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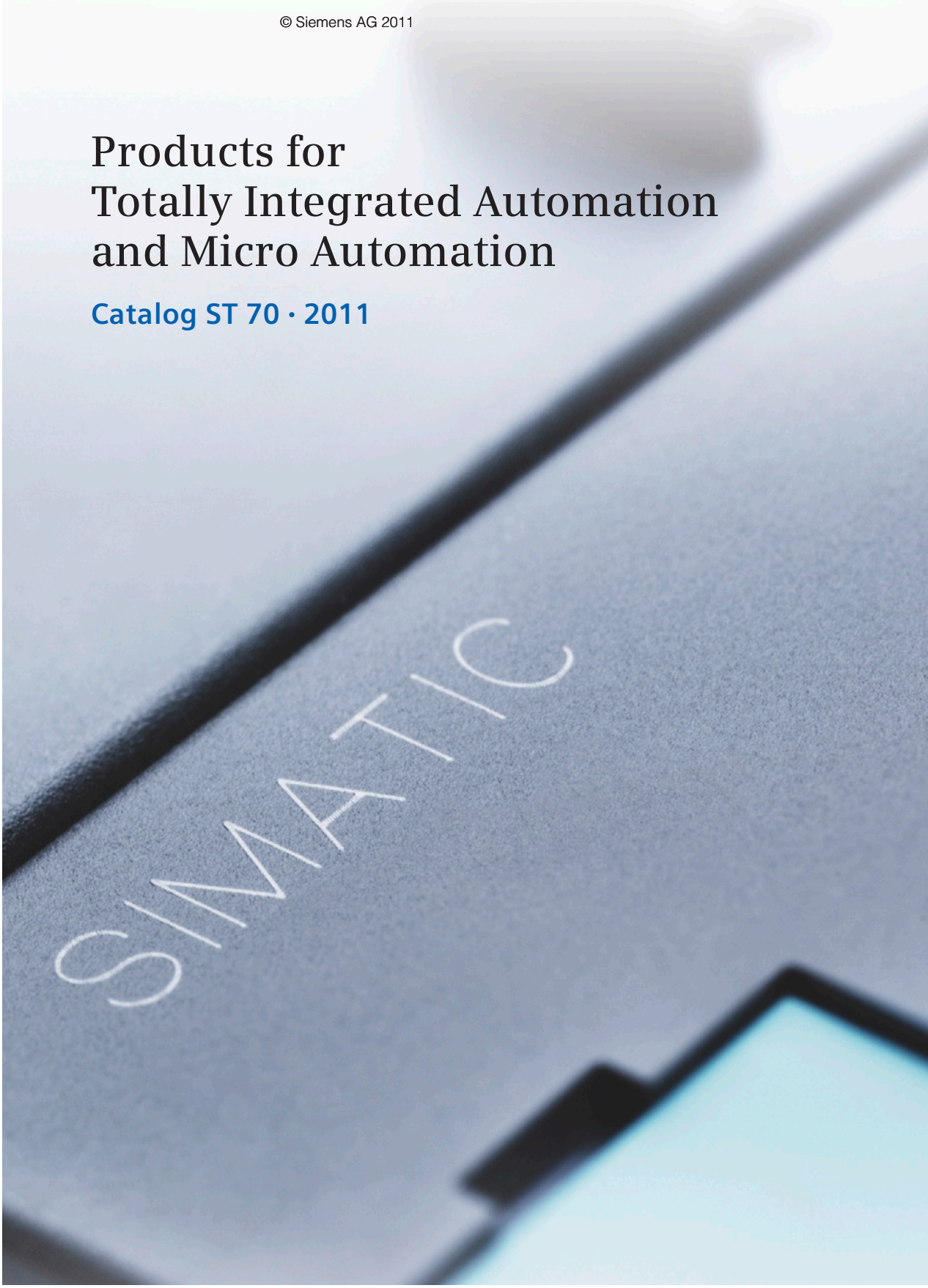






Products for Totally Integrated Automation and Micro Automation

Catalog ST 70 · 2011



SIMATIC

Answers for industry.

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Related catalogs

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SIMATIC HMI / PC-based Automation ST 80/ST PC
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Power supply
SITOP

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SIMATIC TOP connect KT 10.2
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PDF (E86060-K2410-A201-A5-7600)



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Products for Totally Integrated Automation and Micro Automation

Catalog ST 70 · 2011



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Supersedes:
Catalog ST 70 · 2009
Catalog News ST 70 N · 2010

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The products contained in this catalog can also be found in the Interactive Catalog CA 01.
Order No.:
E86060-D4001-A510-C9-7600

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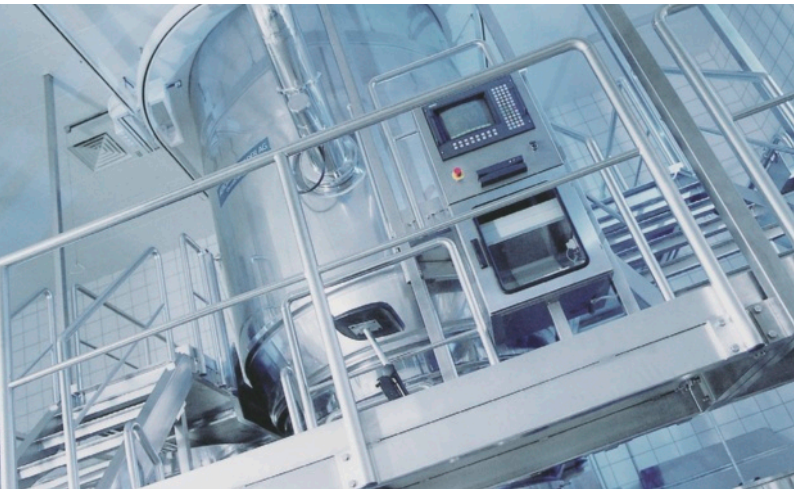
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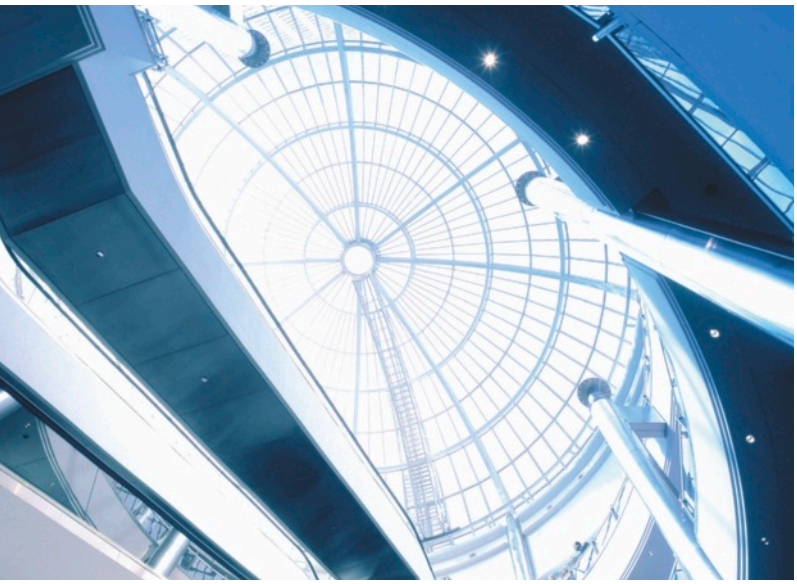
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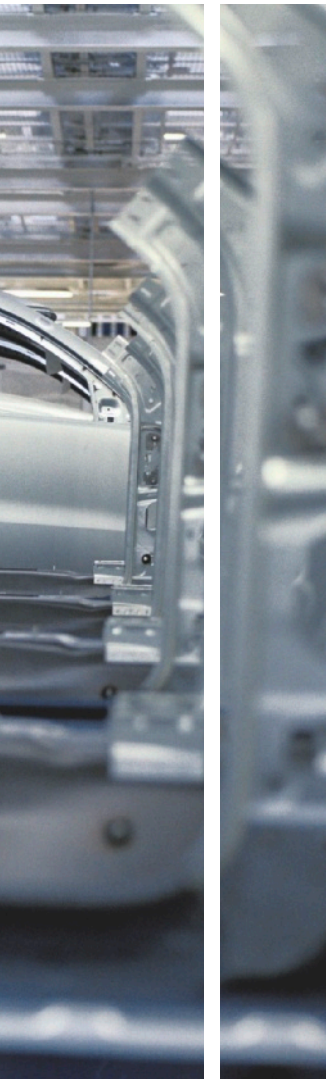
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Answers for industry.

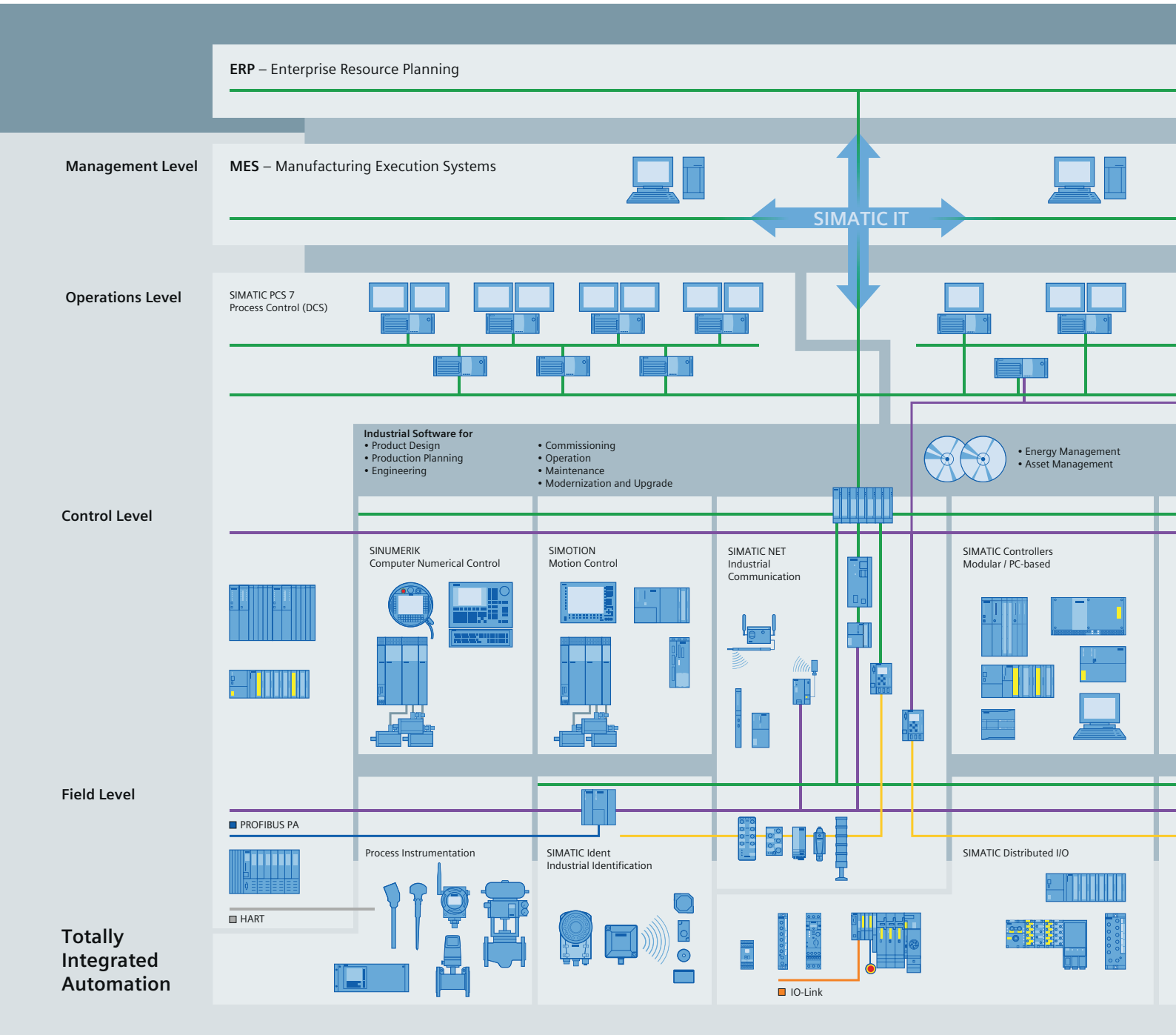
Siemens Industry answers the challenges in the manufacturing and the process industry as well as in the building automation business. Our drive and automation solutions based on Totally Integrated Automation (TIA) and Totally Integrated Power (TIP) are employed in all kinds of industry. In the manufacturing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

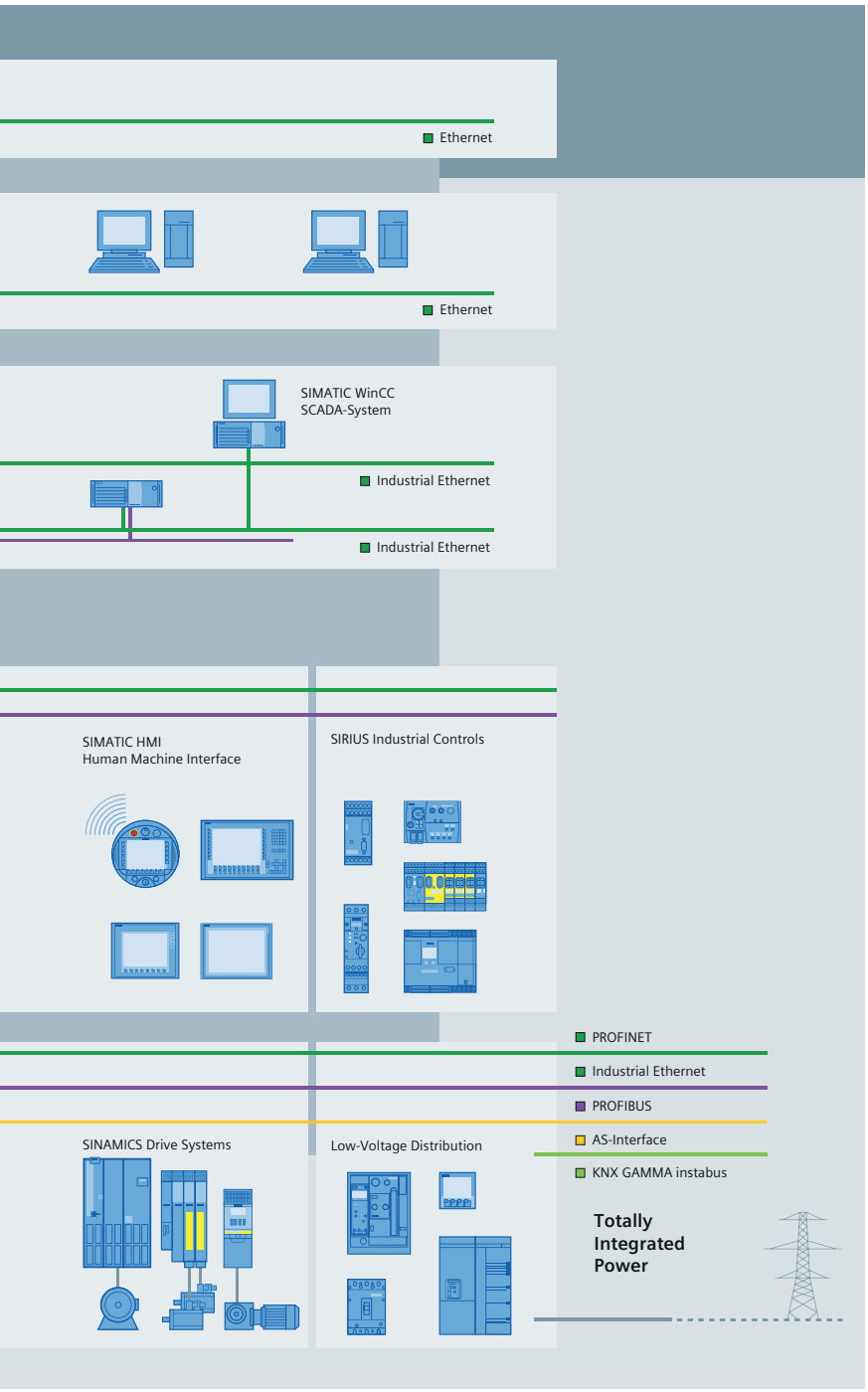
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Setting standards in productivity and competitiveness.

Totally Integrated Automation.

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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.

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

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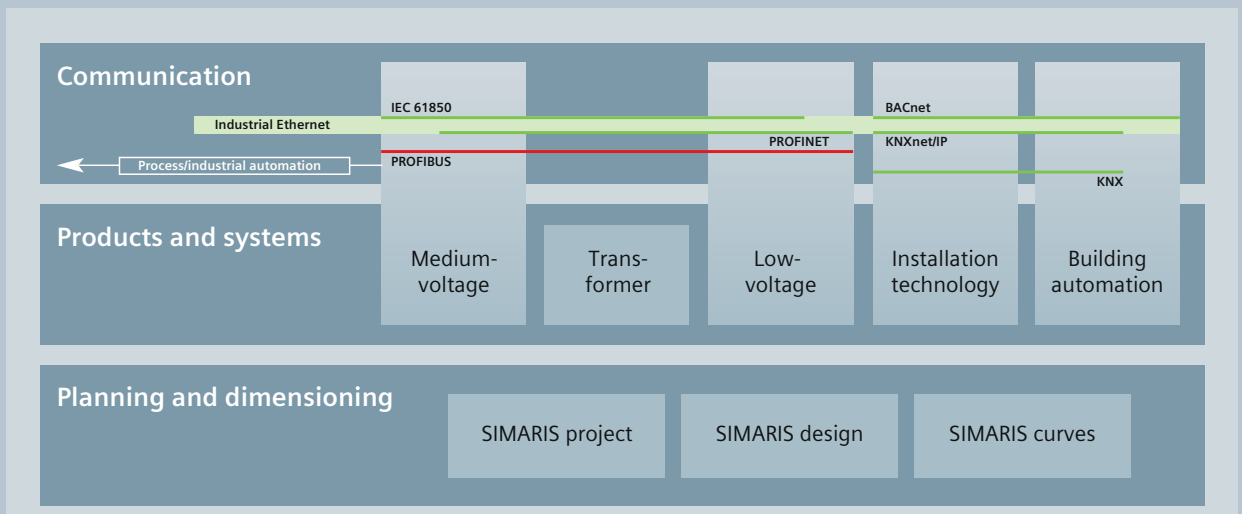


Integrated power distribution from one source.

Totally Integrated Power.

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Electrical power distribution requires integrated solutions. Our answer: Totally Integrated Power (TIP). This includes tools and support for planning and configuration and a complete, optimally harmonized product and system portfolio for integrated power distribution from medium-voltage switchgear right to socket outlets.

The power distribution products and systems can be interfaced to building or industrial automation systems (as part of Total Building Solutions or Totally Integrated Automation) via communication capable circuit breakers and modules, allowing the full potential for optimization that an integrated solution offers to be exploited throughout the product cycle – from planning right through to installation and operation.

Thanks to a comprehensive energy management system, power flows can be made transparent and the energy consumption of individual loads can be calculated and allocated. Building operators can thus identify power-intensive loads and implement effective optimization measures. With its products and systems, Totally Integrated Power forms the basis for this functionality and guarantees greater cost-efficiency in industrial applications, infrastructure and buildings.

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Find your products in the structure tree, in the new "Bread-crumb" navigation or with the integral search machine with expert functions. Electronic configurators are also integrated into the Mall. Enter the various characteristic values and the appropriate product will be displayed with the relevant order numbers. You can save configurations, load them and reset them to their initial status.

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When you have sent the order, you will receive a short e-mail confirmation which you can print out or save. With a click on "Carrier", you will be directly connected to the website of the carrier where you can easily track the delivery status.

Added value due to additional information

So you have found your product and want more information about it? In just a few clicks of the mouse, you will arrive at the image data base, manuals and operating instructions. Create your own user documentation with My Documentation Manager.
Also available are FAQs, software downloads, certificates and technical data sheets as well as our training programs. In the image database you will find, depending on the product, 2D/3D graphics, dimension drawings and exploded drawings, characteristic curves or circuit diagrams which you can download.

Convinced? We look forward to your visit!

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Introduction

Micro Automation

LOGO!:
Easy-to-use technology with a future

The compact, easy-to use and low-cost solution for control tasks of low complexity.
For universal use in industry, non-residential buildings or private buildings.
Replaces wiring by the interconnection of functions.
Operates in a manner similar to a PLC.
With integral HMI unit for direct input on the device and display of message texts/variables.



Simple operation:
- Interconnection of functions by mouse click on the PC or by pressing buttons on the device

Minimum time requirements:
- Wiring solely of the inputs and outputs
- Parallel creation of circuit diagram and assembly of control cabinet

Reduced costs:
- Many integral functions of switching technology

High degree of flexibility:
- Simple modification of functionality at the press of a button
- Versions for different operating voltages
- Modular design, therefore expandable at any time

You can find further information at:
http://www.siemens.com/logo

LOGO!	24C 24Co	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 (of which 4 for use in analog mode)	8 (of which 4 for use in analog mode)	8	8
Outputs	4, transistor	4, relay		
Continuous current	0.3 A	10 A (with resistive load), 3 A (with inductive load)		
Short-circuit protection	Electric (1 A)	External fuse required		
Integral time switches/power reserve	● Power reserve 80 h			
Ambient temperature	0 to +55 °C			
Radio interference suppression	In accordance with EN 50 011 (limit class B)			
Degree of protection	IP20			
Certification	In accordance with 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 × 90 × 55 mm (4 modular widths)			

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Introduction

Micro Automation

SIMATIC S7-200:
Control technology at its best

SIMATIC S7-200 really is in a class of its own: it is compact yet extremely powerful (e.g. real-time response), it is fast, exceptionally communicative, and very user-friendly with regard to software and hardware handling.

- Graded range of CPUs with wide basic PLC functionality.
- Modular expandability for individual adaptation to specific tasks.
- Simple networking using point-to-point interface (PPI) with programming, communication, operation and monitoring functions.
- Programming with STEP 7 Micro/WIN, specially designed for the scope of performance of the S7-200 optimized software.
- Wizards for particularly simple and user-friendly operation.

You can find further information 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 and 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				

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SIMATIC modular controllers

SIMATIC S7-1200:
Modular, compact controllers for discrete and stand-alone automation solutions

- Scalable and flexible design:
  The SIMATIC S7-1200 controller family has been designed with maximum flexibility to fit your individual machine requirements. This allows you to custom design your controller system to meet your needs; it also makes future system expansions quick and easy.
- Integrated Industrial Ethernet/PROFINET interface.
  The Industrial Ethernet/PROFINET interface integrated into SIMATIC S7-1200 offers seamless communication with distributed I/O with SIMATIC HMI Basic Panels for visualization and additional controllers for CPU-to-CPU communication. Also with devices from third parties for extended integration possibilities as well as the SIMATIC STEP 7 Basic engineering system for configuring and programming.
- Integrated technology functions:
  The name SIMATIC has been synonymous with reliability in the field of automation for many years. Based on long years of experience, we have integrated our proven and innovative technology functions into our new controller – ranging from counting and measuring, speed, position and duty cycle control to simple process control functionality. This wide variety of functionality enables you to solve a wide array of applications.



You decide what you want. Use the innovative S7-1200 in your application as an autonomous mini programmable controller, or apply it to conquer the world of TIA.

You can find further information at:
http://www.siemens.com/simatic-s7-1200

SIMATIC S7-1200, CPU	1211C	1212C	1214C
RAM	25 KB		50 KB
Processing times (µs) Bit/word/floating point	0.1/12/18		
Address ranges Digital channels Analog channels	 6/4 2/0	 8/6 2/0	 14/10 2/0
Interfaces DP master DP slaves PtP communication PROFINET	 ● (via CM 1243-5) ● (via CM 1242-5) ● (via CM 1241) ●		
Integrated inputs/outputs DI/DO AI/AO	 4/4 2/0	 8/6 2/0	 14/10 2/0
Integrated functions Counters Pulse outputs Closed-loop control/positioning	 3 (100 kHz) 2 ●	 4 (3 x 100 kHz, 1 x 30 kHz) 2 ●	 6 (3 x 100 kHz, 3 x 30 kHz) 2 ●
Mounting dimensions W x H x D (mm)	90 x 100 x 75		110 x 100 x 75

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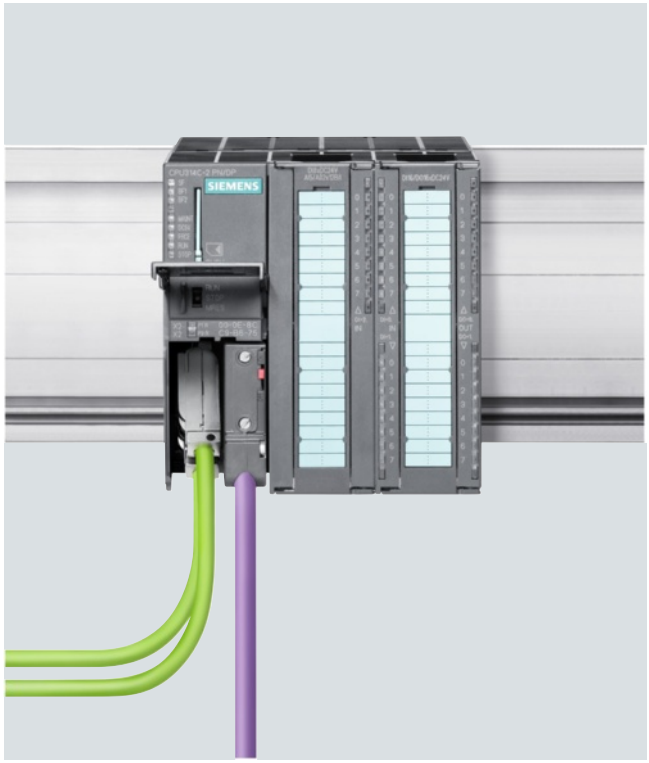
Introduction

SIMATIC modular controllers

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

The SIMATIC S7-300 has been designed for innovative system solutions with a focus on manufacturing engineering, and as a universal automation system, it is the ideal 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 ET200M.
- 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 317TF-2 DP
RAM Instructions	32/128[1] KB 10/42[1] K	256/384[2] KB 85/128[2] K	512/1024[3] KB 170/340[3] K	2 MB 680 K	256 KB 84 K	1/1.5[4] MB 340/400[4] K
Processing times (µs) Bit/word/fixed point/floating point	0.1/0.24/ 0.32/1.1; 0.06/0.12/ 0.16/0.59[1]	0.05/0.09/0.12/ 0.45	0.05/0.2/0.2/1; 0.025/0.03/0.04/ 0.16[3]	0.004/0.01/0.01/ 0.04	0.1/0.2/2/3	0.05/0.2/0.2/1
Timers/counters	256/256	256/256	512/512	2048/2048	256/256	512/512
Address ranges Digital channels Analog channels	 256/1024 64/256	 1024 256	 1024 256	 1024 256	 512 64	 512 64
Interfaces DP master syst. int./CP 342-5 DP slaves PtP communication PROFINET	 —/● — — —	 ● / ● ● — ●[2]	 ● / ● ● — ●[3]	 ● / ● ● — ●	 ● / ● ● — —	 ● / ● ● — —
Integrated inputs/outputs DI/DO AI/AO	 — —	 — —	 — —	 — —	 4/8 —	 4/8 —
Integrated functions Counters/frequency meters Pulse outputs Closed-loop control/positioning	 — — —/—	 — — —/—	 — — —/—	 — — —/—	**Technological functions**, e.g. gearing/camming, travel to fixed stop, travel/time-dependent cam switching, position-controlled positioning	
Mounting dimensions W x H x D (mm)	40 x 125 x 130	40 x 125 x 130	80/40 x 125 x 130	120 x 125 x 130	160 x 125 x 130	160 x 125 x 130

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1) CPU 314
2) CPU 315-2 PN/DP
3) CPU 317-2 PN/DP
4) CPU 317TF-2 PN/DP

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- The Micro Memory Card also enables simple program or firmware updates without 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 in an S7-300 controller.
- Many of the S7-300 components are also available in a SIPLUS extreme version for extreme environmental conditions, e.g. extended temperature range (-40/-25 ... +60/+70 °C) and for use where there is corrosive atmosphere/condensation.
  For more detailed information, visit:
  www.siemens.com/siplus-extreme

You can find further information at:
http://www.siemens.com/simatic-s7-300



SIMATIC S7-300, CPU	312C/313C	313C-2 PtP/ 313C-2 DP	314C-2 PtP / DP / PN/DP	315F-2 DP/ 315F-2 PN/DP	317F-2 DP/ 317F-2 PN/DP	319F-3 PN/ DP
RAM Instructions	32/64[1] KB 10/21[1] K	64 KB 21 K	96/192[4] KB 32/64[4] K	384/512[4] KB	1/ 1.5[8] MB	2.5 MB
Processing times (µs) Bit/word/fixed point/floating point	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; 0.06/0.12/0.16/ 0.59[4]	0.05/0.09/0.12/ 0.45	0.05/0.2/0.2/1; 0.025/0.03/0.04/ 0.16[8]	0.004/0.01/ 0.01/0.04
Timers/counters	128/128 256/256[1]	256/256	256/256	256/256	512/512	2048/2048
Address ranges Digital channels Analog channels	266/1016[1] 64/253[1]	1008 248	1016 253	1024 256	1024 256	1024 256
Interfaces DP master syst. int./CP 342-5 DP slaves PtP communication PROFINET	—/● — — —	—/● (●/●)[2] — (●)[2] ASCII, RK512, 3964R[3] —	—/● (●/●)[5] — (●)[5] ASCII, RK512, 3964R[3] —	● / ● ● — ●[7]	● / ● ● — ●[8]	● / ● ● — ●
Integrated inputs/outputs DI/DO AI/AO	10/6 (24/16)[1] 4/2[1]	16/16 —	24/16 4/2	— —	— —	— —
Integrated functions Counters/frequency meters Pulse outputs Closed-loop control/positioning	2 (10 kHz)/3 (30 kHz)[1] 2 (2.5 kHz)/3 (2.5 kHz)[1] ●/–	3 (30 kHz) 3 (2.5 kHz) ●/–	4 (60 kHz) 4 (2.5 kHz) ● / ●	— — —	— — —	— — —
Mounting dimensions W x H x D (mm)	80/120 x 125 x 130	120 x 125 x 130	120 x 125 x 130	40/80 x 125 x 130	80/40 x 125 x 130	120 x 125 x 130

— = cannot be used/not available
● = can be used/available

1) CPU 313C
2) CPU 313C-2 DP
3) CPU 313C-2 PtP
4) CPU 314C-2 PN/DP
5) CPU 314C-2 DP
CPU 314C-2 PN/DP
6) CPU 314C-2 PtP
7) CPU 315F-2 PN/DP
8) CPU 317F-2 PN/DP

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Introduction

SIMATIC modular controllers

SIMATIC S7-400:
The power controller for system solutions in the manufacturing and processing industry

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

- The S7-400 is especially suitable 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 high-speed backplane bus of S7-400 ensures efficient linking of central I/O modules.
- The S7-400 is used preferably to coordinate overall plants and to control lower-level communications 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 power reserves of the CPUs enable new functions to be integrated without further hardware investment, e.g. 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	412-2 PN	414-2 / 414-3	414-3 PN/DP	416-2 / 416-3	416-3 PN/DP
RAM Instructions	288/512[1] KB 48/84[1] K	1 MB 170 K	1/2.8[2] MB 170/460[2] K	4 MB 680 K	5.6/11.2[3] MB 920/1840[3] K	16 MB 2680 K
Processing times (ns) Bit/word/fixed point/floating point	75/75/75/225	75/75/75/225	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 ranges Digital channels Analog channels	 32768/32768 2048/2048	 32768/32768 2048/2048	 65536/65536 4096/4096	 65536/65536 4096/4096	 131072/131072 8192/8192	 131072/131072 8192/8192
DP interfaces Number of DP interfaces Number of DP slaves Plug-in interface modules	 1(MPI/DP) / 1[1] 32/64 —	 1(MPI/DP) / 1[1] 32/64 —	 1 (2)[2] 96 each — / 1 x DP[2]	 1 125 each 1 x DP	 1 (2)[3] 125 each — / 1 x DP[3]	 1 125 each 1 x DP
PN interfaces Number of PN interfaces PROFINET IO PROFINET with IRT PROFINET CBA TCP/IP UDP Web server ISO-on-TCP (RFC 1006) Data set gateway	 — — — — — — — — ●	 1 (2 ports) ● ● ● ● ● ● ● ●	 — — — — — — — — ●	 1 (2 ports) ● ● ● ● ● ● ● ●	 — — — — — — — — ●	 1 (2 ports) ● ● ● ● ● ● ● ●
Mounting dimensions W x H x D (mm)	25 x 290 x 219	25 x 290 x 219	50 x 290 x 219	50 x 290 x 219	25 (50)[3] x 290 x 219	50x290x219

— = cannot be used/not available
● = can be used/available

[1] CPU 412-2
[2] CPU 414-3
[3] CPU 416-3

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- The S7-400 can be configured in a modular way without any slot rules; there is a wide range 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 removed and inserted while live (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.
- Many S7-400 components are also available in a SIPLUS extreme version for extreme environmental conditions, e.g. for use where there is a corrosive atmosphere/condensation. For more detailed information, visit www.siemens.com/siplus-extreme

You can find further information at:
http://www.siemens.com/simatic-s7-400



SIMATIC S7-400, CPU	417-4	412-3H	414-4H	417-4H	414F-3 PN/DP	416F-2	416F-3 PN/DP
RAM Instructions	30 MB 5 M	768 KB 128 K	2.8 MB 460 K	30 MB 5 M	4 MB	5.6 MB	16 MB
Processing times (ns) Bit/word/fixed point/ floating point	18/18/18/54	75/75/75/225	45/45/45/135	18/18/18/54	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	2048/2048
Address ranges Digital channels Analog channels	131072/131072 8192/8192	65536/65536 4096/4096	65536/65536 4096/4096	131072/131072 8192/8192	65536/65536 4096/4096	131072/131072 8192/8192	131072/131072 8192/8192
DP interfaces Number of DP interfaces Number of DP slaves Plug-in interface modules	3 125 each 2 x DP	1 (MPI/DP) — 2 x sync[1)]	2 — 2 x sync[1)]	2 — 2 x sync[1)]	1 125 each 1 x DP	1 125 —	1 125 each 1 x DP
PN interfaces Number of PN interfaces PROFINET IO PROFINET with IRT PROFINET CBA TCP/IP UDP Web server ISO-on-TCP (RFC 1006) Data set gateway	— — — — — — — — — ●	— — — — — — — — — —	— — — — — — — — — —	— — — — — — — — — —	1 (2 ports) ● ● ● ● ● ● ● ●	— — — — — — — — — ●	1 (2 ports) ● ● ● ● ● ● ● ●
Mounting dimensions W x H x D (mm)	50 x 290 x 219	50 x 290 x 219	50 x 290 x 219	50 x 290 x 219	50 x 290 x 219	25 x 290 x 219	50 x 290 x 219

— = cannot be used/not available
● = can be used/available

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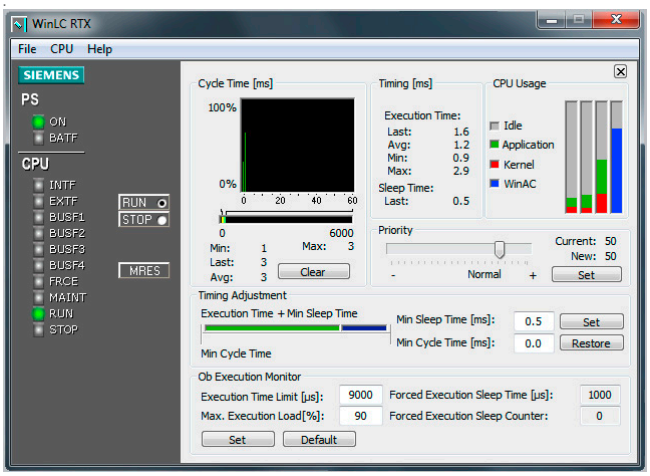
Introduction

SIMATIC controllers

SIMATIC WinAC RTX (F) / Embedded Bundles

SIMATIC PC-based Automation uses the real-time-capable software controller WinAC RTX or its fail-safe version WinAC RTX F on the basis of Windows operating systems. Any PC applications, operator control and monitoring tasks, as well as technological functions can simply be combined here to form an overall automation solution.
Through their rugged design and preinstalled, ready-to-use automation software, the SIMATIC Embedded Bundles allow the advantages of PC-based automation to be used at the machine.

SIMATIC WinAC RTX (F)



SIMATIC WinAC (Windows Automation Center) is the PC-based software controller from Siemens with a real-time response. The WinAC RTX PC-based controller is used when high performance, high data volumes and at the same time hard real time are required. WinAC uses a real-time core for real-time and deterministic response. WinAC RTX offers an open data interface to the standard software of the office world on the basis of OPC.

WinAC RTX is programmed using the standard SIMATIC programming tools, and is code-compatible with SIMATIC S7, i.e. program components can be used in SIMATIC S7-300/400 and WinAC RTX.

With WinAC RTX F, a TÜV-certified (German Technical Inspectorate), fail-safe software controller for safety-oriented applications is available. The S7 Distributed Safety software is used for programming the fail-safe program. The PROFIsafe profile permits fail-safe communication via PROFIBUS DP and PROFINET IO.

WinAC RTX is open for integration of technological applications. C/C++/C# programs can also be integrated into the WinAC RTX control program. Extremely flexible solutions can therefore be generated with access to all the hardware and software components of the PC. C/C++/C# is frequently used to program complex technology functions.
C / C ++ / C# encapsulates these programs. The openness of WinAC RTX can therefore also be used to protect the know-how in customized functions.

Embedded Bundles

SIMATIC Embedded Bundles are a ready-to-use combination of hardware and software for control and HMI applications. This results in simple handling and fast commissioning for automation solutions at machine level. Embedded Bundles 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.

SIMATIC Embedded Bundles are available based on the following hardware:

- SIMATIC IPC227D
- SIMATIC IPC427C
- SIMATIC HMI IPC277D
- SIMATIC HMI IPC477C (PRO)
- SIMATIC S7-mEC Embedded Controller

Thanks to their fan-free and disk-free design, the SIMATIC Embedded Bundles can be used direct at the machine in harsh environments. Windows Embedded Standard is used as the embedded operating system.



You can find further information at:
http://www.siemens.com/pc-based-automation

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SIMATIC programming devices

SIMATIC Field PG M3:
High-performance industrial notebook with new design

The SIMATIC Field PG M3, a member of the SIMATIC family, offers you a whole range of advantages in addition to wireless technology and Bluetooth at an attractive price/performance ratio: powerful Intel® Core™ i5 processor, high-resolution and luminous 15.6" widescreen display with 16:9 format, uniform data backup concept, powerful battery, fold-out handle, and quick-change hard disk. Furthermore, all standard interfaces for industrial applications are already onboard.
The ready-to-run SIMATIC Field PG M3 with preinstalled SIMATIC engineering software is the ideal industrial notebook – optimized for use when configuring, commissioning, servicing and maintaining your automation system.

Application

The Field PG M3 is equipped for industrial use:
- Suitable for use in harsh industrial environments due to state-of-the-art material technology
- Protected against shock and vibration: rugged magnesium die-cast housing with protector strips on the edges
- Safe grip in mobile use: fold-out handle
- Dirt-resistant: new industrial design with dark colors and keyboard with abrasion-resistant laser inscription
- Protection against electromagnetic influences: metalized plastic components on the inside of the enclosure (EMC/ EMS-tested)

Interfaces

- 2x fully-featured Ethernet interfaces with high data throughput (10 / 100 / 1000 Mbit)
- 5 x USB 2.0 ports (2x2 plus 1);
  each pair provides a total of 1 A for stable power supply to external devices
- Industrial WLAN, based on the WLAN standards 802.11 a, b, g and n, permits secure and wireless communication with programmable controllers. The radio link to the terminal equipment is monitored cyclically in the IWLAN and is safe and reliable even in critical situations.
- USB Bluetooth dongle (for insertion into separate USB port) for synchronization and transmission of data to devices with Bluetooth capability such as PDAs or mobile phones
- PROFIBUS/MPI interface as well as SIMATIC Memory Card and MultiMedia Card slot



Powerful hardware components

The very latest Intel Multicore processors together with the current Mobile Intel chipset provide maximum performance even for programs requiring a very high computing performance. The premium version has an Intel i5, 2.4 GHz processor with 3 MB L3 cache and 3 GB DDR3 RAM 1066 MHz (1x 2 GB, 1x 1 GB).
An additional feature of the Intel i5 processor is supporting of turbo boost which provides increased performance even for applications not using multi-threading.
Combination of a 9-cell Li-ion battery with Intel chipset components of highest quality designed for mobile use results in a long mobile application period of more than 3.5 hours.
An easily-replaceable high-speed hard disk with serial ATA interface allows fast data access and also data exchange between different operating systems and software configurations.

Operating system

Microsoft Windows XP Professional MUI (32-bit),
Windows 7 Ultimate 32 bit (available soon).

You can find further information at:
http://www.siemens.com/simatic-pg

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Introduction

SIMATIC IPC

SIMATIC IPC The more industrial PC
Professional automation solutions place a wide range of different demands on the industrial PCs used – vibration, cold, dust, heat – year in, year out, and round the clock. SIMATIC IPCs are the ideal industry-standard PC platforms for this, and offer:

- high system availability,
- high degree of investment protection,
- best industrial functionality.

SIMATIC IPCs are available in various designs and with different functionalities.

SIMATIC Rack PC
Flexible and powerful industrial PC in 19" design.

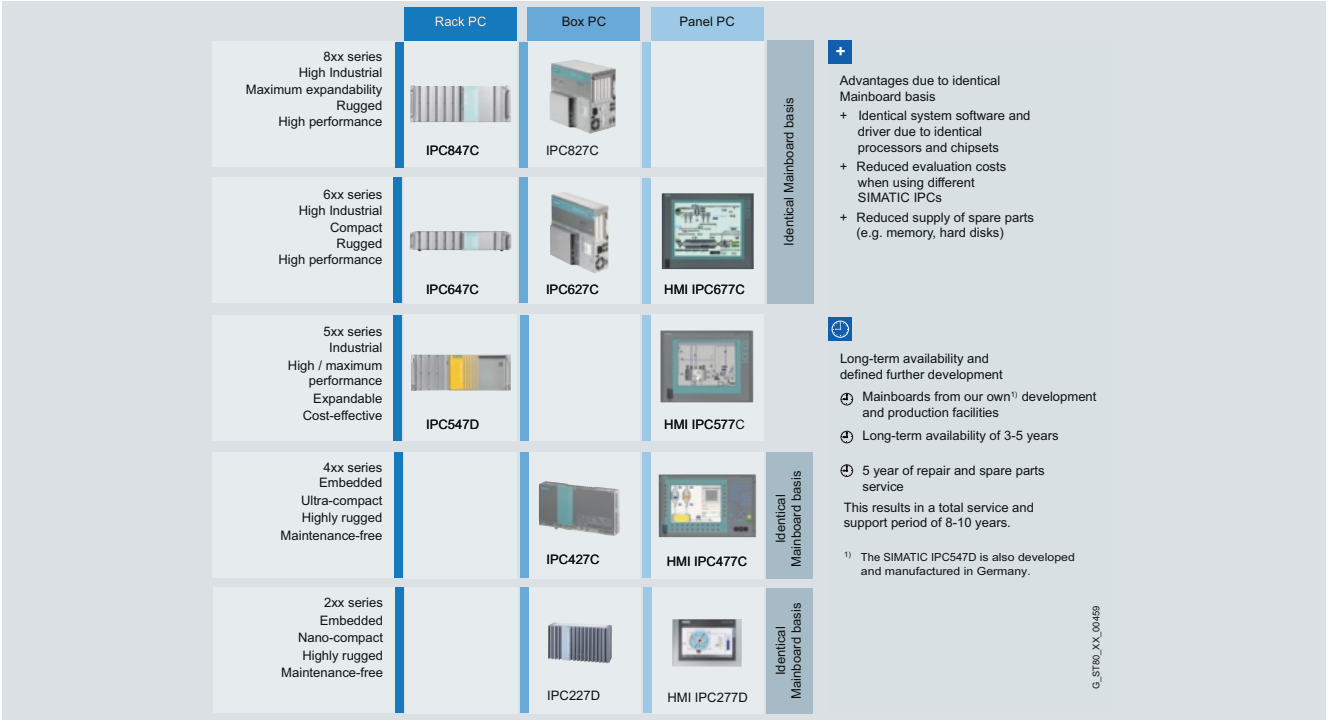
SIMATIC Box PC
Compact and rugged industrial PC for universal applicability.

SIMATIC Panel PC
Rugged and high-performance industrial PC with brilliant display.

SIMATIC IPCs can be configured individually and ordered online. Well-matched expansion components, e.g. the SIMATIC IPC DiagMonitor for diagnostics and preventive maintenance, are available for individual expansion of the system availability. SIMATIC IPCs are the ideal platform for PC-based automation and are used in the manufacturing and process industry, as well as in industry-oriented sectors such as transportation systems and traffic engineering, building management, or warehouse systems.



You can find further information at:
http://www.siemens.com/simatic-ipc



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SIMATIC software

Efficient engineering for all SIMATIC controllers

SIMATIC software is a core component of Totally Integrated Automation and provides the optimum tool for every automation task and every phase of a project. Whether for the manufacturing or process industry, in machine or plant construction, SIMATIC software will allow you to fully utilize the potentials in the engineering workflow.

- Fewer interfaces thanks to integrated engineering environment for logic, HMI, motion control, and process engineering.
- Fast integration of process design into the automation structure as a result of system-wide engineering from a central position.
- Design and implementation times are shortened by structured, process-oriented programming methodology.
- The costs of subsequent projects are reduced because blocks are easy to reuse.
- Increased system availability due to efficient process diagnostics.

Totally Integrated Automation Portal (TIA Portal)

The engineering framework with the name Totally Integrated Automation Portal (TIA Portal) will in future form the basis for all engineering systems for configuring, programming and commissioning programmable controllers. As an integral component of the various engineering systems, the engineering framework will automatically provide a uniform and consistent system response through shared services and features.
SIMATIC STEP 7 V11 is based on the TIA Portal, and offers the standardized operating concept of the new TIA Portal and uses its automatic data consistency and shared services such as configuration, communication and diagnostics. STEP 7 is universally suitable for the current SIMATIC controllers S7-1200, S7-300, S7-400 and WinAC, and offers users a uniform, efficient and intuitive solution.

Standard engineering

- STEP 7,
  the basic engineering environment for SIMATIC S7-300, S7-400 and WinAC.
- STEP 7 Professional,
  the comprehensive engineering suite for SIMATIC S7-300, S7-400 and WinAC.
- STEP 7 Micro/WIN,
  the programming software for SIMATIC S7-200.



Standard engineering options

- SIMATIC iMap,
  software for Component Based Automation.
- CFC,
  technology charts.
- Distributed Safety Software,
  configuration of fail-safe applications.
- DOCPRO,
  creation of plant documentation.
- S7-PDIAG,
  process diagnostics.
- TeleService,
  remote maintenance and remote linking.

Engineering systems – based on TIA Portal

- STEP 7 Basic V11,
  shared engineering for SIMATIC S7-1200 and SIMATIC HMI Basic Panels.
- STEP 7 Professional V11,
  the easy-to-use, uniform engineering system for all SIMATIC controllers.

You can find further information at:
http://www.siemens.com/simatic-software

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Introduction

SIMATIC ET 200

The right solution for every application

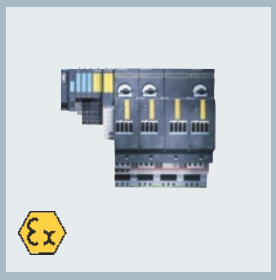
SIMATIC ET 200 offers a broad selection of distributed I/O systems - for solutions in a control cabinet, directly on the machine, or in hazardous areas. SIMATIC ET 200 systems for cabinet-free configurations are installed in a rugged, fiber-glass reinforced plastic enclosure, making them resistant to shock and dirt, as well as watertight. Furthermore, you need fewer additional components, save on cabling, and profit from extremely fast response times.
The modular design makes it possible to scale and expand the ET 200 systems simply and in small stages. Already integrated add-on modules reduce costs and simultaneously offer a wide range of possible applications. You can choose from many different combination options: digital and analog inputs/outputs, intelligent modules with CPU functionality, safety engineering, motor starters, pneumatic systems, frequency converters, and diverse technology modules.

Communication over PROFINET and PROFIBUS, uniform engineering, transparent diagnostics options as well as optimum interfacing to SIMATIC controllers and HMI devices prove the unique integration of
Totally Integrated Automation.
In addition to the fieldbus systems, the point-to-point connection IO-Link is also available for intelligent interfacing of sensors and actuators.

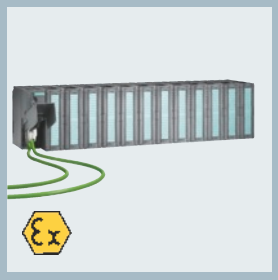
You can find further information at:
http://www.siemens.com/et200

In a control cabinet (IP20)

ET 200S
Discretely modular design and multifunctional



ET 200M
Modular design with S7-300 modules



ET 200L
Low-cost, digital block I/O



ET 200iSP
Intrinsically safe version for hazardous area



Without control cabinet (IP65/67)

ET 200pro
Modular design and multifunctional



ET 200eco PN
Low-cost, spacesaving block I/Os



ET 200eco
Economical digital block I/Os

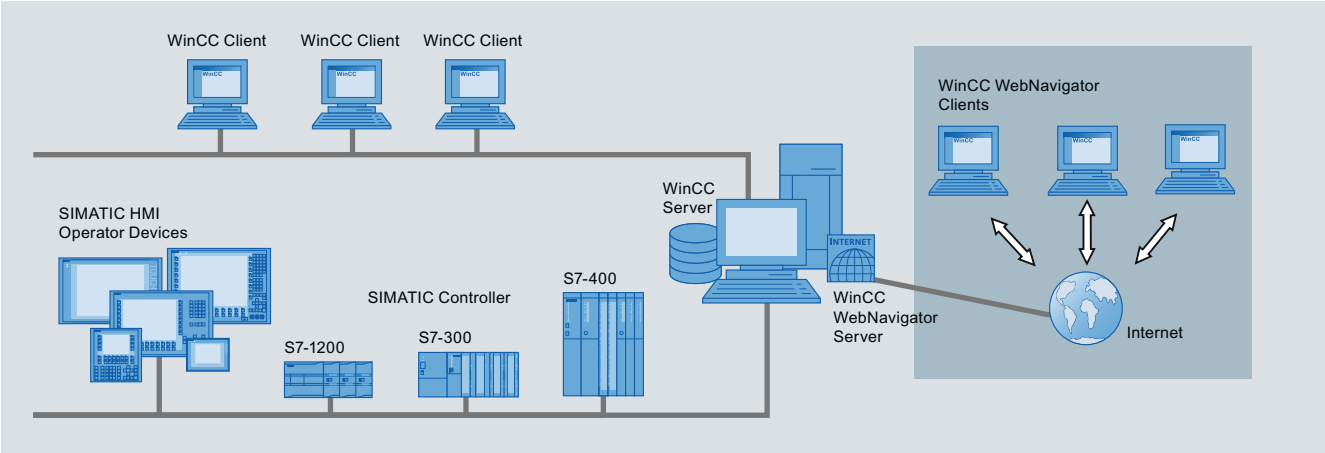


ET 200R
The solution for robots



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SIMATIC HMI



Increase transparency and reduce costs: SIMATIC HMI systems

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. Human machine interfacing is about managing the process, optimizing machine and system operation, availability and productivity.

Everything from a single source
With SIMATIC HMI, Siemens Automation and Drives offers a complete range of innovative and low-cost products and systems for the multi-faceted tasks of operator control and monitoring: Ranging from operator panels and visualization software for operator control and monitoring at the machine through to SCADA systems for widely differing requirements in process visualization. For special requirements, optimally adapted products are offered such as especially rugged operator panels with all-round IP65 protection for mounting on support arms/pedestals, or operator panels with stainless steel front for use in the food and beverages industry. Of course, individual, customer-specific requirements can also be implemented.

Perfectly equipped for integration in the automation environment
With their open, standardized interfaces in hardware and software, SIMATIC HMI products can be integrated at any time in the production and automation level as well as in the corporate management level. Connectability to almost every controller on the market as well as multiple language capability of the configuration and visualization software – including Asian ideographic languages, of course – facilitate operation worldwide.

Flexibility in all HMI applications – from the Basic Panel through the Comfort Panel up to process visualization

SIMATIC WinCC in the Totally Integrated Automation Portal (TIA Portal) is part of a new, integrated engineering framework which offers a uniform engineering environment for programming and configuration of control, visualization and drive solutions.

With WinCC in the TIA Portal it is possible to configure HMI applications ranging from very simple operating solutions with Basic Panels and Comfort Panels up to SCADA applications on PC-based multi-user systems. The possible range of solutions is thus greatly extended compared to the predecessor product SIMATIC WinCC flexible.

Functional or industry-specific expansions of the runtime software are available in the form of options. Some of the options are already integrated as standard functions in the HMI devices of different performance classes, while others can only be executed together with the corresponding runtime basic software.

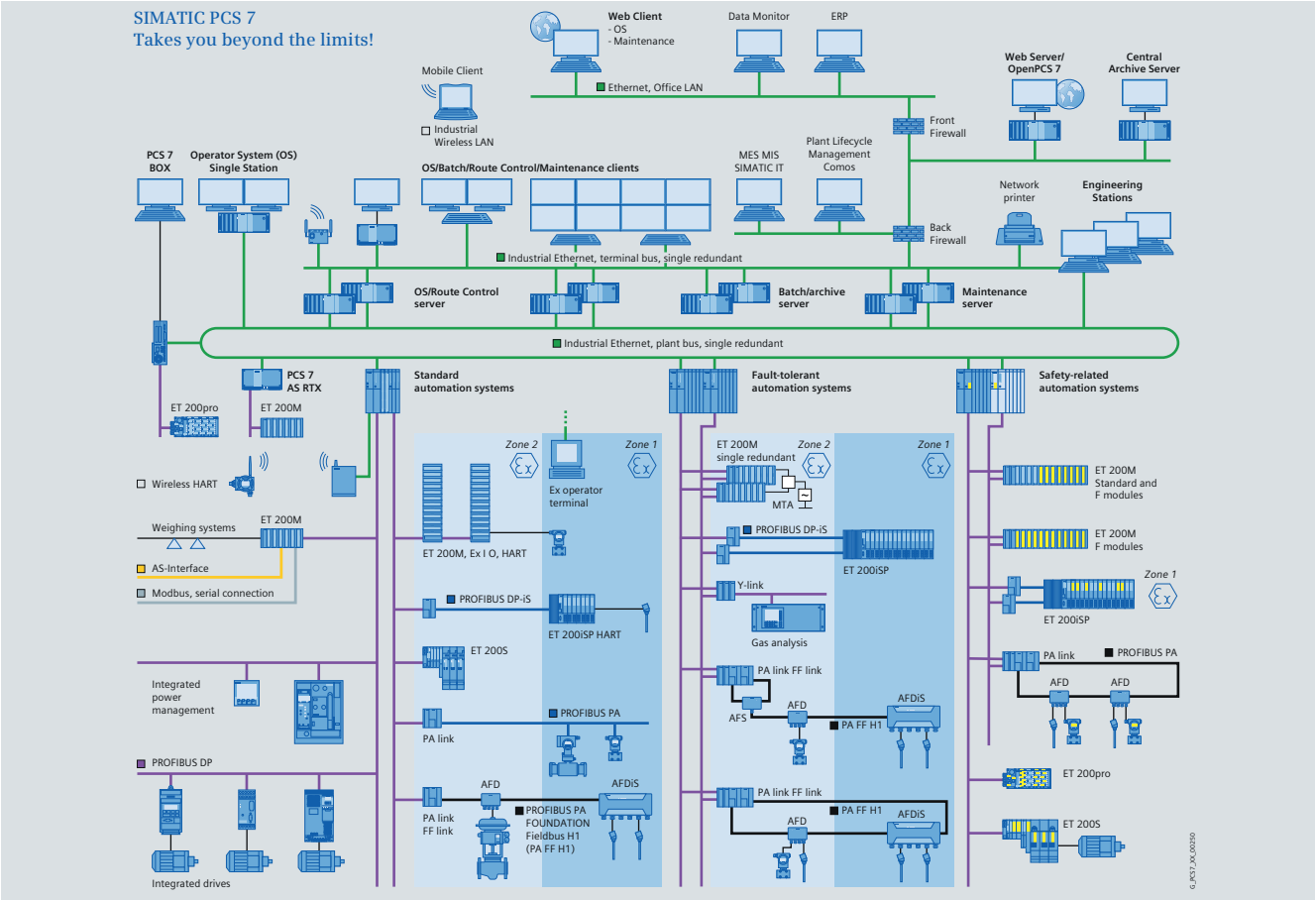
The powerful SCADA system SIMATIC WinCC is additionally available for highly complex applications with plant intelligence solutions, integral archive servers or redundant architectures, whereas WinCC Open Architecture is available for applications with high customer-specific adaptation requirements – even for non-Windows platforms.

You can find further information at:
http://www.siemens.com/simatic-hmi

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Introduction

SIMATIC PCS 7



A process control system with seven advantages

The homogenous and integrated SIMATIC PCS 7 process control system with its unique scalable architecture and outstanding system characteristics is an ideal basis for cost-effective implementation and economic operation of control equipment.

Specifically expanded by the seamless integration of additional functions, SIMATIC PCS 7 offers far more than a typical process control system, for example:

- Asset management
- Automation of batch processes
- Control of material transportation
- Safety
- Advanced Process Control
- Telecontrol
- Energy management
- IT security
- Evaluation/management of process data
- IT system interfacing

This is reflected in the seven advantages of the SIMATIC PCS 7 process control system:

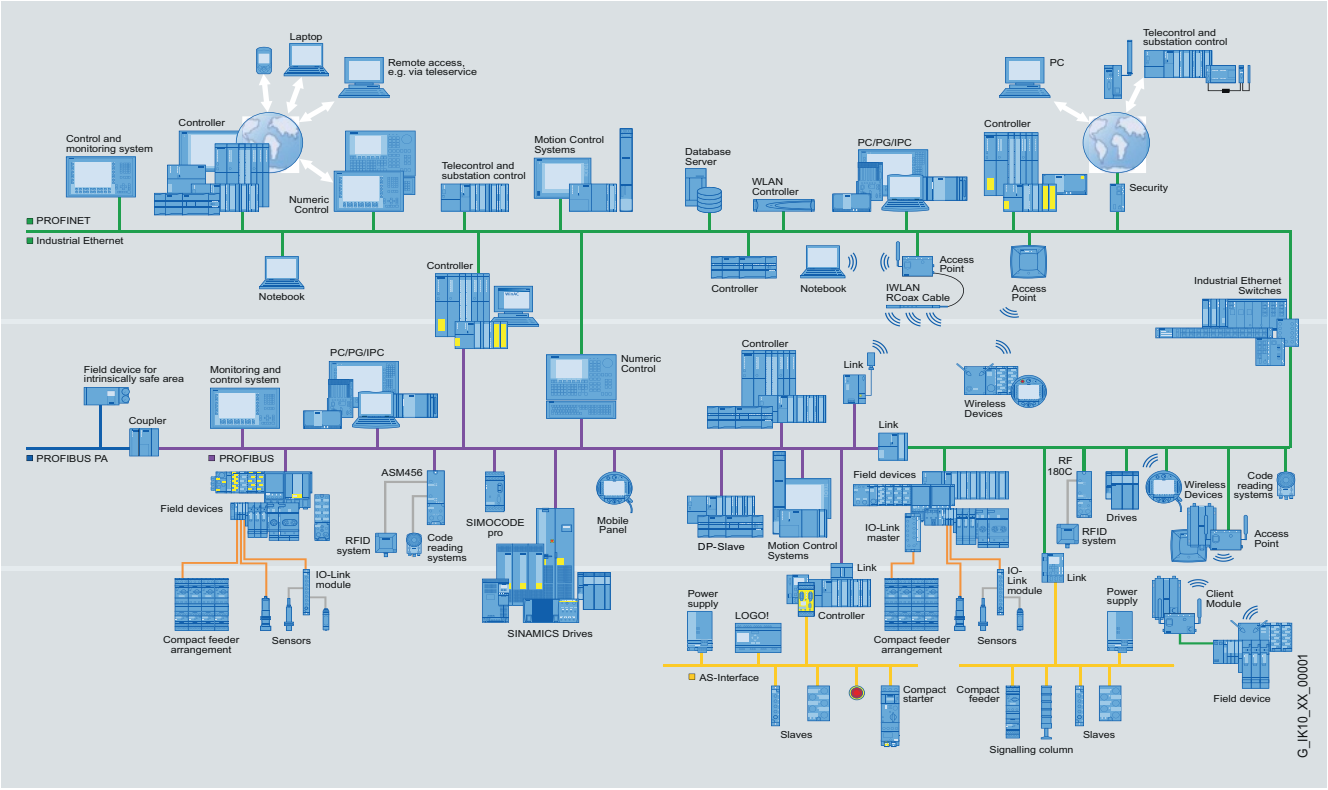
- Reduction of total cost of ownership through integration
- High performance and quality coupled with efficient engineering, reliability, and availability
- Flexibility and scalability – from small laboratory systems to large plant networks
- Protection of investments thanks to step-by-step modernization of Siemens systems and third-party systems
- Safety & security – integrated safety technology and comprehensive IT security for reliable protection of personnel and environment, as well as process and plant
- Continuous technological innovations – from the world's leading provider of automation technology
- Global network of experts – local service and support through a worldwide network of experts and authorized partners

You can find further information at:
http://www.siemens.com/simatic-pcs7

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Introduction

SIMATIC NET



Networking for Industry

Communication networks are of utmost importance for automation solutions. SIMATIC NET – Networking for Industry stands for a diverse range of modular blocks designed for industry – to efficiently solve your communications tasks:

SIMATIC NET offers solutions which both maximize the benefits of Ethernet and simply integrate fieldbus systems. Significant examples include:

- The development of the field level for the use of Industrial Ethernet.
- Complete integration from the field level to the corporate management level.
- The promotion of wireless communication.
- The integration of IT technologies.

SIMATIC NET supports the following communications systems:

Industrial Ethernet (in accordance with IEEE 802.3) – the international standard for area networking is currently the number one network in the LAN environment. Powerful communications networks with long ranges can be established via Industrial Ethernet.

The international standard **PROFINET** (IEC 61158/61784) uses Industrial Ethernet and allows real-time communication all the way to the field level, but also integrates the enterprise level. With full utilization of existing IT standards, PROFINET also allows isochronous motion control applications on the Industrial Ethernet, efficient cross-vendor engineering, and high availability of machines and plants on the Industrial Ethernet.

PROFIBUS (IEC 61158/61784) – the international standard for the field level is the global market leader among fieldbus systems. It is the only fieldbus that allows communication in both manufacturing and process applications.

AS-Interface (IEC 62026-2/EN 50295) – as a low-cost alternative to the cable tree, the AS-Interface connects sensors and actuators via twisted-pair cable.

IO-Link – the standard for intelligently connecting sensors and actuators from the field level to the control level.

Telecontrol – telecontrol and remote maintenance over "classical" connections (radio modems, dial-up connections, dedicated lines) as well as over IP-based networks (Ethernet, Internet, GPRS/UMTS mobile radio).

Industrial Wireless Communication – wireless communication over mobile radio (Industrial Wireless Telecontrol), with Industrial Wireless LAN (IWLAN in accordance with IEEE 802.11) and for connection of field devices in process automation with the WirelessHART radio standard.

You can find further information at:
http://www.siemens.com/simatic-net

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LOGO! logic module

2



2/2 Introduction
2/2 LOGO! logic module

2/3 LOGO! modular
2/3 LOGO! modular basic versions
2/6 SIPLUS LOGO! modular basic versions
2/8 LOGO! modular pure versions
2/11 SIPLUS LOGO! modular pure versions
2/13 LOGO! modular expansion modules
2/18 SIPLUS LOGO! modular expansion modules
2/21 LOGO! CM EIB/KNX communication module
2/22 AS-Interface connection for LOGO!

2/23 LOGO!Power
2/23 LOGO!Power
2/33 SIPLUS LOGO!Power

2/35 LOGO!Contact

2/36 LOGO! software

Brochures

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

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

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LOGO! logic module

2

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 controller for use in the toughest ambient conditions
- With extended temperature range from -40/-25 °C to +70 °C
- Suitable for medial exposure (harmful gas atmosphere)
- Condensation permissible
- With the proven PLC technology of LOGO!
- Easy to handle, program, maintain, and service
- Ideal for use in automotive engineering, environmental engineering, mining, chemical plants, conveying technology, food industry, etc.

Accessories:

- The front plate mounting set also allows simple and reliable installation of the logic modules in front plates; 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 further information, please go to:

www.siemens.com/siplus-extreme

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

www.siemens.com/simatic/printmaterial

General technical data of the SIPLUS LOGO

Ambient temperature range	-40/-25 ... +70 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions.
Ambient conditions	
Relative humidity	5 ... 100%, condensation allowed
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1)2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... 3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX:
Long-term load:
SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d):
SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

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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)

Technical specifications

	6ED1 052-1CC01-0BA6	6ED1 052-1MD00-0BA6	6ED1 052-1HB00-0BA6	6ED1 052-1FB00-0BA6
Supply voltages				
Rated value				
• 12 V DC		Yes		
• 24 V DC	Yes	Yes	Yes	
• 115 V DC				Yes
• 230 V DC				Yes
• Permissible range, lower limit (DC)	20.4 V	10.8 V	20.4 V	100 V
• Permissible range, upper limit (DC)	28.8 V	28.8 V	28.8 V	253 V
• 24 V AC			Yes	
• 115 V AC				Yes
• 230 V AC				Yes
• Permissible range, lower limit (AC)			20.4 V	85 V
• Permissible range, upper limit (AC)			26.4 V	265 V
Time				
Time switching clocks				
• Power reserve	80 h	80 h	80 h	80 h
Digital inputs				
Number of digital inputs	8; of which 4 can be used in analog mode (0 to 10 V)	8; of which 4 can be used in analog mode (0 to 10 V)	8	8
Digital outputs				
Number of digital outputs	4; Transistor	4; Relay	4; Relay	4; Relay
Short-circuit protection	Yes; electrical (1 A)	No; external fusing necessary	No; external fusing necessary	No; external fusing necessary
Output current				
• for signal "1" permissible range for 0 to 55 °C, max.	0.3 A			
Relay outputs				
Switching capacity of contacts				
• with inductive load, max.		3 A	3 A	3 A
• with resistive load, max.		10 A	10 A	10 A
EMC				
Emission of radio interference acc. to EN 55 011				
• Emission of radio interference acc. to EN 55 011 (limit value class B)	Yes; Radio interference suppression according to EN55011, limit value class B	Yes	Yes	Yes

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LOGO! modular basic versions

Technical specifications (continued)

	6ED1 052-1CC01-0BA6	6ED1 052-1MD00-0BA6	6ED1 052-1HB00-0BA6	6ED1 052-1FB00-0BA6
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				
IP20	Yes	Yes	Yes	Yes
Standards, approvals, certificates				
CSA approval	Yes	Yes	Yes	Yes
Developed according to IEC1131	Yes	Yes	Yes	Yes
FM approval	Yes	Yes	Yes	Yes
According to VDE 0631	Yes	Yes	Yes	Yes
Marine approval	Yes	Yes	Yes	Yes
UL approval	Yes	Yes	Yes	Yes
Dimensions and weight				
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.
LOGO! logic module 24C I 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 interlinked, modular expansion capability	**6ED1 052-1CC01-0BA6**
LOGO! logic module 12/24RC 12/24 V DC power supply, 8 x 12/24 V DC digital inputs, of which 4 can be used in analog mode (0 to 10 V), 4 x 10 A relay outputs, integrated time switch; 200 function blocks can be interlinked, modular expansion capability	**6ED1 052-1MD00-0BA6**
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 interlinked, modular expansion capability	**6ED1 052-1HB00-0BA6**
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 interlinked, modular expansion capability	**6ED1 052-1FB00-0BA6**

	Order No.
Accessories	
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**
SIPLUS LOGO! TD text display (extended temperature range -10 ... +60 °C and medial exposure) 4-line text display, can be connected to all LOGO! 0BA6 Basic and Pure versions, including connecting cable	**6AG1 055-4MH00-2BA0**
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**

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

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Ordering data

		Order No.
LOGO! Memory Card Program module for copying, with know-how protection		**6ED1 056-1DA00-0BA0**
LOGO! battery card Battery module for backing up the integral real-time clock (not LOGO! 24)		**6ED1 056-6XA00-0BA0**
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! PROM Programming device used to simultaneously reproduce program module contents on up to 8 program modules	L	**6AG1 057-1AA01-0BA6**
LOGO!Soft Comfort V6.0 For programming on the PC in LAD/FBD; executes on Windows 98 SE and higher, Linux, MAC OSX; on CD-ROM	J	**6ED1 058-0BA02-0YA0**
LOGO!Soft Comfort V6.0 upgrade Upgrade from V1.0 to V6.0	J	**6ED1 058-0CA02-0YE0**
LOGO! PC cable For program transfer between LOGO! and the PC		**6ED1 057-1AA00-0BA0**
LOGO! USB PC cable For transferring the program between LOGO! and PC, including driver on CD-ROM	J	**6ED1 057-1AA01-0BA0**
LOGO! modem cable Adapter cable for analog modem communication		**6ED1 057-1CA00-0BA0**
Front plate mounting set		
Width 4 modular spacings		**6AG1 057-1AA00-0AA0**
Width 4 modular spacings, with keys		**6AG1 057-1AA00-0AA3**
Width 8 modular spacings		**6AG1 057-1AA00-0AA1**
Width 8 modular spacings, with keys		**6AG1 057-1AA00-0AA2**
LOGO! News Box, 12/24 V Contains LOGO! 12/24RC, LOGO! USB PC cable, LOGO!Soft Comfort V6.0, manual, screwdriver, information material		
German	J	**6ED1 057-3BA00-0AA5**
English	J	**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	J	**6ED1 057-3AA02-0AA0**
English	J	**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	J	**6ED1 057-3BA10-0AA0**
English	J	**6ED1 057-3BA10-0BA0**

J: Subject to export regulations AL: N and ECCN: EAR99S
L: Subject to export regulations AL: 9I999 and ECCN: N

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SIPLUS LOGO! modular basic versions

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! text display TD (can be connected to all LOGO! 0BA6 basic versions)

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

	SIPLUS LOGO! 24	SIPLUS LOGO! 12/24RC	SIPLUS LOGO! 24RC	SIPLUS LOGO! 230RC
Order number	**6AG1 052-1CC01-2BA6**	**6AG1 052-1FB00-2BA6**	**6AG1 052-1HB00-2BA6**	**6AG1 052-1MD00-2BA6**
Order No. based on	**6ED1 052-1CC01-0BA6**	**6ED1 052-1FB00-0BA6**	**6ED1 052-1HB00-0BA6**	**6ED1 052-1MD00-0BA6**
Ambient temperature range	-25°C to +70 °C			
Conformal coating	Coating of the printed circuit boards and the electronic components			
Technical data	The technical data of the standard product applies except for the ambient conditions.			
Ambient conditions				
Relative humidity	5 ... 100 % Condensation permissible			
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)			
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]			
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]			
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K			

1) ISA-S71.04 severity level GX: Long-term load:
SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d):
SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

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Ordering data		Order No.
SIPLUS LOGO! 24 (extended temperature range and medial exposure) 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; integrated time switch; 200 function blocks can be interlinked, modular expansion capability	I	**6AG1 052-1CC01-2BA6**
SIPLUS LOGO! 12/24RC (extended temperature range and medial exposure) 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 interlinked, modular expansion capability	L	**6AG1 052-1MD00-2BA6**
SIPLUS LOGO! 24RC (extended temperature range and medial exposure) 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 interlinked, modular expansion capability		**6AG1 052-1HB00-2BA6**
SIPLUS LOGO! 230RC (extended temperature range and medial exposure) 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 interlinked, modular expansion capability		**6AG1 052-1FB00-2BA6**

		Order No.
Accessories		
SIPLUS Upmiter upstream device for reliable operation at the battery of combustion engines	L	**6AG1 053-1AA00-2AA0**
Additional accessories		See LOGO! modular basic versions

I: Subject to export regulations AL: N and ECCN: EAR99H
L: Subject to export regulations AL: 9I999 and ECCN: N

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LOGO! modular pure versions

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)

Technical specifications

	6ED1 052-2CC01-0BA6	6ED1 052-2MD00-0BA6	6ED1 052-2HB00-0BA6	6ED1 052-2FB00-0BA6
Supply voltages				
Rated value				
• 12 V DC		Yes		
• 24 V DC	Yes	Yes	Yes	
• 115 V DC				Yes
• 230 V DC				Yes
• permissible range, lower limit (DC)	20.4 V	10.8 V	20.4 V	100 V
• permissible range, upper limit (DC)	28.8 V	28.8 V	28.8 V	253 V
• 24 V AC			Yes	
• 115 V AC				Yes
• 230 V AC				Yes
• permissible range, lower limit (AC)			20.4 V	85 V
• permissible range, upper limit (AC)			26.4 V	265 V
Time of day				
Time switching clocks				
• Number	190	8	8	8
• Power reserve	80 h	80 h	80 h	80 h
Digital inputs				
Number of digital inputs	8; of which 4 can be used in analog mode (0 to 10 V)	8; of which 4 can be used in analog mode (0 to 10 V)	8	8
Digital outputs				
Number of digital outputs	4; Transistor	4; Relay	4; Relay	4; Relay
Short-circuit protection	Yes; electrical (1 A)	No; external fusing necessary	No; external fusing necessary	No; external fusing necessary
Output current				
• for signal "1" permissible range for 0 to 55 °C, max.	0.3 A			
Relay outputs				
Switching capacity of contacts				
• with inductive load, max.		3 A	3 A	3 A
• with resistive load, max.		10 A	10 A	10 A

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Technical specifications (continued)

	6ED1 052-2CC01-0BA6	6ED1 052-2MD00-0BA6	6ED1 052-2HB00-0BA6	6ED1 052-2FB00-0BA6
EMC				
Emission of radio interference acc. to EN 55 011				
• Emission of radio interference acc. to EN 55 011 (limit value class B)	Yes; Radio interference suppression according to EN55011, limit value 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				
IP20	Yes	Yes	Yes	Yes
Standards, approvals, certificates				
CSA approval	Yes	Yes	Yes	Yes
Developed according to IEC1131	Yes	Yes	Yes	Yes
FM approval	Yes	Yes	Yes	Yes
According to VDE 0631	Yes	Yes	Yes	Yes
Marine approval	Yes	Yes	Yes	Yes
UL approval	Yes	Yes	Yes	Yes
Dimensions and weight				
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.
LOGO! logic module 24Co I 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, integrated time switch; without display and keyboard; 200 function blocks can be interlinked, modular expansion capability	**6ED1 052-2CC01-0BA6**
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 interlinked, modular expansion capability	**6ED1 052-2MD00-0BA6**
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 interlinked, modular expansion capability	**6ED1 052-2HB00-0BA6**
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 interlinked, modular expansion capability	**6ED1 052-2FB00-0BA6**

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

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LOGO! modular pure versions

Ordering data		Order No.
Accessories		
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**
SIPLUS LOGO! TD text display (extended temperature range -10 ... +60 °C and medial exposure) 4-line text display, can be connected to all LOGO! 0BA6 Basic and Pure versions, including connecting cable		**6AG1 055-4MH00-2BA0**
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**
LOGO! Memory Card Program module for copying, with know-how protection		**6ED1 056-1DA00-0BA0**
LOGO! battery card Battery module for backing up the integral real-time clock (not LOGO! 24)		**6ED1 056-6XA00-0BA0**
LOGO! memory/battery card Combined program and battery module, with know-how protection and for backing up the integral real-time clock (not LOGO! 24o)		**6ED1 056-7DA00-0BA0**
LOGO! PROM Programming device used to simultaneously reproduce program module contents on up to 8 program modules	L	**6AG1 057-1AA01-0BA6**
LOGO!Soft Comfort V6.0 For programming on the PC in LAD/FBD; executes on Windows 98 SE and higher, Linux, MAC OSX; on CD-ROM	J	**6ED1 058-0BA02-0YA0**
LOGO!Soft Comfort V6.0 upgrade Upgrade from V1.0 to V6.0	J	**6ED1 058-0CA02-0YE0**
LOGO! PC cable For program transfer between LOGO! and the PC		**6ED1 057-1AA00-0BA0**
LOGO! USB PC cable For transferring the program between LOGO! and PC, including driver on CD-ROM	J	**6ED1 057-1AA01-0BA0**
LOGO! modem cable Adapter cable for analog modem communication		**6ED1 057-1CA00-0BA0**

J: Subject to export regulations AL: N and ECCN: EAR99S
L: Subject to export regulations AL: 9I999 and ECCN: N

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Overview



- Basic versions optimized for costs
- Interface for the connection of expansion modules, up to 24 digital inputs, 16 digital outputs, 8 analog inputs and 2 analog outputs can be addressed
- With connection option for LOGO! text display TD (can be connected to all LOGO! 0BA6 basic versions)

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

	SIPLUS LOGO! 24o	SIPLUS LOGO! 12/24RCo	SIPLUS LOGO! 24RCo	SIPLUS LOGO! 230RCo
Order number	**6AG1 052-2CC01-2BA6**	**6AG1 052-2MD00-2BA6**	**6AG1 052-2HB00-2BA6**	**6AG1 052-2FB00-2BA6**
Order No. based on	**6ED1 052-2CC01-0BA6**	**6ED1 052-2MD00-0BA6**	**6ED1 052-2HB00-0BA6**	**6ED1 052-2FB00-0BA6**
Ambient temperature range	-40 °C to +70 °C			
Conformal coating	Coating of the printed circuit boards and the electronic components			
Technical data	The technical data of the standard product applies except for the ambient conditions.			
Ambient conditions				
Relative humidity	5 ... 100 % Condensation permissible			
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)			
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]			
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]			
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K			

1) ISA-S71.04 severity level GX: Long-term load:
SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d):
SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

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SIPLUS LOGO! modular pure versions

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 4 can be used in analog mode (0 to 10 V), 4 digital outputs 24 V DC, 0.3 A, integrated time switch; without display and keyboard; 200 function blocks can be interlinked, modular expansion capability	I	**6AG1 052-2CC01-2BA6**
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 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 interlinked, modular expansion capability		**6AG1 052-2MD00-2BA6**
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; 200 function blocks can be interlinked, modular expansion capability		**6AG1 052-2HB00-2BA6**
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; 200 function blocks can be interlinked, modular expansion capability		**6AG1 052-2FB00-2BA6**

		Order No.
Accessories		
SIPLUS Upmiter upstream device for reliable operation at the battery of combustion engines	L	**6AG1 053-1AA00-2AA0**
Additional accessories		See LOGO! modular pure versions, page 2/10

I: Subject to export regulations AL: N and ECCN: EAR99H
L: Subject to export regulations AL: 9I999 and ECCN: N

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Overview



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

Technical specifications

	6ED1 055-1CB00-0BA0	6ED1 055-1HB00-0BA0	6ED1 055-1MB00-0BA1	6ED1 055-1FB00-0BA1
Supply voltages				
Rated value				
• 12 V DC			Yes	
• 24 V DC	Yes	Yes	Yes	
• 115 V DC				Yes
• 230 V DC				Yes
• Permissible range, lower limit (DC)	20.4 V	20.4 V	10.8 V	100 V
• Permissible range, upper limit (DC)	28.8 V	28.8 V	28.8 V	253 V
• 24 V AC		Yes		
• 115 V AC				Yes
• 230 V AC				Yes
• Permissible range, lower limit (AC)		20.4 V		85 V
• Permissible range, upper limit (AC)		26.4 V		265 V
Digital inputs				
Number of digital inputs	4	4	4	4
Digital outputs				
Number of digital outputs	4	4; Relay	4; Relay	4; Relay
Short-circuit protection	Yes; electrical (1 A)	No; external fusing necessary	No; external fusing necessary	No; external fusing necessary
Relay outputs				
Switching capacity of 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 acc. to EN 55 011				
• Emission of radio interference acc. to EN 55 011 (limit value class B)	Yes	Yes	Yes	Yes

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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				
IP20	Yes	Yes	Yes	Yes
Standards, approvals, certificates				
CSA approval	Yes	Yes	Yes	Yes
Developed according to IEC1131	Yes	Yes	Yes	Yes
FM approval	Yes	Yes	Yes	Yes
According to VDE 0631	Yes	Yes	Yes	Yes
Marine approval	Yes	Yes	Yes	Yes
UL approval	Yes	Yes	Yes	Yes
Dimensions and weight				
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 DU	36 mm; 2 DU	36 mm; 2 DU	36 mm; 2 DU
• Height	90 mm	90 mm	90 mm	90 mm
• Depth	55 mm	55 mm	55 mm	55 mm

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

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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	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 contacts			
• with inductive load, max.		3 A	3 A
• with resistive load, max.		5 A	5 A
• thermal continuous current, max.	0.3 A		
EMC			
Emission of radio interference acc. to EN 55 011			
• Emission of radio interference acc. to EN 55 011 (limit value 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			
IP20	Yes	Yes	Yes
Standards, approvals, certificates			
CSA approval	Yes	Yes	Yes
Developed according to IEC1131	Yes	Yes	Yes
FM approval	Yes	Yes	Yes
According to VDE 0631	Yes	Yes	Yes
Marine approval	Yes	Yes	Yes
UL approval	Yes	Yes	Yes
Dimensions and weight			
Dimensions			
• Mounting	on 35 mm DIN rail, 4 spacing units wide	on 35 mm DIN rail, 4 spacing units wide	on DIN rail 25 mm, 4 module spaces wide
• Width	72 mm; 4 DU	72 mm; 4 DU	72 mm; 4 DU
• Height	90 mm	90 mm	90 mm
• Depth	53 mm	53 mm	53 mm

	6ED1 055-1MA00-0BA0	6ED1 055-1MD00-0BA1
Product type designation		LOGO! AM2 RTD
Supply voltages		
Rated value		
• 12 V DC	Yes	Yes; 10,8 ... 28.8 V DC
• 24 V DC	Yes	Yes; 10.8 ... 28.8 V DC

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Technical specifications (continued)

	6ED1 055-1MA00-0BA0	6ED1 055-1MD00-0BA1
Analog inputs		
Number of analog inputs	2	2; 2 or 3 wire connection
Input ranges		
• Voltage	Yes	
• Current	Yes	
• Resistance thermometer		Yes; for PT100/PT1000 sensors
Input ranges (rated values), voltages		
• 0 to +10 V	Yes	
Input ranges (rated values), currents		
• 0 to 20 mA	Yes	
EMC		
Emission of radio interference acc. to EN 55 011		
• Emission of radio interference acc. to EN 55 011 (limit value class B)	Yes	Yes; Radio interference suppression according to EN55011, limit value class B
Environmental requirements		
Operating temperature		
• Min.	0 °C	0 °C
• Max.	55 °C	55 °C
Degree of protection		
IP20	Yes	Yes
Standards, approvals, certificates		
CSA approval	Yes	Yes; C22.2 Number 142
Developed according to IEC1131	Yes	Yes; EN 61131-2 (IEC 1131-2)
FM approval	Yes	Yes; FM-Standards No. 3611, 3600, 3810 Class I, Division 2, Group A, B, C, D
According to VDE 0631	Yes	
Marine approval	Yes	Yes; ABS, BV, DNV, GL, LRS, Class NK
UL approval	Yes	Yes; UL 508
Dimensions and weight		
Dimensions		
• Mounting	on 35 mm DIN rail, 2 spacing units wide	
• Width	36 mm	36 mm
• Height	90 mm	90 mm
• Depth	55 mm	53 mm

	6ED1 055-1MM00-0BA1
Supply voltages	
Rated value	
• 12 V DC	No
• 24 V DC	Yes
Analog outputs	
Number of analog outputs	2
Output ranges, voltage	
• 0 to 10 V	Yes
EMC	
Emission of radio interference acc. to EN 55 011	
• Emission of radio interference acc. to EN 55 011 (limit value class B)	Yes; Radio interference suppression according to EN55011, limit value class B
Environmental requirements	
Operating temperature	
• Min.	0 °C
• Max.	55 °C

	6ED1 055-1MM00-0BA1
Degree of protection	
IP20	Yes
Standards, approvals, certificates	
CSA approval	Yes
Developed according to IEC1131	Yes
FM approval	Yes
According to VDE 0631	Yes
Marine approval	Yes
UL approval	Yes
Dimensions and weight	
Dimensions	
• Mounting	on 35 mm DIN rail, 2 spacing units wide
• Width	36 mm
• Height	90 mm
• Depth	55 mm

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Ordering data		Order No.
LOGO! DM8 24 Supply voltage 24 V DC, 4 digital inputs 24 V DC, 4 digital outputs 24 V DC, 0.3 A		**6ED1 055-1CB00-0BA0**
LOGO! DM16 24 Supply voltage 24 V DC, 8 digital inputs 24 V DC, 8 digital outputs 24 V DC, 0.3 A		**6ED1 055-1CB10-0BA0**
LOGO! DM8 12/24R Supply voltage 12/24 V DC, 4 digital inputs 12/24 V DC, 4 relay outputs 5 A		**6ED1 055-1MB00-0BA1**
LOGO! DM8 24R Supply voltage24 V AC/DC, 4 digital inputs 24 V AC/DC, 4 relay outputs 5 A		**6ED1 055-1HB00-0BA0**
LOGO! DM16 24R Supply voltage 24 V DC, 8 digital inputs 24 V DC, 8 relay outputs 5 A		**6ED1 055-1NB10-0BA0**
LOGO! DM8 230R Supply voltage 115/230 V AC/DC, 4 digital inputs 115/230 V AC/DC, 4 relay outputs 5 A		**6ED1 055-1FB00-0BA1**
LOGO! DM16 230R Supply voltage 115/230 V AC/DC, 8 digital inputs 115/230 V AC/DC, 8 relay outputs 5 A		**6ED1 055-1FB10-0BA0**
LOGO! AM2 Supply voltage 12/24 V DC, two analog inputs 0 ... 10 V or 0 ... 20 mA, 10-bit resolution		**6ED1 055-1MA00-0BA0**
LOGO! AM2 PT 100 Supply voltage 12/24 V DC, 2 analog inputs Pt100, temperature range -50 °C ... 200 °C	I	**6ED1 055-1MD00-0BA1**
LOGO! AM2 AQ Supply voltage 24 V DC, 2 analog outputs 0 to 10 V, 0/4 to 20 mA	I	**6ED1 055-1MM00-0BA1**

Accessories		Order No.
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**
LOGO! memory card for copying, with know-how protection		**6ED1 056-1DA00-0BA0**
LOGO!Soft Comfort V6.0 For programming on the PC in LAD/FBD; executes on Windows 98 SE and higher, Linux, MAC OSX; on CD-ROM	J	**6ED1 058-0BA02-0YA0**
LOGO!Soft Comfort V6.0 upgrade Upgrade from V1.0 to V6.0	J	**6ED1 058-0CA02-0YE0**
LOGO! PC cable For program transfer between LOGO! and PC		**6ED1 057-1AA00-0BA0**

I: Subject to export regulations AL: N and ECCN: EAR99H
J: Subject to export regulations AL: N and ECCN: EAR99S

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SIPLUS LOGO! modular expansion modules

Overview



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

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS LOGO! DM8 24		
Order No.	**6AG1 055-1CB00-2BY0**	**6AG1 055-1CB00-2XB0**
Order No. based on	**6ED1 055-1CB00-0BA0**	
Ambient temperature range	-40 ... +70 °C	-25 ... +70 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	

SIPLUS LOGO! DM8 24		
Order No.	**6AG1 055-1PB00-2BY0**	**6AG1 055-1PB00-2XB0**
Order No. based on	**6ED1 055-1CB00-0BA0**	
Ambient temperature range	-40 ... +70 °C	-25 ... +70 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	

SIPLUS LOGO! DM8 24 R		
Order Nor	**6AG1 055-1HB00-2BY0**	**6AG1 055-1HB00-2XB0**
Order No. based on	**6ED1 055-1HB00-0BA0**	
Ambient temperature range	-40 ... +70 °C	-25 ... +70 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	

SIPLUS LOGO! DM8 12/24R		
Order No.	**6AG1 055-1MB00-2BY1**	**6AG1 055-1MB00-2XB1**
Order No. based on	**6ED1 055-1MB00-0BA1**	
Ambient temperature range	-40 ... +70 °C	-25 ... +70 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	

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Overview (continued)

SIPLUS LOGO! DM8 230R		
Order No.	**6AG1 055-1FB00-2BY1**	**6AG1 055-1FB00-2XB1**
Order No. based on	**6ED1 055-1FB00-0BA1**	
Ambient temperature range	-40 ... +70 °C	-25 ... +70 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	

SIPLUS LOGO! AM2		
Order number	**6AG1 055-1MA00-2BY0**	**6AG1055-1MA00-2XB0**
Order No. based on	**6ED1 055-1MA00-0BA0**	
Ambient temperature range	-40 ... +70 °C	-25 ... +70 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	

	SIPLUS LOGO! AM2 AQ	SIPLUS LOGO! DM16 24R
Order number	**6AG1 055-1MM00-2BY1**	**6AG1 055-1NB10-2BA0**
Order No. based on	**6ED1 055-1MM00-0BA1**	**6ED1 055-1CB10-0BA0**
Ambient temperature range	-40 ... +70 °C	-25 ... +70 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	

Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1)2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]

Ambient conditions	
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

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SIPLUS LOGO! modular expansion modules

Ordering data		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	H	**6AG1 055-1CB00-2XB0**
Temperature range -40 ... +70 °C	L	**6AG1 055-1CB00-2BY0**
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		
Temperature range -25 ... +70 °C	L	**6AG1 055-1PB00-2XB0**
Temperature range -40 ... +70 °C	L	**6AG1 055-1PB00-2BY0**
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	A	**6AG1 055-1HB00-2XB0**
Temperature range -40 ... +70 °C	L	**6AG1 055-1HB00-2BY0**
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	H	**6AG1 055-1MB00-2XB1**
Temperature range -40 ... +70 °C	L	**6AG1 055-1MB00-2BY1**
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	A	**6AG1 055-1FB00-2XB1**
Temperature range -40 ... +70 °C	L	**6AG1 055-1FB00-2BY1**

		Order No.
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	H	**6AG1 055-1MA00-2XB0**
Temperature range -40 ... +70 °C	L	**6AG1 055-1MA00-2BY0**
SIPLUS LOGO! AM2 AQ		
(extended temperature range and medial exposure)		
24 V DC power supply, 2x analog inputs 0 ... 10 V, 0/4 ... 20 mA, 10-bit resolution		
Temperature range -40 ... +70 °C	L	**6AG1 055-1MM00-2BY1**
SIPLUS LOGO! DM16 24R		
(extended temperature range and medial exposure)		
Supply voltage 24 V DC, 8x digital outputs 24 V DC, 8x relay outputs 5 A		
Temperature range -25 ... +70 °C	L	**6AG1 055-1NB10-2BA0**
Accessories		
SIPLUS Upmiter upstream device	L	**6AG1 053-1AA00-2AA0**
for reliable operation at the battery of combustion engines		
Additional accessories		See LOGO! modular pure versions, page 2/17

A: Subject to export regulations AL: 9I999 and ECCN: 4A994X
H: Subject to export regulations AL: 9I999 and ECCN: EAR99H
L: Subject to export regulations AL: 9I999 and ECCN: N

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LOGO! CM EIB/KNX communication module

Overview



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

Technical specifications

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

Ordering data

	Order No.
LOGO! CM EIB KNX communication module I for connection to *EIB*, supply voltage 24 V DC	**6BK1 700-0BA00-0AA1**
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**

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

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AS-Interface connection for LOGO!

