STEP 7 project	6ES7 912-0AA00-0AA0 6ES7 398-8FA10-8AA0 6ES7 398-8FA10-8BA0 6ES7 398-8FA10-8CA0 6ES7 398-8FA10-8DA0 6ES7 398-8FA10-8EA0 6ES7 998-8XC01-8YE0 6ES7 998-8XC01-8YE2 6ES7 391-1AA00-0AA0 6ES7 392-2XX00-0AA0 6ES7 392-2XY00-0AA0 2XV9 450-1SL01-0YX0

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

B8: Subject to export regulations: AL: N and ECCN: EAR99S

SIMATIC S7-300

Central processing units

Compact CPUs

Ordering Data	Order No.	Order No.
Labeling sheets for machine inscription For 16-channel signal modules, DIN A4, for printing with laser printer; 10 units petrol light-beige yellow red For 32-channel signal modules, DIN A4, for printing with laser printer; 10 units petrol light-beige yellow red	6ES7 392-2AX00-0AA0 6ES7 392-2BX00-0AA0 6ES7 392-2CX00-0AA0 6ES7 392-2DX00-0AA0 6ES7 392-2AX10-0AA0 6ES7 392-2BX10-0AA0 6ES7 392-2CX10-0AA0 6ES7 392-2DX10-0AA0	PROFIBUS DP bus connector RS 485 - With 90° cable outlet, max. transmission rate 12 Mbit/s - Without programming device interface 6ES7 972-0BA12-0XA0 - With programming device interface 6ES7 972-0BB12-0XA0 - With 90° cable outlet for FastConnect connection system, max. transmission rate 12 Mbit/s - Without programming device interface 6ES7 972-0BA51-0XA0 - With programming device interface 6ES7 972-0BB51-0XA0 - 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 transfer 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

SIMATIC S7-300

Central processing units

Standard CPUs

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 mid-range program memory and quantity frameworks
- High processing power in binary and floating-point arithmetic
- Used as central controller in production lines with central and distributed I/O
- Integral PROFINET 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
- Combined MPI/PROFIBUS DP master/slave interface
- Isochronous mode on PROFIBUS

Micro Memory Card required for operation of CPU.

SIMATIC S7-300

Central processing units

Standard CPUs

Overview CPU 317-2 DP



- The CPU with a 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
- High processing power in binary and floating-point arithmetic
- PROFIBUS DP master/slave interface
- For comprehensive I/O expansion
- For configuring distributed I/O structures
- Isochronous mode on PROFIBUS
- Optionally supports 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 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
- High processing power in binary and floating-point arithmetic
- 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
- Combined MPI/PROFIBUS DP master/slave interface
- For comprehensive I/O expansion
- For configuring distributed I/O structures
- Isochronous mode on PROFIBUS
- Optionally supports the use of SIMATIC engineering tools

Micro Memory Card required for operation of CPU.

SIMATIC S7-300

Central processing units

Standard CPUs

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 CPU.

Technical specifications

	6ES7 312-1AE13-0AB0	6ES7 314-1AG13-0AB0	6ES7 315-2AG10-0AB0	6ES7 315-2EH13-0AB0
Product status				
associated programming package	STEP 7 V5.2 SP1 with hardware update or higher	STEP 7 V5.2 SP1 with hardware update or higher	STEP 7 V 5.2 or higher + SP 1 with HW update	STEP 7 V5.4 SP2
Supply voltages				
Rated value				
• DC 24 V	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				
Current consumption (rated value)	2.5 A	2.5 A	2.5 A	2.5 A
Current consumption (in no-load operation), typ.	0.5 A²s	0.5 A²s	0.5 A²s	1 A²s
Inrush current, typ.	60 mA	60 mA	60 mA	100 mA
I²t	0.6 A	0.6 A	0.8 A	650 mA
from supply voltage L+, max.	600 mA	600 mA	800 mA	
Current consumption/power loss				
Power loss, typ.	2.5 W	2.5 W	2.5 W	3.5 W
Memory				
Type of storage				
RAM				
• integrated	32 Kibyte; For program and data	96 Kibyte; For program and data	128 Kibyte	256 Kibyte; For program and data
• expandable	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

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 range: 1 to 511	511; Number range: 1 to 511	1 023; Number band: 1 to 1023	1 023; Number band: 1 to 1023
• Size, max.	16 Kibyte	16 Kibyte	16 Kibyte	16 Kibyte
FB				
• Number, max.	1 024; Sequence of numbers: 0 to 2047	1 024; Sequence of numbers: 0 to 2047	1 024; Sequence of numbers: 0 to 2047	1 024; Sequence of numbers: 0 to 2047
• Size, max	16 Kibyte	16 Kibyte	16 Kibyte	16 Kibyte
FC				
• Number, max.	1 024; Sequence of numbers: 0 to 2047	1 024; Sequence of numbers: 0 to 2047	1 024; Sequence of numbers: 0 to 2047	1 024; Sequence of numbers: 0 to 2047
• Size, max	16 Kibyte	16 Kibyte	16 Kibyte	16 Kibyte
OB				
• Size, max	16 Kibyte	16 Kibyte	16 Kibyte	16 Kibyte
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	0
- upper limit	127	255	255	255
• Remanence				
- adjustable	Yes	Yes	Yes	Yes
- lower limit	0	0	0	0
- upper limit	127	255	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	0
- upper limit	127	255	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

SIMATIC S7-300

Central processing units

Standard CPUs

Technical specifications (continued)

	6ES7 312-1AE13-0AB0	6ES7 314-1AG13-0AB0	6ES7 315-2AG10-0AB0	6ES7 315-2EH13-0AB0
IEC timer (continued)				
• 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; Number range: 1 to 511	1 023; Number range: 1 to 1023	1 023; Number range: 1 to 1023
• Size, max.	16 Kibyte	16 Kibyte	16 Kibyte; Local data size: max. 1024 bytes per execution level/ 510 bytes per block	16 Kibyte
• 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	1 024 byte; per block max. 510	1 024 byte; per block max. 510
Address area				
I/O address area				
• Inputs	1 Kibyte	1 Kibyte	2 Kibyte	2 Kibyte
• Outputs	1 Kibyte	1 Kibyte	2 Kibyte	2 Kibyte
• of which, distributed				
- Inputs			2 Kibyte	2 Kibyte
- Outputs			2 Kibyte	2 Kibyte
Process image				
• Inputs	128 byte	128 byte	128 byte	2 048 byte
• Outputs	128 byte	128 byte	128 byte	2 048 byte
• Inputs, adjustable				2 Kibyte
• Outputs, adjustable				2 Kibyte
• Inputs, preset				2 Kibyte
• Outputs, preset				2 Kibyte
Subprocess images				
• Number of subprocess images, max.				1
Digital channels				
• Inputs	256	1 024		
• Outputs	256	1 024		
• 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		
• Outputs	64	256		
• 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		
Expansion devices, max.	0	3		
Racks, max.	1	4		
Modules per rack, max.	8	8	8	8

Technical specifications (continued)

	6ES7 312-1AE13-0AB0	6ES7 314-1AG13-0AB0	6ES7 315-2AG10-0AB0	6ES7 315-2EH13-0AB0
Number of DP masters				
• integrated	0	0	1	1
• via CP	4	4	4	4
Number of operable FMs and CPs (recommended)				
• FM	8	8		
• CP, point-to-point	8	8		
• CP, LAN	4	10		
Time				
Clock				
• Hardware clock (real-time clock)		Yes	Yes	Yes
• Software clock	Yes			
• buffered and synchronizable	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 SFC 101)	0 to 2 ³¹ hours (when using SFC 101)	0 to 2 ³¹ hours (when using SFC 101)	2 ³¹ hours (when using 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
• to DP, Master			Yes; on DP slave only time-of-day slave	Yes; on DP slave only time-of-day slave
• to DP, Slave	Yes	Yes	Yes	Yes
• in AS, Master				Yes
• in AS, Slave				Yes; as client
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 communication	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
• 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
• 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

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Central processing units

Standard CPUs

Technical specifications (continued)

	6ES7 312-1AE13-0AB0	6ES7 314-1AG13-0AB0	6ES7 315-2AG10-0AB0	6ES7 315-2EH13-0AB0
Diagnostic buffer				
• present	Yes	Yes	Yes	Yes
• Number of entries, max.	100	100	100	500
• 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 8
- Number of connections, max.				1 460 byte; with connection type 01H; 8192 bytes with connection type 11H
- Data length, max.				
• ISO-on-TCP (RFC1006)				Yes; via integrated PROFINET interface and loadable FBs 8
- Number of connections, max.				8 192 byte
- Data length, max.				
• UDP				Yes; via integrated PROFINET interface and loadable FBs 8
- Number of connections, max.				1 472 byte
- Data length, max.				
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	X1 configured as 1) MPI: max. 10; 2) DP master: max. 24; 3) DP slave (active): max. 14; X2 configured as PROFINET: max. 24
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				30
• 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

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) (continued)				
• Number of device-internal and PROFIBUS interconnections				500
• Data length of device-internal and 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
- Number of outgoing 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; 2x PN OPC/1x 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
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

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Central processing units

Standard CPUs

Technical specifications (continued)

	6ES7 312-1AE13-0AB0	6ES7 314-1AG13-0AB0	6ES7 315-2AG10-0AB0	6ES7 315-2EH13-0AB0
MPI (continued)				
- 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; 1 blocks only
- S7 communication				Yes
- S7 communication, as client				No
- S7 communication, as server				Yes
- equidistance support				Yes
- Isochronous mode				Yes; OB61
- SYNC/FREEZE				Yes
- Activation/deactivation of DP slaves				Yes
- DPV1				Yes
• Transmission speeds, max.				12 MBit/s
• Number of DP slaves, max.				124
• Address area				
- Inputs, max.				2 Kibyte
- Outputs, max.				2 Kibyte
• Useful data per DP slave				
- Inputs, max.				244 byte
- Outputs, max.				244 byte
DP slave				
• Services				
- PG/OP communication				Yes
- Routing				Yes; only with active interface
- Global data communication				No
- S7 basic communication				No
- 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 RJ 45
isolated			Yes	Yes
Power supply to interface (15 to 30 V DC), max.			200 mA	
automatic detection of transmission speed				Yes; (10/100 Mbit/s)

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Central processing units

Standard CPUs

Technical specifications (continued)

	6ES7 312-1AE13-0AB0	6ES7 314-1AG13-0AB0	6ES7 315-2AG10-0AB0	6ES7 315-2EH13-0AB0
Functionality • MPI • DP master • DP slave • PROFINET IO controller • PROFINET CBA • Point-to-point coupling			No Yes Yes No	No No No Yes Yes No
DP master • Number of connections, max. • Services - PG/OP communication - Routing - Global data communication - S7 basic communication - S7 communication - S7 communication, as client - S7 communication, as server - equidistance support - Isochronous mode - SYNC/FREEZE - DPV1 • Transmission speeds, max. • Number of DP slaves, max. • Address area - Inputs, max. - Outputs, max. • Useful data per DP slave - Inputs, max. - Outputs, max.			16 Yes Yes No Yes; I blocks only Yes No Yes Yes No Yes Yes 12 MBit/s 124; Per station 2 048 byte 2 048 byte 244 byte 244 byte	
DP slave • Number of connections • Services - PG/OP communication - Routing - Global data communication - S7 basic communication - S7 communication, as client - S7 communication, as server - direct data exchange (cross traffic) - DPV1 • GSD file • Transmission speeds, max. • automatic baud rate search • Transfer memory - Inputs - Outputs • Address area, max. • Useful data per address area, max.			16 Yes Yes; with interface active No No No Yes Yes No You can obtain the current GSD file from http://www.siemens.com/profinet-gsd 12 MBit/s Yes; only with passive interface 244 byte 244 byte 32 32 byte	

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Central processing units

Standard CPUs

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 - Routing - S7 communication - open IE communication - Transmission speed, max. - Total number of connectable IO Devices, max. - Updating time				Yes Yes Yes; with loadable FBs, max. configurable connections: 14, max. number of instances: 32 Yes; via TCP/IP, ISO on TCP and UDP 100 MBit/s 128 1 to 512 ms (minimum value depends on communication share set for PROFINET I/O, on the number of I/O devices and on the number of configured net data items)
Address area - Inputs, max. - Outputs, max. - Useful data consistency, max.				2 Kibyte 2 Kibyte 254 byte
PROFINET CBA				
- Acyclic transmission - cyclic transmission				Yes Yes
CPU/programming				
Programming language				
STEP 7	Yes; V5.2 SP1 or higher with hardware update	Yes; V5.2 SP1 or higher with hardware update	Yes; V 5.2 SP1 or higher with HW update	Yes; V5.4 SP2 or higher
- LAD - FUP - AWL - SCL - CFC - GRAPH - HiGraph	Yes Yes Yes Yes Yes Yes	Yes Yes Yes Yes Yes Yes Yes	Yes Yes Yes Yes Yes Yes Yes	Yes Yes Yes Yes Yes Yes Yes
Operational stacks	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
Dimensions				
Dimensions				
- Width - Height	40 mm 125 mm	40 mm 125 mm	40 mm 125 mm	80 mm 125 mm
Weights				
Weight, approx.	270 g	280 g	290 g	460 g

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 with hardware update	STEP 7 V5.4 + SP2 or higher	STEP 7 V5.4 + SP2 or higher
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, lower limit (DC)	28.8 V	28.8 V	28.8 V
external protection for supply cables (recommendation)	min. 2 A	min. 2 A	min. 2 A
Current consumption			
Current consumption (rated value))	850 mA	650 mA	1 050 mA
Current consumption (in no-load operation), typ.	100 mA	100 mA	400 mA
Inrush current, typ.	2,5 A	2,5 A	4 A
I^2t	1 A²s	1 A²s	1,2 A²s
Current consumption/power loss			
Power loss, typ.	4 W	3,5 W	14 W
Memory			
Type of storage			
• RAM			
- integrated	512 Kibyte	1 MByte; For program and data	1 400 Kibyte
- 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; Guaranteed by MMC (maintenance-free)
• without battery	Yes; Program and data	Yes; Program and data	Yes; Program and data
CPU/blocks			
DB			
• Number, max.	2 047; Number band: 1 to 2047	2 047; Number band: 1 to 2047	4 095; Sequence of numbers: 1 to 4095
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte
FB			
• Number, max.	2 048; Sequence of numbers: 0 to 2047	2 048; Sequence of numbers: 0 to 2047	2 048; Sequence of numbers: 0 to 2047
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte
FC			
• Number, max.	2 048; Sequence of numbers: 0 to 2047	2 048; Sequence of numbers: 0 to 2047	2 048; Sequence of numbers: 0 to 2047
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte
OB			
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte
Nesting depth			
• per priority class	16	16	16
• additional within an error OB	4	4	4
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

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Central processing units

Standard CPUs

Technical specifications (continued)

	6ES7 317-2AJ10-0AB0	6ES7 317-2EK13-0AB0	6ES7 318-3EL00-0AB0
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	0
- upper limit		511	2 047
• 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	0
- upper limit		511	2 047
- 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 Kibyte
• 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; Number sequence: 1 to 4095
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte
• 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	1 024 byte
Address area			
I/O address area			
• Inputs	8 Kibyte	8 Kibyte	8 Kibyte
• Outputs	8 Kibyte	8 Kibyte	8 Kibyte
• of which, distributed			
- Inputs	8 192 byte	8 Kibyte	8 Kibyte
- Outputs	8 192 byte	8 Kibyte	8 Kibyte
Process image			
• Inputs	2 048 byte	2 048 byte	2 048 byte
• Outputs	2 048 byte	2 048 byte	2 048 byte
• Inputs, adjustable	2 Kibyte	2 048 byte	2 Kibyte

Technical specifications (continued)

	6ES7 317-2AJ10-0AB0	6ES7 317-2EK13-0AB0	6ES7 318-3EL00-0AB0
Process image (continued)			
• Outputs, adjustable	2 Kibyte	2 048 byte	2 Kibyte
• Inputs, preset	256 byte	256 byte	256 byte
• Outputs, preset	256 byte	256 byte	256 byte
Subprocess images			
• Number of subprocess images, max.	1	1	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
• buffered and synchronizable	Yes	Yes	Yes
• Deviation per day, max.	10 s	10 s	10 s
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 SFC 101)	0 to 2 ³¹ hours (when using SFC 101)	0 to 2 ³¹ hours (when using SFC 101)
• 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
• to DP, Master	Yes; on DP slave only time-of-day slave	Yes; on DP slave only time-of-day slave	Yes; on DP slave only time-of-day slave
• to DP, Slave	Yes	Yes	Yes
• in AS, Master	Yes	Yes	Yes
• in AS, Slave	Yes	Yes	Yes
• on Ethernet via NTP		Yes; as client	Yes; as client

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Central processing units

Standard CPUs

Technical specifications (continued)

	6ES7 317-2AJ10-0AB0	6ES7 317-2EK13-0AB0	6ES7 318-3EL00-0AB0
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
• 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
• 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	500	500
• adjustable	No	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
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			
- Number of connections, max.		Yes; via integrated PROFINET interface and loadable FBs 8	Yes; via integrated PROFINET interface and loadable FBs 8
- Data length, max.		1 460 byte; with connection type 01H; 8192 bytes with connection type 11H	1 460 byte; with connection type 01H; 8192 bytes with connection type 11H
• ISO-on-TCP (RFC1006)			
- Number of connections, max.		Yes; via integrated PROFINET interface and loadable FBs 8	Yes; via integrated PROFINET interface and loadable FBs 8
- Data length, max.		8 192 byte	8 192 byte
• UDP			
- Number of connections, max.		Yes; via integrated PROFINET interface and loadable FBs 8	Yes; via integrated PROFINET interface and loadable FBs 8
- Data length, max.		1 472 byte	1 472 byte

Technical specifications (continued)

	6ES7 317-2AJ10-0AB0	6ES7 317-2EK13-0AB0	6ES7 318-3EL00-0AB0
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	X1 configured as 1) MPI: max. 10; 2) DP master: max. 24; 3) DP slave (active): max. 14; X2 configured as PROFINET: max. 24	
PROFINET CBA (at set setpoint communication load)			
• Setpoint for the CPU communication load		50%	20%
• Number of remote interconnection partners		32	32
• Number of functions, master/slave		30	50
• Total of all master/slave connections		1 000	3 000
• Data length of all incoming connections master/slave, max.		4 000 byte	24 000 byte
• Data length of all outgoing connections master/slave, max.		4 000 byte	24 000 byte
• Number of device-internal and PROFIBUS interconnections		500	1 000
• Data length of device-internal and PROFIBUS interconnections, max.		4 000 byte	8 000 byte
• Data length per connection, max.		1 400 byte	1 400 byte
• Remote interconnections with acyclic transmission			
- Sampling frequency: sampling interval, min.		500 ms	200 ms
- Number of incoming interconnections		100	100
- Number of outgoing interconnections		100	100
- Data length of all incoming interconnections, max.		2 000 byte	3 200 byte
- Data length of all outgoing interconnections, max.		2 000 byte	3 200 byte
- Data length per connection, max.		1 400 byte	1 400 byte
• Remote interconnections with cyclic transmission			
- Transmission frequency: transmission interval, min.		10 ms	1 ms
- Number of incoming interconnections		200	300
- Number of outgoing interconnections		200	300
- Data length of all incoming interconnections, max.		2 000 byte	4 800 byte
- Data length of all outgoing interconnections, max.		2 000 byte	4 800 byte
- Data length per connection, max.		450 byte	250 byte
• HMI variables via PROFINET (acyclic)			
- Number of log-in stations for HMI variables (PN OPC/iMap)		3; 2x PN OPC/1x iMap	3; 2x PN OPC/1x iMap
- HMI variable updating		500 ms	500 ms
- Number of HMI variables		200	600
- Data length of all HMI variables, max.		2 000 byte	9 600 byte
• PROFIBUS proxy functionality			
- supported		Yes	Yes
- Number of linked PROFIBUS devices		16	32
- Data length per connection, max.		240 byte; Slave-dependent	240 byte; Slave-dependent

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Technical specifications (continued)

	6ES7 317-2AJ10-0AB0	6ES7 317-2EK13-0AB0	6ES7 318-3EL00-0AB0
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
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; I blocks only	Yes; I blocks only	Yes; I blocks only
- S7 communication	Yes	Yes	Yes
- S7 communication, as client	No	No	No
- S7 communication, as server	Yes	Yes	Yes
- equidistance support	Yes	Yes	Yes
- Isochronous mode	No	Yes; OB 61	No
- SYNC/FREEZE	Yes	Yes	Yes
- Activation/deactivation of DP slaves	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.	8 096 byte	8 Kibyte	8 Kibyte
- Outputs, max.	8 096 byte	8 Kibyte	8 Kibyte
• Useful data per DP slave			
- Inputs, max.	244 byte	244 byte	244 byte
- Outputs, max.	244 byte	244 byte	244 byte
DP slave			
• Services			
- PG/OP communication	Yes	Yes	Yes
- Routing	Yes; only with active interface	Yes; with interface active	Yes; with interface active
- Global data communication	No	No	No
- S7 basic communication	No	No	No
- S7 communication	Yes	Yes	Yes

Technical specifications (continued)

	6ES7 317-2AJ10-0AB0	6ES7 317-2EK13-0AB0	6ES7 318-3EL00-0AB0
• Services (continued)			
- 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	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 RJ 45	RS 485
isolated	Yes	Yes	Yes
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
• PROFINET IO controller		Yes	No
• PROFINET CBA		Yes	No
• Point-to-point coupling	No	No	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; I blocks only		Yes; I blocks only
- S7 communication	Yes		Yes
- S7 communication, as client	No		No
- S7 communication, as server	Yes		Yes
- equidistance support	Yes		Yes
- Isochronous mode	Yes; OB 61		Yes; OB 61
- SYNC/FREEZE	Yes		Yes
- Activation/deactivation of DP slaves	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.	8 096 byte		8 Kibyte
- Outputs, max.	8 096 byte		8 Kibyte
• Useful data per DP slave			
- Inputs, max.	244 byte		244 byte
- Outputs, max.	244 byte		244 byte

SIMATIC S7-300

Central processing units

Standard CPUs

Technical specifications (continued)

	6ES7 317-2AJ10-0AB0	6ES7 317-2EK13-0AB0	6ES7 318-3EL00-0AB0
DP slave			
• Number of connections	32		
• Services			
- PG/OP communication	Yes		Yes
- Routing	Yes; with interface active		Yes; with interface active
- Global data communication	No		No
- S7 basic communication	No		No
- S7 communication, as client	No		No
- S7 communication, as server	Yes		Yes
- direct data exchange (cross traffic)	Yes		Yes
- DPV1	No		No
• GSD file	You can obtain the current GSD file from http://www.siemens.com/profibus-gsd		You can obtain the current GSD file from http://www.siemens.com/profibus-gsd
• 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
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, ISO on TCP and UDP	
• Transmission speed, max.		100 MBit/s	
• Total number of connectable IO Devices, max.		128	
• Updating time		1 to 512 ms (minimum value depends on communication share set for PROFINET I/O, on the number of I/O devices and on the number of configured net data items)	
• Address area			
- Inputs, max.		8 Kibyte	
- Outputs, max.		8 Kibyte	
- Useful data consistency, max.		254 byte	
PROFINET CBA			
• Acyclic transmission		Yes	
• cyclic transmission		Yes	
3rd interface			
Type of interfaces			PROFINET
Physics			Ethernet RJ45
isolated			Yes
power supply to interface (15 to 30 V DC), max.			0 mA
automatic detection of transmission speed			Yes; (10/100 Mbit/s)

SIMATIC S7-300

Central processing units

Standard CPUs

Technical specifications (continued)

	6ES7 317-2AJ10-0AB0	6ES7 317-2EK13-0AB0	6ES7 318-3EL00-0AB0
Functionality • MPI • DP master • DP slave • PROFINET IO controller • PROFINET IO device • PROFINET CBA • Point-to-point coupling • Updating times			No No No Yes No Yes No 250 µs...128 ms (with send cycle of 250 µs); 500 µs...256 ms (with send cycle of 500 µs); 1 ms...512 ms (with send cycle 1 ms); minimum value of the send cycle is also dependent on the set communication share for PROFINET IO, on the number of I/O devices and on the volume of configured user data.
Open IE communication • Number of connections, max.			8
CPU/programming			
Programming language • STEP 7	Yes; V 5.2 SP1 or higher with HW update	Yes; V5.4 + SP2 or higher	Yes; V5.4 or higher + SP2
• LAD • FUP • AWL • SCL • CFC • GRAPH • HiGraph	Yes Yes Yes Yes Yes Yes Yes	Yes Yes Yes Yes Yes Yes Yes	Yes Yes Yes Yes Yes Yes Yes
Operational stacks	See instruction list	See instruction list	See instruction list
Nesting levels	8	8	8
User program protection/password protection	Yes	Yes	Yes
System functions (SFC)	See instruction list	See instruction list	See instruction list
System function blocks (SFB)	See instruction list	See instruction list	See instruction list
Dimensions			
Dimensions			
• Width • Height • Depth	80 mm 125 mm 130 mm	80 mm 125 mm 130 mm	120 mm 125 mm 130 mm
Weights			
• Weight, approx.	460 g	460 g	1 250 g

SIMATIC S7-300

Central processing units

Standard CPUs

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Ordering Data	Order No.	Order No.
CPU 312 Main memory 32 KB, power supply 24 V DC, MPI; MMC required	6ES7 312-1AE13-0AB0	SIMATIC Manual Collection B3 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 Devices), STEP 7, Engineering Tools, Runtime Software, SIMATIC PCS 7, SIMATIC HMI (Human Machine Interface), SIMATIC NET (Indus- trial Communication), SIMATIC Machine Vision, SIMATIC Sensors
CPU 314 Main memory 96 KB, power supply 24 V DC, MPI; MMC required	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	SIMATIC Manual Collection B3 6ES7 998-8XC01-8YE2 update service for 1 year Current "Manual Collection" DVD and the three subsequent updates
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	6ES7 315-2EH13-0AB0	Power supply connector 6ES7 391-1AA00-0AA0 10 units, spare part
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	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
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	6ES7 317-2EK13-0AB0	SIMATIC S7 training case 6ES7 910-3AA00-0XA0 With mounting components for mounting S7-200 and S7-300
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	6ES7 318-3EL00-0AB0	PROFIBUS bus components PROFIBUS DP bus connector RS 485 • With 90° cable outlet, max. transmission rate 12 Mbit/s - Without programming device interface 6ES7 972-0BA12-0XA0 - With programming device interface 6ES7 972-0BB12-0XA0 • With 90° cable outlet for FastConnect connection system, max. transmission rate 12 Mbit/s - Without programming device interface 6ES7 972-0BA51-0XA0 - With programming device interface 6ES7 972-0BB51-0XA0 • With axial cable outlet for SIMATIC OP, for connecting to PPI, MPI, PROFIBUS 6GK1 500-0EA02
Micro Memory Card 64 KB 6ES7 953-8LF20-0AA0 128 KB 6ES7 953-8LG11-0AA0 512 KB 6ES7 953-8LJ20-0AA0 2 MB 6ES7 953-8LL20-0AA0 4 MB 6ES7 953-8LM20-0AA0 8 MB 6ES7 953-8LP20-0AA0		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
MPI cable For connecting SIMATIC S7 and the PG through MPI; 5 m in length	6ES7 901-0BF00-0AA0	RS 485 repeater for PROFIBUS 6ES7 972-0AA01-0XA0 Data transfer rate up to 12 Mbit/s; 24 V DC; IP20 housing
Slot number plates 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	6ES7 912-0AA00-0AA0	

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

SIMATIC S7-300

Central processing units

Standard CPUs

Ordering Data	Order No.		Order No.
PROFINET 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	IE FC RJ45 Plugs RJ45 plug-in connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables	
FO Standard Cable GP (50/125) Standard cable, splittable, UL approval, sold by the meter	6XV1 873-2A	IE FC RJ45 Plug 145 145° cable outlet 1 unit 10 units 50 units	6GK1 901-1BB30-0AA0 6GK1 901-1BB30-0AB0 6GK1 901-1BB30-0AE0
SCALANCE X204-2 Industrial Ethernet Switch 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	6GK5 204-2BB10-2AA3	IE FC RJ45 Plug 180 180° cable outlet 1 unit 10 units 50 units	6GK1 901-1BB10-2AA0 6GK1 901-1BB10-2AB0 6GK1 901-1BB10-2AE0
		PROFIBUS/PROFINET bus components For establishing MPI/PROFIBUS/PROFINET communication	see Catalogs IK PI, CA 01

SIMATIC S7-300

Central processing units

Technology CPUs

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 315-6TH13-0AB0	6ES7 317-6TK13-0AB0
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
external protection for supply cables (recommendation)	min. 2 A	min. 2 A
Current consumption		
Current consumption (in no-load operation), typ.	200 mA	200 mA
Inrush current, typ.	2,5 A	2,5 A
I ² t	1 A ² · s	1 A ² · s

	6ES7 315-6TH13-0AB0	6ES7 317-6TK13-0AB0
Current consumption/power loss		
Power loss, typ.	6 W	6 W
Memory		
Type of storage		
RAM		
• integrated	256 Kibyte	1 024 Kibyte
• expandable	No	No
Load memory		
• pluggable (MMC)	Yes	Yes
• pluggable (MMC), max.	8 MByte	8 MByte

Technical specifications (continued)

	6ES7 315-6TH13-0AB0	6ES7 317-6TK13-0AB0
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.	1 023; Number band: 1 to 1023	2 047; Number band: 1 to 2047
• Size, max.	64 Kibyte	64 Kibyte
FB		
• Number, max.	1 024; Sequence of numbers: 0 to 2047	2 047; Number band: 1 to 2047
• Size, max.	64 Kibyte	64 Kibyte
FC		
• Number, max.	1 024; Sequence of numbers: 0 to 2047	2 047; Number band: 1 to 2047
• Size, max.	64 Kibyte	64 Kibyte
OB		
• Size, max.	64 Kibyte	64 Kibyte
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; Number range: 0...255	512; Number range: 0...511
• Remanence		
- 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; Number range: 0...255	512; Number range: 0...511
• 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

	6ES7 315-6TH13-0AB0	6ES7 317-6TK13-0AB0
S7 times (continued)		
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; From DB 1 to DB 1023	2 047; from DB 1 to DB 2047
• Size, max.	64 Kibyte	64 Kibyte
• Remanence adjustable	Yes; via non-retain property on DB	Yes; via non-retain property on DB
• Remanence preset	Yes	Yes
Local data		
• per priority class, max.	1 024 byte	1 024 byte
Address area		
I/O address area		
• Inputs	2 048 byte	8 192 byte
• Outputs	2 048 byte	8 192 byte
• of which, distributed		
- Inputs	2 048 byte	8 192 byte
- Outputs	2 048 byte	8 192 byte
Process image		
• Inputs, adjustable	2 048 byte	2 048 byte
• Outputs, adjustable	2 048 byte	2 048 byte
• Inputs, preset	128 byte	256 byte
• Outputs, preset	128 byte	256 byte
Subprocess images		
• Number of subprocess images, max.	1	1
Digital channels		
• Inputs	16 384	65 536
• Outputs	16 384	65 536
• Inputs, of which central	512	512
• Outputs, of which central	512	512
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.		
Central devices, max.	1	1
Expansion devices, max.	0	0
Racks, max.	1	1
Modules per rack, max.	8	8

SIMATIC S7-300

Central processing units

Technology CPUs

Technical specifications (continued)

	6ES7 315-6TH13-0AB0	6ES7 317-6TK13-0AB0
Number of DP masters		
• integrated	2; 1 DP and 1 DP (drive)	2; 1 DP and 1 DP (drive)
• via CP	2; for DP	2; for DP
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
• buffered and synchronizable	Yes	Yes
• Deviation per day, max.	10 s	10 s
Operating hours counter		
• Number	1	4
• Number/Number range	0	0 to 3
• Range of values	0 to 2 ³¹ hours (when using SFC 101)	0 to 2 ³¹ hours (when using SFC 101)
• Granularity	1 hour	1 hour
• remanent	Yes; Must be restarted at each restart	Yes; Must be restarted at each restart
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.	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
• Number of variables, max.	30	30
• of which status variable, max.	30	30
• of which control variable, max.	14	14

	6ES7 315-6TH13-0AB0	6ES7 317-6TK13-0AB0
Forcing		
• Forcing	Yes	Yes
• Force, variables	Inputs, outputs	Inputs, outputs
• 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
• usable for routing	8; additional	8; additional
1st 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	Yes	Yes
• DP master	Yes	Yes
• DP slave	Yes	Yes
• Point-to-point coupling	No	No

Technical specifications (continued)

	6ES7 315-6TH13-0AB0	6ES7 317-6TK13-0AB0
MPI		
• Number of connections	32	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	No; but via CP and loadable FB	No; but via CP and loadable FB
- S7 communication, as server	Yes; Connection configured on one side only.	Yes; Connection configured on one side only.
• 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	Yes; I blocks only.	Yes; I blocks only.
- S7 communication	Yes	Yes
- S7 communication, as client	No; but via CP and loadable FB	No; but via CP and loadable FB
- S7 communication, as server	Yes; Connections configured on one side only.	Yes; Connections configured on one side only.
- equidistance support	Yes	Yes
- Isochronous mode	Yes; OB 61	Yes; OB 61
- SYNC/FREEZE	Yes	Yes
- Activation/deactivation of DP slaves	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.	2 048 byte	8 192 byte
- Outputs, max.	2 048 byte	8 192 byte
• 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; only with active interface	Yes; only with active interface
- Global data communication	No	No
- S7 basic communication	No	No
- S7 communication	Yes	Yes
- S7 communication, as client	No; but via CP and loadable FB	No; but via CP and loadable FB
- S7 communication, as server	Yes; Connection configured on one side only.	Yes; Connection configured on one side only.
- direct data exchange (cross traffic)	Yes	Yes
- DPV1	No	No
• Transmission speeds, max.	12 MBit/s	12 MBit/s

	6ES7 315-6TH13-0AB0	6ES7 317-6TK13-0AB0
DP slave (continued)		
• 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
- Isochronous mode	Yes	Yes
- SYNC/FREEZE	No	No
- Activation/deactivation of DP slaves	Yes	Yes
- DPV1	No	No
• Transmission speeds, max.	12 MBit/s	12 MBit/s
• Number of DP slaves, max.	64	64
• Address area		
- Inputs, max.	1 024 byte	1 024 byte
- Outputs, max.	1 024 byte	1 024 byte
• Useful data per DP slave		
- Inputs, max.	244 byte	244 byte
- Outputs, max.	244 byte	244 byte
• GSD file	http://www.siemens.com/support in Product Support area	http://www.siemens.com/support in Product Support area
• Transmission speeds, max.	12 MBit/s	12 MBit/s

SIMATIC S7-300

Central processing units

Technology CPUs

Technical specifications (continued)

	6ES7 315-6TH13-0AB0	6ES7 317-6TK13-0AB0
CPU/programming		
Programming language		
• STEP 7	Yes; V 5.2 SP 1 or higher and S7-Technology option package	Yes
• LAD	Yes	Yes
• FUP	Yes	Yes
• AWL	Yes	Yes
• SCL	Yes	Yes
• CFC	Yes	Yes
• GRAPH	Yes	Yes
• HiGraph	Yes	Yes
Operational stacks	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
Digital inputs		
Number of digital inputs	4	4
• of which, inputs usable for technological functions	4	4
Number of simultaneously controllable inputs		
• horizontal installation		
- up to 40 °C, max.	4	4
- up to 60 °C, max.	4	4
• vertical installation		
- up to 40 °C, max.	4	4
Input characteristic curve to IEC 1131, Typ 1	Yes	Yes
Input voltage		
• Rated value, DC	24 V	24 V
• for signal "0"	-3 V...5 V	-3 V...5 V
• for signal "1"	15 V...30 V	15 V...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
Cable length		
• cable length, shielded, max.	1 000 m	1 000 m
• Cable length unshielded, max.	600 m	600 m

	6ES7 315-6TH13-0AB0	6ES7 317-6TK13-0AB0
Digital outputs		
Number of digital outputs	8	8
• of which, high-speed outputs	8	8
Functions	For technology functions, e.g. high-speed cam switch signals	For technology functions, e.g. high-speed cam switch signals
Short-circuit protection of the output	Yes	Yes
• Response threshold, typ.	1,0 A	1,0 A
Limitation of inductive shutdown voltage to	48 V	48 V
Lamp load, max.	5 W	5 W
Controlling a digital input	No	No
Output voltage		
• for signal "0" (DC), max.	3 V; (2L+)	3 V; (2L+)
• for signal "1", min.	rated voltage - 2,5 V	rated voltage - 2,5 V
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 A
• all other mounting positions		
- up to 40 °C, max.	3 A	3 A
Load impedance range		
• lower limit	48 Ω	48 Ω
• upper limit	4 kΩ	4 kΩ
• cable length, shielded, max.	1 000 m	1 000 m
• Cable length unshielded, max.	600 m	600 m

SIMATIC S7-300

Central processing units

Technology CPUs

Technical specifications (continued)

	6ES7 315-6TH13-0AB0	6ES7 317-6TK13-0AB0
Encoder		
Connectable encoders		
• 2-wire BEROs	No	No
Isolation		
Galvanic isolation, digital inputs		
• between the channels and the backplane bus	Yes	Yes
Isolation, digital outputs		
• between the channels and the backplane bus	Yes	Yes

	6ES7 315-6TH13-0AB0	6ES7 317-6TK13-0AB0
Dimensions		
Dimensions		
• 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 B7	6ES7 315-6TH13-0AB0
Main memory 256 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 B7	6ES7 317-6TK13-0AB0
Main memory 1024 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 V4.1	6ES7 864-1CC41-0YX0
<i>Task:</i> Option package for configuring and programming technology tasks with SIMATIC S7 CPU 31xT-2 DP	
<i>Requirement:</i> STEP 7 V5.4 SP2 or higher	
<i>Delivery package:</i> on DVD; incl. documentation for CPU 31xT-2 DP (included on DVD)	
Micro Memory Card	
4 MB	6ES7 953-8LM20-0AA0
8 MB	6ES7 953-8LP20-0AA0
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 spring-loaded contacts	
• 1 unit	6ES7 392-1BM01-0AA0
• 100 units	6ES7 392-1BM01-1AB0
40-pin, with FastConnect	
• 1 unit	6ES7 392-1CM00-0AA0

	Order No.
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 B3	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 Devices), 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 B3	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 V3.0	
Software for automatic labeling of modules based on data of the STEP 7 project	
Single License B8	2XV9 450-1SL03-0YX0
Upgrade Single License B8	2XV9 450-1SL03-0YX4

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

B7: Subject to export regulations: AL: N and ECCN: EAR99H

B8: Subject to export regulations: AL: N and ECCN: EAR99S

SIMATIC S7-300

Central processing units

Technology CPUs

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Ordering Data	Order No.		Order No.
Labeling sheets for machine inscription For 16-channel signal modules, DIN A4, for printing with laser printer; 10 units petrol light-beige yellow red For 32-channel signal modules, DIN A4, for printing with laser printer; 10 units petrol light-beige yellow red	6ES7 392-2AX00-0AA0 6ES7 392-2BX00-0AA0 6ES7 392-2CX00-0AA0 6ES7 392-2DX00-0AA0	PROFIBUS DP bus connector RS 485 - With 90° cable outlet, max. transmission rate 12 Mbit/s - Without programming device interface - With programming device interface - With 90° cable outlet for FastConnect connection system, max. transmission rate 12 Mbit/s - Without programming device interface - With programming device interface - With axial cable outlet for SIMATIC OP, for connecting to PPI, MPI, PROFIBUS	6ES7 972-0BA12-0XA0 6ES7 972-0BB12-0XA0 6ES7 972-0BA51-0XA0 6ES7 972-0BB51-0XA0 6GK1 500-0EA02
Manual "Communication for SIMATIC S7-300/-400" German English French Spanish Italian	6ES7 398-8EA00-8AA0 6ES7 398-8EA00-8BA0 6ES7 398-8EA00-8CA0 6ES7 398-8EA00-8DA0 6ES7 398-8EA00-8EA0	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 transfer 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

SIMATIC S7-300

Central processing units

Fail-safe CPUs

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.

SIMATIC S7-300

Central processing units

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.

SIMATIC S7-300

Central processing units

Fail-safe CPUs

Overview CPU 319F-3 PN/DP



- The fail-safe CPU with high-performance command processing, large program memory and large quantity structure for demanding applications
- For constructing a fail-safe automation system for plants with increased safety requirements
- Satisfies safety requirements up to SIL 3 acc. to IEC 61508 and up to Cat. 4 acc. to EN 954-1
- Fail-safe I/O modules can be connected decentralized over the integrated PROFINET interface (PROFIsafe) and/or over the integrated PROFIBUS DP interface (PROFIsafe)
- Fail-safe I/O modules of ET200M can also be connected centrally
- Standard modules for non-safety-related applications can be operated centrally and decentralized
- Distributed intelligence in Component Based Automation (CBA) on PROFINET
- Isochronous mode on PROFIBUS
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component Based Automation (CBA)

For operation of the CPU, a micro memory card is required.

Technical specifications

	6ES7 315-6FF01-0AB0	6ES7 315-2FH13-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK13-0AB0	6ES7 318-3FL00-0AB0
Product status					
associated programming package	STEP 7 V5.2 SP1 or higher with HSP 0126	STEP 7 V5.4 SP2 or higher S7 Distributed Safety V5.4 or higher	STEP 7 V5.2 SP1 with hardware update or higher; S7 Distributed Safety 5.2 SP1 or higher	STEP 7 V5.4 SP2 or higher, S7 Distributed Safety V5.4 or higher	STEP 7 V5.4 or higher, Service Pack 2 with HSP 143
Supply voltages					
Rated value					
• DC 24 V	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
• permissible range, upper limit (DC)	28.8 V	28.8 V	28.8 V	28.8 V	28.8 V
external protection for supply cables (recommendation)	min. 2 A	min. 2 A	min. 2 A	min. 2 A	min. 2 A
Current consumption					
Current consumption (rated value)		650 mA		650 mA	1 050 mA
Current consumption (in no-load operation), typ.	60 mA	100 mA	100 mA	100 mA	400 mA
Inrush current, typ.	2.5 A	2.5 A	2.5 A	2.5 A	4 A
I ² t	0.5 A ² · s	1 A ² · s	1 A ² · s	1 A ² · s	1.2 A ² · s
Current consumption/ power loss					
Power loss, typ.	2.5 W	3.5 W	4 W	3,5 W	14 W
Memory					
Type of storage					
RAM					
• integrated	192 Kibyte; 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 Kibyte; For program and data	1 024 Kibyte	1 MByte; For program and data	1 400 Kibyte

SIMATIC S7-300

Central processing units

Fail-safe CPUs

Technical specifications (continued)

	6ES7 315-6FF01-0AB0	6ES7 315-2FH13-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK13-0AB0	6ES7 318-3FL00-0AB0
RAM (continued)					
• expandable	No	No	No	No	No
Load memory					
• pluggable (MMC)	Yes	Yes	Yes	Yes	Yes
• pluggable (MMC), max.	8 MByte	8 MByte	8 MByte	8 MByte	8 MByte
• expandable FEPRM		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)	Yes; Guaranteed by MMC (maintenance-free)	Yes; up to 700 KB, 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.	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	4 095; DB 0 reserved
• Size, max.	16 Kibyte	16 Kibyte	64 Kibyte	64 Kibyte	64 Kibyte
FB					
• Number, max.	2 048; See instruction list	1 024; Sequence of numbers: 0 to 2047	2 048; Sequence of numbers: 0 to 2047	2 048; Sequence of numbers: 0 to 2047	2 048; from FB 0 to FB 2047
• Size, max.	16 Kibyte	16 Kibyte	64 Kibyte	64 Kibyte	64 Kibyte
FC					
• Number, max.	2 048; See instruction list	1 024; Sequence of numbers: 0 to 2047	2 048; Sequence of numbers: 0 to 2047	2 048; Sequence of numbers: 0 to 2047	2 048; from FC 0 to FC 2047
• Size, max.	16 Kibyte	16 Kibyte	64 Kibyte	64 Kibyte	64 Kibyte
OB					
• Size, max.	16 Kibyte	16 Kibyte	64 Kibyte	64 Kibyte	64 Kibyte
Nesting depth					
• per priority class	8	8	16	16	16
• additional within an error OB	4	4	4	4	4
CPU/processing times					
for bit operations, min.	0.1 µs	0.1 µs	0.05 µs	0.05 µs	0.01 µs
for word operations, min.	0.2 µs	0.2 µs	0.2 µs	0.2 µs	0.02 µs
for fixed point arithmetic, min.	2 µs	2 µs	0.2 µs	0.2 µs	0.02 µs
for floating point arithmetic, min.	6 µs	3 µs	1 µs	1 µs	0.1 µs
Times/counters and their remanence					
S7 counter					
• Number	256	256	512	512	2 048
• of which remanent without battery					
- adjustable	Yes	Yes	Yes	Yes	
- lower limit		0		0	
- upper limit		255		511	
• Remanence					
- adjustable		Yes	Yes	Yes	Yes
- lower limit		0	0	0	
- upper limit		255	511	511	
• Counting range					
- adjustable		Yes	Yes	Yes	Yes
- lower limit	0	0	0	0	0
- upper limit	999	999	999	999	999
IEC counter					
• present	Yes	Yes	Yes	Yes	Yes
• Type	SFB	SFB	SFB	SFB	SFB

SIMATIC S7-300

Central processing units

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	6ES7 318-3FL00-0AB0
S7 times					
• Number	256	256	512	512	2 048
• Remanence					
- adjustable	Yes	Yes	Yes	Yes	Yes
- lower limit		0	0	0	
- upper limit		255	511	511	
- preset	No retentivity	No retentivity	No retentivity	No retentivity	No retentivity
• Time range					
- lower limit	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
IEC timer					
• present	Yes	Yes	Yes	Yes	Yes
• Type	SFB	SFB	SFB	SFB	SFB
Data areas and their remanence					
Flag					
• Number, max.	2 048 byte	2 048 byte	4 096 byte	4 096 byte	8 Kibyte
• 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	Yes; MB 0 to MB 8191
• Number of clock memories	8; 1 memory byte	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	4 095; from DB 1 to DB 4095
• Size, max.	16 Kibyte	16 Kibyte	64 Kibyte	64 Kibyte	64 Kibyte
• 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
• Remanence preset		yes	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	1 024 byte
Address area					
I/O address area					
• Inputs	2 Kibyte	2 Kibyte	8 Kibyte	8 Kibyte	8 Kibyte
• Outputs	2 Kibyte	2 Kibyte	8 Kibyte	8 Kibyte	8 Kibyte
• of which, distributed					
- Inputs	2 Kibyte	2 Kibyte	8 Kibyte	8 Kibyte	8 Kibyte
- Outputs	2 Kibyte	2 Kibyte	8 Kibyte	8 Kibyte	8 Kibyte
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	2 Kibyte
• Outputs, adjustable				2 048 byte	2 Kibyte
• Inputs, preset				1 024 byte	1 024 byte
• Outputs, preset				1 024 byte	1 024 byte
Subprocess images					
• Number of subprocess images, max.					1
Digital channels					
• Inputs	16 384	16 384	65 536	65 536	65 536
• Outputs	16 384	16 384	65 536	65 536	65 536
• Inputs, of which central	1 024	1 024; max.	1 024	1 024	1 024
• Outputs, of which central	1 024	1 024; max.	1 024	1 024	1 024

SIMATIC S7-300

Central processing units

Fail-safe CPUs

Technical specifications (continued)

	6ES7 315-6FF01-0AB0	6ES7 315-2FH13-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK13-0AB0	6ES7 318-3FL00-0AB0
Analog channels					
• Inputs	1 024	1 024	4 096	4 096	4 096
• Outputs	1 024	1 024	4 096	4 096	4 096
• Inputs, of which central	256	256; max.	256	256	256
• Outputs, of which central	256	256; max.	256	256	256
Hardware config.					
Central devices, max.		1	1	1	
Expansion devices, max.		3	3	3	
Racks, max.	4	4	4	4	4
Modules per rack, max.	8	8	8	8	8
Number of DP masters					
• integrated	1	1	2	1	2
• via CP	1	4	4	4	4
Number of operable FMs and CPs (recommended)					
• FM	8	8	8	8	8
• CP, point-to-point	8	8	8	8	8
• CP, LAN	10	10	10	10	10
Time					
Clock					
• Hardware clock (real-time clock)	Yes	Yes	Yes	Yes	Yes
• buffered and synchronizable	Yes	Yes	Yes	Yes	Yes
• Deviation per day, max.	10 s	10 s	10 s	10 s	10 s
Operating hours counter					
• Number	1	1	4	4	4
• Number/Number range	0	0	0 to 3	0 to 3	0 to 3
• Range of values	0 to 2 ³¹ hours (when using SFC 101)				
• Granularity	1 hour				
• remanent	Yes; must be restarted at each warm restart.				
Clock synchronization					
• supports	Yes	Yes	Yes	Yes	Yes
• to MPI, Master	Yes	Yes	Yes	Yes	Yes
• to MPI, Slave	Yes	Yes	Yes	Yes	Yes
• to DP, Master	Yes; on DP slave only time-of-day slave	Yes; on DP slave only time-of-day slave	Yes; on DP slave only time-of-day slave	Yes; on DP slave only time-of-day slave	Yes
• to DP, Slave	Yes	Yes	Yes	Yes	Yes; on DP slave only time-of-day slave
• in AS, Master	Yes	Yes	Yes	Yes	Yes
• in AS, Slave		Yes	Yes	Yes	Yes
• on Ethernet via NTP					Yes; as client
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 communication	32; depending on the configured connections for PG/OP and S7 basic communication
Process diagnostic messages	Yes	Yes	Yes	Yes	Yes
simultaneously active Alarm-S blocks, max.	40	40	60	60	60
Test commissioning functions					
Status/control					
• Status/control variable	Yes	Yes	Yes	Yes	Yes

Technical specifications (continued)

	6ES7 315-6FF01-0AB0	6ES7 315-2FH13-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK13-0AB0	6ES7 318-3FL00-0AB0
Status/control (continued)					
• 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
• Number of variables, max.	30	30	30	30	30
• of which status variable, max.	30	30	30	30	30
• of which control variable, max.	14	14	14	14	14
Forcing					
• Forcing	Yes	Yes	Yes	Yes	Yes
• Force, variables	Inputs, outputs	Inputs, outputs	Inputs, outputs	Inputs, outputs	Inputs, outputs
• Number of variables, max.	10	10	10	10	10
Status block	Yes	Yes	Yes	Yes	Yes
Single step	Yes	Yes	Yes	Yes	Yes
Number of breakpoints	2	2	2	2	2
Diagnostic buffer					
• present	Yes	Yes	Yes	Yes	Yes
• Number of entries, max.	100	100	100	100	500
• adjustable	No	No	No	No	
Communication functions					
PG/OP communication	Yes	Yes	Yes	Yes	Yes
Routing	Yes	Yes	Yes	Yes	Yes
Global data communication					
• supported	Yes	Yes	Yes	Yes	Yes
• Size of GD packets, max.	22 byte	22 byte	22 byte	22 byte	22 byte
S7 basic communication					
• supported	Yes	Yes	Yes	Yes	Yes
S7 communication					
• supported	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
Open IE communication					
• TCP/IP		Yes; via integrated PROFINET interface and loadable FBs		Yes; via integrated PROFINET interface and loadable FBs	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.		8		8	8
- Data length, max.		1 460 byte		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	16	16	32	32	32
• usable for PG communication	15	15; max.	31	31	31
• usable for OP communication	15	15	31	31	31

SIMATIC S7-300

Central processing units

Fail-safe CPUs

Technical specifications (continued)

	6ES7 315-6FF01-0AB0	6ES7 315-2FH13-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK13-0AB0	6ES7 318-3FL00-0AB0
Number of connections (continued)					
- usable for S7 basic communication - usable for routing	12	14 X1 as MPI: max. 10; X1 as DP master: max. 24; X1 as DP slave (active): max. 14; X2 as PROFINET: max. 24	30 8	30	30
PROFINET CBA (at set setpoint communication load)					
- Setpoint for the CPU communication load - Number of remote interconnection partners - Number of functions, master/slave - Total of all master/slave connections - Data length of all incoming connections master/slave, max. - Data length of all outgoing connections master/slave, max. - Number of device-internal and PROFIBUS interconnections - Data length of device-internal and PROFIBUS interconnections, max. - Data length per connection, max. - Remote interconnections with acyclic transmission - Sampling frequency: sampling interval, min. - Number of incoming interconnections - Number of outgoing interconnections - Data length of all incoming interconnections, max. - Data length of all outgoing interconnections, max. - Data length per connection, max. - Remote interconnections with cyclic transmission - Transmission frequency: transmission interval, min. - Number of incoming interconnections - Number of outgoing interconnections - Data length of all incoming interconnections, max. - Data length of all outgoing interconnections, max. - Data length per connection, max.		50% 32 17 1 000 4 000 byte 4 000 byte 500 4 000 byte 1 400 byte 500 ms 100 100 2 000 byte 2 000 byte 1 400 byte 10 ms 200 200 2 000 byte 2 000 byte 450 byte		50% 32 17 1 000 4 000 byte 4 000 byte 500 4 000 byte 1 400 byte 500 ms 100 100 2 000 byte 2 000 byte 1 400 byte 10 ms 200 200 2 000 byte 2 000 byte 450 byte	20% 32 50 3 000 24 000 byte 24 000 byte 1 000 8 000 byte 1 400 byte 200 ms 100 100 3 200 byte 3 200 byte 1 400 byte 1 ms 300 300 4 800 byte 4 800 byte 250 byte

Technical specifications (continued)

	6ES7 315-6FF01-0AB0	6ES7 315-2FH13-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK13-0AB0	6ES7 318-3FL00-0AB0
- HMI variables via PROFINET (acyclic) - Number of log-in stations for HMI variables (PN OPC/iMap) - HMI variable updating - Number of HMI variables - Data length of all HMI variables, max. - PROFIBUS proxy functionality - supported - Number of linked PROFIBUS devices - Data length per connection, max.		3; 2x PN OPC/1x iMap 500 ms 200 2 000 byte		3; 2x PN OPC/1x iMap 500 ms 200 2 000 byte	3; 2x PN OPC/1x iMap 500 ms 600 9 600 byte
PROFINET CBA (at 50 % communication load)					
- Data length for arrays and structures (local interconnection), max. - HMI variables via PROFINET (acyclic) - Number of log-in stations for HMI variables (PN OPC/iMap)		Slave-dependent 2 * PN OPC / 1 * iMap		Slave-dependent 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	Integral RS 485 interface
Physics	RS 485	RS 485	RS 485	RS 485	RS 485
isolated	No	Yes	Yes	Yes	Yes
Power supply to interface (15 to 30 V DC), max.	200 mA	200 mA	200 mA	200 mA	150 mA
Functionality					
- MPI - DP master - DP slave - Point-to-point coupling	Yes No No No	Yes Yes Yes No	Yes Yes Yes No	Yes Yes Yes No	Yes Yes Yes No
MPI					
Number of connections	16	16	32	16	32
- Services - PG/OP communication - Routing - Global data communication - S7 basic communication - S7 communication - S7 communication, as client - S7 communication, as server	Yes Yes Yes Yes Yes Yes; via CP and loadable FB Yes	Yes Yes Yes Yes Yes No Yes	Yes Yes Yes Yes Yes No Yes	Yes Yes Yes Yes Yes No Yes	Yes Yes Yes Yes Yes No Yes; via CP and loadable FB
Transmission speeds, max.	187.5 kBit/s	12 MBit/s	12 MBit/s	12 MBit/s	12 MBit/s
DP master					
- Services - PG/OP communication - Routing - Global data communication - S7 basic communication - S7 communication - S7 communication, as client - S7 communication, as server - equidistance support		Yes Yes No Yes Yes No Yes Yes	Yes Yes No Yes Yes No Yes Yes	Yes Yes No Yes Yes No Yes Yes	Yes Yes No Yes; with I blocks Yes No Yes Yes

SIMATIC S7-300

Central processing units

Fail-safe CPUs

Technical specifications (continued)

	6ES7 315-6FF01-0AB0	6ES7 315-2FH13-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK13-0AB0	6ES7 318-3FL00-0AB0
DP master					
• Services (continued)					
- Isochronous mode		Yes; OB 61	No	Yes; OB 61	No
- SYNC/FREEZE		Yes	Yes	Yes	Yes
- Activation/deactivation of DP slaves		Yes	Yes	Yes	Yes
- DPV1		Yes	Yes	Yes	Yes
• Transmission speeds, max.		12 MBit/s	12 MBit/s	12 MBit/s	12 MBit/s
• Number of DP slaves, max.		124	124	124	124
• Address area					
- Inputs, max.			244 byte		8 Kibyte
- Outputs, max.			244 byte		8 Kibyte
• Useful data per DP slave					
- Inputs, max.					244 byte
- Outputs, max.					244 byte
DP slave					
• Services					
- Routing		Yes; only with active interface	Yes; only with active interface	Yes; with interface active	Yes; with interface active
- Global data communication		No	No	No	No
- S7 basic communication		Yes	Yes	Yes	No
- S7 communication		Yes	Yes	Yes	Yes
- S7 communication, as client		No	No	No	No
- S7 communication, as server		Yes	Yes	Yes	Yes
- direct data exchange (cross traffic)		Yes	Yes	Yes	Yes
- DPV1		No	No	No	No
• Transmission speeds, max.		12 MBit/s	12 MBit/s	12 MBit/s	12 MBit/s
• Transfer memory					
- Inputs		244 byte	244 byte	244 byte	244 byte
- Outputs		244 byte	244 byte	244 byte	244 byte
• Address area, max.		32; with max. 32 bytes each	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	PROFINET	Integral RS 485 interface
Physics	RS 485	Ethernet	RS 485	Ethernet	RS 485
isolated	Yes	Yes	Yes	Yes	Yes
Power supply to interface (15 to 30 V DC), max.	200 mA	0 mA	200 mA	0 mA	200 mA
automatic detection of transmission speed		Yes; (10/100 Mbit/s)		Yes; (10/100 Mbit/s)	
Functionality					
• MPI	No	No	No	No	No
• DP master	Yes	No	Yes	No	Yes
• DP slave	Yes	No	Yes	No	Yes
• PROFINET IO controller		Yes		Yes; Firmware Status V2.3 or higher	No
• PROFINET CBA		Yes		Yes	No
• Point-to-point coupling	No	No	No	No	No
DP master					
• Number of connections, max.	16		32		

Technical specifications (continued)

	6ES7 315-6FF01-0AB0	6ES7 315-2FH13-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK13-0AB0	6ES7 318-3FL00-0AB0
DP master (continued)					
• Services					
- PG/OP communication	Yes		Yes		Yes
- Routing	Yes		Yes		Yes
- Global data communication	No		No		No
- S7 basic communication	No		Yes		Yes; with I blocks
- S7 communication	No		Yes		Yes
- S7 communication, as client			No		No
- S7 communication, as server			Yes		Yes
- equidistance support	Yes		Yes		Yes
- Isochronous mode			Yes; OB 61		Yes; OB 61
- SYNC/FREEZE	Yes		Yes		Yes
- Activation/deactivation of DP slaves			Yes		Yes
- DPV1	Yes		Yes		Yes
• Transmission speeds, max.	12 MBit/s		12 MBit/s		12 MBit/s
• Number of DP slaves, max.	125		124		124
• Address area					
- Inputs, max.	244 Kibyte		244 byte		8 Kibyte
- Outputs, max.	244 Kibyte		244 byte		8 Kibyte
• Useful data per DP slave					
- Inputs, max.					244 byte
- Outputs, max.					244 byte
DP slave					
• Number of connections	16		32		
• Services					
- PG/OP communication	Yes		Yes		Yes
- Routing	Yes; with interface active		Yes; with interface active		Yes; with interface active
- Global data communication	No		No		No
- S7 basic communication	No		Yes		Yes
- S7 communication, as client	No		No		No
- S7 communication, as server	No		Yes		Yes
- direct data exchange (cross traffic)	Yes		Yes		Yes
- DPV1	No		No		No
• GSD file	You can obtain the current GSD file from http://www.siemens.com/profibus-gsd		You can obtain the current GSD file from http://www.siemens.com/profibus-gsd		The current GSD file can be obtained from: http://www.siemens.com/profibus-gsd
• Transmission speeds, max.	12 MBit/s		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		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
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	

SIMATIC S7-300

Central processing units

Fail-safe CPUs

Technical specifications (continued)

	6ES7 315-6FF01-0AB0	6ES7 315-2FH13-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK13-0AB0	6ES7 318-3FL00-0AB0
PROFINET IO controller (contin.)					
• Transmission speed, max. • Total number of connectable IO Devices, max. • Updating time		100 MBit/s 128		100 MBit/s 128	
		1 to 512 ms (minimum value depends on communication share set for PROFINET I/O, on the number of I/O devices and on the number of configured net data items)		1 to 512 ms (minimum value depends on communication share set for PROFINET I/O, on the number of I/O devices and on the number of configured net data items)	
• Address area - Inputs, max. - Outputs, max. - Useful data consistency, max.		2 Kibyte 2 Kibyte 256 byte		8 Kibyte 8 Kibyte 256 byte	
PROFINET CBA					
• Acyclic transmission • cyclic transmission		Yes Yes		Yes Yes	
3rd interface					
Type of interfaces					PROFINET
Physics					RJ45
isolated					Yes
automatic detection of transmission speed					Yes; (10/100 MBit/s)
Functionality					
• MPI • PROFINET IO controller • PROFINET IO device • PROFINET CBA • Point-to-point coupling • Updating times					No Yes No Yes No 0.25...512 depending on the send cycle
Open IE communication					
• Number of connections, max.					8
CPU/programming					
Programming language					
• STEP 7	Yes; V5.1 SP6 or higher	Yes; V5.3 SP3 or higher with hardware update	Yes; V5.2 SP1 or higher	Yes; V5.3 SP3 or higher with hardware update	Yes; 5.4 or higher, Service Pack 1 with HSP
• LAD • FUP • AWL • SCL • CFC • GRAPH • HiGraph	Yes Yes Yes Yes Yes Yes	Yes Yes Yes Yes Yes Yes Yes	Yes Yes Yes Yes Yes Yes Yes	Yes Yes Yes Yes Yes Yes Yes	Yes Yes Yes Yes Yes Yes Yes
Operational stacks	See instruction list	See instruction list	See instruction list	See instruction list	See instruction list
Nesting levels	8	8	8	8	8
User program protection/password protection	Yes	Yes	Yes	Yes	Yes
System functions (SFC)	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

SIMATIC S7-300

Central processing units

Fail-safe CPUs

Technical specifications (continued)

	6ES7 315-6FF01-0AB0	6ES7 315-2FH13-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK13-0AB0	6ES7 318-3FL00-0AB0
Dimensions					
Dimensions					
• Width	40 mm	80 mm	80 mm	80 mm	120 mm
• Height	125 mm	125 mm	125 mm	125 mm	125 mm
• Depth	130 mm	130 mm	130 mm	130 mm	130 mm
Weights					
• Weight, approx.	290 g	460 g	460 g	460 g	1 250 g

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 and 2 keys	
CPU 315F-2 PN/DP	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	
CPU 317F-2 DP	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	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	
CPU 319F-3 PN/DP B7	6ES7 318-3FL00-0AB0
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	
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

	Order No.
Micro Memory Card	
64 KB	6ES7 953-8LF20-0AA0
128 KB	6ES7 953-8LG11-0AA0
512 KB	6ES7 953-8LJ20-0AA0
2 MB	6ES7 953-8LL20-0AA0
4 MB	6ES7 953-8LM20-0AA0
8 MB	6ES7 953-8LP20-0AA0
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
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 B3	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 Devices), STEP 7, Engineering Tools, Runtime Software, SIMATIC PCS 7, SIMATIC HMI (Human Machine Interface), SIMATIC NET (Indus- trial Communication), SIMATIC Machine Vision, SIMATIC Sensors	
SIMATIC Manual Collection update service for 1 year B3	6ES7 998-8XC01-8YE2
Current "Manual Collection" DVD and the three subsequent updates	
Power supply connector	6ES7 391-1AA00-0AA0
10 units, spare part	

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

B7: Subject to export regulations: AL: N and ECCN: EAR99H

SIMATIC S7-300

SIPLUS central processing units

SIPLUS compact CPUs

Overview SIPLUS CPU 312C



- The compact CPU with integral digital inputs/outputs
- For small applications with increased processing performance requirements
- With technological functions

Micro Memory Card required for operation of CPU..

SIPLUS CPU 312C		
Order No.	6AG1 312-5BE03-2AB0	6AG1 312-5BE03-2AY0
Order No. based on	6ES7 312-5BE03-0AB0	6ES7 312-5BE03-0AB0
Ambient temperature range	-25 ... +60 °C; condensation permitted	
Ambient conditions	Suitable for extraordinary medial exposure (for example by chloric and sulphuric atmospheres).	
Conforms with standard for electronic equipment used on rolling stock (EN 50155).	No	Yes
Technical specifications	The technical data are identical with those of the based-on modules.	

For further technical documentation on SIPLUS, see:
<http://www.siemens.com/siplus-techdoku>

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 313-5BF03-2AB0	6AG1 313-5BF03-2AY0
Order No. based on	6ES7 313-5BF03-0AB0	6ES7 313-5BF03-0AB0
Ambient temperature range	-25 ... +60 °C; condensation permitted	
Ambient conditions	Suitable for extraordinary medial exposure (for example by chloric and sulphuric atmospheres).	
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1).	No	Yes
Technical specifications	The technical data are identical with the technical data of the based on modules.	

For further technical documentation on SIPLUS, see:
<http://www.siemens.com/siplus-techdoku>

SIMATIC S7-300

SIPLUS central processing units

SIPLUS compact CPUs

Overview SIPLUS CPU 314C-2DP



- The compact CPU with integral digital and analog inputs/outputs and PROFIBUS DP master/slave interface
- With technological functions
- For tasks with special functions
- For connecting distributed I/Os

Micro Memory Card required for operation of CPU.

SIPLUS CPU 314C-2DP		
Order No.	6AG1 314-6CG03-2AB0	6AG1 314-6CG03-2AY0
Order No. based on	6ES7 314-6CG03-0AB0	6ES7 314-6CG03-0AB0
Ambient temperature range	-25 ... +60 °C; condensation permitted	
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere).	
Conforms with standard for electronic equipment used on rolling stock (EN 50155).	No	Yes
Technical specifications	The technical data are identical with those of the based-on modules.	

For further technical documentation on SIPLUS, see:
<http://www.siemens.com/siplus-techdoku>

Ordering Data

Order No.

SIPLUS CPU 312C

(extended temperature and medial exposure)

Compact CPU, main memory 32 KB, power supply 24 V DC, 10 DI/6 DO integrated, integrated functions, MPI; including slot number labels; MMC required

B7

6AG1 312-5BE03-2AB0

Conforms to EN 50155

B7

6AG1 312-5BE03-2AY0

SIPLUS CPU 313C

(extended temperature and medial exposure)

Compact CPU, main memory 64 KB, power supply 24 V DC, 24 DI/16 DO, 4 AI/2 AO integrated, integrated functions, MPI; MMC required

B7

6AG1 313-5BF03-2AB0

Conforms to EN 50155

B7

6AG1 313-5BF03-2AY0

SIPLUS CPU 314C-2 DP

(extended temperature and medial exposure)

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 required

B7

6AG1 314-6CG03-2AB0

Conforms to EN 50155

B7

6AG1 314-6CG03-2AY0

Accessories

see S7-300 compact-CPU's, page 4/18

B7: Subject to export regulations: AL: N and ECCN: EAR99H

SIMATIC S7-300

SIPLUS central processing units

SIPLUS standard CPUs

Overview SIPLUS CPU 314



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

Micro Memory Card required for operation of CPU.

SIPLUS CPU 314		
Order No.	6AG1 314-1AG13-2AB0	6AG1 314-1AG13-2AY0
Order No. based on	6ES7 314-1AG13-0AB0	6ES7 314-1AG13-0AB0
Ambient temperature range	-25 ... +60 °C; condensation permitted	
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere).	
Conforms with standard for electronic equipment used on rolling stock (EN 50155).	No	Yes
Technical specifications	The technical data are identical with those of the based-on modules.	

For further technical documentation on SIPLUS, see:
<http://www.siemens.com/siplus-techdoku>

Overview SIPLUS CPU 315-2 DP



- The CPU with medium to large program memory and quantity frameworks for optional use of SIMATIC engineering tools
- High processing performance in binary and floating-point arithmetic
- PROFIBUS DP master/slave interface
- For large I/O configuration
- For designing distributed I/O structures

Micro Memory Card required for operation of CPU.

SIPLUS CPU 315-2 DP	
Order No.	6AG1 315-2AG10-2AB0
Order No. based on	6ES7 315-2AG10-0AB0
Ambient temperature range	-25 ... +60 °C; condensation permitted
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere).
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	Yes
Technical specifications	The technical data are identical with those of the based-on modules.

For further technical documentation on SIPLUS, see:
<http://www.siemens.com/siplus-techdoku>

SIMATIC S7-300

SIPLUS central processing units

SIPLUS standard CPUs

Overview SIPLUS CPU 315-2 PN/DP



- The CPU with medium-sized program memory and quantity structures
- High processing performance in binary and floating-point arithmetic
- Used as central controller in production lines with central and distributed I/O
- Integrated 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 to operate distributed I/Os on PROFINET

Micro Memory Card required for operation of CPU.

Overview SIPLUS CPU 317-2 PN/DP



- The CPU with a large program memory and quantity framework for demanding applications
- Distributed intelligence in Component Based Automation (CBA) on PROFINET
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component Based Automation (CBA)
- PROFINET IO-Controller to operate distributed I/Os on PROFINET
- 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
- For large I/O configuration
- For designing distributed I/O structures
- High processing performance in binary and floating-point arithmetic
- Combined MPI/PROFIBUS DP master/slave interface
- Optionally supports the use of SIMATIC engineering tools

Micro Memory Card required for operation of CPU.

SIPLUS CPU 315-2 PN/DP		
Order No.	6AG1 315-2EH13-2AB0	6AG1 315-2EH13-2AY0
Order No. based on	6ES7 315-2EH13-0AB0	6ES7 315-2EH13-0AB0
Ambient temperature range	-25 ... +60 °C; condensation permitted	
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere).	
Conforms with standard for electronic equipment used on rolling stock (EN 50155)	No	Yes
Technical specifications	The technical data are identical with those of the based-on modules.	

SIPLUS CPU 317-2 PN/DP		
Order No.	6AG1 317-2EK13-2AB0	6AG1 317-2EK13-2AY0
Order No. based on	6ES7 317-2EK13-0AB0	6ES7 317-2EK13-0AB0
Ambient temperature range	-25 ... +60 °C; condensation permitted	
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere).	
Conforms with standard for electronic equipment used on rolling stock (EN 50155)	No	Yes
Technical specifications	The technical data are identical with those of the based-on modules.	

For further technical documentation on SIPLUS, see:
<http://www.siemens.com/siplus-techdoku>

For further technical documentation on SIPLUS, see:
<http://www.siemens.com/siplus-techdoku>

SIMATIC S7-300

SIPLUS central processing units

SIPLUS standard CPUs

Ordering Data	Order No.	
SIPLUS CPU 314 (extended temperature and medial exposure) Main memory 96 KB, power supply 24 V DC, MPI; MMC required Conforms to EN 50155	B7	6AG1 314-1AG13-2AB0 6AG1 314-1AG13-2AY0
SIPLUS CPU 315-2 DP (extended temperature and medial exposure) Main memory 128 KB, power supply 24 V DC, MPI, PROFIBUS DP master/slave interface, MMC required; Conforms to EN 50155	B7	6AG1 315-2AG10-2AB0
SIPLUS CPU 315-2 PN/DP (extended temperature and medial exposure) Main memory 256 KB, power supply 24 V DC, combined MPI/PROFIBUS DP master/slave interface, Ethernet/PROFINET interface; MMC required Conforms to EN 50155		
SIPLUS CPU 317-2 PN/DP (extended temperature and medial exposure) Main memory 1 MB, power supply 24 V DC, combined MPI/PROFIBUS DP master/slave interface, Ethernet/PROFINET interface; MMC required Conforms to EN 50155		
Accessories		
		6AG1 315-2EH13-2AB0 6AG1 315-2EH13-2AY0 6AG1 317-2EK13-2AB0 6AG1 317-2EK13-2AY0 see S7-300 standard CPUs, page 4/40

B7: Subject to export regulations: AL: N and ECCN: EAR99H

SIMATIC S7-300

SIPLUS central processing units

SIPLUS fail-safe CPUs

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
- Satisfies safety requirements up to SIL 3 acc. to IEC 61508 and up to Cat. 4 acc. 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 ET 200M can also be connected centrally
- Standard modules for non-safety-related applications can be operated centrally and decentralized

Micro Memory Card required for operation of CPU.

SIPLUS CPU 315F-2 DP	
Order No.	6AG1 315-6FF01-2AB0
Order No. based on	6ES7 315-6FF01-0AB0
Ambient temperature range	- 25 ... + 60 °C; condensation permitted
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere).
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	Yes
Technical specifications	The technical data are identical with those of the based-on modules..

For further technical documentation on SIPLUS, see:
<http://www.siemens.com/siplus-techdoku>

Overview SIPLUS CPU 315F-2 PN/DP



- For design of a fail-safe automation system for plants with increased safety requirements
- Satisfies safety requirements up to SIL 3 acc. to IEC 61508 and up to Cat. 4 acc. 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
- Standard modules for non-safety-related applications can be operated centrally and decentralized
- 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.

SIPLUS CPU 315F-2 PN/DP	
Order No.	6AG1 315-2FH13-2AB0
Order No. based on	6ES7 315-2FH13-0AB0
Ambient temperature range	- 25 ... + 60 °C; condensation permitted
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere).
Technical specifications	The technical data are identical with those of the based-on modules.

For further technical documentation on SIPLUS, see:
<http://www.siemens.com/siplus-techdoku>

SIMATIC S7-300

SIPLUS central processing units

SIPLUS fail-safe CPUs

Overview SIPLUS CPU 317F-2 DP



- The fail-safe CPU with a large program memory and quantity framework for demanding applications
- For constructing a fail-safe automation system for plants with increased safety requirements
- Satisfies safety requirements up to SIL 3 acc. to IEC 61508 and up to Cat. 4 acc. 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
- Standard modules for non-safety-related applications can be operated centrally and decentralized

Micro Memory Card required for operation of CPU.

SIPLUS CPU 317F-2 DP		
Order No.	6AG1 317-6FF03-2AB0	6AG1 317-6FF03-2AY0
Order No. based on	6ES7 317-6FF03-0AB0	6ES7 317-6FF03-0AB0
Ambient temperature range	-25 ... +60 °C; condensation permitted	
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere).	
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	No	Yes
Technical specifications	The technical data are identical with those of the based-on modules..	

For further technical documentation on SIPLUS, see:
<http://www.siemens.com/siplus-techdoku>

Overview SIPLUS 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
- Satisfies safety requirements up to SIL 3 acc. to IEC 61508 and up to Cat. 4 acc. to EN 954-1
- Fail-safe I/O modules can be connected decentralized over the integrated PROFINET interface (PROFIsafe) and/or over the integrated PROFIBUS DP interface (PROFIsafe);
- Fail-safe I/O modules of ET 200M can also be connected centrally
- Standard modules for non-safety-related applications can be operated centrally and decentralized
- 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.

SIPLUS CPU 317F-2 PN/DP	
Order No.	6AG1 317-2FK13-2AB0
Order No. based on	6ES7 317-2FK13-0AB0
Ambient temperature range	- 25 ... + 60 °C; condensation permitted
Ambient conditions	Suited for exceptional medial exposure (e. g. by chlorine sulfur atmosphere).
Technical specifications	The technical data is identical to that of the based-on modules.

For further technical documentation on SIPLUS, see:
<http://www.siemens.com/siplus-techdoku>

SIMATIC S7-300

SIPLUS central processing units

SIPLUS fail-safe CPUs

Ordering Data

Order No.

SIPLUS CPU 315F-2 DP

(extended temperature and medial exposure)

CPU for SIMATIC S7-300F;
main memory 192 KB,
power supply 24 V DC,
MPI/PROFIBUS DP master/slave
interface, incl. single slot number
labels; MMC required;
Conforms to EN 50155

6AG1 315-6FF01-2AB0

SIPLUS CPU 315F-2 PN/DP

B7

(extended temperature and medial exposure)

CPU for SIMATIC S7-300F;
main memory 256 KB,
power supply 24 V DC,
MPI/PROFIBUS DP master/slave
interface, Ethernet/PROFINET
interface; incl. single slot number
labels; MMC required

6AG1 315-2FH13-2AB0

Order No.

SIPLUS CPU 317F-2 DP

(extended temperature and medial exposure)

CPU for SIMATIC S7-300F;
main memory 1 MB,
power supply 24 V DC, MPI,
PROFIBUS DP master/slave
interface; MMC required

Conforms to EN 50155

B7

6AG1 317-6FF03-2AB0

6AG1 317-6FF03-2AY0

SIPLUS CPU 317F-2 PN/DP

B7

(extended temperature and medial exposure)

CPU for SIMATIC S7-300F;
main memory 1 MB,
power supply 24 V DC,
MPI/PROFIBUS DP master/slave
interface, Ethernet/PROFINET
interface; MMC required

6AG1 317-2FK13-2AB0

Accessories

see S7-300 fail-safe CPUs,
page 4/61

B7: Subject to export regulations: AL: N and ECCN: EAR99H

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 321-1BP00-0AA0	6ES7 321-1BH10-0AA0
Supply voltages					
Load voltage L+					
• Rated value (DC)	24 V	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	100 mA	110 mA
Current consumption/ power loss					
Power loss, typ.	3.5 W	3.5 W	6.5 W	7 W	3.8 W
Connection point					
required front connectors	20-pin	20-pin	40-pin	Cable: 6ES7 392-4Bxx0-0AA0 terminal blocks: 6ES7 392-1xN00-0AA0	20-pin
Isochronous mode					
Isochronous mode	No	No	No	No	Yes
Digital inputs					
Number of digital inputs	16	16	32	64	16
Number of simultaneously controllable inputs					
• horizontal installation - up to 40 °C, max. - up to 60 °C, max.	16	16	32 16	64 32	16
• vertical installation - up to 40 °C, max.	16	16	32	32	16
Input characteristic curve to IEC 1131, Type 1	Yes	Yes	Yes	Yes	Yes
Input voltage					
• Rated value, DC	24 V	24 V	24 V	24 V	24 V
• for signal "0"	-30 to +5 V	-5 to +30 V	-30 to +5 V	-30...5	-30 to +5 V
• for signal "1"	13 to 30 V	-13 to -30 V	13 to 30 V	13...30	13 to 30 V

SIMATIC S7-300

Digital modules

SM 321 digital input modules

Technical specifications (continued)

	6ES7 321-1BH02-0AA0	6ES7 321-1BH50-0AA0	6ES7 321-1BL00-0AA0	6ES7 321-1BP00-0AA0	6ES7 321-1BH10-0AA0
Input current					
• for signal "1", typ.	7 mA	7 mA	7 mA	4.2 mA; typical	7 mA
Input delay (for rated value of input voltage)					
• for standard inputs				No	
- programmable	1.2 ms	1.2 ms	1.2 ms	1.2 ms	25 µs
- at "1" to "1", min.	4.8 ms	4.8 ms	4.8 ms	4.8 ms	75 µs
- at "0" to "1", max.					
Cable length					
• 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
Encoder					
Connectable encoders					
• 2-wire BEROs	Yes	Yes	Yes	No	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	No
• Diagnostic alarm				No	
• Process alarm				No	
Diagnoses					
• Diagnostic functions	No	No	No	No	No
Diagnostics indication LED					
• Status indicator digital input (green)	Yes	Yes	Yes	Yes	Yes
Isolation					
Isolation checked with	500 V DC	500 V DC	500 V DC	500 V DC	500 V DC
Isolation					
Galvanic isolation, digital inputs					
• between the channels	No	No	No	No	No
• between the channels, in groups of	16	16	16	16	16
• between the channels and the backplane bus	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler	Yes	Yes; Optocoupler
Dimensions					
Dimensions					
• Width	40 mm	40 mm	40 mm	40 mm	40 mm
• Height	125 mm	125 mm	125 mm	125 mm	125 mm

	6ES7 321-7BH01-0AB0	6ES7 321-1CH00-0AA0	6ES7 321-1CH20-0AA0	6ES7 321-1FH00-0AA0
Supply voltages				
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.

Technical specifications (continued)

	6ES7 321-7BH01-0AB0	6ES7 321-1CH00-0AA0	6ES7 321-1CH20-0AA0	6ES7 321-1FH00-0AA0
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
Current consumption/ power loss				
Power loss, typ.	4 W	1.5 W; at 24 V; 2,8 W at 48 V	4.3 W	4.9 W
Connection point				
required front connectors	20-pin	40-pin	20-pin	20-pin
Isochronous mode				
Isochronous mode	Yes	No	No	No
Digital inputs				
Number of digital inputs	16	16	16	16
Number of simultaneously controllable inputs				
• horizontal installation - up to 50 °C, max. - up to 60 °C, max.	16	16	8 8; 6 to Ue 146 V	16
• vertical installation - up to 40 °C, max.	16	16	8	16
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"	-30 to +5 V	-5 to +5 V AC	-146 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	79 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	6.5 mA; (120 V, 60 Hz), 16 mA (230 V, 50 Hz)
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
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
Encoder				
Connectable encoders				
• 2-wire BEROs - permissible quiescent current (2-wire BEROs), max.	Yes 2 mA	Yes 1 mA	Yes 1 mA	Yes 2 mA

SIMATIC S7-300

Digital modules

SM 321 digital input modules

Technical specifications (continued)

	6ES7 321-7BH01-0AB0	6ES7 321-1CH00-0AA0	6ES7 321-1CH20-0AA0	6ES7 321-1FH00-0AA0
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
Isolation				
Isolation checked with	500 V DC	1500 V AC	1500 V DC	4000 VDC
Isolation				
Galvanic isolation, digital inputs				
• between the channels	No	Yes	No	No
• 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				
Dimensions				
• 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
Supply voltages			
Load voltage L1			
• Rated value (AC)	120 V	230 V; 120/230 V 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
Current consumption/power loss			
Power loss, typ.	4 W	4.9 W	4.9 W
Connection point			
required front connectors	40-pin	20-pin	40-pin
Isochronous mode			
Isochronous mode	No	No	No
Digital inputs			
Number of digital inputs	32	8	8
Number of simultaneously controllable inputs			
• horizontal installation			
- up to 40 °C, max.	32		
- up to 60 °C, max.	24	8	8
• vertical installation			
- up to 40 °C, max.	32	8	8

Technical specifications (continued)

	6ES7 321-1EL00-0AA0	6ES7 321-1FF01-0AA0	6ES7 321-1FF10-0AA0
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	79 to 264 V	79 to 264 V
• Frequency range	47 to 63 Hz	47 to 63 Hz	47 to 63 Hz
Input current			
• for signal "1", typ.	21 mA	6.5 mA; (120 V); 11 mA (230 V)	7.5 mA; (120 V); 17.3 mA (230 V)
Input delay (for rated value of input voltage)			
• for standard inputs	No	No	No
- programmable	15 ms	25 ms	25 ms
- at "0" to "1", max.			
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
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; Per channel	Yes	Yes
Isolation			
Isolation checked with	2500 V DC	4000 V DC	1500 V AC
Isolation			
Galvanic isolation, digital inputs			
• between the channels	No	No	Yes
• between the channels, in groups of	8	2	1
• between the channels and the backplane bus	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler
Dimensions			
Dimensions			
• 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

SIMATIC S7-300

Digital modules

SM 321 digital input modules

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Ordering Data	Order No.	Order No.
SM 321 Digital Input Modules incl. labeling strips, bus connector 16 inputs, 24 V DC 16 inputs, 24 V DC, active low 32 inputs, 24 V DC 64 inputs, 24 V DC, active high/low <i>Note:</i> 6ES7 392-4...0-0AA0 connection cable and 6ES7 392-1.N00-0AA0 terminal blocks necessary. 16 inputs, 24 ... 48 V DC 16 inputs, 48 ... 125 V DC 16 inputs, 24 V DC, for isochronous mode 32 inputs, 120 V AC 8 inputs, 120/230 V AC 8 inputs, 120/230 V AC, single root 16 inputs, 120/230 V AC 16 inputs, 24 V DC, for isochronous mode, diagnostics-capable	6ES7 321-1BH02-0AA0 6ES7 321-1BH50-0AA0 6ES7 321-1BL00-0AA0 6ES7 321-1BP00-0AA0 B7 6ES7 321-1CH00-0AA0 B7 6ES7 321-1CH20-0AA0 6ES7 321-1BH10-0AA0 B7 6ES7 321-1EL00-0AA0 B7 6ES7 321-1FF01-0AA0 B7 6ES7 321-1FF10-0AA0 B7 6ES7 321-1FH00-0AA0 6ES7 321-7BH01-0AB0	Front door, elevated design B7 6ES7 328-0AA00-7AA0 e.g. for 32-channel modules; for connecting 1.3mm ² /16 AWG cables SIMATIC TOP connect see page 4/218 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 S7 SmartLabel V3.0 Software for automatic labeling of modules based on data of the STEP 7 project Single license B8 2XV9 450-1SL03-0YX0 Upgrade single license B8 2XV9 450-1SL03-0YX4 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 B3 6ES7 998-8XC01-8YE0 Electronic manuals on DVD, multilingual SIMATIC Manual Collection update service for 1 year B3 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
Front connectors 20-pin, with screw contacts • 1 unit • 100 units 20-pin, with spring-loaded contacts • 1 unit • 100 units 20-pin, with FastConnect • 1 unit 40-pin, with screw contacts • 1 unit • 100 units 40-pin with spring-loaded contacts • 1 unit • 100 units 40-pin, with FastConnect • 1 unit	6ES7 392-1AJ00-0AA0 6ES7 392-1AJ00-1AB0 6ES7 392-1BJ00-0AA0 6ES7 392-1BJ00-1AB0 6ES7 392-1CJ00-0AA0 6ES7 392-1AM00-0AA0 6ES7 392-1AM00-1AB0 6ES7 392-1BM01-0AA0 6ES7 392-1BM01-1AB0 6ES7 392-1CM00-0AA0	
S7-300 connecting cable For 64-channel modules; 2 units 1 m 2.5 m 5 m	6ES7 392-4BB00-0AA0 6ES7 392-4BC50-0AA0 6ES7 392-4BF00-0AA0	
Terminal block For 64-channel modules; 2 units With screw contacts With spring-loaded contacts	6ES7 392-1AN00-0AA0 6ES7 392-1BN00-0AA0	

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

B7: Subject to export regulations: AL: N and ECCN: EAR99H

B8: Subject to export regulations: AL: N and ECCN: EAR99S

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 322-1BP00-0AA0	6ES7 322-1BP50-0AA0	6ES7 322-8BF00-0AB0
Supply voltages						
Load voltage L+						
• Rated value (DC)	24 V	24 V	24 V	24 V	24 V	24 V
Current consumption						
from load voltage L+ (without load), max.	80 mA	110 mA	160 mA	75 mA	75 mA	90 mA
Current consumption/ power loss						
Power loss, typ.	4.9 W	5 W	6.6 W	6 W	6 W	5 W
Connection point						
required front connectors	20-pin	20-pin	40-pin	Cable: 6ES7 392-4Bxx0-0AA0 terminal blocks: 6ES7 392-1xN00-0AA0	Cable: 6ES7 392-4Bxx0-0AA0; terminal blocks: 6ES7 392-1xN00-0AA0	20-pin
Digital outputs						
Number of digital outputs	16	16	32	64	64	8
Short-circuit protection of the output	Yes; Electronic	Yes; Electronic	Yes; Electronic	Yes; Electronic	Yes; Electronic	Yes; Electronic
Limitation of inductive shutdown voltage to	L+ (-53 V)	L+ (-53 V)	L+ (-53 V)	L+ (-53V)	M+ (45 V)	L+ (-45 V)
Lamp load, max.	5 W	5 W	5 W	5 W	5 W	5 W
Output voltage						
• for signal "1", min.	L+ (-0.8 V)	L+ (-0.8 V)	L+ (-0.8 V)	L+ (-0.5V)	M+ (0.5 V)	L+ (-0.8 to -1.6 V)
Output current						
• for signal "1" rated value	0.5 A	0.5 A	0.5 A	0.3 A	0.3 A	0.5 A
• for signal "1" permissible range, min.				2.4 mA	2.4 mA	
• for signal "1" permissible range, max.				0.36 A	0.36 A	
• for signal "1" permissible range for 0 to 40 °C, min.	5 mA	5 mA	5 mA			10 mA

SIMATIC S7-300

Digital modules

SM 322 digital output modules

Technical specifications (continued)

	6ES7 322-1BH01-0AA0	6ES7 322-1BH10-0AA0	6ES7 322-1BL00-0AA0	6ES7 322-1BP00-0AA0	6ES7 322-1BP50-0AA0	6ES7 322-8BF00-0AB0
Output current (continued)						
• for signal "1" permissible range for 0 to 40 °C, max.	0.6 A	0.6 A	0.6 A			0.6 A
• for signal "1" permissible range for 40 to 60 °C, min.	5 mA	5 mA	5 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
• for signal "1" minimum load current	5 mA	5 mA	5 mA			10 mA
• for signal "0" residual current, max.	0.5 mA	0.5 mA	0.5 mA	0.1 mA		0.5 mA
Switching frequency						
• with resistive load, max.	100 Hz	1 000 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	2 Hz
• on lamp load, max.	10 Hz	10 Hz	10 Hz	10 Hz	10 Hz	10 Hz
Aggregate current of the outputs (per group)						
• horizontal installation						
- up to 40 °C, max.	4 A	4 A	4 A	1.6 A	1.6 A	4 A
- up to 60 °C, max.	3 A	3 A	3 A	1.2 A	1.2 A	3 A
• vertical installation						
- up to 40 °C, max.	2 A	2 A	2 A	1.6 A	1.6 A	4 A
• 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
Status information/alarms/diagnostics						
Alarms						
• Diagnostic alarm	No	No	No	No	No	Yes; Parameterizable
Diagnoses						
• Diagnostics	No	No	No	No	No	Yes
Isolation						
Isolation checked with	500 V DC	500 V DC	500 V DC	500 V DC	500 V DC	500 VDC
Isolation						
Isolation, digital outputs						
• between the channels, in groups of	8	8	8	16	16	8
• between the channels and the backplane bus	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler
Dimensions						
Dimensions						
• 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
	6ES7 322-5GH00-0AB0	6ES7 322-1CF00-0AA0	6ES7 322-1BF01-0AA0	6ES7 322-1FF01-0AA0	6ES7 322-5FF00-0AB0	6ES7 322-1FH00-0AA0
Supply voltages						
Load voltage L+						
• Rated value (DC)	24 V; 24 / 48	48 V; 48 to 125 V DC	24 V			
Load voltage L1						
• Rated value (AC)				230 V; AC 120/230 V	230 V; AC 120/230 V	230 V; AC 120/230 V

Technical specifications (continued)

	6ES7 322-5GH00-0AB0	6ES7 322-1CF00-0AA0	6ES7 322-1BF01-0AA0	6ES7 322-1FF01-0AA0	6ES7 322-5FF00-0AB0	6ES7 322-1FH00-0AA0
Current consumption						
from load voltage L+ (without load), max.	200 mA	2 mA	60 mA			2 mA
from load voltage L1 (without load), max.				2 mA	2 mA	3 mA
from backplane bus DC 5 V, max.	100 mA	100 mA	40 mA	100 mA	100 mA	200 mA
Current consumption/ power loss						
Power loss, typ.	2.8 W	7.2 W	6.8 W	8.6 W	8.6 W	8.6 W
Connection point						
required front connectors	40-pin	20-pin	20-pin	20-pin	40-pin	20-pin
Digital outputs						
Number of digital outputs	16	8	8	8	8	16
Short-circuit protection of the output	No; to be provided externally	Yes; Electronic	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 8 A, 250 V; per group
Limitation of inductive shutdown voltage to		M (-1 V)	L+ (-48 V)			
Lamp load, max.	2.5 W	15 W; 15 W (48 V) or 40 W (125 V)	10 W	50 W	50 W	50 W
Output voltage						
• for signal "1", min.	L+ (-0.25 V)		L+ (-0.8 V)	L1 (-1.5 V)	L1 (-8.5 V)	
Output current						
• for signal "1" rated value	0.5 A	1.5 A	2 A	2 A	2 A	1 A
• for signal "1" permissible range for 0 to 40 °C, min.		10 mA	5 mA	10 mA	10 mA	10 mA
• for signal "1" permissible range for 0 to 40 °C, max.		1.5 A	2.4 A	2 A	2 A	1 A
• for signal "1" permissible range for 40 to 60 °C, min.		10 mA	5 mA	10 mA	10 mA	10 mA
• for signal "1" permissible range for 40 to 60 °C, max.		1.5 A	2.4 A	1 A	1 A	0.5 A
• for signal "1" minimum load current		10 mA	5 mA	10 mA	10 mA	10 mA
• for signal "1" permissible peak current, max.	1.5 A; for 50 ms, 1 A 2 s one-time	3 A; for 10 ms		20 A; max. 1 AC cycle	20 A; with 2 half waves	20 A; with 2 half waves
• for signal "0" residual current, max.	10 µA	0.5 mA	0.5 mA	2 mA	2 mA	2 mA
Switching frequency						
• with resistive load, max.	10 Hz	25 Hz	100 Hz	10 Hz	10 Hz	10 Hz
• with inductive load, max.		0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz
• on lamp load, max.	0.5 Hz	10 Hz	10 Hz	1 Hz	1 Hz	1 Hz
Aggregate current of the outputs (per group)						
• horizontal installation						
- up to 40 °C, max.		6 A		4 A	8 A	4 A
- up to 50 °C, max.		4 A				
- up to 60 °C, max.	0.5 A; (8 A per module)	3 A	4 A	2 A	4 A	2 A
• vertical installation						
- up to 40 °C, max.		4 A	4 A	2 A	4 A	2 A
• all other mounting positions						
- up to 40 °C, max.	0.5 A; (8 A per module)					
• 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

SIMATIC S7-300

Digital modules

SM 322 digital output modules

Technical specifications (continued)

	6ES7 322-5GH00-0AB0	6ES7 322-1CF00-0AA0	6ES7 322-1BF01-0AA0	6ES7 322-1FF01-0AA0	6ES7 322-5FF00-0AB0	6ES7 322-1FH00-0AA0
Status information/alarms/diagnostics						
Alarms						
• Diagnostic alarm	Yes; Parameterizable	No	No	No	Yes; Parameterizable	No
Diagnoses						
• Diagnostics	Yes; Parameters can be assigned	No	No	Yes	Yes	Yes
Isolation						
Isolation checked with	1500 V AC	1500 V AC	500 V DC	1500 V AC	1500 V AC	4000 V DC
Isolation						
Isolation, digital outputs						
• between the channels, in groups of	1	4	4	4	1	8
• between the channels and the backplane bus	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler
Dimensions						
Dimensions						
• 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.	260 g	250 g	190 g	275 g	275 g	275 g

	6ES7 322-1FL00-0AA0	6ES7 322-1HF01-0AA0	6ES7 322-1HF10-0AA0	6ES7 322-5HF00-0AB0	6ES7 322-1HH01-0AA0
Supply voltages					
Load voltage L+					
• Rated value (DC)		24 V	120 V	24 V	120 V
Load voltage L1					
• Rated value (AC)	120 V; AC 120/230 V		230 V	230 V	230 V
Current consumption					
from load voltage L+ (without load), max.		110 mA; Current consumption of relay			
from load voltage L1 (without load), max.	10 mA	110 mA			
from backplane bus DC 5 V, max.	190 mA	40 mA	40 mA	100 mA	100 mA
Current consumption/power loss					
Power loss, typ.	25 W	3.2 W	4.2 W	3.5 W	4.5 W
Connection point					
required front connectors	20-pin	20-pin	40-pin	40-pin	20-pin
Digital outputs					
Number of digital outputs	32	8; Relay	8; Relay	8; Relay	16; Relay
Short-circuit protection of the output	No		No; to be provided externally	No; to be provided externally	
Lamp load, max.	50 W	50 W	1 500 W; AC 230 V	1 500 W; AC 230 V	50 W; AC 230 V
Output voltage					
• for signal "1", min.	L1 (-0.8 V)				

Technical specifications (continued)

	6ES7 322-1FL00-0AA0	6ES7 322-1HF01-0AA0	6ES7 322-1HF10-0AA0	6ES7 322-5HF00-0AB0	6ES7 322-1HH01-0AA0
Output current					
• for signal "1" rated value	1 A				
• for signal "1" permissible range for 0 to 40 °C, min.	10 mA				
• for signal "1" permissible range for 0 to 40 °C, max.	1 A				
• for signal "1" permissible range for 40 to 60 °C, min.	10 mA				
• for signal "1" permissible range for 40 to 60 °C, max.	1 A				
• for signal "1" minimum load current	10 mA	5 mA	5 mA	10 mA	10 mA
• for signal "1" permissible peak current, max.	10 A; per group (for 2 AC cycles)				
• for signal "0" residual current, max.	2 mA				
Switching frequency					
• with resistive load, max.	10 Hz	2 Hz	2 Hz	2 Hz	1 Hz
• with inductive load, max.	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz
• on lamp load, max.	1 Hz	2 Hz	2 Hz	2 Hz	1 Hz
• mechanical, max.		10 Hz	10 Hz	10 Hz	10 Hz
Aggregate current of the outputs (per group)					
• horizontal installation					
- up to 40 °C, max.	4 A		5 A	5 A	8 A
- up to 60 °C, max.	3 A				
• vertical installation					
- up to 40 °C, max.	4 A		5 A	5 A	8 A
• 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
Relay outputs					
Rated input voltage of relay L+ (DC)		24 V; 110 mA	24 V		24 V
Number of operating cycles		300 000; 230 V AC: 100 000; 120 V AC: 200 000; 24 V DC: 300 000 (at 2 A)	300 000; 300 000 (24 V DC, at 2 A); 200 000 (120 V AC, at 3 A); 100 000 (230 V AC, at 3 A)	100 000; 100 000 (DC 24 V, at 5 A), 100 000 (AC 230 V, at 5 A)	100 000; 50 000 (24 V DC, at 2 A); 700 000 (120 V AC, at 2 A); 100 000 (230 V AC, at 2 A)
Switching capacity of the contacts					
• with inductive load, max.		2 A; 2 A (230 V AC), 2 A (24 V DC)	3 A; 3 A (230 V DC); 2 A (24 V AC)	5 A; 5 A (230 V DC); 5 A (24 V AC)	2 A; 2 A (230 V AC), 2 A (24 V DC)
• with resistive load, max.		2 A	8 A; 8 A (230 V DC); 5 A (24 V AC)	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	No	No	Yes; Parameterizable	No
Diagnoses					
• Diagnostics	Yes	No	No	Yes	No
Isolation					
Isolation checked with	4000 V DC	1500 V AC	2000 V AC	1500 V AC	1500 V AC

SIMATIC S7-300

Digital modules

SM 322 digital output modules

Technical specifications (continued)

	6ES7 322-1FL00-0AA0	6ES7 322-1HF01-0AA0	6ES7 322-1HF10-0AA0	6ES7 322-5HF00-0AB0	6ES7 322-1HH01-0AA0
Isolation					
Isolation, digital outputs					
• between the channels, in groups of	8	2	1	1	8
• between the channels and the backplane bus	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler
Dimensions					
Dimensions					
• Width	80 mm	40 mm	40 mm	40 mm	40 mm
• Height	125 mm	125 mm	125 mm	125 mm	125 mm
• Depth	117 mm	120 mm	120 mm	120 mm	120 mm
Weights					
• Weight, approx.	500 g	190 g	320 g	320 g	250 g

Ordering Data

SM 322 digital output modules

incl. labeling strips,
bus connector

8 outputs, 24 V DC, 2 A

16 outputs, 24 V DC, 0.5 A

16 outputs, 24 V DC, 0.5 A,
high speed

32 outputs, 24 V DC, 0.5 A

64 outputs, 24 V DC, 0.3 A

Note:

6ES7392-4...0-0AA0 connection
cable and 6ES7392-1.N00-0AA0
terminal blocks necessary.

64 outputs, 24 V DC, 0.3 A,
sink output

Note:

6ES7 392-4...0-0AA0 connection
cable and 6ES7 392-1.N00-0AA0
terminal blocks necessary.

8 outputs, 24 V DC, 0.5 A,
diagnostics-capable

16 outputs, 24/48 V DC, 0.5 A

8 outputs, 48 ... 125 V DC, 1.5 A

8 outputs, 120/230 V AC, 1 A

8 outputs, 120/230 V AC, 2 A

16 outputs, 120/230 V AC, 1 A

32 outputs, 120 V AC, 1 A

8 outputs, relay contacts, 2 A

8 outputs, relay contacts, 5 A

8 outputs, relay contacts, 5 A,
with RC filter, overvoltage
protection

16 outputs, relay contacts, 8 A

Order No.

6ES7 322-1BF01-0AA0

6ES7 322-1BH01-0AA0

6ES7 322-1BH10-0AA0

6ES7 322-1BL00-0AA0

6ES7 322-1BP00-0AA0

6ES7 322-1BP50-0AA0

6ES7 322-8BF00-0AB0

B7 **6ES7 322-5GH00-0AB0**

B7 **6ES7 322-1CF00-0AA0**

B7 **6ES7 322-1FF01-0AA0**

B7 **6ES7 322-5FF00-0AB0**

B7 **6ES7 322-1FH00-0AA0**

B7 **6ES7 322-1FL00-0AA0**

6ES7 322-1HF01-0AA0

6ES7 322-1HF10-0AA0

B7 **6ES7 322-5HF00-0AB0**

6ES7 322-1HH01-0AA0

Front connectors

20-pin, with screw contacts

• 1 unit

• 100 units

20-pin, with spring-loaded
contacts

• 1 unit

• 100 units

20-pin, with FastConnect

• 1 unit

40-pin, with screw contacts

• 1 unit

• 100 units

40-pin with spring-loaded
contacts

• 1 unit

• 100 units

40-pin, with FastConnect

• 1 unit

S7-300 connecting cable

For 64-channel modules; 2 units

1 m

2.5 m

5 m

Terminal block

For 64-channel modules; 2 units

With screw contacts

With spring-loaded contacts

Front door, elevated design
e.g. for 32-channel modules;
for connecting 1.3 mm²/16 AWG
conductors

SIMATIC TOP connect

Order No.

6ES7 392-1AJ00-0AA0

6ES7 392-1AJ00-1AB0

6ES7 392-1BJ00-0AA0

6ES7 392-1BJ00-1AB0

6ES7 392-1CJ00-0AA0

6ES7 392-1AM00-0AA0

6ES7 392-1AM00-1AB0

6ES7 392-1BM01-0AA0

6ES7 392-1BM01-1AB0

6ES7 392-1CM00-0AA0

6ES7 392-4BB00-0AA0

6ES7 392-4BC50-0AA0

6ES7 392-4BF00-0AA0

6ES7 392-1AN00-0AA0

6ES7 392-1BN00-0AA0

B7 **6ES7 328-0AA00-7AA0**

see page 4/218

B7: Subject to export regulations: AL: N and ECCN: EAR99H

SIMATIC S7-300

Digital modules

SM 322 digital output modules

Ordering Data		Order No.		Order No.	
Bus connectors		6ES7 390-0AA00-0AA0		Labeling sheets for machine inscription	
1 unit (spare part)				For 16-channel signal modules, DIN A4, for printing with laser printer; 10 units	
Set of fuses for SM 322		6ES7 973-1HD00-0AA0		petrol	6ES7 392-2AX00-0AA0
10 fuses 8 A quick-response, 2 fuse holders; for 6ES7 322-1FF01-0AA0, 6ES7 322-1FH00-0AA0				light-beige	6ES7 392-2BX00-0AA0
10 fuses 6.3 A; for 6ES7 322-1CF00-0AA0		6ES7 973-1GC00-0AA0		yellow	6ES7 392-2CX00-0AA0
Labeling strips				red	6ES7 392-2DX00-0AA0
10 units (spare part)				For 32-channel signal modules, DIN A4, for printing with laser printer; 10 units	
for modules with 20-pin front connector		6ES7 392-2XX00-0AA0		petrol	6ES7 392-2AX10-0AA0
for modules with 40-pin front connector		6ES7 392-2XX10-0AA0		light-beige	6ES7 392-2BX10-0AA0
Label cover				yellow	6ES7 392-2CX10-0AA0
10 units (spare part)				red	6ES7 392-2DX10-0AA0
for modules with 20-pin front connector		6ES7 392-2XY00-0AA0		SIMATIC Manual Collection	6ES7 998-8XC01-8YE0
for modules with 40-pin front connector		6ES7 392-2XY10-0AA0		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	
S7 SmartLabel V3.0				SIMATIC Manual Collection update service for 1 year	6ES7 998-8XC01-8YE2
Software for automatic labeling of modules based on data of the STEP 7 project				Current S7 Manual Collection DVD and the three subsequent updates	
Single license	B8	2XV9 450-1SL03-0YX0		S7-300 manual	
Upgrade single license	B8	2XV9 450-1SL03-0YX4		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

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

B8: Subject to export regulations: AL: N and ECCN: EAR99S

SIMATIC S7-300

Digital modules

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

4

Technical specifications

	6ES7 323-1BH01-0AA0	6ES7 323-1BL00-0AA0	6ES7 327-1BH00-0AB0
Supply voltages			
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
Current consumption/ power loss			
Power loss, typ.	3.5 W	6.5 W	3 W
Connection point			
required front connectors	20-pin	40-pin	20-pin
Isochronous mode			
Isochronous mode	No	No	No
Digital inputs			
Number of digital inputs	8	16	8; 8 hard-wired, 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
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"	-30 to +5 V	-30 to +5 V	-30 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

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 "0" 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
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
Digital outputs			
Number of digital outputs	8	16	8; can also be parameterized individually as DI
Short-circuit protection of the output	Yes; Electronic	Yes; Electronic	Yes; Electronic
• Response threshold, typ.	1 A	1 A	1 A
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; Outputs of the same group only
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)			
• horizontal installation			
- up to 40 °C, max.		4 A	4 A
- up to 60 °C, max.	4 A	3 A	3 A
• vertical installation			
- up to 40 °C, max.	4 A	2 A	2 A

SIMATIC S7-300

Digital modules

SM 323/SM 327 digital input/output modules

Technical specifications (continued)

	6ES7 323-1BH01-0AA0	6ES7 323-1BL00-0AA0	6ES7 327-1BH00-0AB0
Load impedance range			
• lower limit	48 Ω	48 Ω	48 Ω
• upper limit	4 kΩ	4 kΩ	4 kΩ
• cable length, shielded, max.	1 000 m	1 000 m	1 000 m
• Cable length unshielded, max.	600 m	600 m	600 m
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			
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
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
Permissible potential difference			
between different circuits	75 V DC / 60 V AC	75 V DC / 60 V AC	75 V DC / 60 V AC
Dimensions			
Dimensions			
• 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

SIMATIC S7-300

Digital modules

SM 323/SM 327 digital input/output modules

Ordering Data	Order No.	Order No.
SM 323 digital input/output modules incl. labeling strips, bus connector 8 inputs, 8 outputs 16 inputs, 16 outputs	6ES7 323-1BH01-0AA0 6ES7 323-1BL00-0AA0	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
SM 327 digital input/output modules incl. labeling strips, bus connector 8 inputs, 8 outputs or outputs (can be configured)	6ES7 327-1BH00-0AB0	S7 SmartLabel V3.0 Software for automatic labeling of modules based on data of the STEP 7 project Single license B8 2XV9 450-1SL03-0YX0 Upgrade single license B8 2XV9 450-1SL03-0YX4
Front connectors 20-pin, with screw contacts • 1 unit • 100 units 20-pin, with spring-loaded contacts • 1 unit • 100 units 20-pin, with FastConnect • 1 unit 40-pin, with screw contacts • 1 unit • 100 units 40-pin with spring-loaded contacts • 1 unit • 100 units 40-pin, with FastConnect • 1 unit	6ES7 392-1AJ00-0AA0 6ES7 392-1AJ00-1AB0 6ES7 392-1BJ00-0AA0 6ES7 392-1BJ00-1AB0 6ES7 392-1CJ00-0AA0 6ES7 392-1AM00-0AA0 6ES7 392-1AM00-1AB0 6ES7 392-1BM01-0AA0 6ES7 392-1BM01-1AB0 6ES7 392-1CM00-0AA0	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
Front door, elevated design B7 e.g. for 32 channel modules; enables connection of 1.3 mm ² /16 AWG wires	6ES7 328-0AA00-7AA0	SIMATIC Manual Collection B3 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 TOP connect see page 4/218		
Bus connectors 1 unit (spare part)	6ES7 390-0AA00-0AA0	SIMATIC Manual Collection update service for 1 year B3 6ES7 998-8XC01-8YE2 Current S7 Manual Collection DVD and the three subsequent updates
Labeling strips 10 units (spare part) for modules with 20-pin front connector for modules with 40-pin front connector	6ES7 392-2XX00-0AA0 6ES7 392-2XX10-0AA0	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

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

B7: Subject to export regulations: AL: N and ECCN: EAR99H

B8: Subject to export regulations: AL: N and ECCN: EAR99S

SIMATIC S7-300

SIPLUS digital modules

SIPLUS SM 321 digital input modules

Overview



- Digital inputs
- For connection of switches and 2-wire proximity switches (BEROs)

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 ... + 60 °C, condensation permitted	- 25 ... + 70 °C, condensation permitted	- 25 ... + 60 °C, condensation permitted
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere)		
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	Yes	Yes	Yes
Technical specifications	The technical data are identical with those 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 ... + 60 °C, condensation permitted		
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere)		
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	Yes	Yes	
Technical specifications	The technical data are identical with those of the based-on modules.		

Ordering Data

SIPLUS SM 321 digital input modules

(extended temperature range and medial exposure)

incl. labeling strips, bus connectors

16 inputs, 24 V DC	B7	6AG1 321-1BH02-2AA0
32 inputs, 24 V DC	B7	6AG1 321-1BL00-2AA0
16 inputs, 48 to 120 V DC	B7	6AG1 321-1CH20-2AA0
16 inputs, 24 V DC, for isochronous mode, diagnostics-capable	B7	6AG1 321-7BH01-2AB0
8 inputs, 120/230 V AC	B7	6AG1 321-1FF01-2AA0

B7: Subject to export regulations: AL: N and ECCN: EAR99H

Accessories

Order No.

see S7-300 digital input modules, page 4/76

Overview



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

SIPLUS SM 322	16 DO	8 DO	8 DO	8 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 ... + 60 °C, condensation permitted			
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere)			
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	Yes	Yes	Yes	Yes
Technical specifications	The technical data are identical with those 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 ... + 60 °C, condensation permitted	- 25 ... + 60 °C, condensation permitted	- 25 ... + 70 °C, condensation permitted	- 25 ... + 60 °C, condensation permitted
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere)			
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	Yes	Yes	Yes	Yes
Technical specifications	The technical data are identical with those of the based-on modules.			

Ordering Data

SIPLUS SM 322 digital output modules

(extended temperature range and medial exposure)

incl. labeling strips, bus connectors

8 outputs, 24 V DC, 2 A

6AG1 322-1BF01-2AA0

16 outputs, 24 V DC, 0.5 A

B7 **6AG1 322-1BH01-2AA0**

32 outputs, 24 V DC, 0.5 A

6AG1 322-1BL00-2AA0

8 outputs, 24 V DC, 0.5 A, diagnostics-capable

B7 **6AG1 322-8BF00-2AB0**

8 outputs, 4 ... 125 V DC, 1.5 A

B7 **6AG1 322-1CF00-2AA0**

8 outputs, 120/230 V AC, 1 A

B7 **6AG1 322-1FF01-2AA0**

8 outputs, relay contacts, 5 A

B7 **6AG1 322-1HF10-2AA0**

16 outputs, relay contacts, 8 A

6AG1 322-1HH01-2AA0

Accessories

Order No.

see S7-300 digital output modules, page 4/82

B7: Subject to export regulations: AL: N and ECCN: EAR99H

SIMATIC S7-300

SIPLUS digital modules

SIPLUS SM 323 digital input/output module

Overview



- Digital inputs and outputs
- For connection of switches, 2-wire proximity switches (BERO), solenoid valves, contactors, small-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 ... + 60 °C, condensation permitted
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere)
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	Yes
Technical specifications	The technical data are identical with those of the based-on modules.

Ordering Data	Order No.	Accessories	Order No.
SIPLUS SM 323 digital input/output modules (extended temperature range and medial exposure) incl. labeling strips, bus connectors 8 inputs, 8 outputs	B7 6AG1 323-1BH01-2AA0		see S7-300 digital input/output modules, page 4/87
B7: Subject to export regulations: AL: N and ECCN: EAR99H			

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
Supply voltages				
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
Current consumption/ power loss				
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-polig
Isochronous mode				
Isochronous 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
Input ranges (rated values), voltages				
• 0 to +10 V	No	No	Yes	No
• 1 to 5 V	Yes	Yes	Yes	Yes
• 1 to 10 V	No	Yes	No	No
• -1 V to +1 V	Yes	Yes	Yes	Yes
• -10 V to +10 V	Yes	Yes	Yes	Yes

SIMATIC S7-300

Analog modules

SM 331 analog input modules

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)				
• -2.5 V to +2.5 V	Yes	No	No	Yes
• -250 mV to +250 mV	Yes	No	No	Yes
• -5 V to +5 V	Yes	Yes	Yes	Yes
• -50 mV to +50 mV	No	No	Yes	No
• -500 mV to +500 mV	Yes	Yes	Yes	Yes
• -80 mV to +80 mV	Yes	Yes	No	Yes
Input ranges (rated values), currents				
• 0 to 20 mA	Yes	Yes	Yes	Yes
• -10 to +10 mA	Yes		No	Yes
• -20 to +20 mA	Yes	Yes	Yes	Yes
• -3.2 to +3.2 mA	Yes	No	No	Yes
• 4 to 20 mA	Yes	Yes	Yes	Yes
Input ranges (rated values), thermoelements				
• Type B	No	No	No	
• Type E	Yes	No	No	Yes
• Type J	Yes	No	No	Yes
• Type K	Yes	No	No	Yes
• Type L	No	No	No	No
• Type N	Yes	No	No	Yes
• Type R	No	No	No	No
• Type S	No	No	No	No
• Type T	No	No	No	No
• Type U	No	No	No	No
• Type TXK/TXK(L) to GOST	No	No	No	No
Input ranges (rated values), resistors				
• 0 to 150 Ohm	Yes	No	No	Yes
• 0 to 300 Ohm	Yes	No	No	Yes
• 0 to 600 Ohm	Yes	No	Yes	Yes
• 0 to 6000 Ohm	No	No	Yes	No
Input ranges (rated values), resistance thermometers				
• Cu 10	No	No	No	No
• Ni 100	Yes; Standard	No	Yes; Standard/climate	Yes
• Ni 1000	No	No	Yes	
• LG-Ni 1000	No		Yes; Standard/climate	
• Ni 120	No		No	
• Ni 200	No		No	
• Ni 500	No		No	
• Pt 100	Yes; Standard		Yes; Standard/climate	Yes
• Pt 1000	No		No	
• Pt 200	No		No	
• Pt 500	No		No	
• permissible input frequency for voltage input (destruction limit), max.	20 V; continuous; 75 V for max. 1 s (mark to space ratio 1:20)	20 V; 20 V continuous, 75 V for max. 1 s (mark to space ratio 1:20)	30 V; 12 V continuous, 30 V for max. 1 s	20 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	40 mA	40 mA	40 mA

Technical specifications (continued)

	6ES7 331-7KF02-0AB0	6ES7 331-7HF01-0AB0	6ES7 331-1KF01-0AB0	6ES7 331-7KB02-0AB0
Characteristic curve linearization				
- programmable - for thermoelements - for thermoresistor	Yes Type E, J, K, L, N Pt100 (standard, climatic range), Ni100 (standard, climatic range)		Yes yes; Pt100 standard/air con.; Ni100 standard/air con.; Ni1000 standard/air con.; LG-Ni1000 standard/air con.	Yes Type E, J, K, L, N Pt100 (standard, climatic range), Ni100 (standard, climatic range)
Temperature compensation				
programmable	Yes			Yes
internal temperature compensation	Yes			Yes
external temperature compensation with compensations socket	Yes			Yes
Analog value creation				
Measurement principle	integrating	Actual value encryption	integrating	integrating
Integration and conversion time/resolution per channel				
Resolution with overload area (bit including sign), max.	15 Bit; unipolar: 9/12/12/14 bits; bipolar: 9 bits + sign/ 12 bits + sign/ 12 bits + sign/ 14 bits + sign	14 Bit; unipolar: 14 bits; bipolar: 13 bits + sign	13 Bit	15 Bit; unipolar: 9/12/12/14 bits; bipolar: 9 bits + sign/ 12 bits + sign/ 12 bits + sign/ 14 bits + sign
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, ms		52 μ s per channel	66 / 55 ms	
Basic conversion time, including integration time, ms	3/ 17/ 22/ 102 ms		66 / 55 ms	6 / 34 / 44 / 204 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% (80 mV); +/-0.6% (250 to 1000 mV); +/-0.8% (2.5 to 10 V)	+/- 0,4 %	+/- 0,6 %; +/-0.6% (+/-5 V, 10 V, 1 to 5 V, 0 to 10 V); +/-0.5% (+/-50 mV, 500 mV, 1 V)	+/- 1 %; +/-1% (80 mV); +/-0.6% (250 to 1000 mV); +/-0.8% (2.5 to 10 V)
Current, relative to input area	+/- 0,7 %; from 3.2 to 20 mA	+/- 0,3 %	+/- 0,5 %; +/-20 mA, 0 to 20 mA, 4 to 20 mA	+/- 0,7 %; from 3.2 to 20 mA
Impedance, relative to input area	+/- 0,7 %; 150, 300, 600 Ohm		+/- 0,5 %; 0 to 6 kohms, 0 to 600 kohms	+/- 0,7 %; 150, 300, 600 Ohm

SIMATIC S7-300

Analog modules

SM 331 analog input modules

Technical specifications (continued)

	6ES7 331-7KF02-0AB0	6ES7 331-7HF01-0AB0	6ES7 331-1KF01-0AB0	6ES7 331-7KB02-0AB0
Operational limit in overall temperature range (continued)				
Resistance-type thermometer, relative to input area	+/- 0,7 %; +/-0.7% (Pt100/ Ni100); +/-0.8% (Pt100 climate)		1 Kelvin (Pt100, Ni100, climatic; Ni1000, LG-Ni1000, standard; Ni1000, LG-Ni1000, climatic); 1.2 Kelvin (Pt100, Ni100, standard)	+/- 0,7 %; +/-0.7% (Pt100/ Ni100); +/-0.8% (Pt100 climate)
Basic error limit (operational limit at 25 °C)				
Voltage, relative to input area	+/- 0,6 %; +/-0.4% (250 to 1000 mV); +/-0.6% (2.5 to 10 mV); +/-0.7% (80 mV)	+/- 0,25 %	+/- 0,4 %; 0.4% (+/-5 V, 10 V, 1 to 5 V, 0 to 10 V); 0.3% (+/-50 mV, 500 mV, 1 V)	+/- 0,6 %; +/-0.6% (80 mV, 2.5 to 10 V); +/-0.4% (250 to 1000 mV)
Current, relative to input area	+/- 0,5 %; 3.2 to 20 mA	+/- 0,2 %	+/- 0,3 %; +/-20mA,0-20mA,4-20mA	+/- 0,5 %; 3.2 to 20 mA
Impedance, relative to input area	+/- 0,5 %; 150, 300, 600 Ohm		+/- 0,3 %; 0 to 6 kohms, 0 to 600 kohms	+/- 0,5 %; 150, 300, 600 Ohm
Resistance-type thermometer, relative to input area	+/- 0,6 %; +/-0.5% (Pt100/ Ni100); +/-0.6% (Pt100 climate)		1 Kelvin (Pt100, Ni100, standard); 0.8 Kelvin (Pt100, Ni100, climatic; Ni1000, LG-Ni1000, standard; Ni1000, LG-Ni1000, climatic)	+/- 0,6 %; +/-0.5% (Pt100/ Ni100); +/-0.6% (Pt100 climate)
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 0
Diagnoses				
Diagnostic information readable	Yes	Yes	No	Yes
Isolation				
Isolation checked with	500 V DC	500 V DC	500 V DC	500 V DC
Isolation				
Isolation, analog inputs				
between the channels	No	No	No	No
between the channels and the backplane bus	Yes	Yes	Yes	Yes
Dimensions				
Dimensions				
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
Supply voltages				
Load voltage L+				
Rated value (DC)	24 V	24 V		24 V
reverse polarity protection	Yes	Yes		Yes

Technical specifications (continued)

	6ES7 331-7PF01-0AB0	6ES7 331-7PF11-0AB0	6ES7 331-7NF00-0AB0	6ES7 331-7NF10-0AB0
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
Current consumption/ power loss				
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				
Isochronous 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
Input ranges (rated values), voltages				
• 0 to +10 V	No	No	No	No
• 1 to 5 V	No	No	Yes	Yes
• 1 to 10 V	No	No	No	No
• -1 V to +1 V	No	No	No	No
• -10 V to +10 V	No	No	Yes	Yes
• -2.5 V to +2.5 V	No	No	No	No
• -250 mV to +250 mV	No	No	No	No
• -5 V to +5 V	No	No	Yes	Yes
• -50 mV to +50 mV	No	No	No	No
• -500 mV to +500 mV	No	No	No	No
• -80 mV to +80 mV	No	No	No	No
Input ranges (rated values), currents				
• 0 to 20 mA	No	No	Yes	Yes
• -10 to +10 mA	No	No		
• -20 to +20 mA	No	No	Yes	Yes
• -3.2 to +3.2 mA	No	No	No	No
• 4 to 20 mA	No	No	Yes	Yes
Input ranges (rated values), thermoelements				
• Type B	No	Yes	No	No
• Type E	No	Yes	No	No
• Type J	No	Yes	No	No
• Type K	No	Yes	No	No
• Type L	No	Yes	No	No
• Type N	No	Yes	No	No
• Type R	No	Yes	No	No
• Type S	No	Yes	No	No
• Type T	No	Yes	No	No
• Type U	No	Yes	No	No
• Type TXK/TXK(L) to GOST	No	Yes	No	No

SIMATIC S7-300

Analog modules

SM 331 analog input modules

Technical specifications (continued)

	6ES7 331-7PF01-0AB0	6ES7 331-7PF11-0AB0	6ES7 331-7NF00-0AB0	6ES7 331-7NF10-0AB0
Input ranges (rated values), resistance thermometers				
• Cu 10	Yes	No	No	No
• Ni 100	Yes	No	No	No
• Ni 1000	Yes	No	No	No
• LG-Ni 1000	Yes	No	No	No
• Ni 120	Yes	No	No	No
• Ni 200	Yes	No	No	No
• Ni 500	Yes	No	No	No
• Pt 100	Yes	No	No	No
• Pt 1000	Yes	No	No	No
• Pt 200	Yes	No	No	No
• Pt 500	Yes	No	No	No
Input ranges (rated values), resistors				
• 0 to 150 Ohm	Yes	No	No	No
• 0 to 300 Ohm	Yes	No	No	No
• 0 to 600 Ohm	Yes	No	No	No
• 0 to 6000 Ohm		No	No	No
• 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 continuous, 75 V for max. 1 s (mark to space ratio 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
Characteristic curve linearization				
• programmable - for thermoelements	Yes	Yes Type B, E, J, K, L, N, R, S, T, U, C		
- for thermoresistor	Pt100, Pt200, Pt500, Pt1000, Ni100, Ni120, Ni200, Ni500, Ni1000, Cu10; (standard/climate)			
Temperature compensation				
• programmable		Yes		
• internal temperature compensation		Yes		
• external temperature compensation with compensations socket		Yes		
• external temperature compensation with Pt100		Yes		
Analog value creation				
Measurement principle	integrating	integrating	integrating	integrating
Integration and conversion time/resolution per 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 bits; bipolar: 15 bits + sign/ 15 bits + sign/15 bits + sign/15 bits + sign	16 Bit; unipolar: 15/15/15/15 bits; bipolar: 15 bits + sign/ 5 bits + sign/15 bits + sign/15 bits + 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)

Technical specifications (continued)

	6ES7 331-7PF01-0AB0	6ES7 331-7PF11-0AB0	6ES7 331-7NF00-0AB0	6ES7 331-7NF10-0AB0
Integration and conversion time/resolution per channel (continued)				
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 %			
Resistance-type thermometer, relative to input area	+/- 1 K			
Basic error limit (operational limit at 25 °C)				
Voltage, relative to input area			+/- 0.05 %	+/- 0.05 %
Current, relative to input area			+/- 0.05 %	+/- 0.05 %
Impedance, relative to input area	+/- 0.05 %			
Resistance-type thermometer, relative to input area	+/-0.5 K			
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	No	No	No	No
between the channels, in groups of	2	2	2	2
between the channels and the backplane bus	Yes	Yes	Yes	Yes

SIMATIC S7-300

Analog modules

SM 331 analog input modules

Technical specifications (continued)

	6ES7 331-7PF01-0AB0	6ES7 331-7PF11-0AB0	6ES7 331-7NF00-0AB0	6ES7 331-7NF10-0AB0
Dimensions				
Dimensions				
• 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

Ordering Data

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

6ES7 331-7KB02-0AB0

8 inputs, enhanced resolution 16 bits

B7

6ES7 331-7NF00-0AB0

8 inputs, enhanced resolution 16 bits, 4-channel mode

B7

6ES7 331-7NF10-0AB0

8 inputs, resolution 14 bits, for isochronous mode

6ES7 331-7HF01-0AB0

8 inputs, for thermal resistors

B7

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

20-pin, with screw contacts

• 1 unit

6ES7 392-1AJ00-0AA0

• 100 units

6ES7 392-1AJ00-1AB0

20-pin, with spring-loaded contacts

• 1 unit

6ES7 392-1BJ00-0AA0

• 100 units

6ES7 392-1BJ00-1AB0

20-pin, with FastConnect

• 1 unit

6ES7 392-1CJ00-0AA0

40-pin, with screw contacts

• 1 unit

6ES7 392-1AM00-0AA0

• 100 units

6ES7 392-1AM00-1AB0

40-pin with spring-loaded contacts

• 1 unit

6ES7 392-1BM01-0AA0

• 100 units

6ES7 392-1BM01-1AB0

40-pin, with FastConnect

• 1 unit

6ES7 392-1CM00-0AA0

Order No.