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 oltage	24 V DC
nputs outputs	4 / 4 (virtual inputs / outputs)
us connection	AS-Interface according to specification
Ambient temperature	0 ... +55 °C
egree of protection	IP20
ounting	Onto standard mounting rail
imensions x x	36 x 90 x 58 mm
ndications of the E s	
E • Green • Red • Flashes red/yellow	 Status No data traffic Zero address

Ordering data

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

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

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Overview



The LOGO!Power miniature power supply units from Siemens are the perfect solution for many applications – their flat, step-shaped profile makes them perfectly suited for distribution boards, for example. Even more fields of application in the lower performance range are made possible by: wide-range input, radio interference class B, the extensive temperature range as well as numerous certificates.

Main product features:

- 2 performance classes with 5 V, 12 V, and 15 V each
- 3 performance classes with 24 V
- Flat LOGO! design with an installation depth of only 55 mm
- High efficiency across the entire load range
- Low no-load loss
- Wide-range input from 85 V to 264 V AC
- Operation on DC voltage of 110 V to 300 V
- Constant current for connection of loads with high inrush current
- Adjustable output voltage
- Green LED for "Output voltage OK"
- Temperature range from -20 °C to +70 °C
- Numerous certificates, such as CE, cULus, FM, GL and ATEX

Technical specifications LOGO!Power 5 V

Power supply, type **Order No.**	**5 V/3 A** **6EP1 311-1SH03**	**5 V/6.3 A** **6EP1 311-1SH13**
Input	1-phase AC or DC	1-phase AC or DC
Rated voltage $U_{in\ rated}$	**100-240 V AC** Wide-range input	**100-240 V AC** Wide-range input
Voltage range	85 ... 264 V AC 110 … 300 V DC	85 ... 264 V AC 110 … 300 V DC
Overvoltage strength	2.3 x $U_{in\ rated}$, 1.3 ms	2.3 x $U_{in\ rated}$, 1.3 ms
Mains buffering at $I_{out\ rated}$	> 40 ms at U_{in} = 187 V	> 40 ms at U_{in} = 187 V
Rated line frequency, rated line frequency range	50/60 Hz; 47 ... 63 Hz	50/60 Hz; 47 ... 63 Hz
Rated current $I_{in\ rated}$	0.36-0.22 A	0.71-0.37 A
Switch-on current limitation (+25 °C)	< 26 A	< 50 A
I^2t	< 0.8 A^2s	< 3 A^2s
Built-in incoming fuse	Internal	Internal
Recommended miniature circuit breaker (IEC 898) in the mains power input	16 A or higher, Characteristic B or 10 A or higher, Characteristic C	16 A or higher, Characteristic B or 10 A or higher, Characteristic C
Output	Controlled, isolated DC voltage	Controlled, isolated DC voltage
Rated voltage $U_{out\ rated}$	**5 V DC**	**5 V DC**
Total tolerance, static • Static line compensation • Static load compensation	±3 % Approx. 0.2% Approx. 1.5%	±3 % Approx. 0.1% Approx. 2%
Residual ripple	< 100 mV_{pp} (typ. 10 mV_{pp})	< 100 mV_{pp} (typ. 15 mV_{pp})
Spikes (bandwidth approx. 20 MHz)	< 100 mV_{pp} (typ. 20 mV_{pp})	< 100 mV_{pp} (typ. 70 mV_{pp})
Adjustment range	4.6 ... 5.4 V	4.6 ... 5.4 V
Status indicator	5 V OK = green LED	5 V OK = green LED
On/Off behavior	No overshoot of U_{out} (soft start)	No overshoot of U_{out} (soft start)
Startup delay / voltage rise	< 0.5 s/typ. 15 ms	< 0.5 s/typ. 10 ms
Rated current $I_{out\ rated}$	**3 A**	**6.3 A**
Current range up to +55 °C • Derating	0 ... 3 A 0 ... 2.1 A (up to +70 °C)	0 ... 6.3 A 0 ... 4.4 A (up to +70 °C)
Parallel switching for enhanced performance	Yes, 2 units	Yes, 2 units

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Technical specifications LOGO!Power 5 V (continued)

Power supply, type Order No.	5 V/3 A 6EP1 311-1SH03	5 V/6.3 A 6EP1 311-1SH13
Efficiency		
Efficiency at $U_{out\ rated}$, $I_{out\ rated}$	Approx. 77%	Approx. 83%
Power loss at $U_{out\ rated}$, $I_{out\ rated}$	Approx. 4 W	Approx. 6 W
Closed-loop control		
Dyn. line compensation ($U_{in\ rated}$ ±15%)	< 0.2 % U_{out}	< 0.2 % U_{out}
Dynamic load compensation (I_{out}: 10/90/10 %)	Typ. ±3% U_{out}	Typ. ±3% U_{out}
Load step settling time		
• 10 to 90%	Typ. 2 ms	Typ. 2 ms
• 90 to 10%	Typ. 2 ms	Typ. 2 ms
Protection and monitoring		
Current limitation	Typ. 3.8 A	Typ. 8.2 A
Short-circuit protection	Constant current characteristic	Constant current characteristic
Sustained short-circuit current rms value	< 5 A	< 10 A
Safety		
Primary/secondary isolation	Yes, safety extra low output voltage U_{out} according to EN 60950 and EN 50178	Yes, safety extra low output voltage U_{out} according to EN 60950 and EN 50178
Safety class	Class II (without protective conductor)	Class II (without protective conductor)
Safety test	Yes; CB scheme	Yes; CB scheme
CE marking	Yes	Yes
UL/cUL (CSA) approval	cULus-listed (UL 508, CSA C22.2 No. 107.1), cURus-recognized (UL 60950, CSA C22.2 No. 60950)	cULus-listed (UL 508, CSA C22.2 No. 107.1), cURus-recognized (UL 60950, CSA C22.2 No. 60950)
Protection against explosion	ATEX (available soon)	ATEX (available soon)
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 (available soon)	GL (available soon)
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 ... +70 °C with natural convection	-20 ... +70 °C with natural convection
Transport and storage temperature range	-40 ... +85 °C	-40 ... +85 °C
Humidity class	Climate class 3K3 according to EN 60721, no condensation	Climate class 3K3 according 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
Connections • Output + • Output -	2 screw terminals each for 0.5 ... 2.5 mm^2	2 screw 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.	0.17 kg	0.25 kg
Mounting	Can be snapped onto standard mounting rail EN 60715 35x7.5/15	Can be snapped onto standard mounting rail EN 60715 35x7.5/15

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Technical specifications LOGO!Power 12 V

Power supply, type	**12 V/1.9 A**	**12 V/4.5 A**
Order No.	**6EP1 321-1SH03**	**6EP1 322-1SH03**
Input	1-phase AC or DC	1-phase AC or DC
Rated voltage value $U_{in\ rated}$	**100-240 V AC** Wide-range input	**100-240 V AC** Wide-range input
Voltage range	85 ... 264 V AC 110 … 300 V DC	85 ... 264 V AC 110 … 300 V DC
Overvoltage resistance	2.3 x $U_{in\ rated}$, 1.3 ms	2.3 x $U_{in\ rated}$, 1.3 ms
Mains buffering at $I_{out\ rated}$	> 40 ms at U_{in} = 187 V	> 40 ms at U_{in} = 187 V
Rated line frequency, rated line-frequency range	50/60 Hz; 47 ... 63 Hz	50/60 Hz; 47 ... 63 Hz
Rated current value $I_{in\ rated}$	0.53-0.3 A	1.13-0.61 A
Switch-on current limitation (+25 °C)	< 26 A	< 54 A
I^2t	< 0.8 A^2s	< 3 A^2s
Built-in incoming fuse	Internal	Internal
Recommended miniature circuit breaker (IEC 898) in the mains power input	16 A or higher, Characteristic B or 10 A or higher, Characteristic C	16 A or higher, Characteristic B or 10 A or higher, Characteristic C
Output	Controlled, isolated DC voltage	Controlled, isolated DC voltage
Rated voltage value $U_{out\ rated}$	**12 V DC**	**12 V DC**
Total tolerance, static • Static mains compensation • Static load smoothing	±3 % Approx. 0.2 % Approx. 1.5 %	±3 % Approx. 0.1 % 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. 20 mV_{pp})	< 300 mV_{pp} (typ. 70 mV_{pp})
Adjustment range	10.5 ... 16.1 V	10.5 ... 16.1 V
Status indicator	Green LED for 12 V OK	Green LED for 12 V OK
On/Off behavior	No overshoot of U_{out} (soft start)	No overshoot of U_{out} (soft start)
Startup delay / voltage rise	< 0.5 s/typ. 15 ms	< 0.5 s/typ. 15 ms
Rated current value $I_{out\ rated}$	**1.9 A**	**4.5 A**
Current range up to +55 °C • Derating	0 ... 1.9 A 0 ... 1.3 A (up to +70 °C)	0 ... 4.5 A 0 ... 3.1 A (up to +70 °C)
Parallel switching for enhanced performance	Yes, 2 units	Yes, 2 units
Efficiency		
Efficiency at $U_{out\ rated}$, $I_{out\ rated}$	Typ. 80 %	Typ. 85 %
Heat loss at $U_{out\ rated}$, $I_{out\ rated}$	Typ. 5 W	Typ. 10 W
Closed-loop control		
Dyn. mains compensation ($U_{in\ rated}$ ±15 %)	< 0.2 % U_{out}	< 0.2 % U_{out}
Dynamic load smoothing (I_{out}: 10/90/10%)	Typ. ±3 % U_{out}	Typ. ±4 % U_{out}
Load step settling time • 10 to 90 % • 90 to 10 %	 Approx. 1 ms Approx. 1 ms	 Approx. 1 ms Approx. 1 ms
Protection and monitoring		
Current limitation	Typ. 2.8 A	Typ. 5.8 A
Short-circuit protection	Constant current characteristic	Constant current characteristic
Sustained short-circuit current rms value	< 4 A	< 8 A
Safety		
Primary/secondary isolation	Yes, safety extra low output voltage U_{out} according to EN 60950 and EN 50178	Yes, safety extra low output voltage U_{out} according to EN 60950 and EN 50178
Protection class	Class II (without protective conductor)	Class II (without protective conductor)
German Technical Inspectorate approval	Yes; CB scheme	Yes; CB scheme
CE mark	Yes	Yes

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Technical specifications LOGO!Power 12 V (continued)

Power supply, type Order No.	12 V/1.9 A 6EP1 321-1SH03	12 V/4.5 A 6EP1 322-1SH03
UL/cUL (CSA) approval	cULus-listed (UL 508, CSA C22.2 No. 107.1); cURus-recognized (UL 60950, CSA C22.2 No. 60950)	cULus-listed (UL 508, CSA C22.2 No. 107.1); cURus-recognized (UL 60950, CSA C22.2 No. 60950)
Explosion protection	ATEX (available soon)	ATEX (available soon)
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 (available soon)	GL, ABS (available soon)
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 ... +70 °C with natural convection	-20 ... +70 °C with natural convection
Transport and storage temperature range	-40 ... +85 °C	-40 ... +85 °C
Humidity class	Climate class 3K3 according to EN 60721, no condensation	Climate class 3K3 according to EN 60721, no condensation
Mechanics		
Supply-input connections L1, N	1 screw terminal each for 0.5 mm ... 2.5 mm^2 single-core/finely stranded	1 screw terminal each for 0.5 mm ... 2.5 mm^2 single-core/finely stranded
Connections • Output + • Output -	2 screw terminals each for 0.5 ... 2.5 mm^2	2 screw 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 standard mounting rail EN 60715 35x7.5/15	Snaps onto standard mounting rail EN 60715 35x7.5/15

Technical specifications LOGO!Power 15 V

Power supply, type Order No.	15 V/1.9 A 6EP1 351-1SH03	15 V/4 A 6EP1 352-1SH03
Input	1-phase AC or DC	1-phase AC or DC
Rated voltage value $U_{in\ rated}$	**100-240 V AC** Wide-range input	**100-240 V AC** Wide-range input
Voltage range	85 ... 264 V AC 110 … 300 V DC	85 ... 264 V AC 110 … 300 V DC
Overvoltage resistance	2.3 x $U_{in\ rated}$, 1.3 ms	2.3 x $U_{in\ rated}$, 1.3 ms
Mains buffering at $I_{out\ rated}$	> 40 ms at U_{in} = 187 V	> 40 ms at U_{in} = 187 V
Rated line frequency, rated line-frequency range	50/60 Hz; 47 ... 63 Hz	50/60 Hz; 47 ... 63 Hz
Rated current value $I_{in\ rated}$	0.63-0.33 A	1.24-0.68 A
Switch-on current limit (+25 °C)	< 26 A	< 54 A
I^2t	< 0.8 A^2s	< 3 A^2s
Built-in incoming fuse	Internal	Internal
Recommended miniature circuit breaker (IEC 898) in the mains power input	16 A or higher, Characteristic B or 10 A or higher, Characteristic C	16 A or higher, Characteristic B or 10 A or higher, Characteristic C
Output	Controlled, isolated DC voltage	Controlled, isolated DC voltage
Rated voltage $U_{out\ rated}$	**15 V DC**	**15 V DC**
Total tolerance, static • Static mains compensation • Static load smoothing	±3 % Approx. 0.1 % Approx. 1.5 %	±3 % Approx. 0.1 % Approx. 1.5 %
Residual ripple	< 200 mV_{pp} (typ. 10 mV_{pp})	< 200 mV_{pp} (typ. 10 mV_{pp})

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Technical specifications LOGO!Power 15 V (continued)

Power supply, type	15 V/1.9 A	15 V/4 A
Order No.	**6EP1 351-1SH03**	**6EP1 352-1SH03**
Spikes (bandwidth approx. 20 MHz)	< 300 mV_{pp} (typ. 30 mV_{pp})	< 300 mV_{pp} (typ. 70 mV_{pp})
Adjustment range	10.5 ... 16.1 V	10.5 ... 16.1 V
Status indicator	Green LED for 15 V OK	Green LED for 15 V OK
On/Off behavior	No overshoot of U_{out} (soft start)	No overshoot of U_{out} (soft start)
Startup delay / voltage rise	< 0.5 s/typ. 15 ms	< 0.5 s/typ. 15 ms
Rated current value $I_{in\ rated}$	**1.9 A**	**4 A**
Current range up to +55 °C	0 ... 1.9 A	0 ... 4 A
• Derating	0 ... 1.3 A (up to +70 °C)	0 ... 2.8 A (up to +70 °C)
Parallel switching for enhanced performance	Yes, 2 units	Yes, 2 units
Efficiency		
Efficiency at $U_{out\ rated}$, $I_{out\ rated}$	Approx. 81 %	Approx. 85 %
Heat loss at $U_{out\ rated}$, $I_{out\ rated}$	Approx. 7 W	Approx. 11 W
Closed-loop control		
Dyn. mains compensation ($U_{in\ rated}$ ±15%)	< 0.2 % U_{out}	< 0,2 % U_{out}
Dynamic load smoothing (I_{out}: 10/90/10%)	Typ. ±2.8 % U_{out}	Typ. ±3 % U_{out}
Load step settling time		
• 10 to 90 %	Typ. 1 ms	Typ. 1 ms
• 90 to 10 %	Typ. 1 ms	Typ. 1 ms
Protection and monitoring		
Current limitation	Typ. 2.7 A	Typ. 5.7 A
Short-circuit protection	Constant current characteristic	Constant current characteristic
Sustained short-circuit current rms value	< 4 A	< 8 A
Safety		
Primary/secondary isolation	Yes, safety extra low output voltage U_{out} according to EN 60950 and EN 50178	Yes, safety extra low output voltage U_{out} according to EN 60950 and EN 50178
Protection class	Class II (without protective conductor)	Class II (without protective conductor)
Safety test	Yes; CB scheme	Yes; CB scheme
CE mark	Yes	Yes
UL/cUL (CSA) approval	cULus-listed (UL 508, CSA C22.2 No. 107.1); cURus-recognized (UL 60950, CSA C22.2 No. 60950)	cULus-listed (UL 508, CSA C22.2 No. 107.1); cURus-recognized (UL 60950, CSA C22.2 No. 60950)
Explosion protection	ATEX (available soon)	ATEX (available soon)
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 (available soon)	GL (available soon)
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 ... +70 °C with natural convection	-20 ... +70 °C with natural convection
Transport and storage temperature range	-40 ... +85 °C	-40 ... +85 °C
Humidity class	Climate class 3K3 according to EN 60721, no condensation	Climate class 3K3 according to EN 60721, no condensation

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Technical specifications LOGO!Power 15 V (continued)

Power supply, type	15 V/1.9 A	15 V/4 A
Order No.	6EP1 351-1SH03	6EP1 352-1SH03
Mechanics		
Supply-input connections L1, N	1 screw terminal each for 0.5 mm ... 2.5 mm^2 single-core/finely stranded	1 screw terminal each for 0.5 mm ... 2.5 mm^2 single-core/finely stranded
Connections • Output + • Output -	2 screw terminals each for 0.5 ... 2.5 mm^2	2 screw 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 standard mounting rail EN 60715 35x7.5/15	Snaps onto standard mounting rail EN 60715 35x7.5/15

Technical specifications LOGO!Power 24 V/1.3 A

Power supply, type	24 V/1.3 A
Order No.	6EP1 331-1SH03
Input	1-phase AC or DC
Rated voltage $U_{in\ rated}$	**100-240 V AC** Wide-range input
Voltage range	85 ... 264 V AC 110 … 300 V DC
Overvoltage strength	2.3 x $U_{in\ rated}$, 1.3 ms
Mains buffering at $I_{out\ rated}$	> 40 ms at U_{in} = 187 V
Rated line frequency, rated line-frequency range	50/60 Hz; 47 ... 63 Hz
Rated current $I_{in\ rated}$	0.7-0.35 A
Switch-on current limitation (+25 °C)	< 30 A
I^2t	< 0.8 A^2s
Built-in incoming fuse	Internal
Recommended miniature circuit breaker (IEC 898) in the mains power input	16 A or higher, Characteristic B or 10 A or higher, Characteristic C
Output	Controlled, isolated DC voltage
Rated voltage $U_{out\ rated}$	**24 V DC**
Total tolerance	±3 %
• Static mains compensation	Approx. 0.1%
• Static load smoothing	Approx. 1.5%
Residual ripple	< 200 mV_{pp} (typ. 10 mV_{pp})
Spikes (bandwidth approx. 20 MHz)	< 300 mV_{pp} (typ. 20 mV_{pp})
Adjustment range	22.2 ... 26.4 V
Status indicator	24 V OK = green LED
On/Off behavior	No overshoot of U_{out} (soft start)
Startup delay / voltage rise	< 0.5 s/typ. 15 ms
Rated current $I_{out\ rated}$	**1.3 A**
Current range	
• Current range up to +60 °C	0 ... 1.3 A (up to +55°C)
• Derating	0 ... 0.9 A (up to +70°C)
Parallel switching for enhanced performance	Yes, 2 units
Efficiency	
Efficiency at $U_{out\ rated}$, $I_{out\ rated}$	Approx. 83%
Power loss at $U_{out\ rated}$, $I_{out\ rated}$	Approx. 6.3 W

Power supply, type	24 V/1.3 A
Order No.	6EP1 331-1SH03
Closed-loop control	
Dyn. mains compensation ($U_{in\ rated}$ ±15%)	< 0,2 % U_{out}
Dynamic load smoothing (I_{out}: 50/100/50 %)	Typ. ±1% U_{out} (I_{out}: 10/90/10 %)
Load step settling time	
• 50 to 100%	Typ. 1 ms (10 to 90%)
• 100 to 50%	Typ. 1 ms (90 to 10%)
Protection and monitoring	
Output overvoltage protection	Yes, according to EN 60950
Current limitation	Typ. 1.7 A
Short-circuit protection	Constant current characteristic
Sustained short-circuit current rms value	< 4 A
Overload/short-circuit indicator	-
Safety	
Primary/secondary isolation	Yes, safety extra low output voltage U_{out} according to EN 60950-1 and EN 50178
Safety class	Class II (without protective conductor)
Leakage current	-
Safety test	Yes; CB scheme
CE marking	Yes
UL/cUL (CSA) approval	cULus-listed (UL 508, CSA C22.2 No. 107.1), cURus-recognized (UL 60950, CSA C22.2 No. 60950)
Protection against explosion	ATEX EX II 3G Ex nA IIC T3
FM approval	Class I Div. 2, Group A, B, C, D T4
Marine approval	GL, ABS
Degree of protection (EN 60529)	IP20
EMC	
Emitted interference	EN 55022 Class B
Supply harmonics limitation	Not applicable
Noise immunity	EN 61000-6-2

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Technical specifications LOGO!Power 24 V/1.3 A (continued)

Power supply, type	24 V/1.3 A
Order No.	6EP1 331-1SH03
Operating data	
Ambient temperature range	-20 ... +70 °C with natural convection
Transport and storage temperature range	-40 ... +85 °C
Humidity class	Climate class 3K3 according to EN 60721, no condensation
Mechanics	
Connections	
• Supply input L, N, PE DC input: L+1, M1, PE	Solid/finely-stranded per screw-type terminal (L, N) for 0.5 mm ... 2.5 mm^2
• Output +	2 screw-type terminals for 0.5 ... 2.5 mm^2
• Output -	2 screw-type terminals for 0.5 ... 2.5 mm^2

Power supply, type	24 V/1.3 A
Order No.	6EP1 331-1SH03
Dimensions (W x H x D) in mm	54 x 90 x 55
Weight, approx.	Approx. 0.17 kg
Mounting	Can be snapped onto standard mounting rail EN 60715 35x7.5/15
Accessories	-

Technical specifications LOGO!Power 24 V/2.5 A

Power supply, type	24 V/2.5 A
Order No	6EP1 332-1SH43
Input	1-phase AC or DC
Rated voltage $U_{in\ rated}$	**100-240 V AC** Wide-range input
Voltage range	85 ... 264 V AC 110 … 300 V DC
Overvoltage strength	2.3 x $U_{in\ rated}$, 1.3 ms
Mains buffering at $I_{out\ rated}$	> 40 ms at U_{in} = 187 V
Rated line frequency, rated line-frequency range	50/60 Hz; 47 ... 63 Hz
Rated current $I_{in\ rated}$	1.22-0.66 A
Switch-on current limitation (+25 °C)	< 46 A
I^2t	< 3 A^2s
Built-in incoming fuse	Internal
Recommended miniature circuit breaker (IEC 898) in the mains power input	16 A or higher, Characteristic B or 10 A or higher, Characteristic C
Output	Controlled, isolated DC voltage
Rated voltage $U_{out\ rated}$	**24 V DC**
Total tolerance	±3 %
• Static mains compensation	Approx. 0.1%
• Static load smoothing	Approx. 1.5%
Residual ripple	< 200 mV_{pp} (typ. 10 mV_{pp})
Spikes (bandwidth approx. 20 MHz)	< 300 mV_{pp} (typ. 50 mV_{pp})
Adjustment range	22.2 ... 26.4 V
Status indicator	24 V OK = green LED
On/Off behavior	No overshoot of U_{out} (soft start)
Startup delay / voltage rise	< 0.5 s/typ. 10 ms
Rated current $I_{out\ rated}$	**2.5 A**
Current range	
• Current range up to +60 °C	0 ... 2.5 A (up to +55°C)
• Derating	0 ... 1.75 A (up to +70°C)
Parallel switching for enhanced performance	Yes, 2 units

Power supply, type	24 V/2.5 A
Order No	6EP1 332-1SH43
Efficiency	
Efficiency at $U_{out\ rated}$, $I_{out\ rated}$	Approx. 88%
Power loss at $U_{out\ rated}$, $I_{out\ rated}$	Approx. 8 W
Closed-loop control	
Dyn. mains compensation ($U_{in\ rated}$ ±15%)	< 0,2 % U_{out}
Dynamic load smoothing (I_{out}: 50/100/50 %)	Typ. ±2% U_{out} (I_{out}: 10/90/10 %)
Load step settling time	
• 50 to 100%	Typ. 1 ms (10 to 90%)
• 100 to 50%	Typ. 1 ms (90 to 10%)
Protection and monitoring	
Output overvoltage protection	Yes, according to EN 60950
Current limitation	Typ. 3.3 A
Short-circuit protection	Constant current characteristic
Sustained short-circuit current rms value	Approx. 3.5 A
Safety	
Primary/secondary isolation	Yes, safety extra low output voltage U_{out} according to EN 60950-1 and EN 50178
Safety class	Class II (without protective conductor)
Leakage current	-
Safety test	Yes; CB scheme
CE marking	Yes
UL/cUL (CSA) approval	cULus-listed (UL 508, CSA C22.2 No. 107.1), cURus-recognized (UL 60950, CSA C22.2 No. 60950)
Protection against explosion	ATEX EX II 3G Ex nA IIC T3
FM approval	Class I Div. 2, Group A, B, C, D T4
Marine approval	GL, ABS
Degree of protection (EN 60529)	IP20

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Technical specifications LOGO!Power 24 V/2.5 A (continued)

Power supply, type	24 V/2.5 A
Order No	6EP1 332-1SH43
EMC	
Emitted interference	EN 55022 Class B
Supply harmonics limitation	Not applicable
Noise immunity	EN 61000-6-2
Operating data	
Ambient temperature range	-20 ... +55 °C with natural convection
Transport and storage temperature range	-40 ... +70 °C
Humidity class	Climate class 3K3 according to EN 60721, no condensation

Power supply, type	24 V/2.5 A
Order No	6EP1 332-1SH43
Mechanics	
Connections	
• Supply input L, N, PE DC input: L+1, M1, PE	Solid/finely-stranded per screw-type terminal (L, N) for 0.5 mm ... 2.5 mm^2
• Output +	2 screw-type terminals for 0.5 ... 2.5 mm^2
• Output -	2 screw-type terminals for 0.5 ... 2.5 mm^2
Dimensions (W x H x D) in mm	72 x 90 x 55
Weight, approx.	Approx. 0.25 kg
Mounting	Can be snapped onto standard mounting rail EN 60715 35x7.5/15
Accessories	-

Technical specifications LOGO!Power 24 V/4 A

Power supply, type	24 V/4 A
Order No.	6EP1 332-1SH52
Input	1-phase AC or DC
Rated voltage $U_{in\ rated}$	**100-240 V AC** Wide-range input
Voltage range	85 ... 264 V AC 110 … 300 V DC
Overvoltage strength	2.3 x $U_{in\ rated}$, 1.3 ms
Mains buffering at $I_{out\ rated}$	> 40 ms at U_{in} = 187 V
Rated line frequency, rated line-frequency range	50/60 Hz; 47 ... 63 Hz
Rated current $I_{in\ rated}$	1.95 to 0.97 A
Switch-on current limitation (+25 °C)	< 30 A
I^2t	< 2.5 A^2s
Built-in incoming fuse	Internal
Recommended miniature circuit breaker (IEC 898) in the mains power input	16 A or higher, Characteristic B or 10 A or higher, Characteristic C
Output	Controlled, isolated DC voltage
Rated voltage $U_{out\ rated}$	**24 V DC**
Total tolerance	±3 %
• Static mains compensation	Approx. 0.1%
• Static load smoothing	Approx. 1.5%
Residual ripple	< 200 mV_{pp} (typ. 30 mV_{pp})
Spikes (bandwidth approx. 20 MHz)	< 300 mV_{pp} (typ. 60 mV_{pp})
Adjustment range	22.2 ... 26.4 V
Status indicator	24 V OK = green LED
On/Off behavior	No overshoot of U_{out} (soft start)
Startup delay / voltage rise	< 0.5 s/typ. 15 ms

Power supply, type	24 V/4 A
Order No.	6EP1 332-1SH52
Rated current $I_{out\ rated}$	**4 A**
Current range	
• Current range up to +60 °C	0 ... 4 A (up to +55°C)
• Derating	0 ... 2.8 A (up to +70°C)
Parallel switching for enhanced performance	Yes, 2 units
Efficiency	
Efficiency at $U_{out\ rated}$, $I_{out\ rated}$	Approx. 89%
Power loss at $U_{out\ rated}$, $I_{out\ rated}$	Approx. 12 W
Closed-loop control	
Dyn. mains compensation ($U_{in\ rated}$ ±15%)	< 0,2 % U_{out}
Dynamic load smoothing (I_{out}: 50/100/50 %)	Typ. ±1.5% U_{out} (I_{out}: 10/90/10 %)
Load step settling time	
• 50 to 100%	Typ. 1 ms (10 to 90%)
• 100 to 50%	Typ. 1 ms (90 to 10%)
Protection and monitoring	
Output overvoltage protection	Yes, according to EN 60950
Current limitation	Typ. 5.2 A
Short-circuit protection	Constant current characteristic
Sustained short-circuit current rms value	< 10 A
Overload/short-circuit indicator	-
Safety	
Primary/secondary isolation	Yes, safety extra low output voltage U_{out} according to EN 60950-1 and EN 50178
Safety class	Class II (without protective conductor)

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Technical specifications LOGO!Power 24 V/4 A (continued)

Power supply, type	24 V/4 A
Order No.	6EP1 332-1SH52
Leakage current	-
Safety test	Yes; CB scheme
CE marking	Yes
UL/cUL (CSA) approval	cULus-listed (UL 508, CSA C22.2 No. 107.1), cURus-recognized (UL 60950, CSA C22.2 No. 60950)
Protection against explosion	ATEX EX II 3G Ex nA IIC T3
FM approval	Class I Div. 2, Group A, B, C, D T4
Marine approval	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

Power supply, type	24 V/4 A
Order No.	6EP1 332-1SH52
Operating data	
Ambient temperature range	-20 ... +70 °C with natural convection
Transport and storage temperature range	-40 ... +85 °C
Humidity class	Climate class 3K3 according to EN 60721, no condensation
Mechanics	
Connections	
• Supply input L, N, PE DC input: L+1, M1, PE	Solid/finely-stranded per screw-type terminal (L, N) for 0.5 mm ... 2.5 mm^2
• Output +	2 screw terminals each for 0.5 ... 2.5 mm^2
• Output -	2 screw terminals each for 0.5 ... 2.5 mm^2
Dimensions (W x H x D) in mm	90 x 90 x 55
Weight, approx.	Approx. 0.34 kg
Mounting	Can be snapped onto standard mounting rail EN 60715 35x7.5/15
Accessories	-

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LOGO!Power

Ordering data

	Order No.
LOGO!Power 5 V	
Stabilized power supply; Output: 5 V DC/3 A • Input: 110 … 300 V AC; extended operating temperature range: up to +70°C	**6EP1 311-1SH03**
Stabilized power supply; Output: 5 V DC/6.3 A • Input: 110 … 300 V AC; extended operating temperature range: up to +70°C	**6EP1 311-1SH13**
LOGO!Power 12 V	
Stabilized power supply; Output: 12 V DC/1.9 A • Input: 110 … 300 V AC; extended operating temperature range: up to +70°C	**6EP1 321-1SH03**
Stabilized power supply; Output: 12 V DC/4.5 A • Input: 110 … 300 V AC; extended operating temperature range: up to +70°C	**6EP1 322-1SH03**
LOGO!Power 15 V	
Stabilized power supply; Output: 15 V DC/1.9 A • Input: 110 … 300 V AC; extended operating temperature range: up to +70°C	**6EP1 351-1SH03**
Stabilized power supply; Output: 15 V DC/4 A • Input: 110 … 300 V AC; extended operating temperature range: up to +70°C	**6EP1 352-1SH03**

	Order No.
LOGO!Power 24 V/1.3 A	
Stabilized power supply; Output: 24 V DC/1.3 A • Input: 110 … 300 V AC; extended operating temperature range: up to +70°C	**6EP1 331-1SH03**
LOGO!Power 24 V/2.5 A	
Stabilized power supply; Output: 24 V DC/2.5 A • Input: 110 … 300 V AC; extended operating temperature range: up to +70°C	**6EP1 332-1SH43**
LOGO!Power 24 V/4 A	
Stabilized power supply; Output: 24 V DC/4 A • Input: 110 … 300 V AC; extended operating temperature range: up to +70°C	**6EP1 332-1SH52**

More information

In addition to various power supply product lines, the perfectly coordinated complete SITOP range offers a unique range of add-on modules with which the 24 V power supply can be additionally protected against interference on the primary and secondary side – right up to all-round protection:

- Redundancy module for setting up a redundant power supply
- Uninterruptible 24 V power supplies with batteries or maintenance-free capacitors for continued operation in the event of a power failure
- Selectivity modules for electronic protection of 24 V branches from overload and short-circuit

You can find more information in Catalog KT 10.1 and in the Internet at
www.siemens.com/sitop

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Overview

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS LOGO!Power 1.3 A	
Order number	**6AG1 931-1SH02-2AA0**
Order No. based on	**6EP1 331-1SH02**
Ambient temperature range	-25 °C to +70 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions.
Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Threshold / limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

Technical specifications

Power supply, type	**24 V/1.3 A**
Order number	**6EP1 331-1SH02**
Input	1-phase AC
Rated voltage $U_{in\ rated}$	**100 ... 240 V AC** Wide-range input
Voltage range	85 ... 264 V AC
Overvoltage strength	2.3 x $U_{in\ rated}$, 1.3 ms
Mains buffering at $I_{out\ rated}$	> 40 ms at U_{in} = 187 V
Rated line frequency, rated line frequency range	50/60 Hz; 47 ... 63 Hz
Rated current $I_{in\ rated}$	0.7-0.35 A
Switch-on current limitation (+25 °C)	< 35 A
I^2t	< 0.8 A^2s
Built-in incoming fuse	Internal
Recommended miniature circuit breaker (IEC 898) in the mains power input	16 A or higher, Characteristic B or 10 A or higher, Characteristic C
Output	Controlled, isolated DC voltage
Rated voltage $U_{out\ rated}$	**24 V DC**
Total tolerance	±3 %
• Static mains compensation	Approx. 0.1%
• Static load smoothing	Approx. 1.5%
Residual ripple	< 200 mV_{pp} (typ. 10 mV_{pp})
Spikes (bandwidth approx. 20 MHz)	< 300 mV_{pp} (typ. 20 mV_{pp})
Setting range	22.2 ... 26.4 V
Status indicator	24 V OK = green LED
On/Off behavior	No overshoot of U_{out} (soft start)
Startup delay / voltage rise	< 0.5 s/typ. 15 ms
Rated current $I_{out\ rated}$	**1.3 A**
Current range	
• Current range up to +60 °C	0 ... 1.3 A (up to 55 °C)
• Derating	-
Parallel switching for enhanced performance	Yes, 2 units
Efficiency	
Efficiency at $U_{out\ rated}$, $I_{out\ rated}$	Approx. 82%
Heat loss at $U_{out\ rated}$, $I_{out\ rated}$	Approx. 7 W
Closed-loop control	
Dyn. mains compensation ($U_{in\ rated}$ ±15%)	< 0,2 % U_{out}
Dynamic load smoothing (I_{out}: 50/100/50 %)	Typ. ±1.5 % U_{out} (I_{out}: 10/90/10 %)
Load step settling time	
• 50 to 100%	Typ. 20 ms (10 to 90%)
• 100 to 50%	Typ. 20 ms (90 to 10%)
Protection and monitoring	
Output overvoltage protection	Yes, according to EN 60950
Current limitation	Typ. 2 A
Short-circuit protection	Constant current characteristic
Sustained short-circuit current rms value	< 4 A
Overload/short-circuit indicator	-

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SIPLUS LOGO!Power

Technical specifications (continued)

Power supply, type	24 V/1.3 A
Safety	
Primary/secondary isolation	Yes, safety extra low output voltage U_{out} according to EN 60950 and EN 50178
Protection class	Class II (without protective conductor)
Leakage current	-
Safety test	Yes; CB scheme
CE marking	Yes
UL/cUL (CSA) approval	cULus-listed (UL 508, CSA C22.2 No. 107.1), File E197259; cURus-recognized (UL 60950, CSA C22.2 No. 60950), File E151273
Explosion protection	ATEX EX II 3G Ex nA IIC T3
FM approval	Class I Div. 2, Group A, B, C, D T4
Marine approval	GL, ABS
Degree of protection (EN 60529)	IP20
EMC	
Emitted interference	EN 55022 Class B
Supply harmonics limitation	Not applicable
Noise immunity	EN 61000-6-2
Operating data	
Range of ambient temperature	-20 ... +55 °C with natural convection
Transport and storage temperature range	-40 ... +70 °C
Humidity class	Climate class 3K3 according to EN 60721, no condensation
Mechanics	
Connections	
• Supply input L, N, PE DC input: L+1, M1, PE	One solid/finely-stranded screw-type terminal each (L, N) for 0.5 mm ... 2.5 mm^2
• Output +	2 screw-type terminals for 0.5 ... 2.5 mm^2
• Output -	2 screw-type terminals for 0.5 ... 2.5 mm^2
Dimensions (W x H x D) in mm	54 x 90 x 55
Weight, approx.	Approx. 0.17 kg
Installation	Can be snapped onto standard mounting rail EN 60715 35x7.5/15
Accessories	-

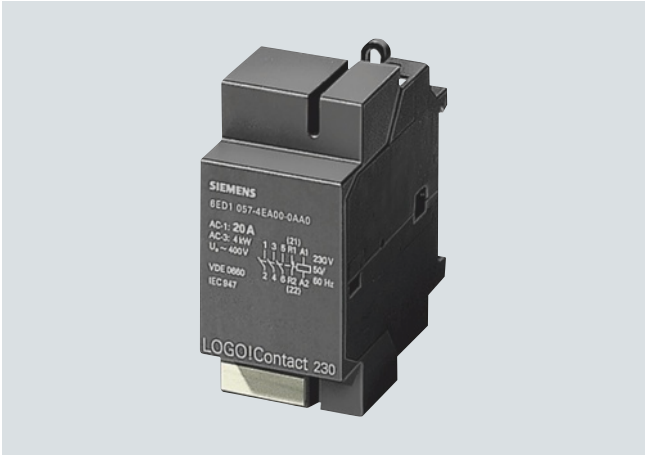
Ordering data

	Order No.
SIPLUS LOGO!Power 24 V 1.3 A L (extended temperature range and medial exposure) Input 100 ... 240 V AC Output 24 V DC, 1.3 A	**6AG1 931-1SH02-2AA0**

L: Subject to export regulations AL: 9I999 and ECCN: N

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Overview



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

Technical specifications

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

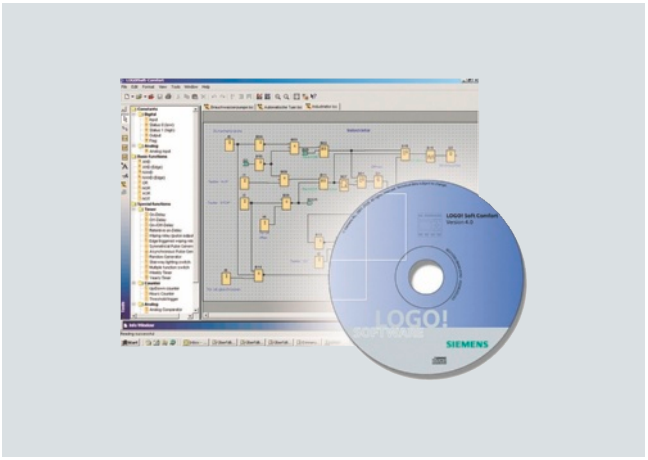
Ordering data

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

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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

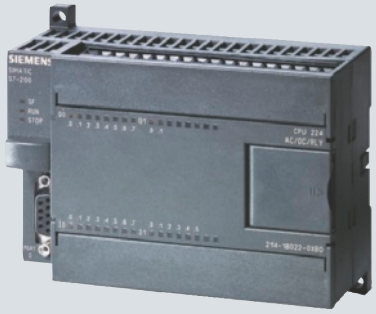
		Order No.
LOGO!Soft Comfort V6.0 For programming on the PC in LAD/FBD; executes under Windows 98 SE and higher, Linux, MAC OSX; on CD-ROM	J	**6ED1 058-0BA02-0YA0**
LOGO!Soft Comfort V6.0 upgrade Upgrade from V1.0 to V6.0	J	**6ED1 058-0CA02-0YE0**

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

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SIMATIC S7-200

3



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3/4 Central processing units
3/4 CPU 221
3/4 CPU 222
3/4 CPU 224
3/4 CPU 224 XP, CPU 224 XPsi
3/4 CPU 226

3/24 SIPLUS central processing units
3/24 SIPLUS CPU 221
3/25 SIPLUS CPU 222
3/26 SIPLUS CPU 224
3/27 SIPLUS CPU 224 XP
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3/30 Digital modules
3/30 EM 221
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3/38 SIPLUS EM 221
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3/42 Analog modules
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3/59 SIWAREX MS
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3/62 EM 241 modem
3/63 EM 277 PROFIBUS DP module
3/64 CP 243-2
3/65 CP 243-1
3/68 MD720-3 GSM/GPRS modem
3/70 MD741-1 EGPRS router
3/72 Telecontrol Server Basic

3/74 SIPLUS communication
3/74 SIPLUS PROFIBUS DP EM 277
3/75 SIPLUS MD720-3 GSM/GPRS modem
3/76 SIPLUS MD741-1 EGPRS routers

3/77 Power supplies
3/77 The S7-200 version

3/79 SIPLUS power supplies
3/79 SIPLUS S7-200 PS 203

3/80 Operator control and monitoring
3/80 TD 200 text display
3/81 TD 400C text display
3/82 SIMATIC OP 73micro
3/84 SIMATIC TP 177micro

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3/86 SIPLUS S7-200 TD 200
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3/88 Software
3/88 Software
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Brochures

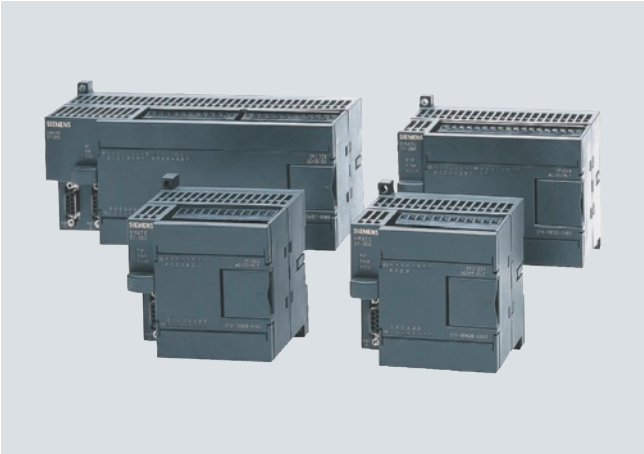
For brochures serving as selection guides for SIMATIC products refer to:

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

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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)

SIPLUS S7-200

- The PLC for use under extremely harsh ambient conditions
- With extended temperature range from -25 °C to +70 °C
- Use in environments with pollutant gases (corrosive gas atmospheres)
- 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

You will find more information at:

www.siemens.com/siplus-extreme

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

www.siemens.com/simatic/printmaterial

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Technical specifications

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

General technical specifications SIMATIC S7-200	
Conformal coating	Coating of the printed circuit boards and the electronic components
Ambient temperature range	-25 ... +70 °C
Technical data	The technical data of the standard product applies except for the ambient conditions.
Ambient conditions:	
• Relative humidity	5 ... 100%, condensation allowed
• Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
• Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
• Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... + 3500 m) Derating 10K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1)	Yes [3)]

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

3) 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

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Central processing units

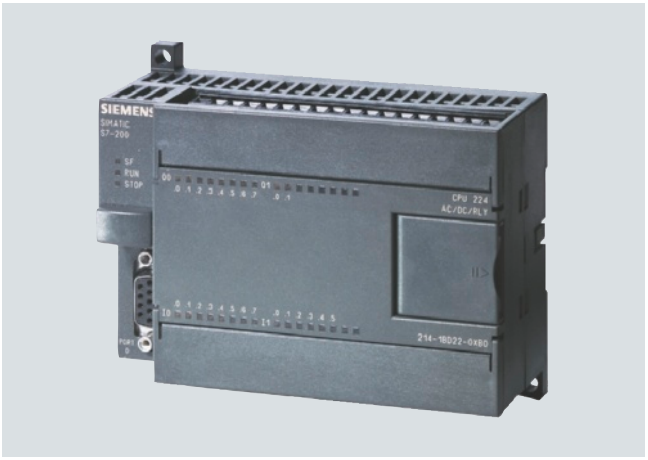
CPU 221, CPU 222, CPU 224, CPU 224 XP, CPU 224 XPsi, CPU 226

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/224 XPsi



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

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Overview CPU 226



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

Technical specifications

	6ES7 211-0AA23-0XB0	6ES7 211-0BA23-0XB0	6ES7 212-1AB23-0XB0	6ES7 212-1BB23-0XB0
Supply voltages				
Rated value				
• 24 V DC	Yes		Yes	
• permissible range, lower limit (DC)	20.4 V		20.4 V	
• permissible range, upper limit (DC)	28.8 V		28.8 V	
• 120 V AC		Yes		Yes
• 230 V AC		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
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

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Technical specifications (continued)

	6ES7 211-0AA23-0XB0	6ES7 211-0BA23-0XB0	6ES7 212-1AB23-0XB0	6ES7 212-1BB23-0XB0
Backup battery				
Battery operation				
• Backup time, max.	50 h; (min. 8 h at 40 °C); 200 days (typ.) with optional battery module	50 h; (min. 8 h at 40 °C); 200 days (typ.) with optional battery module	50 h; (min. 8 h at 40 °C); 200 days (typ.) with optional battery module	50 h; (min. 8 h at 40 °C); 200 days (typ.) with optional battery module
Memory				
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
Counters, timers and their retentivity				
S7 counter				
• Number	256	256	256	256
• of which retentive with battery				
- adjustable	Yes; via high-performance capacitor or battery	Yes; via high-performance capacitor or battery	Yes; via high-performance capacitor or battery	Yes; via high-performance capacitor or battery
- lower limit	1	1	1	1
- upper limit	256	256	256	256
• Counting range				
- lower limit	0	0	0	0
- upper limit	32 767	32 767	32 767	32 767
S7 times				
• Number	256	256	256	256
• of which retentive 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

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Technical specifications (continued)

	6ES7 211-0AA23-0XB0	6ES7 211-0BA23-0XB0	6ES7 212-1AB23-0XB0	6ES7 212-1BB23-0XB0
Data areas and their retentivity				
Flag				
• Number, max.	32 byte	32 byte	32 byte	32 byte
• Retentivity 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 retentive 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 retentive without battery	0 to 112 in EEPROM, adjustable	0 to 112 in EEPROM, adjustable	0 to 112 in EEPROM, adjustable	0 to 112 in EEPROM, adjustable
Hardware configuration				
Connectable programming devices/PCs	SIMATIC PG/PC, standard PC	SIMATIC PG/PC, standard PC	SIMATIC PG/PC, standard PC	SIMATIC PG/PC, tandard 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 method				
Plug-in I/O terminals	No	No	No	No
1st interface				
Type of 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
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 communications is possible in the MPI network with restrictions; transmission rates: 19.2 / 187.5 kbit/s	Yes; as MPI slave for data exchange with MPI masters (S7-300/S7-400 CPUs, OPs, TDs, Push Button Panels); S7-200-internal CPU/CPU communications is possible in the MPI network with restrictions; transmission rates: 19.2 / 187.5 kbit/s	Yes; as MPI slave for data exchange with MPI masters (S7-300/S7-400 CPUs, OPs, TDs, Push Button Panels); S7-200-internal CPU/CPU communications is possible in the MPI network with restrictions; transmission rates: 19.2 / 187.5 kbit/s	Yes; as MPI slave for data exchange with MPI masters (S7-300/S7-400 CPUs, OPs, TDs, Push Button Panels); S7-200-internal CPU/CPU communications is possible in the MPI network with restrictions; transmission rates: 19.2 / 187.5 kbit/s
• PPI	Yes; with PPI protocol for programming functions, HMI functions (TD 200, OP), S7-200-internal CPU/ CPU communications; transmission rates 9.6 / 19.2 / 187.5 kbit/s	Yes; with PPI protocol for programming functions, HMI functions (TD 200, OP), S7-200-internal CPU/ CPU communications; transmission rates 9.6 / 19.2 / 187.5 kbit/s	Yes; with PPI protocol for programming functions, HMI functions (TD 200, OP), S7-200-internal CPU/ CPU communications; transmission rates 9.6 / 19.2 / 187.5 kbit/s	Yes; with PPI protocol for programming functions, HMI functions (TD 200, OP), S7-200-internal CPU/ CPU communications; transmission rates 9.6 / 19.2 / 187.5 kbit/s

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Technical specifications (continued)

	6ES7 211-0AA23-0XB0	6ES7 211-0BA23-0XB0	6ES7 212-1AB23-0XB0	6ES7 212-1BB23-0XB0
• 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	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	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	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 rate, max.	187.5 kbit/s	187.5 kbit/s	187.5 kbit/s	187.5 kbit/s
• Transmission rate, min.	19.2 kbit/s	19.2 kbit/s	19.2 kbit/s	19.2 kbit/s
Programming				
Programming language				
• LAD	Yes	Yes	Yes	Yes
• FBD	Yes	Yes	Yes	Yes
• STL	Yes	Yes	Yes	Yes
Command set	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
Program processing	free cycle (OB 1), interrupt-controller, time-controlled (1 to 255 ms)	free cycle (OB 1), interrupt-controller, time-controlled (1 to 255 ms)	free cycle (OB 1), interrupt-controller, time-controlled (1 to 255 ms)	free cycle (OB 1), interrupt-controller, time-controlled (1 to 255 ms)
Program organization	1 OB, 1 DB, 1 SDB subroutines with/without parameter transfer	1 OB, 1 DB, 1 SDB subroutines with/without parameter transfer	1 OB, 1 DB, 1 SDB subroutines with/without parameter transfer	1 OB, 1 DB, 1 SDB subroutines with/without parameter transfer
Number of subroutines, max.	64	64	64	64
• 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
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				
- parameterizable	Yes; all	Yes; all	Yes; all	Yes; all
- at "0" to "1", min.	0.2 ms	0.2 ms	0.2 ms	0.2 ms
- at "0" to "1", max.	12.8 ms	12.8 ms	12.8 ms	12.8 ms
• for interrupt inputs				
- parameterizable	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				
- parameterizable	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

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Technical specifications (continued)

	6ES7 211-0AA23-0XB0	6ES7 211-0BA23-0XB0	6ES7 212-1AB23-0XB0	6ES7 212-1BB23-0XB0
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
Digital outputs				
Number of digital outputs	4; Transistor	4; Relay	6; Transistor	6; Relay
Short-circuit protection	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	20 V DC	L+/L1
Output current				
• for signal "1" rated value	750 mA	2 A	750 mA	2 A
• for signal "0" residual current, max.	0.1 mA	0 mA	10 µA	0 mA
Output delay with resistive load				
• 0 to "1", max.	15 µs; of the standard outputs, max. (Q 0.2 to Q 0.3) 15 µs; of the pulse outputs, max. (Q 0.0 to Q 0.1) 2 µs	10 ms; all outputs	15 µs; of the standard outputs, max. (Q 0.2 to Q 0.5) 15 µs; of the pulse outputs, max. (Q 0.0 to Q 0.1) 2 µs	10 ms; all outputs
• 1 to "0", max.	130 µs; of the standard outputs, max. (Q 0.2 to Q 0.3) 100 µs; of the pulse outputs, max. (Q 0.0 to Q 0.1) 10 µs	10 ms; all outputs	130 µs; of the standard outputs, max. (Q 0.2 to Q 0.5) 100 µs; of the pulse outputs, max. (Q 0.0 to Q 0.1) 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 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				
• 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		10 000 000; mechanically 10 million, at rated load voltage 100,000		10 000 000; mechanically 10 million, at rated load voltage 100,000
Analog inputs				
Number of analog potentiometers	1; Analog potentiometer; resolution 8 bit	1; Analog potentiometer; resolution 8 bit	1; Analog potentiometer; resolution 8 bit	1; Analog potentiometer; resolution 8 bit
Encoder supply				
24 V encoder supply				
• 24 V	Yes; permissible range: 15.4 to 28.8 V	Yes; permissible range: 20.4 bis 28.8 V	Yes; permissible range: 15.4 to 28.8 V	Yes; permissible range: 20.4 bis 28.8 V
• Short-circuit protection	Yes; electronic at 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

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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	Yes	Yes	Yes	Yes
- permissible quiescent current (2-wire BEROS), max.	1 mA	1 mA	1 mA	1 mA
Integrated Functions				
Number of counters	4; High-speed counters (30 kHz each), 32 bit (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.	4; High-speed counters (30 kHz each), 32 bit (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.	4; High-speed counters (30 kHz each), 32 bit (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.	4; High-speed counters (30 kHz each), 32 bit (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	4; 4 rising edges and/or 4 falling edges	4; 4 rising edges and/or 4 falling edges	4; 4 rising edges and/or 4 falling edges
Number of pulse outputs	2; high-speed outputs, 20 kHz, with interrupt option; pulse-width and frequency modulation option		2; high-speed outputs, 20 kHz, with interrupt option; pulse-width and frequency modulation option	
Limit frequency (pulse)	20 kHz		20 kHz	
Galvanic isolation				
Galvanic isolation digital inputs				
• between the channels	Yes	Yes	Yes	Yes
• between the channels, in groups of	2 and 4	2 and 4	4	4
Galvanic isolation digital outputs				
• between the channels	Yes; Optocoupler	Yes; Relay	Yes; Optocoupler	Yes; Relay
• between the channels, in groups of	4	1 and 3	6	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				
Ambient conditions	For further ambient conditions, see "Automation System S7200, System Manual"	For further ambient conditions, see "Automation System S7-200, System Manual"	For further ambient conditions, see "Automation System S7-200, System Manual"	For further ambient 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 %	5 %	5 %	5 %
• Operation, max.	95 %; RH class 2 in accordance with IEC 1131-2	95 %; RH class 2 in accordance with IEC 1131-2	95 %; RH class 2 in accordance with IEC 1131-2	95 %; RH class 2 in accordance with IEC 1131-2

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Technical specifications (continued)

	6ES7 211-0AA23-0XB0	6ES7 211-0BA23-0XB0	6ES7 212-1AB23-0XB0	6ES7 212-1BB23-0XB0
Degree of protection				
IP20	Yes	Yes	Yes	Yes
Dimensions and weight				
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
Weight				
• Weight, approx.	270 g	310 g	270 g	310 g

	6ES7 214-1AD23-0XB0	6ES7 214-1BD23-0XB0	6ES7 214-2AD23-0XB0	6ES7 214-2BD23-0XB0	6ES7 214-2AS23-0XB0	6ES7 216-2AD23-0XB0	6ES7 216-2BD23-0XB0
Supply voltages							
Rated value							
• 24 V DC	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	
• 120 V AC		Yes		Yes			Yes
• 230 V AC		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 (5 V DC) 660 mA		900 mA; 120 to 900 mA, output current for expansion modules (5 V DC) 660 mA		900 mA; 120 to 900 mA, output current for expansion modules (5 V DC) 660 mA	1 050 mA; 150 to 1050 mA output current for expansion modules (D5 V DC) 1000 mA	

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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
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
Backup battery							
Battery operation							
• Backup time, max.	100 h; (min. 70 h at 40 °C); 200 days (typ.) with optional battery module	100 h; (min. 70 h at 40 °C); 200 days (typ.) with optional battery module	100 h; (min. 70 h at 40 °C); 200 days (typ.) with optional battery module	100 h; (min. 70 h at 40 °C); 200 days (typ.) with optional battery module	100 h; (min. 70 h at 40 °C); 200 days (typ.) with optional battery module	100 h; (min. 70 h at 40 °C); 200 days (typ.) with optional battery module	100 h; (min. 70 h at 40 °C); 200 days (typ.) with optional battery module
Memory							
Number of memory modules (optional)	1; pluggable memory module, content identical with integral EEPROM; can additionally store recipes, data logs and other files	1; pluggable memory module, content identical with integral EEPROM; can additionally store recipes, data logs and other files	1; pluggable memory module, content identical with integral EEPROM; can additionally store recipes, data logs and other files	1; pluggable memory module, content identical with integral EEPROM; can additionally store recipes, data logs and other files	1; pluggable memory module, content identical with integral EEPROM; can additionally store recipes, data logs and other files	1; pluggable memory module, content identical with integral EEPROM; can additionally store recipes, data logs and other files	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 with active run-time edit	12 Kibyte; 8 KB with active run-time edit	16 Kibyte; 12 KB with active run-time edit	16 Kibyte; 12 KB with active run-time edit	16 Kibyte; 12 KB with 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	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	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

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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
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
Counters, timers and their retentivity							
S7 counter							
• Number	256	256	256	256	256	256	256
• of which retentive with battery							
- adjustable	Yes; via high-performance capacitor or battery	Yes; via high-performance capacitor or battery	Yes; via high-performance capacitor or battery	Yes; via high-performance capacitor or battery	Yes; via high-performance capacitor or battery	Yes; via high-performance capacitor or battery	Yes; via high-performance capacitor or battery
- lower limit	1	1	1	1	1	1	1
- upper limit	256	256	256	256	256	256	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 retentive with battery							
- adjustable	Yes; via high-performance capacitor or battery	Yes; via high-performance capacitor or battery	Yes; via high-performance capacitor or battery	Yes; via high-performance capacitor or battery	Yes; via high-performance capacitor or battery	Yes; via high-performance capacitor or battery	Yes; via high-performance capacitor or battery
- upper limit	64	64	64	64	64	64	64
• Time range							
- lower limit	1 ms	1 ms	1 ms	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	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 retentivity							
Flag							
• Number, max.	32 byte	32 byte	32 byte	32 byte	32 byte	32 byte	32 byte
• Retentivity 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	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 retentive with battery	0 to 255, via high-performance capacitor or battery, adjustable	0 to 255, via high-performance capacitor or battery, adjustable	0 to 255, via high-performance capacitor or battery, adjustable	0 to 255, via high-performance capacitor or battery, adjustable	0 to 255, via high-performance capacitor or battery, adjustable	0 to 255, via high-performance capacitor or battery, adjustable	0 to 255, via high-performance capacitor or battery, adjustable
• of which retentive without battery	0 to 112 in EEPROM, adjustable	0 to 112 in EEPROM, adjustable	0 to 112 in EEPROM, adjustable	0 to 112 in EEPROM, adjustable	0 to 112 in EEPROM, adjustable	0 to 112 in EEPROM, adjustable	0 to 112 in EEPROM, adjustable
Hardware configuration							
Connectable programming devices/PCs	SIMATIC PG/PC, standard PC	SIMATIC PG/PC, standard PC	SIMATIC PG/PC, standard PC	SIMATIC PG/PC, standard PC	SIMATIC PG/PC, standard PC	SIMATIC PG/PC, standard PC	SIMATIC PG/PC, standard PC

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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
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.	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.	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.	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.	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.	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.	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.
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 method							
Plug-in I/O terminals	Yes	Yes	Yes	Yes	Yes	Yes	Yes
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	Integrated 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 communications is possible in the MPI network with restrictions; transmission rates: 19.2 / 187.5 kbit/s	Yes; as MPI slave for data exchange with MPI masters (S7-300/ S7-400 CPUs, OPs, TDs, Push Button Panels); S7-200-internal CPU/ CPU communications is possible in the MPI network with restrictions; transmission rates: 19.2 / 187.5 kbit/s	Yes; as MPI slave for data exchange with MPI masters (S7-300/ S7-400 CPUs, OPs, TDs, Push Button Panels); S7-200-internal CPU/ CPU communications is possible in the MPI network with restrictions; transmission rates: 19.2 / 187.5 kbit/s	Yes; as MPI slave for data exchange with MPI masters (S7-300/ S7-400 CPUs, OPs, TDs, Push Button Panels); S7-200-internal CPU/ CPU communications is possible in the MPI network with restrictions; transmission rates: 19.2 / 187.5 kbit/s	Yes; as MPI slave for data exchange with MPI masters (S7-300/ S7-400 CPUs, OPs, TDs, Push Button Panels); S7-200-internal CPU/ CPU communications is possible in the MPI network with restrictions; transmission rates: 19.2 / 187.5 kbit/s	Yes; as MPI slave for data exchange with MPI masters (S7-300/ S7-400 CPUs, OPs, TDs, Push Button Panels); S7-200-internal CPU/ CPU communications is possible in the MPI network with restrictions; transmission rates: 19.2 / 187.5 kbit/s	Yes; as MPI slave for data exchange with MPI masters (S7-300/ S7-400 CPUs, OPs, TDs, Push Button Panels); S7-200-internal CPU/ CPU communications is possible in the MPI network with restrictions; transmission rates: 19.2 / 187.5 kbit/s

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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
• PPI	Yes; with PPI protocol for programming functions, HMI functions (TD 200, OP), S7-200-internal CPU/CPU communications; transmission rates 9.6 / 19.2 / 187.5 kbit/s	Yes; with PPI protocol for programming functions, HMI functions (TD 200, OP), S7-200-internal CPU/CPU communications; transmission rates 9.6 / 19.2 / 187.5 kbit/s	Yes; with PPI protocol for programming functions, HMI functions (TD 200, OP), S7-200-internal CPU/CPU communications; transmission rates 9.6 / 19.2 / 187.5 kbit/s	Yes; with PPI protocol for programming functions, HMI functions (TD 200, OP), S7-200-internal CPU/CPU communications; transmission rates 9.6 / 19.2 / 187.5 kbit/s	Yes; with PPI protocol for programming functions, HMI functions (TD 200, OP), S7-200-internal CPU/CPU communications; transmission rates 9.6 / 19.2 / 187.5 kbit/s	Yes; with PPI protocol for programming functions, HMI functions (TD 200, OP), S7-200-internal CPU/CPU communications; transmission rates 9.6 / 19.2 / 187.5 kbit/s	Yes; with PPI protocol for programming functions, HMI functions (TD 200, OP), S7-200-internal CPU/CPU communications; 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	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	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	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	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	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	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 rate, 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 rate, 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			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
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 communications is possible in the MPI network with restrictions; transmission rates: 19.2 / 187.5 kbit/s	Yes; as MPI slave for data exchange with MPI masters (S7-300/S7-400 CPUs, OPs, TDs, Push Button Panels); S7-200-internal CPU/CPU communications is possible in the MPI network with restrictions; transmission rates: 19.2 / 187.5 kbit/s	Yes; as MPI slave for data exchange with MPI masters (S7-300/S7-400 CPUs, OPs, TDs, Push Button Panels); S7-200-internal CPU/CPU communications is possible in the MPI network with restrictions; transmission rates: 19.2 / 187.5 kbit/s	Yes; as MPI slave for data exchange with MPI masters (S7-300/S7-400 CPUs, OPs, TDs, Push Button Panels); S7-200-internal CPU/CPU communications is possible in the MPI network with restrictions; transmission rates: 19.2 / 187.5 kbit/s	Yes; as MPI slave for data exchange with MPI masters (S7-300/S7-400 CPUs, OPs, TDs, Push Button Panels); S7-200-internal CPU/CPU communications is possible in the MPI network with restrictions; transmission rates: 19.2 / 187.5 kbit/s

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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
• PPI			Yes; with PPI protocol for programming functions, HMI functions (TD 200, OP), S7-200-internal CPU/CPU communications; transmission rates 9.6 / 19.2 / 187.5 kbit/s	Yes; with PPI protocol for programming functions, HMI functions (TD 200, OP), S7-200-internal CPU/CPU communications; transmission rates 9.6 / 19.2 / 187.5 kbit/s	Yes; with PPI protocol for programming functions, HMI functions (TD 200, OP), S7-200-internal CPU/CPU communications; transmission rates 9.6 / 19.2 / 187.5 kbit/s	Yes; with PPI protocol for programming functions, HMI functions (TD 200, OP), S7-200-internal CPU/CPU communications; transmission rates 9.6 / 19.2 / 187.5 kbit/s	Yes; with PPI protocol for programming functions, HMI functions (TD 200, OP), S7-200-internal CPU/CPU communications; 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	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	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	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	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 rate, max.			187.5 kbit/s	187.5 kbit/s	187.5 kbit/s	187.5 kbit/s	187.5 kbit/s
• Transmission rates, min.			19.2 kbit/s	19.2 kbit/s	19.2 kbit/s	19.2 kbit/s	19.2 kbit/s
Programming							
Programming language							
• LAD	Yes	Yes	Yes	Yes	Yes	Yes	Yes
• FBD	Yes	Yes	Yes	Yes	Yes	Yes	Yes
• STL	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Command set	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	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

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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
Program processing	free cycle (OB 1), interrupt-controller, time-controlled (1 to 255 ms)	free cycle (OB 1), interrupt-controller, time-controlled (1 to 255 ms)	free cycle (OB 1), interrupt-controller, time-controlled (1 to 255 ms)	free cycle (OB 1), interrupt-controller, time-controlled (1 to 255 ms)	free cycle (OB 1), interrupt-controller, time-controlled (1 to 255 ms)	free cycle (OB 1), interrupt-controller, time-controlled (1 to 255 ms)	free cycle (OB 1), interrupt-controller, time-controlled (1 to 255 ms)
Program organization	1 OB, 1 DB, 1 SDB subroutines with/ without parameter transfer	1 OB, 1 DB, 1 SDB subroutines with/ without parameter transfer	1 OB, 1 DB, 1 SDB subroutines with/ without parameter transfer	1 OB, 1 DB, 1 SDB subroutines with/ without parameter transfer	1 OB, 1 DB, 1 SDB subroutines with/ without parameter transfer	1 OB, 1 DB, 1 SDB subroutines with/ without parameter transfer	1 OB, 1 DB, 1 SDB subroutines with/ without parameter transfer
Number of subroutines, max.	64	64	64	64	64	64	64
• User program protection/ password protection	Yes; 3-stage password protection	Yes; 3-stage password protection	Yes; 3-stage password protection	Yes; 3-stage password protection	Yes; 3-stage password protection	Yes; 3-stage password protection	Yes; 3-stage password protection
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 I0.3 to I0.5	2.5 mA; 8 mA for I0.3 to I0.5	2.5 mA; 8 mA for I0.3 to I0.5	2.5 mA	2.5 mA
Input delay (for rated value of input voltage)							
• for standard inputs							
- parameterizable	Yes; all	Yes; all	Yes; all	Yes; all	Yes; all	Yes; all	Yes; all
- at "0" to "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							
- parameterizable	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							
- parameterizable	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	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	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	300 m; not for high-speed signals	300 m; not for high-speed signals	300 m; not for high-speed signals

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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
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	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 A1.1))	L+/L1	1M -0.4 V	20 V DC	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 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							
• 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

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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
Relay outputs							
Number of operating cycles		10 000 000; mechanically 10 million, at rated load voltage 100,000		10 000 000; mechanically 10 million, at rated load voltage 100,000			10 000 000; mechanically 10 million, at rated load voltage 100,000
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	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- permissible quiescent current (2-wire BEROS), max.	1 mA	1 mA	1 mA	1 mA	1 mA	1 mA	1 mA
Integrated Functions							
Number of counters	6; High-speed counters (30 kHz each), 32 bit (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 bit (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 bit (incl. sign), can be used as up/down counters or for connecting 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 bit (incl. sign), can be used as up/down counters or for connecting 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 bit (incl. sign), can be used as up/down counters or for connecting 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 bit (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 bit (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.

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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
Counter frequency (counter) max.	30 kHz	30 kHz	200 kHz	200 kHz	200 kHz	30 kHz	30 kHz
Number of alarm inputs	4; 4 rising edges and/or 4 falling edges	4; 4 rising edges and/or 4 falling edges	4; 4 rising edges and/or 4 falling edges	4; 4 rising edges and/or 4 falling edges	4; 4 rising edges and/or 4 falling edges	4; 4 rising edges and/or 4 falling edges	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	
Galvanic 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
Galvanic 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	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 ambient conditions, see "Automation System S7-200, System Manual"	For further ambient conditions, see "Automation System S7-200, System Manual"	For further ambient conditions, see "Automation System S7-200, System Manual"	For further ambient conditions, see "Automation System S7-200, System Manual"	For further ambient conditions, see "Automation System S7-200, System Manual"	For further ambient conditions, see "Automation System S7-200, System Manual"	For further ambient 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 %	5 %	5 %	5 %	5 %	5 %	5 %
• Operation, max.	95 %; RH class 2 in accordance with IEC 1131-2	95 %; RH class 2 in accordance with IEC 1131-2	95 %; RH class 2 in accordance with IEC 1131-2	95 %; RH class 2 in accordance with IEC 1131-2	95 %; RH class 2 in accordance with IEC 1131-2	95 %; RH class 2 in accordance with IEC 1131-2	95 %; RH class 2 in accordance with IEC 1131-2

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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
Degree of protection							
IP20	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dimensions and weight							
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
Weight							
• Weight, approx.	360 g	410 g	390 g	440 g	390 g	550 g	660 g

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Ordering data	Order No.
CPU 221	
Compact CPU, work memory 4 KB, power supply 24 V DC, 6 DI/4 DO integrated	**6ES7 211-0AA23-0XB0**
Compact CPU, work memory 4 KB, power supply 100 V to 230 V AC, 6 DI/4 DO integrated, relay outputs	**6ES7 211-0BA23-0XB0**
CPU 222	
Compact CPU, expandable, work memory 4 KB, power supply 24 V DC, 8 DI/6 DO integrated	**6ES7 212-1AB23-0XB0**
Compact CPU, expandable, work memory 4 KB, power supply 100 V to 230 V AC, 8 DI/6 DO integrated, relay outputs	**6ES7 212-1BB23-0XB0**
CPU 224	
Compact CPU, expandable, work memory 8/12 KB program, 8 KB data, power supply 24 V DC, 14 DI/10 DO integrated	**6ES7 214-1AD23-0XB0**
Compact CPU, expandable, work memory 8/12 KB program, 8 KB data, power supply 100 V to 230 V AC, 14 DI/10 DO integrated, relay outputs	**6ES7 214-1BD23-0XB0**
CPU 224 XP	
Compact CPU, expandable, work memory 12/16 KB program, 10 KB data, power supply 24 V DC, 14 DI/10 DO/ 2 AI/1 AO integrated	**6ES7 214-2AD23-0XB0**
Compact CPU, expandable, work 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 214-2BD23-0XB0**
CPU 224 XPsi	**6ES7 214-2AS23-0XB0**
Compact CPU, with current-sinking outputs, expandable, work memory 12/16 KB program, 10 KB data, power supply 24 V DC, 14 DI/10 DO/ 2 AI/1 AO integrated	
CPU 226	
Compact CPU, expandable, work memory 16/24 KB program, 10 KB data, power supply 24 V DC, 24 DI/16 DO integrated	**6ES7 216-2AD23-0XB0**
Compact CPU, expandable, work memory 16/24 KB program, 10 KB data, power supply 100 V to 230 V AC, 24 DI/16 DO integrated, relay outputs	**6ES7 216-2BD23-0XB0**

		Order No.
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	J	**6ES7 298-0AA20-0AA3**
English	J	**6ES7 298-0AA20-0BA3**
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**
Ground terminal		**6ES5 728-8MA11**
10 units		
Front flap set		**6ES7 291-3AX20-0XA0**
contains various cover flaps for CPUs and EMs; spare part		
SIM 274 simulator (optional)		
with 8 terminals for CPU 221/222		**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**
Pluggable terminal block (spare part)		
With 12 terminals (for CPU 22x)	I	**6ES7 292-1AE20-0AA0**
With 18 terminals (for CPU 224/ 224 XP)	I	**6ES7 292-1AG20-0AA0**
With 14 terminals (for CPU 226)	I	**6ES7 292-1AF20-0AA0**
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		
MPI cable		**6ES7 901-0BF00-0AA0**
5 m; for connecting the S7-200 to MPI		
Backplane bus expansion cable	I	**6ES7 290-6AA20-0XA0**
for connecting two rows of modules with double-tier configuration, for CPU 222/224/224 XP/ 226		

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

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

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Ordering data

		Order No.
Optional battery module		**6ES7 291-8BA20-0XA0**
Optional combined clock and battery module only for CPU 221/222		**6ES7 297-1AA23-0XA0**
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**
SIMATIC manual collection Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	J	**6ES7 998-8XC01-8YE0**
SIMATIC manual collection update service for 1 year Current Manual Collection DVD and the three subsequent updates	D	**6ES7 998-8XC01-8YE2**
STEP 7 Micro/WIN32 V4 programming software Target system: All CPUs of the SIMATIC S7-200 Requirements: Windows 2000/XP on PG or PC Type of delivery: German, English, French, Spanish, Italian, Chinese; with online documentation		
Single license	J	**6ES7 810-2CC03-0YX0**
Upgrade Single License[1)]	J	**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 972-0BA42-0XA0**
• with PG connection		**6ES7 972-0BB42-0XA0**
PROFIBUS FC standard cable 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		**6XV1 830-0EH10**
RS 485 repeater for PROFIBUS		**6ES7 972-0AA02-0XA0**

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

D: Subject to export regulations AL: N and ECCN: 5D992

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

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Overview SIPLUS CPU 221



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

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

	SIPLUS CPU 221	
Order number	**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 ... +55 °C (for applications with cUL approval)	
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions	
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	Yes	Yes
Approvals	CE, cUL	
Ambient conditions		
Relative humidity	5 ... 100 % Condensation permissible	
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)	
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]	
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]	
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K	

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

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Overview SIPLUS CPU 222



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

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

	SIPLUS CPU 222	
Order number	**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 ... +55 °C (for applications with cUL approval)	
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions	
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	Yes	Yes
Approvals	CE, cUL	
Ambient conditions		
Relative humidity	5 ... 100 % Condensation permissible	
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)	
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]	
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]	
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K	

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

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Overview SIPLUS CPU 224



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

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

	SIPLUS CPU 224	
Order number	**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 ... +55 °C (for applications with cUL approval)	
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions	
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	Yes	Yes
Approvals	CE, cUL	
Ambient conditions		
Relative humidity	5 ... 100 % Condensation permissible	
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)	
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]	
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]	
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K	

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

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Overview SIPLUS CPU 224 XP



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

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

	SIPLUS CPU 224 XP	
Order number	**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	
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions	
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	No	No
Approvals	CE	
Ambient conditions		
Relative humidity	5 ... 100 % Condensation permissible	
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)	
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]	
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]	
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K	

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

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Overview SIPLUS CPU 226



- The power pack 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

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

	SIPLUS CPU 226	
Order number	**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 ... +55 °C (for applications with cUL approval)	
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions	
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	Yes	Yes
Approvals	CE, cUL	
Ambient conditions		
Relative humidity	5 ... 100 % Condensation permissible	
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)	
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]	
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]	
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K	

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

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Ordering data		Order No.
SIPLUS CPU 221		
(extended temperature and mediale exposure)		
Compact-CPU, work memory 4 KByte, power supply DC 24 V, 6 DE/4 DA integrated	H	**6AG1 211-0AA23-2XB0**
Compact-CPU, work memory 4 KByte, power supply AC 100 to 230 V, 6 DE/4 DA integrated, relay outputs	H	**6AG1 211-0BA23-2XB0**
SIPLUS CPU 222		
(extended temperature range and medial exposure)	H	**6AG1 212-1AB23-2XB0**
Compact CPU, expandable, 4 KB work memory, 24 V DC supply voltage, 8 DI/6 DO integrated	H	**6AG1 212-1BB23-2XB0**
SIPLUS CPU 224		
(extended temperature range and medial exposure)		
Compact CPU, expandable, work memory 8/12 KB for program and 8 KB for data, 24 V DC supply voltage, 14 DI/10 DO integrated	H	**6AG1 214-1AD23-2XB0**
Compact CPU, expandable, work memory 8/12 KB for program, 8 KB for data, 100-230 V AC supply voltage, 14 DI/10 DO integrated, relay outputs	H	**6AG1 214-1BD23-2XB0**
SIPLUS CPU 224 XP		
(extended temperature range and medial exposure)		
Compact CPU, expandable, work memory 12/16 KB for program, 10 KB for data, 24 V DC supply voltage, 14 DI/10 DO/2 AI/1 AO integrated	L	**6AG1 214-2AD23-2XB0**
Compact CPU, expandable, work memory 12/16 KB for program, 10 KB for data, 100 to 230 V AC supply voltage , 14 DI/10 DO (relay outputs)/2 AI/1 AO integrated	H	**6AG1 214-2BD23-2XB0**
SIPLUS CPU 226		
(extended temperature range and medial exposure)		
Compact CPU, expandable, work memory 16/24 KB for program, 10 KB for data, 24 V DC supply voltage, 24 DI/16 DO integrated	H	**6AG1 216-2AD23-2XB0**
Compact CPU, expandable, work memory 16/24 KB for program, 10 KB for data, 100-230 V AC supply voltage, 24 DI/16 DO integrated, relay outputs	H	**6AG1 216-2BD23-2XB0**
Accessories		
SIPLUS Upmiter upstream device	L	**6AG1 203-1AA00-2AA0**
for reliable operation at the battery of combustion engines		
Additional accessories		See SIMATIC S7-200 CPU 222 central processing unit, page 3/22

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H
L: Subject to export regulations AL: 9I999 and ECCN: N

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EM 221, EM 222, EM 223

Overview



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

Technical specifications EM 221

	6ES7 221-1BH22-0XA0	6ES7 221-1BF22-0XA0	6ES7 221-1EF22-0XA0
Current consumption			
from backplane bus 5 V DC, max.	70 mA	30 mA	30 mA
Power losses			
Power loss, typ.	3 W	2 W	3 W
Connection method			
Plug-in I/O terminals	Yes	Yes	Yes
Digital inputs			
Number of digital inputs	16	8	8
m/p-reading	Yes	Yes	
Input characteristic curve acc. 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

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Technical specifications EM 221 (continued)

	6ES7 221-1BH22-0XA0	6ES7 221-1BF22-0XA0	6ES7 221-1EF22-0XA0
Galvanic 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)
Dimensions and weight			
Dimensions			
• Width	71.2 mm	46 mm	71.2 mm
• Height	80 mm	80 mm	80 mm
• Depth	62 mm	62 mm	62 mm
Weight			
• 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 5 V DC, max.	40 mA	50 mA
Power losses		
Power loss, typ.	3 W	2 W
Connection method		
Plug-in I/O terminals	Yes	Yes
Digital outputs		
Number of digital outputs	4	8
Short-circuit protection	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 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		
• Cable length, shielded, max.	500 m	500 m
• Cable length unshielded, max.	150 m	150 m

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Technical specifications EM 222 (continued)

	6ES7 222-1BD22-0XA0	6ES7 222-1BF22-0XA0
Relay outputs		
Switching capacity of 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
Galvanic isolation		
Galvanic isolation digital outputs		
• Galvanic isolation digital outputs	Yes	Yes; Optocoupler
• Between the channels, in groups of	1	4
Dimensions and weight		
Dimensions		
• Width	45 mm	45 mm
• Height	80 mm	80 mm
• Depth	62 mm	62 mm
Weight		
• 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
• Ppermissible frequency range, lower limit		47 Hz	47 Hz
• Permissible frequency range, upper limit		63 Hz	63 Hz
Current consumption			
from backplane bus 5 V DC, 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	
Power losses			
Power loss, typ.	4 W	2 W	4 W
Connection method			
Plug-in I/O terminals	Yes	Yes	Yes
Digital outputs			
Number of digital outputs	4; Relay	8; Relay	8
Short-circuit protection	No; to be provided externally (see manual package "Setting up an S7-200")	No; to be provided externally (see manual package "Setting up an S7-200")	No; to be provided externally (see manual package "Setting up an S7-200")
Limitation of inductive shutdown voltage to	to be provided externally (see manual package "Setting up an S7-200")	to be provided externally (see manual package "Setting up an S7-200")	to be provided externally (see manual package "Setting up an S7-200")
Output voltage			
• for signal "1", min.			L1 (-0.9 V)

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Technical specifications EM 222 (continued)

	6ES7 222-1HD22-0XA0	6ES7 222-1HF22-0XA0	6ES7 222-1EF22-0XA0
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 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			
• Cable length, shielded, max.	500 m	500 m	500 m
• Cable length unshielded, max.	150 m	150 m	150 m
Relay outputs			
Number of operating cycles	30 000 000; mechanically 30 million, at rated load voltage 30,000	10 000 000; mechanically 10 million, at rated load voltage 100,000	
Switching capacity of 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
Galvanic isolation			
Galvanic 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 and weight			
Dimensions			
• Width	45 mm	45 mm	71.2 mm
• Height	80 mm	80 mm	80 mm
• Depth	62 mm	62 mm	62 mm
Weight			
• 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 5 V DC, max.	40 mA	80 mA	160 mA	240 mA
from sensor current supply or external current supply (24 V DC), max.				128 mA; ON: 4ma/Input
Power losses				
Power loss, typ.	2 W	3 W	6 W	9 W
Connection method				
Plug-in I/O terminals	Yes	Yes	Yes	Yes

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Technical specifications EM 223 (continued)

	6ES7 223-1BF22-0XA0	6ES7 223-1BH22-0XA0	6ES7 223-1BL22-0XA0	6ES7 223-1BM22-0XA0
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	8	16	32
Short-circuit protection	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 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				
• 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 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
Galvanic 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
Galvanic 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 and weight				
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
Weight				
• Weight, approx.	160 g	200 g	360 g	500 g

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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 5 V DC, 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 (24 V DC), max.	72 mA	72 mA	72 mA	128 mA
Power losses				
Power loss, typ.	2 W	3 W	6 W	13 W
Connection method				
Plug-in 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	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 outputs (per group)				
• Maximum current per conductor/group	8 A	8 A	8 A	2 A; 10 A per group
Cable length				
• Cable length, shielded, max.	500 m	500 m	500 m	500 m
• Cable length unshielded, max.	150 m	150 m	150 m	150 m

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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	10 000 000; mechanically 10 million, at rated load voltage 100,000	10 000 000; mechanically 10 million, at rated load voltage 100,000	10 000 000; mechanically 10 million, at rated load voltage 100,000	10 000 000; mechanically 10 million, at rated load voltage 100,000
Switching capacity of 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
Galvanic 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
Galvanic 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 and weight				
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
Weight				
• Weight, approx.	160 g	300 g	400 g	580 g

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Ordering data

	Order No.
Digital input module EM 221	
for CPU 221/222/224/224 XP/226	
• 8 inputs, 24 V DC, isolated, current sourcing/sinking	**6ES7 221-1BF22-0XA0**
• 16 inputs, 24 V DC, isolated, current sourcing/sinking	**6ES7 221-1BH22-0XA0**
• 8 inputs, 120/230 V AC, isolated, current sourcing/sinking	**6ES7 221-1EF22-0XA0**
Digital output module EM 222	
for CPU 221/222/224/224 XP/226	
• 4 outputs, 24 V DC; 5A, isolated	**6ES7 222-1BD22-0XA0**
• 8 outputs, 24 V DC; 0.75 A, isolated	**6ES7 222-1BF22-0XA0**
• 4 outputs, 24 V DC, 24 to 230 V AC; 10 A, isolated, relay outputs I	**6ES7 222-1HD22-0XA0**
• 8 outputs, 24 V DC, 24 to 230 V AC; 2 A, isolated, relay outputs	**6ES7 222-1HF22-0XA0**
• 8 outputs, 120/230 V AC; 0.5 A, isolated	**6ES7 222-1EF22-0XA0**
Digital input/output module EM 223	
for CPU 221/222/224/224 XP/226	
• 4 inputs 24 V DC, 4 outputs 24 V DC; 0.75 A, isolated	**6ES7 223-1BF22-0XA0**
• 8 inputs, 24 V DC, 8 outputs 24 V DC; 0.75 A, isolated	**6ES7 223-1BH22-0XA0**
• 16 inputs, 24 V DC, 16 outputs 24 V DC; 0.75 A, isolated	**6ES7 223-1BL22-0XA0**
• 32 inputs, 24 V DC, 32 outputs 24 V DC; 0.75 A, isolated	**6ES7 223-1BM22-0XA0**
• 4 inputs, 24 V DC; 4 outputs, relays	**6ES7 223-1HF22-0XA0**
• 8 inputs, 24 V DC; 8 outputs, relays	**6ES7 223-1PH22-0XA0**
• 16 inputs, 24 V DC; 16 outputs, relays	**6ES7 223-1PL22-0XA0**
• 32 inputs, 24 V DC; 32 outputs, relays	**6ES7 223-1PM22-0XA0**

	Order No.
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) I	**6ES7 292-1AD20-0AA0**
• With 12 terminals (for EM 223) I	**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**

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

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3

Overview SIPLUS EM 221



- Digital inputs as supplement to the integral I/O of the CPUs

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS EM 221 digital input modules for CPU 22x		
	8 DI	**16 DI**
Order number	**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 ... +55 °C (for applications with cUL approval)	
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions	
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	Yes	Yes
Approvals	CE, cUL	
Ambient conditions		
Relative humidity	5 ... 100 % Condensation permissible	
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)	
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1)2)]	
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]	
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K	

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

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Overview SIPLUS EM 222



- Digital outputs as a supplement to the integral I/O of the CPUs

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS EM 222 digital output modules for CPU 22x		
	8 DO	**16 RO**
Order number	**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 ... +55 °C (for applications with cUL approval)	
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions	
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	Yes	Yes
Approvals	CE, cUL	
Ambient conditions		
Relative humidity	5 ... 100 % Condensation permissible	
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)	
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1)2)]	
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]	
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... 2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K	

[1)] ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

[2)] The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

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SIPLUS EM 221, EM 222, EM 223

Overview SIPLUS EM 223



- Digital inputs and outputs as supplement to the integral I/O of the CPUs

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS EM 223 digital input/output modules for CPU 22x			
	4 DI/4 O	**8 DI/8 DO**	**16 DI/16 DO**
Order number	**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 ... +55 °C (for applications with cUL approval)		
Conformal coating	Coating of the printed circuit boards and the electronic components		
Technical data	The technical data of the standard product applies except for the ambient conditions		
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	Yes	Yes	Yes
Approvals	CE, cUL		

SIPLUS EM 223 digital input/output modules for CPU 22x			
	4 DI/4 O	**8 DI/8 DO**	**16 DI/16 DO**
Order number	**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 ... +55 °C (for applications with cUL approval)		
Conformal coating	Coating of the printed circuit boards and the electronic components		
Technical data	The technical data of the standard product applies except for the ambient conditions		
Compliant with the standard for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	Yes	Yes	Yes
Approvals	CE, cUL		

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Overview SIPLUS EM 223 (continued)

Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]

Ambient conditions	
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS EM 221 digital input module		
(extended temperature range and medial exposure)		
for CPU 222/224/224XP/226		
• 8 inputs, 24 V DC, isolated, current sourcing/sinking	H	**6AG1 221-1BF22-2XB0**
• 16 inputs, 24 V DC, isolated, current sourcing/sinking	H	**6AG1 221-1BH22-2XA0**
SIPLUS EM 222 digital output module		
(extended temperature range and medial exposure)		
for CPU 222/224/224XP/226		
• 8 outputs, 24 V DC; 0.75 A, isolated	H	**6AG1 222-1BF22-2XB0**
• 8 outputs, 24 V DC / 24 to 230 V AC, 2 A, electrically isolated, relay outputs	H	**6AG1 222-1HF22-2XB0**

		Order No.
SIPLUS EM 223 digital input/ output module		
(extended temperature range and medial exposure)		
for CPU 222/224/224XP/226		
• 4 inputs, 24 V DC, 4 outputs, 24 V DC; 0.75 A, isolated	H	**6AG1 223-1BF22-2XB0**
• 8 inputs, 24 V DC, 8 outputs, 24 V DC; 0.75 A, isolated	H	**6AG1 223-1BH22-2XB0**
• 16 inputs, 24 V DC, 16 outputs, 24 V DC; 0.75 A, isolated	H	**6AG1 223-1BL22-2XB0**
• 4 inputs, 24 V DC, 4 outputs, relay	H	**6AG1 223-1HF22-2XB0**
• 8 inputs, 24 V DC, 8 outputs, relay	H	**6AG1 223-1PH22-2XB0**
• 16 inputs, 24 V DC, 16 outputs, 24 V DC; 0.75 A, relay	H	**6AG1 223-1PL22-2XB0**
Accessories		See SIMATIC S7-200 EM 221 digital input modules, page 3/37

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H

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Analog modules

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

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 5 V DC, max.	20 mA	20 mA
Power losses		
Power loss, typ.	2 W	2 W
Connection method		
Plug-in 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
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

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Technical specifications EM 231 (continued)

	6ES7 231-0HC22-0XA0	6ES7 231-0HF22-0XA0
Voltage input		
• permissible input voltage for voltage input (destruction limit), max.	30 V	30 V
Current input		
• permissible input current for current input (destruction limit), max.	32 mA	40 mA
Characteristic linearization		
• for voltage measurement	No	No
• for current measurement	No	No
Temperature compensation		
• Temperature compensation parameterizable	No	No
Analog value creation		
Integrations and conversion time/ resolution per channel		
• Resolution with overrange (bit including sign), max.	12 bit	12 bit
• Interference voltage suppression for interference frequency f1 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 µs	250 µs
Displayable conversion value range		
• bipolar signals	-32000 to +32000	-32000 to +32000
• unipolar signals	0 to 32000	0 to 32000
Errors/accuracies		
Interference voltage suppression for f = n x (fl +/- 1%), fl = interference frequency		
• common mode voltage, max.	12 V	12 V
Galvanic isolation		
Galvanic isolation analog inputs		
• Galvanic isolation analog inputs	No	No
Dimensions and weight		
Dimensions		
• Width	71.2 mm	71.2 mm
• Height	80 mm	80 mm
• Depth	62 mm	62 mm
Weight		
• Weight, approx.	183 g	190 g

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Technical specifications EM 232

	6ES7 232-0HB22-0XA0	6ES7 232-0HD22-0XA0
Current consumption		
from backplane bus 5 V DC, max.	20 mA	20 mA
from sensor current supply or external current supply (24 V DC), max.	70 mA	70 mA
Power losses		
Power loss, typ.	2 W	2 W
Connection method		
Plug-in 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 kΩ	5 kΩ
• with current outputs, max.	0.5 kΩ	0.5 kΩ
Analog value creation		
Integrations and conversion time/ resolution per channel		
• Resolution (incl. overrange)	U/12 bit, I/11 bit	U/12 bit, I/11 bit
Settling time		
• for voltage output	100 µs	100 µs
• for current output	2 ms	2 ms
Displayable conversion value range		
• bipolar signals	-32000 to +32000	-32000 to +32000
• unipolar signals	0 to 32000	0 to 32000
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 %
Galvanic isolation		
Galvanic isolation analog outputs		
• Galvanic isolation analog outputs	No	No
Dimensions and weight		
Dimensions		
• Width	46 mm	71.2 mm
• Height	80 mm	80 mm
• Depth	62 mm	62 mm
Weight		
• Weight, approx.	148 g	190 g

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Technical specifications EM 235

	6ES7 235-0KD22-0XA0
Current consumption	
from backplane bus 5 V DC, max.	30 mA
from sensor current supply or external current supply (24 V DC), max.	60 mA
Power losses	
Power loss, typ.	2 W
Connection method	
Plug-in 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
Voltage input	
• permissible input voltage for voltage input (destruction limit), max.	30 V
Current input	
• permissible input current for current input (destruction limit), max.	32 mA
Characteristic linearization	
• for voltage measurement	No
• for current measurement	No
Temperature compensation	
• Temperature compensation parameterizable	No

	6ES7 235-0KD22-0XA0
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	
Integrations and conversion time/ resolution per channel	
• Resolution with overrange (bit including sign), max.	12 bit; 11 bit 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	-32000 to +32000
• unipolar signals	0 to 32000
Errors/accuracies	
Operational limit in overall temperature range	
• Voltage, relative to output area	+/- 2 %
• Current, relative to output area	+/- 2 %
Basic error limit (operational limit at 25 °C)	
• Voltage, relative to output area	+/- 0.5 %
• Current, relative to output area	+/- 0.5 %
Interference voltage suppression for f = n x (fl +/- 1%), fl = interference frequency	
• common mode voltage, max.	12 V
Galvanic isolation	
Galvanic isolation analog inputs	
• Galvanic isolation analog inputs	No
Galvanic isolation analog outputs	
• Galvanic isolation analog outputs	No
Dimensions and weight	
Dimensions	
• Width	71.2 mm
• Height	80 mm
• Depth	62 mm
Weight	
• Weight, approx.	186 g

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EM 231, EM 232, EM 235

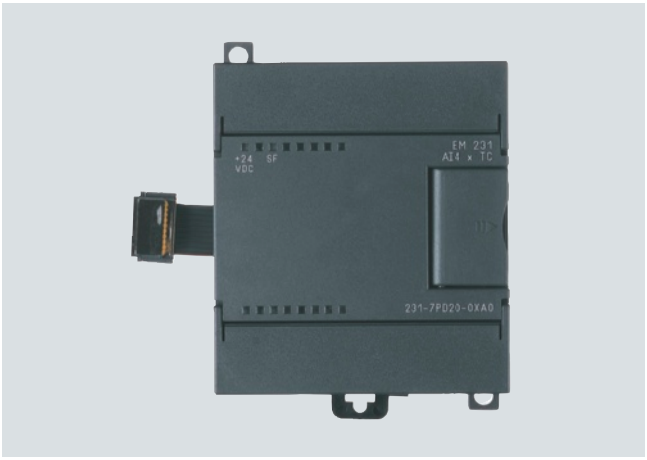
Ordering data

	Order No.
EM 231 analog input module	
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**
EM 232 analog output module	
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**
EM 235 analog input/output module	**6ES7 235-0KD22-0XA0**
for CPU 222/224/224 XP/226; 4 inputs, 1 output, ±10 V DC, 12 bit resolution	

	Order No.
Ground terminal	**6ES5 728-8MA11**
10 units	
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**

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Overview



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

Technical specifications

	6ES7 231-7PD22-0XA0	6ES7 231-7PF22-0XA0
Current consumption		
from load voltage L+ (without load), max.	60 mA	60 mA
from backplane bus 5 V DC, max.	87 mA	87 mA
Power losses		
Power loss, typ.	1.8 W	1.8 W
Connection method		
Plug-in 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
Voltage input		
• Permissible input voltage for voltage input (destruction limit), max.	30 V	30 V
Analog value creation		
Measurement principle	Sigma Delta	Sigma Delta
Integrations and conversion time/ resolution per channel		
• Resolution with overrange (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 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 (fl +/- 1%), fl = interference frequency		
• Common mode voltage, max.	120 V; AC	120 V; AC
• Common mode interference, min.	120 dB; at 120 V AC	120 dB; at 120 V AC
Galvanic isolation		
Galvanic isolation analog inputs		
• Galvanic isolation analog inputs	Yes	Yes
Dimensions and weight		
Dimensions		
• Width	71.2 mm	71.2 mm
• Height	80 mm	80 mm
• Depth	62 mm	62 mm
Weight		
• Weight, approx.	210 g	210 g

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EM 231 thermocouple module

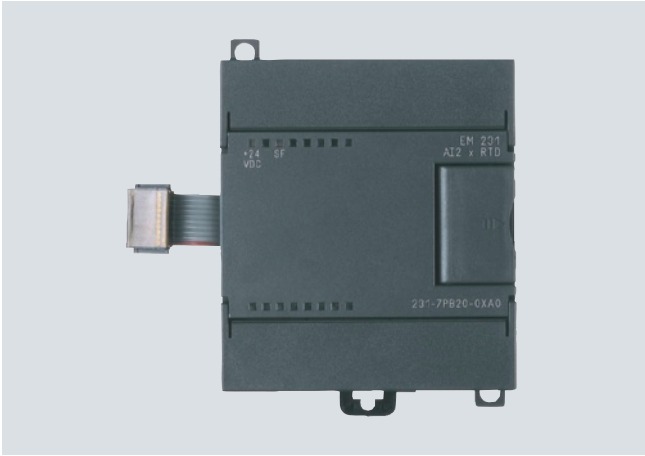
Ordering data	Order No.
EM 231 thermocouple module	
Inputs +/- 80 mV, resolution 15 bit + sign, thermocouples J, K, S, T, R, E, N	
4 inputs	**6ES7 231-7PD22-0XA0**
8 inputs	**6ES7 231-7PF22-0XA0**
Ground terminal	**6ES5 728-8MA11**
10 units	
Backplane bus expansion cable I	**6ES7 290-6AA20-0XA0**
for connecting two rows of modules with double-tier configuration, for CPU 222/224/224 XP/226	

	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**

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

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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

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 5 V DC, max.	87 mA	87 mA
Power losses		
Power loss, typ.	1.8 W; Sensor: 1 mW	1.8 W; Sensor: 1 mW
Connection method		
Plug-in 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
Input ranges (rated values), resistors		
• 0 to 150 Ohm	Yes	Yes
• 0 to 300 Ohm	Yes	Yes
• 0 to 600 Ohm	Yes	Yes
Voltage input		
• permissible input voltage 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)

	6ES7 231-7PB22-0XA0	6ES7 231-7PC22-0XA0
Analog value creation		
Measurement principle	Sigma Delta	Sigma Delta
Integrations and conversion time/ resolution per channel		
• Resolution with overrange (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 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		
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 interference, min.	120 dB; at 120 V AC	120 dB; at 120 V AC
Galvanic isolation		
Galvanic isolation analog inputs		
• Galvanic isolation analog inputs	Yes	Yes
Dimensions and weight		
Dimensions		
• Width	71.2 mm	71.2 mm
• Height	80 mm	80 mm
• Depth	62 mm	62 mm
Weight		
• Weight, approx.	210 g	210 g

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EM 231 RTD module

Ordering data	Order No.
EM 231 RTD module	
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 sensor, resistor 150/300/600 Ohm, resolution 15 bit + sign	**6ES7 231-7PC22-0XA0**
Ground terminal	**6ES5 728-8MA11**
10 units	
Backplane bus expansion cable I	**6ES7 290-6AA20-0XA0**
for connecting two rows of modules with double-tier configuration, for CPU 222/224/224 XP/226	

	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**

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

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Overview SIPLUS EM 231



- Analog inputs for SIPLUS S7-200

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS EM 231 analog input module for CPU 22x	**4 AI**
Order number	**6AG1 231-0HC22-2XB0**
Order No. based on	**6ES7 231-0HC22-0XA0**
Ambient temperature range	-25 ... +70 °C; -25 ... +55 °C (for applications with cUL approval)
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	Yes
Approvals	CE, cUL
Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA-S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

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Overview SIPLUS EM 232



- Analog outputs for SIPLUS S7-200

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS EM 232 analog output modules for CPU 22x	**2 AO**
Order number	**6AG1 232-0HB22-2XB0**
Order No. based on	**6ES7 232-0HB22-0XA0**
Ambient temperature range	-25 ... +70 °C; -25 ... +55 °C (for applications with cUL approval)
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	No
Approvals	CE, cUL
Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA-S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

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Overview SIPLUS EM 235



- Analog inputs and outputs for SIPLUS S7-200

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS EM 235 analog input/ output modules for CPU 22x	**4 AI/1 AO**
Order number	**6AG1 235-0KD22-2XB0**
Order No. based on	**6ES7 235-0KD22-0XA0**
Ambient temperature range	-25 ... +70 °C; -25 ... +55 °C (for applications with cUL approval)
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	No
Approvals	CE, cUL
Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

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SIPLUS EM 231, EM 232, EM 235

Ordering data		Order No.
SIPLUS EM 231 analog input module (extended temperature range and medial exposure) for CPU 222/224/224 XP/226; 4 inputs, 0-10 V, resolution 12 bit	H	**6AG1 231-0HC22-2XB0**
SIPLUS EM 232 analog output module (extended temperature range and medial exposure) for CPU 222/224/224 XP/226; 2 outputs, ± 10 V, resolution 12 bit	H	**6AG1 232-0HB22-2XB0**
SIPLUS EM 235 analog input/ output module (extended temperature range and medial exposure) for CPU 222/224/224 XP/226; 4 inputs, 1 output, ±10 V DC, resolution 12 bit	H	**6AG1 235-0KD22-2XB0**
Accessories		See SIMATIC S7-200 EM 231 analog output modules, page 3/46

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H

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Overview



- For the convenient recording of temperatures with great accuracy
- 31 common resistance temperature detectors can be used
- Can easily be retrofitted to existing plant

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS EM 231 RTD module for CPU 22x	**2 AI Thermo**	**2 AI Thermo**
Order number	**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 ... +55 °C (for applications with cUL approval)	
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions	
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	No	Yes
Approvals	CE, cUL	
Ambient conditions		
Relative humidity	5 ... 100 % Condensation permissible	
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)	
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]	
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]	
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K	

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

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SIPLUS EM 231 RTD module

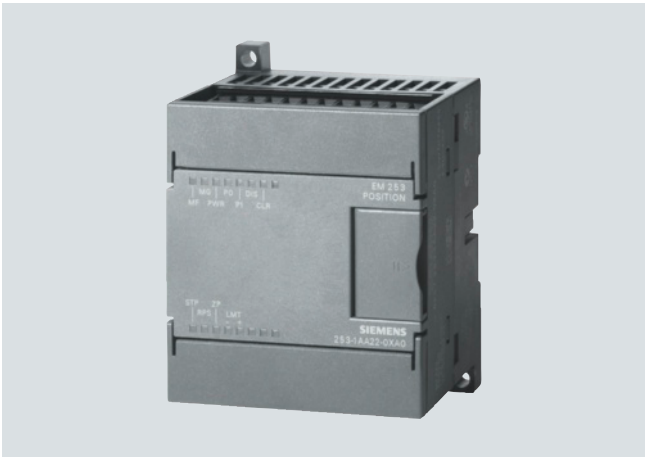
Ordering data		Order No.
SIPLUS EM 231 RTD module		
(extended temperature range and medial exposure)		
2 inputs for resistance temperature detector Pt100/200/500/1000/10000, Ni100/120/1000, Cu10; resistor 150/300/600 Ohm, resolution 15 bit + sign	H	**6AG1 231-7PB22-2XA0**
Conforms to EN 50155; 2 inputs for resistance temperature detectors Pt100/200/500/1000/10000, Ni100/120/1000, Cu10; resistors 150/300/600 Ohm, resolution 15 bit + sign	H	**6AG1 231-7PB22-2XY0**

Accessories	Order No.
	See SIMATIC S7-200 EM 231 RTD module, page 3/50

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H

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Overview



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

Technical specifications

	6ES7 253-1AA22-0XA0
Supply voltages	
Rated value	
• permissible range, lower limit (DC)	11 V
• permissible range, upper limit (DC)	30 V
Current consumption	
from backplane bus 5 V DC, max.	190 mA
from supply voltage L+, max.	300 mA; from 12 V DC, 130 mA from 24 V DC
Hardware configuration	
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- 5 V DC; ZP 1 V DC
• for signal "1"	STP, RPS, LMT+, LMT- 15 V DC; ZP 3 V DC
Input delay (for rated value of input voltage)	
• for standard inputs	
- parameterizable	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	Yes
- permissible quiescent current (2-wire BEROS), max.	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 Ohm
• Pulse frequency	200 kHz; (P0+, P0-, P1+, P1-, P0, P1)
• Cable length, max.	10 m; shielded; 1 m unshielded
Signal output III	
• Type	5 V DC(P0, P1, DIS, CLR)
• Output voltage	30 V DC
• Output current	50 mA; output delay (DIS, CLR) max. 30 µs
Galvanic isolation	
Galvanic isolation digital inputs	
• between the channels	Yes
• between the channels, in groups of	1 (STP, RPS, ZP), 2 (LMT-, LMT+)
Dimensions and weight	
Dimensions	
• Width	71.2 mm
• Height	80 mm
• Depth	62 mm
Weight	
• Weight, approx.	190 g

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EM 253 positioning module

Ordering data	Order No.
EM 253 positioning module For controlling stepper motors or servo drives	**6ES7 253-1AA22-0XA0**
Ground terminal 10 units	**6ES5 728-8MA11**
Backplane bus expansion cable I for connecting two rows of modules with double-tier configuration, for CPU 221/222/224/224 XP/226	**6ES7 290-6AA20-0XA0**

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

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

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Overview

SIWAREX MS is a versatile weighing module for all simple weighing and force measuring tasks. The compact module is easy to install in the SIMATIC S7-200 automation systems.

The data for the actual weight can be accessed directly in the SIMATIC CPU without the need for any additional interfaces.

Technical specifications

SIWAREX MS	
Integration in S7-200 automation systems	• CPU 222 (6ES7212-1*B23-0XB0) • CPU 224 (6ES7214-1*D23-0XB0) • CPU 224XP (6ES7214-2*D23-0XB0) • CPU226 (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	Gross, net
• Limit values	2 (min./max.)
• Zero setting function	Per command
• Tare function	Per command
• Tare specification	Per command
Load cells	Strain gages in 4-wire or 6-wire system
Load cell powering	
• Supply voltage U_s (rated value)	6 V DC typical
• Max. supply current	≤ 150 mA
• Permissible load impedance	
- R_{Lmin}	> 40 Ω
- R_{Lmax}	< 4010 Ω
	With SIWAREX IS Ex interface or SIWAREX Pi:
- R_{Lmin}	> 87 Ω
- R_{Lmax}	< 4010 Ω

SIWAREX MS	
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.
Power supply	
• Rated voltage - Max. current consumption	24 V DC 30 mA
• Rated voltage (from CPU) - Max. current consumption	5 V DC 140 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
Dimensions	71.2 x 80 x 62 mm

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SIWAREX MS

Ordering data	Order No.
SIWAREX MS I Weighing electronics for scales in SIMATIC S7-200 for applications without obligation of verification	**7MH4 930-0AA01**
SIWAREX MS manual available in a range of languages Free download on the Internet at: www.siemens.com/weighing-technology	
SIWAREX MS onfiguration package 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**
SIWAREX MS "Getting started" Sample software show beginners how to program the scales. Free download on the Internet at: www.siemens.com/weighing-technology	
SIWATOOL cable from SIWAREX M, FTA, FTC, MS with serial PC interface, for 9-pin PC interfaces (RS 232)	
• 2 m long	**7MH4 702-8CA**
• 5 m long	**7MH4 702-8CB**
Shield clamps for shield termination Pack of 10; 1 unit 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.: +49 6806/980-0 Fax: +49 6806/980-999 Internet: www.siebert.de Detailed information available from manufacturer.	
Accessories	
SIWAREX JB junction box, aluminium housing for connecting up to 4 load cells in parallel, and for connecting several junction boxes	**7MH4 710-1BA**
SIWAREX JB junction box, stainless steel housing for connecting up to 4 load cells in parallel	**7MH4 710-1EA**
Ex interface, type SIWAREX Pi With UL and FM approvals, but **without ATEX approval** for intrinsically safe connection of load cells, suitable for weighing modules SIWAREX U, CS, MS, FTA, FTC and M. 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	**7MH4 710-5BA**
• With short-circuit current < 137 mA DC	**7MH4 710-5CA**
Cable (optional)	
Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, orange sheath to connect SIWAREX U, 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 … +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 I for TTY (connect 2 pairs of conductors in parallel), for connection of a remote display	**7MH4 407-8BD0**

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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.

www.siemens.com/siplus - Support - Tools and Downloads!

Technical specifications

SIPLUS DCF 77 radio clock module	
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 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	H	**6AG1 057-1AA03-0AA0**

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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 communication 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 5 V DC, max.	80 mA; from expansion bus
Power losses	
Power loss, typ.	2.1 W
Communication functions	
Bus protocol/transmission protocol	PPI, Modbus
Interfaces	
Number of RS 485 interfaces	0
Connection method	
Telephone lines	RJ11 (4 cables, 6 contacts)
Modem	
Physics	Bell 103, Bell 212, V. 21, V. 22, V. 22 bis, V. 23c, V. 32, V. 32 to, V. 34 (preset)
Tone dialing	Yes
Pulse dialing	Yes
Dimensions and weight	
Dimensions	
• Width	71.2 mm
• Height	80 mm
• Depth	62 mm
Weight	
• Weight, approx.	190 g

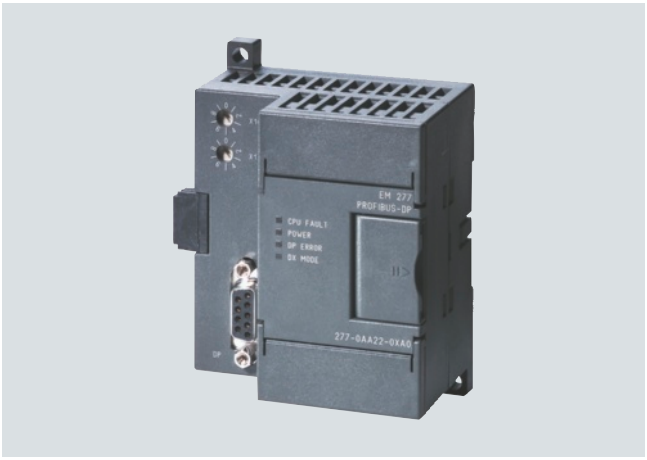
Ordering data

	Order No.
EM 241 modem I Analog modem for remote maintenance/diagnostics; CPU-CPU/PC communication, SMS/pager message transmission	**6ES7 241-1AA22-0XA0**
Grounding terminal 10 units	**6ES5 728-8MA11**
Front door set contains different cover flaps for CPU and EM; spare part	**6ES7 291-3AX20-0XA0**
S7-200 automation system, 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**

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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 5 V DC, max.	150 mA
from sensor current supply or external current supply (24 V DC), max.	180 mA; 30 to 180 mA
Power losses	
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
- number of which are reserved for OP communication	1
- of which reserved for PG communication	1
Interfaces	
Number of RS 485 interfaces	1
5 V DC	
• Output current, max.	90 mA
24 V DC	
• Voltage range	20.4 to 28.8 V
• Output current, max.	120 mA
• Current limiting	0.7 to 2.4 A
Connection method	
Plug-in I/O terminals	No
PROFIBUS DP	
Transmission rate, max.	12 Mbit/s; 9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 Kbit/s; 1 / 1.5 / 3 / 6 / 12 Mbit/s
Node addresses	0 to 99, adjustable
Cable length, max.	1 200 m; 100 to 1200 m, depending on transmission speed
Number of stations in network, max.	126; of which max. 99 EM 277
Number of stations per segment, max.	32
Automatic detection of transmission speed	Yes
Dimensions and weight	
Dimensions	
• Width	71.2 mm
• Height	80 mm
• Depth	62 mm
Weight	
• Weight, approx.	175 g

Ordering data

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

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CP 243-2

Overview



The CP 243-2 is the AS-Interface master for the SIMATIC S7-200 and has the following features:

- Connection of up to 62 AS-Interface slaves
- Integrated analog value transmission
- (Analog profiles 7.3 and 7.4)
- Supports all AS-Interface master functions according to the extended AS-Interface specification V2.1
- Indication of the operating state and readiness for operation of connected slaves by means of LEDs in the front plate
- Indication of faults (e.g. AS-Interface voltage fault, configuration fault) by means of LEDs in the front plate
- Compact enclosure in the design of the SIMATIC S7-200

The CP 243-2 is connected like an expansion module to the S7-200. It has:

- two screw connections for direct connection of the AS-Interface cable
- LEDs in the front plate for indicating the operating state and functional readiness of all connected and activated slaves
- two pushbuttons for indicating the status information of the slaves, for switching over the operating state and for adopting the existing ACTUAL configuration as the DESIRED configuration

The CP 243-2 supports all the specified functions of extended version 2.1 of AS-Interface specification.

In the process image of the S7-200 the CP 243-2 occupies one digital input byte (status byte), one digital output byte (control byte), as well as 8 analog input and 8 analog output words. The CP 243-2 thus occupies two (logic) slots. The operating mode of the CP 243-2 can be set with the status byte and the control byte using the user program. Depending on the operating mode the CP 243-2 saves either the digital or analog I/O data of the AS-Interface slaves or diagnostic values in the analog address area of the S7-200, or it enables master calls (e.g. re-addressing of the slaves).

All connected AS-Interface slaves are configured at the press of a button. No further configuration of the CP is required.

Ordering data

	Order No.
CP 243-2 communication processors For connection of the SIMATIC S7-200 to AS-Interface; corresponds to AS-Interface Specification V2.1; dimensions (W x H x D / mm): 71 x 80 x 62 (dimensions without fixing lugs)	**6GK7 243-2AX01-0XA0**

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Overview



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

- Connection of S7-200 to Industrial Ethernet
  - 1 x RJ45 interface for 10/100 Mbit/s full/half duplex connection with autosensing/autonegotiation and autocrossover function
- Communication services:
  - PG/OP communication
  - S7 communication
- 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, eight S7 connections + one 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
- 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 243-1EX01-0XE0
Product type designation	**CP 243-1**
Transmission rate	
Transmission rate at interface 1	10 … 100 Mbit/s
Interfaces	
Number of electrical connections	
• at interface 1 in accordance with Industrial Ethernet	1
• for power supply	1
Design of electrical connection	
• at interface 1 in accordance with Industrial Ethernet	RJ45 port
• for power supply	3-pin terminal strip
Supply voltage, current consumption, power loss	
Type of power supply	DC
Power supply	
• 1 from backplane bus	5 V
• External	24 V
Relative positive tolerance at 24 V DC	20 %
Relative negative tolerance at 24 V DC	15 %
Current consumed	
• from backplane bus at 5 V DC, typical	0.06 A
• from external power supply with 24 V DC	
- Typical	0.053 A
- Maximum	0.06 A
Effective power loss	1.5 W
Permitted ambient conditions	
Ambient temperature	
• With vertical installation during operating phase	0 … 45 °C
• With horizontal installation during operating phase	0 … 55 °C
• During storage	-40 … +70 °C
• During transport	-40 … +70 °C
Relative humidity at 25 °C without condensation during operating phase, maximum	95 %
IP degree of protection	IP 20
Design, dimensions and weights	
Module format	S7-200 compact module, double-width
Width	71.2 mm
Height	80 mm
Depth	62 mm
Net weight	0.15 kg
Type of mounting	
• 35 mm DIN rail mounting	-
• Wall mounting	-

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Technical specifications (continued)

Order No.	6GK7 243-1EX01-0XE0
Product type designation	**CP 243-1**
Product properties, functions, components General	
Maximum number of modules per CPU	1
Performance data	
Performance data S7 communication	
Maximum number of possible connections for S7 communication	8
Number of possible connections for S7 communication - Note	-
Performance data IT functions	
Number of possible connections	
• as client with FTP, maximum	1
• as server with HTTP, maximum	4
• as e-mail client, maximum	1
Number of e-mails with 1024 characters of e-mail client, maximum	32
Number of access privileges of access protection function	8
Storage capacity of user memory as FLASH memory file system	8 Mibyte
Number of possible write cycles of flash memory cells	100000

Order No.	6GK7 243-1EX01-0XE0
Product type designation	**CP 243-1**
Product functions Management, configuration, programming	
Product function: MIB support	No
Protocol is supported SNMP v1	No
Configuration software required	STEP 7-Micro/WIN V4.0 SP8 and higher
Product functions Diagnostics	
Product function: Web-based diagnostics	Yes
Product functions Switch	
Product feature: Switch	No

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Ordering data		Order No.
CP 243-1 communication processor		**6GK7 243-1EX01-0XE0**
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		
SOFTNET S7 for Industrial Ethernet		
Software for S7 and open communication, including OPC server, PG/OP communication and NCM PC, runtime software, software and electronic manual on CD-ROM, license key on a USB stick, Class A		
SOFTNET V8.0 for Industrial Ethernet		
for 32-bit Windows 7 Professional/ Ultimate; German/English		
up to 64 connections		
• Single license for 1 installation		**6GK1 704-1CW80-3AA0**
SOFTNET Edition 2008 for Industrial Ethernet		
for 32-bit Windows XP Professional SP2/3; Windows 2003 Server R2, SP2; Windows Vista Business/Ultimate SP1; Windows 2008 Server; German/English		
up to 64 connections		
• Single license for 1 installation		**6GK1 704-1CW71-3AA0**
• 1-year Software Update Service, with automatic extension; requirement: Current software version		**6GK1 704-1CW00-3AL0**
• Upgrade from Edition 2006 to V8.0		**6GK1 704-1CW00-3AE0**
• Upgrade from V6.0, V6.1, V6.2 or V6.3 to V8.0		**6GK1 704-1CW00-3AE1**
SOFTNET S7 Lean Edition V8 for Industrial Ethernet		
up to 8 connections		
• Single license for 1 installation		**6GK1 704-1LW80-3AA0**
SOFTNET S7 Lean Edition 2008 for Industrial Ethernet		
up to 8 connections		
• Single license for 1 installation		**6GK1 704-1LW71-3AA0**
• 1-year Software Update Service, with automatic extension; requirement: Current software version		**6GK1 704-1LW00-3AL0**
• Upgrade from Edition 2006 to V8.0		**6GK1 704-1LW00-3AE0**
• Upgrade from V6.0, V6.1, V6.2 or V6.3 to V8.0		**6GK1 704-1LW00-3AE1**
STEP 7-Micro/WIN V4 programming software		
Target system: All CPUs of the SIMATIC S7-200 Requirements: Windows 2000/XP on PG or PC, Type of delivery: German, English, French, Spanish, Italian, Chinese; with online documentation		
• Single license	J	**6ES7 810-2CC03-0YX0**
• Upgrade Single license [1]	J	**6ES7 810-2CC03-0YX3**
IE TP Cord RJ45/RJ45		
TP cable 4 x 2 with 2 RJ45 connectors		
• 0.5 m		**6XV1 870-3QE50**
• 1 m		**6XV1 870-3QH10**
• 2 m		**6XV1 870-3QH20**
• 6 m		**6XV1 870-3QH60**
SCALANCE X005	I	**6GK5 005-0BA00-1AA3**
Industrial Ethernet Switch for 10/100 Mbit/s; with five 10/100 Mbit/s RJ45 ports for configuring small star and line structures		

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

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MD720-3 GSM/GPRS 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 tunnelled GPRS connection with SIMATIC S7
- Use with SINAUT ST7: Data transmission via CSD, GPRS, transmission of SMS
- AT command interface: for remote maintenance via CSD with TS adapter II or for transmission of SMS

*) CSD – **C**ircuit **S**witched **D**ata (data transmission via GSM dialup connection)

Technical specifications

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
Supply voltage	12 … 30 V DC
Power loss	typ. 5 W max. 6.2 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 www.siemens.com/simatic-net/ik-info

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Ordering data		Order No.
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; manual on CD-ROM in German, English, Chinese, Russian		**6NH9 720-3AA00**
Accessories		
Telecontrol Server Basic Software for 8 to 5000 stations; Single License for one installation; OPC server for GPRS communication with SIMATICS7-1200 and SIMATIC S7-200; connection management to 8 remote GPRS stations; routing for connections between S7 GPRS stations; English and German user interface; for Windows 7 Professional, Windows 7 Enterprise, Windows 7 Ultimate, and Windows Server 2008 (32-bit); documentation on CD-ROM in German and English		
• **Telecontrol Server Basic 8** Connection management for eight SIMATIC S7-1200 or S7-200 stations	J	**6NH9 910-0AA20-0AA0**
• **Telecontrol Server Basic 64** Connection management for 64 SIMATIC S7-1200 or S7-200 stations	J	**6NH9 910-0AA20-0AB0**
• **Telecontrol Server Basic 256** Connection management for 256 SIMATIC S7-1200 or S7-200 stations	J	**6NH9 910-0AA20-0AC0**
• **Telecontrol Server Basic 1000** Connection management for 1000 SIMATIC S7-1200 or S7-200 stations	J	**6NH9 910-0AA20-0AD0**
• **Telecontrol Server Basic 5000** Connection management for 5000 SIMATIC S7-1200 or S7-200 stations	J	**6NH9 910-0AA20-0AE0**

	Order No.
ANT794-4MR antenna Quad band antenna, omnidirectional with 5 m cable	**6NH9 860-1AA00**
ANT794-3M antenna Tri-band flat antenna, in enclosure with 1.2 m cable	**6NH9 870-1AA00**
SIMATIC S7-200 PPI modem cable For connecting the S7-200 to the GSM/GPRS modem SINAUT MD720-3	**6NH9 701-0AD**
Connecting cable For connecting a TIM3V-IE/TIM4 (RS232) with the GSM modem MD720-3 (access to GSM network). Also suitable for third-party modems or radio equipment with RS232 standard; cable length 2.5 m.	**6NH7 701-5AN**
SITOP compact 24 V/ 0.6 A 1-phase power supply with wide-range input 85 … 264 V AC/110 … 300 V DC, stabilized output voltage 24 V, rated output current value 0.6 A, slim design	**6EP1 331-5BA00**

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MD741-1 EGPRS router

Overview



- EGPRS (GPRS with Edge) and GPRS router for wireless IP communication from Ethernet-based automation devices over GSM mobile radio networks
- Four times the transmission speed by means of EGPRS
- Integrated security functions with firewall and VPN (IPsec)

Technical specifications

	MD741-1
Transfer rate	
• GPRS/EGPRS Multislot Class 12	
- Up to 2 uplinks	GPRS: 13.4 … 27 Kbit/s upload EGPRS: 53.5 … 108 Kbit/s upload (modem to Internet); net rate approx. 30 % lower
- Up to 4 downlinks	EGPRS: 40 … 54 Kbit/s download gross EGPRS: 160 … 208 Kbit/s download gross (Internet to modem); net rate approx. 30 % lower
Interfaces	
• Communication connection, electrical	RJ45 socket; (10/100 Mbit/s; TP; auto-crossover)
• Antenna connection	1 x SMA antenna socket (50 Ohm)
Frequency ranges	Quad band: 850, 900, 1800, 1900 MHz
Transmitted output power	2 W at 850, 900 MHz; 1 W at 1800, 1900 MHz
EGPRS connection set-up	Automatically when supply voltage is switched on; fallback to GPRS if EGPRS is not available
Virtual Private Network (VPN)	
• Protocol	IPsec (tunnel and transport mode)
• Encryption mechanisms	IPsec 3DES with 168 bit; IPsec AES with 128, 192 and 256 bit
• Packet authentication	MD5; SHA-1
• Internet Key Exchange (IKE)	with Main and Quick Mode
• Authentication	Pre-Shared Key (PSK); X.509v3 certificates

	MD741-1
Firewall	Stateful Packet Inspection; Anti-Spoofing
Router functions	NAT-Traversel; NAT (IP Masquerading); Port Forwarding; Dead Peer Detection (DPD); DynDNS; DNS Cache; NTP; Remote Logging
Current consumption	
Send mode	
• For existing EGPRS connection with data exchange	182 mA at 24 V (I_{Burst} 550 mA); 4.62 ms burst repetition frequency
Supply voltage	24 V DC (12 V ... 30 V)
Power loss	typ. 5 W
Permissible ambient conditions	
• Operating temperature	-20 °C … +60 °C
• Transport/storage temperature	-40 °C … +70 °C
• Relative humidity	max. 95% at +25 °C, no dewing
Design	
• Dimensions (W x H x D) in mm	45 x 114 x 99
• Weight	approx. 280 g
• Assembly	Standard rail
Degree of protection	IP20
Configuration	Over Internet browser
National approvals	Current approvals can be found in the Internet at www.siemens.com/simatic-net/ik-info

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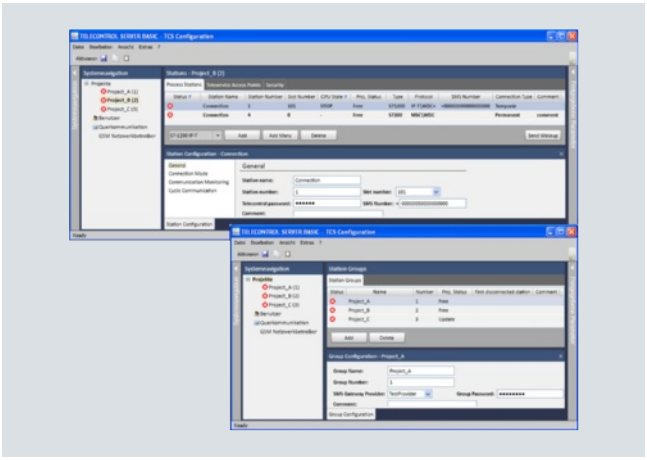
Ordering data		Order No.
MD741-1 EGPRS router For wireless IP communication by industrial Ethernet-based programmable controllers via GSM mobile radio networks; integrated firewall and VPN router (IPsec); quad band GSM; EGPRS Multislot Class 12		**6NH9 741-1AA00**
Accessories		
IE FC RJ45 Plug 180 RJ45 plug-in connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface		
• 1 pack = 1 unit		**6GK1 901-1BB10-2AA0**
• 1 pack = 10 units		**6GK1 901-1BB10-2AB0**
• 1 pack = 50 units		**6GK1 901-1BB10-2AE0**
ANT794-4MR antenna Quad band antenna for MD720-3 and MD741-1, omnidirectional with 5 m cable		**6NH9 860-1AA00**
ANT794-3M antenna Tri-band flat antenna, in enclosure with 1.2 m cable		**6NH9 870-1AA00**
SCALANCE S Industrial Security Modules For protection of programmable controllers and automation networks, and for safeguarding of industrial communication; configuring tool and electronic manual on CD-ROM; German, English, French, Italian, Spanish		
• **SCALANCE S612** uses the Stateful Inspection Firewall to protect network segments against unauthorized access; protects up to 32 devices up to 64 VPN tunnels simultaneously	B	**6GK5 612-0BA00-2AA3**
• **SCALANCE S613** uses Stateful Inspection Firewall to protect network segments against unauthorized access; protects up to 64 devices, up to 128 VPN tunnels simultaneously; enhanced temperature range (-20 ... +70 °C)	B	**6GK5 613-0BA00-2AA3**
IE TP Cord RJ45/RJ45 TP cable 4 x 2 with 2 RJ45 connectors		
• 0.5 m		**6XV1 870-3QE50**
• 1 m		**6XV1 870-3QH10**
• 2 m		**6XV1 870-3QH20**
• 6 m		**6XV1 870-3QH60**
• 10 m		**6XV1 870-3QN10**

B: Subject to export regulations AL: 5A002A1A2 and ECCN: 5A002ENCU

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Telecontrol Server Basic

Overview



- Software package for the PC, comprising:
  - OPC server and connection manager for telecontrol and teleservice tasks (diagnostics with STEP 7 for the S7-1200)
  - OPC configuring software for the S7-1200 and S7-200
  - PLC block library for the S7-200
- GPRS operation
  - of the SIMATIC S7-1200 with CP 1242-7 via dynamic IP addresses with a standard mobile phone flat-rate contract
  - of the SIMATIC S7-200 with SINAUT modem MD720-3 via dynamic IP addresses with a standard mobile phone flat-rate contract
  - of the S7-1200 with CP 1242-7 via fixed IP addresses
- Connection of up to 5000 telecontrol stations to the control center via the OPC interface
- Operation and diagnostics of S7-1200 and S7-200 stations on an OPC server with different STEP 7 projects and separate users with user administration
- Integral teleservice gateway for diagnostics of S7-1200 stations via the CP 1242-7 with STEP 7 via the Internet, also with dynamic IP addresses. This works on every PC with STEP 7 and standard Internet access without parameterizing firewalls or routers.
- GPRS communication between S7-1200 or S7-200 stations by means of routing function (also when using dynamic IP addresses)
- Encrypted transmission for protection against data manipulation and tapping
- Import of SINAUT MICRO SC projects

Technical specifications

	Telecontrol Server Basic
Supported controllers	S7-1200 with CP1242-7 S7-200/S7-1200 with MD720-3 modem (block library included in the scope of supply)
Number of connections (stations) that can be operated (depending on the order version)	8, 64, 256, 1000, or 5000 connections
Number of STEP 7 projects that can be operated in parallel	2000 projects (structured representation, separation of the projects via programmable user rights)
Number of STEP 7 Teleservice connections that can be operated in parallel	5 connections per project (separation of the projects via programmable user rights)
Interfaces to the OPC Client	• DCOM protocol • OPC interface "Data Access Interface 3.0" • Synchronous and asynchronous reading of variables
Interfaces and functions between the OPC server and SIMATIC S7	• Writing of variables in the SIMATIC S7 in the case of value 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 S7-1200 stations or between S7-200 stations • Permanent GPRS connection; the tunnel is established from the GPRS modem • Temporary GPRS connection (as required); the tunnel is established from the GPRS modem and can be initiated by a text message sent automatically by the OPC server ("wake-up"). Manual "wake-up" using a mobile phone is also possible. • Via Internet access as server with public IP address (recommendation: fixed public Internet address)
Operating systems	Microsoft Windows 7 Professional Microsoft Windows 7 Enterprise Microsoft Windows 7 Ultimate Microsoft Windows Server 2008 (32-bit)
Diagnostics	Station group monitoring Station monitoring Connection monitoring STEP 7 Teleservice across Internet and router boundaries – S7-1200 only
Configuration	Integral configuration tool Multi-project-capable Multi-user-capable with user management Configurations can be expanded at runtime

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Ordering data		Order No.
Telecontrol Server Basic		
Software for 8 to 5000 stations; Single License for one installation; OPC server for GPRS communication with SIMATIC S7-1200 and SIMATIC S7-200; connection management to remote GPRS stations; routing for connections between S7 GPRS stations; German and English operator interface; for Windows 7 Professional, Windows 7 Enterprise, Windows 7 Ultimate and Windows Server 2008 (32-bit); documentation on CD-ROM, German and English		
• **Telecontrol Server Basic 8** Connection management for eight SIMATIC S7-1200 or S7-200 stations	J	**6NH9 910-0AA20-0AA0**
• **Telecontrol Server Basic 64** Connection management for 64 SIMATIC S7-1200 or S7-200 stations	J	**6NH9 910-0AA20-0AB0**
• **Telecontrol Server Basic 256** Connection management for 256 SIMATIC S7-1200 or S7-200 stations	J	**6NH9 910-0AA20-0AC0**
• **Telecontrol Server Basic 1000** Connection management for 1000 SIMATIC S7-1200 or S7-200 stations	J	**6NH9 910-0AA20-0AD0**
• **Telecontrol Server Basic 5000** Connection management for 5000 SIMATIC S7-1200 or S7-200 stations	J	**6NH9 910-0AA20-0AE0**

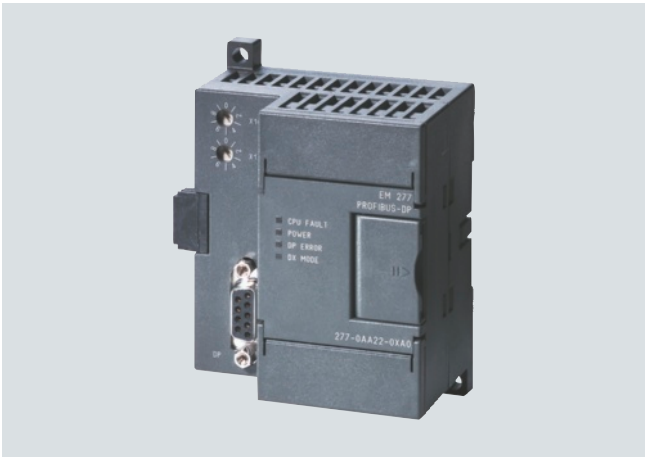
	Order No.
Accessories	
CP 1242-7 communication processor Communication processor for connecting SIMATIC S7-1200 to GSM/GPRS mobile wireless network	**6GK7 242-7KX30-0XE0**
MD720-3 GSM/GPRS modem GPRS modem for IP-based data transmission over GSM networks, quad band, AT command interface, automatic establishment 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**
ANT794-4MR antenna Quad band antenna, omnidirectional with 5 m cable	**6NH9 860-1AA00**
ANT794-3M antenna Triband flat antenna, in enclosure with 1.2 m cable	**6NH9 870-1AA00**

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

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SIPLUS PROFIBUS DP EM 277

Overview



- For connecting the S7-22x to PROFIBUS DP (as slave) and MPI
- Simultaneous operation as MPI slave and DP slave possible
- Max. transmission rate 12 Mbit/s
- Can be used with CPU version 6ES7 2xx-xxx21-xxxx and higher

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS EM 277 PROFIBUS DP module	
Order number	**6AG1 277-0AA22-2XA0**
Order No. based on	**6ES7 277-0AA22-0XA0**
Ambient temperature range	-25 ... +70 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Ambient conditions	Suitable for exceptional exposure to media (e.g. sulfur chlorine atmosphere).
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	Yes
Technical data	The technical data of the standard product applies except for the ambient conditions.
Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data	**Order No.**
SIPLUS EM 277 input module for PROFIBUS DP (extended temperature range and medial exposure) For CPU 222/224/224 XP/226; for connecting to PROFIBUS DP (slave) and MPI	**6AG1 277-0AA22-0XA0**

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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)

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS MD702-3 GSM / GPRS modem	
Order No.	**6AG1 720-3AA00-7AA0**
Order No. based on	**6NH9 720-3AA00**
Ambient temperature range	-25 ... +70 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions.
Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) SA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

	Order No.
SIPLUS MD720-3 GSM/GPRS modem (extended temperature range and medial exposure) GPRS modem for IP-based data transmission over GSM networks, quad-band, AT command interface, automatic establishment of GPRS connection, switchable to CSD operation, RS232; manual on CD-ROM in German, English, Chinese, Russian	**6AG1 720-3AA00-7AA0**
Accessories	see GSM/GPRS modem MD720-3, page 3/69

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SIPLUS MD741-1 EGPRS routers

Overview



- EGPRS (Edge GPRS) and GPRS router for wireless IP communication of Industrial Ethernet-based automation devices over GSM mobile networks
- EGPRS offers four times the transfer speed
- Integrated security features with firewall and VPN (IPsec)

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS MD741-1 EGPRS ROUTER	
Order number	**6AG1 741-1AA00-2AA0**
Order No. based on	**6NH9 741-1AA00**
Ambient temperature range	-25 ... +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions.
Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1] [2]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data	**Order No.**
SIPLUS MD741-1 EGPRS router (extended temperature range and medial exposure) For wireless IP communication by industrial Ethernet-based programmable controllers via GSM mobile radio networks; integrated firewall and VPN router (IPsec); quad band GSM; EGPRS Multislot Class 12	**6AG1 741-1AA00-2AA0**
Accessories	see EGPRS router MD741-1, page 3/71

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Overview



Optimally matched in design and functionality to the SIMATIC S7-200 micro PLC; flat design, particularly suitable for low cabinet depths.

Technical specifications

Power supplies, type	**3.5 A**
Order No.	**6EP1 332-1SH31**[1]
Input	1-phase AC
Rated voltage $U_{in\ rated}$	**120/230 V AC** Set via wire jumper
Voltage range	93 ... 132 V/187 ... 264 V
Overvoltage strength	2.3 x $U_{in\ rated}$, 1.3 ms
Mains buffering at $I_{out\ rated}$	> 20 ms at U_{in} = 187 V
Rated line frequency; rated line frequency range	50/60 Hz, 47 ... 63 Hz
Rated current $I_{in\ rated}$	1.65/0.95 A
Switch-on current limitation (+25 °C)	< 33 A, < 3 ms (U_{in} = 230 V)
I^2t	< 1.0 A^2s
Built-in incoming fuse	T 2.5 A/250 V (not accessible)
Recommended miniature circuit breaker (IEC 898) in the mains power input	Two-pole miniature circuit breaker, 10 A or higher, Characteristic C or 6 A or higher, Characteristic D
Output	Controlled, isolated DC voltage
Rated voltage $U_{out\ rated}$	**24 V DC**
Total tolerance	±5% (typ. ±2%)
• Static line compensation	Approx. ±0.1%
• Static load compensation	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 indicator	-
On/Off behavior	No overshoot of U_{out} (soft start)
Startup delay/voltage rise	< 1 s/typ. 80 ms
Rated current $I_{out\ rated}$	**3.5 A**

Power supplies, type	**3.5 A**
Order No.	**6EP1 332-1SH31**[1]
Current range	
• Up to +60°C	0 ... 3.5 A
• Derating	-
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 $U_{out\ rated}$, $I_{out\ rated}$	Approx. 84%
Power loss at $U_{out\ rated}$, $I_{out\ rated}$	Approx. 16 W
Closed-loop control	
Dyn. line compensation ($U_{in\ rated}$ ±15%)	Typ. ±0.3% U_{out}
Dynamic load compensation (I_{out}: 50/100/50 %)	Typ. ±3% U_{out}
Load step settling time	
• 50 to 100%	< 5 ms
• 100 to 50 %	< 5 ms
Protection and monitoring	
Output overvoltage protection	Yes, according to EN 60950
Current limitation	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	-

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The S7-200 version

Technical specifications (continued)

Power supplies, type	3.5 A
Order No.	**6EP1 332-1SH31[1)]**
Safety	
Primary/secondary isolation	Yes, safety extra low output voltage U_{out} according to EN 60950-1
Safety class	Class I
Leakage current	< 3.5 mA
Safety test	Yes
CE marking	Yes
UL/cUL (CSA) approval	cULus-listed (UL 508, CSA C22.2 No. 142), File E143289
Protection against explosion	-
FM approval	-
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 and storage temperature range	-40 ... +85°C
Humidity class	Climate class 3K3 according to EN 60721, no condensation
Mechanics	
Connections	
• Supply input L, N, PE	One screw terminal each for 0.5 ... 1 mm^2 solid/finely stranded
• 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
Mounting	Can be snapped onto standard mounting rail EN 60715 35x7.5/15, wall mounting
Accessories	Mounting bracket (6EP1 971-1AA1)

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

Ordering data

		Order No.
SIPLUS S7-200 PS203 -25 … +70°C with conformal coating based on 6EP1332-1SH31 S7-200 style, stabilized power supply Input: 120/230 V AC Output: 24 V DC/3.5 A S7-200 design	H	**6AG1203-1SH31-2AA0**
SITOP power 3.5 Universal Line stabilized power supply Input: 120/230 V AC, Output: 24 V DC/3.5 A S7-200 design		**6EP1332-1SH31**
Accessories		
SITOP power mounting bracket 90 degree 35 mm DIN rail, M5 fixing screws, for Special Line flat		**6EP1971-1AA01**

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H

More information

In addition to various power supply product lines, the perfectly coordinated complete SITOP range offers a unique range of add-on modules with which the 24 V power supply can be additionally protected against interference on the primary and secondary side – right up to all-round protection:

- Redundancy module for setting up a redundant power supply
- Uninterruptible 24 V power supplies with batteries or maintenance-free capacitors for continued operation in the event of a power failure
- Selectivity modules for electronic protection of 24 V branches from overload and short-circuit

You can find more information in Catalog KT 10.1 and in the Internet at
www.siemens.com/sitop

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SIPLUS S7-200 PS 203

Overview



- Design and functionality of the power supply are optimally adapted to the SIPLUS S7-200 micro PLC
- Slim design
- Particularly suitable for low cabinet depths

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS S7-200 PS 203	
Order number	**6AG1 203-1SH31-2AA0**
Order No. based on	**6EP1 332-1SH31**
Conformal coating	Coating of the printed circuit boards and the electronic components
Ambient temperature range	-25 ... +70 °C
Technical data	The technical data of the standard product applies except for the ambient conditions.
Ambient conditions	
Relative humidity	5 ... 100%, condensation allowed
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here: www.siemens.com/siplus-extreme

Ordering data		**Order No.**
SIPLUS S7-200 PS 203 stabilized load current supply (extended temperature range and medial exposure) 120/230 V AC, 24 V DC/3.5 A	H	**6AG1 203-1SH31-2AA0**
Accessories		See SIMATIC S7-200 power supplies, page 3/78

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H

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TD 200 text display

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 a 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

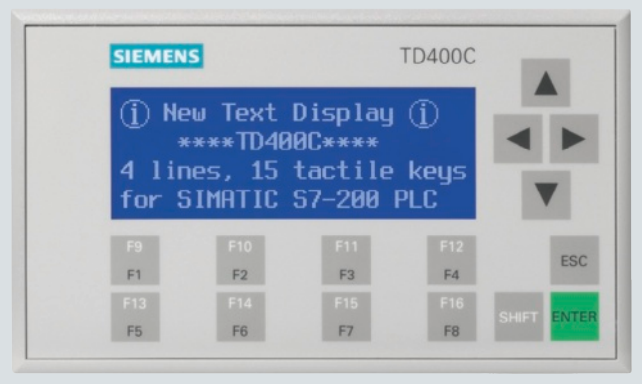
	6ES7 272-0AA30-0YA1
Product type designation	TD 200 text display
Power supply	
Input voltage	
• Rated value	24 V; Power supplied over the S7-200 communications interface or optional external power supply unit; the CPU sensor power supply (24 V DC) is not subjected to load
Input current	
• Rated value at 24 V DC	120 mA
MPI	
Transmission speed (PPI), max.	187.5 kbit/s
1st interface	
Physics	RS 485
Functionality	
• PPI	Yes
PPI	
• Number of nodes, max.	126; S7-200, OP, TP, TBP, PG/PC
Operator control and monitoring	
Display	
• Design of display	LCD backlit
Operating	
• Number of lines	2
• Number of characters per line	20; Characters/line: ASCII, cyrillic; 10 characters/line: Chinese
• Character 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	
IP65	Yes; at front
Dimensions	
Cabinet/switchboard strength	0.3 mm; 0.3 to 4 mm
Dimensions and weight	
Dimensions	
• Width	148 mm
• Height	76 mm
• Depth	27 mm
• Mounting cutout, width	138 mm
• Mounting cutout, height	68 mm
Weight	
• Weight, approx.	250 g

Ordering data

	Order No.
TD 200 text display	
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 200C or TD 400C to S7-200	**6ES7 901-3EB10-0XA0**
Accessories	
Accessories for supplementary ordering	See Catalog ST 80/ST PC

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Overview



- More screen space 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
Product type designation	Text Display TD 400C
Supply voltage	
Supply voltage	24 V DC
permissible range	DC
Memory	
Usable memory for user data	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
Backlighting	
• MTBF backlighting (at 25 °C)	about 20,000 hours
Operating mode	
Control 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)
Functionality under WinCC flexible	
Security	
• Number of user groups	1
Dimensions and weight	
Weight	
• Weight	0.33 kg

Ordering data

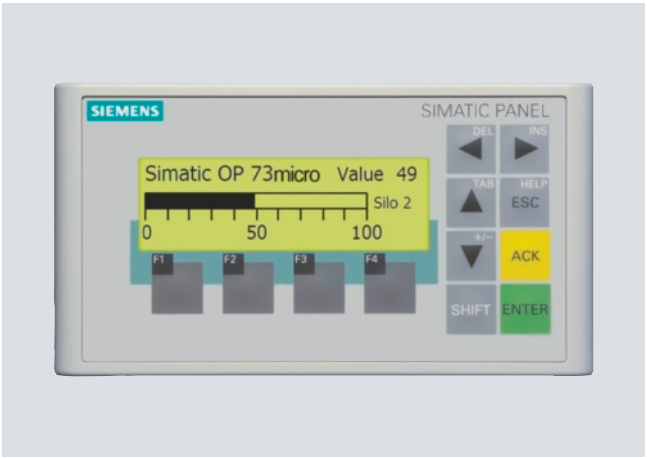
		Order No.
TD 400C text display with customized operator interface on the device front; for connecting to SIMATIC S7-200; can be used from STEP 7-Micro/ WIN V4 SP6, incl. connecting cable	I	**6AV6 640-0AA00-0AX1**
Promotion package Consisting of: • TD 400C • SIMATIC S7-200 • SIMATIC STEP 7 Micro/WIN V4.0 • Simulator module • Memory module • PPI cable • CD-ROM with documentation • TANOS Box	J	**6ES7 298-1AA20-0YA3**
Connecting cables for connecting TD 100C/TD 200C or TD 400C to S7-200		**6ES7 901-3EB10-0XA0**
Blank foils for printing customized keyboard layouts; 2 perforated films per sheet; 10 sheets per pack		**6AV6 671-0AP00-0AX0**
Accessories		
Accessories for supplementary ordering		See Catalog ST 80/ST PC

I: Subject to export regulations AL: N and ECCN: EAR99H
J: Subject to export regulations AL: N and ECCN: EAR99S

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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
Product type designation	OP 73micro
Supply voltage	
Supply voltage	24 V DC
Permissible range	+20.4 V to +28.8 V DC
Memory	
Type	Flash
Usable memory for user data	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
Backlighting	
• MTBF backlighting (at 25 °C)	about 100,000 hours
Operating mode	
Control elements	Membrane keyboard
Function keys, programmable	4 function keys
Connection for mouse/keyboard/ barcode reader	- / - / -
Touch operation	
• Touch screen	No
• System keys	8
• Numeric/alphabetical input	Yes / Yes
Ambient conditions	
Mounting position	vertical
Maximum permissible angle of inclination without external ventilation	+/- 80 °
Max. relative humidity	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
With alarm logging system (incl. buffer and acknowledgment)	
• Number of messages	250
• Bit messages	Yes
• Analog messages	Yes
• Message buffer	Ring buffer (n x 100 entries)
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

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Technical specifications (continued)

	6AV6 640-0BA11-0AX0
Data carrier 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
• Character sets	WinCC flexible Standard, symbol languages
Transfer (upload/download)	
• Transfer of configuration	serial

	6AV6 640-0BA11-0AX0
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)	138 mm x 68 mm / 28.5 mm device depth
Dimensions and weight	
Weight	
• Weight	0.25 kg

Ordering data

	Order No.
SIMATIC OP 73micro	**6AV6 640-0BA11-0AX0**
Operator panel for connection to the SIMATIC S7-200, with 3" display, monochrome incl. mounting accessories	
OP 73micro starter package C	**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)	
OP 73micro/TP 177micro operating instructions	
• 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**

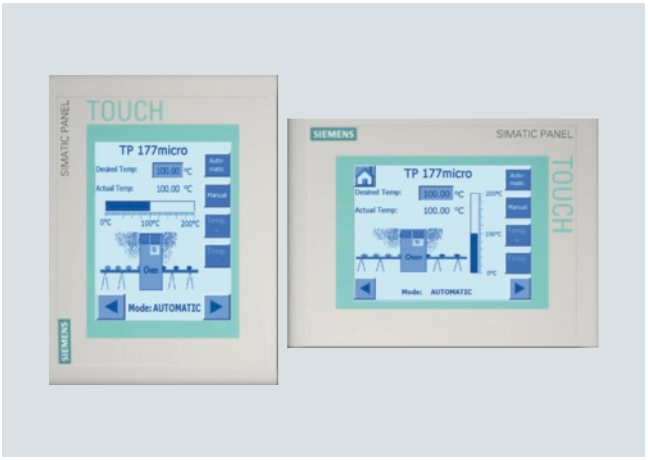
	Order No.
WinCC flexible Micro user manual	
• German	**6AV6 691-1AA01-3AA0**
• English	**6AV6 691-1AA01-3AB0**
• French	**6AV6 691-1AA01-3AC0**
• Italian	**6AV6 691-1AA01-3AD0**
• Spanish	**6AV6 691-1AA01-3AE0**
SIMATIC HMI manual collection J	**6AV6 691-1SA01-0AX0**
Electronic documentation, on DVD	
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/ST PC

C: Subject to export regulations AL: N and ECCN: 5D002ENCU
J: Subject to export regulations AL: N and ECCN: EAR99S

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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
Product type designation	TP 177micro
Supply voltage	
Supply voltage	24 V DC
Permissible range	+20.4 V to +28.8 V DC
Rated current	0.24 A
Memory	
Type	Flash
Usable memory for user data	256 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, 4 Blue mode, 4 levels
Size	5.7"
Resolution (WxH in pixel)	320 x 240
Backlighting	
• MTBF backlighting (at 25 °C)	about 50,000 hours
Operating mode	
Control elements	Touch screen
Function keys, programmable	None
Touch operation	
• Touch screen	analog, resistive
• System keys	0
• Numeric/alphabetical input	Yes / Yes
Ambient conditions	
Mounting position	vertical
maximum permissible angle of inclination without external ventilation	+/- 35 °
max. relative humidity	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, 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
With alarm logging system (incl. buffer and acknowledgment)	
• 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
Image elements	
• Text objects	500 text elements
• Graphics object	Bit maps, icons, icon (full-screen), vector graphics
• dynamic objects	Diagrams, bar graphs

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Technical specifications (continued)

	6AV6 640-0CA11-0AX1
Lists	
• Text lists	150
• Graphics list	100
• Libraries	Yes
Security	
• Number of user groups	1
• Passwords exportable	Yes
• Number of users	1
Data carrier 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
• Character sets	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)	198 mm x 142 mm / 45 mm device depth
Dimensions and weight	
Weight	
• Weight	0.75 kg

Ordering data

		Order No.
SIMATIC TP 177micro	I	**6AV6 640-0CA11-0AX1**
Touch Panel for connection to the SIMATIC S7-200, 5.7" STN display		
TP 177micro starter package	C	**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)		
OP 73micro, TP 177micro operating instructions		
• 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	J	**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/ST PC

C: Subject to export regulations AL: N and ECCN: 5D002ENCU
I: Subject to export regulations AL: N and ECCN: EAR99H
J: Subject to export regulations AL: N and ECCN: EAR99S

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SIPLUS S7-200 TD 200

Overview



- The user-friendly text display for the S7-200
- For operation and monitoring: display of message texts, interventions in the control program, setting of inputs and outputs
- Direct connection to CPU interface via included cable, or integration into network (also via EM 277)
- No separate power supply required
- No separate configuration software required
- Addressing and contrast adjustment via provided menu

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS S7-200 TD 200	
Order number	**6AG1 272-0AA30-2YA1**
Order No. based on	**6ES7 272-0AA30-0YA1**
Ambient temperature range	-25 ... +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions.
Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

	Order No.
SIPLUS S7-200 TD 200 text display (extended temperature range and medial exposure) for connection to SIMATIC S7-200, used from STEP 7 Micro / WIN V3.2 SP4, including cable H	**6AG1 272-0AA30-2YA1**
Connection cable for connection of TD 200C or TD 400C to S7-200	**6ES7 901-3EB10-0XA0**
Accessories for re-ordering	See HMI accessories, ST 80 / ST PC Catalog

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H

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Overview



- Additional screen space and high readability via backlit four-line display
- Customizable user interface with 15 tactile keys
- Audible and visual feedback upon pressing of key
- Optimal support of the S7-200:
  - Direct connection to the S7-200 interface via included cable
  - No separate power supply required
  - Configuration with STEP 7 Micro / WIN V4 SP6

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS S7-200 TD 400C	
Order number	**6AG1 640-0AA00-2AX1**
Order No. based on	**6AV6 640-0AA00-0AX1**
Ambient temperature range	-10 ... + 60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions.

SIPLUS S7-200 TD 400C	
Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load:
SO_2 <4.8 ppm H_2S <9.9 ppm; Cl <0.2 ppm; HCl <0.66 ppm; HF <0.12 ppm; NH <49 ppm; O3 <0.1 ppm; NO x <5.2 ppm
Threshold/ limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS S7-200 TD 400C	H	**6AG1 640-0AA00-2AX1**
(extended temperature range and medial exposure) with individually adaptable user interface on the front plate; for connection to SIMATIC S7-200; usable from STEP 7 Micro/ WIN V4 SP6, including cable		
Connection cable for connection of TD 100C/ TD 200C or TD 400C to S7-200		**6ES7 901-3EB10-0XA0**
Empty sheets for printing customized keyboard layouts; 2 perforated sheets per document; 10 sheets per packing unit		**6AV6 671-0AP00-0AX0**
Accessories for re-ordering		See HMI accessories, ST 80 / ST PC Catalog

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H

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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

You will find more information in catalog part 11.

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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 (HMI), 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. Type of delivery: German, English, French, Spanish, Italian, Chinese; with electronic documentation		
Single license	J	**6ES7 840-2CC01-0YX0**
Multi Copy License for 15 installations	J	**6ES7 840-2CC01-0YX1**
Intelligent RS 232/PPI multi-master cable For connecting devices with an RS 232 interface to SIMATIC S7-200 or the PPI network; master in the multi-master PPI network		**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**
CP 5512 PC card (CardBus, 32-bit) for connecting a programming device or Notebook computer to PROFIBUS or MPI, with 32-bit Windows XP Professional (Windows 2000 Professional available soon), executable under 32-bit Windows 2000 Professional and Windows XP Professional in conjunction with STEP 7 V5.2 German/English		**6GK1 551-2AA00**
CP 5611 PCI card for connecting a PC to the CPU interface or PROFIBUS DP module (187.5 Kbit/s or 12 Mbit/s) over an MPI cable		**6GK1 561-1AA01**

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

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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; RS232 not required	187.5 kbit/s; 9.6/19.2/187.5 Kbit/s; setting: not necessary
Alarms/diagnostics/status information		
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
Galvanic 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 and weight		
Weight		
• Weight, approx.	300 g	300 g

Ordering data

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

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Overview

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

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

	SIPLUS cable 901
Order No.	**6AG1 901-3CB30-2XA0**
Order No. based on	**6ES7 901-3CB30-0XA0**
Ambient temperature range	- 25 ... + 70 °C; - 25 ... + 55 °C (for applications with cUL approval)
Ambient conditions	Suitable for exceptional exposure to media (e.g. sulfur chlorine atmosphere).
Compliant with the standard for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	No
Approvals	CE, cUL
Technical data	The technical data is identical to those based on modules.

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

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

L: Subject to export regulations AL: 9I999 and ECCN: N

3

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SIMATIC S7-1200

4



4/2 Introduction

4/4 Central processing units
4/4 CPU 1211C
4/13 CPU 1212C
4/22 CPU 1214C

4/31 SIPLUS central processing units
4/31 SIPLUS CPU 1211C
4/34 SIPLUS CPU 1212C
4/37 SIPLUS CPU 1214C

4/40 Digital modules
4/40 SM 1221 digital input module
4/43 SB 1221 digital input module
4/46 SM 1222 digital output module
4/50 SB 1222 digital output module
4/53 SM 1223 digital input/output module
4/58 SB 1223 digital input/output module

4/62 SIPLUS digital modules
4/62 SIPLUS SM 1221 digital input module
4/63 SIPLUS SM 1222 digital output module
4/65 SIPLUS SM 1223 digital input/output module
4/67 SIPLUS SB 1223 digital input/output module

4/68 Analog modules
4/68 SM 1231 analog input module
4/71 SB 1231 analog input module
4/73 SM 1232 analog output module
4/76 SB 1232 analog output module
4/78 SM 1234 analog input/output module
4/81 SM 1231 thermocouple module
4/84 SB 1231 thermocouple signal board
4/86 SM 1231 RTD signal module
4/89 SB 1231 RTD signal board

4/91 SIPLUS analog modules
4/91 SIPLUS SM 1231 analog input module
4/92 SIPLUS SM 1232 analog output module
4/93 SIPLUS SB 1232 analog output module
4/94 SIPLUS SM 1234 analog input/output module

4/95 Special modules
4/95 SIM 1274 simulator

4/96 Communication
4/96 CM 1241 communication module
4/98 RS485 CB 1241 communication board
4/100 CM 1242-5
4/102 CM 1243-5
4/104 CSM 1277 unmanaged
4/106 SIPLUS NET CSM 1277
4/107 CP 1242-7
Ch. 3 Telecontrol Server Basic
4/109 SIPLUS CM 1241 communication module

4/110 Power supplies
4/110 SIMATIC S7-1200 PM 1207

4/112 SIPLUS power supplies
4/112 SIPLUS PM 1207 power supplies

4/113 Operator control and monitoring
4/113 Basic panels - Standard

4/120 SIPLUS operator control and monitoring
4/120 SIPLUS basic panels

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Brochures

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

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

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S7-1200

Overview



- The new modular miniature controller from the SIMATIC S7 family
- Comprising:
  - Controller with integrated PROFINET IO controller interface for communication between SIMATIC controllers, HMI, programming device or other automation components
  - Communication module with PROFIBUS DP master interface
  - Communication module PROFIBUS DP slave interface
  - GPRS module for connection to GSM/GPRS mobile phone networks
  - Integrated web server with standard and user-specific web pages
  - Data logging functionality for archiving of data at runtime from the user program
  - Powerful, integrated technology functions such as counting, measuring, closed-loop control, and motion control
  - Integrated digital and analog inputs/outputs
  - Signal boards for direct use in a controller
  - Signal modules for expansion of controllers by input/output channels
  - Communication modules for expansion of controllers with additional communications interfaces
  - Accessories, e.g. power supply, switch module or SIMATIC Memory Card
- The miniature controller that offers maximum automation at minimum cost.
- Extremely simple installation, programming and operation.
- Large-scale integration, space-saving, powerful.
- Suitable for small to medium-size automation engineering applications.
- 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 exceptional real-time performance and powerful communication options.

Technical specifications

General technical specifications SIMATIC S7-1200	
Degree of protection	IP20 acc. to IEC 529
Ambient temperature	
• Operation (95% humidity)	
- horizontal installation	0 ... 55 °C
- vertical installation	0 ... 45 °C
• Transportation and storage	-40 ... +70 °C
- with 95% humidity	25 ... 55 °C
Insulation	
• 5/24 V DC circuits	500 V AC test voltage
• 115/230 V AC circuits to ground	1500 V AC test voltage
• 115/230 V AC circuits to 115/230 V AC circuits	1500 V AC test voltage
• 230 V AC circuits to 5/24 V DC circuits	1500 V AC test voltage
• 115 V AC circuits to 5/24 V DC circuits	1500 V AC test voltage
Electromagnetic compatibility	Requirements of the EMC directive
• Noise immunity acc. to EN 50082-2	Test acc. to: IEC 801-2, IEC 801-3, IEC 801-4, EN 50141, EN 50204, IEC 801-5, VDE 0160
• Emitted interference acc. to EN 50081-1 and EN 50081-2	Test according to EN 55011, Class A, Group 1
Mechanical strength	
• Vibrations, test acc. to / tested with	IEC 68, Part 2-6: 10 ... 57 Hz; constant amplitude 0.3 mm; 58 ... 150 Hz; constant acceleration 1 g (mounted on DIN rail) or 2 g (mounted in switchboard); mode of vibration: frequency sweeps with a sweep rate of 1 octave/minute; duration of vibration: 10 frequency sweeps per axis in each direction of the three mutually perpendicular axes
• Shocks, test acc. to / tested with	IEC 68, Part 2-27/half-sine: magnitude of shock 15 g (peak value), duration 11 ms, 6 shocks in each of the three mutually perpendicular axes

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Technical specifications (continued)

General technical specifications SIPLUS S7-1200	
Ambient temperature range	-25 ... +55/70 °C
Conformal coating	Coating of the PCB and the electronic components
Technical specifications	The technical specifications of the standard product apply except for the ambient conditions.
Ambient conditions	
Relative humidity	5 … 100 %, condensation permitted
Biologically active substances	Conformity with EN 60721-3-3, class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, class 3C4 incl. salt mist and ISA –S71.04 severity level G1; G2; G3; GX[1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, class 3S4 incl. conductive sand, dust[2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 … +2000 m) See ambient temperature range 795 ...658 hPa (+2000 ... + 3500m) Derating 10K 658 … 540 hPa (+3500 … +5000 m) Derating 20 K

1) ISA –S71.04 severity level GX: long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
limit value (max 30 min): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

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CPU 1211C

Overview



- The clever compact solution
- With 10 integral input/outputs
- Expandable by:
  - 1 signal board (SB) or communication board (CB)
  - max. 3 communication modules (CM)

Technical specifications

	6ES7 211-1BD30-0XB0	6ES7 211-1HD30-0XB0	6ES7 211-1AD30-0XB0
Product type designation	CPU 1211C AC/DC/Relay	CPU 1211C DC/DC/Relay	CPU 1211C DC/DC/DC
Product version			
associated programming package	STEP 7 V10.5 or higher	STEP 7 V10.5 or higher	STEP 7 V10.5 or higher
Supply voltages			
Rated value			
• 24 V DC		Yes	Yes
• permissible range, lower limit (DC)		20.4 V	20.4 V
• permissible range, upper limit (DC)		28.8 V	28.8 V
• 120 V AC	Yes		
• 230 V AC	Yes		
• permissible range, lower limit (AC)	85 V		
• permissible range, upper limit (AC)	264 V		
• permissible frequency range, lower limit	47 Hz		
• permissible frequency range, upper limit	63 Hz		
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			
Current consumption (rated value)	60 mA at 120 V AC; 30 mA at 240 V AC	300 mA; Typical	300 mA; Typical
Current consumption, max.	180 mA at 120 V AC; 90 mA at 240 V AC	0.9 A; 24 V DC	0.9 A; 24 V DC
Inrush current, max.	20 A; At 264 V	12 A; at 28.8 V DC	12 A; at 28.8 V DC
Current output to backplane bus (DC 5 V), max.	750 mA; Max. 5 V DC for SM and CM	750 mA; Max. 5 V DC for SM and CM	750 mA; Max. 5 V DC for SM and CM
Power losses			
Power loss, typ.	10 W	8 W	8 W

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Technical specifications (continued)

	6ES7 211-1BD30-0XB0	6ES7 211-1HD30-0XB0	6ES7 211-1AD30-0XB0
Memory			
Usable memory for user data	25 kbyte	25 kbyte	25 kbyte
Work memory			
• integrated	25 kbyte	25 kbyte	25 kbyte
• expandable	No	No	No
Load memory			
• integrated	1 Mbyte	1 Mbyte	1 Mbyte
• expandable, max.	24 Mbyte; with SIMATIC memory card	24 Mbyte; with SIMATIC memory card	24 Mbyte; with SIMATIC memory card
Backup			
• present	Yes; entire project maintenance-free in the integral EEPROM	Yes; entire project maintenance-free in the integral EEPROM	Yes; entire project maintenance-free in the integral EEPROM
• without battery	Yes	Yes	Yes
CPU-blocks			
Number of blocks (total)	DBs, FCs, FBs, counters and timers. The maximum number of addressable blocks ranges from 1 to 65535. There is no restriction, the entire working memory can be used	DBs, FCs, FBs, counters and timers. The maximum number of addressable blocks ranges from 1 to 65535. There is no restriction, the entire working memory can be used	DBs, FCs, FBs, counters and timers. The maximum number of addressable blocks ranges from 1 to 65535. There is no restriction, the entire working memory can be used
OB			
• Number, max.	Limited only by RAM for code	Limited only by RAM for code	Limited only by RAM for code
CPU processing times			
for bit operations, min.	0.1 µs; / Operation	0.1 µs; / Operation	0.1 µs; / Operation
for word operations, min.	12 µs; / Operation	12 µs; / Operation	12 µs; / Operation
for floating point arithmetic, min.	18 µs; / Operation	18 µs; / Operation	18 µs; / Operation
Data areas and their retentivity			
retentive data area in total (incl. times, counters, flags), max.	2 048 byte	2 048 byte	2 048 byte
Flag			
• Number, max.	4 kbyte; Size of bit memory address area	4 kbyte; Size of bit memory address area	4 kbyte; Size of bit memory address area
Address area			
I/O address area			
• I/O address area, overall	1024 byte for inputs / 1024 byte for outputs	1024 byte for inputs / 1024 byte for outputs	1024 byte for inputs / 1024 byte for outputs
• Overall	1 024 byte	1 024 byte	1 024 byte
• Outputs	1 024 byte	1 024 byte	1 024 byte
Process image			
• Inputs, adjustable	1 kbyte	1 kbyte	1 kbyte
• Outputs, adjustable	1 kbyte	1 kbyte	1 kbyte
Digital channels			
• Integrated channels (DI)	6	6	6
• Integrated channels (DO)	4	4	4
Analog channels			
• Integrated channels (AI)	2	2	2
• Integrated channels (AO)	0	0	0

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CPU 1211C

Technical specifications (continued)

	6ES7 211-1BD30-0XB0	6ES7 211-1HD30-0XB0	6ES7 211-1AD30-0XB0
Hardware configuration			
Number of modules per system, max.	3 communication modules, 1 signal board	3 communication modules, 1 signal board	3 communication modules, 1 signal board
Time			
Clock			
• Hardware clock (real-time clock)	Yes	Yes	Yes
• Backup time	240 h; typical	240 h; typical	240 h; typical
• Deviation per day, max.	+/- 60s/month at 25°C	+/- 60s/month at 25°C	+/- 60s/month at 25°C
Test commissioning functions			
Status/control			
• Status/control variable	Yes	Yes	Yes
• Variables	Inputs/outputs, memory bit, DB, distributed I/Os, timers, counters	Inputs/outputs, memory bit, DB, distributed I/Os, timers, counters	Inputs/outputs, memory bit, DB, distributed I/Os, timers, counters
Forcing			
• Forcing	Yes	Yes	Yes
Communication functions			
S7 communication			
• supported	Yes	Yes	Yes
• as server	Yes	Yes	Yes
Web server			
• supported	Yes	Yes	Yes
• User-defined websites	Yes	Yes	Yes
Open IE communication			
• TCP/IP	Yes	Yes	Yes
• ISO-on-TCP (RFC1006)	Yes	Yes	Yes
Number of connections			
• overall	15; dynamically	15; dynamically	15; dynamically
1st interface			
Type of interface	PROFINET	PROFINET	PROFINET
Physics	Ethernet	Ethernet	Ethernet
Isolated	Yes	Yes	Yes
Automatic detection of transmission speed	Yes	Yes	Yes
Autonegotiation	Yes	Yes	Yes
Autocrossing	Yes	Yes	Yes
Functionality			
• PROFINET IO controller	Yes	Yes	Yes
Programming			
Configuration software			
• STEP 7	STEP 7 V10.5 or higher	STEP 7 V10.5 or higher	STEP 7 V10.5 or higher
Programming language			
• LAD	Yes	Yes	Yes
• FBD	Yes	Yes	Yes
• SCL	Yes	Yes	Yes
Cycle time monitoring			
• adjustable	Yes	Yes	Yes

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Technical specifications (continued)

	6ES7 211-1BD30-0XB0	6ES7 211-1HD30-0XB0	6ES7 211-1AD30-0XB0
Digital inputs			
Number of digital inputs	6; Integrated	6; Integrated	6; Integrated
• of which, inputs usable for technological functions	3; HSC (High Speed Counting)	3; HSC (High Speed Counting)	3; HSC (High Speed Counting)
m/p-reading	Yes	Yes	Yes
Input voltage			
• Rated value, DC	24 V	24 V	24 V
• for signal "0"			5 V DC at 1 mA
• for signal "1"			15 V DC at 2.5 mA
Input current			
• for signal "1", typ.	1 mA	1 mA	1 mA
Input delay (for rated value of input voltage)			
• for standard inputs			
- parameterizable	0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in 4 groups	0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in 4 groups	0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four
- at "0" to "1", min.	0.2 ms	0.2 ms	0.2 ms
- at "0" to "1", max.	12.8 ms	12.8 ms	12.8 ms
• for interrupt inputs			
- parameterizable	Yes	Yes	Yes
• for counter/technological functions			
- parameterizable	Single phase : 3 at 100 kHz, differential: 3 at 80 kHz	Single phase : 3 at 100 kHz, differential: 3 at 80 kHz	Single phase : 3 at 100 kHz, differential: 3 at 80 kHz
Cable length			
• Cable length, shielded, max.	500 m; 50 m for technological functions	500 m; 50 m for technological functions	500 m; 50 m for technological functions
• Cable length unshielded, max.	300 m; For technological functions: No	300 m; For technological functions: No	300 m; For technological functions: No
Digital outputs			
Number of digital outputs	4	4	4
• of which high-speed outputs			2; 100 kHz Pulse Train Output
Short-circuit protection	No; to be provided externally	No; to be provided externally	No; to be provided externally
Limitation of inductive shutdown voltage to			L+ (-48 V)
Switching capacity of the outputs			
• with resistive load, max.	2 A	2 A	0.5 A
• on lamp load, max.	30 W DC; 200 W AC	30 W DC; 200 W AC	5 W
Output voltage			
• for signal "0" (DC), max.			0.1 V; with 10 kOhm load
• for signal "1", min.			20 V
Output current			
• for signal "1" rated value			0.5 A
• for signal "0" residual current, max.			0.1 mA
Output delay with resistive load			
• 0 to "1", max.	10 ms; max.	10 ms; max.	1 µs; max.
• 1 to "0", max.	10 ms; max.	10 ms; max.	5 µs; max.
Parallel switching of 2 outputs			
• for increased power	No	No	
Switching frequency			
• of the pulse outputs, with resistive load, max.	1 Hz	1 Hz	100 kHz
Cable length			
• Cable length, shielded, max.	500 m	500 m	500 m
• Cable length unshielded, max.	150 m	150 m	150 m

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Technical specifications (continued)

	6ES7 211-1BD30-0XB0	6ES7 211-1HD30-0XB0	6ES7 211-1AD30-0XB0
Relay outputs			
Number of relay outputs	4	4	
Number of operating cycles	mechanically 10 million, at rated load voltage 100,000	mechanically 10 million, at rated load voltage 100,000	
Analog inputs			
Number of analog inputs	2	2	2
Number of analog inputs for voltage/ current measurement	2	2	
Cable length, shielded, max.	100 m; twisted and shielded	100 m; twisted and shielded	100 m; twisted and shielded
Input ranges			
• Voltage	Yes	Yes	Yes
Input ranges (rated values), voltages			
• 0 to +10 V	Yes	Yes	Yes
• Input resistance (0 to 10 V)	≥100 kOhm	≥100 kOhm	≥100 kOhm
Analog outputs			
Cable length			
• Cable length, shielded, max.	100 m; Shielded, twisted wire pair	100 m; Shielded, twisted wire pair	100 m; Shielded, twisted wire pair
Analog value creation			
Integrations and conversion time/ resolution per channel			
• Resolution with overrange (bit including sign), max.	10 bit	10 bit	10 bit
• Integration time, parameterizable	Yes	Yes	Yes
• Conversion time (per channel)	625 µs	625 µs	625 µs
Encoder supply			
24 V encoder supply			
• 24 V	permissible range: 20.4 to 28.8 V	permissible range: 20.4 to 28.8 V	permissible range: 20.4 to 28.8 V
Encoder			
Connectable encoders			
• 2-wire BEROS	Yes	Yes	Yes
Integrated Functions			
Number of counters	3	3	3
Counter frequency (counter) max.	100 kHz	100 kHz	100 kHz
Frequency meter	Yes	Yes	Yes
Controlled positioning	Yes	Yes	Yes
PID controller	Yes	Yes	Yes
Number of alarm inputs	4	4	4
Number of pulse outputs			2
Limit frequency (pulse)			100 kHz
Operator control and monitoring			
Display			
• Integrated	No	No	No

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Technical specifications (continued)

	6ES7 211-1BD30-0XB0	6ES7 211-1HD30-0XB0	6ES7 211-1AD30-0XB0
Galvanic isolation			
Galvanic isolation digital inputs			
• Galvanic isolation digital inputs	No	No	No
• Between the channels, in groups of	1	1	1
Galvanic isolation digital outputs			
• Galvanic isolation digital outputs	Yes; Relays	Relays	Yes
• Between the channels	No	No	No
• Between the channels, in groups of	1	1	1
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	500 V DC between 24 V DC and 5 V DC
EMC			
Interference immunity against discharge of static electricity			
• Interference immunity against discharge of static electricity acc. to IEC 61000-4-2	Yes	Yes	Yes
- Test voltage at air discharge	8 kV	8 kV	8 kV
- Test voltage at contact discharge	6 kV	6 kV	6 kV
Interference immunity to cable-borne interference			
• on the supply lines acc. to IEC 61000-4-4	Yes	Yes	Yes
• Interference immunity on signal lines acc. to IEC 61000-4-4	Yes	Yes	Yes
Surge immunity			
• on the supply lines acc. to IEC 61000-4-5	Yes	Yes	Yes
Immunity against conducted interference induced by high-frequency fields			
• Interference immunity against high-frequency radiation acc. to IEC 61000-4-6	Yes	Yes	Yes
Emission of radio interference acc. to EN 55 011			
• Emission of radio interferences acc. to EN 55 011 (limit value class A)	Yes; Group 1	Yes; Group 1	Yes; Group 1
• Emission of radio interference acc. to EN 55 011 (limit value class B)	Yes	Yes	Yes
Climatic and mechanical conditions for storage and transport			
Climatic conditions for storage and transport			
• Free fall			
- Drop height, max. (in packaging)	0.3 m; five times, in dispatch package	0.3 m; five times, in dispatch package	0.3 m; five times, in dispatch package
• Temperature			
- Permissible temperature range	-40 °C to +70 °C	-40 °C to +70 °C	-40 °C to +70 °C
• Relative humidity			
- Permissible range (without condensation) at 25 °C	95%	95%	95%