Front door, elevated design

B7

6ES7 328-0AA00-7AA0

e.g. for 32-channel modules; for connecting 1.3 mm²/16 AWG wires

SIMATIC TOP connect

see page 4/218

Bus connectors

1 unit (spare part)

6ES7 390-0AA00-0AA0

Shield connecting element

80 mm wide, with 2 rows for 4 terminal elements 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

Label cover

10 units (spare part), for modules with 20-pin front connector

6ES7 392-2XY00-0AA0

Labeling strips

10 units (spare part), for modules with 20-pin front connector

6ES7 392-2XX00-0AA0

S7 SmartLabel V3.0

Software for automatic labeling of modules based on data of the STEP 7 project

Single license

B8

2XV9 450-1SL03-0YX0

Upgrade single license

B8

2XV9 450-1SL03-0YX4

B7: Subject to export regulations: AL: N and ECCN: EAR99H

B8: Subject to export regulations: AL: N and ECCN: EAR99S

4

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

SIMATIC S7-300

Analog modules

SM 332 analog output modules

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
Supply voltages				
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
Current consumption/ power loss				
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 k Ω	1 k Ω	1 k Ω	1 k Ω
• with voltage outputs, capacitive load, max.	1 μ F	1 μ F	1 μ F	1 μ F
• with current outputs, max.	500 Ω	500 Ω	500 Ω	500 Ω
• with current outputs, inductive load, max.	10 milliH	10 milliH	10 milliH	1 milliH

Technical specifications (continued)

	6ES7 332-5HB01-0AB0	6ES7 332-5HD01-0AB0	6ES7 332-5HF00-0AB0	6ES7 332-7ND02-0AB0
Analog value creation				
Integration and conversion time/resolution per channel				
• Resolution with overload area (bit including sign), max.	12 Bit; +/-10 V, +/-20 mA, 4 to 20 mA, 1 to 5 V: 11 bits + sign; 0 to 10 V, 0 to 20 mA: 12 bits	12 Bit; +/-10 V, +/-20 mA, 4 to 20 mA, 1 to 5 V: 11 bits + sign; 0 to 10 V, 0 to 20 mA: 12 bits	12 Bit; +/-10 V, +/-20 mA, 4 to 20 mA, 1 to 5 V: 11 bits + sign; 0 to 10 V, 0 to 20 mA: 12 bits	16 Bit
• Conversion time (per channel)	0.8 ms	0.8 ms	0.8 ms	200 µs; in isochronous mode 640 µs
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 (1 mH); 3.3 ms (10 mH)	0.5 ms; 0.5 ms (1 mH); 3.3 ms (10 mH)	0.5 ms; 0.5 ms (1 mH); 3.3 ms (10 mH)	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				
Dimensions				
• 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

Overview



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

Technical specifications

	6ES7 334-0CE01-0AA0	6ES7 334-0KE00-0AB0
Supply voltages		
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
Current consumption/ power loss		
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
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), resistance thermometers		
• Pt 100		Yes; only climatic range

	6ES7 334-0CE01-0AA0	6ES7 334-0KE00-0AB0
Input ranges (rated values), resistors		
• 0 to 10000 Ohm		Yes
• permissible input frequency for voltage input (destruction limit), max.	20 V	20 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	
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 milliH	

SIMATIC S7-300

Analog modules

SM 334 analog input/output modules

Technical specifications (continued)

	6ES7 334-0CE01-0AA0	6ES7 334-0KE00-0AB0
Analog value creation		
Integration 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	
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 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 %
• Voltage, relative to output area	+/- 0.6 %	+/- 1 %
• Current, relative to output area	+/- 1 %	

	6ES7 334-0CE01-0AA0	6ES7 334-0KE00-0AB0
Basic error limit (operational limit at 25 °C)		
• Voltage, relative to input area	+/- 0.7 %	+/- 0.5 %; 0 to 10 V
• 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 %
• Voltage, relative to output area	+/- 0.5 %	+/- 0.85 %
• Current, relative to output area	+/- 0.5 %	
Status information/alarms/diagnostics		
Alarms		
• Alarms	No	No
Diagnoses		
• Diagnostic functions	No	No
Isolation		
Isolation checked with	500 V DC	500 V DC
Isolation		
Isolation, analog inputs		
• between the channels and the backplane bus	No	Yes
Isolation, analog outputs		
• between the channels and the backplane bus	No	Yes
Dimensions		
Dimensions		
• Width	40 mm	40 mm
• Height	125 mm	125 mm
• Depth	120 mm	120 mm
Weights		
• Weight, approx.	285 g	200 g

SIMATIC S7-300

Analog modules

SM 334 analog input/output modules

Ordering Data	Order No.	Order No.
SM 334 analog input/output modules incl. labeling strips, bus connector 4 inputs, 2 outputs 4 inputs, 2 outputs, resistance measurement, Pt 100	6ES7 334-0CE01-0AA0 6ES7 334-0KE00-0AB0	Labeling strips 10 units (spare part), for modules with 20-pin front connector 6ES7 392-2XX00-0AA0
Front connectors 20-pin, with screw contacts • 1 unit • 100 units 20-pin, with spring-loaded terminals • 1 unit • 100 units 20-pin, with FastConnect • 1 unit	6ES7 392-1AJ00-0AA0 6ES7 392-1AJ00-1AB0 6ES7 392-1BJ00-0AA0 6ES7 392-1BJ00-1AB0 6ES7 392-1CJ00-0AA0	S7 SmartLabel V3.0 Software for automatic labeling of modules based on data of the STEP 7 project Single license B8 2XV9 450-1SL03-0YX0 Upgrade single license B8 2XV9 450-1SL03-0YX4
Front door, elevated design B7 e.g. for 32-channel modules; for connecting 1.3 mm ² /16 AWG wires	6ES7 328-0AA00-7AA0	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 TOP connect	see page 4/218	SIMATIC Manual Collection B3 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
Bus connectors 1 unit (spare part)	6ES7 390-0AA00-0AA0	SIMATIC Manual Collection update service for 1 year B3 Current S7 Manual Collection DVD and the three subsequent updates
Shield connecting element 80 mm wide, with 2 rows for 4 terminal elements each	6ES7 390-5AA00-0AA0	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
Terminal elements 2 units For 2 cables with 2 mm to 6 mm diameter For 1 cable with 3 mm to 8 mm diameter For 1 cable with 4 mm to 13 mm diameter	6ES7 390-5AB00-0AA0 6ES7 390-5BA00-0AA0 6ES7 390-5CA00-0AA0	
Label cover 10 units (spare part), for modules with 20-pin front connector	6ES7 392-2XY00-0AA0	

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

B7: Subject to export regulations: AL: N and ECCN: EAR99H

B8: Subject to export regulations: AL: N and ECCN: EAR99S

SIMATIC S7-300

Analog modules

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

SM 335	
Conversion time per channel	200 μ s
• Basic conversion time for 4 channels, max.	1 ms
Resolution	
• Bipolar	13 bits + sign
• Unipolar	14 bits
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 M Ω
• 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

Technical specifications (continued)

	SM 335
Permissible input current for current input (destruction limit)	25 mA
Connection of signal encoder	
• for voltage measurement	possible
• for current measurement	not possible
- as 2-wire transducer	possible
- as 4-wire transducer	possible
• for resistance measurement	not possible
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
Operational 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 μ s
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

	SM 335
Operational limits (over entire temperature range, referred to output range)	0.5 %
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 k Ω
• for capacitive load, max.	1 μ F
• 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	
Dimensions	
• Width	40 mm
• Height	125 mm
• Depth	120 mm
Weights	
• 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 English	6ES7 335-7HG00-8AA1 6ES7 335-7HG00-8BA1

	Order No.
Front connectors 20-pin, with screw contacts	
• 1 unit	6ES7 392-1AJ00-0AA0
• 100 units	6ES7 392-1AJ00-1AB0
Shield connecting element 80 mm wide, with 2 rows for 4 terminal elements 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

SIMATIC S7-300

SIPLUS analog modules

SIPLUS SM 331 analog input modules

Overview



- Analog inputs
- Connecting voltage sensors and current sensors, thermo elements, resistors and resistance thermometers

SIPLUS SM 331	2 AI	8 AI	8 AI, 16 bit	8 AI, 16 bit	8 AI, 40pole
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 ... + 60 °C, condensation permitted	- 25 ... + 70 °C, condensation permitted	- 25 ... + 60 °C, condensation permitted	- 25 ... + 60 °C, condensation permitted	- 25 ... + 60 °C, condensation permitted
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere)				
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	Yes	No	Yes	No	No
Technical specifications	The technical data are identical with those of the based-on modules.				

Ordering Data

SIPLUS SM 331 analog input modules

(extended temperature range and medial exposure)

incl. labeling strips, bus connector, measuring range modules

8 inputs, resolution 9/12/14 bits		6AG1 331-7KF02-2AB0
2 inputs, resolution 9/12/14 bits	B7	6AG1 331-7KB02-2AB0
8 inputs, enhanced resolution 16 bits	B7	6AG1 331-7NF00-2AB0
8 inputs, enhanced resolution 16 bits, 4-channel mode	B7	6AG1 331-7NF10-2AB0
8 inputs, for thermal resistors	B7	6AG1 331-7PF01-2AB0

B7: Subject to export regulations: AL: N and ECCN: EAR99H

Accessories

Order No.

see S7-300 analog input modules, page 4/98

Overview



- Analog outputs
- For connection of analog actuators

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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 ... + 60 °C, condensation permitted	
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere)	
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	Yes	No
Technical specifications	The technical data are identical with those of the based-on modules.	

Ordering Data

Order No.

Order No.

SIPLUS SM 332 analog output modules

(extended temperature range and medial exposure)

incl. labeling strips, bus connector

2 outputs, 11/12 bit

B7 **6AG1 332-5HB01-2AB0**

8 outputs, 11/12 bit

6AG1 332-5HF00-2AB0

Accessories

see S7-300 analog output modules, page 4/102

B7: Subject to export regulations: AL: N and ECCN: EAR99H

SIMATIC S7-300

SIPLUS analog modules

SIPLUS SM 334 analog input/output modules

Overview



- Analog inputs and outputs
- For 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 ... + 60 °C, condensation permitted
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere)
Technical specifications	The technical data are identical with those of the based-on modules.

Ordering Data	Order No.	Accessories	Order No.
SIPLUS SM 334 analog input/output modules (extended temperature range and medial exposure) incl. labeling strips, bus connector 4 inputs, 2 outputs, resistance measurement, Pt 100	B7 6AG1 334-0KE00-2AB0		see S7-300 analog input/output modules, page 4/105
B7: Subject to export regulations: AL: N and ECCN: EAR99H			

SIMATIC S7-300

F digital / analog modules

SM 326 F digital input modules - 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

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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
Current consumption/power loss		
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)
Input voltage		
• Rated value, DC	in accordance with DIN 19234 or NAMUR	24 V
• for signal "0"		-30 to +5 V
• for signal "1"		11 to 30 V
Input current		
• for signal "0", max. (permissible quiescent current)	0.35 to 1.2 mA	2 mA
• for signal "1", typ.	2.1 to 7 mA	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
• for NAMUR inputs		
- at "0" to "1", max.	1.2 to 3 ms	
- at "1" to "0", max.	1.2 to 3 ms	
Cable length		
• cable length, shielded, max.	200 m	200 m
• Cable length unshielded, max.	100 m	100 m
Encoder supply		
Number of outputs	8	4; isolated
Output voltage	8.2 V DC	
Output current, rated value		400 mA
Encoder		
Connectable encoders		
• 2-wire BEROs		
- permissible quiescent current (2-wire BEROs), max.		Yes; if short-circuit test is deactivated 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 (short-circuit current), max.	13.9 mA	
• Lo (permissible external inductivity), max.	80 mH	

SIMATIC S7-300

F digital / analog modules

SM 326 F digital input modules - Safety Integrated

Technical specifications (continued)

	6ES7 326-1RF00-0AB0	6ES7 326-1BK01-0AB0
Max. values of input circuits (per channel) (continued)		
• Po (power of load), max.	33.1 mW	
• Uo (output no-load voltage), max.	10 V	
• Um (fault voltage), max.	60 V DC/ 30 V AC	
• Ta (permissible ambient temperature), max.	60 °C	60 °C
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 and 6 (two channel)	AK 6
• to EN 954	Cat. 3 (single-channel), Cat. 4 (two-channel)	Cat. 4
• to IEC 61508	SIL 2 (single-channel), SIL 3 (two-channel)	SIL 3
Dimensions		
Dimensions		
• Width	80 mm	80 mm
• Height	125 mm	125 mm
• Depth	120 mm	120 mm
Weights		
• Weight, approx.	482 g	442 g

SIMATIC S7-300

F digital / analog modules

SM 326 F digital input modules - Safety Integrated

Ordering Data	Order No.	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	6ES7 833-1FC02-0YE5	
From V5.x to V5.4; Floating license for 1 user		
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		
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	
• 90° cable outlet, terminating resistor with isolating function, insulation displacement technology, Fast Connect, without PG socket, up to 12 Mbit/s	6ES7 972-0BA51-0XA0	
• 90° cable outlet, terminating resistor with isolating function, insulation displacement technology, Fast Connect, with PG socket, up to 12 Mbit/s	6ES7 972-0BB51-0XA0	
DIN rail for active bus modules		
for max. 5 active bus modules for hot swapping function		
• 483 mm (19") 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	
Active bus module		6ES7 195-7HC00-0XA0
BM 1 x 80 for 1 module with 80 mm width		
SITOP power supply module		6ES7 307-1EA00-0AA0
for ET 200M; 120/230 V AC, 24 V DC, 5 A; Type PS 307-1E		
Front connectors		
40-pin, with screw contacts		
• 1 unit	6ES7 392-1AM00-0AA0	
• 100 units	6ES7 392-1AM00-1AB0	
40-pin with spring-loaded contacts		
• 1 unit	6ES7 392-1BM01-0AA0	
• 100 units	6ES7 392-1BM01-1AB0	
40-pin, with FastConnect		
• 1 unit	6ES7 392-1CM00-0AA0	
Labeling strips		6ES7 392-2XX20-0AA0
For fail-safe modules (spare part); 10 units		
Label cover		6ES7 392-2XY20-0AA0
For fail-safe modules (spare part); 10 units		
LK 393 cable guide		6ES7 393-4AA10-0AA0
For F modules; L+ and M connections; 5 units		
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 B3		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 B3		6ES7 998-8XC01-8YE2
Current S7 Manual Collection DVD and the three subsequent updates		

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

SIMATIC S7-300

F digital / analog modules

SM 326 F digital output modules - 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
Supply voltages		
Load voltage L+		
• Rated value (DC)	24 V; 1L+, 2L+, 3L+	24 V; 1L+, 2L+, 3L+
Current consumption		
from load voltage 1L+, 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
Current consumption/power loss		
Power loss, typ.	12 W	12 W
Connection point		
required front connectors	40-pin	40-pin
Digital outputs		
Number of digital outputs	10	8
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 V)	L+ (-1 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; 2 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)		
• 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
• vertical installation		
- up to 40 °C, max.	5 A; without series diode, 4 A with series diode	5 A
• 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

SIMATIC S7-300

F digital / analog modules

SM 326 F digital output modules - 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		
Dimensions		
• Width	80 mm	80 mm
• Height	125 mm	125 mm
• Depth	120 mm	120 mm
Weights		
• Weight, approx.	465 g	465 g

SIMATIC S7-300

F digital / analog modules

SM 326 F digital output modules -
Safety Integrated

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Ordering Data	Order No.	Order No.
SM 326 F digital output module 10 outputs, 24 V DC, 2 A 8 outputs, 24 V DC, 2 A	6ES7 326-2BF01-0AB0 6ES7 326-2BF40-0AB0	Active bus module BM 1 x 80 for 1 module with 80 mm width 6ES7 195-7HC00-0XA0
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 Software Update Service	6ES7 833-1FC02-0YA5 6ES7 833-1FC00-0YX2	SITOP power supply module for ET 200M; 120/230 V AC, 24 V DC, 5 A; Type PS 307-1E 6ES7 307-1EA00-0AA0
Distributed Safety Upgrade From V5.x to V5.4; Floating license for 1 user	6ES7 833-1FC02-0YE5	Front connectors 40-pin, with screw contacts • 1 unit • 100 units 40-pin with spring-loaded contacts • 1 unit • 100 units 40-pin, with FastConnect • 1 unit
Labeling sheet with strips for 10 electronic blocks • For 16-channel electronic blocks incl. add-on terminals • For 32-channel electronic blocks incl. add-on terminals	6ES7 193-1BH00-0XA0 6ES7 193-1BL00-0XA0	Labeling strips For fail-safe modules (spare part), 10 units 6ES7 392-2XX20-0AA0
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	Label cover For fail-safe modules (spare part), 10 units 6ES7 392-2XY20-0AA0
PROFIBUS bus connector • 90° cable outlet, terminating resistor with isolating function, without PG socket, up to 12 Mbit/s • 90° cable outlet, terminating resistor with isolating function, without PG socket, up to 12 Mbit/s • 90° cable outlet, terminating resistor with isolating function, insulation displacement technology, Fast Connect, without PG socket, up to 12 Mbit/s • 90° cable outlet, terminating resistor with isolating function, insulation displacement technology, Fast Connect, with PG socket, up to 12 Mbit/s	6ES7 972-0BA12-0XA0 6ES7 972-0BB12-0XA0 6ES7 972-0BA51-0XA0 6ES7 972-0BB51-0XA0	LK 393 cable guide For F modules; L+ and M connections, 5 units 6ES7 393-4AA10-0AA0
DIN rail for active bus modules for max. 5 active bus modules, for function "Insertion and removal" • 483 mm (19") long • 530 mm long • 620 mm long • 2000 mm long	6ES7 195-1GA00-0XA0 6ES7 195-1GF30-0XA0 6ES7 195-1GG30-0XA0 6ES7 195-1GC00-0XA0	S7-300 manual Design, CPU data, module data, instruction list German English French Spanish Italian SIMATIC Manual Collection B3 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 (Indus- trial Communication), SIMATIC Machine Vision, SIMATIC Sensors SIMATIC Manual Collection B3 update service for 1 year Current S7 Manual Collection DVD and the three subsequent updates
		6ES7 398-8FA10-8AA0 6ES7 398-8FA10-8BA0 6ES7 398-8FA10-8CA0 6ES7 398-8FA10-8DA0 6ES7 398-8FA10-8EA0 6ES7 998-8XC01-8YE0 6ES7 998-8XC01-8YE2

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

SIMATIC S7-300

F digital / analog modules

SM 336 F analog input module - Safety Integrated

Overview



- Analog inputs for the fail-safe SIMATIC S7 systems
- Applicable in the ET 200M distributed I/O device with IM 153-2 HF as well as centrally with SIMATIC S7-31xF-2 DP
- Properties of the SM 336; F-AI 6 x 0/4 - 20 mA HART:
 - 6 analog inputs with galvanic isolation between channels and backplane bus
 - Input ranges: 0 to 20 mA, 4 to 20 mA
 - Short-circuit proof power supply from 2 or 4-wire transducer via the module
 - External encoder supply possible
 - Applicable in safety mode
 - HART communication
 - Firmware update using HW Config
 - Identification data

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Technical specifications

6ES7 336-4GE00-0AB0	
Supply voltages	
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.	150 mA; Typical
Current consumption/power loss	
Power loss, typ.	4.5 W
Connection point	
required front connectors	20-pin
Analog inputs	
Number of analog inputs	6
cable length, shielded, max.	1 000 m
Input ranges (rated values), currents	
• 0 to 20 mA	Yes
• 4 to 20 mA	Yes
• permissible input current for current input (destruction limit), max.	40 mA
Analog value creation	
Integration and conversion time/resolution per channel	
• Resolution with overload area (bit including sign), max.	16 Bit; 15bits + sign
• Integration time, ms	20 at 50 Hz 16.7 at 60 Hz
• Interference voltage suppression for interference frequency f1 in Hz	f=n x (f1+-0.5%)
Encoder	
Connection of signal encoders	
• for current measurement as 2-wire transducer	Yes
• for current measurement as 4-wire transducer	Yes

6ES7 336-4GE00-0AB0	
Errors/accuracies	
Operational limit in overall temperature range	
• Current, relative to input area	+/- 0.2 %; 40µA
Basic error limit (operational limit at 25 °C)	
• Current, relative to input area	+/- 0.1 %
Status information/alarms/diagnostics	
Alarms	
• Diagnostic alarm	Yes
Diagnoses	
• Diagnostic information readable	Yes
Isolation	
Isolation checked with	370 V for 1min
Isolation	
Isolation, analog inputs	
• between the channels	Yes
• between the channels and the backplane bus	Yes
• between the channels and the voltage supply to the electronics	Yes
Standards, approvals, certificates	
Highest safety class achievable in safety mode	
• to DIN V 19250	old
• to EN 954	CAT. 4
• to IEC 61508	SIL 3
Dimensions	
Dimensions	
• Width	40 mm
• Height	125 mm
• Depth	120 mm
Weights	
• Weight, approx.	350 g

SIMATIC S7-300

F digital / analog modules

SM 336 F analog input module - Safety Integrated

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Ordering Data	Order No.	Order No.
SM 336 F analog input module 6 inputs, 15 bit, 0/4 - 20 mA HART	B7 6ES7 336-4GE00-0AB0	
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 Software Update Service	6ES7 833-1FC02-0YA5 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 - For 32-channel electronic blocks incl. add-on terminals	6ES7 193-1BH00-0XA0 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 90° cable outlet, terminating resistor with isolating function, without PG socket, up to 12 Mbit/s 90° cable outlet, terminating resistor with isolating function, insulation displacement technology, Fast Connect, without PG socket, up to 12 Mbit/s 90° cable outlet, terminating resistor with isolating function, insulation displacement technology, Fast Connect, with PG socket, up to 12 Mbit/s	6ES7 972-0BA12-0XA0 6ES7 972-0BB12-0XA0 6ES7 972-0BA51-0XA0 6ES7 972-0BB51-0XA0	
		DIN rail for active bus modules for max. 5 active bus modules for hot swapping function - Length: 483 mm - Length: 530 mm - Length: 620 mm - Length: 2000 mm Active bus module BM 1 x 80 for 1 module with 80 mm width SITOP power supply module for ET 200M; 120/230 V AC, 24 V DC, 5 A; Type PS 307-1E Front connectors 40-pin, with screw contacts 1 unit 100 units 40-pin with spring-loaded contacts 1 unit 100 units 40-pin, with FastConnect 1 unit Labeling strips For fail-safe modules (spare part), 10 units Label cover For fail-safe modules (spare part), 10 units S7 SmartLabel V3.0 Software for automatic labeling of modules based on data of the STEP 7 project Single License B7 2XV9 450-1SL03-0YX0 Upgrade Single License B8 2XV9 450-1SL03-0YX4

B7: Subject to export regulations: AL: N and ECCN: EAR99H
 B8: Subject to export regulations: AL: N and ECCN: EAR99S

SIMATIC S7-300

F digital / analog modules

SM 336 F analog input module - Safety Integrated

Ordering Data	Order No.	Order No.
Labeling sheets for machine inscription For 32-channel signal modules, DIN A4, for printing with laser printer; 10 units petrol light-beige yellow red	6ES7 392-2AX10-0AA0 6ES7 392-2BX10-0AA0 6ES7 392-2CX10-0AA0 6ES7 392-2DX10-0AA0	SIMATIC Manual Collection B3 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 devices), STEP 7, Engineering Tools, Runtime Software, SIMATIC PCS 7, SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication), SIMATIC Machine Vision, SIMATIC Sensors
LK 393 cable guide For F modules; L+ and M connections, 5 units	6ES7 393-4AA10-0AA0	SIMATIC Manual Collection update service for 1 year B3 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 English French Spanish Italian	6ES7 398-8FA10-8AA0 6ES7 398-8FA10-8BA0 6ES7 398-8FA10-8CA0 6ES7 398-8FA10-8DA0 6ES7 398-8FA10-8EA0	

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

SIMATIC S7-300

F digital / analog modules

Isolation module

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 • Standard and fail-safe modules in the tier	Yes, behind the CPU 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 • Standard and fail-safe modules in the tier	Yes, after the IM 36x 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 • Standard and fail-safe modules in the station	Yes, after the IM 153-2 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 • Standard and fail-safe modules in the station	No Yes, after the last standard module and before the first fail-safe module

Technical specifications

	6ES7 195-7KF00-0XA0
Dimensions	
Weights	
• Weight, approx.	10 g

Ordering Data

Order No.

Isolation module	6ES7 195-7KF00-0XA0
for simultaneous operation of fail-safe and standard modules in an ET 200M	
Isolation bus module	6ES7 195-7HG00-0XA0
for accommodating the isolating module in an ET 200M	

SIMATIC S7-300

SIPLUS F digital-/analog modules

**SIPLUS 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

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Fail-safe digital input module SIPLUS SM 326	
Order No.	6AG1 326-1BK01-2AB0
Order No. based on	6ES7 326-1BK01-0AB0
Ambient temperature range	- 25 ... + 60 °C, condensation permitted
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere)
Technical specifications	The technical data are identical with those of the based-on modules.

Ordering Data	Order No.
SIPLUS SM 326 F digital input module (extended temperature range and medial exposure) 24 inputs, 24 V DC	6AG1 326-1BK01-2AB0
Accessories	
	see S7-300 F digital input modules, page 4/113

SIMATIC S7-300

SIPLUS F digital-/analog modules

SIPLUS SM 326 F digital output module - Safety Integrated

Overview



- Digital outputs for the fail-safe SIMATIC S7 systems
- Two variants (1 x source/current sourcing, 1 x source/current sinking)
- For connection of solenoid valves, DC contactors and indicator lights
- 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)

Fail-safe digital output module SIPLUS SM 326

Order No.	6AG1 326-2BF01-2AB0	6AG1 326-2BF40-2AB0	6AG1 326-2BF40-2AY0
Order No. based on	6ES7 326-2BF01-0AB0	6ES7 326-2BF40-0AB0	6ES7 326-2BF40-0AB0
Ambient temperature range	-25 ... +60 °C, condensation permitted		
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere)		
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	Yes	No	Yes
Technical specifications	The technical data are identical with those of the based-on modules.		

Ordering Data

SIPLUS SM 326 F digital output modules

(extended temperature range and medial exposure)

10 outputs, 24 V DC, 2 A

8 outputs, 24 V DC, 2 A

8 outputs, 24 V DC, 2 A;
conforms to EN 50155

Order No.

6AG1 326-2BF01-2AB0

6AG1 326-2BF40-2AB0

6AG1 326-2BF40-2AY0

Accessories

Order No.

see S7-300 F digital output
modules, page 4/116

SIMATIC S7-300

SIPLUS F digital-/analog modules

SIPLUS isolating module

Overview



- Permits combined operation of fail-safe signal modules in safety mode and standard S7-300 modules in the same ET 200M system.
- Design of PROFIBUS DP lines using copper bus cables. It is not necessary to use fiber-optic cables.
- Every IM 153-x can be used

The isolation module is not required if safety class SIL 2 is to be achieved.

SIPLUS S7-300 isolation module

Order No.	6AG1 195-7KF00-2XA0
Order No. based on	6ES7 195-7KF00-0XA0
Ambient temperature range	- 25 ... + 60 °C, condensation permitted
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere).
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	Yes
Technical specifications	The technical data are identical with those of the based-on modules.

Information about safety class and safety category see isolating module, page 4/120.

Ordering Data

SIPLUS isolating module

for simultaneous operation of fail-safe and standard modules in an ET 200M

Accessories

Order No.

6AG1 195-7KF00-2XA0

see Isolation module, page 4/120

SIMATIC S7-300

Ex input/output modules

Ex digital 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 isolating non-intrinsically safe circuits of the programmable logic controller and the intrinsically safe circuits from the process

Technical specifications

6ES7 321-7RD00-0AB0	
Supply voltages	
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
Current consumption/ power loss	
Power loss, typ.	1.1 W
Connection point	
required front connectors	20-pin
Digital inputs	
Number of NAMUR inputs	4
Input voltage	
• Rated value, DC	8.2 V; from internal power circuit supply
Input current	
• on wire break, max.	0.1 mA
• on short -circuit, max.	8.5 mA
• for NAMUR encoders - for signal "0" - for signal "1"	0.35 to 1.2 mA 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)
Cable length	
• Cable length unshielded, max.	200 m

6ES7 321-7RD00-0AB0	
Encoder supply	
Output voltage	via the inputs
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 (short-circuit current), max.	14.1 mA
• Lo (permissible external inductivity), max.	100 milliH
• 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	Class II, Division 2, Group A, B, C, D T4
Test number PTB	Ex-96.D.2094X
Dimensions	
Weights	
• Weight, approx.	230 g

SIMATIC S7-300

Ex input/output modules

Ex digital input/output modules

Technical specifications (continued)

	6ES7 322-5SD00-0AB0	6ES7 322-5RD00-0AB0
Supply voltages		
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
Current consumption/ power loss		
Power loss, typ.	3 W	3 W
Connection point		
required front connectors	20-pin	20-pin
Digital outputs		
Number of digital outputs	4	4
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
• Cable length unshielded, max.	200 m	200 m

	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 (short-circuit current), max.	70 mA	85 mA
• Lo (permissible external inductivity), max.	6.7 mH	5 mH
• Po (power of load), max.	440 mW	335 mW
• Uo (output no-load voltage), max.	25.2 V	15.75 V
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
Standards, approvals, certificates		
Type of protection to EN 50020 (CENELEC)	[Ex ib] IIC	[Ex ib] IIC
Type of protection to FM	Class I, Division 2, Group A, B, C, D T4	AIS CL.1, DIV 1, GP A, B, C, D; CL.I, DIV 2, GP A, B, C, D T4
Test number PTB	Ex-96.D.2093X	Ex-96.D.2102X
Dimensions		
Weights		
• Weight, approx.	230 g	230 g

SIMATIC S7-300

Ex input/output modules

Ex digital input/output modules

4

Ordering Data		Order No.	Order No.	
Ex digital input module			S7 SmartLabel V3.0	
4 inputs, isolated, NAMUR		6ES7 321-7RD00-0AB0	Software for automatic labeling of modules based on data of the STEP 7 project	
Ex digital output modules			Single license B8	2XV9 450-1SL03-0YX0
4 outputs, isolated, 24 V DC, 10 mA		6ES7 322-5SD00-0AB0	Upgrade single license B8	2XV9 450-1SL03-0YX4
4 outputs, isolated, 15 V DC, 20 mA		6ES7 322-5RD00-0AB0	Labeling sheets for machine inscription	
Front connectors			For 16-channel signal modules, DIN A4, for printing with laser printer; 10 units	
20-pin, with screw contacts			petrol	6ES7 392-2AX00-0AA0
• 1 unit		6ES7 392-1AJ00-0AA0	light-beige	6ES7 392-2BX00-0AA0
• 100 units		6ES7 392-1AJ00-1AB0	yellow	6ES7 392-2CX00-0AA0
Front door, elevated design			red	6ES7 392-2DX00-0AA0
e.g. for 32 channel modules; enables connection of 1.3 mm ² /16 AWG wires	B7	6ES7 328-0AA00-7AA0	SIMATIC Manual Collection B3	6ES7 998-8XC01-8YE0
LK 393 cable guide		6ES7 393-4AA00-0AA0	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	
Mandatory for operation in Ex-hazard areas			SIMATIC Manual Collection update service for 1 year B3	6ES7 998-8XC01-8YE2
Labeling strips		6ES7 392-2XX00-0AA0	Current S7 Manual Collection DVD and the three subsequent updates	
10 units (spare part), for modules with 20-pin front connector				
Label cover		6ES7 392-2XY00-0AA0		
10 units (spare part), for modules with 20-pin front connector				

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

B7: Subject to export regulations: AL: N and ECCN: EAR99H

B8: Subject to export regulations: AL: N and ECCN: EAR99S

SIMATIC S7-300

Ex input/output modules

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

4

Technical specifications

	6ES7 331-7RD00-0AB0	6ES7 331-7SF00-0AB0
Supply voltages		
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	
Current consumption/power loss		
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; 8x thermocouples; 4x RTD thermal sensors
cable length, shielded, max.	200 m	200 m; TC: 50m
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

	6ES7 331-7RD00-0AB0	6ES7 331-7SF00-0AB0
Input ranges (rated values), thermoelements (continued)		
• Type K		Yes
• Type L		Yes
• Type N		Yes
• Type R		Yes
• Type S		Yes
• Type T		Yes
• Type U		Yes
Input ranges (rated values), resistance thermometers		
• Ni 100		Yes
• Pt 100		Yes
• Pt 200		Yes
• permissible input current for current input (destruction limit), max.	40 mA	
Analog value creation		
Measurement principle	Sigma Delta	Sigma Delta
Integration and conversion time/resolution per channel		
• Resolution with overload area (bit including sign), max.	16 Bit; 10 to 15 bits + sign	16 Bit; 10 to 15 bits + 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

SIMATIC S7-300

Ex input/output modules

Ex analog input/output modules

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	43 µF
• Io (short-circuit current), max.	68.5 mA	28.8 mA
• Lo (permissible external inductivity), max.	7.5 milliH	40 milliH
• 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		
Temperature error (relative to input areas)		Temperature error: 0.001 to 0.002%/K
Operational limit in overall temperature range		
• Current, relative to input area	+/- 0.45 %	
• Resistance-type thermometer, relative to input area		0.09 to 0.04%
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 $f = n \times (f_l \pm 1 \%)$, f_l = 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

	6ES7 331-7RD00-0AB0	6ES7 331-7SF00-0AB0
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
Standards, approvals, certificates		
Type of protection to EN 50020 (CENELEC)	[Ex ib] IIC	[Ex ib] IIC
Type of protection to FM	Class I, Division 2, Group A, B, C, D T4	Class I, Division 2, Group A, B, C, D T4
Test number PTB	Ex-96.D.2092X	Ex-96.D.2108X
Dimensions		
Weights		
• Weight, approx.	290 g	210 g

6ES7 332-5RD00-0AB0	
Supply voltages	
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
Current consumption/power loss	
Power loss, typ.	4 W
Connection point	
required front connectors	20-pin

6ES7 332-5RD00-0AB0	
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

SIMATIC S7-300

Ex input/output modules

Ex analog input/output modules

Technical specifications (continued)

6ES7 332-5RD00-0AB0	
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	
Integration and conversion time/resolution per channel	
• Resolution with overload area (bit including sign), max.	15 Bit
• Basic conversion time, ms	2.5 ms
Ex(i) characteristics	
Max. values of output circuits (per channel)	
• Co (permissible external capacity), max.	850 nF
• Io (short-circuit current), max.	70 mA
• Lo (permissible external inductivity), max.	6.6 mH
• Po (power of load), max.	440 mW
• Uo (output no-load voltage), max.	14 V
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 actuator cable	Yes
• Group error	Yes
Isolation	
Isolation, analog outputs	
• Galvanic isolation, analog outputs	Yes
Standards, approvals, certificates	
Type of protection to EN 50020 (CENELEC)	[Ex ib] IIC
Type of protection to FM	Class I, Division 2, Group A, B, C, D T4
Test number PTB	Ex-96.D.2026X
Dimensions	
Weights	
• Weight, approx.	280 g

SIMATIC S7-300

Ex input/output modules

Ex analog input/output modules

4

Ordering Data

Ex analog input modules

4 inputs, isolated, 0/4 to 20 mA, 15 bit

6ES7 331-7RD00-0AB0

8/4 inputs, isolated, for thermocouples 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 unit
- 100 units

6ES7 392-1AJ00-0AA0

6ES7 392-1AJ00-1AB0

Front door, elevated design

e.g. for 32 channel modules; enables connection of 1.3 mm²/16 AWG wires

B7

6ES7 328-0AA00-7AA0

LK 393 cable guide

Mandatory for operation in Ex-hazard areas

6ES7 393-4AA00-0AA0

Labeling strips

10 units (spare part), for modules with 20-pin front connector

6ES7 392-2XX00-0AA0

Label cover

10 units (spare part), for modules with 20-pin front connector

6ES7 392-2XY00-0AA0

S7 SmartLabel V3.0

Software for automatic labeling of modules based on data of the STEP 7 project

Single license B8

2XV9 450-1SL03-0YX0

Upgrade single license B8

2XV9 450-1SL03-0YX4

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

SIMATIC Manual Collection B3

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 B3

6ES7 998-8XC01-8YE2

Current S7 Manual Collection DVD and the three subsequent updates

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

B7: Subject to export regulations: AL: N and ECCN: EAR99H

B8: Subject to export regulations: AL: N and ECCN: EAR99S

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.

Further information can be found on the Internet at

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

Technical specifications

6ES7 350-1AH03-0AE0	
Supply voltages	
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
Current consumption/ power loss	
Power loss, typ.	4.5 W
Connection point	
required front connectors	1x 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

6ES7 350-1AH03-0AE0	
Input current	
• for signal "1", typ.	9 mA
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+ (-3 V)
• Output current, max.	400 mA

SIMATIC S7-300

Function modules

FM 350-1 counter module

Technical specifications (continued)

6ES7 350-1AH03-0AE0	
Encoder	
Connectable encoders	
• Incremental encoder (symmetrical)	Yes; with 2 pulse strings 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	1
Counting range, Description	32 bit or +/-31 bit
Minimum pulse width, adjustable	Yes; 2.5 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

6ES7 350-1AH03-0AE0	
Isolation	
Isolation checked with	500 V
Isolation	
Galvanic isolation, digital inputs	
• between the channels and the backplane bus	Yes; Optocoupler
Isolation, digital outputs	
• 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	75 V DC / 60 V AC
Dimensions	
Dimensions	
• Width	40 mm
• Height	125 mm
• Depth	120 mm
Weights	
• Weight, approx.	250 g

SIMATIC S7-300

Function modules

FM 350-1 counter module

Ordering Data	Order No.	Order No.
FM 350-1 counter module with 1 channel, max. 500 kHz; for incremental encoder	6ES7 350-1AH03-0AE0	See the A&D Mall under SIMODRIVE Sensors or Motion Connect 500 (see also www.siemens.com/simatic-technology)
Coding plug - Range card for analog inputs Spare part	6ES7 974-0AA00-0AA0	
Front connector 20-pin, with screw contacts • 1 unit • 100 units 20-pin, with spring-loaded contacts • 1 unit • 100 units 20-pin, with FastConnect • 1 unit	6ES7 392-1AJ00-0AA0 6ES7 392-1AJ00-1AB0 6ES7 392-1BJ00-0AA0 6ES7 392-1BJ00-1AB0 6ES7 392-1CJ00-0AA0	6FX5 002-2CA12-0 1 2 3 A B C D E F G H J K A B C D E F G H J K
Bus connectors 1 unit (spare part)	6ES7 390-0AA00-0AA0	
Labeling strips 10 units (spare part)	6ES7 392-2XX00-0AA0	
S7 SmartLabel V3.0 Software for automatic labeling of modules based on data of the STEP 7 project Single license B8 Upgrade single license B8	2XV9 450-1SL03-0YX0 2XV9 450-1SL03-0YX4	
Labeling sheets for machine inscription	see under "Accessories", page 4/233	
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 For 1 cable with 3 mm to 8 mm diameter For 1 cable with 4 mm to 13 mm diameter	6ES7 390-5AB00-0AA0 6ES7 390-5BA00-0AA0 6ES7 390-5CA00-0AA0	

Connectable incremental encoders 6FX2 001-2...

Signal cable

Preassembled for HTL and TTL encoder, without Sub-D connector, UL/DESINA

Length code:

0 m
100 m
200 m

0 m
10 m
20 m
30 m
40 m
50 m
60 m
70 m
80 m
90 m

0 m
1 m
2 m
3 m
4 m
5 m
6 m
7 m
8 m
9 m

B8: Subject to export regulations: AL: N and ECCN: EAR99S

SIMATIC S7-300

Function modules

SIPLUS FM 350-1 counter module

Overview



- Single-channel, intelligent counter module for simple counting tasks
- For direct connection of incremental encoders
- Comparison function with 2 definable comparison values
- Integrated digital outputs for output of the response on reaching the comparison value
- Operating modes:
 - Continuous counting
 - Single count
 - Periodic count
- Special functions:
 - Set counter
 - Latch counter
- Start/stop counter by gate function

Note: Incremental sensors and preassembled connecting cables for counting and positioning functions are available under SIMODRIVE Sensor or Motion Connect 500.

Further information can be found on the Internet at

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

SIPLUS FM 350-1

Order No.	6AG1 350-1AH03-2AY0	6AG1 350-1AH03-2AE0
Order No. based on	6ES7 350-1AH03-0AE0	6ES7 350-1AH03-0AE0
Ambient temperature range	-25 ... +60 °C, condensation permitted	-25 ... +60 °C, condensation permitted
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere)	
Conforms with standard for electronic equipment used on rolling stock (EN 50155).	Yes	No
Technical specifications	The technical data are identical with those of the based-on modules.	

For further technical documentation on SIPLUS, see:

<http://www.siemens.com/siplus-techdoku>

Ordering Data

SIPLUS FM 350-1 counter module

(extended temperature range and medial exposure)

With 1 channel, max. 500 kHz;
for incremental encoder

Without conformity to EN 50155

With conformity to EN 50155

Order No.

6AG1 350-1AH03-2AE0

6AG1 350-1AH03-2AY0

Accessories

Order No.

see FM 350-1 counter module,
page 4/133

Overview



- 8-channel intelligent counter module for universal counting and measuring
- To directly connect 24 V incremental encoders, direction sensors, initiators or NAMUR encoders.
- Check function with preselectable set points (number depends on mode)
- Integrated digital outputs to output the response when the setpoint is reached
- Modes:
 - Continuous/one-off/periodic counting
 - Frequency/speed measurement
 - Cycle duration measurement
 - Dosing

Note:

Incremental encoder and prefabricated connecting cables for counter and positioning function are offered under SIMODRIVE Sensor and Motion Connect 500.

Further information can be found on the Internet at

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

Technical specifications

6ES7 350-2AH01-0AE0	
Supply voltages	
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
Current consumption/ power loss	
Power loss, typ.	10 W
Connection point	
required front connectors	1x 40-pin
Digital inputs	
Number of digital inputs	8
Functions	1 each for gate start/ gate stop
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
Cable length	
• cable length, shielded, max.	100 m

6ES7 350-2AH01-0AE0	
Digital outputs	
Number of digital outputs	8
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
• cable length, shielded, max.	600 m
• Cable length unshielded, max.	100 m
Encoder supply	
Output voltage	NAMUR-encoder supply: 8.2 V +/-2%
Output current, rated value	200 mA
Short-circuit protection	Yes

SIMATIC S7-300

Function modules

FM 350-2 counter module

Technical specifications (continued)

6ES7 350-2AH01-0AE0		6ES7 350-2AH01-0AE0	
Encoder		Status information/alarms/diagnostics	
Connectable encoders		Alarms	
• Incremental encoder (asymmetrical)	Yes	• Diagnostic alarm	Yes; Parameterizable
• 24 V initiator	Yes	• Process alarm	Yes; Parameterizable
• 24 V directional element	Yes	Diagnoses	
• NAMUR encoder	Yes	• Diagnostic functions	Yes; Diagnostic information readable
• 2-wire BEROs	Yes	Isolation	
NAMUR encoder		Galvanic isolation, digital inputs	
• Number of NAMUR inputs	8	• between the channels and the backplane bus	Yes; and shielding
• Input signal	to DIN 19 234	• between the channels and the backplane bus (NAMUR)	Yes, against backplane bus and shielding
• Input current, for signal "0", max.	1.2 mA	Isolation, digital outputs	
• Input current, for signal "1", min.	2.1 mA	• between the channels and the backplane bus	Yes; and shielding
• Input delay, max.	50 µs	Isolation counter	
• Input frequency, max.	20 kHz	• between the channels and the backplane bus	Yes; and shielding
• cable length, shielded, max.	100 m	Dimensions	
Counters		Dimensions	
Counter input 24 V		• Width	80 mm
• Number	8; 32 bit or +/-31 bit	• Height	125 mm
• Input voltage, for signal "0"	-3 to 5 V	• Depth	120 mm
• Input voltage, for signal "1"	11 to 30.2 V	Weights	
• Input current, for signal "0", max. (permissible quiescent current)	2 mA	• Weight, approx.	460 g
• 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 direction encoder: 20 kHz; 24-V initiator: 20 kHz; NAMUR encoder: 20 kHz		
• Cable length, max.	100 m		

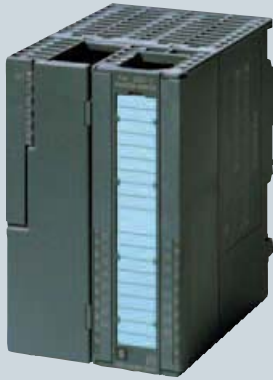
B7: Subject to export regulations: AL: N and ECCN: EAR99H
B8: Subject to export regulations: AL: N and ECCN: EAR99S

SIMATIC S7-300

Function modules

SIPLUS FM 350-2 counter module

Overview



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

Note:

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

More information is available on the Internet at

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

SIPLUS FM 350-2

Order No. **6AG1 350-2AH00-4AE0**

Order No. based on **6ES7 350-2AH00-0AE0**

Environmental conditions Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere)

Technical specifications The technical data are identical with those of the based-on modules.

Ordering Data

SIPLUS FM 350-2 counter module

(extended temperature range and medial exposure)

with 8 channels, max. 20 kHz;
for 24 V incremental encoders
and NAMUR sensors; incl. config-
uring package and electronical
documentation on CD

Order No.

6AG1 350-2AH00-4AE0

Accessories

Order No.

see FM 350-2 counter module,
page 4/137

FM 351 positioning module

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.

Further information can be found on the Internet at

<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	1x 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
• 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 BERO	Yes
- permissible quiescent current (2-wire BERO), 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
• Clock frequency, max.	1 MHz
• Gray code	1
• cable length, shielded, max.	300 m; at max. 125 kHz

SIMATIC S7-300

Function modules

FM 351 positioning module

Technical specifications (continued)

6ES7 351-1AH01-0AE0	
Isolation	
Galvanic isolation, digital inputs	Yes
• galvanic isolation, digital inputs	
Isolation, digital outputs	Yes
• Galvanic isolation, digital outputs	

6ES7 351-1AH01-0AE0	
Dimensions	
Dimensions	
• Width	80 mm
• Height	125 mm
• Depth	120 mm
Weights	
• Weight, approx.	550 g

Ordering Data

FM 351 positioning module	6ES7 351-1AH01-0AE0
for rapid traverse and creep speed drives	
Front connector	
20-pin, with screw contacts	
• 1 unit	6ES7 392-1AJ00-0AA0
• 100 units	6ES7 392-1AJ00-1AB0
20-pin, with spring-loaded contacts	
• 1 unit	6ES7 392-1BJ00-0AA0
• 100 units	6ES7 392-1BJ00-1AB0
20-pin, with FastConnect	
• 1 unit	6ES7 392-1CJ00-0AA0
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 V3.0	
Software for automatic labeling of modules based on data of the STEP 7 project	
Single license	B8 2XV9 450-1SL03-0YX0
Upgrade single license	B8 2XV9 450-1SL03-0YX4
Labeling sheets for machine inscription	see under "Accessories", page 4/233
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

Signal cables

Pre-assembled for HTL encoder, UL/DESINA

Pre-assembled for SSI absolute encoder, UL/DESINA

Pre-assembled for TTL encoder 6FX2001-1, UL/DESINA

Pre-assembled for TTL encoder 24 V, UL/DESINA

Not crimped

Module end crimped, connector case supplied

Motor end crimped, connector case supplied

0 m

100 m

200 m

0 m

10 m

20 m

30 m

40 m

50 m

60 m

70 m

80 m

90 m

0 m

1 m

2 m

3 m

4 m

5 m

6 m

7 m

8 m

0 m

0,0 m

0,1 m

0,2 m

0,3 m

0,4 m

0,5 m

0,6 m

0,7 m

0,8 m

Order No.

6FX5 0 2-2AL00-

6FX5 0 2-2CC11-

6FX5 0 2-2CD01-

6FX5 0 2-2CD24-

0

1

4

1

2

3

A

B

C

D

E

F

G

H

J

K

A

B

C

D

E

F

G

H

J

K

0

1

2

3

4

5

6

7

8

B8: Subject to export regulations: AL: N and ECCN: EAR99S

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.

Further information can be found on the Internet at

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

Technical specifications

6ES7 352-1AH02-0AE0		6ES7 352-1AH02-0AE0	
Supply voltages		Output current	
Rated value		• for signal "1" permissible range for 0 to 60 °C, min.	5 mA; with UPmax
• DC 24 V	Yes	• for signal "1" permissible range for 0 to 60 °C, max.	600 mA; with UPmax
Current consumption		• for signal "0" residual current, max.	0.5 mA
from load voltage L+ (without load), max.	200 mA	Encoder supply	
from backplane bus DC 5 V, max.	100 mA	5 V encoder supply	
Connection point		• 5 V	Yes
required front connectors	1 x 20-pin	• Output current, max.	300 mA
Digital inputs		• Cable length, max.	32 m
Number of digital inputs	4	24 V encoder supply	
Functions	Reference point switch, flying actual value setting/length measurement, brake release, enable track output no. 3	• 24 V	Yes
Input voltage		• Output current, max.	300 mA
• Rated value, DC	24 V	• Cable length, max.	100 m
• for signal "0"	-30 to 5 V	Encoder	
• for signal "1"	11 to 30 V	Connectable encoders	
Input current		• Incremental encoder (symmetrical)	Yes
• for 2-wire BERO		• Incremental encoder (asymmetrical)	Yes
- for signal "0", typ.	2 mA	• Absolute encoder (SSI)	Yes
- for signal "1", typ.	7 mA	• 2-wire BERO	Yes
Digital outputs		- permissible quiescent current (2-wire BERO), max.	2 mA
Number of digital outputs	13	Encoder signals, incremental encoder (symmetrical)	
Functions	Cam track	• Trace mark signals	A, notA, B, notB
Short-circuit protection of the output	Yes	• Zero mark signal	N, notN
Output voltage		• Input signal	5 V difference signal (phys. RS 422)
• Rated value (DC)	24 V	• Input frequency, max.	1 MHz
• for signal "1", min.	UP - 0.8 V		

SIMATIC S7-300

Function modules

FM 352 cam controller

Technical specifications (continued)

6ES7 352-1AH02-0AE0	
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	1
• cable length, shielded, max.	320 m; at max. 125 kHz

6ES7 352-1AH02-0AE0	
Isolation	
Galvanic isolation, digital inputs	
• galvanic isolation, digital inputs	No
Isolation, digital outputs	
• Galvanic isolation, digital outputs	No
Dimensions	
Dimensions	
• Width	80 mm
• Height	125 mm
• Depth	120 mm
Weights	
• Weight, approx.	550 g

Ordering Data

Order No.	
FM 352 electronic cam controller	6ES7 352-1AH02-0AE0
Front connector	
20-pin, with screw contacts	
• 1 unit	6ES7 392-1AJ00-0AA0
• 100 units	6ES7 392-1AJ00-1AB0
20-pin, with spring-loaded contacts	
• 1 unit	6ES7 392-1BJ00-0AA0
• 100 units	6ES7 392-1BJ00-1AB0
20-pin, with FastConnect	
• 1 unit	6ES7 392-1CJ00-0AA0
Bus connectors	6ES7 390-0AA00-0AA0
1 unit (spare part)	
Labeling strips	6ES7 392-2XX00-0AA0
10 units (spare part)	
S7 SmartLabel V3.0	
Software for automatic labeling of modules based on data of the STEP 7 project	
Single license	B8 2XV9 450-1SL03-0YX0
Upgrade single license	B8 2XV9 450-1SL03-0YX4

Order No.

Labeling sheets for machine inscription	see under "Accessories", page 4/233
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
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 4/140

B8: Subject to export regulations: AL: N and ECCN: EAR99S

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.

Further information can be found on the Internet at

<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
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
• reverse polarity protection	Yes	Yes
Current consumption		
from load voltage 1L+, 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	100 mA; typically
Current consumption/power loss		
Power loss, typ.	6.5 W	6.5 W
Memory		
Type of storage		
Memory Card, RAM	128 Kibyte; required for operation, MMC	128 Kibyte; required for operation, MMC

	6ES7 352-5AH00-0AE0	6ES7 352-5AH10-0AE0
interfaces		
Updating time	PLC interface: 5 ms (2.6 ms type)	PLC interface: 5 ms (2.6 ms type)
Connection point		
required front connectors	1x 40-pin	1x 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
Input voltage		
• Rated value, DC	24 V	24 V
• for signal "0"	-30 to +5 V	-30 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
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, 5 µs, 10 µs, 15 µs, 20 µs, 50 µs, 1.5 ms	None, 5 µs, 10 µs, 15 µs, 20 µs, 50 µs, 1.5 ms

SIMATIC S7-300

Function modules

FM 352-5 high-speed Boolean processor

Technical specifications (continued)

	6ES7 352-5AH00-0AE0	6ES7 352-5AH10-0AE0
Input delay (for rated value of input voltage) (continued)		
• Minimum pulse width for program reactions	1 µs, 5 µs, 10 µs, 15 µs, 20 µs, 50 µs, 1.6 ms	1 µs, 5 µs, 10 µs, 15 µs, 20 µs, 50 µs, 1.6 ms
• for standard inputs - at "0" to "1", max.	3 µs; typ. 1.5 µs	3 µs; typ. 1.5 µs
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
Digital outputs		
Number of digital outputs	8	8
M-switching	Yes	
P-switching		Yes
Short-circuit protection of the output	Yes; Overvoltage protection, thermal protection	Yes; Overvoltage protection, thermal protection
• Response threshold, typ.	1.7 to 3.5 A	1.7 to 3.5 A
Limitation of inductive shutdown voltage to	2M +45 V typ, (40 to 55 V); comment: no protection against inductive kickback >55 mJ	2M +45 V typ, (40 to 55 V); comment: no protection against inductive kickback >55 mJ
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 A	1 µs; 0.6 µs 50 mA / 1.0 µs 0.5 A
• "1" to "0", max.	1.5 µs; 1.7 µs 50 mA / 1.5 µs 0.5 A	1.5 µs; 1.7 µs 50 mA / 1.5 µs 0.5 A

	6ES7 352-5AH00-0AE0	6ES7 352-5AH10-0AE0
Parallel switching of 2 outputs		
• for increased power	Yes; 2	Yes; 2
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
• cable length, shielded, max.	600 m	600 m
• Cable length unshielded, max.	100 m	100 m
Encoder supply		
5 V encoder supply		
• 5 V	Yes	Yes
• Short-circuit protection	Yes; Electronic overload protection; no protection on applying a normal or counter voltage.	Yes; Electronic overload protection; 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 on applying a normal or counter voltage	Yes; Overvoltage and overheating protection if overloaded; diagnostics if output reaches temperature limit; no protection on applying 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 - permissible quiescent current (2-wire BEROS), max.	Yes; typ. 1 A 1.5 mA	Yes; typ. 1 A 1.5 mA

Technical specifications (continued)

	6ES7 352-5AH00-0AE0	6ES7 352-5AH10-0AE0
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
• cable length, shielded, max.	100 m; Cable length, RS 422 (5V) incremental encoders, Siemens type 6FX201-2, 5 V supply: 500 kHz, 32 meters, shielded, max.; cable length, RS 422 (5V) incremental encoders, Siemens type 6FX201-2, 24 V supply: 500 kHz, 100 meters, shielded, max.	100 m; Cable length, RS 422 (5V) incremental encoders, Siemens type 6FX201-2, 5 V supply: 500 kHz, 32 meters, shielded, max.; cable length, RS 422 (5V) incremental encoders, Siemens type 6FX201-2, 24 V supply: 500 kHz, 100 meters, 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: 50 kHz, 25 m shielded, max., 25 kHz, 50 m shielded, max.	50 m; Cable length, HTL incremental encoder, Siemens, type 6FX2001-4: 50 kHz, 25 m shielded, max., 25 kHz, 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 encoders, Siemens type 6FX201-5, 24 V supply: 125 kHz, 320 meters shielded, max.; 250 kHz, 160 meters shielded, max.; 500 kHz, 60 meters shielded, max.; 1 MHz, 20 meters shielded, max.	320 m; Cable length, RS-422 SSI absolute encoders, Siemens type 6FX201-5, 24 V supply: 125 kHz, 320 meters shielded, max.; 250 kHz, 160 meters shielded, max.; 500 kHz, 60 meters shielded, max.; 1 MHz, 20 meters shielded, max.

	6ES7 352-5AH00-0AE0	6ES7 352-5AH10-0AE0
Encoder signals, absolute encoder (SSI) (continued)		
• Monoflop time	settable: 16/32/48/64 µs	settable: 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
Encoder signal evaluation		
• Counting direction, forward	Yes	Yes
• Counting direction, backward	Yes	Yes
Reaction times		
Input and output reaction time	5 V input to 24 V output, 0 filter: 1 to 4 µs (typ.); 24 V input to 24 V output, 0 filter: 2 to 6 µs (typ.)	5 V input to 24 V output, 0 filter: 1 to 4 µs (typ.); 24 V input to 24 V output, 0 filter: 2 to 6 µs (typ.)
Counters		
Counting range, Description	Counting range (16-bit counters): -32,768 to 32,767 (user-specific within this range); counting range (32-bit counters): -2,147,483,648 to 2,147,483,647 (user-specific within this range)	Counting range (16-bit counters): -32,768 to 32,767 (user-specific within this range); counting range (32-bit counters): -2,147,483,648 to 2,147,483,647 (user-specific within this range)
Counting range, lower limit	-2.14748E9	-2.14748E9
Counting range, upper limit	2.14748E9	2.14748E9
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 error; SSI message frame overflow	Yes; 1L, 2L, 3L missing; MMC error; output overload (8); encoder supply overload; differential wire break; parameterization error; 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

SIMATIC S7-300

Function modules

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 CPU, E/A and sensor units are separated	Yes; Yes CPU, E/A and sensor units are separated

	6ES7 352-5AH00-0AE0	6ES7 352-5AH10-0AE0
Dimensions		
Dimensions		
• Width	80 mm	80 mm
• Height	125 mm	125 mm
• Depth	120 mm	120 mm
Weights		
• Weight, approx.	434 g; Module weight: approx. 434 g (with 1L connection and without I/O connection or MMC); shipping weight: approx. 500 g (with bus and 1L connection and without I/O connection or MMC)	434 g; Module weight: approx. 434 g (with 1L connection and without I/O connection or MMC); shipping weight: approx. 500 g (with bus and 1L connection and without I/O connection or MMC)

Ordering Data

FM 352-5 high-speed Boolean processor

with current sinking digital outputs	B7	6ES7 352-5AH00-0AE0
with current sourcing digital outputs	B7	6ES7 352-5AH10-0AE0

Micro Memory Card

128 KB	6ES7 953-8LG11-0AA0
512 KB	6ES7 953-8LJ20-0AA0
2 MB	6ES7 953-8LL20-0AA0

Front connectors

40-pin, with screw contacts

- 1 unit
- 100 units

40-pin with spring-loaded contacts

- 1 unit
- 100 units

40-pin, with FastConnect

- 1 unit

Signal cables

To HTL and TTL encoders, preassembled, without Sub-D connector

To SSI absolute encoders 6FX2 001-5, preassembled, without Sub-D connector

Length code

Order No.

6ES7 392-1AM00-0AA0
6ES7 392-1AM00-1AB0

6ES7 392-1BM01-0AA0
6ES7 392-1BM01-1AB0

6ES7 392-1CM00-0AA0

6FX5 002-2CA12-■■■■0

6FX5 002-2CC12-■■■■■

see FM 351, page 4/140

B7: Subject to export regulations: AL: N and ECCN: EAR99H

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	1x 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	
• Output ready signal	
• 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	
Galvanic isolation, digital inputs	
• galvanic isolation, digital inputs	No
Isolation, digital outputs	
• Galvanic isolation, digital outputs	No
Dimensions	
Dimensions	
• Width	80 mm
• Height	125 mm
• Depth	118 mm
Weights	
• Weight, approx.	500 g

SIMATIC S7-300

Function modules

FM 353 positioning module

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Ordering Data

Order No.

FM 353 positioning module

6ES7 353-1AH01-0AE0

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

FM 353 manual

German
English
French
Italian

6ES7 353-1AH01-8AG0

6ES7 353-1AH01-8BG0

6ES7 353-1AH01-8CG0

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
Length code

6FX8 0 2-3AC02-■ ■ ■ ■

see FM 351, page 4/140

Connecting cables and encoders

see Catalog NC 60, CA 01 or in
the DT/IA Mall

Front connector

20-pin, with screw contacts

- 1 unit
- 100 units

6ES7 392-1AJ00-0AA0

6ES7 392-1AJ00-1AB0

20-pin, with spring-loaded
contacts

- 1 unit
- 100 units

6ES7 392-1BJ00-0AA0

6ES7 392-1BJ00-1AB0

20-pin, with FastConnect

- 1 unit

6ES7 392-1CJ00-0AA0

Bus connectors

1 unit (spare part)

Order No.

6ES7 390-0AA00-0AA0

Labeling strips

10 units (spare part)

6ES7 392-2XX00-0AA0

S7 SmartLabel V3.0

Software for automatic labeling of
modules based on data of the
STEP 7 project

Single license

B8

2XV9 450-1SL03-0YX0

Upgrade single license

B8

2XV9 450-1SL03-0YX4

Labeling sheets for machine inscription

see under "Accessories",
page 4/233

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

B8: Subject to export regulations: AL: N and ECCN: EAR99S

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.

Further information can be found on the Internet at

<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	1x 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
Output voltage	
• Rated value (DC)	24 V
• for signal "1", min.	UP - 3 V

6ES7 354-1AH01-0AE0	
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
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
• Clock frequency, max.	1.25 Mbit/s
• cable length, shielded, max.	100 m; 10 m at 1.25 Mbit/s, 100 m at max. 125 kbit/s

SIMATIC S7-300

Function modules

FM 354 positioning module

Technical specifications (continued)

6ES7 354-1AH01-0AE0		6ES7 354-1AH01-0AE0	
Drive interface		Isolation	
Signal input I		Galvanic isolation, digital inputs	
• Type	Input loop controller message, isolated (optocoupler)	• galvanic isolation, digital inputs	No
• Function	"Drive ready"	Isolation, digital outputs	
• Input voltage, rated value (DC)	24 V	• Galvanic isolation, digital outputs	No
• Input voltage, for signal "0"	-3 to 5 V	Dimensions	
• Input voltage, for signal "1"	15 to 30 V	Dimensions	
• Input current, for signal "1"	2 to 6 mA	• Width	80 mm
Signal output II		• Height	125 mm
• Type	Output closed-loop controller enable (contact)	• Depth	118 mm
• Function	Drive disconnection for operation via contact relay	Weights	
• Load	1 A/50 V/30 VA DC	• Weight, approx.	550 g
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		

SIMATIC S7-300

Function modules

FM 354 positioning module

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Ordering Data		Order No.	Order No.	
FM 354 positioning module for servo motors, incl. configuration package on CD-ROM (Ge, En, Fr, It) comprising	A4	6ES7 354-1AH01-0AE0	Encoders	see Catalog NC 60, CA 01 or in the DT/IA Mall
			Front connector 20-pin, with screw contacts	
• FM 354 manual, electronic			• 1 unit	6ES7 392-1AJ00-0AA0
• Standard function blocks (STEP 7 interface software)			• 100 units	6ES7 392-1AJ00-1AB0
• Screen form-based configuration software for FM 354			20-pin, with spring-loaded contacts	
• Standard interactive screen forms for OP7/OP17			• 1 unit	6ES7 392-1BJ00-0AA0
			• 100 units	6ES7 392-1BJ00-1AB0
FM 354 manual			20-pin, with FastConnect	
German		6ES7 354-1AH01-8AG0	• 1 unit	6ES7 392-1CJ00-0AA0
English		6ES7 354-1AH01-8BG0	Bus connectors	6ES7 390-0AA00-0AA0
French		6ES7 354-1AH01-8CG0	1 unit (spare part)	
Italian		6ES7 354-1AH01-8EG0	Labeling strips	6ES7 392-2XX00-0AA0
Edit FM		6FC5 263-0AA03-0AB0	10 units (spare part)	
Program editor for editing, loading and saving NC programs with the standard programming device/PC; German/English, on CD-ROM			S7 SmartLabel V3.0	
Connecting cables			Software for automatic labeling of modules based on data of the STEP 7 project	
To SSI absolute encoders 6FX2 001-5, preassembled		6FX5 0 2-2CC11-■■■■■	Single license B8	2XV9 450-1SL03-0YX0
To incremental encoders 6FX2 001-1, preassembled		6FX5 0 2-2CD01-■■■■■	Upgrade single license B8	2XV9 450-1SL03-0YX4
For 24 V incremental encoders, preassembled		6FX5 0 2-2CD24-■■■■■	Labeling sheets for machine inscription	see under "Accessories", page 4/233
To ROD 320 built-in encoders, preassembled		6FX5 0 2-2CE02-■■■■■	Slot number label	6ES7 912-0AA00-0AA0
To SIMODRIVE 611A, preassembled		6FX5 0 2-2CJ00-■■■■■	Spare part	
To SIMODRIVE 611U, preassembled		6FX5 0 2-2CJ10-■■■■■	Shield connection element	6ES7 390-5AA00-0AA0
To SSI absolute encoders 6FX2 001-5, preassembled, without Sub-D connector		6FX5 002-2CC12-■■■■■	80 mm wide, with 2 rows for 4 terminals each	
To SSI absolute encoders 6FX2 001-5, preassembled, suitable for trailing		6FX8 0 2-2CC11-■■■■■	Terminal elements	
To incremental encoders 6FX2 001-2, preassembled, suitable for trailing		6FX8 0 2-2CD01-■■■■■	2 units	
To ROD 320 built-in encoders, preassembled, suitable for trailing		6FX8 0 2-2CE02-■■■■■	For 2 cables with 2 mm to 6 mm diameter	6ES7 390-5AB00-0AA0
To SIMODRIVE 611A, preassembled, suitable for trailing		6FX8 0 2-2CJ00-■■■■■	For 1 cable with 3 mm to 8 mm diameter	6ES7 390-5BA00-0AA0
To SIMODRIVE 611U, preassembled, suitable for trailing, 1 free end		6FX8 0 2-2CJ10-■■■■■	For 1 cable with 4 mm to 13 mm diameter	6ES7 390-5CA00-0AA0
To SIMODRIVE 611A, preassembled, suitable for trailing, free ends		6FX8 0 2-3AB01-■■■■■		
Length code		see FM 351, page 4/140		

A4: Subject to export regulations: AL: N and ECCN: 4A994B1

B8: Subject to export regulations: AL: N and ECCN: EAR99S

SIMATIC S7-300

Function modules

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.

Further information can be found on the Internet at

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

Technical specifications

6ES7 357-4AH01-0AE0	
Supply voltages	
Rated value	
• DC 24 V	Yes
Current consumption	
from backplane bus DC 5 V, max.	100 mA
Current consumption/ power loss	
Power consumption	
• Power consumption, typ.	24 W
Memory	
Type of storage	
NC program memory	750 Kibyte
Connection point	
required front connectors	1x 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

6ES7 357-4AH01-0AE0	
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.	0.5 A; with UPmax
• 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

Technical specifications (continued)

6ES7 357-4AH01-0AE0	
Encoder signals, absolute encoder (SSI)	
• Input signal	5 V difference signal (phys. RS 422)
• Data signal	DATA, not DATA
• Clock signal	CL, not CL
• Telegram length	13, 21 or 25 bit
• Clock frequency, max.	1.5 Mbit/s
• cable length, shielded, max.	250 m; at max. 187.5 kBit/s
Positioning	
Programmable traverse speed, max.	1 000 m/min
Signal output I	
• Output ready signal	
• 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; I _o = 20 mA
• Differential output voltage, for signal "1", min.	3.7 V; I _o = -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	
Galvanic isolation, digital inputs	
• galvanic isolation, digital inputs	Yes
Isolation, digital outputs	
• Galvanic isolation, digital outputs	Yes
Dimensions	
Dimensions	
• Width	200 mm
• Height	125 mm
• Depth	118 mm
Weights	
• Weight, approx.	1 200 g

SIMATIC S7-300

Function modules

FM 357-2 positioning module

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Ordering Data		Order No.	Order No.	
FM 357-2 positioning module	A4	6ES7 357-4AH01-0AE0	Connecting cables and encoders	see Catalog NC 60, CA 01 or in the DT/IA Mall
Basic unit			Front connector	
System firmware			40-pin, with screw contacts	
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)			• 1 unit	6ES7 392-1AM00-0AA0
			• 100 units	6ES7 392-1AM00-1AB0
			40-pin with spring-loaded contacts	
			• 1 unit	6ES7 392-1BM01-0AA0
			• 100 units	6ES7 392-1BM01-1AB0
FM 357-2L system firmware		6ES7 357-4AH03-3AE0	40-pin, with FastConnect	
On memory card			• 1 unit	6ES7 392-1CM00-0AA0
FM 357-2LX system firmware		6ES7 357-4BH03-3AE0	Back-up battery	6ES7 971-1AA00-0AA0
With additional functions; on memory card			Li-Ion, 3.6 V/0.95 Ah	
FM 357-H system firmware		6ES7 357-4CH03-3AE0	Signal cable	
With additional functions for the handling sector; on memory card			Pre-assembled for SSI absolute encoder, UL/DESINA	6FX5 0 2-2CC11-■■■■■
FM 357-2 manual			Pre-assembled for TTL encoder 6FX2001-1, UL/DESINA	6FX5 0 2-2CD01-■■■■■
German		6ES7 357-4AH00-8AG0	Pre-assembled for TTL encoder 24 V, UL/DESINA	6FX5 0 2-2CD24-■■■■■
English		6ES7 357-4AH00-8BG0	Length code	see FM 351, page 4/140
French		6ES7 357-4AH00-8CG0		
Italian		6ES7 357-4AH00-8EG0		
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				

A4: Subject to export regulations: AL: N and ECCN: 4A994B1

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

4

Technical specifications

	6ES7 355-0VH10-0AE0	6ES7 355-1VH10-0AE0
Supply voltages		
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
Current consumption/ power loss		
Power loss, max.	7.8 W	6.9 W
Power loss, typ.	6.5 W	5.5 W
Connection point		
required front connectors	2x 20-pin	2x 20-pin
Digital inputs		
Number of digital inputs	8	8
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
Cable length		
• cable length, shielded, max.	1 000 m	1 000 m
• Cable length unshielded, max.	600 m	600 m

	6ES7 355-0VH10-0AE0	6ES7 355-1VH10-0AE0
Digital outputs		
Number of digital outputs		8
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
• cable length, shielded, max.		1 000 m
• Cable length unshielded, max.		600 m

SIMATIC S7-300

Function modules

FM 355 controller 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; 50 m at 80 mV and thermocouples	200 m; 50 m at 80 mV and thermocouples
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
• 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
Characteristic curve linearization		
• programmable	Yes	Yes
- for thermoelements	Type B, J, K, R, S	Type B, J, K, R, S
- for thermoresistor	Pt100 (standard)	Pt100 (standard)
Temperature compensation		
• internal temperature compensation	Yes	Yes
• external temperature compensation with Pt100	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	

	6ES7 355-0VH10-0AE0	6ES7 355-1VH10-0AE0
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 milliH	
Analog value creation		
Measurement principle	integrating	integrating
Integration and conversion time/resolution per 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 input area)	+/- 0.05 %	+/- 0.05 %
Temperature error (relative to input areas)	+/- 0.005 %/K	+/- 0.005 %/K
Linearity error (relative to output area)	+/- 0.05 %	
Temperature error (relative to output area)	+/- 0.02 %/K	
Operational limit in overall temperature range		
• 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%
• 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 input area	+/- 0.4 %; 80 mV: +/-0.6%; 250 to 1000 mV: +/-0.4%; 2.5 to 10 V: +/-0.6%; 3.2 to 20 mA: +/-0.5%	+/- 0.4 %; 80 mV: +/-0.6%; 250 to 1000 mV: +/-0.4%; 2.5 to 10 V: +/-0.6%; 3.2 to 20 mA: +/-0.5%
• Current, relative to input area	+/- 0.4 %; +/-0.4 to +/-0.6%	+/- 0.4 %; +/-0.4 to +/-0.6%
• Resistance-type thermometer, relative to input area	+/- 0.4 %; +/-0.4 to +/-0.6%	+/- 0.4 %; +/-0.4 to +/-0.6%
• Voltage, relative to output area	+/- 0.3 %	
• Current, relative to output area	+/- 0.5 %	

	6ES7 355-0VH10-0AE0	6ES7 355-1VH10-0AE0
Interference voltage suppression for $f = n \times (f_l \pm 1 \%)$, f_l = 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 internally and the inputs	75 V DC / 60 V AC	75 V DC / 60 V AC
Dimensions		
Dimensions		
• Width	80 mm	80 mm
• Height	125 mm	125 mm
• Depth	120 mm	120 mm
Weights		
• Weight, approx.	470 g	470 g

SIMATIC S7-300

Function modules

FM 355 controller module

Ordering Data

FM 355 C controller module

with 4 analog outputs for
4 continuous-action controllers

Order No.

6ES7 355-0VH10-0AE0

FM 355 S controller module

with 8 digital outputs for 4 step or
pulse controllers

6ES7 355-1VH10-0AE0

Front connector

20-pin, with screw contacts

- 1 unit
- 100 units

6ES7 392-1AJ00-0AA0

6ES7 392-1AJ00-1AB0

20-pin, with spring-loaded
contacts

- 1 unit
- 100 units

6ES7 392-1BJ00-0AA0

6ES7 392-1BJ00-1AB0

20-pin, with FastConnect

- 1 unit

6ES7 392-1CJ00-0AA0

Bus connectors

1 unit (spare part)

6ES7 390-0AA00-0AA0

Labeling strips

10 units (spare part)

6ES7 392-2XX00-0AA0

S7 SmartLabel V3.0

Software for automatic labeling of
modules based on data of the
STEP 7 project

Single license B8

2XV9 450-1SL03-0YX0

Upgrade single license B8

2XV9 450-1SL03-0YX4

Labeling sheets for machine inscription

see under "Accessories",
page 4/233

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

B8: Subject to export regulations: AL: N and ECCN: EAR99S

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

4

Technical specifications

	6ES7 355-2CH00-0AE0	6ES7 355-2SH00-0AE0
Supply voltages		
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
Current consumption/ power loss		
Power loss, max.	7.8 W	6.9 W
Power loss, typ.	6.5 W	5.5 W
Connection point		
required front connectors	2x 20-pin	2x 20-pin
Digital inputs		
Number of digital inputs	8	8
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
Cable length		
• cable length, shielded, max.	1 000 m	1 000 m
• Cable length unshielded, max.	600 m	600 m

	6ES7 355-2CH00-0AE0	6ES7 355-2SH00-0AE0
Digital outputs		
Number of digital outputs		8
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
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
• cable length, shielded, max.		1 000 m
• Cable length unshielded, max.		600 m

SIMATIC S7-300

Function modules

FM 355-2 temperature controller module

Technical specifications (continued)

	6ES7 355-2CH00-0AE0	6ES7 355-2SH00-0AE0
Analog inputs		
Number of analog inputs	4	4
cable length, shielded, max.	200 m; 50 m at 80 mV and thermocouples	200 m; 50 m at 80 mV and thermocouples
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
• 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
Characteristic curve linearization		
• programmable	Yes	Yes
- for thermoelements	Type B, E, J, K, R, S	Type B, E, J, K, R, S
- for thermoresistor	Pt100 (standard)	Pt100 (standard)
Temperature compensation		
• internal temperature compensation	Yes	Yes
• external temperature compensation with Pt100	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	

	6ES7 355-2CH00-0AE0	6ES7 355-2SH00-0AE0
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 milliH	
Analog value creation		
Measurement principle	integrating	integrating
Integration and conversion time/resolution per channel		
• Resolution with overload area (bit including sign), max.	14 Bit	14 Bit
• Conversion time (per channel)	100 ms; at 50/60 Hz	100 ms; at 50/60 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 355-2CH00-0AE0	6ES7 355-2SH00-0AE0
Errors/accuracies		
Linearity error (relative to input area)	+/- 0.05 %	+/- 0.05 %
Temperature error (relative to input areas)	+/- 0.005 %/K	+/- 0.005 %/K
Linearity error (relative to output area)	+/- 0.05 %	
Temperature error (relative to output area)	+/- 0.02 %/K	
Operational limit in overall temperature range		
• 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%
• 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 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%
• Voltage, relative to output area	+/- 0.4 %	
• Current, relative to output area	+/- 0.5 %	
Interference voltage suppression for $f = n \times (f_l \pm 1 \%)$, f_l = 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 internally and the inputs	75 V DC / 60 V AC	75 V DC / 60 V AC
Dimensions		
Dimensions		
• Width	80 mm	80 mm
• Height	125 mm	125 mm
• Depth	120 mm	120 mm
Weights		
• Weight, approx.	470 g	470 g

SIMATIC S7-300

Function modules

FM 355-2 temperature controller module

4

Ordering Data	Order No.			Order No.
FM 355-2 C temperature controller module with 4 analog outputs for 4 continuous-action controllers	6ES7 355-2CH00-0AE0	S7 SmartLabel V3.0 Software for automatic labeling of modules based on data of the STEP 7 project		
FM 355-2 S temperature controller module with 8 digital outputs for 4 step or pulse controllers	6ES7 355-2SH00-0AE0	Single license	B8	2XV9 450-1SL03-0YX0
		Upgrade single license	B8	2XV9 450-1SL03-0YX4
Front connector 20-pin, with screw contacts		Labeling sheets for machine inscription		see under "Accessories", page 4/233
• 1 unit • 100 units	6ES7 392-1AJ00-0AA0 6ES7 392-1AJ00-1AB0	Slot number label		6ES7 912-0AA00-0AA0
20-pin, with spring-loaded contacts		Spare part		
• 1 unit • 100 units	6ES7 392-1BJ00-0AA0 6ES7 392-1BJ00-1AB0	Shield connection element		6ES7 390-5AA00-0AA0
20-pin, with FastConnect		80 mm wide, with 2 rows for 4 terminals each		
1 unit	6ES7 392-1CJ00-0AA0	Terminal elements		
Bus connectors	6ES7 390-0AA00-0AA0	2 units		
1 unit (spare part)		For 2 cables with 2 mm to 6 mm diameter		6ES7 390-5AB00-0AA0
Labeling strips	6ES7 392-2XX00-0AA0	For 1 cable with 3 mm to 8 mm diameter		6ES7 390-5BA00-0AA0
10 units (spare part)		For 1 cable with 4 mm to 13 mm diameter		6ES7 390-5CA00-0AA0

B8: Subject to export regulations: AL: N and ECCN: EAR99S

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.

Further information can be found on the Internet at

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

Technical specifications

6ES7 338-4BC01-0AB0	
Supply voltages	
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	
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 " to "1", min.	300 µs
Cable length	
• cable length, shielded, max.	600 m

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	
Dimensions	
• Width	40 mm
• Height	125 mm
• Depth	120 mm
Weights	
• Weight, approx.	235 g

SIMATIC S7-300

Function modules

SM 338 POS input module

4

Ordering Data	Order No.	Order No.
SM 338 POS input module For position sensing with 3 SSI encoders	6ES7 338-4BC01-0AB0	SIMATIC Manual Collection update service for 1 year B3 6ES7 998-8XC01-8YE2 Current "Manual Collection" DVD and the three subsequent updates
Front connectors 20-pin, with screw contacts • 1 unit • 100 units 20-pin, with spring-loaded contacts • 1 unit • 100 units 20-pin, with FastConnect • 1 unit	6ES7 392-1AJ00-0AA0 6ES7 392-1AJ00-1AB0 6ES7 392-1BJ00-0AA0 6ES7 392-1BJ00-1AB0 6ES7 392-1CJ00-0AA0	S7-300 manual Design, CPU data, module data, instruction list German English French Spanish Italian Signal cable Pre-assembled for SSI absolute encoder 6FX2 001-5, without Sub-D connector, UL/DESINA Length code
Front door, elevated design B7 e.g. for 32-channel modules; for connecting 1.3 mm ² /16 AWG conductors	6ES7 328-0AA00-7AA0	6ES7 398-8FA10-8AA0 6ES7 398-8FA10-8BA0 6ES7 398-8FA10-8CA0 6ES7 398-8FA10-8DA0 6ES7 398-8FA10-8EA0 6FX5 002-2CC12-■■■■ see FM 351, page 4/140
SIMATIC Manual Collection B3 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	6ES7 998-8XC01-8YE0	

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

B7: Subject to export regulations: AL: N and ECCN: EAR99H

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, SIMOTION C230-2, SIMOTION P350, SIMOTION D4x5
- Can also be used with external encoders

4

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	
Isochronous mode	Yes
shortest clock pulse	1.5 ms
Digital inputs	
Number of digital inputs	10
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 "0" to "1", min.	15 µs
Cable length	
• cable length, shielded, max.	100 m

6ES7 174-0AA00-0AA0	
Digital outputs	
Number of digital outputs	8
Short-circuit protection of the output	Yes
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
• cable length, shielded, max.	600 m
Relay outputs	
Number of relay outputs	5
Number of operating cycles	500 000
Switching capacity of the contacts	
• with resistive load, max.	1 A
Analog outputs	
Number of analog outputs	4
Output ranges, voltage	
• -10 to +10 V	Yes

SIMATIC S7-300

Function modules

IM 174 PROFIBUS module

Technical specifications (continued)

6ES7 174-0AA00-0AA0	
Analog value creation	
Integration and conversion time/resolution per channel	
• Resolution with overload area (bit including sign), max.	15 Bit
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
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	1
• cable length, shielded, max.	250 m; 250 m at 187.5 kHz; 10 m at 1.5 MHz

6ES7 174-0AA00-0AA0	
Number of drive interfaces	4
Analog drive	
• Setpoint signal	
- Short circuit proof	Yes; max. 45 mA, min. 3.3 kOhm load impedance
- Range of rated voltage	-10 to +10 V
- Output current	-3 to +3 mA
• Output controller release	
- Number of relay contacts	4
- Switching voltage, max.	30 V
- Switching current, max.	1 A
- Switching capacity, max.	30 V · A
- Number of switching cycles, min.	500 000; at 30 V DC, 1 A
- Cable length (shielded), max.	35 m
Signal output I	
• Output ready signal	
- Number of relay contacts	1
- Switching voltage, max.	30 V
- Switching current, max.	1 A
- Switching capacity, max.	30 V · A
- Number of switching cycles, min.	500 000; at 30 V DC, 1 A
- Cable length (shielded), max.	35 m
Signal output II	
• Differential output voltage, min.	2 V; R = 100 Ohm
• Differential output voltage for signal "1", min.	3.7 V; 3.7 V at I = -20 mA; 4.5 V at I = -100 µA,
• Differential output voltage for signal "0", max.	1 V; if I = -20 mA
• Load resistance, min.	55 Ω
• Output current, max.	60 mA
Signal output III	
• Pulse frequency	750 kHz
• Cable length (shielded), max.	50 m; in hybrid operation with analog axes 35 m, in asymmetrical transmission 10 m

IM 174 PROFIBUS module

Technical specifications (continued)	
6ES7 174-0AA00-0AA0	
Isolation	
Galvanic isolation, digital inputs	
• galvanic isolation, digital inputs	Yes; to encoders, analog outputs, DP interface; no to other DI/DOs
Isolation, digital outputs	
• Galvanic isolation, digital outputs	Yes; to encoders, analog outputs, DP interface; no to other DI/DOs
Dimensions	
Dimensions	
• Width	160 mm
• Height	125 mm
• Depth	118 mm
Weights	
• Weight, approx.	1 kg

Ordering Data	Order No.
IM 174 PROFIBUS module	B7 6ES7 174-0AA00-0AA0
PROFIBUS module for connecting analog drives and stepper drives to motion controllers	
Setpoint cable	
for the connection between IM 174 and SIMODRIVE 611-A	6FX2 002-3AD01-■■■■
for the connection between IM 174 with 3 stepper drives and one SIMODRIVE (end of cable cut off)	6FX2 002-3AD02-■■■■
Length code	see FM 351, page 4/140

B7: Subject to export regulations: AL: N and ECCN: EAR99H

SIMATIC S7-300

Function modules

SIWAREX U

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:	
• S7-300	Direct integration
• S7-400 (H)	Via ET 200M
• PCS 7 (H)	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 displays (through TTY serial interface)	Gross, channel 1, 2 or default value 1, 2
Adjustment of scales settings	over SIMATIC (P bus) or PC using SIWATOOL U (RS 232)
Measuring properties	
• Error limit to DIN 1319-1 of full-scale value at 20 °C ± 10 K	0.05 %
• Internal resolution ADC Data format of weight values	65535 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
• Limit values	2 (min./max.)
• Zero setting function	Per command
Load cells	Strain gages in 4-wire or 6-wire system

1) Supply of load cells compared to 7MH4601-1AA01 or ... 1BA01 changed to 6 V DC.

	SIWAREX U
Load cell powering	
• Supply voltage U_s (rated value)	6 V DC ¹⁾
• Max. supply current	≤ 150 mA per channel
• Permissible load impedance	
- R_{Lmin}	> 40 Ω per channel
- R_{Lmax}	< 4010 Ω
- R_{Lmin}	With Ex(i) interface: > 87 Ω per channel
- R_{Lmax}	< 4010 Ω
Permissible load cell characteristic	Up to 4 mV/V
Max. distance of load cells	500 m ²⁾ 150/500 m for gas group IIC 500 m ²⁾ for gas group IIB (see SIWAREX IS Manual)
Intrinsically-safe load cell powering	Optional (Ex interface) with SIWAREX IS
Supply voltage 24 V DC	
• Rated voltage	24 V DC
• Max. current consumption	150 mA (single-channel) / 240 mA (two-channel)
Voltage supply from backplane bus	≤ 100 mA
Certification	ATEX 95, FM, cUL _{US} Haz. Loc.
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 ... +60 °C
• Horizontal installation	0 ... +40 °C
EMC requirements according to	NAMUR NE21, Part 1 EN 61326

2) Up to 1000 m possible under certain conditions, provided the recommended cable is used (see Accessories).

Ordering Data	Order No.	Order No.
SIWAREX U for SIMATIC S7 and ET 200M, incl. bus connector, weight 0.3 kg - Single-channel version¹⁾ for connecting one scale B7 7MH4 950-1AA01 - Two-channel version²⁾ for connecting two scales B7 7MH4 950-2AA01		
SIWAREX U Manual available in a range of languages Free download on the Internet at: www.siemens.com/weighing-technology		
SIWAREX U configuration package³⁾ for SIMATIC S7 version 5.4 or higher on CD-ROM - PC SIWATOOL U software (available in a range of languages), new design - Sample program "Getting started" – ready to use application for SIMATIC S7 - SIWAREX U Manual on CD (in a range of languages), new design - HSP Hardware Support Package for integrating SIWAREX U in STEP 7	7MH4 950-1AK01	
SIWAREX U configuration package for PCS 7, version 6.x in German and English on CD-ROM, module for the CFC and faceplate	7MH4 683-3BA64	
SIWATOOL cable B7 from SIWAREX U/CS with serial PC interface, for 9-pin PC interfaces (RS 232), 3 m long	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 Contents: 2 units (suitable for cable with diameter 4 ... 13 mm) Note: one shield connection terminal each is required for: - Scale connection - RS 485 interface - RS 232 interface	6ES7 390-5CA00-0AA0	
		S7 DIN rail 160 mm 480 mm 530 mm 830 mm 2000 mm
		Accessories (optional)
		PS 307 load power supplies (only required if 24 V DC 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.: 06806/980-0 Fax: 06806/980-999 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 7MH4 710-5AA With UL and FM approvals, but without ATEX approval for intrinsically-safe connection of load cells, suitable for the SIWAREX U, CS, MS, FTA, FTC and M weighing modules. Not approved for use in the EU.
		Manual for Ex interface type SIWAREX Pi C71000-T5974-C29

1) compatible with 7MH4601-1AA01; supply of load cells changed to 6 V DC.

2) compatible with 7MH4601-1BA01; supply of load cells changed to 6 V DC.

3) replaces 7MH4683-3AA63

B7: Subject to export regulations: AL: N and ECCN: EAR99H

SIMATIC S7-300

Function modules

SIWAREX U

Ordering Data

Order No.

Order No.

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, CS, MS, FTA, FTC, M and CF weighing modules. Approved for use in the EU.

- With short-circuit current < 199 mA DC
- With short-circuit current < 137 mA DC

7MH4 710-5BA

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, CS, MS, FTA, FTC, M and CF to the junction box (JB), extension box (EB) or Ex interface (Ex-I) or between two JBs, for fixed laying, occasional bending permitted, 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 permitted, 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 B7 for TTY (connect 2 pairs of conductors in parallel), for connection of a remote display

7MH4 407-8BD0

B7: Subject to export regulations: AL: N and ECCN: EAR99H

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	
• S7	Through backplane bus
• RS 232	For SIWATOOL or printer connection
• RS 485	For remote display or digital load cell
Module parameterization	Using SIMATIC S7 Using SIWATOOL FTA software (RS 232)
Measuring properties	
• EU 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 damped, 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 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

	SIWAREX FTA
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 95, FM, 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 ... 20 mA
- Updating rate	100 Hz
Approvals	EU type approval (CE, OIML R76) EU prototype test to MID (OIML R51, R61, R107)
Degree of protection to DIN EN 60529; IEC 60529	IP20
Climatic requirements	
$T_{min}(IND) \dots T_{max}(IND)$ (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 further details, see Ex interface, type SIWAREX IS

SIMATIC S7-300

Function modules

SIWAREX FTA

4

Ordering Data

Order No.

Order No.

SIWAREX FTA

Legal-for-trade weighing electronics for automatic scales for S7-300 and ET 200M. EU type approval 3 x 6000 d Applications: proportioning, filling, bagging, loading. Note: Observe approval conditions for applications with obligation of verification. We recommend using our calibration set and contacting our SIWAREX hotline.

7MH4 900-2AA01

SIWAREX FTA Manual

- available in a range of languages

Free download from the Internet at:

www.siemens.com/weighing-technology

SIWAREX FTA "Getting started"

Sample software shows beginners how to program the scales in STEP 7.

Free download from the Internet at:

www.siemens.com/weighing-technology

SIWAREX FTA configuration package for SIMATIC S7 on CD-ROM

- HSP Hardware Support Package for integrating SIWAREX FTA/FTC in STEP 7
- SIWAREX FTA "Getting started"
- SIWATOOL FTA commissioning software
- Flexible software for legal-for-trade display in WinCC
- Manual

7MH4 900-2AK01

SIWAREX FTA configuration package for PCS 7 V6.x on CD-ROM

- HSP Hardware Support Package for integrating SIWAREX FTA/FTC in STEP 7
- Function block for CFC
- Faceplate
- SIWATOOL FTA commissioning software
- Manual

7MH4 900-2AK61

SIWAREX FTA configuration package for PCS 7 V7.0 on CD-ROM

- HSP Hardware Support Package for integrating SIWAREX FTA/FTC in STEP 7
- Function block for CFC
- Faceplate
- SIWATOOL FTA commissioning software
- Manual

7MH4 900-2AK62

Calibration set for SIWAREX FTA

For verification of up to 5 scales comprising:

- 3 x inscription foil for labeling
- 1 x protection foil
- 10 x EU verification marks (black M on green background)
- Guidelines for verification, verification certificates and approvals, adaptable label, SIWAREX FTA Manual on CD-ROM

7MH4 900-2AY10

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
- 5 m long

7MH4 702-8CA

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 392-1BM01-0AA0

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 each is required for:

- Scale connection
- RS 485 interface
- RS 232 interface

6ES7 390-5CA00-0AA0

Ordering Data	Order No.		Order No.
S7 DIN rail • 160 mm • 480 mm • 530 mm • 830 mm • 2000 mm	6ES7 390-1AB60-0AA0 6ES7 390-1AE80-0AA0 6ES7 390-1AF30-0AA0 6ES7 390-1AJ30-0AA0 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 • PS 307-1E; 5 A • PS 307-1K; 10 A	6ES7 307-1BA00-0AA0 6ES7 307-1EA00-0AA0 6ES7 307-1KA00-0AA0		
MMC memory for data recording up to 16 MB	6ES7 953-8LG11-0AA0		
Remote display (optional) 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.: 06806/980-0 Fax: 06806/980-999 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, CS, MS, FTA, FTC and M weighing modules. 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 load cells, including manual, suitable for the SIWAREX U, CS, MS, FTA, FTC, M and CF weighing modules. Approved for use in the EU. • With short-circuit current < 199 mA DC • With short-circuit current < 137 mA DC	7MH4 710-5BA 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, CS, MS, FTA, FTC, M and CF to the junction box (JB), extension box (EB) or Ex interface (Ex-I) or between two JB's, for fixed laying, occasional bending permitted, 10.8 mm outer diameter, for ambient temperature -40 to +80 °C 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 permitted, blue PVC insulating sheath, approx. 10.8 mm outer diameter, for ambient temperature -40 ... +80 °C Cable LiYCY 4 x 2 x 0.25 mm² B7 for TTY (connect 2 pairs of conductors in parallel), for connection of a remote display	7MH4 702-8AG 7MH4 702-8AF 7MH4 407-8BD0		

B7: Subject to export regulations: AL: N and ECCN: EAR99H

SIMATIC S7-300

Function modules

SIWAREX FTC

Overview



SIWAREX FTC weighing module

The SIWAREX FTC (Flexible Technology for Continuous Weighing) is a versatile and flexible weighing module for conveyor scales, loss-in-weigh scales 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
Communication interfaces	
• S7	Through backplane bus
• RS 232	For SIWATOOL or printer connection
• RS 485	For remote display or digital load cell
Module parameterization	Using SIMATIC S7 Using SIWATOOL FTC software (RS 232)
Measuring properties	
• Accuracy to EN 45501	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 damped, Bessel, Butterworth (0.05 ... 20 Hz), mean-value filter
Weighing functions	
• Non-automatic weighing machine, force measurement	
• Conveyor scale	
• Differential proportioning weigher	
• Bulk flow meter	
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
- R_{Lmax}	> 87 Ω with Ex interface ≤ 4010 Ω

	SIWAREX FTC
Max. distance of load cells	
When using the recommended cable:	
• Standard	1000 m
• 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 95, FM, 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 ... 20 mA
- Updating rate	100 Hz
Degree of protection to DIN EN 60529; IEC 60529	IP20
Climatic requirements	
$T_{min} (IND) \dots T_{max} (IND)$ (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 further details, see Ex interface, type SIWAREX IS

Ordering Data	Order No.		Order No.
SIWAREX FTC Weighing electronics for S7-300 and ET 200M. Applications: Conveyor scales, force measurement, differential proportioning weighers and bulk flow meters	7MH4 900-3AA01	SIWAREX FTC_B configuration package for SIMATIC S7 on CD-ROM (conveyor scale) • HSP Hardware Support Package for integrating SIWAREX FTA/FTC in STEP 7 • "Getting started" for conveyor scales • Commissioning software SIWATOOL FTC_B for conveyor scales • Manual	7MH4 900-3AK02
SIWAREX FTC_B Manual for conveyor scales • Available in a range of languages Free download from the Internet at: www.siemens.com/weighing-technology		SIWAREX FTC_B configuration package for PCS 7 V6.x on CD-ROM (conveyor scale) • HSP Hardware Support Package for integrating SIWAREX FTA/FTC in STEP 7 • Function block for CFC • Faceplate • Commissioning software SIWATOOL FTC_B for conveyor scales • Manual	7MH4 900-3AK61
SIWAREX FTC_L Manual for bulk flow meters and differential proportioning weighers • Available in a range of languages Free download from the Internet at: www.siemens.com/weighing-technology		SIWAREX FTC_B configuration package for PCS 7 V7.0 on CD-ROM (conveyor scale) • HSP Hardware Support Package for integrating SIWAREX FTA/FTC in STEP 7 • Function block for CFC • Faceplate • Commissioning software SIWATOOL FTC_B for conveyor scales • Manual	7MH4 900-3AK63
SIWAREX FTC "Getting started" for conveyor scales Sample software shows beginners how to program the scales in STEP 7 for conveyor scale mode Free download from the Internet at: www.siemens.com/weighing-technology		SIWAREX FTC_L configuration package for PCS 7 V6.x on CD-ROM (loss-in-weight feeder) • HSP Hardware Support Package for integrating SIWAREX FTA/FTC in STEP 7 • Function block for CFC • Faceplate • Commissioning software SIWATOOL FTC_L for bulk flow meters and loss-in-weight feeders • Manual	7MH4 900-3AK62
SIWAREX FTC "Getting started" for bulk flow meters Sample software shows beginners how to program the scales in STEP 7 for bulk flow meter mode Free download from the Internet at: www.siemens.com/weighing-technology		SIWATOOL cable from SIWAREX FTC with serial PC interface, for 9-pin PC interfaces (RS 232) • 2 m long • 5 m long	7MH4 702-8CA 7MH4 702-8CB
SIWAREX FTC "Getting started" for differential proportioning weighers Sample software shows beginners how to program the scales in STEP 7 for differential proportioning weigher mode Free download from the Internet at: www.siemens.com/weighing-technology		40-pin front plug with screw contacts (required for each SIWAREX module), alternatively with spring-loaded contacts	6ES7 392-1AM00-0AA0
SIWAREX FTC_B configuration package for SIMATIC S7 on CD-ROM (conveyor scale) • HSP Hardware Support Package for integrating SIWAREX FTA/FTC in STEP 7 • "Getting started" for conveyor scales • Commissioning software SIWATOOL FTC_B for conveyor scales • Manual	7MH4 900-3AK01	40-pin front plug with spring-loaded contacts (required for each SIWAREX module), alternatively with screw contacts	6ES7 392-1BM01-0AA0

SIMATIC S7-300

Function modules

SIWAREX FTC

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Ordering Data	Order No.	Order No.
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 each is required for: • Scale connection • RS 485 interface • RS 232 interface	6ES7 390-5CA00-0AA0	
S7 DIN rail • 160 mm • 480 mm • 530 mm • 830 mm • 2000 mm	6ES7 390-1AB60-0AA0 6ES7 390-1AE80-0AA0 6ES7 390-1AF30-0AA0 6ES7 390-1AJ30-0AA0 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 • PS 307-1E; 5 A • PS 307-1K; 10 A	6ES7 307-1BA00-0AA0 6ES7 307-1EA00-0AA0 6ES7 307-1KA00-0AA0	
MMC memory for data recording up to 16 MB	6ES7 953-8LG11-0AA0	
Remote display (optional) 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.: 06806/980-0 Fax: 06806/980-999 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, CS, MS, FTA, FTC and M weighing modules. 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 load cells, including manual, suitable for the SIWAREX U, CS, MS, FTA, FTC, M and CF weighing modules. Approved for use in the EU. • With short-circuit current < 199 mA DC • With short-circuit current < 137 mA DC	7MH4 710-5BA 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, CS, MS, FTA, FTC, M and CF to the junction box (JB), extension box (EB) or Ex interface (Ex-I) or between two JB's, for fixed laying, occasional bending permitted, 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 permitted, blue PVC insulating sheath, approx. 10.8 mm outer diameter, for ambient temperature -40 ... +80 °C		7MH4 702-8AF
Cable LiYCY 4 x 2 x 0.25 mm² B7 for TTY (connect 2 pairs of conductors in parallel), for connection of a remote display		7MH4 407-8BD0

B7: Subject to export regulations: AL: N and ECCN: EAR99H

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.

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Technical specifications

	SIWAREX M
Main applications	- Platform scales - Fill level (containers/bins) - Proportioning and batching scales - Legal-for-trade scales
Intrinsically-safe load cell powering	Optional (Ex-I)
Stand-alone (without SIMATIC)	Yes
Integration in:	
• 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 (legal-for-trade) Gross/net/setpoint Remote display with operator control
Printer connection	Yes (legal-for-trade)
Measuring properties	
• EU type approval for medium accuracy weighing machines Class III (certified as legal-for-trade)	6000 d
• Error limit to DIN 1319-1 of full-scale value at 20 °C ± 10 K	0.01 %
• n_{ind} in acc. with EN 45501	6000
• Min. measuring signal Δu_{min} per d	0.5 μ V
• Internal resolution	±524288
• 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
• Limit values	4 (min./max./empty/overflow)
• 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 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
	<u>With Ex(i) interface:</u>
- 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 value)	-41.5 ... 41.5 mV

SIMATIC S7-300

Function modules

SIWAREX M

Technical specifications

	SIWAREX M
Max. distance of load cells	1000 m (300 m in Ex area ¹⁾)
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

1) Up to 1000 m, depending on the gas group.

	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	
$T_{\min}(\text{IND}) \dots T_{\max}(\text{IND})$ (operating temperature)	
• Vertical installation	-10 ... +60 °C
• Horizontal installation/certified legal-for-trade	-10 ... +40 °C
MTBF (SN 29500)	172000 h at +40 °C

2) Serial printer, ANSI-, EPSON-, IBM-compatible

Ordering Data

Order No.	
SIWAREX M	7MH4 553-1AA41
Medium accuracy weighing machine Class III, 6000 d, for the SIMATIC S7 and ET 200M, incl. bus connector, weight 0.6 kg Note: Observe approval conditions for applications with obligation of verification. We recommend that you contact the SIWAREX hotline.	
SIWAREX M Manual	
• available in a range of languages Free download on the Internet at: www.siemens.com/weighing-technology	
SIWAREX M configuration package for SIMATIC S7 version 5.1 or higher	7MH4 583-3FA63
available in German and English on CD-ROM • SIWATOOL PC parameterization software • SIMATIC S7 function blocks • SIWAREX M Manual on CD • Setup for incorporation of SIWAREX M into STEP 7	

Order No.	
SIWAREX M configuration package for PCS 7, version 5.2	7MH4 583-3EA63
available in German and English on CD-ROM Block for the CFC and faceplate	
SIWAREX M configuration package for PCS 7, version 6.x	7MH4 583-3EA64
available in German and English on CD-ROM Block for the CFC and faceplate	
SIWAREX Batch	7MH4 553-4GS01
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	

Ordering Data	Order No.	Order No.
SIWAREX Batch secondary license	7MH4 583-4KL01	
Connection of SIWAREX M to serial PC interface for 9-pin PC interface • 2 m long • 5 m long	7MH4 702-8CA 7MH4 702-8CB	
Installation material (mandatory) Front connector for SIWAREX M 20-pin, with screw contacts (required for each SIWAREX M module)	6ES7 392-1AJ00-0AA0	
Shield contact element One 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 ... 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 • 480 mm • 530 mm • 830 mm • 2000 mm	6ES7 390-1AB60-0AA0 6ES7 390-1AE80-0AA0 6ES7 390-1AF30-0AA0 6ES7 390-1AJ30-0AA0 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 PS 307-1E; 5 A PS 307-1K; 10 A	6ES7 307-1BA00-0AA0 6ES7 307-1EA00-0AA0 6ES7 307-1KA00-0AA0	
Labeling strips (10 units, spare part)	6ES7 392-2XX00-0AA0	
Cable LiYCY 4 x 2 x 0.25 mm² B7 for TTY or RS 232 interface	7MH4 407-8BD0	
	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.: 06806/980-0 Fax: 06806/980-999 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.: 0711/77964-20 Fax: 0711/77964-40 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 also be ordered separately.	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

B7: Subject to export regulations: AL: N and ECCN: EAR99H

SIMATIC S7-300

Function modules

SIWAREX M

4

Ordering Data	Order No.	Order No.
Accessories for SIWAREX M		Cable (optional)
SIWAREX JB junction box, aluminium housing for connecting up to 4 load cells in parallel, and for connecting several junction boxes	7MH4 710-1BA	Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, orange sheath to connect SIWAREX U, CS, MS, FTA, FTC, M and CF to the junction box (JB), extension box (EB) or Ex interface (Ex-I) or between two JBs, for fixed laying, occasional bending permitted, 10.8 mm outer diameter, for ambient temperature -40 to +80 °C
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, CS, MS, FTA, FTC, M and CF weighing modules. Not approved for use in the EU.	7MH4 710-5AA	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 permitted, blue PVC insulating sheath, approx. 10.8 mm outer diameter, for ambient temperature -40 to +80 °C
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, CS, MS, FTA, FTC, M and CF weighing modules. Approved for use in the EU.	7MH4 710-5BA 7MH4 710-5CA	Cable LiYCY 4 x 2 x 0.25 mm² B7 for TTY (connect 2 pairs of conductors in parallel), for connection of a remote display
• With short-circuit current < 199 mA DC • With short-circuit current < 137 mA DC		

B7: Subject to export regulations: AL: N and ECCN: EAR99H

Overview



SIFLOW FC070 is based on the latest developments within the digital processing technology – engineered for high performance, fast flow step response, immunity against process generated noise, easy to install, commission and maintain

SIFLOW FC070 is available in two versions:

- SIFLOW FC070 Standard
- SIFLOW FC070 Ex

The SIFLOW FC070 transmitter delivers true multi-parameter measurements i.e. mass flow, volume flow, density, temperature and fraction.

SIFLOW FC070 is designed for integration in a variety of automation systems, i.e.

- Central mounted in S7-300, C7
- Decentralized in ET 200M for use with S7-300 and S7-400 as PROFIBUS DP masters
- Decentralized in ET 200M for use with any automation system using standardized PROFIBUS DP masters
- Stand-alone via a MODBUS RTU master, i.e. SIMATIC PDM

The SIFLOW FC070 transmitter can be connected to all sensors of types MASS 2100, MC2 and FC300.

Technical specifications

SIFLOW FC070	
Measurement of	Mass flow, volume flow, density, sensor temperature, fraction A flow, fraction B flow, fraction A in %
Measurement functions	
• Totalizer 1	Totalization of mass flow, volume flow, fraction A, fraction B
• Totalizer 2	Totalization of Mass flow, VolumeFlow, Fraction A, Fraction B
• Single and 2-stage Batch function	Batching function with the use of one or two outputs for dosing in high and low speed
• 4 programmable limits	4 programmable high/low limits for mass flow, volume flow density, sensor temperature, fraction A flow, fraction B flow, fraction A in %. Limits will generate an alarm if reached.

SIFLOW FC070

Digital input

Functions

Start batch, stop batch, start/stop batch, hold/continue batch, reset totalizer 1, reset totalizer 2, reset totalizer 1 and 2, zero adjust, force frequency output, freeze frequency output

High signal

- Nominal voltage: 24 V DC
- Lower limit: 15 V DC
- Upper limit: 30 V DC
- Current: 2 ... 15 mA

Low signal

- Nominal voltage: 0 V DC
- Lower limit: -3 V DC
- Upper limit: 5 V DC
- Current: -15 ... 15 mA

Input

Approx. 10 K Ω

Switching

Max. 100 Hz

Digital output 1 and 2

Functions

- Output 1: Pulse, frequency, quadrature pulse, quadrature frequency 2-stage batch, batch
- Output 2: Quadrature pulse, quadrature frequency, 2-stage batch

Voltage supply

3 ... 30 V DC (passive output)

Switching current

Max. 30 mA at 30 V DC

Voltage drop

≤ 3 V DC at max. current

Leakage current

≤ 0.4 mA at max. voltage 30 V DC

Load resistance

1 K Ω to 10 K Ω

Switching frequency

0 ... 12 KHz 50 % duty cycle

Functions

Pulse, frequency, quadrature pulse, quadrature frequency 2-stage batch, batch

Communication

MODBUS RS 232C

- Max. baudrate: 115.200 baud
- Max. line length: 15 m at 115.200 baud
- Signal level: according to EIA-RS 232C

MODBUS RS 485

- Max. baudrate: 115.200 baud
- Max. line length: 1200 m at 115.200 baud
- Signal level: according to EIA-RS 485
- Bus termination: Integrated. Can be enabled by inserting wire jumpers.

Galvanic isolation

All inputs, outputs and communication interfaces are galvanically isolated. Isolation voltage: 500 V

Power

Supply

24 V DC nominal

Tolerance

20.4 V DC ... 28.8 V DC

Consumption

Max. 6 W

Fuse

T1A / 125 V, not to be changed by user

SIMATIC S7-300

Function modules

SIFLOW FC070

Technical specifications (continued)

SIFLOW FC070

Environment

Ambient temperature

- Storage -40 °C ... +70 °C (-40 ... +158 °F)

Operation conditions

Horizontally mounted rail. For vertically mounted rail, the maximum operating temperature is +45°C (+113 °F).

Altitude

- Operation: -1000 m ... 2000 m (pressure 795 hPa ... 1080 hPa)

Enclosure

Material

Noryl, color: athracite

Rating

IP20/NEMA 2 according to IEC 60529

Mechanical load

According to SIMATIC standards (S7-300 devices)

Approvals

- SIFLOW FC070 Standard
- SIFLOW FC070 Ex

CE, cULus, ATEX II 3G EEx nA IIC
CE, cULus, UL Haz.Loc., FM, ATEX II 3 G EEx nA II T4 and II (1) G [EEx ia] IIC

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

NAMUR

Within the limits according to "Allgemeine Anforderung" with error criteria A in accordance with NE21

Programming tools

SIMATIC S7

Configuration trough backplane P-BUS and PLC program

SIMATIC PCS 7

Configuration trough backplane P-BUS and PLC/WinCC faceplates

SIMATIC PDM

Through MODBUS port RS 232C and RS 485

Ordering Data

Order No.

SIFLOW FC070 flow transmitter

Remember to order 40 pin front plug connector.

7ME4 120-2DH20-0EA0

40 pin front plug with screw contacts

6ES7 392-1AM00-0AA0

SIFLOW FC070 Ex flow transmitter

Remember to order 20 pin front plug connector.

7ME4 120-2DH21-0EA0

20 pin front plug with screw contacts

6ES7 392-1AJ00-0AA0

Accessories

Cable with multiplug

for connecting MASS2100 and FC300 sensors

- 5 m (16.4 ft)
- 10 m (32.8 ft)
- 25 m (82 ft)
- 50 m (164 ft)
- 75 m (246 ft)
- 150 m (492 ft)

FDK-083H3015
FDK-083H3016
FDK-083H3017
FDK-083H3018
FDK-083H3054
FDK-083H3055

Cable without multiplug

for connecting MC2 sensors

- 5 m (16.4 ft)
- 25 m (82 ft)
- 75 m (246 ft)
- 150 m (492 ft)

FDK-083H3001
FDK-083H3002
FDK-083H3003
FDK-083H3004

SIMATIC S7-300 rail

The mechanical mounting rack of the SIMATIC S7-300

- 160 mm (6.3")
- 482 mm (18.9")
- 530 mm (20.8")
- 830 mm (32.7")
- 2000 mm (78.7")

6ES7 390-1AB60-0AA0
6ES7 390-1AE80-0AA0
6ES7 390-1AF30-0AA0
6ES7 390-1AJ30-0AA0
6ES7 390-1BC00-0AA0

Shield connecting element

For mounting on S7-300 rail. 80 mm wide with 2 rows for 4 shield terminal elements each (no shield terminal elements included)

6ES7 390-5AA00-0AA0

Shield terminal element

for 1 cable with 3 to 8 mm in dia. 2 pieces

6ES7 390-5BA00-0AA0

Shield terminal element

for 1 cable with 4 to 13 mm in dia. 2 pieces

6ES7 390-5CA00-0AA0

SIFLOW FC070 Demo suitcase

A5E01075465

Power supply

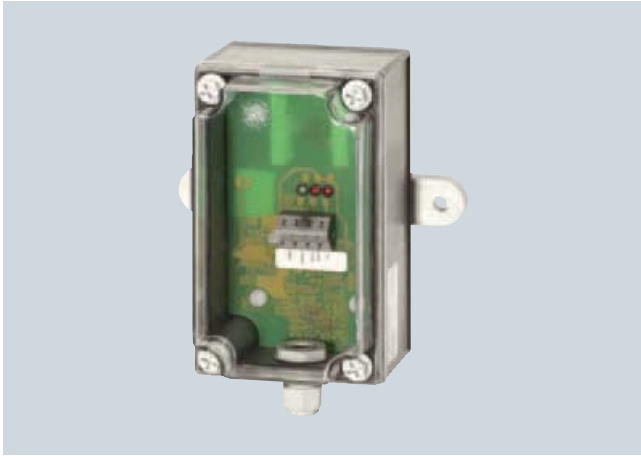
6ES7 307-1BA00-0AA0

SIMATIC S7-300

Function modules

SIPLUS DCF 77 radio clock module

Overview



This module can be used to synchronize the real-time clock of the SIMATIC S7-200, S7-300 and S7-400 automation systems with the official time of the DCF 77 time signal transmitter of the Physikalisch-Technische Bundesanstalt Braunschweig.

The time is received by means of a DCF receiver (antenna with electronics) which is connected via two digital inputs on the SIMATIC and SIPLUS together with a software driver included in the scope of delivery (function block FB). The function blocks are available on the Internet for downloading.

<http://www.siemens.com/siplus> – Support – Tools and 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

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

Ordering Data

Order No.

**SIPLUS DCF 77
radio clock module**

B7

6AG1 057-1AA03-0AA0

For synchronizing SIMATIC S7-200, S7-300 and S7-400 with the official time of the DCF 77 time signal transmitter of the Physikalisch-Technische Bundesanstalt Braunschweig

B7: Subject to export regulations: AL: N and ECCN: EAR99H

SIMATIC S7-300

IQ-Sense modules and sensors

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	
Supply voltages	
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	photoelectric 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	
Dimensions	
• Width	40 mm
• Height	125 mm
• Depth	120 mm
Weights	
Weight, approx.	250 g

SIMATIC S7-300

IQ-Sense modules and sensors

IQ-Sense sensor module

Ordering Data	Order No.	Order No.
Sensor module 8x IQ-Sense <i>Sensors for connection to the sensor module</i>	6ES7 338-7XF00-0AB0	Label cover 10 units (spare part), for modules with 20-pin front connector 6ES7 392-2XY00-0AA0
Diffuse sensor C40 IQ-Sense design B6 3SF7 240-3JQ00 K80 IQ-Sense design B6 3SF7 210-3JQ00 with background blanking, K80 IQ-Sense design B6 3SF7 214-3JQ00		S7 SmartLabel V3.0 Software for automatic labeling of modules based on data of the STEP 7 project Single license B8 2XV9 450-1SL03-0YX0 Upgrade single license B8 2XV9 450-1SL03-0YX4
Retroflective sensor C40 IQ-Sense design B6 3SF7 241-3JQ00 K80 IQ-Sense design B6 3SF7 211-3JQ00		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
Ultrasonic sensor M18 IQ-Sense design; range 6 ... 30 cm 3SF6 232-3JA00 M18 IQ-Sense design; range 15 ... 100 cm 3SF6 233-3JA00		SIMATIC Manual Collection B3 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
Front connectors 20-pin, with screw contacts • 1 unit 6ES7 392-1AJ00-0AA0 • 100 units 6ES7 392-1AJ00-1AB0 20-pin, with spring-loaded contacts • 1 unit 6ES7 392-1BJ00-0AA0 • 100 units 6ES7 392-1BJ00-1AB0 20-pin, with FastConnect • 1 unit 6ES7 392-1CJ00-0AA0		SIMATIC Manual Collection update service for 1 year B3 6ES7 998-8XC01-8YE2 Current S7 Manual Collection DVD and the three subsequent updates
Labeling strips 10 units (spare part), for modules with 20-pin front connector 6ES7 392-2XX00-0AA0		

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

B6: Subject to export regulations: AL: N and ECCN: EAR99

B8: Subject to export regulations: AL: N and ECCN: EAR99S

SIMATIC S7-300

IQ-Sense modules and sensors

SIMATIC PXO opto proximity switches with IQ-Sense

Overview



Opto BERO with IQ-Sense, C40 design IQ-Sense

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.