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CPU 1211C

Technical specifications (continued)

	6ES7 211-1BD30-0XB0	6ES7 211-1HD30-0XB0	6ES7 211-1AD30-0XB0
Mechanical and climatic conditions during operation			
Climatic conditions in operation			
• Temperature			
- Permissible temperature range	0°C to 55°C horizontal mounting, 0°C to 45°C vertical mounting	0°C to 55°C horizontal mounting, 0°C to 45°C vertical mounting	0°C to 55°C horizontal mounting, 0°C to 45°C vertical mounting
- Permissible temperature change	5° C to 55°, 3° C/minute	5°C to 55°C, 3°C / minute	5°C to 55°C, 3°C / minute
• Air pressure acc. to IEC 60068-2-13			
- Permissible air pressure	1080 to 795 hPa	1080 to 795 hPa	1080 to 795 hPa
- Permissible operating height	-1000 to 2000 m	-1000 to 2000 m	-1000 to 2000 m
• Pollutant concentrations			
- SO_2 at RH < 60% without condensation	S02: < 0.5 ppm; H_2S: < 0.1 ppm; RH < 60% condensation-free	S02: < 0.5 ppm; H_2S: < 0.1 ppm; RH < 60% condensation-free	S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free
Environmental requirements			
Operating temperature			
• Min.	0 °C	0 °C	0 °C
• Max.	55 °C	55 °C	55 °C
• Vertical installation, min.	0 °C	0 °C	0 °C
• Vertical installation, max.	45 °C	45 °C	45 °C
• Horizontal installation, min.	0 °C	0 °C	0 °C
• Horizontal installation, max.	55 °C	55 °C	55 °C
Storage/transport temperature			
• Min.	-40 °C	-40 °C	-40 °C
• Max.	70 °C	70 °C	70 °C
Air pressure			
• Operation, min.	795 hPa	795 hPa	795 hPa
• Operation, max.	1 080 hPa	1 080 hPa	1 080 hPa
• Storage/transport, min.	660 hPa	660 hPa	660 hPa
• Storage/transport, max.	1 080 hPa	1 080 hPa	1 080 hPa
Relative humidity			
• Operation, max.	95 %; no condensation	95 %; no condensation	95 %; no condensation
Vibrations			
• Vibrations	2G wall mounting, 1G DIN rail	2G wall mounting, 1G DIN rail	2G wall mounting, 1G DIN rail
• Operation, checked according to IEC 60068-2-6	Yes	Yes	Yes
Shock test			
• checked according to IEC 60068-2-27	Yes; IEC 68, Part 2-27 half-sine: Strength of the shock 15 g (peak value), duration 11 ms	Yes; IEC 68, Part 2-27 half-sine: Strength of the shock 15 g (peak value), duration 11 ms	Yes; IEC 68, Part 2-27 half-sine: Strength of the shock 15 g (peak value), duration 11 ms
Degree of protection			
IP20	Yes	Yes	Yes
Standards, approvals, certificates			
CE mark	Yes	Yes	Yes
C-TICK	Yes	Yes	Yes
cULus	Yes	Yes	Yes
FM approval	Yes	Yes	Yes
Dimensions and weight			
Dimensions			
• Width	90 mm	90 mm	90 mm
• Height	100 mm	100 mm	100 mm
• Depth	75 mm	75 mm	75 mm
Weight			
• Weight, approx.	420 g	380 g	370 g

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Ordering data		Order No.
CPU 1211C		
Compact CPU, AC/DC/relay; integral program/data memory 25 KB, load memory 1 MB; wide-range power supply 85 ... 264 V AC; Boolean execution times 0.1 µs per operation; 6 digital inputs, 4 digital outputs (relays), 2 analog inputs; expandable by up to 3 communication modules and 1 signal board/communication board; digital inputs can be used as HSC at 100 kHz	I	**6ES7 211-1BD30-0XB0**
Compact CPU, DC/DC/DC; integrated program/data memory 25 KB, load memory 1 MB; power supply 24 V DC; Boolean execution times 0.1 µs per operation; 6 digital inputs, 4 digital outputs, 2 analog inputs; expandable by up to 3 communication modules and 1 signal board/communication board; digital inputs can be used as HSC at 100 kHz, 24 V DC digital outputs can be used as pulse outputs (PTO) or pulse-width modulated outputs (PWM) at 100 kHz	I	**6ES7 211-1AD30-0XB0**
Compact CPU, DC/DC/relay; integrated program/data memory 25 KB, load memory 1 MB; power supply 24 V DC; Boolean execution times 0.1 µs per operation; 6 digital inputs, 4 digital outputs (relays), 2 analog inputs; expandable by up to 3 communication modules and 1 signal board/communication board; digital inputs can be used as HSC at 100 kHz	I	**6ES7 211-1HD30-0XB0**
SB 1221 signal board		
4 inputs, 5 V DC, 200 kHz	I	**6ES7 221-3AD30-0XB0**
4 inputs, 24 V DC, 200 kHz	I	**6ES7 221-3BD30-0XB0**
SB 1222 signal board		
4 outputs, 5 V DC, 0.1 A, 200 kHz	I	**6ES7 222-1AD30-0XB0**
4 outputs, 24 V DC, 0.1 A, 200 kHz	I	**6ES7 222-1BD30-0XB0**
SB 1223 signal board		
2 inputs, 24 V DC, IEC type 1 active high; 2 24 V DC transistor outputs, 0.5 A, 5 W; can be used as HSC at up to 30 kHz	I	**6ES7 223-0BD30-0XB0**
2 inputs, 5 V DC, 200 kHz 2 outputs 5 V DC, 0.1 A, 200 kHz	I	**6ES7 223-3AD30-0XB0**
2 inputs, 24 V DC, 200 kHz 2 outputs 24 V DC, 0.1 A, 200 kHz	I	**6ES7 223-3BD30-0XB0**
SB 1231 signal board 1 analog input, ±10 V with 12 bit or 0 ... 20 mA with 11 bit	I	**6ES7 231-4HA30-0XB0**
SB 1231 thermocouple signal board 1 input +/- 80 mV, resolution 15 bit + sign, thermocouples type J, K	I	**6ES7 231-5QA30-0XB0**
SB 1231 RTD signal board 1 input for resistance temperature sensors Pt 100, Pt 200, Pt 500, Pt 1000, resolution 15 bit + sign	I	**6ES7 231-5PA30-0XB0**
SB 1232 signal board 1 analog output, ±10 V with 12 bit or 0 to 20 mA with 11 bit	I	**6ES7 232-4HA30-0XB0**
CB 1241 RS485 communication board for point-to-point connection, with 1 RS485 interface	I	**6ES7 241-1CH30-1XB0**
Simulator (optional)		
8 input switches, for CPU 1211C / CPU 1212C	I	**6ES7 274-1XF30-0XA0**
SIMATIC memory card (optional)		
2 MB	I	**6ES7 954 -8LB01-0AA0**
24 MB	I	**6ES7 954 -8LF01-0AA0**
Terminal block (spare part) for CPU 1211C/1212C		
For DI, with 14 screws, tin-plated; 4 units	I	**6ES7 292-1AH30-0XA0**
For DO, with 8 screws, tin-plated; 4 units	I	**6ES7 292-1AP30-0XA0**
For AI, with 3 screws, tin-plated; 4 units	I	**6ES7 292-1BC30-0XA0**

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

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CPU 1211C

Ordering data		Order No.
Front flap set (spare part)		
for CPU 1211C/1212C		**6ES7 291-1AA30-0XA0**
S7-1200 automation system, system manual		
For SIMATIC S7-1200 and STEP 7 Basic		
German	K	**6ES7 298-8FA30-8AH0**
English	K	**6ES7 298-8FA30-8BH0**
French	K	**6ES7 298-8FA30-8CH0**
Spanish	K	**6ES7 298-8FA30-8DH0**
Italian	K	**6ES7 298-8FA30-8EH0**
Chinese	K	**6ES7 298-8FA30-8KH0**
S7-1200 automation system, Easy Book		
Brief instructions		
German	K	**6ES7 298-8FA30-8AQ0**
English	K	**6ES7 298-8FA30-8BQ0**
French	K	**6ES7 298-8FA30-8CQ0**
Spanish	K	**6ES7 298-8FA30-8DQ0**
Italian	K	**6ES7 298-8FA30-8EQ0**
Chinese	K	**6ES7 298-8FA30-8KQ0**

		Order No.
STEP 7 Basic V11 engineering software		
Target system: SIMATIC S7-1200 controllers and the associated I/O. Requirements: Windows XP Home SP3, Windows XP Professional SP3 (32 bit), Windows 7 Home Premium, Windows 7Professional (32 bit), Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit), Microsoft Server 2008 Std. SP2 (32 bit) Type of delivery: German, English, Chinese, Italian, French, Spanish		
Single license		**6ES7 822-0AA01-0YA0**
Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license		**6ES7 822-0AA01-0YE0**
Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license		**6ES7 822-1AA01-0YC5**
STEP 7 Basic V11, trial license		**6ES7 822-0AA01-0YA7**
STEP 7 Basic Software Update Service, 1 year	D	**6ES7 822-0AA00-0YL0**

D: Subject to export regulations AL: N and ECCN: 5D992
K: Subject to export regulations AL: N and ECCN: EAR99T

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Overview



- The superior compact solution
- With 14 integral input/outputs
- Expandable by:
  - 1 signal board (SB) or communication board (CB)
  - 2 signal modules (SM)
  - Max. 3 communication modules (CM)

Technical specifications

	6ES7 212-1BD30-0XB0	6ES7 212-1AD30-0XB0	6ES7 212-1HD30-0XB0
Product type designation	CPU 1212C AC/DC/Relay	CPU 1212C DC/DC/DC	CPU 1212C DC/DC/Relay
Product version			
associated programming package	STEP 7 V10.5 or higher	STEP 7 V10.5 or higher	STEP 7 V10.5 or higher
Supply voltages			
Rated value			
• 24 V DC		Yes	Yes
• Permissible range, lower limit (DC)		20.4 V	20.4 V
• Permissible range, upper limit (DC)		28.8 V	28.8 V
• 120 V AC	Yes		
• 230 V AC	Yes		
• Permissible range, lower limit (AC)	85 V		
• Permissible range, upper limit (AC)	264 V		
• Permissible frequency range, lower limit	47 Hz		
• Permissible frequency range, upper limit	63 Hz		
Load voltage L+			
• Rated value (DC)	24 V	24 V	24 V
• Permissible range, lower limit (DC)	5 V	20.4 V	5 V
• Permissible range, upper limit (DC)	250 V	28.8 V	250 V
Current consumption			
Current consumption (rated value)	80 mA at 120 V AC; 40 mA at 240 V AC		175 mA; typical
Current consumption, max.	240 mA at 120 V AC; 120 mA at 240 V AC	1.2 A; 24 V DC	1.2 A; 24 V DC
Inrush current, max.	20 A; at 264 V	12 A; at 28.8 V DC	12 A; at 28.8 V DC
Current output to backplane bus (DC 5 V), max.	1 000 mA; max. 5 V DC for SM and CM	1 000 mA; max. 5 V DC for SM and CM	1 000 mA; max. 5 V DC for SM and CM
Power losses			
Power loss, typ.	11 W	9 W	9 W

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CPU 1212C

Technical specifications (continued)

	6ES7 212-1BD30-0XB0	6ES7 212-1AD30-0XB0	6ES7 212-1HD30-0XB0
Memory			
Usable memory for user data	25 kbyte	25 kbyte	25 kbyte
Work memory			
• integrated	25 kbyte	25 kbyte	25 kbyte
• expandable	No	No	No
Load memory			
• integrated	1 Mbyte	1 Mbyte	1 Mbyte
• expandable, max.	24 Mbyte; with SIMATIC memory card	24 Mbyte; with SIMATIC memory card	24 Mbyte; with SIMATIC memory card
Backup			
• present	Yes; entire project maintenance-free in the integral EEPROM	Yes; entire project maintenance-free in the integral EEPROM	Yes; entire project maintenance-free in the integral EEPROM
• without battery	Yes	Yes	Yes
CPU-blocks			
Number of blocks (total)	DBs, FCs, FBs, counters and timers. The maximum number of addressable blocks ranges from 1 to 65535. There is no restriction, the entire working memory can be used	DBs, FCs, FBs, counters and timers. The maximum number of addressable blocks ranges from 1 to 65535. There is no restriction, the entire working memory can be used	DBs, FCs, FBs, counters and timers. The maximum number of addressable blocks ranges from 1 to 65535. There is no restriction, the entire working memory can be used
OB			
• Number, max.	Limited only by RAM for code	Limited only by RAM for code	Limited only by RAM for code
CPU processing times			
for bit operations, min.	0.1 µs; / Operation	0.1 µs; / Operation	0.1 µs; / Operation
for word operations, min.	12 µs; / Operation	12 µs; / Operation	12 µs; / Operation
for floating point arithmetic, min.	18 µs; / Operation	18 µs; / Operation	18 µs; / Operation
Data areas and their retentivity			
retentive data area in total (incl. times, counters, flags), max.	2 048 byte	2 048 byte	2 048 byte
Flag			
• Number, max.	4 kbyte; Size of bit memory address area	4 kbyte; Size of bit memory address area	4 kbyte; Size of bit memory address area
Address area			
I/O address area			
• I/O address area, overall	1024 byte for inputs / 1024 byte for outputs	1024 byte for inputs / 1024 byte for outputs	1024 byte for inputs / 1024 byte for outputs
• Overall	1 024 byte	1 024 byte	1 024 byte
• Outputs	1 024 byte	1 024 byte	1 024 byte
Process image			
• Inputs, adjustable	1 kbyte	1 kbyte	1 kbyte
• Outputs, adjustable	1 kbyte	1 kbyte	1 kbyte
Digital channels			
• Integrated channels (DI)	8	8	8
• Integrated channels (DO)	6	6	6
Analog channels			
• Integrated channels (AI)	2	2	2
• Integrated channels (AO)	0	0	0

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Technical specifications (continued)

	6ES7 212-1BD30-0XB0	6ES7 212-1AD30-0XB0	6ES7 212-1HD30-0XB0
Hardware configuration			
Number of modules per system, max.	3 comm. modules, 1 signal board, 2 signal modules	3 comm. modules, 1 signal board, 2 signal modules	3 comm. modules, 1 signal board, 2 signal modules
Time			
Clock			
• Hardware clock (real-time clock)	Yes	Yes	Yes
• Backup time	240 h; typical	240 h; typical	240 h; typical
• Deviation per day, max.	+/- 60s/month at 25°C	+/- 60s/month at 25°C	+/- 60s/month at 25°C
Test commissioning functions			
Status/control			
• Status/control variable	Yes	Yes	Yes
• Variables	Inputs/outputs, memory bit, DB, distributed I/Os, timers, counters	Inputs/outputs, memory bit, DB, distributed I/Os, timers, counters	Inputs/outputs, memory bit, DB, distributed I/Os, timers, counters
Forcing			
• Forcing	Yes	Yes	Yes
Communication functions			
S7 communication			
• Supported	Yes	Yes	Yes
• As server	Yes	Yes	Yes
Web server			
• Supported	Yes	Yes	Yes
• User-defined websites	Yes	Yes	Yes
Open IE communication			
• TCP/IP	Yes	Yes	Yes
• ISO-on-TCP (RFC1006)	Yes	Yes	Yes
Number of connections			
• overall	15; dynamically	15; dynamically	15; dynamically
1st interface			
Type of interface	PROFINET	PROFINET	PROFINET
Physics	Ethernet	Ethernet	Ethernet
Isolated	Yes	Yes	Yes
Automatic detection of transmission speed	Yes	Yes	Yes
Autonegotiation	Yes	Yes	Yes
Autocrossing	Yes	Yes	Yes
Functionality			
• PROFINET IO controller	Yes	Yes	Yes
Programming			
Configuration software			
• STEP 7	STEP 7 V10.5 or higher	STEP 7 V10.5 or higher	STEP 7 V10.5 or higher
Programming language			
• LAD	Yes	Yes	Yes
• FBD	Yes	Yes	Yes
• SCL	Yes	Yes	Yes
Cycle time monitoring			
• adjustable	Yes	Yes	Yes

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Technical specifications (continued)

	6ES7 212-1BD30-0XB0	6ES7 212-1AD30-0XB0	6ES7 212-1HD30-0XB0
Digital inputs			
Number of digital inputs	8; Integrated	8; Integrated	8; Integrated
• of which, inputs usable for technological functions	4; HSC (High Speed Counting)	4; HSC (High Speed Counting)	4; HSC (High Speed Counting)
m/p-reading	Yes	Yes	Yes
Input voltage			
• Rated value, DC	24 V	24 V	24 V
• for signal "0"		5 V DC at 1 mA	
• for signal "1"		15 V DC at 2.5 mA	
Input current			
• for signal "1", typ.	1 mA	1 mA	1 mA
Input delay (for rated value of input voltage)			
• for standard inputs			
- parameterizable	0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four	0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four	0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four
- at "0" to "1", min.	0.2 ms	0.2 ms	0.2 ms
- at "0" to "1", max.	12.8 ms	12.8 ms	12.8 ms
• for interrupt inputs			
- parameterizable	Yes	Yes	Yes
• for counter/technological functions			
- parameterizable	Single phase : 3 at 100 kHz & 1 at 30 kHz, differential: 3 at 80 kHz & 1 at 30 kHz	Single phase : 3 at 100 kHz & 1 with 30 kHz, differential: 3 at 80 kHz & 1 at 30 kHz	Single phase : 3 at 100 kHz & 1 at 30 kHz, differential: 3 at 80 kHz & 1 at 30 kHz
Cable length			
• Cable length, shielded, max.	500 m; 50 m for technological functions	500 m; 50 m for technological functions	500 m; 50 m for technological functions
• Cable length unshielded, max.	300 m; for technological functions: No	300 m; for technological functions: No	300 m; for technological functions: No
Digital outputs			
Number of digital outputs	6	6	6
• of which high-speed outputs		2; 100 kHz Pulse Train Output	
Short-circuit protection	No; to be provided externally	No; to be provided externally	No; to be provided externally
Limitation of inductive shutdown voltage to		L+ (-48 V)	
Switching capacity of the outputs			
• with resistive load, max.	2 A	0.5 A	2 A
• on lamp load, max.	30 W DC; 200 W AC	5 W	30 W DC; 200 W AC
Output voltage			
• for signal "0" (DC), max.		0.1 V; with 10 kOhm load	
• for signal "1", min.		20 V	
Output current			
• for signal "1" rated value		0.5 A	
• for signal "0" residual current, max.		0.1 mA	
Output delay with resistive load			
• 0 to "1", max.	10 ms; max.	1 µs	10 ms; max.
• 1 to "0", max.	10 ms; max.	5 µs	10 ms; max.
Switching frequency			
• of the pulse outputs, with resistive load, max.	1 Hz	100 kHz	1 Hz
Cable length			
• Cable length, shielded, max.	500 m	500 m	500 m
• Cable length unshielded, max.	150 m	150 m	150 m

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Technical specifications (continued)

	6ES7 212-1BD30-0XB0	6ES7 212-1AD30-0XB0	6ES7 212-1HD30-0XB0
Relay outputs			
Number of relay outputs	6		6
Number of operating cycles	mechanically 10 million, at rated load voltage 100,000		mechanically 10 million, at rated load voltage 100,000
Analog inputs			
Number of analog inputs	2	2	2
Cable length, shielded, max.	100 m; twisted and shielded	100 m; twisted and shielded	100 m; twisted and shielded
Input ranges			
• Voltage	Yes	Yes	Yes
Input ranges (rated values), voltages			
• 0 to +10 V	Yes	Yes	Yes
• Input resistance (0 to 10 V)	≥100 kOhm	≥100 kOhm	≥100 kOhm
Analog outputs			
Cable length			
• Cable length, shielded, max.	100 m; Shielded, twisted wire pair	100 m; Shielded, twisted wire pair	100 m; Shielded, twisted wire pair
Analog value creation			
Integrations and conversion time/ resolution per channel			
• Resolution with overrange (bit including sign), max.	10 bit	10 bit	10 bit
• Integration time, parameterizable	Yes	Yes	Yes
• Conversion time (per channel)	625 µs	625 µs	625 µs
Encoder supply			
24 V encoder supply			
• 24 V	permissible range: 20.4 to 28.8 V	permissible range: 20.4 to 28.8 V	permissible range: 20.4 to 28.8 V
Encoder			
Connectable encoders			
• 2-wire BEROS	Yes	Yes	Yes
Integrated Functions			
Number of counters	4	4	4
Counter frequency (counter) max.	100 kHz	100 kHz	100 kHz
Frequency meter	Yes	Yes	Yes
Controlled positioning	Yes	Yes	Yes
PID controller	Yes	Yes	Yes
Number of alarm inputs	4	4	4
Number of pulse outputs		2	
Limit frequency (pulse)		100 kHz	
Operator control and monitoring			
Display			
• Integrated	No	No	No
Galvanic isolation			
Galvanic isolation digital inputs			
• Galvanic isolation digital inputs	No	No	No
• Between the channels, in groups of	1	1	1
Galvanic isolation digital outputs			
• Galvanic isolation digital outputs	Yes; Relays	Yes	Relays
• Between the channels	No	No	No
• Between the channels, in groups of	2	2	1

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Technical specifications (continued)

	6ES7 212-1BD30-0XB0	6ES7 212-1AD30-0XB0	6ES7 212-1HD30-0XB0
Permissible potential difference between different circuits	500 V DC between 24 V DC and 5 V DC	500 V DC between 24 V DC and 5 V DC	500 V DC between 24 V DC and 5 V DC
EMC			
Interference immunity against discharge of static electricity			
• Interference immunity against discharge of static electricity acc. to IEC 61000-4-2	Yes	Yes	Yes
- Test voltage at air discharge	8 kV	8 kV	8 kV
- Test voltage at contact discharge	6 kV	6 kV	6 kV
Interference immunity to cable-borne interference			
• on the supply lines acc. to IEC 61000-4-4	Yes	Yes	Yes
• Interference immunity on signal lines acc. to IEC 61000-4-4	Yes	Yes	Yes
Surge immunity			
• on the supply lines acc. to IEC 61000-4-5	Yes	Yes	Yes
Immunity against conducted interference induced by high-frequency fields			
• Interference immunity against high-frequency radiation acc. to IEC 61000-4-6	Yes	Yes	Yes
Emission of radio interference acc. to EN 55 011			
• Emission of radio interferences acc. to EN 55 011 (limit value class A)	Yes; Group 1	Yes; Group 1	Yes; Group 1
• Emission of radio interference acc. to EN 55 011 (limit value class B)	Yes	Yes	Yes
Climatic and mechanical conditions for storage and transport			
Climatic conditions for storage and transport			
• Free fall			
- Drop height, max. (in packaging)	0.3 m; five times, in dispatch package	0.3 m; five times, in dispatch package	0.3 m; five times, in dispatch package
• Temperature			
- Permissible temperature range	-40 °C to +70 °C	-40 °C to +70 °C	-40 °C to +70 °C
• Relative humidity			
- Permissible range (without condensation) at 25 °C	95%	95%	95%
Mechanical and climatic conditions during operation			
Climatic conditions in operation			
• Temperature			
- Permissible temperature range	0°C to 55°C horizontal mounting, 0°C to 45°C vertical mounting	0°C to 55°C horizontal mounting, 0°C to 45°C vertical mounting	0°C to 55°C horizontal mounting, 0°C to 45°C vertical mounting
- permissible temperature change	5° C to 55°, 3° C/minute	5°C to 55°C, 3°C / minute	5°C to 55°C, 3°C / minute
• Air pressure acc. to IEC 60068-2-13			
- Permissible air pressure	1080 to 795 hPa	1080 to 795 hPa	1080 to 795 hPa
- Permissible operating height	-1000 to 2000 m	-1000 to 2000 m	-1000 to 2000 m
• Pollutant concentrations			
- SO_2 at RH < 60% without condensation	$S0_2$: < 0.5 ppm; H_2S: < 0.1 ppm; RH < 60% condensation-free	$S0_2$: < 0.5 ppm; H_2S: < 0.1 ppm; RH < 60% condensation-free	$S0_2$: < 0.5 ppm; H_2S: < 0.1 ppm; RH < 60% condensation-free

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Technical specifications (continued)

	6ES7 212-1BD30-0XB0	6ES7 212-1AD30-0XB0	6ES7 212-1HD30-0XB0
Environmental requirements			
Operating temperature			
• Min.	0 °C	0 °C	0 °C
• Max.	55 °C	55 °C	55 °C
• Vertical installation, min.	0 °C	0 °C	0 °C
• Vertical installation, max.	45 °C	45 °C	45 °C
• Horizontal installation, min.	0 °C	0 °C	0 °C
• Horizontal installation, max.	55 °C	55 °C	55 °C
Storage/transport temperature			
• Min.	-40 °C	-40 °C	-40 °C
• Max.	70 °C	70 °C	70 °C
Air pressure			
• Operation, min.	795 hPa	795 hPa	795 hPa
• Operation, max.	1 080 hPa	1 080 hPa	1 080 hPa
• Storage/transport, min.	660 hPa	660 hPa	660 hPa
• Storage/transport, max.	1 080 hPa	1 080 hPa	1 080 hPa
Relative humidity			
• Operation, max.	95 %; no condensation	95 %; no condensation	95 %; no condensation
Vibrations			
• Vibrations	2G wall mounting, 1G DIN rail	2G wall mounting, 1G DIN rail	2G wall mounting, 1G DIN rail
• Operation, checked according to IEC 60068-2-6	Yes	Yes	Yes
Shock test			
• checked according to IEC 60068-2-27	Yes; IEC 68, Part 2-27 half-sine: Strength of the shock 15 g (peak value), duration 11 ms	Yes; IEC 68, Part 2-27 half-sine: Strength of the shock 15 g (peak value), duration 11 ms	Yes; IEC 68, Part 2-27 half-sine: Strength of the shock 15 g (peak value), duration 11 ms
Degree of protection			
IP20	Yes	Yes	Yes
Standards, approvals, certificates			
CE mark	Yes	Yes	Yes
C-TICK	Yes	Yes	Yes
cULus	Yes	Yes	Yes
FM approval	Yes	Yes	Yes
Dimensions and weight			
Dimensions			
• Width	90 mm	90 mm	90 mm
• Height	100 mm	100 mm	100 mm
• Depth	75 mm	75 mm	75 mm
Weight			
• Weight, approx.	425 g	370 g	385 g

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CPU 1212C

Ordering data		Order No.
CPU 1212C		
Compact CPU, AC/DC/relay; integral program/data memory 25 KB, load memory 1 MB; wide-range power supply 85 ... 264 V AC; Boolean execution times 0.1 µs per operation; 8 digital inputs, 6 digital outputs (relays), 2 analog inputs; expandable by up to 3 communication modules, 2 signal modules and 1 signal board/communication board; digital inputs can be used as HSC at 100 kHz	I	**6ES7 212-1BD30-0XB0**
Compact CPU, DC/DC/DC; integrated program/data memory 25 KB, load memory 1 MB; power supply 24 V DC; Boolean execution times 0.1 µs per operation; 8 digital inputs, 6 digital outputs, 2 analog inputs; expandable by up to 3 communication modules, 2 signal modules, and 1 signal board/communication board; digital inputs can be used as HSC at 100 kHz, 24 V DC digital outputs can be used as pulse outputs (PTO) or pulse-width modulated outputs (PWM) at 100 kHz	I	**6ES7 212-1AD30-0XB0**
Compact CPU, DC/DC/relay; integrated program/data memory 25 KB, load memory 2 MB; power supply 24 V DC; Boolean execution times 0.1 µs per operation; 8 digital inputs, 6 digital outputs (relays), 2 analog inputs; expandable by up to 3 communication modules, 2 signal modules, and 1 signal board/communication board; digital inputs can be used as HSC at 100 kHz	I	**6ES7 212-1HD30-0XB0**
SB 1221 signal board		
4 inputs, 5 V DC, 200 kHz	I	**6ES7 221-3AD30-0XB0**
4 inputs, 24 V DC, 200 kHz	I	**6ES7 221-3BD30-0XB0**
SB 1222 signal board		
4 outputs, 5 V DC, 0.1 A, 200 kHz	I	**6ES7 222-1AD30-0XB0**
4 outputs, 24 V DC, 0.1 A, 200 kHz	I	**6ES7 222-1BD30-0XB0**
SB 1223 signal board		
2 inputs, 24 V DC, IEC type 1 active high; 2 24 V DC transistor outputs, 0.5 A, 5 W; can be used as HSC at up to 30 kHz	I	**6ES7 223-0BD30-0XB0**
2 inputs, 5 V DC, 200 kHz 2 outputs 5 V DC, 0.1 A, 200 kHz	I	**6ES7 223-3AD30-0XB0**
2 inputs, 24 V DC, 200 kHz 2 outputs 24 V DC, 0.1 A, 200 kHz	I	**6ES7 223-3BD30-0XB0**
SB 1231 signal board 1 analog input, ±10 V with 12 bit or 0 ... 20 mA with 11 bit	I	**6ES7 231-4HA30-0XB0**
SB 1231 thermocouple signal board 1 input +/- 80 mV, resolution 15 bit + sign, thermocouples type J, K	I	**6ES7 231-5QA30-0XB0**
SB 1231 RTD signal board 1 input for resistance temperature sensors Pt 100, Pt 200, Pt 500, Pt 1000, resolution 15 bit + sign	I	**6ES7 231-5PA30-0XB0**
SB 1232 signal board 1 analog output, ±10 V with 12 bit or 0 to 20 mA with 11 bit	I	**6ES7 232-4HA30-0XB0**
CB 1241 RS485 communication board for point-to-point connection, with 1 RS485 interface	I	**6ES7 241-1CH30-1XB0**
Simulator (optional)		
8 input switches, for CPU 1211C / CPU 1212C	I	**6ES7 274-1XF30-0XA0**
SIMATIC Memory Card (optional)		
2 MB	I	**6ES7 954 -8LB01-0AA0**
24 MB	I	**6ES7 954 -8LF01-0AA0**
Extension cable for two-tier configuration for connecting digital/analog signal modules; length 2 m	I	**6ES7 290-6AA30-0XA0**
Starter box CPU 1212C AC/DC/ relay Complete offer SIMATIC S7-1200, starter box, comprising: CPU 1212C AC/DC/relay, simulator, STEP 7 BASIC CD, manual CD, info material, in Systainer	D	**6ES7 212-1BD30-4YB0**

D: Subject to export regulations AL: N and ECCN: 5D992

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

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Ordering data		Order No.
Terminal block (spare part)		
for CPU 1211C/1212C		
For DI, with 14 screws, tin-plated; 4 units	I	**6ES7 292-1AH30-0XA0**
For DO, with 8 screws, tin-plated; 4 units	I	**6ES7 292-1AP30-0XA0**
For AI, with 3 screws, tin-plated; 4 units	I	**6ES7 292-1BC30-0XA0**
Front flap set (spare part)		
for CPU 1211C/1212C		**6ES7 291-1AA30-0XA0**
S7-1200 automation system, system manual		
For SIMATIC S7-1200 and STEP 7 Basic		
German	K	**6ES7 298-8FA30-8AH0**
English	K	**6ES7 298-8FA30-8BH0**
French	K	**6ES7 298-8FA30-8CH0**
Spanish	K	**6ES7 298-8FA30-8DH0**
Italian	K	**6ES7 298-8FA30-8EH0**
Chinese	K	**6ES7 298-8FA30-8KH0**
S7-1200 automation system, Easy Book		
Brief instructions		
German	K	**6ES7 298-8FA30-8AQ0**
English	K	**6ES7 298-8FA30-8BQ0**
French	K	**6ES7 298-8FA30-8CQ0**
Spanish	K	**6ES7 298-8FA30-8DQ0**
Italian	K	**6ES7 298-8FA30-8EQ0**
Chinese	K	**6ES7 298-8FA30-8KQ0**

		Order No.
STEP 7 Basic V11 engineering software		
Target system: SIMATIC S7-1200 controllers and the associated I/O. Requirements: Windows XP Home SP3, Windows XP Professional SP3 (32 bit), Windows 7 Home Premium, Windows 7Professional (32 bit), Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit), Microsoft Server 2008 Std. SP2 (32 bit) Type of delivery: German, English, Chinese, Italian, French, Spanish		
Single license		**6ES7 822-0AA01-0YA0**
Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license		**6ES7 822-0AA01-0YE0**
Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license		**6ES7 822-1AA01-0YC5**
STEP 7 Basic V11, trial license		**6ES7 822-0AA01-0YA7**
STEP 7 Basic Software Update Service, 1 year	D	**6ES7 822-0AA00-0YL0**

D: Subject to export regulations AL: N and ECCN: 5D992
I: Subject to export regulations AL: N and ECCN: EAR99H
K: Subject to export regulations AL: N and ECCN: EAR99T

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CPU 1214C

Overview



- The compact high-performance CPU
- With 24 integral input/outputs
- Expandable by:
  - 1 signal board (SB) or communication board (CB)
  - 8 signal modules (SM)
  - Max. 3 communication modules (CM)

Technical specifications

	6ES7 214-1BE30-0XB0	6ES7 214-1AE30-0XB0	6ES7 214-1HE30-0XB0
Product type designation	CPU 1214C AC/DC/Relay	CPU 1214C DC/DC/DC	CPU 1214C DC/DC/Relay
Product version			
associated programming package	STEP 7 V10.5 or higher	STEP 7 V10.5 or higher	STEP 7 V10.5 or higher
Supply voltages			
Rated value			
• 24 V DC		Yes	Yes
• permissible range, lower limit (DC)		20.4 V	20.4 V
• permissible range, upper limit (DC)		28.8 V	28.8 V
• 120 V AC	Yes		
• 230 V AC	Yes		
• permissible range, lower limit (AC)	85 V		
• permissible range, upper limit (AC)	264 V		
• permissible frequency range, lower limit	47 Hz		
• permissible frequency range, upper limit	63 Hz		
Load voltage L+			
• Rated value (DC)	24 V	24 V	24 V
• permissible range, lower limit (DC)	5 V	20.4 V	5 V
• permissible range, upper limit (DC)	250 V	28.8 V	250 V
Current consumption			
Current consumption (rated value)	100 mA at 120 V AC; 50 mA at 240 V AC		500 mA; Typical
Current consumption, max.	300 mA at 120 V AC; 150 mA at 240 V AC	1.5 A; 24 V DC	1.2 A; 24 V DC
Inrush current, max.	20 A; At 264 V	12 A; at 28.8 V DC	12 A; at 28.8 V DC
Current output to backplane bus (DC 5 V), max.	1 600 mA; Max. 5 V DC for SM and CM	1 600 mA; Max. 5 V DC for SM and CM	1 600 mA; Max. 5 V DC for SM and CM
Power losses			
Power loss, typ.	14 W	12 W	12 W

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Technical specifications (continued)

	6ES7 214-1BE30-0XB0	6ES7 214-1AE30-0XB0	6ES7 214-1HE30-0XB0
Memory			
Usable memory for user data	50 kbyte	50 kbyte	50 kbyte
Work memory			
• integrated	50 kbyte	50 kbyte	50 kbyte
• expandable	No	No	No
Load memory			
• integrated	2 Mbyte	2 Mbyte	2 Mbyte
• expandable, max.	24 Mbyte; with SIMATIC memory card	24 Mbyte; with SIMATIC memory card	24 Mbyte; with SIMATIC memory card
Backup			
• present	Yes; entire project maintenance-free in the integral EEPROM	Yes; entire project maintenance-free in the integral EEPROM	Yes; entire project maintenance-free in the integral EEPROM
• without battery	Yes	Yes	Yes
CPU-blocks			
Number of blocks (total)	DBs, FCs, FBs, counters and timers. The maximum number of addressable blocks ranges from 1 to 65535. There is no restriction, the entire working memory can be used	DBs, FCs, FBs, counters and timers. The maximum number of addressable blocks ranges from 1 to 65535. There is no restriction, the entire working memory can be used	DBs, FCs, FBs, counters and timers. The maximum number of addressable blocks ranges from 1 to 65535. There is no restriction, the entire working memory can be used
OB			
• Number, max.	Limited only by RAM for code	Limited only by RAM for code	Limited only by RAM for code
CPU processing times			
for bit operations, min.	0.1 µs; / Operation	0.1 µs; / Operation	0.1 µs; / Operation
for word operations, min.	12 µs; / Operation	12 µs; / Operation	12 µs; / Operation
for floating point arithmetic, min.	18 µs; / Operation	18 µs; / Operation	18 µs; / Operation
Data areas and their retentivity			
retentive data area in total (incl. times, counters, flags), max.	2 048 byte	2 048 byte	2 048 byte
Flag			
• Number, max.	8 kbyte; Size of bit memory address area	8 kbyte; Size of bit memory address area	8 kbyte; Size of bit memory address area
Address area			
I/O address area			
• I/O address area, overall	1024 byte for inputs / 1024 byte for outputs	1024 byte for inputs / 1024 byte for outputs	1024 byte for inputs / 1024 byte for outputs
• overall	1 024 byte	1 024 byte	1 024 byte
• Outputs	1 024 byte	1 024 byte	1 024 byte
Process image			
• Inputs, adjustable	1 kbyte	1 kbyte	1 kbyte
• Outputs, adjustable	1 kbyte	1 kbyte	1 kbyte
Digital channels			
• integrated channels (DI)	14	14	14
• integrated channels (DO)	10	10	10
Analog channels			
• Integrated channels (AI)	2	2	2
• Integrated channels (AO)	0	0	0
Hardware configuration			
Number of modules per system, max.	3 comm. modules, 1 signal board, 8 signal modules	3 comm. modules, 1 signal board, 8 signal modules	3 comm. modules, 1 signal board, 8 signal modules

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Technical specifications (continued)

	6ES7 214-1BE30-0XB0	6ES7 214-1AE30-0XB0	6ES7 214-1HE30-0XB0
Time			
Clock			
• Hardware clock (real-time clock)	Yes	Yes	Yes
• Backup time	240 h; typical	240 h; typical	240 h; typical
• Deviation per day, max.	+/- 60s/month at 25°C	+/- 60s/month at 25°C	+/- 60s/month at 25°C
Test commissioning functions			
Status/control			
• Status/control variable	Yes	Yes	Yes
• Variables	Inputs/outputs, memory bit, DB, distributed I/Os, timers, counters	Inputs/outputs, memory bit, DB, distributed I/Os, timers, counters	Inputs/outputs, memory bit, DB, distributed I/Os, timers, counters
Forcing			
• Forcing	Yes	Yes	Yes
Communication functions			
S7 communication			
• supported	Yes	Yes	Yes
• as server	Yes	Yes	Yes
Web server			
• supported	Yes	Yes	Yes
• user-defined websites	Yes	Yes	Yes
Open IE communication			
• TCP/IP	Yes	Yes	Yes
• ISO-on-TCP (RFC1006)	Yes	Yes	Yes
Number of connections			
• overall	15; dynamically	15; dynamically	15; dynamically
1st interface			
Type of interface	PROFINET	PROFINET	PROFINET
Physics	Ethernet	Ethernet	Ethernet
Isolated	Yes	Yes	Yes
Automatic detection of transmission speed	Yes	Yes	Yes
Autonegotiation	Yes	Yes	Yes
Autocrossing	Yes	Yes	Yes
Functionality			
• PROFINET IO controller	Yes	Yes	Yes
Programming			
Configuration software			
• STEP 7	STEP 7 V10.5 or higher	STEP 7 V10.5 or higher	STEP 7 V10.5 or higher
Programming language			
• LAD	Yes	Yes	Yes
• FBD	Yes	Yes	Yes
• SCL	Yes	Yes	Yes
Cycle time monitoring			
• adjustable	Yes	Yes	Yes

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Technical specifications (continued)

	6ES7 214-1BE30-0XB0	6ES7 214-1AE30-0XB0	6ES7 214-1HE30-0XB0
Digital inputs			
Number of digital inputs	14; Integrated	14; Integrated	14; Integrated
• of which, inputs usable for technological functions	6; HSC (High Speed Counting)	6; HSC (High Speed Counting)	6; HSC (High Speed Counting)
m/p-reading	Yes	Yes	Yes
Input voltage			
• Rated value, DC	24 V	24 V	24 V
• for signal "0"		5 V DC at 1 mA	
• for signal "1"		15 V DC at 2.5 mA	
Input current			
• for signal "1", typ.	1 mA	1 mA	1 mA
Input delay (for rated value of input voltage)			
• for standard inputs			
- parameterizable	0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four	0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four	0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four
- at "0" to "1", min.	0.2 ms	0.2 ms	0.2 ms
- at "0" to "1", max.	12.8 ms	12.8 ms	12.8 ms
• for interrupt inputs			
- parameterizable	Yes	Yes	Yes
• for counter/technological functions			
- parameterizable	Single phase : 3 at 100 kHz & 1 at 30 kHz, differential: 3 at 80 kHz & 1 at 30 kHz	Single phase : 3 at 100 kHz & 1 at 30 kHz, differential: 3 at 80 kHz & 1 at 30 kHz	Single phase : 3 at 100 kHz & 3 at 30 kHz, differential: 3 at 80 kHz & 3 at 30 kHz
Cable length			
• Cable length, shielded, max.	500 m; 50 m for technological functions	500 m; 50 m for technological functions	500 m; 50 m for technological functions
• Cable length unshielded, max.	300 m; For technological functions: No	300 m; For technological functions: No	300 m; For technological functions: No
Digital outputs			
Number of digital outputs	10	10	10
• of which high-speed outputs		2; 100 kHz Pulse Train Output	
Short-circuit protection	No; to be provided externally	No; to be provided externally	No; to be provided externally
Limitation of inductive shutdown voltage to		L+ (-48 V)	
Switching capacity of the outputs			
• with resistive load, max.	2 A	0.5 A	2 A
• on lamp load, max.	30 W DC; 200 W AC	5 W	30 W DC; 200 W AC
Output voltage			
• for signal "1", min.		20 V	
Output current			
• for signal "1" rated value		0.5 A	
• for signal "0" residual current, max.		0.1 mA	
Output delay with resistive load			
• 0 to "1", max.	10 ms; max.	1 µs	10 ms; max.
• 1 to "0", max.	10 ms; max.	5 µs	10 ms; max.
Switching frequency			
• of the pulse outputs, with resistive load, max.	1 Hz	100 kHz	1 Hz
Cable length			
• Cable length, shielded, max.	500 m	500 m	500 m
• Cable length unshielded, max.	150 m	150 m	150 m

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Technical specifications (continued)

	6ES7 214-1BE30-0XB0	6ES7 214-1AE30-0XB0	6ES7 214-1HE30-0XB0
Relay outputs			
Number of relay outputs	10		10
Number of operating cycles	mechanically 10 million, at rated load voltage 100,000		mechanically 10 million, at rated load voltage 100,000
Analog inputs			
Number of analog inputs	2	2	2
Cable length, shielded, max.	100 m; twisted and shielded	100 m; twisted and shielded	100 m; twisted and shielded
Input ranges			
• Voltage	Yes	Yes	Yes
Input ranges (rated values), voltages			
• 0 to +10 V	Yes	Yes	Yes
• Input resistance (0 to 10 V)	≥100 kOhm	≥100 kOhm	≥100 kOhm
Analog outputs			
Cable length			
• Cable length, shielded, max.	100 m; Shielded, twisted wire pair	100 m; Shielded, twisted wire pair	100 m; Shielded, twisted wire pair
Analog value creation			
Integrations and conversion time/ resolution per channel			
• Resolution with overrange (bit including sign), max.	10 bit	10 bit	10 bit
• Integration time, parameterizable	Yes	Yes	Yes
• Conversion time (per channel)	625 µs	625 µs	625 µs
Encoder supply			
24 V encoder supply			
• 24 V	permissible range: 20.4 to 28.8 V	permissible range: 20.4 to 28.8 V	permissible range: 20.4 to 28.8 V
Encoder			
Connectable encoders			
• 2-wire BEROS	Yes	Yes	Yes
Integrated Functions			
Number of counters	6	6	6
Counter frequency (counter) max.	100 kHz	100 kHz	100 kHz
Frequency meter	Yes	Yes	Yes
controlled positioning	Yes	Yes	Yes
PID controller	Yes	Yes	Yes
Number of alarm inputs	4	4	4
Number of pulse outputs		2	
Limit frequency (pulse)		100 kHz	
Operator control and monitoring			
Display			
• Integrated	No	No	No
Galvanic isolation			
Galvanic isolation digital inputs			
• Galvanic isolation digital inputs	No	No	No
• between the channels, in groups of	1	1	1
Galvanic isolation digital outputs			
• Galvanic isolation digital outputs	Yes; Relays	Yes	Relays
• between the channels	No	No	No
• between the channels, in groups of	2	2	1

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Technical specifications (continued)

	6ES7 214-1BE30-0XB0	6ES7 214-1AE30-0XB0	6ES7 214-1HE30-0XB0
Permissible potential difference between different circuits	500 V DC between 24 V DC and 5 V DC	500 V DC between 24 V DC and 5 V DC	500 V DC between 24 V DC and 5 V DC
EMC			
Interference immunity against discharge of static electricity			
• Interference immunity against discharge of static electricity acc. to IEC 61000-4-2	Yes	Yes	Yes
- Test voltage at air discharge	8 kV	8 kV	8 kV
- Test voltage at contact discharge	6 kV	6 kV	6 kV
Interference immunity to cable-borne interference			
• on the supply lines acc. to IEC 61000-4-4	Yes	Yes	Yes
• Interference immunity on signal lines acc. to IEC 61000-4-4	Yes	Yes	Yes
Surge immunity			
• on the supply lines acc. to IEC 61000-4-5	Yes	Yes	Yes
Immunity against conducted interference induced by high-frequency fields			
• Interference immunity against high-frequency radiation acc. to IEC 61000-4-6	Yes	Yes	Yes
Emission of radio interference acc. to EN 55 011			
• Emission of radio interferences acc. to EN 55 011 (limit value class A)	Yes; Group 1	Yes; Group 1	Yes; Group 1
• Emission of radio interference acc. to EN 55 011 (limit value class B)	Yes	Yes	Yes
Climatic and mechanical conditions for storage and transport			
Climatic conditions for storage and transport			
• Free fall			
- Drop height, max. (in packaging)	0.3 m; five times, in dispatch package	0.3 m; five times, in dispatch package	0.3 m; five times, in dispatch package
• Temperature			
- Permissible temperature range	-40 °C to +70 °C	-40 °C to +70 °C	-40 °C to +70 °C
• Relative humidity			
- Permissible range (without condensation) at 25 °C	95%	95%	95%

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Technical specifications (continued)

	6ES7 214-1BE30-0XB0	6ES7 214-1AE30-0XB0	6ES7 214-1HE30-0XB0
Mechanical and climatic conditions during operation			
Climatic conditions in operation			
• Temperature			
- Permissible temperature range	0°C to 55°C horizontal mounting, 0°C to 45°C vertical mounting		0°C to 55°C horizontal mounting, 0°C to 45°C vertical mounting
- Permissible temperature change	5° C to 55°, 3° C/minute	5°C to 55°C, 3°C / minute	5°C to 55°C, 3°C / minute
• Air pressure acc. to IEC 60068-2-13			
- Permissible air pressure	1080 to 795 hPa	1080 to 795 hPa	1080 to 795 hPa
- Permissible operating height	-1000 to 2000 m	-1000 to 2000 m	-1000 to 2000 m
• Pollutant concentrations			
- SO_2 at RH < 60% without condensation	$S0_2$: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free	$S0_2$: < 0.5 ppm; H_2S: < 0.1 ppm; RH < 60% condensation-free	$S0_2$: < 0.5 ppm; H_2S: < 0.1 ppm; RH < 60% condensation-free
Environmental requirements			
Operating temperature			
• Min.	0 °C	0 °C	0 °C
• Max.	55 °C	55 °C	55 °C
• Vertical installation, min.	0 °C	0 °C	0 °C
• Vertical installation, max.	45 °C	45 °C	45 °C
• Horizontal installation, min.	0 °C	0 °C	0 °C
• Horizontal installation, max.	55 °C	55 °C	55 °C
Storage/transport temperature			
• Min.	-40 °C	-40 °C	-40 °C
• Max.	70 °C	70 °C	70 °C
Air pressure			
• Operation, min.	795 hPa	795 hPa	795 hPa
• Operation, max.	1 080 hPa	1 080 hPa	1 080 hPa
• Storage/transport, min.	660 hPa	660 hPa	660 hPa
• Storage/transport, max.	1 080 hPa	1 080 hPa	1 080 hPa
Relative humidity			
• Operation, max.	95 %; no condensation	95 %; no condensation	95 %; no condensation
Vibrations			
• Vibrations	2G wall mounting, 1G DIN rail	2G wall mounting, 1G DIN rail	2G wall mounting, 1G DIN rail
• Operation, checked according to IEC 60068-2-6	Yes	Yes	Yes
Shock test			
• checked according to IEC 60068-2-27	Yes; IEC 68, Part 2-27 half-sine: Strength of the shock 15 g (peak value), duration 11 ms	Yes; IEC 68, Part 2-27 half-sine: Strength of the shock 15 g (peak value), duration 11 ms	Yes; IEC 68, Part 2-27 half-sine: Strength of the shock 15 g (peak value), duration 11 ms
Degree of protection			
IP20	Yes	Yes	Yes
Standards, approvals, certificates			
CE mark	Yes	Yes	Yes
C-TICK	Yes	Yes	Yes
cULus	Yes	Yes	Yes
FM approval	Yes	Yes	Yes
Dimensions and weight			
Dimensions			
• Width	110 mm	110 mm	110 mm
• Height	100 mm	100 mm	100 mm
• Depth	75 mm	75 mm	75 mm
Weight			
• Weight, approx.	455 g	415 g	435 g

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Ordering data		Order No.
CPU 1214C		
Compact CPU, AC/DC/relay; integral program/data memory 50 KB, load memory 2 MB; wide-range power supply 85 ... 264 V AC; Boolean execution times 0.1 µs per operation; 14 digital inputs, 10 digital outputs (relays), 2 analog inputs; expandable by up to 3 communication modules, 8 signal modules and 1 signal board/communication board; digital inputs can be used as HSC at 100 kHz	I	**6ES7 214-1BE30-0XB0**
Compact CPU, DC/DC/DC; integrated program/data memory 50 KB, load memory 2 MB; power supply 24 V DC; Boolean execution times 0.1 µs per operation; 14 digital inputs, 10 digital outputs, 2 analog inputs; expandable by up to 3 communication modules, 8 signal modules, and 1 signal board/communication board; digital inputs can be used as HSC at 100 kHz, 24 V DC digital outputs can be used as pulse outputs (PTO) or pulse-width modulated outputs (PWM) at 100 kHz	I	**6ES7 214-1AE30-0XB0**
Compact CPU, DC/DC/relay; integrated program/data memory 50 KB, load memory 2 MB; power supply 24 V DC; Boolean execution times 0.1 µs per operation; 14 digital inputs, 10 digital outputs (relays), 2 analog inputs; expandable by up to 3 communication modules, 8 signal modules, and 1 signal board/communication board; digital inputs can be used as HSC at 100 kHz	I	**6ES7 214-1HE30-0XB0**
SB 1221 signal board		
4 inputs, 5 V DC, 200 kHz	I	**6ES7 221-3AD30-0XB0**
4 inputs, 24 V DC, 200 kHz	I	**6ES7 221-3BD30-0XB0**
SB 1222 signal board		
4 outputs, 5 V DC, 0.1 A, 200 kHz	I	**6ES7 222-1AD30-0XB0**
4 outputs, 24 V DC, 0.1 A, 200 kHz	I	**6ES7 222-1BD30-0XB0**
SB 1223 signal board		
2 inputs, 24 V DC, IEC type 1 active high; 2 24 V DC transistor outputs, 0.5 A, 5 W; can be used as HSC at up to 30 kHz	I	**6ES7 223-0BD30-0XB0**
2 inputs, 5 V DC, 200 kHz 2 outputs 5 V DC, 0.1 A, 200 kHz	I	**6ES7 223-3AD30-0XB0**
2 inputs, 24 V DC, 200 kHz 2 outputs 24 V DC, 0.1 A, 200 kHz	I	**6ES7 223-3BD30-0XB0**
SB 1231 signal board 1 analog input, ±10 V with 12 bit or 0 ... 20 mA with 11 bit	I	**6ES7 231-4HA30-0XB0**
SB 1231 thermocouple signal board 1 input +/- 80 mV, resolution 15 bit + sign, thermocouples type J, K	I	**6ES7 231-5QA30-0XB0**
SB 1231 RTD signal board 1 input for resistance temperature sensors Pt 100, Pt 200, Pt 500, Pt 1000, resolution 15 bit + sign	I	**6ES7 231-5PA30-0XB0**
SB 1232 signal board 1 analog output, ±10 V with 12 bit or 0 to 20 mA with 11 bit	I	**6ES7 232-4HA30-0XB0**
CB 1241 RS485 communication board for point-to-point connection, with 1 RS485 interface	I	**6ES7 241-1CH30-1XB0**
Simulator (optional)		
14 input switches, for CPU 1214C	I	**6ES7 274-1XH30-0XA0**
SIMATIC memory card (optional)		
2 MB	I	**6ES7 954 -8LB01-0AA0**
24 MB	I	**6ES7 954 -8LF01-0AA0**
Extension cable for two-tier configuration for connecting digital/analog signal modules; length 2 m	I	**6ES7 290-6AA30-0XA0**
Terminal block (spare part)		
for CPU 1214C		
For DI, with 20 screws, tin-plated; 4 units	I	**6ES7 292-1AV30-0XA0**
For DO, with 12 screws, tin-plated; 4 units	I	**6ES7 292-1AM30-0XA0**
For AI, with 3 screws, tin-plated; 4 units	I	**6ES7 292-1BC30-0XA0**

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

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CPU 1214C

Ordering data		Order No.
Front flap set (spare part)		
for CPU 1214C		**6ES7 291-1AB30-0XA0**
S7-1200 automation system, system manual		
For SIMATIC S7-1200 and STEP 7 Basic		
German	K	**6ES7 298-8FA30-8AH0**
English	K	**6ES7 298-8FA30-8BH0**
French	K	**6ES7 298-8FA30-8CH0**
Spanish	K	**6ES7 298-8FA30-8DH0**
Italian	K	**6ES7 298-8FA30-8EH0**
Chinese	K	**6ES7 298-8FA30-8KH0**
S7-1200 automation system, Easy Book		
Brief instructions		
German	K	**6ES7 298-8FA30-8AQ0**
English	K	**6ES7 298-8FA30-8BQ0**
French	K	**6ES7 298-8FA30-8CQ0**
Spanish	K	**6ES7 298-8FA30-8DQ0**
Italian	K	**6ES7 298-8FA30-8EQ0**
Chinese	K	**6ES7 298-8FA30-8KQ0**

		Order No.
STEP 7 Basic V11 engineering software		
Target system: SIMATIC S7-1200 controllers and the associated I/O. Requirements: Windows XP Home SP3, Windows XP Professional SP3 (32 bit), Windows 7 Home Premium, Windows 7Professional (32 bit), Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit), Microsoft Server 2008 Std. SP2 (32 bit) Type of delivery: German, English, Chinese, Italian, French, Spanish		
Single license		**6ES7 822-0AA01-0YA0**
Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license		**6ES7 822-0AA01-0YE0**
Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license		**6ES7 822-1AA01-0YC5**
STEP 7 Basic V11, trial license		**6ES7 822-0AA01-0YA7**
STEP 7 Basic Software Update Service, 1 year	D	**6ES7 822-0AA00-0YL0**

D: Subject to export regulations AL: N and ECCN: 5D992
K: Subject to export regulations AL: N and ECCN: EAR99T

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Overview



- The clever compact solution
- With 10 integrated I/Os
- Expandable with:
  - 1 signal board (SB)
  - Max. 3 communication modules (CM)

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS CPU 1211C DC/DC/DC			
Order number	**6AG1 211-1AD30-2XB0**	**6AG1 211-1AD30-4XB0**	**6AG1 211-1AD30-5XB0**
Order No. based on	**6ES7 211-1AD30-0XB0**		
Ambient temperature range	-25 ... + 70 °C[3)]	0 ... +55 °C	-25 ... + 55 °C
Conformal coating	Coating of the printed circuit boards and the electronic components		
Technical data	The technical data of the standard product applies except for the ambient conditions.		

SIPLUS CPU 1211C AC/DC/RLY			
Order number	**6AG1 211-1BD30-2XB0**	**6AG1 211-1BD30-4XB0**	**6AG1 211-1BD30-5XB0**
Order No. based on	**6ES7 211-1BD30-0XB0**		
Ambient temperature range	-25 ... + 70 °C[3)]	0 ... +55 °C	-25 ... +55 °C
Conformal coating	Coating of the printed circuit boards and the electronic components		
Technical data	The technical data of the standard product applies except for the ambient conditions.		

SIPLUS CPU 1211C DC/DC/RLY			
Order number	**6AG1 211-1HD30-2XB0**	**6AG1 211-1HD30-4XB0**	**6AG1 211-1HD30-5XB0**
Order No. based on	**6ES7 211-1HD30-0XB0**		
Ambient temperature range	-25 ... + 70 °C[3)]	0 ... +55 °C	-25 ... +55 °C
Conformal coating	Coating of the printed circuit boards and the electronic components		
Technical data	The technical data of the standard product applies except for the ambient conditions.		

[3)] From +60 °C to +70 °C, the number of simultaneously enabled inputs and outputs is max. 50%; no SB module permitted

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Overview (continued)

Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX[1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS CPU 1211C compact CPU, AC/DC/relay (extended temperature range and medial exposure) Integrated program and data memory of 25 KB, load memory of 1 MB; wide-range alternating voltage supply 85 ... 264 V AC; Boolean execution times of 0.1 µs per operation; 6 digital inputs, 4 digital outputs (relay), 2 analog inputs; expandable with up to 3 communication modules and 1 signal board; digital inputs usable as HSC with 100 kHz		
• Suitable for areas with extraordinary medial exposure (conformal coating)	H	**6AG1 212-1BD30-4XB0**
• Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +55 °C; without restrictions; SB module can be used	I	**6AG1 212-1BD30-5XB0**
• Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +70 °C; from +60 … +70 °C number of simultaneously controllable inputs and outputs max. 50%; no SB module possible	I	**6AG1 212-1BD30-2XB0**

		Order No.
SIPLUS CPU 1211C compact CPU, DC/DC/DC (extended temperature range and medial exposure) Integrated program and data memory of 25 KB, load memory of 1 MB; power supply 24 V DC; boolean execution times of 0.1 µs per operation; 6 digital inputs, 4 digital outputs, 2 analog inputs; expandable with up to 3 communication modules and 1 signal board; digital inputs usable as HSC with 100 kHz, 24 V DC digital outputs usable as pulse outputs (PTO) or pulse-width-modulated outputs (PWM) with 100 kHz		
• Suitable for areas with extraordinary medial exposure (conformal coating)	H	**6AG1 212-1AD30-4XB0**
• Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +55 °C; without restrictions; SB module can be used	I	**6AG1 212-1AD30-5XB0**
• Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +70 °C; from +60 … +70 °C number of simultaneously controllable inputs and outputs max. 50%; no SB module possible	I	**6AG1 212-1AD30-2XB0**

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H

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

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Ordering data

		Order No.
SIPLUS CPU 1211C compact CPU, DC/DC/relay		
(extended temperature range and medial exposure)		
Integrated program and data memory of 25 KB, load memory of 1 MB; power supply 24 V DC; Boolean execution times of 0.1 µs per operation; 6 digital inputs, 4 digital outputs (relay), 2 analog inputs; expandable with up to 3 communication modules and 1 signal board; digital inputs usable as HSC with 100 kHz		
• Suitable for areas with extraordinary medial exposure (conformal coating)	H	**6AG1 211-1HD30-4XB0**
• Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +55 °C; without restrictions; SB module can be used	I	**6AG1 211-1HD30-5XB0**
• Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +70 °C; from +60 … +70 °C number of simultaneously controllable inputs and outputs max. 50%; no SB module possible	I	**6AG1 212-1HD30-2XB0**

	Order No.
Accessories	see SIMATIC S7-1200 CPU 1211C, **page 4/11**

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H
I: Subject to export regulations AL: N and ECCN: EAR99H

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SIPLUS CPU 1212C

Overview



- The superior compact solution
- With 14 integrated I/Os
- Expandable with:
  - 1 signal board (SB)
  - 2 signal modules (SM)
  - Max. 3 communication modules (CM)

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS CPU 1212C DC/DC/DC			
Order number	**6AG1 212-1AD30-2XB0**	**6AG1 212-1AD30-4XB0**	**6AG1 212-1AD30-5XB0**
Order number based on	**6ES7 212-1AD30-0XB0**		
Ambient temperature range	-25 ... +70 °C[3)]	0 ... +55 °C	-25 ... +55 °C
Conformal coating	Coating of the printed circuit boards and the electronic components		
Technical data	The technical data of the standard product applies except for the ambient conditions.		

SIPLUS CPU 1212C AC/DC/RLY			
Order number	**6AG1 212-1BD30-2XB0**	**6AG1 212-1BD30-4XB0**	**6AG1 212-1BD30-5XB0**
Order number based on	**6ES7 212-1BD30-0XB0**		
Ambient temperature range	-25 ... +70 °C[3)]	0 ... +55 °C	-25 ... +55 °C
Conformal coating	Coating of the printed circuit boards and the electronic components		
Technical data	The technical data of the standard product applies except for the ambient conditions.		

SIPLUS CPU 1212C DC/DC/RLY			
Order number	**6AG1 212-1HD30-2XB0**	**6AG1 212-1HD30-4XB0**	**6AG1 212-1HD30-5XB0**
Order number based on	**6ES7 212-1HD30-0XB0**		
Ambient temperature range	-25 ... +70 °C[3)]	0 ... +55 °C	-25 ... +55 °C
Conformal coating	Coating of the printed circuit boards and the electronic components		
Technical data	The technical data of the standard product applies except for the ambient conditions.		

[3)] From +60 °C to +70 °C, the number of simultaneously enabled inputs and outputs is max. 50%; no SB module permitted

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Overview (continued)

Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX[1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust[2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

Technical documentation on SIPLUS is available under:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS CPU 1212C compact CPU, AC/DC/relay		
(extended temperature range and medial exposure)		
Integrated program and data memory of 25 KB, load memory of 1 MB; wide-range alternating voltage supply 85 ... 264 V AC; Boolean execution times of 0.1 µs per operation; 8 digital inputs, 6 digital outputs (relay), 2 analog inputs; expandable with up to 3 communication modules, 2 signal modules, and 1 signal board; digital inputs usable as HSC with 100 kHz		
• Suitable for areas with extraordinary medial exposure (conformal coating)	H	**6AG1 212-1BD30-4XB0**
• Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +55 °C; without restrictions; SB module can be used	I	**6AG1 212-1BD30-5XB0**
• Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +70 °C; from +60 … +70 °C number of simultaneously controllable inputs and outputs max. 50%; no SB module possible	I	**6AG1 212-1BD30-2XB0**

		Order No.
SIPLUS CPU 1212C compact CPU, DC/DC/DC		
(extended temperature range and medial exposure)		
Integrated program and data memory of 25 kbyte, load memory of 1 MB; power supply 24 V DC; Boolean execution times of 0.1 µs per operation; 8 digital inputs, 6 digital outputs, 2 analog inputs; expandable with up to 3 communication modules, 2 signal modules and 1 signal board; digital inputs usable as HSC with 100 kHz; 24 V DC digital outputs usable as pulse outputs (PTO) or pulse-width-modulated outputs (PWM) with 100 kHz		
• Suitable for areas with extraordinary medial exposure (conformal coating)	H	**6AG1 212-1AD30-4XB0**
• Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +55 °C; without restrictions; SB module can be used	I	**6AG1 212-1AD30-5XB0**
• Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +70 °C; from +60 … +70 °C number of simultaneously controllable inputs and outputs max. 50%; no SB module possible	I	**6AG1 212-1AD30-2XB0**

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H

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

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SIPLUS CPU 1212C

Ordering data		Order No.
SIPLUS CPU 1212C compact CPU, DC/DC/relay		
(extended temperature range and medial exposure)		
Integrated program and data memory of 25 KB, load memory of 1 MB; power supply 24 V DC; Boolean execution times of 0.1 µs per operation; 8 digital inputs, 6 digital outputs (relay), 2 analog inputs; expandable with up to 3 communication modules, 2 signal modules and 1 signal board; digital inputs usable as HSC with 100 kHz		
• Suitable for areas with extraordinary medial exposure (conformal coating)	H	**6AG1 212-1HD30-4XB0**
• Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +55 °C; without restrictions; SB module can be used	I	**6AG1 212-1HD30-5XB0**
• Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +70 °C; from +60 … +70 °C number of simultaneously controllable inputs and outputs max. 50%; no SB module possible	I	**6AG1 212-1HD30-2XB0**

Accessories	Order No.
	See SIMATIC S7-1200 CPU 1212C, page 4/20

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H
I: Subject to export regulations AL: N and ECCN: EAR99H

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Overview



- The compact high-performance CPU
- With 24 integrated I/Os
- Expandable with:
  - 1 signal board (SB)
  - 8 signal modules (SM)
  - Max. 3 communication modules (CM)

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS CPU 1214C DC/DC/DC			
Order No.	**6AG1 214-1AE30-2XB0**	**6AG1 214-1AE30-4XB0**	**6AG1 214-1AE30-5XB0**
Order No. based on	**6ES7 214-1AE30-0XB0**		
Ambient temperature range	-25 ... +70 °C[3)]	0 ... +55 °C	-25 ... +55 °C
Conformal coating	Coating of the printed circuit boards and the electronic components		
Technical data	The technical data of the standard product applies except for the ambient conditions.		

SIPLUS CPU 1214C AC/DC/RLY			
Order No.	**6AG1 214-1BE30-2XB0**	**6AG1 214-1BE30-4XB0**	**6AG1 214-1BE30-5XB0**
Order No. based on	**6ES7 214-1BE30-0XB0**		
Ambient temperature range	-25 ... +70 °C[3)]	0 ... +55 °C	-25 ... +55 °C
Conformal coating	Coating of the printed circuit boards and the electronic components		
Technical data	The technical data of the standard product applies except for the ambient conditions.		

SIPLUS CPU 1214C DC/DC/RLY			
Order No.	**6AG1 214-1HE30-2XB0**	**6AG1 214-1HE30-4XB0**	**6AG1 214-1HE30-5XB0**
Order No. based on	**6ES7 214-1HE30-0XB0**		
Ambient temperature range	-25 ... +70 °C[3)]	0 ... +55 °C	-25 ... +55 °C
Conformal coating	Coating of the printed circuit boards and the electronic components		
Technical data	The technical data of the standard product applies except for the ambient conditions.		

[3)] From +60 °C to +70 °C, the number of simultaneously enabled inputs and outputs is max. 50%; no SB module permitted

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Overview (continued)

Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX[1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS CPU 1214C compact CPU, AC/DC/relay (extended temperature range and medial exposure) Integrated program and data memory of 50 kbyte, load memory of 2 MB; wide-range alternating voltage supply 85 ... 264 V AC; Boolean execution times of 0.1 µs per operation; 14 digital inputs, 10 digital outputs (relay), 2 analog inputs; expandable with up to 3 communication modules, 8 signal modules, and 1 signal board; digital inputs usable as HSC with 100 kHz		
• Suitable for areas with extraordinary medial exposure (conformal coating)	H	**6AG1 214-1BE30-4XB0**
• Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +55 °C; without restrictions; SB module can be used	I	**6AG1 214-1BE30-5XB0**
• Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +70 °C; from +60 … +70 °C number of simultaneously controllable inputs and outputs max. 50%; no SB module possible	H	**6AG1 214-1BE30-2XB0**

		Order No.
SIPLUS CPU 1214C compact CPU, DC/DC/DC (extended temperature range and medial exposure) Integrated program and data memory of 50 kbyte, load memory of 2 MB; voltage supply 24 V DC; Boolean execution times of 0.1 µs per operation; 14 digital inputs, 10 digital outputs, 2 analog inputs; expandable with up to 3 communication modules, 8 signal modules and 1 signal board; digital inputs usable as HSC with 100 kHz; 24 V DC digital outputs usable as pulse outputs (PTO) or pulse-width-modulated outputs (PWM) with 100 kHz		
• Suitable for areas with extraordinary medial exposure (conformal coating)	H	**6AG1 214-1AE30-4XB0**
• Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +55 °C; without restrictions; SB module can be used	I	**6AG1 214-1AE30-5XB0**
• Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +70 °C; from +60 … +70 °C number of simultaneously controllable inputs and outputs max. 50%; no SB module possible	H	**6AG1 214-1AE30-2XB0**

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H

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

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Ordering data		Order No.
SIPLUS CPU 1214C compact CPU, DC/DC/relay		
(extended temperature range and medial exposure)		
Integrated program and data memory of 50 KB, load memory of 2 MB; power supply 24 V DC; Boolean execution times of 0.1 µs per operation; 14 digital inputs, 10 digital outputs (relay), 2 analog inputs; expandable with up to 3 communication modules, 8 signal modules and 1 signal board; digital inputs usable as HSC with 100 kHz		
• Suitable for areas with extraordinary medial exposure (conformal coating)	H	**6AG1 214-1HE30-4XB0**
• Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +55 °C; without restrictions; SB module can be used	I	**6AG1 214-1HE30-5XB0**
• Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +70 °C; from +60 … +70 °C number of simultaneously controllable inputs and outputs max. 50%; no SB module possible	H	**6AG1 214-1HE30-2XB0**

Accessories	Order No.
	See SIMATIC S7-1200 CPU 1214C, page 4/29

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H
I: Subject to export regulations AL: N and ECCN: EAR99H

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SM 1221 digital input module

Overview



- Digital inputs as supplement to the integral I/O of the CPUs
- For flexible adaptation of the controller to the relevant task
- For subsequent expansion of the system with additional inputs

Technical specifications

	6ES7 221-1BF30-0XB0	6ES7 221-1BH30-0XB0
Product type designation	SM 1221 DI 8x24 V DC	SM 1221 DI 16x24 V DC
Supply voltages		
Rated value		
• 24 V DC	Yes	Yes
• Permissible range, lower limit (DC)	20.4 V	20.4 V
• Permissible range, upper limit (DC)	28.8 V	28.8 V
Power supply to the transmitters		
• present	Yes	Yes
Current consumption		
from backplane bus 5 V DC, max.	105 mA	130 mA
Digital inputs		
• from load voltage L+ (without load), max.	4 mA; per channel	4 mA; per channel
Power losses		
Power loss, typ.	1.5 W	2.5 W
Connection method		
Required front connector	Yes	Yes
Digital inputs		
Number of digital inputs	8	16
• in groups of	2	4
Number of simultaneously controllable inputs		
• All mounting positions		
- concurrently controllable inputs, up to 40 °C	8	16
• Horizontal installation		
- up to 40 °C, max.	8	16
- up to 50 °C, max.	8	16
• Vertical installation		
- up to 40 °C, max.	8	16
Input characteristic curve acc. to IEC 1131, Type 1	Yes	Yes
Input voltage		
• rated value, DC	24 V	24 V
• for signal "0"	5 V DC at 1 mA	5 V DC at 1 mA
• for signal "1"	15 V DC at 2.5 mA	15 V DC at 2.5 mA
Input current		
• for signal "0", max. (permissible quiescent current)	1 mA	1 mA
• for signal "1", min.	2.5 mA	2.5 mA
• for signal "1", typ.	4 mA; Typical	4 mA; Typical

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Technical specifications (continued)

	6ES7 221-1BF30-0XB0	6ES7 221-1BH30-0XB0
Input delay (for rated value of input voltage)		
• for standard inputs		
- parameterizable	Yes; 0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four	Yes; 0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four
• for interrupt inputs		
- parameterizable	Yes	Yes
Cable length		
• Cable length, shielded, max.	500 m	500 m
• Cable length unshielded, max.	300 m	300 m
Digital outputs		
Number of digital outputs	0	0
Alarms/diagnostics/status information		
Alarms		
• Alarms	Yes	Yes
• Diagnostic alarm	Yes	Yes
Diagnostics		
• Diagnostic functions	Yes	Yes
Diagnostic indication LED		
• for status of the inputs	Yes	Yes
• for maintenance	Yes	Yes
• Status indicator digital input (green)	Yes	Yes
Galvanic isolation		
Galvanic isolation digital inputs		
• between the channels, in groups of	2	4
Climatic and mechanical conditions for storage and transport		
Climatic conditions for storage and transport		
• Free fall		
- Drop height, max. (in packaging)	0.3 m; Five times, in dispatch package	0.3 m; Five times, in dispatch package
• Temperature		
- Permissible temperature range	-40 °C to +70 °C	-40 °C to +70 °C
• Air pressure acc. to IEC 60068-2-13		
- Permissible air pressure	1080 to 660 hPa	1080 to 660 hPa
• Relative humidity		
- Permissible range (without condensation) at 25 °C	95%	95%
Mechanical and climatic conditions during operation		
Climatic conditions in operation		
• Temperature		
- permissible temperature change	5°C to 55°C, 3°C / minute	5°C to 55°C, 3°C / minute
Degree of protection		
IP20	Yes	Yes
Standards, approvals, certificates		
CE mark	Yes	Yes
C-TICK	Yes	Yes
FM approval	Yes	Yes
Mechanics/material		
Type of housing (front)		
• Plastic	Yes	Yes
Dimensions and weight		
Dimensions		
• Width	45 mm	45 mm
• Height	100 mm	100 mm
• Depth	75 mm	75 mm
Weight		
• Weight, approx.	170 g	210 g

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SM 1221 digital input module

Ordering data		Order No.
SM 1221 digital input signal module		
8 inputs, 24 V DC, isolated, current sourcing/sinking	I	**6ES7 221-1BF30-0XB0**
16 inputs, 24 V DC, isolated, current sourcing/sinking	I	**6ES7 221-1BH30-0XB0**
Extension cable for two-tier configuration	I	**6ES7 290-6AA30-0XA0**
for connecting digital/analog signal modules; length 2 m		
Terminal block (spare part)		
for 8/16-channel digital signal modules		
with 7 screws, zinc-plated; 4 units	I	**6ES7 292-1AG30-0XA0**
Front flap set (spare part)		
for 8/16-channel signal modules		**6ES7 291-1BA30-0XA0**
S7-1200 automation system, system manual		
For SIMATIC S7-1200 and STEP 7 Basic		
German	K	**6ES7 298-8FA30-8AH0**
English	K	**6ES7 298-8FA30-8BH0**
French	K	**6ES7 298-8FA30-8CH0**
Spanish	K	**6ES7 298-8FA30-8DH0**
Italian	K	**6ES7 298-8FA30-8EH0**
Chinese	K	**6ES7 298-8FA30-8KH0**

		Order No.
S7-1200 automation system, Easy Book		
Brief instructions		
German	K	**6ES7 298-8FA30-8AQ0**
English	K	**6ES7 298-8FA30-8BQ0**
French	K	**6ES7 298-8FA30-8CQ0**
Spanish	K	**6ES7 298-8FA30-8DQ0**
Italian	K	**6ES7 298-8FA30-8EQ0**
Chinese	K	**6ES7 298-8FA30-8KQ0**
STEP 7 Basic V11 engineering software		
Target system: SIMATIC S7-1200 controllers and the associated I/O. Requirements: Windows XP Home SP3, Windows XP Professional SP3 (32 bit), Windows 7 Home Premium, Windows 7Professional (32 bit), Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit), Microsoft Server 2008 Std. SP2 (32 bit) Type of delivery: German, English, Chinese, Italian, French, Spanish		
Single license		**6ES7 822-0AA01-0YA0**
Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license		**6ES7 822-0AA01-0YE0**
Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license		**6ES7 822-1AA01-0YC5**
STEP 7 Basic V11, trial license		**6ES7 822-0AA01-0YA7**
STEP 7 Basic Software Update Service, 1 year	D	**6ES7 822-0AA00-0YL0**

D: Subject to export regulations AL: N and ECCN: 5D992
I: Subject to export regulations AL: N and ECCN: EAR99H
K: Subject to export regulations AL: N and ECCN: EAR99T

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Overview



- Digital inputs as a supplement to the integral I/O of SIMATIC S7-1200 CPUs
- Can be plugged directly into the CPU

Technical specifications

	6ES7 221-3AD30-0XB0	6ES7 221-3BD30-0XB0
Product type designation	SB 1221 4xDI 5 V DC 200 kHz	SB 1221 4xDI 24 V DC 200 kHz
Supply voltages		
Power supply to the transmitters		
• Supply current, max.	4 mA; per channel	4 mA; per channel
Current consumption		
from backplane bus 5 V DC, typ.	50 mA	50 mA
Power losses		
Power loss, typ.	1 W	1 W
Digital inputs		
Number of digital inputs	4; Current-sourcing	4; Current-sourcing
• in groups of	1	1
Number of simultaneously controllable inputs		
• all mounting positions		
- Concurrently controllable inputs, up to 40 °C	4	4
Input characteristic curve acc. to IEC 1131, Type 1	Yes	
Input characteristic curve acc. to IEC 1131, Type 2		Yes
Input voltage		
• Rated value, DC	5 V	24 V
• for signal "0"	0 to 1 V	0 to 5 V
• for signal "1"	2 to 6 V	15 to 30 V
Input current		
• for signal "0", max. (permissible quiescent current)	3 mA	2 mA
• for signal "1", min.	6 mA	5.8 mA
• for signal "1", typ.		14 mA
Input delay (for rated value of input voltage)		
• for standard inputs		
- parameterizable	Yes; 0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four	Yes; 0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four
- at "0" to "1", max.	2 µs	2.5 µs
• for interrupt inputs		
- parameterizable	Yes	Yes
• for counter/technological functions		
- parameterizable	Yes	Yes
Cable length		
• Cable length, shielded, max.	50 m; Shielded, twisted wire pair	50 m; Standard input: 500 m, high-speed counters: 50 m

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Technical specifications (continued)

	6ES7 221-3AD30-0XB0	6ES7 221-3BD30-0XB0
Alarms/diagnostics/status information		
Alarms		
• Alarms	Yes	Yes
Diagnostics		
• Diagnostic functions	Yes	Yes
Diagnostic indication LED		
• for status of the inputs	Yes	Yes
Climatic and mechanical conditions for storage and transport		
Climatic conditions for storage and transport		
• Free fall		
- Drop height, max. (in packaging)	0.3 m; Five times, in dispatch package	0.3 m; Five times, in dispatch package
• Temperature		
- Permissible temperature range	-40 °C to +70 °C	-40 °C to +70 °C
• Air pressure acc. to IEC 60068-2-13		
- Permissible air pressure	1080 to 660 hPa	1080 to 660 hPa
• Relative humidity		
- Permissible range (without condensation) at 25 °C	95%	95%
Degree of protection		
IP20	Yes	Yes
Standards, approvals, certificates		
Marine approval according to Germanischer Lloyd	Yes	Yes
Mechanics/material		
Type of housing (front)		
• Plastic	Yes	Yes
Dimensions and weight		
Dimensions		
• Width	38 mm	38 mm
• Height	62 mm	62 mm
• Depth	21 mm	21 mm
Weight		
• Weight, approx.	40 g	40 g

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Ordering data		Order No.
SB 1221 signal board digital input modules		
4 inputs, 5 V DC, 200 kHz	I	**6ES7 221-3AD30-0XB0**
4 inputs, 24 V DC, 200 kHz	I	**6ES7 221-3BD30-0XB0**
Terminal block (spare part)		
for Signal Board		
with 6 screws, gold-plated; 4 units	I	**6ES7 292-1BF30-0XA0**
S7-1200 automation system, system manual		
For SIMATIC S7-1200 and STEP 7 Basic		
German	K	**6ES7 298-8FA30-8AH0**
English	K	**6ES7 298-8FA30-8BH0**
French	K	**6ES7 298-8FA30-8CH0**
Spanish	K	**6ES7 298-8FA30-8DH0**
Italian	K	**6ES7 298-8FA30-8EH0**
Chinese	K	**6ES7 298-8FA30-8KH0**
S7-1200 automation system, Easy Book		
Brief instructions		
German	K	**6ES7 298-8FA30-8AQ0**
English	K	**6ES7 298-8FA30-8BQ0**
French	K	**6ES7 298-8FA30-8CQ0**
Spanish	K	**6ES7 298-8FA30-8DQ0**
Italian	K	**6ES7 298-8FA30-8EQ0**
Chinese	K	**6ES7 298-8FA30-8KQ0**

		Order No.
STEP 7 Basic V11 engineering software		
Target system: SIMATIC S7-1200 controllers and the associated I/O. Requirements: Windows XP Home SP3, Windows XP Professional SP3 (32 bit), Windows 7 Home Premium, Windows 7Professional (32 bit), Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit), Microsoft Server 2008 Std. SP2 (32 bit) Type of delivery: German, English, Chinese, Italian, French, Spanish		
Single license		**6ES7 822-0AA01-0YA0**
Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license		**6ES7 822-0AA01-0YE0**
Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license		**6ES7 822-1AA01-0YC5**
STEP 7 Basic V11, trial license		**6ES7 822-0AA01-0YA7**
STEP 7 Basic Software Update Service, 1 year	D	**6ES7 822-0AA00-0YL0**

D: Subject to export regulations AL: N and ECCN: 5D992
I: Subject to export regulations AL: N and ECCN: EAR99H
K: Subject to export regulations AL: N and ECCN: EAR99T

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SM 1222 digital output module

Overview



- Digital outputs as supplement to the integral I/O of the CPUs
- For flexible adaptation of the controller to the relevant task
- For subsequent expansion of the system with additional outputs

Technical specifications

	6ES7 222-1BF30-0XB0	6ES7 222-1BH30-0XB0	6ES7 222-1HF30-0XB0	6ES7 222-1HH30-0XB0
Product type designation	SM1222 DQ 8x24 V DC	SM1222 DQ 16x24 V DC	SM 1222 DQ 8xRelay	SM1222 DQ 16xRelay
Supply voltages				
Rated value				
• permissible range, lower limit (DC)	20.4 V	20.4 V	5 V	5 V
• permissible range, upper limit (DC)	28.8 V	28.8 V	30 V	30 V
Current consumption				
from backplane bus 5 V DC, max.	120 mA	140 mA	120 mA	135 mA
Digital inputs				
• from load voltage L+ (without load), max.			11 mA / relay coil	11 mA / relay coil
Power losses				
Power loss, typ.	1.5 W	2.5 W	4.5 W	8.5 W
Connection method				
required front connector	Yes	Yes	Yes	Yes
Digital inputs				
Number of digital inputs	0	0	0	0
Digital outputs				
Number of digital outputs	8	16	8	16
• in groups of	1	1	2	1
Short-circuit protection	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	typ. (L+) -48 V	typ. (L+) -48 V		
Switching capacity of the outputs				
• with resistive load, max.	0.5 A	0.5 A	2 A	2 A
• on lamp load, max.	5 W	5 W	30 W DC ; 200 W AC	30 W DC ; 200 W AC
Output voltage				
• Rated value (AC)			5 to 250 V AC	5 to 250 V AC
• Rated value (DC)	24 V	24 V	5 to 30 V DC	5 to 30 V DC
• for signal "0" (DC), max.	0.1 V; with 10 kOhm load	0.1 V; with 10 kOhm load		
• for signal "1", min.	20 V DC	20 V DC		

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Technical specifications (continued)

	6ES7 222-1BF30-0XB0	6ES7 222-1BH30-0XB0	6ES7 222-1HF30-0XB0	6ES7 222-1HH30-0XB0
Output current				
• for signal "1" rated value	0.5 A	0.5 A		
• for signal "1" permissible range, max.			2 A	2 A
• for signal "0" residual current, max.	10 µA	10 µA		
Output delay with resistive load				
• 0 to "1", max.	50 µs	50 µs	10 ms	10 ms
• 1 to "0", max.	200 µs	200 µs	10 ms	10 ms
Aggregate current of outputs (per group)				
• horizontal installation				
- up to 50 °C, max.	4 A; Current per mass	8 A; Current per mass	10 A; Current per mass	10 A; Current per mass
Cable length				
• 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 relay outputs			8	16
Rated input voltage of relay L+ (DC)			24 V	24 V
Number of operating cycles			mechanically 10 million, at rated load voltage 100,000	mechanically 10 million, at rated load voltage 100,000
Switching capacity of contacts				
• with inductive load, max.	0.5 A	0.5 A	2 A	2 A
• on lamp load, max.	5 W	5 W	30 W DC ; 200 W AC	30 W DC ; 200 W AC
• with resistive load, max.	0.5 A	0.5 A	2 A	2 A
Alarms/diagnostics/status information				
Alarms				
• Alarms	Yes	Yes	Yes	Yes
• Diagnostic alarm	Yes	Yes	Yes	Yes
Diagnostics				
• Diagnostic functions	Yes	Yes	Yes	Yes
Diagnostic indication LED				
• For status of the outputs	Yes	Yes	Yes	Yes
• for maintenance	Yes	Yes	Yes	Yes
• Status indicator digital output (green)	Yes	Yes	Yes	Yes
Galvanic isolation				
Galvanic isolation digital outputs				
• between the channels			Relays	Relays
• between the channels, in groups of	1	1	2	4
• between the channels and the backplane bus	500 V AC	500 V AC	1500 V AC for 1 minute	1500 V AC for 1 minute

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Technical specifications (continued)

	6ES7 222-1BF30-0XB0	6ES7 222-1BH30-0XB0	6ES7 222-1HF30-0XB0	6ES7 222-1HH30-0XB0
Climatic and mechanical conditions for storage and transport				
Climatic conditions for storage and transport				
• Free fall				
- Drop height, max. (in packaging)	0.3 m; Five times, in dispatch package	0.3 m; Five times, in dispatch package	0.3 m; Five times, in dispatch package	0.3 m; Five times, in dispatch package
• Temperature				
- Permissible temperature range	-40 °C to +70 °C	-40 °C to +70 °C	-40 °C to +70 °C	-40 °C to +70 °C
• Air pressure acc. to IEC 60068-2-13				
- Permissible air pressure	1080 to 660 hPa	1080 to 660 hPa	1080 to 660 hPa	1080 to 660 hPa
• Relative humidity				
- Permissible range (without condensation) at 25 °C	95%	95%	95%	95%
Mechanical and climatic conditions during operation				
Climatic conditions in operation				
• Temperature				
- Permissible temperature range	0° C to 55° C horizontal mounting 0° C to 45° C vertical mounting	0° C to 55° C horizontal mounting 0° C to 45° C vertical mounting 95% non-condensing humidity	0° C to 55° C horizontal mounting 0° C to 45° C vertical mounting	0° C to 55° C horizontal mounting 0° C to 45° C vertical mounting
- permissible temperature change	5°C to 55°C, 3°C / minute	5°C to 55°C, 3°C / minute	5°C to 55°C, 3°C / minute	5°C to 55°C, 3°C / minute
Degree of protection				
IP20	Yes	Yes	Yes	Yes
Standards, approvals, certificates				
CE mark	Yes	Yes	Yes	Yes
C-TICK	Yes	Yes	Yes	Yes
FM approval	Yes	Yes	Yes	Yes
Mechanics/material				
Type of housing (front)				
• Plastic	Yes	Yes	Yes	Yes
Dimensions and weight				
Dimensions				
• Width	45 mm	45 mm	45 mm	45 mm
• Height	100 mm	100 mm	100 mm	100 mm
• Depth	75 mm	75 mm	75 mm	75 mm
Weight				
• Weight, approx.	180 g	220 g	190 g	260 g