Opto BERO with IQ-Sense, K80 design IQ-Sense

Depending on the type of BERO, the interruption or reflection of the light beam is evaluated. The following operating modes are possible with IQ-Sense:

- Diffuse sensors (energetic)
- Diffuse sensor (with background suppression)
- Reflex sensors

Features:

- Designs K80 IQ-Sense and C40 IQ-Sense
- IntelliTeach functionality
- Integrated anti-interference function
- Pre-failure warning (fouling/misalignment)

Technical specifications

Design		C40 design IQ-Sense		K80 design IQ-Sense	
Diffuse sensor (energetic)					
Sensing range	m	0.7		2	
Standard test object	mm	200 × 200 (white)			
Transmitter (type of light)	nm	Red LED, 660		IR LED, 880	
Supply current	mA	50			
Response time	ms	1			
LEDs		Switching status (yellow), surplus light (green)			
Enclosure material		ABS + PBTP		PBTP	
Protection		IP67			
Dimensions	mm	40 × 40 × 53		83 × 65 × 25	
Diffuse sensor with background suppression					
Sensing range	m	–		0.2 ... 1	
Standard test object	mm	–		200 × 200 (white)	
Transmitter (type of light)	nm	–		IR-LED, 880	
Supply current	mA	–		50	
Response time	ms	–		2	
LEDs		–		Switching status (yellow), surplus light (green)	
Enclosure material		–		PBTP	
Protection		–		IP67	
Dimensions	mm	–		83 × 65 × 25	

SIMATIC S7-300

IQ-Sense modules and sensors

SIMATIC PXO opto proximity switches
with IQ-Sense

Technical specifications (continued)

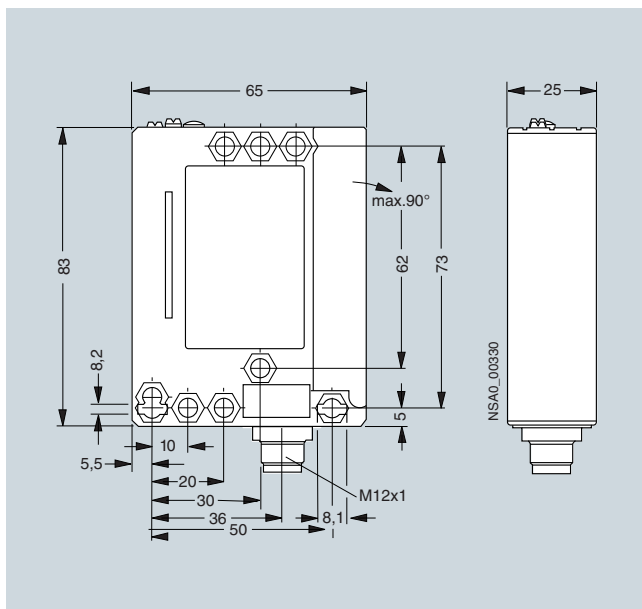
Design	C40 IQ-Sense	K80 IQ-Sense
Reflex sensor		
Sensing range	m 6	8
Standard test object	Reflector D84, 3RX7916	
Transmitter (type of light)	nm Red LED 660 nm, polarized	
Supply current	mA 50	
Response time	ms 1	
LEDs	Switching status (yellow), surplus light (green)	
Enclosure material	ABS + PBTP	PBTP
Protection	IP67	
Dimensions	mm 40 × 40 × 53	83 × 65 × 25

Selection and Ordering Data

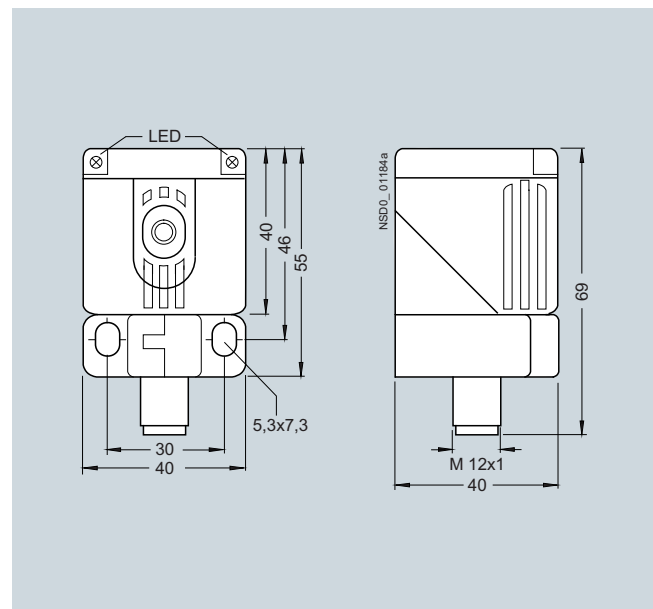
Version	Design	Type	Order No.
Photoelectric sensors for connection to the 4 IQ-Sense sensor module	C40 IQ-Sense	Diffuse sensor	B6 3SF7 240-3JQ00
		Reflex sensor	B6 3SF7 241-3JQ00
	K80 IQ-Sense	Diffuse sensor	B6 3SF7 210-3JQ00
		Diffuse sensor (with background suppression)	B6 3SF7 214-3JQ00
		Reflex sensor	B6 3SF7 211-3JQ00

B6: Subject to export regulations: AL: N and ECCN: EAR99

Dimensions



Opto BERO with IQ-Sense, K80 IQ-Sense design



Opto BERO with IQ-Sense, C40 IQ-Sense design

SIMATIC S7-300

IQ-Sense modules and sensors

SIMATIC PXS sonar proximity switches with IQ-Sense

Overview



The sonar BEROs of the M18 IQ compact series are ready-to-use complete units with a cylindrical M18 housing for connection to the S7-300/ET 200M IQ-Sense module SM338, 8xIQ-Sense.

- Five operating modes:
 - Operation as measuring sensor ("analog signal")
 - Diffuse sensor with background blanking
 - Diffuse sensor with differential travel
 - Diffuse sensor with foreground and background blanking
 - Retroreflective sensor.
- Statically configurable using STEP 7,
- Dynamically configurable using an S7 function block
- Measured distance to object is always transmitted
- Synchronizable, multiplex operation
- Temperature compensation,
- Connection with M12 connector
- Non-polarized 2-conductor connection (protected against polarity reversal),
- Channel-specific system diagnosis (e.g. wire-break, short-circuit, parameterization error).

Technical specifications

Order No.		3SF62 32-3JA00	3SF62 33-3JA00
Sensing range			
• Rated value	cm	5 ... 30	15 ... 100
• Maximum value	cm	5 ... 50	15 ... 150
Standard test object	mm	10 × 10	20 × 20
Differential travel H (adjustable)	mm	3 ... 30	10 ... 100
Repeat accuracy R	mm	1	2
Operating voltage (DC)		of IQ-Sense	
Rated operational current I_e		of IQ-Sense	
No-load current I_0		of IQ-Sense	
Adjustment / configuration		Beginning and end of switching range via IQ-Sense (IntelliTeach) or local teach-in via potentiometer	
Ultra-sound frequency	kHz	400	200
Switching frequency f	Hz	8	4
Response time	ms	54	110
Measuring rate	ms	13.44	26.88
Status display		yellow LED	
Casing material		nickel-plated brass, Transformer cover CRAFTIN, Transformer surface epoxy resin	
Degree of protection		IP67	
Ambient temperature			
• Operation	°C	–25 ... +70	
• Storage	°C	–40 ... +85	

Selection and Ordering Data

Version	Type	Sensing range (cm)	Order No.
Ultrasonic sensors	M18 IQ-Sense	5 ... 30	3SF62 32-3JA00
For connection to IQ-Sense		15 ... 100	3SF62 33-3JA00

Overview



- Simulator module for program testing during commissioning and ongoing operation
- For the simulation of sensor signals using switches
- For display of signal conditions on the outputs using LED
- Simulation of
 - 16 inputs or
 - 16 outputs or
 - 8 inputs and 8 outputs
- Function can be directly adjusted on the module using a screwdriver

4

Technical specifications

	6ES7 374-2XH01-0AA0
Current consumption	
from backplane bus DC 5 V, max.	80 mA
Current consumption/ power loss	
Power loss, typ.	0.35 W
Digital inputs	
Number of digital inputs	16; Switch
Digital outputs	
Number of digital outputs	16; LEDs
Isolation	
Galvanic isolation, digital inputs	
• between the channels and the backplane bus	No
Isolation, digital outputs	
• between the channels and the backplane bus	No
Dimensions	
Dimensions	
• Width	40 mm
• Height	125 mm
• Depth	120 mm
Weights	
• Weight, approx.	190 g

Ordering Data

Order No.

SM 374 simulator module	B7	6ES7 374-2XH01-0AA0
incl. bus connectors, labeling strips		
Bus connectors		6ES7 390-0AA00-0AA0
1 unit, spare part		
Labeling strips		6ES7 392-2XX00-0AA0
10 units (spare part)		
Label cover		6ES7 392-2XY00-0AA0
10 units (spare part)		
S7 SmartLabel V3.0		
Software for automatic labeling of modules based on data of the STEP 7 project		
Single license	B8	2XV9 450-1SL03-0YX0
Upgrade single license	B8	2XV9 450-1SL03-0YX4
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

B7: Subject to export regulations: AL: N and ECCN: EAR99H

B8: Subject to export regulations: AL: N and ECCN: EAR99S

SIMATIC S7-300

Special modules

DM 370 dummy module

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
Current consumption/ power loss	
Power loss, max.	0.03 W
Dimensions	
Dimensions	
• 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
incl. bus connectors, labeling strips		
Bus connectors		6ES7 390-0AA00-0AA0
1 unit, spare part		
Labeling strips		6ES7 392-2XX00-0AA0
10 units (spare part)		
Label cover		6ES7 392-2XY00-0AA0
10 units (spare part)		
S7 SmartLabel V3.0		
Software for automatic labeling of modules based on data of the STEP 7 project		
Single license	B8	2XV9 450-1SL03-0YX0
Upgrade single license	B8	2XV9 450-1SL03-0YX4
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

B8: Subject to export regulations: AL: N and ECCN: EAR99S

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 5 V	No; Power supply via backplane bus 5 V	No; Power supply via backplane bus 5 V
Current consumption			
from backplane bus DC 5 V, max.	165 mA	190 mA	165 mA
Current consumption/ power loss			
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; isolated	1; isolated	1; isolated
Physical interface, 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 sub D connector	9-pin sub D socket	15-pin sub D socket
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-Proprietary, user-defined	HP-Deskjet, HP-Laserjet, IBM-Proprietary, user-defined	HP-Deskjet, HP-Laserjet, IBM-Proprietary, user-defined

SIMATIC S7-300

Communication

CP 340

Technical specifications (continued)

	6ES7 340-1AH02-0AE0	6ES7 340-1BH02-0AE0	6ES7 340-1CH02-0AE0
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
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			
Dimensions			
• 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

Ordering Data	Order No.		Order No.
CP 340 communications processor	6ES7 340-1AH02-0AE0	20 mA (TTY) connecting cable	
With one RS 232 C (V.24) interface		For linking to SIMATIC S7	
RS 232 connecting cable		5 m	6ES7 902-2AB00-0AA0
For linking to SIMATIC S7		10 m	6ES7 902-2AC00-0AA0
5 m	6ES7 902-1AB00-0AA0	50 m	6ES7 902-2AG00-0AA0
10 m	6ES7 902-1AC00-0AA0	CP 340 communications processor	6ES7 340-1CH02-0AE0
15 m	6ES7 902-1AD00-0AA0	With one RS 422/485 (X.27) interface	
CP 340 communications processor	6ES7 340-1BH02-0AE0	RS 422/485 connecting cable	
With one 20 mA (TTY) interface		For linking to SIMATIC S7	
		5 m	6ES7 902-3AB00-0AA0
		10 m	6ES7 902-3AC00-0AA0
		50 m	6ES7 902-3AG00-0AA0

Overview



- The economical, complete solution for serial communication over a point-to-point connection
- RS 232C (V.24) and RS 422/485 (X.27)
- Implemented protocols:
 - ASCII
 - 3964 (R) (not for RS 485)
 - Printer driver
- Simple parameterization using a parameterization tool integrated in STEP 7

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 ... + 60 °C, condensation permitted	
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere). In conformance with the standard for electronic equipment on rolling stock (EN 50155).	
Technical specifications	The technical data are identical with those of the based-on modules.	

Ordering Data	Order No.
SIPLUS CP 340 communication module (extended temperature range and medial exposure) With one RS 232 C (V.24) interface With one RS 422/485 (X.27) interface	6AG1 340-1AH02-2AE0 6AG1 340-1CH02-2AE0
Accessories	see CP 340, page 4/192

SIMATIC S7-300

Communication

CP 341

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
Current consumption/ power loss			
Power loss, max.	4.8 W	4.8 W	5.8 W
interfaces			
Number of interfaces	1; isolated	1; isolated	1; isolated
Physical interface, 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

Technical specifications (continued)

	6ES7 341-1AH01-0AE0	6ES7 341-1BH01-0AE0	6ES7 341-1CH01-0AE0
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
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			
Dimensions			
• 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

SIMATIC S7-300

Communication

CP 341

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Ordering Data	Order No.		Order No.
CP 341 communications processor With one RS 232 C (V.24) interface	6ES7 341-1AH01-0AE0	RS 422/485 connecting cable For linking to SIMATIC S7	
RS 232 connecting cable For linking to SIMATIC S7		5 m	6ES7 902-3AB00-0AA0
5 m	6ES7 902-1AB00-0AA0	10 m	6ES7 902-3AC00-0AA0
10 m	6ES7 902-1AC00-0AA0	50 m	6ES7 902-3AG00-0AA0
15 m	6ES7 902-1AD00-0AA0	Loadable drivers for CP 341	
CP 341 communications processor With one 20 mA (TTY) interface	6ES7 341-1BH01-0AE0	MODBUS master (RTU format)	
20 mA (TTY) connecting cable For linking to SIMATIC S7		• Single license	6ES7 870-1AA01-0YA0
5 m	6ES7 902-2AB00-0AA0	• Single license, without software or documentation	6ES7 870-1AA01-0YA1
10 m	6ES7 902-2AC00-0AA0	MODBUS slave (RTU format)	
50 m	6ES7 902-2AG00-0AA0	• Single license	6ES7 870-1AB01-0YA0
CP 341 communications processor With one RS 422/485 (X.27) interface	6ES7 341-1CH01-0AE0	• 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 fast and powerful serial data exchange over a point-to-point connection
- 3 versions with different physical transmission characteristics:
 - RS 232C (V.24),
 - 20 mA (TTY),
 - RS 422/RS 485 (X.27)
- Implemented protocols: ASCII, 3964 (R), RK 512, customer-specific protocols (can be reloaded)
- Simple parameterization using a parameterization tool integrated in STEP 7

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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 ... + 60 °C, condensation permitted
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere)
Technical specifications	The technical data are identical with those of the based-on modules.

Ordering Data	Order No.
CP 341 communication module (extended temperature range and medial exposure) With one RS 422/485 (X.27) interface	6AG1 341-1CH01-2AE0
Accessories	
	see CP 341, page 4/196

SIMATIC S7-300

Communication

CP 343-2

Overview



The CP 343-2 is the AS-Interface master for the SIMATIC S7-300 PLC and the ET 200M distributed I/O device. The communications processor has the following functions:

- Up to 62 AS-Interface slaves can be connected and integrated analog value transfer (according to the AS-Interface specification V3.0)
- Supports all AS-Interface master functions in accordance with the AS-Interface specification V3.0
- Status displays of the operating statuses and display of the operational readiness of connected slaves with LEDs on the front panel
- Error displays (such as AS-Interface voltage errors, configuration errors) with LEDs on the front plate
- Compact enclosure in SIMATIC S7-300 design

Order No.	6GK7 343-2AH01-0XA0
Product type description	CP 343-2
Permitted ambient conditions	
Ambient temperature	
• during operation	0 ... +60 °C
• during storage	-40 ... +70 °C
• during transport	-40 ... +70 °C
Maximum relative humidity at 25 °C during operation	95%
Design, dimensions and weight	
Module format	S7-300 design
Width	40 mm
Height	125 mm
Depth	120 mm
Net weight	190 g
Number of slots required	1
Standards and specifications	
Version of the AS-Interface specification	V 3.0
Bus cycle time of the AS-Interface	
• with 31 slaves	5 ms
• with 62 slaves	10 ms
Performance data	
Data volume	
• of the address area of the inputs as allocation in the PLC	16 byte
• of the address area of the outputs as allocation in the PLC	16 byte

Technical specifications

Order No.	6GK7 343-2AH01-0XA0
Product type description	CP 343-2
Interfaces	
Version of electrical connection of the AS-Interface	S7-300 front connector with terminal connection
Supply voltage	
Supply voltage from backplane bus	5 V
Current consumption	
• from 5 V DC backplane bus, max.	200 mA
• from AS-Interface cable, max.	100 mA
Effective power loss	
Effective power loss	2 W

Ordering Data

Order No.	6GK7 343-2AH01-0XA0
CP 343-2 communications processor	
for the connection of SIMATIC S7-300 and ET 200M to AS-Interface; configuration of the AS-i network by means of SET-key; including manual on CD-ROM (German, English, French, Spanish, Italian); without front panel connector	
Front connector	6ES7 392-1AJ00-0AA0
20-pin, with screw contacts	
Electronic manuals	6GK1 975-1AA00-3AA0
Communication systems, protocols, products on CD-ROM, German/English Free download in the Internet http://support.automation.siemens.com/WW/view/com/10805930/133300	

Overview



The CP 343-2 P is the AS-Interface master for the SIMATIC S7-300 PLC and the ET 200M distributed I/O device. The communications processor has the following functions:

- **Supports the configuration of the AS-Interface network with STEP 7, V5.2 and later**
- Up to 62 AS-Interface slaves can be connected and integrated analog value transfer (according to the AS-Interface specification V3.0)
- Supports all AS-Interface master functions in accordance with the AS-Interface specification V3.0
- Error displays (such as AS-Interface voltage errors, configuration errors) with LEDs on the front plate
- Compact enclosure in SIMATIC S7-300 design

Technical specifications

Order No.	6GK7 343-2AH11-0XA0
Product type description	CP 343-2 P
Interfaces	
Version of electrical connection of the AS-Interface	S7-300 front connector with terminal connection
Supply voltage	
Supply voltage from backplane bus	5 V
Current consumption	
• from 5 V DC backplane bus, max.	200 mA
• from AS-Interface cable, max.	100 mA
Effective power loss	
Effective power loss	2 W
Permitted ambient conditions	
Ambient temperature	
• during operation	0 ... 60 °C
• during storage	-40 ... +70 °C
• during transport	-40 ... +70 °C

Order No.	6GK7 343-2AH11-0XA0
Product type description	CP 343-2 P
Maximum relative humidity at 25 °C during operation	95%
Design, dimensions and weight	
Module format	S7-300 design
Width	40 mm
Height	125 mm
Depth	120 mm
Net weight	190 g
Number of slots required	1
Standards and specifications	
Version of the AS-Interface specification	V 3.0
Bus cycle time of the AS-Interface	
• with 31 slaves	5 ms
• with 62 slaves	10 ms
Performance data	
Data volume	
• of the address area of the inputs as allocation in the PLC	16 byte
• of the address area of the outputs as allocation in the PLC	16 byte
Configuration	
Configuration software included in scope of delivery of STEP 7 V5.2 or higher	Yes

Ordering Data	Order No.
CP 343-2 P communications processor	6GK7 343-2AH11-0XA0
for the connection of SIMATIC S7-300 and ET 200M to AS-Interface; configuration of the AS-i network by means of SET-key or via STEP 7 (V5.2 or higher); including manual on CD-ROM (German, English, French, Spanish, Italian); without front panel connector	
Front connector	6ES7 392-1AJ00-0AA0
20-pin, with screw contacts	
Electronic manuals	6GK1 975-1AA00-3AA0
Communication systems, protocols, products on CD-ROM, German/English	
Free download in Internet at http://support.automation.siemens.com/WW/view/com/10805930/133300	

SIMATIC S7-300

Communication

CP 342-5

Overview



- 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)
 - Open 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

DP-M	DP-S	FMS	PG/OP	S7/S5	
●	●		●	●	

Technical specifications

Order No.	6GK7 342-5DA02-0XE0
Product type description	CP 342-5
Transfer rate	
Transmission rate at Interface 1	
• Minimum	9.6 kbit/s
• Maximum	12 Mbit/s
Interfaces	
Electrical connection version	
• of the PROFIBUS interface	9-pin Sub-D socket (RS 485)
• for voltage supply	4-pin terminal strip
Supply voltage	
Type of supply voltage	DC
Supply voltage	24 V
Current consumption	
Current consumed	
• from backplane bus at 24 V DC typical	150 mA
• from external supply voltage at 24 V DC typical	250 mA
Effective power loss	
Effective power loss	6.75 W
Permitted ambient conditions	
Ambient temperature	
• during operation	0 ... +60 °C
• during storage	-40 ... +70 °C
• during transport	-40 ... +70 °C
Maximum relative humidity at 25 °C during operation	95%

Order No.	6GK7 342-5DA02-0XE0
Product type description	CP 342-5
Design, dimensions and weight	
Module format	S7-300 compact module, single width
• Width	40 mm
• Height	125 mm
• Depth	120 mm
Net weight	300 g
Max. number of modules per CPU	4
Performance data	
PROFIBUS DP	
Service as DP-Master DPV0	Yes
Number of DP-Slaves operable on DP-Master	124
Data volume	
• of the address area of the inputs as DP-Master overall	2 160 bytes
• of the address area of the outputs as DP-Master overall	2 160 bytes
• of the address area of the inputs per DP-Slave	244 bytes
• of the address area of the outputs per DP-Slave	244 bytes
Service as DP-Slave DPV0	Yes
Data volume	
• of the address area of the inputs as DP-Slave overall	240 bytes
• of the address area of the outputs as DP-Slave overall	240 bytes

Technical specifications (continued)

Order No.	6GK7 342-5DA02-0XE0	Order No.	6GK7 342-5DA02-0XE0
Product type description	CP 342-5	Product type description	CP 342-5
S7 communication		Data volume as useful data for open communication (SEND/RECEIVE) per connection, max.	240 bytes
Number of possible connections for S7 communication, max.	16	Multi-protocol	
PG/OP communication		Number of active connections in multi-protocol operation	
Number of operable OP connections (acyclic services)	16	• without DP, max.	32
Open communication		• with DP, max.	28
Number of possible connections for open communication by means of SEND/RECEIVE blocks, max. ¹⁾	16	Data volume of the address area of the diagnostic data per DP-Slave	240 bytes

1) also S5-compatible communication

Ordering data	Order No.		Order No.
CP 342-5 communications processor Communications processor for electrical connection of SIMATIC S7-300 to PROFIBUS at up to 12 Mbit/s, with electronic manual on CD-ROM	6GK7 342-5DA02-0XE0	PROFIBUS FastConnect bus connector RS485 With 90° cable outlet; insulation displacement technology, max. transmission rate 12 Mbit/s • Without PG interface • With PG interface	6ES7 972-0BA51-0XA0 6ES7 972-0BB51-0XA0
STEP 7 Version 5.4 <i>Target system:</i> SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC <i>Requirement:</i> Windows 2000 Prof./XP Prof. <i>Delivery package:</i> German, English, French, Spanish, Italian; incl. 3.5" authorization diskette, without documentation • Floating license on CD • Rental license for 50 hours • Software Update Service on CD (requires current software version) • Upgrade Floating License 3.x/4.x/5.x to V5.4; on CD • Trial License STEP 7 V5.4; on CD, runs for 14 days	6ES7 810-4CC08-0YA5 6ES7 810-4CC08-0YA6 6ES7 810-4BC01-0YX2 6ES7 810-4CC08-0YE5 6ES7 810-4CC08-0YA7	PROFIBUS bus connector IP20 With connection to PPI, MPI, PROFIBUS • Without PG interface • With PG interface PROFIBUS bus terminal 12M Bus terminal for connection of PROFIBUS nodes at up to 12 Mbit/s with connecting cable SIMATIC S7-300 DM 370 Dummy module; used for module replacement	6ES7 972-0BA12-0XA0 6ES7 972-0BB12-0XA0 6GK1 500-0AA10 6ES7 370-0AA01-0AA0

SIMATIC S7-300

Communication

CP 342-5 FO

Overview



- 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)
 - Open 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

DP-M	DP-S	FMS	PG/OP	S7/S5	
●	●		●	●	

Technical specifications

Order No.	6GK7 342-5DF00-0XE0
Product type description	CP 342-5 FO
Transfer rate	
Transmission rate at Interface 1	
• Minimum	9.6 kbit/s
• Maximum	12 Mbit/s
Interfaces	
Version of optical connection of the PROFIBUS interface	2 x duplex socket
Electrical connection version for voltage supply	4-pin terminal strip
Supply voltage	
Type of supply voltage	DC
Supply voltage	24 V
Current consumption	
Current consumed	
• from backplane bus at 24 V DC typical	150 mA
• from external supply voltage at 24 V DC typical	250 mA
Effective power loss	
Effective power loss	6.75 W
Transmission link	
• for PCF plastic optical fiber, max.	300 m
• for POF FOC, max.	50 m

Order No.	6GK7 342-5DF00-0XE0
Product type description	CP 342-5 FO
Permitted ambient conditions	
Ambient temperature	
• during operation	0 ... +60 °C
• during storage	-40 ... +70 °C
• during transport	-40 ... +70 °C
Maximum relative humidity at 25 °C during operation	95%
Design, dimensions and weight	
Module format	Compact module
• Width	40 mm
• Height	125 mm
• Depth	120 mm
Net weight	300 g
Max. number of modules per CPU	4
Performance data	
PROFIBUS DP	
Service as DP-Master DPV0	Yes
Max. number of DP-Slaves operable on DP-Master	124
Data volume	
• of the address area of the inputs as DP-Master overall	2 160 bytes
• of the address area of the outputs as DP-Master overall	2 160 bytes
• of the address area of the inputs per DP-Slave	244 bytes
• of the address area of the outputs per DP-Slave	244 bytes
• of the address area of the diagnostic data per DP-Slave	240 bytes

Technical specifications (continued)

Order No.	6GK7 342-5DF00-0XE0
Product type description	CP 342-5 FO
Service as DP-Slave DPV0	Yes
Data volume	
• of the address area of the inputs as DP-Slave overall	240 bytes
• of the address area of the outputs as DP-Slave overall	240 bytes
S7 communication	
Number of possible connections for S7 communication, max.	16
PG/OP communication	
Number of operable OP connections (acyclic services)	16

Order No.	6GK7 342-5DF00-0XE0
Product type description	CP 342-5 FO
Open communication	
Number of possible connections for open communication by means of SEND/RECEIVE blocks, max. ¹⁾	16
Data volume as useful data for open communication (SEND/RECEIVE) per connection, max.	240 bytes
Multi-protocol	
Number of active connections in multi-protocol operation	
• without DP, max.	32
• with DP, max.	28

¹⁾ also S5-compatible communication

Ordering Data

Order No.	Order No.
CP 342-5 FO communications processor	6GK7 342-5DF00-0XE0
Communication processor for optical connection of SIMATIC S7-300 to PROFIBUS to 12 Mbit/s with electronic manual on CD-ROM	
STEP 7 Version 5.4	
<i>Target system:</i> SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC	
<i>Requirement:</i> Windows 2000 Prof./XP Prof.	
<i>Delivery package:</i> German, English, French, Spanish, Italian; incl. 3.5" authori- zation diskette, without documen- tation	
• Floating license on CD	6ES7 810-4CC08-0YA5
• Rental license for 50 hours	6ES7 810-4CC08-0YA6
• Software Update Service on CD (requires current software version)	6ES7 810-4BC01-0YX2
• Upgrade Floating License 3.x/4.x/5.x to V5.4; on CD	6ES7 810-4CC08-0YE5
• Trial License STEP 7 V5.4; on CD, runs for 14 days	6ES7 810-4CC08-0YA7

Order No.	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, B7 Simplex Connector/ Polishing Set	6GK1 901-0FB00-0AA0
100 simplex connectors and 5 polishing sets for assembling PROFIBUS plastic fiber optic cables for the optical PROFIBUS DP	
PROFIBUS Plastic Fiber Optic, B7 Stripping Tool Set	6GK1 905-6PA10
Tools for removing the outer sheath or core sheath of Plastic Fiber Optic cables	
Plug-in adapter	6ES7 195-1BE00-0XA0
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	

B7: Subject to export regulations: AL: N and ECCN: EAR99H

SIMATIC S7-300

Communication

CP 343-5

Overview



DP-M	DP-S	FMS	PG/OP	S7/S5	
		●	●	●	

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
 - Open 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

Order No.	6GK7 343-5FA01-0XE0
Product type description	CP 343-5
Transfer rate	
Transmission rate at Interface 1	
• Minimum	9.6 kbit/s
• Maximum	12 Mbit/s
Interfaces	
Electrical connection version	
• of the PROFIBUS interface	9-pin Sub-D socket (RS 485)
• for voltage supply	4-pin terminal strip
Supply voltage	
Type of supply voltage	DC
Supply voltage	24 V

Order No.	6GK7 343-5FA01-0XE0
Product type description	CP 343-5
Current consumption	
Current consumed	
• from backplane bus at 24 V DC typical	150 mA
• from external supply voltage at 24 V DC typical	250 mA
Effective power loss	
Effective power loss	6.75 W
Permitted ambient conditions	
Ambient temperature	
• during operation	0 ... +60 °C
• during storage	-40 ... +70 °C
• during transport	-40 ... +70 °C
Maximum relative humidity at 25 °C during operation	95%
Design, dimensions and weight	
Module format	S7-300 compact module, single width
• Width	40 mm
• Height	125 mm
• Depth	120 mm
Net weight	300 g
Max. number of modules per CPU	4
Performance data	
FMS function	
Number of possible connections in the case of FMS connection, max.	16
Data volume of the variables	
• for READ job, max.	237 bytes
• for WRITE and REPORT job, max.	233 bytes
Number of variables	
• Configurable from server to FMS partner	256
• Loadable from server to FMS partner	256
S7 communication	
Number of possible connections for S7 communication, max.	16 ¹⁾
Open communication	
Number of possible connections for open communication by means of SEND/RECEIVE blocks, max. ²⁾	16
Data volume as useful data for open communication (SEND/RECEIVE) per connection, max.	240 bytes
Multi-protocol	
Number of active connections in multi-protocol operation	48

1) depending on the CPU type

2) also S5-compatible communication

Ordering Data	Order No.		Order No.
CP 343-5 communications processor Communications processor for connection of S7-300 to PROFIBUS, FMS, open communication, PG/OP and S7 communication; with electronic manual on CD-ROM	6GK7 343-5FA01-0XE0	PROFIBUS FastConnect bus connector RS485 With 90° cable outlet; insulation displacement technology, max. transmission rate 12 Mbit/s • without PG interface • with PG interface	6ES7 972-0BA51-0XA0 6ES7 972-0BB51-0XA0
STEP 7 Version 5.4 <i>Target system:</i> SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC <i>Requirement:</i> Windows 2000 Prof./XP Prof. <i>Delivery package:</i> German, English, French, Spanish, Italian; incl. 3.5" authorization diskette, without documentation • Floating license on CD • Rental license for 50 hours • Software Update Service on CD (requires current software version) • Upgrade Floating License 3.x/4.x/5.x to V5.4; on CD • Trial License STEP 7 V5.4; on CD, runs for 14 days	6ES7 810-4CC08-0YA5 6ES7 810-4CC08-0YA6 6ES7 810-4BC01-0YX2 6ES7 810-4CC08-0YE5 6ES7 810-4CC08-0YA7	PROFIBUS bus connector IP20 With connection to PPI, MPI, PROFIBUS • without PG interface • with PG interface PROFIBUS bus terminal 12M Bus terminal for connection of PROFIBUS nodes at up to 12 Mbit/s with connecting cable SIMATIC S7-300 DM 370 Dummy module; used for module replacement	6ES7 972-0BA12-0XA0 6ES7 972-0BB12-0XA0 6GK1 500-0AA10 6ES7 370-0AA01-0AA0

SIMATIC S7-300

Communication

CP 343-1 Lean

Overview



ISO	TCP/UDP	PN	MRP	IT	IP-R	PG/OP	S7/S5
	●	●				●	●

- Interface for the SIMATIC S7-300 to Industrial Ethernet (not for SINUMERIK)
 - 2 x RJ45 interface for 10/100 Mbit/s full/half duplex connection (with autosensing for automatic switchover and autocrossover function)
 - Integral 2-port real-time switch ERTEC
 - Multi-protocol operation with TCP and UDP transport protocol and PROFINET I/O
 - Keep Alive function
- Communication services:
 - Open communication (TCP/IP and UDP)
 - PG/OP communication
 - S7 communication (server)
 - PROFINET I/O device
- Multicast for UDP
- Remote programming and initial start-up is possible exclusively over Industrial Ethernet
- IT communication
 - Web function
- Integration into network management through SNMP
- Configuration with STEP 7
- Cross-network programming device/operator panel communication through S7 routing
- Diagnostic possibilities in STEP 7 and with web browser

Technical specifications

Order No.	6GK7 343-1CX10-0XE0
Product type description	CP 343-1 Lean
Transfer rate	
Transmission rate at Interface 1	
• Minimum	10 Mbit/s
• Maximum	100 Mbit/s
Interfaces	
Electrical connection version	
• at Industrial Ethernet interface 1	2 x RJ45 socket (TP)
• for voltage supply	2-pin plug-in terminal strip
Supply voltage	
Type of supply voltage	DC
Supply voltage	24 V
• Relative positive tolerance at 24 V DC	20%
• Relative negative tolerance at 24 V DC	15%
Current consumption	
Current consumed	
• from backplane bus at 5 V DC, max.	200 mA
• from external supply voltage at 24 V DC typical	160 mA
• from external supply voltage at 24 V DC max.	200 mA
Effective power loss	
Effective power loss	5.8 W

Order No.	6GK7 343-1CX10-0XE0
Product type description	CP 343-1 Lean
Permitted ambient conditions	
Ambient temperature	
• during operation	0 ... +60 °C
• during storage	-40 ... +70 °C
• during transport	-40 ... +70 °C
Maximum relative humidity at 25 °C during operation	95%
Design, dimensions and weight	
Module format	S7-300 compact module, single width
• Width	40 mm
• Height	125 mm
• Depth	120 mm
Net weight	220 g
Performance data	
Open communication	
Number of possible connections for open communication by means of SEND/RECEIVE blocks, max. ¹⁾	8
Number of multicast stations	8
Data volume as useful data for open communication by means of SEND/RECEIVE blocks	
• per TCP connection, max.	8 Kibyte
• per UDP connection, max.	2 Kibyte

1) also S5-compatible communication

Technical specifications (continued)

Order No.	6GK7 343-1CX10-0XE0
Product type description	CP 343-1 Lean
S7 communication	
Number of possible connections for S7 communication, max.	4
PG/OP communication	
Number of operable OP connections, max.	4
Multi-protocol operation	
Number of active connections in multi-protocol operation	12
Performance data PROFINET communication as PN IO-Device	
Data volume	
• as useful data for input variables as PROFINET IO device, max.	512 bytes
• as useful data for output variables as PROFINET IO device, max.	512 bytes

Order No.	6GK7 343-1CX10-0XE0
Product type description	CP 343-1 Lean
Data volume	
• as useful data for input variables per sub-module as PROFINET IO device, max.	240 bytes
• as useful data for output variables per sub-module as PROFINET IO device, max.	240 bytes
• as useful data for the consistency area for each sub-module	240 bytes
Number of sub-modules per PROFINET IO device	32
Configuration	
Configuration software for full functional scope in STEP 7 V5.4 or higher	Yes

Ordering Data

Order No.	Order No.
CP 343-1 Lean communications processor	6GK7 343-1CX10-0XE0
For connecting SIMATIC S7-300 to Industrial Ethernet through TCP/IP and UDP, Multicast, S7 communication, open communication (SEND/RECEIVE), FETCH/WRITE, PROFINET IO device, integral 2-port switch ERTEC, comprehensive diagnostics facilities, module replacement without PG, SNMP, initial commissioning over LAN; with electronic manual on CD-ROM	
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 204-2BB10-2AA3
Industrial Ethernet switches with integral SNMP access, online 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	

Order No.	Order No.
Compact Switch Module CSM 377	6GK7 377-1AA00-0AA0
Unmanaged switch for connection of a SIMATIC S7-300-CPU, ET 200M and as many as three further nodes to Industrial Ethernet operating at 10/100 Mbit/s; 4 x RJ45 ports; external 24 V DC power supply, LED diagnostics, S7-300 module including electronic equipment manual on CD-ROM	
IE FC RJ45 Plug 180	
RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables with 180° cable outlet;	
• 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 Edition 2007 for Industrial Ethernet	
Software for S7 and open communication, incl. OPC server, PG/OP communication and NCM PC, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2, Windows 2003 Server SP1, R2, SP2, Windows Vista Business/Ultimate; German/English	

SIMATIC S7-300

Communication

CP 343-1 Lean

4

Ordering Data

Order No.

Order No.

SOFTNET-S7 Edition 2007 for Industrial Ethernet

up to 64 connections

- Single license for 1 installation B3 **6GK1 704-1CW70-3AA0**
- Software Update Service for 1 year, with automatic extension; requirement: Current software version **6GK1 704-1CW00-3AL0**
- Upgrade from V6.4 to 2007 edition B3 **6GK1 704-1CW00-3AE0**
- Upgrade from V6.0, V6.1, V6.2 or V6.3 to 2007 Edition B3 **6GK1 704-1CW00-3AE1**

SOFTNET-S7 Lean Edition 2007 for Industrial Ethernet

up to 8 connections

- Single License for 1 installation B3 **6GK1 704-1LW70-3AA0**
- Software Update Service for 1 year, with automatic extension; requirement: Current software version **6GK1 704-1LW00-3AL0**
- Upgrade from V6.4 to 2007 edition B3 **6GK1 704-1LW00-3AE0**
- Upgrade from V6.0, V6.1, V6.2 or V6.3 to 2007 Edition B3 **6GK1 704-1LW00-3AE1**

S7-1613 Edition 2007

Software for S7 and open communication, incl. PG/OP communication, OPC server and NCM PC; up to 120 connections, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, SP2; Windows 2003 Server SP1, R2, SP2, Windows Vista Business/Ultimate; for CP 1613/CP 1613 A2/CP 1623; German/English

- Single License for 1 installation B3 **6GK1 716-1CB70-3AA0**
- Software Update Service for 1 year, with automatic extension; requirement: Current software version **6GK1 716-1CB00-3AL0**
- Upgrade S7-1613 from V6.4 to 2007 Edition B3 **6GK1 716-1CB00-3AE0**
- Upgrade S7-1613 from V6.0, V6.1, V6.2 or V6.3 to S7-1613 Edition 2007 B3 **6GK1 716-1CB00-3AE1**

STEP 7 Version 5.4

Target system:
SIMATIC S7-300/-400,
SIMATIC C7, SIMATIC WinAC

Requirement:
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 (requires current software version) **6ES7 810-4BC01-0YX2**
- Upgrade Floating License 3.x/4.x/5.x to V5.4; on CD **6ES7 810-4CC08-0YE5**
- Trial License STEP 7 V5.4; on CD, runs for 14 days **6ES7 810-4CC08-0YA7**

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

Overview



ISO	TCP/UDP	PN	MRP	IT	IP-R	PG/OP	S7/S5
●	●	●				●	●

- Connection of SIMATIC S7-300/SINUMERIK 840D powerline to Industrial Ethernet
 - 2 x RJ45 interface for 10/100 Mbit/s full/half duplex connection with autosensing/autonegotiation and autocrossover function
 - Integral 2-port real-time switch ERTEC
 - Multi-protocol operation with ISO, TCP and UDP transport protocol and PROFINET I/O
 - Adjustable Keep Alive function
- Communication services:
 - Open communication (ISO, TCP/IP and UDP)
 - PROFINET IO Controller or PROFINET IO Device
 - Programming device/operator panel communication: Cross-network by means of S7 routing
 - S7 communication (client, server, multiplexing)
- 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 Industrial Ethernet
- Configuration with STEP 7
- Automatic setting of the CPU clock via Ethernet with NTP or SIMATIC procedure
- IT communication
 - Web function
- Integration in network management systems over SNMP (MIB2 diagnostic information)
- Diagnostic possibilities in STEP 7 and with web browser

Technical specifications

Order No.	6GK7 343-1EX30-0XE0
Product type description	CP 343-1
Transfer rate	
Transmission rate at Interface 1	
• Minimum	10 Mbit/s
• Maximum	100 Mbit/s
Interfaces	
Electrical connection version	
• at Industrial Ethernet interface 1	2 x RJ45 (TP)
• for voltage supply	2-pin plug-in terminal strip
Supply voltage	
Type of supply voltage	DC
Supply voltage	24 V
• Relative positive tolerance at 24 V DC	20%
• Relative negative tolerance at 24 V DC	15%
Current consumption	
Current consumed	
• from backplane bus at 5 V DC typical	200 mA
• from external supply voltage at 24 V DC typical	-
• from external supply voltage at 24 V DC max.	200 mA

Order No.	6GK7 343-1EX30-0XE0
Product type description	CP 343-1
Effective power loss	
Effective power loss	5,8 W
Permitted ambient conditions	
Ambient temperature	
• during operation	0 ... +60 °C
• during storage	-40 ... +70 °C
• during transport	-40 ... +70 °C
Maximum relative humidity at 25 °C during operation	95%
Design, dimensions and weight	
Module format	S7-300 compact module, single width
• Width	40 mm
• Height	125 mm
• Depth	120 mm
Net weight	220 g3
Performance data	
Open communication	
Number of possible connections for open communication by means of SEND/RECEIVE blocks, max. ¹⁾	16
Number of multicast stations	16

1) also S5-compatible communication

SIMATIC S7-300

Communication

CP 343-1

Technical specifications (continued)

Order No.	6GK7 343-1EX30-0XE0
Product type description	CP 343-1
Data volume as useful data for open comm. by means of SEND/RECEIVE blocks	
• per ISO connection, max.	8 KB
• per ISO on TCP connection, max.	8 KB
• per TCP connection, max.	8 KB
• per UDP connection, max.	2 KB
S7 communication	
Number of possible connections for S7 communication, max.	16
PG/OP communication	
Number of possible connections for S7 communication for OP connections, max.	16
Multi-protocol operation	
Number of active connections in multi-protocol operation	32
Performance data, PROFINET communication as PN IO controller	
Number of PN IO devices operable as PROFINET IO controllers	32

Order No.	6GK7 343-1EX30-0XE0
Product type description	CP 343-1
Data volume	
• as useful data for input variables as PROFINET IO controller	1 024 bytes
• as useful data for output variables as PROFINET IO controller	1 024 bytes
• as useful data for input variables per PN IO device as PROFINET IO controller, max.	240 bytes
• as useful data for output variables per PN IO device as PROFINET IO controller, max.	240 bytes
Performance data PROFINET communication as PN IO-Device	
Data volume	
• as useful data for input variables as PROFINET IO device, max.	512 bytes
• as useful data for output variables as PROFINET IO device, max.	512 bytes
• as useful data for input variables per sub-module as PROFINET IO device, max.	240 bytes
• as useful data for output variables per sub-module as PROFINET IO device, max.	240 bytes
• as useful data for the consistency area for each sub-module	240 bytes
Number of sub-modules per PROFINET IO device	32
Configuration	
Configuration software for full functional scope in STEP 7 V5.4 or higher	Yes

Ordering Data	Order No.	Order No.
CP 343-1 communications processor For connection of SIMATIC S7-300 to Industrial Ethernet over ISO and TCP/IP; PROFINET IO Controller or PROFINET IO Device, integrated 2-port switch ERTEC; S7 communication, open communication (SEND/RECEIVE), FETCH/WRITE, with and without RFC 1006, multicast, DHCP, CPU clock synchronization via SIMATIC procedure and NTP, diagnostics, SNMP, access protection through IP access list, initialization over LAN 10/100 Mbit/s; with electronic manual on DVD	6GK7 343-1EX30-0XE0	SOFTNET-S7 Edition 2007 for Industrial Ethernet up to 64 connections - Single license for 1 installation B3 6GK1 704-1CW70-3AA0 6GK1 704-1CW00-3AL0 - Software Update Service for 1 year, with automatic extension; requirement: Current software version - Upgrade from V6.4 to 2007 edition B3 6GK1 704-1CW00-3AE0 - Upgrade from V6.0, V6.1, V6.2 or V6.3 to 2007 Edition B3 6GK1 704-1CW00-3AE1
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	SOFTNET-S7 Lean Edition 2007 for Industrial Ethernet up to 8 connections - Single License for 1 installation B3 6GK1 704-1LW70-3AA0 6GK1 704-1LW00-3AL0 - Software Update Service for 1 year, with automatic extension; requirement: Current software version - Upgrade from V6.4 to 2007 edition B3 6GK1 704-1LW00-3AE0 - Upgrade from V6.0, V6.1, V6.2 or V6.3 to 2007 Edition B3 6GK1 704-1LW00-3AE1
FO Standard Cable GP (50/125) Standard cable, splittable, UL approval, sold by the meter	6XV1 873-2A	
SCALANCE X204-2 Industrial Ethernet switch Industrial Ethernet switches with integral SNMP access, online 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	6GK5 204-2BB10-2AA3	S7-1613 Edition 2007 Software for S7 and open communication, incl. PG/OP communication, OPC server and NCM PC; up to 120 connections, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, SP2; Windows 2003 Server SP1, R2, SP2, Windows Vista Business/Ultimate; for CP 1613/CP 1613 A2/CP 1623; German/English - Single License for 1 installation B3 6GK1 716-1CB70-3AA0 6GK1 716-1CB00-3AL0 - Software Update Service for 1 year, with automatic extension; requirement: Current software version - Upgrade S7-1613 from V6.4 to 2007 Edition B3 6GK1 716-1CB00-3AE0 - Upgrade S7-1613 from V6.0, V6.1, V6.2 or V6.3 to S7-1613 Edition 2007 B3 6GK1 716-1CB00-3AE1
Compact Switch Module CSM 377 Unmanaged switch for connection of a SIMATIC S7-300-CPU, ET 200M and as many as three further nodes to Industrial Ethernet operating at 10/100 Mbit/s; 4 x RJ45 ports; external 24 V DC power supply, LED diagnostics, S7-300 module including electronic device manual on CD-ROM	6GK7 377-1AA00-0AA0	
IE FC RJ45 Plug 145 RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 145° cable outlet 1 pack = 1 unit 6GK1 901-1BB30-0AA0 1 pack = 10 units 6GK1 901-1BB30-0AB0 1 pack = 50 units 6GK1 901-1BB30-0AE0		STEP 7 Version 5.4 <i>Target system:</i> SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC <i>Requirement:</i> Windows 2000 Prof./XP Prof. <i>Delivery package:</i> 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 (requires current software version) 6ES7 810-4BC01-0YX2 - Upgrade Floating License 3.x/4.x/5.x to V5.4; on CD 6ES7 810-4CC08-0YE5 - Trial License STEP 7 V5.4; on CD, runs for 14 days 6ES7 810-4CC08-0YA7
SOFTNET Edition 2007 for Industrial Ethernet Software for S7 and open communication, incl. OPC server, PG/OP communication and NCM PC, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32 bit Windows XP Professional SP1, 2, Windows 2003 Server SP1, R2, SP2, Windows Vista Business/Ultimate; German/English		

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

SIMATIC S7-300

Communication

CP 343-1 Advanced

Overview



ISO	TCP/UDP	PN	MRP	IT	IP-R	PG/OP	S7/S5
●	●	●				●	●

- Connection of SIMATIC S7-300/SINUMERIK 840D powerline to Industrial Ethernet
 - Multi-protocol operation with TCP and UDP transport protocol
 - Adjustable Keep Alive function
- Two separate interfaces (integrated network separation):
 - Gigabit interface with an RJ45 connection with 10/100/1000 Mbit/s full/half duplex with auto-sensing functionality
 - PROFINET interface with two RJ45 connections with 10/100 Mbit/s full/half duplex with auto-sensing and auto-crossover functionality via integrated 2-port switch

- Communication services via both interfaces:
 - Open communication (TCP/IP and UDP): Multicast for UDP, incl. routing between both interfaces
 - PG/OP communication: Cross-network by means of S7 routing
 - S7 communication (client, server, multiplexing) incl. routing between both interfaces
 - IT communication:
 - HTTP communication allows access to process data via own web sites;
 - e-mail client function, sending of e-mails with authentication directly from the user program;
 - FTP communication allows program-controlled FTP client communication;
 - access to data blocks via FTP servers
- Communication services via PROFINET interfaces:
 - PROFINET IO Controller and IO Device with real-time properties (RT and IRT)¹⁾
 - PROFINET CBA
 - IP address assignment via DHCP, simple PC tool or via program block (e.g. for HMI)
- Configuration with STEP 7
- Access protection by means of a configurable IP access list
- Module replacement without PG; all information is stored on the C-PLUG (also file system for IT functions)
- Extensive diagnostic functions for all modules in the rack
- IT communication
 - Web function
 - E-mail function
 - FTP
- Integration into network management systems through the support of SNMP V1 MIB-II

- 1) Possible combinations in parallel mode:
- IO Controller with IRT and IO Device with RT
 - IO Controller with RT and IO Device using IRT

Technical specifications

Order No.	6GK7 343-1GX30-0XE0
Product type description	CP 343-1 Advanced
Transfer rate	
Transmission rate at Interface 1	
• Minimum	10 Mbit/s
• Maximum	1 000 Mbit/s
Transmission rate at Interface 2	
• Minimum	10 Mbit/s
• Maximum	100 Mbit/s
Electrical connection version	
• at Industrial Ethernet interface 1	1 x RJ45 (TP)
• at Industrial Ethernet interface 2	2 x RJ45 (TP)
• for voltage supply	2-pin plug-in terminal strip
Slot version of the swap medium	C-PLUG

Order No.	6GK7 343-1GX30-0XE0
Product type description	CP 343-1 Advanced
Supply voltage	
Type of supply voltage	DC
Supply voltage	24 V
• Relative positive tolerance at 24 V DC	20 %
• Relative negative tolerance at 24 V DC	15 %
Current consumption	
Current consumed	
• from backplane bus at 5 V DC typical	140 mA
• from external supply voltage at 24 V DC typical	-
• from external supply voltage at 24 V DC max.	620 mA

Technical specifications (continued)

Order No.	6GK7 343-1GX30-0XE0
Product type description	CP 343-1 Advanced
Effective power loss	
Effective power loss	14.7 W
Permitted ambient conditions	
Ambient temperature	
• during operation	0 ... +60 °C
• during storage	-40 ... +70 °C
• during transport	-40 ... +70 °C
Maximum relative humidity at 25 °C during operation	95%
Design, dimensions and weight	
Module format	Compact module S7-300, double width
• Width	80 mm
• Height	125 mm
• Depth	120 mm
Net weight	600 g
Performance data	
Open communication	
Number of possible connections for open communication by means of SEND/RECEIVE blocks, max. ¹⁾	16
Number of multicast stations	16
Data volume as useful data for open communication by means of SEND/RECEIVE blocks	
• per ISO connection, max.	8 KB
• per ISO on TCP connection, max.	8 KB
• per TCP connection, max.	8 KB
• per UDP connection, max.	2 KB
S7 communication	
Number of possible connections for S7 communication, max.	16
PG/OP communication	
Number of possible connections for S7 communication for OP connections, max.	16
Multi-protocol operation	
Number of active connections in multi-protocol operation	48

Order No.	6GK7 343-1GX30-0XE0
Product type description	CP 343-1 Advanced
IT functions	
Number of possible connections as client by means of FTP, max.	10
Number of possible connections as server by means of FTP, max.	2
Number of possible connections as server by means of HTTP, max.	4
Number of possible connections to an e-mail server as e-mail client, max.	1
Data volume as useful data (incl. e-mail header information) for e-mail communication by means of SEND/RECEIVE blocks	8 KB
Memory capacity of the user memory	
• as Flash memory file system	28 MB
• as RAM	30 MB
Number of possible write cycles of the flash memory cells	100 000
Performance data, PROFINET communication as PN IO controller	
Number of PN IO devices operable on PROFINET IO controller	128
• of which, PN IO IRT devices	32
Number of external PN IO lines with PROFINET per subrack	1
Data volume	
• as useful data for input variables as PROFINET IO controller, max.	4 KB
• as useful data for output variables as PROFINET IO controller	4 KB
• as useful data for input variables per PN IO device as PROFINET IO controller	240 bytes
• as useful data for output variables per PN IO device as PROFINET IO controller	240 bytes
Performance data PROFINET communication as PN IO-Device	
Data volume	
• as useful data for input variables as PROFINET IO device, max.	1 KB
• as useful data for output variables as PROFINET IO device, max.	1 KB
• as useful data for input variables per sub-module as PROFINET IO device, max.	240 bytes
• as useful data for output variables per sub-module as PROFINET IO device, max.	240 bytes
• as useful data for the consistency area for each sub-module	240 bytes
Number of sub-modules per PROFINET IO device	32

1) also S5-compatible communication

SIMATIC S7-300

Communication

CP 343-1 Advanced

Technical specifications (continued)

Order No.	6GK7 343-1GX30-0XE0
Product type description	CP 343-1 Advanced
Performance data PROFINET CBA	
Number of remote interconnection partners in the case of PROFINET CBA	64
Total number of interconnections in the case of PROFINET CBA	1 000
Data volume	
• as useful data for digital inputs in the case of PROFINET CBA, max.	8 KB
• as useful data for digital outputs in the case of PROFINET CBA, max.	8 KB
• as useful data for arrays and data types	
- in case of acyclic transmission with PROFINET CBA, max.	8 KB
- in case of cyclic transmission with PROFINET CBA, max.	450 bytes
- in case of local interconnection with PROFINET CBA, max.	2 400 bytes
Performance data PROFINET CBA, remote interconnections with acyclic transmission	
Send cycle of the remote interconnections in the case of acyclic transmission with PROFINET CBA min.	100 ms
Number of remote interconnections	
• with input variables in case of acyclic transmission with PROFINET CBA, max.	128
• with output variables in case of acyclic transmission with PROFINET CBA, max.	128
Data volume	
• as useful data for remote interconnections with input variables in the case of acyclic transmission with PROFINET CBA	8 KB
• as useful data for remote interconnections with output variables in the case of acyclic transmission with PROFINET CBA	8 KB
Performance data PROFINET CBA, remote interconnections with cyclic transmission	
Send cycle of the remote interconnections in the case of cyclic transmission with PROFINET CBA min.	8 ms
Number of remote interconnections	
• with input variables in case of cyclic transmission with PROFINET CBA, max.	200
• with output variables in case of cyclic transmission with PROFINET CBA, max.	200
Data volume	
• as useful data for remote interconnections with input variables in the case of cyclic transmission with PROFINET CBA, max.	2 000 bytes
• as useful data for remote interconnections with output variables in the case of cyclic transmission with PROFINET CBA, max.	2 000 bytes

Order No.	6GK7 343-1GX30-0XE0
Product type description	CP 343-1 Advanced
Performance data PROFINET CBA, HMI variables via PROFINET (acyclic)	
Number of HMI stations with login capability for HMI variables in the case of acyclic transmission with PROFINET CBA	3
Send cycle of the HMI variables in the case of acyclic transmission with PROFINET CBA	500 ms
Send cycle of the HMI variables in the case of acyclic transmission with PROFINET CBA max.	200
Data volume as useful data for HMI variables in the case of acyclic transmission with PROFINET CBA max.	8 KB
Performance data PROFINET CBA, device-internal interconnections	
Number of internal interconnections in the case of PROFINET CBA, max	256
Data volume of internal interconnections in the case of PROFINET CBA, max	2 400 bytes
Performance data PROFINET CBA, interconnections with constants	
Number of interconnections with constants in the case of PROFINET CBA, max	200
Data volume as useful data for interconnections with constants in the case of PROFINET CBA, max	4 096 bytes
Performance data PROFINET CBA, PROFIBUS proxy functionality	
Product function in the case of PROFINET CBA, PROFIBUS proxy functionality	No
Number of accesses to S7-extended variables in case of PROFINET CBA max.	32
Configuration	
Configuration software for full functional scope STEP 7 V5.4 SP4 or higher	Yes

Ordering Data	Order No.	Order No.
CP 343-1 Advanced communications processor For the connection of SIMATIC S7-300 to Industrial Ethernet; PROFINET IO Controller and IO Device with RT and IRT, MRP, PROFINET CBA, TCP/IP and UDP, S7 communication, open communication (SEND/RECEIVE), FETCH/WRITE, with and without RFC 1006, diagnostic 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 DVD	6GK7 343-1GX30-0XE0	S7-1613 Edition 2007 Software for S7 and open communication, incl. PG/OP communication, OPC server and NCM PC; up to 120 connections, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2; Windows 2003 Server SP1, R2, SP2, Windows Vista Business/Ultimate; for CP 1613/CP 1613 A2/CP 1623; German/English • Single License for 1 installation B3 • Software Update Service for 1 year, with automatic extension; requirement: Current software version • Upgrade S7-1613 from V6.4 to S7-1613 2007 Edition B3 • Upgrade S7-1613 from V6.0, V6.1, V6.2 or V6.3 to S7-1613 2007 Edition B3
C-PLUG Swap medium for simple replacement of devices in the event of a fault; for storing configuration or engineering and application data; can be used for SIMATIC NET products with C-PLUG slot	6GK1 900-0AB00	6GK1 716-1CB70-3AA0 6GK1 716-1CB00-3AL0 6GK1 716-1CB00-3AE0 6GK1 716-1CB00-3AE1
SOFTNET Edition 2007 for Industrial Ethernet Software for S7 and open communication, incl. OPC server, PG/OP communication and NCM PC, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2; Windows 2003 Server SP1, R2, SP2; Windows Vista Business/Ultimate; German/English		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/CPU's with Industrial Ethernet interface • 1 pack = 1 unit • 1 pack = 10 units • 1 pack = 50 units
SOFTNET-S7 Edition 2007 for Industrial Ethernet up to 64 connections • Single License for 1 installation B3 • Software Update Service for 1 year, with automatic extension; requirement: Current software version • Upgrade from V6.4 to 2007 edition B3 • Upgrade from V6.0, V6.1, V6.2 or V6.3 to 2007 Edition B3	6GK1 704-1CW70-3AA0 6GK1 704-1CW00-3AL0 6GK1 704-1CW00-3AE0 6GK1 704-1CW00-3AE1	IE FC RJ45 Plug 4 x 2 RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbit/s) with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPU's with Industrial Ethernet interface • 1 pack = 1 unit • 1 pack = 10 units • 1 pack = 50 units
SOFTNET-S7 Lean Edition 2007 for Industrial Ethernet up to 8 connections • Single License for 1 installation B3 • Software Update Service for 1 year, with automatic extension; requirement: Current software version • Upgrade from V6.4 to 2007 edition B3 • Upgrade from V6.0, V6.1, V6.2 or V6.3 to 2007 Edition B3	6GK1 704-1LW70-3AA0 6GK1 704-1LW00-3AL0 6GK1 704-1LW00-3AE0 6GK1 704-1LW00-3AE1	Compact Switch Module CSM 377 Unmanaged switch for connection of a SIMATIC S7-300-CPU, ET 200M and as many as three further nodes to Industrial Ethernet operating at 10/100 Mbit/s; 4 x RJ45 ports; external 24 V DC power supply, LED diagnostics, S7-300 module including electronic equipment manual on CD-ROM
		6GK7 377-1AA00-0AA0

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

SIMATIC S7-300

Communication

CP 343-1 Advanced

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Ordering Data	Order No.	Order No.
SCALANCE X204-2 Industrial Ethernet switch with four 10/100 Mbit/s RJ45 ports and two fiber-optic ports	6GK5 204-2BB10-2AA3	SIMATIC iMap V3.0 for configuring PROFINET CBA, <i>Requirement:</i> 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 <i>Type of supply:</i> German, English, with electronic documentation • Single License B3 • Software Update Service B3 • Upgrade to V3.0, Single License B3
Industrial Ethernet switch SCALANCE X308-2 2 x 1000 Mbit/s multimode fiber-optic ports (SC sockets), 1 x 10/100/1000 Mbit/s RJ45 port, 7 x 10/100 Mbit/s RJ45 ports; for glass fiber-optic cables (multimode) up to a max. 750 m.	6GK5 308-2FL00-2AA3	
STEP 7 Version 5.4 <i>Target system:</i> SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC <i>Requirement:</i> Windows 2000 Prof./XP Prof. <i>Delivery package:</i> German, English, French, Spanish, Italian; incl. 3.5" authorization diskette, without documentation • Floating license on CD • Rental license for 50 hours • Software Update Service on CD (requires current software version) • Upgrade Floating License 3.x/4.x/5.x to V5.4; on CD • Trial License STEP 7 V5.4; on CD, runs for 14 days	6ES7 810-4CC08-0YA5 6ES7 810-4CC08-0YA6 6ES7 810-4BC01-0YX2 6ES7 810-4CC08-0YE5 6ES7 810-4CC08-0YA7	

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

Overview



- For the simple and user-friendly connection of sensors and actuators to the S7-300 I/O modules
- For maintaining the wiring when replacing modules ("permanent wiring")
- With mechanical coding to avoid errors when replacing modules

Ordering Data	Order No.
Front connectors	
20-pin, with screw contacts	
• 1 item	6ES7 392-1AJ00-0AA0
• 100 units	6ES7 392-1AJ00-1AB0
20-pin, with spring-loaded contacts	
• 1 item	6ES7 392-1BJ00-0AA0
• 100 units	6ES7 392-1BJ00-1AB0
20-pin, with FastConnect	
• 1 unit	6ES7 392-1CJ00-0AA0
40-pin, with screw contacts	
• 1 item	6ES7 392-1AM00-0AA0
• 100 units	6ES7 392-1AM00-1AB0
40-pin, with spring-loaded contacts	
• 1 item	6ES7 392-1BM01-0AA0
• 100 units	6ES7 392-1BM01-1AB0
40-pin, with FastConnect	
• 1 unit	6ES7 392-1CM00-0AA0
Front door, elevated design	B7 6ES7 328-0AA00-7AA0
e.g. for 32 channel modules; enables connection of 1.3 mm ² /16 AWG wires	

B7: Subject to export regulations: AL: N and ECCN: EAR99H

SIMATIC S7-300

Connection methods

Fully modular connection

Overview

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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.

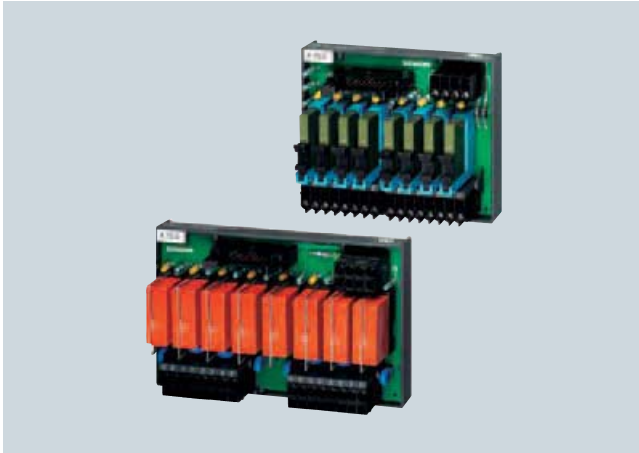
SIMATIC S7-300

Connection methods

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 TPPro 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 TPPr 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 VDC
Max. permissible operating voltage	60 V DC
Max. permissible continuous current	1 A
• per connector pin	
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

Wiring rules for front connector modules

Front connector module SIMATIC TOP connect, connection for potential infeed	
	Spring connection Screw connection
Modules up to 4 connections	
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	-
Blade width of the screw-driver	Form A; 5 to 7 mm long
Tightening torque for connecting the cables	- 0.4 to 0.7 Nm

Front connector module SIMATIC TOP connect, connection for potential infeed	
	Spring connection Screw connection
Modules up to 8 connections	
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 screw-driver	3.5 mm (cylindrical shape)
Tightening torque for connecting the cables	- 0.4 to 0.7 Nm

SIMATIC S7-300

Connection methods

Fully modular connection

Technical specifications Connecting 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	Approx. 55 x 43.2 x 63
• 1-wire connection 6ES7 924-0AA10-0A_0	Approx. 68 x 43.2 x 80
• for 3-wire initiators 6ES7 924-0CA10-0A_0	Approx. 100 x 43.2 x 80
• for 2 x 8 signals 6ES7 924-1AA10-0A_0	

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	Approx. 68 x 43.2 x 80
• for 2 ampere modules 6ES7 924-0BB10-0A_0	

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	Approx. 68 x 43.2 x 80
• for 2 analog modules 6ES7 924-0CC10-0A_0	

Wiring rules for connection modules

	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 6047-1)
• 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

SIMATIC S7-300

Connection methods

Fully modular connection

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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 6ES7 924-0AA10-0B_0	Approx. 55 x 43.2 x 63
• for 3-wire initiators with LED 6ES7 924-0CA10-0B_0	Approx. 68 x 43.2 x 80
• for 2 x 8 signals with LED 6ES7 924-1AA10-0B_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 6ES7 924-0BB10-0B_0	Approx. 68 x 43.2 x 80

Wiring rules for connection modules

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; Cul (Reference CSA C22.2 No. 142) overvoltage category III pollution degree 2
Dimensions (W x H x D) in mm 6ES7 924-0BD10-0B_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; Cul (Reference CSA C22.2 No. 142) overvoltage category III pollution degree 2
Dimensions (W x H x D) in mm 6ES7 924-0BE10-0B_0	Approx. 120 x 45 x 80

SIMATIC S7-300

Connection methods

Fully modular connection

Technical specifications Function modules (continued)

Wiring rules for the connection modules

	Connection modules TPPro 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 screw-driver	3.5 mm (cylindrical shape)	
Tightening torque for connecting the cables	-	0.4 to 0.7 Nm

Ordering data

Front connector modules

Order No.

Front connector module (Compact CPU 312C)

Voltage infeed via

- Spring terminals
- Screw terminals

6ES7 921-3AJ20-0AA0

6ES7 921-3AK20-0AA0

Front connector module (Compact CPU 313C/314C-2 PtP/314C-2 DP), slot X1

Voltage infeed via

- Spring terminals
- Screw terminals

6ES7 921-3AL20-0AA0

6ES7 921-3AM20-0AA0

Front connector module (digital 2 x 8 I/O)

Voltage infeed via

- Spring terminals
- Screw terminals

6ES7 921-3AA00-0AA0

6ES7 921-3AB00-0AA0

Front connector module (digital 4 x 8 I/O)

Voltage infeed via

- Spring terminals
- Screw terminals

6ES7 921-3AA20-0AA0

6ES7 921-3AB20-0AA0

Front connector module (1 x 8 outputs) for 2 ampere digital outputs

Voltage infeed via

- Spring terminals
- Screw terminals

6ES7 921-3AC00-0AA0

6ES7 921-3AD00-0AA0

Front connector module 20-pole (analog)

Voltage infeed via

- Spring terminals
- Screw terminals

6ES7 921-3AF00-0AA0

6ES7 921-3AG00-0AA0

Front connector module 40-pole (analog)

Voltage infeed via

- Spring terminals
- Screw terminals

6ES7 921-3AF20-0AA0

6ES7 921-3AG20-0AA0

B7: Subject to export regulations: AL: N and ECCN: EAR99H

SIMATIC S7-300

Connection methods

Fully modular connection

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Ordering data	Order No.
Connecting cables	
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	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)	

B7: Subject to export regulations: AL: N and ECCN: EAR99H

Ordering data	Order No.
Basic modules	
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

SIMATIC S7-300

Connection methods

Fully modular connection

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**Ordering data
Signal modules****Order No.****Connection module TP1 with LED**

for 1-wire initiators

Packaging unit (1 unit)

- Spring terminals
- Screw terminals

6ES7 924-0AA10-0BB0**6ES7 924-0AA10-0BA0****Connection module TP3 with LED**

for 3-wire initiators

Packaging unit (1 unit)

- Spring terminals
- Screw terminals

6ES7 924-0CA10-0BB0**6ES7 924-0CA10-0BA0****Connection module TPK with LED**

for 2 x 8 signals

Packaging unit (1 unit)

- Spring terminals
- Screw terminals

6ES7 924-1AA10-0BB0**6ES7 924-1AA10-0BA0****Connection module TP2 with LED**

for 2 A modules

for 2-wire initiators

Packaging unit (1 unit)

- Spring terminals
- Screw terminals

6ES7 924-0BB10-0BB0**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 modules****Order No.****Connection module TPRO for output signals**

for 2-wire connection

Packaging unit (1 unit)

- Spring terminals
- Screw terminals

6ES7 924-0BD10-0BB0**6ES7 924-0BD10-0BA0****Connection module TPRI for input signals**

for 2-wire connection

Packaging unit (1 unit)

- Spring terminals
- Screw terminals

6ES7 924-0BE10-0BB0**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 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 mm² 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

SIMATIC S7-300

Connection methods

Flexible connection

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Ordering Data	Order No.	Ordering Data	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 <u>Screw version</u> Packaging unit (1 unit) Length: • 2.5 m • 3.2 m • 5 m • Special lengths Packaging unit (5 units) Length: • 2.5 m • 3.2 m • 5.0 m <u>Crimp version</u> Packaging unit (1 unit) Length: • 2.5 m • 3.2 m • 5.0 m • Special lengths	6ES7 922-3BC50-0AB0 6ES7 922-3BD20-0AB0 6ES7 922-3BF00-0AB0 on request 6ES7 922-3BC50-5AB0 6ES7 922-3BD20-5AB0 6ES7 922-3BF00-5AB0 6ES7 922-3BC50-0AF0 6ES7 922-3BD20-0AF0 6ES7 922-3BF00-0AF0 on request	Core type H05V-K <u>Screw version</u> Packaging unit (1 unit) Length: • 2.5 m • 3.2 m • 5.0 m • Special lengths Packaging unit (5 units) Length: • 2.5 m • 3.2 m • 5.0 m <u>Crimp version</u> Packaging unit (1 unit) Length: • 2.5 m • 3.2 m • 5.0 m • Special lengths	6ES7 922-3BC50-0AC0 6ES7 922-3BD20-0AC0 6ES7 922-3BF00-0AC0 on request 6ES7 922-3BC50-5AC0 6ES7 922-3BD20-5AC0 6ES7 922-3BF00-5AC0 6ES7 922-3BC50-0AG0 6ES7 922-3BD20-0AG0 6ES7 922-3BF00-0AG0 on request
Core type UL/CSA-certified <u>Screw-type version</u> Packaging unit (1 unit) Length: • 3.2 m • 5.0 m	6ES7 922-3BD20-0UB0 6ES7 922-3BF00-0UB0	Core type UL/CSA-certified <u>Screw version</u> Packaging unit (1 unit) Length: • 3.2 m • 5.0 m	6ES7 922-3BD20-0UC0 6ES7 922-3BF00-0UC0

SIMATIC S7-300

Interface modules

IM 360/-361/-365 interface modules

Overview



- For connecting mounting racks in multi-tier SIMATIC S7-300 configurations
- IM 365: For design of central controller and max. 1 expansion unit.
Limited use of modules in the expansion unit (e.g. no CPs or FMs)
- IM 360/IM 361: For design of central controller and max. 3 expansion units.
No limitation in selection of modules in the expansion unit

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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	
Current consumption/ power loss			
Power loss, typ.	2 W	5 W	0.5 W
Hardware config.			
Number of interfaces per CPU, max.	1	3	1; 1 pair
Dimensions			
Dimensions			
• 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 B3	6ES7 998-8XC01-8YE0
SIMATIC Manual Collection update service for 1 year B3	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

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

SIMATIC S7-300

SIPLUS interface modules

SIPLUS IM 365 interface module

Overview



- SIPLUS IM 365: for configuring 1 central controller and no more than 1 expansion rack

Ordering Data

Order No.

SIPLUS IM 365 interface module

6AG1 365-0BA01-2AA0

(extended temperature range and medial exposure)

for expanding the S7-300 with max. 1 EU; 2 modules with permanent connecting cable (1 m)

Accessories

see IM 365, page 4/227

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 exposure (e.g. by chloric and sulphuric atmospheres).
Technical data	The technical data are identical with the technical data of the based on modules.

Overview



- Load current supplies for S7-300/ET 200M
- To convert the line voltage to the required operating voltage (24 V 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 $V_{in \text{ rated}}$	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	$2.3 \times V_{in \text{ rated}}$, 1.3 ms	154 V; 0.1 s	$2.3 \times V_{in \text{ rated}}$, 1.3 ms	$2.3 \times V_{in \text{ rated}}$, 1.3 ms	$2.3 \times V_{in \text{ rated}}$, 1.3 ms
Line buffering at $I_{out \text{ rated}}$	> 20 ms at $V_{in} = 93/187 \text{ V}$	> 10 ms at $V_{in \text{ rated}}$	> 20 ms at $V_{in} = 93/187 \text{ V}$	> 20 ms at $V_{in} = 93/187 \text{ V}$	> 20 ms at $V_{in} = 93/187 \text{ V}$
Rated line frequency; rated line-frequency range	50/60 Hz, 47 ... 63 Hz	-	50/60 Hz; 47 Hz ... 63 Hz	50/60 Hz, 47 Hz ... 63 Hz	50/60 Hz, 47 Hz ... 63 Hz
Rated current $I_{in \text{ rated}}$	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 ² s	< 5 A ² s	< 1.2 A ² s	< 1.8 A ² s (typ. 1.2 A ² s)	< 3.3 A ² s
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 $V_{out \text{ rated}}$	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})

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).

SIMATIC S7-300

Power supplies

Power supplies

Technical specifications (continued)

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⁾	
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	-	-	-	-	-
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 V_{in} > 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	-	-	-	-	-

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)

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⁾	
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)
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 ... 2.5 mm ²	Solid/finely-stranded per screw-type terminal for 0.5 ... 2.5 mm ²	Solid/finely-stranded per screw-type terminal for 0.5 ... 2.5 mm ²	Solid/finely-stranded per screw-type terminal for 0.5 ... 2.5 mm ²	Solid/finely-stranded per screw-type terminal for 0.5 ... 2.5 mm ²
• Output L+	2 screw-type terminals for 0.5 ... 2.5 mm ²	3 screw-type terminals for 0.5 ... 2.5 mm ²	3 screw-type terminals for 0.5 ... 2.5 mm ²	3 screw-type terminals for 0.5 ... 2.5 mm ²	4 screw-type terminals for 0.5 ... 2.5 mm ²
• Output M	2 screw-type terminals for 0.5 ... 2.5 mm ²	3 screw-type terminals for 0.5 ... 2.5 mm ²	3 screw-type terminals for 0.5 ... 2.5 mm ²	3 screw-type terminals for 0.5 ... 2.5 mm ²	4 screw-type terminals for 0.5 ... 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).

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

For fail-safe modules (spare part), 10 units

6ES7 392-2XX20-0AA0

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

For fail-safe modules (spare part), 10 units

6ES7 392-2XY20-0AA0

SIMATIC S7-300



4

SIMATIC S7-400



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5/89 FM 453 positioning module
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5/101 Accessories for FM 458-1 DP
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Brochures

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

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

SIMATIC S7-400

Introduction

S7-400/S7-400H/S7-400F/FH

Overview



S7-400H

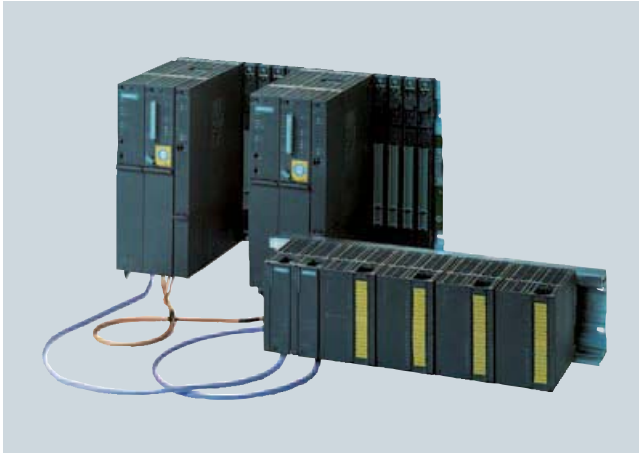


- The power PLC for the mid to high-end performance ranges.
- The solution for even the most demanding tasks.
- With a comprehensive range of modules and performance-graded CPUs for optimal adaptation to the automation task.
- Flexible in use through simple implementation of distributed structures; user-friendly connection methods.
- Optimal communication and networking options.
- User-friendly handling and uncomplicated design without a fan.
- Can be expanded without problems when the tasks increase.
- Multicomputing:
Simultaneous operation of several CPUs in one S7-400 central rack.
The overall performance power of an S7-400 is spread by means of multicomputing. For example, complex tasks can be broken down into technologies such open-loop control, computing or communication, and assigned to different CPUs. Each CPU can be assigned its own local I/O.
- Modularity:
The powerful backplane bus of the S7-400 and the communication interfaces that can be connected direct to the CPU enable high-performance operation of many communication lines. This makes it possible, for example, to have one communication line for HMI and programming tasks, one for high-performance and equidistant motion control components, and one "normal" I/O fieldbus. Additionally required connections to MES/ERP systems or the Internet can also be implemented.
- Engineering and diagnostics:
The S7-400 is configured and programmed extremely efficiently together with the SIMATIC Engineering Tools, particularly in the case of extensive automation solutions with a high engineering component. There are high-level languages such as SCL available for this purpose and graphical engineering tools for sequential controls, state diagrams, and technology-oriented diagrams.

- 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 *PROFISafe* 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 ... +60 °C
Relative humidity	5 ... 95 %, no condensation
Atmospheric pressure	860 ... 1080 hPa
Electromagnetic compatibility	EU Directive 89/336/EEG; • 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

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

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

SIMATIC S7-400

Central processing units

CPU 412

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 412-1XJ05-0AB0	6ES7 412-2XJ05-0AB0
Product status		
Hardware product status	1	
Firmware version	V5.0	V5.0
associated programming package	STEP7 V5.3 SP2 or higher with HW-update	STEP7 V5.3 SP2 or higher with HW-update
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.	0.6 A	1.1 A
from interface DC 5 V, max.	90 mA; At the DP interface	90 mA; At each DP interface
Current consumption/power loss		
Power loss, typ.	2.5 W	4 W
Backup battery		
• Buffer current, typ.	125 µA; (up to 40 °C)	125 µA; Valid up to 40°C
• Buffer current, max.	550 µA	550 µA; Dealt with in the module data manual with the secondary conditions and the factors of influence
Memory		
Type of storage		
RAM		
• integrated (for program)	144 Kibyte	256 Kibyte
• integrated (for data)	144 Kibyte	256 Kibyte
• expandable	No	No
Load memory		
• expandable FEPROM	Yes	Yes
• expandable FEPROM, max.	64 MByte	64 MByte
• integrated RAM, max.	512 Kibyte	512 Kibyte
• expandable RAM	Yes	Yes
• expandable RAM, max.	64 MByte	64 MByte

	6ES7 412-1XJ05-0AB0	6ES7 412-2XJ05-0AB0
Backup		
• present	Yes	Yes
• with battery	Yes	Yes
• without battery	No	No
CPU/blocks		
DB		
• Number, max.	1 500; Number range: 1 to 16,000	3 000; Number range: 1 to 16,000
• Size, max.	64 Kibyte	64 Kibyte
FB		
• Number, max.	750; Number range: 0 to 7999	1 500; Number range: 0 to 7999
• Size, max.	64 Kibyte	64 Kibyte
FC		
• Number, max.	750; Number range: 0 to 7,999	1 500; Number range: 0 to 7,999
• Size, max.	64 Kibyte	64 Kibyte
OB		
• Size, max.	64 Kibyte	64 Kibyte
Nesting depth		
• per priority class	24	24
• additional within an error OB	1	1
CPU/processing times		
for bit operations, min.	75 ns	75 ns
for word operations, min.	75 ns	75 ns
for fixed point arithmetic, min.	75 ns	75 ns
for floating point arithmetic, min.	225 ns	225 ns

Technical specifications (continued)

	6ES7 412-1XJ05-0AB0	6ES7 412-2XJ05-0AB0
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
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 times 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	Total working and load memory (with backup battery)
Flag		
• Number, max.	4 Kibyte	4 Kibyte
• Remanence available	Yes	Yes
• Number of clock memories	8; (in 1 memory byte)	8; (in 1 memory byte)
Address area		
I/O address area		
• Inputs	4 Kibyte	4 Kibyte
• Outputs	4 Kibyte	4 Kibyte
• of which, distributed		
- MPI/DP interface, inputs	2 Kibyte	2 Kibyte
- MPI/DP interface, outputs	2 Kibyte	2 Kibyte
- DP interface, inputs		4 Kibyte
- DP interface, outputs		4 Kibyte

	6ES7 412-1XJ05-0AB0	6ES7 412-2XJ05-0AB0
Process image		
• Inputs, adjustable	4 Kibyte	4 Kibyte
• Outputs, adjustable	4 Kibyte	4 Kibyte
• 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	31	31
Central devices, max.	1	1
Expansion devices, max.	21	21
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 Extended	10; CP 443-5 Extended
• 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	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	0	0
• Number of pluggable S5 modules (via adapter capsule in central device), max.	6	6

SIMATIC S7-400

Central processing units

CPU 412

Technical specifications (continued)

	6ES7 412-1XJ05-0AB0	6ES7 412-2XJ05-0AB0
Number of IO controllers		
• integrated	0	
• via CP	4; Via CP 443-1 EX 41 in PN mode; max. 4 in central controller	Via CP 443-1 EX 41 in PN mode; max. 4 in central controller
Number of operable FMs and CPs (recommended)		
• FM	Limited due to number of slots and number of connections	Limited due to number of slots and number of connections
• CP, point-to-point	Limited due to number of slots and number of connections	Limited due to number of slots and number of connections
• PROFIBUS and Ethernet CPs	14; Of which 10 CPs max. or IMs as DP master, 4 PN controller maximum	14; Of which 10 CP or IM max. as DP master and PN controller
Time		
Clock		
• Hardware clock (real-time clock)	Yes	Yes
• buffered and synchronizable	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
• on Ethernet via NTP	No; Via CP	No; Via CP
S7 message functions		
Number of login stations for message functions, max.	31; Max. 31 with alarm_S and alarm_D (OP's); max. 8 with alarm_8	31; Max. 31 with alarm_S and alarm_D (OP's); max. 8 with alarm_8 and alarm_P (e.g. WinCC)
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

	6ES7 412-1XJ05-0AB0	6ES7 412-2XJ05-0AB0
Test commissioning functions		
Status/control		
• Status/control variable	Yes	Yes
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
Communication functions		
PG/OP communication	Yes	Yes
Routing	Yes	Yes
Global data communication		
• supported	Yes	Yes
• Size of GD packets, max.	54 byte	54 byte
S7 basic communication		
• supported	Yes	Yes
• Useful data per job, max.	76 byte	76 byte
S7 communication		
• supported	Yes	Yes
• Useful data per job, max.	64 Kibyte	64 Kibyte
S5-compatible communication		
• supported	Yes; Via FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5	Yes; (via CP max. 10 and FC AG_SEND and FC AG_RECV)
• Useful data per job, max.	8 Kibyte	8 Kibyte
Standard communication (FMS)		
• supported	Yes; Via CP and loadable FB	Yes; Via CP and loadable FB
Web server		
• Web server	No; Via CP	No; Via CP
• ISO-on-TCP (RFC1006)	Via CP 443-1 Adv. and loadable FB	Via CP 443-1 Adv. and loadable FB
- Number of connections, max.	30	
- Data length, max.	1 452 byte	1452
Number of connections		
• overall	32	32

Technical specifications (continued)

	6ES7 412-1XJ05-0AB0	6ES7 412-2XJ05-0AB0
1st interface		
Physics	RS 485 / PROFIBUS	RS 485 / PROFIBUS
isolated	Yes	Yes
Functionality		
• MPI	Yes	Yes
• DP master	Yes	Yes
• DP slave	Yes	Yes
MPI		
• Number of connections	32	32
• 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; Max. 544 slots	32
• Address area		
- Inputs, max.	2 Kibyte	2 Kibyte
- Outputs, max.	2 Kibyte	2 Kibyte
• Useful data per DP slave		
- 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
• 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; Virtual slots	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 412-1XJ05-0AB0	6ES7 412-2XJ05-0AB0
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 Kibyte
- Outputs, max.		4 Kibyte
• Useful data per DP slave		
- Inputs, max.		244 byte
- Outputs, max.		244 byte
DP slave		
• Number of connections		16
• Services		
- Routing		Yes
- Programming		Yes
• GSD file		http://support.automation.siemens.com/WW/view/en/113652
• 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	1.5 ms; 0.5 ms without use of SFC 126, 127	1.5 ms; 0.5 ms without use of SFC 126, 127

SIMATIC S7-400

Central processing units

CPU 412

Technical specifications (continued)

	6ES7 412-1XJ05-0AB0	6ES7 412-2XJ05-0AB0
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		
Configuration software		
• STEP 7	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

	6ES7 412-1XJ05-0AB0	6ES7 412-2XJ05-0AB0
Nesting levels	7	7
User program protection/ password protection	Yes	Yes
Dimensions		
Required slots	1	1
Dimensions		
• Width	25 mm	25 mm
• Height	290 mm	290 mm
• Depth	219 mm	219 mm
Weights		
• Weight, approx.	720 g	720 g

SIMATIC S7-400

Central processing units

CPU 412

Ordering data	Order No.	Order No.
CPU 412-1 Main memory 288 KB, power supply 24 V DC, MPI/PROFIBUS DP master interface, slot for memory card, incl. slot number labels	6ES7 412-1XJ05-0AB0	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 B3 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 B3 6ES7 998-8XC01-8YE2 update service for 1 year Current "Manual Collection" DVD and the three subsequent updates Brochure "SIMATIC S7-400 automation system - Design and application" German 6ES7 498-8AA00-8AB0 English 6ES7 498-8AA00-8BB0
CPU 412-2 Main memory 512 KB, power supply 24 V DC, MPI/PROFIBUS DP master interface, slot for memory card, incl. slot number labels	6ES7 412-2XJ05-0AB0	
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 For connecting SIMATIC S7 and the PG through MPI; 5 m in length	6ES7 901-0BF00-0AA0	
Slot number plates 1 set (spare part)	6ES7 912-0AA00-0AA0	
Manual "SIMATIC S7-400 automation system" incl. instruction list German 6ES7 498-8AA05-8AA0 English 6ES7 498-8AA05-8BA0 French 6ES7 498-8AA05-8CA0 Spanish 6ES7 498-8AA05-8DA0 Italian 6ES7 498-8AA05-8EA0		
S7-400 instructions list German 6ES7 498-8AA05-8AN0 English 6ES7 498-8AA05-8BN0 French 6ES7 498-8AA05-8CN0 Spanish 6ES7 498-8AA05-8DN0 Italian 6ES7 498-8AA05-8EN0		
		RS 485 bus connector with 90° cable outlet Max. transfer 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. transfer 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. transfer rate 12 Mbit/s Without PG interface 6ES7 972-0BA51-0XA0 With PG interface 6ES7 972-0BB51-0XA0 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 order quantity 20 m 6XV1 830-0EH10

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

SIMATIC S7-400

Central processing units

CPU 414

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

5

Technical specifications

	6ES7 414-2XK05-0AB0	6ES7 414-3XM05-0AB0	6ES7 414-3EM05-0AB0
Product status			
Hardware product status			1
Firmware version	V5.0	V5.0	V5.0
associated programming package	STEP7 V5.3 SP2 or higher with HW-update	STEP7 V5.3 SP2 or higher with HW-update	STEP7 V5.4 SP1 or higher
Feeding of external buffer voltage to CPU	5 to 15 VDC	5 to 15 VDC	5 to 15 VDC
Current consumption			
from backplane bus DC 5 V, max.	1.1 A	1.3 A	1.4 A
from interface DC 5 V, max.	90 mA; At each DP interface	90 mA; At each DP interface	90 mA; At each DP interface
Current consumption/power loss			
Power loss, typ.	4 W	4.5 W	5.5 W
Backup battery			
• Buffer current, typ.	125 µA; Valid up to 40°C	125 µA; Valid up to 40°C	125 µA; Valid up to 40°C
• Buffer current, max.	550 µA	550 µA	550 µA
Memory			
Type of storage			
RAM			
• integrated (for program)	0.5 MByte	1.4 MByte	1.4 MByte
• integrated (for data)	0.5 MByte	1.4 MByte	1.4 MByte
• expandable	No	No	No
Load memory			
• expandable FEPRM	Yes	Yes	Yes
• expandable FEPRM, max.	64 MByte	64 MByte	64 MByte
• integrated RAM, max.	512 Kibyte	512 Kibyte	512 Kibyte
• expandable RAM	Yes	Yes	Yes
• expandable RAM, max.	64 MByte	64 MByte	64 MByte
Backup			
• present	Yes	Yes	Yes
• with battery	Yes	Yes	Yes; All data
• without battery	No	No	No
CPU/blocks			
DB			
• Number, max.	6 000; Number range: 1 to 16,000	6 000; Number range: 1 to 16,000	6 000; Number range: 1 to 16,000
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte

Technical specifications (continued)

	6ES7 414-2XK05-0AB0	6ES7 414-3XM05-0AB0	6ES7 414-3EM05-0AB0
FB			
• Number, max.	3 000; Number range: 0 to 7999	3 000; Number range: 0 to 7999	3 000; Number range: 0 to 7999
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte
FC			
• Number, max.	3 000; Number range: 0 to 7,999	3 000; Number range: 0 to 7999	3 000; Number range: 0 to 7999
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte
OB			
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte
Nesting depth			
• per priority class	24	24	24
• additional within an error OB	1	1	1
CPU/processing times			
for bit operations, min.	45 ns	45 ns	45 ns
for word operations, min.	45 ns	45 ns	45 ns
for fixed point arithmetic, min.	45 ns	45 ns	45 ns
for floating point arithmetic, min.	135 ns	135 ns	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 times retentive	No times 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)

SIMATIC S7-400

Central processing units

CPU 414

Technical specifications (continued)

	6ES7 414-2XK05-0AB0	6ES7 414-3XM05-0AB0	6ES7 414-3EM05-0AB0
Flag			
• Number, max.	8 Kibyte	8 Kibyte	8 Kibyte
• Remanence available	Yes	Yes	Yes
• Number of clock memories	8; (in 1 memory byte)	8; (in 1 memory byte)	8; (in 1 memory byte)
Address area			
I/O address area			
• Inputs	8 Kibyte	8 Kibyte	8 Kibyte
• Outputs	8 Kibyte	8 Kibyte	8 Kibyte
• of which, distributed			
- MPI/DPinterface, inputs	2 Kibyte	2 Kibyte	2 Kibyte
- MPI/DP interface, outputs	2 Kibyte	2 Kibyte	2 Kibyte
- DP interface, inputs	6 Kibyte	6 Kibyte	6 Kibyte
- DP interface, outputs	6 Kibyte	6 Kibyte	6 Kibyte
- PN interface, inputs			8 Kibyte
- PN interface, outputs			8 Kibyte
Process image			
• Inputs, adjustable	8 Kibyte	8 Kibyte	8 Kibyte
• Outputs, adjustable	8 Kibyte	8 Kibyte	8 Kibyte
• 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	31	31
Central devices, max.	1	1	1
Expansion devices, max.	21	21	21
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 463-2

Technical specifications (continued)

	6ES7 414-2XK05-0AB0	6ES7 414-3XM05-0AB0	6ES7 414-3EM05-0AB0
Number of DP masters			
• integrated	2	2	1
• via IM 467	4	4	4
• via CP	10; CP 443-5 Extended	10; CP 443-5 Extended	10; CP 443-5 Extended
• 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	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.; IM 467 cannot be used with CP 443-1 EX40 in PN IO mode
• via interface module	0	1	1; IF 964-DP
• Number of pluggable S5 modules (via adapter capsule in central device), max.	6	6	6
Number of IO controllers			
• integrated			1
• via CP	4; Via CP 443-1 EX 41 in PN mode; max. 4 in central controller	4; Via CP 443-1 EX 41 in PN mode; max. 4 in central controller	4; Via CP 443-1 EX 41 in PN mode; max. 4 in central controller
Number of operable FMs and CPs (recommended)			
• FM	Limited due to number of slots and number of connections	Limited due to number of slots and number of connections	Limited due to number of slots and number of connections
• CP, point-to-point	Limited due to number of slots and number of connections	Limited due to number of slots and number of connections	Limited due to number of slots and number of connections
• PROFIBUS and Ethernet CPs	14; Of which 10 CP or IM max. as DP master and PN controller	14; Of which 10 CP or IM max. as DP master and PN controller	14; Of which 10 CP/IM max. as DP master and PN controller
Time			
Clock			
• Hardware clock (real-time clock)	Yes	Yes	Yes
• buffered and synchronizable	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
• in AS, Master	Yes	Yes	Yes
• in AS, Slave	Yes	Yes	Yes
• on Ethernet via NTP			Yes; as client
• to IF 964 DP		Yes	Yes
S7 message functions			
Number of login stations for message functions, max.	31; Max. 31 with alarm_S and alarm_D (OP's); max. 8 with alarm_8 and alarm_P (e.g. WinCC)	31; Max. 31 with alarm_S and alarm_D (OP's); max. 8 with alarm_8 and alarm_P (e.g. WinCC)	31; Max. 31 with alarm_S and alarm_D (OP's); max. 8 with alarm_8 and alarm_P (e.g. WinCC)
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

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Central processing units

CPU 414

Technical specifications (continued)

	6ES7 414-2XK05-0AB0	6ES7 414-3XM05-0AB0	6ES7 414-3EM05-0AB0
Test commissioning functions			
Status/control			
• Status/control variable	Yes	Yes	Yes
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.	54 byte	54 byte	54 byte
S7 basic communication			
• supported	Yes	Yes	Yes
• Useful data per job, max.	76 byte	76 byte	76 byte
S7 communication			
• supported	Yes	Yes	Yes
• Useful data per job, max.	64 Kibyte	64 Kibyte	64 Kibyte
S5-compatible communication			
• supported	Yes; (via CP max. 10 and FC AG_SEND and FC AG_RECV)	Yes; (via CP max. 10 and FC AG_SEND and FC AG_RECV)	Yes; (via CP max. 10 and FC AG_SEND and FC AG_RECV)
• Useful data per job, max.	8 Kibyte	8 Kibyte	8 Kibyte
Standard communication (FMS)			
• supported	Yes; Via CP and loadable FB	Yes; Via CP and loadable FB	Yes; Via CP and loadable FB
Web server			
• Web server	No; Via CP	No; Via CP	Yes
Open IE communication			
• TCP/IP			Yes
- Number of connections, max.			32
- Data length, max.			32 Kibyte
• ISO-on-TCP (RFC1006)	Via CP 443-1 Adv. and loadable FB	Via CP 443-1 Adv. and loadable FB	Yes
- Number of connections, max.			32
- Data length, max.	1452	1452	32 Kibyte; 1452 bytes via CP 443-1 Adv.
• UDP			Yes
- Number of connections, max.			32
- Data length, max.			1 472 byte
Number of connections			
• overall	32	32	32
PROFINET CBA (at set setpoint communication load)			
• Number of remote interconnection partners			32
• Number of functions, master/slave			150
• Total of all master/slave connections			4 500

Technical specifications (continued)

	6ES7 414-2XK05-0AB0	6ES7 414-3XM05-0AB0	6ES7 414-3EM05-0AB0
PROFINET CBA (at set setpoint communication load) • Data length of all incoming connections master/slave, max. • Data length of all outgoing connections master/slave, max. • Number of device-internal and PROFIBUS interconnections • Data length of device-internal and PROFIBUS interconnections, max. • Data length per connection, max.			45 000 byte 45 000 byte 1 000 16 000 byte 2 000 byte
• Remote interconnections with acyclic transmission - Sampling frequency: sampling interval, min. - Number of incoming interconnections - Number of outgoing interconnections - Data length of all incoming interconnections, max. - Data length of all outgoing interconnections, max. - Data length per connection, max.			200 ms; Depending on preset communication load, number of interconnections and data length used 250 250 8 000 byte 8 000 byte 2 000 byte
• Remote interconnections with cyclic transmission - Transmission frequency: transmission interval, min. - Number of incoming interconnections - Number of outgoing interconnections - Data length of all incoming interconnections, max. - Data length of all outgoing interconnections, max. - Data length per connection, max.			1 ms; Depending on preset communication load, number of interconnections and data length used 300 300 4 800 byte 4 800 byte 250 byte
• HMI variables via PROFINET (acyclic) - Number of log-in stations for HMI variables (PN OPC/iMap) - HMI variable updating - Number of HMI variables - Data length of all HMI variables, max.			2x PN OPC / 1x iMap 500 ms 1 000 32 000 byte
• PROFIBUS proxy functionality - supported - Data length per connection, max.			Yes; 32 PROFIBUS slaves max. connectable 240 byte; Slave-dependent
1st interface			
Physics	RS 485 / PROFIBUS	RS 485 / PROFIBUS	RS 485 / PROFIBUS + MPI
isolated	Yes	Yes	Yes

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Central processing units

CPU 414

Technical specifications (continued)

	6ES7 414-2XK05-0AB0	6ES7 414-3XM05-0AB0	6ES7 414-3EM05-0AB0
Functionality			
• MPI	Yes	Yes	Yes
• DP master	Yes	Yes	Yes
• DP slave	Yes	Yes	Yes
MPI			
• Number of connections	32	32	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
- 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
- Global data communication	No	No	No
- 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 Kibyte	2 Kibyte	2 Kibyte
- Outputs, max.	2 Kibyte	2 Kibyte	2 Kibyte
• 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			
- PG/OP communication	Yes	Yes	Yes
- Routing	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
DP slave (continued)			
• Address area, max.	32	32	32; Virtual slots
• 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			
Physics	RS 485 / PROFIBUS	RS 485 / PROFIBUS	Ethernet
isolated	Yes	Yes	Yes

Technical specifications (continued)

	6ES7 414-2XK05-0AB0	6ES7 414-3XM05-0AB0	6ES7 414-3EM05-0AB0
Functionality			
• DP master	Yes	Yes	No
• DP slave	Yes	Yes	No
• PROFINET IO controller			Yes
• PROFINET CBA			Yes
• Point-to-point coupling			No
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.	96	96	
• Address area			
- Inputs, max.	6 Kibyte	6 Kibyte	
- Outputs, max.	6 Kibyte	6 Kibyte	
• Useful data per DP slave			
- Inputs, max.	244 byte	244 byte	
- Outputs, max.	244 byte	244 byte	
DP slave			
• Number of connections	16	16	
• Services			
- Routing	Yes	Yes	
- Programming	Yes	Yes	
• GSD file	http://support.automation.siemens.com/WW/view/en/113652	http://support.automation.siemens.com/WW/view/en/113652	
• 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	
PROFINET IO controller			
• Services			Yes
- PG/OP communication			Yes; Routing of PG functions
- Routing			Yes
- S7 communication			Yes
- open IE communication			Yes
• Transmission rate, min.			10 MBit/s
• Transmission speed, max.			100 MBit/s
• Total number of connectable IO Devices, max.			256
• Updating time			250 µs to 512 ms; minimum value dependent on preset communication share for PROFINET I/O, of number of I/O devices and number of configured user data

Technical specifications (continued)

	6ES7 414-2XK05-0AB0	6ES7 414-3XM05-0AB0	6ES7 414-3EM05-0AB0
DP slave (continued)			
• GSD file			http://support.automation.siemens.com/WW/view/en/113652
• Transmission rate, max.			12 MBit/s
• Transfer memory			
- Inputs			244 byte
- Outputs			244 byte
• Address range, 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	244 byte
equidistance	Yes	Yes	Yes
shortest clock pulse	1 ms; 0.5 ms without use of SFC 126, 127	1 ms; 0.5 ms without use of SFC 126, 127	1 ms; Without use of SFC 126 and 127 up to 0.5 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			
Configuration software			
• STEP 7	Yes	Yes	Yes
Programming language			
• STEP 7			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	7	7	7
User program protection/ password protection	Yes	Yes	Yes
Dimensions			
Required slots	1	2	2
Dimensions			
Dimensions			
• Width	25 mm	50 mm	50 mm
• Height	290 mm	290 mm	290 mm
• Depth	219 mm	219 mm	219 mm
Weights			
• Weight, approx.	720 g	880 g	900 g

SIMATIC S7-400

Central processing units

CPU 414

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Ordering data	Order No.		Order No.
CPU 414-2 Main memory 1 MB, power supply 24 V DC, MPI/PROFIBUS DP master interface, slot for memory card, incl. slot number labels	6ES7 414-2XK05-0AB0	Slot number plates 1 set (spare part)	6ES7 912-0AA00-0AA0
CPU 414-3 Main memory 2.8 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	6ES7 414-3XM05-0AB0	Manual "SIMATIC S7-400 automation system" incl. instruction list German English French Spanish Italian	6ES7 498-8AA05-8AA0 6ES7 498-8AA05-8BA0 6ES7 498-8AA05-8CA0 6ES7 498-8AA05-8DA0 6ES7 498-8AA05-8EA0
CPU 414-3 PN/DP Main memory 2.8 MB, power supply 24 V DC, MPI/PROFIBUS DP master interface, PROFINET interface, slot for memory card, module slot for 1 IF module, incl. slot number labels	6ES7 414-3EM05-0AB0	S7-400 instructions list German English French Spanish Italian	6ES7 498-8AA05-8AN0 6ES7 498-8AA05-8BN0 6ES7 498-8AA05-8CN0 6ES7 498-8AA05-8DN0 6ES7 498-8AA05-8EN0
Memory card RAM 64 KB 256 KB 1 MB 2 MB 4 MB 8 MB 16 MB 64 MB	6ES7 952-0AF00-0AA0 6ES7 952-1AH00-0AA0 6ES7 952-1AK00-0AA0 6ES7 952-1AL00-0AA0 6ES7 952-1AM00-0AA0 6ES7 952-1AP00-0AA0 6ES7 952-1AS00-0AA0 6ES7 952-1AY00-0AA0	Manual "Communication for SIMATIC S7-300/-400" German English French Spanish Italian	6ES7 398-8EA00-8AA0 6ES7 398-8EA00-8BA0 6ES7 398-8EA00-8CA0 6ES7 398-8EA00-8DA0 6ES7 398-8EA00-8EA0
FEPROM memory card 64 KB 256 KB 1 MB 2 MB 4 MB 8 MB 16 MB 32 MB 64 MB	6ES7 952-0KF00-0AA0 6ES7 952-0KH00-0AA0 6ES7 952-1KK00-0AA0 6ES7 952-1KL00-0AA0 6ES7 952-1KM00-0AA0 6ES7 952-1KP00-0AA0 6ES7 952-1KS00-0AA0 6ES7 952-1KT00-0AA0 6ES7 952-1KY00-0AA0	SIMATIC Manual Collection B3 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	6ES7 998-8XC01-8YE0
MPI cable For connecting SIMATIC S7 and the PG through MPI; 5 m in length	6ES7 901-0BF00-0AA0	SIMATIC Manual Collection update service for 1 year B3 Current "Manual Collection" DVD and the three subsequent updates	6ES7 998-8XC01-8YE2
IF 964-DP interface module For connecting an additional PROFIBUS subnet; for CPU 414-3, CPU 414-3 PN/DP, CPU 416-3, CPU 416-3 PN/DP, CPU 417-4	6ES7 964-2AA04-0AB0	Brochure "SIMATIC S7-400 automation system - Design and application" German English	6ES7 498-8AA00-8AB0 6ES7 498-8AA00-8BB0

B3: Subject to export regulations; AL: N and ECCN: 5D992B1

SIMATIC S7-400

Central processing units

CPU 414

Ordering data	Order No.		Order No.
PROFIBUS bus components		PROFINET bus components	
RS 485 bus connector with 90° cable outlet Max. transfer rate 12 Mbit/s Without PG interface With PG interface	 6ES7 972-0BA12-0XA0 6ES7 972-0BB12-0XA0	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
RS 485 bus connector with angled cable outlet Max. transfer rate 12 Mbit/s Without PG interface With PG interface	 6ES7 972-0BA41-0XA0 6ES7 972-0BB41-0XA0	FO Standard Cable GP (50/125) Standard cable, splittable, UL approval, sold by the meter	6XV1 873-2A
RS 485 bus connector with 90° cable outlet for FastConnect system Max. transfer rate 12 Mbit/s Without PG interface With PG interface	 6ES7 972-0BA51-0XA0 6ES7 972-0BB51-0XA0	SCALANCE X204-2 Industrial Ethernet Switch 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	6GK5 204-2BB10-2AA3
RS 485 bus connector with axial cable outlet For SIMATIC OP, for connection to PPI, MPI, PROFIBUS	 6GK1 500-0EA02	IE FC RJ45 plugs RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables	
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 order quantity 20 m	 6XV1 830-0EH10	IE FC RJ45 plug 180 180° cable outlet 1 unit 10 units 50 units	 6GK1 901-1BB10-2AA0 6GK1 901-1BB10-2AB0 6GK1 901-1BB10-2AE0
RS 485 repeater for PROFIBUS Data transfer rate up to 12 Mbit/s; 24 V DC; IP20 housing	 6ES7 972-0AA01-0XA0	PROFIBUS/PROFINET bus components For establishing MPI/PROFIBUS/PROFINET communication	see Catalogs IK PI, CA 01

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SIMATIC S7-400

Central processing units

CPU 416

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

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Technical specifications

	6ES7 416-2XN05-0AB0	6ES7 416-3XR05-0AB0	6ES7 416-3ER05-0AB0
Product status			
Firmware version	V5.0	V5.0	V5.0
associated programming package	STEP7 V5.3 SP2 or higher with HW-update	STEP7 V5.3 SP2 or higher with HW-update	STEP7 V5.4 SP1 or higher
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.	1.1 A	1.3 A	1.4 A
from interface DC 5 V, max.	90 mA; At each DP interface	90 mA; At each DP interface	90 mA; At each DP interface
Current consumption/power loss			
Power loss, typ.	4 W	4.5 W	5.5 W
Backup battery			
• Buffer current, typ.	125 µA; Valid up to 40°C	125 µA; Valid up to 40°C	125 µA; Valid up to 40°C
• Buffer current, max.	550 µA	550 µA	550 µA
Memory			
Type of storage			
RAM			
• integrated (for program)	2.8 MByte	5.6 MByte	5.6 MByte
• integrated (for data)	2.8 MByte	5.6 MByte	5.6 MByte
• expandable	No	No	No
Load memory			
• expandable FEPRM	Yes	Yes	Yes; with Memory Card (FLASH)
• expandable FEPRM, max.	64 MByte	64 MByte	64 MByte
• integrated RAM, max.	1 MByte	1 MByte	1 MByte
• expandable RAM	Yes	Yes	Yes; With Memory Card (RAM)
• expandable RAM, max.	64 MByte	64 MByte	64 MByte
Backup			
• present	Yes	Yes	Yes
• with battery	Yes	Yes	Yes
• without battery	No	No	No
CPU/blocks			
DB			
• Number, max.	10 000; Number range: 1 to 16,000	10 000; Number range: 1 to 16,000	10 000; Number range: 1 to 16,000
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte

Technical specifications (continued)

	6ES7 416-2XN05-0AB0	6ES7 416-3XR05-0AB0	6ES7 416-3ER05-0AB0
FB			
• Number, max.	5 000; Number range: 0 to 7999	5 000; Number range: 0 to 7999	5 000; Number range: 0 to 7999
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte
FC			
• Number, max.	5 000; Number range: 0 to 7999	5 000; Number range: 0 to 7999	5 000; Number range: 0 to 7,999
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte
OB			
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte
Nesting depth			
• per priority class	24	24	24
• additional within an error OB	2	2	2
CPU/processing times			
for bit operations, min.	30 ns	30 ns	30 ns
for word operations, min.	30 ns	30 ns	30 ns
for fixed point arithmetic, min.	30 ns	30 ns	30 ns
for floating point arithmetic, min.	90 ns	90 ns	90 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 times retentive	No times retentive	No times 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)

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Central processing units

CPU 416

Technical specifications (continued)

	6ES7 416-2XN05-0AB0	6ES7 416-3XR05-0AB0	6ES7 416-3ER05-0AB0
Flag			
• Number, max.	16 Kibyte	16 Kibyte	16 Kibyte; Size of bit memory address area
• Remanence available	Yes	Yes	Yes
• Number of clock memories	8; (in 1 memory byte)	8; (in 1 memory byte)	8; (in 1 memory byte)
Address area			
I/O address area			
• Inputs	16 Kibyte	16 Kibyte	16 Kibyte
• Outputs	16 Kibyte	16 Kibyte	16 Kibyte
• of which, distributed			
- MPI/DP interface, inputs	2 Kibyte	2 Kibyte	2 Kibyte
- MPI/DP interface, outputs	2 Kibyte	2 Kibyte	2 Kibyte
- DP interface, inputs	8 Kibyte	8 Kibyte	8 Kibyte
- DP interface, outputs	8 Kibyte	8 Kibyte	8 Kibyte
- PN interface, inputs			8 Kibyte
- PN interface, outputs			8 Kibyte
Process image			
• Inputs, adjustable	16 Kibyte	16 Kibyte	16 Kibyte
• Outputs, adjustable	16 Kibyte	16 Kibyte	16 Kibyte
• 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	63	63
Central devices, max.	1	1	1
Expansion devices, max.	21	21	21
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 463-2

Technical specifications (continued)

	6ES7 416-2XN05-0AB0	6ES7 416-3XR05-0AB0	6ES7 416-3ER05-0AB0
Number of DP masters			
• integrated	2	2	1
• via IM 467	4	4	4
• via CP	10; CP 443-5 Extended	10; CP 443-5 Extended	10; CP 443-5 Extended
• 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	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.; IM 467 cannot be used with CP 443-1 EX40 in PN IO mode
• via interface module	0	1	1; IF 964-DP
• Number of pluggable S5 modules (via adapter capsule in central device), max.	6	6	6
Number of IO controllers			
• integrated			1
• via CP	4; Via CP 443-1 EX 41 in PN mode; max. 4 in central controller	4; Via CP 443-1 EX 41 in PN mode; max. 4 in central controller	4; Via CP 443-1 EX 41 in PN mode; max. 4 in central controller
Number of operable FMs and CPs (recommended)			
• FM	Limited due to number of slots and number of connections	Limited due to number of slots and number of connections	Limited due to number of slots and number of connections
• CP, point-to-point	Limited due to number of slots and number of connections	Limited due to number of slots and number of connections	Limited due to number of slots and number of connections
• PROFIBUS and Ethernet CPs	14; Of which 10 CP or IM max. as DP master and PN controller	14; Of which 10 CP or IM max. as DP master and PN controller	14; Of which 10 CP/IM max. as DP master and PN controller
Time			
Clock			
• Hardware clock (real-time clock)	Yes	Yes	Yes
• buffered and synchronizable	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
• in AS, Master	Yes	Yes	Yes
• in AS, Slave	Yes	Yes	Yes
• on Ethernet via NTP	Via CP	Via CP	Yes; as client
• to IF 964 DP		Yes	Yes
S7 message functions			
Number of login stations for message functions, max.	63; Max. 63 with ALARM_S and ALARM_D (OPs); max. 12 with ALARM_8 and ALARM_P (e.g. WinCC)	63; Max. 63 with ALARM_S and ALARM_D (OPs); max. 12 with ALARM_8 and ALARM_P (e.g. WinCC)	63; Max. 63 with ALARM_S and ALARM_D (OPs); max. 12 with ALARM_8 and ALARM_P (e.g. WinCC)
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

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Central processing units

CPU 416

Technical specifications (continued)

	6ES7 416-2XN05-0AB0	6ES7 416-3XR05-0AB0	6ES7 416-3ER05-0AB0
Test commissioning functions			
Status/control			
• Status/control variable	Yes	Yes	Yes
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.	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	Yes
Global data communication			
• supported	Yes	Yes	Yes
• Size of GD packets, max.	54 byte	54 byte	54 byte
S7 basic communication			
• supported	Yes	Yes	Yes
• Useful data per job, max.	76 byte	76 byte	76 byte
S7 communication			
• supported	Yes	Yes	Yes
• Useful data per job, max.	64 Kibyte	64 Kibyte	64 Kibyte
S5-compatible communication			
• supported	Yes; (via CP max. 10 and FC AG_SEND and FC AG_RECV)	Yes; (via CP max. 10 and FC AG_SEND and FC AG_RECV)	Yes; (via CP max. 10 and FC AG_SEND and FC AG_RECV)
• Useful data per job, max.	8 Kibyte	8 Kibyte	8 Kibyte
Standard communication (FMS)			
• supported	Yes; Via CP and loadable FB	Yes; Via CP and loadable FB	Yes; Via CP and loadable FB
• Web server	No; Via CP	No; Via CP	Yes; Read-only function
Open IE communication			
• TCP/IP			Yes
- Number of connections, max.			64
- Data length, max.			32 Kibyte
• ISO-on-TCP (RFC1006)	Via CP 443-1 Adv. and loadable FB	Via CP 443-1 Adv. and loadable FB	Yes
- Number of connections, max.			64
- Data length, max.	1452	1452	32 Kibyte; 1452 bytes via CP 443-1 Adv.
• UDP			Yes
- Number of connections, max.			64
- Data length, max.			1 472 byte
Number of connections			
• overall	64	64	64

Technical specifications (continued)

	6ES7 416-2XN05-0AB0	6ES7 416-3XR05-0AB0	6ES7 416-3ER05-0AB0
PROFINET CBA (at set setpoint communication load) • Number of remote interconnection partners • Number of functions, master/slave • Total of all master/slave connections • Data length of all incoming connections master/slave, max. • Data length of all outgoing connections master/slave, max. • Number of device-internal and PROFIBUS interconnections • Data length of device-internal and PROFIBUS interconnections, max. • Data length per connection, max.			32 150 6 000 65 000 byte 65 000 byte 1 000 16 000 byte 2 000 byte
• Remote interconnections with acyclic transmission - Sampling frequency: sampling interval, min. - Number of incoming interconnections - Number of outgoing interconnections - Data length of all incoming interconnections, max. - Data length of all outgoing interconnections, max. - Data length per connection, max.			200 ms; Depending on preset communication load, number of interconnections and data length used 500 500 16 000 byte 16 000 byte 2 000 byte
• Remote interconnections with cyclic transmission - Transmission frequency: transmission interval, min. - Number of incoming interconnections - Number of outgoing interconnections - Data length of all incoming interconnections, max. - Data length of all outgoing interconnections, max. - Data length per connection, max.			1 ms; Depending on preset communication load, number of interconnections and data length used 300 300 4 800 byte 4 800 byte 250 byte
• HMI variables via PROFINET (acyclic) - Number of log-in stations for HMI variables (PN OPC/iMap) - HMI variable updating - Number of HMI variables - Data length of all HMI variables, max.			2x PN OPC/1x iMap 500 ms 1 500 48 000 byte

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Central processing units

CPU 416

Technical specifications (continued)

	6ES7 416-2XN05-0AB0	6ES7 416-3XR05-0AB0	6ES7 416-3ER05-0AB0
- PROFIBUS proxy functionality - supported - Data length per connection, max.			Yes; 32 PROFIBUS slaves max. connectable 240 byte; Slave-dependent
1st interface			
Physics	RS 485 / PROFIBUS	RS 485 / PROFIBUS	RS 485 / PROFIBUS + MPI
isolated	Yes	Yes	Yes
Functionality			
- MPI - DP master - DP slave	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes
MPI			
- Number of connections - Services - PG/OP communication - Routing - Global data communication - S7 basic communication - S7 communication - Transmission speeds, max.	44 Yes Yes Yes Yes Yes 12 MBit/s	44 Yes Yes Yes Yes Yes 12 MBit/s	44 Yes Yes Yes Yes Yes 12 MBit/s
DP master			
- Number of connections, max. - Services - PG/OP communication - Routing - Global data communication - S7 basic communication - S7 communication - equidistance support - Activation/deactivation of DP slaves - direct data exchange (cross traffic) - Transmission speeds, max. - Number of DP slaves, max. - Address area - Inputs, max. - Outputs, max. - Useful data per DP slave - Inputs, max. - Outputs, max.	32 Yes Yes No Yes Yes Yes Yes 12 MBit/s 32 2 Kibyte 2 Kibyte 244 byte 244 byte	32 Yes Yes No Yes Yes Yes Yes 12 MBit/s 32 2 Kibyte 2 Kibyte 244 byte 244 byte	32; if a diagnostic repeater is used on the line, the number of connection resources on the line is reduced by 1 Yes Yes No Yes Yes Yes Yes 12 MBit/s 32 2 Kibyte 2 Kibyte 244 byte 244 byte
DP slave			
- Number of connections - Services - PG/OP communication - Routing - Transmission speeds, max. - Transfer memory - Inputs - Outputs	32 Yes Yes 12 MBit/s 244 byte 244 byte	32 Yes Yes 12 MBit/s 244 byte 244 byte	32 Yes; with interface active Yes; with interface active 12 MBit/s 244 byte 244 byte

Technical specifications (continued)

	6ES7 416-2XN05-0AB0	6ES7 416-3XR05-0AB0	6ES7 416-3ER05-0AB0
DP slave (continued)			
• Address area, max.	32	32	32; Virtual slots
• 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			
Physics	RS 485 / PROFIBUS	RS 485 / PROFIBUS	Ethernet
isolated	Yes	Yes	Yes
Functionality			
• DP master	Yes	Yes	No
• DP slave	Yes	Yes	No
• PROFINET IO controller			Yes
• PROFINET CBA			Yes
• Point-to-point coupling			No
DP master			
• Number of connections, max.	32	32	
• 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.	125	125	
• Address area			
- Inputs, max.	8 Kibyte	8 Kibyte	
- Outputs, max.	8 Kibyte	8 Kibyte	
• Useful data per DP slave			
- Inputs, max.	244 byte	244 byte	
- Outputs, max.	244 byte	244 byte	
DP slave			
• Number of connections	32	32	
• Services			
- Routing	Yes	Yes	
- Programming	Yes	Yes	
• GSD file	http://support.automation.siemens.com/WW/view/en/113652	http://support.automation.siemens.com/WW/view/en/113652	
• 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	
PROFINET IO-Controller			
• Services			
- PG/OP communication			Yes
- Routing			Yes; Routing of PG functions
- S7 communication			Yes
- open IE communication			Yes

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Central processing units

CPU 416

Technical specifications (continued)

	6ES7 416-2XN05-0AB0	6ES7 416-3XR05-0AB0	6ES7 416-3ER05-0AB0
PROFINET IO-Controller (cont.)			
• Transmission rate, min. • Transmission speed, max. • Total number of connectable IO Devices, max. • Updating time			10 MBit/s 100 MBit/s 256 250 µs to 512 ms; minimum value dependent on preset communication share for PROFINET I/O, of number of I/O devices and number of configured user data
• Address area - Inputs, max. - Outputs, max. - Useful data consistency, max.			8 Kibyte 8 Kibyte 255 byte; incl. net data accompaniers
PROFINET CBA			
• Acyclic transmission • cyclic transmission			Yes Yes
3rd interface			
Type of interfaces		Pluggable interface module (IF), technical specifications as for 2nd interface	Pluggable interface module (IF), technical specifications as for 2nd interface
pluggable interface module		IF 964-DP (Order No.: 6ES7 964-2AA04-0AB0)	IF 964-DP (Order No.: 6ES7 964-2AA04-0AB0)
Physics			RS 485 / PROFIBUS
isolated			Yes
power supply to interface (15 to 30 V DC), max.			150 mA
Number of connection resources			32
Functionality			
• MPI • DP master • DP slave			No Yes Yes
DP master			
• Number of connections, max. • Services - PG/OP communication - Routing - Global data communication - S7 basic communication - S7 communication - Equidistance support - SYNC/FREEZE - Activation/deactivation of DP slaves - Direct data exchange • Transmission rate, max. • Number of DP slaves, max. • Address area - Inputs, max. - Outputs, max. • Useful data per DP slave - Useful data per DP slave, max. - Inputs, max. - Outputs, max.			32 Yes Yes No Yes Yes Yes Yes Yes Yes Yes 12 MBit/s 125 8 Kibyte 8 Kibyte 244 byte 244 byte 244 byte

Technical specifications (continued)

	6ES7 416-2XN05-0AB0	6ES7 416-3XR05-0AB0	6ES7 416-3ER05-0AB0
- Useful data per DP slave (cont.) - Slots, max. - per slot, max.			244 128 byte
DP slave			
- Number of connections - Services - Routing - Status/control - GSD file			32 Yes; When interface active Yes; When interface active http://support.automation.siemens.com/WW/view/en/113652
- Transmission rate, max. - Transfer memory - Inputs - Outputs - Address range, max. - Useful data per address area, max. - Useful data per address area, of which consistent, max.			12 MBit/s 244 byte 244 byte 32 32 byte 32 byte
Isochronous mode			
Useful data per isochronous slave, max.	244 byte	244 byte	244 byte
equidistance	Yes	Yes	Yes
shortest clock pulse	1 ms; 0.5 ms without use of SFC 126, 127	1 ms; 0.5 ms without use of SFC 126, 127	1 ms; Without use of SFC 126 and 127 up to 0.5 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			
Configuration software			
STEP 7	Yes	Yes	Yes
Programming language			
- STEP 7 - LAD - FUP - AWL - SCL - CFC - GRAPH - HiGraph	 Yes Yes Yes Yes Yes Yes Yes Yes	 Yes Yes Yes Yes Yes Yes Yes Yes	 Yes Yes Yes Yes Yes Yes Yes Yes
Nesting levels	7	7	7
User program protection/password protection	Yes	Yes	Yes
Dimensions			
Required slots	1	2	2
Dimensions			
Dimensions			
- Width - Height - Depth	25 mm 290 mm 219 mm	50 mm 290 mm 219 mm	50 mm 290 mm 219 mm
Weights			
Weight, approx.	720 g	880 g	900 g

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Central processing units

CPU 416

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Ordering data	Order No.		Order No.
CPU 416-2 Main memory 5.6 MB, power supply 24 V DC, MPI/PROFIBUS DP master interface, PROFIBUS DP master interface, slot for memory card, incl. slot number labels	6ES7 416-2XN05-0AB0	Slot number plates 1 set (spare part)	6ES7 912-0AA00-0AA0
CPU 416-3 Main memory 11.2 MB, power supply 24 V DC, MPI/PROFIBUS DP master interface, PROFIBUS DP master interface, module slot for 1 IF module, slot for memory card, incl. slot number labels	6ES7 416-3XR05-0AB0	Manual "SIMATIC S7-400 automation system" incl. instruction list German English French Spanish Italian	6ES7 498-8AA05-8AA0 6ES7 498-8AA05-8BA0 6ES7 498-8AA05-8CA0 6ES7 498-8AA05-8DA0 6ES7 498-8AA05-8EA0
CPU 416-3 PN/DP 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	6ES7 416-3ER05-0AB0	S7-400 instructions list German English French Spanish Italian	6ES7 498-8AA05-8AN0 6ES7 498-8AA05-8BN0 6ES7 498-8AA05-8CN0 6ES7 498-8AA05-8DN0 6ES7 498-8AA05-8EN0
Memory card RAM 64 KB 256 KB 1 MB 2 MB 4 MB 8 MB 16 MB 64 MB	6ES7 952-0AF00-0AA0 6ES7 952-1AH00-0AA0 6ES7 952-1AK00-0AA0 6ES7 952-1AL00-0AA0 6ES7 952-1AM00-0AA0 6ES7 952-1AP00-0AA0 6ES7 952-1AS00-0AA0 6ES7 952-1AY00-0AA0	Manual "Communication for SIMATIC S7-300/-400" German English French Spanish Italian	6ES7 398-8EA00-8AA0 6ES7 398-8EA00-8BA0 6ES7 398-8EA00-8CA0 6ES7 398-8EA00-8DA0 6ES7 398-8EA00-8EA0
FEPROM memory card 64 KB 256 KB 1 MB 2 MB 4 MB 8 MB 16 MB 32 MB 64 MB	6ES7 952-0KF00-0AA0 6ES7 952-0KH00-0AA0 6ES7 952-1KK00-0AA0 6ES7 952-1KL00-0AA0 6ES7 952-1KM00-0AA0 6ES7 952-1KP00-0AA0 6ES7 952-1KS00-0AA0 6ES7 952-1KT00-0AA0 6ES7 952-1KY00-0AA0	SIMATIC Manual Collection B3 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	6ES7 998-8XC01-8YE0
MPI cable For connecting SIMATIC S7 and the PG through MPI; 5 m in length	6ES7 901-0BF00-0AA0	SIMATIC Manual Collection update service for 1 year B3 Current "Manual Collection" DVD and the three subsequent updates	6ES7 998-8XC01-8YE2
IF 964-DP interface module For connecting an additional PROFIBUS subnet; for CPU 414-3, CPU 414-3 PN/DP, CPU 416-3, CPU 416-3 PN/DP, CPU 417-4	6ES7 964-2AA04-0AB0	Brochure "SIMATIC S7-400 automation system - Design and application" German English	6ES7 498-8AA00-8AB0 6ES7 498-8AA00-8BB0
		PROFIBUS bus components	see CPU 414, page 5/21
		PROFINET bus components	see CPU 414, page 5/21

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

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

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Technical specifications

6ES7 417-4XT05-0AB0	
Product status	
Firmware version	V5.0
associated programming package	STEP7 V5.3 SP2 or higher with HW-update
Feeding of external buffer voltage to CPU	5 to 15 V DC
Current consumption	
from backplane bus DC 5 V, max.	1.8 A
Current consumption/power loss	
Power loss, max.	6 W
Backup battery	
• Buffer current, typ.	225 µA; Valid up to 40°C
• Buffer current, max.	750 µA
Memory	
Type of storage	
RAM	
• integrated (for program)	15 MByte
• integrated (for data)	15 MByte
• expandable	No
Load memory	
• expandable FEPROM	Yes
• expandable FEPROM, max.	64 MByte
• integrated RAM, max.	1 MByte
• expandable RAM	Yes
• expandable RAM, max.	64 MByte
Backup	
• present	Yes
• with battery	Yes
• without battery	No
CPU/blocks	
DB	
• Number, max.	16 000; Number range: 1 to 16,000
• Size, max.	64 Kibyte

6ES7 417-4XT05-0AB0	
FB	
• Number, max.	8 000; Number range: 0 to 7999
• Size, max.	64 Kibyte
FC	
• Number, max.	8 000; Number range: 0 to 7,999
• Size, max.	64 Kibyte
OB	
• Size, max.	64 Kibyte
Nesting depth	
• per priority class	24
• additional within an error OB	2
CPU/processing times	
for bit operations, min.	18 ns
for word operations, min.	18 ns
for fixed point arithmetic, min.	18 ns
for floating point arithmetic, min.	54 ns
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
IEC counter	
• present	Yes
• Type	SFB

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Technical specifications (continued)

6ES7 417-4XT05-0AB0	
S7 times	
• Number	2 048
• Remanence	
- adjustable	Yes
- lower limit	0
- upper limit	2 047
- preset	No times 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 Kibyte
• Remanence available	Yes
• Number of clock memories	8; (in 1 memory byte)
Address area	
I/O address area	
• Inputs	16 Kibyte
• Outputs	16 Kibyte
• of which, distributed	
- MPI/DPinterface, inputs	2 Kibyte
- MPI/DP interface, outputs	2 Kibyte
- DP interface, inputs	8 Kibyte
- DP interface, outputs	8 Kibyte
Process image	
• Inputs, adjustable	16 Kibyte
• Outputs, adjustable	16 Kibyte
• Inputs, preset	1 024 byte
• Outputs, preset	1 024 byte
• consistent data, max.	244 byte
• Access to consistent data in process image	Yes
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

6ES7 417-4XT05-0AB0	
Hardware config.	
connectable OPs	63
Central devices, max.	1
Expansion devices, max.	21
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 Extended
• 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
• Number of pluggable S5 modules (via adapter capsule in central device), max.	6
Number of IO controllers	
• via CP	4; Via CP 443-1 EX 41 in PN mode; max. 4 in central controller
Number of operable FMs and CPs (recommended)	
• FM	Limited due to number of slots and number of connections
• CP, point-to-point	Limited due to number of slots and number of connections
• PROFIBUS and Ethernet CPs	14; Of which 10 CP or IM max. as DP master and PN controller
Time	
Clock	
• Hardware clock (real-time clock)	Yes
• buffered and synchronizable	Yes
• Resolution	1 ms
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
• on Ethernet via NTP	Via CP
• to IF 964 DP	Yes

Technical specifications (continued)

6ES7 417-4XT05-0AB0	
S7 message functions	
Number of login stations for message functions, max.	63; Max. 63 with ALARM_S and ALARM_D (OPs); max. 16 with ALARM_8 and ALARM_P (e.g. WinCC)
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
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.	54 byte
S7 basic communication	
• supported	Yes
• Useful data per job, max.	76 byte
S7 communication	
• supported	Yes
• Useful data per job, max.	64 Kibyte
S5-compatible communication	
• supported	Yes; (via CP max. 10 and FC AG_SEND and FC AG_RECV)
• Useful data per job, max.	8 Kibyte
Standard communication (FMS)	
• supported	Yes; Via CP and loadable FB
• Web server	No; Via CP
• ISO-on-TCP (RFC1006) - Data length, max.	Via CP 443-1 Adv. and loadable FB 1452
Number of connections	
• overall	64

6ES7 417-4XT05-0AB0	
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
• Services	
- PG/OP communication	Yes
- Routing	Yes
- Global data communication	No
- 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 Kibyte
- Outputs, max.	2 Kibyte
• Useful data per DP slave	
- Inputs, max.	244 byte
- Outputs, max.	244 byte
DP slave	
• Number of connections	32
• Services	
- PG/OP communication	Yes
- Routing	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

SIMATIC S7-400

Central processing units

CPU 417

Technical specifications (continued)

6ES7 417-4XT05-0AB0	
2nd interface	
Physics	RS 485 / PROFIBUS
isolated	Yes
Functionality	
• DP master	Yes
• DP slave	Yes
DP master	
• Number of connections, max.	32
• 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 Kibyte
- Outputs, max.	8 Kibyte
• Useful data per DP slave	
- Inputs, max.	244 byte
- Outputs, max.	244 byte
DP slave	
• Number of connections	32
• Services	
- Routing	Yes
- Programming	Yes
• GSD file	http://support.automation.siemens.com/WW/view/en/113652
• 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

6ES7 417-4XT05-0AB0	
3rd interface	
Type of interfaces	Pluggable interface module (IF), technical specifications as for 2nd interface
pluggable interface module	IF 964-DP (Order No.: 6ES7 964-2AA04-0AB0)
4th interface	
Type of interface	Pluggable interface module (IF), technical specifications as for 2nd interface
pluggable interface modules	IF 964-DP (Order No.: 6ES7 964-2AA04-0AB0)
Isochronous mode	
Useful data per isochronous 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	
Configuration software	
• STEP 7	Yes
Programming language	
• LAD	Yes
• FUP	Yes
• AWL	Yes
• SCL	Yes
• CFC	Yes
• GRAPH	Yes
• HiGraph	Yes
Nesting levels	7
User program protection/password protection	Yes
Dimensions	
Required slots	2
Dimensions	
Dimensions	
• Width	50 mm
• Height	290 mm
• Depth	219 mm
Weights	
• Weight, approx.	920 g

SIMATIC S7-400

Central processing units

CPU 417

Ordering data	Order No.	Order No.
CPU 417-4 Main memory 30 MB, power supply 24 V DC, MPI/PROFIBUS DP master interface, PROFIBUS DP master interface, module slots for max. 2 additional IF modules, slot for memory card, incl. slot number labels	6ES7 417-4XT05-0AB0	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
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		SIMATIC Manual Collection B3 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
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		SIMATIC Manual Collection update service for 1 year B3 6ES7 998-8XC01-8YE2 Current "Manual Collection" DVD and the three subsequent updates
MPI cable For connecting SIMATIC S7 and the PG through MPI; 5 m in length	6ES7 901-0BF00-0AA0	Brochure "SIMATIC S7-400 automation system - Design and application" German 6ES7 498-8AA00-8AB0 English 6ES7 498-8AA00-8BB0
IF 964-DP interface module 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	6ES7 964-2AA04-0AB0	RS 485 bus connector with 90° cable outlet Max. transfer rate 12 Mbit/s Without PG interface 6ES7 972-0BA12-0XA0 With PG interface 6ES7 972-0BB12-0XA0
Slot number plates 1 set (spare part)	6ES7 912-0AA00-0AA0	RS 485 bus connector with angled cable outlet Max. transfer rate 12 Mbit/s Without PG interface 6ES7 972-0BA41-0XA0 With PG interface 6ES7 972-0BB41-0XA0
Manual "SIMATIC S7-400 automation system" incl. instruction list German 6ES7 498-8AA05-8AA0 English 6ES7 498-8AA05-8BA0 French 6ES7 498-8AA05-8CA0 Spanish 6ES7 498-8AA05-8DA0 Italian 6ES7 498-8AA05-8EA0		RS 485 bus connector with 90° cable outlet for FastConnect system Max. transfer rate 12 Mbit/s Without PG interface 6ES7 972-0BA51-0XA0 With PG interface 6ES7 972-0BB51-0XA0
S7-400 instructions list German 6ES7 498-8AA05-8AN0 English 6ES7 498-8AA05-8BN0 French 6ES7 498-8AA05-8CN0 Spanish 6ES7 498-8AA05-8DN0 Italian 6ES7 498-8AA05-8EN0		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 order quantity 20 m 6XV1 830-0EH10

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

SIMATIC S7-400

Central processing units

CPU 412H, CPU 414H, CPU 417H

Overview CPU 412-3H



- CPU for the SIMATIC S7-400H and S7-400F/FH
- Can be used in S7-400H fault-tolerant systems
- Can be used with F runtime license as F-enabled CPU in S7-400F/FH safety-related systems
- With combined MPI/PROFIBUS DP master interface
- With 2 connection slots for synchronization 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

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

SIMATIC S7-400

Central processing units

CPU 412H, CPU 414H, CPU 417H

Technical specifications

	6ES7 412-3HJ14-0AB0	6ES7 414-4HM14-0AB0	6ES7 417-4HT14-0AB0
Product status			
Hardware product status	1	1	1
Firmware version	V4.5	V4.5	V4.5
associated programming package	STEP7 V5.3 SP2 or higher with HW update	STEP7 V5.3 SP2 or higher with HW update	STEP7 V5.3 SP2 or higher with HW update
Supply voltages			
Rated value			
• DC 24 V	No; Power supply via system power supply	No; Power supply via system power supply	No; Power supply via system power supply
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.	1.5 A	1.7 A	1.8 A
from interface DC 5 V, max.	90 mA; At each DP interface	90 mA; At each DP interface	90 mA; At each DP interface
Current consumption/ power loss			
Power loss, typ.	5.5 W	6 W	6.5 W
Backup battery			
• Buffer current, typ.	190 µA; Valid up to 40°C	190 µA; Valid up to 40°C	970 µA; Valid up to 40°C
• Buffer current, max.	660 µA	660 µA	1 980 µA
Memory			
Type of storage			
RAM			
• integrated (for program)	512 Kibyte	1.4 MByte	15 MByte
• integrated (for data)	256 Kibyte	1.4 MByte	15 MByte
• expandable	No	No	No
Load memory			
• expandable FEPRM	Yes	Yes	Yes
• expandable FEPRM, max.	64 MByte	64 MByte	64 MByte
• integrated RAM, max.	256 Kibyte	256 Kibyte	256 Kibyte
• expandable RAM	Yes	Yes	Yes
• expandable RAM, max.	64 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; Number range: 1 - 4095	4 095; Number range: 1 - 4095	8 191; Number range: 1 - 8191
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte
FB			
• Number, max.	2 048; Number range: 0 - 2047	2 048; Number range: 0 - 2047	6 144; Number range: 0 - 6143
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte
FC			
• Number, max.	2 048; Number range: 0 - 2047	2 048; Number range: 0 - 2047	6 144; Number range: 0 - 6143
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte
OB			
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte
Nesting depth			
• per priority class	24	24	24
• additional within an error OB	1	1	2

SIMATIC S7-400

Central processing units

CPU 412H, CPU 414H, CPU 417H

Technical specifications (continued)

	6ES7 412-3HJ14-0AB0	6ES7 414-4HM14-0AB0	6ES7 417-4HT14-0AB0
CPU/processing times			
for bit operations, min.	0.075 µs	0.045 µs	0.018 µs
for word operations, min.	0.075 µs	0.045 µs	0.018 µs
for fixed point arithmetic, min.	0.075 µs	0.045 µs	0.018 µs
for floating point arithmetic, min.	0.225 µs	0.135 µs	0.054 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.	8 Kibyte	8 Kibyte	16 Kibyte
• Remanence available	Yes	Yes	Yes
• Number of clock memories	8; (in 1 memory byte)	8; (in 1 memory byte)	8; (in 1 memory byte)
Address area			
I/O address area			
• Inputs	8 Kibyte	8 Kibyte	16 Kibyte
• Outputs	8 Kibyte	8 Kibyte	16 Kibyte
• of which, distributed			
- MPI/DP interface, inputs	2 Kibyte	2 Kibyte	2 Kibyte
- MPI/DP interface, outputs	2 Kibyte	2 Kibyte	2 Kibyte
- DP interface, inputs		6 Kibyte	8 Kibyte
- DP interface, outputs		6 Kibyte	8 Kibyte

SIMATIC S7-400

Central processing units

CPU 412H, CPU 414H, CPU 417H

Technical specifications (continued)

	6ES7 412-3HJ14-0AB0	6ES7 414-4HM14-0AB0	6ES7 417-4HT14-0AB0
Process image			
• Inputs, adjustable	8 Kibyte	8 Kibyte	16 Kibyte
• Outputs, adjustable	8 Kibyte	8 Kibyte	16 Kibyte
• Inputs, preset	256 byte	256 byte	1 024 byte
• Outputs, preset	256 byte	256 byte	1 024 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	131 072
• Outputs	65 536	65 536	131 072
• Inputs, of which central	65 536	65 536	131 072
• Outputs, of which central	65 536	65 536	131 072
Analog channels			
• Inputs	4 096	4 096	8 192
• Outputs	4 096	4 096	8 192
• Inputs, of which central	4 096	4 096	8 192
• Outputs, of which central	4 096	4 096	8 192
Hardware config.			
connectable OPs	15 without message processing, 8 with message processing	31 without message processing, 8 with message processing	63 without message processing, 16 with message processing
Central devices, max.	1	1	1
Expansion devices, max.	21	21	21
Multicomputing	No	No	No
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; Single mode only	4; Single mode only	4; Single mode only
Number of DP masters			
• integrated	1	2	2
• via CP	10	10	10
• Mixed mode IM + CP permitted	No	No	No
• via interface module	0		
Number of operable FMs and CPs (recommended)			
• FM	See manual Automation System S7-400H fault-tolerant systems. Limited due to number of slots and number of connections	See manual Automation System S7-400H fault-tolerant systems. Limited due to number of slots and number of connections	See manual Automation System S7-400H fault-tolerant systems. Limited due to number of slots and number of connections
• CP, point-to-point	See manual Automation System S7-400H fault-tolerant systems. Limited due to number of slots and number of connections	See manual Automation System S7-400H fault-tolerant systems. Limited due to number of slots and number of connections	See manual Automation System S7-400H fault-tolerant systems. Limited due to number of slots and number of connections
• PROFIBUS and Ethernet CPs	14; Of which max. 10 CP as DP master	14; Of which max. 10 CP as DP master	14; Of which max. 10 CP as DP master

SIMATIC S7-400

Central processing units

CPU 412H, CPU 414H, CPU 417H

Technical specifications (continued)

	6ES7 412-3HJ14-0AB0	6ES7 414-4HM14-0AB0	6ES7 417-4HT14-0AB0
Time			
Clock			
• Hardware clock (real-time clock)	Yes	Yes	Yes
• buffered and synchronizable	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
• in AS, Master	Yes	Yes	Yes
• in AS, Slave	Yes	Yes	Yes
S7 message functions			
Number of login stations for message functions, max.	8	8	16
Symbol-related messages	No	No	No
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
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.	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	Yes
Global data communication			
• supported	No	No	No
S7 basic communication			
• supported	No	No	No
S7 communication			
• supported	Yes	Yes	Yes
• as server	Yes	Yes	Yes
• as client	Yes	Yes	Yes
• Useful data per job, max.	64 Kibyte	64 Kibyte	64 Kibyte

SIMATIC S7-400

Central processing units

CPU 412H, CPU 414H, CPU 417H

Technical specifications (continued)

	6ES7 412-3HJ14-0AB0	6ES7 414-4HM14-0AB0	6ES7 417-4HT14-0AB0
S5-compatible communication			
• supported	Yes; (via CP -max. 10- and FC AG_SEND and FC AG_RECV)	Yes; (via CP -max. 10- and FC AG_SEND and FC AG_RECV)	Yes; (via CP -max. 10- and FC AG_SEND and FC AG_RECV)
• Useful data per job, max.	8 Kibyte	8 Kibyte	8 Kibyte
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	16	32	64
1st interface			
Physics	RS 485 / PROFIBUS + MPI	RS 485 / PROFIBUS + MPI	RS 485 / PROFIBUS + MPI
isolated	Yes	Yes	Yes
Functionality			
• MPI	Yes	Yes	Yes
• DP master	Yes	Yes	Yes
• DP slave	No	No	No
MPI			
• Number of connections	16	32	44
• Services			
- PG/OP communication	Yes	Yes	Yes
- Routing	Yes	Yes	Yes
- Global data communication	No	No	No
- S7 basic communication	No	No	No
- 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	32
• Services			
- PG/OP communication	Yes	Yes	Yes
- Routing	Yes	Yes	Yes
- Global data communication	No	No	No
- S7 basic communication	No	No	No
- S7 communication	Yes	Yes	Yes
- S7 communication, as client			Yes
- S7 communication, as server			Yes
- equidistance support	No	No	No
- Activation/deactivation of DP slaves	No	No	No
- direct data exchange (cross traffic)	No	No	No
• 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 Kibyte	2 Kibyte	2 Kibyte
- Outputs, max.	2 Kibyte	2 Kibyte	2 Kibyte
• 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	No configuration of CPU as DP slave		

SIMATIC S7-400

Central processing units

CPU 412H, CPU 414H, CPU 417H

Technical specifications (continued)

	6ES7 412-3HJ14-0AB0	6ES7 414-4HM14-0AB0	6ES7 417-4HT14-0AB0
2nd interface			
Physics		RS 485 / PROFIBUS + MPI	RS 485 / PROFIBUS + MPI
isolated		Yes	Yes
Functionality			
• DP master		Yes	Yes
• DP slave		No	No
DP master			
• Number of connections, max.		16	32
• Services			
- PG/OP communication		Yes	Yes
- Routing		Yes	Yes
- S7 basic communication		No	No
- S7 communication		Yes	Yes
- equidistance support		No	No
- Activation/deactivation of DP slaves		No	No
- direct data exchange (cross traffic)		No	No
• Transmission speeds, max.		12 MBit/s	12 MBit/s
• Number of DP slaves, max.		96	125
• Address area			
- Inputs, max.		6 Kibyte	8 Kibyte
- Outputs, max.		6 Kibyte	8 Kibyte
• Useful data per DP slave			
- Inputs, max.		244 byte	244 byte
- Outputs, max.		244 byte	244 byte
3rd interface			
Type of interfaces	Pluggable synchronization submodule (FO)	Pluggable synchronization submodule (FO)	Pluggable synchronization submodule (FO)
pluggable interface module	Synchronization submodule IF 960 6ES7 960-1AA04-0XA0	Synchronization submodule IF 960 6ES7 960-1AA04-0XA0 or 6ES7 960-1AB04-0XA0	Synchronization submodule IF 960 6ES7 960-1AA04-0XA0 or 6ES7 960-1AB04-0XA0
4th interface			
Type of interface	Pluggable synchronization submodule (FO)	Pluggable synchronization submodule (FO)	Pluggable synchronization submodule (FO)
pluggable interface modules	Synchronization submodule IF 960 6ES7 960-1AA04-0XA0	Synchronization submodule IF 960 6ES7 960-1AA04-0XA0 or 6ES7 960-1AB04-0XA0	Synchronization submodule IF 960 6ES7 960-1AA04-0XA0 or 6ES7 960-1AB04-0XA0
Isochronous mode			
equidistance	No		
CiR configuration in RUN			
CiR synchronization time, basic load	150 ms	100 ms	60 ms
CiR synchronization time, time per I/O slave	40 µs	25 µs	10 µs

SIMATIC S7-400

Central processing units

CPU 412H, CPU 414H, CPU 417H

Technical specifications (continued)

	6ES7 412-3HJ14-0AB0	6ES7 414-4HM14-0AB0	6ES7 417-4HT14-0AB0
CPU/programming			
Configuration software			
• STEP 7	Yes; With hardware update as of STEP7 V5.3 SP2	Yes; With hardware update as of STEP7 V5.3 SP2	Yes; With hardware update as of STEP7 V5.3 SP2
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			
Required slots	2	2	2
Dimensions			
Dimensions			
• Width	50 mm	50 mm	50 mm
• Height	290 mm	290 mm	290 mm
• Depth	219 mm	219 mm	219 mm
Weights			
• Weight, approx.	990 g	995 g	995 g

SIMATIC S7-400

Central processing units

CPU 412H, CPU 414H, CPU 417H

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Ordering data		Order No.	Order No.	
CPU 412-3H		6ES7 412-3HJ14-0AB0	MPI cable	
For S7-400H and S7-400F/FH; 768 KB main memory, combined MPI/PROFIBUS DP master interface, 2 slots for sync modules, slot for memory card, incl. slot number labels			For connecting SIMATIC S7 and the PG through MPI; 5 m in length	
CPU 412-3H system bundle			Slot number plates	
Not assembled, comprising: UR2-H rack, 2 x PS 405/407 power supply, 2 x CPU 412-3H, 2 x memory card RAM (1 MB), 4 x sync module (for max. 10 m), 2 x fiber-optic connecting cable for sync modules (1 m), 4 x backup battery			1 set (spare part)	
412H system bundle, 1 MB, 120/230 V AC, 10 A		B7 6ES7 400-0HR00-4AB0	S7 F systems RT license	
412H system bundle, 1 MB, 24/48/60 V DC, 10 A		B7 6ES7 400-0HR50-4AB0	For processing safety-related user programs, for one S7 400H- based system each with CPU 412-3H, CPU 414-4H or CPU 417-4H	
CPU 414-4H		6ES7 414-4HM14-0AB0	S7 F systems V6.0	
For S7-400H and S7-400F/FH; 2.8 MB main memory, MPI/PROFIBUS DP master interface, 2 slots for sync modules, slot for memory card, incl. slot number labels			Programming and configuration environment for creating and using safety-related STEP 7 programs for an S7 400H-based target system, Floating License for 1 user, executes with Windows XP Prof SP2, Windows 2000 SP4, Windows Server 2003 SP1/SP2 2 languages (German, English) <i>Type of delivery:</i> Certificate of License as well as software and electronic documentation on CD	
CPU 417-4H		6ES7 417-4HT14-0AB0	S7 F systems upgrade from V5.x to V6.0	
For S7-400H and S7-400F/FH; 30 MB main memory, MPI/PROFIBUS DP master interface, 2 slots for sync modules, slot for memory card, incl. slot number plates			2 languages (German, English), Floating License for 1 user <i>Type of delivery:</i> Certificate of License as well as software and electronic documentation on CD	
Memory card RAM			Manual "Communication for SIMATIC S7-300/-400"	
1 MB		6ES7 952-1AK00-0AA0	German	
2 MB		6ES7 952-1AL00-0AA0	English	
4 MB		6ES7 952-1AM00-0AA0	French	
8 MB		6ES7 952-1AP00-0AA0	Spanish	
16 MB		6ES7 952-1AS00-0AA0	Italian	
64 MB		6ES7 952-1AY00-0AA0	SIMATIC Manual Collection	
FEPROM memory card			B3 6ES7 998-8XC01-8YE0	
1 MB		6ES7 952-1KK00-0AA0	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	
2 MB		6ES7 952-1KL00-0AA0	SIMATIC Manual Collection update service for 1 year	
4 MB		6ES7 952-1KM00-0AA0	Current "Manual Collection" DVD and the three subsequent updates	
8 MB		6ES7 952-1KP00-0AA0	B3 6ES7 998-8XC01-8YE2	
16 MB		6ES7 952-1KS00-0AA0		
32 MB		6ES7 952-1KT00-0AA0		
64 MB		6ES7 952-1KY00-0AA0		

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

B7: Subject to export regulations: AL: N and ECCN: EAR99H

SIMATIC S7-400

Central processing units

CPU 412H, CPU 414H, CPU 417H

Ordering data	Order No.		Order No.
Brochure "SIMATIC S7-400 automation system - design and application" German English	6ES7 498-8AA00-8AB0 6ES7 498-8AA00-8BB0		
RS 485 bus connector with 90° cable outlet Max. transmission rate 12 Mbit/s Without programming device interface With programming device interface	6ES7 972-0BA12-0XA0 6ES7 972-0BB12-0XA0	RS 485 bus connector with axial cable outlet For SIMATIC OP, for connecting to PPI, MPI, PROFIBUS	6GK1 500-0EA02
RS 485 bus connector with angular cable outlet Max. transmission rate 12 Mbit/s Without programming device interface With programming device interface Max. transmission rate 1.5 Mbit/s Without programming device interface	6ES7 972-0BA41-0XA0 6ES7 972-0BB41-0XA0 6ES7 972-0BA30-0XA0	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
RS 485 bus connector with 90° cable outlet for FastConnect connection system Max. transmission rate 12 Mbit/s Without programming device interface With programming device interface	6ES7 972-0BA51-0XA0 6ES7 972-0BB51-0XA0		

SIMATIC S7-400

Central processing units

CPU 416F

Overview



- For constructing a fail-safe automation system for plants with increased safety requirements
- High-performance CPU in the top-end performance range
- Satisfies safety requirements up to SIL 3 acc. to IEC 61508 and Cat. 4 acc. to EN 954-1
- Standard and safety-related tasks can be performed with a single CPU
- Multi-processor mode is possible
- Safety-related communication with distributed I/O devices over PROFIBUS DP with the *PROFIsafe* profile
- Fail-safe I/O modules can be connected decentralized over the integrated interfaces (DP and PN with CPU 416F-3 PN/DP) and/or through communication modules (CP 443-5 Ext. and CP 443-1 Adv.)
- Standard modules for non-safety-related applications can be operated centrally and decentralized

Technical specifications

	6ES7 416-2FN05-0AB0	6ES7 416-3FR05-0AB0
Product status		
Firmware version	V5.0	V5.0
associated programming package	STEP7 V5.3 SP2 or higher with HW-update	STEP7 V5.4 SP1 or higher
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.	1.1 A	1.3 A
from interface DC 5 V, max.	90 mA; At each DP interface	90 mA; At each DP interface
Current consumption/power loss		
Power loss, typ.	4 W	4.5 W
Backup battery		
• Buffer current, typ.	125 µA; Valid up to 40°C	125 µA; Valid up to 40°C
• Buffer current, max.	550 µA	550 µA
Memory		
Type of storage		
RAM		
• integrated (for program)	2.8 MByte	5.6 MByte
• integrated (for data)	2.8 MByte	5.6 MByte
• expandable	No	No
Load memory		
• expandable FEPRM	Yes	Yes
• expandable FEPRM, max.	64 MByte	64 MByte
• integrated RAM, max.	1 MByte	1 MByte
• expandable RAM	Yes	Yes
• expandable RAM, max.	64 MByte	64 MByte
Backup		
• present	Yes	Yes
• with battery	Yes	Yes
• without battery	No	No

	6ES7 416-2FN05-0AB0	6ES7 416-3FR05-0AB0
CPU/blocks		
DB		
• Number, max.	10 000; Number range: 1 to 16,000	10 000; Number range: 1 to 16,000
• Size, max.	64 Kibyte	64 Kibyte
FB		
• Number, max.	5 000; Number range: 0 to 7999	5 000; Number range: 0 to 7999
• Size, max.	64 Kibyte	64 Kibyte
FC		
• Number, max.	5 000; Number range: 0 to 7,999	5 000; Number range: 0 to 7,999
• Size, max.	64 Kibyte	64 Kibyte
OB		
• Size, max.	64 Kibyte	64 Kibyte
Nesting depth		
• per priority class	24	24
• additional within an error OB	2	2
CPU/processing times		
for bit operations, min.	30 ns	30 ns
for word operations, min.	30 ns	30 ns
for fixed point arithmetic, min.	30 ns	30 ns
for floating point arithmetic, min.	90 ns	90 ns
Times/counters and their remanence		
S7 counter		
• Number	2 048	2 048

Technical specifications (continued)

	6ES7 416-2FN05-0AB0	6ES7 416-3FR05-0AB0
S7 counter (continued)		
• Remanence	Yes	Yes
- adjustable	0	0
- lower limit	2 047	2 047
- upper limit	From Z 0 to Z 7	From Z 0 to Z 7
- preset		
• Counting range		
- lower limit	0	0
- upper limit	999	999
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 times retentive	No times 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.	16 Kibyte	16 Kibyte
• Remanence available	Yes	Yes
• Number of clock memories	8; (in 1 memory byte)	8; (in 1 memory byte)
Address area		
I/O address area		
• Inputs	16 Kibyte	16 Kibyte
• Outputs	16 Kibyte	16 Kibyte
• of which, distributed		
- MPI/DP interface, inputs	2 Kibyte	2 Kibyte
- MPI/DP interface, outputs	2 Kibyte	2 Kibyte
- DP interface, inputs	8 Kibyte	8 Kibyte
- DP interface, outputs	8 Kibyte	8 Kibyte
Process image		
• Inputs, adjustable	16 Kibyte	16 Kibyte
• Outputs, adjustable	16 Kibyte	16 Kibyte
• Inputs, preset	512 byte	512 byte
• Outputs, preset	512 byte	512 byte
• consistent data, max.	244 byte	244 byte
• Access to consistent data in process image	Yes	Yes

	6ES7 416-2FN05-0AB0	6ES7 416-3FR05-0AB0
Subprocess images		
• Number of subprocess images, max.	15	15
Digital channels		
• Inputs	131 072	131 072
• Outputs	131 072	131 072
• Inputs, of which central	131 072	131 072
• Outputs, of which central	131 072	131 072
Analog channels		
• Inputs	8 192	8 192
• Outputs	8 192	8 192
• Inputs, of which central	8 192	8 192
• Outputs, of which central	8 192	8 192
Hardware config.		
connectable OPs	63	63
Central devices, max.	1	1
Expansion devices, max.	21	21
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	2	2
• via IM 467	4	4
• via CP	10; CP 443-5 Extended	10; CP 443-5 Extended
• 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	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	0	1
• Number of pluggable S5 modules (via adapter capsule in central device), max.	6	6
Number of IO controllers		
• integrated		
• via CP	4; Via CP 443-1 EX 41 in PN mode; max. 4 in central controller	4; Via CP 443-1 EX 41 in PN mode; max. 4 in central controller
Number of operable FMs and CPs (recommended)		
• FM	Limited due to number of slots and number of connections	Limited due to number of slots and number of connections

SIMATIC S7-400

Central processing units

CPU 416F

Technical specifications (continued)

	6ES7 416-2FN05-0AB0	6ES7 416-3FR05-0AB0
Number of operable FMs and CPs (recommended) (cont.)		
• CP, point-to-point	Limited due to number of slots and number of connections	Limited due to number of slots and number of connections
• PROFIBUS and Ethernet CPs	14; Of which 10 CP or IM max. as DP master and PN controller	14; Of which 10 CP/IM max. as DP master and PN controller
Time		
Clock		
• Hardware clock (real-time clock)	Yes	Yes
• buffered and synchronizable	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
• on Ethernet via NTP	Via CP	Via CP
• to IF 964 DP		Yes
S7 message functions		
Number of login stations for message functions, max.	63; Max. 63 with ALARM_S and ALARM_D (OPs); max. 12 with ALARM_8 and ALARM_P (e.g. WinCC)	63; Max. 63 with ALARM_S and ALARM_D (OPs); max. 12 with ALARM_8 and ALARM_P (e.g. WinCC)
Symbol-related messages	Yes	Yes
Number of messages		
• overall, max.	1 024	1 024
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
Forcing		
• Forcing	Yes	Yes
Status block	Yes	Yes
Single step	Yes	Yes
Number of breakpoints	4	4

	6ES7 416-2FN05-0AB0	6ES7 416-3FR05-0AB0
Diagnostic buffer		
• present	Yes	Yes
• Number of entries, max.	3 200	3 200
• adjustable	Yes	Yes
• preset	120	120
Communication functions		
PG/OP communication	Yes	Yes
Routing	Yes	Yes
Global data communication		
• supported	Yes	Yes
• Size of GD packets, max.	54 byte	54 byte
S7 basic communication		
• supported	Yes	Yes
• Useful data per job, max.	76 byte	76 byte
S7 communication		
• supported	Yes	Yes
• Useful data per job, max.	64 Kibyte	64 Kibyte
S5-compatible communication		
• supported	Yes; (via CP max. 10 and FC AG_SEND and FC AG_RECV)	Yes; (via CP max. 10 and FC AG_SEND and FC AG_RECV)
• Useful data per job, max.	8 Kibyte	8 Kibyte
Standard communication (FMS)		
• supported	Yes; Via CP and loadable FB	Yes; Via CP and loadable FB
Web server		
• Web server	No; Via CP	Yes; Read-only function
Open IE communication		
• TCP/IP		Yes
- Number of connections, max.		64
- Data length, max.		32 Kibyte
• ISO-on-TCP (RFC1006)	Via CP 443-1 Adv. and loadable FB	Yes
- Number of connections, max.		64
- Data length, max.	1452	32 Kibyte; 1452 bytes via CP 443-1 Adv.
• UDP		Yes
- Number of connections, max.		64
- Data length, max.		1 472 byte
Number of connections		
• overall	64	64

Technical specifications (continued)

	6ES7 416-2FN05-0AB0	6ES7 416-3FR05-0AB0
PROFINET CBA (at set setpoint communication load)		
• Number of remote inter-connection partners		32
• Number of functions, master/slave		150
• Total of all master/slave connections		6 000
• Data length of all incoming connections master/slave, max.		65 000 byte
• Data length of all outgoing connections master/slave, max.		65 000 byte
• Number of device-internal and PROFIBUS interconnections		1 000
• Data length of device-internal and PROFIBUS interconnections, max.		16 000 byte
• Data length per connection, max.		2 000 byte
• Remote interconnections with acyclic transmission		
- Transmission frequency: transmission interval, min.		1 ms; Depending on preset communication load, number of interconnections and data length used
- Number of incoming interconnections		300
- Number of outgoing interconnections		300
- Data length of all incoming interconnections, max.		4 800 byte
- Data length of all outgoing interconnections, max.		4 800 byte
- Data length per connection, max.		250 byte
• HMI variables via PROFINET (acyclic)		
- Number of log-in stations for HMI variables (PN OPC/iMap)		2x PN OPC/1x iMap
- HMI variable updating		500 ms
- Number of HMI variables		1 500
- Data length of all HMI variables, max.		48 000 byte
• PROFIBUS proxy functionality		
- supported		Yes; 32 PROFIBUS slaves max. connectable
- Data length per connection, max.		240 byte; Slave-dependent
1st interface		
Physics	RS 485 / PROFIBUS	RS 485 / PROFIBUS + MPI
isolated	Yes	Yes

	6ES7 416-2FN05-0AB0	6ES7 416-3FR05-0AB0
Functionality		
• MPI	Yes	Yes
• DP master	Yes	Yes
• DP slave	Yes	Yes
MPI		
• Number of connections	44	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.	32	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
- 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 Kibyte	2 Kibyte
- Outputs, max.	2 Kibyte	2 Kibyte
• Useful data per DP slave		
- Inputs, max.	244 byte	244 byte
- Outputs, max.	244 byte	244 byte
DP slave		
• Number of connections	32	32
• Services		
- PG/OP communication	Yes	Yes; with interface active
- Routing	Yes	Yes; with interface active
• 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; Virtual slots
• Useful data per address area, max.	32 byte	32 byte
• Useful data per address area, of which consistent, max.	32 byte	32 byte

SIMATIC S7-400

Central processing units

CPU 416F

Technical specifications (continued)

	6ES7 416-2FN05-0AB0	6ES7 416-3FR05-0AB0
2nd interface		
Physics	RS 485 / PROFIBUS	Ethernet
isolated	Yes	Yes
Functionality		
• DP master	Yes	No
• DP slave	Yes	No
• PROFINET IO controller		Yes
• PROFINET CBA		Yes
• Point-to-point coupling		No
DP master		
• Number of connections, max.	32	
• 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 Kibyte	
- Outputs, max.	8 Kibyte	
• Useful data per DP slave		
- Inputs, max.	244 byte	
- Outputs, max.	244 byte	
DP slave		
• Number of connections	32	
• Services		
- Routing	Yes	
- Programming	Yes	
• GSD file	http://support.automation.siemens.com/WW/view/en/113652	
• 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	

	6ES7 416-2FN05-0AB0	6ES7 416-3FR05-0AB0
PROFINET IO controller		
• Services		Yes
- PG/OP communication		Yes; Routing of PG functions
- Routing		Yes
- S7 communication		Yes
- open IE communication		Yes
• Transmission rate, min.		10 MBit/s
• Transmission speed, max.		100 MBit/s
• Total number of connectable IO Devices, max.		256
• Updating time		250 µs to 512 ms; minimum value dependent on preset communication share for PROFINET I/O, of number of I/O devices and number of configured user data
• Address area		
- Inputs, max.		8 Kibyte
- Outputs, max.		8 Kibyte
- Useful data consistency, max.		255 byte; incl. net data accompaniers
PROFINET CBA		
• Acyclic transmission		Yes
• cyclic transmission		Yes
3rd interface		
Type of interfaces		Pluggable interface module (IF), technical specifications as for 2nd interface
pluggable interface module		IF 964-DP (Order No.: 6ES7 964-2AA04-0AB0)
Physics		RS 485 / PROFIBUS
isolated		Yes
power supply to interface (15 to 30 V DC), max.		150 mA
Number of connection resources		32
Functionality		
• MPI		No
• DP master		Yes
• DP slave		Yes

Technical specifications (continued)

	6ES7 416-2FN05-0AB0	6ES7 416-3FR05-0AB0
DP master		
• Number of connections, max.		32
• Services		
- PG/OP communication		Yes
- Routing		Yes
- Global data communication		No
- S7 basic communication		Yes
- S7 communication		Yes
- Equidistance support		Yes
- SYNC/FREEZE		Yes
- Activation/deactivation of DP slaves		Yes
- Direct data exchange		Yes
• Transmission rate, max.		12 MBit/s
• Number of DP slaves, max.		125
• Address area		
- Inputs, max.		8 Kibyte
- Outputs, max.		8 Kibyte
• Useful data per DP slave		
- Useful data per DP slave, max.		244 byte
- Inputs, max.		244 byte
- Outputs, max.		244 byte
- Slots, max.		244
- per slot, max.		128 byte
DP slave		
• Number of connections		32
• Services		
- Routing		Yes; When interface active
- Status/control		Yes; When interface active
• GSD file		http://support.automation.siemens.com/WW/view/en/113652
• Transmission rate, max.		12 MBit/s
• Transfer memory		
- Inputs		244 byte
- Outputs		244 byte
• Address range, max.		32
• Useful data per address area, max.		32 byte
• Useful data per address area, of which consistent, max.		32 byte

	6ES7 416-2FN05-0AB0	6ES7 416-3FR05-0AB0
Isochronous mode		
Useful data per isochronous slave, max.	244 byte	244 byte
equidistance	Yes	Yes
shortest clock pulse	1 ms; 0.5 ms without use of SFC 126, 127	1 ms; Without use of SFC 126 and 127 up to 0.5 ms
CiR configuration in RUN		
CiR synchronization time, basic load	100 ms	100 ms
CiR synchronization time, time per I/O slave	40 µs	40 µs
CPU/programming		
Configuration software		
• STEP 7	Yes	Yes
Programming language		
• STEP 7		Yes
• LAD	Yes	Yes
• FUP	Yes	Yes
• AWL	Yes	Yes
• SCL	Yes	Yes
• CFC	Yes	Yes
• GRAPH	Yes	Yes
• HiGraph	Yes	Yes
Nesting levels	7	7
User program protection/password protection	Yes	Yes
Dimensions		
Required slots	1	2
Dimensions		
Dimensions		
• Width	25 mm	50 mm
• Height	290 mm	290 mm
• Depth	219 mm	219 mm
Weights		
• Weight, approx.	720 g	900 g

SIMATIC S7-400

Central processing units

CPU 416F

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Ordering data	Order No.		Order No.
CPU 416F-2 For configuring safety-related automation systems; main memory 5.6 MB, 24 V DC power supply, MPI/PROFIBUS DP master interface, PROFIBUS DP master interface, slot for memory card, incl. slot number labels	6ES7 416-2FN05-0AB0	MPI cable For connecting SIMATIC S7 and the PG through MPI; 5 m in length	6ES7 901-0BF00-0AA0
CPU 416F-3 PN/DP For configuring safety-related automation systems; main memory 11.2 MB, 24 V DC power supply, MPI/PROFIBUS DP master interface, PROFINET interface, PROFIBUS DP master interface, receptacle for 1 IF submodule, slot for memory card, incl. slot number labels	6ES7 416-3FR05-0AB0	IF 964-DP interface module For connecting an additional DP line	6ES7 964-2AA04-0AB0
Option package S7 F Distributed Safety V5.4 for generating fail-safe programs for the S7-300F Floating License Upgrade from V5.x to V5.4 Software Update Service	6ES7 833-1FC02-0YA5 6ES7 833-1FC02-0YE5 6ES7 833-1FC00-0YX2	Slot number plates 1 set (spare part)	6ES7 912-0AA00-0AA0
Memory card RAM 64 KB 256 KB 1 MB 2 MB 4 MB 8 MB 16 MB 64 MB	6ES7 952-0AF00-0AA0 6ES7 952-1AH00-0AA0 6ES7 952-1AK00-0AA0 6ES7 952-1AL00-0AA0 6ES7 952-1AM00-0AA0 6ES7 952-1AP00-0AA0 6ES7 952-1AS00-0AA0 6ES7 952-1AY00-0AA0	Manual "SIMATIC S7-400 automation system" incl. instruction list German English French Spanish Italian	6ES7 498-8AA05-8AA0 6ES7 498-8AA05-8BA0 6ES7 498-8AA05-8CA0 6ES7 498-8AA05-8DA0 6ES7 498-8AA05-8EA0
FEPROM memory card 64 KB 256 KB 1 MB 2 MB 4 MB 8 MB 16 MB 32 MB 64 MB	6ES7952-0KF00-0AA0 6ES7952-0KH00-0AA0 6ES7 952-1KK00-0AA0 6ES7 952-1KL00-0AA0 6ES7 952-1KM00-0AA0 6ES7 952-1KP00-0AA0 6ES7 952-1KS00-0AA0 6ES7 952-1KT00-0AA0 6ES7 952-1KY00-0AA0	S7-400 instructions list German English French Spanish Italian	6ES7 498-8AA05-8AN0 6ES7 498-8AA05-8BN0 6ES7 498-8AA05-8CN0 6ES7 498-8AA05-8DN0 6ES7 498-8AA05-8EN0
		Manual "Communication for SIMATIC S7-300/-400" German English French Spanish Italian	6ES7 398-8EA00-8AA0 6ES7 398-8EA00-8BA0 6ES7 398-8EA00-8CA0 6ES7 398-8EA00-8DA0 6ES7 398-8EA00-8EA0
		SIMATIC Manual Collection B3 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	6ES7 998-8XC01-8YE0
		SIMATIC Manual Collection update service for 1 year B3 Current "Manual Collection" DVD and the three subsequent updates	6ES7 998-8XC01-8YE2
		Brochure "SIMATIC S7-400 automation system - Design and application" German English	6ES7 498-8AA00-8AB0 6ES7 498-8AA00-8BB0

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

SIMATIC S7-400

Central processing units

CPU 416F

Ordering data	Order No.		Order No.
PROFIBUS bus components		PROFINET bus components	
RS 485 bus connector with 90° cable outlet Max. transfer rate 12 Mbit/s Without PG interface With PG interface	 6ES7 972-0BA12-0XA0 6ES7 972-0BB12-0XA0	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
RS 485 bus connector with angled cable outlet Max. transfer rate 12 Mbit/s Without PG interface With PG interface	 6ES7 972-0BA41-0XA0 6ES7 972-0BB41-0XA0	FO Standard Cable GP (50/125) Standard cable, splittable, UL approval, sold by the meter	6XV1 873-2A
RS 485 bus connector with 90° cable outlet for FastConnect system Max. transfer rate 12 Mbit/s Without PG interface With PG interface	 6ES7 972-0BA51-0XA0 6ES7 972-0BB51-0XA0	SCALANCE X204-2 Industrial Ethernet Switch 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	6GK5 204-2BB10-2AA3
RS 485 bus connector with axial cable outlet For SIMATIC OP, for connection to PPI, MPI, PROFIBUS	 6GK1 500-0EA02	IE FC RJ45 plugs RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables	
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 order quantity 20 m	 6XV1 830-0EH10	IE FC RJ45 plug 180 180° cable outlet 1 unit 10 units 50 units	 6GK1 901-1BB10-2AA0 6GK1 901-1BB10-2AB0 6GK1 901-1BB10-2AE0
RS 485 repeater for PROFIBUS Data transfer rate up to 12 Mbit/s; 24 V DC; IP20 housing	 6ES7 972-0AA01-0XA0	PROFIBUS/PROFINET bus components For establishing MPI/PROFIBUS/PROFINET communication	see Catalogs IK PI, CA 01

SIMATIC S7-400

Central processing units

Sync module for coupling the CPU 41xH

Overview



- For coupling the two CPU 41xH in the S7-400H subunits.
- Can be plugged direct into the CPU

Technical specifications

	6ES7 960-1AA04-0XA0	6ES7 960-1AB04-0XA0
Current consumption		
from CPU, max.	210 mA	250 mA
Current consumption/ power loss		
Power loss, typ.	1.1 mW	1.3 mW
Dimensions		
Dimensions		
• 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.

for coupling the CPU 41xH for S7-400H/F/FH;
2 modules required per CPU;

For 6ES7 412-3HJ14-0AB0, 6ES7 414-4HM14-0AB0 and 6ES7 417-4HT14-0AB0;
for patch cable, can be used for fiber-optic cables up to 10 m in length

6ES7 960-1AA04-0XA0

For 6ES7 414-4HM14-0AB0 and B7 6ES7 417-4HT14-0AB0;
for patch and installation cables, can be used for fiber-optic cables up to 10 km in length

6ES7 960-1AB04-0XA0

Fiber-optic connecting cable

For Sync module
6ES7 960-1Ax04-0XA0

- 1 m
- 2 m
- 10 m

6ES7 960-1AA04-5AA0

6ES7 960-1AA04-5BA0

6ES7 960-1AA04-5KA0

on request

For Sync module
6ES7 960-1AB04-0XA0;
fiber-optic monomode
LC/LC duplex crossed 9/125 μ
(max. 10 km)

B7: Subject to export regulations: AL: N and ECCN: EAR99H

SIMATIC S7-400

Central processing units

IF-964 DP PROFIBUS module

Overview



- To connect distributed I/Os over PROFIBUS DP
- Max. transmission rate 12 Mbit/s
- Electrically isolated RS 485 interface
- Connection via 9-pin sub-D connector
- One or two PROFIBUS modules can be inserted per S7-400 CPU:
 - CPU 414-3/416-3: 1 module
 - CPU 417-4: 2 modules

Note:

Can only be used with CPUs 6ES7 414-3XM05-0AB0, 6ES7 414-3EM05-0AB0, 6ES7 416-3XR05-0AB0, 6ES7 416-3ER05-0AB0 and 6ES7 417-4XT05-0AB0.

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
• Address area	
- Inputs, max.	device-dependent
- Outputs, max.	device-dependent
• Useful data per DP slave	
- Inputs, max.	244 byte
- Outputs, max.	244 byte
Dimensions	
Dimensions	
• Width	26 mm
• Height	54 mm
• Depth	130 mm
Weights	
• Weight, approx.	65 g

Technical specifications

6ES7 964-2AA04-0AB0	
Current consumption from CPU, max.	150 mA; Current consumption from S7-400 bus: The module uses no current at 24 V, it provides this voltage only at the DP interface. Total current consumption of the components connected to the DP interface, but maximum 150 mA. Current carrying capacity of the isolated 5 V (P5ext) maximum 90 mA, current carrying capacity of the 24 V maximum 150 mA.
Current consumption/power loss Power loss, typ.	1 W
Communication functions Number of connections	
• overall	device-dependent
PROFIBUS DP Cable length, max.	1 200 m; at 9.6 Kbit/s: max. 1200 m; at 12 Mbit/s: max. 100 m

Ordering data

Order No.

IF-964 DP interface module	6ES7 964-2AA04-0AB0
Interface module with integral PROFIBUS DP master interface	

SIMATIC S7-400

SIPLUS central processing units

SIPLUS CPU 416, CPU 417

Overview SIPLUS CPU 416-3, CPU 416-3 PN/DP



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

SIPLUS CPU 416-3		
Order No.	6AG1 416-3XR05-4AB0	6AG1 416-3ER05-4AB0
Order No. based on	6ES7 416-3XR05-0AB0	6ES7 416-3ER05-0AB0
Environmental conditions	Suited for exceptional medial exposure (e. g. by chlorine sulfur atmosphere).	
Technical data	The technical data are identical with those of the based-on modules.	

For further technical documentation on SIPLUS, see:
<http://www.siemens.com/siplus-techdoku>

Overview SIPLUS CPU 417-4



The most powerful SIMATIC S7-400 CPU

- Applicable for plants with maximum requirements in the high-end performance range
- With 2 plug-in slots for IF modules

SIPLUS CPU 417-4	
Order No.	6AG1 417-4XT05-4AB0
Order No. based on	6ES7 417-4XT05-0AB0
Environmental conditions	Suited for exceptional medial exposure (e. g. by chlorine sulfur atmosphere)
Technical data	The technical data are identical with those of the based-on modules.

For further technical documentation on SIPLUS, see:
<http://www.siemens.com/siplus-techdoku>

Ordering data	Order No.
CPU 416-3 (medium exposure) Main memory 11.2 MB, power supply 24 V DC, MPI/PROFIBUS DP master interface, PROFIBUS DP master interface, module slot for 1 IF module, slot for memory card, incl. slot number labels	B7 6AG1 416-3XR05-4AB0
CPU 416-3 PN/DP (medium exposure) Main memory 11.2 MB, power supply 24 V DC, MPI/PROFIBUS DP master interface, PROFINET interface, PROFIBUS DP master interface, module slot for 1 IF submodule, slot for memory card, incl. slot number labels	B7 6AG1 416-3ER05-4AB0
Accessories	see CPU 416, page 5/32

B7: Subject to export regulations: AL: N and ECCN: EAR99H

Ordering data	Order No.
SIPLUS CPU 417-4 (medium exposure) Main memory 30 MB, power supply 24 V DC, MPI/PROFIBUS DP master interface, PROFIBUS DP master interface, module slots for max. 2 additional IF modules, slot for memory card, incl. slot number labels	B7 6AG1 417-4XT05-4AB0
Accessories	see CPU 417, page 5/37

B7: Subject to export regulations: AL: N and ECCN: EAR99H

SIMATIC S7-400

SIPLUS central processing units

SIPLUS CPU 414-4H, CPU 417-4H

Overview SIPLUS CPU 414-4H



CPU for SIMATIC S7-400H and S7-400F/FH

- For use in S7-400H fault-tolerant systems
- Can be used with F-Runtime license as fail-safe CPU in safety-related S7-400F/FH systems
- With integral PROFIBUS DP master interface
- With 2 plug-in slots for sync modules

SIPLUS CPU 414-4H	
Order No.	6AG1 414-4HJ04-4AB0
Order No. based on	6ES7 414-4HJ04-0AB0
Environmental conditions	Suited for exceptional medial exposure (e. g. by chlorine sulfur atmosphere)
Technical data	The technical data are identical with those of the based-on modules.

For further technical documentation on SIPLUS, see:
<http://www.siemens.com/siplus-techdoku>

Overview SIPLUS CPU 417-4H



CPU for SIMATIC S7-400H and S7-400F/FH

- For use in S7-400H fault-tolerant systems
- Can be used with F-Runtime license as fail-safe CPU in safety-related S7-400F/FH systems
- With integral PROFIBUS DP master interface
- With 2 plug-in slots for sync modules

SIPLUS CPU 417-4H	
Order No.	6AG1 417-4HL04-4AB0
Order No. based on	6ES7 417-4HL04-0AB0
Environmental conditions	Suited for exceptional medial exposure (e. g. by chlorine sulfur atmosphere)
Technical data	The technical data are identical with those of the based-on modules.

For further technical documentation on SIPLUS, see:
<http://www.siemens.com/siplus-techdoku>

Technical specifications

	6AG1 414-4HJ04-4AB0	6AG1 417-4HL04-4AB0
Supply voltages		
Rated value		
• DC 24 V	Yes	Yes
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.	2 A	1.7 A
Current consumption/power loss		
Power loss, typ.	4.5 W	6 W
Backup battery		
• Buffer current, typ.	550 µA	600 µA
• Buffer current, max.	1 530 µA	1 810 µA

	6AG1 414-4HJ04-4AB0	6AG1 417-4HL04-4AB0
Memory		
Type of storage		
RAM		
• integrated (for program)	700 Kibyte	
• integrated (for data)	700 Kibyte	
• expandable	No	No
Load memory		
• expandable FEPRM	Yes; with Memory Card (FLASH)	Yes; with Memory Card (FLASH)
• expandable FEPRM, max.	64 MByte	64 MByte
• integrated RAM, max.	256 Kibyte	256 Kibyte
• expandable RAM	Yes; With Memory Card (RAM)	Yes; With Memory Card (RAM)
• expandable RAM, max.	16 MByte	16 MByte

SIMATIC S7-400

SIPLUS central processing units

SIPLUS CPU 414-4H, CPU 417-4H

Technical specifications (continued)

	6AG1 414-4HJ04-4AB0	6AG1 417-4HL04-4AB0
Backup		
• present	Yes	Yes
• with battery	Yes; All data	Yes; All data
• without battery	No	No
CPU/blocks		
DB		
• Number, max.	4 095; DB 0 reserved	8 192; DB 0 reserved
• Size, max.	64 Kibyte	
FB		
• Number, max.	2 048	6 144
• Size, max.	64 Kibyte	64 Kibyte
FC		
• Number, max.	2 048	6 144
• Size, max.	64 Kibyte	64 Kibyte
OB		
• Size, max.	64 Kibyte	64 Kibyte
Nesting depth		
• per priority class	24	24
• additional within an error OB		2
CPU/processing times		
for bit operations, min.	0.06 µs	0.03 µs
for word operations, min.	0.06 µs	0.03 µs
for fixed point arithmetic, min.	0.06 µs	0.03 µs
for floating point arithmetic, min.	0.18 µs	0.09 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	From Z 0 to Z 7	From Z 0 to Z 7
• Counting range		
- lower limit	0	1
- upper limit	999	999
IEC counter		
• present	Yes	Yes
• Type	SFB	SFB
S7 times		
• Number	2 048	2 048
• Time range		
- lower limit	10 ms	10 ms
- upper limit	9 990 s	9 990 s
IEC timer		
• present	Yes	Yes
• Type	SFB	SFB

	6AG1 414-4HJ04-4AB0	6AG1 417-4HL04-4AB0
Data areas and their remanence		
Flag		
• Number, max.	8 Kibyte	16 Kibyte
• Remanence available	Yes; MB 0 to MB 8191	Yes; MB 0 to MB 16383
Address area		
I/O address area		
• Inputs	8 Kibyte	16 Kibyte
• Outputs	8 Kibyte	16 Kibyte
• of which, distributed		
- MPI/DP interface, inputs	2 Kibyte	2 Kibyte
- MPI/DP interface, outputs	2 Kibyte	2 Kibyte
- DP interface, inputs	6 Kibyte	8 Kibyte
- DP interface, outputs	6 Kibyte	8 Kibyte
Process image		
• Inputs, adjustable	8 Kibyte	16 Kibyte
• Outputs, adjustable	8 Kibyte	16 Kibyte
• Inputs, preset	1 024 byte	1 024 byte
• Outputs, preset	1 024 byte	1 024 byte
Subprocess images		
• Number of subprocess 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
Hardware config.		
Central devices, max.	1	1
Expansion devices, max.	21	21
Multicomputing	No	No
IM		
• Number of connectable IMs (total), max.	6	6
• Number of connectable IM 460s, max.	6	6
• Number of connectable IM 463-2	6; IM 463-2	6; IM 463-2
• Number of connectable IM 463s, max.		

SIMATIC S7-400

SIPLUS central processing units

SIPLUS CPU 414-4H, CPU 417-4H

Technical specifications (continued)

	6AG1 414-4HJ04-4AB0	6AG1 417-4HL04-4AB0
Number of DP masters		
• integrated	2	2
• via IM 467	0	0
• via CP	10	10
• Mixed mode IM + CP permitted	No; IM 467 cannot be used jointly with CP 443-5 Ext.	No; IM 467 cannot be used jointly with CP 443-5 Ext.
• via interface module	0	0
Number of operable FMs and CPs (recommended)		
• FM	32; Limited due to number of slots and number of connections	64; Limited due to number of slots and number of connections
• CP, point-to-point	32; Limited due to number of slots and number of connections	64; Limited due to number of slots and number of connections
• CP, LAN	32; limited due to number of slots and number of connections	64; limited due to number of slots and number of connections
Time		
Clock		
• Hardware clock (real-time clock)	Yes	Yes
• buffered and synchronizable	Yes	Yes
Operating hours counter		
• Number	8	8
Clock synchronization		
• supports	Yes	Yes
S7 message functions		
Number of login stations for message functions, max.	8	16
Diagnostic buffer		
• present	Yes	
• Number of entries, 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
S7 communication		
• supported	Yes	Yes
• as server	Yes	Yes
• as client	Yes	Yes
• Useful data per job, max.	64 Kibyte	64 Kibyte

	6AG1 414-4HJ04-4AB0	6AG1 417-4HL04-4AB0
S5-compatible communication		
• supported	Yes; via CP and loadable FC	Yes; via CP and loadable FC
• Useful data per job, max.	8 Kibyte	8 Kibyte
Standard communication (FMS)		
• supported	Yes; Via CP and loadable FB	Yes; Via CP and loadable FB
• Useful data per job, max.	Dependent on CP	Dependent on CP
Number of connections		
• overall	32	64
1st interface		
Physics	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 speeds, max.	12 MBit/s	12 MBit/s
DP master		
• Number of connections, max.	32	32
• Services		
- PG/OP communication	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	No	No
- Activation/deactivation of DP slaves	Yes	No
- direct data exchange (cross traffic)	No	No
• Transmission speeds, max.	12 MBit/s	12 MBit/s
• Number of DP slaves, max.	32; Number of slots, max. 512	32; Number of slots, max. 512

SIMATIC S7-400

SIPLUS central processing units

SIPLUS CPU 414-4H, CPU 417-4H

Technical specifications (continued)

	6AG1 414-4HJ04-4AB0	6AG1 417-4HL04-4AB0
DP master (continued)		
• Address area		
- Inputs, max.	2 Kibyte	2 Kibyte
- Outputs, max.	2 Kibyte	2 Kibyte
• Useful data per DP slave		
- Inputs, max.	244 byte	244 byte
- Outputs, max.	244 byte	244 byte
2nd interface		
Physics	RS 485 / PROFIBUS	RS 485 / PROFIBUS
isolated	Yes	Yes
Functionality		
• DP master	Yes; Default setting	Yes
• DP slave	No	No
• Point-to-point coupling	No	No
DP master		
• Number of connections, max.	16	32
• 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
- Activation/deactivation of DP slaves	No	No
- direct data exchange (cross traffic)	No	No
• Transmission speeds, max.	12 MBit/s	12 MBit/s
• Number of DP slaves, max.	96	125; Number of slots, max. 2048
• Address area		
- Inputs, max.	8 Kibyte	8 Kibyte
- Outputs, max.	8 Kibyte	8 Kibyte
• Useful data per DP slave		
- Inputs, max.	244 byte	244 byte
- Outputs, max.	244 byte	244 byte

	6AG1 414-4HJ04-4AB0	6AG1 417-4HL04-4AB0
CPU/programming		
Programming language		
• STEP 7	Yes; V5.0 SP2	Yes; V5.0 SP2
• LAD	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		
Required slots	2	2
Dimensions		
Dimensions		
• Width	50 mm	50 mm
• Height	290 mm	290 mm
• Depth	219 mm	219 mm
Weights		
• Weight, approx.	1 070 g	1 070 g

Ordering data

SIPLUS CPU 414-4H

(medium exposure)

For S7-400H and S7-400F/FH;
main memory 1.4 MB,
MPI/PROFIBUS DP master
interface, 2 slots for synchroni-
zation modules, slot for memory
card, incl. slot number plates

Order No.

6AG1 414-4HJ04-4AB0

Order No.

6AG1 417-4HL04-4AB0

SIPLUS CPU 417-4H

(medium exposure)

For S7-400H and S7-400F/FH;
main memory 20 MB,
MPI/PROFIBUS DP master
interface, 2 slots for synchroni-
zation modules, slot for memory
card, incl. slot number plates

Accessories

see CPU 41xH, page 5/46

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
Supply voltages					
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				
Current consumption/ power loss					
Power loss, max.	5 W	6 W	16 W	12 W	8 W; 3.5 W (24 V DC); 6.5 W (48 V DC); 8.0 W (60 V DC)
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
Input voltage					
• Rated value, DC	24 V	24 V			
• Rated value, UC			120 V	230 V; 120/230 V UC	24 V; 24 to 60 V UC
• for signal "0"	-30 to +5 V DC	-30 to +5 V DC	0 to 20 V UC	0 to 40 V AC/ -40 to +40 V DC	-6 to +6 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	15 to 72 V DC; -15 to -72 V DC; 15 to 60 V AC
• Frequency range			47 to 63 Hz	47 to 63 Hz	47 to 63 Hz AC / DC

SIMATIC S7-400

Digital modules

SM 421 digital input modules

Technical specifications (continued)

	6ES7 421-7BH01-0AB0	6ES7 421-1BL01-0AA0	6ES7 421-1EL00-0AA0	6ES7 421-1FH20-0AA0	6ES7 421-7DH00-0AB0
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 - Rated value	Yes				Yes 0.5 ms; 0.5 / 3 / 10 / 20 ms
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; 600 m: 3, 10, 20 ms; 100 m: 0.5 ms
Encoder					
Connectable encoders					
• 2-wire BEROs - permissible quiescent current (2-wire BEROs), max.	Yes 3 mA	Yes 1.5 mA	Yes 1 mA	Yes 5 mA; AC: 5 mA	Yes 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					
Dimensions					
• 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

SIMATIC S7-400

Digital modules

SM 421 digital input modules

Ordering data		Order No.	Order No.	
SM 421 digital input modules			Labeling sheets for machine inscription	
16 inputs, 24 V DC, with process/diagnostics interrupt		6ES7 421-7BH01-0AB0	DIN A4, for printing using laser printer; pack of 10	
32 inputs, 24 V DC		6ES7 421-1BL01-0AA0	petrol	6ES7 492-2AX00-0AA0
32 inputs, 120 V AC/DC		6ES7 421-1EL00-0AA0	light-beige	6ES7 492-2BX00-0AA0
16 inputs, 120/230 V AC/DC, inputs according to IEC 1131-2 Type 2		6ES7 421-1FH20-0AA0	yellow	6ES7 492-2CX00-0AA0
16 inputs, 24 to 60 V AC/DC, with process/diagnostics interrupt		6ES7 421-7DH00-0AB0	red	6ES7 492-2DX00-0AA0
Front connectors			SIMATIC Manual Collection	B3 6ES7 998-8XC01-8YE0
48-pin			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	
• With screw-type contacts, 1 unit	B7	6ES7 492-1AL00-0AA0	SIMATIC Manual Collection maintenance service for 1 year	B3 6ES7 998-8XC01-8YE2
• With screw-type contacts, 84 units	B6	6ES7 492-1AL00-1AB0	Current "Manual Collection" DVD and the three subsequent updates	
• With spring-loaded contacts, 1 unit		6ES7 492-1BL00-0AA0	Manual "SIMATIC S7-400 programmable controller"	6ES7 498-8AA05-8AA0 6ES7 498-8AA05-8BA0 6ES7 498-8AA05-8CA0 6ES7 498-8AA05-8DA0 6ES7 498-8AA05-8EA0
• With crimp contacts, 1 unit	B7	6ES7 492-1CL00-0AA0		
• With crimp contacts, 84 units		6ES7 492-1CL00-1AB0		
SIMATIC TOP connect		see page 5/131; Information about which components can be used for the respective module, see DT&IAMall or Catalog KT 10.2		
Cover film for labeling strips		6ES7 492-2XX00-0AA0		
Spare part				
S7 SmartLabel V3.0				
Software for automatic labeling of modules based on data of the STEP 7 project				
Single license	B8	2XV9 450-1SL03-0YX0		
Upgrade single license	B8	2XV9 450-1SL03-0YX4		

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

B6: Subject to export regulations: AL: N and ECCN: EAR99

B7: Subject to export regulations: AL: N and ECCN: EAR99H

B8: Subject to export regulations: AL: N and ECCN: EAR99S

SIMATIC S7-400

Digital modules

SM 422 digital output modules

Overview



- Digital outputs for the SIMATIC S7-400
- For connecting solenoid valves, contactors, low-power motors, lamps and motor starters

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Technical specifications

	6ES7 422-1FH00-0AA0	6ES7 422-1HH00-0AA0	6ES7 422-1BH11-0AA0	6ES7 422-1BL00-0AA0	6ES7 422-7BL00-0AB0
Supply voltages					
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
Current consumption/ power loss					
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
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)

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 subassembly; 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
• 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
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 (30 V DC); 5 A (230 V AC); 1.2 A (60 V DC); 0.2 A (125 V DC)			
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					
Dimensions					
• 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

SIMATIC S7-400

Digital modules

SM 422 digital output modules

Ordering data	Order No.	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 item B7	6ES7 492-1AL00-0AA0	
• with screw contacts, 84 items B6	6ES7 492-1AL00-1AB0	
• with spring-loaded terminals, 1 item	6ES7 492-1BL00-0AA0	
• with crimp contacts, 1 item B7	6ES7 492-1CL00-0AA0	
• with crimp contacts, 84 items	6ES7 492-1CL00-1AB0	
SIMATIC TOP connect	see page 5/131; Information about which components can be used for the respective module, see DT&I AMall or Catalog KT 10.2	
Cover film for labeling strips	6ES7 492-2XX00-0AA0	
Spare part		
S7 SmartLabel V3.0		
Software for automatic labeling of modules direct from the STEP 7 project		
Single license B8	2XV9 450-1SL03-0YX0	
Upgrade single license B8	2XV9 450-1SL03-0YX4	
	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 B3	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 B3	6ES7 998-8XC01-8YE2
	Current "Manual Collection" DVD and the three subsequent updates	
	Manual "SIMATIC S7-400 programmable controller"	
	incl. instruction list	
	German	6ES7 498-8AA05-8AA0
	English	6ES7 498-8AA05-8BA0
	French	6ES7 498-8AA05-8CA0
	Spanish	6ES7 498-8AA05-8DA0
	Italian	6ES7 498-8AA05-8EA0

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

B6: Subject to export regulations: AL: N and ECCN: EAR99

B7: Subject to export regulations: AL: N and ECCN: EAR99H

B8: Subject to export regulations: AL: N and ECCN: EAR99S

SIMATIC S7-400

SIPLUS digital modules

SIPLUS SM 421 digital input modules
SIPLUS SM 422 digital output modules

Overview SIPLUS SM 421



- Digital inputs for SIMATIC S7-400
- For connection of switches and 2-wire proximity switches (BEROs)

Digital input module SIPLUS SM 421

Order No.	6AG1 421-1BL01-2AA0
Order No. based on	6ES7 421-1BL01-0AA0
Ambient temperature range	-25 ... +60 °C
Environmental conditions	Suited for exceptional medial exposure (e. g. by chlorine sulfur atmosphere).
Technical data	The technical data are identical with those of the based-on modules.

For further technical documentation on SIPLUS, see:
<http://www.siemens.com/siplus-techdoku>

Overview SIPLUS SM 422



- Digital outputs for SIMATIC S7-400
- For connecting solenoid valves, contactors, small-power motors, lamps and motor starters

Digital input module SIPLUS SM 422

Order No.	6AG1 422-1BL00-2AA0
Order No. based on	6ES7 422-1BL00-0AA0
Ambient temperature range	-25 ... +60 °C
Environmental conditions	Suited for exceptional medial exposure (e. g. by chlorine sulfur atmosphere).
Technical data	The technical data are identical with those of the based-on modules.

For further technical documentation on SIPLUS, see:
<http://www.siemens.com/siplus-techdoku>

Ordering data	Order No.
SIPLUS SM 421 digital input module (extended temperature range and medium exposure) 32 inputs, 24 V DC	6AG1 421-1BL01-2AA0
Accessories	see S7-400 digital input modules SM 421, page 5/65

Ordering data	Order No.
SIPLUS SM 422 digital output module (extended temperature range and medium exposure) 32 outputs, 24 V DC; 0.5 A	6AG1 422-1BL00-2AA0
Accessories	see S7-400 digital output modules SM 422, page 5/68

SIMATIC S7-400

Analog modules

SM 431 analog input modules

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

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Technical specifications

	6ES7 431-0HH00-0AB0	6ES7 431-1KF20-0AB0	6ES7 431-1KF00-0AB0	6ES7 431-1KF10-0AB0
Supply voltages				
Load voltage L+				
• Rated value (DC)	24 V; only required for supplying 2-wire transmitters	24 V; only required for supplying 2-wire transmitters	not necessary	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; for 8 connected, fully controlled 2-wire transmitters		200 mA
from backplane bus DC 5 V, max.	100 mA	1 000 mA	350 mA	600 mA
Current consumption/ power loss				
Power loss, typ.	2 W	4.9 W	1.8 W	3.5 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	200 m; 50 m with thermocouples and input ranges ≤ 80 mV
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 431-1KF20-0AB0	6ES7 431-1KF00-0AB0	6ES7 431-1KF10-0AB0
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), resistance thermometers				
• Ni 100				Yes
• Ni 1000				Yes
• Pt 100				Yes
• Pt 1000				Yes
• Pt 10000				Yes
• Pt 200				Yes
• Pt 500				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
• permissible input frequency for voltage input (destruction limit), max.	20 V; 20 V continuous, 75 V for max. 1 s (mark to space ratio 1:20)	18 V; 18 V continuous, 75 V for 1 ms (mark to space ratio 1:20)	50 V	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	40 mA; Permanent	50 mA; 40 mA continuous	40 mA; Permanent
Characteristic curve linearization				
• programmable				Yes
- for thermoelements				Type B, E, J, K, L, N, R, S, T, U
- for thermoresistor				Pt100, Pt200, Pt500, Pt1000, Ni100, Ni1000
Temperature compensation				
• internal temperature compensation				Yes
• external temperature compensation with compensations socket				Yes
• external temperature compensation with Pt100				No
• dynamic reference temperature value				Yes

SIMATIC S7-400

Analog modules

SM 431 analog input modules

Technical specifications (continued)

	6ES7 431-0HH00-0AB0	6ES7 431-1KF20-0AB0	6ES7 431-1KF00-0AB0	6ES7 431-1KF10-0AB0
Analog value creation				
Integration and conversion time/resolution per channel				
• Resolution with overload area (bit including sign), max.	13 Bit	14 Bit; 14 / 14 / 14	13 Bit	14 Bit; with activated smoothing: 16 Bit
• Integration time, parameterizable	Yes	Yes	Yes	Yes
• Basic conversion time, ms	50 / 60 ms		16.7 / 20 ms	16.7 / 20 ms
• Integration time, ms	55 / 65 ms	52 µs	23 / 25 ms	20.1 / 23.5 ms
• additional conversion time for wire break monitoring				4.3 ms
• additional conversiontime for resistance measurement				5.5 ms
• additional conversiontime for wire break monitoring and resistance measurement				40.2 / 47 ms
• Interference voltage suppression for interference frequency f1 in Hz	60 / 50 Hz	none / 400 / 60 / 50 Hz	60 / 50 Hz	60 / 50 Hz
Encoder				
Connection of signal encoders				
• for current measurement as 2-wire transducer		Yes	Yes; with external transmitter supply	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; Line resistances are also measured	Yes
• for resistance measurement with 4-conductor connection		Yes	Yes	Yes
Errors/accuracies				
Operational limit in overall temperature range				
• Voltage, relative to input area	+/- 0,65 %; 1.0% at 1 to 5 V; 0.65% at +/-1 V, +/-10 V	+/- 0,7 %; +/-0.7% at +/-1 V; +/-0.9% at +/-10 V, 1 to 5 V	+/- 1 %; +/-1.0% at +/-1 V; +/-0.6% 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 to 5 V, +/-10 V
• Current, relative to input area	+/- 0.65 %	+/- 0,8 %; at +/-20 mA, 4 to 20 mA	+/- 1 %; at +/-20 mA, 4 to 20 mA	+/- 0,35 %; 0 to 20 mA, +/-20 mA, 4 to 20 mA
• Impedance, relative to input area		+/- 1 %	+/- 1,25 %; 0 to 500 ohms (4-conductor measurement, in range of 600 ohms)	+/- 0.5 %
• 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	+/- 0,6 %; 0.6% at +/-1 V; 0.75% at +/-10 V, 1 to 5 V	+/- 0,7 %; 0.7% at +/-1 V; 0.4% at +/-10 V; 0.5% at 1 to 5 V	+/- 0,15 %; +/-0.15% (+/-250 mV, +/-500 mV, +/-1 V, +/-2.5 V, +/-5 V, 1 to 5 V, +/- 10 V); +/-0.17% (+/- 80 mV);
• Current, relative to input area	+/- 0,25 %; at +/-20 mA, 4 to 20 mA	+/- 0,7 %; 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

Technical specifications (continued)

	6ES7 431-0HH00-0AB0	6ES7 431-1KF20-0AB0	6ES7 431-1KF00-0AB0	6ES7 431-1KF10-0AB0
Basic error limit (operational limit at 25 °C) Impedance, relative to input area		+/- 0,7 %; 0 to 600 ohms	+/- 0,8 %; 0 to 500 ohms (4-conductor measurement, in range of 600 ohms)	+/- 0,15 %; +/-0.15% at 0 to 48 ohms (4-conductor measurement), 0 to 150 ohms (4-conductor measurement), 0 to 300 ohms (4-conductor measurement), 0 to 600 ohms (4-conductor measurement), 0 to 5000 ohms (4-conductor measurement, in range of 6000 ohms); +/-0.3% at 0 to 300 ohms (3-conductor measurement), 0 to 600 ohms (3-conductor measurement), 0 to 5000 ohms (3-conductor measurement, in range of 6000 ohms) +/- 0.3 %
Resistance-type thermometer, relative to input area				
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; 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; 2120 V DC between analog part and local ground	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
Isolation Isolation, analog inputs - Isolation, analog inputs - between the channels	No No	Yes; internal/external No	Yes; internal/external No	Yes; internal/external No
Permissible potential difference between the inputs (UCM)	2 V DC / 2 Vpp AC	8 V AC	30 V AC	120 V AC
Dimensions Required slots	1	1	1	1
Dimensions Dimensions - Width - Height - Depth	25 mm 290 mm 210 mm	25 mm 290 mm 210 mm	25 mm 290 mm 210 mm	25 mm 290 mm 210 mm
Weights Weight, approx.	500 g	500 g	500 g	500 g

SIMATIC S7-400

Analog modules

SM 431 analog input modules

Technical specifications (continued)

	6ES7 431-7QH00-0AB0	6ES7 431-7KF00-0AB0	6ES7 431-7KF10-0AB0
Supply voltages			
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
Current consumption/ power loss			
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
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	
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	

Technical specifications (continued)

	6ES7 431-7QH00-0AB0	6ES7 431-7KF00-0AB0	6ES7 431-7KF10-0AB0
Input ranges (rated values), resistance thermometers			
• Ni 100	Yes		Yes
• Ni 1000	Yes		Yes; Different characteristics selectable: Europe/U.S
• Pt 100	Yes		Yes
• Pt 1000	Yes		Yes
• Pt 200	Yes		Yes
• Pt 500	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		
• 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	
Characteristic curve linearization			
• programmable	Yes	Yes	Yes
- for thermoelements	Type B, E, J, K, L, N, R, S, T, U	Type B, E, J, K, L, N, R, S, T, U	
- for thermoresistor	Pt100, Pt200, Pt500, Pt1000, Ni100, Ni1000		Pt100, Pt200, Pt500, Pt1000, Ni100, Ni1000; different characteristics selectable (Europe/U.S.)
Temperature compensation			
• internal temperature compensation	Yes	Yes	
• external temperature compensation with compensations socket	Yes		
• external temperature compensation with Pt100		Yes	
• dynamic reference temperature value	Yes	Yes	
Analog value creation			
Integration and conversion time/resolution per channel			
• Resolution with overload area (bit including sign), max.	16 Bit; 16 / 16 / 16	16 Bit	16 Bit
• Integration time, parameterizable	Yes	Yes	Yes
• Basic conversion time, ms	2.5 / 16.7 / 20 ms	2.5 / 16.7 / 20 / 100	8 / 23 / 25 ms

SIMATIC S7-400

Analog modules

SM 431 analog input modules

Technical specifications (continued)

	6ES7 431-7QH00-0AB0	6ES7 431-7KF00-0AB0	6ES7 431-7KF10-0AB0
Analog value creation (cont.)			
• Integration time, ms	2.5 / 16.7 / 20 ms	2.5 / 16.7 / 20 / 100 ms	20 ms at 50 Hz (entire module incl. wire break)
• additional conversion time for wire break monitoring	4.3 / 4.3 / 4.3 ms		110 ms / 4 ms
• additional conversion time for resistance measurement	12 / 40.2 / 47 ms		
• additional conversion time for wire break monitoring and resistance measurement	5.5 ms	1 ms (module)	none
• 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 ohms (4-conductor measurement), 0 to 150 ohms (4-conductor measurement), 0 to 300 ohms (4-conductor measurement), 0 to 600 ohms (4-conductor measurement), 0 to 5000 ohms (4-conductor measurement, in range of 6000 ohms); +/-0.4% at 0 to 300 ohms (3-conductor measurement), 0 to 600 ohms (3-conductor measurement), 0 to 5000 ohms (3-conductor measurement, in range of 6000 ohms);		
• Resistance-type thermometer, relative to input area	+/- 0.4 %		+/-1 °C
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, 1 to 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 to 20 mA, +/-5 mA, +/-10 mA, +/- 20 mA, 4 to 20 mA	+/- 0.17 %	

Technical specifications (continued)

	6ES7 431-7QH00-0AB0	6ES7 431-7KF00-0AB0	6ES7 431-7KF10-0AB0
Basic error limit (operational limit at 25 °C)			
Impedance, relative to input area	+/- 0,15 %; +/-0.15% at 0 to 48 ohms (4-conductor measurement), 0 to 150 ohms (4-conductor measurement), 0 to 300 ohms (4-conductor measurement), 0 to 5000 ohms (4-conductor measurement, in range of 6000 ohms); +/-0.3% at 0 to 300 ohms (3-conductor measurement), 0 to 600 ohms (3-conductor measurement), 0 to 5000 ohms (3-conductor measurement, in range of 6000 ohms)		
Resistance-type thermometer, relative to input area	+/- 0.3 %		+/-0.2 °C
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; internal/external	Yes; internal/external	Yes; internal/external
between the channels	No	Yes	No
Permissible potential difference			
between the inputs (UCM)	120 V AC	120 V AC	none
Dimensions			
Required slots	1	1	1
Dimensions			
Dimensions			
Width	25 mm	25 mm	25 mm
Height	290 mm	290 mm	290 mm
Depth	210 mm	210 mm	210 mm
Weights			
Weight, approx.	500 g	650 g	650 g

SIMATIC S7-400

Analog modules

SM 431 analog input modules

Ordering data	Order No.	Order No.
SM 431 analog output module		
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 thermo-couples (I, U)	6ES7 431-7KF00-0AB0	
8 inputs, floating, 16 bit, process interrupt capability, for temperature sensors	6ES7 431-7KF10-0AB0	
Front connectors		
48-pin		
• with screw contacts, 1 item B7	6ES7 492-1AL00-0AA0	
• with screw contacts, 84 items B6	6ES7 492-1AL00-1AB0	
• with spring-loaded terminals, 1 item	6ES7 492-1BL00-0AA0	
• with crimp contacts, 1 item B7	6ES7 492-1CL00-0AA0	
• with crimp contacts, 84 items	6ES7 492-1CL00-1AB0	
1 unit; for 6ES7 431-7KF00-0AB0; spare part, included in scope of delivery	6ES7431-7KF00-6AA0	
SIMATIC TOP connect	see page 5/131; Information about which components can be used for the respective module, see DT&IAMall or Catalog KT 10.2	
Measuring range module for analog inputs	6ES7 974-0AA00-0AA0	
1 module for 2 inputs (spare part)		
Cover film for labeling strips	6ES7 492-2XX00-0AA0	
Spare part		
	S7 SmartLabel V3.0	
	Software for automatic labeling of modules direct from the STEP 7 project	
	Single license B8	2XV9 450-1SL03-0YX0
	Upgrade single license B8	2XV9 450-1SL03-0YX4
	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 B3	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 B3	6ES7 998-8XC01-8YE2
	Current "Manual Collection" DVD and the three subsequent updates	
	Manual "SIMATIC S7-400 programmable controller"	
	incl. instruction list	
	German	6ES7 498-8AA05-8AA0
	English	6ES7 498-8AA05-8BA0
	French	6ES7 498-8AA05-8CA0
	Spanish	6ES7 498-8AA05-8DA0
	Italian	6ES7 498-8AA05-8EA0

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

B6: Subject to export regulations: AL: N and ECCN: EAR99

B7: Subject to export regulations: AL: N and ECCN: EAR99H

B8: Subject to export regulations: AL: N and ECCN: EAR99S

Overview



- Analog outputs for the SIMATIC S7-400
- For the connection of analog actuators

Technical specifications

6ES7 432-1HF00-0AB0	
Supply voltages	
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
Current consumption/ power loss	
Power loss, max.	9 W
Analog outputs	
Number of analog 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 k Ω
• with voltage outputs, capacitive load, max.	1 μ F
• with current outputs, max.	500 Ω 600 ohms if common-mode-voltage reduced to <1 V

6ES7 432-1HF00-0AB0	
Analog value creation	
Integration and conversion time/resolution per channel	
• Resolution with overload area (bit including sign), max.	13 Bit
• Conversion time (per channel)	420 μ s; 420 μ s in the ranges 1 to 5 V and 4 to 20 mA; 300 μ s 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 to 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
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

SIMATIC S7-400

Analog modules

SM 432 analog output modules

Technical specifications (continued)

6ES7 432-1HF00-0AB0	
Isolation	
Isolation, analog outputs	
• between the channels and the backplane bus	Yes
Dimensions	
Required slots	1
Dimensions	
Dimensions	
• Width	25 mm
• Height	290 mm
• Depth	210 mm
Weights	
• Weight, approx.	650 g

Ordering data

Order No.

SM 432 analog output module		6ES7 432-1HF00-0AB0
8 outputs, floating, 13 bit		
Front connectors		
48-pin		
• with screw contacts, 1 item	B7	6ES7 492-1AL00-0AA0
• with screw contacts, 84 items	B6	6ES7 492-1AL00-1AB0
• with spring-loaded terminals, 1 item		6ES7 492-1BL00-0AA0
• with crimp contacts, 1 item	B7	6ES7 492-1CL00-0AA0
• with crimp contacts, 84 items		6ES7 492-1CL00-1AB0
SIMATIC TOP connect		see page 5/131; 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 V3.0		
Software for automatic labeling of modules direct from the STEP 7 project		
Single license	B8	2XV9 450-1SL03-0YX0
Upgrade single license	B8	2XV9 450-1SL03-0YX4
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	B3	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	B3	6ES7 998-8XC01-8YE2
Current "Manual Collection" DVD and the three subsequent updates		
Manual "SIMATIC S7-400 programmable controller"		
incl. instruction list		
German		6ES7 498-8AA05-8AA0
English		6ES7 498-8AA05-8BA0
French		6ES7 498-8AA05-8CA0
Spanish		6ES7 498-8AA05-8DA0
Italian		6ES7 498-8AA05-8EA0

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

B6: Subject to export regulations: AL: N and ECCN: EAR99

B7: Subject to export regulations: AL: N and ECCN: EAR99H

B8: Subject to export regulations: AL: N and ECCN: EAR99S

SIMATIC S7-400

SIPLUS analog modules

SIPLUS SM 431 analog input module
SIPLUS SM 432 analog output module

Overview SIPLUS SM 431



- Analog inputs for SIMATIC S7-400
- Connecting voltage sensors and current sensors, thermo elements, resistors and resistance thermometers
- Resolution 13 to 16 bit

Analog input module SIPLUS SM 431

Order No.	6AG1 431-0HH00-4AB0
Order No. based on	6ES7 431-0HH00-0AB0
Ambient conditions	Suited for exceptional medial exposure (e. g. by chlorine sulfur atmosphere).
Technical data	The technical data are identical with those of the based-on modules.

For further technical documentation on SIPLUS, see:

<http://www.siemens.com/siplus-techdoku>

Overview SIPLUS SM 432



- Analog outputs for SIMATIC S7-400
- For connection of analog actuators

Analog output module SIPLUS SM 432

Order No.	6AG1 432-1HF00-4AB0
Order No. based on	6ES7 432-0HF00-0AB0
Ambient conditions	Suited for exceptional medial exposure (e. g. by chlorine sulfur atmosphere).
Technical data	The technical data are identical with those of the based-on modules.

For further technical documentation on SIPLUS, see:

<http://www.siemens.com/siplus-techdoku>

Ordering data	Order No.
SIPLUS SM 431 analog input module (medial exposure) 16 inputs, non-floating, 13 bit	6AG1 431-0HH00-4AB0
Accessories	see S7-400 analog input modules SM 431, page 5/78

Ordering data	Order No.
SIPLUS SM 432 analog output module (medium exposure) 8 outputs, floating, 13 bit	6AG1 432-1HF00-4AB0
Accessories	see S7-400 analog output modules SM 432, page 5/80

SIMATIC S7-400

Function modules

FM 450-1 counter module

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.

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

Technical specifications

6ES7 450-1AP00-0AE0	
Supply voltages	
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
Current consumption/ power loss	
Power loss, typ.	9 W
Connection point	
required front connectors	1x 48-polig
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+ (-3 V)
• Short-circuit protection	Yes
• Output current, max.	300 mA

SIMATIC S7-400

Function modules

FM 450-1 counter module

Technical specifications (continued)

6ES7 450-1AP00-0AE0	
Encoder	
Connectable encoders	
• Incremental encoder (symmetrical)	Yes; with 2 pulse strings 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 +5 V
• Input voltage, for signal "1"	+11 to +30 V
• Input current, for signal "1", typ.	9 mA
• Counter frequency, max.	200 kHz
• Minimum pulse width	>= 2.5 μs (200 kHz); <= 25 μs (20 kHz) (parameterizable)
Parameter	
Remark	Assigned binary addresses: 64 bytes/64 bytes
Isolation	
Isolation checked with	500 V
Isolation	
Galvanic isolation, digital inputs	
• between the channels and the backplane bus	Yes; Optocoupler
Isolation, digital outputs	
• 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	75 V DC / 60 V AC
Dimensions	
Dimensions	
• 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 connectors		
48-pin		
• with screw contacts, 1 item	B7	6ES7 492-1AL00-0AA0
• with screw contacts, 84 items	B6	6ES7 492-1AL00-1AB0
• with spring-loaded terminals, 1 item		6ES7 492-1BL00-0AA0
• with crimp contacts, 1 item	B7	6ES7 492-1CL00-0AA0
• with crimp contacts, 84 items		6ES7 492-1CL00-1AB0
Front covers for CPU and function modules		6ES7 492-1XL00-0AA0
Spare part		
B6: Subject to export regulations: AL: N and ECCN: EAR99		
B7: Subject to export regulations: AL: N and ECCN: EAR99H		

SIMATIC S7-400

Function modules

SIPLUS FM 450-1 counter module

Overview

- Two-channel, intelligent counter module for simple counting tasks
- For direct connection of incremental sensors
- Comparison functions with two definable comparison values
- Integrated digital outputs for the output of the reaction on reaching the comparison values

Ordering data

Order No.

FM 450-1 counter module

(medium exposure)

with 2 channels, max. 500 kHz;
for incremental encoder

6AG1 450-1AP00-4AE0

Accessories

see FM 450-1, page 5/83

SIPLUS FM 450-1 counter module

Order No.	6AG1 450-1AP00-4AE0
Order No. based on	6ES7 450-1AP00-0AE0
Ambient conditions	Suited for exceptional medial exposure (e. g. by chlorine sulfur atmosphere)
Technical data	The technical data are identical to that of the based-on modules.

For further technical documentation on SIPLUS, see:

<http://www.siemens.com/siplus-techdoku>

Note:

We offer incremental sensors and preassembled connecting cables for counting and positioning functions under SIMODRIVE Sensor or Motion Connect 500.

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

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.

<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	1x 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

6ES7 451-3AL00-0AE0	
Encoder supply	
5 V encoder supply	
• 5 V	Yes
• Output current, max.	210 mA
• Cable length, max.	35 m; at max. 210 mA
24 V encoder supply	
• 24 V	Yes
• Output current, max.	300 mA
• Cable length, max.	100 m; at max. 300 mA
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

SIMATIC S7-400

Function modules

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	1
• cable length, shielded, max.	300 m; at max. 156 kBit/s
Isolation	
Galvanic isolation, digital inputs	
• galvanic isolation, digital inputs	Yes
Isolation, digital outputs	
• Galvanic isolation, digital outputs	Yes
Environmental requirements	
Operating temperature	
• min.	0 °C
• max.	55 °C
Storage/transport temperature	
• min.	-40 °C
• max.	70 °C
Relative humidity	
• Humidity class F	Yes
Degree of protection	
IP 20	Yes
Dimensions	
Dimensions	
• Width	50 mm
• Height	290 mm
• Depth	210 mm
Weights	
• Weight, approx.	1 300 g

Ordering data

Order No.

FM 451 positioning module		6ES7 451-3AL00-0AE0
for rapid traverse and creep speed drives		
Front connector		
48-pin		
• with screw contacts, 1 item	B7	6ES7 492-1AL00-0AA0
• with screw contacts, 84 items	B6	6ES7 492-1AL00-1AB0
• with spring-loaded terminals, 1 item		6ES7 492-1BL00-0AA0
• with crimp contacts, 1 item	B7	6ES7 492-1CL00-0AA0
• with crimp contacts, 84 items		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	2-2CD01-
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
0 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

B6: Subject to export regulations: AL: N and ECCN: EAR99

B7: Subject to export regulations: AL: N and ECCN: EAR99H

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.

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

Technical specifications

6ES7 452-1AH00-0AE0		6ES7 452-1AH00-0AE0	
Supply voltages		Encoder supply	
Rated value		5 V encoder supply	
• DC 24 V	Yes	• 5 V	Yes
Current consumption		• Output current, max.	300 mA
Current consumption, max.	500 mA	• Cable length, max.	32 m
Connection point		24 V encoder supply	
required front connectors	1x 48-pin	• 24 V	Yes
Digital inputs		• Output current, max.	300 mA
Number of digital inputs	11	• Cable length, max.	100 m
Functions	Reference point switch, flying actual value setting/length measurement, brake release, enable track output no. 3 to 10	Encoder	
Input voltage		Connectable encoders	
• Rated value, DC	24 V	• Incremental encoder (symmetrical)	Yes
• for signal "0"	-28.8 to +5 V	• Incremental encoder (asymmetrical)	Yes
• for signal "1"	11 to 28.8 V	• Absolute encoder (SSI)	Yes
Input current		• 2-wire BERO	Yes
• for signal "0", max. (permissible quiescent current)	2 mA	Encoder signals, incremental encoder (symmetrical)	
• for 2-wire BERO - for signal "1", typ.	9 mA	• Trace mark signals	A. notA. B. notB
Digital outputs		• Zero mark signal	N. notN
Number of digital outputs	16	• Input signal	5 V difference signal (phys. RS 422)
Functions	Cam tracks	• Input frequency, max.	1 MHz
Short-circuit protection of the output	Yes	Encoder signals, incremental encoder (asymmetrical)	
Output voltage		• Trace mark signals	A. B
• Rated value (DC)	24 V	• Zero mark signal	N
• for signal "1", min.	UP - 0.8 V	• Input voltage	24 V
Output current		• Input frequency, max.	50 kHz; 50 kHz for 25 m cable length; 25 kHz for 100 m cable length
• for signal "1" permissible range for 0 to 55 °C, max.	600 mA; with UPmax		
• for signal "0" residual current, max.	0.5 mA		

SIMATIC S7-400

Function modules

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	1
• cable length, shielded, max.	300 m; at max. 125 kHz
Isolation	
Galvanic isolation, digital inputs	
• galvanic isolation, digital inputs	No
Isolation, digital outputs	
• Galvanic isolation, digital outputs	No
Environmental requirements	
Operating temperature	
• min.	0 °C
• max.	55 °C
Storage/transport temperature	
• min.	-40 °C
• max.	70 °C
Relative humidity	
• Humidity class F	Yes
Degree of protection	
IP 20	Yes
Dimensions	
Dimensions	
• 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 item	B7	6ES7 492-1AL00-0AA0
• with screw contacts, 84 items	B6	6ES7 492-1AL00-1AB0
• with spring-loaded terminals, 1 item		6ES7 492-1BL00-0AA0
• with crimp contacts, 1 item	B7	6ES7 492-1CL00-0AA0
• with crimp contacts, 84 items		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 5/86

B6: Subject to export regulations: AL: N and ECCN: EAR99

B7: 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.

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

Technical specifications

6ES7 453-3AH00-0AE0	
Supply voltages	
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 voltage 1L+, 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
Current consumption/ power loss	
Power loss, max.	8 W
Connection point	
required front connectors	1x 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	15 µs; via input voltage range, 8 µs at DC 24 V
- at "0" to "1", max.	
- 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

6ES7 453-3AH00-0AE0	
Output voltage	
• Rated value (DC)	24 V
• for signal "1", min.	UP - 0.3 V
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

SIMATIC S7-400

Function modules

FM 453 positioning module

Technical specifications (continued)

6ES7 453-3AH00-0AE0	
Encoder signals, absolute encoder (SSI)	
• Input signal	5 V difference signal (phys. RS 422)
• Clock frequency, max.	1.25 Mbit/s at 10 cable length (2.5 Mbit/s available soon)
• cable length, shielded, max.	250 m; at max. 156 kBit/s
Drive interface	
Signal input I	
• Type	Drive interface step, signal input "READY 1"
• Function	"Power section ready" where $U_i < 1 \text{ V}$, $I_i = 2 \text{ mA}$
Signal output I	
• Type	5 V (phys. RS 422)
• Function	Clock pulse, direction, enable, current control
• Differential output voltage, min.	2 V; $R_L = 100 \text{ Ohm}$
• Differential output voltage for signal "0", max.	1.1 V; $I_o = 30 \text{ mA}$
• Differential output voltage, for signal "1", min.	3.7 V; $I_o = -30 \text{ mA}$
• Load impedance	55 Ω
• Pulse frequency	200 kHz; 500 kHz available soon
• Cable length, max.	35 m; 35 m with symm. transmission; 10 m with asymm. transmission
Signal output II	
• Type	Contact relay
• Function	Drive disconnection for operation
• Load	1 A/50 V/30 VA DC
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

6ES7 453-3AH00-0AE0	
Isolation	
Galvanic isolation, digital inputs	
• galvanic isolation, digital inputs	Yes; Optocoupler
Isolation, digital outputs	
• Galvanic isolation, digital outputs	Yes; Optocoupler
Environmental requirements	
Operating temperature	
• min.	0 °C
• max.	55 °C
Storage/transport temperature	
• min.	-40 °C
• max.	70 °C
Relative humidity	
• Humidity class F	No
Degree of protection	
IP 20	Yes
Dimensions	
Dimensions	
• Width	50 mm
• Height	290 mm
• Depth	210 mm
Weights	
• Weight, approx.	1 620 g

Ordering data	Order No.
FM 453 positioning module with 3 channels/axes	6ES7 453-3AH00-0AE0
Setpoint connecting cable for 3 servo motors	6FX2 002-3AD01-■■■■■
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 5/86
Front covers for CPU and function modules Spare part	6ES7 492-1XL00-0AA0

Ordering data	Order No.
Front connector 48-pin	
• with screw contacts, 1 item B7	6ES7 492-1AL00-0AA0
• with screw contacts, 84 items B6	6ES7 492-1AL00-1AB0
• with spring-loaded terminals, 1 item	6ES7 492-1BL00-0AA0
• with crimp contacts, 1 item B7	6ES7 492-1CL00-0AA0
• with crimp contacts, 84 items	6ES7 492-1CL00-1AB0
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 5/86

B6: Subject to export regulations: AL: N and ECCN: EAR99
 B7: 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

5

Technical specifications

	6ES7 455-0VS00-0AE0	6ES7 455-1VS00-0AE0
Supply voltages		
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
Current consumption/ power loss		
Power loss, max.	17.3 W	16.2 W
Power loss, typ.	12 W	10.7 W
Connection point		
required front connectors	2x 48-pin	2x 48-pin
Digital inputs		
Number of digital inputs	16	16
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
Cable length		
• cable length, shielded, max.	1 000 m	1 000 m
• Cable length unshielded, max.	600 m	600 m
Digital outputs		
Number of digital outputs		32
Short-circuit protection of the output		Yes; Electronic

	6ES7 455-0VS00-0AE0	6ES7 455-1VS00-0AE0
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
• cable length, shielded, max.		1 000 m
• Cable length unshielded, max.		600 m
Analog inputs		
Number of analog inputs	16; with thermo- couples or 2-wire connection; 8 with Pt 100 or 4-wire connection	16; with thermo- couples or 2-wire connection; 8 with Pt 100 or 4-wire connection

SIMATIC S7-400

Function modules

FM 455 controller module

Technical specifications (continued)

	6ES7 455-0VS00-0AE0	6ES7 455-1VS00-0AE0
cable length, shielded, max.	200 m; 50 m at 80 mV and thermocouples	200 m; 50 m at 80 mV and thermocouples
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
• 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
Characteristic curve linearization		
• programmable - for thermoelements - for thermoresistor	Yes Typ B. J. K. R. S Pt100 (Standard)	Yes Typ B. J. K. R. S Pt100 (Standard)
Temperature compensation		
• internal temperature compensation	Yes; parametrizable	Yes; parametrizable
• external temperature compensation with Pt100	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
Integration and conversion time/resolution per 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 - permissible quiescent current (2-wire BEROs), max.	Yes 1.5 mA	Yes 1.5 mA
Errors/accuracies		
Linearity error (relative to input area)	+/- 0.05 %	+/- 0.05 %

Technical specifications (continued)

	6ES7 455-0VS00-0AE0	6ES7 455-1VS00-0AE0
Temperature error (relative to input areas)	+/- 0.005 %/K	+/- 0.005 %/K
Linearity error (relative to output area)	+/- 0.05 %	
Temperature error (relative to output area)	+/- 0.02 %/K	
Operational limit in overall temperature range		
• Voltage, relative to input area	+/-0.6 to +/-1%	+/-0.6 to +/-1%
• Current, relative to input area	+/-0.6 to +/-1%	+/-0.6 to +/-1%
• Resistance-type thermometer, relative to input area	+/-0.6 to +/-1%	+/-0.6 to +/-1%
• 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 input area	+/-0.4 to +/-0.6%	+/-0.4 to +/-0.6%
• Current, relative to input area	+/-0.4 to +/-0.6%	+/-0.4 to +/-0.6%
• Resistance-type thermometer, relative to input area	+/-0.4 to +/-0.6%	+/-0.4 to +/-0.6%
• Voltage, relative to output area	+/- 0.4 %	
• Current, relative to output area	+/- 0.5 %	

	6ES7 455-0VS00-0AE0	6ES7 455-1VS00-0AE0
Interference voltage suppression for $f = n \times (f_l \pm 1 \%)$, f_l = 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	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
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 internally and the inputs	75 V DC / 60 V AC	75 V DC / 60 V AC
Dimensions		
Dimensions		
• 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

Ordering data	Order No.
FM 455 C controller module with 16 analog outputs for 16 continuous controllers	6ES7 455-0VS00-0AE0
FM 455 S controller module with 32 digital outputs for 16 step or pulse controllers	6ES7 455-1VS00-0AE0

Ordering data	Order No.
Front connectors	
48-pin	
• with screw contacts, 1 item B7	6ES7 492-1AL00-0AA0
• with screw contacts, 84 items B6	6ES7 492-1AL00-1AB0
• with spring-loaded terminals, 1 item	6ES7 492-1BL00-0AA0
• with crimp contacts, 1 item B7	6ES7 492-1CL00-0AA0
• with crimp contacts, 84 items	6ES7 492-1CL00-1AB0

B6: Subject to export regulations: AL: N and ECCN: EAR99
B7: Subject to export regulations: AL: N and ECCN: EAR99H

SIMATIC S7-400

Function modules

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

5

Technical specifications

6DD1 607-0AA2	
Supply voltages	
Rated value	
• DC 5 V	Yes
• DC 24 V	Yes
• Permissible range (ripple included), lower limit (DC)	4.8 V
• permissible range (ripple included), upper limit (DC)	5.25 V
Current consumption	
Current consumption, typ.	3 A
Current consumption, max.	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
direct data exchange (cross traffic)	Yes

6DD1 607-0AA2	
Digital inputs	
Number of digital inputs	8; Connectors x2
Input voltage	
• Rated value, DC	24 V
• for signal "0"	-1 to +6 V
• for signal "1"	13.5 to 33 V
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; only via optional interface modules
Dimensions	
Required slots	1
Dimensions	
Weights	1 000 g

SIMATIC S7-400

Function modules

FM 458-1 DP basic module

Ordering data	Order No.		Order No.
FM 458-1 DP application module Basic module for computing, closed-loop control and open-loop control tasks; with PROFIBUS DP interface	6DD1 607-0AA2	RS 485 bus connector with 90° cable outlet Max. transfer rate 12 Mbit/s Without PG interface With PG interface	6ES7 972-0BA12-0XA0 6ES7 972-0BB12-0XA0
Micro Memory Card for FM 458-1 DP basic module 2 MB 4 MB	6ES7 953-8LL20-0AA0 6ES7 953-8LM20-0AA0	RS 485 bus connector with angled cable outlet Max. transfer rate 12 Mbit/s Without PG interface With PG interface	6ES7 972-0BA41-0XA0 6ES7 972-0BB41-0XA0
FM 458-1 DP Know-How-Protect for protection of technological application modules against unauthorized copying	6DD1 607-0GA0	RS 485 bus connector with 90° cable outlet for FastConnect system Max. transfer rate 12 Mbit/s Without PG interface With PG interface	6ES7 972-0BA51-0XA0 6ES7 972-0BB51-0XA0
SC 64 interface cable To connect FM 458-1 to the serial interface of a programming device/ PC	6DD1 684-0GE0	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 order quantity 20 m Preferred lengths: 20 m 50 m 100 m	6XV1 830-0EH10 6XV1 830-0EN20 6XV1 830-0EN50 6XV1 830-0ET10
SB10 interface module To connect 8 binary I/Os to FM 458-1 DP	6DD1 681-0AE2		
SB61 interface module To connect 8 binary I/Os to FM 458-1 DP, input voltage: 24/48 V DC	6DD1 681-0EB3		
SU12 interface module To connect 10 signals to FM 458-1 DP	6DD1 681-0AJ1		

SIMATIC S7-400

Function modules

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
• for signal "1" (DC), max.	Supply voltage -2.5 V
Output current	
• for signal "1" rated value	50 mA
• for signal "1" permissible range for 0 to 40 °C, min.	100 mA
• for signal "0" residual current, max.	20 µA
• Total switching current	80% at 50 °C all outputs 50 mA
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 analog outputs	8; 4 outputs 16 bit; 4 outputs 12 bit
Voltage output, Short-circuit protection	Yes; relative to frame
Voltage output, short-circuit current, max..	16 bits: 27 mA; 12 bits: 100 mA
Output ranges, voltage	
• -10 to +10 V	Yes
Analog value creation	
Integration and conversion time/resolution per channel	
• Resolution with overload area (bit including sign), max.	4 AO: 16 bits, 4 AO: 12 bits, 5 AI: 12 bits
• Conversion time (per channel)	4 AO (16 bits): 2 µs; 4 AO (12 bits): 4 µs; 5 AI: 45 µs
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
Connectable encoders	
• Incremental encoder (symmetrical)	Yes
• Incremental encoder (asymmetrical)	Yes
• Absolute encoder (SSI)	Yes; Single- or multturn-encoder with SSI (synchronous serial) or EnDat interface+

SIMATIC S7-400

Function modules

EXM 438-1 input/output expansion module

Technical specifications

6DD1 607-0CA1	
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	with 0 signal: -5 to 0 V; with 1 signal: +3 to +5 V; permissible input voltage range: differential voltage -5 to +5 V; max. input current: 15 mA (important: not limited on module side!)
• 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	with 0 signal: -30 to +4 V (at 15 mA load); with 1 signal: +8 to 30 V (at 15 mA load); permissible input voltage range: differential voltage -30 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)
Errors/accuracies	
Linearity error (relative to output area)	(+/- 1 LSB)
Isolation	
Galvanic isolation, digital inputs	
• galvanic isolation, digital inputs	No
Isolation, digital outputs	
• Galvanic isolation, digital outputs	No
Isolation, analog inputs	
• Isolation, analog inputs	No
Isolation, analog outputs	
• Galvanic isolation, analog outputs	No
Dimensions	
Required slots	1
Dimensions	
Weights	1 kg

Ordering data

Order No.

EXM 438-1 input/output expansion	6DD1 607-0CA1
for direct exchange of digital and analog signals between FM 458-1 DP and the plant	
SB10 interface module	6DD1 681-0AE2
To connect 8 binary inputs or outputs to FM 458-1 DP	
SB61 interface module	6DD1 681-0EB3
To connect 8 binary inputs to FM 458-1 DP, input voltage: 24/48 V DC	
SB71 interface module	6DD1 681-0DH1
To connect 8 binary outputs to FM 458-1 DP, output voltage: 24/48 V DC	
SU12 interface module	6DD1 681-0AJ1
To connect 10 signals to FM 458-1 DP	
SU13 interface module	6DD1 681-0GK0
To connect 50 signals to FM 458-1 DP	
SC 62 interface cable	6DD1 684-0GC0
To connect EXM 438-1 with up to 5 SBxx or SU12	
SC 63 interface cable	6DD1 684-0GD0
To connect EXM 438-1 with an SU13	

Overview



- Optional expansion module for the FM 458-1 DP basic module
- For fast communication over PROFIBUS DP or SIMOLINK
- EXM 448: With vacant slot for a MASTERDRIVES option module

Technical specifications

6DD1 607-0EA0	
Supply voltages	
Rated value	Yes
• DC 5 V	
Current consumption	
Current consumption, typ.	0.8 A
Dimensions	
Required slots	1
Dimensions	
Weights	0.8 kg

Ordering data

**EXM 448
universal communications
expansion module**

For fast communication, for example, with drives; with free slot for MASTERDRIVES option module

Order No.

6DD1 607-0EA0

SIMATIC S7-400

Function modules

EXM 448-2 universal communication expansion module

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	
Required slots	1
Dimensions	
Weights	0.9 kg

Ordering data

Order No.

EXM 448-2 universal communications expansion module		6DD1 607-0EA2	
For fast communication with drives; for constructing two SIMOLINK fiber-optic connections			
FM 458-1 DP User Manual	B7	6DD1 904-0AE1	
English/German			

B7: Subject to export regulations: AL: N and ECCN: EAR99H

SIMATIC S7-400

Function modules

Accessories for FM 458-1 DP

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.

SIMATIC S7-400

Function modules

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 SU12 interface module



The interface module is used to connect 10 signals; there is no electronic conversion.

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 SU13 interface module



This interface module can be used to connect 50 signals; there is no electronic conversion.

SIMATIC S7-400

Function modules

Accessories for FM 458-1 DP

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	DC 24/48 V
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 modules 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 module

with screw-plug-in terminal

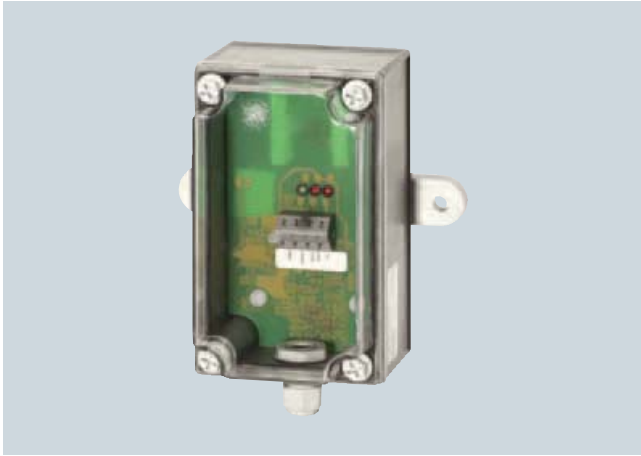
6DD1 681-0GK0

SIMATIC S7-400

Function modules

SIPLUS DCF 77 radio clock module

Overview



This module can be used to synchronize the real-time clock of the SIMATIC S7-200, S7-300 and S7-400 automation systems with the official time of the DCF 77 time signal transmitter of the Physikalisch-Technische Bundesanstalt Braunschweig.

The time is received by means of a DCF receiver (antenna with electronics) which is connected via two digital inputs on the SIMATIC and SIPLUS together with a software driver included in the scope of delivery (function block FB). The function blocks are available on the Internet for downloading.

<http://www.siemens.com/siplus> – Support – Tools and 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.