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Ordering data

		Order No.
SM 1222 digital output signal module		
8 outputs, 24 V DC; 0.5 A, 5 W, isolated	I	**6ES7 222-1BF30-0XB0**
16 outputs, 24 V DC; 0.5 A, 5 W, isolated	I	**6ES7 222-1BH30-0XB0**
8 relay outputs, 5 ... 30 V DC/ 5 ... 250 V AC, 2 A, 30 W DC/ 200 W AC	I	**6ES7 222-1HF30-0XB0**
16 relay outputs, 5 ... 30 V DC/ 5 ... 250 V AC, 2 A, 30 W DC/ 200 W AC	I	**6ES7 222-1HH30-0XB0**
Extension cable for two-tier configuration	I	**6ES7 290-6AA30-0XA0**
for connecting digital/analog signal modules; length 2 m		
Terminal block (spare part)		
for 8/16-channel digital signal modules		
with 7 screws, zinc-plated; 4 units	I	**6ES7 292-1AG30-0XA0**
Front flap set (spare part)		
for 8/16-channel signal modules		**6ES7 291-1BA30-0XA0**
S7-1200 automation system, system manual		
For SIMATIC S7-1200 and STEP 7 Basic		
German	K	**6ES7 298-8FA30-8AH0**
English	K	**6ES7 298-8FA30-8BH0**
French	K	**6ES7 298-8FA30-8CH0**
Spanish	K	**6ES7 298-8FA30-8DH0**
Italian	K	**6ES7 298-8FA30-8EH0**
Chinese	K	**6ES7 298-8FA30-8KH0**
S7-1200 automation system, Easy Book		
Brief instructions		
German	K	**6ES7 298-8FA30-8AQ0**
English	K	**6ES7 298-8FA30-8BQ0**
French	K	**6ES7 298-8FA30-8CQ0**
Spanish	K	**6ES7 298-8FA30-8DQ0**
Italian	K	**6ES7 298-8FA30-8EQ0**
Chinese	K	**6ES7 298-8FA30-8KQ0**
STEP 7 Basic V11 engineering software		
Target system: SIMATIC S7-1200 controllers and the associated I/O. Requirements: Windows XP Home SP3, Windows XP Professional SP3 (32 bit), Windows 7 Home Premium, Windows 7Professional (32 bit), Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit), Microsoft Server 2008 Std. SP2 (32 bit) Type of delivery: German, English, Chinese, Italian, French, Spanish		
Single license		**6ES7 822-0AA01-0YA0**
Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license		**6ES7 822-0AA01-0YE0**
Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license		**6ES7 822-1AA01-0YC5**
STEP 7 Basic V11, trial license		**6ES7 822-0AA01-0YA7**
STEP 7 Basic Software Update Service, 1 year	D	**6ES7 822-0AA00-0YL0**

D: Subject to export regulations AL: N and ECCN: 5D992
I: Subject to export regulations AL: N and ECCN: EAR99H
K: Subject to export regulations AL: N and ECCN: EAR99T

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SB 1222 digital output module

Overview



- Digital outputs as a supplement to the integral I/O of SIMATIC S7-1200 CPUs
- Can be plugged directly into the CPU

Technical specifications

	6ES7 222-1AD30-0XB0	6ES7 222-1BD30-0XB0
Product type designation	SB 1222 4xDQ 5 V DC 200kHz	SB 1222 4xDQ 24 V DC 200kHz
Supply voltages		
Power supply to the transmitters		
• Supply current, max.	4 mA; per channel	4 mA; per channel
Current consumption		
from backplane bus 5 V DC, typ.	50 mA	50 mA
Power losses		
Power loss, typ.	1 W	1 W
Digital outputs		
Number of digital outputs	4; MOSFET, solid-state (current-sinking/current-sourcing)	4; MOSFET, solid-state (current-sinking/current-sourcing)
• in groups of	1	1
Short-circuit protection	No	No
Switching capacity of the outputs		
• with resistive load, max.	0.1 A	0.1 A
Output voltage		
• Rated value (DC)	5 V	24 V
• for signal "0" (DC), max.	0.4 V	0.1 V; with 10 kOhm load
• for signal "1", min.	L+ (-0.5 V)	20 V
• for signal "1" (DC), max.	6 V	
Output current		
• for signal "1" rated value	0.1 A	0.1 A
• for signal "1" permissible range, max.	0.11 A	
• for signal "0" residual current, max.		10 µA
Load resistance range		
• upper limit	5 Ω	10 Ω
Cable length		
• Cable length, shielded, max.	50 m	50 m
Alarms/diagnostics/status information		
Alarms		
• Alarms	Yes	Yes
Diagnostics		
• Diagnostic functions	Yes	Yes
Diagnostic indication LED		
• For status of the outputs	Yes	Yes

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Technical specifications (continued)

	6ES7 222-1AD30-0XB0	6ES7 222-1BD30-0XB0
Climatic and mechanical conditions for storage and transport		
Climatic conditions for storage and transport		
• Free fall		
- Drop height, max. (in packaging)	0.3 m; Five times, in dispatch package	0.3 m; Five times, in dispatch package
• Temperature		
- Permissible temperature range	-40 °C to +70 °C	-40 °C to +70 °C
• Air pressure acc. to IEC 60068-2-13		
- Permissible air pressure	1080 to 660 hPa	1080 to 660 hPa
• Relative humidity		
- Permissible range (without condensation) at 25 °C	95%	95%
Degree of protection		
IP20	Yes	Yes
Standards, approvals, certificates		
Marine approval according to Germanischer Lloyd	Yes	Yes
Mechanics/material		
Type of housing (front)		
• Plastic	Yes	Yes
Dimensions and weight		
Dimensions		
• Width	38 mm	38 mm
• Height	62 mm	62 mm
• Depth	21 mm	21 mm
Weight		
• Weight, approx.	40 g	40 g

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SB 1222 digital output module

Ordering data		Order No.
SB 1222 signal board digital output modules		
4 outputs, 5 V DC, 0.1 A, 200 kHz	I	**6ES7 222-1AD30-0XB0**
4 outputs, 24 V DC, 0.1 A, 200 kHz	I	**6ES7 222-1BD30-0XB0**
Terminal block (spare part)		
for Signal Board		
with 6 screws, gold-plated; 4 units	I	**6ES7 292-1BF30-0XA0**
S7-1200 automation system, system manual		
For SIMATIC S7-1200 and STEP 7 Basic		
German	K	**6ES7 298-8FA30-8AH0**
English	K	**6ES7 298-8FA30-8BH0**
French	K	**6ES7 298-8FA30-8CH0**
Spanish	K	**6ES7 298-8FA30-8DH0**
Italian	K	**6ES7 298-8FA30-8EH0**
Chinese	K	**6ES7 298-8FA30-8KH0**
S7-1200 automation system, Easy Book		
Brief instructions		
German	K	**6ES7 298-8FA30-8AQ0**
English	K	**6ES7 298-8FA30-8BQ0**
French	K	**6ES7 298-8FA30-8CQ0**
Spanish	K	**6ES7 298-8FA30-8DQ0**
Italian	K	**6ES7 298-8FA30-8EQ0**
Chinese	K	**6ES7 298-8FA30-8KQ0**

		Order No.
STEP 7 Basic V11 engineering software		
Target system: SIMATIC S7-1200 controllers and the associated I/O. Requirements: Windows XP Home SP3, Windows XP Professional SP3 (32 bit), Windows 7 Home Premium, Windows 7Professional (32 bit), Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit), Microsoft Server 2008 Std. SP2 (32 bit) Type of delivery: German, English, Chinese, Italian, French, Spanish		
Single license		**6ES7 822-0AA01-0YA0**
Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license		**6ES7 822-0AA01-0YE0**
Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license		**6ES7 822-1AA01-0YC5**
STEP 7 Basic V11, trial license		**6ES7 822-0AA01-0YA7**
STEP 7 Basic	D	**6ES7 822-0AA00-0YL0**
Software Update Service, 1 year		

D: Subject to export regulations AL: N and ECCN: 5D992
I: Subject to export regulations AL: N and ECCN: EAR99H
K: Subject to export regulations AL: N and ECCN: EAR99T

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Overview



- Digital inputs and outputs as supplement to the integral I/O of the CPUs
- For flexible adaptation of the controller to the relevant task
- For subsequent expansion of the system with additional inputs and outputs

Technical specifications

	6ES7 223-1BH30-0XB0	6ES7 223-1BL30-0XB0	6ES7 223-1PH30-0XB0	6ES7 223-1PL30-0XB0	6ES7 223-1QH30-0XB0
Product type designation	SM 1223 DI 8x24 V DC, DQ 8x24 V DC	SM 1223 DI 16x24 V DC, DQ 16x24 V DC	SM 1223 DI 8x24 V DC, DQ 8xRelay	SM 1223 DI 16x24 V DC, DQ 16xRelay	120/230 V AC SM223 DIx8/DQx8 RLY
Supply voltages					
Rated value					
• 24 V DC	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
Power supply to the transmitters					
• present	Yes	Yes	Yes	Yes	Yes
Current consumption					
from backplane bus 5 V DC, max.	145 mA	185 mA	145 mA	180 mA	120 mA
Digital inputs					
• from load voltage L+ (without load), max.	4 mA; per channel	4 mA; per channel			
Power losses					
Power loss, typ.	2.5 W	4.5 W	5.5 W	10 W	
Connection method					
required front connector	Yes	Yes	Yes	Yes	Yes
Digital inputs					
Number of digital inputs	8	16	8	16	8
• in groups of	2	2	2	2	4
Number of simultaneously controllable inputs					
• all mounting positions					
- Concurrently controllable inputs, up to 40 °C	8	16	8	16	8
• horizontal installation					
- up to 40 °C, max.	8	16	8	16	8
- up to 50 °C, max.	8	16	8	16	8
• vertical installation					
- up to 40 °C, max.	8	16	8	16	8

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Technical specifications (continued)

	6ES7 223-1BH30-0XB0	6ES7 223-1BL30-0XB0	6ES7 223-1PH30-0XB0	6ES7 223-1PL30-0XB0	6ES7 223-1QH30-0XB0
Input characteristic curve acc. to IEC 1131, Type 1	Yes	Yes	Yes	Yes	Yes
Input voltage					
• Rated value, AC					230 V
• Rated value, DC	24 V	24 V	24 V	24 V	
• for signal "0"	5 V DC at 1 mA	5 V DC at 1 mA	5 V DC at 1 mA	5 V DC at 1 mA	20 V AC at 1 mA
• for signal "1"	15 V DC at 2.5 mA	15 V DC at 2.5 mA	15 V DC at 2.5 mA	15 V DC at 2.5 mA	79 V AC at 2.5 mA
Input current					
• for signal "0", max. (permissible quiescent current)	1 mA	1 mA	1 mA	1 mA	1 mA
• for signal "1", min.	2.5 mA	2.5 mA	2.5 mA	2.5 mA	2.5 mA
• for signal "1", typ.	4 mA; typical	4 mA; typical	4 mA; typical	4 mA; typical	9 mA; typical
Input delay (for rated value of input voltage)					
• for standard inputs					
- parameterizable	Yes; 0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four	Yes; 0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four	Yes; 0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four	Yes; 0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four	Yes; 0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four
• for interrupt inputs					
- parameterizable	Yes	Yes	Yes	Yes	Yes
Cable length					
• Cable length, shielded, max.	500 m	500 m	500 m	500 m	500 m
• Cable length unshielded, max.	300 m	300 m	300 m	300 m	300 m
Digital outputs					
Number of digital outputs	8	16	8	16	8
• in groups of	1	1	2	4	2
Short-circuit protection	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	L+ (-48 V)	L+ (-48 V)			
Switching capacity of the outputs					
• with resistive load, max.	0.5 A	0.5 A	2 A	2 A	2 A
• on lamp load, max.	5 W	5 W	30 W DC ; 200 W AC	30 W DC ; 200 W AC	30 W DC ; 200 W AC
Output voltage					
• Rated value (AC)			5 to 250 V AC	5 to 250 V AC	5 to 250 V AC
• Rated value (DC)	24 V	24 V	5 to 30 V AC	5 to 30 V AC	5 to 30 V DC
• for signal "0" (DC), max.	0.1 V; with 10 kOhm load	0.1 V; with 10 kOhm load			
• for signal "1", min.	20 V DC	20 V DC			
Output current					
• for signal "1" permissible range, max.	0.5 A	0.5 A	2 A	2 A	2 A
• for signal "0" residual current, max.	10 µA	10 µA			
Output delay with resistive load					
• 0 to "1", max.	50 µs	50 µs	10 ms	10 ms	10 ms
• 1 to "0", max.	200 µs	200 µs	10 ms	10 ms	10 ms

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Technical specifications (continued)

	6ES7 223-1BH30-0XB0	6ES7 223-1BL30-0XB0	6ES7 223-1PH30-0XB0	6ES7 223-1PL30-0XB0	6ES7 223-1QH30-0XB0
Aggregate current of outputs (per group)					
• Horizontal installation					
- up to 50 °C, max.	4 A; Current per mass	8 A; Current per mass	10 A; Current per mass	8 A; Current per mass	10 A; Current per mass
Cable length					
• Cable length, shielded, max.	500 m	500 m	500 m	500 m	500 m
• Cable length unshielded, max.	150 m	150 m	150 m	150 m	150 m
Relay outputs					
Number of relay outputs			8	16	8
Rated input voltage of relay L+ (DC)			24 V	24 V	24 V
Number of operating cycles			mechanically 10 million, at rated load voltage 100,000	mechanically 10 million, at rated load voltage 100,000	mechanically 10 million, at rated load voltage 100,000
Switching capacity of contacts					
• with inductive load, max.	0.5 A	0.5 A	2 A	2 A	2 A
• on lamp load, max.	5 W	5 W	30 W DC ; 200 W AC	30 W DC ; 200 W AC	30 W DC ; 200 W AC
• with resistive load, max.	0.5 A	0.5 A	2 A	2 A	2 A
Alarms/diagnostics/ status information					
Alarms					
• Alarms	Yes	Yes	Yes	Yes	Yes
• Diagnostic alarm	Yes	Yes	Yes	Yes	Yes
Diagnostics					
• Diagnostic functions	Yes	Yes	Yes	Yes	Yes
Diagnostic indication LED					
• for status of the inputs	Yes	Yes	Yes	Yes	Yes
• for status of the outputs	Yes	Yes	Yes	Yes	Yes
• for maintenance	Yes	Yes	Yes	Yes	Yes
• Status indicator digital output (green)	Yes	Yes	Yes	Yes	Yes
• Status indicator digital input (green)	Yes	Yes	Yes	Yes	Yes
Galvanic isolation					
Galvanic isolation digital inputs					
• between the channels, in groups of	2	2	2	2	2
Galvanic isolation digital outputs					
• between the channels			Relays	Relays	Relays
• between the channels, in groups of	1	1	2	4	2
• between the channels and the backplane bus	500 V AC	500 V AC	1500 V AC for 1 minute	1500 V AC for 1 minute	1500 V AC for 1 minute

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Technical specifications (continued)

	6ES7 223-1BH30-0XB0	6ES7 223-1BL30-0XB0	6ES7 223-1PH30-0XB0	6ES7 223-1PL30-0XB0	6ES7 223-1QH30-0XB0
Climatic and mechanical conditions for storage and transport					
Climatic conditions for storage and transport					
• Free fall					
- Drop height, max. (in packaging)	0.3 m; five times, in dispatch package	0.3 m; five times, in dispatch package	0.3 m; five times, in dispatch package	0.3 m; five times, in dispatch package	0.3 m; five times, in dispatch package
• Temperature					
- Permissible temperature range	-40 °C to +70 °C	-40 °C to +70 °C	-40 °C to +70 °C	-40 °C to +70 °C	-40 °C to +70 °C
• Air pressure acc. to IEC 60068-2-13					
- Permissible air pressure	1080 to 660 hPa	1080 to 660 hPa	1080 to 660 hPa	1080 to 660 hPa	1080 to 660 hPa
• Relative humidity					
- Permissible range (without condensation) at 25 °C	95%	95%	95%	95%	95%
Mechanical and climatic conditions during operation					
Climatic conditions in operation					
• Temperature					
- permissible temperature change	5°C to 55°C, 3°C / minute	5°C to 55°C, 3°C / minute	5°C to 55°C, 3°C / minute	5°C to 55°C, 3°C / minute	5°C to 55°C, 3°C / minute
Degree of protection					
IP20	Yes	Yes	Yes	Yes	Yes
Standards, approvals, certificates					
CE mark	Yes	Yes	Yes	Yes	Yes
C-TICK	Yes	Yes	Yes	Yes	Yes
FM approval	Yes	Yes	Yes	Yes	Yes
Mechanics/material					
Type of housing (front)					
• Plastic	Yes	Yes	Yes	Yes	Yes
Dimensions and weight					
Dimensions					
• Width	45 mm	70 mm	45 mm	70 mm	45 mm
• Height	100 mm	100 mm	100 mm	100 mm	100 mm
• Depth	75 mm	75 mm	75 mm	75 mm	75 mm
Weight					
• Weight, approx.	210 g	310 g	230 g	350 g	230 g

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Ordering data		Order No.
SM 1223 digital input/output signal module		
8 inputs, 24 V DC, IEC type 1 current sinking; 8 24 V DC transistor outputs, 0.5 A, 5 W	I	**6ES7 223-1BH30-0XB0**
16 inputs, 24 V DC, IEC type 1 current sinking; 16 24 V DC transistor outputs, 0.5 A, 5 W	I	**6ES7 223-1BL30-0XB0**
8 inputs, 24 V DC, IEC type 1 current sinking; 8 relay outputs, 5 ... 30 V DC/ 5 ... 250 V AC, 2 A, 30 W DC/ 200 W AC	I	**6ES7 223-1PH30-0XB0**
16 inputs, 24 V DC, IEC type 1 current sinking; 16 relay outputs, 5 ... 30 V DC/ 5 ... 250 V AC, 2 A, 30 W DC/ 200 W AC	I	**6ES7 223-1PL30-0XB0**
8 inputs, 120/230 V AC; 8 relay outputs, 5 ... 30 V DC/ 5 ... 250 V AC, 2 A, 30 W DC/ 200 W AC	I	**6ES7 223-1QH30-0XB0**
Extension cable for two-tier configuration	I	**6ES7 290-6AA30-0XA0**
for connecting digital/analog signal modules; length 2 m		
Terminal block (spare part)		
for 8/16-channel digital signal modules		
with 7 screws, zinc-plated; 4 units	I	**6ES7 292-1AG30-0XA0**
Terminal block (spare part)		
for 8/16-channel signal modules		**6ES7 291-1BA30-0XA0**
for 32-channel signal modules		**6ES7 291-1BB30-0XA0**
S7-1200 automation system, system manual		
For SIMATIC S7-1200 and STEP 7 Basic		
German	K	**6ES7 298-8FA30-8AH0**
English	K	**6ES7 298-8FA30-8BH0**
French	K	**6ES7 298-8FA30-8CH0**
Spanish	K	**6ES7 298-8FA30-8DH0**
Italian	K	**6ES7 298-8FA30-8EH0**
Chinese	K	**6ES7 298-8FA30-8KH0**

		Order No.
S7-1200 automation system, Easy Book		
Brief instructions		
German	K	**6ES7 298-8FA30-8AQ0**
English	K	**6ES7 298-8FA30-8BQ0**
French	K	**6ES7 298-8FA30-8CQ0**
Spanish	K	**6ES7 298-8FA30-8DQ0**
Italian	K	**6ES7 298-8FA30-8EQ0**
Chinese	K	**6ES7 298-8FA30-8KQ0**
STEP 7 Basic V11 engineering software		
Target system: SIMATIC S7-1200 controllers and the associated I/O. Requirements: Windows XP Home SP3, Windows XP Professional SP3 (32 bit), Windows 7 Home Premium, Windows 7Professional (32 bit), Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit), Microsoft Server 2008 Std. SP2 (32 bit) Type of delivery: German, English, Chinese, Italian, French, Spanish		
Single license		**6ES7 822-0AA01-0YA0**
Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license		**6ES7 822-0AA01-0YE0**
Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license		**6ES7 822-1AA01-0YC5**
STEP 7 Basic V11, trial license		**6ES7 822-0AA01-0YA7**
STEP 7 Basic	D	**6ES7 822-0AA00-0YL0**
Software Update Service, 1 year		

D: Subject to export regulations AL: N and ECCN: 5D992
I: Subject to export regulations AL: N and ECCN: EAR99H
K: Subject to export regulations AL: N and ECCN: EAR99T

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SB 1223 digital input/output module

Overview



- Digital inputs and outputs as supplement to the integral I/O of the SIMATIC S7-1200 CPUs
- Can be plugged direct into the CPU

Technical specifications

	6ES7 223-0BD30-0XB0	6ES7 223-3AD30-0XB0	6ES7 223-3BD30-0XB0
Product type designation	SB 1223 DI2x24 V DC, DQ 2x24 V DC	SB 1223 2xDI / 2xDQ 5 V DC 200kHz	SB 1223 2xDI / 2xDQ 24 V DC 200kHz
Supply voltages			
Rated value			
• Permissible range, lower limit (DC)	20.4 V		
• Permissible range, upper limit (DC)	30 V		
Power supply to the transmitters			
• Supply current, max.	4 mA; per channel	4 mA; per channel	4 mA; per channel
Current consumption			
from backplane bus 5 V DC, typ.	50 mA	50 mA	50 mA
Power losses			
Power loss, typ.	1 W	1 W	1 W
Digital inputs			
Number of digital inputs	2; current-sinking	2; current-sourcing	2; current-sourcing
• in groups of	1	1	1
Number of simultaneously controllable inputs			
• all mounting positions			
- Concurrently controllable inputs, up to 40 °C	2	2	2
Input characteristic curve acc. to IEC 1131, Type 1	Yes	Yes	Yes
Input voltage			
• Rated value, DC	24 V	5 V	24 V
• for signal "0"	0 to 5 V	0 to 1 V	0 to 5 V
• for signal "1"	15 to 30 V	2 to 6 V	15 to 30 V
Input current			
• for signal "0", max. (permissible quiescent current)	1 mA	3 mA	2 mA
• for signal "1", min.		6 mA	5.8 mA
• for signal "1", typ.	0.5 A		14 mA

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Technical specifications (continued)

	6ES7 223-0BD30-0XB0	6ES7 223-3AD30-0XB0	6ES7 223-3BD30-0XB0
Input delay (for rated value of input voltage)			
• for standard inputs			
- parameterizable	Yes; 0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four	Yes; 0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four	Yes; 0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four
- at "0" to "1", max.	2 µs	2 µs	2.5 µs
- at "1" to "0", max.	10 µs		
• for interrupt inputs			
- parameterizable	Yes	Yes	Yes
• for counter/technological functions			
- parameterizable	Yes	Yes	Yes
Cable length			
• Cable length, shielded, max.	500 m	50 m	Standard input: 500 m, high-speed counters: 50 m
• Cable length unshielded, max.	300 m		
Digital outputs			
Number of digital outputs	2; MOSFET, solid-state (current-sinking/current-sourcing)	2; MOSFET, solid-state (current-sinking/current-sourcing)	2; MOSFET, solid-state (current-sinking/current-sourcing)
• in groups of	1	1	1
Short-circuit protection	No	No	No
Switching capacity of the outputs			
• with resistive load, max.	0.5 A	0.1 A	0.1 A
• on lamp load, max.	5 W		
Output voltage			
• Rated value (DC)	24 V	5 V	24 V
• for signal "0" (DC), max.	0.1 V; with 10 kOhm load	0.4 V	0.1 V; with 10 kOhm load
• for signal "1", min.	20 V	L+ (-0.5 V)	20 V
• for signal "1" (DC), max.		6 V	
Output current			
• for signal "1" rated value	0.5 A	0.1 A	0.1 A
• for signal "1" permissible range, max.		0.11 A	
• for signal "0" residual current, max.	10 µA		10 µA
Load resistance range			
• upper limit	0.6 Ω	5 Ω	10 Ω
Cable length			
• Cable length, shielded, max.	500 m	50 m	50 m
• Cable length unshielded, max.	150 m		
Alarms/diagnostics/status information			
Alarms			
• Alarms	Yes	Yes	Yes
Diagnostics			
• Diagnostic functions	Yes	Yes	Yes
Diagnostic indication LED			
• for status of the inputs	Yes	Yes	Yes
• for status of the outputs	Yes	Yes	Yes

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Technical specifications (continued)

	6ES7 223-0BD30-0XB0	6ES7 223-3AD30-0XB0	6ES7 223-3BD30-0XB0
Climatic and mechanical conditions for storage and transport			
Climatic conditions for storage and transport			
• Free fall			
- Drop height, max. (in packaging)	0.3 m; Five times, in dispatch package	0.3 m; Five times, in dispatch package	0.3 m; Five times, in dispatch package
• Temperature			
- Permissible temperature range	-40 °C to +70 °C	-40 °C to +70 °C	-40 °C to +70 °C
• Air pressure acc. to IEC 60068-2-13			
- Permissible air pressure	1080 to 660 hPa	1080 to 660 hPa	1080 to 660 hPa
• Relative humidity			
- Permissible range (without condensation) at 25 °C	95%	95%	95%
Degree of protection			
IP20	Yes	Yes	Yes
Standards, approvals, certificates			
Marine approval according to Germanischer Lloyd	Yes	Yes	Yes
Mechanics/material			
Type of housing (front)			
• Plastic	Yes	Yes	Yes
Dimensions and weight			
Dimensions			
• Width	38 mm	38 mm	38 mm
• Height	62 mm	62 mm	62 mm
• Depth	21 mm	21 mm	21 mm
Weight			
• Weight, approx.	40 g	40 g	40 g

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Ordering data

		Order No.
SB 1223 digital input/output signal board		
2 inputs, 24 V DC, IEC type 1 current sinking; 2 24 V DC transistor outputs, 0.5 A, 5 W; can be used as HSC at up to 30 kHz	I	**6ES7 223-0BD30-0XB0**
2 inputs, 5 V DC, 200 kHz 2 outputs 5 V DC, 0.1 A, 200 kHz	I	**6ES7 223-3AD30-0XB0**
2 inputs, 24 V DC, 200 kHz 2 outputs 24 V DC, 0.1 A, 200 kHz	I	**6ES7 223-3BD30-0XB0**
Terminal block (spare part)		
for signal board		
with 6 screws, gold-plated; 4 units	I	**6ES7 292-1BF30-0XA0**
S7-1200 automation system, system manual		
For SIMATIC S7-1200 and STEP 7 Basic		
German	K	**6ES7 298-8FA30-8AH0**
English	K	**6ES7 298-8FA30-8BH0**
French	K	**6ES7 298-8FA30-8CH0**
Spanish	K	**6ES7 298-8FA30-8DH0**
Italian	K	**6ES7 298-8FA30-8EH0**
Chinese	K	**6ES7 298-8FA30-8KH0**
S7-1200 automation system, Easy Book		
Brief instructions		
German	K	**6ES7 298-8FA30-8AQ0**
English	K	**6ES7 298-8FA30-8BQ0**
French	K	**6ES7 298-8FA30-8CQ0**
Spanish	K	**6ES7 298-8FA30-8DQ0**
Italian	K	**6ES7 298-8FA30-8EQ0**
Chinese	K	**6ES7 298-8FA30-8KQ0**
STEP 7 Basic V11 engineering software		
Target system: SIMATIC S7-1200 controllers and the associated I/O. Requirements: Windows XP Home SP3, Windows XP Professional SP3 (32 bit), Windows 7 Home Premium, Windows 7Professional (32 bit), Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit), Microsoft Server 2008 Std. SP2 (32 bit) Type of delivery: German, English, Chinese, Italian, French, Spanish		
Single license		**6ES7 822-0AA01-0YA0**
Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license		**6ES7 822-0AA01-0YE0**
Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license		**6ES7 822-1AA01-0YC5**
STEP 7 Basic V11, trial license		**6ES7 822-0AA01-0YA7**
STEP 7 Basic Software Update Service, 1 year	D	**6ES7 822-0AA00-0YL0**

D: Subject to export regulations AL: N and ECCN: 5D992
I: Subject to export regulations AL: N and ECCN: EAR99H
K: Subject to export regulations AL: N and ECCN: EAR99T

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SIPLUS SM 1221 digital input module

Overview



- Digital inputs as supplement to the integral I/O of the CPUs
- For flexible adaptation of the controller to the corresponding task
- For subsequent expansion of the system with additional inputs
- From +60 °C to +70 °C, max. 50% of the inputs can be controlled simultaneously

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS SM 1221		
Order number	**6AG1 221-1BF30-2XB0**	**6AG1 211-1BF30-4XB0**
Order No. based on	**6ES7 221-1BF30-0XB0**	
Ambient temperature range	-25 ... +70 °C	0 ... +55 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for ambient conditions.	

SIPLUS SM 1221		
Order number	**6AG1 221-1BH30-2XB0**	**6AG1 221-1BH30-4XB0**
Order No. based on	**6ES7 221-1BH30-0XB0**	
Ambient temperature range	-25 ... +70 °C	0 ... +55 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for ambient conditions.	

Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX[1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust[2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
Digital input SIPLUS SM 1221 signal module		
(extended temperature range and medial exposure)		
8 inputs, 24 V DC, isolated, current sourcing/sinking		
• Suitable for areas with extraordinary medial exposure (conformal coating)	H	**6AG1 221-1BF30-4XB0**
• -25 ... +70 °C, from +60 … +70 °C number of simultaneously controllable inputs and outputs max. 50 %	I	**6AG1 221-1BF30-2XB0**
16 inputs, 24 V DC, isolated, current sourcing/sinking		
• Suitable for areas with extraordinary medial exposure (conformal coating)	H	**6AG1 221-1BH30-4XB0**
• -25 ... +70 °C, from +60 … +70 °C number of simultaneously controllable inputs and outputs max. 50 %	I	**6AG1 221-1BH30-2XB0**
Accessories		See SIMATIC S7-1200 SM 1221 digital input, page 4/42

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H
I: Subject to export regulations AL: N and ECCN: EAR99H

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Overview



- Digital outputs as a supplement to the integral I/O of the CPUs
- For flexible adaptation of the controller to the corresponding task
- For subsequent expansion of the system with additional outputs
- From +60 °C to +70 °C, max. 50% of the inputs can be controlled simultaneously

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS SM 1222		
Order number	**6AG1 222-1BF30-2XB0**	**6AG1 222-1BF30-4XB0**
Order No. based on	**6ES7 222-1BF30-0XB0**	
Ambient temperature range	-25 ... +70 °C	0 ... +55 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	

SIPLUS SM 1222		
Order number	**6AG1 222-1BH30-2XB0**	**6AG1 222-1BH30-4XB0**
Order No. based on	**6ES7 222-1BH30-0XB0**	
Ambient temperature range	-25 ... +70 °C	0 ... +55 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	

SIPLUS SM 1222		
Order number	**6AG1 222-1HF30-2XB0**	**6AG1 222-1HF30-4XB0**
Order No. based on	**6ES7 222-1HF30-0XB0**	
Ambient temperature range	-25 ... +70 °C	0 ... +55 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	

SIPLUS SM 1222		
Order number	**6AG1 222-1HH30-2XB0**	**6AG1 222-1HH30-4XB0**
Order No. based on	**6ES7 222-1HH30-0XB0**	
Ambient temperature range	-25 ... +70 °C	0 ... +55 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	

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SIPLUS SM 1222 digital output module

Overview (continued)

Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX[1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust[2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
Digital output SIPLUS SM 1222 signal module		
(extended temperature range and medial exposure)		
8 outputs, 24 V DC; 0.5 A, 5 W, isolated		
• Suitable for areas with extraordinary medial exposure (conformal coating)	H	**6AG1 222-1BF30-4XB0**
• -25 ... +70 °C, from +60 … +70°C number of simultaneously controllable inputs and outputs max. 50 %	I	**6AG1 222-1BF30-2XB0**
16 outputs, 24 V DC; 0.5 A, 5 W, isolated		
• Suitable for areas with extraordinary medial exposure (conformal coating)	H	**6AG1 222-1BH30-4XB0**
• -25 ... +70 °C, from +60 … +70°C number of simultaneously controllable inputs and outputs max. 50 %	I	**6AG1 222-1BH30-2XB0**
8 relay outputs, 5 ... 30 V DC/ 5 ... 250 V AC, 2 A, 30 W DC/ 200 W AC		
• Suitable for areas with extraordinary medial exposure (conformal coating)	H	**6AG1 222-1HF30-4XB0**
• -25 ... +70 °C, from +60 … +70°C number of simultaneously controllable inputs and outputs max. 50 %	I	**6AG1 222-1HF30-2XB0**
16 relay outputs, 5 ... 30 V DC/ 5 ... 250 V AC, 2 A, 30 W DC/ 200 W AC		
• Suitable for areas with extraordinary medial exposure (conformal coating)	H	**6AG1 222-1HH30-4XB0**
• -25 ... +70 °C, from +60 … +70°C number of simultaneously controllable inputs and outputs max. 50 %	I	**6AG1 222-1HH30-2XB0**
Accessories		See SIMATIC S7-1200 SM 1222 digital output, page 4/49

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H
I: Subject to export regulations AL: N and ECCN: EAR99H

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Overview



- Digital inputs and outputs as supplement to the integral I/O of the CPUs
- For flexible adaptation of the controller to the corresponding task
- For subsequent expansion of the system with additional inputs and outputs
- From +60 °C to +70 °C, max. 50% of the inputs can be controlled simultaneously

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS SM 1223		
Order number	**6AG1 223-1BH30-2XB0**	**6AG1 223-1BH30-4XB0**
Order No. based on	**6ES7 223-1BH30-0XB0**	
Ambient temperature range	-25 ... +70 °C	0 ... +55 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	

SIPLUS SM 1223		
Order number	**6AG1 223-1PH30-2XB0**	**6AG1 223-1PH30-4XB0**
Order No. based on	**6ES7 223-1PH30-0XB0**	
Ambient temperature range	-25 ... +70 °C	0 ... +55 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	

SIPLUS SM 1223		
Order number	**6AG1 223-1PL30-2XB0**	**6AG1 223-1PL30-4XB0**
Order No. based on	**6ES7 223-1PL30-0XB0**	
Ambient temperature range	-25 ... +70 °C	0 ... +55 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	

SIPLUS SM 1223		
Order number	**6AG1 223-1BL30-2XB0**	**6AG1 223-1BL30-4XB0**
Order No. based on	**6ES7 223-1BL30-0XB0**	
Ambient temperature range	-25 ... +70 °C	0 ... +55 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	

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SIPLUS SM 1223 digital input/output module

Overview (continued)

Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX[1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust[2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
Digital input/output SIPLUS SM 1223 signal module (extended temperature range and medial exposure)		
8 inputs, 24 V DC, IEC type 1 current sinking; 8 transistor outputs, 24 V DC, 0.5 A, 5 W		
• Suitable for areas with extra-ordinary medial exposure (conformal coating)	H	**6AG1 223-1BH30-4XB0**
• -25 ... +70 °C, from +60 … +70 °C number of simultaneously controllable inputs and outputs max. 50 %	I	**6AG1 223-1BH30-2XB0**
16 inputs, 24 V DC, IEC type 1 current sinking; 16 transistor outputs, 24 V DC, 0.5 A, 5 W		
• Suitable for areas with extra-ordinary medial exposure (conformal coating)	H	**6AG1 223-1BL30-4XB0**
• -25 ... +70 °C, from +60 … +70 °C number of simultaneously controllable inputs and outputs max. 50 %	I	**6AG1 223-1BL30-2XB0**
8 inputs, 24 V DC, IEC type 1 current sinking; 8 relay outputs, 5 ... 30 V DC / 5 ... 250 V AC, 2 A, 30 W DC / 200 W AC		
• Suitable for areas with extra-ordinary medial exposure (conformal coating)	H	**6AG1 223-1PH30-4XB0**
• -25 ... +70 °C, from +60 … +70 °C number of simultaneously controllable inputs and outputs max. 50 %	I	**6AG1 223-1PH30-2XB0**
16 inputs, 24 V DC, IEC type 1 current sinking; 16 relay outputs, 5 ... 30 V DC / 5 ... 250 V AC, 2 A, 30 W DC / 200 W AC		
• Suitable for areas with extra-ordinary medial exposure (conformal coating)	H	**6AG1 223-1PL30-4XB0**
• -25 ... +70 °C, from +60 … +70 °C number of simultaneously controllable inputs and outputs max. 50 %	I	**6AG1 223-1PL30-2XB0**
Accessories		See SIMATIC S7-1200 SM 1223 digital input/output, page 4/57

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H
I: Subject to export regulations AL: N and ECCN: EAR99H

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Overview



- Digital inputs and outputs as supplement to the integral I/O of the SIPLUS S7-1200-CPUs
- Can be plugged directly into the CPU (cannot be used for +70 °C version)

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS SB 1223		
Order number	**6AG1 223-0BD30-4XB0**	**6AG1 223-0BD30-5XB0**
Order No. based on	**6ES7 223-0BD30-0XB0**	
Ambient temperature range	0 ... +55 °C	-25 ... +55 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	
Ambient conditions		
Relative humidity	5 ... 100 % Condensation permissible	
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)	
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1]	
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust	
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K	

[1] ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
Digital input/output SIPLUS SM 1223 signal board		
(extended temperature range and medial exposure)		
2 inputs, 24 V DC, IEC type 1 current sinking; 2 transistor outputs, 24 V DC, 0.5 A, 5 W; usable as HSC up to 30 kHz		
• Suitable for areas with extraordinary medial exposure (conformal coating)	H	**6AG1 223-0BD30-4XB0**
• Ambient temperature -25 ... +55 °C	I	**6AG1 223-0BD30-5XB0**

	Order No.
Accessories	See SIMATIC S7-1200 SB 1223 digital input/output, page 4/61

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H
I: Subject to export regulations AL: N and ECCN: EAR99H

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SM 1231 analog input module

Overview



- Analog inputs for SIMATIC S7-1200
- With extremely short conversion times
- For connecting analog sensors without additional amplifiers
- For solving even more complex automation tasks

Technical specifications

	6ES7 231-4HD30-0XB0	6ES7 231-4HF30-0XB0
Product type designation	SM 1231 AI 4x13 bit	SM 1231 AI 8 x 13 bit
Supply voltages		
Rated value		
• 24 V DC	Yes	Yes
Current consumption		
Current consumption, typ.	45 mA	45 mA
from backplane bus 5 V DC, typ.	80 mA	90 mA
Power losses		
Power loss, typ.	1.5 W	1.5 W
Connection method		
required front connector	Yes	Yes
Analog inputs		
Number of analog inputs	4; current or voltage differential inputs	8; current or voltage differential inputs
Permissible input frequency for current input (destruction limit), max.	± 35 V	± 35 V
Permissible input current for voltage input (destruction limit), max.	40 mA	40 mA
Cycle time (all channels) max.	625 µs	625 µs
Input ranges		
• Voltage	Yes; ±10 V, ±5 V, ±2.5 V	Yes; ±10 V, ±5 V, ±2.5 V
• Current	Yes; 0 to 20 mA	Yes; 0 to 20 mA
• Thermocouple	No	No
• Resistance thermometer	No	No
• Resistance	No	No
Input ranges (rated values), voltages		
• -10 V to +10 V	Yes	Yes
• Input resistance (-10 V to +10 V)	≥9 MOhm	≥9 MOhm
• -2.5 V to +2.5 V	Yes	Yes
• Input resistance (-2.5 V to +2.5 V)	≥9 MOhm	≥9 MOhm
• -5 V to +5 V	Yes	Yes
• Input resistance (-5 V to +5 V)	≥9 MOhm	≥9 MOhm
Input ranges (rated values), currents		
• 0 to 20 mA	Yes	Yes
• Input resistance (0 to 20 mA)	≥ 250 Ohm	≥ 250 Ohm
Voltage input		
• permissible input voltage for voltage input (destruction limit), max.	35 V	35 V

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Technical specifications (continued)

	6ES7 231-4HD30-0XB0	6ES7 231-4HF30-0XB0
Current input		
• permissible input current for current input (destruction limit), max.	40 mA	40 mA
Temperature compensation		
• Temperature compensation parameterizable	No	No
Analog outputs		
Number of analog outputs	0	0
Analog value creation		
Integrations and conversion time/ resolution per channel		
• Resolution with overrange (bit including sign), max.	12 bit; + sign	12 bit; + sign
• Integration time, parameterizable	Yes	Yes
• Interference voltage suppression for interference frequency f1 in Hz	40 dB, DC to 60 V for interference frequency 50 / 60 Hz	40 dB, DC to 60 V for interference frequency 50 / 60 Hz
Smoothing of measured values		
• Parameterizable	Yes	Yes
• Step: None	Yes	Yes
• Step: Low	Yes	Yes
• Step: Medium	Yes	Yes
• Step: High	Yes	Yes
Errors/accuracies		
Temperature error (relative to input area)	25°C ±0.1% to 55°C ±0.2% total measurement range	25°C ±0.1% to 55°C ±0.2% total measurement range
Basic error limit (operational limit at 25 °C)		
• Voltage, relative to input area	+/- 0.1 %	+/- 0.1 %
• Current, relative to input area	+/- 0.1 %	+/- 0.1 %
Interference voltage suppression for f = n x (fl +/- 1%), fl = interference frequency		
• Common mode voltage, max.	12 V	12 V
Alarms/diagnostics/status information		
Alarms		
• Alarms	Yes	Yes
• Diagnostic alarm	Yes	Yes
Diagnostics		
• Diagnostic functions	Yes	Yes
• Monitoring the supply voltage to the electronics	Yes	Yes
• Wire break	No	No
Diagnostic indication LED		
• for status of the inputs	Yes	Yes
• for maintenance	Yes	Yes
Galvanic isolation		
Galvanic isolation analog outputs		
• between the channels and the power supply of the electronics	No	No
Climatic and mechanical conditions for storage and transport		
Climatic conditions for storage and transport		
• Free fall		
- Drop height, max. (in packaging)	0.3 m; five times, in dispatch package	0.3 m; five times, in dispatch package
• Temperature		
- Permissible temperature range	-40 °C to +70 °C	-40 °C to +70 °C
• Air pressure acc. to IEC 60068-2-13		
- Permissible air pressure	1080 to 660 hPa	1080 to 660 hPa
• Relative humidity		
- Permissible range (without condensation) at 25 °C	95%	95%

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SM 1231 analog input module

	6ES7 231-4HD30-0XB0	6ES7 231-4HF30-0XB0
Mechanical and climatic conditions during operation		
Climatic conditions in operation		
• Air pressure acc. to IEC 60068-2-13		
- Permissible air pressure	1080 to 795 hPa	1080 to 795 hPa
• Pollutant concentrations		
- SO_2 at RH < 60% without condensation	$S0_2$: < 0.5 ppm; H_2S: < 0.1 ppm; RH < 60% condensation-free	$S0_2$: < 0.5 ppm; H_2S: < 0.1 ppm; RH < 60% condensation-free
Degree of protection		
IP20	Yes	Yes
Standards, approvals, certificates		
CE mark	Yes	Yes
C-TICK	Yes	Yes
FM approval	Yes	Yes
Mechanics/material		
Type of housing (front)		
• Plastic	Yes	Yes
Dimensions and weight		
Dimensions		
• Width	45 mm	45 mm
• Height	100 mm	100 mm
• Depth	75 mm	75 mm
Weight		
• Weight, approx.	180 g	180 g

Ordering data

		Order No.
SM 1231 analog input signal module		
4 analog inputs ±10 V, ±5 V, ±2.5 V, or 0 ... 20 mA 12 bit + sign	I	**6ES7 231-4HD30-0XB0**
8 analog inputs ±10 V, ±5 V, ±2.5 V, or 0 ... 20 mA 12 bit + sign	I	**6ES7 231-4HF30-0XB0**
Extension cable for two-tier configuration	I	**6ES7 290-6AA30-0XA0**
for connecting digital/analog signal modules; length 2 m		
Terminal block (spare part)		
for 8/16-channel analog signal modules		
with 7 screws, gold-plated; 4 units	I	**6ES7 292-1BG30-0XA0**
Front flap set (spare part)		
for 8/16-channel signal modules		**6ES7 291-1BA30-0XA0**
S7-1200 automation system, system manual		
For SIMATIC S7-1200 and STEP 7 Basic		
German	K	**6ES7 298-8FA30-8AH0**
English	K	**6ES7 298-8FA30-8BH0**
French	K	**6ES7 298-8FA30-8CH0**
Spanish	K	**6ES7 298-8FA30-8DH0**
Italian	K	**6ES7 298-8FA30-8EH0**
Chinese	K	**6ES7 298-8FA30-8KH0**

		Order No.
S7-1200 automation system, Easy Book		
Brief instructions		
German	K	**6ES7 298-8FA30-8AQ0**
English	K	**6ES7 298-8FA30-8BQ0**
French	K	**6ES7 298-8FA30-8CQ0**
Spanish	K	**6ES7 298-8FA30-8DQ0**
Italian	K	**6ES7 298-8FA30-8EQ0**
Chinese	K	**6ES7 298-8FA30-8KQ0**
STEP 7 Basic V11 engineering software		
Single license		**6ES7 822-0AA01-0YA0**
Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license		**6ES7 822-0AA01-0YE0**
Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license		**6ES7 822-1AA01-0YC5**
STEP 7 Basic V11, trial license		**6ES7 822-0AA01-0YA7**
STEP 7 Basic Software Update Service, 1 year	D	**6ES7 822-0AA00-0YL0**

D: Subject to export regulations AL: N and ECCN: 5D992
I: Subject to export regulations AL: N and ECCN: EAR99H
K: Subject to export regulations AL: N and ECCN: EAR99T

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Overview

- Analog input module for the SIMATIC S7-1200
- With extremely short conversion times
- For the connection of analog sensors without additional amplifiers
- For the solution of more complex automation tasks as well
- Can be plugged directly into the CPU

Technical specifications

Product type designation	6ES7 231-4HA30-0XB0 SB1231 AI 1x12 BIT
Supply voltages	
Rated value	
• 24 V DC	Yes
Connection method	
required front connector	Yes
Analog inputs	
Number of analog inputs	1; Current or voltage differential inputs
permissible input frequency for current input (destruction limit), max.	± 35 V
Cycle time (all channels) max.	156.25 µs; 400 Hz suppression
Input ranges	
• Voltage	Yes; ±10 V, ±5 V, ±2.5 V
• Current	Yes; 0 to 20 mA
• Thermocouple	No
• Resistance thermometer	No
• Resistance	No
Input ranges (rated values), voltages	
• -10 V to +10 V	Yes
• Input resistance (-10 V to +10 V)	≥9 MOhm
• -2.5 V to +2.5 V	Yes
• Input resistance (-2.5 V to +2.5 V)	≥9 MOhm
• -5 V to +5 V	Yes
• Input resistance (-5 V to +5 V)	≥9 MOhm
Input ranges (rated values), currents	
• 0 to 20 mA	Yes
• Input resistance (0 to 20 mA)	≥ 250 Ohm
Voltage input	
• permissible input voltage for voltage input (destruction limit), max.	35 V
Cable length	
• Cable length, shielded, max.	Twisted and shielded in pairs
Analog value creation	
Measurement principle	Integrating
Integrations and conversion time/ resolution per channel	
• Resolution with overrange (bit including sign), max.	11 bit; + sign
• Integration time, parameterizable	Yes
• Interference voltage suppression for interference frequency f1 in Hz	40 dB, DC to 60 Hz
Smoothing of measured values	
• parameterizable	Yes
• Step: None	Yes
• Step: Low	Yes
• Step: Medium	Yes
• Step: High	Yes
Errors/accuracies	
Temperature error (relative to input area)	25 °C ±0.3% to 55 °C ±0.6% total measurement range
Alarms/diagnostics/status information	
Alarms	
• Alarms	Yes
• Diagnostic alarm	Yes
Diagnostics	
• Diagnostic functions	Yes
• Wire break	No
Diagnostic indication LED	
• for status of the inputs	Yes
• for maintenance	Yes
Climatic and mechanical conditions for storage and transport	
Climatic conditions for storage and transport	
• Free fall	
- Drop height, max. (in packaging)	0.3 m; five times, in dispatch package
• Temperature	
- Permissible temperature range	-40 °C to +70 °C
• Air pressure acc. to IEC 60068-2-13	
- Permissible air pressure	1080 to 660 hPa
• Relative humidity	
- Permissible range (without condensation) at 25 °C	95%
Mechanical and climatic conditions during operation	
Climatic conditions in operation	
• Air pressure acc. to IEC 60068-2-13	
- Permissible air pressure	1080 to 795 hPa
• Pollutant concentrations	
- SO_2 at RH < 60% without condensation	$S0_2$: < 0.5 ppm; H_2S: < 0.1 ppm; RH < 60% condensation-free

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SB 1231 analog input module

Technical specifications (continued)

Product type designation	6ES7 231-4HA30-0XB0 SB1231 AI 1x12 BIT
Degree of protection	
IP20	Yes
Standards, approvals, certificates	
CE mark	Yes
C-TICK	Yes
FM approval	Yes
Mechanics/material	
Type of housing (front)	
• Plastic	Yes
Dimensions and weight	
Dimensions	
• Width	38 mm
• Height	62 mm
• Depth	21 mm
Weight	
• Weight, approx.	35 g

Ordering data

		Order No.
SB 1231 signal board analog input module		
1 analog input, ±10 V with 12 bit or 0 ... 20 mA with 11 bit	I	**6ES7 231-4HA30-0XB0**
Terminal block (spare part)		
for signal board		
with 6 screws, gold-plated; 4 units	I	**6ES7 292-1BF30-0XA0**
S7-1200 automation system, system manual		
For SIMATIC S7-1200 and STEP 7 Basic		
German	K	**6ES7 298-8FA30-8AH0**
English	K	**6ES7 298-8FA30-8BH0**
French	K	**6ES7 298-8FA30-8CH0**
Spanish	K	**6ES7 298-8FA30-8DH0**
Italian	K	**6ES7 298-8FA30-8EH0**
Chinese	K	**6ES7 298-8FA30-8KH0**
S7-1200 automation system, Easy Book		
Brief instructions		
German	K	**6ES7 298-8FA30-8AQ0**
English	K	**6ES7 298-8FA30-8BQ0**
French	K	**6ES7 298-8FA30-8CQ0**
Spanish	K	**6ES7 298-8FA30-8DQ0**
Italian	K	**6ES7 298-8FA30-8EQ0**
Chinese	K	**6ES7 298-8FA30-8KQ0**
STEP 7 Basic V11 engineering software		
Target system: SIMATIC S7-1200 controllers and the associated I/O. Requirements: Windows XP Home SP3, Windows XP Professional SP3 (32 bit), Windows 7 Home Premium, Windows 7Professional (32 bit), Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit), Microsoft Server 2008 Std. SP2 (32 bit) Type of delivery: German, English, Chinese, Italian, French, Spanish		
Single license		**6ES7 822-0AA01-0YA0**
Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license		**6ES7 822-0AA01-0YE0**
Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license		**6ES7 822-1AA01-0YC5**
STEP 7 Basic V11, trial license		**6ES7 822-0AA01-0YA7**
STEP 7 Basic Software Update Service, 1 year	D	**6ES7 822-0AA00-0YL0**

D: Subject to export regulations AL: N and ECCN: 5D992
I: Subject to export regulations AL: N and ECCN: EAR99H
K: Subject to export regulations AL: N and ECCN: EAR99T

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Overview



- Analog outputs for SIMATIC S7-1200
- With extremely short conversion times
- For connecting analog actuators without additional amplifiers
- For solving even more complex automation tasks

Technical specifications

	6ES7 232-4HB30-0XB0	6ES7 232-4HD30-0XB0
Product type designation	SM 1232 AQ 2x14 bit	SM 1232 AQ 4 x14 bit
Supply voltages		
Rated value		
• 24 V DC	Yes	Yes
Current consumption		
Current consumption, typ.	45 mA	45 mA
from backplane bus 5 V DC, typ.	80 mA	80 mA
Power losses		
Power loss, typ.	1.5 W	1.5 W
Connection method		
required front connector	Yes	Yes
Analog inputs		
Number of analog inputs	0	
Temperature compensation		
• Temperature compensation parameterizable	No	No
Analog outputs		
Number of analog outputs	2; current or voltage	4; current or voltage
Output ranges, voltage		
• -10 to +10 V	Yes	Yes
Output ranges, current		
• 0 to 20 mA	Yes	Yes
Load impedance (in rated range of output)		
• with voltage outputs, min.	1 000 Ω	1 000 Ω
• with current outputs, max.	600 Ω	600 Ω
Analog value creation		
Measurement principle	Differential	Differential
Integrations and conversion time/ resolution per channel		
• Resolution (incl. overrange)	Voltage: 14 bit; Current : 13 bit	Voltage: 14 bit; Current : 13 bit
• Integration time, parameterizable	Yes	Yes
• Interference voltage suppression for interference frequency f1 in Hz	40 dB, DC to 60 V for interference frequency 50 / 60 Hz	40 dB, DC to 60 V for interference frequency 50 / 60 Hz

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Technical specifications (continued)

	6ES7 232-4HB30-0XB0	6ES7 232-4HD30-0XB0
Errors/accuracies		
Temperature error (relative to output area)	25°C ±0.3% to 55°C ±0.6% total measurement range	25°C ±0.3% to 55°C ±0.6% total measurement range
Basic error limit (operational limit at 25 °C)		
• Voltage, relative to output area	+/- 0.3 %	+/- 0.3 %
• Current, relative to output area	+/- 0.3 %	+/- 0.3 %
Interference voltage suppression for f = n x (fl +/- 1%), fl = interference frequency		
• common mode voltage, max.	12 V	12 V
Alarms/diagnostics/status information		
Alarms		
• Alarms	Yes	Yes
• Diagnostic alarm	Yes	Yes
Diagnostics		
• Diagnostic functions	Yes	Yes
• Monitoring the supply voltage to the electronics	Yes	Yes
• Wire break	Yes	Yes
• Short circuit	Yes	Yes
Diagnostic indication LED		
• for status of the outputs	Yes	Yes
• for maintenance	Yes	Yes
Climatic and mechanical conditions for storage and transport		
Climatic conditions for storage and transport		
• Free fall		
- Drop height, max. (in packaging)	0.3 m; five times, in dispatch package	0.3 m; five times, in dispatch package
• Temperature		
- Permissible temperature range	-40 °C to +70 °C	-40 °C to +70 °C
• Air pressure acc. to IEC 60068-2-13		
- Permissible air pressure	1080 to 660 hPa	1080 to 660 hPa
• Relative humidity		
- Permissible range (without condensation) at 25 °C	95%	95%
Mechanical and climatic conditions during operation		
Climatic conditions in operation		
• Air pressure acc. to IEC 60068-2-13		
- Permissible air pressure	1080 to 795 hPa	1080 to 795 hPa
• Pollutant concentrations		
- SO_2 at RH < 60% without condensation	$S0_2$: < 0.5 ppm; H_2S: < 0.1 ppm; RH < 60% condensation-free	$S0_2$: < 0.5 ppm; H_2S: < 0.1 ppm; RH < 60% condensation-free
Degree of protection		
IP20	Yes	Yes
Standards, approvals, certificates		
CE mark	Yes	Yes
C-TICK	Yes	Yes
FM approval	Yes	Yes
Mechanics/material		
Type of housing (front)		
• Plastic	Yes	Yes
Dimensions and weight		
Dimensions		
• Width	45 mm	45 mm
• Height	100 mm	100 mm
• Depth	75 mm	75 mm
Weight		
• Weight, approx.	180 g	180 g

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Ordering data		Order No.
SM 1232 analog output signal module		
2 analog outputs, ±10 V with 14 bit or 0 ... 20 mA with 13 bit	I	**6ES7 232-4HB30-0XB0**
4 analog outputs, ±10 V with 14 bit or 0 ... 20 mA with 13 bit	I	**6ES7 232-4HD30-0XB0**
Extension cable for two-tier configuration	I	**6ES7 290-6AA30-0XA0**
for connecting digital/analog signal modules; length 2 m		
Terminal block (spare part)		
for 8/16-channel analog signal modules		
with 7 screws, gold-plated; 4 units	I	**6ES7 292-1BG30-0XA0**
S7-1200 automation system, system manual		
For SIMATIC S7-1200 and STEP 7 Basic		
German	K	**6ES7 298-8FA30-8AH0**
English	K	**6ES7 298-8FA30-8BH0**
French	K	**6ES7 298-8FA30-8CH0**
Spanish	K	**6ES7 298-8FA30-8DH0**
Italian	K	**6ES7 298-8FA30-8EH0**
Chinese	K	**6ES7 298-8FA30-8KH0**
S7-1200 automation system, Easy Book		
Brief instructions		
German	K	**6ES7 298-8FA30-8AQ0**
English	K	**6ES7 298-8FA30-8BQ0**
French	K	**6ES7 298-8FA30-8CQ0**
Spanish	K	**6ES7 298-8FA30-8DQ0**
Italian	K	**6ES7 298-8FA30-8EQ0**
Chinese	K	**6ES7 298-8FA30-8KQ0**

		Order No.
STEP 7 Basic V11 engineering software		
Target system: SIMATIC S7-1200 controllers and the associated I/O. Requirements: Windows XP Home SP3, Windows XP Professional SP3 (32 bit), Windows 7 Home Premium, Windows 7Professional (32 bit), Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit), Microsoft Server 2008 Std. SP2 (32 bit) Type of delivery: German, English, Chinese, Italian, French, Spanish		
Single license		**6ES7 822-0AA01-0YA0**
Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license		**6ES7 822-0AA01-0YE0**
Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license		**6ES7 822-1AA01-0YC5**
STEP 7 Basic V11, trial license		**6ES7 822-0AA01-0YA7**
STEP 7 Basic Software Update Service, 1 year	D	**6ES7 822-0AA00-0YL0**

D: Subject to export regulations AL: N and ECCN: 5D992
I: Subject to export regulations AL: N and ECCN: EAR99H
K: Subject to export regulations AL: N and ECCN: EAR99T

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SB 1232 analog output module

Overview



- Analog output for the SIMATIC S7-1200
- Can be plugged direct into the CPU

Technical specifications

	6ES7 232-4HA30-0XB0
Product type designation	SB 1232 1x AO
Supply voltages	
Power supply to the transmitters	
• Supply current, max.	25 mA
Current consumption	
from backplane bus 5 V DC, typ.	15 mA
Power losses	
Power loss, typ.	1.5 W
Analog outputs	
Number of analog outputs	1
Cycle time (all channels) max.	Voltage: 300 µS (R), 750 µS (1 uF) Current: 600 ms (1 mH); 2 ms (10 mH)
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.	1 000 Ω
• with current outputs, max.	600 Ω
Cable length	
• Cable length, shielded, max.	Shielded, twisted wire pair
Analog value creation	
Measurement principle	Differential
Integrations and conversion time/ resolution per channel	
• Resolution (incl. overrange)	U / 12 bit, I / 11 bit
Smoothing of measured values	
• parameterizable	Yes
Errors/accuracies	
Temperature error (relative to output area)	25°C ±0.5% bis 55°C ±1%
Alarms/diagnostics/status information	
Alarms	
• Alarms	Yes
Diagnostics	
• Diagnostic functions	Yes
Diagnostic indication LED	
• For status of the outputs	Yes
Climatic and mechanical conditions for storage and transport	
Climatic conditions for storage and transport	
• Free fall	
- Drop height, max. (in packaging)	0.3 m; five times, in dispatch package
• Temperature	
- Permissible temperature range	-40 °C to +70 °C
• Air pressure acc. to IEC 60068-2-13	
- Permissible air pressure	1080 to 660 hPa
• Relative humidity	
- Permissible range (without condensation) at 25 °C	95%

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Technical specifications (continued)

	6ES7 232-4HA30-0XB0
Mechanical and climatic conditions during operation	
Climatic conditions in operation	
• Pollutant concentrations	
- SO_2 at RH < 60% without condensation	S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free
Degree of protection	
IP20	Yes
Standards, approvals, certificates	
CE mark	Yes
C-TICK	Yes
FM approval	Yes
Mechanics/material	
Type of housing (front)	
• Plastic	Yes
Dimensions and weight	
Dimensions	
• Width	38 mm
• Height	62 mm
• Depth	21 mm
Weight	
• Weight, approx.	40 g

Ordering data

		Order No.
SB 1232 analog output signal board		
1 analog output, ±10 V with 12 bit or 0 ... 20 mA with 11 bit	I	**6ES7 232-4HA30-0XB0**
Terminal block (spare part)		
for signal board		
with 6 screws, gold-plated; 4 units	I	**6ES7 292-1BF30-0XA0**
S7-1200 automation system, system manual		
For SIMATIC S7-1200 and STEP 7 Basic		
German	K	**6ES7 298-8FA30-8AH0**
English	K	**6ES7 298-8FA30-8BH0**
French	K	**6ES7 298-8FA30-8CH0**
Spanish	K	**6ES7 298-8FA30-8DH0**
Italian	K	**6ES7 298-8FA30-8EH0**
Chinese	K	**6ES7 298-8FA30-8KH0**
S7-1200 automation system, Easy Book		
Brief instructions		
German	K	**6ES7 298-8FA30-8AQ0**
English	K	**6ES7 298-8FA30-8BQ0**
French	K	**6ES7 298-8FA30-8CQ0**
Spanish	K	**6ES7 298-8FA30-8DQ0**
Italian	K	**6ES7 298-8FA30-8EQ0**
Chinese	K	**6ES7 298-8FA30-8KQ0**
STEP 7 Basic V11 engineering software		
Target system: SIMATIC S7-1200 controllers and the associated I/O. Requirements: Windows XP Home SP3, Windows XP Professional SP3 (32 bit), Windows 7 Home Premium, Windows 7Professional (32 bit), Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit), Microsoft Server 2008 Std. SP2 (32 bit) Type of delivery: German, English, Chinese, Italian, French, Spanish		
Single license		**6ES7 822-0AA01-0YA0**
Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license		**6ES7 822-0AA01-0YE0**
Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license		**6ES7 822-1AA01-0YC5**
STEP 7 Basic V11, trial license		**6ES7 822-0AA01-0YA7**
STEP 7 Basic Software Update Service, 1 year	D	**6ES7 822-0AA00-0YL0**

D: Subject to export regulations AL: N and ECCN: 5D992
I: Subject to export regulations AL: N and ECCN: EAR99H
K: Subject to export regulations AL: N and ECCN: EAR99T

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SM 1234 analog input/output module

Overview



- Analog inputs and outputs for the SIMATIC S7-1200
- With extremely short conversion times
- For connecting analog actuators and sensors without additional amplifiers
- For solving even more complex automation tasks

Technical specifications

	6ES7 234-4HE30-0XB0
Product type designation	SM 1234 A I4x13 bit AQ 2x14 bit
Supply voltages	
Rated value	
• 24 V DC	Yes
Current consumption	
Current consumption, typ.	60 mA
from backplane bus 5 V DC, typ.	80 mA
Power losses	
Power loss, typ.	2 W
Connection method	
Required front connector	Yes
Analog inputs	
Number of analog inputs	4; current or voltage differential inputs
Permissible input frequency for current input (destruction limit), max.	± 35 V
Permissible input current for voltage input (destruction limit), max.	40 mA
Cycle time (all channels) max.	625 µs
Input ranges	
• Voltage	Yes; ±10 V, ±5 V, ±2.5 V
• Current	Yes; 0 to 20 mA
• Thermocouple	No
• Resistance thermometer	No
• Resistance	No
Input ranges (rated values), voltages	
• -10 V to +10 V	Yes
• Input resistance (-10 V to +10 V)	≥9 MOhm
• -2.5 V to +2.5 V	Yes
• Input resistance (-2.5 V to +2.5 V)	≥9 MOhm
• -5 V to +5 V	Yes
• Input resistance (-5 V to +5 V)	≥9 MOhm
Input ranges (rated values), currents	
• 0 to 20 mA	Yes
• Input resistance (0 to 20 mA)	≥ 250 Ohm
Voltage input	
• Permissible input voltage for voltage input (destruction limit), max.	35 V
Current input	
• Permissible input current for current input (destruction limit), max.	40 mA
Temperature compensation	
• Temperature compensation parameterizable	No

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Technical specifications (continued)

	6ES7 234-4HE30-0XB0
Analog outputs	
Number of analog outputs	2; current or voltage
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.	1 000 Ω
• with current outputs, max.	600 Ω
Analog value creation	
Measurement principle	Differential
Integrations and conversion time/ resolution per channel	
• Resolution (incl. overrange)	Voltage: 14 bit; Current : 13 bit
• Resolution with overrange (bit including sign), max.	12 bit; + sign
• Integration time, parameterizable	Yes
• Interference voltage suppression for interference frequency f1 in Hz	40 dB, DC to 60 V for interference frequency 50 / 60 Hz
Smoothing of measured values	
• Parameterizable	Yes
• Step: None	Yes
• Step: Low	Yes
• Step: Medium	Yes
• Step: High	Yes
Errors/accuracies	
Temperature error (relative to input area)	25°C ±0.1% to 55°C ±0.2% total measurement range
Temperature error (relative to output area)	25°C ±0.3% to 55°C ±0.6% total measurement range
Basic error limit (operational limit at 25 °C)	
• Voltage, relative to input area	+/- 0,1 %
• Current, relative to input area	+/- 0,1 %
• Voltage, relative to output area	+/- 0,3 %
• Current, relative to output area	+/- 0,3 %
Interference voltage suppression for f = n x (fl +/- 1%), fl = interference frequency	
• common mode voltage, max.	12 V
Alarms/diagnostics/status information	
Alarms	
• Alarms	Yes
• Diagnostic alarm	Yes
Diagnostics	
• Diagnostic functions	Yes
• Monitoring the supply voltage to the electronics	Yes
• Wire break	Yes
• Short circuit	Yes
Diagnostic indication LED	
• for status of the inputs	Yes
• For status of the outputs	Yes
• for maintenance	Yes

	6ES7 234-4HE30-0XB0
Galvanic isolation	
Galvanic isolation analog outputs	
• between the channels and the power supply of the electronics	No
Climatic and mechanical conditions for storage and transport	
Climatic conditions for storage and transport	
• Free fall	
- Drop height, max. (in packaging)	0.3 m; five times, in dispatch package
• Temperature	
- Permissible temperature range	-40 °C to +70 °C
• Air pressure acc. to IEC 60068-2-13	
- Permissible air pressure	1080 to 660 hPa
• Relative humidity	
- Permissible range (without condensation) at 25 °C	95%
Mechanical and climatic conditions during operation	
Climatic conditions in operation	
• Air pressure acc. to IEC 60068-2-13	
- Permissible air pressure	1080 to 795 hPa
• Pollutant concentrations	
- SO_2 at RH < 60% without condensation	SO_2: < 0.5 ppm; H_2S: < 0.1 ppm; RH < 60% condensation-free
Degree of protection	
IP20	Yes
Standards, approvals, certificates	
CE mark	Yes
C-TICK	Yes
FM approval	Yes
Mechanics/material	
Type of housing (front)	
• Plastic	Yes
Dimensions and weight	
Dimensions	
• Width	45 mm
• Height	100 mm
• Depth	75 mm
Weight	
• Weight, approx.	220 g

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SM 1234 analog input/output module

Ordering data		Order No.
SM 1234 analog input/output signal module		
4 analog inputs, ±10 V, ±5 V, ±2.5 V, or 0 ... 20 mA, 12 bit + sign; 2 analog outputs, ±10 V with 14 bit or 0 ... 20 mA with 13 bit	I	**6ES7 234-4HE30-0XB0**
Extension cable for two-tier configuration	I	**6ES7 290-6AA30-0XA0**
for connecting digital/analog signal modules; length 2 m		
Terminal block (spare part)		
for 8/16-channel analog signal modules		
with 7 screws, gold-plated; 4 units	I	**6ES7 292-1BG30-0XA0**
Front flap set (spare part)		
for 8/16-channel signal modules		**6ES7 291-1BA30-0XA0**
S7-1200 automation system, system manual		
For SIMATIC S7-1200 and STEP 7 Basic		
German	K	**6ES7 298-8FA30-8AH0**
English	K	**6ES7 298-8FA30-8BH0**
French	K	**6ES7 298-8FA30-8CH0**
Spanish	K	**6ES7 298-8FA30-8DH0**
Italian	K	**6ES7 298-8FA30-8EH0**
Chinese	K	**6ES7 298-8FA30-8KH0**
S7-1200 automation system, Easy Book		
Brief instructions		
German	K	**6ES7 298-8FA30-8AQ0**
English	K	**6ES7 298-8FA30-8BQ0**
French	K	**6ES7 298-8FA30-8CQ0**
Spanish	K	**6ES7 298-8FA30-8DQ0**
Italian	K	**6ES7 298-8FA30-8EQ0**
Chinese	K	**6ES7 298-8FA30-8KQ0**

		Order No.
STEP 7 Basic V11 engineering software		
Target system: SIMATIC S7-1200 controllers and the associated I/O. Requirements: Windows XP Home SP3, Windows XP Professional SP3 (32 bit), Windows 7 Home Premium, Windows 7Professional (32 bit), Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit), Microsoft Server 2008 Std. SP2 (32 bit) Type of delivery: German, English, Chinese, Italian, French, Spanish		
Single license		**6ES7 822-0AA01-0YA0**
Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license		**6ES7 822-0AA01-0YE0**
Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license		**6ES7 822-1AA01-0YC5**
STEP 7 Basic V11, trial license		**6ES7 822-0AA01-0YA7**
STEP 7 Basic Software Update Service, 1 year	D	**6ES7 822-0AA00-0YL0**

D: Subject to export regulations AL: N and ECCN: 5D992
I: Subject to export regulations AL: N and ECCN: EAR99H
K: Subject to export regulations AL: N and ECCN: EAR99T

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Overview

- For the convenient recording of temperatures with great accuracy
- 7 common thermocouple types can be used
- Also for the measurement of analog signals with a low level (±80 mV)
- Can easily be retrofitted to existing plant

Technical specifications

	6ES7 231-5QD30-0XB0	6ES7 231-5QF30-0XB0
Product type designation	SM1231 TC 4x16 bit	SM 1231 TC 8x16 bit
Supply voltages		
Rated value		
• 24 V DC	Yes	Yes
Current consumption		
Current consumption, typ.	40 mA	
From backplane bus 5 V DC, typ.	80 mA	80 mA
Power losses		
Power loss, typ.	1.5 W	1.5 W
Connection method		
Required front connector	Yes	Yes
Analog inputs		
Number of analog inputs	4; Thermocouples	8; Thermocouples
Permissible input frequency for current input (destruction limit), max.	± 35 V	± 35 V
Technical unit for temperature measurement adjustable	Degrees Celsius/degrees Fahrenheit	Degrees Celsius/degrees Fahrenheit
Input ranges		
• Thermocouple	Yes; J, K, T, E, R, S, N, C, TXK/XK(L); voltage range: +/-80 mV	Yes; J, K, T, E, R, S, N, C, TXK/XK(L); voltage range: +/-80 mV
Input ranges (rated values), voltages		
• -80 mV to +80 mV	Yes	Yes
• Input resistance (-80 mV to +80 mV)	>=1MOhm	>=1MOhm
Input ranges (rated values), thermoelements		
• Type C	Yes	Yes
• 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
• Type TXK/TXK(L) to GOST	Yes	Yes
Thermocouple (TC)		
• permissible input voltage for voltage input (destruction limit), max.	+-35V	+-35V
Temperature compensation		
• Temperature compensation parameterizable	No	No

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Technical specifications (continued)

	6ES7 231-5QD30-0XB0	6ES7 231-5QF30-0XB0
Analog value creation		
Measurement principle	Integrating	Integrating
Integrations and conversion time/ resolution per channel		
• Resolution with overrange (bit including sign), max.	15 bit; + sign	15 bit; + sign
• Integration time, parameterizable	No	No
• Interference voltage suppression for interference frequency f1 in Hz	85 dB at 50/60/400 Hz	85 dB at 50/60/400 Hz
Analog value generation (in isochronous mode)		
Smoothing of measured values		
• Parameterizable	Yes	Yes
Errors/accuracies		
Cold connection point		+/-1.5 °C
Temperature error (relative to input area)	25°C ±0.1% to 55°C ±0.2% total measurement range	25°C ±0.1% to 55°C ±0.2% total measurement range
Interference voltage suppression for f = n x (fl +/- 1%), fl = interference frequency		
• Common mode interference, min.	120 dB	120 dB
Alarms/diagnostics/status information		
Alarms		
• Alarms	Yes	Yes
• Diagnostic alarm	Yes	Yes
Diagnostics		
• Diagnostic functions	Yes; can be read out	Yes; can be read out
• Monitoring the supply voltage to the electronics	Yes	Yes
• Wire break	Yes	Yes
Diagnostic indication LED		
• for status of the inputs	Yes	Yes
• for maintenance	Yes	Yes
Climatic and mechanical conditions for storage and transport		
Climatic conditions for storage and transport		
• Free fall		
- Drop height, max. (in packaging)	0.3 m; five times, in dispatch package	0.3 m; five times, in dispatch package
• Temperature		
- Permissible temperature range	-40 °C to +70 °C	-40 °C to +70 °C
• Air pressure acc. to IEC 60068-2-13		
- Permissible air pressure	1080 to 660 hPa	1080 to 660 hPa
• Relative humidity		
- Permissible range (without condensation) at 25 °C	95%	95%
Mechanical and climatic conditions during operation		
Climatic conditions in operation		
• Temperature		
- Permissible temperature range	0° C to 55° C horizontal mounting 0° C to 45° C vertical mounting	0° C to 55° C horizontal mounting 0° C to 45° C vertical mounting
• Air pressure acc. to IEC 60068-2-13		
- Permissible air pressure	1080 to 795 hPa	1080 to 795 hPa
• Pollutant concentrations		
- SO_2 at RH < 60% without condensation	$S0_2$: < 0.5 ppm; H_2S: < 0.1 ppm; RH < 60% condensation-free	$S0_2$: < 0.5 ppm; H_2S: < 0.1 ppm; RH < 60% condensation-free

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	6ES7 231-5QD30-0XB0	6ES7 231-5QF30-0XB0
Degree of protection		
IP20	Yes	Yes
Standards, approvals, certificates		
CE mark	Yes	Yes
C-TICK	Yes	Yes
FM approval	Yes	Yes
Mechanics/material		
Type of housing (front)		
• Plastic	Yes	Yes
Dimensions and weight		
Dimensions		
• Width	45 mm	45 mm
• Height	100 mm	100 mm
• Depth	75 mm	75 mm
Weight		
• Weight, approx.	180 g	220 g

Ordering data

		Order No.
SM 1231 thermocouple module		
4 inputs +/- 80 mV, resolution 15 bit + sign, thermocouple types J, K, S, T, R, E, N	I	**6ES7 231-5QD30-0XB0**
8 inputs +/- 80 mV, resolution 15 bit + sign, thermocouple types J, K, T, E, R, S, N, C, TXK/XK(L)	I	**6ES7 231-5QF30-0XB0**
Accessories		
Terminal block (spare part)		
for 8/16-channel analog signal modules		
with 7 screws, gold-plated; 4 units	I	**6ES7 292-1BG30-0XA0**
Front flap set (spare part)		
for 8/16-channel signal modules		**6ES7 291-1BA30-0XA0**
S7-1200 automation system, system manual		
For SIMATIC S7-1200 and STEP 7 Basic		
German	K	**6ES7 298-8FA30-8AH0**
English	K	**6ES7 298-8FA30-8BH0**
French	K	**6ES7 298-8FA30-8CH0**
Spanish	K	**6ES7 298-8FA30-8DH0**
Italian	K	**6ES7 298-8FA30-8EH0**
Chinese	K	**6ES7 298-8FA30-8KH0**
S7-1200 automation system, Easy Book		
Brief instructions		
German	K	**6ES7 298-8FA30-8AQ0**
English	K	**6ES7 298-8FA30-8BQ0**
French	K	**6ES7 298-8FA30-8CQ0**
Spanish	K	**6ES7 298-8FA30-8DQ0**
Italian	K	**6ES7 298-8FA30-8EQ0**
Chinese	K	**6ES7 298-8FA30-8KQ0**

		Order No.
STEP 7 Basic V11 engineering software		
Target system: SIMATIC S7-1200 controllers and the associated I/O. Requirements: Windows XP Home SP3, Windows XP Professional SP3 (32 bit), Windows 7 Home Premium, Windows 7Professional (32 bit), Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit), Microsoft Server 2008 Std. SP2 (32 bit) Type of delivery: German, English, Chinese, Italian, French, Spanish		
Single license		**6ES7 822-0AA01-0YA0**
Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license		**6ES7 822-0AA01-0YE0**
Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license		**6ES7 822-1AA01-0YC5**
STEP 7 Basic V11, trial license		**6ES7 822-0AA01-0YA7**
STEP 7 Basic Software Update Service, 1 year	D	**6ES7 822-0AA00-0YL0**

D: Subject to export regulations AL: N and ECCN: 5D992
I: Subject to export regulations AL: N and ECCN: EAR99H
K: Subject to export regulations AL: N and ECCN: EAR99T

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SB 1231 thermocouple signal board

Overview

- For the convenient recording of temperatures with great accuracy
- 1 input with 16-bit resolution
- Common thermocouple types can be used
- Also for the measurement of analog signals with a low level (±80 mV)
- Can easily be retrofitted to existing plant
- Can be plugged directly into the CPU

Technical specifications

	6ES7 231-5QA30-0XB0
Product type designation	**SB1231 AI 1xTC**
Supply voltages	
Rated value	
• 24 V DC	Yes
Current consumption	
Current consumption, typ.	5 mA
Connection method	
required front connector	Yes
Analog inputs	
Number of analog inputs	1; Thermocouples
Permissible input frequency for current input (destruction limit), max.	± 35 V
Technical unit for temperature measurement adjustable	Degrees Celsius/degrees Fahrenheit
Input ranges	
• Thermocouple	Yes; J, K; voltage range ±80 MV
Input ranges (rated values), voltages	
• -80 mV to +80 mV	Yes
• Input resistance (-80 mV to +80 mV)	>=1 MOhm
Input ranges (rated values), thermoelements	
• Type J	Yes
• Input resistance (type J)	1200°C
• Type K	Yes
• Input resistance (Type K)	1372°C
Thermocouple (TC)	
• Permissible input voltage for voltage input (destruction limit), max.	+-35V
Temperature compensation	
• Temperature compensation parameterizable	No
Analog value creation	
Measurement principle	Integrating
Integrations and conversion time/ resolution per channel	
• Resolution with overrange (bit including sign), max.	15 bit; + sign
• Integration time, parameterizable	No
• Interference voltage suppression for interference frequency f1 in Hz	85 dB at 10 / 50 / 60 / 400 Hz

	6ES7 231-5QA30-0XB0
Product type designation	**SB1231 AI 1xTC**
Analog value generation (in isochronous mode)	
Smoothing of measured values	
• parameterizable	Yes
Errors/accuracies	
Temperature error (relative to input area)	25°C ±0.1% to 55°C ±0.2% total measurement range
Interference voltage suppression for f = n x (fl +/- 1%), fl = interference frequency	
• Common mode interference, min.	120 dB
Alarms/diagnostics/status information	
Alarms	
• Alarms	Yes
• Diagnostic alarm	Yes
Diagnostics	
• Diagnostic functions	Yes; Can be read out
• Wire break	Yes
Diagnostic indication LED	
• for status of the inputs	Yes
• for maintenance	Yes
Climatic and mechanical conditions for storage and transport	
Climatic conditions for storage and transport	
• Free fall	
- Drop height, max. (in packaging)	0.3 m; Five times, in dispatch package
• Temperature	
- Permissible temperature range	-40°C to +70°C
• Air pressure acc. to IEC 60068-2-13	
- Permissible air pressure	1080 to 660 hPa
• Relative humidity	
- Permissible range (without condensation) at 25 °C	95%
Mechanical and climatic conditions during operation	
Climatic conditions in operation	
• Temperature	
- Permissible temperature range	0°C to 55°C horizontal mounting, 0°C to 45°C vertical mounting
• Air pressure acc. to IEC 60068-2-13	
- Permissible air pressure	1080 to 795 hPa
• Pollutant concentrations	
- SO_2 at RH < 60% without condensation	$S0_2$: < 0.5 ppm; H_2S: < 0.1 ppm; RH < 60% condensation-free

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Technical specifications (continued)

Product type designation	6ES7 231-5QA30-0XB0 SB1231 AI 1xTC
Degree of protection	
IP20	Yes
Standards, approvals, certificates	
CE mark	Yes
C-TICK	Yes
FM approval	Yes
Mechanics/material	
Type of housing (front)	
• Plastic	Yes
Dimensions and weight	
Dimensions	
• Width	38 mm
• Height	62 mm
• Depth	21 mm
Weight	
• Weight, approx.	35 g

Ordering data

		Order No.
SB 1231 thermocouple signal board 1 input +/- 80 mV, resolution 15 bit + sign, thermocouples type J, K	I	**6ES7 231-5QA30-0XB0**
Accessories		
Terminal block (spare part) for signal board with 6 screws, gold-plated; 4 units	I	**6ES7 292-1BF30-0XA0**
S7-1200 automation system, system manual For SIMATIC S7-1200 and STEP 7 Basic		
German	K	**6ES7 298-8FA30-8AH0**
English	K	**6ES7 298-8FA30-8BH0**
French	K	**6ES7 298-8FA30-8CH0**
Spanish	K	**6ES7 298-8FA30-8DH0**
Italian	K	**6ES7 298-8FA30-8EH0**
Chinese	K	**6ES7 298-8FA30-8KH0**
S7-1200 automation system, Easy Book Brief instructions		
German	K	**6ES7 298-8FA30-8AQ0**
English	K	**6ES7 298-8FA30-8BQ0**
French	K	**6ES7 298-8FA30-8CQ0**
Spanish	K	**6ES7 298-8FA30-8DQ0**
Italian	K	**6ES7 298-8FA30-8EQ0**
Chinese	K	**6ES7 298-8FA30-8KQ0**
STEP 7 Basic V11 engineering software Target system: SIMATIC S7-1200 controllers and the associated I/O. Requirements: Windows XP Home SP3, Windows XP Professional SP3 (32 bit), Windows 7 Home Premium, Windows 7Professional (32 bit), Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit), Microsoft Server 2008 Std. SP2 (32 bit) Type of delivery: German, English, Chinese, Italian, French, Spanish		
Single license		**6ES7 822-0AA01-0YA0**
Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license		**6ES7 822-0AA01-0YE0**
Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license		**6ES7 822-1AA01-0YC5**
STEP 7 Basic V11, trial license		**6ES7 822-0AA01-0YA7**
STEP 7 Basic Software Update Service, 1 year	D	**6ES7 822-0AA00-0YL0**

D: Subject to export regulations AL: N and ECCN: 5D992
I: Subject to export regulations AL: N and ECCN: EAR99H
K: Subject to export regulations AL: N and ECCN: EAR99T

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SM 1231 RTD signal module

Overview

- For the convenient recording of temperatures with great accuracy
- 4 inputs
- Most popular resistance temperature detectors can be used
- Can easily be retrofitted to existing installation

Technical specifications

	6ES7 231-5PD30-0XB0	6ES7 231-5PF30-0XB0
Product type designation	SM1231 RTD 4x16 bit	SM 1231 RTD 8x16 bit
Supply voltages		
Rated value		
• 24 V DC	Yes	Yes
Current consumption		
Current consumption, typ.	40 mA	
From backplane bus 5 V DC, typ.	80 mA	80 mA
Power losses		
Power loss, typ.	1.5 W	1.5 W
Connection method		
Required front connector	Yes	Yes
Analog inputs		
Number of analog inputs	4; Resistance thermometer	8; Resistance thermometer
Permissible input frequency for current input (destruction limit), max.	± 35 V	± 35 V
Technical unit for temperature measurement adjustable	Degrees Celsius/degrees Fahrenheit	Degrees Celsius/degrees Fahrenheit
Input ranges		
• Resistance thermometer	Yes; Resistance-type transmitter: Pt10, Pt50, Pt100, Pt200, Pt500, Pt1000, Ni100, Ni120, Ni200, Ni500, Ni1000, Cu10, Cu50, Cu 100, LG-Ni1000	Yes; Resistance-type transmitter: Pt10, Pt50, Pt100, Pt200, Pt500, Pt1000, Ni100, Ni120, Ni200, Ni500, Ni1000, Cu10, Cu50, Cu 100, LG-Ni1000
• Resistance	Yes; 150 Ω, 300 Ω, 600 Ω	Yes; 150 Ω, 300 Ω, 600 Ω
Input ranges (rated values), resistance thermometers		
• Cu 10	Yes	Yes
• Input resistance (Cu 10)	10 Ω	10 Ω
• Ni 100	Yes	Yes
• Input resistance (Ni 100)	100 Ω	100 Ω
• Ni 1000	Yes	Yes
• Input resistance (Ni 1000)	1 000 Ω	1 000 Ω
• LG-Ni 1000	Yes	Yes
• Input resistance (LG-Ni 1000)	1 000 Ω	1 000 Ω
• Ni 120	Yes	Yes
• Input resistance (Ni 120)	120 Ω	120 Ω
• Ni 200	Yes	Yes
• Input resistance (Ni 200)	200 Ω	200 Ω
• Ni 500	Yes	Yes
• Input resistance (Ni 500)	500 Ω	500 Ω
• Pt 100	Yes	Yes
• Input resistance (Pt 100)	100 Ω	100 Ω
• Pt 1000	Yes	Yes
• Input resistance (Pt 1000)	1 000 Ω	1 000 Ω
• Pt 200	Yes	Yes
• Input resistance (Pt 200)	200 Ω	200 Ω
• Pt 500	Yes	Yes
• Input resistance (Pt 500)	500 Ω	500 Ω
Input ranges (rated values), resistors		
• 0 to 150 Ohm	Yes	Yes
• 0 to 300 Ohm	Yes	Yes
• 0 to 600 Ohm	Yes	Yes
Temperature compensation		
• Temperature compensation parameterizable	No	No

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Technical specifications (continued)

	6ES7 231-5PD30-0XB0	6ES7 231-5PF30-0XB0
Analog value creation		
Measurement principle	Integrating	Integrating
Integrations and conversion time/ resolution per channel		
• Resolution with overrange (bit including sign), max.	15 bit; + sign	15 bit; + sign
• Integration time, parameterizable	No	No
• Interference voltage suppression for interference frequency f1 in Hz	85 dB at 50/60/400 Hz	85 dB at 10 / 50 / 60 / 400 Hz
Errors/accuracies		
Cold connection point		+/-1.5 °C
Temperature error (relative to input area)	25°C ±0.1% to 55°C ±0.2% total measurement range	25°C ±0.1% to 55°C ±0.2% total measurement range
Interference voltage suppression for f = n x (fl +/- 1%), fl = interference frequency		
• Common mode interference, min.	120 dB	120 dB
Alarms/diagnostics/status information		
Alarms		
• Alarms	Yes	Yes
• Diagnostic alarm	Yes	Yes
Diagnostics		
• Diagnostic functions	Yes; can be read out	Yes; can be read out
• Monitoring the supply voltage to the electronics	Yes	Yes
• Wire break	Yes	Yes
Diagnostic indication LED		
• for status of the inputs	Yes	Yes
• for maintenance	Yes	Yes
Climatic and mechanical conditions for storage and transport		
Climatic conditions for storage and transport		
• Free fall		
- Drop height, max. (in packaging)	0.3 m; five times, in dispatch package	0.3 m; five times, in dispatch package
• Temperature		
- Permissible temperature range	-40 °C to +70 °C	-40 °C to +70 °C
• Air pressure acc. to IEC 60068-2-13		
- Permissible air pressure	1080 to 660 hPa	1080 to 660 hPa
• Relative humidity		
- Permissible range (without condensation) at 25 °C	95%	95%
Mechanical and climatic conditions during operation		
Climatic conditions in operation		
• Temperature		
- Permissible temperature range	0° C to 55° C horizontal mounting 0° C to 45° C vertical mounting	0° C to 55° C horizontal mounting 0° C to 45° C vertical mounting
• Air pressure acc. to IEC 60068-2-13		
- Permissible air pressure	1080 to 795 hPa	1080 to 795 hPa
• Pollutant concentrations		
- SO_2 at RH < 60% without condensation	$S0_2$: < 0.5 ppm; H_2S: < 0.1 ppm; RH < 60% condensation-free	$S0_2$: < 0.5 ppm; H_2S: < 0.1 ppm; RH < 60% condensation-free

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SM 1231 RTD signal module

	6ES7 231-5PD30-0XB0	6ES7 231-5PF30-0XB0
Degree of protection		
IP20	Yes	Yes
Standards, approvals, certificates		
CE mark	Yes	Yes
C-TICK	Yes	Yes
FM approval	Yes	Yes
Mechanics/material		
Type of housing (front)		
• Plastic	Yes	Yes
Dimensions and weight		
Dimensions		
• Width	45 mm	
• Height	100 mm	100 mm
• Depth	75 mm	75 mm
Weight		
• Weight, approx.	220 g	220 g

4

Ordering data

		Order No.
SM 1231 RTD signal module		
4 inputs for resistance temperature detectors Pt10/50/100/200/500/1000, Ni100/120/200/500/1000, Cu10/50/100, LG-Ni1000; resistance 150/300/600 Ohm, resolution 15 bit + sign	I	**6ES7 231-5PD30-0XB0**
8 inputs for resistance temperature detectors Pt10/50/100/200/500/1000, Ni100/120/200/500/1000, Cu10/50/100, LG-Ni1000; resistance 150/300/600 Ohm, resolution 15 bit + sign	I	**6ES7 231-5PF30-0XB0**
Accessories		
Terminal block (spare part)		
for 8/16-channel analog signal modules		
with 7 screws, gold-plated; 4 units	I	**6ES7 292-1BG30-0XA0**
Front flap set (spare part)		
for 8/16-channel signal modules		**6ES7 291-1BA30-0XA0**
S7-1200 automation system, sstem manual		
For SIMATIC S7-1200 and STEP 7 Basic		
German	K	**6ES7 298-8FA30-8AH0**
English	K	**6ES7 298-8FA30-8BH0**
French	K	**6ES7 298-8FA30-8CH0**
Spanish	K	**6ES7 298-8FA30-8DH0**
Italian	K	**6ES7 298-8FA30-8EH0**
Chinese	K	**6ES7 298-8FA30-8KH0**

		Order No.
S7-1200 automation system, Easy Book		
Brief instructions		
German	K	**6ES7 298-8FA30-8AQ0**
English	K	**6ES7 298-8FA30-8BQ0**
French	K	**6ES7 298-8FA30-8CQ0**
Spanish	K	**6ES7 298-8FA30-8DQ0**
Italian	K	**6ES7 298-8FA30-8EQ0**
Chinese	K	**6ES7 298-8FA30-8KQ0**
STEP 7 Basic V11 engineering software		
Target system: SIMATIC S7-1200 controllers and the associated I/O. Requirements: Windows XP Home SP3, Windows XP Professional SP3 (32 bit), Windows 7 Home Premium, Windows 7 Professional (32 bit), Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit), Microsoft Server 2008 Std. SP2 (32 bit) Type of delivery: German, English, Chinese, Italian, French, Spanish		
Single license		**6ES7 822-0AA01-0YA0**
Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license		**6ES7 822-0AA01-0YE0**
Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license		**6ES7 822-1AA01-0YC5**
STEP 7 Basic V11, trial license		**6ES7 822-0AA01-0YA7**
STEP 7 Basic Software Update Service, 1 year	D	**6ES7 822-0AA00-0YL0**

D: Subject to export regulations AL: N and ECCN: 5D992
I: Subject to export regulations AL: N and ECCN: EAR99H
K: Subject to export regulations AL: N and ECCN: EAR99T

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Overview

- For the convenient recording of temperatures with great accuracy
- 1 input with 16-bit resolution
- Common resistance-type temperature detectors can be used
- Can easily be retrofitted to existing plant
- Can be plugged directly into the CPU

Technical specifications

	6ES7 231-5PA30-0XB0
Product type designation	**SB1231 AI 1xRTD**
Supply voltages	
Rated value	
• 24 V DC	Yes
Current consumption	
Current consumption, typ.	5 mA
Connection method	
required front connector	Yes
Analog inputs	
Number of analog inputs	1; Resistance thermometer
Permissible input frequency for current input (destruction limit), max.	± 35 V
Technical unit for temperature measurement adjustable	Degrees Celsius/degrees Fahrenheit
Input ranges	
• Resistance thermometer	Yes; Platinum (Pt)
• Resistance	Yes; 150 Ω, 300 Ω, 600 Ω
Input ranges (rated values), voltages	
• Input resistance (-80 mV to +80 mV)	>=10 MOhm
Input ranges (rated values), resistance thermometers	
• Pt 100	Yes
• Input resistance (Pt 100)	100 Ω
• Pt 1000	Yes
• Input resistance (Pt 1000)	1 000 Ω
• Pt 200	Yes
• Input resistance (Pt 200)	200 Ω
• Pt 500	Yes
• Input resistance (Pt 500)	500 Ω
Input ranges (rated values), resistors	
• 0 to 150 Ohm	Yes
• 0 to 300 Ohm	Yes
• 0 to 600 Ohm	Yes
Temperature compensation	
• Temperature compensation parameterizable	No

	6ES7 231-5PA30-0XB0
Product type designation	**SB1231 AI 1xRTD**
Analog value creation	
Measurement principle	Integrating
Integrations and conversion time/ resolution per channel	
• Resolution with overrange (bit including sign), max.	15 bit; + sign
• Integration time, parameterizable	No
• Interference voltage suppression for interference frequency f1 in Hz	85 dB at 10 / 50 / 60 / 400 Hz
Errors/accuracies	
Temperature error (relative to input area)	25°C ±0.1% to 55°C ±0.2% total measurement range
Interference voltage suppression for f = n x (fl +/- 1%), fl = interference frequency	
• Common mode interference, min.	120 dB
Alarms/diagnostics/status information	
Alarms	
• Alarms	Yes
• Diagnostic alarm	Yes
Diagnostics	
• Diagnostic functions	Yes; Can be read out
• Wire break	Yes
Diagnostic indication LED	
• For status of the inputs	Yes
• For maintenance	Yes
Climatic and mechanical conditions for storage and transport	
Climatic conditions for storage and transport	
• Free fall	
- Drop height, max. (in packaging)	0.3 m; Five times, in dispatch package
• Temperature	
- Permissible temperature range	-40°C to +70°C
• Air pressure acc. to IEC 60068-2-13	
- Permissible air pressure	1080 to 660 hPa
• Relative humidity	
- Permissible range (without condensation) at 25 °C	95%
Mechanical and climatic conditions during operation	
Climatic conditions in operation	
• Temperature	
- Permissible temperature range	0°C to 55°C horizontal mounting, 0°C to 45°C vertical mounting
• Air pressure acc. to IEC 60068-2-13	
- Permissible air pressure	1080 to 795 hPa
• Pollutant concentrations	
- SO_2 at RH < 60% without condensation	S02: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free

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SB 1231 RTD signal board

Technical specifications (continued)

	6ES7 231-5PA30-0XB0
Product type designation	**SB1231 AI 1xRTD**
Degree of protection	
IP20	Yes
Standards, approvals, certificates	
CE mark	Yes
C-TICK	Yes
FM approval	Yes
Mechanics/material	
Type of housing (front)	
• Plastic	Yes
Dimensions and weight	
Dimensions	
• Width	38 mm
• Height	62 mm
• Depth	21 mm
Weight	
• Weight, approx.	35 g

Ordering data

		Order No.
SB 1231 RTD signal board	I	**6ES7 231-5PA30-0XB0**
1 input for resistance temperature sensors Pt 100, Pt 200, Pt 500, Pt 1000, resolution 15 bit + sign		
Accessories		
Terminal block (spare part)		
for signal board		
with 6 screws, gold-plated; 4 units	I	**6ES7 292-1BF30-0XA0**
S7-1200 automation system, system manual		
For SIMATIC S7-1200 and STEP 7 Basic		
German	K	**6ES7 298-8FA30-8AH0**
English	K	**6ES7 298-8FA30-8BH0**
French	K	**6ES7 298-8FA30-8CH0**
Spanish	K	**6ES7 298-8FA30-8DH0**
Italian	K	**6ES7 298-8FA30-8EH0**
Chinese	K	**6ES7 298-8FA30-8KH0**
S7-1200 automation system, Easy Book		
Brief instructions		
German	K	**6ES7 298-8FA30-8AQ0**
English	K	**6ES7 298-8FA30-8BQ0**
French	K	**6ES7 298-8FA30-8CQ0**
Spanish	K	**6ES7 298-8FA30-8DQ0**
Italian	K	**6ES7 298-8FA30-8EQ0**
Chinese	K	**6ES7 298-8FA30-8KQ0**
STEP 7 Basic V11 engineering software		
Target system: SIMATIC S7-1200 controllers and the associated I/O. Requirements: Windows XP Home SP3, Windows XP Professional SP3 (32 bit), Windows 7 Home Premium, Windows 7Professional (32 bit), Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit), Microsoft Server 2008 Std. SP2 (32 bit) Type of delivery: German, English, Chinese, Italian, French, Spanish		
Single license		**6ES7 822-0AA01-0YA0**
Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license		**6ES7 822-0AA01-0YE0**
Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license		**6ES7 822-1AA01-0YC5**
STEP 7 Basic V11, trial license		**6ES7 822-0AA01-0YA7**
STEP 7 Basic Software Update Service, 1 year	D	**6ES7 822-0AA00-0YL0**

D: Subject to export regulations AL: N and ECCN: 5D992
I: Subject to export regulations AL: N and ECCN: EAR99H
K: Subject to export regulations AL: N and ECCN: EAR99T

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Overview



- Analog inputs for SIPLUS S7-1200
- With extremely short conversion times
- For connecting analog actuators and sensors without additional amplifiers
- Even solves more complex automation tasks
- From +60°C to +70°C, max. 50% of the inputs can be controlled simultaneously

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS SM 1231		
Order number	**6AG1231-4HD30-2XB0**	**6AG1231-4HD30-4XB0**
Order No. based on	**6ES7 231-4HD30-0XB0**	
Ambient temperature range	-25 ... +70 °C	0 ... +55 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for ambient conditions.	