SIPLUS DCF 77 radio clock module

B7

6AG1 057-1AA03-0AA0

For synchronizing SIMATIC S7-200, S7-300 and S7-400 with the official time of the DCF 77 time signal transmitter of the Physikalisch-Technische Bundesanstalt Braunschweig

B7: 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
Current consumption/ power loss	
Power loss, typ.	1.7 W
Memory	
Type of storage	
Memory requirements per interface in CompactFlash Card of S7-CPU	1 to 5 Kbytes for parameters
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	
Dimensions	
• 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

SIMATIC S7-400

Communication

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 (retrofitable)
- 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
Current consumption/ power loss		
Power loss, typ.	0.3 W	0.3 W
Memory		
Type of storage		
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
Physical interface, 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 5 V	300 mA
• RS 232C (V.24), power consumption from 5 V, max.	100 mA; from 5 V	300 mA

	6ES7 441-1AA04-0AE0	6ES7 441-2AA04-0AE0
Point-to-point		
supported printers	HP-Deskjet, HP-Laserjet, IBM-Proprietary, user-defined	HP-Deskjet, HP-Laserjet, IBM-Proprietary, 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	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.	38.4 kBit/s	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.	38.4 kBit/s	115.2 kBit/s

Technical specifications (continued)

	6ES7 441-1AA04-0AE0	6ES7 441-2AA04-0AE0		6ES7 441-1AA04-0AE0	6ES7 441-2AA04-0AE0
CPU/programming			Dimensions		
Configuration software			Dimensions		
• STEP 7	Yes; own parameter assignment forms	Yes; own parameter assignment forms	• Width	25 mm	25 mm
			• Height	290 mm	290 mm
			• Depth	210 mm	210 mm
			Weights		
			• Weight, approx.	800 g; Interface module: 100 g	720 g; Interface module: 100 g

Ordering data

Order No.	Order No.
CP 441-1 communications processor	6ES7 441-1AA04-0AE0
With 1 variable interface for interface submodules; including configuration package on CD	
CP 441-2 communications processor	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
RS 422/485 connecting cable	
5 m	6ES7 902-3AB00-0AA0
10 m	6ES7 902-3AC00-0AA0
50 m	6ES7 902-3AG00-0AA0
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

SIMATIC S7-400

Communication

CP 443-5 Basic

Overview



- Connection of the S7-400 to PROFIBUS
- Communication services:
 - PG/OP communication
 - S7 communication
 - Open 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	FMS	PG/OP	S7/S5	
		●	●	●	

Technical specifications

Order No.	6GK7 443-5FX02-0XE0
Product type description	CP 443-5 BASIC
Transfer rate	
Transmission rate at Interface 1	
• Minimum	9.6 kbit/s
• Maximum	12 Mbit/s
Interfaces	
Version of electrical connection of the PROFIBUS interface	9-pin Sub-D socket (RS 485)
Supply voltage	
Type of supply voltage	DC
Supply voltage	5 V
Relative symmetrical tolerance at 5 V DC	5%
Current consumption	
Current consumed from backplane bus at 5 V DC, typical	1.2 A
Effective power loss	
Effective power loss	6.5 W
Permitted ambient conditions	
Ambient temperature	
• during operation	0 ... +60 °C
• during storage	-40 ... +70 °C
• during transport	-40 ... +70 °C
Maximum relative humidity at 25 °C during operation	95%

Order No.	6GK7 443-5FX02-0XE0
Product type description	CP 443-5 BASIC
Design, dimensions and weight	
Module format	S7-400 compact module, single width
• Width	25 mm
• Height	290 mm
• Depth	210 mm
Net weight	700 g
Performance data	
FMS function	
Number of possible connections in the case of FMS connection, max.	48
Data volume of the variables	
• for READ job, max.	237 byte
• for WRITE job, max.	233 byte
Number of variables	
• Configurable from server to FMS partner	512
• Loadable from server to FMS partner	2640
S7 communication	
Number of possible connections for S7 communication, max. ¹⁾	48

¹⁾ depending on the CPU type

Technical specifications (continued)

Order No.	6GK7 443-5FX02-0XE0
Product type description	CP 443-5 BASIC
Open communication	
Number of possible connections for open communication by means of SEND/RECEIVE blocks, max. ²⁾	32
Data volume as useful data for open communication (SEND/RECEIVE) per connection, max.	240 bytes

Order No.	6GK7 443-5FX02-0XE0
Product type description	CP 443-5 BASIC
Multi-protocol operation	
Number of possible connections, of which 2 reserved for PG/OP communication in the case of multi-protocol operation, max.	59

²⁾ also S5-compatible communication

Ordering data

CP 443-5 communications processor	6GK7 443-5FX02-0XE0
Communications processor for connection of S7-400 to PROFIBUS, FMS, open communication, PG/OP and S7 communication; with electronic manual on CD-ROM	
STEP 7 Version 5.4	
<i>Target system:</i> SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC	
<i>Requirement:</i> Windows 2000 Prof./XP Prof.	
<i>Delivery package:</i> 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 (requires current software version)	6ES7 810-4BC01-0YX2
• Upgrade Floating License 3.x/4.x/5.x to V5.4; on CD	6ES7 810-4CC08-0YE5
• Trial License STEP 7 V5.4; on CD, runs for 14 days	6ES7 810-4CC08-0YA7

PROFIBUS FastConnect bus connector RS485	
With 90° cable outlet; insulation displacement technology, max. transmission rate 12 Mbit/s	
• without PG interface	6ES7 972-0BA51-0XA0
• with PG interface	6ES7 972-0BB51-0XA0
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	

SIMATIC S7-400

Communication

CP 443-5 Extended

Overview



- DP-V1 master connection of the S7-400 to PROFIBUS
- For setting up additional PROFIBUS DP lines
- Communication services:
 - PROFIBUS DP
 - PG/OP communication
 - S7 communication
 - Open 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

DP-M	DP-S	FMS	PG/OP	S7/S5	
●			●	●	

Technical specifications

Order No.	6GK7 443-5DX04-0XE0
Product type description	CP 443-5 Extended
Transfer rate	
Transmission rate at Interface 1	
• Minimum	9.6 kbit/s
• Maximum	12 Mbit/s
Interfaces	
Version of electrical connection of the PROFIBUS interface	9-pin Sub-D socket (RS 485)
Supply voltage	
Type of supply voltage	DC
Supply voltage	5 V
Relative symmetrical tolerance at 5 V DC	5%
Current consumption	
Current consumed from backplane bus at 5 V DC, typical	1.3 A
Effective power loss	
Effective power loss	6.5 W
Permitted ambient conditions	
Ambient temperature	
• during operation	0 ... +60 °C
• during storage	-40 ... +70 °C
• during transport	-40 ... +70 °C
Maximum relative humidity at 25 °C during operation	95%

Order No.	6GK7 443-5DX04-0XE0
Product type description	CP 443-5 Extended
Design, dimensions and weight	
Module format	S7-400 compact module, single width
• Width	25 mm
• Height	290 mm
• Depth	210 mm
Net weight	700 g
Max. number of modules per CPU	14
Number of external DP lines per central rack, max.	10
Performance data	
PROFIBUS DP	
Service as DP-Master DPV1	Yes
Number of DP-Slaves operable on DP-Master	125
Data volume	
• of the address area of the inputs as DP-Master overall	4 Kibyte
• of the address area of the outputs as DP-Master overall	4 Kibyte
• of the address area of the inputs per DP-Slave	244 bytes
• of the address area of the outputs per DP-Slave	244 bytes

Technical specifications (continued)

Order No.	6GK7 443-5DX04-0XE0
Product type description	CP 443-5 Extended
S7 communication	
Number of possible connections for S7 communication, max.	48 ¹⁾
Open communication	
Number of possible connections for open communication by means of SEND/RECEIVE blocks, max. ²⁾	32
Data volume as useful data for open communication (SEND/RECEIVE) per connection, max.	240 bytes

Order No.	6GK7 443-5DX04-0XE0
Product type description	CP 443-5 Extended
Multi-protocol operation	
Number of active connections in multi-protocol operation	
• without DP, max.	59
• with DP, max.	55

¹⁾ depending on the CPU type

²⁾ also S5-compatible communication

Ordering data	Order No.	Order No.
CP 443-5 Extended communications processor	6GK7 443-5DX04-0XE0	
for connection of the SIMATIC S7-400 to PROFIBUS, Extended version for PROFIBUS DP; with electronic manual on CD-ROM		
STEP 7 Version 5.4		
<i>Target system:</i> SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC		
<i>Requirement:</i> Windows 2000 Prof./XP Prof.		
<i>Delivery package:</i> 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 (requires current software version)	6ES7 810-4BC01-0YX2	
• Upgrade Floating License 3.x/4.x/5.x to V5.4; on CD	6ES7 810-4CC08-0YE5	
• Trial License STEP 7 V5.4; on CD, runs for 14 days	6ES7 810-4CC08-0YA7	
PROFIBUS FastConnect bus connector RS485		
With 90° cable outlet; insulation displacement technology, max. transmission rate 12 Mbit/s		
• without PG interface		6ES7 972-0BA51-0XA0
• with PG interface		6ES7 972-0BB51-0XA0
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 nodes at up to 12 Mbit/s with connecting cable		

SIMATIC S7-400

Communication

CP 443-1

Overview



ISO	TCP/UDP	PN	MRP	IT	IP-R	PG/OP	S7/S5
•	•	•	•			•	•

- Connection of SIMATIC S7-400 to Industrial Ethernet
 - 2 x RJ45 interface for 10/100 Mbit/s full/half duplex connection with autosensing/autonegotiation and autocrossover function
 - Integrated real-time switch ERTEC with two ports
 - Multi-protocol operation for ISO, TCP/IP, UDP and PROFINET IO protocols
 - Adjustable Keep Alive function
- Communication services:
 - Open communication (ISO, TCP/IP and UDP)
 - PROFINET IO Controller with real-time properties RT and IRT
 - PG/OP communication: Across networks by means of S7 routing
 - S7 communication
- Multicast for UDP
- Access protection by means of configurable access list
- Support for fail-safe programmable controllers in combination with SIMATIC S7-400 CPU 416F-3 PN/DP
- Module replacement without PG
- SIMATIC H system operation for redundant S7 communication
- Configuration with STEP 7
- Diagnostic possibilities in STEP 7 and with web browser
- Automatic setting of the CPU clock by means of Industrial Ethernet with NTP or SIMATIC procedure
- Integration of network management systems via SNMP (MIB II diagnostic information)

5

Technical specifications

Order No.	6GK7 443-1EX20-0XE0
Product type description	CP 443-1
Transfer rate	
Transmission rate at Interface 1	
• Minimum	10 Mbit/s
• Maximum	100 Mbit/s
Interfaces	
Version of electrical connection to the Industrial Ethernet interface 1	2 x RJ45 (TP)
Supply voltage	
Type of supply voltage	DC
Supply voltage	5 V
Relative symmetrical tolerance at 5 V DC	5%
Current consumption	
Current consumed from backplane bus at 5 V DC, typical	1.4 A
Effective power loss	
Effective power loss	8.6 W
Permitted ambient conditions	
Ambient temperature	
• during operation	0 ... +60 °C
• during storage	-40 ... +70 °C
• during transport	-40 ... +70 °C
Maximum relative humidity at 25 °C during operation	95%
Design, dimensions and weight	
Module format	S7-400 compact module, single width
• Width	25 mm
• Height	290 mm
• Depth	210 mm
Net weight	700 g

Order No.	6GK7 443-1EX20-0XE0
Product type description	CP 443-1
Performance data	
Open communication	
Number of possible connections for open communication by means of SEND/RECEIVE blocks, max. ³⁾	64 ²⁾
Data volume as useful data for open communication by means of SEND/RECEIVE blocks	
• per ISO connection, max.	8 KB
• per ISO on TCP connection, max.	8 KB
• per TCP connection, max.	8 KB
• per UDP connection, max.	2 KB
Number of possible connections for open communication by means of T blocks, max.	64
Data volume as useful data for open communication by means of T-blocks	
• per ISO on TCP connection, max.	1 452 bytes
S7 communication	
Number of possible connections for S7 communication	
• Maximum	128 ¹⁾
• for PG connections, maximum	2
• for OP connections, maximum	30
Multi-protocol operation	
Number of active connections in multi-protocol operation	128
Performance data, PROFINET communication as PN IO controller	
Number of PN IO devices operable on PROFINET IO controller	128
Number of external PN IO lines with PROFINET per subrack	4
of which, PN IO IRT devices	32
Data volume	
• as useful data for input variables as PROFINET IO controller	4 KB
• as useful data for output variables as PROFINET IO controller	4 KB
• as useful data for input variables per PN IO device as PROFINET IO controller	240 bytes
• as useful data for output variables per PN IO device as PROFINET IO controller	240 bytes
Configuration	
Configuration software for full functional scope STEP 7 V5.4 SP4 or higher	Yes

¹⁾ when using several CPUs

²⁾ depending on the CPU type

³⁾ also S5-compatible communication

SIMATIC S7-400

Communication

CP 443-1

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Ordering data	Order No.	Order No.
CP 443-1 communications processor For connecting SIMATIC S7-400 to Industrial Ethernet through TCP/IP, ISO and UDP; PROFINET IO Controller, integrated real-time switch ERTEC with two ports; 2 x RJ45 interface; S7 communication, open communication (SEND/RECEIVE) with FETCH/WRITE, with and without RFC 1006, DHCP, SNMP V2, diagnostics, multicast, access protection over IP access list, initialization over LAN 10/100 Mbit/s with electronic manual on DVD	A8 6GK7 443-1EX20-0XE0	SOFTNET-S7 Lean Edition 2007 for Industrial Ethernet up to 8 connections - Single license for 1 installation B3 6GK1 704-1LW70-3AA0 6GK1 704-1LW00-3AL0 - Software Update Service for 1 year, with automatic extension; requirement: Current software version - Upgrade from V6.4 to 2007 Edition B3 6GK1 704-1LW00-3AE0 - Upgrade from V6.0, V6.1, V6.2 or V6.3 to 2007 Edition B3 6GK1 704-1LW00-3AE1
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, splittable, UL approval, sold by the meter	6XV1 873-2A	
SCALANCE X204-2 Industrial Ethernet switch Industrial Ethernet switches with integral SNMP access, online 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	6GK5 204-2BB10-2AA3	
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; 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 Edition 2007 for Industrial Ethernet Software for S7 and open communication, incl. OPC server, PG/OP communication and NCM PC, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2, Windows 2003 Server SP1, R2, SP2, Windows Vista Business/Ultimate; German/English		
SOFTNET-S7 Edition 2007 for Industrial Ethernet up to 64 connections - Single license for 1 installation B3 6GK1 704-1CW70-3AA0 6GK1 704-1CW00-3AL0 - Software Update Service for 1 year, with automatic extension; requirement: Current software version - Upgrade from V6.4 to 2007 edition B3 6GK1 704-1CW00-3AE0 - Upgrade from V6.0, V6.1, V6.2 or V6.3 to 2007 Edition B3 6GK1 704-1CW00-3AE1		S7-1613 Edition 2007 Software for S7 and open communication, incl. PG/OP communication, OPC server and NCM PC; up to 120 connections, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2; Windows 2003 Server SP1, R2, SP2, Windows Vista Business/Ultimate; for CP 1613/CP 1613 A2/CP 1623; German/English - Single license for 1 installation B3 6GK1 716-1CB70-3AA0 6GK1 716-1CB00-3AL0 - Software Update Service for 1 year, with automatic extension; requirement: Current software version - Upgrade S7-1613 from V6.4 to 2007 Edition B3 6GK1 716-1CB00-3AE0 - Upgrade S7-1613 from V6.0, V6.1, V6.2 or V6.3 to S7-1613 Edition 2007 B3 6GK1 716-1CB00-3AE1
		STEP 7 Version 5.4 <i>Target system:</i> SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC <i>Requirement:</i> Windows 2000 Prof./XP Prof. <i>Delivery package:</i> 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 (requires current software version) 6ES7 810-4BC01-0YX2 - Upgrade Floating License 3.x/4.x/5.x to V5.4; on CD 6ES7 810-4CC08-0YE5 - Trial License STEP 7 V5.4; on CD, runs for 14 days 6ES7 810-4CC08-0YA7

A8: Subject to export regulations: AL: N and ECCN: 5A991X
 B3: Subject to export regulations: AL: N and ECCN: 5D992B1

Overview



ISO	TCP/UDP	PN	MRP	IT	IP-R	PG/OP	S7/S5
●	●	●	●	●	●	●	●

- Connection of SIMATIC S7-400 to Industrial Ethernet
 - Multi-protocol operation for ISO, TCP/IP, UDP and PROFINET IO protocols
 - Adjustable Keep Alive function
- Two separate interfaces (integrated network separation):
 - Gigabit interface with an RJ45 connection with 10/100/1000 Mbit/s full/half duplex with auto-sensing functionality
 - PROFINET interface with four RJ45 connections with 10/100 Mbit/s full/half duplex with auto-sensing and auto-crossover functionality via integrated 4-port switch
- Communication services via both interfaces
 - Open communication (ISO, TCP/IP and UDP), Multicast with UDP, incl. routing between two interfaces
 - PG/OP communication:
 - Cross-network by means of S7 routing
 - S7 communication (client, server, multiplexing) incl. routing between both interfaces
 - IT communication:
 - HTTP communication allows access to process data via own web sites;
 - e-mail client function, sending of e-mails with authentication directly from the user program;
 - FTP communication allows program-controlled FTP client communication;
 - access to data blocks via FTP servers
- Communication services via PROFINET interface
 - PROFINET IO Controller with real-time properties (RT and IRT)
 - PROFINET CBA
 - IP address assignment via DHCP, simple PC tool or via the user program (e.g. HMI)
 - Support of prioritized start-ups of PROFINET IO Devices
- Configuration with STEP 7
- Access protection by means of a configurable IP access list
- Module replacement without PG; 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
- Operation in SIMATIC H system for redundant S7 communication
- Operation in fail-safe applications (PROFIsafe) together with SIMATIC S7-400 CPU 416F

SIMATIC S7-400

Communication

CP 443-1 Advanced

Technical specifications

Order No.	6GK7 443-1GX20-0XE0
Product type description	CP 443-1 Advanced
Transfer rate	
Transmission rate at Interface 1	
• Minimum	10 Mbit/s
• Maximum	1000 Mbit/s
Transmission rate at Interface 2	
• Minimum	10 Mbit/s
• Maximum	100 Mbit/s
Interfaces	
Electrical connection version	
• at Industrial Ethernet interface 1	1 x RJ45 (TP)
• at Industrial Ethernet interface 2	4 x RJ45 (TP)
Slot version of the swap medium	C-PLUG
Supply voltage	
Type of supply voltage	DC
Supply voltage	5 V
Relative symmetrical tolerance at 5 V DC	5%
Current consumption	
Current consumed from backplane bus at 5 V DC, typical	1.34 A
Effective power loss	
Effective power loss	7.25 W
Permitted ambient conditions	
Ambient temperature	
• during operation	0 ... +60 °C
• during storage	-40 ... +70 °C
• during transport	-40 ... +70 °C
Maximum relative humidity at 25 °C during operation	95%
Design, dimensions and weight	
Module format	S7-400 compact module, single width
• Width	25 mm
• Height	290 mm
• Depth	217 mm
Net weight	750 g
Performance data	
Open communication	
Number of possible connections for open communication by means of SEND/RECEIVE blocks, max. ¹⁾	64 ²⁾

¹⁾ also S5-compatible communication

²⁾ depending on the CPU type

Order No.	6GK7 443-1GX20-0XE0
Product type description	CP 443-1 Advanced
Data volume as useful data for open communication by means of SEND/RECEIVE blocks	
• per ISO connection, max.	8 KB
• per ISO on TCP connection, max.	8 KB
• per TCP connection, max.	8 KB
• per UDP connection, max.	2 KB
• for each e-mail connection, max.	2 KB
Number of possible connections for open communication by means of T blocks, max.	64 ²⁾
Data volume as useful data for open comm. by means of T-blocks	
• per ISO on TCP connection, max.	1 452 bytes
S7 communication	
Number of possible connections for S7 communication	
• Maximum	128
• for PG connections, maximum	2
• for OP connections, maximum	30
Multi-protocol operation	
Number of active connections in multi-protocol operation	128
IT functions	
Number of possible connections	
• as client by means of FTP, max.	20
• as server	
- by means of FTP, max.	10
- by means of HTTP, max.	4
Memory capacity of the user memory	
• as Flash memory file system	30 MB
• as RAM	16 MB
• additionally buffered as RAM via central backup battery	512 KB
Performance data, PROFINET communication as PN IO controller	
Number of PN IO devices operable on PROFINET IO controller	128
• of which, PN IO IRT devices	32
Number of external PN IO lines with PROFINET per subrack	4
Data volume	
• as useful data for input variables as PROFINET IO controller	4 KB
• as useful data for output variables as PROFINET IO controller	4 KB

Technical specifications (continued)

Order No.	6GK7 443-1GX20-0XE0
Product type description	CP 443-1 Advanced
Data volume (continued)	
• as useful data for input variables per PN IO device as PROFINET IO controller	240 bytes
• as useful data for output variables per PN IO device as PROFINET IO controller	240 bytes
Performance data PROFINET CBA	
Number of remote interconnection partners in the case of PROFINET CBA	64
Total number of interconnections in the case of PROFINET CBA	600
Data volume	
• as useful data for digital inputs in the case of PROFINET CBA, max.	8 192 bytes
• as useful data for digital outputs in the case of PROFINET CBA, max.	8 192 bytes
• as useful data for arrays and data types	
- in case of acyclic transmission with PROFINET CBA, max.	8 192 bytes
- in case of cyclic transmission with PROFINET CBA, max.	250 bytes
- in case of local interconnection with PROFINET CBA, max.	2 400 bytes
Performance data PROFINET CBA, remote interconnections with acyclic transmission	
Send cycle of the remote interconnections in the case of acyclic transmission with PROFINET CBA	100 ms
Number of remote interconnections	
• with input variables in case of acyclic transmission with PROFINET CBA, max.	150
• with output variables in case of acyclic transmission with PROFINET CBA, max.	150
Data volume	
• as useful data for remote interconnections with input variables in the case of acyclic transmission with PROFINET CBA	81 92 bytes
• as useful data for remote interconnections with output variables in the case of acyclic transmission with PROFINET CBA	8 192 bytes
Performance data PROFINET CBA, remote interconnections with cyclic transmission	
Send cycle of the remote interconnections in the case of cyclic transmission with PROFINET CBA	10 ms

Order No.	6GK7 443-1GX20-0XE0
Product type description	CP 443-1 Advanced
Number of remote interconnections	
• with input variables in case of cyclic transmission with PROFINET CBA, max.	250
• with output variables in case of cyclic transmission with PROFINET CBA, max.	250
Data volume	
• as useful data for remote interconnections with input variables in the case of cyclic transmission with PROFINET CBA, max.	2 000 bytes
• as useful data for remote interconnections with output variables in the case of cyclic transmission with PROFINET CBA, max.	2 000 bytes
Performance data PROFINET CBA, HMI variables via PROFINET (acyclic)	
Number of HMI stations with login capability for HMI variables in the case of acyclic transmission with PROFINET CBA	3
Send cycle of the HMI variables in the case of acyclic transmission with PROFINET CBA	500 ms
Send cycle of the HMI variables in the case of acyclic transmission with PROFINET CBA max.	200
Data volume as useful data for HMI variables in the case of acyclic transmission with PROFINET CBA max.	8 192 bytes
Performance data PROFINET CBA, device-internal interconnections	
Number of interconnections in the case of PROFINET CBA, max	300
Data volume of internal interconnections in the case of PROFINET CBA, max	2 400 bytes
Performance data PROFINET CBA, interconnections with constants	
Number of interconnections with constants in the case of PROFINET CBA, max	500
Data volume as useful data for interconnections with constants in the case of PROFINET CBA, max	4 000 bytes
Performance data PROFINET CBA, PROFIBUS proxy functionality	
Product function in the case of PROFINET CBA, PROFIBUS proxy functionality	No
Number of accesses to S7-extended variables in case of PROFINET CBA max.	32
Configuration	
Configuration software for full functional scope STEP 7 V5.4 SP4 or higher	Yes

SIMATIC S7-400

Communication

CP 443-1 Advanced

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Ordering data	Order No.	Order No.
CP 443-1 Advanced communications processor For the connection of SIMATIC S7-400 to Industrial Ethernet; PROFINET IO Controller with RT and IRT, MRP, PROFINET CBA; TCP/IP, ISO and UDP; S7 communication, open communication (SEND/RECEIVE) with FETCH/WRITE, with and without RFC 1006, diagnostic expansions, multicast, clock synchronization by means of SIMATIC procedure or NTP, access protection by means of IP access list, FTP client/server, HTTP server, HTML diagnostics, SNMP, DHCP, e-mail, data storage on C-PLUG; PROFINET connection: 4 x RJ45 (10/100 Mbit/s) via switch; Gigabit connection: 1 x RJ45 (10/100/1000 Mbit/s); with electronic manual on DVD For use with SIMATIC S7-400 CPU, V5.2 or higher;	6GK7 443-1GX20-0XE0	SOFTNET-S7 Lean Edition 2007 for Industrial Ethernet up to 8 connections - Single License for 1 installation B3 6GK1 704-1LW70-3AA0 - Software Update Service for 1 year, with automatic extension; requirement: Current software version 6GK1 704-1LW00-3AL0 - Upgrade from V6.4 to 2007 edition 6GK1 704-1LW00-3AE0 - Upgrade from V6.0, V6.1, V6.2 or V6.3 to 2007 Edition B3 6GK1 704-1LW00-3AE1
C-PLUG Swap medium for simple replacement of devices in the event of a fault; for storing configuration or engineering and application data; can be used for SIMATIC NET products with C-PLUG slot	6GK1 900-0AB00	S7-1613 2007 Edition Software for S7 and open communication, incl. PG/OP communication, OPC server and NCM PC; up to 120 connections, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2; Windows 2003 Server SP1, R2, SP2, Windows Vista Business/Ultimate; for CP 1613/CP 1613 A2/CP 1623; German/English - Single License for 1 installation B3 6GK1 716-1CB70-3AA0 - Software Update Service for 1 year, with automatic extension; requirement: Current software version 6GK1 716-1CB00-3AL0 - Upgrade S7-1613 from V6.4 to S7-1613 2007 Edition B3 6GK1 716-1CB00-3AE0 - Upgrade S7-1613 from V6.0, V6.1, V6.2 or V6.3 to S7-1613 2007 Edition B3 6GK1 716-1CB00-3AE1
SOFTNET Edition 2007 for Industrial Ethernet Software for S7 and open communication, incl. OPC server, PG/OP communication and NCM PC, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2, Windows 2003 Server SP1, R2, SP2; Windows Vista Business/Ultimate; German/English		
SOFTNET-S7 Edition 2007 for Industrial Ethernet up to 64 connections - Single License for 1 installation B3 6GK1 704-1CW70-3AA0 - Software Update Service for 1 year, with automatic extension; requirement: Current software version 6GK1 704-1CW00-3AL0 - Upgrade from V6.4 to 2007 edition 6GK1 704-1CW00-3AE0 - Upgrade from V6.0, V6.1, V6.2 or V6.3 to 2007 Edition B3 6GK1 704-1CW00-3AE1		
		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 CPUs/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

A8: Subject to export regulations: AL: N and ECCN: 5A991X

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

Ordering data (continued)	Order No.	Order No.
IE FC RJ45 Plug 4 x 2 RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbit/s) with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPU with Industrial Ethernet interface • 1 pack = 1 unit • 1 pack = 10 units • 1 pack = 50 units	6GK1 901-1BB11-2AA0 6GK1 901-1BB11-2AB0 6GK1 901-1BB11-2AE0	
SCALANCE X204-2 Industrial Ethernet switch with four 10/100 Mbit/s RJ45 ports and two fiber-optic ports	6GK5 204-2BB10-2AA3	
Industrial Ethernet Switch SCALANCE X308-2 2 x 1000 Mbit/s multimode fiber-optic ports (SC sockets), 1 x 10/100/1000 Mbit/s RJ45 port, 7 x 10/100 Mbit/s RJ45 ports; for glass fiber-optic cables (multimode) up to a max. 750 m.	6GK5 308-2FL00-2AA3	
		STEP 7 Version 5.4 <i>Target system:</i> SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC <i>Requirement:</i> Windows 2000 Prof./XP Prof. <i>Delivery package:</i> German, English, French, Spanish, Italian; incl. 3.5" authorization diskette, without documentation • Floating license on CD • Rental license for 50 hours • Software Update Service on CD (requires current software version) • Upgrade Floating License 3.x/4.x/5.x to V5.4; on CD • Trial License STEP 7 V5.4; on CD, runs for 14 days
		6ES7 810-4CC08-0YA5 6ES7 810-4CC08-0YA6 6ES7 810-4BC01-0YX2 6ES7 810-4CC08-0YE5 6ES7 810-4CC08-0YA7
		SIMATIC iMap V3.0 for configuring PROFINET CBA, <i>Requirement:</i> 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 <i>Type of supply:</i> German, English, with electronic documentation • Single License • Software Update Service • Upgrade to V3.0, Single License
		B3 6ES7 820-0CC04-0YA5 B3 6ES7 820-0CC01-0YX2 B3 6ES7 820-0CC04-0YE5

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

SIMATIC S7-400

Modules for SIMATIC S7-400H

Y link for S7-400H

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

5

Technical specifications

6ES7 153-2BA02-0XB0	
Supply voltages	
Rated value	
• 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	20 ms
Voltages and currents	
external protection for supply cables (recommendation)	2.5 A
Current consumption	
Inrush current, typ.	3 A
I^2t	0.1 A ² s
Current consumption, max.	600 mA
Power loss, typ.	5.5 W
Address area	
Addressing volume	
• Outputs	244 byte
• Inputs	244 byte
Hardware config.	
Number of modules per DP slave interface, max.	12
interfaces	
PROFIBUS DP, Output current, max.	70 mA
interface physics, RS 485	Yes
PROFIBUS DP	
Transmission procedure	RS 485
Transmission speed, max.	12 MBit/s
Node addresses	1...125
SYNC capability	Yes
FREECE capability	Yes
direct data exchange (cross traffic)	Yes; Sender

6ES7 153-2BA02-0XB0	
1st interface	
DP slave	
• GSD file	SI04801.GSD
CPU/programming	
Configuration software	
• STEP 7	Yes; STEP 7 / COM PROFIBUS / non-Siemens tools via GSD file
Time stamping	
Accuracy	1 ms; 1ms at up to 8 modules; 10ms at up to 12 modules
Number of stampable digital inputs, max.	128; Max. 128 signals / station; max. 32 signals / slot
Time format	RFC 1119
Time resolution	0.466 ns
Time stamp on signal change	Yes
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
General information	
Vendor identification (VendorID)	801E
Dimensions	
Dimensions	
Width	40 mm
Height	125 mm
Depth	117 mm
Weights	
Weight, approx.	360 g

SIMATIC S7-400

Modules for SIMATIC S7-400H

Y link for S7-400H

Technical specifications (continued)

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
• Number of DP slaves, max.	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	
Dimensions	
• Width	40 mm
• Height	125 mm
• Depth	130 mm
Weights	
• Weight, approx.	200 g

Ordering data**Order No.**

For use with STEP 7 from V5.4 or PCS 7 from V7.0:

Y link

B7

6ES7 197-1LA04-0XA0

For connecting single-channel DP slaves to SIMATIC S7-400H; consisting of
Two IM 153 interface modules (6ES7 153-2BA02-0XB0),
One Y coupler (6ES7 197-1LB00-0XA0),
One BM IM/IM bus module (6ES7 195-7HD80-0XA0),
One BM Y coupler bus module (6ES7 654-7HY00-0XA0)

For use with PCS 7 V6.1 SP1

Y link

B7

6ES7 197-1LA11-0XA0

For connecting single-channel DP slaves to SIMATIC S7-400H; consisting of
Two IM 153 interface modules (6ES7 153-2BA82-0XB0),
One Y coupler (6ES7 197-1LB00-0XA0),
One BM IM/IM bus module (6ES7 195-7HD80-0XA0),
One BM Y coupler bus module (6ES7 654-7HY00-0XA0)

Accessories**Mounting rail**

For assembling the Y link with active bus modules

- Length 483 mm
- Length 530 mm

6ES7 195-1GA00-0XA0**6ES7 195-1GF30-0XA0**

B7: Subject to export regulations: AL: N and ECCN: EAR99H

SIMATIC S7-400

Modules for SIMATIC S7-400F/FH

IM 153-1/153-2

Overview



The ET 200M system with various interface modules is available for the decentralized use of S7-300 I/O modules. Depending on the application purpose, the best suited IM in terms of costs and functions can be selected:

IM 153-1 Standard

The IM 153-1 is one reasonably priced version that is best suited for most applications in the manufacturing environment. It permits the use of up to eight S7-300 I/O modules.

IM 153-2 High Feature

For higher requirements in manufacturing technology, such as the use of F-technology or the highest performance in conjunction with clock synchronization, the IM 153-2 High Feature is available. This IM is also designed for use with the PCS 7 in the field of manufacturing applications. This IM can be redundantly used and supports typical functions as they are required in the control field. These include, for example, clock synchronization or time stamping with an accuracy of up to 1 ms.

IM 153-2 High Feature FO

The High Feature version (with reduced scope of services) is also available as an FO version. This permits fiber optic cables to be connected in the POF or the PCF, and is therefore particularly well suited for use in the heavily EMC-charged areas.

Technical specifications

	6ES7 153-1AA03-0XB0	6ES7 153-2BA02-0XB0	6ES7 153-2BA82-0XB0	6ES7 153-2BB00-0XB0
Power supply				
Input current				
• Rated value at DC 24 V	625 mA			
Output voltage				
• Rated value, DC 5 V	Yes	Yes		Yes
Output current				
• for backplane bus (DC 5 V), max.	1 A	1.5 A		1 A
Supply voltages				
Rated value				
• DC 24 V		Yes	Yes	Yes
• Permissible range (ripple included), lower limit (DC)	20.4 V	20.4 V	20.4 V	20.4 V
• permissible range (ripple included), upper limit (DC)	28.8 V	28.8 V	28.8 V	28.8 V
external protection for supply cables (recommendation)	not necessary	2.5A	2.5A	not necessary
Power supply and voltage jumpering				
• Mains/voltage failure jumpering	5 ms	20 ms	20 ms	
Current consumption				
Current consumption, max.	350 mA; At 24 V DC	600 mA	600 mA	500 mA; At 24 V DC
Inrush current, typ.	2.5 A	3 A	3 A	3.5 A
I ² t	0.1 A ² s	0.1 A ² s	0.1 A ² s	0.1 A ² s
Current consumption/ power loss				
Power loss, typ.	3 W	5.5 W	5.5 W	4.5 W

SIMATIC S7-400

Modules for SIMATIC S7-400F/FH

IM 153-1/153-2

Technical specifications (continued)

	6ES7 153-1AA03-0XB0	6ES7 153-2BA02-0XB0	6ES7 153-2BA82-0XB0	6ES7 153-2BB00-0XB0
Address area				
Addressing volume				
• Outputs	128 byte	244 byte	244 byte	128 byte
• Inputs	128 byte	244 byte	244 byte	128 byte
Hardware config.				
Number of modules per DP slave interface, max.	8	12	12	8
Communication functions				
Bus protocol/ transmission protocol	PROFIBUS DP to EN 50170	PROFIBUS DP to EN 50170	PROFIBUS DP	PROFIBUS DP to EN 50170
interfaces				
PROFIBUS DP, Output current, max.	90 mA	70 mA	70 mA	Not applicable
interface physics, RS 485	Yes	Yes	Yes	No
interface physics, LWL	No	No	No	Yes
Connection point				
PROFIBUS DP	9-pin sub D socket	9-pin SUB-D	9-pin SUB-D	optical, 2 x duplex sockets
PROFIBUS DP				
Transmission procedure	RS 485	RS 485	RS 485	LWL, wavelength 660 nm
Transmission speed, max.	12 MBit/s	12 MBit/s	12 MBit/s	12 MBit/s; 9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 Kbit/s; 1.5 / 12 Mbit/s
Node addresses	1 to 125 permitted	1 to 125 permitted	1.125	1 to 125 permitted
automatic detection of transmission speed	Yes	Yes	Yes	1 to 125 permitted
SYNC capability	Yes	Yes	Yes	Yes
FREECE capability	Yes	Yes	Yes	Yes
direct data exchange (cross traffic)	Yes; Sender	Yes; Sender	Yes	Yes; Sender
1st interface				
DP slave				
• GSD file	(for DPV1) SIEM801D.GSD; SI01801D.GSG	SI04801.GSG	SI0480E.GSG	(for DPV1) SIEM8071.GSD; SI018071.GSG (for IM 153-2AB0x); SI028071.GSG (for IM 153-2BB0x)
• automatic baud rate search	Yes	Yes	Yes	Yes
CPU/programming				
Configuration software				
• STEP 7	STEP 7 / COM PROFIBUS / non-Siemens tools via GSD file	Yes; STEP 7 / COM PROFIBUS / non-Siemens tools via GSD file	Yes	Yes; STEP 7 / COM PROFIBUS / non-Siemens tools via GSD file
Time stamping				
Accuracy		1 ms; 1ms at up to 8 modules; 10ms at up to 12 modules	1 ms; 1ms at up to 8 modules; 10ms at up to 12 modules	10 ms; 10 ms / 3 ms
Number of message buffers				15
Messages per message buffer				20
Number of stampable digital inputs, max.		128; Max. 128 signals / station; max. 32 signals / slot	128; 128 signals / station; max. 32 signals / slot	128
Time format		RFC 1119		RFC 1119 Internet (ISP)

SIMATIC S7-400

Modules for SIMATIC S7-400F/FH

IM 153-1/153-2

Technical specifications (continued)

	6ES7 153-1AA03-0XB0	6ES7 153-2BA02-0XB0	6ES7 153-2BA82-0XB0	6ES7 153-2BB00-0XB0
Time resolution		0.466 ns	0.466 ns	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	Yes	rising / falling edge as signal entering or exiting
Isolation				
Isolation checked with	Isolation voltage 500 V	Isolation voltage 500 V	500 V DC	Isolation voltage 500 V
Environmental requirements				
Operating temperature				
• min.	0 °C	0 °C	-25 °C	0 °C
• max.	60 °C	60 °C	60 °C	60 °C
Air pressure				
• Operating height above sea level, max.	3 000 m	3 000 m	3 000 m	3 000 m
Degree of protection				
IP 20	Yes	Yes	Yes	Yes
General information				
Vendor identification (VendorID)	801Dh	801E	801E	8071h
Dimensions				
Dimensions				
• Width	40 mm	40 mm	40 mm	40 mm
• Height	125 mm	125 mm	125 mm	125 mm
• Depth	117 mm	117 mm	117 mm	117 mm
Weights				
• Weight, approx.	360 g	360 g	360 g	360 g
	6ES7 195-7HD10-0XA0	6ES7 195-7HA00-0XA0	6ES7 195-7HB00-0XA0	6ES7 195-7HC00-0XA0
Accessories				
belongs to product	ET 200M			
Dimensions				
Weights				
• Weight, approx.	133 g	111 g	140 g	127 g

SIMATIC S7-400

Modules for SIMATIC S7-400F/FH

IM 153-1/153-2

Ordering data	Order No.		Order No.
IM 153-1 interface module Slave interface for connecting an ET 200M to PROFIBUS DP Standard temperature range	6ES7 153-1AA03-0XB0	Accessories PROFIBUS bus connector 90° outgoing cable, terminating resistor with disconnecting function, without PG connection socket, up to 12 Mbit/s, FastConnect 90° outgoing cable, terminating resistor with disconnecting function, with PG connection socket, up to 12 Mbit/s, FastConnect	6ES7 972-0BA51-0XA0 6ES7 972-0BB51-0XA0
IM 153-2 interface module Slave interface for connecting an ET 200M to PROFIBUS DP; also for use in redundant systems - High Feature - High Feature with extended temperature range - Fiber optic	6ES7 153-2BA02-0XB0 6ES7 153-2BA82-0XB0 6ES7 153-2BB00-0XB0	SIMATIC DP DIN rail for ET 200M For insertion of up to 5 bus modules for - Length: 483 mm (19") - Length: 530 mm	6ES7 195-1GA00-0XA0 6ES7 195-1GF30-0XA0
Active IM 153 /IM 153 bus module For two IM 153-2 High Feature modules for designing redundant systems	6ES7 195-7HD10-0XA0	SIMATIC S7-300 DIN rail - Length: 160 mm - Length: 480 mm (19") - Length: 530 mm - Length: 830 mm - Length: 2,000 mm	6ES7 390-1AB60-0AA0 6ES7 390-1AE80-0AA0 6ES7 390-1AF30-0AA0 6ES7 390-1AJ30-0AA0 6ES7 390-1BC00-0AA0
Bus module for ET 200M - To accommodate a power supply and an IM 153 module for the hot-swapping function during RUN time including bus module cover - To accommodate two 40-mm wide I/O modules for the hot-swapping function - To accommodate one 80-mm wide I/O module for the hot-swapping function	6ES7 195-7HA00-0XA0 6ES7 195-7HB00-0XA0 6ES7 195-7HC00-0XA0	S7 Manual Collection Electronic manuals on DVD, multi-language: S7-200, TD 200, S7-300, C7, S7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication)	6ES7 998-8XC01-8YE0
ET 200M redundancy bundle Comprising two IM 153-2 High Feature modules and one IM 153/IM 153 bus module	6ES7153-2AR03-0XA0	S7 Manual Collection update service for 1 year Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates	6ES7 998-8XC01-8YE2

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

SIMATIC S7-400

Modules for SIMATIC S7-400F/FH

SIPLUS IM 153-1/153-2

Overview



- For connecting ET 200M as a slave to PROFIBUS DP (via copper conductors)
- IM 153-2 also for use in redundant PROFIBUS DP systems with S7-400H, software redundancy and S5-155H
- With time stamp functionality and time synchronization
- Suitable for isochronous mode

	SIPLUS IM 153-1	SIPLUS IM 153-2
Order No.	6AG1 153-1AA03-2XB0	6AG1 153-2BA02-7XB0
Order No. based on	6ES7 153-1AA03-0XB0	6ES7 153-2BA02-0XB0
Ambient temperature range	-25 ... +60 °C Condensation permissible	-25 ... +70 °C -25 ... +60 °C (for applications with cUL approval), condensation permissible
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere)	
Approvals	CE, UL haz. Loc.	CE
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	Yes	No
Technical data	The technical data are identical with those of the based-on modules.	

SIPLUS bus module	for accommodating an 80 mm module	for accommodating two IM 153-2	for accommodating a PS and an IM 153	For accommodating two 40 mm wide I/O modules
Order No.	6AG1 195-7HC00-2XA0	6AG1 195-7HD10-2XA0	6AG1 195-7HA00-2XA0	6AG1 195-7HB00-7XA0
Order No. based on	6ES7 195-7HC00-0XA0	6ES7 195-7HD10-0XA0	6ES7 195-7HA00-0XA0	6ES7 195-7HB00-0XA0
Ambient temperature range	-25 ... +60 °C Condensation permissible			
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere)			
Approvals	CE, cUL (available soon)		CE, UL haz. Loc.	CE, UL haz. Loc.
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	No	No	No	No
Technical data	The technical data are identical with those of the based-on modules.			

For further technical documentation on SIPLUS, see:
<http://www.siemens.com/siplus-techdoku>

SIMATIC S7-400

Modules for SIMATIC S7-400F/FH

SIPLUS IM 153-1/153-2

Ordering data	Order No.		Order No.
IM 153-1 interface module Slave interface for connecting an ET 200M to PROFIBUS DP • Standard temperature range	6AG1 153-1AA03-2XB0	Bus module for ET 200M • To accommodate a power supply and an IM 153 for the hot-swapping function during RUN, incl. bus module cover	6AG1 195-7HA00-2XA0
IM 153-2 interface module Slave interface for connecting an ET 200M to PROFIBUS DP; also for use in redundant systems • High Feature	6AG1 153-2BA02-7XB0	• To accommodate two 40 mm wide I/O modules for the hot-swapping function • To accommodate one 80 mm wide I/O module for the hot-swapping function	6AG1 195-7HB00-7XA0 6AG1 195-7HC00-2XA0
Active IM 153/IM 153 bus module For two IM 153-2 High Feature modules for designing redundant systems	6AG1 195-7HD10-2XA0	Accessories	see IM 153-1/IM 153-2, page 5/125

B7: Subject to export regulations: AL: N and ECCN: EAR99H

SIMATIC S7-400

Modules for SIMATIC S7-400F/FH

Isolation module

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 • Standard and fail-safe modules in the tier	Yes, behind the CPU 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 • Standard and fail-safe modules in the tier	Yes, after the IM 36x 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 • Standard and fail-safe modules in the station	Yes, after the IM 153-2 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 • Standard and fail-safe modules in the station	No Yes, after the last standard module and before the first fail-safe module

Technical specifications

	6ES7 195-7KF00-0XA0
Dimensions	
Weights	
• Weight, approx.	10 g

Ordering data

	Order No.
Isolation module	6ES7 195-7KF00-0XA0
for simultaneous operation of fail-safe and standard modules in an ET 200M	
Isolation bus module	6ES7 195-7HG00-0XA0
for accommodating the isolating module in an ET 200M	

SIMATIC S7-400

Modules for SIMATIC S7-400F/FH

SIPLUS isolating module

Overview



- Permits combined operation of fail-safe signal modules in safety mode and standard S7-300 modules in the same ET 200M system.
- Design of PROFIBUS DP lines using copper bus cables. It is not necessary to use fiber-optic cables.
- Every IM 153-x can be used

The isolation module is not required if safety class SIL 2 is to be achieved.

SIPLUS S7-300 isolation module

Order No.	6AG1 195-7KF00-2XA0
Order No. based on	6ES7 195-7KF00-0XA0
Ambient temperature range	- 25 ... + 60 °C, condensation permitted
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere).
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	Yes
Technical data	The technical data are identical with those of the based-on modules.

Information about safety class and safety category see isolating module, page 5/128.

Ordering data

Order No.

Isolating module

(medial exposure)

for simultaneous operation of fail-safe and standard modules in an ET 200M

6AG1 195-7KF00-2XA0

Accessories

see Isolation module, page 5/128

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 111.

SIMATIC S7-400

Connection methods

Front connectors

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	B7	6ES7 492-1AL00-0AA0
• With spring-loaded terminals		6ES7 492-1BL00-0AA0
• With crimp contacts	B7	6ES7 492-1CL00-0AA0

48-pin for signal modules, function modules; 84 units per pack

• With screw contacts	B6	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

250 units

Crimping tool

for crimping the contacts

Front cover for front connector	B7	6ES7 492-2XL00-0AA0
6 units		

Connection terminal for modules

6 units

Manual "SIMATIC S7-400 automation system"

incl. instruction list

German	6ES7 498-8AA05-8AA0
English	6ES7 498-8AA05-8BA0
French	6ES7 498-8AA05-8CA0
Spanish	6ES7 498-8AA05-8DA0
Italian	6ES7 498-8AA05-8EA0

SIMATIC Manual Collection

B3
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

B3
Current "Manual Collection" DVD and the three subsequent updates

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

B6: Subject to export regulations: AL: N and ECCN: EAR99

B7: 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.

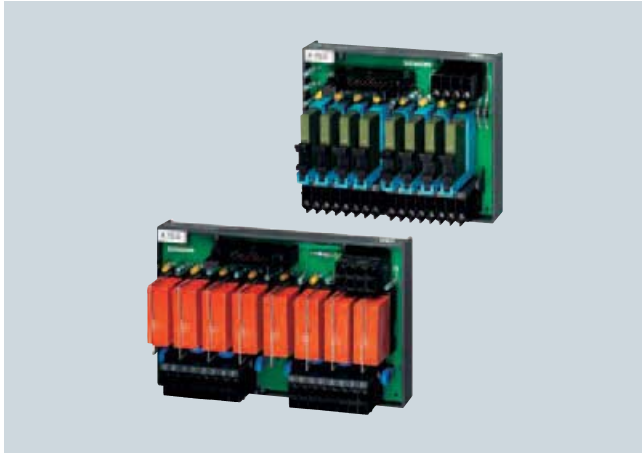
SIMATIC S7-400

Connection methods

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 TPPro 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 TPPr 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	1 A
• per connector pin	
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

Wiring rules for the front connector modules

Front connector module SIMATIC TOP connect, connection for potential supply	
	Screw connection
Modules up to 4 connections	
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	-
Blade width of the screw-driver	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	
	Screw connection
Modules up to 6 connections	
Connectable cable cross-sections	
• solid cables	No
• flexible cables with/without wire end ferrule	0.25 bis 0.75 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	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 screw-driver	3.5 mm (cylindrical shape)
Tightening torque for connecting the cables	0.4 to 0.7 Nm

SIMATIC S7-400

Connection methods

Fully modular connection

Technical specifications connecting 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 6ES7 924-0AA10-0A_0 Approx. 55 x 43.2 x 63 • for 3-wire initiators 6ES7 924-0CA10-0A_0 Approx. 68 x 43.2 x 80 • for 2 x 8 signals 6ES7 924-1AA10-0A_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 6ES7 924-0BB10-0A_0 Approx. 68 x 43.2 x 80

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 6ES7 924-0CC10-0A_0 Approx. 68 x 43.2 x 80

Wiring rules for connection modules

	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 screw-driver	3.5 mm (cylindrical shape)	
Tightening torque for connecting the cables	-	0.4 to 0.7 Nm

SIMATIC S7-400

Connection methods

Fully modular connection

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 6ES7 924-0AA10-0B_0	Approx. 55 x 43.2 x 63
• for 3-wire initiators with LED 6ES7 924-0CA10-0B_0	Approx. 68 x 43.2 x 80
• for 2 x 8 signals with LED 6ES7 924-1AA10-0B_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	EC 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 6ES7 924-0BB10-0B_0	Approx. 68 x 43.2 x 80

Wiring rules for connection modules

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; Cul (Reference CSA C22.2 No. 142) overvoltage category III pollution degree 2
Dimensions (W x H x D) in mm	
6ES7 924-0BD10-0B_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; Cul (Reference CSA C22.2 No. 142) overvoltage category III pollution degree 2
Dimensions (W x H x D) in mm	
6ES7 924-0BE10-0B_0	Approx. 120 x 45 x 80

SIMATIC S7-400

Connection methods

Fully modular connection

Technical specifications function modules (continued)

Wiring rules for the connection modules

	Connection modules TPPro 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 screw-driver	3.5 mm (cylindrical shape)	
Tightening torque for connecting the cables	-	0.4 to 0.7 Nm

Ordering data

front connector modules

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 connect. cables

Order No.

Pre-assembled round cable

16-pole, 0.14 mm²

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 mm²

unshielded

30 m

6ES7 923-0CD00-0AA0

60 m

B7

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 mm²

unshielded

30 m

6ES7 923-2CD00-0AA0

60 m

6ES7 923-2CG00-0AA0

8 connectors (16-pole)

Insulation displacement system with 8 cable grips

6ES7 921-3BE10-0AA0

Accessories

Crimping tool

6ES7 928-0AA00-0AA0

For processing the connectors (female ribbon cable connector)

B7: Subject to export regulations: AL: N and ECCN: EAR99H

SIMATIC S7-400

Connection methods

Fully modular connection

Ordering data basic modules Order No.

Connection module TP1

for 1-wire initiators

Packaging unit (1 unit)

- Spring terminals
- Screw terminals

6ES7 924-0AA10-0AB0

6ES7 924-0AA10-0AA0

Connection module TP3

for 3-wire initiators

Packaging unit (1 unit)

- Spring terminals
- Screw terminals

6ES7 924-0CA10-0AB0

6ES7 924-0CA10-0AA0

Connection module TPK

for 2 x 8 signals

Packaging unit (1 unit)

- Spring terminals
- Screw terminals

6ES7 924-1AA10-0AB0

6ES7 924-1AA10-0AA0

Connection module TP2

for 2 A modules

for 2-wire initiators

Packaging unit (1 unit)

- Spring terminals
- Screw terminals

6ES7 924-0BB10-0AB0

6ES7 924-0BB10-0AA0

Connection module TPA

for analog signals

Packaging unit (1 unit)

- Spring terminals
- Screw terminals

6ES7 924-0CC10-0AB0

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)
- 3 to 8 mm
- 4 to 13 mm

6ES7 390-5AB00-0AA0

6ES7 390-5BA00-0AA0

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
- Screw terminals

6ES7 924-0AA10-0BB0

6ES7 924-0AA10-0BA0

Connection module TP3 with LED

for 3-wire initiators

Packaging unit (1 unit)

- Spring terminals
- Screw terminals

6ES7 924-0CA10-0BB0

6ES7 924-0CA10-0BA0

Connection module TPK with LED

for 2 x 8 signals

Packaging unit (1 unit)

- Spring terminals
- Screw terminals

6ES7 924-1AA10-0BB0

6ES7 924-1AA10-0BA0

Connection module TP2 with LED

for 2 A modules

for 2-wire initiators

Packaging unit (1 unit)

- Spring terminals
- Screw terminals

6ES7 924-0BB10-0BB0

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

SIMATIC S7-400

Connection methods

Fully modular connection

Ordering data function modules

Connection module TPRO for output signals

for 2-wire connection

Packaging unit (1 unit)

- Spring terminals
- Screw terminals

Order No.

6ES7 924-0BD10-0BB0

6ES7 924-0BD10-0BA0

Connection module TPRI for input signals

for 2-wire connection

Packaging unit (1 unit)

- Spring terminals
- Screw terminals

6ES7 924-0BE10-0BB0

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 TPRI
PU = 4 units

6ES7 928-3DA00-4AA0

Optocoupler AC alternative

for relay in the case of TPRO
PU = 4 units

6ES7 928-3CA00-4AA0

SIMATIC S7-400

Connection methods

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 mm² 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 mm²

Core type H05V-K

Screw version

Packaging unit (1 unit)

Length:

- 2.5 m
- 3.2 m
- 5 m
- Special lengths

Packaging unit (5 units)

Length:

- 2.5 m
- 3.2 m
- 5 m

Crimp version

Packaging unit (1 unit)

Length:

- 2.5 m
- 3.2 m
- 5 m
- Special lengths

Packaging unit (5 units)

- 2.5 m
- 3.2 m
- 5 m

Core type UL/CSA-certified

Screw version

Packaging unit (1 unit)

Length:

- 3.2 m
- 5 m
- Special lengths

6ES7 922-4BC50-0AD0

6ES7 922-4BD20-0AD0

6ES7 922-4BF00-0AD0

on request

6ES7 922-4BC50-5AD0

6ES7 922-4BD20-5AD0

6ES7 922-4BF00-5AD0

6ES7 922-4BC50-0AE0

6ES7 922-4BD20-0AE0

6ES7 922-4BF00-0AE0

on request

6ES7 922-4BC50-5AE0

6ES7 922-4BD20-5AE0

6ES7 922-4BF00-5AE0

6ES7 922-4BD20-0UD0

6ES7 922-4BF00-0UD0

on request

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 setting up central controllers and expansion units
- For holding up to 18 modules
- Also suitable for S7-400H
- Also available as aluminum rack

UR2 (Universal Rack)

- For setting up central controllers and expansion units
- For holding up to 9 modules
- Also suitable for S7-400H
- Also available as aluminum rack

CR2 (Central Rack)

- For setting up central controllers
- For holding up to 18 modules
- Segmented rack:
For operating two mutually independent S7-400 CPUs without S7-400 Multicomputing, but with communication between the CPUs over the backplane bus (C bus). Both CPUs can address their own local I/O modules (segmented P bus).

CR3 (Central Rack)

- For configuring central racks
- Optimized for distributed automation solutions due to holding up to 4 modules

UR2-H

- For configuring a complete S7-400H system in one subrack
- Also suitable for S7-400:
Operation of 2 separate CPUs with their own I/O (separate P and C buses)
- Can also be used as an expansion unit
- For holding up to 18 modules
- Also available as aluminum rack

ER1 (Extension Rack)

- For setting up expansion units economically
- For holding up to 18 modules with restricted functionality
- Also suitable for S7-400H
- Also available as aluminum rack

ER2 (Extension Rack)

- For setting up expansion units economically
- For holding up to 9 modules with restricted functionality
- Also suitable for S7-400H
- Also available as aluminum rack

Technical specifications

	6ES7 400-1TA01-0AA0	6ES7 400-1TA11-0AA0	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	18	9	9	18; 2 segments with 8 or 10 slots	4
Rack						
• K bus	Yes	Yes	Yes	Yes	Yes	Yes
• P bus	Yes	Yes	Yes	Yes	Yes	Yes
Dimensions						
Dimensions						
• Width	482.5 mm	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	290 mm
• Depth	27.5 mm	27.5 mm	27.5 mm	27.5 mm	27.5 mm	27.5 mm
Weights						
• Weight, approx.	4 200 g	3 000 g	2 200 g	1 500 g	4 200 g	750 g

SIMATIC S7-400

Racks

Racks

Technical specifications (continued)

	6ES7 400-2JA00-0AA0	6ES7 400-2JA10-0AA0	6ES7 403-1TA01-0AA0	6ES7 403-1TA11-0AA0	6ES7 403-1JA01-0AA0	6ES7 403-1JA11-0AA0
Hardware config.						
Number of single-width slots, max.	18	18	18	18	9	9
Rack						
• K bus	Yes	Yes				
• P bus	Yes	Yes	Yes	Yes	Yes	Yes
Dimensions						
Dimensions						
• Width	482.5 mm	482.5 mm	482.5 mm	482.5 mm	257.5 mm	257.5 mm
• Height	290 mm	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	27.5 mm
Weights						
• Weight, approx.	4 200 g	3 000 g	4 200 g	2 500 g	2 200 g	1 250 g

Ordering data

Ordering data	Order No.
UR1 rack for central controllers and expansion units, 18 slots	6ES7 400-1TA01-0AA0
UR1 aluminum rack for central controllers and expansion units, 18 slots	6ES7 400-1TA11-0AA0
UR2 rack for central controllers and expansion units, 9 slots	6ES7 400-1JA01-0AA0
UR2 aluminum rack for central controllers and expansion units, 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 units, 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-H aluminum rack for split CCs, 18 slots	6ES7 400-2JA10-0AA0
ER1 rack for expansion units, P bus only, 18 slots	6ES7 403-1TA01-0AA0
ER1 aluminum rack for expansion units, P bus only, 18 slots	6ES7 403-1TA11-0AA0
ER2 rack for expansion units, P bus only, 9 slots	6ES7 403-1JA01-0AA0
ER2 aluminum rack for expansion units, P bus only, 9 slots	6ES7 403-1JA11-0AA0
Slot cover 10 units (spare part)	6ES7 490-1AA00-0AA0

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 range, lower limit (AC)		85/170 V AC
• permissible range, upper limit (AC)		132 V AC or 264 V AC
• 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	0.6 A at rated voltage 230 V AC; 1.15 A: at rated voltage 120 V AC
Current consumption/ power loss		
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		
Dimensions		
• 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	

SIMATIC S7-400

Racks

Expansion racks

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

The following requirements must be met for expansion:

- IM 463-2 interface module plugged into the SIMATIC S7-400 central controller
- IM 314 interface module plugged into SIMATIC S5 expansion racks
- Maximum configuration:
 - Up to 32 SIMATIC S5 expansion racks can be connected to one S7-400 central controller
- Transmission distance:
 - The maximum permissible distance between the central controller and the last expansion rack on a line is 600 m

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

SIMATIC S7-400

Interface modules

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
Current consumption/ power loss	
Power loss, max.	700 mW
Hardware config.	
Cable length between first and last interface module, max.	5 m
Dimensions	
Dimensions	
• 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

SIMATIC S7-400

Interface modules

IM 461-0

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
Current consumption/ power loss	
Power loss, max.	1 450 mW
Hardware config.	
Cable length between first and last interface module, max.	5 m
Dimensions	
Dimensions	
• 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	

SIMATIC S7-400

Interface modules

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
Current consumption/ power loss	
Power loss, max.	425 mW
Hardware config.	
Cable length between first and last interface module, max.	1.5 m
Dimensions	
Dimensions	
• Width	25 mm
• Height	290 mm
• Depth	217 mm
Weights	
• Weight, approx.	600 g

Ordering data

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

SIMATIC S7-400

Interface modules

IM 461-1

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
Current consumption/ power loss	
Power loss, max.	600 mW
Hardware config.	
Cable length between first and last interface module, max.	1.5 m
Dimensions	
Dimensions	
• Width	25 mm
• Height	290 mm
• Depth	217 mm
Weights	
• Weight, approx.	610 g

Ordering data

Order No.

IM 461-1 interface module

Receive IM for central coupling up to max. 1.5 m; without C bus transfer

6ES7 461-1BA01-0AA0

468-3 connecting cable

For connecting IM 460-1 and IM 461-1

0.75 m

1.5 m

6ES7 468-3AH50-0AA0

6ES7 468-3BB50-0AA0

SIMATIC S7-400

Interface modules

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
Current consumption/ powerloss	
Power loss, max.	7 750 mW
Hardware config.	
Cable length between first and last interface module, max.	102 m
Dimensions	
Dimensions	
• 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

SIMATIC S7-400

Interface modules

IM 461-3

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
Current consumption/ power loss	
Power loss, max.	3 100 mW
Hardware config.	
Cable length between first and last interface module, max.	102 m
Dimensions	
Dimensions	
• 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	

SIMATIC S7-400

Interface modules

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
Current consumption/ power loss	
Power loss, max.	6 600 mW
Hardware config.	
Cable length between first and last interface module, max.	600 m
Dimensions	
Dimensions	
• Width	25 mm
• Height	290 mm
• Depth	217 mm
Weights	
• Weight, approx.	360 g

Ordering data

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	

SIMATIC S7-400

Power supplies

PS 405/407 power supply

Overview



- Power supplies for SIMATIC S7-400
- For conversion of AC or DC line voltages to the 5 V DC and 24 V DC operating voltages required
- 4 A, 10 A and 20 A output currents
- In addition:
 - SIPLUS power supply 6AG1 405-0KA02-2AA0 for temperature range of -25 to +60 °C and use under medium load (e.g. chlorine/sulfur atmosphere). Technical specifications similar to 6ES7 405-0KA02-0AA0
 - SIPLUS power supply 6AG1 407-0KA02-4AA0 for use under medium load (e.g. chlorine/sulfur atmosphere). Technical specifications similar to 6ES7 407-0KA02-0AA0
 - SIPLUS power supply 6AG1 407-0KR02-4AA0 for use under medium load (e.g. chlorine/sulfur atmosphere). Technical specifications similar to 6ES7 407-0KR02-0AA0

Technical specifications

	6ES7 405-0DA02-0AA0	6ES7 405-0KA02-0AA0	6ES7 405-0KR02-0AA0	6ES7 405-0RA02-0AA0
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	static 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	static: 72 V, dynamic 75.5 V
Input current				
• Rated value at DC 24 V	2 A	4 A	4 A	7 A
• Rated value at DC 48 V	1 000 mA	2 A	2 A	3.2 A
• Rated value at DC 60 V	800 mA	1.6 A	1.6 A	2.5 A
• Inrush current, max.	18 A; Full width at half maximum 20 ms	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; 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
Current consumption/ power loss				
Power consumption				
• Power consumption, typ.	48 W	95 W	95 W	168 W

Technical specifications (continued)

	6ES7 405-0DA02-0AA0	6ES7 405-0KA02-0AA0	6ES7 405-0KR02-0AA0	6ES7 405-0RA02-0AA0
Current consumption/ power loss				
Power loss, typ.	16 W	20 W	20 W	44 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/1.9 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	3x 1.5 mm ² , solid or stranded wire with end sleeve, external diameter 3 to 9 mm	3x 1.5 mm ² , solid or stranded wire with end sleeve, external diameter 3 to 9 mm	3x 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
Degree of protection				
Class of protection	1; with protective conductor	1; with protective conductor	1; with protective conductor	1; with protective conductor
Standards, approvals, certificates				
FM approval	Yes; Ta: 0 to 60 °C T4	Yes; Up to 60 °C: T4	Yes; Ta: 0 to 60 °C T4	Yes; Up to 60°C: T4
Dimensions				
Required slots	1	2	2	2
Dimensions				
Dimensions				
• 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
Weights				
• Weight, approx.	760 g	1 200 g	1 200 g	1 300 g

	6ES7 407-0DA02-0AA0	6ES7 407-0KA02-0AA0	6ES7 407-0KR02-0AA0	6ES7 407-0RA02-0AA0
Power supply				
Input voltage				
• Rated value, DC 24 V	Yes			
• Rated value, DC 110 V	Yes; Rated value 120 V DC	Yes; Rated value 120 V DC	Yes; Rated value 120 V DC	Yes; Rated value 120 V 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

SIMATIC S7-400

Power supplies

PS 405/407 power supply

Technical specifications (continued)

	6ES7 407-0DA02-0AA0	6ES7 407-0KA02-0AA0	6ES7 407-0KR02-0AA0	6ES7 407-0RA02-0AA0
Power supply				
Input voltage				
• 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 120 V DC	1 A; at 120 V DC	1 A; at 120 V DC	1.4 A
• Rated value at DC 230 V	190 mA	0.5 A	0.5 A	0.7 A
• 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	10 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
Current consumption/ power loss				
Power consumption				
• Power consumption, typ.	52 W	95 W	95 W	
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	3x 1.5 mm ² , solid or stranded wire with end sleeve, external diameter 3 to 9 mm	3x 1.5 mm ² , solid or stranded wire with end sleeve, external diameter 3 to 9 mm	3x 1.5 mm ² , solid or stranded wire with end sleeve, external diameter 3 to 9 mm	3x 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

Technical specifications (continued)

	6ES7 407-0DA02-0AA0	6ES7 407-0KA02-0AA0	6ES7 407-0KR02-0AA0	6ES7 407-0RA02-0AA0
Degree of protection				
Class of protection	1; with protective conductor	1; with protective conductor	1; with protective conductor	1; with protective conductor
Standards, approvals, certificates				
FM approval	Yes; Ta: 0 to 60 °C T4	Yes; Ta: 0 to 60 °C T4	Yes; Ta: 0 to 60 °C T4	Yes; Ta: 0 to 60 °C T4
Dimensions				
Required slots	1	2	2	2
Dimensions				
Dimensions				
• 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
Weights				
• Weight, approx.	760 g	1 200 g	1 200 g	1 300 g

Ordering data

Order No.	
PS 405 power supply modules	
24 V DC; 5 V DC, 24 V DC	
4 A	6ES7 405-0DA02-0AA0
10 A, wide range	6ES7 405-0KA02-0AA0
10 A, redundant, wide range	6ES7 405-0KR02-0AA0
20 A, wide range	6ES7 405-0RA02-0AA0
SIPLUS PS 405 power supply modules	
(extended temperature range and medium load)	
24 V DC; 5 V DC, 24 V DC	
10 A, wide range	6AG1 405-0KA02-2AA0
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	6ES7 407-0DA02-0AA0
10 A	6ES7 407-0KA02-0AA0
10 A, redundant	6ES7 407-0KR02-0AA0
20 A	6ES7 407-0RA02-0AA0
SIPLUS PS 407 power supply modules	
(extended temperature range and medium load)	
120/230 V AC; 5 V DC, 24 V DC	
10 A	6AG1 407-0KA02-4AA0
10 A, redundant	6AG1 407-0KR02-4AA0
Power plug for PS 407	6ES7 490-0AB00-0AA0
Spare part	
Backup battery	6ES7 971-0BA00
Type AA, 1.9 Ah	

B7: Subject to export regulations: AL: N and ECCN: EAR99H

SIMATIC S7-400

Accessories

Labeling sheets

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

5

Technical specifications

	6ES7 492-2AX00-0AA0	6ES7 492-2BX00-0AA0	6ES7 492-2CX00-0AA0	6ES7 492-2DX00-0AA0	6ES7 492-2XX00-0AA0
Dimensions					
Weights					
• Weight, approx.	2 g	2 g	2 g	2 g	72 g

Ordering data

Labeling sheets

DIN A4, for printing using laser printer; 10 pieces

Petrol

Light beige

Yellow

Red

Order No.

6ES7 492-2AX00-0AA0

6ES7 492-2BX00-0AA0

6ES7 492-2CX00-0AA0

6ES7 492-2DX00-0AA0

Cover film for labeling strips

10 pieces (spare part)

Order No.

6ES7 492-2XX00-0AA0

Overview

Cover film for labeling strips

- Teal-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

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 S7-400



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SIMATIC Software



6/2	Introduction	6/54	HMI software
6/3	Standard Tools	6/54	SIMATIC WinCC flexible ES
6/3	STEP 7	6/57	WinCC flexible/ChangeControl
6/6	STEP 7 Professional	6/58	SIMATIC WinCC flexible RT
6/7	STEP 7 Lite	6/61	SIMATIC WinCC flexible RT options
6/9	STEP 7 - Micro / WIN	6/63	SIMATIC WinCC
6/10	STEP 7-Micro/WIN instruction library	6/70	WinCC Options
6/10	Technical specifications	6/71	SIMATIC ProAgent
	Standard Tools	6/73	SIMATIC Maintenance Station
6/11	Engineering Tools	6/75	Premium Studio
6/11	S7-SCL	6/76	Supplementary Components
6/12	S7-GRAPH	6/76	ADDM - Data Management
6/13	S7-HiGraph	6/77	Technical product data for
6/14	CFC		CAX applications
6/15	S7-PDIAG	6/77	External prommer
6/16	S7-PLCSIM	6/78	HVAC Lite Library runtime software
6/17	TeleService		
6/19	DOCPRO		
6/20	S7-200 PC Access		
6/21	SIMATIC iMap		
6/23	S7-Technology		
6/24	D7-SYS		
6/25	Drive ES engineering software		
6/26	Distributed Safety Software		
6/27	S7 F/FH Systems		
6/28	S7-F/FH Systems: S7 F Systems		
6/29	S7-F/FH Systems:		
	SIMATIC Safety Matrix		
6/30	Version Cross Manager		
6/31	Version Trail		
6/32	SIMATIC PDM		
	Process Device Manager		
6/35	SINEMA E		
6/36	Technical specifications		
	Engineering Tools		
6/40	Runtime software		
6/40	Standard PID Control		
6/41	Modular PID Control		
6/44	PID Self-Tuner		
6/45	Fuzzy Control		
6/46	NeuroSystems		
6/47	Loadable drivers for CP 441-2 and CP 341		
6/49	Software redundancy		
6/50	PRODAVE MPI		
6/51	Easy Motion Control		
6/53	Technical specifications		
	Runtime Software		

Brochures

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

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

SIMATIC Software

Introduction

Software for SIMATIC S7/C7/WinAC

Overview

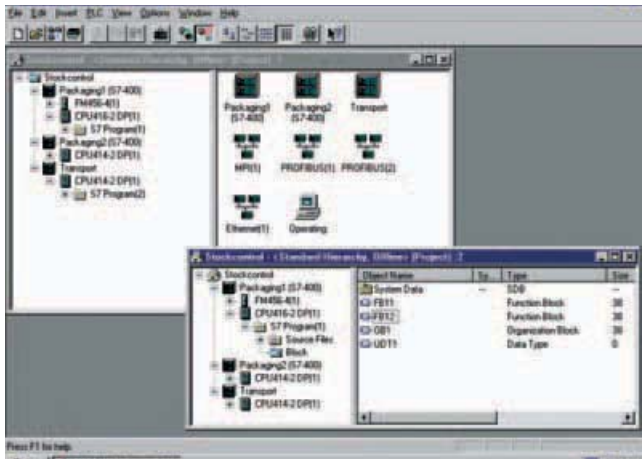


- System of seamlessly meshed software tools for SIMATIC S7 and PC-based Control SIMATIC WinAC
- With user-friendly functions for all phases of an automation project
- Comprising:
 - Standard tools:
Basis for the SIMATIC hardware.
 - Engineering tools:
High-level programming languages and technology-oriented software.
 - Runtime software:
Off-the-shelf execution software for the production process.
 - Human Machine Interface:
Software especially 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".

SIMATIC Software

Standard Tools

STEP 7

Technical specifications PC adapter USB

6ES7 972-0CB20-0XA0		6ES7 972-0CB20-0XA0	
Supply voltages		Environmental requirements	
Rated value		Operating temperature	
• DC 24 V	Yes	• min.	5 °C
		• max.	40 °C
Current consumption		• permissible temperature change	10 °C/h; Operation: 10 K/h; storage/transport: 20 K/h
Current consumption, typ.	100 mA	Storage/transport temperature	
Current consumption/ power loss		• min.	-20 °C
Power consumption		• max.	60 °C
• Power consumption, typ.	max. 2,5 W	Relative humidity	
EMC		• Operation, min.	5%
Interference immunity against discharge of static electricity		• Operation, max.	80%; at 25 °C (no condensation)
• Interference immunity against discharge of static electricity to IEC 61000-4-2	Yes; 6 kV, contact discharge (to IEC 61000-4-2); 8 kV, air discharge (to IEC 61000-4-2)	• Storage/transport, min.	5%
Interference immunity to cable-borne interference		• Storage/transport, max.	95%; at 25 °C (no condensation)
• on the supply lines to IEC 61000-4-4	Yes; 2 kV (to IEC 61000-4-4, Burst)	Vibrations	
• Interference immunity on signal lines to 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)	• Operation checked according to IEC 60068-2-6	Yes; 10 to 58 Hz: amplitude 0.075 mm; 58 to 500 Hz: acceleration 9.8 m/s ²
• on the supply lines to IEC 61000-4-5	Yes; 1 kV (to IEC 61000-4-5; surge symm.); 2 kV (to IEC 61000-4-5; surge asymm.)	• Transport tested checked to IEC 60068-2-6	Yes; (packed) 5 to 9 Hz, amplitude 3.5 mm; 9 to 500 Hz, acceleration 9.8 m/s ²
• Interference immunity against high frequency irradiation to IEC 61000-4-3	Yes; 10 V/m, 80 to 1000 MHz (to IEC 61000-4-3); 10 V/m, 900 MHz, 1.89 GHz, 50% ED (to IEC 61000-4-3)	Shock test	
• Interference immunity against high frequency current feed to IEC 61000-4-6	Yes; 10 V, 9 kHz to 80 MHz (to IEC 61000-4-6)	• Impact test	Tested to DIN IEC 60068-2-2; Operation: 950 m/s ² (10 g), 30 ms, 100 Shocks; Transport (packaged): 250 m/s ² (25 g), 6 ms, 1000 shocks
• Interference immunity to magnetic fields at 50 Hz	30 A/m; to IEC 61000-4-8	Dimensions	
• Interference emission to EN 55022, class B	Yes	Dimensions	
		• Width	105 mm
		• Height	58 mm
		• Depth	26 mm
		Weights	
		• Weight, approx.	100 g

B3: Subject to export regulations: AL: N and ECCN: 5D992B1
B7: Subject to export regulations: AL: N and ECCN: EAR99H

SIMATIC Software

Standard Tools

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.

6

Ordering Data

STEP 7 Professional Edition 2006

Target system:

SIMATIC S7-300/400,
SIMATIC C7, SIMATIC WinAC

Requirements:

Windows XP Prof., Vista Ultimate,
Vista Business

Type of delivery:

German, English, French,
Spanish, Italian; license key on
USB stick, without documentation

Floating license on DVD

6ES7 810-5CC10-0YA5

Rental license for 50 hours

6ES7 810-5CC10-0YA6

Software Update Service on DVD
(requires current software
version)

6ES7 810-5CC04-0YE2

Upgrade of Floating License to
Edition 2006; on DVD

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 DVD, 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

Order No.

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

B3

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, S
IMATIC HMI, SIMATIC NET

SIMATIC Manual Collection update service for 1 year

B3

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

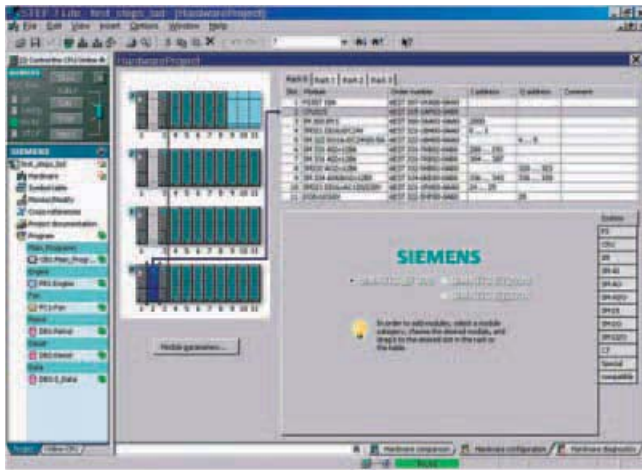
see STEP 7, page 6/5

Components for connecting the PC to Industrial Ethernet

see STEP 7, page 6/5

B3: 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](http://support.automation.siemens.com/WW/view/en/22764848) as of immediately. Additional information is available in 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

SIMATIC Manual Collection

B3

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

B3

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 6/16

TeleService

see page 6/17

Components for connecting a PC to MPI and PROFIBUS

For PCs with a free PCI slot:

CP 5611

6GK1 561-1AA01

CP 5611 MPI

B7

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)

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

B7: Subject to export regulations: AL: N and ECCN: EAR99H

SIMATIC Software

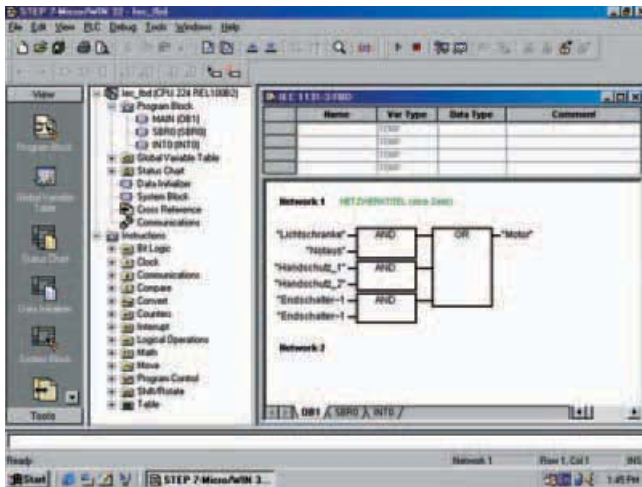
Standard Tools

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	LAD/FBD/IL	LAD/FBD/IL and IL source	Like STEP 7 plus S7-GGRAPH (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-GGRAPH	
Option packages			
Optional programming languages	None	S7-GGRAPH, 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 B8 **6ES7 810-2CC03-0YX0**

Upgrade Single License¹⁾ B8 **6ES7 810-2CC03-0YX3**

To be ordered separately:

Intelligent RS 232/PPI multi-master cable **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 **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

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 **6GK1 561-1AA01**

CP 5611 MPI B7 **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)

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

B7: Subject to export regulations: AL: N and ECCN: EAR99H

B8: Subject to export regulations: AL: N and ECCN: EAR99S

SIMATIC Software

Standard Tools

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

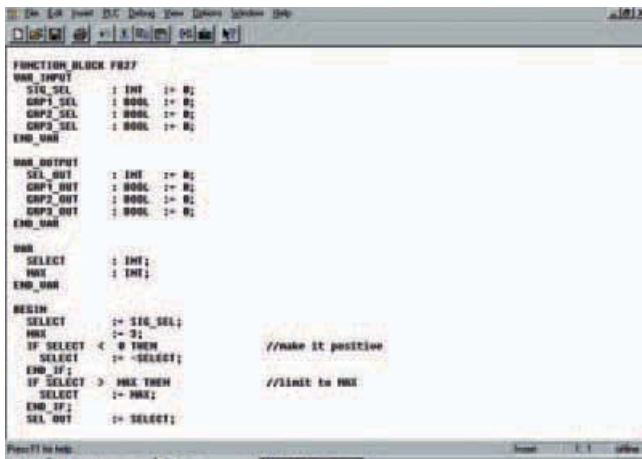
Protocol libraries for USS and MODBUS protocols; can be used with STEP 7-Micro/Win32 V3.2; including documentation, on CD-ROM

6ES7 830-2BC00-0YX0

Technical specifications Standard Tools

Standard Tool	STEP 7 Professional	STEP 7	STEP 7 Lite	STEP 7- Micro/WIN
Type of license	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 XP Professional Windows Vista Ultimate, Windows Vista Business	Windows XP Professional Windows Vista Ultimate, Windows Vista Business	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: 1 to 2 GB	Depends on Microsoft Windows operating system used. Recommendation: 1 to 2 GB	Depends on Microsoft Windows operating system used. Recommendation: 128 MB	32 MB
Hard drive requirement in programming device / PC	Depending on scope of installation, 700 to 1000 MB	Depending on scope of installation, 650 to 900 MB	Depending on scope of installation, 90 to 250 MB	50 MB
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 language programming

Target system:

SIMATIC S7-300 (CPU 314 and higher), SIMATIC S7-400, SIMATIC C7, SIMATIC WinAC

Requirement:

STEP 7 V5.3 and higher

Delivery package:

on CD; German, English, French, Spanish, Italian; incl. authorization diskette, with electronic documentation

Floating license

Software Update Service (requires current software version)

Upgrade floating to V5.3

6ES7 811-1CC05-0YA5

6ES7 811-1CA01-0YX2

6ES7 811-1CC05-0YE5

SIMATIC Manual Collection

B3

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

B3

6ES7 998-8XC01-8YE2

Current "Manual Collection" DVD and the three subsequent updates

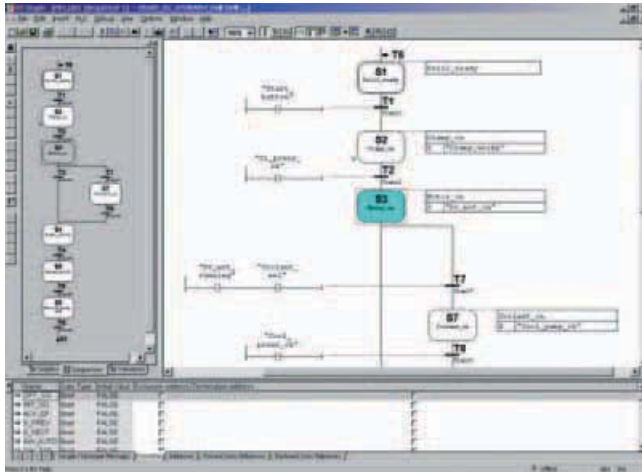
B3: Subject to export regulations: AL: N and ECCN: 5D992B1

SIMATIC Software

Engineering Tools

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 sequences

Target system:

SIMATIC S7-300, SIMATIC S7-400, SIMATIC C7, SIMATIC WinAC

Requirement:

STEP 7 V5.3 and higher

Delivery package:

on CD; German, English, French, Spanish, Italian; incl. authorization diskette, with electronic documentation

Floating license

6ES7 811-0CC06-0YA5

Software Update Service (requires current software version)

6ES7 811-0CA01-0YX2

Floating license upgrade to V5.3

6ES7 811-0CC06-0YE5

SIMATIC Manual Collection

B3

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

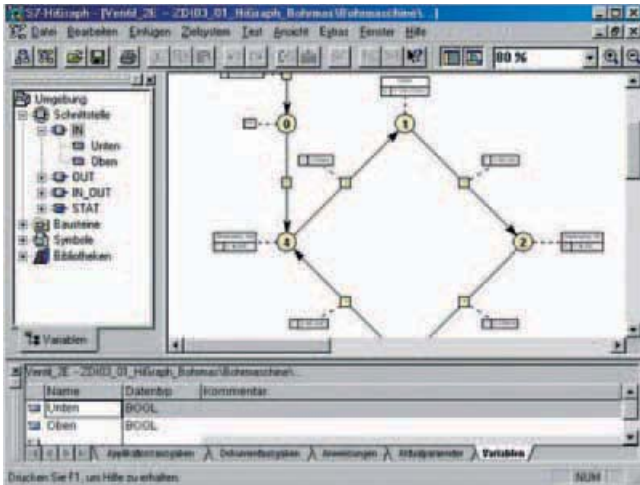
B3

6ES7 998-8XC01-8YE2

Current "Manual Collection" DVD and the three subsequent updates

B3: 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 state diagrams

Target system:

SIMATIC S7-300,
SIMATIC S7-400, SIMATIC C7,
SIMATIC WinAC

Requirement:

STEP 7 V5.3 and higher

Delivery package:

on CD; German, English, French,
Spanish, Italian; incl. authori-
zation diskette, with electronic
documentation

Floating license

6ES7 811-3CC05-0YA5

Software Update Service
(requires current software
version)

6ES7 811-3BA01-0YX2

Floating license upgrade to V5.3

6ES7 811-3CC05-0YE5

SIMATIC Manual Collection

B3

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

B3

6ES7 998-8XC01-8YE2

Current "Manual Collection" DVD
and the three subsequent
updates

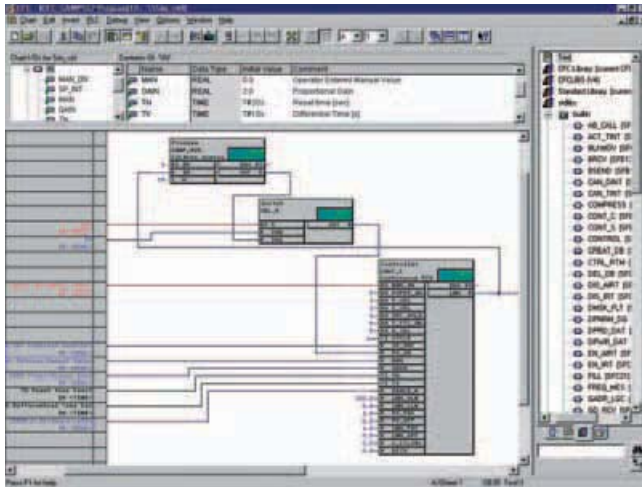
B3: Subject to export regulations: AL: N and ECCN: 5D992B1

SIMATIC Software

Engineering Tools

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 7.0

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 658-1EX07-2YA5

Upgrade to floating license V7.0

6ES7 658-1EX07-2YE5

Software Update Service
(requires current software version)

6ES7 658-1EX00-2YL8

SIMATIC Manual Collection

B3

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

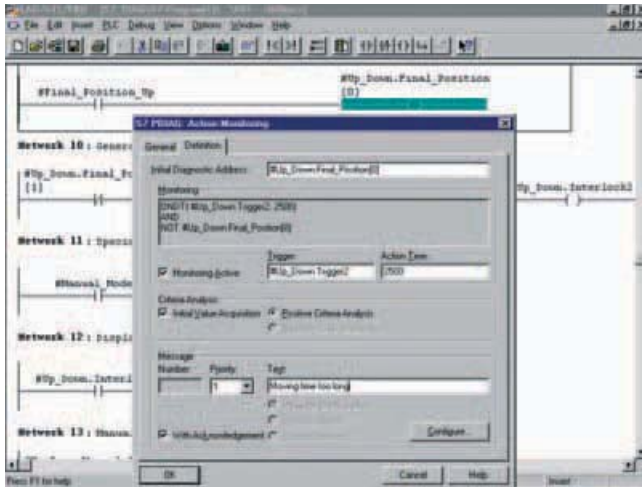
B3

6ES7 998-8XC01-8YE2

Current "Manual Collection" DVD and the three subsequent updates

B3: 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
(requires current software version)

6ES7 840-0CA01-0YX2

Upgrade to V5.3

6ES7 840-0CC04-0YE5

SIMATIC Manual Collection

B3

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

B3

6ES7 998-8XC01-8YE2

Current "Manual Collection" DVD and the three subsequent updates

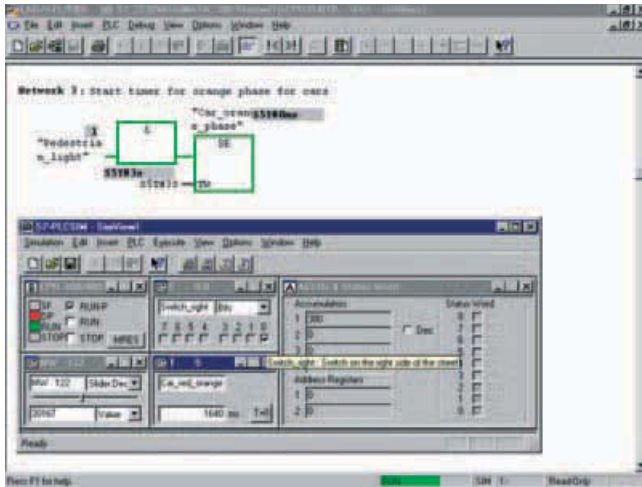
B3: Subject to export regulations: AL: N and ECCN: 5D992B1

SIMATIC Software

Engineering Tools

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 5.4

Task:

Function testing of SIMATIC S7 application blocks on PG/PC

Target system:

SIMATIC S7-300, SIMATIC S7-400, SIMATIC C7

Requirement:

From STEP 7 V5.4 incl. SP1, SP2 or SP3

Type of delivery:

on CD; English, German, French, Spanish, Italian; license key on USB stick, with electronic documentation

Floating license

6ES7 841-0CC05-0YA5

Software Update Service (requires current software version)

6ES7 841-0CA01-0YX2

Upgrade floating license to V5.4

6ES7 841-0CC05-0YE5

SIMATIC Manual Collection

B3

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

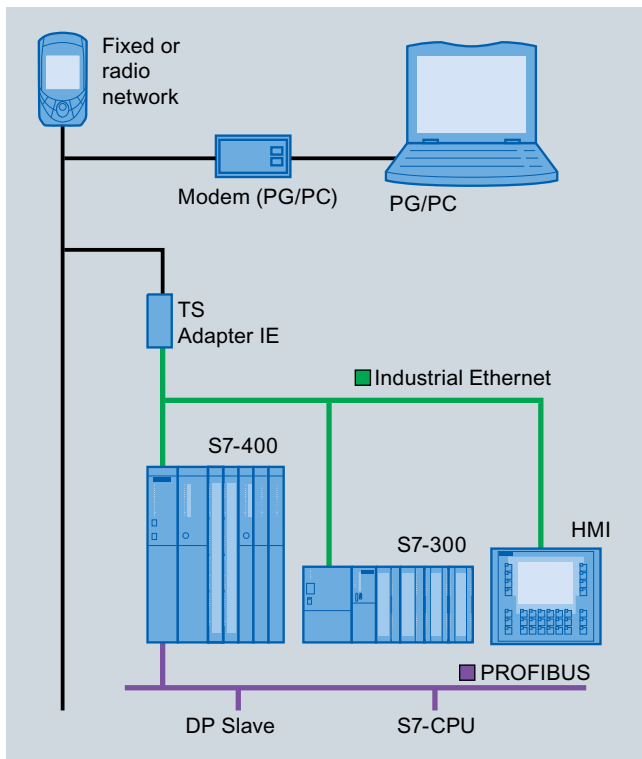
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6ES7 998-8XC01-8YE2

Current "Manual Collection" DVD and the three subsequent updates

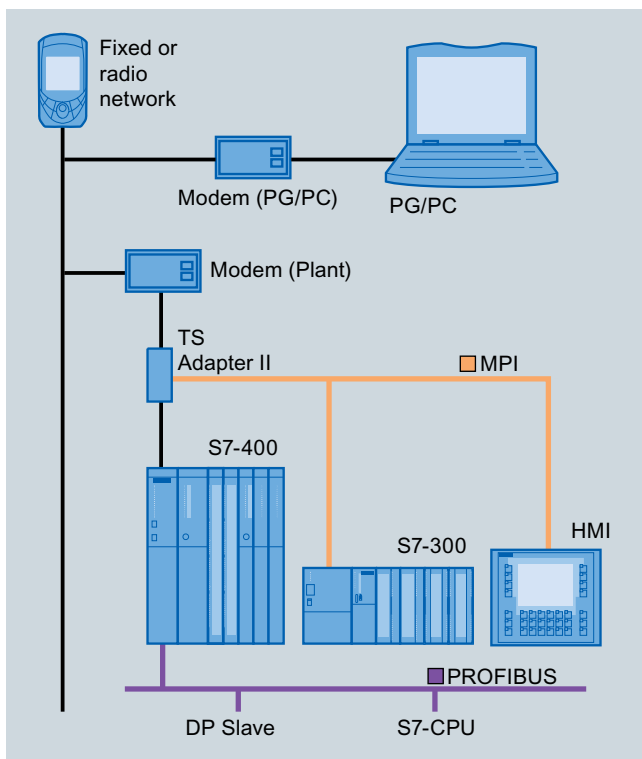
B3: Subject to export regulations: AL: N and ECCN: 5D992B1

Overview



Teleservice with TS Adapter IE

- For performing remote maintenance over the telephone network:
A PG/PC with an Engineering Tool installed, e.g. STEP 7, can access automation components (e.g. S7 CPUs) over the telephone network that are connected to the appropriate adapters over Industrial Ethernet or PROFIBUS.
- Comprising the TeleService software and different adapters:
 - TS Adapter II for connection to PPI, MPI or PROFIBUS DP
 - TS Adapter IE for connection to Industrial Ethernet
- Additional functions with TS Adapter II:
 - Establishing a connection from/to remote plants, e.g. for calling up process data from an automation system (*PG-to-AS remote coupling*).
 - Exchanging data between plants (*AS-to-AS remote coupling*):
Exchange of process data between two SIMATIC automation systems.
 - Sending a *text message*:
Sending a text message from a SIMATIC automation system via a GSM wireless modem.
- Additional functions with TS Adapter IE:
 - Remote operation of HMI devices:
Access to the HMI device via an Internet browser installed on the adapter
 - Sending e-mails:
Establishing a modem link to a dial-up server (e.g. to an Internet service provider): A SIMATIC CPU can send e-mails over an e-mail server that can be accessed in this manner.
 - Standard routing:
A modem link can be established to an Internet service provider for accessing data on the Internet.



Teleservice with TS Adapter II

SIMATIC Software

Engineering Tools

TeleService

Technical specifications

For technical data for TeleService, see "Engineering Tools".

TS Adapter II	
Dimensions (W x H x D) in mm	125 x 110 x 40
Weight, approx.	250 g
Interfaces	
• to S7/C7	RS 485 (up to 12 Mbit/s)
• to the PC	USB 1.1 (12 Mbit/s)
• to an external modem	RS 232 (up to 115 kbaud)
• to the analog telephone network	RJ12
• to the ISDN telephone network	RJ45
Supply voltage, external or via MPI interface	24 V DC
Current consumption	60 mA (typ.) / 120 mA (max.)
Switch-on current, max.	0.7 A; 8 µs
Degree of protection	IP20
Temperature	
• Operation	±0 °C ... +60 °C
• Storage/transport	-40 °C ... +70 °C

TS Adapter IE	
Dimensions (W x H x D) in mm	125 x 110 x 40
Weight, approx.	approx. 370 g
Interfaces	
• Ethernet	RJ45 (10/100 Mbit/s)
• to an external modem	RS 232 (up to 115 kbaud)
• to the analog telephone network	RJ12
• to the ISDN telephone network	RJ45
Supply voltage, external or via MPI interface	24 V DC
Current consumption of the TSA-IE ISDN	typ. 170 mA / max. 230 mA
Current consumption of the modem TSA IE	typ. 180 mA / max. 240 mA
Switch-on current, max.	0.7 A; 8 µs
Degree of protection	IP20
Temperature	
• Operation	±0 °C ... +60 °C
• Storage/transport	-40 °C ... +70 °C

Ordering Data

Order No.

TeleService, Version 6.1

Task:

Remote maintenance 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	B8	6ES7 842-0CE00-0YE0
Floating License Upgrade (from each previous version)	B8	6ES7 842-0CE00-0YE4
Software Update Service (requires current software version)		6ES7 842-0CA01-0YX2

TS Adapter II modem

With MPI connection and RS 232;
9-pin, male

6ES7 972-0CB35-0XA0

TS Adapter II ISDN

With MPI connection and RS 232;
9-pin, male

6ES7 972-0CC35-0XA0

TS Adapter IE modem

With Ethernet connection RJ45
(10/100 Mbit/s) and RS 232;
9-pin, male

6ES7 972-0EM00-0XA0

TS Adapter IE ISDN

With Ethernet connection RJ45
(10/100 Mbit/s) and RS 232;
9-pin, male

6ES7 972-0ED00-0XA0

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

B3 **6ES7 998-8XC01-8YE0**

SIMATIC Manual Collection update service for 1 year

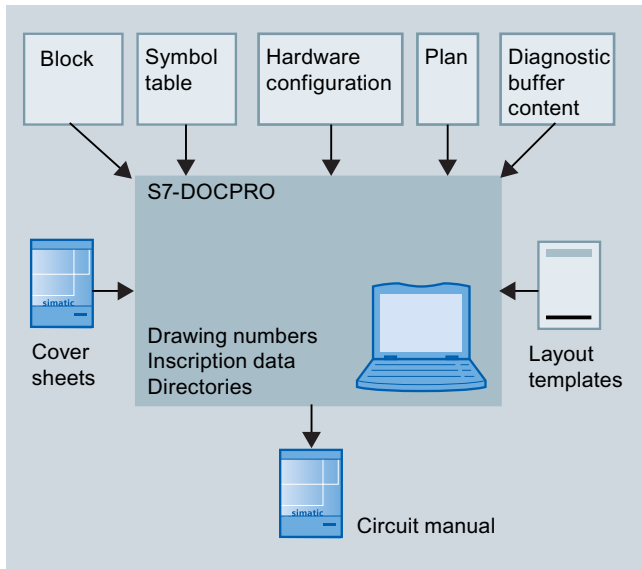
Current "Manual Collection" DVD
and the three subsequent
updates

B3 **6ES7 998-8XC01-8YE2**

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

B8: Subject to export regulations: AL: N and ECCN: EAR99S

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 5.4

Task:

Creation of circuit manuals for plant documentation management

Target system:

SIMATIC S7-300, SIMATIC S7-400, SIMATIC C7

Requirement:

from STEP 7 V5.4

Delivery package:

on CD; German, English, French, Spanish, Italian; incl. authorization diskette, with electronic documentation

Floating License

6ES7 803-0CC03-0YA5

Software Update Service (requires current software version)

6ES7 803-0CA01-0YX2

Single license upgrade to V5.4

6ES7 803-0CC03-0YE5

SIMATIC Manual Collection

B3

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

B3

6ES7 998-8XC01-8YE2

Current "Manual Collection" DVD and the three subsequent updates

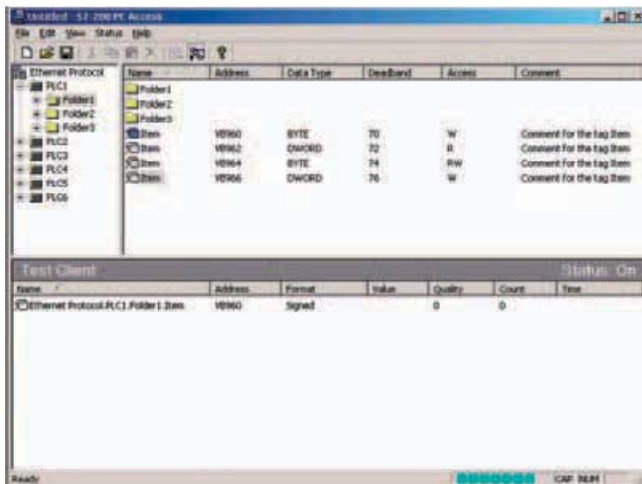
B3: Subject to export regulations: AL: N and ECCN: 5D992B1

SIMATIC Software

Engineering Tools

S7-200 PC Access

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

B8

6ES7 840-2CC01-0YX0

Multi Copy License for 15 installations

B8

6ES7 840-2CC01-0YX1

Intelligent RS 232/PPI multi-master cable

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

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

CP 5512

6GK1 551-2AA00

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

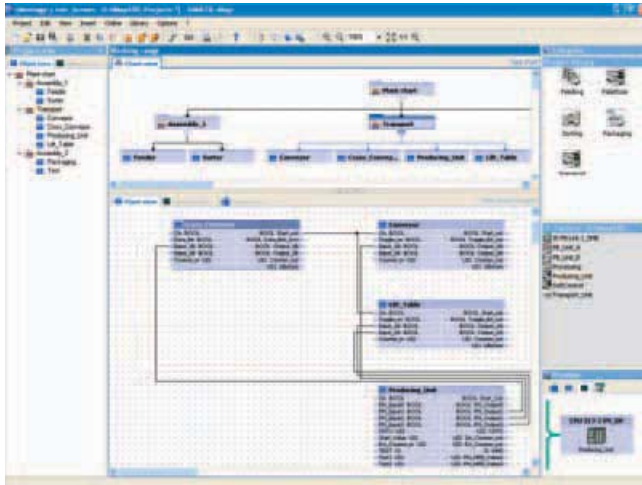
CP 5611

6GK1 561-1AA01

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

B8: Subject to export regulations: AL: N and ECCN: EAR99S

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

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 • Diagnosis of communication in the diagnostics window
Sectors	• 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 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)

SIMATIC Software

Engineering Tools

SIMATIC iMap

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 Prof. 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	B3	6ES7 820-0CC04-0YA5
Software Update Service (requires current software version)	B3	6ES7 820-0CC01-0YX2
Upgrade to V3.0, single license	B3	6ES7 820-0CC04-0YE5

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

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 V4.1****6ES7 864-1CC41-0YX0***Task:*

Option package for configuring and programming technology tasks with SIMATIC S7 CPU 31xT-2 DP

Requirement:

STEP 7 V5.4 SP2 or higher

Type of delivery:

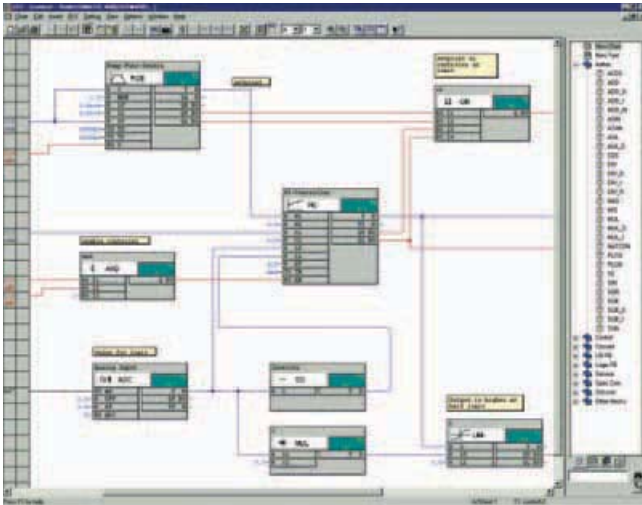
on DVD;
incl. documentation for CPU 31xT-2 DP
(included on DVD)

SIMATIC Software

Engineering Tools

D7-SYS

Overview



- Add-on for STEP 7/CFC/SFC for configuration of control and automation tasks with T400, FM 458, SIMADYN D or SIMATIC TDC
- Contains function blocks for every application
- Scope of delivery:
Software packages D7-SYS, CFC, SFC, TH-PO
- Optional:
D7-FB-Gen, function block generator for the creation of customized function blocks

Ordering Data

Order No.

SIMATIC D7-SYS V7.0

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 852-0CC01-0YA5

Upgrade License V5.x and higher

6ES7 852-0CC01-0YE5

Software Update Service

6ES7 852-0CC01-0YL5

SIMATIC D7 FB Gen V2.1

B8

6DD1 805-5DA0

Function block generator

SIMATIC Manual Collection

B3

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

B3

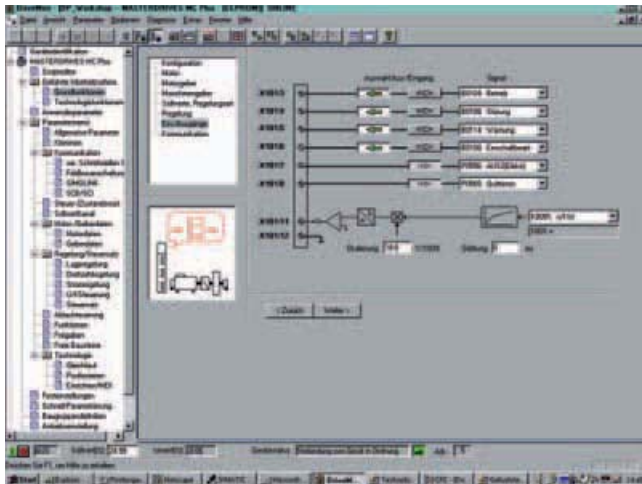
6ES7 998-8XC01-8YE2

Current "Manual Collection" DVD and the three subsequent updates

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

B8: Subject to export regulations: AL: N and ECCN: EAR99S

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

- Configuration software for the integration of drives into Totally Integrated Automation
- Requirement:
STEP 7 V5.3 or higher, SP 3
- Supply format: CD-ROM
Ger, En, Fr, Sp, It,
with electronic documentation

Single license	6SW1 700-5JA00-4AA0
Multi-user license, 60 pieces	6SW1 700-5JA00-4AA1
Software update service for single license	6SW1 700-0JA00-0AB2
Software update service for multi-user license	6SW1 700-0JA00-1AB2
Upgrade from V5.x to V5.4	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 V5 or higher and CFC V5.1 or higher, SP 2
- Supply format: 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

- Function block library for SIMATIC for the parameterization of the communication with the drives
- Requirement: STEP 7 V5.3, SP 3 or higher
- Supply format: 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
Software update service for single license	6SW1 700-0JC00-0AB2
Upgrade from V5.x to V5.4	6SW1 700-5JC00-4AA4

Drive ES PCS7 V6.1

- Function block library for PCS 7 for the integration of drives
- Requirement:
PCS7 V6.1 and higher
- Supply format: CD-ROM
de, en, fr, es, it
with electronic documentation

Single license, incl. 1x runtime license	6SW1 700-6JD00-1AA0
Runtime license	6SW1 700-5JD00-1AC0
Software update service for single license	6SW1 700-0JD00-0AB2
Upgrade from V5.x to V6.x	6SW1 700-6JD00-1AA4

SIMATIC Software

Engineering Tools

Distributed Safety Software

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

Software Update Service (requires current software version)

6ES7 833-1FC02-0YA5

6ES7 833-1FC00-0YX2

Distributed Safety Upgrade

From V5.x to V5.4;
Floating license for 1 user

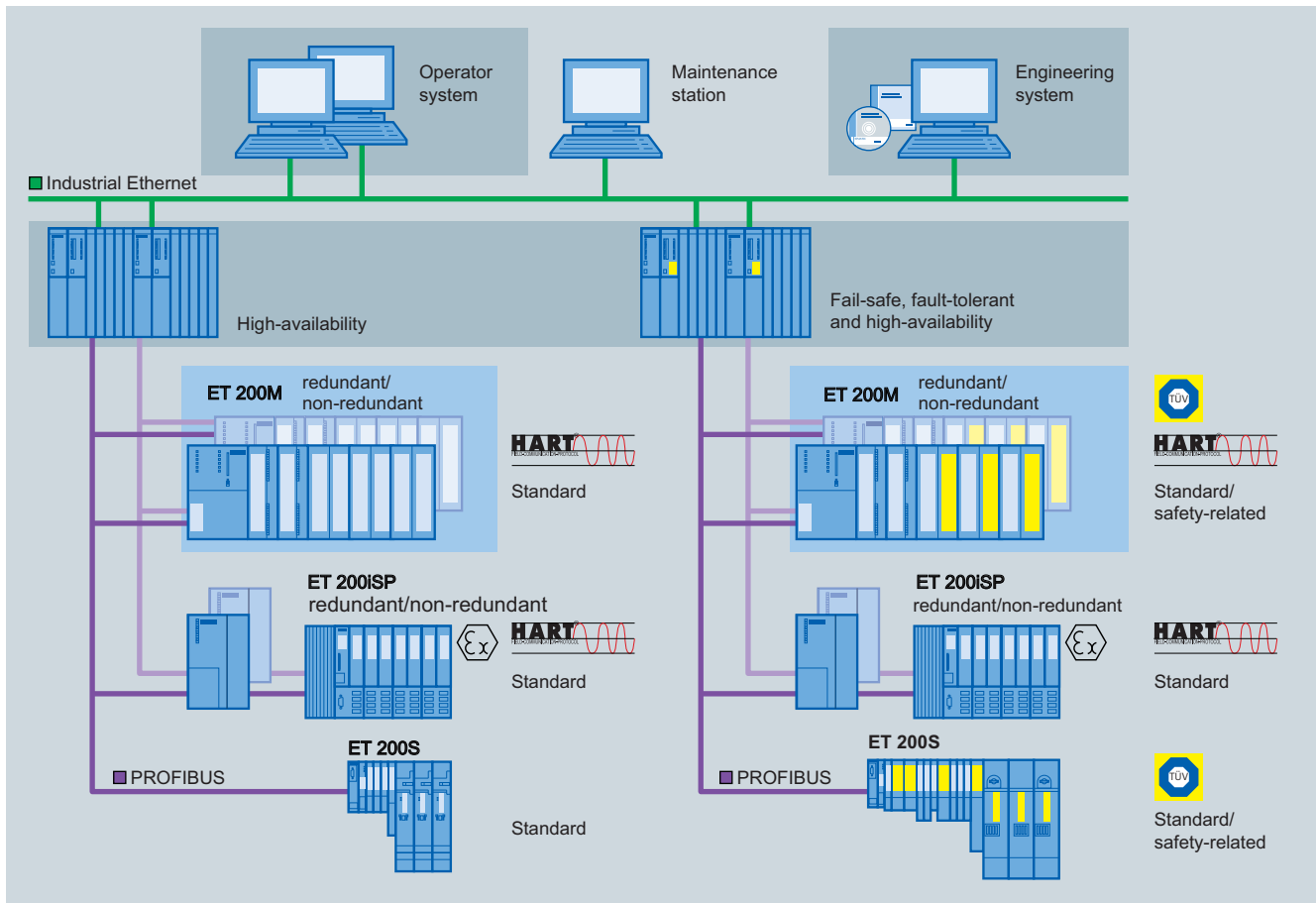
6ES7 833-1FC02-0YE5

Single license for "fail-safe function blocks for burner systems" V 5.4

License for one controller

9AL3 100-1AD54

Overview



Common engineering system for basic process control system and safety instrumented system

The process industry frequently features complex technological sequences with high safety demands, and faults and failures in the process automation could have fatal consequences for personnel, machines, plants and the environment. Therefore process safety is of particular significance. The safety technology used must reliably detect errors in the process and also its own internal errors, and automatically set the plant/application to a safe state if an error is detected.

S7 F/FH Systems is the comprehensive range of products and services from Siemens for safe, fault-tolerant applications in the process industry. This is characterized by:

- Safe communication via PROFIBUS with PROFI-safe
- Safe communication also via PROFIBUS PA with PROFI-safe
- ET 200 distributed I/O systems with safety-related I/O modules

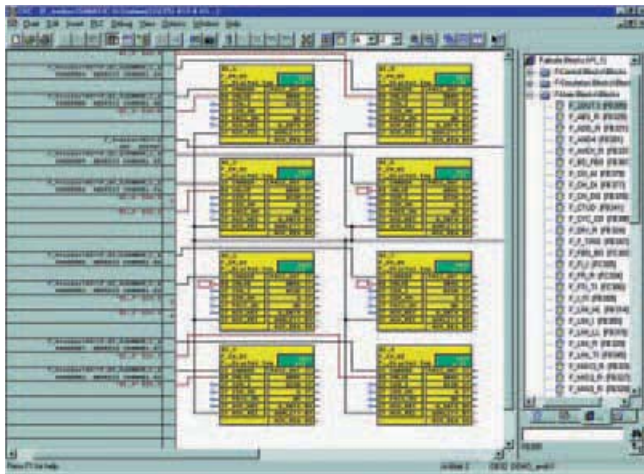
- User-friendly process visualization, including safety-relevant fault messages, via the optional operator system
 - Engineering system with S7 F Systems software package and SIMATIC Safety Matrix
 - AS 412F/FH, AS 414F/FH and AS 417F/FH safety-related automation systems
- The safety-related automation systems of the S7 F/FH-System are based on the hardware of the CPU 412H, CPU 414H or CPU 417H automation systems that are extended with the S7 F Systems software package to include safety functions. All F/FH systems listed are TÜV-certified and comply with the safety requirements up to SIL 3 according to IEC 61508. There are two design variants:
- Single-channel (with one CPU, safety-related)
 - High-availability (with redundant CPUs, safety-related and fault-tolerant)

SIMATIC Software

Engineering Tools

S7-F/H Systems: S7 F Systems

Overview



The S7 F Systems engineering tool integrated in the SIMATIC Manager can be used to configure an S7 F/FH System. With this tool you can:

- Parameterize CPU and F-signal modules
- Create safety-related applications in the CFC.

Predefined, TÜV-approved blocks are available for this purpose. The safety-related blocks save the user having to perform redundant programming for detecting and reacting to errors.

Ordering Data

Order No.

S7 F Systems RT license

6ES7 833-1CC00-6YX0

For processing safety-related application programs, for one AS 412F/FH, AS 414F/FH or AS 417F/FH

S7 F Systems V6.0

6ES7 833-1CC01-0YA5

Programming and configuring environment for creating and operating safety-related STEP 7 programs for an S7 400H-based target system, floating license for 1 user, executable under Windows XP Prof SP2, Windows 2000 SP4, Windows Server 2003 SP1/SP2
2 languages (German, English)

Type of supply:
Certificate of license as well as software and electronic documentation on CD

S7 F Systems Upgrade from V5.x to V6.0

6ES7 833-1CC01-0YE5

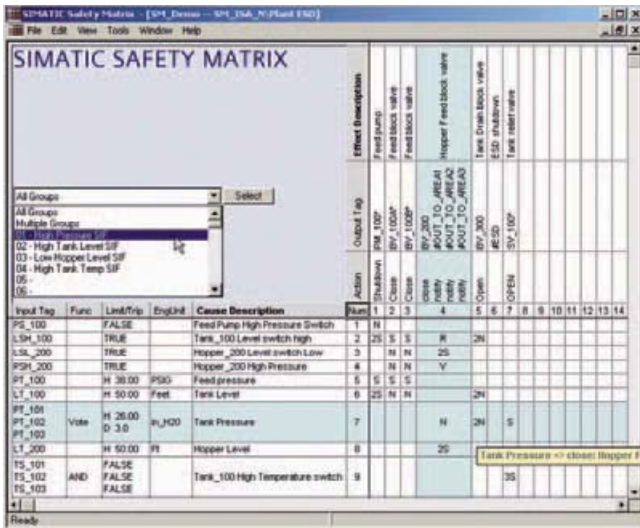
2 languages (German, English), floating license for 1 user

Type of supply:
Certificate of license as well as software and electronic documentation on CD

Note:

In the case of an S7 F Systems Upgrade from V5.x to V6.0, the type of S7 F Systems license changes from single license to floating license.

Overview



The SIMATIC Safety Matrix which can be used in addition to the CFC is an innovative safety lifecycle tool from Siemens that can be used not only for user-friendly configuration of safety applications, but also for their operation and service. The tool, which is based on the proven principle of a cause & effect matrix, is ideally suited to processes where defined statuses require specific safety reactions.

The SIMATIC Safety Matrix not only means that programming of the safety logic is significantly simpler and more convenient, but also much faster than in the conventional manner. During the risk analysis of a plant, the configuration engineer can assign exactly defined reactions (effects) to events (causes) which may occur during a process.

Ordering Data

Order No.

SIMATIC Safety Matrix Tool V6.1

B8

6ES7 833-1SM01-0YA5

Creation, configuration, compilation, loading and online monitoring of the Safety Matrix in a SIMATIC PCS 7 environment

Including SIMATIC Safety Matrix Viewer for SIMATIC PCS 7, for operation and monitoring of the Safety Matrix in a SIMATIC PCS 7 environment with several operator control levels

1 language (English), executes with Windows XP Professional, Single License for 1 installation

Type of supply: Certificate of License and authorization diskette for Safety Matrix Tool and Safety Matrix Viewer; software and electronic documentation on CD

Upgrade SIMATIC Safety Matrix Tool V6.1

B8

6ES7 833-1SM01-0YE5

From V5.2 to V6.1

SIMATIC Safety Matrix Editor

B8

6ES7 833-1SM41-0YA5

Creation and checking of the Safety Matrix logic on an external computer without a SIMATIC PCS 7 or STEP 7 environment

1 language (English), executes with Windows 2000 Professional or Windows XP Professional, single license for 1 installation

Type of supply: Certificate of License and authorization diskette; software and electronic documentation on CD

SIMATIC Safety Matrix Viewer for SIMATIC PCS 7

Operation and monitoring of the Safety Matrix in the SIMATIC PCS 7 environment with several operating levels
Bilingual (English/German), runs on Windows 2000 Professional or Windows XP Professional, Windows 2003 Server
Type of supply: Certificate of License and authorization diskette; software and electronic documentation on CD

Floating License for 1 installation B8

6ES7 833-1SM61-0YA5

Floating License upgrade from V6.0 to V6.1 B8

6ES7 833-1SM61-0YE5

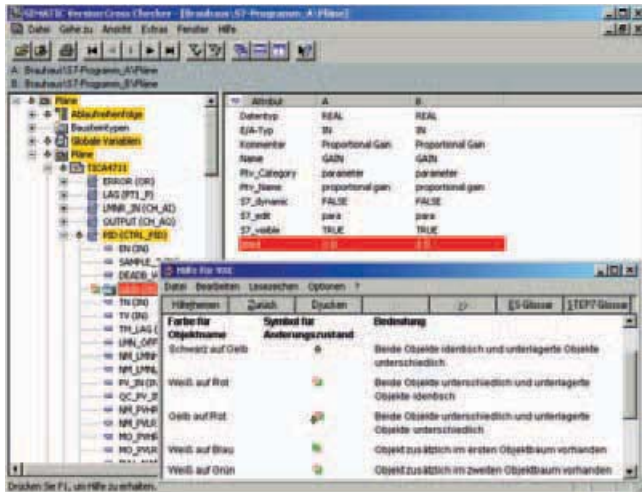
B8: Subject to export regulations: AL: N and ECCN: EAR99S

SIMATIC Software

Engineering Tools

Version Cross Manager

Overview



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

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

The SIMATIC Version Cross Manager is a SIMATIC product which was developed for the SIMATIC PCS 7 process control system but which can also be used together with other SIMATIC products in the context of Totally Integrated Automation (TIA).

Ordering Data

Order No.

SIMATIC Version Cross Manager V7.0

6ES7 658-1CX07-2YA5

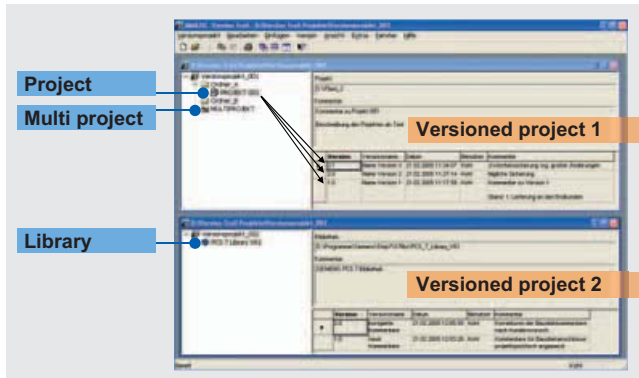
6 languages (German, English, French, Spanish, Italian, Chinese), executes with Windows 2000 Professional, Windows XP Professional or Windows Server 2003, floating license for 1 user
Type of delivery:
License key disk, emergency key disk, certificate of license, terms and conditions as well as TIA toolset CD V7.0

SIMATIC Version Cross Manager Upgrade V7.0

6ES7 658-1CX07-2YE5

for upgrading from Version Cross Checker V6.0/V6.1 to Version Cross Manager V7.0
6 languages (German, English, French, Spanish, Italian, Chinese), 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 as well as TIA toolset CD V7.0

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 V7.0

6 languages (German, English, French, Spanish, Italian, Chinese), 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 as well as TIA toolset CD V7.0

6ES7 658-1FX07-2YA5

SIMATIC Version Trail Upgrade V7.0

6 languages (German, English, French, Spanish, Italian, Chinese), 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 as well as TIA toolset CD V7.0

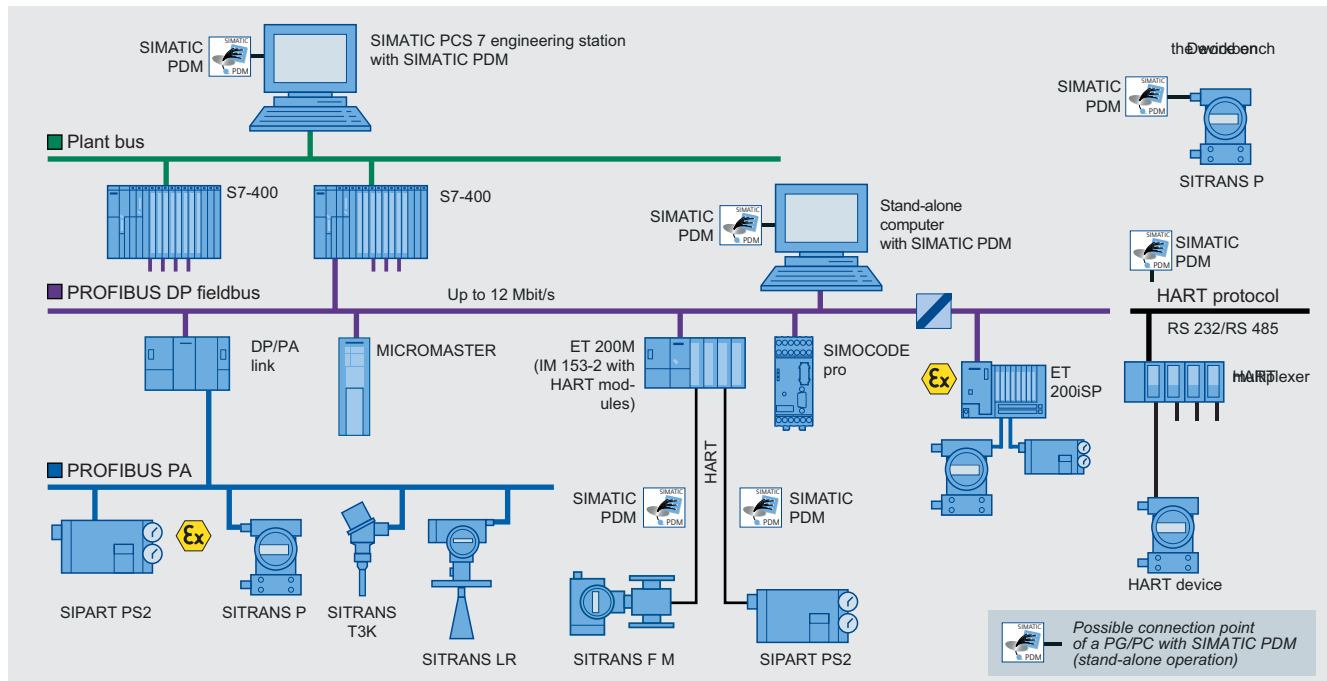
6ES7 658-1FX07-2YE5

SIMATIC Software

Engineering Tools

SIMATIC PDM Process Device Manager

Overview



Configuration options with SIMATIC PDM

SIMATIC PDM (Process Device Manager) is a universal, vendor-independent tool for the configuration, parameterization, commissioning, diagnostics and servicing of intelligent field devices (sensors and actuators) and field components (remote I/Os, multiplexers, control-room devices, compact controllers), which in the following sections will be referred to simply as devices.

Using *one* software, SIMATIC PDM enables the processing of more than 1200 devices from Siemens and over 100 vendors worldwide on *one* homogeneous user interface. Parameters and functions for all supported devices are displayed in a consistent and uniform fashion independent of their communications interface.

From the viewpoint of device integration, SIMATIC PDM is the most powerful open device manager available in the world. Devices which previously were not supported can be 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.

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 trail), parameter information. It is possible to change directly to SIMATIC PDM from the diagnostics faceplates in the maintenance station.

Technical specifications

Requirements for stand-alone operation

Hardware	- PG/PC/notebook with processor corresponding to operating system requirements - Main memory 256 MB or more - Vacant hard disk 210 MB or more
Operating systems (alternative)	- Microsoft Windows 2000 Professional SP1 or higher - Microsoft Windows XP Professional SP1/SP2
Further software components	SIMATIC PDM integrated in STEP 7
	STEP 7 V5.1 or higher with ServicePack 6 or higher, order separately

Ordering Data	Order No.	Order No.	
<i>Minimum configuration SIMATIC PDM Single Point</i>		<i>Components for individual configuration</i>	
SIMATIC PDM Single Point V6.0 for operation and parameterization of one field device; communication via PROFIBUS DP/PA or HART modem, including 1 TAG, cannot be expanded with respect to functions or with TAG option/PowerPack 6 languages (German, English, French, Spanish, Italian, Chinese), 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; 2 CDs with SIMATIC PDM V6.0 and device library	6ES7 658-3HX06-0YA5	SIMATIC PDM Basic V6.0 for operation and parameterization of field devices and components, communication via PROFIBUS DP/PA, HART (modem, RS 232, PROFIBUS) and Modbus, including 4 TAGs 6 languages (German, English, French, Spanish, Italian, Chinese), 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 • Floating license for 1 user • Rental license for 50 hours	6ES7 658-3AX06-0YA5 6ES7 658-3AX06-0YA6
<i>Predefined SIMATIC PDM V6.0 product configurations for special applications</i>			
SIMATIC PDM Service V6.0 Complete package for stand-alone users for servicing, with • SIMATIC PDM Basic V6.0 • Option "128 TAGs" 6 languages (German, English, French, Italian, Spanish, Chinese), 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	Integration in STEP 7 / SIMATIC PCS 7 Only required if integration of SIMATIC PDM into HW-Config is to be used 6 languages (German, English, French, Spanish, Italian, Chinese), 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
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" 6 languages (German, English, French, Italian, Spanish, Chinese), 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	Routing through S7-400 6 languages (German, English, French, Spanish, Italian, Chinese), 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 via standard HART multiplexer 6 languages (German, English, French, Spanish, Italian, Chinese), 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

SIMATIC Software

Engineering Tools

SIMATIC PDM Process Device Manager

Ordering Data (continued)

Order No.

Order No.

TAG options / PowerPacks

SIMATIC PDM TAG option

for TAG expansion, additive to
SIMATIC PDM Basic V6.0

6 languages (German, English,
French, Spanish, Italian,
Chinese), 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
- Up to 512 TAGs
- Up to 1024 TAGs
- Up to 2048 TAGs

6ES7 658-3XA06-2YB5

6ES7 658-3XB06-2YB5

6ES7 658-3XC06-2YB5

6ES7 658-3XD06-2YB5

SIMATIC PDM PowerPack

for subsequent TAG expansion of
all SIMATIC PDM V6.0 product
configurations

6 languages (German, English,
French, Spanish, Italian,
Chinese), 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
- From 512 TAGs to 1024 TAGs
- From 1024 TAGs to 2048 TAGs
- From 2048 TAGs to unlimited
TAGs

6ES7 658-3XB06-2YD5

6ES7 658-3XC06-2YD5

6ES7 658-3XD06-2YD5

6ES7 658-3XH06-2YD5

Demonstration software

SIMATIC PDM Demo V6.0

without online communication
and storage functionality

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

Type of delivery:

2 CDs with SIMATIC PDM V6.0
and device library

6ES7 658-3GX06-0YC8

SIMATIC PDM Upgrade/Update Service

SIMATIC PDM Upgrade from V5.x to V6.0

for all product versions and
combinations

6 languages (German, English,
French, Italian, Spanish,
Chinese), 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

6ES7 651-5CX06-0YE5

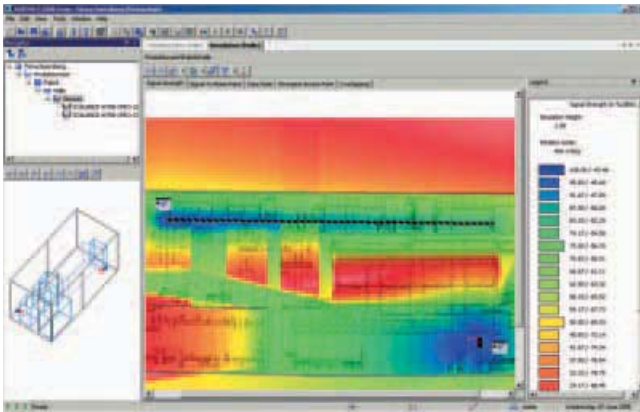
SIMATIC PDM Software Update Service

Subscription for 1 year with
automatic extension

Requirement: current software
version

6ES7 658-3XX00-0YL8

Overview



- Engineering tool for support with planning, configuration, simulation and measurement of an IWLAN radio field on site (Site Survey) according to the IEEE 802.11 a/b/g/h standard
- Automatic determination of the WLAN infrastructure for new and existing networks
- Optimization functions for minimization of channel interference
- Visualization and analysis of WLAN networks according to signal strength, data rate, signal-to-noise ratio, overlapping and applications (PROFINET, TCP/IP, Voice over WLAN)
- Configuration of single and multiple devices as well as uploading/downloading of IWLAN device parameters
- Site survey functions (measurements) for the acquisition, conditioning, evaluation and visualization of measured WLAN signals
- 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 documenting the configured and measured WLAN infrastructure

Ordering Data

Order No.

SINEMA E

Engineering software for planning, configuring, simulating and measuring (Site Survey) industrial WLAN applications in office and industrial environments on PG/PC in accordance with the 802.11 a/b/g/h standard; software and electronic manual on CD-ROM, license key on diskette, Class A, for 32-bit Windows XP Professional +SP2; German/English

• SINEMA E 2006 Lean	B3	6GK1 781-0AA00-6AA0
Planning, configuring and simulating WLAN applications		
• SINEMA E 2006 Standard	B3	6GK1 782-0AA00-6AA0
Extended planning, configuring, simulating and measuring (site survey) of WLAN applications (automatic placement, application profile, contour presentation, storage/comparison of simulations, extended filter options)		
• SINEMA E 2006 Powerpack	B3	6GK1 782-4AA00-6AC0
Software upgrade from SINEMA E Lean to SINEMA E Standard		

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

SIMATIC Software

Engineering Tools

Technical specifications Engineering Tools

Technical specifications Engineering Tools

Engineering Tool	S7-SCL	S7-GRAPH
Current version	V5.3	V5.3
Software class	A	A
Applications		
Used for	High-level language text programming of simple and complex calculations, CASE, loop, jump and comparison operations	Graphic programming of sequential controllers and sequencers
Marketing message	Program algorithms and calculations with ease!	The fast, elegant way to program sequential processes easily and transparently!
Advantages	• Clear, easy to read programs • Functional, module-based programming • CASE instruction replaces numerous jump and comparison operations • Easily understood by PLC programmers, as the programming philosophy of LAD/FBD/STL is retained • Easy for PC programmers to become familiar with PLC programming • Exchangeability (porting) of subroutines in accordance with IEC 61131-3 • A great deal of time is saved on engineering compared with LAD/FBD/STL: up to 20 % in the case of simple programs; at least 50 % in the case of demanding program structures	• Already ideal for use during the design phase • The time spent on configuration is reduced due to the graphic structure and programming • Familiarization is fast and easy • Exact fault localization thanks to comprehensive diagnosis in combination with ProAgent for ProTool/Pro and WinCC • A great deal of time is saved on engineering compared with LAD/FBD/STL: approx. 40 to 70 %
Sectors	• Labeling machines • Chemical plants (e.g. oxygen extraction, evaluation of measured values) • Rubber and plastic processing machines • Wood-processing machines • Storage and logistics systems • Paper machines and printing presses • Punching and cutting machines • Water industry • Winding machines	• Automotive industry (e.g. body-in-white, final assembly) • Production of electrical appliances • Rubber and plastic processing machines • Handling machines • Wood-processing machines • Metal working machines • Paper machines and printing presses • Testing machines • Rolling mills • Winding machines • Leisure and entertainment facilities
Target systems		
For use in	S7-300 (recommended from CPU 313 and CPU 312C onwards) S7-400 C7 (recommended from C7-626 onwards) WinAC	S7-300 (recommended from CPU 314 and CPU 312C onwards) S7-400 C7 (recommended from C7-626 onwards) WinAC
System requirements		
Operating system	Windows 2000 Professional Windows XP Professional	Windows 2000 Professional Windows XP Professional
Required hard drive memory in the PG/PC approx.	8 MB	15 MB
Required software	STEP 7 V5.3	STEP 7 V5.3
Features		
Observation of variables	Yes	Yes
Control of variables	Yes	Yes
Single-step processing	Yes	Yes
Integration in CFC	Yes	-
Program runtimes		
with S7-300 (typical)	Similar to LAD/FBD/STL	3 ms per block + 1 ms per active step
with S7-400 (typical)	Similar to LAD/FBD/STL	0.4 ms per block + 0.06 ms per active step

Technical specifications Engineering Tools (continued)

Engineering Tool	S7-SCL	S7-GRAPH
Diagnosis		
Integration of diagnostic data in ProAgent	-	Yes
Integration of diagnostic data in ProTool/Pro	-	Via ProAgent
Integration of diagnostic data in WinCC	-	Via ProAgent
Compliance with standards		
IEC 61131-3	PLCopen certification • Base level ST available • Conformity and reusability level ST (available soon)	PLCopen certification • Base level ST available"
Status of PLCopen activities	Test profile for conformity and reusability level ST available	-
Available versions/licenses		
Floating license	CD ROM with • Tool • Electronic manual • Getting Started and • Examples Authorization disk Certificate of License Product information	CD ROM with • Tool • Electronic manual • Getting Started and • Examples Authorization disk Certificate of License Product information
Upgrade (Floating License)	CD ROM with • Tool • Electronic manual • Getting Started and • Examples Authorization disk Certificate of License Product information	CD ROM with • Tool • Electronic manual • Getting Started and • Examples Authorization disk Certificate of License Product information
Software Update Service (SUS)		
Also part of		
STEP 7 Professional	Yes	Yes
S7 Trainer Package	Yes	Yes
PCS 7	Yes	-
D7-SYS	-	-

Engineering Tool	S7-HiGraph	CFC
Current version	V5.3	V7.0
Software class	A	A
Applications		
Used for	The graphic, flexible state description of functional units and coordination functions	The graphic creation, interconnection and configuration of (prefabricated) modules and functions
Marketing message	One common language for technicians, programmers, commissioning personnel, operators and maintenance staff!	Simply interconnect and configure instead of programming!

SIMATIC Software

Engineering Tools

Technical specifications Engineering Tools

Technical specifications Engineering Tools (continued)

Engineering Tool	S7-HiGraph	CFC
Advantages	• Already ideal for use during the design phase • Clear overview of mechanical functions • Graphic programming reduces the time spent on configuration • High degree of reusability of functions already described, such as the behavior of valves, motors, clamping devices, etc. • Familiarization is fast and easy • Short program runtimes • Exact fault localization thanks to comprehensive diagnosis in combination with ProAgent for ProTool/Pro • A great deal of time is saved on engineering compared with LAD/FBD/STL: Up to 50 %	• Already ideal for use during the design phase • Graphic interconnection reduces the time spent on configuration • High degree of reusability of previously created plans • Familiarization is fast and easy • Fast, clear interconnection of prefabricated functions • Technological creation of the program as a whole • Clear presentation of technical control structures • Short startup time • High plant availability • A great deal of time is saved on engineering compared with LAD/FBD/STL: Up to 50 %
Sectors	• Automotive industry (e.g. engine building, axle production, transmission production) • Chemical plants (e.g. oxygen extraction) • Rubber and plastic processing machines • Food and beverage machines • Packaging machines • Machine tools • Winding machines • Customized machines	• Automotive industry (e.g. thermostats, tire production processes) • Chemicals • Energy technology and supply • Rubber and plastic processing machines • Metal working machines • Food and beverage machines • Petrochemicals • Rolling mills • Water industry • Winding machines
Target systems		
For use in	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 from SP4 or later, Windows Server 2003, Windows XP Professional
Required hard drive memory in the PG/PC approx.	10 MB	approx. 60 MB
Required software	STEP 7 V5.3	STEP 7 V5.3 or later S7-SCL V5.1 SP 3 or later
Features		
Observation of variables	Yes	Yes
Control of variables	Yes	Yes
Single-step processing	-	-
Integration in CFC	Yes	Yes
Program runtimes		
with S7-300 (typical)	0.1 ms per graph group + 0.1 ms per state graph	Depending on the connected modules
with S7-400 (typical)	0.1 ms per graph group + 0.01 ms per state graph	Depending on the connected modules
Diagnosis		
Integration of diagnostic data in ProAgent	Yes	-
Integration of diagnostic data in ProTool/Pro	Via ProAgent	-
Integration of diagnostic data in WinCC	Via ProAgent (available soon)	-

Technical specifications Engineering Tools (continued)

Engineering Tool	S7-HiGraph	CFC
Compliance with standards		
IEC 61131-3	Conforms to and exceeds the IEC standard	Based on the IEC standard
Status of PLCOpen activities	-	-
Available versions/licenses		
Floating License (S7-HiGraph) or Single License (CFC)	CD ROM with • Tool • Electronic manual • Getting Started and • Examples Authorization disk Certificate of License	CD ROM with • Tool • Electronic manual • Getting Started and • 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 and • Examples Authorization disk Certificate of License Product information	CD ROM with • Tool • Electronic manual • Getting Started and • Examples License key disk Emergency key disk Certificate of License Terms and Conditions Product information
Software Update Service (SUS)		
Also part of		
STEP 7 Professional	-	-
S7 Trainer Package	Yes	-
PCS 7	-	Yes
D7-SYS	-	Yes

Engineering Tool	S7-PDIAG	S7-PLCSIM
Type of license	Floating License	Floating License
Software class	A	A
Current version	V5.3	V5.4
Target system (recommended)	SIMATIC S7-300 (CPU 314 onwards) 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 or later	STEP 7 V5.4 SP1 or later
Required hard drive memory in the PG/PC	6 MB	5 MB

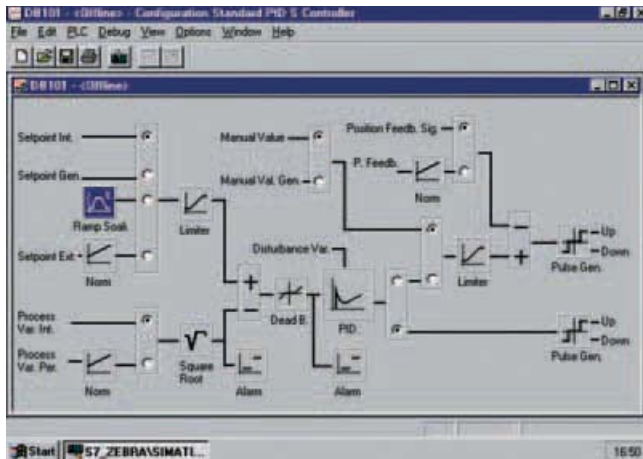
Engineering Tool	TeleService	DOCPRO
Type of license	Floating License	Floating License
Software class	A	A
Current version	V6.1	V5.4
Target system (recommended)	SIMATIC S7-300/400 SIMATIC C7	SIMATIC S7-300/400 SIMATIC C7
Operating system	Windows 2000 Windows XP Home Windows XP Professional	Windows 2000 Professional Windows XP Professional Windows Vista Business/Ultimate
Required software packages	-	STEP 7 as of V5.4 in Windows Vista as of V5.4 SP3
Required hard drive memory in the PG/PC	2 MB	5 MB

SIMATIC Software

Runtime software

Standard PID Control

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

6

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

Order No.

Order No.

Parameterization tool Standard PID Control, V5.1

Task: Parameterization tool for standard closed-loop controls

Requirement: STEP 7 V5.2 and higher

Delivery package: With electronic manual/Getting Started English, German; incl. authorization diskette

Single license

6ES7 830-2AA21-0YX0

Software Update Service (requires current software version)

6ES7 830-2AA00-0YX2

Single license upgrade from V5.0 to V5.1

6ES7 830-2AA21-0YX4

Standard function blocks Standard PID Control, V5.1

Task: Standard FBs for standard closed-loop controls

Target system: SIMATIC S7-300 (CPU 313 and higher), S7-400, C7

Delivery package: With electronic manual/Getting Started English, German

Single license

6ES7 860-2AA21-0YX0

Single license without software and documentation

6ES7 860-2AA21-0YX1

SIMATIC Manual Collection

B3

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

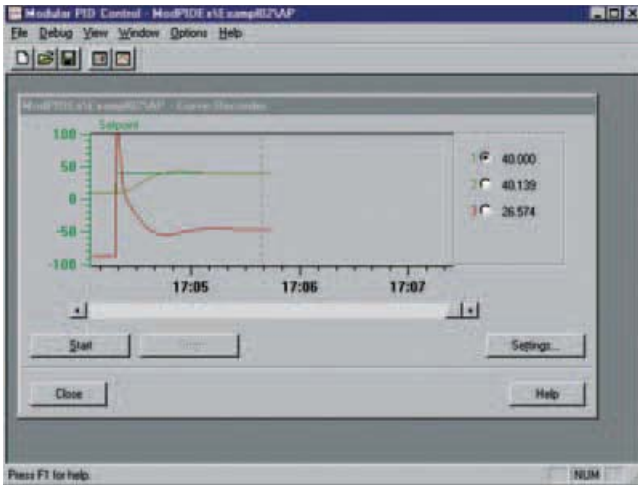
B3

6ES7 998-8XC01-8YE2

Current "Manual Collection" DVD and the three subsequent updates

B3: Subject to export regulations; AL: N and ECCN: 5D992B1

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

Technical specifications

Startup software

Requirements	STEP 7 V3.1 or higher
Main memory expansion	16 MB
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 to 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	

SIMATIC Software

Runtime software

Modular PID Control

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	

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		LP_SCHED	
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.	Order No.
Start-up tool Modular PID Control, V5.0 for SIMATIC S7 and C7 <i>Task:</i> Start-up tool for modular PID controllers <i>Requirement:</i> STEP 7 V5.2 and higher <i>Delivery package:</i> With electronic manual, English, German; incl. authorization diskette Single license Software Update Service (requires current software version)	6ES7 830-1AA10-0YX0 6ES7 830-1AA00-0YX2	SIMATIC Manual Collection B3 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 B3 6ES7 998-8XC01-8YE2 Current "Manual Collection" DVD and the three subsequent updates
Standard function blocks Modular PID Control, V5.0 <i>Task:</i> Standard FBs for modular PID controllers <i>Target system:</i> SIMATIC S7-300 (CPU 313 and higher), S7-400, C7 <i>Delivery package:</i> English, German; with electronic manual Single license Single license, without software and documentation	6ES7 860-1AA10-0YX0 6ES7 860-1AA10-0YX1	

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

SIMATIC Software

Runtime software

PID Self-Tuner

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	approx. 6542 bytes	approx. 5956 bytes	6332 bytes	5714 bytes
• DB length in the memory	644 bytes	294 bytes	638 bytes	288 bytes
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) Depending on the selected CPU

Ordering Data

PID Self Tuner V5.0

Task:

Online optimization for PID controller

Target system:

SIMATIC S7-300 (CPU 313 and higher), S7-400, C7

Delivery package:

Standard function blocks, electronic manual and Getting Started German/English;

Single license

Single license, without software and documentation

Order No.

6ES7 860-4AA01-0YX0

6ES7 860-4AA01-0YX1

Order No.

SIMATIC Manual Collection

B3

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

6ES7 998-8XC01-8YE0

SIMATIC Manual Collection update service for 1 year

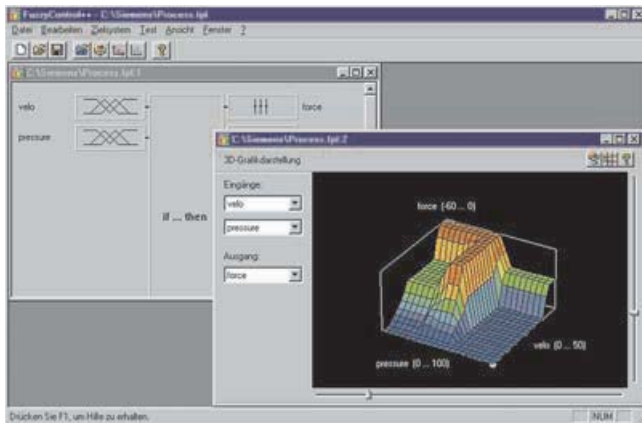
B3

Current "Manual Collection" DVD and the three subsequent updates

6ES7 998-8XC01-8YE2

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

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

Fuzzy Control++ configuration tool

Function blocks for S7-300/400 CPU 314 and higher incl. SmartObject for SIMATIC WinCC, manual; single license

Basic license	B8	2XV9 450-1WC10-0AA1
Copy license	B8	2XV9 450-1WC11-4XA0

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

SIMATIC Manual Collection

B3
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

B3
Current "Manual Collection" DVD and the three subsequent updates

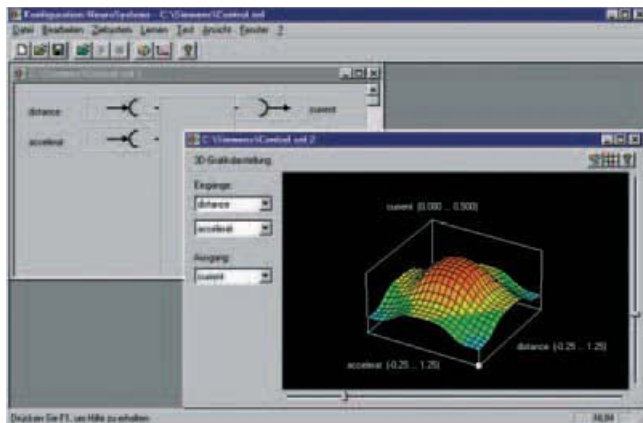
B8: Subject to export regulations: AL: N and ECCN: EAR99S

SIMATIC Software

Runtime software

NeuroSystems

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, Softnet S7 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. SmartObject for SIMATIC single license	
Basic license	B8 2XV9 450-1WC15-0AA0
Copy license	B8 2XV9 450-1WC16-4XA0

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

Order No.

SIMATIC Manual Collection	B3	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	B3	6ES7 998-8XC01-8YE2
Current "Manual Collection" DVD and the three subsequent updates		

B8: 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: $x^{16} + x^{15} + x^2 + 1$ • 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: $x^{16} + x^{15} + x^2 + 1$ • 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)

MODBUS Slave

	• 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 Highway full duplex (DF1) protocol • Interfaces: TTY (20 mA), V.24 (RS 232C), RS 422/485 (four-wire) • No "embedded responses" • 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

SIMATIC Software

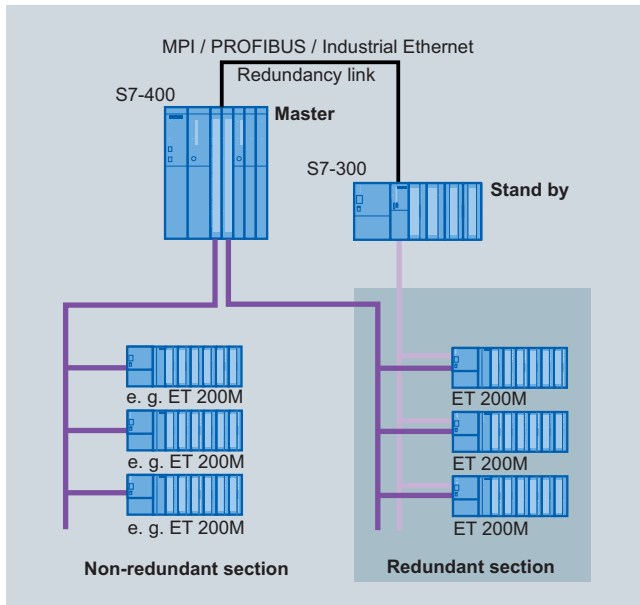
Runtime software

Loadable drivers for CP 441-2 and CP 341

Ordering Data	Order No.		Order No.
MODBUS Master V3.1 <i>Task:</i> Communication via MODBUS protocol with RTU format, SIMATIC S7 as master <i>Requirement:</i> CP 341 or CP 441-2; STEP 7 V4.02 and higher <i>Delivery package:</i> Driver program/documentation, English, German, French Single license Single license, without software and documentation	6ES7 870-1AA01-0YA0 6ES7 870-1AA01-0YA1		
MODBUS Slave V3.1 <i>Task:</i> Communication via MODBUS protocol with RTU format, SIMATIC S7 as slave <i>Requirement:</i> CP 341 or CP 441-2; STEP 7 V4.02 and higher <i>Delivery package:</i> Driver program/documentation, English, German, French Single license Single license, without software and documentation	6ES7 870-1AB01-0YA0 6ES7 870-1AB01-0YA1		
		Data Highway V1.0 <i>Task:</i> Communication via Data Highway Asynchronous Link with DF1 protocol <i>Requirement:</i> CP 341 or CP 441-2; STEP 7 V4.02 and higher <i>Delivery package:</i> Driver program/documentation, English, German, French Single license Single license, without software and documentation	6ES7 870-1AE00-0YA0 6ES7 870-1AE00-0YA1
		SIMATIC Manual Collection B3 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	6ES7 998-8XC01-8YE0
		SIMATIC Manual Collection update service for 1 year B3 Current "Manual Collection" DVD and the three subsequent updates	6ES7 998-8XC01-8YE2

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

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

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.

Program package software redundancy V1.2

Task:
Configuring a redundant control.

Target system:
SIMATIC S7-300, S7-400

Requirement:
STEP 7 V5.2, NCM S7 for PROFIBUS

Delivery package:
incl. electronic documentation (English, German, French, Spanish, Italian), 4 application examples and faceplate for WinCC on CD-ROM

Single license (for 2 CPUs)

6ES7 862-0AC01-0YA0

Single license, without software and documentation

6ES7 862-0AC01-0YA1

SIMATIC Manual Collection

B3

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

B3

6ES7 998-8XC01-8YE2

Current "Manual Collection" DVD and the three subsequent updates

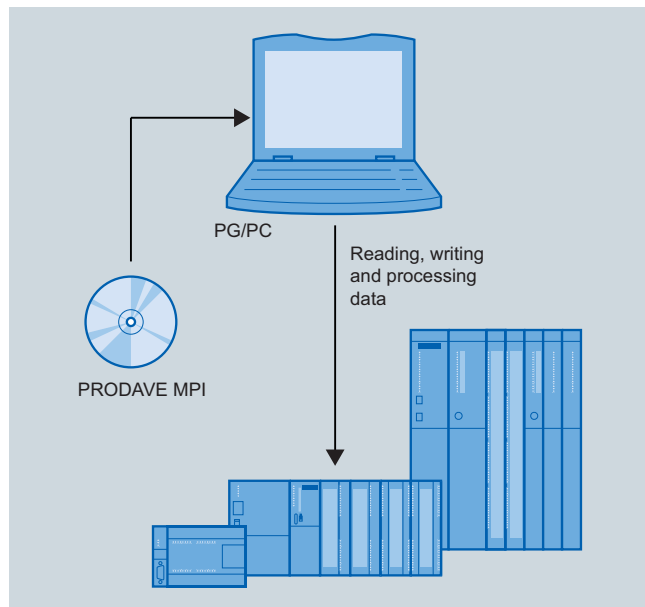
B3: Subject to export regulations: AL: N and ECCN: 5D992B1

SIMATIC Software

Runtime software

PRODAVE MPI

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 B8 **6ES7 807-4BA01-0YA0**

Copy license, without software and documentation B8 **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 B8 **6ES7 807-3BA01-0YA0**

Copy license, without software and documentation B8 **6ES7 807-3BA01-0YA1**

SIMATIC Manual Collection B3 **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 B3 **6ES7 998-8XC01-8YE2**

Current "Manual Collection" DVD and the three subsequent updates

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

B8: Subject to export regulations: AL: N and ECCN: EAR99S

Overview

- Low-priced package for simple, controlled positioning and simple geared synchronous motion
- For use with any standard drive with alterable speed, such as, for example, frequency inverter, servo drive
- For incremental and absolute encoders

Technical specifications

Supported hardware:

Easy Motion Control is runnable on the following CPUs:

- S7-300.
- S7-400.
- C7.
- WinAC.

Supported modules for the measuring of actual values:

- CPU 314C (FW version 2.0 of the CPU or higher).
- ET 200S 1 Count 5V/500 kHz.
- ET 200S 1 Count 24V/100kHz.
- ET 200S 1SSI

- SM 338.
- FM 350-1, FM 450-1.
- SIMODRIVE sensor with PROFIBUS DP.
- Other modules for measuring actual values (using free driver).

Supported modules for setpoint output:

- ET 200S 2AO U.
- SM 332.
- SM 432.
- Other modules for setpoint output (using free driver).

Supported drives using PROFIBUS DP:

- MM4

Storage space requirements

Required main storage in byte		
Block	Required main storage per block	Additional main storage required per instance
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 driver	1416 ... 2654	76 ... 128
Output driver	384 ... 1242	52 ... 68
Axis data block	-	294

Runtime load

Typical runtimes of the 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 driver	50	662	1323	44
Output driver	20	223	413	31

1) The highlighted travel blocks require more runtime once at the start of a trip. For more information please consult the manual.

Runtime software

Easy Motion Control

[illegible]

Technical specifications Runtime Software

Runtime software				
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
Operating system			-	Windows 95 / NT
Required software packages	STEP 7 V5.2 or higher	STEP 7 V3.1/V3.2 or higher	-	
Main memory configuration in PG/PC	16 MB	16 MB	-	16 MB
Disk space required in PG/PC	1.85 MB	1.85 MB	-	5 MB
Standard FBs				
Required libraries	Standard PID Control FBs V5.1	Modular PID Control FBs V4.0	PID Self-Tuner-FBs V5.0	Fuzzy Control++ FBs
License types	Single license and 1 runtime license; 1 runtime license	Single license and 1 runtime license; 1 runtime license	-	Single license
Software class	A	A	A	A
Current version	V 5.0	V 4.1	V5.0	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 313 and higher) SIMATIC S7-400 SIMATIC C7	SIMATIC S7-300 (CPU 314 and higher) SIMATIC S7-400
Operating system				Windows 95 / NT
Required software packages	STEP 7 V5.2 or higher	STEP 7 V3.1/V3.2 or higher	STEP 7 V3.2 or higher	Windows 95 / NT
Main memory configuration in PG/PC	16 MB	16 MB	-	16 MB on PG/PC
Disk space required in PG/PC	1.85 MB	1.85 MB	-	5 MB

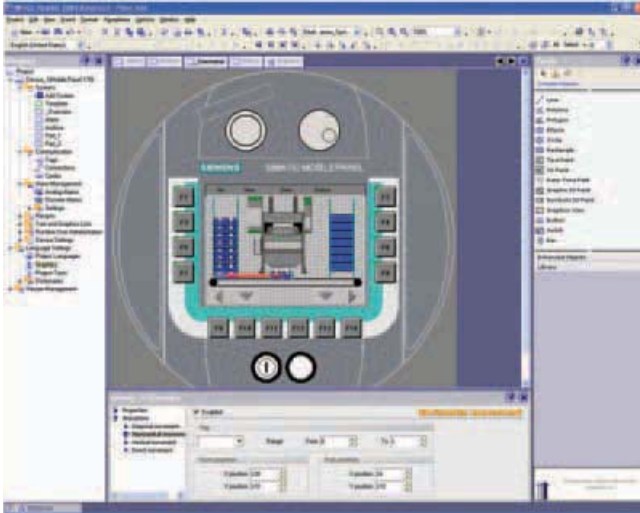
Runtime software				
Parameterization software	Neuro Systems	Loadable drivers for CP 441-2 and CP 341	Software redundancy	PRODAVE MPI
License form	Single license	Single license, copy license	Single license, copy license	Single license, copy license
Software class				A
Current version				V6.0
Target system	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			

SIMATIC Software

HMI software

SIMATIC WinCC flexible ES

Overview



- Integrated family of **engineering tools** for configuring SIMATIC HMI Operator Panels, the operating device of SIMATIC C7 units, SIMOTION/SINUMERIK Panel PCs as well as the PC-based visualization software WinCC flexible Runtime.
- Runs under Windows XP Professional/Windows VISTA Business, Ultimate
- **Current version:**
 - SIMATIC WinCC flexible 2008 Advanced
 - SIMATIC WinCC flexible 2008 Standard
 - SIMATIC WinCC flexible 2008 Compact
 - SIMATIC WinCC flexible 2008 Micro

6

Ordering Data

Order No.

WinCC flexible 2008 Advanced B3 6AV6 613-0AA51-3CA5

Floating license, on DVD incl. license key, includes:

- Engineering software for configuring WinCC flexible Runtime on basic PCs/Panel PCs as well as Micro Panels, Basic Panels and 70/170/270/370 series Panels incl. C7-635/636
- SW for WinCC flexible/ChangeControl engineering option ¹⁾
- Simulation software for WinCC flexible Runtime as well as Micro Panels, Basic Panels and 70/170/270/370 series Panels incl. C7-635/636
- Native drivers
- Electronic documentation (.pdf) in German, English, French, Italian, Spanish, simplified Chinese, traditional Chinese, Korean, Japanese

Order No.

WinCC flexible 2008 Standard B3 6AV6 612-0AA51-3CA5

Floating license, on DVD incl. license key, includes:

- Engineering software for configuring Micro Panels, Basic Panels and 70/170/270/370 series Panels incl. C7-635/636
- SW for WinCC flexible/ChangeControl engineering option ¹⁾
- Simulation software for Micro Panels, Basic Panels and 70/170/270/370 series Panels incl. C7-635/636
- Native drivers
- Electronic documentation (.pdf) in German, English, French, Italian, Spanish, simplified Chinese, traditional Chinese, Korean, Japanese

WinCC flexible 2008 Compact B3 6AV6 611-0AA51-3CA5

Floating license, on DVD incl. license key, includes:

- Engineering software for configuring Micro Panels, Basic Panels and 70/170 series Panels incl. C7-635
- SW for WinCC flexible/ChangeControl engineering option ¹⁾
- Simulation software for Micro Panels, Basic Panels and 70/170 series Panels incl. C7-635
- Native drivers
- Electronic documentation (.pdf) in German, English, French, Italian, Spanish, simplified Chinese, traditional Chinese, Korean, Japanese

¹⁾ A separate license for WinCC flexible/ChangeControl must be purchased for each engineering station.

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

Ordering Data (continued)		Order No.	Order No.
WinCC flexible 2008 Micro		B3	6AV6 610-0AA01-3CA8
Floating license, on DVD without license key, includes:			
• Engineering software for configuration Micro Panels • Electronic documentation (.pdf) in English, German, French, Italian, Spanish			
WinCC flexible/ChangeControl for WinCC flexible 2008 Compact/Standard/Advanced¹⁾³⁾		B3	6AV6 613-6AA01-3AB5
Floating license, option, license key only			
Power Packs			
SIMATIC WinCC flexible Power Packs			
Single license, license key only			
• WinCC flexible 2008 Standard to 2008 Advanced	B3		6AV6 613-2CD01-3AD5
• WinCC flexible 2008 Compact to 2008 Advanced	B3		6AV6 613-2BD01-3AD5
• WinCC flexible 2008 Compact to 2008 Standard	B3		6AV6 612-2BC01-3AD5
Software Update Service			
Software Update Service SIMATIC WinCC flexible^{2) 4)}			
• WinCC flexible Advanced	B3		6AV6 613-0AA00-0AL0
• WinCC flexible Standard	B3		6AV6 612-0AA00-0AL0
• WinCC flexible Compact	B3		6AV6 611-0AA00-0AL0
Upgrades			
SIMATIC ProTool to SIMATIC WinCC flexible 2008			
• ProTool/Lite to WinCC flexible 2008 Compact	B3		6AV6 611-3AA51-3CE5
• ProTool to WinCC flexible 2008 Standard	B3		6AV6 612-3AA51-3CE5
• ProTool/Pro to WinCC flexible 2008 Advanced	B3		6AV6 613-3AA51-3CE5
SIMATIC WinCC flexible 2004/2005/2007 to SIMATIC WinCC flexible 2008			
• Upgrade to WinCC flexible 2008 B3 Compact, incl. ChangeControl option ¹⁾			6AV6 611-0AA51-3CE5
• Upgrade to WinCC flexible 2008 B3 Standard, incl. ChangeControl option ¹⁾			6AV6 612-0AA51-3CE5
• Upgrade to WinCC flexible 2008 B3 Advanced, incl. ChangeControl option ¹⁾			6AV6 613-0AA51-3CE5
• Upgrade to WinCC flexible 2008 B3 Micro ⁴⁾			6AV6 610-0AA01-3CE8
SIMATIC WinCC flexible ASIA 2004/2005/2007 to SIMATIC WinCC flexible ASIA 2008			
• Upgrade to WinCC flexible 2008 B3 ASIA Standard, incl. ChangeControl option ¹⁾			6AV6 612-0AA11-3CE5
• Upgrade to WinCC flexible 2008 B3 ASIA Advanced, incl. ChangeControl option ¹⁾			6AV6 613-0AA11-3CE5
WinCC flexible 2008 ASIA Standard		B3	6AV6 612-0AA11-3CA5
Floating license, on DVD incl. license key, includes:			
• Engineering software for configuring Micro Panels, Basic Panels and 70/170/270/370 series Panels incl. C7-635/636 • Simulation software for Micro Panels, Basic Panels and 70/170/270/370 series Panels incl. C7-635/636 • Native drivers • Electronic documentation (.pdf) in German, English, French, Italian, Spanish, simplified Chinese, traditional Chinese, Korean, Japanese			
WinCC flexible 2008 ASIA Advanced		B3	6AV6 613-0AA11-3CA5
Floating license, on DVD incl. license key, includes:			
• Engineering software for configuring WinCC flexible Runtime as well as Micro Panels, Basic Panels and 70/170/270/370 series Panels incl. C7-635/636 • SW for WinCC flexible/ChangeControl engineering option¹⁾ • Simulation software for WinCC flexible Runtime as well as Micro Panels, Basic Panels and 70/170/270/370 series Panels incl. C7-635/636 • Native drivers • Electronic documentation (.pdf) in German, English, French, Italian, Spanish, simplified Chinese, traditional Chinese, Korean, Japanese			
Documentation (must be ordered separately)			
User Manual WinCC flexible Communication			
• German			6AV6 691-1CA01-3AA0
• English			6AV6 691-1CA01-3AB0
• French			6AV6 691-1CA01-3AC0
• Italian			6AV6 691-1CA01-3AD0
• Spanish			6AV6 691-1CA01-3AE0

- 1) A separate license for WinCC flexible/ChangeControl must be purchased for each engineering station.
 - 2) 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 expiration.
 - 3) The ChangeControl option has not been released for integrated operation with STEP 7.
 - 4) Original delivery note or Certificate of License (CoL) from previous WinCC flexible Micro required
- B3: Subject to export regulations: AL: N and ECCN: 5D992B1

SIMATIC Software

HMI software

SIMATIC WinCC flexible ES

Ordering Data (continued)

WinCC flexible Micro User Manual

- German
- English
- French
- Italian
- Spanish

Order No.

6AV6 691-1AA01-3AA0
6AV6 691-1AA01-3AB0
6AV6 691-1AA01-3AC0
6AV6 691-1AA01-3AD0
6AV6 691-1AA01-3AE0

User Manual WinCC flexible Compact/Standard/Advanced

- German
- English
- French
- Italian
- Spanish

6AV6 691-1AB01-3AA0
6AV6 691-1AB01-3AB0
6AV6 691-1AB01-3AC0
6AV6 691-1AB01-3AD0
6AV6 691-1AB01-3AE0

Order No.

SIMATIC HMI Manual Collection B8

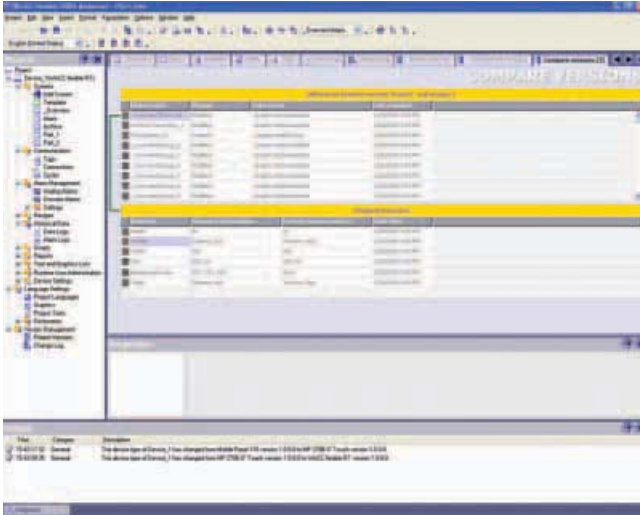
Electronic documentation, on DVD

5 languages (English, French, German, Italian, Spanish); contains: all currently available user manuals, manuals and communication manuals for SIMATIC HMI

6AV6 691-1SA01-0AX0

B8: Subject to export regulations: AL: N and ECCN: EAR99S

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 2008 Compact/Standard/Advanced ¹⁾

Floating License, option, license key only

B3 **6AV6 613-6AA01-3AB5**

1) The ChangeControl option has not been released for integrated operation with STEP 7.

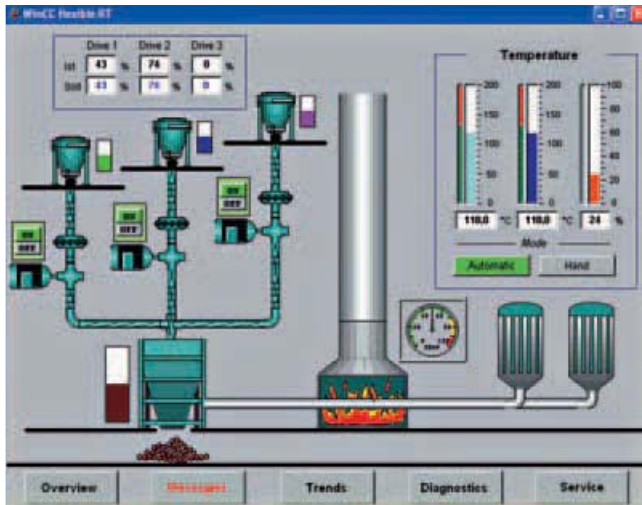
B3: Subject to export regulations: AL: N and ECCN: 5D992B1

SIMATIC Software

HMI software

SIMATIC WinCC flexible RT

Overview



- **PC-based visualization software** for single-user systems directly at the machine
 - Runs under Windows XP Professional and Windows Vista Business/Ultimate
 - **Current version:** SIMATIC WinCC flexible 2008 Runtime with 128, 512, 2048 or 4096 PowerTags
- SIMATIC WinCC flexible Runtime is configured with the SIMATIC WinCC flexible Advanced configuration software.

6

Technical specifications

Type	SIMATIC WinCC flexible Runtime
	The specifications are maximum values
Displays	500
• 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
Variables	4.096 ³⁾
Messages bit-triggered / analog	4.000 / 500
• Message text (number of characters)	80
• Number of process values per message	8
• Size of message buffer	1.024
• Pending message events	500
Archives ⁴⁾	100
• Archivable data	Process data, messages
• Max. number of entries per archive (incl. sequence archive)	500.000
• Archive types	Short-term archive, sequence archive (max. 400 per archive)
• Data storage format	CSV (Comma Separated Variable), RDB (Runtime Data Base), interface to ODBC database (database not included in scope of delivery)

Type	SIMATIC WinCC flexible Runtime
Recipes ⁴⁾	1,000
• Elements per recipe	2,000 ³⁾
• Data records per recipe	5,000 ²⁾
Password protection	
• User rights	32
• Number of user groups	50
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

Ordering Data	Order No.	Order No.
SIMATIC WinCC flexible 2008 Runtime for PC systems; incl. SW for PC systems options ¹⁾ Single license, on CD-ROM incl. licensing, for: 128 PowerTags (RT 128) B3 6AV6 613-1BA51-3CA0 512 PowerTags (RT 512) B3 6AV6 613-1DA51-3CA0 2048 PowerTags (RT 2048) B3 6AV6 613-1FA51-3CA0 4096 PowerTags (RT 4096) B3 6AV6 613-1GA51-3CA0		
Power Packs		
SIMATIC WinCC flexible 2008 Runtime Single license, only license key for PowerTags, from 128 to 512 PowerTags B3 6AV6 613-4BD01-3AD0 128 to 2048 PowerTags B3 6AV6 613-4BF01-3AD0 512 to 2048 PowerTags B3 6AV6 613-4DF01-3AD0 128 to 4096 PowerTags B3 6AV6 613-4BG01-3AD0 512 to 4096 PowerTags B3 6AV6 613-4DG01-3AD0 2048 to 4096 PowerTags B3 6AV6 613-4FG01-3AD0		
Upgrades		
SIMATIC ProTool/Pro RT to SIMATIC WinCC flexible 2008 - ProTool/Pro Runtime 128 PowerTags to WinCC flexible 2008 Runtime 128 PowerTags ²⁾ B3 6AV6 613-3BB51-3CE0 - ProTool/Pro Runtime 256 PowerTags to WinCC flexible 2008 Runtime 512 PowerTags ²⁾ B3 6AV6 613-3CD51-3CE0 - ProTool/Pro Runtime 512 PowerTags to WinCC flexible 2008 Runtime 512 PowerTags ²⁾ B3 6AV6 613-3DD51-3CE0 - ProTool/Pro Runtime 2048 PowerTags to WinCC flexible 2008 Runtime 2048 PowerTags ²⁾ B3 6AV6 613-3FF51-3CE0		
SIMATIC WinCC flexible 2004/2005/2007 Runtime to SIMATIC WinCC flexible 2008 Runtime - Upgrade to SIMATIC WinCC flexible Runtime 2008 PowerTags incl. Runtime Options for: - WinCC flexible/Sm@rtAccess - Sm@rtService - OPC server - Archives - Recipes - ProAgent - Audit	B3 6AV6 613-1XA51-3CE0	
SIMATIC WinCC flexible 2004/2005/2007 Runtime to SIMATIC WinCC flexible 2008 Runtime (continued) - Upgrade of the SIMATIC WinCC B3 flexible Panel options: - 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 Multi Panel - WinCC flexible Audit for SIMATIC Panel		6AV6 618-7XX01-3AF0
Documentation (must be ordered separately)		
User Manual WinCC flexible Runtime - German 6AV6 691-1BA01-3AA0 - English 6AV6 691-1BA01-3AB0 - French 6AV6 691-1BA01-3AC0 - Italian 6AV6 691-1BA01-3AD0 - Spanish 6AV6 691-1BA01-3AE0		
User Manual WinCC flexible Communication - German 6AV6 691-1CA01-3AA0 - English 6AV6 691-1CA01-3AB0 - French 6AV6 691-1CA01-3AC0 - Italian 6AV6 691-1CA01-3AD0 - Spanish 6AV6 691-1CA01-3AE0		
SIMATIC HMI Manual Collection B8 Electronic documentation, on DVD 5 languages (English, French, German, Italian, Spanish); contains: all currently available user manuals, manuals and communication manuals for SIMATIC HMI		6AV6 691-1SA01-0AX0

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

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

B8: Subject to export regulations: AL: N and ECCN: EAR99S

SIMATIC Software

HMI software

SIMATIC WinCC flexible RT

6

Ordering Data (continued)

Order No.

Order No.

Communication via Industrial Ethernet

CP 1613-A2

PCI card (32 bit) for connecting a PG/PC to Industrial Ethernet (communications software must be ordered separately)

6GK1 161-3AA01

S7-1613 Edition 2007

Software for S7 and open communication, incl. PG/OP communication, OPC server and NCM PC; up to 120 connections, runtime software, software and electronic manual on CD-ROM, license key on a USB stick, Class A, for 32-bit Windows XP Professional SP1, 2; Windows 2003 Server SP1, R2, SP2; Windows Vista Business/Ultimate for CP 1613/CP 1613 A2/CP 1623; German/English

- Single license for 1 installation B3
- Software Update Service for one year, with automatic extension; requirement: Current software version
- Upgrade S7-1613 from V6.4 to S7-1613 Edition 2007 B3
- Upgrade S7-1613 from V6.0, V6.1, V6.2 or V6.3 to S7-1613 Edition 2007 B3

6GK1 716-1CB70-3AA0

6GK1 716-1CB00-3AL0

6GK1 716-1CB00-3AE0

6GK1 716-1CB00-3AE1

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 2007

Software for S7 communication, incl. PG and FDL protocol, OPC server and NCM PC; runtime software, software and electronic manual on a USB stick, license key on diskette, Class A, for 32-bit Windows XP Professional SP1, 2; Windows 2003 Server SP1, R2, SP2; Windows Vista Business/Ultimate for CP 5613, CP 5613 A2, CP5613 FO, CP 5614, CP5614 A2; German/English

- Single license for 1 installation B3
- Software Update Service for one year, with automatic extension; requirement: Current software version
- Upgrade S7-5613 from V6.4 to S7-5613 Edition 2007 B3
- Upgrade S7-5613 from V6.0, V6.1, V6.2 or V6.3 to S7-5613 Edition 2007 B3

6GK1 713-5CB70-3AA0

6GK1 713-5CB00-3AL0

6GK1 713-5CB00-3AE0

6GK1 713-5CB00-3AE1

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

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

Comprising CP 5611 A2 (32-bit) and MPI cable, 5 m

6GK1 561-1AM01

CP 5621

PCI Express X1 card (32-bit) for connecting a PG/PC to PROFIBUS or MPI

6GK1 562-1AA00

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 use with Windows 2000/XP

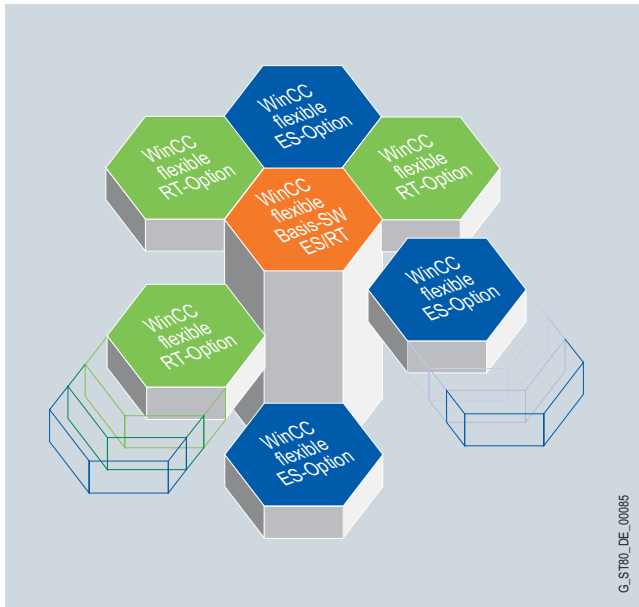
6ES7 972-0CB20-0XA0

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

B7: Subject to export regulations: AL: N and ECCN: EAR99H

C2: Subject to export regulations: AL: 5A002A1A2 and ECCN: 5A002A1A

Overview



Options for SIMATIC Panels/Multi Panels and 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. (a license is not required for Simatic Panels/Multi Panels).

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. (a license is not required for Simatic Panels/Multi Panels).

SIMATIC WinCC flexible/Audit

- Option for SIMATIC WinCC flexible Runtime as well as SIMATIC Panels for recording operations in an audit trail, and electronic signature.
- A convenient configuration process, which is included as standard in WinCC flexible 2005, is used to define the following:
 - Which user actions should be recorded in the audit trail during runtime.
 - Which important operator actions during execution time require electronic signature/commentary.
- The audit option combined with the WinCC flexible ES ChangeControl option supports the user with plant validation.

- Available for the following SIMATIC HMI systems:
 - TP/OP270, TP/OP277
 - MP270B, MP277
 - MP370, MP377
 - WinCC flexible Runtime
- A license is required for every operator station (Panel and PC Runtime).

SIMATIC WinCC flexible/SIMATIC Logon

Option for connecting PCs with SIMATIC WinCC flexible Runtime and SIMATIC Panels to central user administration.

- Creates user administration on a central computer to which one or more WinCC flexible stations can be connected over Ethernet.
- With each logging-on/off of a user on one of the connected stations, SIMATIC Logon checks whether a user password has been created and that the required privileges exist.
- SIMATIC Logon for WinCC flexible supports the user in combination with the /Audit and /ChangeControl options in meeting requirements in accordance with FDA 21 CFR Part 11 and EU178.
- Available for the following SIMATIC HMI systems:
 - Mobile Panel 177, Mobile Panel 277
 - TP/OP 177B PN/DP
 - TP/OP 277
 - MP 177, MP 277, MP 377
 - WinCC flexible Runtime

- Licensing: SIMATIC Logon (basic license) and SIMATIC Logon Remote Access (3-pack license) for connection of 3 WinCC flexible stations to the central user administration. Additional stations can be connected by using further SIMATIC Logon Remote Access licenses (3-pack/10-pack).

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/OP 177B PN/DP
 - TP/OP 270, TP/OP 277
 - MP 177, MP 270B, MP 277, MP 370, MP 377
 - 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 Software

HMI software

SIMATIC WinCC flexible RT options

Overview (continued)

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/OP 177B PN/DP
 - TP/OP 270, TP/OP 277
 - MP 177, MP 270B, MP 277, MP 370, MP 377
 - WinCC flexible Runtime
- One license is required for each operator station.

SIMATIC WinCC flexible/OPC Server

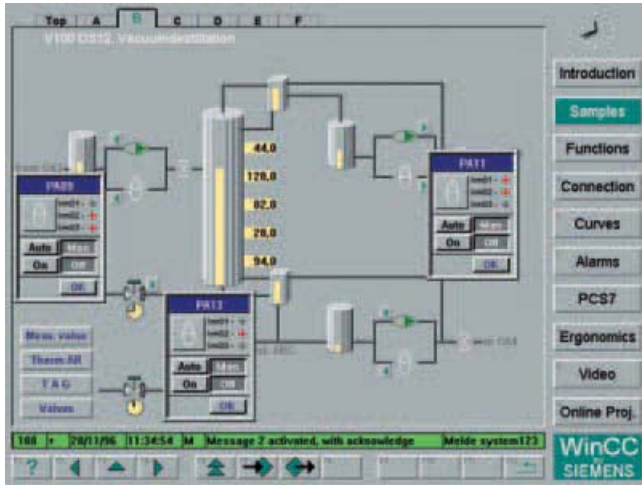
Option for SIMATIC WinCC flexible Runtime as well as Multi Panels for communication with applications from different vendors (e.g. MES, ERP, or applications in the office sector).

- Available for the following SIMATIC HMI systems:
 - MP 270B, MP 277, MP 370, MP 377 (use of OPC on XML basis)
 - WinCC flexible Runtime (use of OPC based on DCOM)
- 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
- Available for the following SIMATIC HMI systems:
 - Mobile Panel 277
 - TP/OP 270, TP/OP 277
 - MP 270B, MP 277, MP 370, MP 377
 - WinCC flexible Runtime

Overview



- PC-based operator control and monitoring system for visualizing and operating processes, production flows, machines and plants in all sectors - from 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 Industry Automation) and WinCC add-ons have been developed (by Siemens-internal and external partners).
- WinCC can be operated with every PC that meets the given HW requirements. The product range of the SIMATIC Panel PC and SIMATIC Rack PC is available in particular for the industrial usage of WinCC systems. SIMATIC PCs stand out due to their powerful PC technology, are designed for round-the-clock operation, and can be operated in both harsh industrial environments and office areas.

Current versions:

- **SIMATIC WinCC V7.0:**
Executable with
 - Windows VISTA 32-bit Ultimate, Business and Enterprise
 - Windows XP Professional
 - Windows 2003 Server and Windows 2003 Server R2
 - Contains the Microsoft SQL Server 2005 SP2
- **SIMATIC WinCC V6.2 SP2:**
Executable with
 - Windows XP Professional
 - Windows 2000 Professional
 - Windows Server 2003 and Windows Server 2003 R2
 - Contains the Microsoft SQL Server 2005 SP1

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Technical specifications

Type	SIMATIC WinCC V6.2 SP2	SIMATIC WinCC V7.0
Operating system	• Windows XP Professional SP2, Windows 2000 Professional SP4, Windows Server 2003 SP2, Windows Server 2003 R2 SP2	• Windows VISTA Ultimate, Business and Enterprise • Windows XP Professional SP2 • Windows 2003 Server SP2 and Windows 2003 Server R2 SP2
PC hardware requirements		
Processor type ¹⁾		
• Minimum	Single-user station/server: Pentium III, 1 GHz Central Archive Server: Pentium 4, 2 GHz Client: Pentium III, 600 MHz	Single-user station/server: Pentium 3, 1 GHz ²⁾ Central Archive Server: Pentium 4, 2.5 GHz Client: Pentium 3, 800 MHz ²⁾ WebClient/DataMonitor Client: Pentium III, 600 MHz ²⁾
• Recommended	Single-user station/server: Pentium 4, 2 GHz Central Archive Server: Pentium 4, 2.5 GHz Client: Pentium III, 1 GHz WebClient/DataMonitor Client: Pentium III, 1 GHz	Single-user station/server: Pentium 4, 2.5 GHz ²⁾ Central Archive Server: Pentium 4 or Dual Core, 3 GHz Client: Pentium 4, 2 GHz ²⁾ WebClient/DataMonitor Client: Pentium III, 1 GHz

¹⁾ An AMD system with comparable performance can also be used

²⁾ Hardware requirement when using Microsoft XP Professional

SIMATIC Software

HMI software

SIMATIC WinCC

Technical specifications (continued)

Type	SIMATIC WinCC V6.2 SP2	SIMATIC WinCC V7.0
RAM		
• Minimum	Single-user station: 512 MB, server: 1 GB Central Archive Server: 1 GB Client: 512 MB WebClient/DataMonitor Client: 256 MB	Single-user station/server: 1 GB ²⁾ Central Archive Server: 2 GB Client: 512 MB ²⁾ WebClient/DataMonitor Client: 256 MB
• Recommended	Single-user station: >= 1 GB, server: >1 GB Central Archive Server: ≥ 2 GByte Client: 512 MByte WebClient/DataMonitor Client: 512 MB	Single-user station/server: 2 GB ²⁾ Central Archive Server: ≥ 2 GByte Client: 1 GByte ²⁾ WebClient/DataMonitor Client: 512 MB ²⁾
Graphics card		
• Minimum	16 MB, 800 x 600	16 MB, 800 x 600 ²⁾
• Recommended	32 MB, 1280 x 1024	32 MB, 1280 x 1024 ²⁾
Hard disk		
• Minimum	Single-user station/server: 20 GB Client: 5 GB Central Archive Server: 40 GB WebClient/DataMonitor Client: 5 GB	Single-user station/server: 20 GB Client: 5 GB Central Archive Server: 40 GB WebClient/DataMonitor Client: 5 GB
• Recommended	Single-user station/server: 80 GB Client: 20 GByte Central Archive Server: 2 x 80 GB WebClient/DataMonitor Client: 10 GB	Single-user station/server: 80 GB Client: 20 GByte Central Archive Server: 2 x 80 GB WebClient/DataMonitor Client: 10 GB
• Hard disk (free memory space for installation)		
- Minimum	Server: 1.5 GB Client: 1 GB	Server: > 1.5 GB Client: 1.5 GB
- Recommended	Server: > 10 GB Client: > 1.5 GB	Server: > 10 GB Client: > 1.5 GB
CD ROM/DVD ROM/ diskette drive/USB interface	for software installation	for software installation

2) Hardware requirement when using Microsoft XP Professional

Technical specifications (continued)

Type	SIMATIC WinCC
Functionality/quantity structure	
Number of messages	150.000
• Message text (number of characters)	10 x 256
• Alarm log	> 500,000 messages ¹⁾
• Process values per message	10
• Constant load of messages, max.	Central Archive Server: 100/sec Server/single-user station: 10/s
• Message burst, max.	Server/single-user station: 2,000/10 s every 5 min
Archives	
• Archive data points	Max. 120,000 per server ²⁾
• Archive types	Short-term archive with and without long-term archiving
• Data storage format	Microsoft SQL Server 2005
• Measured values per second, max.	Server/single-user station: 5,000/s
User archive	
• Archives and views	500 each
• Product consisting of data record and column per user archive	320.000
• Fields per user archive	500
Graphics system	
• Number of screens	System-limited ¹⁾
• Number of objects per screen	System-limited ¹⁾
• Number of controllable fields per screen	System-limited ¹⁾
PowerTags	256 K ³⁾
Trends	
• Trend views per image	25
• Trends per trend view	80
User administration	
• User groups	128
• Number of users	128
• Authorization groups	999
Configuration languages	5 European (Eng., Fr., Ger., It., Sp.), 4 Asian (simpl.+trad. Chi/Kor/Jpn) ⁵⁾
Protocols	
• Message sequence reports (simultaneously)	1 per server/single-user station
• Message archive reports (simultaneously)	3
• User reports	System-limited ¹⁾
• Report lines per group	66
• Variables per report	300 ⁵⁾
Multi-user system	
• Server	12
• Clients for server with operator station	4
• Clients for server without operator station	32 clients + 3 WebClients or 50 WebClients + 1 client

1) Dependent on the available storage space

2) Dependent on the number of licensed archive variables

3) Dependent on number of licensed PowerTags

4) Asian versions for Version 7 SP1 or higher

5) The number of variables per report is dependent on process communication performance

SIMATIC Software

HMI software

SIMATIC WinCC

Ordering Data

Order No.

Order No.

SIMATIC WinCC system software V7.0

Runtime packages on DVD

Language/script versions:
DE/EN/FR/IT/ES; with license for

- 128 PowerTags (RT 128)
- 512 PowerTags (RT 512)
- 2048 PowerTags (RT 2048)
- 8192 PowerTags (RT 8192)
- 65536 PowerTags (RT 65536)
- 102400 PowerTags (RT 102400)
- 153600 PowerTags (RT 153600)
- 262144 PowerTags (RT 262144)

Incl. 512 archive tags each

6AV6 381-2BC07-0AX0
6AV6 381-2BD07-0AX0
6AV6 381-2BE07-0AX0
6AV6 381-2BH07-0AX0
6AV6 381-2BF07-0AX0
6AV6 381-2BJ07-0AX0
6AV6 381-2BK07-0AX0
6AV6 381-2BL07-0AX0

Complete packages on DVD

Language versions:
DE/EN/FR/IT/ES; with license for

- 128 PowerTags (RC 128)
- 512 PowerTags (RC 512)
- 2048 PowerTags (RC 2048)
- 8192 PowerTags (RC 8192)
- 65536 PowerTags (RC 65536)
- 102400 PowerTags (RT 102400)
- 153600 PowerTags (RT 153600)
- 262144 PowerTags (RT 262144)

6AV6 381-2BM07-0AX0
6AV6 381-2BN07-0AX0
6AV6 381-2BP07-0AX0
6AV6 381-2BS07-0AX0
6AV6 381-2BQ07-0AX0
6AV6 381-2BT07-0AX0
6AV6 381-2BU07-0AX0
6AV6 381-2BV07-0AX0

SIMATIC WinCC V7.0 PowerPacks

For upgrading from:

Runtime packages

- 128 to 512 PowerTags
- 128 to 2048 PowerTags
- 128 to 8192 PowerTags
- 128 to 65536 PowerTags
- 512 to 2048 PowerTags
- 512 to 8192 PowerTags
- 512 to 65536 PowerTags
- 2048 to 8192 PowerTags
- 2048 to 65536 PowerTags
- 8192 to 65536 PowerTags
- 65536 to 102400 PowerTags
- 102400 to 153600 PowerTags
- 153600 to 262144 PowerTags

6AV6 371-2BD07-0AX0
6AV6 371-2BE07-0AX0
6AV6 371-2BK07-0AX0
6AV6 371-2BF07-0AX0
6AV6 371-2BG07-0AX0
6AV6 371-2BL07-0AX0
6AV6 371-2BH07-0AX0
6AV6 371-2BM07-0AX0
6AV6 371-2BJ07-0AX0
6AV6 371-2BN07-0AX0
6AV6 371-2BP07-0AX0
6AV6 371-2BQ07-0AX0
6AV6 371-2BR07-0AX0

Complete packages

- 128 to 512 PowerTags
- 128 to 2048 PowerTags
- 128 to 8192 PowerTags
- 128 to 65536 PowerTags
- 512 to 2048 PowerTags
- 512 to 8192 PowerTags
- 512 to 65536 PowerTags
- 2048 to 8192 PowerTags
- 2048 to 65536 PowerTags

6AV6 371-2BD17-0AX0
6AV6 371-2BE17-0AX0
6AV6 371-2BK17-0AX0
6AV6 371-2BF17-0AX0
6AV6 371-2BG17-0AX0
6AV6 371-2BL17-0AX0
6AV6 371-2BH17-0AX0
6AV6 371-2BM17-0AX0
6AV6 371-2BJ17-0AX0

SIMATIC WinCC V7.0 PowerPacks

For upgrading from:

Complete packages

- 8192 to 65536 PowerTags
- 65536 to 102400 PowerTags
- 102400 to 153600 PowerTags
- 153600 to 262144 PowerTags

6AV6 371-2BN17-0AX0
6AV6 371-2BP17-0AX0
6AV6 371-2BQ17-0AX0
6AV6 371-2BR17-0AX0

SIMATIC WinCC V7.0 Archive

- 1500 archives
- 5000 archives
- 10000 archives
- 30000 archives
- 80000 archives
- 120000 archives

6AV6 371-1DQ17-0AX0
6AV6 371-1DQ17-0BX0
6AV6 371-1DQ17-0CX0
6AV6 371-1DQ17-0EX0
6AV6 371-1DQ17-0GX0
6AV6 371-1DQ17-0JX0

SIMATIC WinCC V7.0 Archive PowerPacks

For upgrading archiving from

- 1500 to 5000 archive tags
- 5000 to 10000 archive tags
- 10000 to 30000 archive tags
- 30000 to 80000 archive tags
- 80000 to 120000 archive tags

6AV6 371-1DQ17-0AB0
6AV6 371-1DQ17-0BC0
6AV6 371-1DQ17-0CE0
6AV6 371-1DQ17-0EG0
6AV6 371-1DQ17-0GJ0

SIMATIC WinCC Upgrade/Comprehensive Support

SIMATIC WinCC V7 upgrade ¹⁾

For upgrading the RT version

- from V6.0 to V7.0 B8 **6AV6 381-2AA07-0AX4**
- from V6.2 to V7.0 B8 **6AV6 381-2AA07-0AX3**

For upgrading the Client RT version

- from V6.0 to V7.0 B8 **6AV6 381-2BC07-0AX4**
- from V6.2 to V7.0 B8 **6AV6 381-2BC07-0AX3**

For upgrading the RC version

- from V6.0 to V7.0 B8 **6AV6 381-2AB07-0AX4**
- from V6.2 to V7.0 B8 **6AV6 381-2AB07-0AX3**

SIMATIC WinCC Comprehensive Support ^{2) 3)}

Software Update Service for
WinCC basic software and
options:

- 1 license
- 3 licenses
- 10 licenses

6AV6 381-1AA00-0AX5
6AV6 381-1AA00-0BX5
6AV6 381-1AA00-0CX5

1) According to licensing provisions, 1 upgrade package must be ordered for each WinCC station

2) Comprehensive Support runs for 1 year. The contract is automatically extended by 1 more year unless canceled 3 months prior to expiration. According to licensing provisions, 1 Comprehensive Support package must be ordered for each WinCC station.

3) Requires the current software version

B8: Subject to export regulations: AL: N and ECCN: EAR99S

Ordering Data (continued)	Order No.	Order No.
SIMATIC WinCC V6.2 SP2 system software		
Runtime packages on CD-ROM Language/script versions: DE/EN/FR/IT/ES; with license for 128 PowerTags (RT 128) 256 PowerTags (RT 256) 1024 PowerTags (RT 1024) 8192 PowerTags (RT 8192) 65536 PowerTags (RT 65536) Incl. 512 archive tags each	6AV6 381-1BC06-2AX0 6AV6 381-1BD06-2AX0 6AV6 381-1BE06-2AX0 6AV6 381-1BH06-2AX0 6AV6 381-1BF06-2AX0	
Complete packages on CD-ROM Language versions: DE/EN/FR/IT/ES; with license for 128 PowerTags (RC 128) 256 PowerTags (RC 256) 1024 PowerTags (RC 1024) 8192 PowerTags (RC 8192) 65536 PowerTags (RC 65536)	6AV6 381-1BM06-2AX0 6AV6 381-1BN06-2AX0 6AV6 381-1BP06-2AX0 6AV6 381-1BS06-2AX0 6AV6 381-1BQ06-2AX0	
SIMATIC WinCC V6.2 SP2 ASIA system software		
Runtime packages on CD-ROM Language versions: English/simplified and traditional Chinese/Korean/Taiwanese/Japanese; with license for 128 PowerTags (RT 128) 256 PowerTags (RT 256) 1024 PowerTags (RT 1024) 8192 PowerTags (RT 8192) 65536 PowerTags (RT Max) Incl. 512 archive tags each	6AV6 381-1BC06-2AV0 6AV6 381-1BD06-2AV0 6AV6 381-1BE06-2AV0 6AV6 381-1BH06-2AV0 6AV6 381-1BF06-2AV0	
Complete packages on CD-ROM Language versions: English/simplified and traditional Chinese/Korean/Taiwanese, Japanese; with license for 128 PowerTags (RC 128) 256 PowerTags (RC 256) 1024 PowerTags (RC 1024) 8192 PowerTags (RC 8192) 65536 PowerTags (RC Max) Incl. 512 archive tags each	6AV6 381-1BM06-2AV0 6AV6 381-1BN06-2AV0 6AV6 381-1BP06-2AV0 6AV6 381-1BS06-2AV0 6AV6 381-1BQ06-2AV0	
SIMATIC WinCC V6.2 PowerPacks		
For upgrading from:		
Runtime packages		
128 to 256 PowerTags	6AV6 371-1BD06-2AX0	
128 to 1024 PowerTags	6AV6 371-1BE06-2AX0	
128 to 8192 PowerTags	6AV6 371-1BK06-2AX0	
128 to 65536 PowerTags	6AV6 371-1BF06-2AX0	
256 to 1024 PowerTags	6AV6 371-1BG06-2AX0	
256 to 8192 PowerTags	6AV6 371-1BL06-2AX0	
256 to 65536 PowerTags	6AV6 371-1BH06-2AX0	
1024 to 8192 PowerTags	6AV6 371-1BM06-2AX0	
1024 to 65536 PowerTags	6AV6 371-1BJ06-2AX0	
8192 to 65536 PowerTags	6AV6 371-1BN06-2AX0	
Complete packages		
128 to 256 PowerTags	6AV6 371-1BD16-2AX0	
128 to 1024 PowerTags	6AV6 371-1BE16-2AX0	
128 to 8192 PowerTags	6AV6 371-1BK16-2AX0	
128 to 65536 PowerTags	6AV6 371-1BF16-2AX0	
256 to 1024 PowerTags	6AV6 371-1BG16-2AX0	
256 to 8192 PowerTags	6AV6 371-1BL16-2AX0	
256 to 65536 PowerTags	6AV6 371-1BH16-2AX0	
1024 to 8192 PowerTags	6AV6 371-1BM16-2AX0	
1024 to 65536 PowerTags	6AV6 371-1BJ16-2AX0	
8192 to 65536 PowerTags	6AV6 371-1BN16-2AX0	
SIMATIC WinCC V6.2 Archive		
1500 archives	6AV6 371-1DQ16-2AX0	
5000 archives	6AV6 371-1DQ16-2BX0	
10000 archives	6AV6 371-1DQ16-2CX0	
30000 archives	6AV6 371-1DQ16-2EX0	
80000 archives	6AV6 371-1DQ16-2GX0	
120000 archives	6AV6 371-1DQ16-2JX0	
SIMATIC WinCC V6.2 Archive PowerPacks		
For upgrading archiving from		
1500 to 5000 archive tags	6AV6 371-1DQ16-2AB0	
5000 to 10000 archive tags	6AV6 371-1DQ16-2BC0	
10000 to 30000 archive tags	6AV6 371-1DQ16-2CE0	
30000 to 80000 archive tags	6AV6 371-1DQ16-2EG0	
80000 to 120000 archive tags	6AV6 371-1DQ16-2GJ0	
SIMATIC WinCC V6.2 upgrade ¹⁾		
For upgrading the RT version		
from V5.x to V6.2 SP2	B8	6AV6 381-1AA06-2AX4
from V6.x to V6.2 SP2	B8	6AV6 381-1AA06-2AX3
from V5.x ASIA to V6.2 SP2 ASIA	B8	6AV6 381-1AA06-2AV4
from V6.x ASIA to V6.2 SP2 ASIA	B8	6AV6 381-1AA06-2AV3
For upgrading the RC version		
from V5.x to V6.2 SP2	B8	6AV6 381-1AB06-2AX4
from V6.x to V6.2 SP2	B8	6AV6 381-1AB06-2AX3
from V5.x ASIA to V6.2 SP2 ASIA	B8	6AV6 381-1AB06-2AV4
from V6.x ASIA to V6.2 SP2 ASIA	B8	6AV6 381-1AB06-2AV3

1) According to licensing provisions, 1 upgrade package must be ordered for each WinCC station.

B8: Subject to export regulations: AL: N and ECCN: EAR99S

SIMATIC Software

HMI software

SIMATIC WinCC

Ordering Data (continued)

Order No.

Order No.

SIMATIC WinCC documentation (to be ordered separately)

SIMATIC WinCC V6 Communication Manual

Communication manual for process communication and OPC communication from WinCC V6

- German
- English

6AV6 392-1CA06-0AA0
6AV6 392-1CA06-0AB0

SIMATIC WinCC communication

Communication via Industrial Ethernet

SOFTNET-S7 Edition 2007

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 USB stick, Class A, for 32-bit: Windows XP Professional, Windows 2003 Server, VISTA Ultimate/Business; for CP 1612; German/English

- Single license for 1 installation B3 **6GK1 704-1CW70-3AA0**
- Upgrade package for SIMATIC NET Edition 2006 B3 **6GK1 704-1CW00-3AE0**
- Upgrade package for SIMATIC NET V6.0, V6.1, V6.2 and Edition 2005 B3 **6GK1 704-1CW00-3AE1**

SOFTNET-S7 Lean Edition 2007 (included in the scope of delivery of WinCC V7.0)

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 USB stick, Class A, for 32-bit: Windows XP Professional, Windows 2003 Server, VISTA Ultimate/Business; for CP 1612; German/English

- Single license for 1 installation B3 **6GK1 704-1LW70-3AA0**
- Upgrade package for SIMATIC NET Edition 2006 B3 **6GK1 704-1LW00-3AE0**
- Upgrade package for SIMATIC NET V6.0, V6.1, V6.2 and Edition 2005 B3 **6GK1 704-1LW00-3AE1**

CP 1613 A2

PCI card (32 bit) for the connection of PG/PC to Industrial Ethernet (communications software must be ordered separately)

6GK1 161-3AA01

CP 1623

A8

PCI Express card (32 bits) for connecting a PG/PC to Industrial Ethernet (communications software must be ordered separately)

6GK1 162-3AA00

S7-1613 Edition 2007

Software for S7 and S5-compatible communication, incl. OPC server, PG/OP communication and NCM PC; up to 120 connections, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit: Windows XP Professional, Windows 2003 Server, Windows VISTA Ultimate/Business; for CP 1613, CP 1613 A2, CP1623; German/English

- Single license for 1 installation B3 **6GK1 716-1CB70-3AA0**
- Upgrade package for SIMATIC NET Edition 2006 B3 **6GK1 716-1CB00-3AE0**
- Upgrade package for SIMATIC NET V6.0, V6.1, V6.2 and Edition 2005 B3 **6GK1 716-1CB00-3AE1**

Communication via PROFIBUS

CP 5611 A2

PCI card (32 bit) for connecting a PG/PC to PROFIBUS (communications software included in the WinCC basic package)

6GK1 561-1AA01

CP 5621

C2

PCI Express card (32-bit) for connecting a PG/PC to PROFIBUS (communications software included in the WinCC basic package)

6GK1 562-1AA00

CP 5611 MPI

B7

Comprising CP 5611 A2 and MPI cable, 5 m

6GK1 561-1AM01

CP 5621 MPI

C2

Comprising CP 5621 (32-bit) and MPI cable, 5 m

6GK1 562-1AM00

CP 5512

PCMCIA card (CARDBUS 32 bit) for the connection of a PG/notebook to PROFIBUS or MPI (communications software included in 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

A8: Subject to export regulations: AL: N and ECCN: 5A991X
B3: Subject to export regulations: AL: N and ECCN: 5D992B1

B7: Subject to export regulations: AL: N and ECCN: EAR99H
C2: Subject to export regulations: AL: 5A002A1A2 and ECCN: 5A002A1A

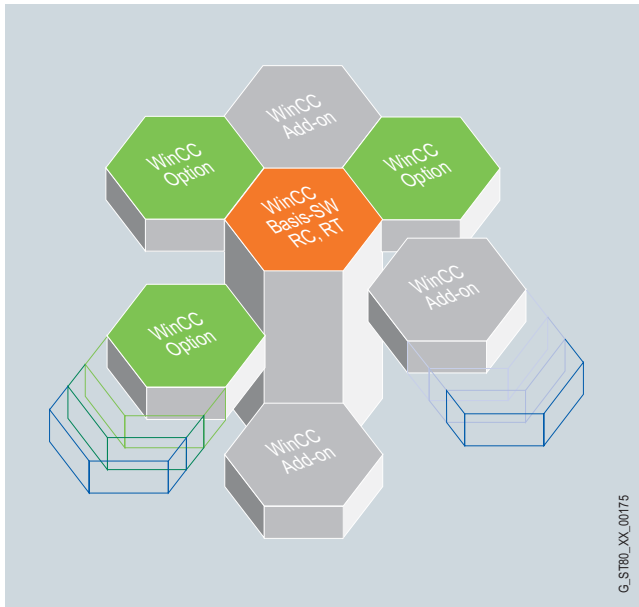
Ordering Data (continued)		Order No.	Order No.	
S7-5613 Edition 2007			FMS-5613 Edition 2007	
Software for S7 Communication incl. PG/OP protocol, FDL, OPC server; runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit: Windows XP Professional, Windows 2003 Server, Windows VISTA Ultimate/Business; for CP 5613 A2; German/English			Software for FMS protocol incl. PG/OP communication, FDL, OPC server, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit: Windows XP Professional, Windows 2003 Server, Windows VISTA Ultimate/Business; for CP 5613 A2; German/English	
• Single license for 1 installation	B3	6GK1 713-5CB70-3AA0	• Single license for 1 installation	B3 6GK1 713-5FB70-3AA0
• Upgrade package for SIMATIC NET Edition 2006	B3	6GK1 713-5CB00-3AE0	• Upgrade package for SIMATIC NET Edition 2006	B3 6GK1 713-5FB00-3AE0
• Upgrade package for SIMATIC NET V6.0, V6.1, V6.2 and Edition 2005	B3	6GK1 713-5CB00-3AE1	• Upgrade package for SIMATIC NET V6.0, V6.1, V6.2 and Edition 2005	B3 6GK1 713-5FB00-3AE1
DP-5613 Edition 2007			Hardware for process control functions	
Software for DP protocol incl. PG/OP communication, FDL, OPC server, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit: Windows XP Professional, Windows 2003 Server, Windows VISTA Ultimate/Business; for CP 5613 A2; German/English			DCF-77 receiver	
for time synchronization				
• Single license for 1 installation	B3	6GK1 713-5DB70-3AA0	• DCF77 (Europe)	2XV9 450-1AR14
• Upgrade package for SIMATIC NET Edition 2006	B3	6GK1 713-5DB00-3AE0	• GPS (worldwide)	B5 2XV9 450-1AR13
• Upgrade package for SIMATIC NET V6.0, V6.1, V6.2 and Edition 2005	B3	6GK1 713-5DB00-3AE1	Multi-VGA	
			• 2 screens	B7 6ES7 652-0XX03-1XE0
			• 4 screens	B7 6ES7 652-0XX03-1XE1
			B3: Subject to export regulations: AL: N and ECCN: 5D992B1 B5: Subject to export regulations: AL: N and ECCN: 7A994A B7: Subject to export regulations: AL: N and ECCN: EAR99H	
			Note: For further information about process control options, see Catalog ST PCS 7	

SIMATIC Software

HMI software

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 Premium add-ons.
- WinCC options are created by WinCC Development and are Siemens Industry Automation 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
- WinCC/Central Archive Server (CAS)
 - For configuring a central archive server

Options for increasing the availability

- WinCC/Redundancy;
 - For increased system availability through redundancy
- SIMATIC Maintenance Station
 - For system-integrated diagnostics and system-based asset management
- WinCC/ProAgent
 - For reliable process diagnostics

Options for IT and Business Integration – Plant Intelligence

- WinCC/DataMonitor
 - For display and analysis of current process states and historical data on office PCs with standard tools
- WinCC/DowntimeMonitor
 - For the detection and analysis of standstill times for machines and systems
- WinCC/ProcessMonitor
 - Management information system and quality analysis

- WinCC/Connectivity Pack
 - Access to WinCC archive via OPC HDA, OPC A&E, OPC XML Server and WinCC OLE-DB/OLE-DB
- WinCC/Connectivity Station
 - Gateway to WinCC server data over OPC HDA, OPC A&E, OPC XML server and WinCC OLE-DB /OLE-DB from independent computers
- WinCC/IndustrialDataBridge
 - Configurable link to databases and IT systems

Options for SCADA expansions

- WinCC/User Archives
 - To manage data sets in user archives

Options for sector-specific expansions

- SIMATIC BATCH (for WinCC)
 - WinCC in combination with the SIMATIC BATCH products offers the solution for implementation of batch processes in accordance with ISA S88.
 - Batch processes which place heterogeneous demands on the interfacing of different types of PLC, such as S7-400/300, S5 and third-party PLCs, are automated using SIMATIC BATCH (for WinCC).
- WinCC/ChangeControl
 - Change and version management
 - Generation of audit trails for engineering
- WinCC/Audit
 - Change management
 - Generation of audit trails for engineering and runtime
- SIMATIC Logon
 - Central management of WinCC users, plant-wide (to CFR 21 Part 11)

Options for individual system expansions

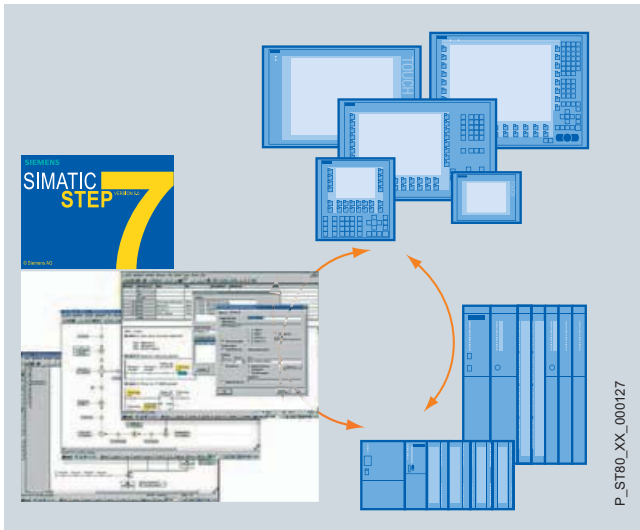
- WinCC/IndustrialX
 - For the creation of customized WinCC ActiveX objects in a VB development environment and .net.
- WinCC/ODK
 - For the use of open programming interfaces (Open Development Kit)

Options for comprehensive support

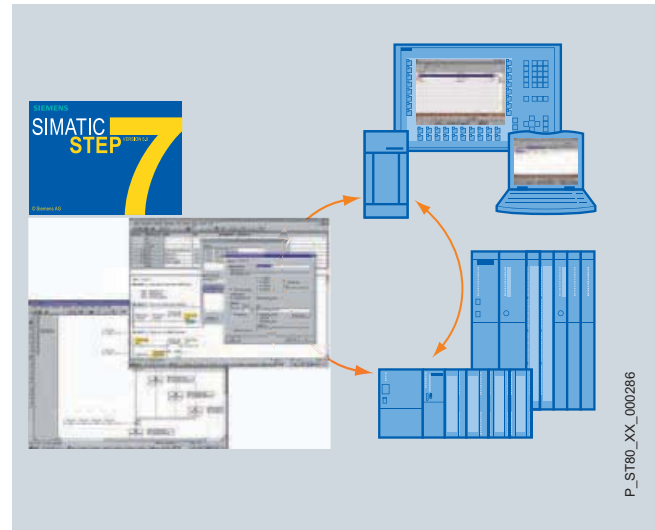
- WinCC/Comprehensive Support
 - Extensive support package; contains current updates/upgrades for WinCC basic software and options.

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



Prozess fault diagnostics with ProAgent for ProTool and WinCC flexible/ProAgent as well as the STEP 7 engineering tools



Prozess fault diagnostics with WinCC/ProAgent and the STEP 7 engineering tools

Technical specifications

	WinCC/ProAgent	WinCC flexible/ProAgent
Interfaces • Can be used in conjunction with programmable controllers • Types of connection	SIMATIC S7: S7-300/S7-400; WinAC SIMATIC S7 Protocol Suite: MPI, PROFIBUS DP, Industrial Ethernet, TCP/IP	SIMATIC S7: S7-300/S7-400; WinAC SIMATIC S7 Protocol Suite: MPI, PROFIBUS DP, PROFINET IO, Industrial Ethernet, TCP/IP
Display units Standard images for:		Standard displays for easy embedding in user displays, example project for MP 377
Number of languages for online language selection	3 (d/e/f)	5 (d/e/f/i/s)
Functionality		
Modification of HMI diagnostics data management in RT	WinCC/ProAgent V6.0 and higher	No
Unit overview	Yes	Yes
Message display	Yes	Yes
Sequencer operating display	Yes	Yes
Diagnostics detail display	Yes	Yes
• Display STL/LAD/signal list	Yes/Yes/Yes	Yes/Yes/Yes
• Display of operands with symbol and comment	Yes	Yes

SIMATIC Software

HMI software

SIMATIC ProAgent

Technical specifications (continued)

	WinCC/ProAgent	WinCC flexible /ProAgent
Criteria analysis	When fault occurs/current status/ can be archived	When fault occurs/current status
Motion display		
• Number of viewable movements	6	6
• Directions of motion	2	2
• Number of viewable end positions per movement	16	16
Documentation		
In electronic format	de/en/fr; included in scope of delivery	de/en/fr/it/es; included in scope of delivery
Requirements		
HMI software	WinCC V6.2 (ProAgent V6.0 + SP4)	WinCC flexible 2008
Operating system: Configuration	<i>WinCC/ProAgent V6.0 + SP4:</i> Windows 2000 + SP3, Windows XP + SP2, Windows Server 2003 + SP1	Windows XP SP2/SP3 Windows Vista Business Windows Vista Ultimate
Operating system Runtime	<i>WinCC/ProAgent V6.0 + SP4:</i> Windows 2000 + SP3, Windows XP + SP2, Windows Server 2003 + SP1	<i>WinCC flexible/ProAgent for SIMATIC Panels:</i> <i>WinCC flexible/ProAgent for WinCC flexible Runtime:</i> Windows XP SP2/SP3 Windows Vista Business Windows Vista Ultimate
STEP 7	V5.3 and higher	V5.3 and higher
• S7-GRAPH	V5.3 and higher	V5.2 + SP3 and higher
• S7-PDIAG	V5.1 and higher	V5.1 and higher
• S7-HiGraph	No	V5.3 and higher
Type of delivery (one license is required for each target hardware)	CD-ROM/ Runtime license	Runtime license

Ordering Data

Order No.

Order No.

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 a 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)

WinCC version:

- V7.0, V6.2 (ProAgent V6.0 SP4)

Upgrade

- to V6.0 (SP4)

6AV6 371-1DG06-0EX0

6AV6 371-1DG06-0EX4

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** B3
Runtime license (Single License) executable on OP/TP/MP 270/277, MP 370/377

6AV6 618-7DB01-2AB0

- **WinCC flexible /ProAgent for WinCC flexible Runtime** B3
Runtime license (single license)

6AV6 618-7DD01-2AB0

Documentation (must be ordered separately)

SIMATIC HMI Manual Collection B8

6AV6 691-1SA01-0AX0

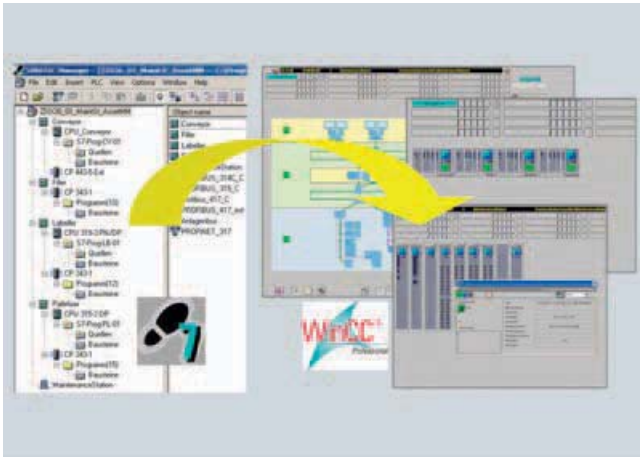
Electronic documentation, on CD-ROM

5 languages (English, French, German, Italian, Spanish); contains: all currently available user manuals, manuals and communication manuals for SIMATIC HMI

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

B8: Subject to export regulations: AL: N and ECCN: EAR99S

Overview



System-integrated plant asset management system

- Automatic generation of a maintenance view in WinCC from the STEP 7 hardware configuration
- Plant-wide visualization of all automation components from the management level to the field level in ready linked, hierarchically arranged WinCC displays
- Mapping of central and distributed SIMATIC S7 components, PROFIBUS and PROFINET networks as well as associated bus nodes
- Ethernet network components and industrial PCs can be integrated through SIMATIC NET SNMP OPC Server
- Display of device status with group status generation in overview and detail displays
- The device statuses "Maintenance required" and "Maintenance request" are supported for status-based maintenance
- Provision of uniform faceplates showing detailed information for all components displayed
- Display of the device identification data (electronic rating plate)
- Integrated display of the status of the request

Technical specifications

Hardware requirements

System	Clock frequency	Main memory	Free hard disk space
Engineering station	2.8 GHz	1 GB	15 GB
Maintenance Station Stand-alone / WinCC-Station "Single-user Workstation"	2.8 GHz	1 GB	15 GB
Maintenance Station Server / WinCC Server	2.8 GHz	1 GB	15 GB
Maintenance Station Client / WinCC Client	2.8 GHz	512 MB	3 GB

Software requirements

System	Operating system	System	Operating system
Engineering station "ES"	Windows XP Professional SP2 Windows Server 2003 SP1	Maintenance Station Server / WinCC Server	Windows Server 2003 SP1
Maintenance Station Stand-alone / WinCC-Station "Single-user Workstation"	Windows XP Professional SP2 Windows Server 2003 SP1	Maintenance Station Client / WinCC Client	Windows XP Professional SP2 Windows Server 2003 SP1
ES with Maintenance Station Stand-alone	Windows XP Professional SP2 Windows Server 2003 SP1		

Requirements for the integration of devices

Type	Integration	Comment
SIMATIC S7 controllers / I/O		
• S7-300 ¹⁾	Yes	
• S7-400	Yes	
• Win AC	Yes	
Distributed devices		
• ET 200	Yes	PROFIBUS DP and PROFINET IO according to STEP 7 hardware catalog
• PROFIBUS standard slaves	Yes	Integration using a GSD file
• PROFINET standard devices	Yes	Integration using a GSD file

SIMATIC Software

SIMATIC Maintenance Station

SIMATIC Maintenance Station

Technical specifications (continued)

Type	Integration	Comment
Network components		
Ethernet network components	Yes	SIMATIC NET SNMP OPC Server and MIB also required
PROFINET network components	Yes	
PROFIBUS diagnostic repeater	Yes	
Personal Computer		
PC/Industrial PC	Yes	SIMATIC NET SNMP OPC Server also required
Drives		
Drives with PROFIBUS connection	Yes	For integrating devices designed to the PROFIDRIVE profile, Drive ES SIMATIC (V5.4 SP1 or higher) is required
Drives with PROFINET connection	Yes	For integrating devices designed to the PROFIDRIVE profile, Drive ES SIMATIC (V5.4 SP1 or higher) is required
Accessory devices		
Devices not configured in STEP 7 Hardware Config	Yes	Integrated via function block (asset proxy)

1) With S7-300, PROFIBUS/PROFINET systems are supported if they are connected to the internal CPU interfaces

Ordering Data

SIMATIC Maintenance Station 2007 SP1

Software for implementation of a plant-oriented asset management system

Basic package with engineering software (Floating License) and Runtime License for 100 devices

Powerpack 100 Runtime License for 100 additional devices

B3 **6ES7 840-0WD00-0YA0**

B3 **6ES7 840-0WD10-0YD0**

Order No.

SIMATIC Maintenance Station 2007 SP1

Software for implementation of a plant-oriented asset management system

Powerpack 500 Runtime License for 500 additional devices

Powerpack 1000 Runtime License for 1000 additional devices

Basic demo package 2007 SP1 B3 **6ES7 840-0WD00-0YA7**

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

Order No.

B3 **6ES7 840-0WD20-0YD0**

B3 **6ES7 840-0WD30-0YD0**

Overview



- Contains the most important engineering and runtime software packages for SIMATIC S7/C7, SIMATIC HMI, SIMATIC NET, SINUMERIK, SIRIUS and SIMATIC RFID on several data carriers (DVD)
- Permits the simultaneous, automatic installation of several software packages
- Permits the automatic updating of installed software packages
- Considerably reduces installation costs
- Optimal for company-wide rollout of identical engineering software versions using recording files of the master installation
- Supports company-wide rollout with simple installation options over the network
- General settings such as languages to be installed, installation path, etc. can be made using the Premium Studio Setup

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 2008

Task:

Installation/updating of software packages for engineering and runtime for SIMATIC S7/C7, SIMATIC HMI, SIMATIC NET, SINUMERIK, SIRIUS und SIMATIC RFID; without licenses;

Target system:

Windows XP Professional SP2, Windows Vista Business, Windows Vista Ultimate

Requirements:

PG/PC, PCU, S7-300/-400, C7

Type of delivery:

on DVD; without licenses for the software packages

DVD

B8 **6ES7 815-8CD06-0YA7**

Software Update Service (requires current software version)

B8 **6ES7 815-8CD00-0YL7**

B8: Subject to export regulations: AL: N and ECCN: EAR99S

SIMATIC Software

Supplementary Components

ADDM - Data Management

Overview



With ADDM, you are completely in control of the SIMATIC and SINUMERIK controls – 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	B4	6BQ3 030-1AA30-3AC0
• Trial license with CD-ROM of current software version	B8	6BQ3 030-1AA70-3AC0
• Single user upgrade	B4	6BQ3 030-1AB13-3AC0

ADDM Client

• Single license without data carrier	B4	6BQ3 030-1AA20-1AC0
• Single license with CD-ROM of current software version	B4	6BQ3 030-1AA10-0AC0
• Client upgrade from V5.x to V6.1 with CD-ROM	B4	6BQ3 030-1AB11-3AC0

ADDM Server

• Single license with CD-ROM of current software version	B4	6BQ3 030-1AA00-3AC0
• Server upgrade from V5.x to V6.1 with CD-ROM	B4	6BQ3 030-1AB10-3AC0

ADDM Agent

• Single license without data carrier	B4	6BQ3 030-1AA00-1AB0
• Single license with CD-ROM of current software version	B4	6BQ3 030-4AA00-0AC0
• Agent upgrade from V1.x to V1.2 with CD-ROM	B4	6BQ3 030-1AB12-3AC0

B4: Subject to export regulations: AL: N and ECCN: 5D992B2

B8: Subject to export regulations: AL: N and ECCN: EAR99S

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

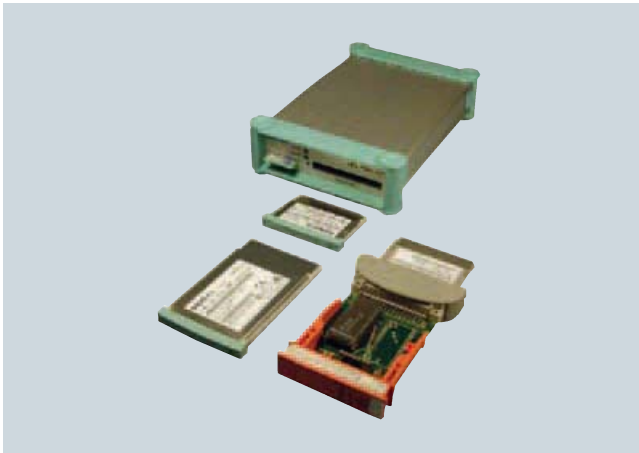
One Off License

6ES7 991-0CD01-0YX0

6

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 7, page 7/5.

SIMATIC Software

Supplementary Components

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
Functionality	
Input/output functions	Yes
Open-loop and closed-loop control functions	Yes
Optimization functions	Time switching

	HVAC Lite Library
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	(optional instead of operator control and monitoring)
FDL via PROFIBUS	
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

SIMATIC Programming Devices



7/2	Programming devices
7/2	Field PG M2
7/5	Accessories
7/5	External prommer
7/6	Communications software
7/6	SOFTNET for PROFIBUS
7/8	S7-REDCONNECT
7/9	SOFTNET for Industrial Ethernet
7/10	SOFTNET PN IO
7/12	OPC server for Industrial Ethernet
7/14	PN CBA OPC server
7/16	SNMP OPC server

Brochures

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

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

SIMATIC Programming devices

Programming devices

Field PG M2

Overview



- The mobile, industrial programming device with powerful Intel Core 2 Duo processor.
- Optimal for startup, service and maintenance of automation systems.
- Industrial notebook with wireless technology, large display, long battery service life, high-speed RAM, and integral data backup concept.
- With all commonly used 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 M2
General features	
Format	Notebook
Processor	Intel Core 2 Duo processor with 2.0 GHz or 2.2 GHz, 800 MHz FSB; Intel Mobile GM 965 Express chipset
Main memory	1 x 2 GB DDR 2 RAM with 667 MHz (Premium version)
Free slots for expansions	1 x PC card type I/II and 1 x ExpressCard/54
Graphics	Intel GME 965 with Dualview (e.g. desktop via 2 screens)
Display	15" display; resolution XGA (1024 x 768) or SXGA+ (1400 x 1050)
Loudspeaker	Built-in stereo loudspeaker
Pointing device	Touch pad
Operating system	Windows XP Prof. SP2 Engl. MUI (Eng, Ger, Fr, Sp, It; additional languages can be installed later) or Windows VISTA Ultimate Engl. 32-bit
Power supply	Wide-range power supply unit 100-240 V AC, 50-60 Hz, high-power lithium-ion battery 73 Wh (running time 3.5 to 4 hours)
Warranty conditions	24 months for hardware components (6 months for battery)
Drives	
Hard disk	3.5" serial ATA with 80 GB or 160 GB; easily replaceable
DVD/CD	Multistandard DVD RW/CD RW
Disk drive	1.44 MB; 3.5"

	SIMATIC Field PG M2
Interfaces	
PROFIBUS DP/MPI	CP 5611-compatible, 9.6 Kbit/s to 12 Mbit/s, 9-pin sub D socket
COM 1	V.24/TTY (for SIMATIC S5); over supplied adapter on 9-pin sub-D male connector
Programming interface	For memory cards, micro memory cards and S5 EPROM modules (over supplied adapter)
Ethernet	10/100/1000 Mbit/s Gigabit Ethernet (RJ45)
USB 2.0	2 x 2 interfaces for high speed universal serial bus, max. 2 high current (500 mA) - 1 interface can be used as high current in each interface block
PC card (PCMCIA)/ExpressCard/54	1 x type I/II and 1 x Express Card/54
VGA	1 x (for connecting an external monitor)
Parallel (LPT)	ECP
WLAN ¹⁾	Integrated, IEEE802.11 a,b,g
Modem	Analog, V.92 compatible
Headphones	1 x (stereo)
Microphone	1 x (stereo)
Environmental conditions	
Degree of protection in accordance with IEC 60529	Front IP30 when covers closed
Vibrations	Tested in accordance with DIN IEC 60068-2-6
• Operation	10 to 58 Hz: Amplitude 0.0375 mm, 58 to 500 Hz: Acceleration 4.9 m/s ²
• Transport	5 to 9 Hz: Amplitude 3.5 mm, 9 to 500 Hz: Acceleration 9.8 m/s ²

1) The integral wireless LAN and modem are approved for operation in Europe. For operation in the U.S. and China there is a WLAN module with UL, FCC and CCC approvals. It can be ordered via the selection tool.
For operation outside these countries, the relevant national regulations must be observed.

SIMATIC Programming devices

Programming devices

Field PG M2

Technical specifications (continued)

	SIMATIC Field PG M2
Shock	Tested in accordance with IEC 60068-2-27, IEC 60068-2-29
• Operation	Half-sine 50 m/s ² , 30 ms, 100 shocks
• Storage/transport	Half-sine 250 m/s ² , 6 ms, 1000 shocks
Electromagnetic compatibility (EMC)	
• Interference emission	EN 55022 Class B, EN 61000-3-2 Class D and EN 61000-3-3
• Immunity to line-conducted interference on the supply cables	±2 kV (in accordance with IEC 61000-4-4; burst) ±1 kV (in accordance with IEC 61000-4-5; surge pulse symm.) ±2 kV (in accordance with IEC 61000-4-5; surge pulse asymm.)
• Interference immunity on signal lines	±2 kV (in accordance with IEC 61000-4-4; burst; length > 3 m) ±2 kV (in accordance with IEC 61000-4-5; surge pulse length > 20 m)
• Immunity to electrostatic discharges	±4 kV discharge on contact (in accordance with IEC 61000-4-2: ESD) ±8 kV discharge to air (in accordance with IEC 61000-4-2: ESD)
• Immunity to high-frequency irradiation	10 V/m; 80 to 1000 MHz and 1.4 GHz to 2 GHz; 80 % AM (in accordance with IEC 61000-4-3)

	SIMATIC Field PG M2
Electromagnetic compatibility (EMC) (continued)	
• Immunity to high-frequency emissions	10 V; 10 kHz to 80 MHz
• Immunity to magnetic fields	100 A/m; 50/60 Hz in accordance with IEC 61000-4-8
Temperature	Tested in accordance with IEC 60068-2-2, IEC 60068-2-1
• Operation ²⁾	+5 to +40 °C
• Storage/transport	-20 to +60 °C
• Gradient, max.	20 °C/h (no condensation)
Relative humidity	Tested in accordance with IEC 60068-2-78, IEC 60068-2-30, IEC 60068-2-14
• 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	328 x 294 x 52
Weight, approx.	3.9 kg

2) Battery charging and CD/DVD writing is only possible at temperatures up to 35 °C

Ordering Data

SIMATIC Field PG M2 programming device

Field PG M2 Standard: 2.0 GHz Core 2 Duo processor (T7250, 800 MHz, 2ML L2c), Multi Standard DVD-RW drive, 15" XGA display (1024x768), 80 GB serial ATA hard disk, 1 x 1 GB DDR 2 RAM	B3	6ES7 713-0AA0	- 0 ■ ■ 1
Field PG M2 Premium: 2.2 GHz Core 2 Duo processor (T7500, 800 MHz, 4MB L2c), Multi Standard DVD-RW drive, 15" SXGA+ display (1400x1050), 160 GB serial ATA hard disk, 1 x 2 GB DDR2 RAM	B3	6ES7 713-1BB1	- 0 ■ ■ 1
Power cable (required)			
• for Germany, France, the Netherlands, Spain, Belgium, Austria, Sweden, Finland; Keyboard: International (& German); WLAN module with CE			0
• For Great Britain; Keyboard: International (& German); WLAN module with CE			1
• For Switzerland; Keyboard: International (& German); WLAN module with CE			2

SIMATIC Field PG M2 programming device

Field PG M2 Standard	B3	6ES7 713-0AA0	- 0 ■ ■ 1
Field PG M2 Premium	B3	6ES7 713-1BB1	- 0 ■ ■ 1
Power cable (required)			
• for the USA, Japan; Keyboard: International (& German); WLAN module with UL, FCC, CCC (no CE)			3
• For Italy; Keyboard: International (& German); WLAN module with CE			4
• for Germany, France, the Netherlands, Spain, Belgium, Austria, Sweden, Finland; keyboard: French (AZERTY) with country-specific labeling for France, Belgium, Switzerland; WLAN module with CE			5
• For Switzerland; Keyboard: French (AZERTY) with country-specific labeling for France, Belgium, Switzerland; WLAN module with CE			6
• For China; Keyboard: International (& German); WLAN module with UL, FCC and CCC (no CE!)			7

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

SIMATIC Programming devices

Programming devices

Field PG M2

Ordering Data

SIMATIC Field PG M2 programming device

Field PG M2 Standard B3 **6ES7 713-0AA0 - 0** 1

Field PG M2 Premium B3 **6ES7 713-1BB1 - 0** 1

Operating system

- Windows XP Professional English MUI (Fr., Span., Ital., Ger.; image stored on HD, other language packages available for downloading) **A**
- Windows VISTA Ultimate Engl. 32-bit (Fr, Sp, It, Ger; image stored on HD, other language packages available for downloading. (Note: WinCC flexible Advanced 2007 and STEP 5 are not preinstalled and are enclosed. WinCC flex. Advanced 2007 and STEP 5 are not runnable on Windows VISTA.) **B**

Licenses for the SIMATIC software

- Trial license for STEP 7 Professional, WinCC flexible Advanced **A**
- Upgrade license STEP 7 Professional, STEP 5, WinCC flexible Advanced (requires license for STEP 7 Prof./STEP 5 (at least V3.0)) **B**
- Powerpack license STEP 7 Professional, Upgrade STEP 5, WinCC flexible Advanced (requires license for STEP 7 / STEP 5 (at least V3.0)) **C**
- License STEP 7 Professional, STEP 5, STEP 7-Micro/WIN, WinCC flexible Advanced; incl. EPROM adapter and S5-CC cable **D**
- License for STEP 7, STEP 7 Micro/WIN, WinCC flexible Advanced **E**
- License for STEP 7 Professional, STEP 5, STEP 7 Micro/WIN, WinCC flexible Advanced **F**

Order No.

Order No.

Accessories

Memory expansion

1 GB DDR 2 RAM 667 MHz B7 **6ES7 648-2AG40-0HA0**

2 GB DDR 2 RAM 667 MHz B7 **6ES7 648-2AG50-0HA0**

USB mouse (PS/2-compatible) B7 **6ES7 790-0AA01-0XA0**

AC/DC external 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 USA **6ES7 900-5DA00-0XA0**

For Italy **6ES7 900-5EA00-0XA0**

for China **6ES7 900-5FA00-0XA0**

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

S5 EPROM programming adapter **6ES7 798-0CA00-0XA0**

for SIMATIC S5 EPROM programming using the Field PG

S5 PLC cable **6ES5 734-2BF00**

For connecting programming devices to SIMATIC S5 PLCs, 5 m

Hard disk kit B7 **6ES7 791-2BA00-0AA0**

Replaceable hard disk 160 GB serial ATA; with protective pocket and Torx screwdriver

Adapter serial ATA to USB B7 **6ES7 790-1AA00-0AA0**

For using the replaceable hard disk of the hard disk kit as an external hard disk (only for Field PG M2 or Field PG M)

Rucksack for Field PG **6ES7 798-0DA00-0XA0**

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.

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

B7: Subject to export regulations: AL: N and ECCN: EAR99H

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 temperature	
• min.	5 °C
• max.	40 °C
Storage/transport temperature	
• min.	-20 °C
• max.	60 °C
Dimensions	
Dimensions	
• Width	172 mm
• Height	40 mm
• Depth	121 mm
Weights	
• Weight, approx.	400 g

Ordering Data

**EPROM programming device
USB-Prommer**
for programming SIMATIC
memory cards and EPROM
modules

Order No.

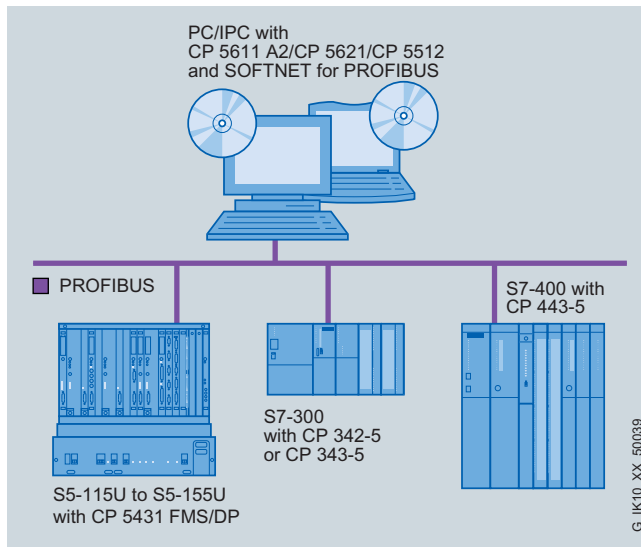
6ES7 792-0AA00-0XA0

SIMATIC Programming devices

Communications software

SOFTNET for PROFIBUS

Overview



Technical specifications

Performance data	CP 5611 A2/CP 5621/CP 5512
<u>Mono protocol mode</u>	
Number of connectable DP slaves	max. 60
Number of FDL tasks waiting	max. 100
Number of PG/OP and S7 connections	max. 8
• DP-Master	DP-V0, DP-V1 with SOFTNET-DP
• DP-Slave	DP-V0, DP-V1 with SOFTNET-DP slave

7

DP-M	DP-S	FMS	OPC	PG/OP	S7/S5
●	●		●	●	●

G_IK10_XX_50039

- Software for coupling PCs/programming devices and notebooks to programmable controllers
- Communication services:
 - PROFIBUS DP master Class 1 and 2 with acyclic expansions
 - PROFIBUS DP slave
 - PG/OP communication
 - S7 communication
 - Open communication (SEND/RECEIVE) based on the FDL interface
- The appropriate OPC servers are included in the scope of supply of the respective communication software

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

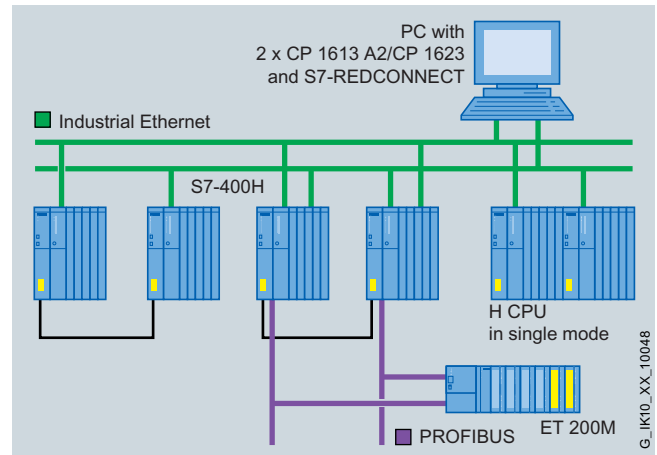
SIMATIC Programming devices

Communications software

S7-REDCONNECT

Overview

- For connecting 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

ISO	TCP/UDP	PN	MRP	OPC	PG/OP	S7/S5	IT
●				●	●	●	

7

Ordering Data

Order No.

S7-REDCONNECT 2007 Edition

Software for fail-safe S7 communication over redundant networks incl. S7-OPC server, S7-1613 2007, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2, Windows 2003 Server SP1, R2, SP2; Windows Vista Business/Ultimate; German/English

- Single license for 1 installation B3 **6GK1 716-0HB70-3AA0**
- Software Update Service for 1 year, with automatic extension; requirement: Current software version **6GK1 716-0HB00-3AL0**
- Upgrade S7-REDCONNECT from V6.4 to S7-REDCONNECT 2007 Edition B3 **6GK1 716-0HB00-3AE0**
- Upgrade S7-REDCONNECT from V6.0, V6.1, V6.2 or V6.3 to S7-REDCONNECT 2007 Edition B3 **6GK1 716-0HB00-3AE1**

Power Pack S7-REDCONNECT 2007 Edition B3

For expanding S7-1613 2007 to S7-REDCONNECT, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2, Windows 2003 Server SP1, R2, SP2; Windows Vista Business/Ultimate; German/English

CP 1613 A2 communications processor

PCI card (32-bit, 33 MHz/66 MHz; 3.3 V/5 V universal keyed) for connection to Industrial Ethernet (10/100 Mbit/s) with ITP and RJ45 connection over S7-1613 and S7-REDCONNECT, incl. driver for 32-bit Windows XP Professional, 2003 Server, Windows 2000 Professional/Server

CP 1623 communications processor A8

PCI Express x1 card (3.3 V/12) for connection to Industrial Ethernet (10/100/1000 Mbit/s) with 2-port switch (RJ45) connection via S7-1613 and S7-REDCONNECT, incl. driver for 32-bit Windows XP Professional, 2003 Server, Windows Vista Ultimate/Business

Order No.

6GK1 716-0HB70-3AC0

6GK1 161-3AA01

6GK1 162-3AA00

A8: Subject to export regulations: AL: N and ECCN: 5A991X
B3: Subject to export regulations: AL: N and ECCN: 5D992B1

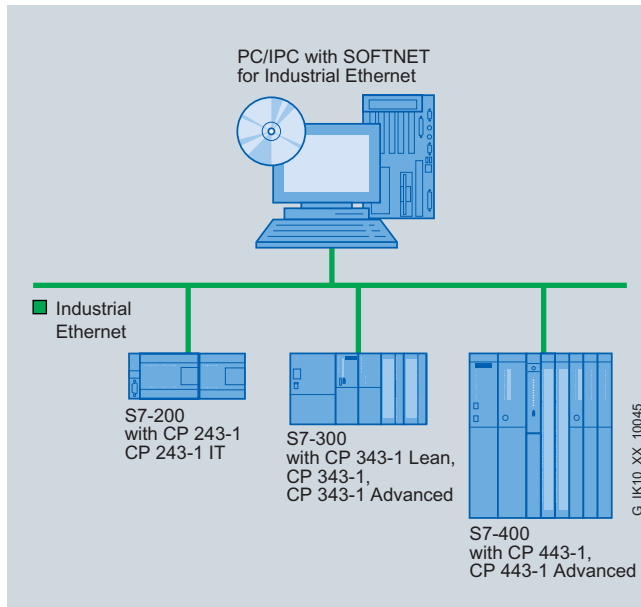
SIMATIC Programming devices

Communications software

SOFTNET for Industrial Ethernet

Overview

- For coupling programming devices/PCs/workstations to programmable controllers
- Communication services:
 - PG/OP communication
 - S7 communication
 - Open communication (SEND/RECEIVE)
- Can be used with
 - Layer 2 Ethernet card (PCI/PCle)
 - 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

ISO	TCP/UDP	PN	MRP	OPC	PG/OP	S7/S5	IT
●	●			●	●	●	

Technical specifications

SOFTNET for Industrial Ethernet	
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 Edition 2007 for Industrial Ethernet

Software for S7 and open communication, incl. OPC server, PG/OP communication and NCM PC, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2, Windows 2003 Server SP1, R2, SP2, Windows Vista Business/Ultimate; German/English

SOFTNET-S7 2007 Edition for Industrial Ethernet

up to 64 connections

- Single license for 1 installation B3 **6GK1 704-1CW70-3AA0**
- Software Update Service for 1 year, with automatic extension; requirement: Current software version **6GK1 704-1CW00-3AL0**
- Upgrade from V6.4 to 2007 edition B3 **6GK1 704-1CW00-3AE0**
- Upgrade from V6.0, V6.1, V6.2 or V6.3 to 2007 Edition B3 **6GK1 704-1CW00-3AE1**

SOFTNET-S7 Lean 2007 Edition for Industrial Ethernet

up to 8 connections

- Single License für 1 Installation B3 **6GK1 704-1LW70-3AA0**
- Software Update Service for 1 year, with automatic extension; requirement: Current software version **6GK1 704-1LW00-3AL0**
- Upgrade from V6.4 to 2007 Edition B3 **6GK1 704-1LW00-3AE0**
- Upgrade from V6.0, V6.1, V6.2 or V6.3 to 2007 Edition B3 **6GK1 704-1LW00-3AE1**

SOFTNET-PG Edition 2007 for Industrial Ethernet

Software for PG/OP-communication; runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2, Windows 2003 Server SP1, R2, SP2, Windows Vista Business/Ultimate; German/English

- Single license for 1 installation B3 **6GK1 704-1PW70-3AA0**
- Software Update Service for 1 year, with automatic extension; requirement: Current software version **6GK1 704-1PW00-3AL0**
- Upgrade from V6.4 to 2007 Edition B3 **6GK1 704-1PW00-3AE0**
- Upgrade from V6.0, V6.1, V6.2 or V6.3 to 2007 Edition B3 **6GK1 704-1PW00-3AE1**

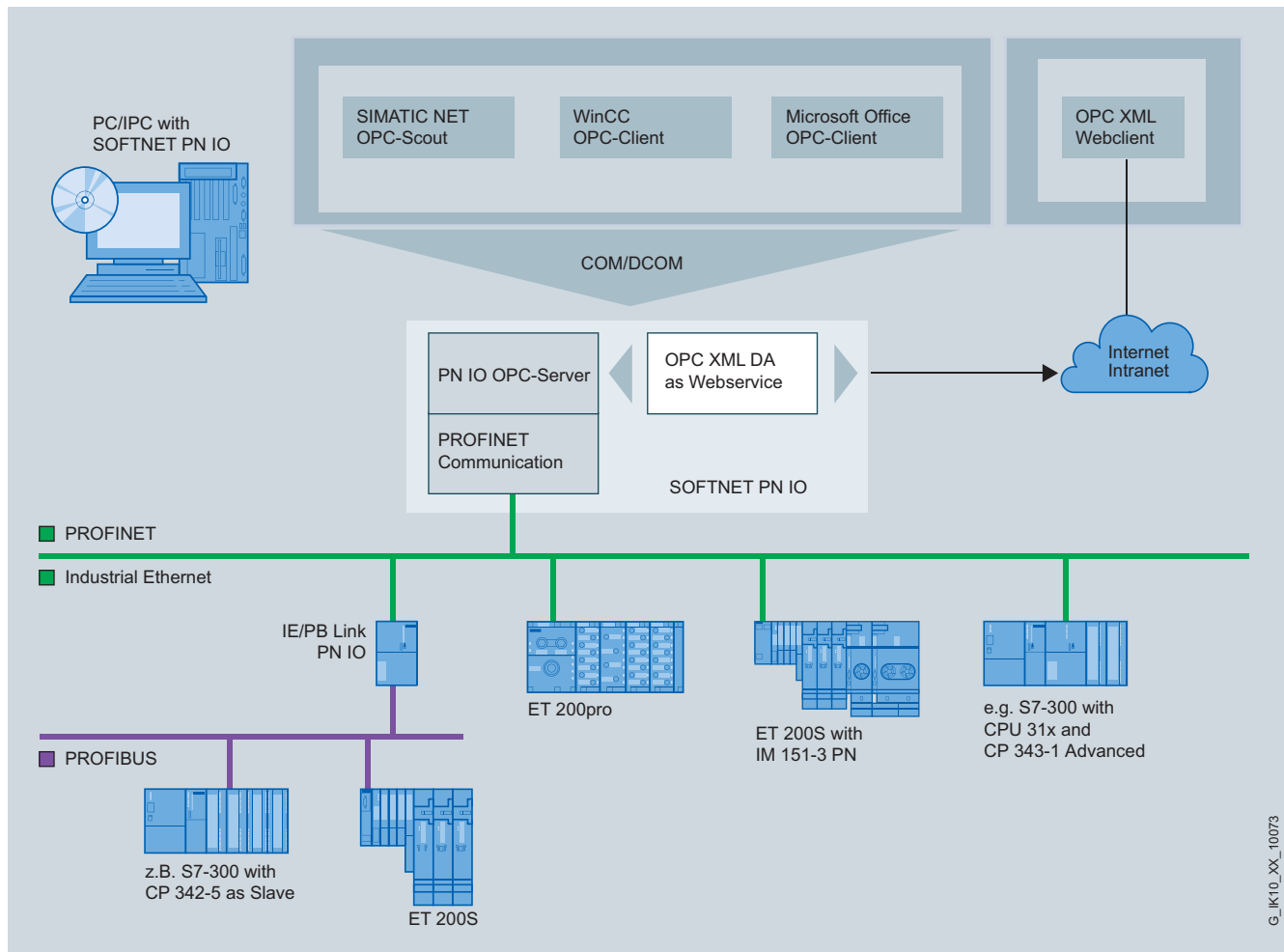
B3: Subject to export regulations: AL: N and ECCN: 5D992B1

SIMATIC Programming devices

Communications software

SOFTNET PN IO

Overview



PC with SOFTNET PN IO as PROFINET IO Controller

ISO	TCP/UDP	PN	MRP	OPC	PG/OP	S7/S5	IT
	●	●		●			

- 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

SIMATIC Programming devices

Communications software

SOFTNET PN IO

Technical specifications		Ordering Data	Order No.
	SOFTNET PN IO	SOFTNET PN IO, 2007 Edition	
Performance data		Software for PROFINET IO controller with OPC server and NCM PC; runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2, Windows 2003 Server SP1, R2, SP2; German/English	
• Number of operable IO devices	Max. 64	• Single license for one installation	B3 6GK1 704-1HW70-3AA0
• Number of external IO-lines in one central rack	Max. 1	• Software Update Service for 1 year, with automatic extension; requirement: Current software version	6GK1 704-1HW00-3AL0
• Size of IO data areas overall		• Upgrade SOFTNET-PN IO from V6.4 to SOFTNET-PN IO, 2007 Edition	B3 6GK1 704-1HW00-3AE0
- I/O input area	Max. 2 KB	• Upgrade SOFTNET-PN IO from V6.0, V6.1, V6.2 or V6.3 to SOFTNET-PN IO 2007 Edition	B3 6GK1 704-1HW00-3AE1
- I/O output area	Max. 2 KB		
• Size of I/O data area per connected I/O device			
- I/O input range	Max. 1433 byte		
- I/O output range	Max. 1433 byte		

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

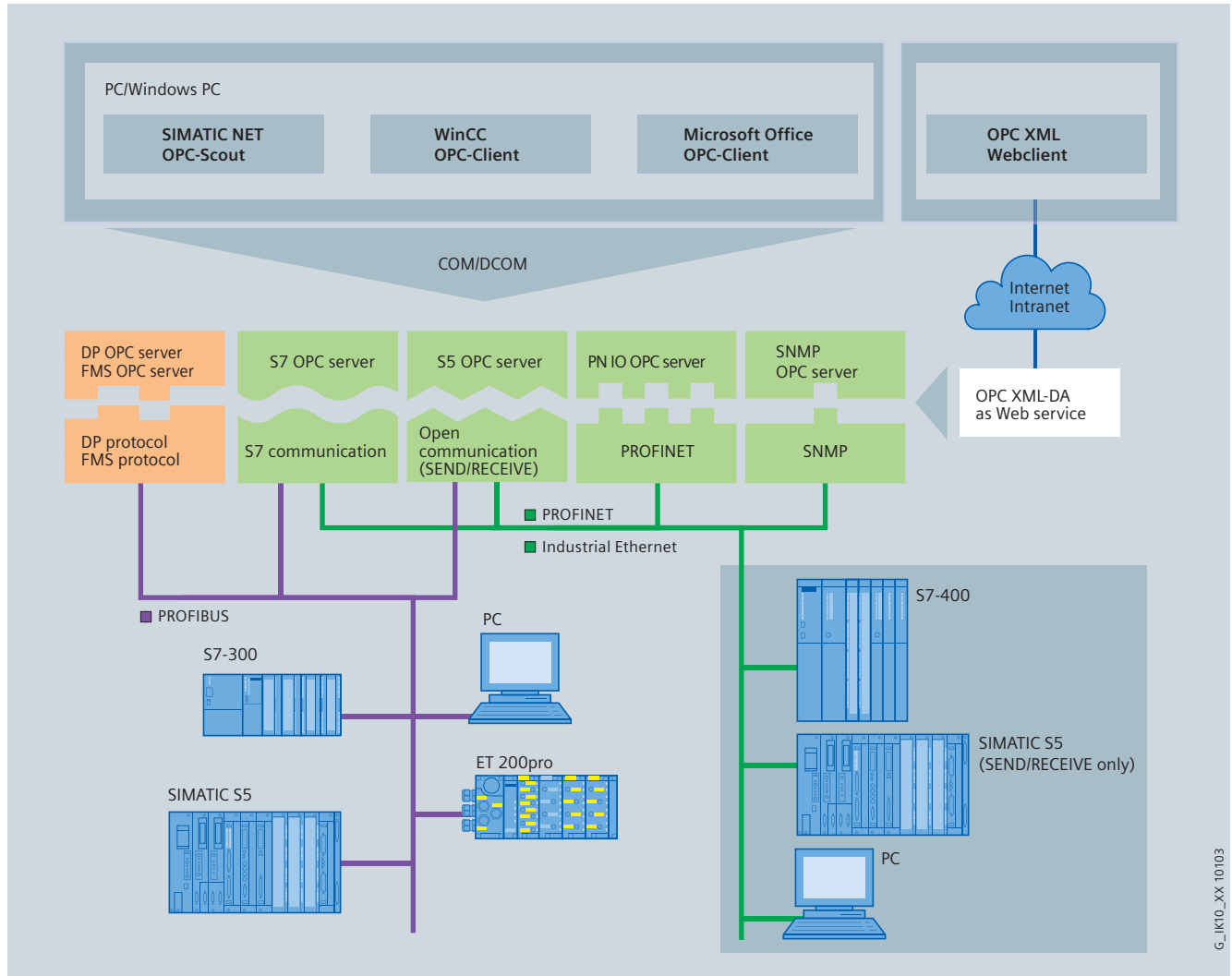
SIMATIC Programming devices

Communications software

OPC server for Industrial Ethernet

Overview

- The appropriate OPC servers are included in the scope of supply of the respective communication software
- Standardized, open multi-vendor interface
- It permits interfacing of OPC-capable Windows applications to S7-communication, open communication (SEND/RECEIVE), PROFINET and SNMP.
- OPC Scout with browser functionality as an OPC client and OCX Data Control



System integration with OPC server

G_1K10_XX 10103

SIMATIC Programming devices

Communications software

OPC server for Industrial Ethernet

Technical specifications		Ordering Data	Order No.
	OPC-Server for Industrial Ethernet	PN CBA OPC Server, 2007 Edition	
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.	PROFINET OPC server for CBA; runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2; Windows 2003 Server SP1, R2, SP2; Windows Vista Business/Ultimate; German/English	
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	- Single license for 1 installation B3 - Software Update Service for 1 year, with automatic extension; requirement: Current software version - Upgrade from Edition 2006 to Edition 2007, single license B3 - Upgrade from V6.0 to Edition 2007, single license B3	6GK1 706-0HB70-3AA0 6GK1 706-0HB00-3AL0 6GK1 706-0HB00-3AE0 6GK1 706-0HB00-3AE1
Products	include OPC servers for:	SNMP OPC Server 2007 Edition	
Industrial Ethernet	S7-1613, SOFTNET-S7 for Industrial Ethernet, SOFTNET-S7 Lean	Including MIB compiler; single license for 1 installation of the runtime software, software and electronic manual on CD-ROM; license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2; Windows 2003 Server SP1, R2, SP2; Windows Vista Business/Ultimate; German/English	
PROFINET	- SOFTNET PN IO - PN CBA OPC server	Basic 2007 B3 - Administration of up to 20 IP addresses; Single license for 1 installation - Upgrade from Edition 2006 to Edition 2007, single license B3 - Upgrade from V6.0 to Edition 2007, single license B3 Extended 2007 B3 - Administration of up to 200 IP addresses - Upgrade from Edition 2006 to Edition 2007, single license B3 - Upgrade from V6.0 to Edition 2007, single license B3 Power Pack 2007; B3 - upgrade from SNMP OPC Server Basic to SNMP OPC Server Extended 2007 Edition	6GK1 706-1NW70-3AA0 6GK1 706-1NW00-3AE0 6GK1 706-1NW00-3AE1 6GK1 706-1NX70-3AA0 6GK1 706-1NX00-3AE0 6GK1 706-1NX00-3AE1 6GK1 706-1NW70-3AC0
PROFIBUS	- DP-5613, SOFTNET-DP, SOFTNET-DP slave - FMS-5613	- DP-OPC server for PROFIBUS DP communication; XML-DA - FMS-OPC server for PROFIBUS FMS communication; XML-DA	

1) also S5-compatible communication

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

Overview

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System integration with the PN CBA OPC server

SIMATIC Programming devices

Communications software

PN CBA OPC server

Technical specifications		Ordering Data	Order No.
	PN CBA OPC server	PN CBA OPC Server, 2007 Edition	
Programming	• Open and standardized • Synchronous and asynchronous reading and writing of variables • Monitoring of variables by the OPC server with an alarm message to the client in the case of a change • Use of batch operations, so a large volume of data can be processed in a short time	PROFINET OPC server for CBA; runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2, Windows 2003 Server SP1, R2, SP2, Windows Vista Business/Ultimate; German/English	
Interfaces	• Custom Interface (C++, .NET) • Automation Interface (Visual Basic, Excel, Access,...) • OPC Data Control • OPC XML Interface for Data Access	• Single license for 1 installation B3 • Software Update Service for 1 year, with automatic extension; requirement: Current software version	6GK1 706-0HB70-3AA0 6GK1 706-0HB00-3AL0
Protocols	• DCOM protocol	• Upgrade of PN CBA OPC Server B3 from V6.4 to PN CBA OPC Server 2007 Edition	6GK1 706-0HB00-3AE0
Configuration	Configuring software for PROFINET SIMATIC iMap	• Upgrade of PN CBA OPC Server B3 from V6.0, V6.1, V6.2 or V6.3 to PN CBA OPC Server 2007 Edition	6GK1 706-0HB00-3AE1
PROFINET communication (CBA)		Software iMap V3.0	
• Number of communication partners	max. 228	for configuring PROFINET CBA	
• Number of connections	max. 10,000	<i>Requirement:</i> 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 <i>Type of supply:</i> German, English with electronic documentation	
		• Single license B3 • Software Update Service B3 • Upgrade to V3.0, single license B3	6ES7 820-0CC04-0YA5 6ES7 820-0CC01-0YX2 6ES7 820-0CC04-0YE5

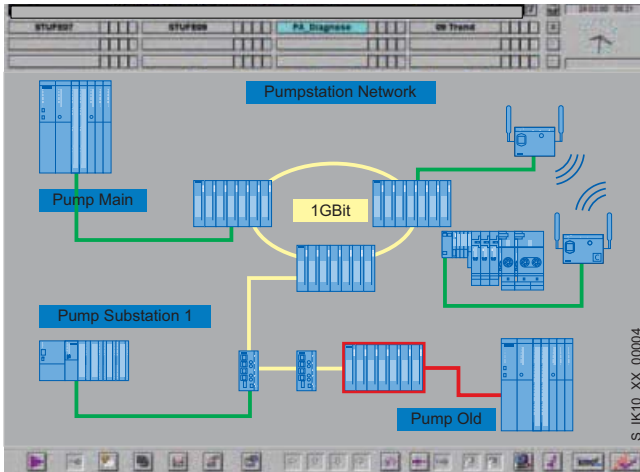
B3: Subject to export regulations: AL: N and ECCN: 5D992B1

SIMATIC Programming devices

Communications software

SNMP OPC server

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 2007 Edition

Including MIB compiler; single license for 1 installation of the runtime software, software and electronic manual on CD-ROM; license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2, Windows 2003 Server SP1, R2, SP2, Windows Vista Business/Ultimate; German/English

• Basic 2007	B3	6GK1 706-1NW70-3AA0
Administration of up to 20 IP addresses; Single license for 1 installation		
- Upgrade of SNMP OPC Server Basic from V6.4 to SNMP OPC Server Basic 2007 Edition	B3	6GK1 706-1NW00-3AE0
- Upgrade of SNMP OPC Server Basic from V6.0, V6.1, V6.2 or V6.3 to SNMP OPC Server Basic 2007 Edition	B3	6GK1 706-1NW00-3AE1
• Extended 2007	B3	6GK1 706-1NX70-3AA0
Administration of up to 200 IP addresses		
- Upgrade of SNMP OPC Server Extended from V6.4 to SNMP OPC Server Extended 2007 Edition	B3	6GK1 706-1NX00-3AE0
- Upgrade of SNMP OPC Server Extended from V6.0, V6.1, V6.2 or V6.3 to SNMP OPC Server Extended 2007 Edition	B3	6GK1 706-1NX00-3AE1
• Power Pack 2007;	B3	6GK1 706-1NW70-3AC0
upgrade from SNM OPC Server Basic to SNM OPC Server Extended 2007 Edition		

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

Embedded/ PC-based Automation



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Introduction

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SIMATIC Embedded Automation

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Introduction

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SIMATIC S7-modular
Embedded Controller

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SIMATIC Microbox 427B-RTX,
-HMI/RTX

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SIMATIC Panel PC 477B-HMI, -RTX,
-HMI/RTX

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SIMATIC MP 177

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SIMATIC MP 277 (incl. INOX)

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SIMATIC MP 377

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SIMATIC WinAC MP

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Logic Control

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SIMATIC PC-based Controller

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SIMATIC WinAC Software PLC

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SIMATIC WinAC ODK

Brochures

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

[http://www.siemens.com/simatic/
printmaterial](http://www.siemens.com/simatic/printmaterial)

Embedded/PC-based Automation

Introduction

Embedded/PC-based Automation

Overview

Why PC-based Automation or Embedded Automation?



The PC is a unique success story, and many areas of everyday life are unimaginable without it. PC know-how is taken for granted today and, with the PC, standards (hardware components, operating system, user interfaces, communication etc.) have been created that are interesting for more and more areas of application thanks to their constantly growing performance – and their fall in price.

In automation, too, a small number of PC applications – for visualization purposes in particular – have become the basis in the meantime for large applications for complex tasks.

This has basically been promoted by two aspects:

- The PC offers new opportunities with regard to flexibility, cost reduction and the reduction of time-to-market – backed by considerable increases in performance.
- The PC technologies create on one hand new areas of application in a standardized environment and permit on the other hand the simple connection of such PC-based solutions to the office world.