SIPLUS SM 1231	
Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust[2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) SA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS SM 1231 analog input signal module		
(extended temperature range and medial exposure)		
Ambient temperature range 25 ... +70 °C, from +60 … +70 °C number of simultaneously controllable inputs and outputs max. 50%		
4 analog inputs ±10 V, ±5 V, ±2.5 V, or 0 ... 20 mA; 12 bit + sign	I	**6AG1 231-4HD30-2XB0**
Ambient temperature range 0 ... +55 °C		
4 analog inputs ±10 V, ±5 V, ±2.5 V, or 0 ... 20 mA; 12 bit + sign	H	**6AG1 231-4HD30-4XB0**
Accessories		See SIMATIC S7-1200 SM 1231 analog input, page 4/70

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H
I: Subject to export regulations AL: N and ECCN: EAR99H

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SIPLUS SM 1232 analog output module

Overview



- Analog outputs for SIPLUS S7-1200
- With extremely short conversion times
- For connecting analog actuators without additional amplifiers
- Even solves more complex automation tasks
- From +60 °C to +70 °C, max. 50% of the outputs can be controlled simultaneously

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS SM 1232		
Order number	**6AG1 232-4HB30-2XB0**	**6AG1 232-4HB30-4XB0**
Order No. based on	**6ES7 232-4HB30-0XB00**	
Ambient temperature range	-25 ... +70 °C	0 ... +55 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for ambient conditions.	

SIPLUS SM 1232	
Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust[2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS SM 1232 analog output signal modules		
(extended temperature range and medial exposure)		
Ambient temperature range 25 ... +70 °C, from +60 … +70 °C number of simultaneously controllable inputs and outputs max. 50%		
2 analog outputs, ± 10 V with 14 bit or 0 ... 20 mA with 13 bit	I	**6AG1 232-4HB30-2XB0**
Ambient temperature range 0 ... +55 °C		
2 analog outputs, ± 10 V with 14 bit or 0 ... 20 mA with 13 bit	H	**6AG1 232-4HB30-4XB0**
Accessories		See SIMATIC S7-1200 SM 1232 analog output, page 4/75

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H
I: Subject to export regulations AL: N and ECCN: EAR99H

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Overview



- Analog output for SIPLUS S7-1200
- Can be plugged directly into the CPU (cannot be used for +70 °C version)

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS SB 1232		
Order number	**6AG1 232-4HA30-4XB0**	**6AG1 232-4HA30-5XB0**
Order No. based on	**6ES7 232-4HA30-0XB0**	
Ambient temperature range	0 ... +55 °C	-25 ... +55 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for ambient conditions.	

SIPLUS SB 1232	
Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust[2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS SB 1232 analog output signal board		
(extended temperature range and medial exposure)		
Ambient temperature range -25 ... +55 °C		
1 analog output, ±10 V with 12 bit or 0 ... 20 mA with 11 bit	I	**6AG1 232-4HA30-5XB0**
Ambient temperature range 0 ... +55 °C		
1 analog output, ±10 V with 12 bit or 0 ... 20 mA with 11 bit	H	**6AG1 232-4HA30-4XB0**
Accessories		See SIMATIC S7-1200 SB 1232 analog output, page 4/77

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H
I: Subject to export regulations AL: N and ECCN: EAR99H

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SIPLUS SM 1234 analog input/output module

Overview



- Analog inputs and outputs for SIPLUS S7-1200
- With extremely short conversion times
- For connecting analog actuators and sensors without additional amplifiers
- Even solves more complex automation tasks
- From +60 °C to +70 °C, max. 50% of the inputs and outputs can be controlled simultaneously

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS SM 1231		
Order number	**6AG1 234-4HE30-2XB0**	**6AG1 234-4HE30-4XB0**
Order No. based on	**6ES7 234-4HE30-0XB0**	
Ambient temperature range	-25 ... +70 °C	0 ... +55 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for ambient conditions.	

SIPLUS SM 1231	
Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX[1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust[2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

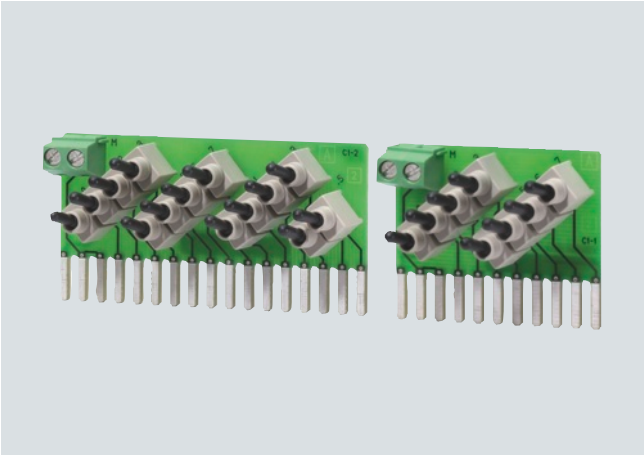
Ordering data

		Order No.
SIPLUS SM 1234 analog input/output signal modules		
(extended temperature range and medial exposure)		
Ambient temperature range 25 ... +70 °C, from +60 … +70 °C number of simultaneously controllable inputs and outputs max. 50%		
4 analog inputs, ±10 V, ±5 V, ±2.5 V, or 0 ... 20 mA, 12 bit + sign; 2 analog outputs, ±10 V with 14 bit or 0 ... 20 mA with 13 bit	I	**6AG1 234-4HE30-2XB0**
Ambient temperature range 0 ... +55 °C		
4 analog inputs, ±10 V, ±5 V, ±2.5 V, or 0 ... 20 mA, 12 bit + sign; 2 analog outputs, ±10 V with 14 bit or 0 ... 20 mA with 13 bit	H	**6AG1 234-4HE30-4XB0**
Accessories		See SIMATIC S7-1200 SM 1234 analog input/output, page 4/80

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H
I: Subject to export regulations AL: N and ECCN: EAR99H

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Overview



- Simulator module for program testing during commissioning and ongoing operation
- Simulation of 8 or 14 inputs

Technical specifications

	6ES7 274-1XH30-0XA0	6ES7 274-1XF30-0XA0
Product type designation	SIM 1274 14Ch DI simulator	SIM 1274 8Ch DI simulator
Supply voltages		
Rated value		
• 24 V DC	Yes	Yes
Degree of protection		
IP20	Yes	Yes

Ordering data

		Order No.
Digital input simulator SIM 1274 simulator module (optional)		
with 14 input switches, for CPU 1214C	I	**6ES7 274-1XH30-0XA0**
with 8 input switches, for CPU 1211C, CPU 1212C	I	**6ES7 274-1XF30-0XA0**
Accessories		
S7-1200 automation system, system manual		
For SIMATIC S7-1200 and STEP 7 Basic		
German	K	**6ES7 298-8FA30-8AH0**
English	K	**6ES7 298-8FA30-8BH0**
French	K	**6ES7 298-8FA30-8CH0**
Spanish	K	**6ES7 298-8FA30-8DH0**
Italian	K	**6ES7 298-8FA30-8EH0**
Chinese	K	**6ES7 298-8FA30-8KH0**
S7-1200 automation system, Easy Book		
Brief instructions		
German	K	**6ES7 298-8FA30-8AQ0**
English	K	**6ES7 298-8FA30-8BQ0**
French	K	**6ES7 298-8FA30-8CQ0**
Spanish	K	**6ES7 298-8FA30-8DQ0**
Italian	K	**6ES7 298-8FA30-8EQ0**
Chinese	K	**6ES7 298-8FA30-8KQ0**
STEP 7 Basic V11 engineering software		
Target system: SIMATIC S7-1200 controllers and the associated I/O. Requirements: Windows XP Home SP3, Windows XP Professional SP3 (32 bit), Windows 7 Home Premium, Windows 7Professional (32 bit), Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit), Microsoft Server 2008 Std. SP2 (32 bit) Type of delivery: German, English, Chinese, Italian, French, Spanish		
Single license		**6ES7 822-0AA01-0YA0**
Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license		**6ES7 822-0AA01-0YE0**
Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license		**6ES7 822-1AA01-0YC5**
STEP 7 Basic V11, trial license		**6ES7 822-0AA01-0YA7**
STEP 7 Basic Software Update Service, 1 year	D	**6ES7 822-0AA00-0YL0**

D: Subject to export regulations AL: N and ECCN: 5D992
I: Subject to export regulations AL: N and ECCN: EAR99H
K: Subject to export regulations AL: N and ECCN: EAR99T

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CM 1241 communication module

Overview



- For quick, high-performance serial data exchange via point-to-point connection
- Implemented protocols: ASCII, USS drive protocol, Modbus RTU
- Additional protocols can also be loaded
- Simple parameterization with STEP 7 Basic

Technical specifications

	6ES7 241-1CH30-0XB0	6ES7 241-1AH30-0XB0
Product type designation	CM 1241 RS485	CM 1241 RS232
Current consumption		
Current consumption, max.	220 mA; from L5+; logic	220 mA; from L5+; logic
Power losses		
Power loss, typ.	1.1 W	1.1 W
Interfaces		
Number of interfaces	1	1
Interface physics, RS 232C (V.24)		Yes
Interface physics, RS 422/RS 485 (X.27)	Yes	
Point-to-point		
Cable length, max.	1 000 m	10 m
Integrated protocol driver		
• ASCII	Yes; available as library function	Yes
• USS	Yes; available as library function	
Climatic and mechanical conditions for storage and transport		
Climatic conditions for storage and transport		
• Free fall		
- Drop height, max. (in packaging)	0.3 m; Five times, in dispatch package	0.3 m; Five times, in dispatch package
• Temperature		
- Permissible temperature range	-40 °C to +70 °C	-40 °C to +70 °C
• Air pressure acc. to IEC 60068-2-13		
- Permissible air pressure	1080 to 660 hPa	1080 to 660 hPa
• Relative humidity		
- Permissible range (without condensation) at 25 °C	95%	95%
Mechanical and climatic conditions during operation		
Climatic conditions in operation		
• Temperature		
- Permissible temperature range	0°C to 55°C horizontal mounting 0° C to 45° C vertical mounting	0°C to 55°C horizontal mounting 0° C to 45° C vertical mounting
- Permissible temperature change	5°C to 55°C, 3°C / minute	5°C to 55°C, 3°C / minute
• Air pressure acc. to IEC 60068-2-13		
- Permissible air pressure	1080 to 795 hPa	1080 to 795 hPa

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Technical specifications (continued)

	6ES7 241-1CH30-0XB0	6ES7 241-1AH30-0XB0
Software		
Runtime software		
• Target system		
- S7-1200	Yes	Yes
Dimensions and weight		
Dimensions		
• Width	30 mm	30 mm
• Height	100 mm	100 mm
• Depth	75 mm	75 mm
Weight		
• Weight, approx.	150 g	150 g

Ordering data

		Order No.
CM 1241 communication module		
Communication module for point-to-point connection, with one RS485 interface	I	**6ES7 241-1CH30-0XB0**
Communication module for point-to-point connection, with one RS232 interface	I	**6ES7 241-1AH30-0XB0**
Accessories		
S7-1200 automation system, system manual		
For SIMATIC S7-1200 and STEP 7 Basic		
German	K	**6ES7 298-8FA30-8AH0**
English	K	**6ES7 298-8FA30-8BH0**
French	K	**6ES7 298-8FA30-8CH0**
Spanish	K	**6ES7 298-8FA30-8DH0**
Italian	K	**6ES7 298-8FA30-8EH0**
Chinese	K	**6ES7 298-8FA30-8KH0**
S7-1200 automation system, Easy Book		
Brief instructions		
German	K	**6ES7 298-8FA30-8AQ0**
English	K	**6ES7 298-8FA30-8BQ0**
French	K	**6ES7 298-8FA30-8CQ0**
Spanish	K	**6ES7 298-8FA30-8DQ0**
Italian	K	**6ES7 298-8FA30-8EQ0**
Chinese	K	**6ES7 298-8FA30-8KQ0**

		Order No.
STEP 7 Basic V11 engineering software		
Target system: SIMATIC S7-1200 controllers and the associated I/O. Requirements: Windows XP Home SP3, Windows XP Professional SP3 (32 bit), Windows 7 Home Premium, Windows 7Professional (32 bit), Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit), Microsoft Server 2008 Std. SP2 (32 bit) Type of delivery: German, English, Chinese, Italian, French, Spanish		
Single license		**6ES7 822-0AA01-0YA0**
Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license		**6ES7 822-0AA01-0YE0**
Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license		**6ES7 822-1AA01-0YC5**
STEP 7 Basic V11, trial license		**6ES7 822-0AA01-0YA7**
STEP 7 Basic Software Update Service, 1 year	D	**6ES7 822-0AA00-0YL0**

D: Subject to export regulations AL: N and ECCN: 5D992
I: Subject to export regulations AL: N and ECCN: EAR99H
K: Subject to export regulations AL: N and ECCN: EAR99T

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RS485 CB 1241 communication board

Overview

- For fast, high-performance serial data exchange via point-to-point connection
- Implemented protocols: ASCII, USS drive protocol, Modbus RTU
- Additional protocols can be loaded later
- Simple parameterization with STEP 7 Basic
- Can be plugged directly into the CPU

Technical specifications

Product type designation	6ES7 241-1CH30-1XB0 CB 1241 RS485
Current consumption	
from backplane bus 5 V DC, typ.	50 mA
Power losses	
Power loss, typ.	1.5 W
Alarms/diagnostics/status information	
Diagnostics	
• Diagnostic functions	Yes
Diagnostic indication LED	
• For status of the outputs	Yes
Climatic and mechanical conditions for storage and transport	
Climatic conditions for storage and transport	
• Free fall	
- Drop height, max. (in packaging)	0.3 m; Five times, in dispatch package
• Temperature	
- Permissible temperature range	-40°C to +70°C
• Air pressure acc. to IEC 60068-2-13	
- Permissible air pressure	1080 to 660 hPa
• Relative humidity	
- Permissible range (without condensation) at 25 °C	95%

Product type designation	6ES7 241-1CH30-1XB0 CB 1241 RS485
Mechanical and climatic conditions during operation	
Climatic conditions in operation	
• Temperature	
- Permissible temperature range	0°C to 55°C horizontal mounting 0° C to 45° C vertical mounting
- Permissible temperature change	5°C to 55°C, 3°C / minute
• Air pressure acc. to IEC 60068-2-13	
- Permissible air pressure	1080 to 795 hPa
• Pollutant concentrations	
- SO_2 at RH < 60% without condensation	$S0_2$: < 0.5 ppm; H_2S: < 0.1 ppm; RH < 60% condensation-free
Degree of protection	
IP20	Yes
Standards, approvals, certificates	
CE mark	Yes
C-TICK	Yes
FM approval	Yes
Mechanics/material	
Type of housing (front)	
• Plastic	Yes
Dimensions and weight	
Dimensions	
• Width	38 mm
• Height	62 mm
• Depth	21 mm
Weight	
• Weight, approx.	40 g

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Ordering data		Order No.
RS485 CB 1241 communication board	I	**6ES7 241-1CH30-1XB0**
for point-to-point connection, with 1 RS485 interface		
Accessories		
Terminal block (spare part)		
for signal board		
with 6 screws, gold-plated; 4 units	I	**6ES7 292-1BF30-0XA0**
S7-1200 automation system, system manual		
For SIMATIC S7-1200 and STEP 7 Basic		
German	K	**6ES7 298-8FA30-8AH0**
English	K	**6ES7 298-8FA30-8BH0**
French	K	**6ES7 298-8FA30-8CH0**
Spanish	K	**6ES7 298-8FA30-8DH0**
Italian	K	**6ES7 298-8FA30-8EH0**
Chinese	K	**6ES7 298-8FA30-8KH0**
S7-1200 automation system, Easy Book		
Brief instructions		
German	K	**6ES7 298-8FA30-8AQ0**
English	K	**6ES7 298-8FA30-8BQ0**
French	K	**6ES7 298-8FA30-8CQ0**
Spanish	K	**6ES7 298-8FA30-8DQ0**
Italian	K	**6ES7 298-8FA30-8EQ0**
Chinese	K	**6ES7 298-8FA30-8KQ0**

		Order No.
STEP 7 Basic V11 engineering software		
Target system: SIMATIC S7-1200 controllers and the associated I/O. Requirements: Windows XP Home SP3, Windows XP Professional SP3 (32 bit), Windows 7 Home Premium, Windows 7Professional (32 bit), Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit), Microsoft Server 2008 Std. SP2 (32 bit) Type of delivery: German, English, Chinese, Italian, French, Spanish		
Single license		**6ES7 822-0AA01-0YA0**
Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license		**6ES7 822-0AA01-0YE0**
Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license		**6ES7 822-1AA01-0YC5**
STEP 7 Basic V11, trial license		**6ES7 822-0AA01-0YA7**
STEP 7 Basic Software Update Service, 1 year	D	**6ES7 822-0AA00-0YL0**

D: Subject to export regulations AL: N and ECCN: 5D992
I: Subject to export regulations AL: N and ECCN: EAR99H
K: Subject to export regulations AL: N and ECCN: EAR99T

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CM 1242-5

Overview



The CM 1242-5 communication module is used to connect a SIMATIC S7-1200 to PROFIBUS as a DP slave and has the following characteristics:

- PROFIBUS DPV1 slave in accordance with IEC 61158
- Module replacement without PG supported
- Power is supplied via the backplane bus so that no extra cabling is required
- Support of all standard baud rates from 9.6 Kbit/s to 12 Mbit/s
- Compact industry-standard enclosure in S7-1200 design for mounting on a standard mounting rail
- Fast commissioning thanks to easy configuration using STEP 7 without additional programming effort

The CM 1242-5 is intended for use in factory automation. Low-cost PROFIBUS-based automation solutions can be created on the basis of the S7-1200 for optimal production.

Technical specifications

Order No.	6GK7 242-5DX30-0XE0
Product type designation	
Transmission rate	
Transmission rate at interface 1 in accordance with PROFIBUS	9.6 Kbit/s … 12 Mbit/s
Interfaces	
Number of electrical connections	
• at interface 1 in accordance with PROFIBUS	1
• for power supply	0
Design of electrical connection	
• at interface 1 in accordance with PROFIBUS	9-pin D-sub socket (RS485)
• for power supply	-
Supply voltage, current consumption, power loss	
Type of power supply	DC
Supply voltage	
• 1 from backplane bus	5 V
• External	-
Relative positive tolerance at 24 V DC	-
Relative negative tolerance at 24 V DC	-
Current consumed	
• from backplane bus at 5 V DC, typical	0.15 A
• from external power supply at 24 V DC	
- Typical	-
- Maximum	-
Effective power loss	0.75 W
Permitted ambient conditions	
Ambient temperature	
• During operation	
- Minimum	-
- Maximum	-
• During storage	-40 … +70 °C
• During transport	-40 … +70 °C
• Note	-
Relative humidity at 25 °C without condensation during operation, maximum	95%
IP degree of protection	IP 20
Design, dimensions and weights	
Module format	S7-1200 compact module, single width
Width	30 mm
Height	100 mm
Depth	75 mm
Net weight	0.12 kg

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Technical specifications (continued)

Order No.	6GK7 242-5DX30-0XE0
Product properties, functions, components in general	
Maximum number of modules per CPU	3
Number of modules - Note	-
Performance data	
Performance data open communication	
Number of possible connections for open communication by means of SEND/RECEIVE blocks, maximum	-
Data volume as user data per connection for open communication by means of SEND/RECEIVE blocks, maximum	-
Performance data PROFIBUS DP	
Service as DP master DPV0	-
Number of DP slaves that can be operated on DP master	-
Data volume	
• of address area of the inputs as DP master, total	-
• of address area of the outputs as DP master, total	-
• of address area of the inputs per DP slave	-
• of address area of the outputs per DP slave	-
• of address area of the diagnostic data per DP slave	-
Service as DP slave	
• DPV0	-
• DPV1	Yes
Data volume	
• of address area of the inputs as DP slave, total	240 byte
• of address area of the outputs as DP slave, total	240 byte
Performance data S7 communication	
Number of possible connections for S7 communication	
• Maximum	-
• For PG connections, maximum	-
• Maximum with PG/OP connections	-
• Note	-
Performance data multiprotocol operation	
Number of active connections in multiprotocol mode	
• Maximum without DP	-
• Maximum with DP	-
Product functionsManagement, configuration, programming	
Configuration software required	STEP 7 Basic V11.0 or higher

Ordering data

	Order No.
CM 1242-5 communication module	
Communication module for electrical connection of SIMATIC S7-1200 to PROFIBUS as a DPV1 slave	**6GK7 242-5DX30-0XE0**
Accessories	
RS485 PROFIBUS FastConnect connector	
With 90° cable outlet; insulation displacement technology, max. transmission rate 12 Mbit/s	
• Without PG interface	**6ES7 972-0BA52-0XA0**
• With PG interface	**6ES7 972-0BB52-0XA0**
PROFIBUS FC standard cable	
2-core bus cable, shielded, special design for fast mounting, delivery unit: max. 1000 m, minimum order 20 m, sold by the meter	**6XV1 830-0EH10**
PROFIBUS FastConnect stripping tool	
Stripping tool for fast stripping of the PROFIBUS FastConnect bus cable	**6GK1 905-6AA00**
12M PROFIBUS bus terminal	
Bus terminal for connection of PROFIBUS nodes at up to 12 Mbit/s with connecting cable	**6GK1 500-0AA10**

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CM 1243-5

Overview



The CM 1243-5 communication module is used to connect a SIMATIC S7-1200 to PROFIBUS as a DP master and has the following characteristics:

- PROFIBUS DPV1 master in accordance with IEC 61158
- Support of up to 16 PROFIBUS DP slaves
- Communication with other S7 controllers based on S7 communication
- Allows the connection of programming devices and operator panels with a PROFIBUS interface to the S7-1200
- Module replacement without PG supported
- Support of all standard baud rates from 9.6 Kbit/s to 12 Mbit/s
- Compact industry-standard enclosure in S7-1200 design for mounting on a standard mounting rail
- Fast commissioning thanks to easy configuration using STEP 7 without additional programming overhead

The CM 1243-5 is intended for use in factory automation. Low-cost PROFIBUS-based automation solutions can be created on the basis of the S7-1200 for optimal production.

Technical specifications

Order No.	6GK7 243-5DX30-0XE0
Product type designation	
Transmission rate	
Transmission rate at interface 1 in accordance with PROFIBUS	9.6 Kbit/s … 12 Mbit/s
Interfaces	
Number of electrical connections	
• at interface 1 in accordance with PROFIBUS	1
• for power supply	1
Design of electrical connection	
• at interface 1 in accordance with PROFIBUS	9-pin D-sub socket (RS485)
• for power supply	3-pin terminal strip
Supply voltage, current consumption, power loss	
Type of power supply	DC
Supply voltage	
• 1 from backplane bus	-
• External	24 V
Relative positive tolerance at 24 V DC	20 %
Relative negative tolerance at 24 V DC	20%
Current consumed	
• from backplane bus at 5 V DC, typical	0 A
• from external power supply at 24 V DC	
- Typical	0.1 A
- Maximum	-
Effective power loss	2.4 W
Permitted ambient conditions	
Ambient temperature	
• for vertical installation	
- during operating phase	0 … 45°C
• for horizontal installation	
- during operating phase	0 … 55°C
• during storaget	-40 … +70 °C
• during transport	-40 … +70 °C
Relative humidity at 25 °C without condensation during operation, maximum	95 %
IP degree of protection	IP 20
Design, dimensions and weights	
Module format	S7-1200 compact module, single width
Width	30 mm
Height	100 mm
Depth	75 mm
Net weight	0.14 kg

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Technical specifications (continued)

Order No.	6GK7 243-5DX30-0XE0
Product properties, functions, components in general	
Number of modules	
• Per CPU, maximum	1
• Note	-
Performance data	
Performance data open communication	
Number of possible connections for open communication by means of SEND/RECEIVE blocks, maximum	-
Data volume as user data per connection for open communication by means of SEND/RECEIVE blocks, maximum	-
Performance data PROFIBUS DP	
Service as DP master DPV0	-
Number of DP slaves that can be operated on DP master	16
Data volume	
• of address area of the inputs as DP master, total	512 byte
• of address area of the outputs as DP master, total	512 byte
• of address area of the inputs per DP slave	244 byte
• of address area of the outputs per DP slave	244 byte
• of address area of the diagnostic data per DP slave	240 byte
Service as DP slave	
• DPV0	-
• DPV1	-
Data volume	
• of address area of the inputs as DP slave, total	-
• of address area of the outputs as DP slave, total	-
Performance data S7 communication	
Number of possible connections for S7 communication	
• Maximum	8
• For PG connections, maximum	1
• For PG/OP connections, maximum	3
• Note	max. 4 connections to other S7 stations
Performance data multiprotocol operation	
Number of active connections in multiprotocol mode	
• Maximum without DP	8
• Maximum with DP	8
Product functions Management, configuration, programming	
Configuration software required	STEP 7 Basic V11.0 or higher

Ordering data

	Order No.
CM 1243-5 communication module	
Communication module for electrical connection of SIMATIC S7-1200 to PROFIBUS as a DPV1 master	**6GK7 243-5DX30-0XE0**
Accessories	
RS485 PROFIBUS FastConnect connector	
With 90° cable outlet; insulation displacement technology, max. transmission rate 12 Mbit/s	
• Without PG interface	**6ES7 972-0BA52-0XA0**
• With PG interface	**6ES7 972-0BB52-0XA0**
PROFIBUS FC standard cable	
2-core bus cable, shielded, special design for fast mounting, delivery unit: max. 1000 m, minimum order 20 m, sold by the meter	**6XV1 830-0EH10**
PROFIBUS FastConnect stripping tool	
Stripping tool for fast stripping of the PROFIBUS FastConnect bus cable	**6GK1 905-6AA00**
12M PROFIBUS bus terminal	
Bus terminal for connection of PROFIBUS nodes at up to 12 Mbit/s with connecting cable	**6GK1 500-0AA10**

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CSM 1277 unmanaged

Overview



- Unmanaged switch for connecting a SIMATIC S7-1200 to an Industrial Ethernet network with a line, tree or star topology
- Multiplication of Ethernet interfaces on a SIMATIC S7-1200 for additional connection of up to three programming devices, operator controls, and further Ethernet nodes
- Simple, space-saving mounting on the SIMATIC S7-1200 mounting rail
- Low-cost solution for implementing small, local Ethernet networks
- Connection without any problems using RJ45 standard connectors
- Simple and fast status display via LEDs on the device
- Integral autocrossover function permits use of uncrossed connecting cables

Technical specifications

Order number	6GK7 277-1AA00-0AA0
Product type designation	**CSM 1277**
Data transmission rate	
Transmission rate 1	10 Mbit/s
Transmission rate 2	100 Mbit/s
Interfaces	
Maximum number of electrical/ optical connections for network components or terminal equipment	4
Number of electrical connections	
• For network components or terminal equipment	4
• For signal contact	-
• For power supply	1
Design of electrical connection	
• For network components or terminal equipment	RJ45 port
• For signal contact	-
• For power supply	3-pin terminal block
Supply voltage, current consumption, power loss	
Type of power supply	DC
Supply voltage, external	24 V
• Minimum	19.2 V
• Maximum	28.8 V
Current consumption, maximum	0.07 A
Product component: fusing of power supply input	Yes
Type of fusing of power supply input	0.5 A / 60 V
Effective power loss at 24 V with DC	1.6 W
Permitted ambient conditions	
Ambient temperature	
• During operating phase	0 … 60 °C
• During storage	-40 … +70 °C
• During transport	-40 … +70 °C
Relative humidity at 25 °C without condensation during operating phase, maximum	95 %
IP degree of protection	IP20
Design, dimensions and weights	
Type of construction	SIMATIC S7-1200 device design
Width	45 mm
Height	100 mm
Depth	75 mm
Net weight	0.15 kg
Type of mounting	
• 35 mm DIN rail mounting	Yes
• Wall mounting	Yes
• S7-300 rail mounting	No

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Technical specifications (continued)

Order number	6GK7 277-1AA00-0AA0
Product properties, functions, components in general	
Cascading with star topology	-
Product function: switch-managed	No
Standards, specifications, approvals	
Standard	
• For EMC from FM	FM3611: Class 1, Division 2, Group A, B, C, D / T.., CL.1, Zone 2, GP. IIC, T.. Ta
• For Ex zone	EN 600079-15:2005, EN 600079-0:2006, II 3 G Ex nA II T4, KEMA 08 ATEX 0003 X
• For CSA and UL safety	UL 508, CSA C22.2 No. 142
• For Ex zone of CSA and UL	-
• For emitted interference	EN 61000-6-4 (Class A)
• For noise immunity	EN 61000-6-2
Certificate of suitability	EN 61000-6-2, EN 61000-6-4
• CE mark	Yes
• C-Tick	Yes

Ordering data

	Order No.
CSM 1277 compact switch module	
Unmanaged switch for connecting a SIMATIC S7-1200 and up to three further nodes to Industrial Ethernet with 10/100 Mbit/s; 4 x RJ45 ports; external 24 V DC power supply, diagnostics on LEDs, S7-1200 module including electronic manual on CD-ROM	**6GK7 277-1AA10-0AA0**
Accessories	
IE TP Cord RJ45/RJ45	
TP cable 4 x 2 with 2 RJ45 connectors	
• 0.5 m	**6XV1 870-3QE50**
• 1 m	**6XV1 870-3QH10**
• 2 m	**6XV1 870-3QH20**
• 6 m	**6XV1 870-3QH60**
• 10 m	**6XV1 870-3QN10**
IE FC Outlet RJ45	**6GK1 901-1FC00 0AA0**
For connecting Industrial Ethernet FC cables and TP cords; graduated prices for 10 and 50 units or more	

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SIPLUS NET CSM 1277

Overview



- Unmanaged switch for connection of SIPLUS S7-1200 to an Industrial Ethernet network with a line, tree or star topology
- Multiplication of Ethernet interfaces on a SIPLUS S7-1200 for additional connection of up to three programming devices, operator controls, and further Ethernet nodes
- Simple, space-saving mounting on the SIPLUS S7-1200 rail
- Low-cost solution for implementing small, local Ethernet networks
- Problem-free connection using RJ45 standard connectors
- Simple and fast status display via LEDs on the device
- Integral autocrossover function permits use of uncrossed connecting cables

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS NET CSM 1277	
Order number	**6AG1 277-1AA00-4AA0**
Order number based on	**6GK7 277-1AA00-0AA0**
Ambient temperature range	0 ... +55 °C
Ambient conditions	Suitable for exceptional medial exposure (e.g. in sulfur chloride atmosphere).
Technical data	The technical data of the standard product applies except for the ambient conditions.
Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including sand, dust[2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 14.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

For further technical documentation on SIPLUS, see:
www.siemens.com/siplus-extreme

Ordering data

	Order No.
SIPLUS NET CSM 1277 compact switch module (extended temperature range and medial exposure) Unmanaged switch for connection of SIPLUS S7-1200 and up to three further nodes to Industrial Ethernet with 10/100 Mbit/s; 4 x RJ45 ports; external 24 V DC power supply, LED diagnostics, S7-1200 module including electronic Manual on CD-ROM	**6AG1 277-1AA00-4AA0**

	Order No.
Accessories	See CSM 1277 unmanaged, page 4/105

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Overview



The CP 1242-7 communication processor is used to connect a SIMATIC S7-1200 to the globally widespread GSM/GPRS mobile radio network and has the following characteristics:

- Worldwide wireless exchange of data between S7-1200 controllers and/or between S7-1200 controllers and control centers with an Internet connection
- Communication based on the GPRS (General Packet Radio Service) mobile wireless service with data transmission speeds of up to 86 Kbit/s in the downlink and 43 Kbit/s in the uplink
- GPRS mode with fixed IP addresses and dynamic IP addresses with standard mobile phone contract
- Time synchronization on the basis of NTP (Network Time Protocol)
- On-demand connection buildup via voice call or text message
- Sending and receiving of text messages
- Clearly laid out LED signaling for fast and easy diagnostics
- Compact industrial enclosure in S7-1200 design for mounting on a standard mounting rail
- Fast commissioning thanks to easy configuration using STEP 7

In conjunction with the "Telecontrol Server Basic" software, the CP 1242-7 forms a telecontrol system with further properties:

- Connection of up to 5000 telecontrol stations to the control center via an OPC interface
- Data buffering in the substations in the event of connection failures
- Central status monitoring of the substations
- No special provider services required for fixed IP addresses
- Teleservice access with STEP 7 to the substations via Internet

Technical specifications

Order No.	6GK7 242-7KX30-0XE0
Product type designation	
Transmission rate	
Transmission rate for GPRS transmission on uplink	
• Minimum	-
• Maximum	43 Kbit/s
Transmission rate for GPRS transmission on downlink	
• Minimum	-
• Maximum	86 Kbit/s
Wireless technology	
Type of mobile wireless service supported	
• SMS	Yes
• GPRS	Yes
Type of mobile wireless network supported	
• GSM	Yes
• UMTS	-
Type of mobile wireless service - note	GPRS (Multislot Class 10)
Operating frequency	
• 850 MHz	Yes
• 900 MHz	Yes
• 1800 MHz	Yes
• 1900 MHz	Yes
Transmit power	
• At operating frequency 850 MHz	2 W
• At operating frequency 900 MHz	2 W
• At operating frequency 1800 MHz	1 W
• At operating frequency 1900 MHz	1 W
Interfaces	
Number of electrical connections	
• for external antenna(s)	1
• for power supply	1
Number of slots for SIM cards	1
Design of electrical connection	
• for external antenna(s)	SMA socket (50 Ohm)
• for power supply	3-pin terminal strip
Design of SIM card slot	Slot under front flap
Supply voltage, current consumption, power loss	
Type of power supply	DC
External power supply	24 V
Relative positive tolerance at 24 V DC	20%
Relative negative tolerance at 24 V DC	20 %
Current input from external power supply at 24 V DC	
• Typical	0.1 A
• Maximum	0.22 A
Effective power loss	2.5 W

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Technical specifications (continued)

Order No.	6GK7 242-7KX30-0XE0
Permitted ambient conditions	
Ambient temperature	
• For vertical installation	
- During operation	0 … 45 °C
• For horizontal installation	
- During operation	0 … 55 °C
• During storage	-40 … +70 °C
• During transport	-40 … +70 °C
• Note	-
Relative humidity at 25 °C without condensation during operating phase, maximum	95 %
IP degree of protection	IP 20
Design, dimensions and weights	
Module format	S7-1200 compact module, single width
Width	30 mm
Height	100 mm
Depth	75 mm
Net weight	0.14 kg
Product properties, functions, components in general	
Maximum number of modules per CPU	3
Number of modules - Note	-
Performance data	
Performance data open communication	
Number of possible connections for open communication by means of TC blocks, maximum	4
Data volume as user data per send call, maximum	2 048 byte
Performance data S7 communication	
Number of possible connections for S7 communication	
• Maximum	-
• For PG connections, maximum	-
• For PG/OP connections, maximum	-
• Note	-

Order No.	6GK7 242-7KX30-0XE0
Performance data Telecontrol	
Connection to the control center	Telecontrol Server Basic
• Note	Connection to Scada system by means of OPC interface
• with automatic connection buildup	is supported
• with connection buildup as required	is supported
Protocol is supported	
• DNP3	No
• IEC 60870-5	No
Product function: data buffering if connection is aborted	Yes
• Note	up to 1000 message frames
Data volume as user data per station in telecontrol mode, maximum	1 024 byte
Performance data Teleservice	
Diagnostics function: online diagnostics with SIMATIC STEP 7	Yes
Product function: program download with SIMATIC STEP 7	Yes
Product function: remote firmware update	No
Product functions Management, configuration, programming	
Configuration software required	STEP 7 Basic V11.0 or higher
Product functions Security	
Product function: password protection for teleservice access	Yes
Product function: encrypted data transmission	Yes

Ordering data

		Order No.
CP 1242-7 communication processor		
Communication processor for connecting SIMATIC S7-1200 to GSM/GPRS mobile wireless network		**6GK7 242-7KX30-0XE0**
Accessories		
Telecontrol Server Basic		
Software for		
• License for up to 8 stations	J	**6NH9 910-0AA20-0AA0**
• License for up to 64 stations	J	**6NH9 910-0AA20-0AB0**
• License for up to 256 stations	J	**6NH9 910-0AA20-0AC0**
• License for up to 1000 stations	J	**6NH9 910-0AA20-0AD0**
• License for up to 5000 stations	J	**6NH9 910-0AA20-0AE0**

	Order No.
ANT794-4MR antenna	
GSM quad band antenna	**6NH9 860-1AA00**
ANT794-3M antenna	
GSM quad band antenna	**6NH9 870-1AA00**

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

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Overview



- For fast, high-performance serial data exchange via point-to-point coupling
- Implemented protocols: ASCII, USS drive protocol, Modbus RTU
- Additional protocols can also be loaded
- Simple parameterization with STEP 7 Basic

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS CM 1241		
Order number	**6AG1 241-1AH30-2XB0**	**6AG1 241-1AH30-4XB0**
Order No. based on	**6ES7 241-1AH30-0XB0**	
Ambient temperature range	-25 ... +70 °C	0 ... +55 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	

SIPLUS CM 1241		
Order number	**6AG1 241-1CH30-2XB0**	**6AG1 241-1CH30-4XB0**
Order No. based on	**6ES7 241-1CH30-0XB0**	
Ambient temperature range	-25 ... +70 °C	0 ... +55 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	

Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS CM 1241 communication module		
(extended temperature range and medial exposure)		
Ambient temperature 25 ... +70° C		
Communication module for point-to-point connection, with one RS485 interface	I	**6AG1 241-1CH30-2XB0**
Communication module for point-to-point connection, with one RS232 interface	I	**6AG1 241-1AH30-2XB0**
Suitable for areas with extraordinary medial exposure (conformal coating)		
Communication module for point-to-point connection, with one RS485 interface	H	**6AG1 241-1CH30-4XB0**
Communication module for point-to-point connection, with one RS232 interface	H	**6AG1 241-1AH30-4XB0**
Accessories		See SIMATIC S7-1200 CM 1241 communication module, page 4/97

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H
I: Subject to export regulations AL: N and ECCN: EAR99H

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SIMATIC S7-1200 PM 1207

Overview



The power supply PM1207 (Power Module) is optimized for the new SIMATIC S7-1200 controllers in terms of design and functionality and serves as an external supply for the inputs and outputs which, to prevent an imbalance, must not be drawn from the CPU encoder supply.

Technical specifications

Power supply, type	**2.5 A**
Order number	**6EP1 332-1SH71**[1)]
Input	
Rated voltage value $U_{in\ rated}$	**120/230 V AC** Automatic range switchover
Voltage range	85 ... 132 V/176 ... 264 V
Overvoltage strength	2.3 x $U_{in\ rated}$, 1.3 ms
Mains buffering at $I_{out\ rated}$	> 20 ms at U_{in} = 93/187 V
Rated line frequency, rated line-frequency range	50/60 Hz; 47 ... 63 Hz
Rated current $I_{in\ rated}$	1.2/0.67 A
Switch-on current limitation (+25 °C)	< 13 A, < 3 ms (U_{in} = 230 V)
I^2t	< 0.5 A^2s
Built-in incoming fuse	T 3.15 A/250 V (not accessible)
Recommended miniature circuit breaker (IEC 898) in the mains power input	16 A, characteristic B; 10 A, characteristic C
Output	Controlled, isolated DC voltage
Rated voltage $U_{out\ rated}$	**24 V DC**
Total tolerance	±3 %
• Static line smoothing	Approx. ±0.1 %
• Static load smoothing	Approx. ±0.2 %
Residual ripple	< 150 mV_{pp}
Spikes (bandwidth: 20 MHz)	< 240 mV_{pp}
Adjustment range	-
Status indicator	24 V OK = green LED
On/Off behavior	No overshoot of U_{out} (soft start)
Startup delay/voltage rise	< 2 (6) s at 230 (120) V/typ. 10 ms
Rated current $I_{out\ rated}$	**2.5 A**

Power supply, type	**2.5 A**
Order number	**6EP1 332-1SH71**[1)]
Current range	
• Up to +60 °C	0 ... 2.5 A
• Derating	-
Dynamic overcurrent on	
• Power-up on short-circuit	Typ. 6 A for 100 ms
• Short-circuit during operation	Typ. 6 A for 100 ms
Parallel switching for enhanced performance	Yes, two units
Efficiency	
Efficiency at $U_{out\ rated}$, $I_{out\ rated}$	Approx. 83%
Power loss at $U_{out\ rated}$, $I_{out\ rated}$	Approx. 12 W
Closed-loop control	
Dyn. mains compensation ($U_{in\ rated}$ ±15%)	Typ. ±0.3 % U_{out}
Dynamic load smoothing (I_{out}: 50/100/50 %)	Typ. ±3% U_{out}
Load step settling time	
• 50 to 100 %	< 5 ms
• 100 to 50%	< 5 ms
Protection and monitoring	
Output overvoltage protection	< 33 V
Current limitation	2.65 A
Short-circuit protection	Constant current characteristic
Sustained short-circuit current rms value	-
Overload/short-circuit indicator	-

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Technical specifications (continued)

Power supply, type	2.5 A
Order number	**6EP1 332-1SH71[1)]**
Safety	
Primary/secondary isolation	Yes, safety extra low output voltage according to EN 60950-1 and EN 50178
Protection class	Class I
Leakage current	< 3.5 mA
Safety test	Yes
CE marking	Yes
UL/cUL (CSA) approval	cULus-listed (UL 508, CSA C22.2 No. 107.1) File E197259; cULus-recognized (UL 60950-1, CSA C22.2 No. 60950-1), File E151273
Protection against explosion	ATEX (available soon)
FM approval	-
Marine approval	GL, ABS, DNV, NK
Degree of protection (EN 60529)	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 and storage temperature range	-40 ... +85°C
Humidity class	Climate class 3K3 according to EN 60721, no condensation
Mechanics	
Connections	
• Supply input L, N, PE	One screw-type terminal each for 0.5 ... 2.5 mm^2
• Output +	2 screw-type terminals each for 0.5 ... 2.5 mm^2
• Output -	2 screw-type terminals each for 0.5 ... 2.5 mm^2
Dimensions (W x H x D) in mm	70 x 100 x 75
Weight, approx.	0.3 kg
Mounting	Can be snapped onto standard mounting rail EN 60715 DC 35x7.5/15, wall mounting

1) SIPLUS module 6AG1 332-1SH71-7AA0 for extended temperature range -25 °C to +70 °C, derating from +55 °C to +70 °C to 1.5 A output current. Suitable for use under medial load (e.g. sulfur chloride atmosphere).

Ordering data

		Order No.
SIMATIC S7-1200 PM 1207 Input 120/230 V AC, output 24 V DC/2.5 A		**6EP1 332-1SH71**
SIMATIC S7-1200 PM 1207 (Extended temperature range and medial exposure, -25 ... +70°C)	L	**6AG1 332-1SH71-7AA0**

L: Subject to export regulations AL: 9I999 and ECCN: N

Further information

The perfectly matched, complete SITOP range includes different switch mode power supply series in addition to a unique range of add-on modules, which can be used to additionally protect the 24 V power supply against faults on the primary and secondary side - all the way to complete protection:

- Redundancy module for setting up a redundant power supply
- Uninterruptible 24 V power supplies with batteries or maintenance-free capacitors for continued operation in the event of a power failure
- Selectivity modules for the electronic protection of 24 V feeders against overload and short circuits

More information can be found in the KT 10.1 Catalog and in the Internet at
www.siemens.com/sitop

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SIPLUS PM 1207 power supplies

Overview



- Stabilized power supply for SIPLUS S7-1200
- In the S7-1200 design
- Input 120/230 V AC, output 24 V DC, 2.5 A (derating: 1.5 A from 60 °C)

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS power supply PM 1207		
Order number	**6AG1 332-1SH71-4AA0**	**6AG1 332-1SH71-7AA0**
Order No. based on	**6EP1 332-1SH71**	
Ambient temperature range	0 ... +60° C	-25 ... +70° C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	

SIPLUS power supply PM 1207	
Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust[2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

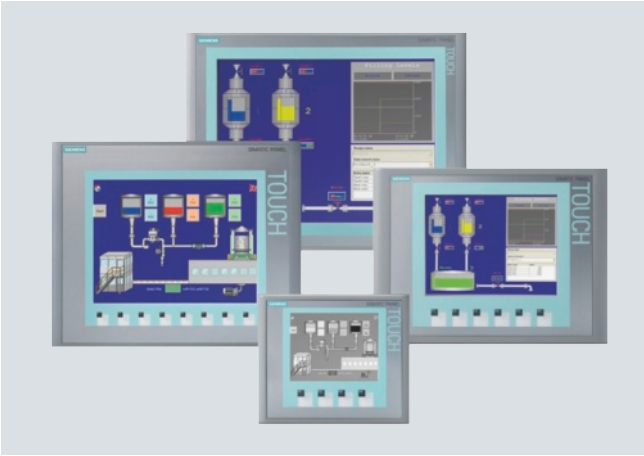
Ordering data

		Order No.
SIPLUS PM 1207 power supply		
(extended temperature range and medial exposure)		
Input 120/230 V AC, output 24 V DC, 2.5 A; derating from + 55 °C to + 70 °C to 1.2 A output current		
Ambient temperature -25 ... +70 °C	L	**6AG1 332-1SH71- 7AA0**
Ambient temperature 0 ... +60 °C		**6AG1 332-1SH71- 4AA0**

L: Subject to export regulations AL: 9I999 and ECCN: N

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Overview



- The ideal entry level series of 3.8" to 15" for operating and monitoring compact 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

Technical specifications

	6AV6 647-0AA11-3AX0	6AV6 647-0AB11-3AX0	6AV6 647-0AC11-3AX0	6AV6 647-0AD11-3AX0
Product type designation	SIMATIC HMI KTP400 Basic mono PN	SIMATIC HMI KTP600 Basic mono PN	SIMATIC HMI KTP600 Basic color DP	SIMATIC HMI KTP600 Basic color PN
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	0.07 A	0.24 A	0.35 A	0.35 A
Memory				
Type	Flash / RAM	Flash / RAM	Flash / RAM	Flash / RAM
Usable memory for user data	512 kbyte usable memory for user data	512 kbyte usable memory for user data	512 kbyte usable memory for user data	512 kbyte usable memory for user data
Protocols				
Protocols (terminal link)				
• Sm@rtAccess	No	No	No	No
Configuration				
Configuration tool	WinCC flexible Compact Version 2008 SP1 or higher (to be ordered separately)	WinCC flexible Compact Version 2008 SP1 or higher (to be ordered separately)	WinCC flexible Compact Version 2008 SP1 or higher (to be ordered separately)	WinCC flexible Compact Version 2008 SP1 or higher (to be ordered separately)
Display				
Display type	STN, gray scales	STN, gray scales	TFT, 256 Farben	TFT, 256 Farben
Size	3.8" (76.8 mm x 57.6 mm)	5.7" (115.2 mm x 86.4 mm)	5.7" (115.2 mm x 86.4 mm)	5.7" (115.2 mm x 86.4 mm)
Resolution (WxH in pixel)	320 x 240	320 x 240	320 x 240	320 x 240
Backlighting				
• MTBF backlighting (at 25 °C)	Approx. 30000 hours	about 50,000 hours	about 50,000 hours	about 50,000 hours
Operating mode				
Control elements	Membrane keyboard	Membrane keyboard	Membrane keyboard	Membrane keyboard
Function keys, programmable	4 function keys	6 function keys	6 function keys	6 function keys
Connection for mouse/ keyboard/barcode reader	- / - / -	- / - / -	- / - / -	- / - / -

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Technical specifications (continued)

	6AV6 647-0AA11-3AX0	6AV6 647-0AB11-3AX0	6AV6 647-0AC11-3AX0	6AV6 647-0AD11-3AX0
Touch operation				
• Touch screen	analog, resistive	analog, resistive	analog, resistive	analog, resistive
• Numeric/alphabetical input	Yes (on-screen keyboard) / Yes (on-screen keyboard)	Yes (on-screen keyboard) / Yes (on-screen keyboard)	Yes (on-screen keyboard) / Yes (on-screen keyboard)	Yes (on-screen keyboard) / Yes (on-screen keyboard)
Ambient conditions				
Mounting position	vertical	vertical	vertical	vertical
Maximum permissible angle of inclination without external ventilation	+/- 35 °	+/- 35 °	+/- 35 °	+/- 35 °
Max. relative humidity	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
• Operation (max. tilt angle)	0 °C to +40 °C	0 °C to +40 °C	0 °C to +40 °C	0 °C to +40 °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 4x, NEMA 12 (when installed)	IP65, NEMA 4, NEMA 4x, NEMA 12 (when installed)	IP65, NEMA 4, NEMA 4x, NEMA 12 (when installed)	IP65, NEMA 4, NEMA 4x, NEMA 12 (when installed)
Rear	IP20	IP20	IP20	IP20
Certifications & standards				
Certifications	CE, UL, cULus, NEMA 4, NEMA 4x, NEMA 12	CE, UL, cULus, NEMA 4, NEMA 4x, NEMA 12	CE, UL, cULus, NEMA 4, NEMA 4x, NEMA 12	CE, UL, cULus, NEMA 4, NEMA 4x, NEMA 12
I/O				
I/O devices	None	None	None	None
Type of output				
LED colors	None	None	None	None
Acoustics	Sound signal	Sound signal	Sound signal	Sound signal
Interfaces				
Interfaces	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	1 x RS422,1 x RS485 (max. 12 Mbit/s)	1 x Ethernet (RJ45)
PC card slot	No	No	No	No
CF card slot	No	No	No	No
Multi Media Card slot	No	No	No	No
USB port	No	No	No	No
Industrial Ethernet interface	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	No	1 x Ethernet (RJ45)
Processor				
Processor	RISC 32 bit, 75 MHz	RISC 32 bit, 75 MHz	RISC 32 bit, 75 MHz	RISC 32 bit, 75 MHz
Functionality under WinCC flexible/ WinCC Basic				
Applications/options	None	None	None	None
Number of Visual Basic Scripts	Not possible	Not possible	Not possible	Not possible
Task planner	Yes	Yes	Yes	Yes
Help system	Yes	Yes	Yes	Yes
Status/control	Not possible	Not possible	Not possible	Not possible
With alarm logging system (incl. buffer and acknowledgment)				
• Number of messages	200	200	200	200
• Bit messages	Yes	Yes	Yes	Yes
• Analog messages	Yes	Yes	Yes	Yes
• Message buffer	Ring buffer (n x 256 entries), retentive, maintenance-free	Ring buffer (n x 256 entries), retentive, maintenance-free	Ring buffer (n x 256 entries), retentive, maintenance-free	Ring buffer (n x 256 entries), retentive, maintenance-free

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Technical specifications (continued)

	6AV6 647-0AA11-3AX0	6AV6 647-0AB11-3AX0	6AV6 647-0AC11-3AX0	6AV6 647-0AD11-3AX0
Recipes				
• Recipes	5	5	5	5
• Data records per recipe	20	20	20	20
• Entries per data record	20	20	20	20
• Recipe memory	40 kbyte integrated Flash	40 kbyte integrated Flash	40 kbyte integrated Flash	40 kbyte integrated Flash
Number of process images				
• Process images	50	50	50	50
• Variables	250	500	500	500
• Limit values	Yes	Yes	Yes	Yes
• Multiplexing	Yes	Yes	Yes	Yes
Image elements				
• Text objects	500 text elements	500 text elements	500 text elements	500 text elements
• Graphics object	Bit maps, icons, icon (full-screen), vector graphics	Bit maps, icons, icon (full-screen), vector graphics	Bit maps, icons, icon (full-screen), vector graphics	Bit maps, icons, icon (full-screen), vector graphics
• dynamic objects	Diagrams, bar graphs	Diagrams, bar graphs	Diagrams, bar graphs	Diagrams, bar graphs
Lists				
• Text lists	150	150	150	150
• Graphics list	100	100	100	100
• Libraries	Yes	Yes	Yes	Yes
Security				
• Number of user groups	50	50	50	50
• Passwords exportable	No	No	No	No
• Number of user rights	32	32	32	32
Data carrier support				
• PC card	No	No	No	No
• CF card	No	No	No	No
• Multi Media Card	No	No	No	No
Recording				
• Recording/Printing	-	-	-	-
Fonts				
• Keyboard fonts	US American (English)	US American (English)	US American (English)	US American (English)
Languages				
• Online languages	5	5	5	5
• Configuration languages	D, GB, F, I, E, CHN "traditional", CHN "simplified", DK, FIN, GR, J, KP / ROK, NL, N, PL, P, RUS, S, CZ / SK, TR, H	D, GB, F, I, E, CHN "traditional", CHN "simplified", DK, FIN, GR, J, KP / ROK, NL, N, PL, P, RUS, S, CZ / SK, TR, H	D, GB, F, I, E, CHN "traditional", CHN "simplified", DK, FIN, GR, J, KP / ROK, NL, N, PL, P, RUS, S, CZ / SK, TR, H	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
• Character sets	Tahoma, WinCC flexible Standard, symbol languages	Tahoma, WinCC flexible Standard, symbol languages	Tahoma, WinCC flexible Standard, symbol languages	Tahoma, WinCC flexible Standard, symbol languages
Transfer (upload/download)				
• Transfer of configuration	Ethernet, automatic transfer recognition	Ethernet, automatic transfer recognition	MPI/PROFIBUS DP, serial, automatic transfer recognition	Ethernet, automatic transfer recognition
Process coupling				
• Connection to controller	S7-200, S7-300/400, Modicon (Modbus) see chapter "System interfaces"	S7-200, S7-300/400, Modicon (Modbus) see chapter "System interfaces"	S7-200, S7- 300/400, Allen Bradley (DF1), Mitsubishi (FX), OMRON (LINK/ Multilink), Modicon (Modbus) see section on "System interfaces"	S7-200, S7-300/400, Modicon (Modbus) see chapter "System interfaces"
Expandability/openness				
• Open Platform Program	No	No	No	No
Dimensions				
Front of enclosure (W x H)	140 mm x 116 mm	214 mm x 158 mm	214 mm x 158 mm	214 mm x 158 mm
Mounting cutout/device depth (W x H)	123 mm x 99 mm/40 mm device depth	197 mm x 141 mm/44 mm device depth	197 mm x 141 mm/44 mm device depth	197 mm x 141 mm/44 mm device depth
Dimensions and weight				
Weight				
• Weight	0.32 kg	1.07 kg	1.07 kg	1.07 kg

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Technical specifications (continued)

	6AV6 647-0AE11-3AX0	6AV6 647-0AF11-3AX0	6AV6 647-0AG11-3AX0
Product type designation	SIMATIC HMI KTP1000 Basic color DP	SIMATIC HMI KTP1000 Basic color PN	SIMATIC HMI TP1500 Basic color PN
Supply voltage			
Supply voltage	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
Rated current	0.6 A	0.6 A	0.8 A
Memory			
Type	Flash / RAM	Flash / RAM	Flash / RAM
Usable memory for user data	1024 kbyte usable memory for user data	1024 kbyte usable memory for user data	1024 kbyte usable memory for user data
Protocols			
Protocols (terminal link)			
• Sm@rtAccess	No	No	No
Configuration			
Configuration tool	WinCC flexible Compact Version 2008 or higher (to be ordered separately)	WinCC flexible Compact Version 2008 or higher (to be ordered separately)	WinCC flexible Compact Version 2008 or higher (to be ordered separately)
Display			
Display type	TFT, 256 colors	TFT, 256 colors	TFT, 256 colors
Size	10.4" (211.2 mm x 158.4 mm)	10.4" (211.2 mm x 158.4 mm)	15" (304.1 mm x 228.1 mm)
Resolution (WxH in pixel)	640 x 480	640 x 480	1024 x 768
Backlighting			
• MTBF backlighting (at 25 °C)	about 50,000 hours	about 50,000 hours	about 50,000 hours
Operating mode			
Control elements	Membrane keyboard	Membrane keyboard	Touch screen
Function keys, programmable	8 function keys	8 function keys	None
Connection for mouse/keyboard/ barcode reader	- / - / -	- / - / -	- / - / -
Touch operation			
• Touch screen	analog, resistive	analog, resistive	analog, resistive
• Numeric/alphabetical input	Yes (on-screen keyboard) / Yes (on-screen keyboard)	Yes (on-screen keyboard) / Yes (on-screen keyboard)	Yes (on-screen keyboard) / Yes (on-screen keyboard)
Ambient conditions			
Mounting position	vertical	vertical	vertical
Maximum permissible angle of inclination without external ventilation	+/- 35 °	+/- 35 °	+/- 35 °
Max. relative humidity	90 %	90 %	90 %
Temperature			
• Operation (vertical installation)	0 °C to +50 °C	0 °C to +50 °C	0 °C to +50 °C
• Operation (max. tilt angle)	0 °C to +40 °C	0 °C to +40 °C	0 °C to +40 °C
• Transport, storage	-20 °C to +60 °C	-20 °C to +60 °C	-20 °C to +60 °C
Degree of protection			
Front	IP65, NEMA 4, NEMA 4x, NEMA 12 (when installed)	IP65, NEMA 4, NEMA 4x, NEMA 12 (when installed)	IP65, NEMA 4, NEMA 4x, NEMA 12 (when installed)
Rear	IP20	IP20	IP20

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Technical specifications (continued)

	6AV6 647-0AE11-3AX0	6AV6 647-0AF11-3AX0	6AV6 647-0AG11-3AX0
Certifications & standards			
Certifications	CE, UL, cULus, NEMA 4, NEMA 4x, NEMA 12	CE, UL, cULus, NEMA 4, NEMA 4x, NEMA 12	CE, UL, cULus, NEMA 4, NEMA 4x, NEMA 12
I/O			
I/O devices	None	None	None
Type of output			
LED colors	None	None	None
Acoustics	Sound signal	Sound signal	Sound signal
Interfaces			
Interfaces	1 x RS422,1 x RS485 (max. 12 Mbit/s)	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)
PC card slot	No	No	No
CF card slot	No	No	No
Multi Media Card slot	No	No	No
USB port	No	No	No
Industrial Ethernet interface	No	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)
Processor			
Processor	RISC 32 bit, 200 MHz	RISC 32 bit, 200 MHz	RISC 32 bit, 200 MHz
Functionality under WinCC flexible/WinCC Basic			
Applications/options	None	None	None
Number of Visual Basic Scripts	Not possible	Not possible	Not possible
Task planner	Yes	Yes	Yes
Help system	Yes	Yes	Yes
Status/control	Not possible	Not possible	Not possible
With alarm logging system (incl. buffer and acknowledgment)			
• Number of messages	200	200	200
• Bit messages	Yes	Yes	Yes
• Analog messages	Yes	Yes	Yes
• Message buffer	Ring buffer (n x 256 entries), retentive, maintenance-free	Ring buffer (n x 256 entries), retentive, maintenance-free	Ring buffer (n x 256 entries), retentive, maintenance-free
Recipes			
• Recipes	5	5	5
• Data records per recipe	20	20	20
• Entries per data record	20	20	20
• Recipe memory	40 kbyte integrated Flash	40 kbyte integrated Flash	40 kbyte integrated Flash
Number of process images			
• Process images	50	50	50
• Variables	500	500	500
• Limit values	Yes	Yes	Yes
• Multiplexing	Yes	Yes	Yes
Image elements			
• Text objects	500 text elements	500 text elements	500 text elements
• Graphics object	Bit maps, icons, icon (full-screen), vector graphics	Bit maps, icons, icon (full-screen), vector graphics	Bit maps, icons, icon (full-screen), vector graphics
• Dynamic objects	Diagrams, bar graphs	Diagrams, bar graphs	Diagrams, bar graphs
Lists			
• Text lists	150	150	150
• Graphics list	100	100	100
• Libraries	Yes	Yes	Yes
Security			
• Number of user groups	50	50	50
• Passwords exportable	No	No	No
• Number of user rights	32	32	32

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Technical specifications (continued)

	6AV6 647-0AE11-3AX0	6AV6 647-0AF11-3AX0	6AV6 647-0AG11-3AX0
Data carrier support			
• PC card	No	No	No
• CF card	No	No	No
• Multi Media Card	No	No	No
Recording			
• Recording/Printing	-	-	-
Fonts			
• Keyboard fonts	US American (English)	US American (English)	US American (English)
Languages			
• Online languages	5	5	5
• Configuration languages	D, GB, F, I, E, CHN "traditional", CHN "simplified", DK, FIN, GR, J, KP / ROK, NL, N, PL, P, RUS, S, CZ / SK, TR, H	D, GB, F, I, E, CHN "traditional", CHN "simplified", DK, FIN, GR, J, KP / ROK, NL, N, PL, P, RUS, S, CZ / SK, TR, H	D, GB, F, I, E, CHN "traditional", CHN "simplified", DK, FIN, GR, J, KP / ROK, NL, N, PL, P, RUS, S, CZ / SK, TR, H
• Character sets	Tahoma, WinCC flexible Standard, symbol languages	Tahoma, WinCC flexible Standard, symbol languages	Tahoma, WinCC flexible Standard, symbol languages
Transfer (upload/download)			
• Transfer of configuration	MPI/PROFIBUS DP, serial, automatic transfer recognition	Ethernet, automatic transfer recognition	Ethernet, automatic transfer recognition
Process coupling			
• Connection to controller	S7-200, S7- 300/400, Allen Bradley (DF1), Mitsubishi (FX), OMRON (LINK/Multilink), Modicon (Modbus) see section on "System interfaces"	S7-200, S7-300/400, Modicon (Modbus) see chapter "System interfaces"	S7-200, S7-300/400, Modicon (Modbus) see chapter "System interfaces"
Expandability/openness			
• Open Platform Program	No	No	No
Dimensions			
Front of enclosure (W x H)	335 mm x 275 mm	335 mm x 275 mm	400 mm x 310 mm
Mounting cutout/device depth (W x H	310 mm x 248 mm / 60 mm device depth	310 mm x 248 mm / 60 mm device depth	367 mm x 289 mm / 60 mm device depth
Dimensions and weight			
Weight			
• Weight	2.65 kg	2.65 kg	4.2 kg

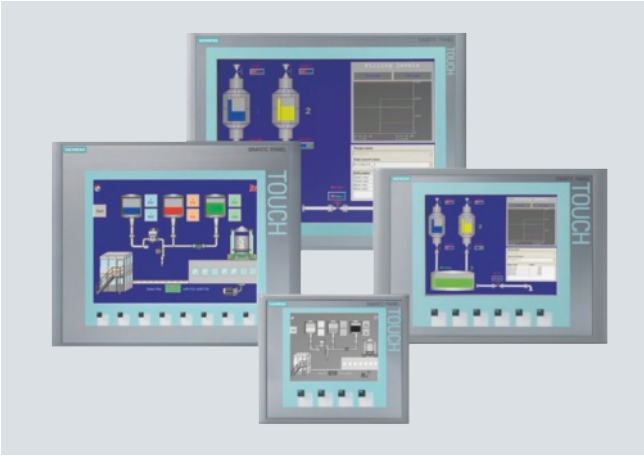
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Ordering data		Order No.
SIMATIC HMI KP300 Basic mono PN	I	**6AV6 647-0AH11-3AX0**
SIMATIC HMI KTP400 Basic mono PN	I	**6AV6 647-0AA11-3AX0**
Starter kit for SIMATIC HMI KTP400 Basic mono PN	D	**6AV6 652-7AA01-3AA0**
SIMATIC HMI KTP600 Basic mono PN	I	**6AV6 647-0AB11-3AX0**
Starter kit for SIMATIC HMI KTP600 Basic mono PN	D	**6AV6 652-7BA01-3AA0**
SIMATIC HMI KTP600 Basic color DP	I	**6AV6 647-0AC11-3AX0**
Starter kit for SIMATIC HMI KTP600 Basic color DP	D	**6AV6 652-7CA01-3AA0**
SIMATIC HMI KTP600 Basic color PN	I	**6AV6 647-0AD11-3AX0**
Starter kit for SIMATIC HMI KTP600 Basic color PN	D	**6AV6 652-7DA01-3AA0**
SIMATIC HMI KTP1000 Basic color DP	I	**6AV6 647-0AE11-3AX0**
Starter kit for SIMATIC HMI KTP1000 Basic color DP	D	**6AV6 652-7EA01-3AA0**
SIMATIC HMI KTP1000 Basic color PN	I	**6AV6 647-0AF11-3AX0**
Starter kit for SIMATIC HMI KTP1000 Basic color PN	D	**6AV6 652-7FA01-3AA0**
SIMATIC HMI TP1500 Basic color PN Starter kits consist of: • the relevant SIMATIC KTP Basic Panel • SIMATIC WinCC flexible Compact 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 • Ethernet cable on PN devices • MPI cable on DP devices (for download and test purposes only)	I	**6AV6 647-0AG11-3AX0**
Starter kit SIMATIC S7-1200 + KTP400 Basic consisting of: • SIMATIC HMI KTP400 Basic mono PN • SIMATIC S7-1200 CPU 1212C AC/DC/Rly • SIMATIC S7-1200 Simulator Module SIM 1274 • SIMATIC STEP 7 BASIC CD • SIMATIC S7-1200 HMI Manual Collection CD • Ethernet CAT5 cable, 2 m	D	**6AV6 651-7AA01-3AA0**
Starter kit SIMATIC S7-1200 + KTP600 Basic consisting of: • SIMATIC HMI KTP600 Basic color PN • SIMATIC S7-1200 CPU 1212C AC/DC/Rly • SIMATIC S7-1200 SIM 1274 simulator module • SIMATIC STEP 7 BASIC CD • SIMATIC S7-1200 HMI Manual Collection CD • Ethernet CAT5 cable, 2 m	D	**6AV6 651-7DA01-3AA0**
Configuration • All device versions: with SIMATIC WinCC V11, configurable		see catalog ST 80/ST PC
Documentation (to be ordered separately)		
You can find the manual for the Basic Panels on the Internet at http://support.automation.siemens.com		
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**
WinCC flexible Communication user manual		
• 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 **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	J	**6AV6 691-1SA01-0AX0**

D: Subject to export regulations AL: N and ECCN: 5D992
I: Subject to export regulations AL: N and ECCN: EAR99H
J: Subject to export regulations AL: N and ECCN: EAR99S

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Overview



- Ideal entry-level series of 3.8 inches to 15 inches for operating and monitoring compact machines and systems
- Clear process representation through the use of full-graphic displays
- Intuitive operation via touch and tactile function keys
- Equipped with all the necessary basic functions such as reporting, recipe management, curve representation, vector graphics, and language selection
- Easy connection to the controller via integrated Ethernet interface or a separate version with RS485/422

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

	SIPLUS HMI KTP 400 BASIC MONO PN	SIPLUS HMI KTP 600 BASIC COLOR PN	SIPLUS HMI KTP 1000 BASIC COLOR DP	SIPLUS HMI KTP 1000 BASIC COLOR PN	SIPLUS HMI TP 1500 BASIC COLOR PN
Order No.	**6AG1647-0AA11-2AX0**	**6AG1647-0AD11-2AX0**	**6AG1647-0AE11-4AX0**	**6AG1647-0AF11-4AX0**	**6AG1647-0AG11-4AX0**
Order No. based on	**6AV6647-0AA11-3AX0**	**6AV6647-0AD11-3AX0**	**6AV6647-0AE11-3AX0**	**6AV6647-0AF11-3AX0**	**6AV6647-0AG11-3AX0**
Ambient temperature range	-10 ... +60 °C	-25 ... +60 °C	0 ... +50 °C	0 ... +50 °C	0 ... +50 °C
Conformal coating	Coating of the printed circuit boards and the electronic components				
Technical data	The technical data of the standard product applies except for ambient conditions.				
Ambient conditions					
Relative humidity	5 ... 100 % Condensation permissible				
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)				
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]				
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust[2)]				
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K				

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2 The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

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Ordering data

		Order No.
SIPLUS HMI KTP400 Basic mono PN Suitable for areas with extra-ordinary medial exposure (conformal coating); ambient temperature -10 ... +60 °C	I	**6AG1 647-0AA11-2AX0**
SIPLUS HMI KTP 600 Basic color PN Suitable for areas with extra-ordinary medial exposure (conformal coating); ambient temperature -25 ... +60 °C	H	**6AG1 647-0AD11-2AX0**
SIPLUS HMI KTP 1000 Basic Color DP Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature 0 ... +50 °C	I	**6AG1 647-0AE11-4AX0**
SIPLUS HMI KTP 1000 Basic Color PN Suitable for areas with extra-ordinary medial exposure (conformal coating); ambient temperature 0 ... +50 °C	I	**6AG1 647-0AF11-4AX0**
SIPLUS HMI TP 1500 Basic Color PN Suitable for areas with extra-ordinary medial exposure (conformal coating); ambient temperature 0 ... +50 °C	I	**6AG1 647-0AG11-4AX0**
Accessories		See SIMATIC basic panels, page 4/119

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H
I: Subject to export regulations AL: N and ECCN: EAR99H

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Software

Overview

- Software for the SIMATIC S7-1200
- Functions for all phases of the automation project:
  - configuring and parameterizing the hardware
  - specifying the communication
  - programming in LAD (Ladder Diagram) and FBD (Function Block Diagram)
  - configuration of the visualization
  - test, commissioning, and service

The following is available:

- STEP 7 Professional/Basic V11

For further information see chapter 11.

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SIMATIC S7-300



5/2 Introduction

5/4 Central processing units
5/4 Standard CPUs
5/32 SIPLUS Standard CPUs
5/36 Compact CPUs
5/68 SIPLUS compact CPUs
5/73 Fail-safe CPUs
5/94 SIPLUS fail-safe CPUs
5/98 Technology CPUs

5/109 Digital modules
5/109 SM 321 digital input module
5/115 SM 322 digital output module
5/123 SM 323/SM 327 digital input/output module

5/127 SIPLUS digital modules

5/132 Analog modules
5/132 SM 331 analog input module
5/141 SM 332 analog output module
5/144 SM 334 analog input/output module

5/147 SIPLUS analog modules

5/152 F digital / analog modules
5/152 SM 326 F digital input module - Safety Integrated
5/155 SM 326 F digital output module - Safety Integrated
5/158 SM 336 F analog input module - Safety Integrated
5/160 Isolation module

5/161 SIPLUS F digital/analog modules

5/165 Ex digital modules

5/169 Ex analog modules

5/174 Function modules
5/174 FM 350-1 counter module
5/176 FM 350-2 counter module
5/178 FM 351 positioning module
5/181 FM 352 cam controller
5/183 FM 352-5 high-speed Boolean processor
5/188 FM 353 positioning module
5/190 FM 354 positioning module
5/193 FM 357-2 positioning module
5/195 FM 355 controller module
5/200 FM 355-2 temperature controller module
5/204 SM 338 POS input module
5/206 IM 174 PROFIBUS module
5/208 SIWAREX U
5/211 SIWAREX FTA
5/214 SIWAREX FTC
5/217 SIFLOW FC070

5/220 SIPLUS function modules

5/224 Special modules
5/224 SM 374 simulator
5/225 DM 370 placeholder module

5/226 Communication
5/226 CP 340
5/228 CP 341
5/230 Loadable drivers for CP 441-2 and CP 341
5/232 CP 343-2 P, CP 343-2
5/234 CP 342-5
5/236 CP 342-5 FO
5/238 CP 343-5
5/240 CP 343-1 Lean
5/243 CP 343-1
5/247 CP 343-1 Advanced
5/252 CP 343-1 ERPC
5/255 CSM 377 unmanaged
5/257 TIM 3V-IE for WAN and Ethernet
5/260 TIM 3V-IE Advanced
5/263 TIM 4R-IE for WAN and Ethernet
5/266 TIM 3V-IE DNP3
5/269 TIM 4R-IE DNP3
5/272 ASM 475

5/274 SIPLUS communication

5/284 Connection methods
5/284 Front connectors
5/285 SIMATIC TOP connect for SIMATIC S7
5/286 SIMATIC TOP connect for SIMATIC S7 Fully modular connection
5/293 SIMATIC TOP connect for SIMATIC S7 Flexible connection

5/295 Interface modules

5/296 SIPLUS interface modules

5/297 Power supplies

5/303 SIPLUS power supplies

5/307 Accessories

Brochures

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

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

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S7-300/S7-300F

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 via PROFIBUS DP with PROFIsafe profile
- Standard modules can be used in addition for non-safety-relevant applications

SIPLUS S7-300

- The controller for use in the toughest ambient conditions
- Features an extended temperature range of -40/-25 °C to +60/70 °C
- Suitable for medial exposure (harmful gas atmosphere)
- Condensation and increased mechanical stress is permissible
- Features the proven PLC technology of the S7-300
- Easy to handle, program, maintain, and service
- Ideal for use in automotive engineering, environmental engineering, mining, chemical plants, material handling, food industry, etc.
- The replacement for expensive custom solutions

For further information, please go to:

www.siemens.com/siplus-extreme

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

www.siemens.com/simatic/printmaterial

Technical specifications

General technical data SIMATIC S7-300, S7-300F	
Degree of protection	IP20 according to IEC 60 529
Ambient temperature	
• For horizontal installation	0 to 60 °C
• For vertical installation	0 to 40 °C
Relative humidity	10 to 95%, without condensation, corresponds to relative humidity (RH), stress level 2 acc. to IEC 61131, Part 2)
Air pressure	From 1080 to 795 hPa (corresponds to an altitude of -1000 to +2000 m)
Insulation	
• < 50 V	500 V DC test voltage
• < 150 V	2500 V DC test voltage
• < 250 V	4000 V DC test voltage
Electromagnetic compatibility	Requirements of the EMC directive; interference immunity according to IEC 61000-6-2
• Pulse-shaped disturbance variables	Test according to: Electrostatic discharge according to IEC 61000-4-2, burst pulses according to IEC 61000-4-4, energy single pulse (surge) according to IEC 61000-4-5,
• Sinusoidal disturbance variables	Test according to: HF irradiation according to IEC 61000-4-3, HF decoupling according to IEC 61000-4-6
• Emission of radio interference	Interference emission according to EN 50081-2 Test according to: Emitted interference of electromagnetic fields according to EN 55016: Limit value class A, (measured at a distance of 10 m) Interference emission via AC mains according to EN 55011: Limit value class A, Group 1
Mechanical strength	
• Vibrations	Frequency range 10 Hz ≤ f ≤ 58 Hz • Continuous: 0.0375 mm amplitude • Occasionally 0.75 mm amplitude Frequency range 58 Hz ≤ f ≤ 150 Hz • Continuous: 0.5 g constant acceleration • Occasionally 1 g constant acceleration Testing according to IEC 60068-2-6 Tested with: 5 Hz ≤ f ≤ 9 Hz, constant amplitude 3.5 mm; 9 Hz ≤ f ≤ 150 Hz, constant acceleration 1 g; Duration of oscillation: 10 frequency passes per axis in each direction of the 3 mutually perpendicular axes
• Shock	Testing according to IEC 60068-2-27 Tested with: Half-sine wave: strength of shock 15 g peak value, 11 ms duration; Shock direction: 3 shocks each in ± direction in each of the 3 mutually vertical axes

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Technical specifications (continued)

General technical data SIPLUS S7-300	
Ambient temperature range	-40/-25 ... +60/70 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions.
Ambient conditions	
Relative humidity	5 ... 100%, condensation allowed
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... 3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K
Compliant with the standard for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1)	Yes

[1)] ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOx < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOx < 10.4 ppm

[2)] The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

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Standard CPUs

Overview CPU 312



- The entry level CPU in Totally Integrated Automation (TIA)
- For smaller applications with moderate processing performance requirements

SIMATIC Micro Memory Card required for operation of the CPU.

Overview CPU 314



- For plants with medium requirements for program size
- High processing power in binary and floating-point arithmetic

SIMATIC Micro Memory Card required for operation of CPU.

Overview CPU 315-2 DP



- The CPU with medium to large program memory and quantity structures for optional use of SIMATIC engineering tools
- High processing power in binary and floating-point arithmetic
- Used as central controller in production lines with central and distributed I/O
- PROFIBUS DP master/slave interface
- For comprehensive I/O expansion
- For configuring distributed I/O structures
- Isochronous mode on PROFIBUS

SIMATIC Micro Memory Card required for operation of CPU.

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Overview CPU 315-2 PN/DP



- The CPU with mid-range program memory and quantity structure
- High processing power in binary and floating-point arithmetic
- Used as central controller in production lines with central and distributed I/O
- PROFINET interface with 2-port switch
- PROFINET IO Controller for operating distributed I/O on PROFINET
- PROFINET I-Device for connecting the CPU as intelligent PROFINET device under a SIMATIC or third-party PROFINET I/O Controller
- Component Based Automation (CBA) on PROFINET
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component Based Automation (CBA)
- Integrated web server with the option of creating user-defined web pages
- Combined MPI/PROFIBUS DP master/slave interface
- Isochronous mode on PROFIBUS and PROFINET

SIMATIC Micro Memory Card required for operation of CPU.

Overview CPU 317-2 DP



- The CPU with a large program memory and quantity structure 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

SIMATIC Micro Memory Card required for operation of CPU.

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Standard CPUs

Overview CPU 317-2 PN/DP



- The CPU with a large program memory and quantity structure for demanding applications
- For cross-industry 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
- PROFINET interface with 2-port switch
- PROFINET I/O Controller for operating distributed I/O on PROFINET
- PROFINET I-Device for connecting the CPU as intelligent PROFINET device under a SIMATIC or third-party PROFINET I/O Controller
- Distributed intelligence in Component Based Automation (CBA) on PROFINET
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component Based Automation (CBA)
- Integrated web server with the option of creating user-defined web pages
- Combined MPI/PROFIBUS DP master/slave interface
- Isochronous mode on PROFIBUS and PROFINET
- Optionally supports the use of SIMATIC engineering tools

SIMATIC Micro Memory Card required for operation of CPU.