Automation solutions based on these technologies thus lead to the integration of all important components (visualization, logic control, motion control, distributed I/O, IT integration etc.) either as a PC-based Automation System or as an Embedded Automation System, linking the capabilities of the classic PLC world with the openness and performance of the PC world.

SIMATIC Embedded Automation

In the past few years it has become possible to create a new class of embedded PCs thanks to the rapid progress of PC technology. Here, technologies are used that raise the ruggedness of such devices to a new level. A modern embedded PC no longer requires a fan thanks to new, low-power processors and an appropriate enclosure design.

Furthermore, rotating mass storage units are no longer required as the conventional hard disk is replaced by a flash memory card. Extremely compact, powerful and rugged embedded automation systems for use at machine level can then be produced based on a compact embedded operating system (XPe) and in association with software PLCs, visualization software and technology or motion control functions. SIMATIC Embedded Automation offers a further customer benefit in that the logic control and visualization functions are pre-installed ready to run in the relevant versions. This enables time savings in engineering/commissioning your applications. Technology and motion control functions can also be added later.

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

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

Embedded/PC-based Automation

SIMATIC Embedded Automation

Introduction

Overview



An embedded PC or an embedded device is combined with automation software (e.g. Software PLC, HMI system, etc.) as a ready-to-use product.

Windows XP Embedded or Windows CE are used as operating system.

SIMATIC Embedded Automation comprises:

- Controller
- Technology
- Visualization
- Data processing
- Communication

on a common embedded PC platform.

S7-mEC, EC31-RTX

SIMATIC S7-mEC is a modular controller in S7-300 design with the latest embedded PC technology. The embedded controller combines the advantages of the tried and tested modular S7 controller with PC technology in one new device.

SIMATIC S7-mEC RTX stands out due to:

- Maximum ruggedness without fan or hard disk
- Modular expansion options, e.g. central expansion with S7-300 I/O
- Commissioning by specialist automation personnel as with the S7-300
- SIMATIC WinAC RTX already installed as software PLC.

Microbox 427B-RTX and Microbox 427B-HMI/RTX

Microbox 427B-RTX or Microbox 427B-HMI/RTX are ready-to-run combined embedded PCs with WinAC RTX and optionally with SIMATIC WinCC flexible.

The combination links the openness of PC-based controllers with the ruggedness of a conventional PLC: Flexible software and powerful, scalable hardware in an open, compact network.

An automation system is thus available to users with which strict real-time automation tasks and superior visualization tasks can be handled on a compact and rugged platform. In addition, this platform offers flexibility and effective integration into the overall task. This includes the close link with data processing or logistics systems as well as the link to technological tasks such as motion or vision systems. Windows XP Embedded is used as the operating system.

Panel PC 477B-HMI, Panel PC 477B-RTX and Panel PC 477B-HMI/RTX

The Panel PC 477B-HMI contains a preinstalled runtime of the WinCC flexible HMI software.

The Panel PC 477B-RTX includes the high-performance control software, preinstalled and preconfigured for PROFIBUS or PROFINET.

The Panel PC 477B-HMI/RTX includes both software installations.

Both panels are available in 12", 15" and 19" front versions either with touch or key functionality. With its compact design, the Panel PC 477B-HMI and 477B-HMI/RTX is the ideal combination of control and HMI functionality on one platform and also offers the openness of a PC-based system.

Multi Panels MP 177, MP 277 and MP 377 with WinAC MP

- Multi Panels (MP) are – like Operator Panels – used to control and monitor machines on site.
- Their functionality can be expanded by the installation of additional Windows CE applications (Software PLC and Sm@rt options).
- The SIMATIC Multi Panels on the basis of Windows CE combine the rugged construction of operator panels with the flexibility of PCs.
- With the SIMATIC Multi Panels, the data in the message buffer are retained even when the panel is disconnected from the power supply, without battery backup.

Embedded/PC-based Automation

SIMATIC Embedded Automation

SIMATIC S7-modular Embedded Controller

Overview



- Quick start in automation solutions with embedded PC platforms.
 - SIMATIC WinAC RTX pre-installed ready to use on EC31
 - Pre-configured for use in a SIMATIC environment with PROFINET and Industrial Ethernet
 - Commissioning by specialist automation personnel as with the S7-300
 - Configuration and programming with SIMATIC STEP 7 via Industrial Ethernet
- Modular expansion options, e.g. central expansion with S7 300 I/O (SM modules of the S7-300)
- Rugged operation
 - Operation without hard disk, based on flash disk and Windows XP embedded
 - Operation without fan
- Flexibility of a PC-based automation environment
 - Spare memory capacity on flash disk can be used for further PC applications
 - Use of WinAC ODK with SIMATIC WinAC RTX
 - Connection option for USB devices
- Data retention for WinAC RTX without uninterruptible power supply (UPS)

Ordering Data

Order No.

SIMATIC S7-modular Embedded Controller

EC31

B3

6ES7 677-1DD00-0BA0

1.2 GHz Intel CoreDuo processor
 Memory configuration:
 1 GB RAM, 2 GB flash disk;
 Interfaces:
 1 Industrial Ethernet port,
 2 PROFINET ports, 2 USB ports,
 1 slot for multimedia card;
 Software:
 Windows XP embedded pre-
 installed, Software Development
 Kit (SDK) for creating C/C++
 applications with access to
 central I/O modules

EC31-RTX

B3

6ES7 677-1DD00-0BB0

1.2 GHz Intel CoreDuo processor
 Memory configuration:
 1 GB RAM, 2 GB flash disk;
 Interfaces:
 1 Industrial Ethernet port,
 2 PROFINET ports, 2 USB ports,
 1 slot for multimedia card;
 Software:
 Windows XP embedded and
 WinAC RTX 2008 pre-installed

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

Embedded/PC-based Automation

SIMATIC Embedded Automation

SIMATIC Microbox 427B-RTX, -HMI/RTX

Overview



- Quick start in automation solutions with embedded PC platforms.
 - SIMATIC WinAC RTX ready-to-run preinstalled on Microbox PC 427B
 - PROFIBUS, PROFINET and Industrial Ethernet pre-configured for use in a SIMATIC environment
 - Optionally WinCC flexible for visualization tasks
 - Configuration and programming with SIMATIC STEP 7 via Industrial Ethernet, PROFINET, or PROFIBUS
- Rugged operation
 - Operation without hard disk based on Compact-Flash-Card (CF-Card) and Windows XP embedded
 - Fanless operation
- Flexibility of a PC-based automation environment
 - Freer storage space on CF-Card useable for further PC applications
 - Use of WinAC ODK with SIMATIC WinAC RTX
 - Connection option for USB devices, flat panel monitor or screen
 - PCI 104 cards pluggable
- 128 KB remanent data for WinAC RTX even without uninterruptible power supply (UPS)

New

- Versions with integrated PROFINET interface available
- Current product versions of the pre-installed software:
 - SIMATIC WinAC RTX 2008
 - SIMATIC WinCC flexible 2008
 - SIMATIC Net Edition 2007

Technical specifications

6ES7 675-1C..0-0..0	
Product status	
Hardware product status	1
PC configuration	
Computer platform	SIMATIC Microbox PC 427B
Processor selection	Celeron M 900MHz, 512MB RAM; optional: Celeron M 1.0 GHz, 1 GB RAM; Pentium M 1.4 GHz, 1 GB RAM
Main memory	See processor options
Compact Flash	2 GB; optional: 4 GB
Operating systems	Windows XP embedded SP2
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	2.5 A; max. at 24 V
Supply voltages	
Power supply and voltage jumpering	
• Mains/voltage failure jumpering	5 ms; For details, see Microbox PC 427B
Current consumption/power loss	
Power consumption	
• Power consumption, max.	61 W; For details, see Microbox PC 427B

6ES7 675-1C..0-0..0	
Installed software	
Visualization	Optional: SIMATIC WinCC flexible 2007 RT incl. recipes and archives
Control	SIMATIC WinAC RTX 2005 incl. SP2 incl. SIMATIC SOFTNET-S7 Lean Edition 2006
Communication	Yes
Status information/alarms/diagnostics	
Diagnoses	
• Diagnostic functions	Yes; PWR-LED; WD LED; SF and RUN/STOP LED for SIMATIC
Environmental requirements	
Operating temperature	
• min.	0 °C; For details, see Microbox PC 427B
• max.	50 °C; For details, see Microbox PC 427B
Storage/transport temperature	
• min.	-20 °C; For details, see Microbox PC 427B
• max.	60 °C; For details, see Microbox PC 427B
Vibrations	
• Vibrations	For details, see Microbox PC 427B
Shock test	
• Impact test	For details, see Microbox PC 427B

Embedded/PC-based Automation

SIMATIC Embedded Automation

SIMATIC Microbox 427B-RTX, -HMI/RTX

Technical specifications (continued)

6ES7 675-1C..0-0..0	
Degree of protection	
IP 20	Yes; For details, see Microbox PC 427B
Standards, approvals, certificates	
CE symbol	Yes; For details, see Microbox PC 427B
cULus	Yes; For details, see Microbox PC 427B
Dimensions	
Dimensions	
• Width	262 mm
• Height	133 mm
• Depth	47 mm; Without PC104 expansion rack
Weights	
• Weight	2 kg

Ordering Data

Order No.

SIMATIC Microbox 427B-RTX, - B3 HMI/RTX and -HMI

6ES7 675-1C ■ ■ 0-0 ■ ■ 0

CPU:

Celeron M, 900 MHz, PROFIBUS, 512 MB RAM

B 2

Celeron M, 1 GHz, PROFIBUS, 1 GB RAM

F 3

Celeron M, 1 GHz, PROFINET, 1 GB RAM

G 3

Pentium M, 1.4 GHz, PROFIBUS, 1 GB RAM

K 3

Pentium M, 1.4 GHz, PROFINET, 1 GB RAM

L 3

Mass storage:

2 GB CompactFlash, Windows XP embedded and preinstalled software

C

4 GB CompactFlash, Windows XP embedded and preinstalled software

D

Software configuration:

WinAC RTX 2008

B

WinCC flexible 2008 RT 128 PT

C

WinCC flexible 2008 RT 512 PT

D

WinCC flexible 2008 RT 2048 PT

E

WinAC RTX 2008,
WinCC flexible 2007 RT 128 PT

F

WinAC RTX 2008,
WinCC flexible 2007 RT 512 PT

G

WinAC RTX 2008,
WinCC flexible 2007 RT 2048 PT

H

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

Embedded/PC-based Automation

SIMATIC Embedded Automation

SIMATIC Panel PC 477B-HMI, -RTX, -HMI/RTX

Overview

SIMATIC Panel PC 477B-HMI, 477B-RTX and 477B-HMI/RTX



- Quick start in automation solutions with Embedded Automation
 - SIMATIC WinCC flexible RT preinstalled and ready to switch on (Panel PC 477B HMI) or SIMATIC WinCC flexible and SIMATIC WinAC RTX preinstalled and ready to switch on (Panel PC 477B HMI/RTX)
 - PROFIBUS and Industrial Ethernet pre-configured for use in a SIMATIC environment
 - Configuration and programming with SIMATIC WinCC flexible ES and SIMATIC STEP 7 via Industrial Ethernet or PROFIBUS
- Rugged operation
 - Hard-disk-free operation based on Compact Flash card (from 2 GB CF card) and Windows XP embedded
 - Operation without fan
- Flexibility of a PC-based automation environment
 - Open for additional PC applications
 - Can be expanded with PC/104+ cards
 - Connection option for USB devices, flat panel monitor or screen
 - Use of WinAC ODK with SIMATIC WinAC RTX
 - Data retention for WinAC RTX without uninterruptible power supply (UPS)

Technical specifications

6ES7 676 and 6AV7 85	
General features	
Processor	Intel Pentium M technology; Intel Celeron M 1.0 GHz, Intel Pentium M 1.4 GHz
Memory type	DDR2-RAM
Main memory	1 GB, 2 GB
Free slots	3 x PC/104 (over spec. expansion frame)
Operating system	Windows XP Embedded
Additional OS information	Language: EN/DE
SIMATIC Software	Optional with pre-installed bundle software SIMATIC WinCC flexible or WinCC flexible/WinAC RTX
Drives	
Floppy drive	Optional via external USB floppy drive
Optical drives	Possible as external drive via USB
Hard disk/mass storage	Compact Flash Drive with 2 GB or 4 GB
Interfaces	
Graphics interface	DVI-I can be used for additional display device (only VGA via adapter); color depth 32 bits, graphics memory up to 128 MB, resolution based on integrated display
Connection for keyboard/mouse	USB / USB
Serial interface	COM1: 1 x V.24 (RS232)
PROFIBUS/MPI	Onboard, floating, max. 12 Mbit/s, no plug-in card required, CP 5611-compatible, not retrofittable
PROFINET	3 x RJ45, CP1616-compatible; not retrofittable

6ES7 676 and 6AV7 85	
USB	1x on front, 4x on reverse, USB 2.0 (500mA)
Ethernet	Onboard, 2 x 10/100/1000 Mbit (RJ45 with/without PROFIBUS), 1 x 10/100/1000 Mbit (RJ45 with PROFIBUS), no plug-in card required
Multimedia	No
Supply voltage	
Supply voltage	24 V DC
Monitoring functions	
Temperature	Yes
Watchdog	Yes
Status LEDs	Yes (rear side)
Front side according to EN 60529	IP65 (front side) according to EN 60529 and NEMA4
Ambient conditions	
Vibration load during operation	Tested according to DIN IEC 60068-2-6: 10 - 58 Hz: 0.075 mm, 58 to 200 Hz: 9.8 m/s ² (1 g)
Shock loading during operation	Tested according to DIN IEC 60068-2-7: 50 m/s ² (5 g), 30 ms, 100 shocks
Relative humidity	Tested according to DIN IEC 60068-78, DIN IEC 68-2-30: 5% to 80% at 25 °C (no condensation)
Maximum permissible installation angle +/-	30° over vertical
Ambient temperature during operation	+5 °C to +50 °C in maximum configuration; no fan
Certifications & standards	
Approvals	CE, cULus(508)
EMC	CE, 55022A, EN 61000-6-4, EN 61000-6-2

Embedded/PC-based Automation

SIMATIC Embedded Automation

SIMATIC Panel PC 477B-HMI, -RTX, -HMI/RTX

Technical specifications (continued)

	6ES7 676-1 6AV7 851	6ES7 676-2 6AV7 852	6ES7 676-3 6AV7 853	6ES7 676-4 6AV7 854	6ES7 676-6 6AV7 856
Front panel	12" TFT Touch	12" TFT Key	15" TFT Touch	15" TFT Key	19" TFT Touch
Display					
Resolution (W x H in pixels)	800 x 600	800 x 600	1024 x 768	1024 x 768	1280 x 1024
MTBF backlit display (at 25 °C)	50000 h at 24 h continuous operation, temperature- dependent	50000 h at 24 h continuous operation, temperature- dependent	50000 h at 24 h continuous operation, temperature- dependent	50000 h at 24 h continuous operation, temperature- dependent	50000 h at 24 h continuous operation, temperature- dependent
Type of operation					
Function keys	No	36	No	36	No
Alphanumeric keyboard	No	Yes	No	Yes	No
Touch screen (analog/resistive)	Yes	No	Yes	No	Yes
Mouse on the front	No	Yes	No	Yes	No
Design					
Centralized configura- tion	Yes	Yes	Yes	Yes	Yes
Distributed configura- tion	No	No	No	No	No
Dimensions					
Mounting dimensions of the centralized configuration (W x H x D, without optical drive) in mm	368 x 290 x 75	450 x 290 x 75	450 x 290 x 75	450 x 321 x 75	450 x 380 x 88
Operator control unit (W x H) in mm	400 x 310 (7 HU)	483 x 310 (19", 7 HU)	483 x 310 (19", 7 HU)	483 x 355 (19", 8 HU)	483 x 400 (19", 9 HU)
Weights					
Panel PC in a centralized configura- tion approx.	7.3 kg	7.7 kg	8.3 kg	8.7 kg	14.3 kg
General features					
Accessories	Touch cover foil	Keyboard slide-in labels	Touch cover foil	Keyboard slide-in labels	Touch cover foil
Power loss in maximum configuration	24 V DC: max. 70 W (contains 3 W per slot)	24 V DC: max. 70 W (contains 3 W per slot)	24 V DC: max. 70 W (contains 3 W per slot)	24 V DC: max. 70 W (contains 3 W per slot)	24 V DC: max. 90 W, (contains 3 W per slot)

Embedded/PC-based Automation

SIMATIC Embedded Automation

SIMATIC Panel PC 477B-HMI, -RTX, -HMI/RTX

Ordering Data (continued)

Order No.

Further Panel PCs as build to order versions

(max. delivery time 15 working days)

SIMATIC Panel PC 477B embedded	B3	6AV7 85 -0A - - A0	
24 V DC power supply			
Software packages			
With Windows XP embedded operating system (EN/DE) preinstalled			
• With CF card 2 GB		3 B	
• With CF card 4 GB		4 B	
With operating system and RTX, Windows XP embedded (EN/DE) preinstalled, WinAC RTX preinstalled and preconfigured for PROFIBUS (DP) or PROFINET (PN)			
• With CF card 2 GB		3	
• With CF card 4 GB		4	
• WinAC RTX (DP) configured for PROFIBUS			C
• WinAC RTX (PN) configured for PROFINET			K
With operating system and HMI, Windows XP embedded preinstalled, WinCC flexible RT (incl. archives/recipes) preinstalled			
• With CF card 2 GB		3	
• With CF card 4 GB		4	
• Number of tags 128 PT			D
• Number of tags 512 PT			E
• Number of tags 2048 PT			F
With operating system and HMI/RTX (DP) Windows XP embedded preinstalled, WinCC flexible RT (incl. Archives/Recipes) preinstalled, WinAC RTX preinstalled and configured for PROFIBUS			
• With CF card 2 GB		3	
• With CF card 4 GB		4	
• Number of tags 128 PT			G
• Number of tags 512 PT			H
• Number of tags 2048 PT			J
• With operating system and HMI/RTX (PN), Windows XP embedded preinstalled, WinCC flexible RT (incl. Archives/Recipes) preinstalled, WinAC RTX preinstalled and configured for PROFINET			
• With CF card 2 GB		3	
• With CF card 4 GB		4	
• Number of tags 128 PT			L
• Number of tags 512 PT			M
• Number of tags 2048 PT			N

Order No.

Accessories

Cover foil for

Panel PCs 477/577/677/877

For protecting the touch screen against dirt/scratches

- for 12" Touch
- for 15" Touch
- for 19" Touch

6AV7 671-2BA00-0AA0

6AV7 671-4BA00-0AA0

6AV7 672-1CE00-0AA0

Labeling foil for

Panel PCs 477/577/677/877

For labeling softkeys and function keys, blank, supplied in sets of 10

6AV7 672-0DA00-0AA0

Touch pen

B7

6AV7 672-1JB00-0AA0

Undetachable pen for operation of the touch devices, mounting of the support on the control cabinet

Expansion components

SIMATIC PC/PG DiagMonitor V3.1

B8

6ES7 648-6CA03-1YX0

Software tool for monitoring SIMATIC PCs, incl. manual, on CD-ROM (German/English)

SIMATIC PC/PG

Image & Partition Creator

B8

6ES7 648-6AA04-0YX0

Software tool for data backup and hard-disk partitioning for SIMATIC PCs, incl. manual, on CD-ROM (Ger/En/Fr/Sp/It)

SIMATIC PC USB FlashDrive

B7

6ES7 648-0DC30-0AA0

1 GB, USB 2.0, metal enclosure, bootable

3.5" disk drive, USB

B7

6FC5 235-0AA05-1AA2

With 1 m connecting cable

Industrial USB Hub 4

B7

6AV6 671-3AH00-0AX0

4 x USB 2.0, IP65 for control cabinet door or DIN rail

Compact Flash Card

- 2 GB

B7

6ES7 648-2BF01-0XF0

- 4 GB

B7

6ES7 648-2BF01-0XG0

Expansion kit PC/104

B7

6AG4 070-0BA00-0XA0

For integration of PC/104 modules (packing unit contains 6 expansion frames)

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

B7: Subject to export regulations: AL: N and ECCN: EAR99H

B8: Subject to export regulations: AL: N and ECCN: EAR99S

Please note:

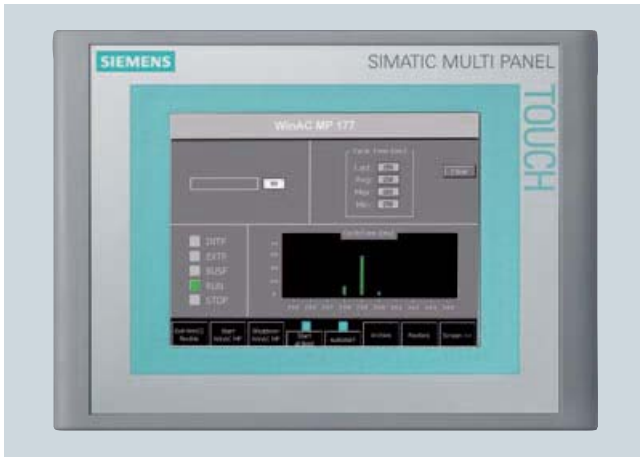
The scope of supply of the Panel PC 477B mainly comprises the Panel PC and a software pack that contains the CompactFlash card with preinstalled and configured software as well as all the necessary license keys. After the CompactFlash card has been inserted in the (internal) slot provided, the unit is ready for switching on

Embedded/PC-based Automation

SIMATIC Embedded Automation

SIMATIC MP 177

Overview



- Like operator panels, Multi Panels (MP) are used for local machine operation and monitoring
- Message buffer contents and residual WinAC MP data are retained even when panel is disconnected, without batteries
- PLC functionality can be integrated directly into the MP 177 platform as an option
- The multi panel can be expanded with the options Sm@rtService and Sm@rtAccess
- Pixel-graphics 5.7" TFT display, color (64k colors)
- All interfaces, e.g. MPI, PROFIBUS DP, USB, PROFINET (Ethernet TCP/IP), are on-board

The MP 177 6" Touch can also be delivered as a package, complete with a WinAC MP 177. WinCC flexible 2008 or higher is required for configuring the MP 177.

Technical specifications

MP 177	6" Touch
Supply voltage	
Supply voltage	24 V DC
permissible range	+19.2 V to +28.8 V DC
Memory	
Type of storage	
Type	Flash / RAM
Memory usable for project data/Options	2 MB usable memory for user data
Time	
Clock	
• Type	Hardware clock, battery backed, Synchronizable
Configuration	
Configuration tool	WinCC flexible Standard Version 2008 or higher (to be ordered separately)
Display	
Display type	TFT, 65536 Colors
Size	5.7"
Resolution (WxH in pixel)	320 x 240
MTBF backlighting (at 25 °C)	about 50,000 hours
Operating mode	
Operating elements	Touch screen
Touchscreen	analog, resistive
Numeric/alphabetical input	Yes (on-screen keyboard) / Yes (on-screen keyboard)
Connection for mouse/keyboard/barcode reader	USB / USB / USB
EMC	
• Emission of radio interferences to EN 55 011 (limit class A)	Yes; EN 61000-6-4, interference emission: Intended for use in industrial areas.

MP 177	6" Touch
Ambient conditions	
Mounting position	Vertical
max. relative humidity (in %)	90%
Temperature	
• Operation	0 °C to +50 °C
• Transport, storage	-20 °C to +70 °C
Degree of protection	
Front	IP65, NEMA 4, NEMA 4x, NEMA 12 (when installed)
Rear	IP20
Certifications & Standards	
Certifications	CE, FM Class I Div. 2, cULus, C-TICK, NEMA 4, NEMA 4x, NEMA 12
I/O/Options	
I/O devices	Printer, barcode reader
Interfaces	
Interfaces	1 x RS422, 1 x RS485, 1 x Ethernet (RJ45) (max. 12 Mbit/s)
Multi Media Card slot	1 x Multi Media Card slot
USB	1 x USB
Ethernet	1 x Ethernet (RJ45)
Operating systems	
Operating system	Windows CE (Version 5)
Processor	
Processor	RISC 32-bit, 520 MHz
Functionality under WinCC flexible	
Applications/options	Soft PLC, Sm@rtService, Sm@rtAccess
Task planner	Yes
Help system	Yes
Status/control	with SIMATIC S7

Embedded/PC-based Automation

SIMATIC Embedded Automation

SIMATIC MP 177

Technical specifications (continued)

MP 177	6" Touch
Message system	
• Number of messages	2 000
• Bit messages	Yes
• Analog messages	Yes
• Message buffer	Ring buffer (n x 256 entries), retentive, maintenance-free
Recipes	
• Recipes	100
• Data records per recipe	200
• Entries per data record	200
• Recipe memory	32 kByte integrated Flash, expandable
Number of process images	
• Process images	500
• Variables	1 000
• Limit values	Yes
• Multiplexing	Yes
Image elements	
• Text objects	2,500 text elements
• Graphics object	Bit maps, icons, vector graphics
• dynamic objects	Diagrams, bar graphs, sliders, analog display, invisible buttons
Lists	
• Text lists	300
• Graphics list	100
• Libraries	Yes
Security	
• Number of user groups	50
• Passwords exportable	Yes
• Number of user rights	32

MP 177	6" Touch
Data medium support	
• Multi Media Card	Yes
Recording	
• Recording/Printing	Alarms, report (shift report), color print, hardcopy
• Printer driver	ESC/P2, PCL3/PCL6
Fonts	
• Keyboard fonts	US American (English)
Languages	
• Online languages	16
• 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
• Fonts	Tahoma, Courier New, WinCC flexible Standard, symbol languages, all freely scalable
Transfer (Upload/Download)	
• Transfer of configuration	MPI/PROFIBUS DP, serial, USB, Ethernet, automatic transfer recognition
Process coupling	
• Connection to controller	S7-200, S7- 300/400, TI 505, Win AC, SINUMERIK, SIMOTION, Allen Bradley (DF1), Allen Bradley (DF485), Mitsubishi (FX), OMRON (LINK/Multilink), Modicon (Modbus), for further non-Siemens drivers, see section on "System interfaces"
Dimensions	
Front of enclosure (W x H)	212 mm x 156 mm
Mounting cutout/Device depth (W x H/D) in mm	198 mm x 142 mm / 45 mm device depth
Dimensions	
Weights	
• Weight	0.85 kg

Embedded/PC-based Automation

SIMATIC Embedded Automation

SIMATIC MP 177

Ordering Data	Order No.	Order No.
SIMATIC HMI MP 177 6" Touch min. WinCC flexible 2008 necessary B1	6AV6 642-0EA01-3AX0	
SIMATIC MP 177 6" Touch package Consisting of: • SIMATIC MP 177 6" Touch • SIMATIC WinAC MP • Single License for WinAC MP 177 on USB stick¹⁾ • Electronic documentation for WinAC MP • Standard SD card 256 MB (empty) Configuration with SIMATIC WinCC flexible • WinCC flexible/Sm@rtAccess • WinCC flexible/Sm@rtService • WinAC MP/software PLC	on request	User Manual WinCC flexible Communication • German 6AV6 691-1CA01-3AA0 • English 6AV6 691-1CA01-3AB0 • French 6AV6 691-1CA01-3AC0 • Italian 6AV6 691-1CA01-3AD0 • Spanish 6AV6 691-1CA01-3AE0 SIMATIC HMI Manual Collection B8 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
Documentation (to be ordered separately)		
User manual MP 177 6" Touch • German 6AV6 691-1DP02-0AA0 • English 6AV6 691-1DP02-0AB0 • French 6AV6 691-1DP02-0AC0 • Italian 6AV6 691-1DP02-0AD0 • Spanish 6AV6 691-1DP02-0AE0		
WinCC flexible Compact/Standard/Advanced User Manual • German 6AV6 691-1AB01-3AA0 • English 6AV6 691-1AB01-3AB0 • French 6AV6 691-1AB01-3AC0 • Italian 6AV6 691-1AB01-3AD0 • Spanish 6AV6 691-1AB01-3AE0		
Accessories		
Accessories for supplementary ordering		see catalog ST 80

1) Can only be used for license handling

B1: Subject to export regulations: AL: N and ECCN: 5D002ENC3

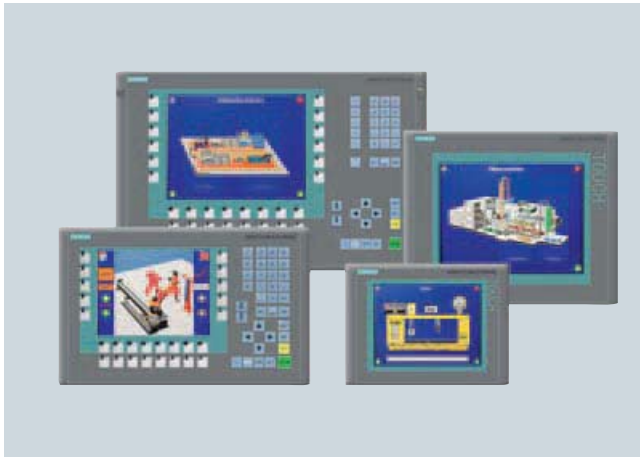
B8: Subject to export regulations: AL: N and ECCN: EAR99S

Embedded/PC-based Automation

SIMATIC Embedded Automation

SIMATIC MP 277 (incl. INOX)

Overview



- Like operator panels, Multi Panels (MP) are used for local machine operation and monitoring
- Content of message buffer is retained even when panel is disconnected, without batteries
- PLC functionality can be integrated directly into the MP277 platform with Option
- Their functionality can be expanded by the installation of additional Windows CE applications (Multi Panel and Panel options)
- SIMATIC MP 277 devices on the basis of Windows CE combine the rugged construction of Operator Panels with the flexibility of PCs
- Pixel-graphics 7.5" or 10.4" TFT display, color (64k colors)
- *MP 277 8" and MP 277 10" Touch:*
Touch screen (analog/resistive)
MP 277 8" Key:
38 system keys, 26 user-configurable and freely inscribable function keys (18 with LEDs)
MP 277 10" Key:
38 system keys, 36 user-configurable and freely inscribable function keys (28 with LEDs)
- The MP 277 is also available *with a stainless steel front panel*, and therefore meets the high requirements of, e.g., the food and beverage industry.
- All interfaces, e.g. MPI, PROFIBUS DP, USB, PROFINET (Ethernet TCP/IP), are onboard

Technical specifications

	8" Touch	10" Touch	8" Key	10" Key	10" Touch/INOX (with stainless steel front)
Supply voltage					
Supply voltage	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC
permissible range	+19.2 V to +28.8 V DC	+19.2 V to +28.8 V DC	+19.2 V to +28.8 V DC	+19.2 V to +28.8 V DC	+19.2 V to +28.8 V DC
Memory					
Type of storage					
Type	Flash / RAM	Flash / RAM	Flash / RAM	Flash / RAM	Flash / RAM
Memory usable for project data/Options	6 MB usable memory for user data	6 MB usable memory for user data	6 MB usable memory for user data	6 MB usable memory for user data	6 MB usable memory for user data
Time					
Clock					
• Type	Hardware clock, battery backed, Synchronizable	Hardware clock, battery backed, Synchronizable	Hardware clock, battery backed, Synchronizable	Hardware clock, battery backed, Synchronizable	Hardware clock, battery backed, Synchronizable
Configuration					
Configuration tool	WinCC flexible Standard Version 2005 SP1 or higher (to be ordered separately)	WinCC flexible Standard Version 2005 SP1 or higher (to be ordered separately)	WinCC flexible Standard Version 2005 SP1 or higher (to be ordered separately)	WinCC flexible Standard Version 2005 SP1 or higher (to be ordered separately)	WinCC flexible Standard Version 2005 SP1 or higher (to be ordered separately)
Display					
Display type	TFT, 65536 Colors	TFT, 65536 Colors	TFT, 65536 Colors	TFT, 65536 Colors	TFT, 65536 Colors
Size	7.5"	10.4"	7.5"	10.4"	10.4"
Resolution (WxH in pixel)	640 x 480	640 x 480	640 x 480	640 x 480	640 x 480
MTBF backlighting (at 25 °C)	about 50,000 hours	about 50,000 hours	about 50,000 hours	about 50,000 hours	about 50,000 hours
Operating mode					
Operating elements	Touch screen	Touch screen	Membrane keyboard	Membrane keyboard	Touch screen
Function keys, programmable			26 function keys, 26 with LEDs	36 function keys, 26 with LEDs	

Embedded/PC-based Automation

SIMATIC Embedded Automation

SIMATIC MP 277 (incl. INOX)

Technical specifications (continued)

	8" Touch	10" Touch	8" Key	10" Key	10" Touch/INOX (with stainless steel front)
System keys			36	36	
Touchscreen	analog, resistive	analog, resistive			analog, resistive
Numeric/alphabetical input	Yes / Yes	Yes / Yes	Yes / Yes	Yes / Yes	Yes / Yes
Connection for mouse/keyboard/barcode reader	USB / USB / USB	USB / USB / USB	USB / USB / USB	USB / USB / USB	USB / USB / USB
Ambient conditions					
Mounting position	Vertical	Vertical	Vertical	Vertical	Vertical
maximum permissible angle of inclination without external ventilation	+/- 35 °	+/- 35 °	+/- 35 °	+/- 35 °	+/- 35 °
max. relative humidity (in %)	90%	90%	90%	90%	90%
Temperature					
• Operation	0 °C to +50 °C	0 °C to +50 °C	0 °C to +50 °C	0 °C to +50 °C	0 °C to +50 °C
• Transport, storage	-20 °C to +60 °C	-20 °C to +60 °C	-20 °C to +60 °C	-20 °C to +60 °C	-20 °C to +60 °C
Degree of protection					
Front	IP65, NEMA 4x, (when installed)	IP65, NEMA 4x, (when installed)	IP65, NEMA 4x, (when installed)	IP65, NEMA 4x, (when installed)	IP66K, NEMA 4x, (when installed)
Rear	IP20	IP20	IP20	IP20	IP20
Certifications & Standards					
Certifications	CE, FM Class I Div. 2, UL, cULus, EX-Zone 22, NEMA 4x (Enclosure Type 4X, Type 12)	CE, FM Class I Div. 2, UL, cULus, EX-Zone 22, NEMA 4x (Enclosure Type 4X, Type 12)	CE, UL, cULus, NEMA 4x (Enclosure Type 4X, Type 12)	CE, FM Class I Div. 2, UL, cULus, EX-Zone 22, NEMA 4x (Enclosure Type 4X, Type 12)	CE, FM Class I Div. 2 (available soon), UL, CSA, cULus, EX-Zone 2 (available soon), EX-Zone 22 (available soon), NEMA 4x (Enclosure Type 4X, Type 12)
I/O/Options					
I/O devices	Printer, barcode reader	Printer, barcode reader	Printer, barcode reader	Printer, barcode reader	Printer, barcode reader
Type of output					
LED colors			Green	Green	
interfaces					
Interfaces	1 x RS422, 1 x RS485, 1 x Ethernet (RJ45)	1 x RS422, 1 x RS485, 1 x Ethernet (RJ45)	1 x RS422, 1 x RS485, 1 x Ethernet (RJ45)	1 x RS422, 1 x RS485, 1 x Ethernet (RJ45)	1 x RS422, 1 x RS485, 1 x Ethernet (RJ45)
Multi Media Card slot	1 x Multi Media Card slot	1 x Multi Media Card slot	1 x Multi Media Card slot	1 x Multi Media Card slot	1 x Multi Media Card slot
USB	2 x USB	2 x USB	2 x USB	2 x USB	2 x USB
Ethernet	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)
Operating systems					
Operating system	Windows CE	Windows CE	Windows CE	Windows CE	Windows CE
Processor					
Processor	ARM	ARM	ARM	ARM	ARM
Functionality under WinCC flexible					
Applications/options	ProAgent, Internet Explorer, Soft-PLC, Sm@rtService, Sm@rtAccess	ProAgent, Internet Explorer, Soft-PLC, Sm@rtService, Sm@rtAccess	ProAgent, Internet Explorer, Soft-PLC, Sm@rtService, Sm@rtAccess	ProAgent, Internet Explorer, Soft-PLC, Sm@rtService, Sm@rtAccess	ProAgent, Internet Explorer, Soft-PLC, Sm@rtService, Sm@rtAccess
Number of Visual Basic scripts	50	50	50	50	50
Task planner	Yes	Yes	Yes	Yes	Yes
Help system	Yes	Yes	Yes	Yes	Yes
Status/control	with SIMATIC S7	with SIMATIC S7	with SIMATIC S7	with SIMATIC S7	with SIMATIC S7

Embedded/PC-based Automation

SIMATIC Embedded Automation

SIMATIC MP 277 (incl. INOX)

Technical specifications (continued)

	8" Touch	10" Touch	8" Key	10" Key	10" Touch/INOX (with stainless steel front)
Message system					
• Number of messages	4 000	4 000	4 000	4 000	4 000
• Bit messages	Yes	Yes	Yes	Yes	Yes
• Analog messages	Yes	Yes	Yes	Yes	Yes
• Message buffer	Ring buffer (n x 512 entries), retentive, maintenance-free	Ring buffer (n x 512 entries), retentive, maintenance-free	Ring buffer (n x 512 entries), retentive, maintenance-free	Ring buffer (n x 512 entries), retentive, maintenance-free	Ring buffer (n x 512 entries), retentive, maintenance-free
Recipes					
• Recipes	300	300	300	300	300
• Data records per recipe	500	500	500	500	500
• Entries per data record	1000	1000	1000	1000	1000
• Recipe memory	64 kByte integrated Flash, expandable	64 kByte integrated Flash, expandable	64 kByte integrated Flash, expandable	64 kByte integrated Flash, expandable	64 kByte integrated Flash, expandable
Number of process images					
• Process images	500	500	500	500	500
• Variables	2 048	2 048	2 048	2 048	2 048
• Limit values	Yes	Yes	Yes	Yes	Yes
• Multiplexing	Yes	Yes	Yes	Yes	Yes
Image elements					
• Text objects	10,000 text elements	10,000 text elements	10,000 text elements	10,000 text elements	10,000 text elements
• Graphics object	Bit maps, icons, vector graphics	Bit maps, icons, vector graphics	Bit maps, icons, vector graphics	Bit maps, icons, vector graphics	Bit maps, icons, vector graphics
• dynamic objects	Diagrams, bar graphs, sliders, analog display, invisible buttons	Diagrams, bar graphs, sliders, analog display, invisible buttons	Diagrams, bar graphs, sliders, analog display, invisible buttons	Diagrams, bar graphs, sliders, analog display, invisible buttons	Diagrams, bar graphs, sliders, analog display, invisible buttons
Lists					
• Text lists	500	500	500	500	500
• Graphics list	400	400	400	400	400
• Libraries	Yes	Yes	Yes	Yes	Yes
Archiving					
• Number of archives per project	20	20	20	20	20
• Number of measuring points per project	20	20	20	20	20
• Number of entries per archive	10 000	10 000	10 000	10 000	10 000
• Memory location	SD and Multi Media Card	SD and Multi Media Card	SD and Multi Media Card	SD and Multi Media Card	SD and Multi Media Card
Security					
• Number of user groups	50	50	50	50	50
• Passwords exportable	Yes	Yes	Yes	Yes	Yes
• Number of user rights	32	32	32	32	32
Data medium support					
• Multi Media Card	Yes	Yes	Yes	Yes	Yes
Recording					
• Recording/Printing	Alarms, report (shift report), color print, hardcopy	Alarms, report (shift report), color print, hardcopy	Alarms, report (shift report), color print, hardcopy	Alarms, report (shift report), color print, hardcopy	Alarms, report (shift report), color print, hardcopy
Fonts					
• Keyboard fonts	US American (English)	US American (English)	US American (English)	US American (English)	US American (English)

Embedded/PC-based Automation

SIMATIC Embedded Automation

SIMATIC MP 277 (incl. INOX)

Technical specifications (continued)

	8" Touch	10" Touch	8" Key	10" Key	10" Touch/INOX (with stainless steel front)
Languages					
• Online languages	16	16	16	16	16
• 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	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, WinCC flexible Standard, symbol languages, all freely scalable	Tahoma, Arial, Courier New, WinCC flexible Standard, symbol languages, all freely scalable	Tahoma, Arial, Courier New, WinCC flexible Standard, symbol languages, all freely scalable	Tahoma, Arial, Courier New, WinCC flexible Standard, symbol languages, all freely scalable	Tahoma, Arial, Courier New, WinCC flexible Standard, symbol languages, all freely scalable
Transfer (Upload/Download)					
• Transfer of configuration	MPI/PROFIBUS DP, USB, Ethernet, automatic transfer recognition	MPI/PROFIBUS DP, USB, Ethernet, automatic transfer recognition	MPI/PROFIBUS DP, USB, Ethernet, automatic transfer recognition	MPI/PROFIBUS DP, USB, Ethernet, automatic transfer recognition	MPI/PROFIBUS DP, USB, Ethernet, automatic transfer recognition
Process coupling					
• Connection to controller	S5, S7-200, S7- 300/400, TI 505, SINUMERIK, SIMOTION, Allen Bradley (DF1), Allen Bradley (DF485), Mitsubishi (FX), OMRON (LINK/Multilink), Modicon (Modbus) see section on "System interfaces"	S5, S7-200, S7- 300/400, TI 505, SINUMERIK, SIMOTION, Allen Bradley (DF1), Allen Bradley (DF485), Mitsubishi (FX), OMRON (LINK/Multilink), Modicon (Modbus) see section on "System interfaces"	S5, S7-200, S7- 300/400, TI 505, SINUMERIK, SIMOTION, Allen Bradley (DF1), Allen Bradley (DF485), Mitsubishi (FX), OMRON (LINK/Multilink), Modicon (Modbus) see section on "System interfaces"	S5, S7-200, S7- 300/400, TI 505, SINUMERIK, SIMOTION, Allen Bradley (DF1), Allen Bradley (DF485), Mitsubishi (FX), OMRON (LINK/Multilink), Modicon (Modbus) see section on "System interfaces"	S5, S7-200, S7- 300/400, TI 505, SINUMERIK, SIMOTION, Allen Bradley (DF1), Allen Bradley (DF485), Mitsubishi (FX), OMRON (LINK/Multilink), Modicon (Modbus) see section on "System interfaces"
Expandability/openness					
• Open Platform Program	Yes	Yes	Yes	Yes	Yes
Dimensions					
Front of enclosure (W x H)	240 mm x 180 mm	325 mm x 263 mm	352 mm x 221 mm	483 mm x 310 mm	325 mm x 263 mm
Mounting cutout/Device depth (W x H/D) in mm	226 mm x 166 mm / 60 mm device depth	310 mm x 248 mm / 61 mm device depth	338 mm x 206 mm / 61 mm device depth	434 mm x 291 mm / 60 mm device depth	310 mm x 248 mm / 61 mm device depth
Dimensions					
Weights					
• Weight	1.61 kg	2.65 kg	2.25 kg	4.95 kg	4.2 kg

Embedded/PC-based Automation

SIMATIC Embedded Automation

SIMATIC MP 277 (incl. INOX)

Ordering Data	Order No.		Order No.	
SIMATIC MP 277 Multi Panel (including installation accessories) with 8" color TFT display, Touch 10" color TFT display, Touch 8" color TFT display, keyboard 10" color TFT display, keyboard 10" color TFT display, Touch, INOX (with stainless steel front panel)	B1	6AV6 643-0CB01-1AX1 6AV6 643-0CD01-1AX1 6AV6 643-0DB01-1AX1 6AV6 643-0DD01-1AX1 6AV6 643-0ED01-2AX0	Configuration with SIMATIC WinCC flexible Configuration set 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	see catalog ST 80 6AV6 622-0BA01-0AA0
SIMATIC MP 277 8" Touch Starter Package Consisting of: - SIMATIC MP 277 8" Touch - SIMATIC WinCC flexible 2007 - SIMATIC HMI Manual Collection - Voucher for Software Update Service for 1 year - MPI cable, 5 m (for download and test purposes only) - PC/PPI cable (RS 232)	B1	6AV6 652-3MB01-0AA0	Applications/Options When configuration with WinCC flexible - WinCC flexible/Sm@rtAccess - WinCC flexible/Sm@rtService - WinCC flexible/OPC Server - WinCC flexible/ProAgent - WinCC flexible/Audit - WinAC MP 2007/Software PLC	see catalog ST 80 see catalog ST 80 see catalog ST 80 see catalog ST 80 see catalog ST 80 see catalog ST 80
SIMATIC MP 277 10" Touch Starter Package Consisting of: - SIMATIC MP 277 10" Touch - SIMATIC WinCC flexible 2007 - SIMATIC HMI Manual Collection - Voucher for Software Update Service for 1 year - MPI cable, 5 m (for download and test purposes only) - PC/PPI cable (RS 232)	B1	6AV6 652-3PB01-0AA0	Documentation (to be ordered separately) MP 277 Operating Instructions - German - English - French - Italian - Spanish	6AV6 691-1DJ01-0AA0 6AV6 691-1DJ01-0AB0 6AV6 691-1DJ01-0AC0 6AV6 691-1DJ01-0AD0 6AV6 691-1DJ01-0AE0
Complete pre-assembled packages SIMATIC MP 277 with WinAC MP 2007 Package MP 277 8" Touch - MP 277 8" Touch - Electronic documentation - Single license for MP 277 on USB stick¹⁾ - Standard SD Card (empty)	B1	6AV6 652-3MC01-1AA0	WinCC flexible Compact/Standard/Advanced User Manual - German - English - French - Italian - Spanish	6AV6 691-1AB01-3AA0 6AV6 691-1AB01-3AB0 6AV6 691-1AB01-3AC0 6AV6 691-1AB01-3AD0 6AV6 691-1AB01-3AE0
Package MP 277 8" Key - MP 277 8" Key - Electronic documentation - Single license for MP 277 on USB stick¹⁾ - Standard SD Card (empty)	B1	6AV6 652-3LC01-1AA0	User Manual WinCC flexible Communication - German - English - French - Italian - Spanish	6AV6 691-1CA01-3AA0 6AV6 691-1CA01-3AB0 6AV6 691-1CA01-3AC0 6AV6 691-1CA01-3AD0 6AV6 691-1CA01-3AE0
Package MP 277 10" Touch - MP 277 10" Touch - Electronic documentation - Single license for MP 277 on USB stick¹⁾ - Standard SD Card (empty)	B1	6AV6 652-3PC01-1AA0	SIMATIC HMI Manual Collection 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
Package MP 277 10" Key - MP 277 10" Key - Electronic documentation - Single license for MP 277 on USB stick¹⁾ - Standard SD Card (empty)	B1	6AV6 652-3NC01-1AA0	Accessories Accessories for supplementary ordering	see catalog ST 80

1) Can only be used for license handling

B1: Subject to export regulations: AL: N and ECCN: 5D002ENC3

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

1) Can only be used for license handling

B1: Subject to export regulations: AL: N and ECCN: 5D002ENC3

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

B8: Subject to export regulations: AL: N and ECCN: EAR99S

Embedded/PC-based Automation

SIMATIC Embedded Automation

SIMATIC MP 377

Overview



- Like operator panels, Multi Panels (MP) are used for local machine operation and monitoring
- Their functionality can be expanded by the installation of additional Windows CE applications (Multi Panel and Panel options)
- SIMATIC MP 377 devices on the basis of Windows CE combine the rugged construction of Operator Panels with the flexibility of PCs
- PLC functionality can be integrated directly into the MP 377 platform with Option
- Pixel-graphics 12.1" or 15.1" or 19" TFT display, color (64k colors)
- *MP 377 12" Touch, MP 377 15" Touch and MP 377 19" Touch:* Touch screen (analog/resistive)
- *MP 377 12" Key:* 38 system keys, 36 user-configurable and freely inscribable function keys (36 with LEDs)
- *SIMATIC MP 377 PRO 15" Touch:* with a rugged and extremely compact aluminum housing, full IP65 protection and thus suitable for harsh environmental conditions.
- All interfaces, e.g. MPI, PROFIBUS DP, USB, PROFINET (Ethernet TCP/IP), are on-board

Technical specifications

	12" Touch	12" Key	15" Touch	19" Touch
Supply voltage				
Supply voltage	24 V DC	24 V DC	24 V DC	24 V DC
permissible range	+19.2 V to +28.8 V DC	+19.2 V to +28.8 V DC	+19.2 V to +28.8 V DC	+19.2 V to +28.8 V DC
Rated current	1.5 A	1.5 A	1.9 A	2.5 A
Memory				
Type of storage				
Type	Flash / RAM	Flash / RAM	Flash / RAM	Flash / RAM
Memory usable for project data/Options	12288 KB usable memory for user data / 12288 KB additional memory for options	12288 KB usable memory for user data / 12288 KB additional memory for options	12288 KB usable memory for user data / 12288 KB additional memory for options	12288 KB usable memory for user data / 12288 KB additional memory for options
Time				
Clock				
• Type	Hardware clock, battery backed, Synchronizable	Hardware clock, battery backed, Synchronizable	Hardware clock, battery backed, Synchronizable	Hardware clock, battery backed, Synchronizable
Protocols				
Protocols (terminal link)				
• Sm@rtAccess	Yes	Yes	Yes	Yes
Configuration				
Configuration tool	WinCC flexible Standard Version 2007 or higher (to be ordered separately)	WinCC flexible Standard Version 2007 or higher (to be ordered separately)	WinCC flexible Standard Version 2007 or higher (to be ordered separately)	WinCC flexible Standard Version 2007 or higher (to be ordered separately)
Display				
Display type	TFT, 65536 Colors	TFT, 65536 Colors	TFT, 65536 Colors	TFT, 65536 Colors
Size	12.1" (246 mm x 184.5 mm)	12.1" (246 mm x 184.5 mm)	15" (304.1 mm x 228.1 mm)	19" (376.3 mm x 301.1 mm)
Resolution (WxH in pixel)	800 x 600	800 x 600	1024 x 768	1280 x 1024
MTBF backlighting (at 25 °C)	about 50,000 hours	about 50,000 hours	about 50,000 hours	about 50,000 hours

Embedded/PC-based Automation

SIMATIC Embedded Automation

SIMATIC MP 377

Technical specifications (continued)

	12" Touch	12" Key	15" Touch	19" Touch
Operating mode				
Operating elements	Touch screen	Membrane keyboard	Touch screen	Touch screen
Function keys, programmable		36 function keys, 36 with LEDs		
System keys		38		
Touchscreen	analog, resistive		analog, resistive	analog, resistive
Numeric/alphabetical input	Yes / Yes	Yes / Yes	Yes / Yes	Yes / Yes
Connection for mouse/keyboard/barcode reader	USB / USB / USB	USB / USB / USB	USB / USB / USB	USB / USB / USB
EMC				
• Emission of radio interferences to EN 55 011 (limit class A)	Yes	Yes	Yes	
Ambient conditions				
maximum permissible angle of inclination without external ventilation	+/- 35 °	+/- 35 °	+/- 35 °	+/- 35 °
max. relative humidity (in %)	90%	90%	90%	90%
Temperature				
• Operation (vertical installation)	0 °C to +50 °C	0 °C to +50 °C	0 °C to +50 °C	0 °C to +50 °C
• Transport, storage	-20 °C to +60 °C	-20 °C to +60 °C	-20 °C to +60 °C	-20 °C to +60 °C
Degree of protection				
Front	IP65, NEMA 4, NEMA 12 (when installed)	IP65, NEMA 4, NEMA 12 (when installed)	IP65, NEMA 4, NEMA 12 (when installed)	IP65, NEMA 4, NEMA 12 (when installed)
Rear	IP20	IP20	IP20	IP20
Certifications & Standards				
Certifications	CE, FM Class I Div. 2, cULus, EX-Zone 22, C-TICK, NEMA 4, NEMA 12	CE, cULus, C-TICK, NEMA 4, NEMA 12	CE, FM Class I Div. 2, cULus, EX-Zone 22, C-TICK, NEMA 4, NEMA 12	FM Class I Div. 2, cULus, EX-Zone 22, C-TICK, NEMA 4, NEMA 12
I/O/Options				
I/O devices	Printer, card reader, barcode reader	Printer, card reader, barcode reader	Printer, card reader, barcode reader	Printer, card reader, barcode reader
Type of output				
LED colors		Red, green		
Acoustics	WAV sound signal	WAV sound signal	WAV sound signal	WAV sound signal
interfaces				
Interfaces	1 x RS422, 1 x RS485, 2 x Ethernet (RJ45)	1 x RS422, 1 x RS485, 2 x Ethernet (RJ45)	1 x RS422, 1 x RS485, 2 x Ethernet (RJ45)	1 x RS422, 1 x RS485, 2 x Ethernet (RJ45)
CF card slot	1 x CF card slot	1 x CF card slot	1 x CF card slot	1 x CF card slot
Multi Media Card slot	1 x Multi Media Card slot	1 x Multi Media Card slot	1 x Multi Media Card slot	1 x Multi Media Card slot
USB	2 x USB	2 x USB	2 x USB	2 x USB
Ethernet	2 x Ethernet (RJ45)	2 x Ethernet (RJ45)	2 x Ethernet (RJ45)	2 x Ethernet (RJ45)
Operating systems				
Operating system	Windows CE	Windows CE	Windows CE	Windows CE
Functionality under WinCC flexible				
Applications/options	ProAgent, Internet Explorer, Soft-PLC, Pocket Word, Pocket Excel, Sm@rtService, Sm@rtAccess	ProAgent, Internet Explorer, Soft-PLC, Pocket Word, Pocket Excel, Sm@rtService, Sm@rtAccess	ProAgent, Internet Explorer, Soft-PLC, Pocket Word, Pocket Excel, Sm@rtService, Sm@rtAccess	ProAgent, Internet Explorer, Soft-PLC, Pocket Word, Pocket Excel, Sm@rtService, Sm@rtAccess
Number of Visual Basic scripts	100	100	100	100
Task planner	Yes	Yes	Yes	Yes
Help system	Yes	Yes	Yes	Yes
Status/control	with SIMATIC S7	with SIMATIC S7	with SIMATIC S7	with SIMATIC S7

Embedded/PC-based Automation

SIMATIC Embedded Automation

SIMATIC MP 377

Technical specifications (continued)

	12" Touch	12" Key	15" Touch	19" Touch
Message system				
• Number of messages	4 000	4 000	4 000	4 000
• Bit messages	Yes	Yes	Yes	Yes
• Analog messages	Yes	Yes	Yes	Yes
• Message buffer	Ring buffer (n x 1024 entries), retentive, maintenance-free	Ring buffer (n x 1024 entries), retentive, maintenance-free	Ring buffer (n x 1024 entries), retentive, maintenance-free	Ring buffer (n x 1024 entries), retentive, maintenance-free
Recipes				
• Recipes	500	500	500	500
• Data records per recipe	1 000	1 000	1 000	1 000
• Entries per data record	1000	1000	1000	1000
• Recipe memory	128 kByte integrated Flash, expandable	128 kByte integrated Flash, expandable	128 kByte integrated Flash, expandable	128 kByte integrated Flash, expandable
Number of process images				
• Process images	500	500	500	500
• Variables	2 048	2 048	2 048	2 048
• Limit values	Yes	Yes	Yes	Yes
• Multiplexing	Yes	Yes	Yes	Yes
Image elements				
• Text objects	30,000 text elements	30,000 text elements	30,000 text elements	30,000 text elements
• Graphics object	Bit maps, icons, vector graphics	Bit maps, icons, vector graphics	Bit maps, icons, vector graphics	Bit maps, icons, vector graphics
• dynamic objects	Diagrams, bar graphs, sliders, analog display, invisible buttons	Diagrams, bar graphs, sliders, analog display, invisible buttons	Diagrams, bar graphs, sliders, analog display, invisible buttons	Diagrams, bar graphs, sliders, analog display, invisible buttons
Lists				
• Text lists	500	500	500	500
• Graphics list	500	500	500	500
• Libraries	Yes	Yes	Yes	Yes
Archiving				
• Number of archives per project	50	50	50	50
• Number of measuring points per project	50	50	50	50
• Number of entries per archive	50 000	50 000	50 000	50 000
• Archiving types	Sequence archive, short- term archive, alarm log, process value archive	Sequence archive, short- term archive, alarm log, process value archive	Sequence archive, short- term archive, alarm log, process value archive	Sequence archive, short- term archive, alarm log, process value archive
• Memory location	CF card, SD/MMC card, Ethernet, USB memory stick	CF card, SD/MMC card, Ethernet, USB memory stick	CF card, SD/MMC card, Ethernet, USB memory stick	CF card, SD/MMC card, Ethernet, USB memory stick
• 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	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.	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	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	Using trends
Security				
• Number of user groups	50	50	50	50
• Passwords exportable	Yes	Yes	Yes	Yes
• Number of user rights	32	32	32	32
Data medium support				
• CF card	Yes	Yes	Yes	Yes
• Multi Media Card	Yes	Yes	Yes	Yes

Embedded/PC-based Automation

SIMATIC Embedded Automation

SIMATIC MP 377

Technical specifications (continued)

	12" Touch	12" Key	15" Touch	19" Touch
Recording				
• Recording/Printing	Alarms, report (shift report), color print, hardcopy	Alarms, report (shift report), color print, hardcopy	Alarms, report (shift report), color print, hardcopy	Alarms, report (shift report), color print, hardcopy
• Printer driver	ESC/P2, PCL3/PCL6	ESC/P2, PCL3/PCL6	ESC/P2, PCL3/PCL6	ESC/P2, PCL3/PCL6
Fonts				
• Keyboard fonts	US American (English)	US American (English)	US American (English)	US American (English)
Languages				
• Online languages	16	16	16	16
• 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	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, symbol languages, 4 additional character sets can be loaded, all freely scalable	Tahoma, Arial, Courier New, symbol languages, 4 additional character sets can be loaded, all freely scalable	Tahoma, Arial, Courier New, symbol languages, 4 additional character sets can be loaded, all freely scalable	Tahoma, Arial, Courier New, symbol languages, 4 additional character sets can be loaded, all freely scalable
Transfer (Upload/Download)				
• Transfer of configuration	MPI/PROFIBUS DP, serial, USB, Ethernet, by means of external storage medium, automatic transfer recognition	MPI/PROFIBUS DP, serial, USB, Ethernet, by means of external storage medium, automatic transfer recognition	MPI/PROFIBUS DP, serial, USB, Ethernet, by means of external storage medium, automatic transfer recognition	MPI/PROFIBUS DP, serial, USB, Ethernet, by means of external storage medium, automatic transfer recognition
Process coupling				
• Connection to controller	S5, S7-200, S7- 300/400, TI 505, Win AC, PC (TCP/IP), SINUMERIK, SIMOTION, Allen Bradley (DF1), Allen Bradley (DF485), Mitsubishi (FX), OMRON (LINK/Multilink), Modicon (Modbus), see section on "System interfaces"	S5, S7-200, S7- 300/400, TI 505, Win AC, PC (TCP/IP), SINUMERIK, SIMOTION, Allen Bradley (DF1), Allen Bradley (DF485), Mitsubishi (FX), OMRON (LINK/Multilink), Modicon (Modbus), see section on "System interfaces"	S5, S7-200, S7- 300/400, TI 505, Win AC, PC (TCP/IP), SINUMERIK, SIMOTION, Allen Bradley (DF1), Allen Bradley (DF485), Mitsubishi (FX), OMRON (LINK/Multilink), Modicon (Modbus), see section on "System interfaces"	S5, S7-200, S7- 300/400, TI 505, Win AC, PC (TCP/IP), SINUMERIK, SIMOTION, Allen Bradley (DF1), Allen Bradley (DF485), Mitsubishi (FX), OMRON (LINK/Multilink), Modicon (Modbus), see section on "System interfaces"
Expandability/openness				
• Open Platform Program	Yes	Yes	Yes	Yes
Dimensions				
Front of enclosure (W x H)	335 mm x 275 mm	483 mm x 310 mm	400 mm x 310 mm	483 mm x 400 mm
Mounting cutout/Device depth (W x H/D) in mm	310 mm x 248 mm / 72 mm device depth	450 mm x 290 mm / 59 mm device depth	367 mm x 289 mm / 72 mm device depth	449 mm x 379 mm / 75 mm device depth
Dimensions				
Weights				
• Weight	3.8 kg	5.5 kg	4.7 kg	7.7 kg

Embedded/PC-based Automation

SIMATIC Embedded Automation

SIMATIC MP 377

Bestelldaten	Bestell-Nr.	Bestell-Nr.
SIMATIC MP 377 Multi Panel (including installation accessories) with • 12" color TFT display, Touch B1 • 12" color TFT display, keyboard B1 • 15" color TFT display, Touch B1 • 19" color TFT display, Touch B1 • PRO 15" color TFT display, Touch	6AV6 644-0AA01-2AX0 6AV6 644-0BA01-2AX1 6AV6 644-0AB01-2AX0 6AV6 644-0AC01-2AX0 6AV6 644-2AB01-2AX0	SIMATIC MP 377 15" Touch Starter Package B1 Comprising: • SIMATIC MP 377 15" TOUCH • SIMATIC WINCC flexible STANDARD 2008 • SIMATIC HMI Manual Collection • Voucher for Software Update Service for 1 year • MPI cable, 5 m (for download and test purposes only)
Configuring with SIMATIC WinCC flexible Configuration set MP 377 B3 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 (for download and test purposes only)	6AV6 622-0BA01-0AA0	Applications/Options When configuration with WinCC flexible • 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 • WinCC flexible/Audit see catalog ST 80 • WinAC MP 2007/Software PLC see catalog ST 80
Complete pre-assembled packages SIMATIC MP 377 with WinAC MP 2007 Package MP 377 12" Touch B1 • MP 377 12" Touch • Single license for MP 377 on USB stick¹⁾ • Standard Multimedia Card (empty)	6AV6 652-4FC01-2AA0	Documentation (to be ordered separately) MP 377 Operating Instructions • German 6AV6 691-1DR01-0AA0 • English 6AV6 691-1DR01-0AB0 • French 6AV6 691-1DR01-0AC0 • Italian 6AV6 691-1DR01-0AD0 • Spanish 6AV6 691-1DR01-0AE0
Package MP 377 12" Key B1 • MP 377 12" Key • Single license for MP 377 on USB stick¹⁾ • Standard Multimedia Card (empty)	6AV6 652-4EC01-2AA0	WinCC flexible Compact/Standard/Advanced User Manual • German 6AV6 691-1AB01-3AA0 • English 6AV6 691-1AB01-3AB0 • French 6AV6 691-1AB01-3AC0 • Italian 6AV6 691-1AB01-3AD0 • Spanish 6AV6 691-1AB01-3AE0
Package MP 377 15" Touch B1 • MP 377 15" Touch • Single license for MP 377 on USB stick¹⁾ • Standard Multimedia Card (empty)	6AV6 652-4GC01-2AA0	User Manual WinCC flexible Communication • German 6AV6 691-1CA01-3AA0 • English 6AV6 691-1CA01-3AB0 • French 6AV6 691-1CA01-3AC0 • Italian 6AV6 691-1CA01-3AD0 • Spanish 6AV6 691-1CA01-3AE0
Package MP 377 19" Touch B1 • MP 377 19" Touch • Single license for MP 377 on USB stick¹⁾ • Standard Multimedia Card (empty)	6AV6 652-4HC01-2AA0	SIMATIC HMI Manual Collection B8 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
Starter packages SIMATIC MP 377 12" Touch Starter Package B1 Comprising: • SIMATIC MP 377 12" TOUCH • SIMATIC WINCC flexible STANDARD 2008 • SIMATIC HMI Manual Collection • Voucher for Software Update Service for 1 year • MPI cable, 5 m (for download and test purposes only)	6AV6 652-4FA01-0AA0	Accessories Accessories for supplementary ordering see catalog ST 80

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B3: Subject to export regulations: AL: N and ECCN: 5D992B1

B8: Subject to export regulations: AL: N and ECCN: EAR99S

Embedded/PC-based Automation

SIMATIC Embedded Automation

SIMATIC WinAC MP

Overview



- WinAC MP, the software PLC based on Windows CE
- An optimized version is available for all current MP platforms
- The economical solution for all applications in combination with a rugged hardware platform
- Ideal for tasks on the machine level, saves space and costs
- Best service concept, backup/restore of all data on a standard SD card, standard Multi Media Card or standard USB stick

Technical specifications

	Win AC MP 277	WinAC MP 377
Memory		
Type of storage		
RAM		
• integrated	256 Kibyte	512 Kibyte
• expandable	No	No
Load memory		
• integrated RAM, max.	1.2 MByte	1.2 MByte
CPU/blocks		
DB		
• Number, max.	1 024; FBs+FCs+DBs= 1024	2 048; FBs+FCs+DBs= 2048
• Size, max.	64 Kibyte	64 Kibyte
FB		
• Number, max.	1 024; FBs+FCs+DBs= 1024	2 048; FBs+FCs+DBs= 2048
• Size, max.	64 Kibyte	64 Kibyte
FC		
• Number, max.	1 024; FBs+FCs+DBs= 1024	2 048; max. 2048 total
• Size, max.	64 Kibyte	64 Kibyte
OB		
• Number, max.	18	18
• Size, max.	64 Kibyte	64 Kibyte
Nesting depth		
• per priority class	8	16
• additional within an error OB	2	2
Times/counters and their remanence		
S7 counter		
• Number	256	512
• of which remanent without battery		
- adjustable	Yes	Yes
- lower limit	0	0
- upper limit	256	512

	Win AC MP 277	WinAC MP 377
• Remanence		
- adjustable	Yes	Yes
- preset	8	8
• Counting range		
- lower limit	0	0
- upper limit	999	999
IEC counter		
• present	Yes; SFB0, SFB1, SFB2	Yes; SFB0, SFB1, SFB2
S7 times		
• Number	256	512
• of which remanent without battery		
- adjustable	Yes	Yes
- lower limit	0	0
- upper limit	256	512
• Remanence		
- adjustable	Yes	Yes
- preset	0	0
• Time range		
- lower limit	10 ms	10 ms
- upper limit	9 990 s	9 990 s
IEC timer		
• present	Yes; SFB3, SFB4, SFB5	Yes; SFB3, SFB4, SFB5
Data areas and their remanence		
Retentive data area in total (incl. times, counters, flags), max.	128 Kibyte	256 Kibyte
Flag		
• Number, max.	2 Kibyte	4 Kibyte
• Remanence available	Yes	Yes
Data blocks		
• Number, max.	1 024	2 048
• Size, max.	64 Kibyte	64 Kibyte

Embedded/PC-based Automation

SIMATIC Embedded Automation

SIMATIC WinAC MP

Technical specifications (continued)

	Win AC MP 277	WinAC MP 377
Local data		
• per priority class, max.	16 384 byte; Max. for all priority classes	16 384 byte; Max. for all priority classes
Address area		
I/O address area		
• Inputs	4 Kibyte	8 Kibyte
• Outputs	4 Kibyte	8 Kibyte
Process image		
• Inputs	2 Kibyte	2 Kibyte
• Outputs	2 Kibyte	2 Kibyte
• Inputs, adjustable	2 Kibyte	2 Kibyte
• Outputs, adjustable	2 Kibyte	2 Kibyte
• Inputs, preset	512 byte	512 byte
• Outputs, preset	512 byte	512 byte
• consistent data, max.	32 byte	32 byte
Hardware config.		
Number of DP masters		
• integrated	1	1
Time		
Operating hours counter		
• Number	8	8
• Number/Number range	0 to 7	0 to 7
S7 message functions		
Process diagnostic messages	Yes	Yes
Test commissioning functions		
Status/control		
• Status/control variable	Yes; Status blocks, single step, break-point	Yes; Status blocks, single step, break-point
Forcing		
• Forcing	No	No
Diagnostic buffer		
• present	Yes	Yes
• Number of entries, max.	1 000; preset 120	1 000; preset 120
• adjustable	Yes	Yes
Communication functions		
Number of logical connections (also in network), max.	16	32
PG/OP communication	Yes	Yes
Routing	Yes	Yes
Global data communication		
• supported	No	No
S7 basic communication		
• supported	No	No

	Win AC MP 277	WinAC MP 377
S7 communication		
• supported	Yes; PUT/GET, without BSEND/BRCV	Yes
• as server	Yes	Yes
• as client	Yes	Yes
• Useful data per job, max.	0.48 Kibyte	0.48 Kibyte
Number of connections		
• overall	16; (DP max.8, rest PN)	32; (DP max.8, rest PN)
- of which static	14; DP max.6, rest PN	30; DP max.6, rest PN
- reserved for PG communication	1	1
- reserved for OP communication	1	1
• usable for routing	6	16
1st interface		
DP master		
• Number of connections, max.	8	8
• Services		
- PG/OP communication	Yes	Yes
- Routing	Yes	Yes
- Global data communication	No	No
- S7 basic communication	No	No
- S7 communication	Yes	Yes
- equidistance support	No	No
- SYNC/FREEZE	Yes	Yes
- Activation/deactivation of DP slaves	Yes	Yes
- DPV1	Yes	Yes
• Transmission speeds, max.	12 000 kBit/s	12 000 kBit/s
• Number of DP slaves, max.	32	32
• Address area		
- Inputs, max.	2.048 Kibyte	8.192 Kibyte
- Outputs, max.	2.048 Kibyte	8.192 Kibyte
CPU/programming		
Configuration software		
• STEP 7	Yes	Yes
• WinCC flexible Compact	No	No
• WinCC flexible Standard	Yes	Yes
• WinCC flexible Advanced	Yes	Yes
Programming language		
• LAD	Yes	Yes
• FUP	Yes	Yes
• AWL	Yes	Yes
Cycle time monitoring		
• adjustable	Yes	Yes
• preset	6 000 ms	6 000 ms
Operating systems		
Operating system		
• Windows CE	Yes	Yes
Online languages		
Number	1; English	1; English

Embedded/PC-based Automation

SIMATIC Embedded Automation

SIMATIC WinAC MP

Ordering Data		Order No.	Order No.	
WinAC MP, version WinAC MP 277 ²⁾	B8	6ES7 671-5EF00-0YA0	Package MP 277 10" Key	B1 6AV6 652-3NC01-1AA0
incl. a single license for MP 277 on USB stick ¹⁾ and electronic documentation			• MP 277 10" Key • WinAC MP Version 277 • Electronic documentation • Single license for MP 277 on USB stick¹⁾ • Standard SD card 256 MB (empty)	
WinAC MP, version WinAC MP 377 ²⁾	B8	6ES7 671-7EG00-0YA0		
incl. a single license for MP 377 on USB stick ¹⁾ and electronic documentation				
Complete pre-assembled packages			Package MP 377 12" Touch	B1 6AV6 652-4FC01-2AA0
Package MP 277 8" Touch	B1	6AV6 652-3MC01-1AA0	• MP 377 12" Touch • WinAC MP Version 377 • Electronic documentation • Single license for MP 377 on USB stick¹⁾ • Standard SD card 256 MB (empty)	
• MP 277 8" Touch • WinAC MP Version 277 • Electronic documentation • Single license for MP 277 on USB stick¹⁾ • Standard SD card 256 MB (empty)			Package MP 377 12" Key	B1 6AV6 652-4EC01-2AA0
Package MP 277 8" Key	B1	6AV6 652-3LC01-1AA0	• MP 377 12" Key • WinAC MP Version 377 • Electronic documentation • Single license for MP 377 on USB stick¹⁾ • Standard SD card 256 MB (empty)	
• MP 277 8" Key • WinAC MP Version 277 • Electronic documentation • Single license for MP 277 on USB stick¹⁾ • Standard SD card 256 MB (empty)			Package MP 377 15" Touch	B1 6AV6 652-4GC01-2AA0
Package MP 277 10" Touch	B1	6AV6 652-3PC01-1AA0	• MP 377 15" Touch • WinAC MP Version 377 • Electronic documentation • Single license for MP 377 on USB stick¹⁾ • Standard SD card 256 MB (empty)	
• MP 277 10" Touch • WinAC MP Version 277 • Electronic documentation • Single license for MP 277 on USB stick¹⁾ • Standard SD card 256 MB (empty)			Package MP 377 19" Touch	B1 6AV6 652-4HC01-2AA0
			• MP 377 19" Touch • WinAC MP Version 377 • Electronic documentation • Single license for MP 377 on USB stick¹⁾ • Standard SD card 256 MB (empty)	

1) Can only be used for license handling

2) UCL version on request

B1: Subject to export regulations: AL: N and ECCN: 5D002ENC3

B8: Subject to export regulations: AL: N and ECCN: EAR99S

Embedded/PC-based Automation

Logic Control

Introduction

Overview



Siemens has developed a wide range of coordinated hardware and software components for PC-based Automation.

Focus: **SIMATIC PC-based Controllers** with SIMATIC WinAC, the open, flexible and reliable controller for your PC-based automation solution.

The PC can be used to implement all automation tasks such as open/closed-loop control, operator control and visualization and motion control on one platform. PC-based Automation is first choice wherever PC applications have to be implemented in addition to standard PLC tasks.

Additional information is available in the Internet at:

<http://www.siemens.com/simatic-controller>

SIMATIC PC-based Controller

Overview

- Adds PC-based control 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 ODK**
allows PC solutions for technological tasks to be integrated flexibly and powerfully into the controller

Properties:

- Runs on standard PCs under Windows XP Professional.
- Code-compatible with SIMATIC S7:
Programmed with SIMATIC industrial software, created 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.

Embedded/PC-based Automation

Logic Control

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.

New with WinAC RTX 2008:

- Option for connecting distributed I/O via PROFINET. In addition to PROFINET IO, it is also possible to use PROFINET CBA and Open User Communication (open communication via TCP and UDP).

Ordering Data

Order No.

SIMATIC WinAC RTX 2008 B8 **6ES7 671-0RC06-0YA0**

Software-based PC-based control system for applications requiring a strictly deterministic response; PROFIBUS and PROFINET; CD-ROM with electronic documentation in English, French and German; Single License, running on Windows XP SP2

SIMATIC WinAC RTX 2008 Upgrade B8 **6ES7 671-0RC06-0YE0**

For upgrading from Basic/RTX V3.x, V4.0, V4.1 and 2005; Single License, executable on Windows XP SP2

SIMATIC WinAC NV128 B7 **6ES7 671-0AG00-1YA7**

PC plug-in card with non-volatile memory for the storage of up to 128 Kbyte of retentive data in the event of voltage failure

CP 5611 A2 communications processor **6GK1 561-1AA01**

PCI card (32-bit) for connection of a programming device or PC to PROFIBUS

CP 5613 A2 communications processor **6GK1 561-3AA01**

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

CP 1616 communications processor **6GK1 161-6AA00**

PCI Card (32-bit; 3.3/5 V universal keyed) with ASIC ERTEC 400 for connecting PCs to PROFINET IO with 4-port real-time switch (RJ45); incl. IO base software for PROFINET IO Controller (RT operation) and NCM PC; Single License for one installation, runtime software, software and electronic manual on CD-ROM, Class A, for 32-bit Windows XP Professional; German/English

CP 1604 Microbox Package **6GK1 160-4AU00**

Package for implementing the CP 1604 in the SIMATIC Microbox PC; comprising the CP 1604, connection board, power supply and expansion racks for Microbox PC; for use with Development Kit DK-16xx PN IO; NCM PC

B7: Subject to export regulations: AL: N and ECCN: EAR99H

B8: Subject to export regulations: AL: N and ECCN: EAR99S

Embedded/PC-based Automation

Logic Control

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	
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
Resolution (pixels)	
Required memory on hard disk, min.	10 MByte
Main memory, min.	256 MByte
Processor	Intel Pentium 800 MHz
Software requirement	
Software required	MS Visual Developer Studio, V6.0 >= SP3; MS Visual Developer Studio .net 2003; Ardenne SDK V6.5 (only for real time applications with WinAC RTX 2005)
Operating systems	
Operating system	
• Windows NT 4.0	No
• Windows 2000	Yes; Professional, SP3 or higher
• Windows XP	Yes; Professional, SP1
Software	
Configuration software	
• Description	WinAC product support for WinAC RTX 2005 and WinAC Slot V4.0

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

B8 **6ES7 806-1CC02-0BA0**

B8: Subject to export regulations: AL: N and ECCN: EAR99S

Embedded/PC-based Automation



Component Based Automation



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9/3	Software
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9/6	PN CBA OPC server
9/8	SIMATIC WinCC flexible ES
9/11	WinCC flexible /ChangeControl
9/12	SIMATIC WinCC flexible RT
9/15	SIMATIC WinCC flexible RT options
9/17	Controller / Distributed IO for Industrial Ethernet
9/17	SIMATIC WinAC Software PLC
9/18	CP 343-1
9/20	CP 343-1 Advanced
9/23	CP 443-1
9/25	CP 443-1 Advanced
9/27	Controller / Distributed IO for PROFIBUS
9/27	Central processing units of the S7-300
9/29	IM 151-7 CPU interface modules
9/35	Network transitions
9/35	IE/PB Link PN IO

Brochures

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

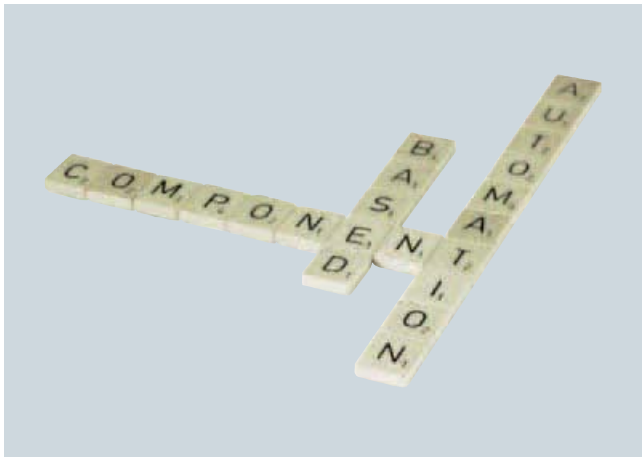
<http://www.siemens.com/simatic/printmaterial>

Component Based Automation

Introduction

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:

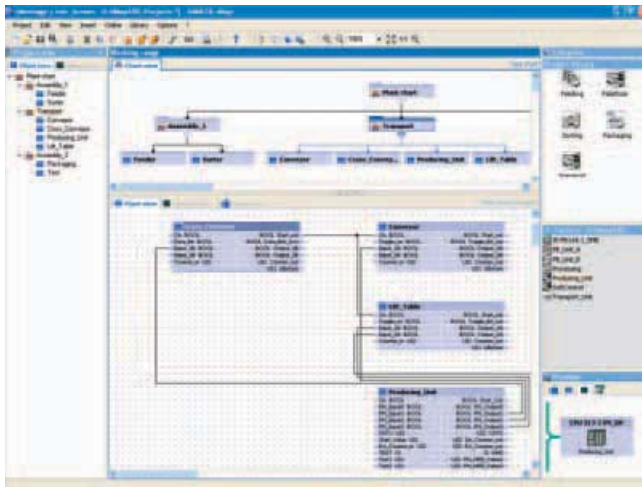
- SIMATIC ET 200X and ET 200S with separate CPU as intelligent field devices on PROFIBUS
- SIMATIC S7-300 CPUs with integrated PROFIBUS DP interface as intelligent slaves on PROFIBUS, e.g., compact CPUs CPU 313C-2 DP and CPU 314-2 DP
- All current standard slaves with GSD file to PROFIBUS DP standard

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.

Component Based Automation Software

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

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 • Diagnosis of communication in the diagnostics window
Sectors	• 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)

Component Based Automation Software

SIMATIC iMap

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-2 DP, CPU 314C-2 DP, CPU 315-2 DP, CPU 316-2 DP, ET 200M 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 Prof. 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	B3	6ES7 820-0CC04-0YA5
Software Update Service (requires current software version)	B3	6ES7 820-0CC01-0YX2
Upgrade to V3.0, single license	B3	6ES7 820-0CC04-0YE5

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

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 V4.1****6ES7 864-1CC41-0YX0***Task:*

Option package for configuring and programming technology tasks with SIMATIC S7 CPU 31xT-2 DP

Requirement:

STEP 7 V5.4 SP2 or higher

Type of delivery:

on DVD;
incl. documentation for CPU 31xT-2 DP (included on DVD)

Overview

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9/6

Component Based Automation Software

PN CBA OPC server

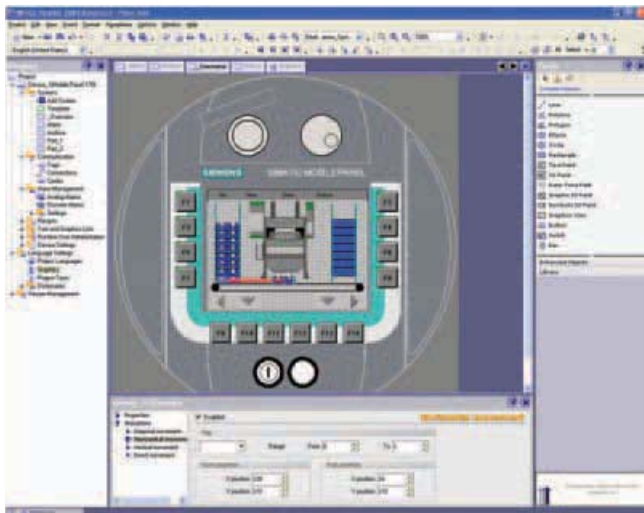
Technical specifications		Ordering Data	Order No.
	PN CBA OPC server	PN CBA OPC Server, 2007 Edition	
Programming	• Open and standardized • Synchronous and asynchronous reading and writing of variables • Monitoring of variables by the OPC server with an alarm message to the client in the case of a change • Use of batch operations, so a large volume of data can be processed in a short time	PROFINET OPC server for CBA; runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2, Windows 2003 Server SP1, R2, SP2, Windows Vista Business/Ultimate; German/English	
Interfaces	• Custom Interface (C++, .NET) • Automation Interface (Visual Basic, Excel, Access,...) • OPC Data Control • OPC XML Interface for Data Access • DCOM protocol	• Single license for 1 installation B3 • Software Update Service for 1 year, with automatic extension; requirement: Current software version	6GK1 706-0HB70-3AA0 6GK1 706-0HB00-3AL0
Protocols		• Upgrade of PN CBA OPC Server B3 from V6.4 to PN CBA OPC Server 2007 Edition	6GK1 706-0HB00-3AE0
Configuration	Configuring software for PROFINET SIMATIC iMap	• Upgrade of PN CBA OPC Server B3 from V6.0, V6.1, V6.2 or V6.3 to PN CBA OPC Server 2007 Edition	6GK1 706-0HB00-3AE1
PROFINET communication (CBA)		Software iMap V3.0	
• Number of communication partners • Number of connections	max. 228 max. 10,000	for configuring PROFINET CBA <i>Requirement:</i> 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 <i>Type of supply:</i> German, English with electronic documentation	
		• Single license B3 • Software Update Service B3 • Upgrade to V3.0, single license B3	6ES7 820-0CC04-0YA5 6ES7 820-0CC01-0YX2 6ES7 820-0CC04-0YE5

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

Component Based Automation Software

SIMATIC WinCC flexible ES

Overview



- Integrated family of **engineering tools** for configuring SIMATIC HMI Operator Panels, the operating device of SIMATIC C7 units, SIMOTION/SINUMERIK Panel PCs as well as the PC-based visualization software WinCC flexible Runtime.
- Runs under Windows XP Professional/Windows VISTA Business, Ultimate
- **Current version:**
 - SIMATIC WinCC flexible 2008 Advanced
 - SIMATIC WinCC flexible 2008 Standard
 - SIMATIC WinCC flexible 2008 Compact
 - SIMATIC WinCC flexible 2008 Micro

Ordering Data

Order No.

WinCC flexible 2008 Advanced B3 6AV6 613-0AA51-3CA5

Floating license, on DVD incl. license key, includes:

- Engineering software for configuring WinCC flexible Runtime on basic PCs/Panel PCs as well as Micro Panels, Basic Panels and 70/170/270/370 series Panels incl. C7-635/636
- SW for WinCC flexible/Change-Control engineering option ¹⁾
- Simulation software for WinCC flexible Runtime as well as Micro Panels, Basic Panels and 70/170/270/370 series Panels incl. C7-635/636
- Native drivers
- Electronic documentation (.pdf) in German, English, French, Italian, Spanish, simplified Chinese, traditional Chinese, Korean, Japanese

Order No.

WinCC flexible 2008 Standard B3 6AV6 612-0AA51-3CA5

Floating license, on DVD incl. license key, includes:

- Engineering software for configuring Micro Panels, Basic Panels and 70/170/270/370 series Panels incl. C7-635/636
- SW for WinCC flexible/Change-Control engineering option ¹⁾
- Simulation software for Micro Panels, Basic Panels and 70/170/270/370 series Panels incl. C7-635/636
- Native drivers
- Electronic documentation (.pdf) in German, English, French, Italian, Spanish, simplified Chinese, traditional Chinese, Korean, Japanese

WinCC flexible 2008 Compact B3 6AV6 611-0AA51-3CA5

Floating license, on DVD incl. license key, includes:

- Engineering software for configuring Micro Panels, Basic Panels and 70/170 series Panels incl. C7-635
- SW for WinCC flexible/Change-Control engineering option ¹⁾
- Simulation software for Micro Panels, Basic Panels and 70/170 series Panels incl. C7-635
- Native drivers
- Electronic documentation (.pdf) in German, English, French, Italian, Spanish, simplified Chinese, traditional Chinese, Korean, Japanese

1) A separate license for WinCC flexible/ChangeControl must be purchased for each engineering station.

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

Component Based Automation Software

SIMATIC WinCC flexible ES

Ordering Data (continued)		Order No.	Order No.	
WinCC flexible 2008 Micro		B3 6AV6 610-0AA01-3CA8	WinCC flexible 2008 ASIA Standard	
Floating license, on DVD without license key, includes:			Floating license, on DVD incl. license key, includes:	
• Engineering software for configuration Micro Panels • Electronic documentation (.pdf) in English, German, French, Italian, Spanish			• Engineering software for configuring Micro Panels, Basic Panels and 70/170/270/370 series Panels incl. C7-635/636 • Simulation software for Micro Panels, Basic Panels and 70/170/270/370 series Panels incl. C7-635/636 • Native drivers • Electronic documentation (.pdf) in German, English, French, Italian, Spanish, simplified Chinese, traditional Chinese, Korean, Japanese	
WinCC flexible/ChangeControl for WinCC flexible 2008 Compact/Standard/Advanced^{1) 3)}		B3 6AV6 613-6AA01-3AB5	WinCC flexible 2008 ASIA Advanced	
Floating license, option, license key only			Floating license, on DVD incl. license key, includes:	
Power Packs			• Engineering software for configuring WinCC flexible Runtime as well as Micro Panels, Basic Panels and 70/170/270/370 series Panels incl. C7-635/636 • SW for WinCC flexible/ChangeControl engineering option ¹⁾ • Simulation software for WinCC flexible Runtime as well as Micro Panels, Basic Panels and 70/170/270/370 series Panels incl. C7-635/636 • Native drivers • Electronic documentation (.pdf) in German, English, French, Italian, Spanish, simplified Chinese, traditional Chinese, Korean, Japanese	
SIMATIC WinCC flexible Power Packs			Documentation (must be ordered separately)	
Single license, license key only			User Manual	
• WinCC flexible 2008 Standard to B3 2008 Advanced • WinCC flexible 2008 Compact to B3 2008 Advanced • WinCC flexible 2008 Compact to B3 2008 Standard		6AV6 613-2CD01-3AD5 6AV6 613-2BD01-3AD5 6AV6 612-2BC01-3AD5	WinCC flexible Communication	
Software Update Service			• German • English • French • Italian • Spanish	
Software Update Service SIMATIC WinCC flexible^{2) 4)}			6AV6 691-1CA01-3AA0 6AV6 691-1CA01-3AB0 6AV6 691-1CA01-3AC0 6AV6 691-1CA01-3AD0 6AV6 691-1CA01-3AE0	
• WinCC flexible Advanced • WinCC flexible Standard • WinCC flexible Compact		B3 6AV6 613-0AA00-0AL0 B3 6AV6 612-0AA00-0AL0 B3 6AV6 611-0AA00-0AL0		
Upgrades				
SIMATIC ProTool to SIMATIC WinCC flexible 2008				
• ProTool/Lite to WinCC flexible 2008 Compact • ProTool to WinCC flexible 2008 Standard • ProTool/Pro to WinCC flexible 2008 Advanced		B3 6AV6 611-3AA51-3CE5 B3 6AV6 612-3AA51-3CE5 B3 6AV6 613-3AA51-3CE5		
SIMATIC WinCC flexible 2004/2005/2007 to SIMATIC WinCC flexible 2008				
• Upgrade to WinCC flexible 2008 B3 Compact, incl. ChangeControl option ¹⁾ • Upgrade to WinCC flexible 2008 B3 Standard, incl. ChangeControl option ¹⁾ • Upgrade to WinCC flexible 2008 B3 Advanced, incl. ChangeControl option ¹⁾ • Upgrade to WinCC flexible 2008 B3 Micro ⁴⁾		6AV6 611-0AA51-3CE5 6AV6 612-0AA51-3CE5 6AV6 613-0AA51-3CE5 6AV6 610-0AA01-3CE8		
SIMATIC WinCC flexible ASIA 2004/2005/2007 to SIMATIC WinCC flexible ASIA 2008				
• Upgrade to WinCC flexible 2008 B3 ASIA Standard, incl. ChangeControl option ¹⁾ • Upgrade to WinCC flexible 2008 B3 ASIA Advanced, incl. ChangeControl option ¹⁾		6AV6 612-0AA11-3CE5 6AV6 613-0AA11-3CE5		

- 1) A separate license for WinCC flexible/ChangeControl must be purchased for each engineering station.
 - 2) 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 expiration.
 - 3) The ChangeControl option has not been released for integrated operation with STEP 7.
 - 4) Original delivery note or Certificate of License (CoL) from previous WinCC flexible Micro required
- B3: Subject to export regulations: AL: N and ECCN: 5D992B1

Component Based Automation Software

SIMATIC WinCC flexible ES

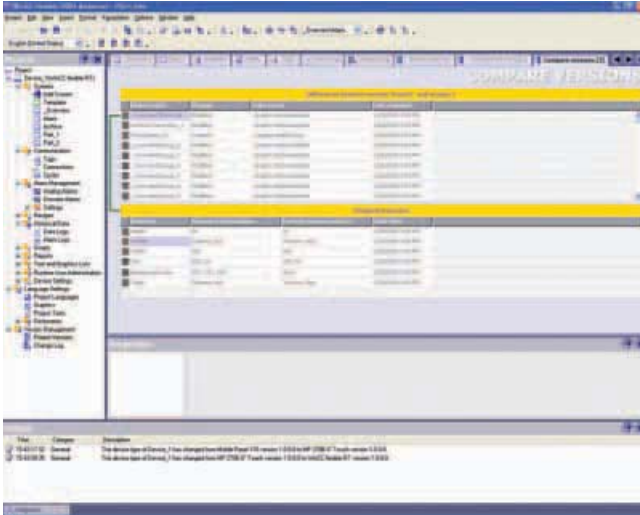
Ordering Data (continued)	Order No.		Order No.
WinCC flexible Micro User Manual • German • English • French • Italian • Spanish	6AV6 691-1AA01-3AA0 6AV6 691-1AA01-3AB0 6AV6 691-1AA01-3AC0 6AV6 691-1AA01-3AD0 6AV6 691-1AA01-3AE0	SIMATIC HMI Manual Collection B8 Electronic documentation, on DVD 5 languages (English, French, German, Italian, Spanish); contains: all currently available user manuals, manuals and communication manuals for SIMATIC HMI	6AV6 691-1SA01-0AX0
User Manual WinCC flexible Compact/Standard/Advanced • German • English • French • Italian • Spanish	6AV6 691-1AB01-3AA0 6AV6 691-1AB01-3AB0 6AV6 691-1AB01-3AC0 6AV6 691-1AB01-3AD0 6AV6 691-1AB01-3AE0		

B8: Subject to export regulations: AL: N and ECCN: EAR99S

Component Based Automation Software

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 2008 Compact/Standard/Advanced ¹⁾

Floating License, option,
license key only

B3 **6AV6 613-6AA01-3AB5**

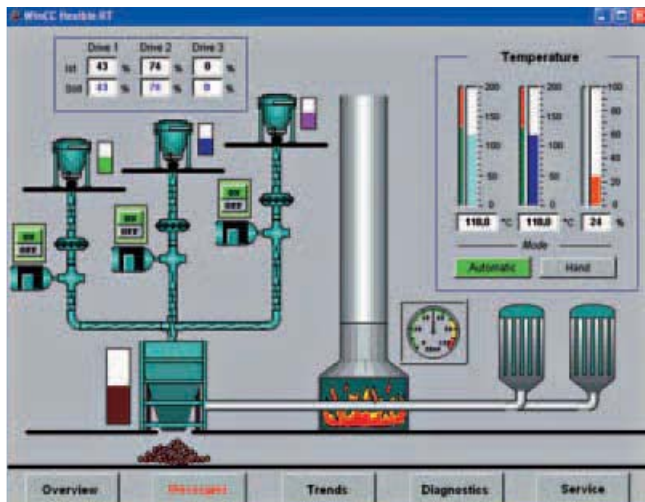
1) The ChangeControl option has not been released for integrated operation with STEP 7.

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

Component Based Automation Software

SIMATIC WinCC flexible RT

Overview



- **PC-based visualization software** for single-user systems directly at the machine
 - Runs under Windows XP Professional and Windows Vista Business/Ultimate
 - **Current version:** SIMATIC WinCC flexible 2008 Runtime with 128, 512, 2048 or 4096 PowerTags
- SIMATIC WinCC flexible Runtime is configured with the SIMATIC WinCC flexible Advanced configuration software.

Technical specifications

Type	SIMATIC WinCC flexible Runtime
	The specifications are maximum values
Displays	500
• 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
Variables	4.096 ³⁾
Messages bit-triggered / analog	4.000 / 500
• Message text (number of characters)	80
• Number of process values per message	8
• Size of message buffer	1.024
• Pending message events	500
Archives ⁴⁾	100
• Archivable data	Process data, messages
• Max. number of entries per archive (incl. sequence archive)	500.000
• Archive types	Short-term archive, sequence archive (max. 400 per archive)
• Data storage format	CSV (Comma Separated Variable), RDB (Runtime Data Base), interface to ODBC database (database not included in scope of delivery)

Type	SIMATIC WinCC flexible Runtime
Recipes ⁴⁾	1,000
• Elements per recipe	2,000 ³⁾
• Data records per recipe	5,000 ²⁾
Password protection	
• User rights	32
• Number of user groups	50
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

Ordering Data	Order No.	Order No.
SIMATIC WinCC flexible 2008 Runtime for PC systems; incl. SW for PC systems options ¹⁾ Single license, on CD-ROM incl. licensing, for: • 128 PowerTags (RT 128) B3 6AV6 613-1BA51-3CA0 • 512 PowerTags (RT 512)2 B3 6AV6 613-1DA51-3CA0 • 2048 PowerTags (RT 2048) B3 6AV6 613-1FA51-3CA0 • 4096 PowerTags (RT 4096) B3 6AV6 613-1GA51-3CA0		
Power Packs		
SIMATIC WinCC flexible 2008 Runtime Single license, only license key for PowerTags, from • 128 to 512 PowerTags B3 6AV6 613-4BD01-3AD0 • 128 to 2048 PowerTags B3 6AV6 613-4BF01-3AD0 • 512 to 2048 PowerTags B3 6AV6 613-4DF01-3AD0 • 128 to 4096 PowerTags B3 6AV6 613-4BG01-3AD0 • 512 to 4096 PowerTags B3 6AV6 613-4DG01-3AD0 • 2048 to 4096 PowerTags B3 6AV6 613-4FG01-3AD0		
Upgrades		
SIMATIC ProTool/Pro RT to SIMATIC WinCC flexible 2008 • ProTool/Pro Runtime 128 PowerTags to WinCC flexible 2008 Runtime 128 PowerTags ²⁾ B3 6AV6 613-3BB51-3CE0 • ProTool/Pro Runtime 256 PowerTags to WinCC flexible 2008 Runtime 512 PowerTags ²⁾ B3 6AV6 613-3CD51-3CE0 • ProTool/Pro Runtime 512 PowerTags to WinCC flexible 2008 Runtime 512 PowerTags ²⁾ B3 6AV6 613-3DD51-3CE0 • ProTool/Pro Runtime 2048 PowerTags to WinCC flexible 2008 Runtime 2048 PowerTags ²⁾ B3 6AV6 613-3FF51-3CE0		
SIMATIC WinCC flexible 2004/2005/2007 Runtime to SIMATIC WinCC flexible 2008 Runtime • Upgrade to SIMATIC WinCC flexible Runtime 2008 PowerTags incl. Runtime Options for: - WinCC flexible/Sm@rtAccess - Sm@rtService - OPC server - Archives - Recipes - ProAgent - Audit	B3 6AV6 613-1XA51-3CE0	
SIMATIC WinCC flexible 2004/2005/2007 Runtime to SIMATIC WinCC flexible 2008 Runtime • Upgrade of the SIMATIC WinCC flexible Panel options: - 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 Multi Panel - WinCC flexible Audit for SIMATIC Panel	B3 6AV6 618-7XX01-3AF0	
Documentation (must be ordered separately)		
User Manual WinCC flexible Runtime • German 6AV6 691-1BA01-3AA0 • English 6AV6 691-1BA01-3AB0 • French 6AV6 691-1BA01-3AC0 • Italian 6AV6 691-1BA01-3AD0 • Spanish 6AV6 691-1BA01-3AE0		
User Manual WinCC flexible Communication • German 6AV6 691-1CA01-3AA0 • English 6AV6 691-1CA01-3AB0 • French 6AV6 691-1CA01-3AC0 • Italian 6AV6 691-1CA01-3AD0 • Spanish 6AV6 691-1CA01-3AE0		
SIMATIC HMI Manual Collection B8 Electronic documentation, on DVD 5 languages (English, French, German, Italian, Spanish); contains: all currently available user manuals, manuals and communication manuals for SIMATIC HMI	B8 6AV6 691-1SA01-0AX0	

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

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

B8: Subject to export regulations: AL: N and ECCN: EAR99S

Component Based Automation Software

SIMATIC WinCC flexible RT

Ordering Data (continued)

Communication via Industrial Ethernet

CP 1613-A2

PCI card (32 bit) for connecting a PG/PC to Industrial Ethernet (communications software must be ordered separately)

6GK1 161-3AA01

SIMATIC Edition 2007

Software for S7 and open communication, incl. PG/OP communication, OPC server and NCM PC; up to 120 connections, runtime software, software and electronic manual on CD-ROM, license key on a USB stick, Class A, for 32-bit Windows XP Professional SP1, 2; Windows 2003 Server SP1, R2, SP2; Windows Vista Business/Ultimate for CP 1613/CP 1613 A2/CP 1623; German/English

- Single license for 1 installation B3
- Software Update Service for one year, with automatic extension; requirement: Current software version
- Upgrade S7-1613 from V6.4 to S7-1613 Edition 2007 B3
- Upgrade S7-1613 from V6.0, V6.1, V6.2 or V6.3 to S7-1613 Edition 2007 B3

6GK1 716-1CB70-3AA0

6GK1 716-1CB00-3AL0

6GK1 716-1CB00-3AE0

6GK1 716-1CB00-3AE1

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 2007

Software for S7 communication, incl. PG and FDL protocol, OPC server and NCM PC; runtime software, software and electronic manual on a USB stick, license key on diskette, Class A, for 32-bit Windows XP Professional SP1, 2; Windows 2003 Server SP1, R2, SP2; Windows Vista Business/Ultimate for CP 5613, CP 5613 A2, CP5613 FO, CP 5614, CP5614 A2; German/English

- Single license for 1 installation B3
- Software Update Service for one year, with automatic extension; requirement: Current software version
- Upgrade S7-5613 from V6.4 to S7-5613 Edition 2007 B3
- Upgrade S7-5613 from V6.0, V6.1, V6.2 or V6.3 to S7-5613 Edition 2007 B3

6GK1 713-5CB70-3AA0

6GK1 713-5CB00-3AL0

6GK1 713-5CB00-3AE0

6GK1 713-5CB00-3AE1

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

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

Comprising CP 5611 A2 (32-bit) and MPI cable, 5 m

B7

6GK1 561-1AM01

CP 5621

PCI Express X1 card (32-bit) for connecting a PG/PC to PROFIBUS or MPI

C2

6GK1 562-1AA00

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 use with Windows 2000/XP

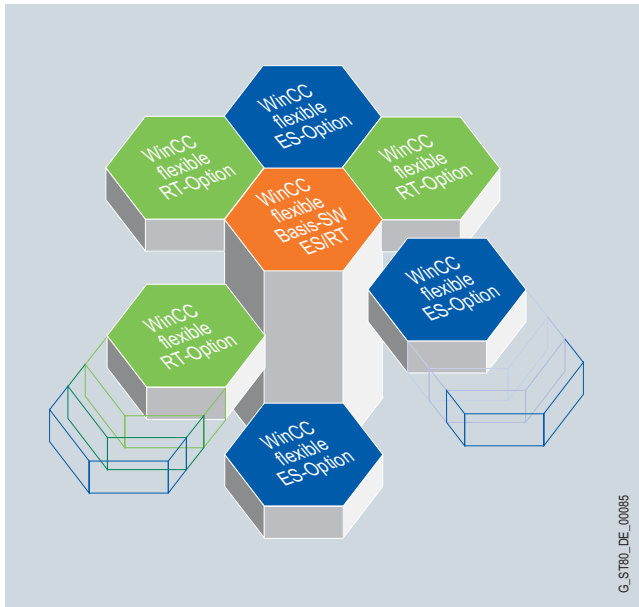
6ES7 972-0CB20-0XA0

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

B7: Subject to export regulations: AL: N and ECCN: EAR99H

C2: Subject to export regulations: AL: 5A002A1A2 and ECCN: 5A002A1A

Overview



Options for SIMATIC Panels/Multi Panels and 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. (a license is not required for Simatic Panels/Multi Panels)

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 (a license is not required for Simatic Panels/Multi Panels).

SIMATIC WinCC flexible/Audit

- Option for SIMATIC WinCC flexible Runtime as well as SIMATIC Panels for recording operations in an audit trail, and electronic signature.
- A convenient configuration process, which is included as standard in WinCC flexible 2005, is used to define the following:
 - Which user actions should be recorded in the audit trail during runtime.
 - Which important operator actions during execution time require electronic signature/commentary.
- The audit option combined with the WinCC flexible ES ChangeControl option supports the user with plant validation.
- Available for the following SIMATIC HMI systems:
 - TP/OP270, TP/OP277
 - MP270B, MP277
 - MP370, MP 377
 - WinCC flexible Runtime
- A license is required for every operator station (Panel and PC Runtime).

SIMATIC WinCC flexible/SIMATIC Logon

Option for connecting PCs with SIMATIC WinCC flexible Runtime and SIMATIC Panels to central user administration.

- Creates user administration on a central computer to which one or more WinCC flexible stations can be connected over Ethernet.
- With each logging-on/off of a user on one of the connected stations, SIMATIC Logon checks whether a user password has been created and that the required privileges exist.
- SIMATIC Logon for WinCC flexible supports the user in combination with the /Audit and /ChangeControl options in meeting requirements in accordance with FDA 21 CFR Part 11 and EU178.
- Available for the following SIMATIC HMI systems:
 - Mobile Panel 177, Mobile Panel 277
 - TP/OP 177B PN/DP
 - TP/OP 277
 - MP 177, MP 277, MP 377
 - WinCC flexible Runtime
- Licensing:
 - SIMATIC Logon (basic license) and SIMATIC Logon Remote Access (3-pack license) for connection of 3 WinCC flexible stations to the central user administration. Additional stations can be connected by using further SIMATIC Logon Remote Access licenses (3-pack/10-pack).

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/OP 177B PN/DP
 - TP/OP 270, TP/OP 277
 - MP 177, MP 270B, MP 277, MP 370, MP 377
 - 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.

Component Based Automation Software

SIMATIC WinCC flexible RT options

Overview (continued)

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/OP 177B PN/DP
 - TP/OP 270, TP/OP 277
 - MP 177, MP 270B, MP 277, MP 370, MP 377
 - WinCC flexible Runtime
- One license is required for each operator station.

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, MP 377 (use of OPC on XML basis)
 - WinCC flexible Runtime (use of OPC based on DCOM)
- 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
- Available for the following SIMATIC HMI systems:
 - Mobile Panel 277
 - TP/OP 270, TP/OP 277
 - MP 270B, MP 277, MP 370, MP 377
 - WinCC flexible Runtime

Component Based Automation

Controller / Distributed IO for Industrial Ethernet

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.

New with WinAC RTX 2008:

- Option for connecting distributed I/O via PROFINET. In addition to PROFINET IO, it is also possible to use PROFINET CBA and Open User Communication (open communication via TCP and UDP).

Ordering Data

Order No.

SIMATIC WinAC RTX 2008 B8 **6ES7 671-0RC06-0YA0**

Software-based PC-based control system for applications requiring a strictly deterministic response; PROFIBUS and PROFINET; CD-ROM with electronic documentation in English, French and German; Single License, running on Windows XP SP2

SIMATIC WinAC RTX 2008 Upgrade B8 **6ES7 671-0RC06-0YE0**

For upgrading from Basic/RTX V3.x, V4.0, V4.1 and 2005; Single License, executable on Windows XP SP2

SIMATIC WinAC NV128 B7 **6ES7 671-0AG00-1YA7**

PC plug-in card with non-volatile memory for the storage of up to 128 Kbyte of retentive data in the event of voltage failure

CP 5611 A2 communications processor **6GK1 561-1AA01**

PCI card (32-bit) for connection of a programming device or PC to PROFIBUS

CP 5613 A2 communications processor **6GK1 561-3AA01**

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

CP 1616 communications processor **6GK1 161-6AA00**

PCI Card (32-bit; 3.3/5 V universal keyed) with ASIC ERTEC 400 for connecting PCs to PROFINET IO with 4-port real-time switch (RJ45); incl. IO base software for PROFINET IO Controller (RT operation) and NCM PC; Single License for one installation, runtime software, software and electronic manual on CD-ROM, Class A, for 32-bit Windows XP Professional; German/English

CP 1604 Microbox Package **6GK1 160-4AU00**

Package for implementing the CP 1604 in the SIMATIC Microbox PC; comprising the CP 1604, connection board, power supply and expansion racks for Microbox PC; for use with Development Kit DK-16xx PN IO; NCM PC

B7: Subject to export regulations: AL: N and ECCN: EAR99H

B8: Subject to export regulations: AL: N and ECCN: EAR99S

Component Based Automation

Controller / Distributed IO for Industrial Ethernet

CP 343-1

Overview



ISO	TCP/UDP	PN	MRP	IT	IP-R	PG/OP	S7/S5
●	●	●		●		●	●

- Connection of SIMATIC S7-300/SINUMERIK 840D powerline to Industrial Ethernet
 - 2 x RJ45 interface for 10/100 Mbit/s full/half duplex connection with autosensing/autonegotiation and autocrossover function
 - Integral 2-port real-time switch ERTEC
 - Multi-protocol operation with ISO, TCP and UDP transport protocol and PROFINET I/O
 - Adjustable Keep Alive function
- Communication services:
 - Open communication (ISO, TCP/IP and UDP)
 - PROFINET IO Controller or PROFINET IO Device
 - Programming device/operator panel communication: Cross-network by means of S7 routing
 - S7 communication (client, server, multiplexing)
- 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 Industrial Ethernet
- Configuration with STEP 7
- Automatic setting of the CPU clock via Ethernet with NTP or SIMATIC procedure
- IT communication
 - Web function
- Integration in network management systems over SNMP (MIB2 diagnostic information)
- Diagnostic possibilities in STEP 7 and with web browser

Technical specifications

See section 4, page 4/209

Ordering Data

Order No.

CP 343-1 communications processor

For connection of SIMATIC S7 300 to Industrial Ethernet over ISO and TCP/IP; PROFINET IO Controller or PROFINET IO Device, integrated 2-port switch ERTEC; S7 communication, open communication (SEND/RECEIVE), FETCH/WRITE, with and without RFC 1006, multicast, DHCP, CPU clock synchronization via SIMATIC procedure and NTP, diagnostics, SNMP, access protection through IP access list, initialization over LAN 10/100 Mbit/s; with electronic manual on DVD

6GK7 343-1EX30-0XE0

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, splittable, UL approval, sold by the meter

6XV1 873-2A

SCALANCE X204-2 Industrial Ethernet switch

Industrial Ethernet switches with integral SNMP access, online 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

6GK5 204-2BB10-2AA3

Compact Switch Module CSM 377

Unmanaged switch for connection of a SIMATIC S7-300-CPU, ET 200M and as many as three further nodes to Industrial Ethernet operating at 10/100 Mbit/s; 4 x RJ45 ports; external 24 V DC power supply, LED diagnostics, S7-300 module including electronic device manual on CD-ROM

6GK7 377-1AA00-0AA0

IE FC RJ45 Plug 145

RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 145° cable outlet

- 1 pack = 1 unit
- 1 pack = 10 units
- 1 pack = 50 units

6GK1 901-1BB30-0AA0

6GK1 901-1BB30-0AB0

6GK1 901-1BB30-0AE0

Component Based Automation

Controller / Distributed IO for Industrial Ethernet

CP 343-1

Ordering Data (continued)	Order No.	Order No.
SOFTNET Edition 2007 for Industrial Ethernet Software for S7 and open communication, incl. OPC server, PG/OP communication and NCM PC, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32 bit Windows XP Professional SP1, 2, Windows 2003 Server SP1, R2, SP2, Windows Vista Business/ Ultimate; German/English		
SOFTNET-S7 Edition 2007 for Industrial Ethernet up to 64 connections		
Single license for 1 installation B3	6GK1 704-1CW70-3AA0	
Software Update Service for 1 year, with automatic extension; requirement: Current software version	6GK1 704-1CW00-3AL0	
Upgrade from V6.4 to 2007 edition B3	6GK1 704-1CW00-3AE0	
Upgrade from V6.0, V6.1, V6.2 or V6.3 to 2007 Edition B3	6GK1 704-1CW00-3AE1	
SOFTNET-S7 Lean Edition 2007 for Industrial Ethernet up to 8 connections		
Single License for 1 installation B3	6GK1 704-1LW70-3AA0	
Software Update Service for 1 year, with automatic extension; requirement: Current software version	6GK1 704-1LW00-3AL0	
Upgrade from V6.4 to 2007 edition B3	6GK1 704-1LW00-3AE0	
Upgrade from V6.0, V6.1, V6.2 or V6.3 to 2007 Edition B3	6GK1 704-1LW00-3AE1	
		S7-1613 Edition 2007 Software for S7 and open communication, incl. PG/OP communication, OPC server and NCM PC; up to 120 connections, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, SP2; Windows 2003 Server SP1, R2, SP2, Windows Vista Business/Ultimate; for CP 1613/CP 1613 A2/CP 1623; German/English
		Single License for 1 installation B3
		Software Update Service for 1 year, with automatic extension; requirement: Current software version
		Upgrade S7-1613 from V6.4 to 2007 Edition B3
		Upgrade S7-1613 from V6.0, V6.1, V6.2 or V6.3 to S7-1613 Edition 2007 B3
		STEP 7 Version 5.4 <i>Target system:</i> SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC <i>Requirement:</i> Windows 2000 Prof./XP Prof. <i>Delivery package:</i> German, English, French, Spanish, Italian; incl. 3.5" authorization diskette, without documentation
		Floating License on CD
		Rental license for 50 hours
		Software Update Service on CD (requires current software version)
		Upgrade Floating License 3.x/4.x/5.x to V5.4; on CD
		Trial License STEP 7 V5.4; on CD, runs for 14 days

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

Component Based Automation

Controller / Distributed IO for Industrial Ethernet

CP 343-1 Advanced

Übersicht



ISO	TCP/ UDP	PN	MRP	IT	IP-R	PG/OP	S7/S5
●	●	●	●	●	●	●	●

- Connection of SIMATIC S7-300/SINUMERIK 840D powerline to Industrial Ethernet
 - Multi-protocol operation with TCP and UDP transport protocol
 - Adjustable Keep Alive function
- Two separate interfaces (integrated network separation):
 - Gigabit interface with an RJ45 connection with 10/100/1000 Mbit/s full/half duplex with auto-sensing functionality
 - PROFINET interface with two RJ45 connections with 10/100 Mbit/s full/half duplex with auto-sensing and auto-crossover functionality via integrated 2-port switch

- Communication services via both interfaces:
 - Open communication (TCP/IP and UDP): Multicast for UDP, incl. routing between both interfaces
 - PG/OP communication:
 - Cross-network by means of S7 routing
 - S7 communication (client, server, multiplexing) incl. routing between both interfaces
 - IT communication:
 - HTTP communication allows access to process data via own web sites;
 - e-mail client function, sending of e-mails with authentication directly from the user program;
 - FTP communication allows program-controlled FTP client communication;
 - access to data blocks via FTP servers
- Communication services via PROFINET interfaces:
 - PROFINET IO Controller and IO Device with real-time properties (RT and IRT)¹⁾
 - PROFINET CBA
 - IP address assignment via DHCP, simple PC tool or via program block (e.g. for HMI)
- Configuration with STEP 7
- Access protection by means of a configurable IP access list
- Module replacement without PG; all information is stored on the C-PLUG (also file system for IT functions)
- Extensive diagnostic functions for all modules in the rack
- IT communication
 - Web function
 - E-mail function
 - FTP
- Integration in network management systems over SNMP (MIB2 diagnostic information)

- 1) Possible combinations in parallel mode:
- IO Controller with IRT and IO Device with RT
 - IO Controller with RT and IO Device using IRT

Technical specifications

See section 4, page 4/212

Component Based Automation

Controller / Distributed IO for Industrial Ethernet

CP 343-1 Advanced

Ordering Data	Order No.	Order No.
CP 343-1 Advanced communications processor For the connection of SIMATIC S7-300 to Industrial Ethernet; PROFINET IO Controller and IO Device with RT and IRT, MRP, PROFINET CBA, TCP/IP and UDP, S7 communication, open communication (SEND/RECEIVE), FETCH/WRITE, with and without RFC 1006, diagnostic 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 DVD	6GK7 343-1GX30-0XE0	S7-1613 Edition 2007 Software for S7 and open communication, incl. PG/OP communication, OPC server and NCM PC; up to 120 connections, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2; Windows 2003 Server SP1, R2, SP2, Windows Vista Business/Ultimate; for CP 1613/CP 1613 A2/CP 1623; German/English • Single License for 1 installation B3 • Software Update Service for 1 year, with automatic extension; requirement: Current software version • Upgrade S7-1613 from V6.4 to S7-1613 2007 Edition B3 • Upgrade S7-1613 from V6.0, V6.1, V6.2 or V6.3 to S7-1613 2007 Edition B3
C-PLUG Swap medium for simple replacement of devices in the event of a fault; for storing configuration or engineering and application data; can be used for SIMATIC NET products with C-PLUG slot	6GK1 900-0AB00	• Upgrade S7-1613 from V6.4 to S7-1613 2007 Edition B3 • Upgrade S7-1613 from V6.0, V6.1, V6.2 or V6.3 to S7-1613 2007 Edition B3
SOFTNET Edition 2007 for Industrial Ethernet Software for S7 and open communication, incl. OPC server, PG/OP communication and NCM PC, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2; Windows 2003 Server SP1, R2, SP2; Windows Vista Business/Ultimate; German/English		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/CPU's with Industrial Ethernet interface • 1 pack = 1 unit • 1 pack = 10 units • 1 pack = 50 units
SOFTNET-S7 Edition 2007 for Industrial Ethernet up to 64 connections • Single License for 1 installation B3 • Software Update Service for 1 year, with automatic extension; requirement: Current software version • Upgrade from V6.4 to 2007 edition B3 • Upgrade from V6.0, V6.1, V6.2 or V6.3 to 2007 Edition B3	6GK1 704-1CW70-3AA0 6GK1 704-1CW00-3AL0 6GK1 704-1CW00-3AE0 6GK1 704-1CW00-3AE1	IE FC RJ45 Plug 4 x 2 RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbit/s) with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPU's with Industrial Ethernet interface • 1 pack = 1 unit • 1 pack = 10 units • 1 pack = 50 units
SOFTNET-S7 Lean Edition 2007 for Industrial Ethernet up to 8 connections • Single License for 1 installation B3 • Software Update Service for 1 year, with automatic extension; requirement: Current software version • Upgrade from V6.4 to 2007 edition B3 • Upgrade from V6.0, V6.1, V6.2 or V6.3 to 2007 Edition B3	6GK1 704-1LW70-3AA0 6GK1 704-1LW00-3AL0 6GK1 704-1LW00-3AE0 6GK1 704-1LW00-3AE1	Compact Switch Module CSM 377 Unmanaged switch for connection of a SIMATIC S7-300-CPU, ET 200M and as many as three further nodes to Industrial Ethernet operating at 10/100 Mbit/s; 4 x RJ45 ports; external 24 V DC power supply, LED diagnostics, S7-300 module including electronic equipment manual on CD-ROM

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

Component Based Automation

Controller / Distributed IO for Industrial Ethernet

CP 343-1 Advanced

Ordering Data (continued)	Order No.		Order No.
SCALANCE X204-2 Industrial Ethernet switch with four 10/100 Mbit/s RJ45 ports and two fiber-optic ports	6GK5 204-2BB10-2AA3	SIMATIC iMap V3.0 for configuring PROFINET CBA, <i>Requirement:</i> 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 <i>Type of supply:</i> German, English, with electronic documentation • Single License • Software Update Service • Upgrade to V3.0, Single License	
Industrial Ethernet switch SCALANCE X308-2 2 x 1000 Mbit/s multimode fiber-optic ports (SC sockets), 1 x 10/100/1000 Mbit/s RJ45 port, 7 x 10/100 Mbit/s RJ45 ports; for glass fiber-optic cables (multimode) up to a max. 750 m.	6GK5 308-2FL00-2AA3		
STEP 7 Version 5.4 <i>Target system:</i> SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC <i>Requirement:</i> Windows 2000 Prof./XP Prof. <i>Delivery package:</i> German, English, French, Spanish, Italian; incl. 3.5" authorization diskette, without documentation • Floating license on CD • Rental license for 50 hours • Software Update Service on CD (requires current software version) • Upgrade Floating License 3.x/4.x/5.x to V5.4; on CD • Trial License STEP 7 V5.4; on CD, runs for 14 days	6ES7 810-4CC08-0YA5 6ES7 810-4CC08-0YA6 6ES7 810-4BC01-0YX2 6ES7 810-4CC08-0YE5 6ES7 810-4CC08-0YA7		6ES7 820-0CC04-0YA5 6ES7 820-0CC01-0YX2 6ES7 820-0CC04-0YE5

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

Overview



ISO	TCP/ UDP	PN	MRP	IT	IP-R	PG/OP	S7/S5
●	●	●	●			●	●

- Connection of SIMATIC S7-400 to Industrial Ethernet
 - 2 x RJ45 interface for 10/100 Mbit/s full/half duplex connection with autosensing/autonegotiation and autocrossover function
 - Integrated real-time switch ERTEC with two ports
 - Multi-protocol operation for ISO, TCP/IP, UDP and PROFINET IO protocols
 - Adjustable Keep Alive function
- Communication services:
 - Open communication (ISO, TCP/IP and UDP)
 - PROFINET IO Controller with real-time properties RT and IRT
 - PG/OP communication: Across networks by means of S7 routing
 - S7 communication
- Multicast for UDP
- Access protection by means of configurable access list
- Support for fail-safe programmable controllers in combination with SIMATIC S7-400 CPU 416F-3 PN/DP
- Module replacement without PG
- SIMATIC H system operation for redundant S7 communication
- Configuration with STEP 7
- Diagnostic possibilities in STEP 7 and with web browser
- Automatic setting of the CPU clock by means of Industrial Ethernet with NTP or SIMATIC procedure
- Integration of network management systems via SNMP (MIB II diagnostic information)

Technical specifications

See section 5, page 5/113

Component Based Automation

Controller / Distributed IO for Industrial Ethernet

CP 443-1

Ordering Data	Order No.	Order No.
CP 443-1 communications processor For connecting SIMATIC S7-400 to Industrial Ethernet through TCP/IP, ISO and UDP; PROFINET IO Controller, integrated real-time switch ERTEC with two ports; 2 x RJ45 interface; S7 communication, open communication (SEND/RECEIVE) with FETCH/WRITE, with and without RFC 1006, DHCP, SNMP V2, diagnostics, multicast, access protection over IP access list, initialization over LAN 10/100 Mbit/s with electronic manual on DVD	A8 6GK7 443-1EX20-0XE0	SOFTNET-S7 Lean Edition 2007 for Industrial Ethernet (cont.) up to 64 connections • Upgrade from V6.4 to 2007 edition B3 6GK1 704-1CW00-3AE0 • Upgrade from V6.0, V6.1, V6.2 or V6.3 to 2007 Edition B3 6GK1 704-1CW00-3AE1
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	SOFTNET-S7 Lean Edition 2007 for Industrial Ethernet up to 8 connections • Single license for 1 installation B3 6GK1 704-1LW70-3AA0 • Software Update Service for 1 year, with automatic extension; requirement: Current software version B3 6GK1 704-1LW00-3AL0 • Upgrade from V6.4 to 2007 Edition B3 6GK1 704-1LW00-3AE0 • Upgrade from V6.0, V6.1, V6.2 or V6.3 to 2007 Edition B3 6GK1 704-1LW00-3AE1
FO Standard Cable GP (50/125) Standard cable, splittable, UL approval, sold by the meter	6XV1 873-2A	
SCALANCE X204-2 Industrial Ethernet switch Industrial Ethernet switches with integral SNMP access, online 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	6GK5 204-2BB10-2AA3	
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; for network components and CPs/CPUs with Industrial Ethernet interface • 1 pack = 1 unit • 1 pack = 10 units • 1 pack = 50 units	6GK1 901-1BB10-2AA0 6GK1 901-1BB10-2AB0 6GK1 901-1BB10-2AE0	S7-1613 Edition 2007 Software for S7 and open communication, incl. PG/OP communication, OPC server and NCM PC; up to 120 connections, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2; Windows 2003 Server SP1, R2, SP2, Windows Vista Business/Ultimate; for CP 1613/CP 1613 A2/CP 1623; German/English • Single license for 1 installation B3 6GK1 716-1CB70-3AA0 • Software Update Service for 1 year, with automatic extension; requirement: Current software version B3 6GK1 716-1CB00-3AL0 • Upgrade S7-1613 from V6.4 to 2007 Edition B3 6GK1 716-1CB00-3AE0 • Upgrade S7-1613 from V6.0, V6.1, V6.2 or V6.3 to S7-1613 Edition 2007 B3 6GK1 716-1CB00-3AE1
SOFTNET Edition 2007 for Industrial Ethernet Software for S7 and open communication, incl. OPC server, PG/OP communication and NCM PC, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2, Windows 2003 Server SP1, R2, SP2, Windows Vista Business/Ultimate; German/English SOFTNET-S7 Edition 2007 for Industrial Ethernet up to 64 connections • Single license for 1 installation B3 6GK1 704-1CW70-3AA0 • Software Update Service for 1 year, with automatic extension; requirement: Current software version B3 6GK1 704-1CW00-3AL0		STEP 7 Version 5.4 <i>Target system:</i> SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC <i>Requirement:</i> Windows 2000 Prof./XP Prof. <i>Delivery package:</i> German, English, French, Spanish, Italian; incl. 3.5" authorization diskette, without documentation • Floating license on CD 6ES7 810-4CC08-0YA5 • Floating license on CD 6ES7 810-4CC08-0YA6 • Rental license for 50 hours 6ES7 810-4BC01-0YX2 • Software Update Service on CD (requires current software version) 6ES7 810-4CC08-0YE5 • Upgrade Floating License 3.x/4.x/5.x to V5.4; on CD 6ES7 810-4CC08-0YA7

A8: Subject to export regulations: AL: N and ECCN: 5A991X

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

Component Based Automation

Controller / Distributed IO for Industrial Ethernet

CP 443-1 Advanced

Overview



ISO	TCP/UDP	PN	MRP	IT	IP-R	PG/OP	S7/S5
●	●	●	●	●	●	●	●

- Connection of SIMATIC S7-400 to Industrial Ethernet
 - Multi-protocol operation for ISO, TCP/IP, UDP and PROFINET IO protocols
 - Adjustable Keep Alive function
- Two separate interfaces (integrated network separation):
 - Gigabit interface with an RJ45 connection with 10/100/1000 Mbit/s full/half duplex with auto-sensing functionality
 - PROFINET interface with four RJ45 connections with 10/100 Mbit/s full/half duplex with auto-sensing and auto-crossover functionality via integrated 4-port switch
- Communication services via both interfaces
 - Open communication (ISO, TCP/IP and UDP), Multicast with UDP, incl. routing between two interfaces
 - PG/OP communication:
 - Cross-network by means of S7 routing
 - S7 communication (client, server, multiplexing) incl. routing between both interfaces
 - IT communication:
 - HTTP communication allows access to process data via own web sites;
 - e-mail client function, sending of e-mails with authentication directly from the user program;
 - FTP communication allows program-controlled FTP client communication;
 - access to data blocks via FTP servers
- Communication services via PROFINET interface
 - PROFINET IO Controller with real-time properties (RT and IRT)
 - PROFINET CBA
 - IP address assignment via DHCP, simple PC tool or via the user program (e.g. HMI)
 - Support of prioritized start-ups of PROFINET IO Devices
- Configuration with STEP 7
- Access protection by means of a configurable IP access list
- Module replacement without PG; 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
- Operation in SIMATIC H system for redundant S7 communication
- Operation in fail-safe applications (PROFIsafe) together with SIMATIC S7-400 CPU 416F

Technical specifications

See section 5, page 5/116

Ordering Data

Order No.