Overview CPU 319-3 PN/DP



- The CPU with high command processing performance, large program memory and quantity structure for demanding applications
- For cross-industry 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
- PROFINET I/O controller for operating distributed I/O on PROFINET
- PROFINET I-Device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or non-Siemens PROFINET I/O controller
- PROFINET interface with 2-port switch
- Isochronous mode on PROFIBUS or PROFINET
- Integral Web server with the option of creating user-defined Web sites
- Distributed intelligence in Component Based Automation (CBA) on PROFINET
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component Based Automation (CBA)
- Optionally supports the use of SIMATIC engineering tools

SIMATIC Micro Memory Card required for operation of the CPU.

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Technical specifications

	6ES7 312-1AE14-0AB0	6ES7 314-1AG14-0AB0	6ES7 315-2AH14-0AB0	6ES7 315-2EH14-0AB0
Product version				
associated programming package	STEP 7 > V 5.4 + SP5 or STEP 7 as of V5.2 + SP1 with HSP 176	STEP 7 > V 5.4 + SP5 or STEP 7 as of V5.2 + SP1 with HSP 175	STEP 7 > V 5.4 + SP5 or STEP 7 as of V5.2 + SP1 with HSP 177	STEP7 V 5.5 or higher
Supply voltages				
Rated value				
• permissible range, lower limit (DC)	20.4 V	20.4 V	20.4 V	20.4 V
external protection for supply cables (recommendation)	Min. 2 A	Min. 2 A	Min. 2 A	Min. 2 A
Current consumption				
Current consumption (rated value)	650 mA	650 mA	850 mA	750 mA
Current consumption (in no-load operation), typ.	140 mA	140 mA	150 mA	150 mA
Inrush current, typ.	3.5 A	3.5 A	3.5 A	4 A
I^2t	1 $A^2 \cdot s$	1 $A^2 \cdot s$	1 $A^2 \cdot s$	1 $A^2 \cdot s$
from supply voltage L+, max.	650 mA	650 mA	900 mA	
Power losses				
Power loss, typ.	4 W	4 W	4.5 W	
Memory				
Work memory				
• integrated	32 Kibyte; For program and data	128 Kibyte; For program and data	256 Kibyte	384 Kibyte
• expandable	No	No	No	No
• Size of retentive memory for retentive data blocks	32 Kibyte	64 Kibyte	128 Kibyte	128 Kibyte
Load memory				
• pluggable (MMC)	Yes	Yes	Yes	Yes
• pluggable (MMC), max.	8 Mbyte	8 Mbyte	8 Mbyte	8 Mbyte
Backup				
• present	Yes; guaranteed by MMC (maintenance-free)	Yes; guaranteed by MMC (maintenance-free)	Yes; guaranteed by MMC (maintenance-free)	Yes; guaranteed by MMC (maintenance-free)
• without battery	Yes; Program and data	Yes; Program and data	Yes; Program and data	Yes; Program and data
CPU-blocks				
DB				
• Number, max.	1 024; Number range: 1 to 16000	1 024; Number range: 1 to 16000	1 024; Number range: 1 to 16000	1 024; Number range: 1 to 16000
• Size, max.	32 Kibyte	64 Kibyte	64 Kibyte	64 Kibyte
FB				
• Number, max.	1 024; Number range: 0 to 7999	1 024; Number range: 0 to 7999	1 024; Number range: 0 to 7999	1 024; Number range: 0 to 7999
• Size, max.	32 Kibyte	64 Kibyte	64 Kibyte	64 Kibyte
FC				
• Number, max.	1 024; Number range: 0 to 7999	1 024; Number range: 0 to 7999	1 024; Number range: 0 to 7999	1 024; Number range: 0 to 7999
• Size, max.	32 Kibyte	64 Kibyte	64 Kibyte	64 Kibyte
OB				
• Size, max.	32 Kibyte	64 Kibyte	64 Kibyte	64 Kibyte
Nesting depth				
• per priority class	16	16	16	16
• additional within an error OB	4	4	4	4

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Technical specifications (continued)

	6ES7 312-1AE14-0AB0	6ES7 314-1AG14-0AB0	6ES7 315-2AH14-0AB0	6ES7 315-2EH14-0AB0
CPU processing times				
for bit operations, min.	0.1 µs	0.06 µs	0.05 µs	0.05 µs
for word operations, min.	0.24 µs	0.12 µs	0.09 µs	0.09 µs
for fixed point arithmetic, min.	0.32 µs	0.16 µs	0.12 µs	0.12 µs
for floating point arithmetic, min.	1.1 µs	0.59 µs	0.45 µs	0.45 µs
Counters, timers and their retentivity				
S7 counter				
• Number	256	256	256	256
• Retentivity				
- adjustable	Yes	Yes	Yes	Yes
- lower limit	0	0	0	0
- upper limit	255	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	256	256	256	256
• Retentivity				
- adjustable	Yes	Yes	Yes	Yes
- lower limit	0	0	0	0
- upper limit	255	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
IEC timer				
• present	Yes	Yes	Yes	Yes
• Type	SFB	SFB	SFB	SFB
Data areas and their retentivity				
Flag				
• Number, max.	256 byte	256 byte	2 048 byte	2 048 byte
• Retentivity available	Yes; MB 0 to MB 255	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.	1 024; Number range: 1 to 16000	1 024; Number range: 1 to 16000	1 024; Number range: 1 to 16000	1 024; Number range: 1 to 16000
• Size, max.	32 Kibyte	64 Kibyte	64 Kibyte	64 Kibyte
• Retentivity 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
• Retentivity preset	yes	yes	yes	yes
Local data				
• per priority class, max.	32 Kibyte; Max. 2 KB per block	32 Kibyte; Max. 2 KB per block	32 Kibyte; Max. 2 KB per block	32 768 byte; 2048 byte max. per block
Address area				
I/O address area				
• overall	1 024 byte	1 024 byte	2 048 byte	2 048 byte
• Outputs	1 024 byte	1 024 byte	2 048 byte	2 048 byte
• of which, distributed				
- Inputs			2 048 byte	2 048 byte
- Outputs			2 048 byte	2 048 byte

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Technical specifications (continued)

	6ES7 312-1AE14-0AB0	6ES7 314-1AG14-0AB0	6ES7 315-2AH14-0AB0	6ES7 315-2EH14-0AB0
Process image				
• Inputs	1 024 byte	1 024 byte	2 048 byte	2 048 byte
• Outputs	1 024 byte	1 024 byte	2 048 byte	2 048 byte
• Inputs, adjustable	1 024 byte	1 024 byte	2 048 byte	2 048 byte
• Outputs, adjustable	1 024 byte	1 024 byte	2 048 byte	2 048 byte
• Inputs, preset	128 byte	128 byte	128 byte	128 byte
• Outputs, preset	128 byte	128 byte	128 byte	128 byte
Subprocess images				
• Number of subprocess images, max.			1	1; With PROFINET IO, the length of the user data is limited to 1600 bytes
Digital channels				
• Inputs	256	1 024	16 384	16 384
• Outputs	256	1 024	16 384	16 384
• Inputs, of which central	256	1 024	1 024	1 024
• Outputs, of which central	256	1 024	1 024	1 024
Analog channels				
• Inputs	64	256	1 024	1 024
• Outputs	64	256	1 024	1 024
• Inputs, of which central	64	256	256	256
• Outputs, of which central	64	256	256	256
Hardware configuration				
Central devices, max.	1	1	1	1
Expansion devices, max.	0	3	3	3
Racks, max.	1	4	4	4
Modules per rack, max.	8	8	8	8
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	8	8
• CP, point-to-point	8	8	8	8
• CP, LAN	4	10	10	10
Time				
Clock				
• Hardware clock (real-time clock)		Yes	Yes	Yes
• Software clock	Yes			
• battery-backed and synchronizable	Buffered No Can be synchronized Yes	Yes	Yes	Yes
• Behavior of the clock following POWER-ON	The clock continues at the time of day it had when power was switched off			Clock continues running after POWER OFF
• Behavior of the clock following expiry of backup period		The clock continues at the time of day it had when power was switched off	The clock continues at the time of day it had when power was switched off	The clock continues at the time of day it had when power was switched off
• Deviation per day, max.	10 s; Typ.: 2 s	10 s; Typ.: 2 s	10 s; Typ.: 2 s	10 s; Typ.: 2 s
Runtime meter				
• 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)	0 to 2^31 hours (when using SFC 101)
• Granularity	1 hour	1 hour	1 hour	1 hour
• Retentive	Yes; Must be restarted at each restart	Yes; Must be restarted at each restart	Yes; Must be restarted at each restart	Yes; Must be restarted at each restart

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Technical specifications (continued)

	6ES7 312-1AE14-0AB0	6ES7 314-1AG14-0AB0	6ES7 315-2AH14-0AB0	6ES7 315-2EH14-0AB0
Clock synchronization				
• supported	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
• in AS, master	Yes	Yes	Yes	Yes
• in AS, slave				Yes
• on Ethernet via NTP				Yes; as client
S7 message functions				
Number of login stations for message functions, max.	6; Depending on the connections configured for PG/OP and S7 basic communication	12; Depending on the connections configured for PG/OP and S7 basic communication	16; Depending on the connections configured for PG/OP and S7 basic communication	16; Depending on the connections configured for PG/OP and S7 basic communication
Process diagnostic messages	Yes	Yes	Yes	Yes
simultaneously active Alarm-S blocks, max.	300	300	300	300
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 variables, max.	30	30	30	30
• of which control variables, max.	14	14	14	14
Forcing				
• Forcing	Yes	Yes	Yes	Yes
Status block	Yes; Up to 2 simultaneously	Yes; Up to 2 simultaneously	Yes; Up to 2 simultaneously	Yes; Up to 2 simultaneously
Single step	Yes	Yes	Yes	Yes
Number of breakpoints	4	4	4	4
Diagnostic buffer				
• present	Yes	Yes	Yes	Yes
• Number of entries, max.	500	500	500	500
- adjustable	No	No	No	No
- Of which powerfail-proof	100; Only the last 100 entries are retained	100; Only the last 100 entries are retained	100; Only the last 100 entries are retained	100; Only the last 100 entries are retained
• Number of entries readable in RUN, max.				499
- adjustable	Yes; From 10 to 499	Yes; From 10 to 499	Yes; From 10 to 499	Yes; From 10 to 499
- preset	10	10	10	10
Service data				
• can be read out				Yes
Monitoring functions				
Status LEDs	Yes	Yes	Yes	Yes
Communication functions				
PG/OP communication	Yes	Yes	Yes	Yes
Data record routing			Yes	Yes
Routing	No	No	Yes; Max. 4	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

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Technical specifications (continued)

	6ES7 312-1AE14-0AB0	6ES7 314-1AG14-0AB0	6ES7 315-2AH14-0AB0	6ES7 315-2EH14-0AB0
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
Web server				
• supported				Yes
• Number of HTTP clients				5
• User-defined websites				Yes
Open IE communication				
• TCP/IP				Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.				8
- Several passive connections per port, supported				Yes
• ISO-on-TCP (RFC1006)				Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.				8
- Data length, max.				32 768 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	6	12	16	16
• usable for PG communication	5	11	15	15
• usable for OP communication	5	11	15	15
• usable for S7 basic communication	2	8	12	14
• usable for S7 communication				14
- reserved for S7 communication				0
- Adjustable for S7 communication, min.				0
- Adjustable for S7 communication, max.				14
• Max. total number of instances				32
• usable for routing				X1 as MPI: max. 10; X1 as DP master: max. 24; X1 as DP slave (active): max. 14; X2 as PROFINET: max. 24
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

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Technical specifications (continued)

	6ES7 312-1AE14-0AB0	6ES7 314-1AG14-0AB0	6ES7 315-2AH14-0AB0	6ES7 315-2EH14-0AB0
PROFINET CBA (at set setpoint communication load)				
• Total of all Master/Slave connections				1 000
• Data length of all incoming connections master/slave, max.				4 000 byte
• Data length of all outgoing connections master/slave, max.				4 000 byte
• Number of device-internal and PROFIBUS interconnections				500
• Data length of device-internal und PROFIBUS interconnections, max.				4 000 byte
• Data length per connection, max.				1 400 byte
• Remote interconnections with acyclic transmission				
- Sampling frequency: Sampling time, 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 stations that can log on 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

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Technical specifications (continued)

	6ES7 312-1AE14-0AB0	6ES7 314-1AG14-0AB0	6ES7 315-2AH14-0AB0	6ES7 315-2EH14-0AB0
1st interface				
Type of 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
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 connection	No	No	No	No
MPI				
• Number of connections	6	12	16	
• Services				
- PG/OP communication	Yes	Yes	Yes	Yes
- Routing	No	No	Yes	Yes
- Global data communication	Yes	Yes	Yes	Yes
- S7 basic communication	Yes	Yes	Yes	Yes
- S7 communication	Yes	Yes	Yes	Yes
- S7 communication, as client	No	No	No	No; but via CP and loadable FB
- S7 communication, as server	Yes	Yes	Yes	Yes
• Transmission rate, 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; I blocks only
- S7 communication				Yes
- S7 communication, as client				No
- S7 communication, as server				Yes
- Equidistance mode support				Yes
- Isochronous mode				Yes; OB61; isochronous mode can only be used alternatively on PROFIBUS DP or PROFINET IO
- SYNC/FREEZE				Yes
- Activation/deactivation of DP slaves				Yes
- Number of DP slaves that can be simultaneously activated/deactivated, max.				8
- Direct data exchange (slave-to-slave communication)				Yes; As subscriber
- DPV1				Yes
• Transmission rate, max.				12 Mbit/s
• Number of DP slaves, max.				124
• Address area				
- Inputs, max.				2 Kibyte
- Outputs, max.				2 Kibyte
• User data per DP slave				
- Inputs, max.				244 byte
- Outputs, max.				244 byte

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Technical specifications (continued)

	6ES7 312-1AE14-0AB0	6ES7 314-1AG14-0AB0	6ES7 315-2AH14-0AB0	6ES7 315-2EH14-0AB0
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; Connection configured on one side only
- Direct data exchange (slave-to-slave communication)				Yes
- DPV1				No
• Transmission rate, max.				12 Mbit/s
• Transfer memory				
- Inputs				244 byte
- Outputs				244 byte
• Address area, max.				32
• User data per address area, max.				32 byte
2nd interface				
Type of interface			integrated RS 485 interface	PROFINET
Physics			RS 485	Ethernet RJ45
Isolated			Yes	Yes
Integrated switch				Yes
Number of ports				2
Power supply to interface (15 to 30 V DC), max.			200 mA	
Automatic detection of transmission speed				Yes; 10/100 Mbit/s
Autonegotiation				Yes
Autocrossing				Yes
Media redundancy				
• Supported				Yes
• Switchover time on line break, typically				200 ms; PROFINET MRP
• Number of stations in the ring, max.				50
Change of IP address at runtime, supported				Yes
Functionality				
• MPI			No	No
• DP master			Yes	No
• DP slave			Yes	No
• PROFINET IO controller				Yes; Also simultaneously with IO device functionality
• PROFINET IO device				Yes; Also simultaneously with IO controller functionality
• PROFINET CBA				Yes
• Web server				Yes
- Number of HTTP clients				5
• Local Operating Network			No	

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Technical specifications (continued)

	6ES7 312-1AE14-0AB0	6ES7 314-1AG14-0AB0	6ES7 315-2AH14-0AB0	6ES7 315-2EH14-0AB0
DP master				
• Number of connections, max.			16	
• Services				
- PG/OP communication			Yes	
- Routing			Yes	
- Global data communication			No	
- S7 basic communication			Yes; I blocks only	
- S7 communication			Yes	
- S7 communication, as client			No	
- S7 communication, as server			Yes	
- Equidistance mode support			Yes	
- Isochronous mode			Yes; OB 61	
- SYNC/FREEZE			Yes	
- Activation/deactivation of DP slaves			Yes	
- Number of DP slaves that can be simultaneously activated/ deactivated, max.			8	
- DPV1			Yes	
• Transmission rate, max.			12 Mbit/s	
• Number of DP slaves, max.			124; Per station	
• Address area				
- Inputs, max.			2 048 byte	
- Outputs, max.			2 048 byte	
• User data per DP slave				
- Inputs, max.			244 byte	
- Outputs, max.			244 byte	
DP slave				
• Number of connections			16	
• Services				
- PG/OP communication			Yes	
- Routing			Yes; Only with active interface	
- Global data communication			No	
- S7 basic communication			No	
- S7 communication, as client			No	
- S7 communication, as server			Yes	
- Direct data exchange (slave-to-slave communi- cation)			Yes	
- DPV1			No	
• GSD file			The current GSD file can be obtained from: www.siemens.com/ profibus-gsd	
• Transmission rate, max.			12 Mbit/s	
• Automatic baud rate search			Yes; only with passive interface	
• Transfer memory				
- Inputs			244 byte	
- Outputs			244 byte	
• Address area, max.			32	
• User data per address area, max.			32 byte	

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Technical specifications (continued)

	6ES7 312-1AE14-0AB0	6ES7 314-1AG14-0AB0	6ES7 315-2AH14-0AB0	6ES7 315-2EH14-0AB0
PROFINET IO controller				
• Services				
- PG/OP communication				Yes
- Routing				Yes
- S7 communication				Yes; with loadable FBs, max. configurable connections: 14, max. number of instances: 32
- Isochronous mode				Yes; OB61; isochronous mode can only be used alternatively on PROFIBUS DP or PROFINET IO
- Open IE communication				Yes; via TCP/IP, ISO on TCP and UDP
• Transmission rate, max.				100 Mbit/s
• Number of connectable IO devices, max.				128
• Max. number of connectable IO devices for RT				128
- of which in line, max.				128
• Number of IO devices with IRT and the option "high flexibility"				128
- of which in line, max.				61
• Number of IO devices with IRT and the option "high performance", max.				64
- of which in line, max.				64
• IRT, supported				Yes
• Shared device, supported				Yes
• Prioritized startup supported				Yes
- Number of IO devices, max.				32
• Activation/deactivation of IO devices				Yes
- Number of IO devices that can be simultaneously activated/deactivated, max.				8
• IO devices changing during operation (partner ports), supported				Yes
- Max. number of IO devices per tool				8
• Device replacement without swap medium				Yes
• Updating time				250 µs to 512 ms (depending on the operating mode, see Manual "S7-300 CPU 31xC and CPU 31x, Technical Data" for more details)
• Address area				
- Inputs, max.				2 Kibyte
- Outputs, max.				2 Kibyte
• User data per address area, max.				
- User data consistency, max.				1 024 byte
PROFINET IO device				
• Services				
- PG/OP communication				Yes
- Routing				Yes
- S7 communication				Yes; With loadable FBs, max. configurable connections: 14, max. number of instances: 32

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Technical specifications (continued)

	6ES7 312-1AE14-0AB0	6ES7 314-1AG14-0AB0	6ES7 315-2AH14-0AB0	6ES7 315-2EH14-0AB0
PROFINET IO device				
- Isochronous mode				No
- Open IE communication				Yes; Via TCP/IP, ISO on TCP, UDP
- IRT, supported				Yes
- PROFIenergy, supported				Yes; With SFB 73 / 74 prepared for loadable PROFIenergy standard FB for I-Device
- Shared device, supported				Yes
- Number of IO controllers with shared device, max.				2
• Transfer memory				
- Inputs, max.				1 440 byte; Per IO controller with shared device
- Outputs, max.				1 440 byte; Per IO controller with shared device
• Submodules				
- Number, max.				64
- User data per submodule, max.				1 024 byte
PROFINET CBA				
• acyclic transmission				Yes
• cyclic transmission				Yes
Open IE communication				
• Open IE communication, supported				Yes
• Number of connections, max.				8
• Local port numbers used at the system end				0, 20, 21, 25, 80, 102, 135, 161, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535
• Keep-alive function, supported				Yes
Isochronous mode				
Isochronous mode			Yes	Yes; Via PROFIBUS DP or PROFINET interface
Programming				
Programming language				
• STEP 7	Yes; V5.2 SP1 or higher with HW update	Yes; V5.2 SP1 or higher with HW update	Yes; V5.2 SP1 or higher with HW update	Yes; V5.5 or higher
• LAD	Yes	Yes	Yes	Yes
• FBD	Yes	Yes	Yes	Yes
• STL	Yes	Yes	Yes	Yes
• SCL	Yes	Yes	Yes	Yes
• CFC		Yes	Yes	Yes
• GRAPH	Yes	Yes	Yes	Yes
• HiGraph®	Yes	Yes	Yes	Yes
Command set	See instruction list	See instruction list	See instruction list	See instruction list
Nesting levels	8	8	8	8
Know-how protection				
• User program protection/ password protection	Yes	Yes	Yes	Yes
• Block encryption				Yes; with S7 block privacy
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

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Technical specifications (continued)

	6ES7 312-1AE14-0AB0	6ES7 314-1AG14-0AB0	6ES7 315-2AH14-0AB0	6ES7 315-2EH14-0AB0
Environmental requirements				
Operating temperature				
• Min.				0 °C
Dimensions and weight				
Dimensions				
• Width	40 mm	40 mm	40 mm	40 mm
• Height	125 mm	125 mm	125 mm	125 mm
• Depth	130 mm	130 mm	130 mm	130 mm
Weight				
• Weight, approx.	270 g	280 g	290 g	340 g

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	6ES7 317-2AJ10-0AB0	6ES7 317-2EK14-0AB0	6ES7 318-3EL01-0AB0
Product version			
associated programming package	STEP 7 V 5.2 or higher + SP 1 with HW update	STEP7 V 5.5 or higher	STEP7 V 5.5 or higher
Supply voltages			
Rated value			
• permissible range, lower limit (DC)	20.4 V	20.4 V	19.2 V
external protection for supply cables (recommendation)	Min. 2 A	Min. 2 A	Min. 2 A
Current consumption			
Current consumption (rated value)	850 mA	750 mA	1 250 mA
Current consumption (in no-load operation), typ.	100 mA	150 mA	500 mA
Inrush current, typ.	2.5 A	4 A	4 A
I^2t	1 $A^2 \cdot s$	1 $A^2 \cdot s$	1.2 $A^2 \cdot s$
Power losses			
Power loss, typ.	4 W		14 W
Memory			
Work memory			
• integrated	512 Kibyte; For program and data	1 024 Kibyte	2 048 Kibyte
• expandable	No	No	No
• Size of retentive memory for retentive data blocks	256 Kibyte	256 Kibyte	700 Kibyte
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
• without battery	Yes; Program and data	Yes; Program and data	Yes
CPU-blocks			
DB			
• Number, max.	2 047; Number band: 1 to 2047	2 048; Number range: 1 to 16000	4 096; Number range: 1 to 16000
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte
FB			
• Number, max.	2 048; Sequence of numbers: 0 to 2047	2 048; Number range: 0 to 7999	4 096; Number range: 0 to 7999
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte
FC			
• Number, max.	2 048; Sequence of numbers: 0 to 2047	2 048; Number range: 0 to 7999	4 096; Number range: 0 to 7999
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte
OB			
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte

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Technical specifications (continued)

	6ES7 317-2AJ10-0AB0	6ES7 317-2EK14-0AB0	6ES7 318-3EL01-0AB0
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	0.025 µs	0.004 µs
for word operations, min.	0.2 µs	0.03 µs	0.01 µs
for fixed point arithmetic, min.	0.2 µs	0.04 µs	0.01 µs
for floating point arithmetic, min.	1 µs	0.16 µs	0.04 µs
Counters, timers and their retentivity			
S7 counter			
• Number	512	512	2 048
• Retentivity			
- adjustable	Yes	Yes	Yes
- lower limit	0	0	0
- upper limit	511	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
• Retentivity			
- adjustable	Yes	Yes	Yes
- lower limit	0	0	0
- upper limit	511	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 retentivity			
Flag			
• Number, max.	4 096 byte	4 096 byte	8 192 byte
• Retentivity 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; Number range: 1 to 2047	2 048; Number range: 1 to 16000	4 096; Number range: 1 to 16000
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte
• Retentivity adjustable	Yes; via non-retain property on DB	Yes; via non-retain property on DB	Yes; via non-retain property on DB
• Retentivity preset	Yes	Yes	Yes
Local data			
• per priority class, max.	1 024 byte	32 768 byte; 2048 bytes max. per block	32 768 byte; 2048 bytes max. per block
Address area			
I/O address area			
• overall	8 192 byte	8 192 byte	8 192 byte
• Outputs	8 192 byte	8 192 byte	8 192 byte
• of which, distributed			
- Inputs	8 192 byte	8 192 byte	8 192 byte
- Outputs	8 192 byte	8 192 byte	8 192 byte

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Technical specifications (continued)

	6ES7 317-2AJ10-0AB0	6ES7 317-2EK14-0AB0	6ES7 318-3EL01-0AB0
Process image			
• Inputs	2 048 byte	8 192 byte	8 192 byte
• Outputs	2 048 byte	8 192 byte	8 192 byte
• Inputs, adjustable	2 048 byte	8 192 byte	8 192 byte
• Outputs, adjustable	2 048 byte	8 192 byte	8 192 byte
• 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; With PROFINET IO, the length of the user data is limited to 1600 bytes	1; With PROFINET IO, the length of the user data is limited to 1600 bytes
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 configuration			
Central devices, max.	1	1	
Expansion devices, max.	3	3	
Racks, max.	4	4	4
Modules per rack, max.	8	8	8
Number of DP masters			
• integrated	2	1	2
• via CP	4	4	4
Number of operable FMs and CPs (recommended)			
• FM	8	8	8
• CP, point-to-point	8	8	8
• CP, LAN	10	10	10
Time			
Clock			
• Hardware clock (real-time clock)	Yes	Yes	Yes
• battery-backed and synchronizable	Yes	Yes	Yes
• Behavior of the clock following POWER-ON	Clock continues running after POWER OFF	Clock continues running after POWER OFF	Clock continues running after POWER OFF
• Behavior of the clock following expiry of backup period	The clock continues at the time of day it had when power was switched off	The clock continues at the time of day it had when power was switched off	The clock continues at the time of day it had when power was switched off
• Deviation per day, max.	10 s	10 s; Typ.: 2 s	10 s; Typ.: 2 s
Runtime meter			
• 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
• Retentive	Yes; Must be restarted at each restart	Yes; Must be restarted at each restart	Yes; Must be restarted at each restart
Clock synchronization			
• supported	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	No	Yes; as client	Yes; as client

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Technical specifications (continued)

	6ES7 317-2AJ10-0AB0	6ES7 317-2EK14-0AB0	6ES7 318-3EL01-0AB0
S7 message functions			
Number of login stations for message functions, max.	32; Depending on the connections configured for PG/OP and S7 basic communication	32; Depending on the connections configured for PG/OP and S7 basic communication	32; Depending on the connections configured for PG/OP and S7 basic communication
Process diagnostic messages	Yes	Yes	Yes
simultaneously active Alarm-S blocks, max.	60	300	300
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 variables, max.	30	30	30
• of which control variables, max.	14	14	14
Forcing			
• Forcing	Yes	Yes	Yes
Status block	Yes	Yes; Up to 2 simultaneously	Yes; Up to 2 simultaneously
Single step	Yes	Yes	Yes
Number of breakpoints	2	4	4
Diagnostic buffer			
• Present	Yes	Yes	Yes
• Number of entries, max.	100	500	500
- adjustable	No	No	No
- Of which powerfail-proof	100	100; Only the last 100 entries are retained	100
• Number of entries readable in RUN, max.		499	499
- adjustable		Yes; From 10 to 499	Yes; From 10 to 499
- preset		10	10
Service data			
• can be read out		Yes	Yes
Monitoring functions			
Status LEDs		Yes	Yes
Communication functions			
PG/OP communication	Yes	Yes	Yes
Data record routing	No	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
Web server			
• supported		Yes	Yes
• Number of HTTP clients		5	5
• User-defined websites		Yes	Yes

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Technical specifications (continued)

	6ES7 317-2AJ10-0AB0	6ES7 317-2EK14-0AB0	6ES7 318-3EL01-0AB0
Open IE communication			
• TCP/IP		Yes; via integrated PROFINET interface and loadable FBs	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.		16	32
- Several passive connections per port, supported		Yes	Yes
• ISO-on-TCP (RFC1006)		Yes; via integrated PROFINET interface and loadable FBs	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.		16	32
- Data length, max.		32 768 byte	32 768 byte
• UDP		Yes; via integrated PROFINET interface and loadable FBs	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.		16	32
- Data length, max.		1 472 byte	1 472 byte
Number of connections			
• overall	32	32	32
• usable for PG communication	31	31	31
• usable for OP communication	31	31	31
• usable for S7 basic communication	30	30	30
• usable for S7 communication		16	16
- reserved for S7 communication		0	0
- Adjustable for S7 communication, min.		0	0
- Adjustable for S7 communication, max.		16	16
• Max. total number of instances		32	32
• usable for routing	8	X1 as MPI: max. 10; X1 as DP master: max. 24; X1 as DP slave (active): max. 14; X2 as PROFINET: max. 24	X1 as MPI: max. 10; X1 as DP master: max. 24; X1 as DP slave (active): max. 14; X2 as DP master: max. 24; X2 as DP slave (active): max. 14; X3 as PROFINET: 48 max.
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 und 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 time, 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

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Technical specifications (continued)

	6ES7 317-2AJ10-0AB0	6ES7 317-2EK14-0AB0	6ES7 318-3EL01-0AB0
PROFINET CBA (at set setpoint communication load)			
• 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	450 byte
• HMI variables via PROFINET (acyclic)			
- Number of stations that can log on 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
1st interface			
Type of interface	Integrated RS 485 interface	Integrated RS 485 interface	Integrated 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 connection	No	No	No
MPI			
• Number of connections	32		
• Services			
- PG/OP communication	Yes	Yes	Yes
- Routing	Yes	Yes	Yes
- Global data communication	Yes	Yes	Yes
- S7 basic communication	Yes	Yes	Yes
- S7 communication	Yes	Yes	Yes
- S7 communication, as client	No	No; but via CP and loadable FB	No; but via CP and loadable FB
- S7 communication, as server	Yes	Yes	Yes
• Transmission rate, 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

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Technical specifications (continued)

	6ES7 317-2AJ10-0AB0	6ES7 317-2EK14-0AB0	6ES7 318-3EL01-0AB0
DP master			
• Services			
- S7 communication, as server	Yes	Yes	Yes
- Equidistance mode support	Yes	Yes	Yes
- Isochronous mode	No	Yes; OB61; isochronous mode can only be used alternatively on PROFIBUS DP or PROFINET IO	No
- SYNC/FREEZE	Yes	Yes	Yes
- Activation/deactivation of DP slaves	Yes	Yes	Yes
- Number of DP slaves that can be simultaneously activated/ deactivated, max.	4	8	8
- Direct data exchange (slave-to-slave communication)		Yes; As subscriber	Yes; As subscriber
- DPV1	Yes	Yes	Yes
• Transmission rate, 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
• User 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; Only with active interface	Yes; with interface active
- Global data communication	No	No	No
- S7 basic communication	No	No	No
- S7 communication	Yes	Yes	Yes
- S7 communication, as client	No	No	No
- S7 communication, as server	Yes	Yes; Connection configured on one side only	Yes; Connection configured on one side only
- Direct data exchange (slave-to-slave communication)	Yes	Yes	Yes
- DPV1	No	No	No
• Transmission rate, 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
• User data per address area, max.	32 byte	32 byte	32 byte
2nd interface			
Type of interface	integrated RS 485 interface	PROFINET	integrated RS 485 interface
Physics	RS 485	Ethernet RJ45	RS 485
Isolated	Yes	Yes	Yes
Integrated switch		Yes	
Number of ports		2	
Power supply to interface (15 to 30 V DC), max.	200 mA		200 mA
Automatic detection of transmission speed		Yes; 10/100 Mbit/s	
Autonegotiation		Yes	
Autocrossing		Yes	
Media redundancy			
• supported		Yes	
• Switchover time on line break, typically		200 ms; PROFINET MRP	
• Number of stations in the ring, max.		50	

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Technical specifications (continued)

	6ES7 317-2AJ10-0AB0	6ES7 317-2EK14-0AB0	6ES7 318-3EL01-0AB0
Change of IP address at runtime, supported		Yes	
Functionality			
• MPI	No	No	No
• DP master	Yes	No	Yes
• DP slave	Yes	No	Yes
• PROFINET IO controller		Yes; Also simultaneously with IO device functionality	No
• PROFINET IO device		Yes; Also simultaneously with IO controller functionality	No
• PROFINET CBA		Yes	No
• Web server		Yes	No
- Number of HTTP clients		5	
• Local Operating Network	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; Connection configured on one side only
- Equidistance mode support	Yes		Yes
- Isochronous mode	Yes; OB 61		Yes; OB 61 - isochronous mode is possible either on DP or PROFINET IO (not simultaneously)
- SYNC/FREEZE	Yes		Yes
- Activation/deactivation of DP slaves	Yes		Yes
- Number of DP slaves that can be simultaneously activated/deactivated, max.			8
- Direct data exchange (slave-to-slave communication)			Yes; As subscriber
- DPV1	Yes		Yes
• Transmission rate, 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
• User data per DP slave			
- Inputs, max.	244 byte		244 byte
- Outputs, max.	244 byte		244 byte
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; Connection configured on one side only
- Direct data exchange (slave-to-slave communication)	Yes		Yes
- DPV1	No		No
• GSD file	The current GSD file can be obtained from: www.siemens.com/profibus-gsd		The current GSD file can be obtained from: www.siemens.com/profibus-gsd

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Technical specifications (continued)

	6ES7 317-2AJ10-0AB0	6ES7 317-2EK14-0AB0	6ES7 318-3EL01-0AB0
DP slave			
• Transmission rate, 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
• User 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	
- Isochronous mode		Yes; OB61; isochronous mode can only be used alternatively on PROFIBUS DP or PROFINET IO	
- Open IE communication		Yes; via TCP/IP, ISO on TCP and UDP	
• Transmission rate, max.		100 Mbit/s	
• Number of connectable IO devices, max.		128	
• Max. number of connectable IO devices for RT		128	
- of which in line, max.		128	
• Number of IO devices with IRT and the option "high flexibility"		128	
- of which in line, max.		61	
• Number of IO devices with IRT and the option "high performance", max.		64	
- of which in line, max.		64	
• IRT, supported		Yes	
• Shared device, supported		Yes	
• Prioritized startup supported		Yes	
- Number of IO devices, max.		32	
• Activation/deactivation of IO devices		Yes	
- Number of IO devices that can be simultaneously activated/ deactivated, max.		8	
• IO devices changing during operation (partner ports), supported		Yes	
- Max. number of IO devices per tool		8	
• Device replacement without swap medium		Yes	
• Updating time		250 µs to 512 ms (depending on the operating mode, see Manual "S7-300 CPU 31xC and CPU 31x, Technical Data" for more details)	
• Address area			
- Inputs, max.		8 Kibyte	
- Outputs, max.		8 Kibyte	
• User data per address area, max.			
- User data consistency, max.		1 024 byte	
PROFINET IO device			
• Services			
- PG/OP communication		Yes	
- Routing		Yes	
- S7 communication		Yes; With loadable FBs, max. configurable connections: 16, max. number of instances: 32	
- Isochronous mode		No	

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Technical specifications (continued)

	6ES7 317-2AJ10-0AB0	6ES7 317-2EK14-0AB0	6ES7 318-3EL01-0AB0
PROFINET IO device			
• Services			
- Open IE communication		Yes; Via TCP/IP, ISO on TCP, UDP	
- IRT, supported		Yes	
- PROFIenergy, supported		Yes; With SFB 73 / 74 prepared for loadable PROFIenergy standard FB for I-Device	
- Shared device, supported		Yes	
- Number of IO controllers with shared device, max.		2	
• Transfer memory			
- Inputs, max.		1 440 byte; Per IO controller with shared device	
- Outputs, max.		1 440 byte; Per IO controller with shared device	
• Submodules			
- Number, max.		64	
- User data per submodule, max.		1 024 byte	
PROFINET CBA			
• acyclic transmission		Yes	
• cyclic transmission		Yes	
Open IE communication			
• Open IE communication, supported		Yes	
• Number of connections, max.		16	
• Local port numbers used at the system end		0, 20, 21, 25, 80, 102, 135, 161, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535	
• Keep-alive function, supported		Yes	
3rd interface			
Type of interface			PROFINET
Physics			Ethernet RJ45
Isolated			Yes
Integrated switch			Yes
Number of ports			2
Automatic detection of transmission speed			Yes; 10/100 Mbit/s
Autonegotiation			Yes
Autocrossing			Yes
Media redundancy			
• supported			Yes
• Switchover time on line break, typically			200 ms; PROFINET MRP
• Number of stations in the ring, max.			50
Change of IP address at runtime, supported			Yes
Functionality			
• MPI			No
• DP master			No
• DP slave			No
• PROFINET IO controller			Yes; also simultaneously with I-Device functionality
• PROFINET IO device			Yes; also simultaneously with IO controller functionality
• PROFINET CBA			Yes
• Open IE communication			Yes; via TCP/IP, ISO on TCP and UDP
• Web server			Yes
- Number of HTTP clients			5

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Technical specifications (continued)

	6ES7 317-2AJ10-0AB0	6ES7 317-2EK14-0AB0	6ES7 318-3EL01-0AB0
PROFINET IO controller			
• Services			
- Isochronous mode			Yes; OB 61 - isochronous mode is possible either on DP or PROFINET IO (not simultaneously)
• Max. number of connectable IO devices for RT			256
- of which in line, max.			256
• Number of IO devices with IRT and the option "high flexibility"			256
- of which in line, max.			61
• Number of IO devices with IRT and the option "high performance", max.			64
- of which in line, max.			64
• IRT, supported			Yes
• Shared device, supported			Yes
• Prioritized startup supported			Yes
- Number of IO devices, max.			32
• Activation/deactivation of IO devices			Yes
- Number of IO devices that can be simultaneously activated/deactivated, max.			8
• IO devices changing during operation (partner ports), supported			Yes
- Max. number of IO devices per tool			8
• Device replacement without swap medium			Yes
• Send clock times			250 µs, 500 µs,1 ms; 2 ms, 4 ms (not in the case of IRT with "high flexibility" option)
• Updating time			250 µs to 512 ms (depending on the operating mode, see Manual "S7-300 CPU 31xC and CPU 31x, Technical Data" for more details)
PROFINET IO device			
• Services			
- PG/OP communication			Yes
- Routing			Yes
- S7 communication			Yes; With loadable FBs, max. configurable connections: 16, max. number of instances: 32
- Isochronous mode			No
- Open IE communication			Yes; Via TCP/IP, ISO on TCP, UDP
- IRT, supported			Yes
- PROFIenergy, supported			Yes; With SFB 73 / 74 prepared for loadable PROFIenergy standard FB for I-Device
- Shared device, supported			Yes
- Number of IO controllers with shared device, max.			2
• Transfer memory			
- Inputs, max.			1 440 byte; Per IO controller with shared device
- Outputs, max.			1 440 byte; Per IO controller with shared device
• Submodules			
- Number, max.			64
- User data per submodule, max.			1 024 byte
PROFINET CBA			
• acyclic transmission			Yes
• cyclic transmission			Yes

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Technical specifications (continued)

	6ES7 317-2AJ10-0AB0	6ES7 317-2EK14-0AB0	6ES7 318-3EL01-0AB0
Open IE communication			
• Open IE communication, supported			Yes
• Number of connections, max.			32
• Local port numbers used at the system end			0, 20, 21, 23, 25, 80, 102, 135, 161, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535
• Keep-alive function, supported			Yes
Isochronous mode			
Isochronous mode		Yes; Via PROFIBUS DP or PROFINET interface	Yes; Via 2nd PROFIBUS DP or PROFINET interface
Programming			
Programming language			
• STEP 7	Yes; V5.2 SP1 or higher with HW update	Yes; V5.5 or higher	Yes; V5.5 or higher
• LAD	Yes	Yes	Yes
• FBD	Yes	Yes	Yes
• STL	Yes	Yes	Yes
• SCL	Yes	Yes	Yes
• CFC	Yes	Yes	Yes
• GRAPH	Yes	Yes	Yes
• HiGraph®	Yes	Yes	Yes
Command set	See instruction list	See instruction list	See instruction list
Nesting levels	8	8	8
Know-how protection			
• User program protection/password protection	Yes	Yes	Yes
• Block encryption		Yes; with S7 block privacy	Yes; with S7 block privacy
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
Environmental requirements			
Operating temperature			
• Min.		0 °C	0 °C
Dimensions and weight			
Dimensions			
• Width	80 mm	40 mm	120 mm
• Height	125 mm	125 mm	125 mm
• Depth	130 mm	130 mm	130 mm
Weight			
• Weight, approx.	460 g	340 g	1 250 g

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Standard CPUs

Ordering data		Order No.
CPU 312 32 KB work memory, 24 V DC power supply, MPI; MMC required	I	**6ES7 312-1AE14-0AB0**
CPU 314 128 KB work memory, 24 V DC power supply, MPI; MMC required		**6ES7 314-1AG14-0AB0**
CPU 315-2 DP 256 KB work memory, 24 V DC power supply, MPI, PROFIBUS DP master/slave interface, MMC required		**6ES7 315-2AH14-0AB0**
CPU 315-2 PN/DP 384 KB work memory, 24 V DC power supply, combined MPI/ PROFIBUS DP master/slave interface, Ethernet/PROFINET interface with 2-port switch; MMC required		**6ES7 315-2EH14-0AB0**
CPU 317-2 DP 512 KB work memory, 24 V DC power supply, MPI, PROFIBUS DP master/slave interface, MMC required		**6ES7 317-2AJ10-0AB0**
CPU 317-2 PN/DP 1 MB work memory, 24 V DC power supply, combined MPI/ PROFIBUS DP master/slave interface, Ethernet/PROFINET interface with 2-port switch; MMC required		**6ES7 317-2EK14-0AB0**
CPU 319-3 PN/DP 1.4 MB work memory, 24 V DC power supply, combined MPI/ PROFIBUS DP master/slave interface, PROFIBUS DP master/ slave interface, Ethernet/ PROFINET interface with 2-port switch; MMC required		**6ES7 318-3EL01-0AB0**
SIMATIC Micro Memory Card		
64 KB		**6ES7 953-8LF20-0AA0**
128 KB		**6ES7 953-8LG20-0AA0**
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 For connecting SIMATIC S7 and the PG through MPI; 5 m in length		**6ES7 901-0BF00-0AA0**
Slot number plates		**6ES7 912-0AA00-0AA0**
S7-300 manual Design, CPU data, module data, instruction list		
German		**6ES7 398-8FA10-8AA0**
English		**6ES7 398-8FA10-8BA0**
SIMATIC manual collection Electronic manuals on DVD, multi-lingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	J	**6ES7 998-8XC01-8YE0**
SIMATIC manual collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	D	**6ES7 998-8XC01-8YE2**
Power supply connector 10 units, spare part		**6ES7 391-1AA00-0AA0**
Manual "Communication for SIMATIC S7-300/-400"		
German		**6ES7 398-8EA00-8AA0**
English		**6ES7 398-8EA00-8BA0**
French		**6ES7 398-8EA00-8CA0**
Spanish		**6ES7 398-8EA00-8DA0**
Italian		**6ES7 398-8EA00-8EA0**
SIMATIC S7 training case With mounting components for mounting S7-200 and S7-300		**6ES7 910-3AA00-0XA0**
PC adapter USB For connecting a PC to SIMATIC S7-200/300/400 via USB; with USB cable (5 m)		**6ES7 972-0CB20-0XA0**
PROFIBUS bus components		
RS 485 PROFIBUS DP bus connector		
• With 90° cable outlet, max. transmission rate 12 Mbit/s		
- Without PG interface		**6ES7 972-0BA12-0XA0**
- With PG interface		**6ES7 972-0BB12-0XA0**
• With 90° cable outlet for FastConnect connection system, max. transmission rate 12 Mbit/s		
- Without PG interface, 1 unit		**6ES7 972-0BA52-0XA0**
- Without PG interface, 100 units		**6ES7 972-0BA52-0XB0**
- With PG interface, 1 unit		**6ES7 972-0BB52-0XA0**
- With PG interface, 100 units		**6ES7 972-0BB52-0XB0**
• 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 Transmission rate up to 12 Mbit/s; 24 V DC; IP20 enclosure		**6ES7 972-0AA02-0XA0**

D: Subject to export regulations AL: N and ECCN: 5D992

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

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

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Ordering data	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**
FO standard cable GP (50/125) Standard cable, splittable, UL approval, sold by the meter	**6XV1 873-2A**
SCALANCE X204-2 Industrial Ethernet Switch I 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**
CSM 377 compact wwitch module Unmanaged switch for connecting a SIMATIC S7-300, ET200 M and up to three other participants to Industrial Ethernet with 10/100 Mbit/s; 4 x RJ45 ports; external 24 V DC power supply, LED diagnostics, S7-300 module incl. electronic manual on CD-ROM	**6GK7 377-1AA00-0AA0**

	Order No.
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	
IE FC RJ45 Plug 145 145° cable outlet	
1 unit	**6GK1 901-1BB30-0AA0**
10 units	**6GK1 901-1BB30-0AB0**
50 units	**6GK1 901-1BB30-0AE0**
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**
PROFIBUS/PROFINET bus components For establishing MPI/PROFIBUS/ PROFINET communication	see Catalogs IK PI, CA 01

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

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SIPLUS Standard CPUs

Overview SIPLUS CPU 314



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

SIMATIC Micro Memory Card required for operation of the CPU.

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

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SIPLUS CPU 314		
Order number	**6AG1 314-1AG14-2AY0**	**6AG1 314-1AG14-7AB0**
Order No. based on	**6ES7 314-1AG14-0AB0**	**6ES7 314-1AG14-0AB0**
Ambient temperature range	-25 ... +60 °C	-25 ... +70 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions	
Compliant with the standard for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	Yes	No
Ambient conditions		
Relative humidity	5 ... 100 % Condensation permissible	
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)	
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]	
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]	
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K	

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOx < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOx < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS CPU 314		
(extended temperature range and medial exposure)		
Work memory 128 KB, power supply 24 V DC, MPI; MMC required	H	**6AG1 314-1AG14-7AB0**
Additional conformance with EN 50155	H	**6AG1 314-1AG14-2AY0**
Accessories		See SIMATIC CPU 314, page 5/30

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H

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Overview SIPLUS CPU 315-2 DP



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

SIMATIC Micro Memory Card required for operation of the CPU.

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

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SIPLUS CPU 315-2 DP		
Order number	**6AG1 315-2AH14-2AY0**	**6AG1 315-2AH14-7AB0**
Order No. based on	**6ES7 315-2AH14-0AB0**	**6ES7 315-2AH14-0AB0**
Ambient temperature range	-25 ... +60 °C	-25 ... +70 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions	
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	Yes	No
Ambient conditions		
Relative humidity	5 ... 100 % Condensation permissible	
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)	
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]	
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]	
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K	

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOx < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOx < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS CPU 315-2 DP		
(extended temperature range and medial exposure)		
Work memory 256 KB, power supply 24 V DC, MPI, PROFIBUS DP master/slave interface, MMC required	H	**6AG1 315-2AH14-7AB0**
Additional conformance with EN 50155	H	**6AG1 315-2AH14-2AY0**

	Order No.
Accessories	See SIMATIC CPU 315-2 DP, page 5/30

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H

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SIPLUS Standard CPUs

Overview SIPLUS CPU 315-2 PN/DP



- The CPU with medium-sized program memory and quantity structure
- High processing performance in binary and floating-point arithmetic
- Used as central controller in production lines with central and distributed I/O
- 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
- PROFINET interface with 2-port switch
- Combined MPI/PROFIBUS DP master/slave interface
- Isochronous mode on PROFIBUS

SIMATIC Micro Memory Card required for operation of the CPU.

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS CPU 315-2 PN/DP		
Order number	**6AG1 315-2EH14-2AY0**	**6AG1 315-2EH14-7AB0**
Order No. based on	**6ES7 315-2EH14-0AB0**	**6ES7 315-2EH14-0AB0**
Ambient temperature range	-25 ... +60 °C	-25 ... +70 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions	
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	Yes	No
Ambient conditions		
Relative humidity	5 ... 100 % Condensation permissible	
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)	
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]	
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]	
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K	

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOx < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOx < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

	Order No.
SIPLUS CPU 315-2 PN/DP	
(extended temperature range and medial exposure)	
Work memory 384 KB, power supply 24 V DC, combined MPI/PROFIBUS DP master/slave interface, Ethernet/PROFINET interface with 2-port switch; MMC required	**6AG1 315-2EH14-7AB0**
Additional conformance with EN 50155	**6AG1 315-2EH14-2AY0**

	Order No.
Accessories	See SIMATIC CPU 315-2 PN/DP, page 5/30

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Overview SIPLUS CPU 317-2 PN/DP



- The CPU with a large program memory and quantity structure 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 for operating 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 comprehensive I/O configuration
- For setting up 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 the CPU.

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

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 ... +70 °C	
Conforms with standard for electronic equipment used on rolling stock (EN 50155)	No	Yes
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical specifications	The technical data of the standard product applies except for the ambient conditions.	
Ambient conditions		
Relative humidity	5 ... 100 % Condensation permissible	
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)	
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]	
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]	
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K	

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOx < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOx < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

Technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS CPU 317-2 PN/DP		
(extended temperature range and medial exposure)		
Work memory 512 KB, power supply 24 V DC, combined MPI/PROFIBUS DP master/slave interface, Ethernet/PROFINET interface; MMC required	L	**6AG1 317-2EK13-2AB0**
Additional conformance with EN 50155	H	**6AG1 317-2EK13-2AY0**

	Order No.
Accessories	See SIMATIC CPU 317-2 PN/DP, page 5/30

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H
L: Subject to export regulations AL: 9I999 and ECCN: N

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Compact CPUs

Overview CPU 312C



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

SIMATIC Micro Memory Card required for operation of CPU.

Overview CPU 313C-2 PtP



- The compact CPU with integrated digital inputs/outputs as well as second serial interface
- For plants with high processing performance and response time requirements
- With technological functions

SIMATIC Micro Memory Card required for operation of the CPU.

Overview CPU 313C



- The compact CPU with integral digital and analog inputs/outputs
- For plants with high processing performance and response time requirements
- With technological functions

SIMATIC Micro Memory Card required for operation of the CPU.

Overview CPU 313C-2 DP



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

SIMATIC Micro Memory Card required for operation of the CPU.

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Overview CPU 314C-2 PtP



- The compact CPU with integrated digital and analog inputs/ outputs as well as second serial interface
- For plants with high processing performance and response time requirements
- With technological functions

SIMATIC Micro Memory Card required for operation of the CPU.

Overview CPU 314C-2 DP



- 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

SIMATIC Micro Memory Card required for operation of the CPU.

Overview CPU 314C-2 PN/DP



- The compact CPU with integral digital and analog inputs/ outputs and technological functions
- High processing performance in binary and floating-point arithmetic
- For connecting distributed I/O via PROFIBUS and PROFINET
- Combined MPI/PROFIBUS DP master/slave interface
- PROFINET interface with 2-port switch
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET I-Device for connecting the CPU as intelligent PROFINET device under a SIMATIC or third-party PROFINET I/O controller
- Component based Automation (CBA) on PROFINET
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component based Automation (CBA)
- Integrated Web server with the option of creating user-defined web pages
- Isochronous mode on PROFINET

SIMATIC Micro Memory Card required for operation of CPU.

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Technical specifications

	6ES7 312-5BE03-0AB0	6ES7 313-5BF03-0AB0	6ES7 313-6BF03-0AB0	6ES7 313-6CF03-0AB0
Product version				
associated programming package	STEP 7 V5.3 SP2 or higher with HW update	STEP 7 V5.3 SP2 or higher with HW update	STEP 7 V5.3 SP2 or higher with HW update	STEP 7 V5.3 SP2 or higher with HW update
Supply voltages				
Rated value				
• permissible range, lower limit (DC)	20.4 V	20.4 V	20.4 V	20.4 V
external protection for supply cables (recommendation)	Miniature circuit breaker, type C; min. 2 A; miniature circuit breaker type B, min. 4 A	Miniature circuit breaker, type C; min. 2 A; miniature circuit breaker type B, min. 4 A	Miniature circuit breaker, type C; min. 2 A; miniature circuit breaker type B, min. 4 A	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
Current consumption (in no-load operation), typ.	60 mA	150 mA	100 mA	100 mA
Inrush current, typ.	11 A	11 A	11 A	11 A
I^2t	0.7 $A^2 \cdot s$	0.7 $A^2 \cdot s$	0.7 $A^2 \cdot s$	0.7 $A^2 \cdot s$
from supply voltage L+, max.	500 mA	700 mA	700 mA	900 mA
Power losses				
Power loss, typ.	6 W	14 W	10 W	10 W
Memory				
Work memory				
• 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
• expandable	No	No	No	No
Load memory				
• pluggable (MMC)	Yes	Yes	Yes	Yes
• pluggable (MMC), max.	4 Mbyte	8 Mbyte	8 Mbyte	8 Mbyte
Backup				
• present	Yes; guaranteed by MMC (maintenance-free)	Yes; guaranteed by MMC (maintenance-free)	Yes; guaranteed by MMC (maintenance-free)	Yes; guaranteed by MMC (maintenance-free)
• without battery	Yes; Program and data	Yes; Program and data	Yes; Program and data	Yes; Program and data
CPU-blocks				
DB				
• Number, max.	511; Number 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	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

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Technical specifications (continued)

	6ES7 312-5BE03-0AB0	6ES7 313-5BF03-0AB0	6ES7 313-6BF03-0AB0	6ES7 313-6CF03-0AB0
Counters, timers and their retentivity				
S7 counter				
• Number	128	256	256	256
• of which retentive without battery				
- adjustable	Yes	Yes	Yes	Yes
- lower limit	0	0	0	0
- upper limit	127	255	255	255
• Retentivity				
- adjustable	Yes	Yes	Yes	Yes
- lower limit	0	0	0	0
- upper limit	127	255	255	255
• Counting range				
- lower limit	0	0	0	0
- upper limit	999	999	999	999
IEC counter				
• present	Yes	Yes	Yes	Yes
• Type	SFB	SFB	SFB	SFB
S7 times				
• Number	128	256	256	256
• Retentivity				
- 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
IEC timer				
• present	Yes	Yes	Yes	Yes
• Type	SFB	SFB	SFB	SFB
Data areas and their retentivity				
Flag				
• Number, max.	128 byte	256 byte	256 byte	256 byte
• Retentivity available	Yes; MB 0 to MB 127	Yes; MB 0 to MB 255	Yes; MB 0 to MB 255	Yes; MB 0 to MB 255
• Number of clock memories	8; 1 memory byte	8; 1 memory byte	8; 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
• Size, max.	16 Kibyte	16 Kibyte	16 Kibyte	16 Kibyte
• Retentivity 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
• Retentivity preset	yes	yes	yes	yes
Local data				
• per priority class, max.	256 byte	510 byte	510 byte	510 byte
Address area				
I/O address area				
• overall	1 Kibyte	1 Kibyte	1 Kibyte	1 Kibyte
• Outputs	1 Kibyte	1 Kibyte	1 Kibyte	1 Kibyte
• of which, distributed				
- Inputs			none	1 006 byte; max.
- Outputs			none	1 006 byte; max.
Process image				
• Inputs	128 byte	128 byte	128 byte	128 byte
• Outputs	128 byte	128 byte	128 byte	128 byte

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Technical specifications (continued)

	6ES7 312-5BE03-0AB0	6ES7 313-5BF03-0AB0	6ES7 313-6BF03-0AB0	6ES7 313-6CF03-0AB0
Digital channels				
• Inputs	266	1 016	1 008	8 064
• Outputs	262	1 008	1 008	8 064
• Inputs, of which central	266	1 016	1 008	1 008
• Outputs, of which central	262	1 008	1 008	1 008
Analog channels				
• Inputs	64	253	248	503
• Outputs	64	250	248	503
• Inputs, of which central	64	253	248	248
• Outputs, of which central	64	250	248	248
Hardware configuration				
Central devices, max.	1	1	1	1
Expansion devices, max.	0	3	3	3
Racks, max.	1	4	4	4
Modules per rack, max.	8	8; in rack 3 max. 7	8; in rack 3 max. 7	8; in rack 3 max. 7
Number of DP masters				
• integrated	none	none	No	1
• via CP	4	4	4	4
Number of operable FMs and CPs (recommended)				
• FM	8	8	8	8
• CP, point-to-point	8	8	8	8
• CP, LAN	4	6	6	6
Time				
Clock				
• Hardware clock (real-time clock)		Yes	Yes	Yes
• Software clock	Yes			
• battery-backed and synchronizable	No	Yes	Yes	Yes
• Deviation per day, max.	15 s	10 s	10 s	10 s
Runtime meter				
• 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)	0 to 2^31 hours (when using SFC 101)
• Granularity	1 hour	1 hour	1 hour	1 hour
• Retentive	Yes; Must be restarted at each restart	Yes; Must be restarted at each restart	Yes; Must be restarted at each restart	Yes
Clock synchronization				
• supported	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
• to DP, slave				Yes
• in AS, master	Yes	Yes	Yes	Yes
S7 message functions				
Number of login stations for message functions, max.	6; Depending on the connections configured for PG/OP and S7 basic communication	8; Depending on the connections configured for PG/OP and S7 basic communication	8; Depending on the connections configured for PG/OP and S7 basic communication	8
Process diagnostic messages	Yes	Yes	Yes	Yes
Simultaneously active Alarm-S blocks, max.	20	20	20	20

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Technical specifications (continued)

	6ES7 312-5BE03-0AB0	6ES7 313-5BF03-0AB0	6ES7 313-6BF03-0AB0	6ES7 313-6CF03-0AB0
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 variables, max.	30	30	30	30
• of which control variables, max.	14	14	14	14
Forcing				
• Forcing	Yes	Yes	Yes	Yes
Status block	Yes	Yes	Yes	Yes
Single step	Yes	Yes	Yes	Yes
Number of breakpoints	2	2	2	2
Diagnostic buffer				
• Present	Yes	Yes	Yes	Yes
• Number of entries, max.	100	100	100	100
- adjustable				No
Communication functions				
PG/OP communication	Yes	Yes	Yes	Yes
Routing	No	No	No	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; Server	Yes
S7 communication				
• supported	Yes	Yes	Yes	Yes
S5-compatible communication				
• supported	Yes; via CP and loadable FC	Yes; via CP and loadable FC	Yes; via CP and loadable FC	Yes; via CP and loadable FC
Number of connections				
• overall	6	8	8	8
• usable for PG communication	5	7	7	7
• usable for OP communication	5	7	7	7
• usable for S7 basic communication	2	4	4	4
• usable for routing	No	No	No	4; max.
Connection method				
required front connector	1x 40-pin	2x 40-pin	1x 40-pin	1x 40-pin
MPI				
Cable length, max.	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	
Integrated protocol driver				
• 3964 (R)			Yes	
• ASCII			Yes	
• RK512			No	
Transmission speed, RS 422/485				
• with 3964 (R) protocol, max.			38.4 Kbit/s half duplex; 19.2 Kbit/s full duplex	
• with ASCII protocol, max.			38.4 kbit/s half duplex; 19.2 kbit/s full duplex	

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Technical specifications (continued)

	6ES7 312-5BE03-0AB0	6ES7 313-5BF03-0AB0	6ES7 313-6BF03-0AB0	6ES7 313-6CF03-0AB0
1st interface				
Type of 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
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	No
• DP slave	No	No	No	No
• Point-to-point connection	No	No	No	No
MPI				
• Number of connections	6	8	8	8
• Services				
- PG/OP communication	Yes	Yes	Yes	Yes
- Routing	No	No	No	Yes
- Global data communication	Yes	Yes	Yes	Yes
- S7 basic communication	Yes	Yes	Yes	Yes
- S7 communication	Yes	Yes	Yes	Yes
- S7 communication, as client	No	No	No	No
- S7 communication, as server	Yes	Yes	Yes	Yes
• Transmission rate, max.	187.5 kbit/s	187.5 kbit/s	187.5 kbit/s	187.5 kbit/s
2nd interface				
Type of interface			integrated RS 422/ 485 interface	integrated RS 485 interface
Physics			RS 422/RS 485 (X.27)	RS 485
Isolated			Yes	Yes
Power supply to interface (15 to 30 V DC), max.			No	200 mA
Number of connection resources			none	8
Functionality				
• MPI			No	No
• DP master			No	Yes
• DP slave			No	Yes
• PROFINET IO controller			No	No
• PROFINET CBA			No	No
• Local Operating Network			Yes	No

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Technical specifications (continued)

	6ES7 312-5BE03-0AB0	6ES7 313-5BF03-0AB0	6ES7 313-6BF03-0AB0	6ES7 313-6CF03-0AB0
DP master				
• Number of connections, max.				8; for PG / OP communication
• Number of connections (of which reserved), max.				1 for PG, 1 for OP
• Services				
- PG/OP communication				Yes
- Routing				Yes
- Global data communication				No
- S7 basic communication				Yes; I blocks only
- S7 communication				Yes
- S7 communication, as client				No
- S7 communication, as server				Yes
- Equidistance mode support				Yes
- Isochronous mode				No
- SYNC/FREEZE				Yes
- Activation/deactivation of DP slaves				Yes
- Direct data exchange (slave-to-slave communication)				Yes
- DPV1				Yes
• Transmission rate, max.				12 Mbit/s
• Number of DP slaves, max.				32
• Address area				
- Inputs, max.				1 Kibyte
- Outputs, max.				1 Kibyte
• User data per DP slave				
- Inputs, max.				244 byte
- Outputs, max.				244 byte
DP slave				
• Number of connections				8
• Services				
- PG/OP communication				Yes
- Routing				Yes; Only with active interface
- Global data communication				No
- S7 basic communication				No
- S7 communication, as client				No
- S7 communication, as server				Yes
- Direct data exchange (slave-to-slave communication)				Yes
- DPV1				No
• GSD file				The current GSD file can be obtained from: www.siemens.com/profibus-gsd
• Transmission rate, max.				12 Mbit/s
• Automatic baud rate search				Yes; only with passive interface
• Transfer memory				
- Inputs				244 byte
- Outputs				244 byte
• Address area, max.				32
• User data per address area, max.				32 byte

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Technical specifications (continued)

	6ES7 312-5BE03-0AB0	6ES7 313-5BF03-0AB0	6ES7 313-6BF03-0AB0	6ES7 313-6CF03-0AB0
Programming				
Programming language				
• STEP 7	Yes; V5.3 SP2 with HW update	Yes; V5.3 SP2 with HW update	Yes; V5.2 SP1 with HW update	Yes; V5.3 SP2 with HW update
• LAD	Yes	Yes	Yes	Yes
• FBD	Yes	Yes	Yes	Yes
• STL	Yes	Yes	Yes	Yes
• SCL	Yes	Yes	Yes	Yes
• GRAPH	Yes	Yes	Yes	Yes
• HiGraph®	Yes	Yes	Yes	Yes
Command set	see instruction list	see instruction list	see instruction list	see instruction list
Nesting levels	8	8	8	8
Know-how protection				
• User program protection/ password protection	Yes	Yes	Yes	Yes
System functions (SFC)	see instruction list	see instruction list	see instruction list	see instruction list
System function blocks (SFB)	see instruction list	see instruction list	see instruction list	see instruction list
Digital inputs				
Number of digital inputs	10	24	16	16
• of which, inputs usable for technological functions	8	12	12	12
Number of simultaneously controllable inputs				
• horizontal installation				
- up to 40 °C, max.	10	24	16	16
- up to 60 °C, max.	5	12	8	8
• vertical installation				
- up to 40 °C, max.	5	12	8	8
• Technological functions				
- shielded, max.	100 m	100 m	100 m	100 m
- unshielded, max.	not allowed	not allowed	not allowed	not allowed
• Standard DI				
- shielded, max.	1 000 m	1 000 m	1 000 m	1 000 m
- unshielded, max.	600 m	600 m	600 m	600 m
Input characteristic curve acc. to IEC 1131, Type 1	Yes	Yes	Yes	Yes
Input voltage				
• Rated value, DC	24 V	24 V	24 V	24 V
• for signal "0"	-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
Input current				
• for signal "1", typ.	9 mA	9 mA	9 mA	9 mA
Input delay (for rated value of input voltage)				
• for standard inputs				
- parameterizable	Yes; 0.1 / 0.3 / 3 / 15 ms	Yes; 0.1 / 0.3 / 3 / 15 ms	Yes; 0.1 / 0.3 / 3 / 15 ms	Yes; 0.1 / 0.3 / 3 / 15 ms
- Rated value	3 ms	3 ms	3 ms	3 ms
• for counter/technological functions				
- at "0" to "1", max.	48 µs	16 µs	16 µs	16 µs
Cable length				
• Cable length, shielded, max.	1 000 m; 100 m for technological functions	1 000 m; 100 m for technological functions	1 000 m; 100 m for technological functions	1 000 m; 100 m for technological functions
• Cable length unshielded, max.	600 m; For technological functions: No	600 m; For technological functions: No	600 m; For technological functions: No	600 m; For technological functions: No

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Technical specifications (continued)

	6ES7 312-5BE03-0AB0	6ES7 313-5BF03-0AB0	6ES7 313-6BF03-0AB0	6ES7 313-6CF03-0AB0
Digital outputs				
Number of digital outputs	6	16	16	16
• of which high-speed outputs	2	4	4	4
Short-circuit protection	Yes; electronically switched	Yes; electronically switched	Yes; electronically switched	Yes; electronically switched
• Response threshold, typ.	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)
Lamp load, max.	5 W	5 W	5 W	5 W
Controlling a digital input	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)
Output current				
• for signal "1" rated value	500 mA	500 mA	500 mA	500 mA
• for signal "1" permissible range, min.	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
• for signal "1" minimum load current	5 mA	5 mA	5 mA	5 mA
• for signal "0" residual current, max.	0.5 mA	0.5 mA	0.5 mA	0.5 mA
Parallel switching of 2 outputs				
• for increased power	No	No	No	No
• for redundant control of a load	Yes	Yes	Yes	Yes
Switching frequency				
• with resistive load, max.	100 Hz	100 Hz	100 Hz	100 Hz
• with inductive load, max.	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz
• on lamp load, max.	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
Aggregate current of outputs (per group)				
• horizontal installation				
- up to 40 °C, max.	2 A	3 A	3 A	3 A
- up to 60 °C, max.	1.5 A	2 A	2 A	2 A
• vertical installation				
- up to 40 °C, max.	1.5 A	2 A	2 A	2 A
Load resistance range				
• lower limit	48 Ω	48 Ω	48 Ω	48 Ω
• upper limit	4 kΩ	4 kΩ	4 kΩ	4 kΩ
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

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Technical specifications (continued)

	6ES7 312-5BE03-0AB0	6ES7 313-5BF03-0AB0	6ES7 313-6BF03-0AB0	6ES7 313-6CF03-0AB0
Analog inputs				
Number of analog inputs for voltage/current measurement		4		
Number of analog inputs for resistance/temperature measurement		1		
Cable length, shielded, max.		100 m		
permissible input frequency for current input (destruction limit), max.		5 V; permanent		
permissible input current for voltage input (destruction limit), max.		0.5 mA; permanent		
Technical unit for temperature measurement adjustable		Yes; Degrees Celsius / degrees Fahrenheit / Kelvin		
Input ranges (rated values), voltages				
• 0 to +10 V		Yes		
• -10 V to +10 V		Yes		
Input ranges (rated values), currents				
• 0 to 20 mA		Yes		
• -20 to +20 mA		Yes		
• 4 to 20 mA		Yes		
Input ranges (rated values), resistance thermometers				
• Pt 100		Yes		
Input ranges (rated values), resistors				
• No-Load voltage, typ.		2.5 V		
• Measured current, typ.		1.8 to 3.3 mA		
• 0 to 600 Ohm		Yes		
Voltage input				
• permissible input voltage for voltage input (destruction limit), max.		30 V; permanent		
Current input				
• permissible input current for current input (destruction limit), max.		50 mA; permanent		
Characteristic linearization				
• parameterizable		Yes; by software		
• for resistance thermometer		Pt 100		
Temperature compensation				
• Temperature compensation parameterizable		No		

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Technical specifications (continued)

	6ES7 312-5BE03-0AB0	6ES7 313-5BF03-0AB0	6ES7 313-6BF03-0AB0	6ES7 313-6CF03-0AB0
Analog outputs				
Number of analog outputs		2		
Cable length, shielded, max.		200 m		
Voltage output, short-circuit protection		Yes		
Voltage output, short-circuit current, max.		55 mA		
Current output, no-load voltage, max.		17 V		
Output ranges, voltage				
• 0 to 10 V		Yes		
• -10 to +10 V		Yes		
Output ranges, current				
• 0 to 20 mA		Yes		
• -20 to +20 mA		Yes		
• 4 to 20 mA		Yes		
Connection of actuators				
• for voltage output 2-conductor connection		Yes; Without compensation of the line resistances		
• for voltage output 4-conductor connection		No		
• for current output 2-conductor connection		Yes		
Load impedance (in rated range of output)				
• with voltage outputs, min.		1 kΩ		
• with voltage outputs, capacitive load, max.		0.1 µF		
• with current outputs, max.		300 Ω		
• with current outputs, inductive load, max.		0.1 mH		
Destruction limits against externally applied voltages and currents				
• Voltages at the outputs towards MANA		16 V; permanent		
• Current, max.		50 mA; permanent		
Analog value creation				
Measurement principle		Actual value encryption (successive approximation)		
Integrations and conversion time/ resolution per channel				
• Resolution with overrange (bit including sign), max.		12 bit		
• Integration time, parameterizable		Yes; 2.5 / 16.6 / 20 ms		
• Permissible input frequency, max.		400 Hz		
• Interference voltage suppression for interference frequency f1 in Hz		400 / 60 / 50 Hz		
• Conversion time (per channel)		1 ms		
• Time constant of the input filter		0.38 ms		
• Basic execution time of the module (all channels released)		1 ms		
Settling time				
• for resistive load		0.6 ms		
• for capacitive load		1 ms		

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Technical specifications (continued)

	6ES7 312-5BE03-0AB0	6ES7 313-5BF03-0AB0	6ES7 313-6BF03-0AB0	6ES7 313-6CF03-0AB0
Encoder				
Connection of signal encoders				
• for voltage measurement		Yes		
• for current measurement as 2-wire transducer		Yes; with external supply		
• for current measurement as 4-wire transducer		Yes		
• for resistance measurement with 2-conductor connection		Yes; without compensation of the line resistances		
• for resistance measurement with 3-conductor connection		No		
• for resistance measurement with 4-conductor connection		No		
Connectable encoders				
• 2-wire BEROS	Yes	Yes	Yes	Yes
- permissible quiescent current (2-wire BEROS), max.	1.5 mA	1.5 mA	1.5 mA	1.5 mA
Errors/accuracies				
Temperature error (relative to input area)		+/- 0.006 %/K		
Crosstalk between the inputs, min.		60 dB		
Repeat accuracy in settled status at 25 °C (relative to input area)		+/- 0.06 %		
Output ripple (based on output area, bandwidth 0 to 50 kHz)		+/- 0.1 %		
Linearity error (relative to output area)		+/- 0.15 %		
Temperature error (relative to output area)		+/- 0.01 %/K		
Crosstalk between the outputs, min.		60 dB		
Repeat accuracy in settled status at 25 °C (relative to output area)		+/- 0.06 %		
Operational limit in overall temperature range				
• Voltage, relative to input area		+/- 1 %		
• Current, relative to input area		+/- 1 %		
• Impedance, relative to input area		+/- 5 %		
• Voltage, relative to output area		+/- 1 %		
• Current, relative to output area		+/- 1 %		
Basic error limit (operational limit at 25 °C)				
• Voltage, relative to input area		+/- 0.7 %; Linearity error +/- 0.06%		
• Current, relative to input area		+/- 0.7 %; Linearity error +/- 0.06%		
• Impedance, relative to input area		+/- 3 %; Linearity error +/- 0.2%		
• Resistance-type thermometer, relative to input area		+/- 3 %		
• Voltage, relative to output area		+/- 0.7 %		
• Current, relative to output area		+/- 0.7 %		

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Technical specifications (continued)

	6ES7 312-5BE03-0AB0	6ES7 313-5BF03-0AB0	6ES7 313-6BF03-0AB0	6ES7 313-6CF03-0AB0
Interference voltage suppression for f = n x (fl +/- 1%), fl = interference frequency				
• Series mode interference (peak value of interference < rated value of input range), min.		30 dB		
• Common mode interference, min.		40 dB		
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)
Counter frequency (counter) max.	10 kHz	30 kHz	30 kHz	30 kHz
Frequency measurement	Yes	Yes	Yes	Yes
controlled positioning	No	No	No	No
PID controller	No	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)
Limit frequency (pulse)	2.5 kHz	2.5 kHz	2.5 kHz	2.5 kHz
Galvanic isolation				
Galvanic isolation digital inputs				
• Galvanic isolation digital inputs	Yes	Yes	Yes	Yes
• between the channels	No	No	No	No
• between the channels and the backplane bus	Yes	Yes	Yes	Yes
Galvanic isolation digital outputs				
• Galvanic isolation digital outputs	Yes	Yes	Yes	Yes
• between the channels	No	Yes	Yes	Yes
• between the channels, in groups of		8	8	8
• between the channels and the backplane bus	Yes	Yes	Yes	Yes
Galvanic isolation analog inputs				
• Galvanic isolation analog inputs		Yes; common for analog I/O		
• between the channels		No		
• between the channels and the backplane bus		Yes		
Galvanic isolation analog outputs				
• Galvanic isolation analog outputs		Yes; common for analog I/O		
• between the channels		No		
• between the channels and the backplane bus		Yes		
Dimensions and weight				
Dimensions				
• Width	80 mm	120 mm	120 mm	120 mm
• Height	125 mm	125 mm	125 mm	125 mm
• Depth	130 mm	130 mm	130 mm	130 mm
Weight				
• Weight, approx.	409 g	660 g	566 g	566 g

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Technical specifications (continued)

	6ES7 314-6BG03-0AB0	6ES7 314-6CG03-0AB0	6ES7 314-6EH04-0AB0
Product version			
associated programming package	STEP 7 V5.3 SP2 or higher with HW update	STEP 7 V5.3 SP2 or higher with HW update	STEP7 V5.5 or higher with HSP191
Supply voltages			
Rated value			
• permissible range, lower limit (DC)	20.4 V	20.4 V	19.2 V
external protection for supply cables (recommendation)	Miniature circuit breaker, type C; min. 2 A; miniature circuit breaker type B, min. 4 A	Miniature circuit breaker, type C; min. 2 A; miniature circuit breaker type B, min. 4 A	Miniature circuit breaker, type C; min. 2 A; miniature circuit breaker type B, min. 4 A
Current consumption			
Current consumption (rated value)	800 mA	1 000 mA	850 mA
Current consumption (in no-load operation), typ.	150 mA	150 mA	190 mA
Inrush current, typ.	11 A	11 A	5 A
I^2t	0.7 $A^2 \cdot s$	0.7 $A^2 \cdot s$	0.7 $A^2 \cdot s$
from supply voltage L+, max.	800 mA	1 000 mA	850 mA
Power losses			
Power loss, typ.	14 W	14 W	14 W
Memory			
Work memory			
• integrated	96 Kibyte; For program and data	96 Kibyte; For program and data	192 Kibyte
• expandable	No	No	No
• Size of retentive memory for retentive data blocks			64 Kibyte
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.	511; Number range: 1 to 511	511; Number range: 1 to 511	1 024; Number range: 1 to 16000
• Size, max.	16 Kibyte	16 Kibyte	64 Kibyte
FB			
• Number, max.	1 024; Sequence of numbers: 0 to 2047	1 024; Sequence of numbers: 0 to 2047	1 024; Number range: 0 to 7999
• Size, max.	16 Kibyte	16 Kibyte	64 Kibyte
FC			
• Number, max.	1 024; Sequence of numbers: 0 to 2047	1 024; Sequence of numbers: 0 to 2047	1 024; Number range: 0 to 7999
• Size, max.	16 Kibyte	16 Kibyte	64 Kibyte
OB			
• Size, max.	16 Kibyte; see instruction list	16 Kibyte	64 Kibyte
Nesting depth			
• per priority class	8	8	16
• additional within an error OB	4	4	4
CPU processing times			
for bit operations, min.	0.1 µs	0.1 µs	0.06 µs
for word operations, min.	0.2 µs	0.2 µs	0.12 µs
for fixed point arithmetic, min.	2 µs	2 µs	0.16 µs
for floating point arithmetic, min.	3 µs	3 µs	0.59 µs

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Technical specifications (continued)

	6ES7 314-6BG03-0AB0	6ES7 314-6CG03-0AB0	6ES7 314-6EH04-0AB0
Counters, timers and their retentivity			
S7 counter			
• Number	256	256	256
• of which retentive without battery			
- adjustable	Yes	Yes	
- lower limit	0	0	
- upper limit	255	255	
• Retentivity			
- adjustable	Yes	Yes	Yes
- lower limit	0	0	0
- upper limit	255	255	255
• Counting range			
- adjustable			Yes
- lower limit	0	0	0
- upper limit	999	999	999
IEC counter			
• present	Yes	Yes	Yes
• Type	SFB	SFB	SFB
S7 times			
• Number	256	256	256
• Retentivity			
- adjustable	Yes	Yes	Yes
- lower limit	0	0	0
- upper limit	255	255	255
- 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 retentivity			
Flag			
• Number, max.	256 byte	256 byte	256 byte
• Retentivity available	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
Data blocks			
• Number, max.	511; Number range: 1 to 511	511; Number range: 1 to 511	1 024; Number range: 1 to 16000
• Size, max.	16 Kibyte	16 Kibyte	64 Kibyte
• Retentivity adjustable	Yes; via non-retain property on DB	Yes; via non-retain property on DB	Yes; via non-retain property on DB
• Retentivity preset	Yes	Yes	Yes
Local data			
• per priority class, max.	510 byte	510 byte	32 Kibyte; 2048 bytes max. per block

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Technical specifications (continued)

	6ES7 314-6BG03-0AB0	6ES7 314-6CG03-0AB0	6ES7 314-6EH04-0AB0
Address area			
I/O address area			
• overall	1 Kibyte	1 Kibyte	2 048 byte
• Outputs	1 Kibyte	1 Kibyte	2 048 byte
• of which, distributed			
- Inputs	none	979 byte	2 003 byte
- Outputs	none	986 byte	2 010 byte
Process image			
• Inputs	128 byte	128 byte	2 048 byte
• Outputs	128 byte	128 byte	2 048 byte
• Inputs, adjustable			2 048 byte
• Outputs, adjustable			2 048 byte
• Inputs, preset			256 byte
• Outputs, preset			256 byte
Subprocess images			
• Number of subprocess images, max.			1; With PROFINET IO, the length of the user data is limited to 1600 bytes
Digital channels			
• Inputs	1 016	7 856	16 048
• Outputs	1 008	7 904	16 096
• Inputs, of which central	1 016	1 016	1 016
• Outputs, of which central	1 008	1 008	1 008
Analog channels			
• Inputs	253	494	1 006
• Outputs	250	495	1 007
• Inputs, of which central	253	253	253
• Outputs, of which central	250	250	250
Hardware configuration			
Central devices, max.	1	1	1
Expansion devices, max.	3	3	3
Racks, max.	4	4	4
Modules per rack, max.	8; in rack 3 max. 7	8; in rack 3 max. 7	8; in rack 3 max. 7
Number of DP masters			
• integrated	none	1	1
• 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

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Technical specifications (continued)

	6ES7 314-6BG03-0AB0	6ES7 314-6CG03-0AB0	6ES7 314-6EH04-0AB0
Time			
Clock			
• Hardware clock (real-time clock)	Yes	Yes	Yes
• Battery-backed and synchronizable	Yes	Yes	Yes
• Behavior of the clock following POWER-ON			Clock continues running after POWER OFF
• Behavior of the clock following expiry of backup period			The clock continues at the time of day it had when power was switched off
• Deviation per day, max.	10 s	10 s	10 s; Typ.: 2 s
Runtime meter			
• Number	1	1	1
• Number/Number range	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)
• Granularity	1 hour	1 hour	1 hour
• Retentive	Yes; Must be restarted at each restart	Yes; Must be restarted at each restart	Yes; Must be restarted at each restart
Clock synchronization			
• supported	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
• to DP, slave		Yes	Yes
• in AS, master	Yes	Yes	Yes
• in AS, slave			Yes
• on Ethernet via NTP			Yes; as client
S7 message functions			
Number of login stations for message functions, max.	12; Depending on the connections configured for PG/OP and S7 basic communication	12; Depending on the connections configured for PG/OP and S7 basic communication	12; Depending on the connections configured for PG/OP and S7 basic communication
Process diagnostic messages	Yes	Yes	Yes
Simultaneously active Alarm-S blocks, max.	40	40	300
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 variables, max.	30	30	30
• of which control variables, max.	14	14	14
Forcing			
• Forcing	Yes	Yes	Yes
Status block	Yes	Yes	Yes; Up to 2 simultaneously
Single step	Yes	Yes	Yes
Number of breakpoints	2	2	4
Diagnostic buffer			
• present	Yes	Yes	Yes
• Number of entries, max.	100	100	500
- adjustable			No
- Of which powerfail-proof			100; Only the last 100 entries are retentive
• Number of entries readable in RUN, max.			499
- adjustable			Yes; From 10 to 499
- preset			10
Service data			
• can be read out			Yes

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Technical specifications (continued)

	6ES7 314-6BG03-0AB0	6ES7 314-6CG03-0AB0	6ES7 314-6EH04-0AB0
Monitoring functions			
Status LEDs			Yes
Communication functions			
PG/OP communication	Yes	Yes	Yes
Data record routing			Yes
Routing	No	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
Web server			
• supported			Yes
• Number of HTTP clients			5
• User-defined websites			Yes
Open IE communication			
• TCP/IP			Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.			8
- Several passive connections per port, supported			Yes
• ISO-on-TCP (RFC1006)			Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.			8
- Data length, max.			32 768 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	12	12	12
• usable for PG communication	11	11	11
• usable for OP communication	11	11	11
• usable for S7 basic communication	8	8	8
• usable for S7 communication			10
- reserved for S7 communication			0
- Adjustable for S7 communication, min.			0
- Adjustable for S7 communication, max.			10
• Max. total number of instances			32
• usable for routing	No	4; max.	X1 as MPI: max. 10; X1 as DP master: max. 24; X1 as DP slave (active): max. 14; X2 as PROFINET: max. 24

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Technical specifications (continued)

	6ES7 314-6BG03-0AB0	6ES7 314-6CG03-0AB0	6ES7 314-6EH04-0AB0
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
• Number of device-internal and PROFIBUS interconnections			500
• Data length of device-internal und PROFIBUS interconnections, max.			4 000 byte
• Data length per connection, max.			1 400 byte
• Remote interconnections with acyclic transmission			
- Sampling frequency: Sampling time, min.			500 ms
- Number of incoming inter-connections			100
- Number of outgoing inter-connections			100
- Data length of all incoming inter-connections, max.			2 000 byte
- Data length of all outgoing inter-connections, max.			2 000 byte
- Data length per connection, max.			1 400 byte
• Remote interconnections with cyclic transmission			
- Transmission frequency: Trans-mission interval, min.			10 ms
- Number of incoming inter-connections			200
- Number of outgoing inter-connections			200
- Data length of all incoming inter-connections, max.			2 000 byte
- Data length of all outgoing inter-connections, max.			2 000 byte
- Data length per connection, max.			450 byte
• HMI variables via PROFINET (acyclic)			
- Number of stations that can log on 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
Connection method			
required front connector	2x 40-pin	2x 40-pin	2x 40-pin
MPI			
Cable length, max.	50 m; without repeater	50 m; without repeater	

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Technical specifications (continued)

	6ES7 314-6BG03-0AB0	6ES7 314-6CG03-0AB0	6ES7 314-6EH04-0AB0
Point-to-point			
Cable length, max.	1 200 m		
Integrated protocol driver			
• 3964 (R)	Yes		
• ASCII	Yes		
• RK512	Yes		
Transmission speed, RS 422/485			
• with 3964 (R) protocol, max.	19.2 kbit/s; 38.4 Kbit/s half duplex; 19.2 Kbit/s full duplex		
• with ASCII protocol, max.	19.2 kbit/s; 38.4 kbit/s half duplex; 19.2 kbit/s full duplex		
• with RK 512 protocol, max.	19.2 kbit/s; 38.4 Kbit/s half duplex; 19.2 Kbit/s full duplex		
1st interface			
Type of interface	Integrated RS 485 interface	Integrated RS 485 interface	Integrated RS 485 interface
Physics	RS 485	RS 485	RS 485
Isolated	No	No	Yes
Power supply to interface (15 to 30 V DC), max.	200 mA	200 mA	200 mA
Functionality			
• MPI	Yes	Yes	Yes
• DP master	No	No	Yes
• DP slave	No	No	Yes
• Point-to-point connection	No	No	No
MPI			
• Number of connections	12	12	
• Services			
- PG/OP communication	Yes	Yes	Yes
- Routing	No	Yes	Yes
- Global data communication	Yes	Yes	Yes
- S7 basic communication	Yes	Yes	Yes
- S7 communication	Yes	Yes	Yes
- S7 communication, as client	No	No	No
- S7 communication, as server	Yes	Yes	Yes
• Transmission rate, max.	187.5 kbit/s	187.5 kbit/s	12 Mbit/s
DP master			
• Services			
- PG/OP communication			Yes
- Routing			Yes
- Global data communication			No
- S7 basic communication			Yes
- S7 communication			Yes
- S7 communication, as client			No
- S7 communication, as server			Yes
- Equidistance mode support			Yes
- Isochronous mode			No
- SYNC/FREEZE			Yes
- Activation/deactivation of DP slaves			Yes
- Number of DP slaves that can be simultaneously activated/ deactivated, max.			8
- Direct data exchange (slave-to-slave communication)			Yes; As subscriber
- DPV1			Yes
• Transmission rate, max.			12 Mbit/s
• Number of DP slaves, max.			124
• Address area			
- Inputs, max.			2 Kibyte
- Outputs, max.			2 Kibyte
• User data per DP slave			
- Inputs, max.			244 byte
- Outputs, max.			244 byte

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Technical specifications (continued)

	6ES7 314-6BG03-0AB0	6ES7 314-6CG03-0AB0	6ES7 314-6EH04-0AB0
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; Connection configured on one side only
- Direct data exchange (slave-to-slave communication)			Yes
- DPV1			No
• Transmission rate, max.			12 Mbit/s
• Transfer memory			
- Inputs			244 byte
- Outputs			244 byte
• Address area, max.			32
• User data per address area, max.			32 byte
2nd interface			
Type of interface	integrated RS 422/ 485 interface	integrated RS 485 interface	PROFINET
Physics	RS 422/RS 485 (X.27)	RS 485	Ethernet RJ45
Isolated	Yes	Yes	Yes
Integrated switch			Yes
Number of ports			2
Power supply to interface (15 to 30 V DC), max.	No	200 mA	
Automatic detection of transmission speed			Yes; 10/100 Mbit/s
Autonegotiation			Yes
Autocrossing			Yes
Media redundancy			
• supported			Yes
• Switchover time on line break, typically			200 ms; PROFINET MRP
• Number of stations in the ring, max.			50
Change of IP address at runtime, supported			Yes
Number of connection resources	none	12	
Functionality			
• MPI	No	No	No
• DP master	No	Yes	No
• DP slave	No	Yes	No
• PROFINET IO controller	No	No	Yes; Also simultaneously with IO device functionality
• PROFINET IO device			Yes; Also simultaneously with IO controller functionality
• PROFINET CBA	No	No	Yes
• Web server			Yes
- Number of HTTP clients			5
• Local Operating Network	Yes	No	

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Technical specifications (continued)