CP 443-1 Advanced communications processor

For the connection of SIMATIC S7-400 to Industrial Ethernet; PROFINET IO Controller with RT and IRT, MRP, PROFINET CBA; TCP/IP, ISO and UDP; S7 communication, open communication (SEND/RECEIVE) with FETCH/WRITE, with and without RFC 1006, diagnostic expansions, multicast, clock synchronization by means of SIMATIC procedure or NTP, access protection by means of IP access list, FTP client/server, HTTP server, HTML diagnostics, SNMP, DHCP, e-mail, data storage on C-PLUG; PROFINET connection: 4 x RJ45 (10/100 Mbit/s) via switch; Gigabit connection: 1 x RJ45 (10/100/1000 Mbit/s); with electronic manual on DVD

- For use with SIMATIC S7-400 CPU, V5.2 or higher;

A8 **6GK7 443-1GX20-0XE0**

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

6GK1 900-0AB00

SOFTNET Edition 2007 for Industrial Ethernet

Software for S7 and open communication, incl. OPC server, PG/OP communication and NCM PC, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2, Windows 2003 Server SP1, R2, SP2; Windows Vista Business/Ultimate; German/English

SOFTNET-S7 Edition 2007 for Industrial Ethernet

up to 64 connections

- Single License for 1 installation B3
- Software Update Service for 1 year, with automatic extension; requirement: Current software version
- Upgrade from V6.4 to 2007 edition B3
- Upgrade from V6.0, V6.1, V6.2 or V6.3 to 2007 Edition B3

6GK1 704-1CW70-3AA0**6GK1 704-1CW00-3AL0****6GK1 704-1CW00-3AE0****6GK1 704-1CW00-3AE1**

A8: Subject to export regulations: AL: N and ECCN: 5A991X

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

Component Based Automation

Controller / Distributed IO for PROFIBUS

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 and 4/22.

Component Based Automation

Controller / Distributed IO for PROFIBUS

Central processing units of the S7-300

Ordering Data		Order No.	Order No.	
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		6ES7 313-6CF03-0AB0	Power supply connector 10 units, spare part	6ES7 391-1AA00-0AA0
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		6ES7 314-6CG03-0AB0	Labeling strips 10 units, spare part	6ES7 392-2XX00-0AA0
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	Label cover 10 units, spare part	6ES7 392-2XY00-0AA0
Micro Memory Card 64 KB 128 KB 512 KB 2 MB 4 MB 8 MB		6ES7 953-8LF20-0AA0 6ES7 953-8LG11-0AA0 6ES7 953-8LJ20-0AA0 6ES7 953-8LL20-0AA0 6ES7 953-8LM20-0AA0 6ES7 953-8LP20-0AA0	S7 SmartLabel B8 Software for automatic labeling of modules direct from the STEP 7 project	2XV9 450-1SL01-0YX0
MPI cable For connecting SIMATIC S7 and the PG through MPI; 5 m in length		6ES7 901-0BF00-0AA0	Labeling sheets for machine inscription For 16-channel signal modules, DIN A4, for printing with laser printer; 10 units petrol light-beige yellow red For 32-channel signal modules, DIN A4, for printing with laser printer; 10 units petrol light-beige yellow red	6ES7 392-2AX00-0AA0 6ES7 392-2BX00-0AA0 6ES7 392-2CX00-0AA0 6ES7 392-2DX00-0AA0 6ES7 392-2AX10-0AA0 6ES7 392-2BX10-0AA0 6ES7 392-2CX10-0AA0 6ES7 392-2DX10-0AA0
Front connector (1 unit) for compact CPUs 40-pin, with screw contacts • 1 unit • 100 units 40-pin with spring-loaded contacts • 1 unit • 100 units 40-pin, with FastConnect • 1 unit		6ES7 392-1AM00-0AA0 6ES7 392-1AM00-1AB0 6ES7 392-1BM01-0AA0 6ES7 392-1BM01-1AB0 6ES7 392-1CM00-0AA0	PROFIBUS DP bus connector RS 485 • With 90° cable outlet, max. transmission rate 12 Mbit/s - Without programming device interface - With programming device interface • With 90° cable outlet for FastConnect connection system, max. transmission rate 12 Mbit/s - Without programming device interface - With programming device interface • With axial cable outlet for SIMATIC OP, for connecting to PPI, MPI, PROFIBUS	6ES7 972-0BA12-0XA0 6ES7 972-0BB12-0XA0 6ES7 972-0BA51-0XA0 6ES7 972-0BB51-0XA0 6GK1 500-0EA02
SIMATIC TOP connect See page 4/218 For information about which components can be used for the respective module, see I DT/IA Mall or Catalog KT 10.2				
Slot number plates		6ES7 912-0AA00-0AA0		
S7-300 manual Design, CPU data, module data, instruction list German English French Spanish Italian		6ES7 398-8FA10-8AA0 6ES7 398-8FA10-8BA0 6ES7 398-8FA10-8CA0 6ES7 398-8FA10-8DA0 6ES7 398-8FA10-8EA0	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
SIMATIC Manual Collection	B3	6ES7 998-8XC01-8YE0	RS 485 repeater for PROFIBUS Data transfer rate up to 12 Mbit/s; 24 V DC; IP20 housing	6ES7 972-0AA01-0XA0
SIMATIC Manual Collection update service for 1 year	B3	6ES7 998-8XC01-8YE2	PROFIBUS bus components For establishing MPI/PROFIBUS communication	See catalogs IK PI, CA 01

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

B8: Subject to export regulations: AL: N and ECCN: EAR99S

Component Based Automation

Controller / Distributed IO for PROFIBUS

IM 151-7 CPU interface modules

Overview



- Interface module for SIMATIC ET 200S with integrated S7-CPU 314
- 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
- Also available as IM 151-8(F) PN/DP CPU with PROFINET interface

Note:

Micro Memory Card required for operation of CPU.

Technical specifications

	6ES7 151-7AB00-0AB0	6ES7 151-7AA20-0AB0
Product status		
associated programming package		STEP7 V5.2 SP1 or higher + HW update
Load voltage L+		
• Rated value (DC)		24 V
• permissible range, lower limit (DC)		20.4 V
• permissible range, upper limit (DC)		28.8 V
• Short-circuit protection		Yes
• reverse polarity protection		Yes
Current consumption		
Inrush current, max.	3.5 A	
Current output to backplane bus (DC 5 V), max.		700 mA
from supply voltage 1L+, max.		250 mA; 280 mA with DP master module
Current consumption/ power loss		
Power loss, typ.		3.3 W
Memory		
Type of storage		
RAM		
• integrated	48 Kibyte; as of FW V1.13 48 KB; previously 24 KB	96 Kibyte; For program and data
• expandable		No
Load memory		
• pluggable (MMC)		Yes
• pluggable (MMC), max.		8 MByte

	6ES7 151-7AB00-0AB0	6ES7 151-7AA20-0AB0
CPU/blocks		
Number of blocks (total)		1 024; (DBs, FCs, FBs); the maximum number of loadable blocks can be reduced by the MMC used.
DB		
• Number, max.	127	511; Number range: 1 to 511
• Size, max.		16 Kibyte
FB		
• Number, max.	128	1 024; Number range: 0 to 2047
• Size, max.		16 Kibyte
FC		
• Number, max.	128	1 024; Number range: 0 to 2047
• Size, max.		16 Kibyte
OB		
• Size, max.		16 Kibyte
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

Component Based Automation

Controller / Distributed IO for PROFIBUS

IM 151-7 CPU interface modules

Technical specifications (continued)

	6ES7 151-7AB00-0AB0	6ES7 151-7AA20-0AB0
Times/counters and their remanence		
S7 counter		
• Number	256	256
• Remanence		Yes
- adjustable		0
- lower limit		255
- upper limit		From Z 0 to Z 7
- preset		
• 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		Yes
- adjustable		0
- lower limit		255
- upper limit		No retentivity
- preset		
• 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)
Retentive data area in total (incl. times, counters, flags), max.	4 Kibyte	64 Kibyte
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; Number range: 1 to 511
• Size, max.		16 Kibyte
Local data		
• per priority class, max.		510 byte

	6ES7 151-7AB00-0AB0	6ES7 151-7AA20-0AB0
Address area		
I/O address area		
• Inputs		2 048 byte
• Outputs		2 048 byte
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
Addressing volume		
• Outputs	244 byte	
• Inputs	244 byte	
Hardware config.		
Number of modules per system, max.	63	63; Centralized
Connectable programming devices/PCs	PGs/OPs with STEP 7 connectable via PROFIBUS interface	
Time		
Clock		
• Hardware clock (real-time clock)		Yes
• buffered and synchronizable		Yes
• Backup time		6 Weeks; 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 SFC 101)
• Granularity		1 hour
• remanent		Yes; Must be restarted at each restart

Component Based Automation

Controller / Distributed IO for PROFIBUS

IM 151-7 CPU interface modules

Technical specifications (continued)

	6ES7 151-7AB00-0AB0	6ES7 151-7AA20-0AB0
Clock synchronization		
• supports		Yes
• to MPI, Master		Yes
• to MPI, Slave		Yes
• to DP, Master		Yes
• to DP, Slave		Yes
• in AS, Master		No
• in AS, Slave		No
S7 message functions		
Number of login stations for message functions, max.		12
Process diagnostic messages		Yes; ALARM_S, ALARM_SC, ALARM_SQ, ALARM_D, ALARM_DQ
simultaneously active Alarm-S blocks, max.		40
Test commissioning functions		
Status/control		
• Status/control variable		Yes
• Variables		Inputs, outputs, memory bits, DB, times, counters
• Number of variables, max.		30
• of which status variable, max.		30
• of which control variable, max.		14
Forcing		
• Forcing		Yes
• Force, variables		Inputs, outputs
• 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 151-7AA20-0AB0
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
MPI		
• Number of connections		12; Notice: 12 connections per CPU, not per interface

Technical specifications (continued)

	6ES7 151-7AB00-0AB0	6ES7 151-7AA20-0AB0
- Services - PG/OP communication - Routing - Global data communication - S7 basic communication - S7 communication - S7 communication, as client - S7 communication, as server - equidistance support - SYNC/FREEZE - Activation/deactivation of DP slaves - direct data exchange (cross traffic) - DPV1 - Transmission speeds, max. - Number of DP slaves, max. - Address area - Inputs, max. - Outputs, max. - Useful data per DP slave - Inputs, max. - Outputs, max.		Yes Yes No Yes; 1 blocks only Yes No Yes Yes Yes Yes Yes Yes 12 MBit/s 32; Per station 2 Kibyte 2 Kibyte 244 byte 244 byte
Isochronous mode		
Isochronous 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)
Programming language		
- STEP 7 - LAD - FUP - AWL - SCL - GRAPH	Yes	Yes Yes Yes Yes Yes; Optional Yes; Optional
Operational stocks	Binary logic operations, 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

Component Based Automation

Controller / Distributed IO for PROFIBUS

IM 151-7 CPU interface modules

Technical specifications (continued)

	6ES7 151-7AB00-0AB0	6ES7 151-7AA20-0AB0
Nesting levels	8	8
User program protection/password protection	Yes	Yes
System functions (SFC)	Interrupt and error processing, copy data, clock functions, diagnostic functions, module parameterization, operating mode transitions	See instruction list
System function blocks (SFB)		See instruction list
Isolation		
Isolation checked with		500 V DC
Isolation		
between load voltage and all other switching components		Yes
between PROFIBUS DP all other circuits		Yes

	6ES7 151-7AB00-0AB0	6ES7 151-7AA20-0AB0
Permissible potential difference		
between different circuits		75 V DC / 60 V AC
Environmental requirements		
Operating temperature		
• min.	0 °C	
• max.	60 °C	
Dimensions		
Dimensions		
• 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; DP master module: Approx. 100 g

Component Based Automation

Controller / Distributed IO for PROFIBUS

IM 151-7 CPU interface modules

Ordering Data	Order No.		Order No.
IM 151-7 CPU FO interface module (48 K) Including termination module	6ES7 151-7AB00-0AB0	Label sheets DIN A4 (10 units) Each sheet contains 60 label strips for peripheral modules and 20 label strips for interface modules	
IM 151-7 CPU interface module (96 K) Including termination module	6ES7 151-7AA20-0AB0	• petrol • red • yellow • light beige	6ES7 193-4BH00-0AA0 6ES7 193-4BD00-0AA0 6ES7 193-4BB00-0AA0 6ES7 193-4BA00-0AA0
Accessories		ET 200S distributed I/O system manuals are available in the Internet as PDF files: http://www.siemens.com/simatic-docu	
MMC 64 KB ¹⁾ for program backup	6ES7 953-8LF20-0AA0	Terminating module as spare part for ET 200S	6ES7 193-4JA00-0AA0
MMC 128 KB ¹⁾ for program backup	6ES7 953-8LG11-0AA0	SIMATIC S5, 35 mm DIN rail	
MMC 512 KB ¹⁾ for program backup	6ES7 953-8LJ20-0AA0	• Length: 483 mm for 19" cabinets • Length: 530 mm for 600 mm cabinets • Length: 830 mm for 900 mm cabinets • Length: 2 m	6ES5 710-8MA11 6ES5 710-8MA21 6ES5 710-8MA31 6ES5 710-8MA41
MMC 2 MB ¹⁾ for program backup and/or firmware update	6ES7 953-8LL20-0AA0		
MMC 4 MB ¹⁾ for program backup	6ES7 953-8LM20-0AA0		
MMC 8 MB ¹⁾ for program backup	6ES7 953-8LP20-0AA0		
External prommer for e.g. MMC with USB interface	6ES7 792-0AA00-0XA0		
PG with integrated MMC interface	on request		

1) For operating the CPU, an MMC is essential

Component Based Automation

Network transitions

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 according to PROFINET standard:
 - From the viewpoint of the I/O controller, all DP slaves are handled like I/O devices of the Ethernet interface, such as I/O devices with an 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 programming device, using the C-PLUG swap media for backing up the configuration data

Technical specifications

Product type description	IE/PB Link PN IO
Data transmission rates • Industrial Ethernet • PROFIBUS	10/100 Mbit/s autosensing 9.6 kbit/s to 12 Mbit/s incl. 45.45 kbit/s (PROFIBUS PA)
Interfaces • Connection to Industrial Ethernet - AUI (10 Mbit/s) - 10BaseT/100BaseT • Connection to PROFIBUS • Connection for supply voltage	15-pin Sub-D socket RJ45 9-pin Sub-D socket 4-pin terminal block
Supply voltage	24 V 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 • Transport/storage temperature • Relative humidity, max.	0 °C ... + 60 °C - 40 °C ... + 70 °C 95 % at +25 °C
Construction • Module format • Dimensions (W x H x D) in mm • Weight	S7-300 construction 80 x 125 x 120 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

Component Based Automation

Network transitions

IE/PB Link PN IO

Ordering Data	Order No.		Order No.
IE/PB Link PN IO Network transition between Industrial Ethernet and PROFIBUS with PROFINET IO functionality, TCP/IP, S7 routing and data record routing, 10/100 Mbit/s Fast Ethernet, 9.6 to 12 Mbit/s PROFIBUS; including electronic manual on CD-ROM German, English, French, Spanish, Italian	6GK1 411-5AB00	SCALANCE X204-2 Industrial Ethernet switch with four 10/100 Mbit/s RJ45 ports and two fiber-optic ports	6GK5 204-2BB10-2AA3
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; for network components and CPs/CPUs with Industrial Ethernet interface • 1 pack = 1 unit • 1 pack = 10 units • 1 pack = 50 units	6GK1 901-1BB10-2AA0 6GK1 901-1BB10-2AB0 6GK1 901-1BB10-2AE0	Industrial Ethernet Switch SCALANCE X308-2 2 x 1000 Mbit/s multi-mode fiber-optic ports (SC sockets), 1 x 10/100/1000 Mbit/s RJ45 port, 7 x 10/100 Mbit/s RJ45 ports; for glass fiber-optic cables (multi-mode) up to a max. 750 m.	6GK5 308-2FL00-2AA3
		C-PLUG Swap medium for simple replacement of devices in the event of a fault; for storing configuration or engineering and application data; can be used for SIMATIC NET products with C-PLUG slot	6GK1 900-0AB00

Overview



10/2 SIMATIC ET 200

- 10/2 General
- 10/3 SIMATIC ET 200iSP
- 10/4 SIMATIC ET 200M
- 10/4 SIMATIC ET 200S
- 10/5 SIMATIC ET 200S COMPACT
- 10/5 SIMATIC ET 200L
- 10/6 SIMATIC ET 200eco
- 10/6 SIMATIC ET 200pro
- 10/7 SIMATIC ET 200R

10/8 SIMATIC PCS 7

10/10 SIMATIC HMI

- 10/10 General
- 10/11 SIMATIC TD 400C
- 10/11 Mobile Panel 177 / Mobile Panel 277
- 10/13 Basic Panels
- 10/13 SIMATIC TP 177B (incl. INOX)
- 10/14 SIMATIC MP 177
- 10/14 SIMATIC MP 277 (incl. INOX)
- 10/15 SIMATIC MP 377
- 10/15 SIMATIC WinAC MP
- 10/16 SIMATIC THIN CLIENT

10/17 SIMATIC NET

- 10/17 General
- 10/18 Industrial Ethernet/PROFINET
- 10/20 Industrial Wireless Communication
- 10/21 PROFIBUS
- 10/22 AS-Interface
- 10/23 Telecontrol
- 10/24 Supplementary components

10/26 SIMATIC PC

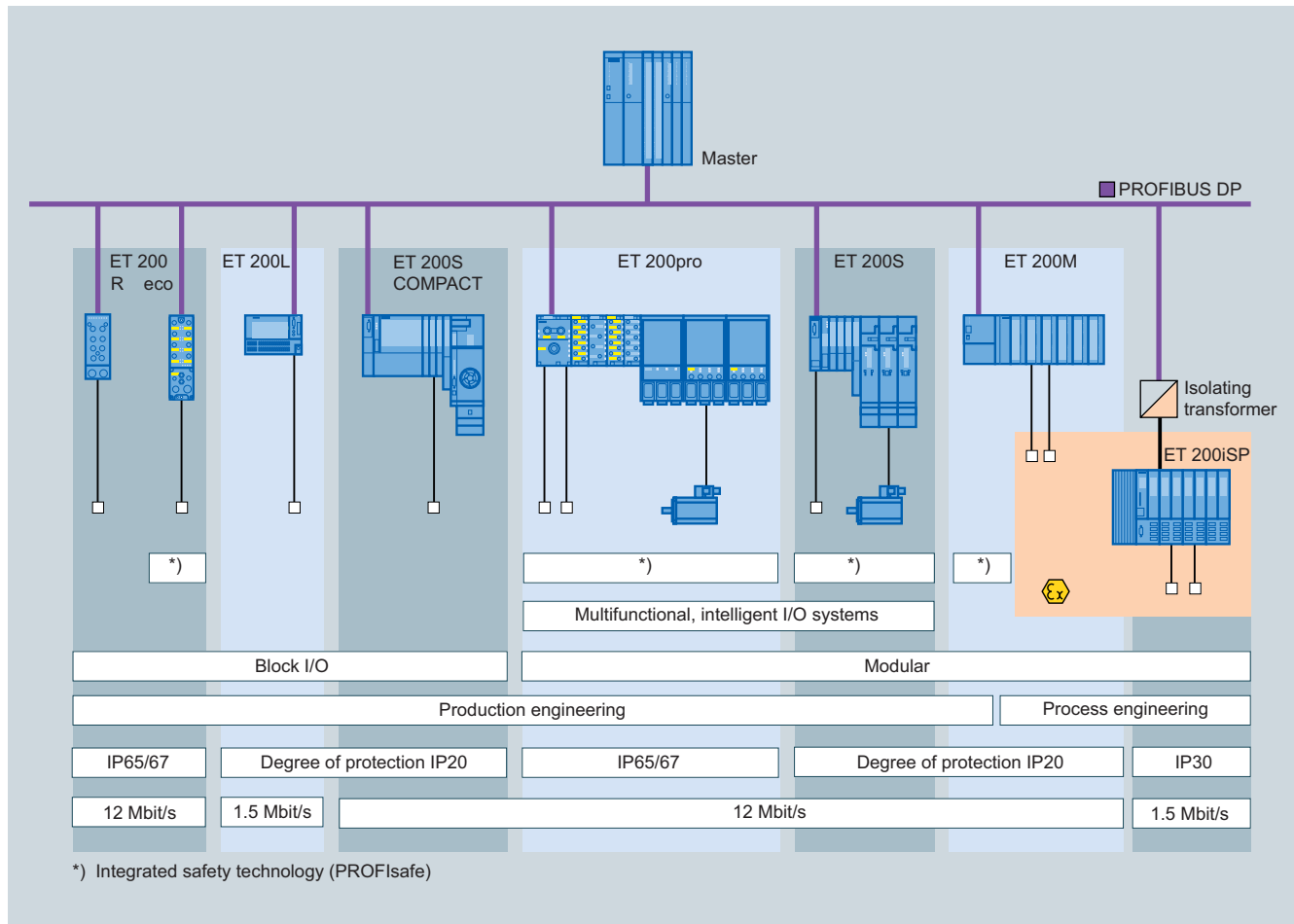
- 10/26 SIMATIC Rack PC
- 10/27 SIMATIC Box PC
- 10/28 SIMATIC Panel PC

10/29 SIMATIC Sensors

Overview SIMATIC ET 200

General

Overview



- 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.

Application

SIMATIC ET 200 can provide the ideal distributed solution for all industries and applications:

- Can be used in factory automation as well as for process engineering, even in hazardous areas.
- IP65/67 degree of protection (without control cabinet) and IP20 (with control cabinet).
- Designs ranging from low-cost up 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.

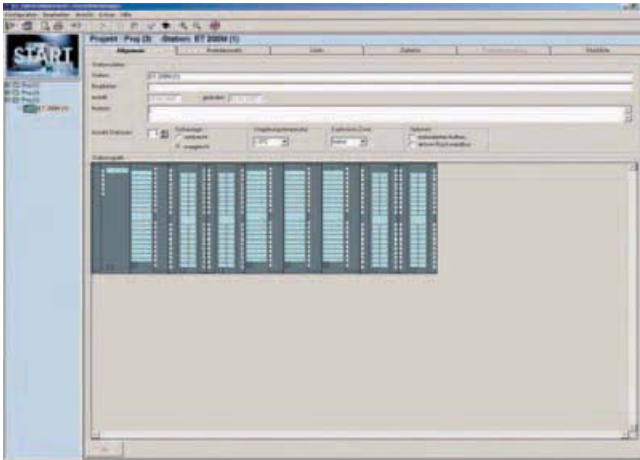
Diagnostics

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

SIMATIC ET 200iSP

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:

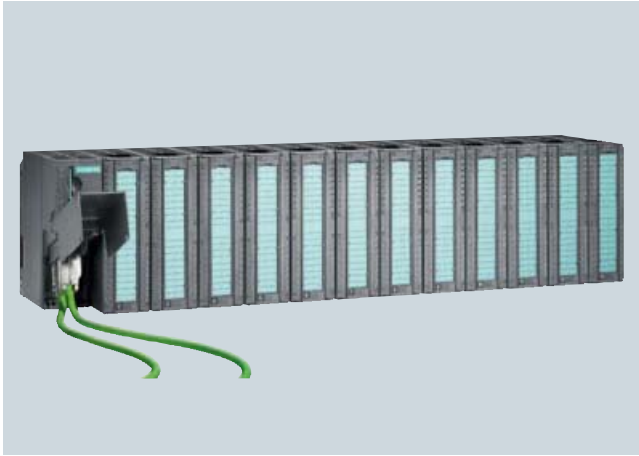
- Catalogs IK PI, CA 01
- Internet: www.siemens.com/et200iSP
www.siemens.com/et200 (general)

Overview

SIMATIC ET 200

SIMATIC ET 200M

Overview



- Modular I/O device with IP20 degree of protection, particularly suitable for individual and complex automation tasks
- Communication over PROFIBUS (up to 12 Mbit/s) or PROFINET

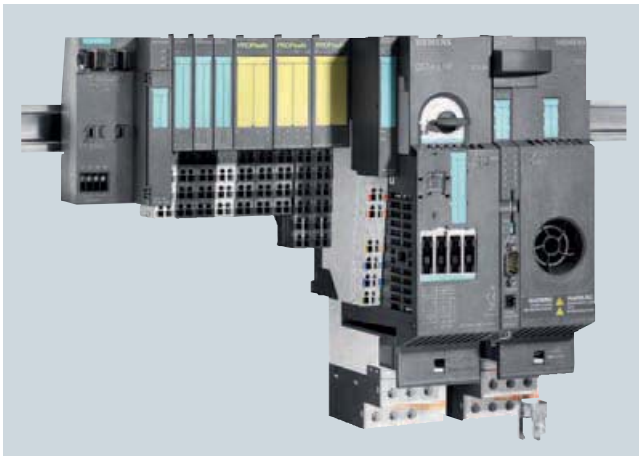
- Can be expanded with the signal, communications and function modules of the S7-300 automation system
- Compatible Ex analog input and output modules with HART optimize the ET 200M for use in process engineering
- Can be used in redundant systems (S7-400H, S7-400F/FH)
- Comprises a PROFIBUS DP IM 153 interface module, up to twelve 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
- Configuration changes during operation (CiR)
- Can be supplied with integrated fiber optic interface if required.
- 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



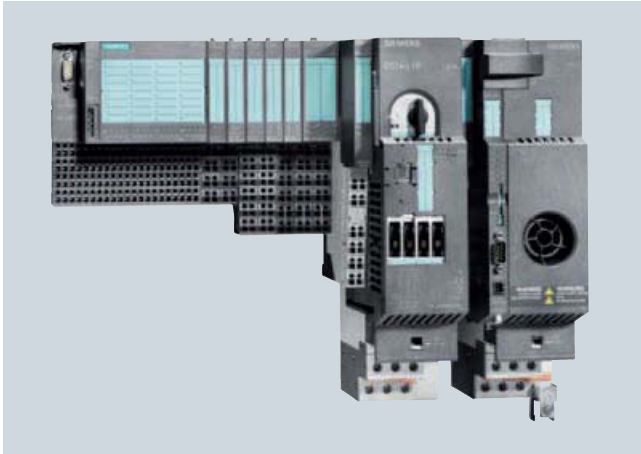
- Distributed I/O system with IP20 degree of protection which requires little wiring, also for extremely time-critical and isochronous tasks, e.g. fast closed-loop controls
- Bit-modular design for exact adaptation to the automation task in hand.
- Communication using PROFIBUS (up to 12 Mbit/s) or PROFINET
- Digital and analog input or output modules, technology modules, motor starters, frequency converters for controlling drives up to 7.5 or 4 kW, as well as pneumatic interfacing can be combined

- Can be used with integrated CPU as mini programmable controller (also fail-safe)
- Hot swapping of modules
- Channel-specific diagnostics for high availability.
- Can be supplied with integrated fiber optic interface if required.
- 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: Digital modules, motor starters, frequency converters
- Independent wiring for fast commissioning and simple replacement of modules
- Multi-channel modules allow a 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)

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 128 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.
- Terminal blocks for 16 and 32 channels with screw-type or spring-loaded terminals
- Electronic blocks for 16 and 32 digital inputs or outputs
- Baud rate 1.5 Mbps.

Further information:

- Catalogs IK PI, CA 01
- Internet:
<http://www.siemens.com/et200>

Overview SIMATIC ET 200

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.
- Baud rates up to 12 Mbit/s.
- Range of modules: 8DI, 16DI, 8DI/8DO (1.3 A), 8DI/8DO (2.0 A), 8DO (2.0 A), 16DO (0.5 A)
- 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
- Small, multifunctional all-in-one solution – also with CPU functionality:
 - analog and digital inputs/outputs, fail-safe modules, motor starters up to 5.5 kW, frequency converters up to 1.1 kW as well as pneumatic and RFID interfacing

- Communication via PROFIBUS (up to 12 Mbit/s) 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
- 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
- Frequency converters up to 1.1 kW in standard version and with integral safety functions
- 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.

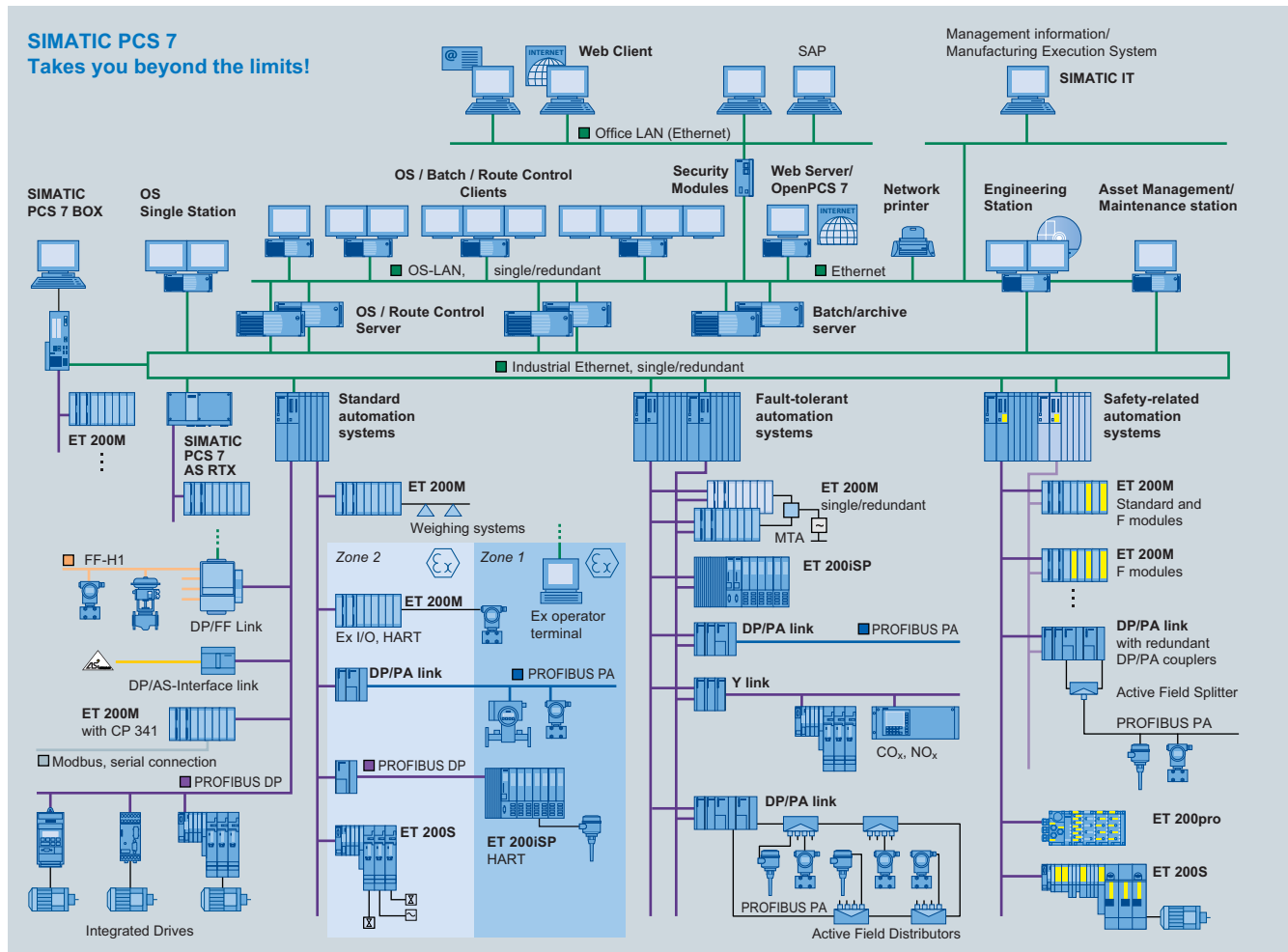
Further information

- Catalogs IK PI, CA 01
- Internet:
<http://www.siemens.com/et200>

Overview SIMATIC PCS 7

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.

Overview (continued)

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

With its pioneering design, modular and open architecture based on state-of-the-art SIMATIC technology, consistent application of industrial standards, and the I&C functionality paired with high-performance, the SIMATIC PCS 7 process control system allows cost-effective implementation and economical operation of I&C plants in all phases of their lifecycle and with consideration of all aspects: from planning, engineering, commissioning, training, through operation, maintenance and repair, up to expansion and refurbishment. In the process, SIMATIC PCS 7 combines high-performance and reliability with simple and safe operation and maximum convenience.

You primarily profit from Totally Integrated Automation with the SIMATIC PCS 7 process control system through:

- Calculable development, implementation and lifecycle costs
- Minimization of engineering overhead
- Facilities for process optimization
- Adaptability to changing requirements
- Advantages resulting from the use of standard SIMATIC 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
 - Global availability
 - Savings in logistics, maintenance and training costs

Function

A consistent and homogeneous overall system

SIMATIC PCS 7 is a modern process control system that can be used alone or in combination with other systems, e.g. SIMATIC, SIMOTION or drive systems, as a consistent and homogeneous overall system. Its popularity is increasing along with the demand for seamlessly integrated universal automation engineering solutions, which is determined by sustained competition and price pressure, the demand for increasingly flexible production plants and the need for increased 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 to 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
- Safety-related automation solutions
- Extensive fieldbus integration
- Flexible solutions for batch processes
- Efficient control of material transport
- Asset management for I&C equipment (diagnostics, preventive maintenance and repairs)
- Direct interface with the IT world
- Advanced security concept for safeguarding the I&C system.

Flexibility and scalability

As a result of its modular architecture 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 tags (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 tags, 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 can be expanded and innovated seamlessly and with little effort and are open for the future via long-term stable interfaces. This makes long-term protection of customer investments possible, despite the fast pace of innovation and short product 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, ISA-88 or ISA-95, just to mention a few.

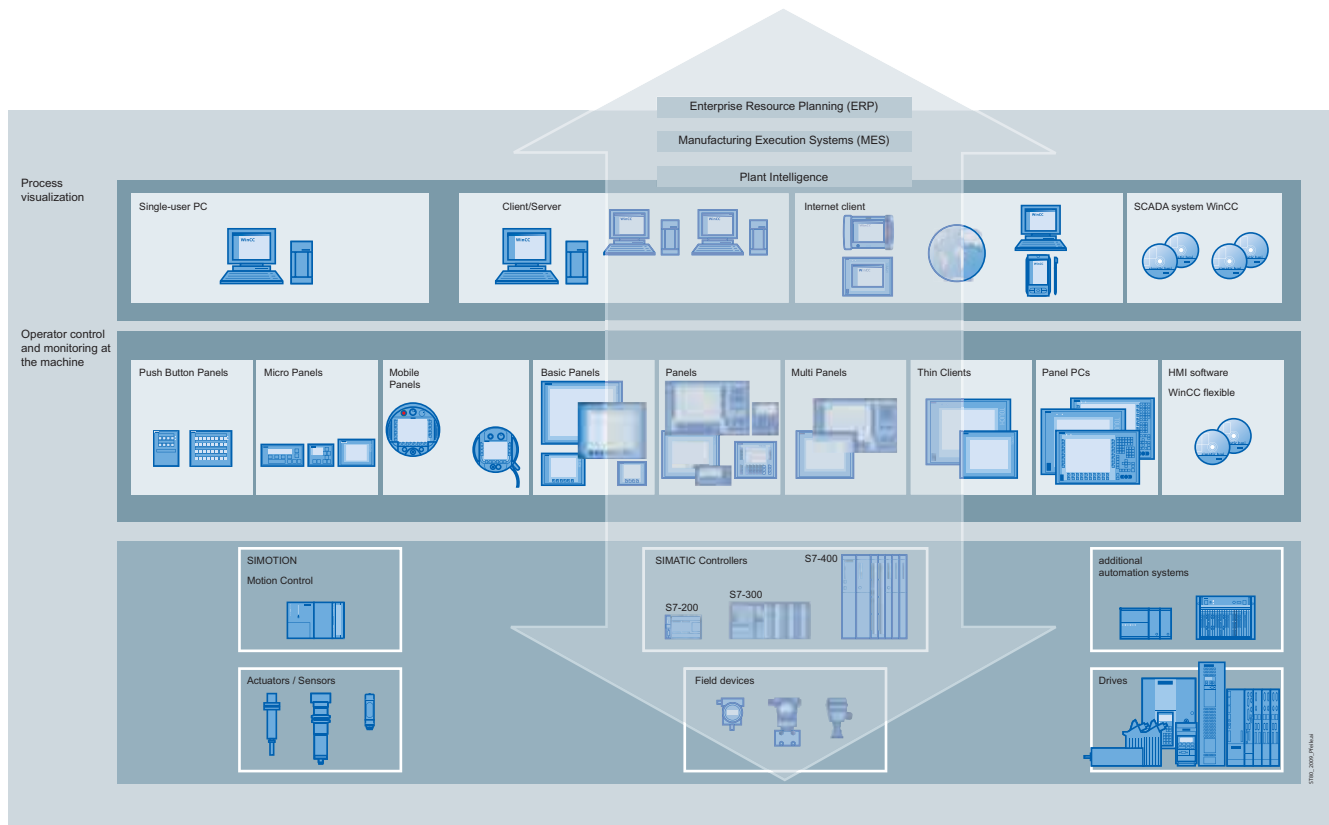
Openness with SIMATIC PCS 7 covers all levels, and equally applies to automation systems and process I/Os as to industrial communications networks, operator systems or engineering systems.

Not just system architecture and communication are characterized by openness. This is a feature also evident in the programming and data transfer interfaces for user programs as well as in 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

General

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.

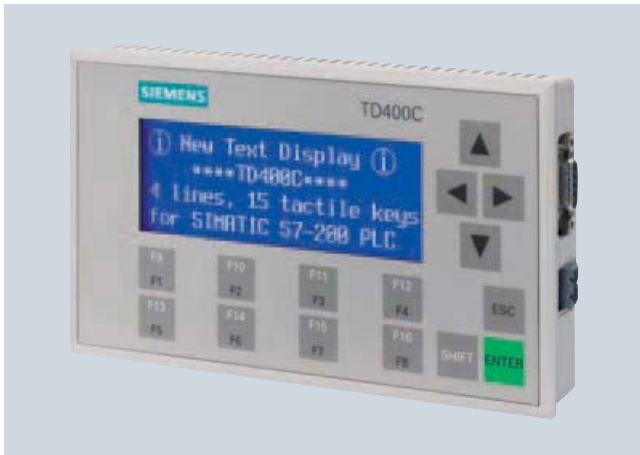
When working together with other SIMATIC components, SIMATIC HMI additionally supports system and process diagnostics during runtime. For example, you can start the STEP 7 diagnostics for comprehensive error diagnostics from the circuit diagram up to the PLC program directly from WinCC. Maintenance information for the automation technology of a plant can be visualized using the SIMATIC Maintenance Station – from the controller, via the network components, up to the switching, protection and control devices, and the drives. Thus a clear overview of the status of the automation technology is available at all times.

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.

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Overview



The TD 400C Text Display is the optimal solution for all operator control and monitoring tasks of the SIMATIC S7-200. The customizable operator interface enables optimal adaptation of the device to the surroundings in which it is used.

It enables:

- Display of message texts
- Intervention in the control program, e.g. setpoint changes
- Setting of inputs and outputs, e.g. for switching a motor on and off

Compatibility with the TD 100C, TD 200 and TD 200C Text Displays:

The TD 400C Text Display is not compatible with existing Text Displays (different mounting dimensions, configuration cannot be adopted).

The TD 400C is connected to the S7-200 using the supplied connecting cable. A separate power supply is not required. It is also possible to connect several TD 400Cs to one S7-200.

- Increased screen size and extremely good readability thanks to backlit four-line display
- Customizable operator interface with 15 tactile keys
- Acoustic and visual feedback from key operation
- Optimal support of the S7-200:
 - Direct connection to the S7-200 interface via supplied cable
 - No separate power supply required
 - Parameterization with STEP 7-Micro/WIN V4 SP6

Further information:

- Catalog ST 80
- Internet: <http://www.siemens.com/panels>

Mobile Panel 177 / Mobile Panel 277

Overview



The portable operator panels facilitate operator control and monitoring at the actual scene of the event with direct access and visual contact to the process. Due to the well-conceived concept, the SIMATIC Mobile Panels provide maximum flexibility and can be used efficiently on the machine or in the plant.

SIMATIC Mobile Panel 177 and SIMATIC Mobile Panel 277

- Mobile operator panel for direct operator control of the plant and machine from any point
- Simple and safe reconnection during operation
- Two three-stage enabling buttons;
 - Optional versions include:
 - STOP pushbutton
 - STOP button, handwheel, key-operated switch and illuminated pushbutton (not for Mobile Panel 277 10" PN/DP)
- Communication is supported via a serial link, MPI/PROFIBUS or PROFINET
- Fast system availability after plugging into the junction box
- Connected to the PLC and power supply via the junction box and the connecting cable
- Connection point recognition for local identification of the device based on the connection point ID
- Short device ramp-up time after docking By using an optional battery pack, the ramp-up time of the mobile panel – after a short period of separation from the connection box – can again be significantly reduced.

Overview

SIMATIC HMI

Mobile Panel 177 / Mobile Panel 277

Overview (continued)

SIMATIC Mobile Panel 177

- Pixel-graphics 5.7" color STN touch screen (analog/resistive), 256 colors
- 14 user-configurable and user-label function keys (8 with LED)

SIMATIC Mobile Panel 277

- High-contrast 7.5" or 10.4" TFT touch screen display, 64k colors and 18 membrane keys with LED (not for Mobile Panel 277 10" PN/DP)
- Externally accessible USB port

SIMATIC Mobile Panel 277(F) IWLAN

- Wireless, mobile operator panel for flexible and location-independent system and machine operation
- WLAN communication in accordance with IEEE 802.11 a (b/g) and support of PROFINET
- Powerful batteries and flexible concept for changing permit battery replacement "on the fly" without interrupting operation
- Effective range limitation and the local identification of the device by using transponder technology
- Optional variants with: Handwheel, key switch and illuminated pushbutton
- Fail-safe operator controls of the SIMATIC Mobile Panel 277F IWLAN using PROFI-safe:
 - Two three-stage enabling buttons
 - Emergency stop button

IWLAN Access Points SCALANCE W for SIMATIC Mobile Panel 277(F) IWLAN

- The Access Points of the product line SCALANCE W-780 are ideally suited for setting up Industrial Wireless LAN (IWLAN) radio networks for 2.4 GHz and 5 GHz with data rates of up to 54 Mbit/s; they can be used for all applications that require a high degree of operational reliability, even under extremely harsh ambient conditions
- Suitable for any application:
 - SCALANCE W-788 for cabinet-free installation
 - SCALANCE W-786 for cabinet-free installation, also with integral antennas
 - SCALANCE W-784 for installation in control cabinets or integration into devices
- Wireless communication suitable for use in applications with high real-time and reliability requirements, such as PROFINET, PROFI-safe or video
- Standard-compliant thanks to IEEE 802.11 support, additional functional expansions especially for use with increased reliability
- Effective encryption mechanisms protect against unauthorized access, spying, tapping, and corruption
- The SINEMA E engineering tool, wizards and online help support planning, simulation, configuration and documentation; easy management with the web server and SNMP
- Fast commissioning of the Access Points thanks to the optional swap medium PRESET-PLUG and fast device replacement in the event of a fault thanks to the optional swap medium C-PLUG (Configuration Plug)
- Accessories such as antennas, connectors, cables incl. RCoax cables (leaky wave cables) that are tuned to one another for a reliable radio link.

Further information:

- Catalog ST 80
- Internet: <http://www.siemens.com/panels>

Overview



The SIMATIC HMI Basic Panels can be used wherever simple machines and plants are controlled and monitored locally - in production, process and building automation alike. They are used in the most diverse sectors and applications.

- The ideal entry level series of 3.8" to 15" for operating and monitoring simple machines and plants
- Clear process representation thanks to use of pixel-graphics displays
- Intuitive operation using Touch and tactile function keys
- Equipped with all the necessary basic functions such as alarm logging, recipe management, plots, vector graphics, and language switching
- Simple connection to the controller via integral Ethernet interface or separate version with RS485/422

- Flexible scalability within the HMI family thanks to configuring with WinCC flexible

The SIMATIC HMI Basic Panels are installation-compatible with the existing touch devices of the product family of Panels and Multi Panels.

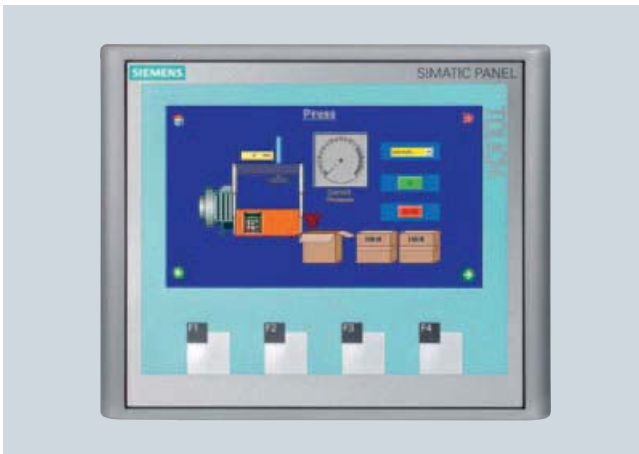
- **KTP400 Basic mono**
3.8" STN mono
1 Ethernet interface (TCP/IP)
Touch screen and 4 tactile function keys
- **KTP600 Basic mono**
5.7" STN mono
1 Ethernet interface (TCP/IP)
Touch screen and 6 tactile function keys
- **KTP600 Basic color**
5.7" TFT with 256 colors
1 Ethernet interface (TCP/IP) or 1 RS 485/422 interface (separate version)
Touch screen and 6 tactile function keys
- **KTP1000 Basic color**
10.4" TFT with 256 colors
1 Ethernet interface (TCP/IP) or 1 RS 485/422 interface (separate version)
Touch screen and 8 tactile function keys
- **TP1500 Basic color**
15.1" TFT with 256 colors
1 Ethernet interface (TCP/IP)
Touch screen
- No slot for SD/CF/MultiMedia Card, no USB interface

Further information:

- Catalog ST 80
- Internet: <http://www.siemens.com/panels>

SIMATIC TP 177B (incl. INOX)

Overview



- Touch Panel with comprehensive functions for operator control and monitoring of machines and plants
- Pixel-graphics display with analog touch screen
 - 4.3" TFT widescreen color display or
 - 5.7" STN blue mode/color display

- All interfaces for communication with Siemens SIMATIC S7 (e.g. MPI, PROFIBUS DP) are on-board
- The PROFINET interface is on-board in the color version
- Drivers are also available for non-Siemens PLCs
- Content of message buffer is retained even when panel is disconnected without batteries
- The 4" version features 4 additional function keys for optimized operator control efficiency
- The SIMATIC TP 177B 6" is the innovative successor to the TP 170B Touch Panel
- The TP 177B PN/DP 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

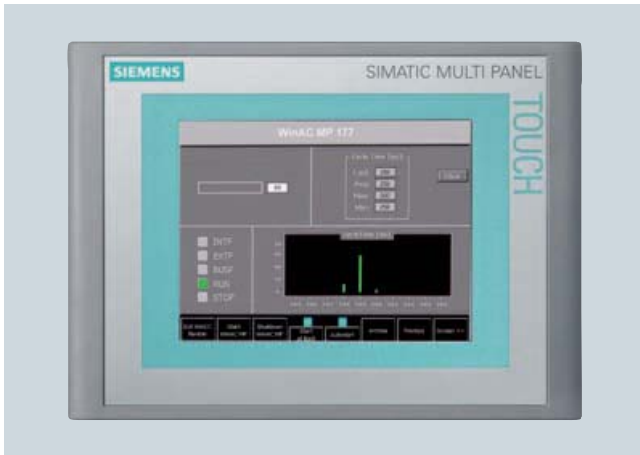
Further information:

- Catalog ST 80
- Internet: <http://www.siemens.com/panels>

Overview SIMATIC HMI

SIMATIC MP 177

Overview



- Like operator panels, Multi Panels (MP) are used for local machine operation and monitoring
- Message buffer contents and residual WinAC MP data are retained even when panel is disconnected, without batteries
- PLC functionality can be integrated directly into the MP 177 platform as an option
- The multi panel can be expanded with the options Sm@rtService and Sm@rtAccess
- Pixel-graphics 5.7" TFT display, color (64k colors)
- All interfaces, e.g. MPI, PROFIBUS DP, USB, PROFINET (Ethernet TCP/IP), are on-board

The MP 177 6" Touch can also be delivered as a package, complete with a WinAC MP 177. WinCC flexible 2008 or higher is required for configuring the MP 177.

Further information:

- Catalog ST 80
- Internet: <http://www.siemens.com/panels>

SIMATIC MP 277

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
- The MP 277 is also available with a stainless steel front, and is thus suitable for the high demands associated e.g. with the food & beverages industry.

Further information:

- Catalog ST 80
- Internet: <http://www.siemens.com/panels>

Overview



- Like operator panels, Multi Panels (MP) are used for local machine operation and monitoring
- Their functionality can be expanded by the installation of additional Windows CE applications (Multi Panel and Panel options)

- SIMATIC MP 377 devices on the basis of Windows CE combine the rugged construction of Operator Panels with the flexibility of PCs
- PLC functionality can be integrated directly into the MP 377 platform with Option
- Pixel-graphics 12.1" or 15.1" or 19" TFT display, color (64k colors)
- MP 377 12" Touch, MP 377 15" Touch and MP 377 19" Touch: Touch screen (analog/resistive)
- MP 377 12" Key:
38 system keys, 36 user-configurable and freely inscribable function keys (36 with LEDs)
- SIMATIC MP 377 PRO 15" Touch:
with a rugged and extremely compact aluminum housing, full IP65 protection and thus suitable for harsh environmental conditions.
- All interfaces, e.g. MPI, PROFIBUS DP, USB, PROFINET (Ethernet TCP/IP), are on-board

Further information:

- Catalog ST 80
- Internet: <http://www.siemens.com/panels>

SIMATIC WinAC MP

Overview



WinAC MP, the software PLC based on Windows CE

- An optimized version is available for all current MP platforms
- The economical solution for all applications in combination with a rugged hardware platform
- Ideal for tasks on the machine level, saves space and costs
- Best service concept, backup/restore of all data on a standard SD card, standard Multi Media Card or standard USB stick

Further information:

- Catalog ST 80
- Internet: <http://www.siemens.com/panels>

Overview

SIMATIC HMI

SIMATIC THIN CLIENT

Overview



SIMATIC THIN CLIENT is another member of the SIMATIC Panel family. Its extremely rugged hardware makes it ideal for industrial use.

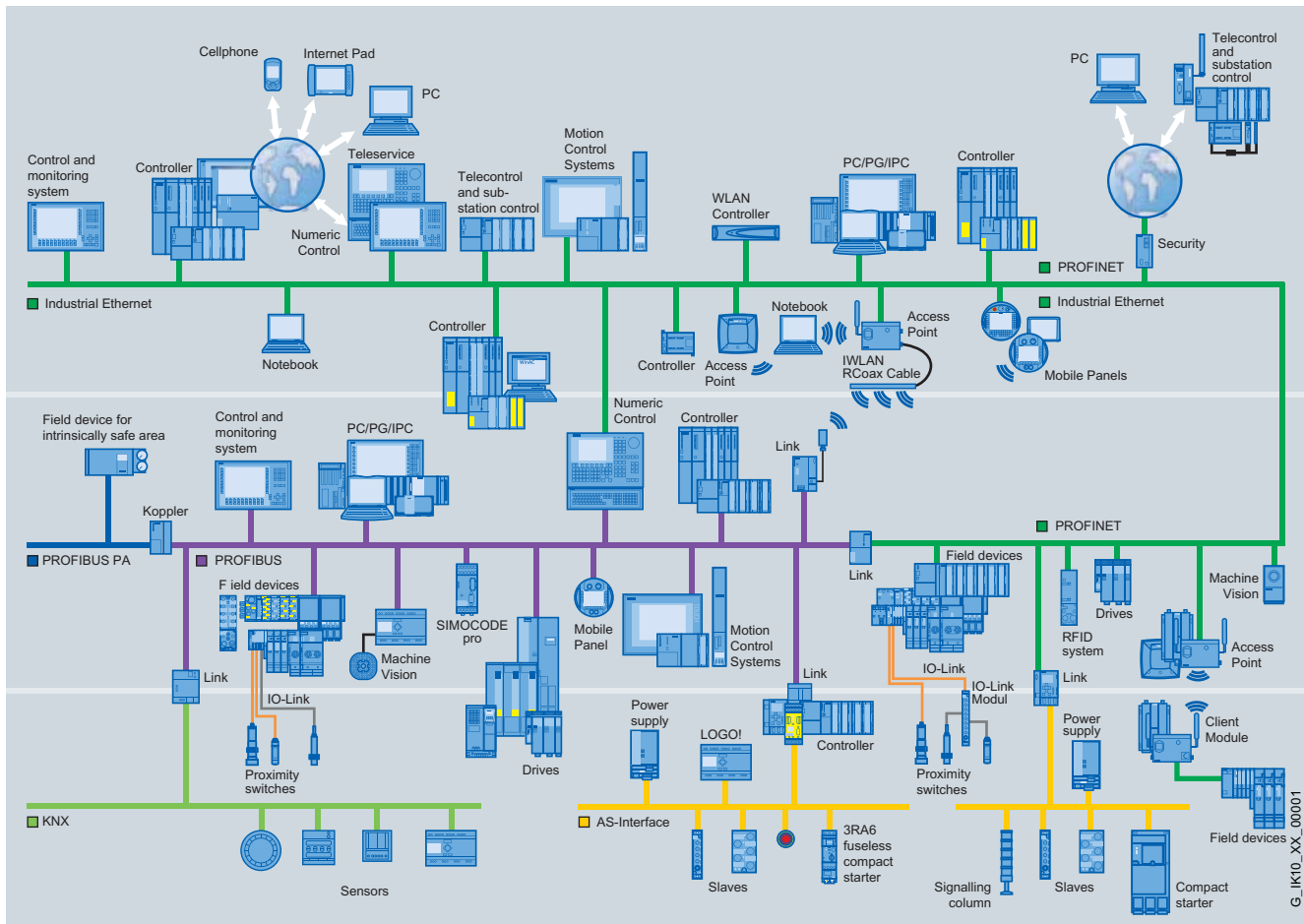
The following versions are available:

- The rack-mounting versions SIMATIC THIN CLIENT 10" Touch and SIMATIC THIN CLIENT 15" Touch.
- The support arm version SIMATIC THIN CLIENT PRO 15" Touch with a rugged and very compact aluminum enclosure which is completely IP65 protected and therefore suitable for harsh ambient conditions.

Further information:

- Catalog ST 80
- Internet: <http://www.siemens.com/panels>

Overview



SIMATIC 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 of components for designing totally integrated industrial 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. Even fail-safe communication with safety or complex applications with real-time demands are possible using wireless networking.
- SCALANCE X modular switches (active network components) make networks fit for the future.

SIMATIC NET supports the Industrial Ethernet, PROFINET, PROFIBUS or AS-Interface bus systems.

Further information

- Catalog IK PI
- Catalog CA 01

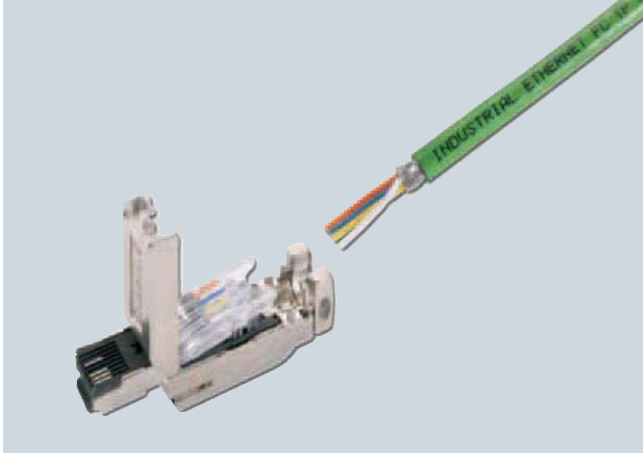
Overview

SIMATIC NET

Industrial Ethernet/PROFINET

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.:

- 4-core (Cat5e) or 8-core (Cat6) FastConnect cabling system for Fast Ethernet or Gigabit Ethernet
- 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/X300 managed switches also suitable for real-time,
SCALANCE X-400 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 IWLAN/PB Link PN IO implements the transition from IWLAN to PROFIBUS (also for safety-related communication).
The IE/PB Link PN IO permits a transition from Industrial Ethernet to PROFIBUS (also for safety-related communication).
The IE/AS-i LINK PN IO permits a transition from Industrial Ethernet to AS-Interface.
The DP/AS-i LINK Advanced (also for safety-related communication) or the DP/AS-Interface Link 20E implements the transition from PROFIBUS to AS-Interface.

Overview (continued)

Communications processors for SIMATIC S7



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

Properties:

- Designed for use in harsh industrial environments
- Marine approval for use on ships and offshore units
- Additionally integrated 2-port switch for designing small local networks with CP 343-1 Lean, CP 343-1, CP 443-1 or CP 443-1 Advanced
- Can be used via RJ45 interface for the industry-compatible SIMATIC NET FastConnect cabling system
- Fast data transmission even with large data quantities

Additionally with CP 343-1 Advanced and 443-1 Advanced:

- With Gigabit connection including routing functionality (10/100/1000 Mbit/s)
- Network isolation with IP routing functionality
- Access protection using IP access list
- Comprehensive diagnostics facilities etc.

Communications processors for PG/PC/IPC



The communications processors for PG/PC/IPC with their own microprocessor provide a stable data throughput at a high level thanks to processing of the protocol on the CP, and provide fast response times without fluctuations. The communications processors provide versatile links by means of ITP or RJ45 connections on the module, and release computing performance for other applications in the PC, e.g. HMI (ISO and TCP/IP transport on-board).

The following processors with different software are available for connecting to programming devices/PCs:

- CP 1613 A2 (PCI) and CP 1623 (PCIe) for connecting programming devices/PCs to Industrial Ethernet with 10/100 Mbit/s autosensing/autonegotiation
- CP 1616 (PCI) of PCs and SIMATIC PG/PC or CP 1604 for connection of PC/104-Plus systems to PROFINET IO. With their IRT function (isochronous real-time), the CPs are particularly suitable for time-critical applications extending into the range of strict isochronous mode control in the motion control sector. The 4-port switch integrated in each case permits cost-effective system solutions, and the design of small local networks.

Overview SIMATIC NET

Industrial Wireless 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

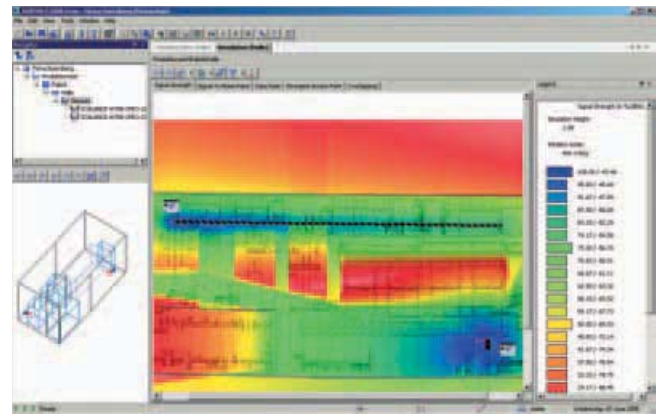


Active network components for industrial wireless communication establish a reliable, industry-compatible and secure radio network on the basis of Wireless LAN according to IEEE 802.11. The modules use technologies such as antenna diversity, high-quality receivers and fault-tolerant modulation procedures to improve the signal quality and to thus prevent an interruption in radio traffic.

The IWLAN modules offer various advantages:

- Wear-free – saves maintenance and repair costs on connectors, trailing cables, carbon brushes, sliding contacts or rolling-up units
- Reliable radio link e.g. using redundant connection, automatic roaming in the event of an interruption in the cable connection between the access point and the Industrial Ethernet (forced roaming), cyclic monitoring of radio link (link check) or monitoring of IP connections (IP alive)
- Predictable data traffic (deterministic) and defined response times on the radio link
- Wireless transmission of standard and fail-safe signals using PROFINET and PROFIsafe

SINEMA E



The IWLAN software SINEMA E is an engineering tool for supporting planning, configuration, simulation and measurement of an IWLAN radio field on site (site survey) in accordance with the IEEE 802.11 a/b/g/h standard.

- Simple and fast generation of WLAN applications for industrial and office environments, both indoors and outdoors, using functions for:
 - Automatic determination of the optimum WLAN infrastructure
 - Minimization of channel interferences
 - Simulation of changes in device properties in order to predict the operation of real networks
 - Wizard-based project planning and generation of quotations
- Minimization of configuration and commissioning overheads using grouped offline and online functions
- Reduction in configuration errors as a result of integral consistency test

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.

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.
- The DP/AS-i LINK Advanced and DP/AS-i Link 20E routers allow the transition between PROFIBUS DP and AS-Interface.

Communications processors for SIMATIC S7



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:

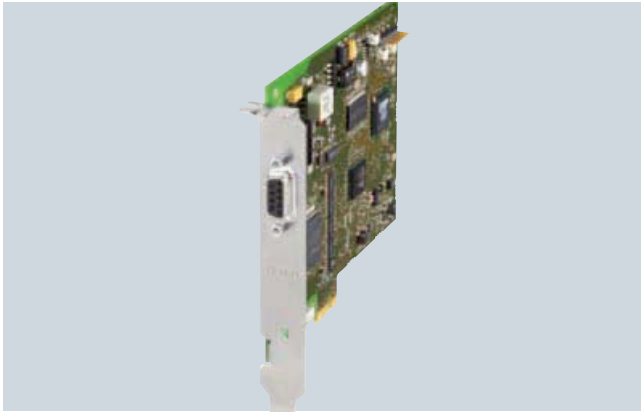
- CP 342-5 and 342-5 FO for SIMATIC S7-300
- CP 443-5 Basic and CP 443-5 Extended for SIMATIC S7-400

Overview SIMATIC NET

PROFIBUS

Overview (continued)

Communications processors for PG/PC/IPC



The processors listed below are suitable for connection to the PG/PC.

The loading on the CPU is significantly reduced through the use of communications processors.

Communications processors with own microprocessor

- CP 5613 A2 and CP 5613 FO with DP master interface or CP 5614 with DP master and slave interfaces; PCI cards (universal keyed 5 V/3.3 V) with microprocessor for system connection of PCs and SIMATIC PG/PC to PROFIBUS up to 12 Mbit/s.
- Recommended solution for:
 - PC-based control systems (soft control, PLC, numeric control, robot control)
 - Process control systems
 - HMI systems
 - PROFIBUS DP slave interface (CP 5614 A2)
 - PROFIBUS systems with large quantity framework (more than eight nodes)
 - Multi-protocol operation
 - Use of several CPs in one computer
 - Designs with fiber-optic interface (FO)

Communications processors without own microprocessor

- CP 5512 (PC Card/CardBus), CP 5611 A2 (PCI), CP 5621 (PCIe x1)
- Recommended solution for:
 - Configuration tools (e.g. STEP 7)
 - PROFIBUS DP diagnostics station (e.g. with COM PROFIBUS or as DP master Class 2)
 - PROFIBUS DP slave connection
 - PROFIBUS systems with up to eight nodes
 - Mono-protocol operation

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

Overview

Passive network components



Various passive network components are available for designing telecontrol networks. These 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
- The EGPRS router MD741-1 is a component of the SINAUT ST7 system for SINAUT data transmission using EGPRS, but can also be used independent of this system. The MD741-1 is used for wireless IP communication of programmable controllers based on Industrial Ethernet via GSM mobile radio networks.
- Radio clock components, e.g. GPS components or accessories for DCF77.

Communications processors



The SINAUT telecontrol system, based on SIMATIC S7, consists of two independent systems:

- **SINAUT MICRO;**
Telecontrol system for monitoring and control of distributed systems using wireless communication (GPRS) on the basis of SIMATIC S7-200 and WinCC flexible or WinCC. As a result of its bidirectional communications capability, SINAUT MICRO can handle simple telecontrol tasks. Configuration is carried out using STEP 7 Micro/WIN.
- **SINAUT ST7;**
Versatile telecontrol system on the basis of SIMATIC S7-300, S7-400 and WinCC/PCS7 for fully-automatic monitoring and control of process stations which exchange data with each other and with one or more control centers over WAN or Ethernet (TCP/IP). Configuration is carried out using STEP 7.

The central component of the SINAUT ST7 hardware is the TIM communications module (telecontrol interface module). This handles the data transfer for the S7 CPU or for the control center PC via the respective SINAUT network, either with the SINAUT ST7 or SINAUT ST1 protocol.

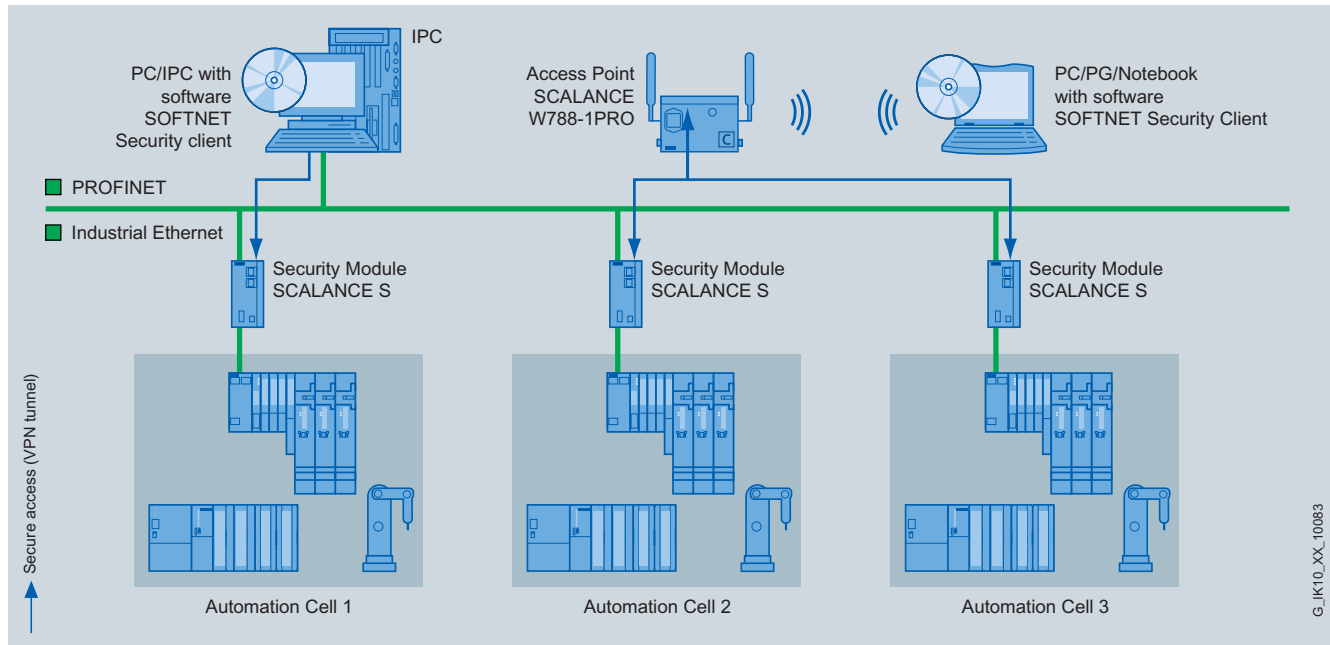
- The SINAUT TIM communications processors are designed for SIMATIC S7-300 and S7-400.
- TIM 3 version without MPI connection
- TIM 4 version with MPI connection

Overview SIMATIC NET

Supplementary components

Overview

Security Client



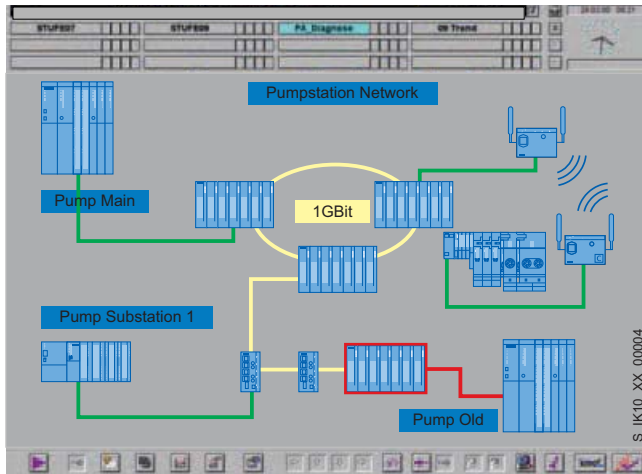
The SOFTNET Security Client software is part of the industrial security concept for protecting PLCs and for providing security when exchanging data between automation systems.

- 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.

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Overview (continued)

OPC server



OPC (openness, productivity & collaboration) is used as an expansion of the COM (component object model) and DCOM (distributed COM) communications interfaces for the user software. The basic principle of OPC is that OPC client applications communicate on a standardized/open and thus cross-vendor interface with the OPC server. Interfacing is possible to OPC-capable Windows applications (Microsoft Office or HMI systems) already available on the market.

The following communication facilities via OPC servers are available for Industrial Ethernet:

- S7 communication
- Open communication (SEND/RECEIVE)
- PROFINET
- SNMP (simple network management protocol)

The OPC servers offer:

- Data access interfaces 2.0, 2.05a and 3.0
- Alarm and event interface 1.1
- OPC XML-DA interface 1.0
- Uniformity of automation products from different vendors
- Uniform and user-friendly user interface for different components
- Access is possible from any computer in the LAN
- High-performance data access over the custom interface (C++, NET)
- Easy to use over the automation interface (VB, NET) or the supplied OCX data control

Communications software

Various software packages are available for the communications processors for PG/PC/IPC for both PROFIBUS and Industrial Ethernet:

- For CPs with own microprocessor
- For CPs without microprocessor
- S7-REDCONNECT for redundant communication (over Industrial Ethernet to SIMATIC S7-400H)
- SOFTNET PN IO with PROFINET IO-Controller function for connecting PG/PC and IPC to PROFINET IO-Devices (over Industrial Ethernet)

The following are available as user interfaces:

- PG/OP communication for SIMATIC S7
- Open communication (SEND/RECEIVE) for communication with SIMATIC S5 and S7
- S7 communication
- PROFINET communication

Overview

SIMATIC PC

SIMATIC Rack PC

Overview



SIMATIC Rack PCs provide flexible, high-availability industrial PC systems for powerful yet compact applications using 19" technology.

Two device classes are available for different requirements:

- SIMATIC Rack PC 547B – maximum performance at an attractive price with Intel Core 2 Duo technology
- SIMATIC Rack PC 847B – maximum expandability for excellent industrial functionality with Intel Core 2 Duo technology

Shared functions

- Maximum system performance for complex automation tasks in the industrial environment through use of Intel Core 2 Duo processors
- Designed for 24-hour continuous operation
- Monitoring and diagnostics functions (e.g. temperature, fan, watchdog)
- RAID1 configuration (mirrored drives), optionally in "hot swap" frames
- Compact dimensions for installation in control cabinets only 500 mm deep
- Dust protection thanks to overpressure ventilation concept with fan on the front and dust filter
- Lockable front panel or front door
- Service-friendly equipment design due to prepared telescopic rail mounting
- Universal implementation as an industrial workstation or server
- Operating system preinstalled and activated for fast startup
- Fast restoration of the delivery status of the HDD thanks to restore DVD
- High flexibility and expandability of components
- PCI and PCI-Express expansion slots
- Independent industrial product design

SIMATIC Rack PC 547B – maximum performance at an attractive price with Intel Core 2 Duo technology

- Maximum processor performance in maximum configuration without loss of power (throttling) at ambient temperatures of up to 40 °C
- Hard disks with capacities up to 250 GB for large volumes of data
- Low noise output thanks to controlled fan
- Status and alarm LEDs at the front for signaling critical alarm states
- Availability at least 1.5 years
- Guaranteed spare parts availability for at least 3 years

SIMATIC Rack PC 847B – maximum expandability for excellent industrial functionality with Intel Core 2 Duo technology

- Maximum expandability due to 11 free PCI/PCI Express slots for installing long expansion cards and integrated interfaces for communication, e.g. integrated PROFIBUS/MPI or PROFINET interface
- High thermal stability up to 50 °C even at maximum processor performance
- High vibration/shock resistance thanks to special hard disk holders
- Service-friendly device design due, for example, to the replacement of filters/fans from front without the need for tools or the opening of the enclosure with just one screw.
- Front LED concept for efficient self-diagnostics, e.g. monitoring of the hard disks in RAID1 configurators, fans or the status display for Ethernet, PROFINET and PROFIBUS.
- Integrated PROFIBUS DP/MPI interface (optional)
- High continuity of the components/design
- Motherboard developed and manufactured by Siemens
- 3 to 5 years availability
- Guaranteed spare parts availability for at least 5 years

Further information:

- Catalog CA 01
- Internet: <http://www.siemens.com/simatic-pc>

Overview



SIMATIC Box PCs provide mechanical engineers, plant engineers and control cabinet makers with particularly rugged industrial PC systems for use in powerful yet compact applications.

Three device classes are available for various requirements:

- SIMATIC Microbox PC 427B – ultra-compact and maintenance-free: the flexible embedded industrial PC
- SIMATIC Box PC 627B – maximum performance in the most restricted space / with Intel Core 2 Duo technology
- SIMATIC Box PC 827B – maximum performance with high flexibility / with Intel Core 2 Duo technology

Shared industrial functionality

- Extremely compact
- Certification for global marketing
- System-tested with SIMATIC components
- High vibration/shock load during operation
- Wide operational temperature range
- Designed for 24-hour continuous operation
- Integrated PROFIBUS and PROFIBUS/MPI interface (optional)
- Integrated parameterizable monitoring functions (temperature, fan, watchdog)
- High service friendliness
- Operating system preinstalled and activated for fast startup
- Motherboard developed and manufactured by Siemens
- Availability for 3 to 5 years
- Repairs and spare parts service for 5 years
- High continuity of the components/design
- Installation and software compatible with predecessor model
- Long-term availability of PC components from the Intel embedded line

SIMATIC Microbox PC 427B – ultra-compact and maintenance-free: the flexible embedded industrial PC

- Operation without fan thanks to CompactFlash
- High performance with highly compact design
- Optimized for embedded applications
- Expandable with as many as 3 PC/104-Plus or PCI-104 I/O cards

SIMATIC Box PC 627B – maximum performance in the most restricted space / with Intel Core 2 Duo technology

- Maximum system performance for complex measuring, control and visualization tasks through use of Intel Core 2 Duo processors
- Highly compact design for space-saving and flexible installation as result of:
 - Compact housing design (volume 6 liters)
 - Flexible installation with mounting brackets or portrait assembly kit
- RAID1 controller onboard
- Rugged design for direct installation in the machine
- Maximum processor performance up to ambient temperature of 55 °C
- High shock/vibration resistance in all possible mounting positions
- High system availability
- Battery-backed SRAM as memory for WinAC data (with 24 V DC industrial power supply)
- 2 x 7-segment display and 2 signal LEDs (freely programmable)

SIMATIC Box PC 827B – maximum performance with high flexibility / with Intel Core 2 Duo technology

- Maximum system performance for complex measuring, control and visualization tasks through use of Intel Core 2 Duo processors
- Highly compact design for space-saving and flexible installation as result of:
 - High flexibility with 5 expansion slots and integral interfaces
 - Flexible installation with mounting brackets or portrait assembly kit
- RAID1 controller onboard
- Rugged design for direct installation in the machine
- Maximum processor performance up to ambient temperature of 55 °C
- High shock/vibration resistance in all possible mounting positions
- All interfaces on one side to allow optimum installation in control cabinet
- 2 CompactFlash drives, both accessible from the outside
- High system availability
- Battery-backed SRAM as memory for WinAC data (with 24 V DC industrial power supply)
- 2 x 7-segment display and 2 signal LEDs (freely programmable)

Further information:

- Catalog CA 01
- Internet: <http://www.siemens.com/simatic-pc>

Overview SIMATIC PC

SIMATIC Panel PC

Overview



SIMATIC Panel PCs are suitable thanks to their high industrial compatibility both for use in control cabinets, consoles and control panels, as well as directly on the machine. Typical areas of application can be found in both production and process automation.

There is a broad range of robust, high-performance SIMATIC Panel PCs available for different requirements.

Shared industrial functionality

- High-quality components and modules with a high MTBF (mean time between failure), which also ensure 24-hour operation in the extended temperature range.
- High swing/shock capacity of the devices through special hard-disk suspensions, locked connectors and card retainers
- Rugged housing model with high electromagnetic compatibility (EMC) and integrated industrial power supplies (also as per NAMUR)
- Service-friendly device design
- Bright, brilliant displays in different sizes up to 19"
- Same front panel mounting dimensions and uniform front design across all device families
- Rugged fronts protected from dust, humidity and chemical substances (front-side IP65 / NEMA 4 degrees of protection)

SIMATIC Panel PC 477B embedded **Compact, rugged and maintenance-free Panel PC in embedded technology**

- Only 75 mm mounting depth (19" display: 98 mm)
- No rotating parts (without fan and hard disk)
- High security due to the Microsoft Windows XP embedded operating system
- Ready-to-use devices with optionally preinstalled software
- HMI: Innovative HMI software WinCC flexible (incl. archives and recipes)
- RTX: with real-time capable software PLC WinAC RTX
- Expandable with PC/104(+) plug-in cards
- Retentive memory on board (NV-RAM, usable with WinAC RTX)

SIMATIC Panel PC 577B

Industrial functionality and high performance at an attractive price

- High performance
- Rugged design for industrial use
- Can be expanded using PCI slots and further ports

SIMATIC Panel PC 677B

Compact, powerful and extremely rugged

- High performance thanks to latest process technology from Intel
- Dual Core technology: up to Intel Core 2 Duo 2.16 GHz
- Compact structure with simultaneous expandability through PCI/PCIe slots
- Strong communication through two Ethernet and integrated PROFIBUS DP/MPI interfaces
- Control and computer units can be separated by up to 30 m
- RAID1 controller on board
- Retentive memory on board (NV-RAM, usable with WinAC RTX)

Fully enclosed HMI devices: **SIMATIC Flat Panel PRO 15"**

The industrial SIMATIC Flat Panel Monitor PRO is used wherever the operator panel and the computer unit have to be installed separately. In the fully enclosed version, the Flat Panel can be located up to 30 m away from the computer unit / IPC.

- For direct mounting on supporting bracket / stand
- Protection on all sides IP65 / NEMA 4
- Small device depth and low weight
- Connection of device either from above or below
- Complete flexibility in selection of supporting bracket components through direct connection to renowned manufacturers thereof
- Supports the globally established VESA 75 / VESA 100 standard
- Easy to service – device need not be removed from the supporting bracket for maintenance or to replace memory cards
- Rugged and extremely compact aluminium housing
- 100% functionally compatible with the proven rack-mounted devices
- Standard connecting cables can be used

Further information:

- Catalog ST 80
- Catalog CA 01
- Internet: <http://www.siemens.com/simatic-pc>

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:

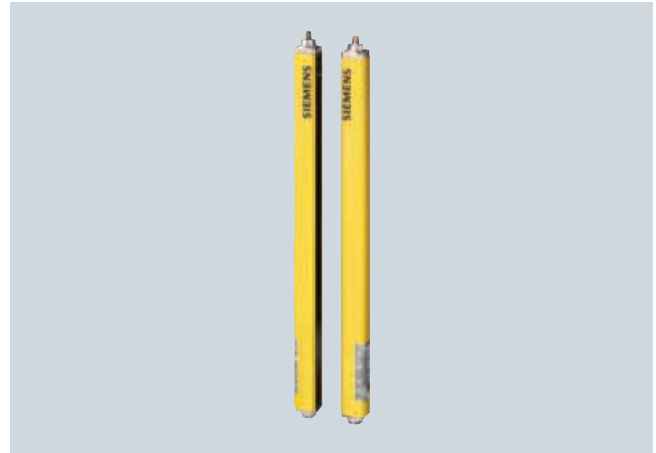
From simple object detection with contactless proximity switches, product tracking with electronic ID systems and quality control with image processing systems, right up to safety sensors for protecting persons in dangerous areas.

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 RF 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

SIMATIC Sensors

General

Overview (continued)

SIMATIC MV image processing systems

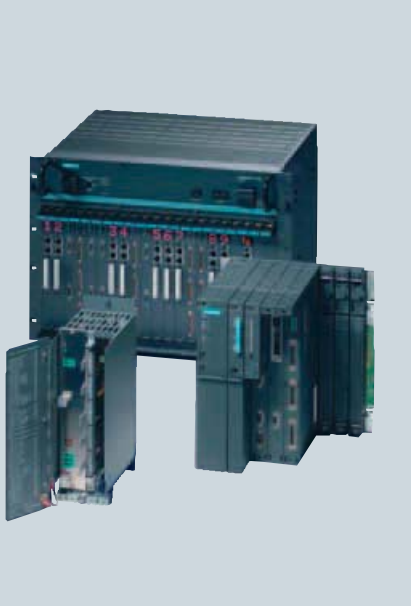


Further information:

- Catalog FS 10
- Catalog CA 01
- Internet: <http://www.siemens.com/simatic-sensors>

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.

SIMATIC Control Systems



11/2	T400 Technological Module
11/2	T400 technological module
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11/5	Standard software package: Axial winder with T400 - SPW420
11/5	Standard software package: Angular synchronous control with T400 - SPA440
11/5	Standard software package: Cross-cutter with T400 - SPS450
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SIMATIC Control Systems

T400 Technological Module

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 with FPU
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 to 1.6 ms
Typical computation times (REAL)	
• MUL, multiplier	5.5 µs
• PIC, PI-controller	14.3 µs
• RGE, ramp generator	29.5 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

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

SIMATIC Control Systems

T400 Technological Module

T400 technological module

Technical specifications

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 B7	6DD1 606-0AD1
(incl. T400 brief description)	
SC400 commissioning cable	6DD1 684-0GF0
to connect a PC to the T400	
LBA local bus adapter	6SE7 090-0XX84-4HA0
for MASTERDRIVES and SIMOREG DC-Master	

Order No.	
ADB adapter module B7	6SE7 090-0XX84-0KA0
CBP2 communications module B7	6SE7 090-0XX84-6FF5
for PROFIBUS DP and USS	
CBC communications module B7	6SE7 090-0XX84-0FG0
for CAN	

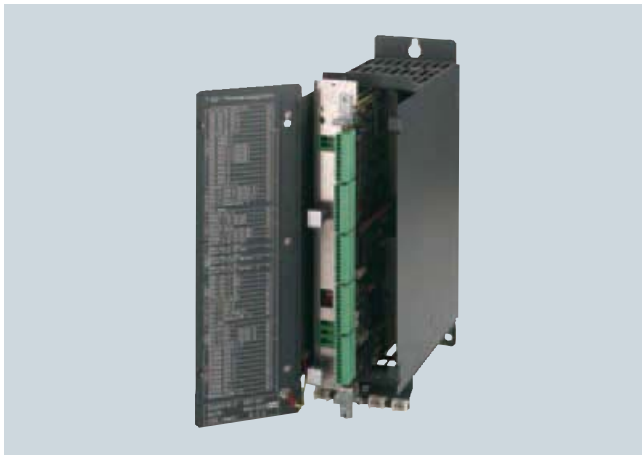
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SIMATIC Control Systems

T400 Technological Module

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 $\pm 15\%$

Line supply frequency

- Nominal value 50/60 Hz
- Permissible range $\pm 2.5\%$ 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

Compact subrack with power supply 115 V/230 V AC, 2 vacant slots

6DD1 682-0CG0

SIMATIC Control Systems

T400 Technological Module

**Standard software package:
Axial winder with T400 - SPW420**

Overview

The SPW420 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 842-0AA1

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 SPA440 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 842-0AB1

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 842-0AD1

SIMATIC Control Systems

SIMATIC TDC

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

UR5213 subrack

Order No.

6DD1 682-0CH2

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

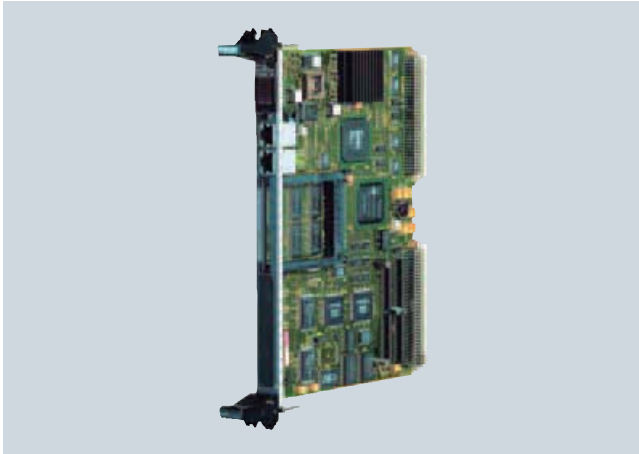
SR51 slot cover

covers vacant slots in the subrack

Order No.

6DD1 682-0DA1

Overview



High-performance CPU module for open and closed-loop control and arithmetic tasks.

Technical specifications

CPU551

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	128 MByte
Synchronous cache	8 MByte
Clock cycle	500 MHz
CPU	64 Bit RISC CPU with Floating Point Unit
SRAM	512 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. 3 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	B7	6DD1 600-0BA2
MC500 memory module 4 Mbyte	B7	6DD1 610-0AH4
MC510 memory module 8 Mbyte	B7	6DD1 610-0AH6
MC521 memory module 2 Mbyte	B7	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

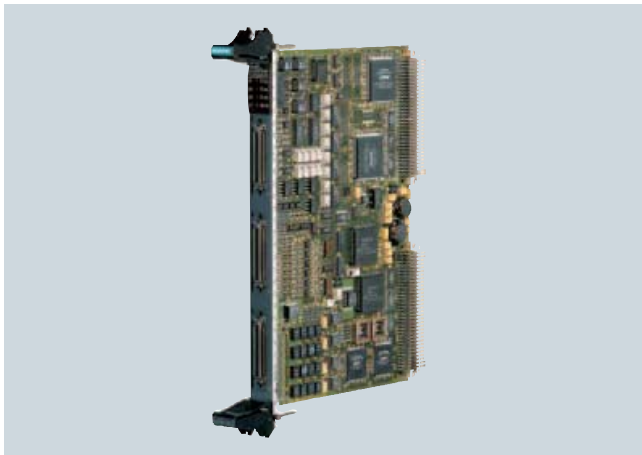
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SIMATIC Control Systems

SIMATIC TDC

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

SM500 I/O module	
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
Resolution	12 bit
Max. conversion time per channel	Approx. 20 µs

SM500 I/O module	
Analog inputs (continued)	
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)

SM500 I/O module	
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
Min. phase difference of the track signals	200 ns
Max. pulse frequency (track frequency)	1 MHz

SM500 I/O module	
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 available
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
Absolute value encoder inputs	
Number	4
Version	Differential inputs, RS 485 signal 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

SIMATIC Control Systems

SIMATIC TDC

SM500 I/O module

Ordering Data		Order No.		Order No.
SM500 I/O module	B7	6DD1 640-0AH0	SU12 interface module	6DD1 681-0AJ1
SB10 interface module to connect 8 digital inputs/outputs, 24 V DC, to FM 458-1 DP		6DD1 681-0AE2	to connect 10 signals to an FM 458-1 DP	
SB60 interface module to connect 8 digital inputs, 115/230 V AC/DC, to FM 458-1 DP		6DD1 681-0AF4	SU13 interface module to connect 50 signals to an FM 458-1 DP	6DD1 681-0GK0
SB61 interface module to connect 8 digital inputs/outputs, 24/48 V DC, to FM 458-1 DP		6DD1 681-0EB3	SC62 interface cable to connect up to 5 interface modules SBxx and/or SU 12, 2 m long	6DD1 684-0GC0
SB70 interface module 8 digital outputs with relay		6DD1 681-0AG2	SC63 interface cable to connect an SU13 interface module, 2 m long	6DD1 684-0GD0
SB71 interface module 8 digital outputs with transistors, 24/48 V DC		6DD1 681-0DH1		

B7: Subject to export regulations: AL: N and ECCN: EAR99H

CP50M1 communications module

Overview

The CP50M1 communications module provides two PROFIBUS DP/MPI interfaces and 8 MB 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

CP50M1 communications module	
Voltage/current supply	+5 V typ. 1.0 A
Power loss, typical	5 W
Space requirement / width	1 slot
Weight	0.34 kg

Ordering Data

Order No.

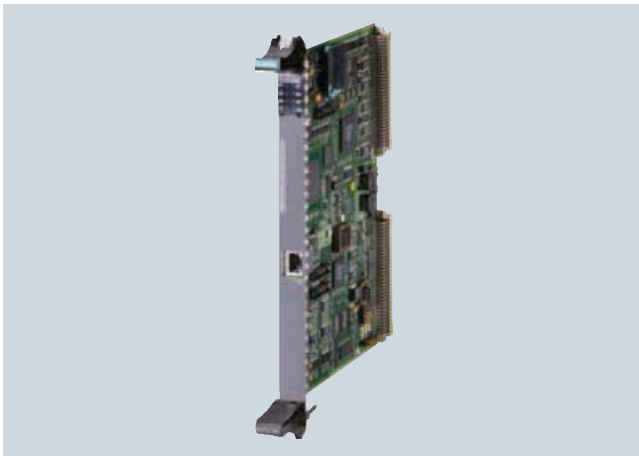
CP50M1 communications module

6DD1 661-0AD1

with 8 MByte buffer memory, provides up to 2 MPI interfaces and up to 2 PROFIBUS DP interfaces

CP51M1 communications module

Overview



The CP51M1 communications module is an Industrial Ethernet interface for the SIMATIC TDC automation system.

Technical specifications¹⁾

CP51M1 communications module	
Space requirement/width	1 slot
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

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

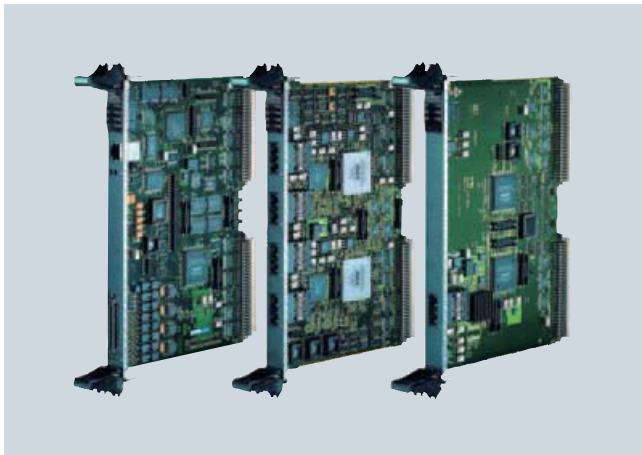
6DD1 661-0AE1

SIMATIC Control Systems

SIMATIC TDC

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	External power supply voltage + 1 V

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 SC66 interface cable



Interface cable for the SIMATIC TDC CPU551 processor module and the SB10, SB60, SB61 and SU12 interface modules.

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 SC67 service cable



Service cable for the SIMATIC TDC CPU551 processor module and a local engineering/service PC.

SIMATIC Control Systems

SIMATIC TDC

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	6DD1 681-0AF4
8 digital inputs, 120 V AC	
SB70 interface module	6DD1 681-0AG2
8 digital outputs with relay	
SC66 interface cable	6DD1 684-0GG0
between the CPU551 and the SB10, SB60, SB61 or SU12 interface module, 2 m long	
SC67 service cable	6DD1 684-0GH0
between CPU551 and PG/PC, 7 m long	

Additional accessories

Overview

For information about interface cables SC62, SC63, SC64 and interface modules SB10, SB61, SB71, SU12 and SU13 see section 5, page 5/101.

Supplementary Components



12/2	Drive systems
12/2	SINAMICS
12/4	SIMODRIVE
12/4	SIMOVERT MASTERDRIVES
12/5	SIMOREG DC MASTER 6RA70
12/5	Interface and monitoring technology
12/5	SIRIUS relays
12/6	Measuring systems
12/6	SIMODRIVE sensor
12/7	Automating systems
12/7	SIMOTION motion control system
12/8	SINUMERIK CNC automation systems
12/9	Time synchronization systems
12/9	SICLOCK
12/10	Power supplies
12/10	SITOP power and LOGO!Power
12/11	System cables
12/11	MOTION-CONNECT cables and connections

Supplementary components

Drive systems

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 120 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 small powers

- For speed-controlled applications (V/f) in 200 - 240 V systems.
- Power range from 0.12 - 3 kW.
- 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 - 132 kW
- Modular building block system for more flexibility: various types of communication (USS protocol, PROFINET 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 integral line filter and energy recovery

Further information:

- Catalog D11.1
- Internet:
www.siemens.com/sinamics-g120

SINAMICS G120D – the decentralized individual drive with high degree of protection for mounting outside cabinets

- For speed-controlled applications (V/f and vector control with/without encoder) in 380 - 480 V networks
- Power range from 0.75 - 7.5 kW
- Modular design for increased flexibility: different types of communication (PROFINET and PROFIBUS DP) and Safety Integrated with fail-safe control units
- Can be used in a wide range of industrial applications, with the main focus on the automotive industry
- Flat design with uniform hole dimensions and IP65 protection
- With integral line filter and energy recovery

Further information

- Catalog D11.1
- Internet:
www.siemens.com/sinamics-g120d

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

Overview (continued)

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:

- Catalogs PM 21, NC 61, D 21.3
- Catalog CA 01
- Internet:
www.siemens.com/sinamics-s120
www.siemens.com/automation/mall

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.
- Power module with HV-IGBT technology for powers up to 10 MVA, output voltage 2.3 to 6.6 kV, alternatively with air or water cooling.
- Power module with IGCT technology for powers above 10 MVA up to 28 MVA, output voltage 3.3 kV, 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

Supplementary components

Drive systems

SIMODRIVE

Overview



- Inverter 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 6, Engineering Tools, page 6/25.

Further information:

- Catalogs NC 60/DA 65.4
- Catalog CA 01
- Internet:
 - www.siemens.com/drivesolutions
 - www.siemens.com/automation/mall

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 6, Engineering Tools, page 6/25.

Further information:

- Catalogs DA 65.10/DA 65.11
- Catalog CA 01
- Internet:
 - www.siemens.com/drivesolutions
 - www.siemens.com/automation/mall

Supplementary components

Drive systems, interface and monitoring technology

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 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 12000 A
- Protection against commutation failures with SIMOREG CCP.

Further information:

- Catalog DA 21.1 and DA 22

Internet:

www.siemens.com/automation

SIRIUS relays

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 electrical isolation or for converting analog signals, as 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 relay 3TX70 and plug-in relay connector LZS

Interface relay 3TX7 with a minimum overall width of 6.2 mm:

- Can be used for contact multiplication, potential equalization, or as EMC and overvoltage protection.
- Semiconductor versions for applications with high switching rates or for switching capacitive loads.

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.

Plug-in relay connector LZS:

- Can be used for contact multiplication, potential matching or to switch small loads.
- Up to 4 changeover contacts in one device:
 - Wide-voltage designs with or without hard gold-plated contacts
 - With screw-type or push-in spring-loaded terminals

Supplementary components

Interface and monitoring technology, measuring systems

SIRIUS relays

Overview (continued)

Monitoring relays 3RS10/11, 3UG3, 3RN1

Temperature monitoring relays 3RS10/11 work autonomously or parallel to a temperature control circuit, and are used to monitor a defined temperature limit in solid, liquid or gaseous media.

- Easy to operate without complicated menu guidance or add-on software.

Monitoring relays 3UG are used to monitor electrical and non-electrical variables which cannot or should not be directly recorded by an automation system.

- Monitoring of line supplies for overvoltage or undervoltage, direction of rotation or asymmetry.
- Monitoring of loads using power factor or current measurement.
- 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

Time relays 3RP15 and 3RP20 are used for all time-delayed switching processes in open-loop control, starting, protection and closed-loop control circuits. They guarantee high functionality and repeatability of the set time. Applications include critical real-time processes such as the star/delta changeover of motors.

- 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, PM 21, DA 65.3, DA 65.4
- Catalog CA 01
- Internet:
www.siemens.com/simodrive
www.siemens.com/automation/mall

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.

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.
- Optimum suitability for:
 - Compact machines
 - Distributed automation concepts
 - Modular machines
 - Time-critical demands on the coupled axes

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.
- Optimum suitability for:
 - Largest possible freedom in selection of drives
 - Wide range of process signals
 - Retrofit applications due to integral analog interfaces.

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 MC1-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.
- Optimum suitability for:
 - Applications requiring an open PC world
 - Applications with particularly high performance demands, e.g. hydraulics applications
 - Applications requiring open-loop control and visualization on one hardware system
 - Comprehensive data management, evaluation and logging

Further information:

- Catalog PM 21
- Catalog CA 01
- Internet:
 - www.siemens.com/simotion
 - www.siemens.com/automation/mall

Supplementary components

Automating systems

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 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 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 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
- Catalog CA 01
- Internet:
www.siemens.com/sinumerik
www.siemens.com/automation/mall

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 MC12 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.

Supplementary components

Automating systems, time synchronization systems

SINUMERIK CNC automation systems

Overview (continued)



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
- Catalog CA 01
- Internet:
www.siemens.com/sinumerik
www.siemens.com/automation/mall

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 TC400 and SICLOCK TS plant central clocks, radio synchronization units, pulse converters and driver software for message frame reception.

SICLOCK TC400 and SICLOCK TS

- Plant central clocks for process synchronization.
- Simple and fast adaptation to the process using parameterization of interfaces and frame contents with LC display on the device (TS) and user-friendly Web interface (TC400).
- Radio synchronization via GPS, DCF77, IRIG B, etc.
- Process synchronization over Ethernet or point-to-point connections, e.g. with DCF77, minutes pulse, IRIG B and IRIG A frames.

Note:

SICLOCK TM will be discontinued at the end of 2008.

Further information:

- Siemens AG, Electronic Design and Manufacturing Services (I IS MS EDM), Frauenausracher Straße 98, 91056 Erlangen
 Tel.: 09131/18-82010 (Hotline)
 Fax: 09131/18-80604
 E-mail: siclock@siemens.com
- Internet:
www.siemens.de/siclock
www.siemens.com/siclock

Supplementary components

Power supplies

SITOP power and LOGO!Power

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.
- Low residual ripple of < 0.4 %
- Integrated short-circuit protection, additional fusing not required.
- Safe electrical isolation.
- Meets the requirements of national and international standards.

SITOP modular

- Single-phase, two-phase and three-phase basic devices 24 V/ 5 to 40 A
- Rugged metal housing for DIN rail mounting.
- With comprehensive functionalities such as wide-range input, power boost up to three times the rated current (50% extra power is available for a duration of 5 s) and selectable short-circuit response.
- Functionalities can be extended by all SITOP add-ons.

SITOP smart

- 24 V/2.5, 5 and 10 A for standard applications.
- Narrow and compact design with width of just 32.5, 50 or 70 mm.
- Permanent 120% of rated power up to 45 °C with the single-phase devices.

SITOP supplementary modules

- Expand the SITOP power supply units for many different requirements.
- Signaling module, redundancy module, backup module, SITOP *select* diagnostics module, DC UPS and battery modules.
- DC UPS modules and 24 V battery modules for power loss ride-through.

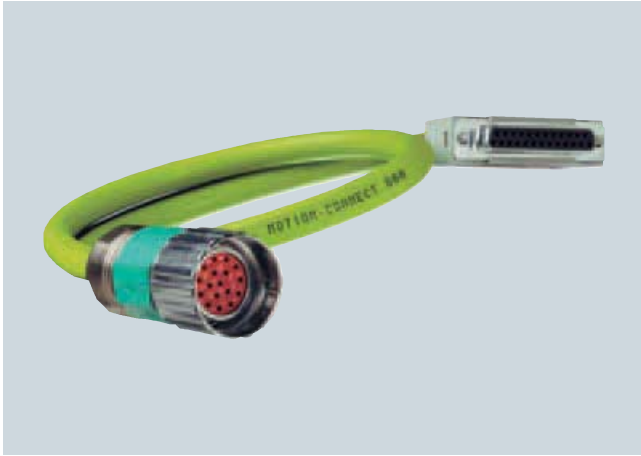
LOGO!Power

- Power supplies with same design as LOGO! logic modules. 2 power classes for output voltages of 5 V, 12 V and 15 V, 3 power classes for 24 V.
- For universal application in the bottom performance range.
- Compact design, installation possible in small distribution board.

Further information:

- Catalog KT 10.1
- Internet:
www.siemens.com/sitop

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, for average mechanical requirements, therefore particularly suitable for timber processing machines, printing machines and simple machine tools.
- MOTION-CONNECT 700, optimum suitability for linear motors and machines with high dynamic requirements.
- MOTION-CONNECT 800, satisfies all high mechanical requirements for use in trailing cables with processing and production machines.

Further information:

- Catalogs NC 60, NC 61, PM 21, DA 65.3, DA 65.4
- Catalog CA 01
- Internet:
www.siemens.com/automation/mall

Supplementary components



Appendix



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Appendix

Training

Faster and more applicable know-how: Hands-on training from the manufacturer

SITRAIN® – the Siemens Training for Automation and Industrial Solutions – provides you with comprehensive support in solving your tasks.

Training by the market leader in automation and plant engineering enables you to make independent decisions with confidence. Especially where the optimum and efficient use of products and plants are concerned. You can eliminate deficiencies in existing plants, and exclude expensive faulty planning right from the beginning.



First-class know-how directly pays for itself: In shorter startup times, high-quality end products, faster troubleshooting and reduced downtimes. In other words, increased profits and lower costs.

Achieve more with SITRAIN

- Shorter times for startup, maintenance and servicing
- Optimized production operations
- Reliable configuration and startup
- Minimization of plant downtimes
- Flexible plant adaptation to market requirements
- Compliance with quality standards in production
- Increased employee satisfaction and motivation
- Shorter familiarization times following changes in technology and staff

Contact

Visit our site on the Internet at:

www.siemens.com/sitrain

or let us advise you personally. You can request our latest training catalog from:

SITRAIN Customer Support Germany:

Phone: +49 (0)1805 / 23 56 11

Fax: +49 (0)1805 / 23 56 12

(0.14 €/min. from a German landline network, mobile telephone prices may vary)

E-Mail: info@sitrain.com

SITRAIN highlights

Top trainers

Our trainers are skilled teachers with direct practical experience. Course developers have close contact with product development, and directly pass on their knowledge to the trainers.

Practical experience

The practical experience of our trainers enables them to teach theory effectively. But since theory can be pretty drab, we attach great importance to practical exercises which can comprise up to half of the course time. You can therefore immediately implement your new knowledge in practice. We train you on state-of-the-art methodically/didactically designed training equipment. This training approach will give you all the confidence you need.

Wide variety

With a total of about 300 local attendance courses, we train the complete range of Siemens products as well as interaction of the products in systems. Telecourses, teach-yourself software and seminars with a presenter on the Web supplement our classic range of courses.

Tailor-made training

We are only a short distance away. You can find us at more than 50 locations in Germany, and in 62 countries worldwide. You wish to have individual training instead of one of our 300 courses? Our solution: We will provide a program tailored exactly to your personal requirements. Training can be carried out in our Training Centers or at your company.

The right mixture: Blended learning

"Blended learning" means a combination of various training media and sequences. For example, a local attendance course in a Training Center can be optimally supplemented by a teach-yourself program as preparation or follow-up. Additional effect: Reduced traveling costs and periods of absence.



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.		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 English	 6ZB3 500-0AQ01-0AA0 6ZB3 500-0AQ02-0AA0	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 English	 6ZB3 500-0AC01-0AA0 6ZB3 500-0AC02-0AA0
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 English	 6ZB3 500-0AE01-0AA0 6ZB3 500-0AE02-0AA0	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 English	 6ZB3 500-0AP01-0AA0 6ZB3 500-0AP02-0AA0
Automating with STEP 7 in STL and SCL Now in its fifth edition, this book presents the most recent version of the STEP 7 programming software. It is intended for all users of SIMATIC S7 controllers. German English	 6ZB3 500-0AA01-0AA0 6ZB3 500-0AA02-0AA0	Electrical Feed Drives in Automation This book provides a comprehensive introduction to the physical and technical fundamentals of control and drive technology. Particular attention is given to the computation and measurement of electric feed drives in automation technology. German English	 6ZB3 500-0AF01-0AA0 6ZB3 500-0AF02-0AA0
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 English	 6ZB3 500-0AB01-0AA0 6ZB3 500-0AB02-0AA0	Industrial Ethernet in industrial automation This book provides plant planners, programmers and commissioning engineers with the necessary basics and terms to use Ethernet LAN technologies in industrial automation using SIMATIC. German	 6ZB3 500-0AM01-0AA0
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 English	 6ZB3 500-0AD01-0AA0 6ZB3 500-0AD02-0AA0	Electrical feed drives in production/automation engineering This book describes individual and up-to-date components for feed drives such as motors and mechanical transfer elements in a practical context. German	 6ZB3 500-0BC01-0AA0

Appendix

Additional documentation

Technical books for automation engineering

Ordering data (continued)	Order No.		Order No.
Dictionary of Drive Technology and Mechatronics 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 German/English, on CD-ROM	6ZB3 500-0AG01-0AA0 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 English-German German-English/ English-German; on CD-ROM	6ZB3 500-0AJ01-0AA0 6ZB3 500-0AJ02-0AA0 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 B3 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	6ES7 998-8XC01-8YE0
SIMATIC Manual Collection update service for 1 year B3 Current Manual Collection DVD as well as the three following updates	6ES7 998-8XC01-8YE2

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

Overview

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/EEG "Electromagnetic Compatibility" (EMC guideline).
- 73/23/EEG "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 subsidiaries.

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. Therefore a declaration of conformity with regard to the EU machine directive 89/392/EEC or 2006/42/EU (new edition, applicable from end of 2009) may not be provided for SIMATIC.

The EU machine directive regulates the requirements placed on a machine or a part thereof. 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 integrated into the evaluation of the complete machine by the machine manufacturer.

As electrical equipment, SIMATIC is subject to the low-voltage directive which, as a "total safety directive", covers all dangers just like the machine directive.

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 will help you in the provision of your declaration of conformity, and shows which criteria according to EN 60204-1 (2006-06) apply to SIMATIC. You can obtain further information from the enclosed declaration of conformity according to the low-voltage and EMC directives (with list of included standards).

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

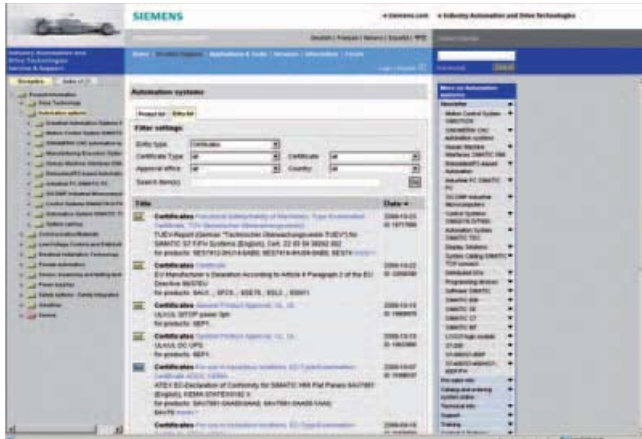
Appendix

Standards and approbations, Quality management

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 continuously updated. The data for products which have not yet been included in the overview is continuously 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

Overview

The screenshot shows the 'Local Partners' page for Germany. It asks the user if they are looking for a local contact for Siemens Automation and Drives products. It prompts the user to select a city (Berlin is selected) and a team (Sales is selected). A 'Next >' button is visible at the bottom right.

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.

The screenshot shows the 'Please select a sector' step. It lists various sectors such as 'Video Systems, Visualization Systems', 'Electrical Wholesale', 'Material Flow Controlling, Distribution and Logistics', etc. The 'Sales' team is selected. A 'Next >' button is visible at the bottom right.

The screenshot shows the 'Please select a Siemens product group' step. It lists various product groups such as 'Drive Technology', 'Automation systems', 'Communication/Networks', etc. The 'Sales' team is selected. A 'Next >' button is visible at the bottom right.

Appendix

Siemens Partners

Siemens Solution Partner Automation, Power Distribution and PLM

Overview



Siemens Solution Partner is the name used to identify selected system integrators as suppliers of solutions for the Siemens portfolio in the automation, power distribution and product lifecycle management (PLM) sectors in accordance with globally uniform qualification procedures.

In the context of the Siemens Solution Partner program, our strengths merge with the competences of our Solution Partners. Our product and system expertise works together with the comprehensive application and sector expertise of our partners to always produce perfect solutions for every application.

The number of Solution Partners has increased extremely rapidly, and now more than 850 certified Solution Partners are able to provide pioneering, tailored solutions in more than 45 countries.

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 DVD:
On the start page via "Contacts & Partners;
Siemens Solution Partner Automation, Power Distribution and PLM"
- 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

Siemens Industry Automation and Drive Technologies in the WWW



A detailed knowledge of the range of products and services available is essential when planning and configuring automation systems. It goes without saying that this information must always be fully up-to-date.

Siemens Industry Automation and Drive Technologies has therefore built up a comprehensive range of information in the World Wide Web, which offers quick and easy access to all data required.

Under the address

<http://www.siemens.com/automation>

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

Product Selection Using the Offline Mall



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.

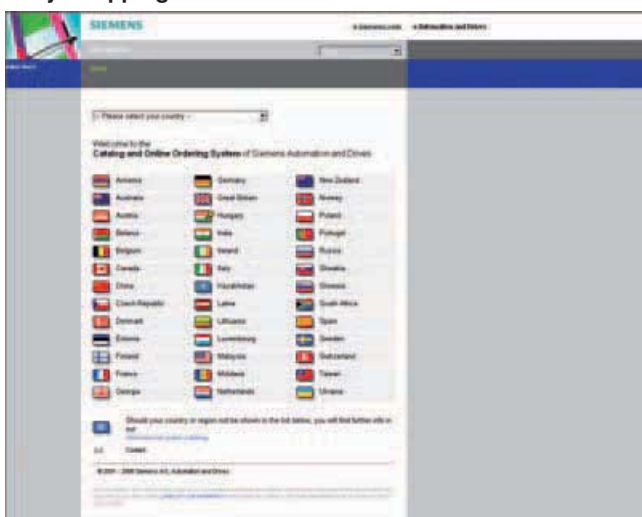
After selecting the product of your choice you can order at the press of a button, by fax or by online link.

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 Mall



The 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 Mall on the Internet under:

<http://www.siemens.com/automation/mall>

Appendix

Online Services

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.

Configuration and Software Engineering



Support in configuring and developing with customer-oriented services from actual configuration to implementation of the automation project.¹⁾

Service On Site



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

In Germany

0180 50 50 444¹⁾

(€ 0.14 /min. from a German landline network, mobile telephone prices may vary)

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.

<http://www.siemens.com/automation/service&support>

Repairs and Spare Parts



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

In Germany

0180 50 50 446¹⁾

(€ 0.14 /min. from a German landline network, mobile telephone prices may vary)

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

(€ 0.14 /min. from a German landline network, mobile telephone prices may vary)

<http://www.siemens.com/automation/support-request>

Optimization and Upgrading



To enhance productivity and save costs in your project we offer high-quality services in optimization and upgrading.¹⁾

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⁾

¹⁾ For country-specific telephone numbers go to our Internet site at: <http://www.siemens.com/automation/service&support>

Knowledge Base on CD-ROM



For locations without online connections to the Internet there are excerpts of the free part of the information sources available on CD-ROM (Service & Support Knowledge Base). This CD-ROM contains all the latest product information at the time of production (FAQs, Downloads, Tips and Tricks, Updates) as well as general information on Service and Technical Support.

The CD-ROM also includes a full-text search and our

Knowledge Manager for targeted searches for solutions. The CD-ROM will be updated every 4 months.

Just the same as our online offer in the Internet, the Service & Support Knowledge Base on CD comes complete in 5 languages (German, English, French, Italian, Spanish).

You can order the **Service & Support Knowledge Base** CD from your Siemens contact.

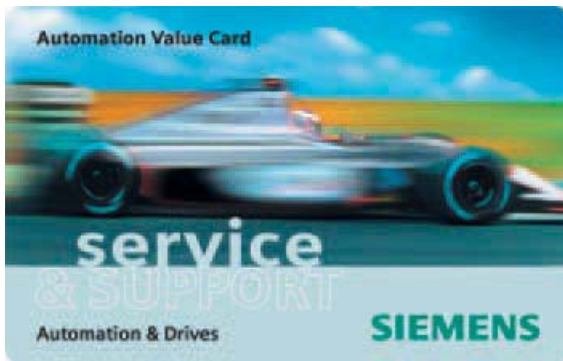
Order no. **6ZB5310-0EP30-0BA2**

Orders via the Internet
(with Automation Value Card or credit card) at:

<http://www.siemens.com/automation/service&support>

in the Shop domain.

Automation Value Card



Small card - great support

The Automation Value Card is an integral component of the comprehensive service concept with which Siemens Automation and Drives will accompany you in each phase of your automation project.

It doesn't matter whether you want just specific services from our Technical Support or want to purchase high-quality Support Tools in our Online Shop, you can always pay with your Automation Value Card. No invoicing, transparent and safe. With your personal card number and associated PIN you can view the state of your account and all transactions at any time.

Services on card. This is how it's done.

Card number and PIN are on the back of the Automation Value Card. When delivered, the PIN is covered by a scratch field, guaranteeing that the full credit is on the card.

By entering the card number and PIN you have full access to the Service & Support services being offered. The charge for the services procured is debited from the credits on your Automation Value Card.

All the services offered are marked in currency-neutral credits, so you can use the Automation Value Card worldwide.

Automation Value Card order numbers

Credits	Order no.
200	6ES7 997-0BA00-0XA0
500	6ES7 997-0BB00-0XA0
1000	6ES7 997-0BC00-0XA0
10000	6ES7 997-0BG00-0XA0

Detailed information on the services offered is available on our Internet site at:

<http://www.siemens.com/automation/service&support>

Service & Support à la Card:

Examples

Technical Support	
„Priority“	Priority processing for urgent cases
„24 h“	Availability round the clock
„Extended“	Technical consulting for complex questions
Support Tools in the Support Shop	
„System Utilities“	Tools that can be used directly for configuration, analysis and testing
„Applications“	Complete topic solutions including ready-tested software
„Functions & Samples“	Adaptable blocks for accelerating your developments

Appendix

Software Licenses

Overview

Software types

Software requiring a license is categorized into types. The following software types have been defined:

- Engineering software
- Runtime software

Engineering software

This includes all software products for creating (engineering) user software, e.g. for configuring, programming, parameterizing, testing, commissioning or servicing.

Data generated with engineering software and executable programs can be duplicated for your own use or for use by third parties free-of-charge.

Runtime software

This includes all software products required for plant/machine operation, e.g. operating system, basic system, system expansions, drivers, etc.

The duplication of the runtime software and executable programs created with the runtime software for your own use or for use by third-parties is subject to a charge.

You can find information about license fees according to use in the ordering data (e.g. in the catalog). Examples of categories of use include per CPU, per installation, per channel, per instance, per axis, per control loop, per variable, etc.

Information about extended rights of use for parameterization/configuration tools supplied as integral components of the scope of delivery can be found in the readme file supplied with the relevant product(s).

License types

Siemens 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)

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Catalog improvement suggestions

Fax form

To

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 Gleiwitzer Str. 555
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Fax: +49 (911) 895-4837

Your address

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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.
 Thank You!

We invite you to grade our catalog on a point system from 1 (= good) to 6 (= poor):

Do the contents of the catalog live up to your expectations?

☐

Do the technical details meet your expectations?

☐

Is the information easy to find?

☐

How would you assess the graphics and tables?

☐

Can the texts be readily understood?

☐
Did you find any printing errors?

Appendix

Just copy this form, fill it in and fax it to us. We will deliver right away!

Fax order form

To:

Fax No.

(For address, see „Siemens contact partners“)

Contact person

Item	Order No.	Description	Qty.	Price	Total price

Subject to the General Conditions of Supply and Delivery specified in your sales partner's catalog and/or price list.

Company address (company stamp)

Shipping address (if different)

Customer No. (if known)

Company/Department

Company/Department

Street/No.

Street/No.

Postal code/City

Postal code/City

Contact person

Tel. No./Fax

Remarks

Customer Order No.:

Deliver by

Date

Signature

Notes



Appendix

Notes

Notes



Appendix

Notes

Notes

Appendix

Conditions of sale and delivery, Export regulations

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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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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.

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(for customers based in Germany)
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(for customers based outside Germany)

or download them from the Internet

<http://www.siemens.com/automation/mall>

(Germany: A&D Mall Online-Help System)

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Industry Automation, Drive Technologies and Electrical Installation Technology

Further information can be obtained from our branch offices listed in the appendix or at www.siemens.com/automation/partner

Automation and Drives	<i>Catalog</i>	Low-Voltage	<i>Catalog</i>
Interactive catalog on DVD	CA 01	Controls and Distribution – SIRIUS, SENTRON, SIVACON	LV 1
Drive Systems		Controls and Distribution – Technical Information SIRIUS, SENTRON, SIVACON	LV 1 T
<u>Variable-Speed Drives</u>		SIDAC Reactors and Filters	LV 60
SINAMICS G110/SINAMICS G120	D 11.1	SIVENT Fans	LV 65
Inverter Chassis Units		SIVACON 8PS Busbar Trunking Systems	LV 70
SINAMICS G120D			
Distributed Frequency Inverters			
SINAMICS G130 Drive Converter Chassis Units, SINAMICS G150 Drive Converter Cabinet Units	D 11	Motion Control	
SINAMICS GM150/SINAMICS SM150 Medium-Voltage Converters	D 12	SINUMERIK & SIMODRIVE Automation Systems for Machine Tools	NC 60
SINAMICS S150 Drive Converter Cabinet Units	D 21.3	SINUMERIK & SINAMICS Automation Systems for Machine Tools	NC 61
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Synchronous Motors with Permanent-Magnet Technology, HT-direct	D 86.2		
DC Motors	DA 12		
SIMOREG DC MASTER 6RA70 Digital Chassis Converters	DA 21.1	Process Instrumentation and Analytics	
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SIMOVERT PM Modular Converter Systems	DA 45	<i>PDF: Indicators for panel mounting</i>	<i>MP 12</i>
SIEMOSYN Motors	DA 48	SIREC Recorders and Accessories	MP 20
MICROMASTER 420/430/440 Inverters	DA 51.2	SIPART, Controllers and Software	MP 31
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SIMOVERT MASTERDRIVES Vector Control	DA 65.10	Continuous Weighing and Process Protection	WT 02
SIMOVERT MASTERDRIVES Motion Control	DA 65.11	Process Analytical Instruments	PA 01
Synchronous and asynchronous servomotors for SIMOVERT MASTERDRIVES	DA 65.3	<i>PDF: Process Analytics, Components for the System Integration</i>	<i>PA 11</i>
SIMODRIVE 611 universal and POSMO	DA 65.4		
<u>Low-Voltage Three-Phase-Motors</u>		SIMATIC Industrial Automation Systems	
IEC Squirrel-Cage Motors	D 81.1	Products for Totally Integrated Automation and Micro Automation	ST 70
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GAMMA Building Controls	ET G1	Applications and Products for Industry are part of the interactive catalog CA 01	
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