	6ES7 314-6BG03-0AB0	6ES7 314-6CG03-0AB0	6ES7 314-6EH04-0AB0
DP master			
• Number of connections, max.		12; for PG / OP communication	
• Number of connections (of which reserved), max.		1 for PG, 1 for OP	
• Services			
- PG/OP communication		Yes	
- Routing		Yes	
- Global data communication		No	
- S7 basic communication		Yes; I blocks only	
- S7 communication		Yes	
- S7 communication, as client		No	
- S7 communication, as server		Yes	
- Equidistance mode support		Yes	
- Isochronous mode		No	
- SYNC/FREEZE		Yes	
- Activation/deactivation of DP slaves		Yes	
- Direct data exchange (slave-to-slave communication)		Yes	
- DPV1		Yes	
• Transmission rate, max.		12 Mbit/s	
• Number of DP slaves, max.		32	
• Address area			
- Inputs, max.		1 Kibyte	
- Outputs, max.		1 Kibyte	
• User data per DP slave			
- Inputs, max.		244 byte	
- Outputs, max.		244 byte	
DP slave			
• Number of connections		12	
• Services			
- PG/OP communication		Yes	
- Routing		Yes; Only with active interface	
- Global data communication		No	
- S7 basic communication		No	
- S7 communication, as client		No	
- S7 communication, as server		Yes	
- Direct data exchange (slave-to-slave communication)		Yes	
- DPV1		No	
• GSD file		The current GSD file can be obtained from: www.siemens.com/profibus-gsd	
• Transmission rate, max.		12 Mbit/s	
• Automatic baud rate search		Yes; only with passive interface	
• Transfer memory			
- Inputs		244 byte	
- Outputs		244 byte	
• Address area, max.		32	
• User data per address area, max.		32 byte	

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Technical specifications (continued)

	6ES7 314-6BG03-0AB0	6ES7 314-6CG03-0AB0	6ES7 314-6EH04-0AB0
PROFINET IO controller			
• Services			
- PG/OP communication			Yes
- Routing			Yes
- S7 communication			Yes; With loadable FBs, max. configurable connections: 10, max. number of instances: 32
- Isochronous mode			Yes; OB 61
- Open IE communication			Yes; via TCP/IP, ISO on TCP and UDP
• Transmission rate, max.			100 Mbit/s
• Number of connectable IO devices, max.			128
• Max. number of connectable IO devices for RT			128
- of which in line, max.			128
• Number of IO devices with IRT and the option "high flexibility"			128
- of which in line, max.			61
• Number of IO devices with IRT and the option "high performance", max.			64
- of which in line, max.			64
• IRT, supported			Yes
• Shared device, supported			Yes
• Prioritized startup supported			Yes
- Number of IO devices, max.			32
• Activation/deactivation of IO devices			Yes
- Number of IO devices that can be simultaneously activated/ deactivated, max.			8
• IO devices changing during operation (partner ports), supported			Yes
- Max. number of IO devices per tool			8
• Device replacement without swap medium			Yes
• Updating time			250 µs to 512 ms (depending on the operating mode, see Manual "S7-300 CPU 31xC and CPU 31x, Technical Data" for more details)
• Address area			
- Inputs, max.			2 Kibyte
- Outputs, max.			2 Kibyte
• User data per address area, max.			
- User data consistency, max.			1 024 byte
PROFINET IO device			
• Services			
- PG/OP communication			Yes
- Routing			Yes
- S7 communication			Yes; With loadable FBs, max. configurable connections: 10, max. number of instances: 32
- Isochronous mode			No
- Open IE communication			Yes; Via TCP/IP, ISO on TCP, UDP
- IRT, supported			Yes
- PROFIenergy, supported			Yes; With SFB 73 / 74 prepared for loadable PROFIenergy standard FB for I-Device
- Shared device, supported			Yes
- Number of IO controllers with shared device, max.			2
• Transfer memory			
- Inputs, max.			1 440 byte; Per IO controller with shared device
- Outputs, max.			1 440 byte; Per IO controller with shared device
• Submodules			
- Number, max.			64
- User data per submodule, max.			1 024 byte

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Technical specifications (continued)

	6ES7 314-6BG03-0AB0	6ES7 314-6CG03-0AB0	6ES7 314-6EH04-0AB0
PROFINET CBA			
• acyclic transmission			Yes
• cyclic transmission			Yes
Open IE communication			
• Open IE communication, supported			Yes
• Number of connections, max.			8
• Local port numbers used at the system end			0, 20, 21, 25, 80, 102, 135, 161, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535
• Keep-alive function, supported			Yes
Isochronous mode			
Isochronous mode			Yes; For PROFINET only
Programming			
Programming language			
• STEP 7	Yes; V5.3 SP2 with HW update	Yes; V5.3 SP2 with HW update	Yes; V5.5 or higher
• LAD	Yes	Yes	Yes
• FBD	Yes	Yes	Yes
• STL	Yes	Yes	Yes
• SCL	Yes	Yes	Yes
• CFC	Yes	Yes	Yes
• GRAPH	Yes	Yes	Yes
• HiGraph®	Yes	Yes	Yes
Command set	see instruction list	see instruction list	see instruction list
Nesting levels	8	8	8
Know-how protection			
• User program protection/password protection	Yes	Yes	Yes
• Block encryption			Yes; with S7 block privacy
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
Digital inputs			
Number of digital inputs	24	24	24
• of which inputs usable for technological functions	16	16	16
Number of simultaneously controllable inputs			
• horizontal installation			
- up to 40 °C, max.	24	24	24
- up to 60 °C, max.	12	12	12
• vertical installation			
- up to 40 °C, max.	12	12	12
• Technological functions			
- shielded, max.	50 m	50 m	50 m; At maximum count frequency
- unshielded, max.	not allowed	not allowed	not allowed
• Standard DI			
- shielded, max.	1 000 m	1 000 m	1 000 m
- unshielded, max.	600 m	600 m	600 m
Input characteristic curve acc. to IEC 1131, Type 1	Yes	Yes	Yes

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Technical specifications (continued)

	6ES7 314-6BG03-0AB0	6ES7 314-6CG03-0AB0	6ES7 314-6EH04-0AB0
Input voltage			
• Rated value, DC	24 V	24 V	24 V
• for signal "0"	-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
Input current			
• for signal "1", typ.	9 mA	9 mA	8 mA
Input delay (for rated value of input voltage)			
• for standard inputs			
- parameterizable	Yes; 0.1 / 0.3 / 3 / 15 ms	Yes; 0.1 / 0.3 / 3 / 15 ms	Yes; 0.1 / 0.3 / 3 / 15 ms (You can reconfigure the input delay of the standard inputs during program runtime. Please note that under certain circumstances your newly set filter time may not be effective until the next filter cycle.)
- Rated value	3 ms	3 ms	3 ms
• for counter/technological functions			
- at "0" to "1", max.	8 µs	8 µs	8 µs; Minimum pulse width/ minimum pause between pulses at maximum counting frequency
Cable length			
• Cable length, shielded, max.	1 000 m; 50 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
Digital outputs			
Number of digital outputs	16	16	16
• of which high-speed outputs	4	4	4; Notice: You cannot connect the fast outputs of your CPU in parallel
Short-circuit protection	Yes; Clocked electronically	Yes; Clocked electronically	Yes; Clocked electronically
• Response threshold, typ.	1 A	1 A	1 A
Limitation of inductive shutdown voltage to	L+ (-48 V)	L+ (-48 V)	L+ (-48 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+ (-0.8 V)
Output current			
• for signal "1" rated value	500 mA	500 mA	500 mA
• for signal "1" permissible range, min.	5 mA	5 mA	5 mA
• for signal "1" permissible range, max.	0.6 A	0.6 A	0.6 A
• for signal "1" minimum load current	5 mA	5 mA	5 mA
• for signal "0" residual current, max.	0.5 mA	0.5 mA	0.5 mA
Parallel switching of 2 outputs			
• for increased power	No	No	No
• for redundant control of a load	Yes	Yes	Yes
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.	100 Hz	100 Hz	100 Hz
• of the pulse outputs, with resistive load, max.	2.5 kHz	2.5 kHz	2.5 kHz

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Technical specifications (continued)

	6ES7 314-6BG03-0AB0	6ES7 314-6CG03-0AB0	6ES7 314-6EH04-0AB0
Aggregate current of outputs (per group)			
• horizontal installation			
- up to 40 °C, max.	3 A	3 A	3 A
- up to 60 °C, max.	2 A	2 A	2 A
• vertical installation			
- up to 40 °C, max.	2 A	2 A	2 A
Load resistance range			
• lower limit	48 Ω	48 Ω	48 Ω
• upper limit	4 kΩ	4 kΩ	4 kΩ
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
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.	5 V; permanent	5 V; permanent	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	3.3 V
• Measured current, typ.	1.8 to 3.3 mA	1.8 to 3.3 mA	1.25 mA
• 0 to 600 Ohm	Yes	Yes	Yes
Voltage input			
• permissible input voltage for voltage input (destruction limit), max.	30 V; permanent	30 V; permanent	30 V; permanent
Current input			
• permissible input current for current input (destruction limit), max.	50 mA; permanent	50 mA; permanent	50 mA; permanent
Characteristic linearization			
• parameterizable	Yes; by software	Yes; by software	Yes; by software
• for resistance thermometer	Pt 100	Pt 100	Pt 100
Temperature compensation			
• Temperature compensation parameterizable	No	No	No

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Technical specifications (continued)

	6ES7 314-6BG03-0AB0	6ES7 314-6CG03-0AB0	6ES7 314-6EH04-0AB0
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	14 V
Output ranges, voltage			
• 0 to 10 V	Yes	Yes	Yes
• -10 to +10 V	Yes	Yes	Yes
Output ranges, current			
• 0 to 20 mA	Yes	Yes	Yes
• -20 to +20 mA	Yes	Yes	Yes
• 4 to 20 mA	Yes	Yes	Yes
Connection of actuators			
• for voltage output 2-conductor connection	Yes; Without compensation of the line resistances	Yes; Without compensation of the line resistances	Yes; Without compensation of the line resistances
• for voltage output 4-conductor connection	No	No	No
• for current output 2-conductor connection	Yes	Yes	Yes
Load impedance (in rated range of output)			
• with voltage outputs, min.	1 kΩ	1 kΩ	1 kΩ
• with voltage outputs, capacitive load, max.	0.1 µF	0.1 µF	0.1 µF
• with current outputs, max.	300 Ω	300 Ω	300 Ω
• with current outputs, inductive load, max.	0.1 mH	0.1 mH	0.1 mH
Destruction limits against externally applied voltages and currents			
• Voltages at the outputs towards MANA	16 V; permanent	16 V; permanent	16 V; permanent
• Current, max.	50 mA; permanent	50 mA; permanent	50 mA; permanent
Analog value creation			
Measurement principle	Actual value encryption (successive approximation)	Actual value encryption (successive approximation)	Actual value encryption (successive approximation)
Integrations and conversion time/ resolution per channel			
• Resolution with overrange (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; 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	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
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

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Technical specifications (continued)

	6ES7 314-6BG03-0AB0	6ES7 314-6CG03-0AB0	6ES7 314-6EH04-0AB0
• for resistance measurement with 3-conductor connection	No	No	No
• for resistance measurement with 4-conductor connection	No	No	No
Connectable encoders			
• 2-wire BEROS	Yes	Yes	Yes
- permissible quiescent current (2-wire BEROS), max.	1.5 mA	1.5 mA	1.5 mA
Errors/accuracies			
Temperature error (relative to input area)	+/- 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 area, 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 %	+/- 1 %
• 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%	+/- 0,8 %; Linearity error +/- 0.06%
• Current, relative to input area	+/- 0,7 %; Linearity error +/- 0.06%	+/- 0,7 %; Linearity error +/- 0.06%	+/- 0,8 %; Linearity error +/- 0.06%
• Impedance, relative to input area	+/- 3 %; Linearity error +/- 0.2%	+/- 3 %; Linearity error +/- 0.2%	+/- 0,8 %; Linearity error +/- 0.2%
• Resistance-type thermometer, relative to input area	+/- 3 %	+/- 3 %	+/- 0,8 %
• Voltage, relative to output area	+/- 0,7 %	+/- 0,7 %	+/- 0,8 %
• Current, relative to output area	+/- 0,7 %	+/- 0,7 %	+/- 0,8 %
Interference voltage suppression for f = n x (fl +/- 1%), fl = interference frequency			
• Series mode interference (peak value of interference < rated value of input range), min.	30 dB	30 dB	30 dB
• Common mode interference, min.	40 dB	40 dB	40 dB

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Technical specifications (continued)

	6ES7 314-6BG03-0AB0	6ES7 314-6CG03-0AB0	6ES7 314-6EH04-0AB0
Integrated Functions			
Number of counters	4; see "Technological Functions" manual	4; see "Technological Functions" manual	4; see "Technological Functions" manual
Counter frequency (counter) max.	60 kHz	60 kHz	60 kHz
Frequency measurement	Yes	Yes	Yes
Controlled positioning	Yes	Yes	Yes
PID controller	Yes	Yes	Yes
Number of pulse outputs	4; Pulse width modulation up to 2.5 kHz (see "Technological Functions" Manual)	4; Pulse width modulation up to 2.5 kHz (see "Technological Functions" Manual)	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
Galvanic isolation			
Galvanic isolation digital inputs			
• Galvanic isolation digital inputs	Yes	Yes	Yes
• between the channels	No	No	No
• between the channels and the backplane bus	Yes	Yes	Yes
Galvanic isolation digital outputs			
• Galvanic isolation digital outputs	Yes	Yes	Yes
• between the channels	Yes	Yes	Yes
• between the channels, in groups of	8	8	8
• between the channels and the backplane bus	Yes	Yes	Yes
Galvanic isolation analog inputs			
• Galvanic 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
Galvanic 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
Environmental requirements			
Operating temperature			
• Min.			0 °C
Dimensions and weight			
Dimensions			
• Width	120 mm	120 mm	120 mm
• Height	125 mm	125 mm	125 mm
• Depth	130 mm	130 mm	130 mm
Weight			
• Weight, approx.	676 g	676 g	730 g

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Compact CPUs

Ordering data		Order No.
CPU 312C		**6ES7 312-5BE03-0AB0**
Compact CPU, 32 KB work memory, 24 V DC power supply, 10 DI/6 DO integrated, integrated functions, MPI; including slot number labels; MMC is required		
CPU 313C		**6ES7 313-5BF03-0AB0**
Compact CPU, 64 KB work memory, 24 V DC power supply, 24 DI/16 DO, 4 AI/2 AO integrated, integrated functions, MPI; MMC is required		
CPU 313C-2 PtP		**6ES7 313-6BF03-0AB0**
Compact CPU, 64 KB, 24 V DC power supply, 16 DI/16 DO integrated, integrated functions, MPI; RS 422/485 interface; MMC is required		
CPU 313C-2 DP		**6ES7 313-6CF03-0AB0**
Compact CPU, 64 KB work memory, 24 V DC power supply, 16 DI/16 DO integrated, integrated functions, MPI PROFIBUS DP master/slave interface; MMC is required		
CPU 314C-2 PtP		**6ES7 314-6BG03-0AB0**
Compact CPU, 96 KB work memory, 24 V DC power supply, 24 DI/16 DO/4 AI/2 AO integrated, integrated functions, MPI, RS 422/485 interface; MMC is required		
CPU 314C-2 DP		**6ES7 314-6CG03-0AB0**
Compact CPU, 96 KB work memory, 24 V DC power supply, 24 DI/16 DO/4 AI/2 AO integrated, integrated functions, MPI, PROFIBUS DP master/slave interface; MMC is required		
CPU 314C-2 PN/DP		**6ES7 314-6EH04-0AB0**
Compact CPU, 192 KB work memory, 24 V DC power supply, 24 DI/16 DO/4 AI/2 AO integrated, integrated functions, MPI; PROFIBUS DP master/slave interface; PROFINET IO controller/I-Device interface, MMC is required		
Starter kit 2009	I	**6ES7 313-5BF03-4YB0**
Comprising a CPU 313C, STEP 7 V5.4 (Floating License), PC adapter incl. cable, Micro Memory Card 64 MB, 160 mm mounting rail, front connector		
SIMATIC Micro Memory Card		
64 KB		**6ES7 953-8LF20-0AA0**
128 KB		**6ES7 953-8LG20-0AA0**
512 KB		**6ES7 953-8LJ20-0AA0**
2 MB		**6ES7 953-8LL20-0AA0**
4 MB		**6ES7 953-8LM20-0AA0**
8 MB		**6ES7 953-8LP20-0AA0**

		Order No.
MPI cable		**6ES7 901-0BF00-0AA0**
For connecting SIMATIC S7 and the PG through MPI; 5 m in length		
Point-to-point link cable		
for connection to CPU 31xC-2 PtP		
5 m		**6ES7 902-3AB00-0AA0**
10 m		**6ES7 902-3AC00-0AA0**
50 m		**6ES7 902-3AG00-0AA0**
Front connector (1 unit)		
For compact CPUs		
40-pin, with screw contacts		
• 1 unit		**6ES7 392-1AM00-0AA0**
• 100 units		**6ES7 392-1AM00-1AB0**
40-pin, with 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**
SIMATIC TOP connect		See page 5/290; for information about which components can be used for the respective module, see Industry Mall or Catalog KT 10.2
Slot number plates		**6ES7 912-0AA00-0AA0**
S7-300 manual		
Design, CPU data, module data, instruction list		
German		**6ES7 398-8FA10-8AA0**
English		**6ES7 398-8FA10-8BA0**
SIMATIC manual collection	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC		
SIMATIC manual collection update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		
Power supply connector		**6ES7 391-1AA00-0AA0**
10 units, spare part		
Labeling strips		**6ES7 392-2XX00-0AA0**
10 units, spare part		
Label cover		**6ES7 392-2XY00-0AA0**
10 units, spare part		

D: Subject to export regulations AL: N and ECCN: 5D992

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

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

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Ordering data

		Order No.
S7 SmartLabel V3.0		
Software for automatic labeling of modules direct from the STEP 7 project		
Single license	J	**2XV9 450-1SL03-0YX0**
Upgrade single license	J	**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**
PC adapter USB		**6ES7 972-0CB20-0XA0**
For connecting a PC to SIMATIC S7-200/300/400 via USB; with USB cable (5 m)		

	Order No.
RS 485 PROFIBUS DP bus connector	
• With 90° cable outlet, max. transmission rate 12 Mbit/s	
- Without PG interface	**6ES7 972-0BA12-0XA0**
- With PG interface	**6ES7 972-0BB12-0XA0**
• With 90° cable outlet for FastConnect connection system, max. transmission rate 12 Mbit/s	
- Without PG interface, 1 unit	**6ES7 972-0BA52-0XA0**
- Without PG interface, 100 units	**6ES7 972-0BA52-0XB0**
- With PG interface, 1 unit	**6ES7 972-0BB52-0XA0**
- With PG interface, 100 units	**6ES7 972-0BB52-0XB0**
• With axial cable outlet for SIMATIC OP, for connecting to PPI, MPI, PROFIBUS	**6GK1 500-0EA02**
PROFIBUS Fast Connect bus cable	**6XV1 830-0EH10**
Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m	
RS 485 repeater for PROFIBUS	**6ES7 972-0AA02-0XA0**
Transmission rate up to 12 Mbit/s; 24 V DC; IP20 enclosure	
PROFIBUS bus components	see catalogs IK PI, CA 01
For establishing MPI/PROFIBUS communication	

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

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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.

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

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	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 ... +70 °C	
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical specifications	The technical data of the standard product applies except for the ambient conditions	
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	No	Yes
Ambient conditions		
Relative humidity	5 ... 100 % Condensation permissible	
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)	
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]	
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]	
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K	

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOx < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOx < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS CPU 312C		
(extended temperature range and medial exposure)		
Compact CPU, work memory 32 KB, power supply 24 V DC, 10 DI/6 DO integrated, integrated functions, MPI; including slot number labels; MMC is required	H	**6AG1 312-5BE03-2AB0**
Additional conformance with EN 50155	H	**6AG1 312-5BE03-2AY0**

	Order No.
Accessories	See SIMATIC CPU 312C, page 5/66

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H

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Overview SIPLUS CPU 313C



- The compact CPU with integral digital and analog inputs/ outputs
- For plants with high processing performance and response time requirements
- With technological functions

Micro Memory Card required to operate the CPU.

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

	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 ... +70 °C; condensation permitted	
Conformal coating	Coating of the PCB and the electronic components according to EN 60721	
Technical specifications	The technical specifications of the standard product apply except for the ambient conditions.	
Compliant with the standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	No	Yes
Ambient conditions		
Relative humidity	5 ... 100 %, condensation permitted	
Biologically active substances	Conformity with EN 60721-3-3, class 3B2 mold and fungal spores (except fauna)	
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX[1) 2)]	
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]	
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 … +2000 m) See ambient temperature range 795 ...658 hPa (+2000 ... + 3500 m) Derating 10K 658 … 540 hPa (+3500 … +5000 m) Derating 20 K	

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOx < 5.2 ppm
Limit value (max. 30 min): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOx < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS CPU 313C		
(extended temperature range and medial exposure)		
Compact CPU, work memory 64 KB, power supply 24 V DC, 24 DI/16 DO, 4 AI/2 AO integrated, integrated functions, MPI; MMC is required	H	**6AG1 313-5BF03-2AB0**
Additional conformance with EN 50155	H	**6AG1 313-5BF03-2AY0**

	Order No.
Accessories	See SIMATIC CPU 313C, page 5/66

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H

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SIPLUS compact CPUs

Overview SIPLUS CPU 313C-2DP



- The compact CPU with integral digital 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 CPU operation.

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

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	SIPLUS CPU 313C-2 DP	
Order number	**6AG1 313-6CF03-2AB0**	**6AG1 313-6CF03-2AY0**
Order number based on	**6ES7 313-6CF03-0AB0**	**6ES7 313-6CF03-0AB0**
Ambient temperature range	-25 ... +70 °C	
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions	
Compliant with the standard for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	No	Yes
Ambient conditions		
Relative humidity	5 ... 100 % Condensation permissible	
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)	
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]	
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]	
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K	

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOx < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOx < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

Technical documentation on SIPLUS is available under:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS CPU 313C-2 DP		
(extended temperature range and medial exposure)		
Compact CPU, 64 KB work memory, power supply 24 V DC, 16 DI/16 DO integrated, integrated functions, MPI, PROFIBUS DP master/slave interface; MMC required	H	**6AG1 313-6CF03-2AB0**
Additional conformance with EN 50155	L	**6AG1 313-6CF03-2AY0**

	Order No.
Accessories	See SIMATIC CPU 313C-2 DP, page 5/66

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H
L: Subject to export regulations AL: 9I999 and ECCN: N

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Overview SIPLUS CPU 314C-2 PtP



- The compact CPU with integrated digital and analog inputs/ outputs as well as second serial interface
- For plants with high processing performance and response time requirements
- With technological functions

SIMATIC Micro Memory Card required for operation of the CPU.

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS CPU 315-2 PN/DP	
Order number	**6AG1 314-6BG03-7AB0**
Order No. based on	**6ES7 314-6BG03-0AB0**
Ambient temperature range	-25 ... +70 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions
Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOx < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOx < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data		**Order No.**
SIPLUS CPU 314C-2 PtP		
(extended temperature range and medial exposure)		
Compact CPU, work memory 96 KB, power supply 24 V DC, 24 DI/16 DO/4 AI/2 AO integrated, integrated functions, MPI; RS 422/485 interface; MMC is required	L	**6AG1 314-6BG03-7AB0**
Accessories		See SIMATIC CPU 314C-2 PtP, page 5/66

L: Subject to export regulations AL: 9I999 and ECCN: N

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SIPLUS compact CPUs

Overview SIPLUS CPU 314C-2 DP



- 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 CPU operation.

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

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	SIPLUS CPU 314C-2 DP	
Order number	**6AG1 314-6CG03-2AB0**	**6AG1 314-6CG03-2AY0**
Order No. based on	**6ES7 314-6CG03-0AB0**	**6ES7 314-6CG03-0AB0**
Ambient temperature range	-25 ... +70 °C	
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions	
Conforms with standard for electronic equipment used on rolling stock (EN 50155).	No	Yes
Ambient conditions		
Relative humidity	5 ... 100 % Condensation permissible	
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)	
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]	
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]	
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K	

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOx < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOx < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS CPU 314C-2 DP		
(extended temperature range and medial exposure)		
Compact CPU, 96 KB work memory, power supply 24 V DC, 24 DI / 16 DO / 4 AI / 2 AO integrated, integrated functions, MPI; PROFIBUS DP master/slave interface; MMC required	H	**6AG1 314-6CG03-2AB0**
Additional conformance with EN 50155	H	**6AG1 314-6CG03-2AY0**

	Order No.
Accessories	See SIMATIC CPU 314C-2 DP, page 5/66

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H

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Overview 315F-2 DP



- Based on the SIMATIC CPU 315-2 DP
- For setting up a fail-safe automation system in plants with increased safety requirements
- Complies with safety requirements up to SIL 3 according 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-oriented applications

SIMATIC Micro Memory Card required for operation of CPU.

Overview CPU 317F-2 DP



- The fail-safe CPU with a large program memory and 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 in a distributed configuration to both 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

SIMATIC Micro Memory Card required for operation of CPU.

Overview CPU 315F-2 PN/DP



- Based on CPU 315-2 PN/DP
- The CPU with medium-sized program memory and quantity structures for setting up a fail-safe automation system in plants with increased safety requirements
- Complies with safety requirements up to SIL 3 according to IEC 61508, PL e according to ISO 13849, 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 IO Controller for operating distributed I/O on PROFINET
- PROFINET interface with 2-port switch
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component Based Automation (CBA)

SIMATIC Micro Memory Card required for operation of CPU.

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Fail-safe CPUs

Overview 317F-2 PN/DP



- Based on CPU 317-2 PN/DP
- The fail-safe CPU with a large program memory and quantity structure for demanding applications; for setting up a fail-safe automation system in plants with increased safety require-ments.
- Complies with safety requirements up to SIL 3 according to IEC 61508, PL e according to ISO 13849-1, 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 IO Controller for operating distributed I/O on PROFINET
- PROFINET interface with 2-port switch
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component Based Automation (CBA)

SIMATIC Micro Memory Card required for operation of CPU.

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
- Complies with safety requirements up to SIL 3 according to IEC 61508, PL e according to 13849-1, and up to Cat. 4 according 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
- Central and distributed use of standard modules for non safety-relevant applications
- 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)

SIMATIC Micro Memory Card required for operation of CPU.

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Technical specifications

	6ES7 315-6FF04-0AB0	6ES7 315-2FJ14-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK14-0AB0	6ES7 318-3FL01-0AB0
Product version					
Hardware product version	01	01	01	01	01
Firmware version	V3.0	V3.1	V2.6	V3.1	V3.2
Associated programming package	STEP 7 > V 5.4 + SP5 or STEP 7 as of V5.2 + SP1 with HSP 177, S7 Distributed Safety as of V5.4		STEP 7 V5.2 SP1 with hardware update or higher; S7 Distributed Safety 5.2 SP1 or higher	STEP 7 > V 5.4 + SP5 or STEP 7 V5.4 + SP4 or higher with HSP 189, S7 Distributed Safety V5.4 or higher	STEP 7 V 5.5 or higher, Distributed Safety V 5.4 SP4
Input voltage					
• 24 V DC	Yes	Yes	Yes	Yes	Yes
Input current					
Current consumption (rated value)	850 mA	750 mA		750 mA	1 250 mA
Current consumption (in no-load operation), typ.	150 mA	150 mA	100 mA	150 mA	500 mA
Inrush current, typ.	3.5 A	4 A	2.5 A	4 A	4 A
I^2t	1 $A^2 \cdot s$	1 $A^2 \cdot s$	1 $A^2 \cdot s$	1 $A^2 \cdot s$	1.2 $A^2 \cdot s$
from supply voltage L+, max.	900 mA				
Power losses					
Power loss, typ.	4.5 W		4 W		14 W
Memory					
Work memory					
• integrated	384 Kibyte	512 Kibyte	1 024 Kibyte	1.5 Mbyte	2 560 Kibyte
• expandable	No	No	No	No	No
• Size of retentive memory for retentive data blocks	128 Kibyte	128 Kibyte		256 Kibyte	700 Kibyte
Load memory					
• pluggable (MMC)	Yes	Yes	Yes	Yes	Yes
• pluggable (MMC), max.	8 Mbyte	8 Mbyte	8 Mbyte	8 Mbyte	8 Mbyte
• Data management on MMC (after last programming), min.	10 a	10 a	10 a	10 a	10 a
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
• without battery	Yes; Program and data	Yes; Program and data	Yes; Program and data	Yes; Program and data	Yes
CPU-blocks					
Number of blocks (total)	1 024; (DBs, FCs, FBs) the maximum number of loadable blocks can be reduced by the MMC used.	1 024; (DBs, FCs, FBs) the maximum number of loadable blocks can be reduced by the MMC used.	2 048; (DBs, FCs, FBs) the maximum number of loadable blocks can be reduced by the MMC used.	2 048; (DBs, FCs, FBs) the maximum number of loadable blocks can be reduced by the MMC used.	4 096; (DBs, FCs, FBs) the maximum number of loadable blocks can be reduced by the MMC used.
DB					
• Number, max.	1 024	1 024; Number range: 1 to 16000	2 047; Number band: 1 to 2047	2 048	4 096
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte	64 Kibyte	64 Kibyte

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Technical specifications (continued)

	6ES7 315-6FF04-0AB0	6ES7 315-2FJ14-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK14-0AB0	6ES7 318-3FL01-0AB0
FB					
• Number, max.	1 024	1 024; Number range: 0 to 7999	2 048; Sequence of numbers: 0 to 2047	2 048	4 096
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte	64 Kibyte	64 Kibyte
FC					
• Number, max.	1 024	1 024; Number range: 0 to 7999	2 048; Sequence of numbers: 0 to 2047	2 048	4 096
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte	64 Kibyte	64 Kibyte
OB					
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte	64 Kibyte	64 Kibyte
Nesting depth					
• per priority class	16	16	16	16	16
• additional within an error OB	4	4	4	4	4
CPU processing times					
for bit operations, min.	0.05 µs	0.05 µs	0.05 µs	0.025 µs	0.004 µs
for word operations, min.	0.09 µs	0.09 µs	0.2 µs	0.03 µs	0.01 µs
for fixed point arithmetic, min.	0.12 µs	0.12 µs	0.2 µs	0.04 µs	0.01 µs
for floating point arithmetic, min.	0.45 µs	0.45 µs	1 µs	0.16 µs	0.04 µs
Counters, timers and their retentivity					
S7 counter					
• Number	256	256	512	512	2 048
• Retentivity					
- adjustable	Yes	Yes	Yes	Yes	Yes
- lower limit	0	0	0	0	0
- upper limit	255	255	511	511	2 047
- preset	Z 0 to Z 7	Z 0 to Z 7	8	Z 0 to Z 7	Z 0 to Z 7
• Counting range					
- adjustable	Yes	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
• Number	Unlimited (limited only by RAM capacity)	Unlimited (limited only by RAM capacity)	Unlimited (limited only by RAM capacity)	Unlimited (limited only by RAM capacity)	Unlimited (limited only by RAM capacity)
S7 times					
• Number	256	256	512	512	2 048
• Retentivity					
- adjustable	Yes	Yes	Yes	Yes	Yes
- lower limit	0	0	0	0	0
- upper limit	255	255	511	511	2 047
- 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

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Technical specifications (continued)

	6ES7 315-6FF04-0AB0	6ES7 315-2FJ14-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK14-0AB0	6ES7 318-3FL01-0AB0
IEC timer					
• present	Yes	Yes	Yes	Yes	Yes
• Type	SFB	SFB	SFB	SFB	SFB
• Number	unlimited (limited only by RAM capacity)	unlimited (limited only by RAM capacity)	unlimited (limited only by RAM capacity)	unlimited (limited only by RAM capacity)	unlimited (limited only by RAM capacity)
Data areas and their retentivity					
retentive data area, total	All, 128 KB max.	All, 128 KB max.	All, max. 256 KB	All, max. 256 KB	All, max. 700 KB
Flag					
• Number, max.	2 048 byte	2 048 byte	4 096 byte	4 096 byte	8 192 byte
• Retentivity 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
• Retentivity preset	MB 0 to MB 15	MB 0 to MB 15	MB 0 to MB 15	MB 0 to MB 15	MB 0 to MB 15
• Number of clock memories	8; 1 memory byte	8; 1 memory byte	8; 1 memory byte	8; 1 memory byte	8; 1 memory byte
Data blocks					
• Retentivity adjustable	Yes; via non-retain property on DB	Yes; via non-retain property on DB	Yes; via non-retain property on DB	Yes; via non-retain property on DB	Yes; via non-retain property on DB
• Retentivity preset	yes	yes	yes	yes	yes
Local data					
• per priority class, max.	32 Kibyte; Max. 2 KB per block	32 Kibyte; Max. 2 KB per block	1 024 byte	32 Kibyte; Max. 2 KB per block	32 768 byte; 2048 bytes max. per block
Address area					
I/O address area					
• overall	2 048 byte	2 048 byte	8 Kibyte	8 192 byte	8 192 byte
• Outputs	2 048 byte	2 048 byte	8 Kibyte	8 192 byte	8 192 byte
• of which, distributed					
- Inputs	2 048 byte	2 048 byte	8 Kibyte	8 192 byte	8 192 byte
- Outputs	2 048 byte	2 048 byte	8 Kibyte	8 192 byte	8 192 byte
Process image					
• Inputs, adjustable	2 048 byte	2 048 byte		8 192 byte	8 192 byte
• Outputs, adjustable	2 048 byte	2 048 byte		8 192 byte	8 192 byte
• Inputs, default	384 byte	384 byte		1 024 byte	1 024 byte
• Outputs, default	384 byte	384 byte		1 024 byte	1 024 byte
Subprocess images					
• Number of subprocess images, max.	1	1		1	1; With PROFINET IO, the length of the user data is limited to 1600 bytes
Digital channels					
• integrated channels (DI)	0		0		
• integrated channels (DO)	0		0		
• 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	1 024	1 024	1 024
• Outputs, of which central	1 024	1 024	1 024	1 024	1 024

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Technical specifications (continued)

	6ES7 315-6FF04-0AB0	6ES7 315-2FJ14-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK14-0AB0	6ES7 318-3FL01-0AB0
Analog channels					
• Integrated channels (AI)	0		0		
• Integrated channels (AO)	0		0		
• 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	256	256	256
• Outputs, of which central	256	256	256	256	256
Hardware configuration					
Racks, max.	4	4	4	4	4
Modules per rack, max.	8	8	8	8	8
Expansion devices, max.	3	3	3	3	
Number of DP masters					
• integrated	1	1	2	1	2
• via CP	4	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
• battery-backed and synchronizable	Yes	Yes	Yes	Yes	Yes
• Deviation per day, max.	10 s; Typ.: 2 s	10 s; Typ.: 2 s	10 s	10 s; Typ.: 2 s	10 s; Typ.: 2 s
• Backup time	6 wk	6 wk; at 40°C ambient temperature	6 wk	6 wk	6 wk
• Behavior of the clock following POWER-ON					Clock continues running after POWER OFF
• Behavior of the clock following expiry of backup period	The clock continues at the time of day it had when power was switched off	The clock continues at the time of day it had when power was switched off		The clock continues at the time of day it had when power was switched off	The clock continues at the time of day it had when power was switched off
Runtime meter					
• 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)	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)	0 to 2^31 hours (when using SFC 101)
• Granularity	1 hour	1 hour	1 hour	1 hour	1 hour
• Retentive	Yes; must be restarted at each restart	Yes; must be restarted at each restart	Yes; must be restarted at each restart	Yes; must be restarted at each restart	Yes; must be restarted at each restart

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Technical specifications (continued)

	6ES7 315-6FF04-0AB0	6ES7 315-2FJ14-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK14-0AB0	6ES7 318-3FL01-0AB0
Clock synchronization					
• supported	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; on DP slave only time-of-day slave
• to DP, slave	Yes	Yes	Yes	Yes	Yes
• in AS, master	Yes	Yes	Yes	Yes	Yes
• in AS, slave		Yes	Yes	Yes	Yes
• on Ethernet via NTP		Yes; as client		Yes; as client	Yes; as client
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
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	Yes	Yes	Yes	Yes	Yes
• DP master	No	Yes	Yes	Yes	Yes
• DP slave	No	Yes	Yes	Yes	Yes
• Point-to-point connection	No	No	No	No	No
MPI					
• Number of connections	16	16	32	32	
• Services					
- PG/OP communication	Yes	Yes	Yes	Yes	Yes
- Routing	Yes	Yes	Yes	Yes	Yes
- Global data communication	Yes	Yes	Yes	Yes	Yes
- S7 basic communication	Yes	Yes	Yes	Yes	Yes
- S7 communication	Yes	Yes	Yes	Yes	Yes
- S7 communication, as client	No	No; but via CP and loadable FB	No	No; but via CP and loadable FB	No; but via CP and loadable FB
- S7 communication, as server	Yes	Yes	Yes	Yes	Yes
• Transmission rate, max.	187.5 kbit/s	12 Mbit/s	12 Mbit/s	12 Mbit/s	12 Mbit/s
DP master					
• Services					
- PG/OP communication		Yes	Yes	Yes	Yes
- Global data communication		No	No	No	No
- S7 basic communication		Yes; I blocks only	Yes	Yes; I blocks only	Yes; I blocks only
- S7 communication		Yes	Yes	Yes	Yes
- S7 communication, as client		No	No	No	No

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Technical specifications (continued)

	6ES7 315-6FF04-0AB0	6ES7 315-2FJ14-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK14-0AB0	6ES7 318-3FL01-0AB0
DP master					
• Services					
- S7 communication, as server		Yes	Yes	Yes	Yes
- Equidistance mode support		Yes	Yes	Yes	Yes
- 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
- Number of DP slaves that can be simultaneously activated/deactivated, max.		8		8	8
- Direct data exchange (slave-to-slave communication)					Yes; As subscriber
- DPV1		Yes	Yes	Yes	Yes
• Transmission rate, 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.		2 Kibyte	244 byte	8 Kibyte	8 Kibyte
- Outputs, max.		2 Kibyte	244 byte	8 Kibyte	8 Kibyte
• User 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
- Global data communication		No	No	No	No
- S7 basic communication		No	Yes	No	No
- S7 communication		Yes	Yes	Yes	Yes
- S7 communication, as client		No	No	No	No
- S7 communication, as server		Yes; Connection configured on one side only	Yes	Yes; Connection configured on one side only	Yes; Connection configured on one side only
- Direct data exchange (slave-to-slave communication)		Yes	Yes	Yes	Yes
- DPV1		No	No	No	No
• Transmission rate, max.		12 Mbit/s	12 Mbit/s	12 Mbit/s	12 Mbit/s
• Automatic baud rate search		Yes; only with passive interface	Yes; only with passive interface	Yes; only with passive interface	Yes; only with passive interface
• Transfer memory					
- Inputs		244 byte	244 byte	244 byte	244 byte
- Outputs		244 byte	244 byte	244 byte	244 byte
• Address area, max.		32	32	32	32
• User data per address area, max.		32 byte	32 byte	32 byte	32 byte

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Technical specifications (continued)

	6ES7 315-6FF04-0AB0	6ES7 315-2FJ14-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK14-0AB0	6ES7 318-3FL01-0AB0
2nd interface					
Type of interface	integrated RS 485 interface	PROFINET	integrated RS 485 interface	PROFINET	integrated RS 485 interface
Physics	RS 485	Ethernet RJ45	RS 485	Ethernet RJ45	RS 485
Isolated	Yes	Yes	Yes	Yes	Yes
Integrated switch		Yes		Yes	
Number of ports		2		2	
Power supply to interface (15 to 30 V DC), max.	200 mA		200 mA		200 mA
Automatic detection of transmission speed		Yes; 10/100 Mbit/s		Yes; 10/100 Mbit/s	
Autonegotiation		Yes		Yes	
Autocrossing		Yes		Yes	
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	No
• PROFINET IO device		No		No	No
• PROFINET CBA		Yes		Yes	No
• Local Operating Network	No	No	No	No	
DP master					
• Number of connections, max.	16		32		
• Services					
- PG/OP communication	Yes		Yes		Yes
- Global data communication	No		No		No
- S7 basic communication	Yes; I blocks only		Yes		Yes; I blocks only
- S7 communication	Yes		Yes		Yes
- S7 communication, as client	No		No		No
- S7 communication, as server	Yes		Yes		Yes
- Equidistance mode support	Yes		Yes		Yes
- Isochronous mode	Yes; OB 61		Yes; OB 61		Yes; OB 61 - isochronous mode is possible either on DP or PROFINET IO (not simultaneously)
- SYNC/FREEZE	Yes		Yes		Yes
- Activation/deactivation of DP slaves	Yes		Yes		Yes

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Technical specifications (continued)

	6ES7 315-6FF04-0AB0	6ES7 315-2FJ14-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK14-0AB0	6ES7 318-3FL01-0AB0
DP master					
• Services					
- Number of DP slaves that can be simultaneously activated/deactivated, max.	8				8
- Direct data exchange (slave-to-slave communication)					Yes; As subscriber
- DPV1	Yes		Yes		Yes
• Transmission rate, max.	12 Mbit/s		12 Mbit/s		12 Mbit/s
• Number of DP slaves, max.	124; Per station		124		124
• Address area					
- Inputs, max.	2 048 byte		244 byte		8 Kibyte
- Outputs, max.	2 048 byte		244 byte		8 Kibyte
• User data per DP slave					
- Inputs, max.	244 byte				244 byte
- Outputs, max.	244 byte				244 byte
DP slave					
• Number of connections	16		32		
• Services					
- PG/OP communication	Yes		Yes		Yes
- Global data communication	No		No		No
- S7 basic communication	No		Yes		No
- S7 communication	Yes		Yes		Yes
- S7 communication, as client	No		No		No
- S7 communication, as server	Yes		Yes		Yes
- Direct data exchange (slave-to-slave communication)	Yes		Yes		Yes
- DPV1	No		No		No
• GSD file	The current GSD file can be obtained from: www.siemens.com/profibus-gsd		The current GSD file can be obtained from: www.siemens.com/profibus-gsd		The current GSD file can be obtained from: www.siemens.com/profibus-gsd
• Transmission rate, max.	12 Mbit/s		12 Mbit/s		12 Mbit/s
• Automatic baud rate search	Yes; only with passive interface		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
• User data per address area, max.	32 byte		32 byte		32 byte

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Technical specifications (continued)

	6ES7 315-6FF04-0AB0	6ES7 315-2FJ14-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK14-0AB0	6ES7 318-3FL01-0AB0
PROFINET IO controller					
• Services					
- PG/OP communication		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	
- Isochronous mode		No		No	
- Open IE communication		Yes; via TCP/IP, ISO on TCP and UDP		Yes; via TCP/IP, ISO on TCP and UDP	
• Transmission rate, max.		100 Mbit/s		100 Mbit/s	
• Number of connectable IO devices, max.		128		128	
• Max. number of connectable IO devices for RT		128		128	
- of which in line, max.		128		128	
• Number of IO devices with IRT and the option "high flexibility"		128		128	
- of which in line, max.		61		61	
• IRT, supported		Yes		Yes	
• Prioritized startup supported		Yes		Yes	
- Number of IO devices, max.		32		32	
• Activation/deactivation of IO devices		Yes		Yes	
- Number of IO devices that can be simultaneously activated/deactivated, max.		8		8	
• IO devices changing during operation (partner ports), supported		Yes		Yes	
- Max. number of IO devices per tool		8		8	
• Device replacement without swap medium		Yes		Yes	
• Send clock times		250 µs, 500 µs, 1 ms		250 µs, 500 µs, 1 ms	

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Technical specifications (continued)

	6ES7 315-6FF04-0AB0	6ES7 315-2FJ14-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK14-0AB0	6ES7 318-3FL01-0AB0
PROFINET IO controller					
• Updating time		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 IO devices		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 IO devices	
• Address area					
- Inputs, max.		2 Kibyte		8 Kibyte	
- Outputs, max.		2 Kibyte		8 Kibyte	
• User data per address area, max.					
- User data consistency, max.		254 byte		254 byte	
Open IE communication					
• Open IE communication, supported		Yes		Yes	
• Number of connections, max.		8		8	
• Local port numbers used at the system end		0, 20, 21, 25, 80, 102, 135, 161, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535		0, 20, 21, 25, 80, 102, 135, 161, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535	
3rd interface					
Type of interface					PROFINET
Physics					Ethernet RJ45
Isolated					Yes
Integrated switch					Yes
Number of ports					2
Automatic detection of transmission speed					Yes; 10/100 Mbit/s
Autonegotiation					Yes
Autocrossing					Yes
Media redundancy					
• supported					Yes
• Switchover time on line break, typically					200 ms; PROFINET MRP
• Number of stations in the ring, max.					50
Change of IP address at runtime, supported					Yes

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Technical specifications (continued)

	6ES7 315-6FF04-0AB0	6ES7 315-2FJ14-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK14-0AB0	6ES7 318-3FL01-0AB0
Functionality					
• MPI					No
• DP master					No
• DP slave					No
• PROFINET IO controller					Yes; also simultaneously with I device functionality
• PROFINET IO device					No; also simultaneously with IO controller functionality
• PROFINET CBA					Yes
PROFINET IO controller					
• Services					
- PG/OP communication					Yes
- S7 communication					Yes; With loadable FBs, max. configurable connections: 16, max. number of instances: 32
- Isochronous mode					Yes; OB 61 - isochronous mode is possible either on DP or PROFINET IO (not simultaneously)
- Open IE communication					Yes; via TCP/IP, ISO on TCP, UDP
• Transmission rate, max.					100 Mbit/s
• Number of connectable IO devices, max.					256
• Max. number of connectable IO devices for RT					256
- of which in line, max.					256
• Number of IO devices with IRT and the option "high flexibility"					256
- of which in line, max.					61
• Number of IO devices with IRT and the option "high performance", max.					64
- of which in line, max.					64
• IRT, supported					Yes
• Shared device, supported					Yes
• Prioritized startup supported					Yes
- Number of IO devices, max.					32

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Technical specifications (continued)

	6ES7 315-6FF04-0AB0	6ES7 315-2FJ14-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK14-0AB0	6ES7 318-3FL01-0AB0
PROFINET IO controller					
• Activation/deactivation of IO devices					Yes
- Number of IO devices that can be simultaneously activated/deactivated, max.					8
• IO devices changing during operation (partner ports), supported					Yes
- Max. number of IO devices per tool					8
• Device replacement without swap medium					Yes
• Send clock times					250 µs, 500 µs,1 ms; 2 ms, 4 ms (not in the case of IRT with "high flexibility" option)
• Updating time					250 µs to 512 ms (depending on the operating mode, see Manual "S7-300 CPU 31xC and CPU 31x, Technical Data" for more details)
• Address area					
- Inputs, max.					8 Kibyte
- Outputs, max.					8 Kibyte
• User data per address area, max.					
- User data consistency, max.					1 024 byte
PROFINET IO device					
• Services					
- PG/OP communication					Yes
- Routing					Yes
- S7 communication					Yes; With loadable FBs, max. configurable connections: 16, max. number of instances: 32
- Isochronous mode					No
- Open IE communication					Yes; Via TCP/IP, ISO on TCP, UDP
- IRT, supported					Yes
- PROFIenergy, supported					Yes; With SFB 73 / 74 prepared for loadable PROFIenergy standard FB for I-Device
- Shared device, supported					Yes
- Number of IO controllers with shared device, max.					2

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Technical specifications (continued)

	6ES7 315-6FF04-0AB0	6ES7 315-2FJ14-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK14-0AB0	6ES7 318-3FL01-0AB0
PROFINET IO controller					
• Transfer memory					
- Inputs, max.					1 440 byte; Per IO controller with shared device
- Outputs, max.					1 440 byte; Per IO controller with shared device
• Submodules					
- Number, max.					64
- User data per submodule, max.					1 024 byte
Open IE communication					
• Open IE communication, supported					Yes
• Number of connections, max.					32
• Local port numbers used at the system end					0, 20, 21, 23, 25, 80, 102, 135, 161, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535
• Keep-alive function, supported					Yes
Communication functions					
PG/OP communication	Yes	Yes	Yes	Yes	Yes
Data record routing	Yes	Yes		Yes	Yes
Global data communication					
• supported	Yes	Yes	Yes	Yes	Yes
• Number of GD loops, max.	8	8	8	8	8
• Number of GD packets, max.	8	8	8	8	8
• Number of GD packets, transmitter, max.	8	8	8	8	8
• Number of GD packets, receiver, max.	8	8	8	8	8
• Size of GD packets, max.	22 byte	22 byte	22 byte	22 byte	22 byte
• Size of GD packet (of which consistent), max.	22 byte	22 byte	22 byte	22 byte	22 byte
S7 basic communication					
• supported	Yes	Yes	Yes	Yes	Yes
• User data per job, max.	76 byte	76 byte	76 byte	76 byte	76 byte
• User data per job (of which consistent), max.	76 byte; 76 bytes (with X_SEND or X_RCV); 64 bytes (with X_PUT or X_GET as server)	76 byte; 76 bytes (with X_SEND or X_RCV); 64 bytes (with X_PUT or X_GET as server)	76 byte; 76 bytes (with X_SEND or X_RCV); 64 bytes (with X_PUT or X_GET as server)	76 byte; 76 bytes (with X_SEND or X_RCV); 64 bytes (with X_PUT or X_GET as server)	76 byte; 76 bytes (with X_SEND or X_RCV); 64 bytes (with X_PUT or X_GET as server)

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Technical specifications (continued)

	6ES7 315-6FF04-0AB0	6ES7 315-2FJ14-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK14-0AB0	6ES7 318-3FL01-0AB0
S7 communication					
• supported	Yes	Yes	Yes	Yes	Yes
• as server	Yes	Yes	Yes	Yes	Yes
• as client	Yes; via CP and loadable FB	Yes; via integrated PROFINET interface and loadable FB or via CP and loadable FB	Yes; via CP and loadable FB	Yes; via integrated PROFINET interface and loadable FB or via CP and loadable FB	Yes; via integrated PROFINET interface and loadable FB or via CP and loadable FB
• User data per job, max.	180 byte; With PUT/GET	See online help of STEP 7 (shared parameters of the SFBs/FBs and of the SFCs/FCs of S7 Communication)	180 byte; With PUT/GET	See online help of STEP 7 (shared parameters of the SFBs/FBs and of the SFCs/FCs of S7 Communication)	See online help of STEP 7 (shared parameters of the SFBs/FBs and of the SFCs/FCs of S7 Communication)
• User data per job (of which consistent), max.	240 byte; as server		160 byte; as server		
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		16	32
- Data length for connection type 01H, max.		1 460 byte		1 460 byte	1 460 byte
- Data length for connection type 11H, max.		32 768 byte		32 768 byte	32 768 byte
• ISO-on-TCP (RFC1006)		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		16	32
- Data length, max.		32 768 byte		32 768 byte	32 768 byte
• UDP		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		16	32
- Data length, max.		1 472 byte		1 472 byte	1 472 byte
Web server					
• supported		Yes; Read-only function		Yes; Read-only function	Yes
• Number of HTTP clients				5	5
• User-defined websites					Yes

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Technical specifications (continued)

	6ES7 315-6FF04-0AB0	6ES7 315-2FJ14-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK14-0AB0	6ES7 318-3FL01-0AB0
PROFINET CBA (at set setpoint communication load)					
• Setpoint for the CPU communication load		50 %		50 %	20 %
• Number of remote interconnection partners		32		32	32
• Number of functions, master/slave		30		30	50
• Total of all Master/ Slave connections		1 000		1 000	3 000
• Data length of all incoming connections master/slave, max.		4 000 byte		4 000 byte	24 000 byte
• Data length of all outgoing connections master/slave, max.		4 000 byte		4 000 byte	24 000 byte
• Number of device-internal and PROFIBUS interconnections		500		500	1 000
• Data length of device-internal und PROFIBUS interconnections, max.		4 000 byte		4 000 byte	8 000 byte
• Data length per connection, max.		1 400 byte		1 400 byte	1 400 byte
• Remote interconnections with acyclic transmission					
- Sampling frequency: Sampling time, min.		500 ms		500 ms	200 ms
- Number of incoming interconnections		100		100	100
- Number of outgoing interconnections		100		100	100
- Data length of all incoming interconnections, max.		2 000 byte		2 000 byte	3 200 byte
- Data length of all outgoing interconnections, max.		2 000 byte		2 000 byte	3 200 byte
- Data length per connection, max.		1 400 byte		1 400 byte	1 400 byte
• Remote interconnections with cyclic transmission					
- Transmission frequency: Transmission interval, min.		10 ms		10 ms	1 ms
- Number of incoming interconnections		200		200	300

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Technical specifications (continued)

	6ES7 315-6FF04-0AB0	6ES7 315-2FJ14-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK14-0AB0	6ES7 318-3FL01-0AB0
PROFINET CBA (at set setpoint communication load)					
• Remote interconnections with cyclic transmission					
- Number of outgoing interconnections		200		200	300
- Data length of all incoming interconnections, max.		2 000 byte		2 000 byte	4 800 byte
- Data length of all outgoing interconnections, max.		2 000 byte		2 000 byte	4 800 byte
- Data length per connection, max.		450 byte		450 byte	450 byte
• HMI variables via PROFINET (acyclic)					
- Number of stations that can log on for HMI variables (PN OPC/iMap)		3; 2x PN OPC/ 1x iMap		3; 2x PN OPC/ 1x iMap	3; 2x PN OPC/ 1x iMap
- HMI variable updating		500 ms		500 ms	500 ms
- Number of HMI variables		200		200	600
- Data length of all HMI variables, max.		2 000 byte		2 000 byte	9 600 byte
• PROFIBUS proxy functionality					
- supported		Yes		Yes	Yes
- Number of linked PROFIBUS devices		16		16	32
- Data length per connection, max.		240 byte; Slave-dependent		240 byte; Slave-dependent	240 byte; Slave-dependent
Number of connections					
• overall	16	16	32	32	32
• usable for PG communication	15	15	31	31	31
• usable for OP communication	15	15	31	31	31
• usable for S7 basic communication	12	14	30	30	30
• usable for S7 communication		14		16	16
• Max. total number of instances		32		32	32
• usable for routing		X1 as MPI: max. 10; X1 as DP master: max. 24; X1 as DP slave (active): max. 14; X2 as PROFINET: max. 24	8	X1 as MPI: max. 10; X1 as DP master: max. 24; X1 as DP slave (active): max. 14; X2 as PROFINET: max. 24	X1 as MPI: max. 10; X1 as DP master: max. 24; X1 as DP slave (active): max. 14; X2 as DP master: max. 24; X2 as DP slave (active): max. 14; X3 as PROFINET: 48 max.

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Technical specifications (continued)

	6ES7 315-6FF04-0AB0	6ES7 315-2FJ14-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK14-0AB0	6ES7 318-3FL01-0AB0
S7 message functions					
Number of login stations for message functions, max.	16; Depending on the connections configured for PG/OP and S7 basic communication	16; Depending on the connections configured for PG/OP and S7 basic communication	32; Depending on the connections configured for PG/OP and S7 basic communication	32; Depending on the connections configured for PG/OP and S7 basic communication	32; Depending on the connections configured for PG/OP and S7 basic communication
Process diagnostic messages	Yes	Yes	Yes	Yes	Yes
Simultaneously active Alarm-S blocks, max.	300	300	60	300	300
Test commissioning functions					
Status/control					
• Status/control variable	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
• Number of variables, max.	30	30	30	30	30
• of which status variables, max.	30	30	30	30	30
• of which control variables, max.	14	14	14	14	14
Forcing					
• Forcing	Yes	Yes	Yes	Yes	Yes
• Forcing, variables	Inputs, outputs	Inputs, outputs	Inputs, outputs	Inputs, outputs	Inputs, outputs
• Number of variables, max.	10	10	10	10	10
Status block	Yes; Up to 2 simultaneously	Yes; Up to 2 simultaneously	Yes	Yes; Up to 2 simultaneously	Yes; Up to 2 simultaneously
Single step	Yes	Yes	Yes	Yes	Yes
Number of breakpoints	4	4	2	4	4
Diagnostic buffer					
• Present	Yes	Yes	Yes	Yes	Yes
• Number of entries, max.	500	500	100	500	500
- adjustable	No	No	No	No	No
- Of which powerfail-proof	100; Only the last 100 entries are retained	100; Only the last 100 entries are retained		100; Only the last 100 entries are retained	100
• Number of entries readable in RUN, max.				499	499
- adjustable	Yes; From 10 to 499			Yes; From 10 to 499	Yes; From 10 to 499
- preset	10			10	10
Isochronous mode					
Isochronous mode	Yes				Yes; Via 2nd PROFIBUS DP or PROFINET interface
Permissible potential difference					
Operating temperature					
• Min.		0 °C		0 °C	0 °C
• max.		60 °C		60 °C	60 °C

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Technical specifications (continued)

	6ES7 315-6FF04-0AB0	6ES7 315-2FJ14-0AB0	6ES7 317-6FF03-0AB0	6ES7 317-2FK14-0AB0	6ES7 318-3FL01-0AB0
Configuration					
programming					
• Programming language					
- LAD	Yes	Yes	Yes	Yes	Yes
- FBD	Yes	Yes	Yes	Yes	Yes
- STL	Yes	Yes	Yes	Yes	Yes
- SCL	Yes	Yes	Yes	Yes	Yes
- CFC	Yes	Yes	Yes	Yes	Yes
- GRAPH	Yes	Yes	Yes	Yes	Yes
- HiGraph®	Yes	Yes	Yes	Yes	Yes
• Command set	See instruction list	See instruction list	See instruction list	See instruction list	See instruction list
• Nesting levels	8	8	8	8	8
Know-how protection					
• User program protection/password protection	Yes	Yes	Yes	Yes	Yes
• Block encryption					Yes; with S7 block privacy
Dimensions and weight					
Dimensions					
• Width	40 mm	40 mm	80 mm	40 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
Weight					
• Weight, approx.	290 g		460 g	340 g	1 250 g

Ordering data

	Order No.
CPU 315F-2 DP CPU for SIMATIC S7-300F; 384 KB RAM, power supply 24 V DC, MPI, PROFIBUS DP master/ slave interface, incl. slot number labels; MMC required	**6ES7 315-6FF04-0AB0**
CPU 315F-2 PN/DP CPU for SIMATIC S7-300F; 512 KB work memory, 24 V DC power supply, MPI/PROFIBUS DP master/slave interface, Industrial Ethernet/PROFINET interface; incl. slot number labels	**6ES7 315-2FJ14-0AB0**
CPU 317F-2 DP 1024 KB work memory, 24 V DC power supply, MPI, PROFIBUS DP master/slave interface, MMC required	**6ES7 317-6FF03-0AB0**
CPU 317F-2 PN/DP Work memory 1.5 MB, 24 V DC power supply, MPI/PROFIBUS DP master/slave interface, Industrial Ethernet/PROFINET interface; MMC required	**6ES7 317-2FK14-0AB0**
CPU 319F-3 PN/DP Work memory 2.5 MB, 24 V DC power supply, combined MPI/ PROFIBUS DP master/slave interface, PROFIBUS DP master/ slave interface, Ethernet/ PROFINET interface; MMC required	**6ES7 318-3FL01-0AB0**
Distributed Safety V5.4 programming tool Task: Software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, ET 200S Requirements: 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**
SIMATIC Micro Memory Card	
64 KB	**6ES7 953-8LF20-0AA0**
128 KB	**6ES7 953-8LG20-0AA0**
512 KB	**6ES7 953-8LJ20-0AA0**
2 MB	**6ES7 953-8LL20-0AA0**
4 MB	**6ES7 953-8LM20-0AA0**
8 MB	**6ES7 953-8LP20-0AA0**

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Ordering data		Order No.
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**
SIMATIC manual collection	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC		
SIMATIC manual collection update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		
Power supply connector		**6ES7 391-1AA00-0AA0**
10 units, spare part		
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**
PC adapter USB		**6ES7 972-0CB20-0XA0**
For connecting a PC to SIMATIC S7-200/300/400 via USB; with USB cable (5 m)		
PROFIBUS bus components		
RS 485 PROFIBUS DP bus connector		
• With 90° cable outlet, max. transmission rate 12 Mbit/s		
- Without PG interface		**6ES7 972-0BA12-0XA0**
- With PG interface		**6ES7 972-0BB12-0XA0**
• With 90° cable outlet for FastConnect connection system, max. transmission rate 12 Mbit/s		
- Without PG interface, 1 unit		**6ES7 972-0BA52-0XA0**
- Without PG interface, 100 units		**6ES7 972-0BA52-0XB0**
- With PG interface, 1 unit		**6ES7 972-0BB52-0XA0**
- With PG interface, 100 units		**6ES7 972-0BB52-0XB0**
• With axial cable outlet for SIMATIC OP, for connecting to PPI, MPI, PROFIBUS		**6GK1 500-0EA02**
PROFIBUS Fast Connect bus cable		**6XV1 830-0EH10**
Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m		
PROFINET bus components		
IE FC TP standard cable GP 2x2		**6XV1 840-2AH10**
4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug; PROFINET-compatible; with UL approval; sold by the meter		
FO standard cable GP (50/125)		**6XV1 873-2A**
Standard cable, splittable, UL approval, sold by the meter		
SCALANCE X204-2 Industrial Ethernet Switch	I	**6GK5 204-2BB10-2AA3**
Industrial Ethernet Switches with integral SNMP access, Web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbit/s RJ45 ports and two FO ports		
CSM 377 compact switch module		**6GK7 377-1AA00-0AA0**
Unmanaged switch for connecting a SIMATIC S7-300, ET200 M and up to three other participants to Industrial Ethernet with 10/100 Mbit/s; 4 x RJ45 ports; external 24 V DC power supply, LED diagnostics, S7-300 module incl. electronic manual on CD-ROM		
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		
IE FC RJ45 Plug 145		
145° cable outlet		
1 unit		**6GK1 901-1BB30-0AA0**
10 units		**6GK1 901-1BB30-0AB0**
50 units		**6GK1 901-1BB30-0AE0**
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**
PROFIBUS/PROFINET bus components		see catalogs IK PI, CA 01
For establishing MPI/PROFIBUS/ PROFINET communication		

D: Subject to export regulations AL: N and ECCN: 5D992
I: Subject to export regulations AL: N and ECCN: EAR99H
J: Subject to export regulations AL: N and ECCN: EAR99S

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SIPLUS fail-safe CPUs

Overview SIPLUS CPU 315F-2DP



- For configuring a fail-safe automation system for plants with increased safety requirements
- Complies with safety requirements up to SIL 3 according 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)
- The fail-safe I/O modules of ET 200M can be also centrally connected
- The standard modules for non-safety applications can be operated both centrally and locally

Micro Memory Card required for CPU operation.

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

	SIPLUS CPU 315F-2 DP
Order number	**6AG1 315-6FF04-2AB0**
Order number based on	**6ES7 315-6FF04-0AB0**
Ambient temperature range	-25 ... +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions.
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	No
Ambient conditions	
Relative humidity	5 … 100 % Condensation permissible

For further technical documentation on SIPLUS, see:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS CPU 315F-2 DP	H	**6AG1 315-6FF04-2AB0**
(extended temperature range and medial exposure) CPU for SIPLUS S7-300F; 384 KB work memory, 24 V DC supply voltage, MPI, PROFIBUS DP master/slave interface, incl. slot number labels; MMC required		
Accessories		See SIMATIC CPU 315F-2 DP, page 5/92

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H

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Overview SIPLUS CPU 315F-2 PN/DP



- The CPU with a medium sized program memory and quantity structures to build a fail-safe automation system for plants with increased safety requirements
- Complies with safety requirements up to SIL 3 according to IEC 61508, PL e in accordance with ISO 13849 and up to category 4 of EN 954-1
- The fail-safe I/O modules can be locally connected to the integrated PROFINET interface (PROFIsafe) and/or to the integrated PROFIBUS DP interface (PROFIsafe)
- The fail-safe I/O modules of ET 200M can be also centrally connected
- The standard modules for non-safety applications can be operated both centrally and locally
- Component based Automation (CBA) on PROFINET
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET interface with 2-port switch
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component based Automation (CBA)

Micro Memory Card required for CPU operation.

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

	SIPLUS CPU 315F-2 PN/DP	
Order No.	**6AG1 315-2FJ14-2AB0**	**6AG1 315-2FJ14-2AY0**
Order No. based on	**6ES7 315-2FJ14-0AB0**	**6ES7 315-2FJ14-0AB0**
Ambient temperature range	-25 ... +60 °C	
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	No	Yes
Ambient conditions:		
Relative humidity	5 ... 100%, condensation allowed	

Technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

	Order No.
CPU 315F-2 PN/DP	
CPU for SIPLUS S7-300F; work memory 512 KB, power supply 24 V DC, MPI/PROFIBUS DP master/slave interface, Industrial Ethernet/PROFINET interface; incl. slot number labels	**6AG1 315-2FJ14-2AB0**
Additional conformance with EN 50155	**6AG1 315-2FJ14-2AY0**

	Order No.
Accessories	See SIMATIC CPU 315F-2 PN/DP, page 5/92

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SIPLUS fail-safe CPUs

Overview SIPLUS CPU 317F-2 DP



- The fail-safe CPU with a large program memory and quantity structure for demanding applications
- For configuring a fail-safe automation system for plants with increased safety requirements
- Complies with safety requirements up to SIL 3 according to IEC 61508 and up to Cat. 4 according to EN 954-1
- Fail-safe I/O modules can be connected in a distributed configuration to both integral PROFIBUS DP interfaces (PROFIsafe)
- The fail-safe I/O modules of ET 200M can be also centrally connected
- The standard modules for non-safety applications can be operated both centrally and locally

Micro Memory Card required for CPU operation.

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

	SIPLUS CPU 317F-2 DP	
Order number	**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	
Conformal coating	Coating of the printed circuit boards and the electronic components.	
Technical data	The technical data of the standard product applies except for the ambient conditions.	
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	No	Yes
Technical data	The technical data is identical to that of the based on modules.	
Ambient conditions		
Relative humidity	5 ... 100%, condensation allowed	

Technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS CPU 317F-2 DP		
(extended temperature range and medial exposure)		
Work memory 1024 KB, power supply 24 V DC, MPI/PROFIBUS DP master/slave interface, MMC required		**6ES7 317-6FF03-2AB0**
Additional conformance with EN 50155	L	**6AG1 317-6FF03-2AY0**

	Order No.
Accessories	See SIMATIC CPU 317F-2 DP, page 5/92

L: Subject to export regulations AL: 9I999 and ECCN: N

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Overview SIPLUS CPU 317F-2 PN/DP



- The failsafe CPU with a large program memory and quantity structures for demanding applications to build a fail-safe automation system for plants with increased safety requirements
- Complies with safety requirements up to SIL 3 according to IEC 61508, PL e in accordance with ISO 13849-1 and up to category 4 of EN 954-1
- The fail-safe I/O modules can be locally connected via the integrated PROFINET interface (PROFIsafe) and/or via the integrated PROFIBUS DP interface (PROFIsafe)
- The fail-safe I/O modules of ET 200M can be also centrally connected
- The standard modules for non-safety applications can be operated both centrally and locally
- Component Based Automation (CBA) on PROFINET
- PROFINET IO controller for operating distributed I/O on PROFINET
- PROFINET interface with 2-port switch
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component Based Automation (CBA)

SIMATIC Micro Memory Card required for operation of the CPU.

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

	SIPLUS CPU 317F-2 PN/DP	
Order number	**6AG1 317-2FK14-2AB0**	**6AG1 317-2FK14-2AY0**
Order No. based on	**6ES7 317-2FK14-0AB0**	**6ES7 317-2FK14-0AB0**
Ambient temperature range	-25 ... +60 °C	
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	No	Yes
Ambient conditions		
Relative humidity	5 ... 100%, condensation allowed	

Technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

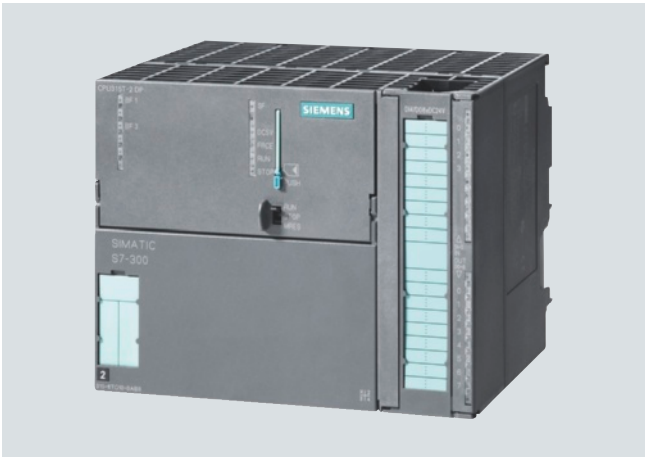
	Order No.
SIPLUS CPU 317F-2 PN/DP	
(extended temperature range and medial exposure)	
Work memory 1.5 MB, power supply 24 V DC, MPI/PROFIBUS DP master/slave interface; Industrial Ethernet/PROFINET interface; MMC required	**6AG1 317-2FK14-2AB0**
Additional conformance with EN 50155	**6AG1 317-2FK14-2AY0**

	Order No.
Accessories	See SIMATIC CPU 317F-2 PN/DP, page 5/92

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Technology CPUs

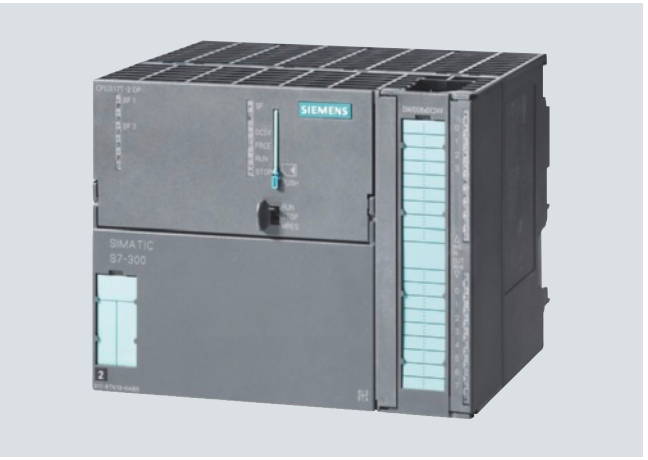
Overview CPU 315T-2 DP



- SIMATIC CPU with integral Technology/Motion Control functionality
- With full standard CPU 315-2 DP functionality
- For cross-industry automation tasks in series machine, special machine and plant construction
- Ideal for synchronized motion, such as coupling to a virtual/ real master, gear synchronization, cam disk or print mark compensation
- 3D path interpolation with standard kinematics
- Position and pressure-regulated hydraulic axes
- Used as central controller in production lines with central and distributed I/O
- With integrated I/O for high-speed technology functions (e.g. camming, reference point acquisition)
- PROFIBUS DP (DRIVE) interface for isochronous connection of drive components
- One common S7 user program for control and motion control tasks (no additional programming language necessary for motion control)
- "S7-Technology" option package required

SIMATIC Micro Memory Card (8 MB) required for operation of the CPU.

Overview CPU 317T-2 DP



- SIMATIC CPU with integral Technology/Motion Control functionality
- With full standard CPU 317-2 DP functionality
- For cross-industry automation tasks in series machine, special machine and plant construction
- Ideal for synchronized motion, such as coupling to a virtual/ real master, gear synchronization, cam disk, path interpolation, or print mark compensation
- 3D path interpolation with different kinematics
- Position and pressure-regulated hydraulic axes
- Used as central controller in production lines with central and distributed I/O
- Distributed intelligence in Component Based Automation (CBA) on PROFIBUS DP
- With integrated I/O for high-speed technology functions (e.g. camming, reference point acquisition)
- PROFIBUS DP (DRIVE) interface for isochronous connection of drive components
- One common S7 user program for control and motion control tasks (no additional programming language necessary for motion control)
- "S7-Technology" option package required

SIMATIC Micro Memory Card (8 MB) required for operation of the CPU.

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Overview CPU 317F-2 DP



- Failsafe SIMATIC CPU with integral Technology/Motion Control functionality
- With full functionality of the standard CPU 317-2 DP and CPU 317F-2 DP
- For cross-industry automation tasks in series machine, special machine and plant construction
- Ideal for synchronized motion, such as coupling to a virtual/real master, gear synchronization, cam disk, path interpolation, or print mark compensation
- 3D path interpolation with different kinematics
- Used as central controller in production lines with central and distributed I/O
- Distributed intelligence in Component Based Automation (CBA) on PROFIBUS DP
- With integrated I/O for high-speed technology functions (e.g. camming, reference point acquisition)
- PROFIBUS DP (DRIVE) interface for isochronous connection of drive components
- One common S7 user program for control and motion control tasks (no additional programming language necessary for motion control)
- "S7-Technology" option package required
- "S7 Distributed Safety" option package required

SIMATIC Micro Memory Card (8 MB) required for operation of the CPU.

Technical specifications

	6ES7 315-6TH13-0AB0	6ES7 317-6TK13-0AB0	6ES7 317-6TF14-0AB0
Product version			
associated programming package	STEP 7 V5.4 + SP5 (and higher) and "S7-Technology" V4.2 option package	STEP 7 V5.4 + SP5 (and higher) and "S7-Technology" V4.2 option package	STEP7 V 5.4 SP5 or higher, "S7-Technology" V4.2 or higher, Distributed Safety V5.4 SP5 or higher, S7-F Configuration Pack V5.5 SP7 or higher
Supply voltages			
Rated value			
• permissible range, lower limit (DC)	20.4 V	20.4 V	20.4 V
external protection for supply cables (recommendation)	Min. 2 A	Min. 2 A	Min. 2 A
Current consumption			
Current consumption (in no-load operation), typ.	200 mA	200 mA	250 mA
Inrush current, typ.	2.5 A	2.5 A	2.5 A
I^2t	1 $A^2 \cdot s$	1 $A^2 \cdot s$	1 $A^2 \cdot s$
Power losses			
Power loss, typ.	6 W	6 W	6 W
Memory			
Work memory			
• integrated	256 Kibyte	1 024 Kibyte	1 536 Kibyte
• expandable	No	No	No
• Size of retentive memory for retentive data blocks			256 Kibyte
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.	1 023; Number band: 1 to 1023	2 047; Number band: 1 to 2047	2 047; Number band: 1 to 2047
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte

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Technical specifications (continued)

	6ES7 315-6TH13-0AB0	6ES7 317-6TK13-0AB0	6ES7 317-6TF14-0AB0
FB			
• Number, max.	1 024; 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.	1 024; 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
• Number of technology synchronous alarm OBs	1; OB 65	1; OB 65	1; OB 65
Nesting depth			
• per priority class	8	16	16
• additional within an error OB	4	4	4
CPU processing times			
for bit operations, min.	0.1 µs	0.05 µs	0.05 µs
for word operations, min.	0.2 µs	0.2 µs	0.2 µs
for fixed point arithmetic, min.	2 µs	0.2 µs	0.2 µs
for floating point arithmetic, min.	3 µs	1 µs	1 µs
Counters, timers and their retentivity			
S7 counter			
• Number	256; Number range: 0...255	512; Number range: 0...511	512; Number range: 0...511
• Retentivity			
- adjustable	Yes	Yes	Yes
• 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	256; Number range: 0 to 255	512; Number range: 0 to 511	512; Number range: 0 to 511
• Retentivity			
- adjustable	Yes	Yes	Yes
- preset	no retentivity	no retentivity	no retentivity
• Time range			
- lower limit	10 ms	10 ms	10 ms
- upper limit	9 990 s	9 990 s	9 990 s
IEC timer			
• present	Yes	Yes	Yes
• Type	SFB	SFB	SFB
Data areas and their retentivity			
Flag			
• Number, max.	2 048 byte	4 096 byte	4 096 byte
• Retentivity available	Yes; MB 0 to MB 2047	Yes; MB 0 to MB 4095	Yes; MB 0 to MB 4095
• Number of clock memories	8; 1 memory byte	8; 1 memory byte	8; 1 memory byte
Data blocks			
• Number, max.	1 023; From DB 1 to DB 1023	2 047; from DB 1 to DB 2047	2 047; from DB 1 to DB 2047
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte
• Retentivity adjustable	Yes; via non-retain property on DB	Yes; via non-retain property on DB	Yes; via non-retain property on DB
• Retentivity preset	Yes	Yes	Yes
Local data			
• per priority class, max.	1 024 byte	1 024 byte	1 024 byte

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Technical specifications (continued)

	6ES7 315-6TH13-0AB0	6ES7 317-6TK13-0AB0	6ES7 317-6TF14-0AB0
Address area			
I/O address area			
• overall	2 048 byte	8 192 byte	8 192 byte
• Outputs	2 048 byte	8 192 byte	8 192 byte
• of which, distributed			
- Inputs	2 048 byte	8 192 byte	8 192 byte
- Outputs	2 048 byte	8 192 byte	8 192 byte
Process image			
• Inputs, adjustable	2 048 byte	2 048 byte	2 048 byte
• Outputs, adjustable	2 048 byte	2 048 byte	2 048 byte
• Inputs, preset	128 byte	256 byte	1 024 byte
• Outputs, preset	128 byte	256 byte	1 024 byte
Subprocess images			
• Number of subprocess images, max.	1	1	1
Digital channels			
• Inputs	16 384	65 536	65 536
• Outputs	16 384	65 536	65 536
• Inputs, of which central	512	512	512
• Outputs, of which central	512	512	512
Analog channels			
• Inputs	1 024	4 096	4 096
• Outputs	1 024	4 096	4 096
• Inputs, of which central	64	64	64
• Outputs, of which central	64	64	64
Hardware configuration			
Central devices, max.	1	1	1
Expansion devices, max.	0	0	0
Racks, max.	1	1	1
Modules per rack, max.	8	8	8
Number of DP masters			
• integrated	2; 1 DP and 1 DP (drive)	2; 1 DP and 1 DP (drive)	2; 1 DP and 1 DP (drive)
• via CP	2; for DP	2; for DP	2; for DP
Number of operable FMs and CPs (recommended)			
• FM	8	8	8
• CP, point-to-point	8	8	8
• CP, LAN	10	10	8
Time			
Clock			
• Hardware clock (real-time clock)	Yes	Yes	Yes
• battery-backed and synchronizable	Yes	Yes	Yes
• Behavior of the clock following POWER-ON			Clock continues running after POWER OFF
• Behavior of the clock following expiry of backup period			The clock continues at the time of day it had when power was switched off
• Deviation per day, max.	10 s	10 s	10 s
Runtime meter			
• Number	1	4	4
• Number/Number range	0	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
• Retentive	Yes; must be restarted at each restart	Yes; must be restarted at each restart	Yes; must be restarted at each restart

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Technical specifications (continued)

	6ES7 315-6TH13-0AB0	6ES7 317-6TK13-0AB0	6ES7 317-6TF14-0AB0
Clock synchronization			
• supported	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; Only time-of-day slave
• in AS, master	Yes	Yes	Yes
• in AS, slave	Yes	Yes	Yes
S7 message functions			
Number of login stations for message functions, max.	16; Depending on the connections configured for PG/OP and S7 basic communication	32; Depending on the connections configured for PG/OP and S7 basic communication	32; Depending on the connections configured for PG/OP and S7 basic communication
Process diagnostic messages	Yes	Yes	Yes
simultaneously active Alarm-S blocks, max.	40	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 variables, max.	30	30	30
• of which control variables, max.	14	14	14
Forcing			
• Forcing	Yes	Yes	Yes
Status block	Yes	Yes	Yes; up to 2 simultaneously
Single step	Yes	Yes	Yes
Number of breakpoints	2	2	2; without continuation
Diagnostic buffer			
• present	Yes	Yes	Yes
• Number of entries, max.	100	100	100
- adjustable	No	No	No
- of which powerfail-proof			100
Monitoring functions			
Status LEDs			Yes
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
Number of connections			
• overall	16	32	32
• usable for PG communication	15	31	31
• usable for OP communication	15	31	31
• usable for S7 basic communication	12	30	30
• usable for routing	8; additional	8; additional	8

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Technical specifications (continued)

	6ES7 315-6TH13-0AB0	6ES7 317-6TK13-0AB0	6ES7 317-6TF14-0AB0
1st interface			
Type of interface	Integrated RS 485 interface	Integrated RS 485 interface	Integrated 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	200 mA
Functionality			
• MPI	Yes	Yes	Yes
• DP master	Yes	Yes	Yes
• DP slave	Yes	Yes	Yes
• Point-to-point connection	No	No	No
MPI			
• Number of connections	32	32	32
• Services			
- PG/OP communication	Yes	Yes	Yes
- Routing	Yes	Yes	Yes
- Global data communication	Yes	Yes	Yes
- S7 basic communication	Yes	Yes	Yes
- S7 communication	Yes	Yes	Yes
- S7 communication, as client	No; but via CP and loadable FB	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	Yes
• Transmission rate, 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; but via CP and loadable FB	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	Yes
- Equidistance mode support	Yes	Yes	Yes
- Isochronous mode	Yes; OB 61	Yes; OB 61	Yes; OB 61
- SYNC/FREEZE	Yes	Yes	Yes
- Activation/deactivation of DP slaves	Yes	Yes	Yes
- Number of DP slaves that can be simultaneously activated/ deactivated, max.			4
- DPV1	Yes	Yes	Yes
• Transmission rate, max.	12 Mbit/s	12 Mbit/s	12 Mbit/s
• Number of DP slaves, max.	124	124	124
• Address area			
- Inputs, max.	2 048 byte	8 192 byte	8 192 byte
- Outputs, max.	2 048 byte	8 192 byte	8 192 byte
• User 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; only with active interface	Yes; only with active interface
- Global data communication	No	No	No
- S7 basic communication	No	No	No
- S7 communication	Yes	Yes	Yes; only server, configured on one side only

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Technical specifications (continued)

	6ES7 315-6TH13-0AB0	6ES7 317-6TK13-0AB0	6ES7 317-6TF14-0AB0
DP slave			
• Services			
- S7 communication, as client	No; but via CP and loadable FB	No; but via CP and loadable FB	Yes; but via CP and loadable FB
- S7 communication, as server	Yes; Connection configured on one side only	Yes; Connection configured on one side only	Yes; Connection configured on one side only
- Direct data exchange (slave-to-slave communication)	Yes	Yes	Yes
- DPV1	No	No	No
• GSD file			www.siemens.com/profibus-gsd
• Transmission rate, 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
• User data per address area, max.	32 byte	32 byte	32 byte
2nd interface			
Type of interface	integrated RS 485 interface	integrated RS 485 interface	integrated 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	200 mA
Functionality			
• MPI	No	No	No
• DP master	Yes; DP(DRIVE)-Master	Yes; DP(DRIVE)-Master	Yes; DP(DRIVE)-Master
• DP slave	No	No	No
• Local Operating Network	No	No	No
DP master			
• Services			
- PG/OP communication	No	No	No
- Routing	No	No	Yes
- Global data communication	No	No	No
- S7 basic communication	No	No	No
- S7 communication	No	No	No
- Equidistance mode support	Yes	Yes	Yes
- Isochronous mode	Yes	Yes	Yes
- SYNC/FREEZE	No	No	No
- Activation/deactivation of DP slaves	Yes	Yes	Yes
- DPV1	No	No	No
• Transmission rate, max.	12 Mbit/s	12 Mbit/s	12 Mbit/s
• Number of DP slaves, max.	64	64	64
• Address area			
- Inputs, max.	1 024 byte	1 024 byte	1 024 byte
- Outputs, max.	1 024 byte	1 024 byte	1 024 byte
• User data per DP slave			
- Inputs, max.	244 byte	244 byte	244 byte
- Outputs, max.	244 byte	244 byte	244 byte
DP slave			
• GSD file	http://support.automation.siemens.com in Product Support area	http://support.automation.siemens.com in Product Support area	
• Transmission rate, max.	12 Mbit/s	12 Mbit/s	

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Technical specifications (continued)

	6ES7 315-6TH13-0AB0	6ES7 317-6TK13-0AB0	6ES7 317-6TF14-0AB0
Programming			
Programming language			
• STEP 7	Yes; V5.2 SP1 or higher and S7 Technology option package	Yes	Yes
• LAD	Yes	Yes	Yes
• FBD	Yes	Yes	Yes
• STL	Yes	Yes	Yes
• SCL	Yes	Yes	Yes
• CFC	Yes	Yes	Yes
• GRAPH	Yes	Yes	Yes
• HiGraph®	Yes	Yes	Yes
Command set	See instruction list	See instruction list	see instruction list
Nesting levels	8	8	8
Know-how protection			
• 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
Digital inputs			
Number of digital inputs	4	4	4
• of which, inputs usable for technological functions	4	4	4
Number of simultaneously controllable inputs			
• horizontal installation			
- up to 40 °C, max.	4	4	4
- up to 60 °C, max.	4	4	4
• vertical installation			
- up to 40 °C, max.	4	4	4
Input characteristic curve acc. to IEC 1131, Type 1	Yes	Yes	Yes
Input voltage			
• Rated value, DC	24 V	24 V	24 V
• for signal "0"	-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
Input current			
• for signal "1", typ.	7 mA	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	10 µs; typically
- at "1" to "0", max.	10 µs; typically	10 µs; typically	10 µs; typically
Cable length			
• Cable length, shielded, max.	1 000 m	1 000 m	1 000 m
Digital outputs			
Number of digital outputs	8	8	8
• of which high-speed outputs	8	8	8
Functions	For technology functions, e.g. high-speed cam switch signals	For technology functions, e.g. high-speed cam switch signals	For technology functions, e.g. high-speed cam switch signals
Short-circuit protection	Yes	Yes	Yes
• Response threshold, typ.	1.0 A	1.0 A	1.0 A
Limitation of inductive shutdown voltage to	48 V	48 V	48 V
Lamp load, max.	5 W	5 W	5 W
Controlling a digital input	No	No	No

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Technical specifications (continued)

	6ES7 315-6TH13-0AB0	6ES7 317-6TK13-0AB0	6ES7 317-6TF14-0AB0
Output voltage			
• for signal "0" (DC), max.	3 V; (2L+)	3 V; (2L+)	3 V; 2L+
• for signal "1", min.	Rated voltage -2.5 V	Rated voltage -2.5 V	Rated voltage -2.5 V (2L+)
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	5 mA	5 mA
• for signal "1" permissible range for 0 to 60 °C, max.	0.6 A	0.6 A	0.6 A
• for signal "0" residual current, max.	0.3 mA	0.3 mA	0.3 mA
Parallel switching of 2 outputs			
• for increased power	No	No	No
• for redundant control of a load	No	No	No
Switching frequency			
• with resistive load, max.	100 Hz	100 Hz	100 Hz
• with inductive load, max.	0.2 Hz; to IEC 947-5-1, 13 DC	0.2 Hz; to IEC 947-5-1, 13 DC	0.2 Hz; to IEC 947-5-1, 13 DC
• on lamp load, max.	100 Hz	100 Hz	100 Hz
Aggregate current of outputs (per group)			
• horizontal installation			
- up to 40 °C, max.	4 A	4 A	4 A
- up to 60 °C, max.	3 A	3 A	3 A
• all other mounting positions			
- up to 40 °C, max.	3 A	3 A	3 A
Load resistance range			
• lower limit	48 Ω	48 Ω	48 Ω
• upper limit	4 kΩ	4 kΩ	4 kΩ
Cable length			
• Cable length, shielded, max.	1 000 m	1 000 m	1 000 m
Encoder			
Connectable encoders			
• 2-wire BEROS	No	No	No
Galvanic isolation			
Galvanic isolation digital inputs			
• between the channels and the backplane bus	Yes	Yes	Yes
Galvanic isolation digital outputs			
• between the channels and the backplane bus	Yes	Yes	Yes
Environmental requirements			
Operating temperature			
• Min.	0 °C	0 °C	0 °C
Dimensions and weight			
Dimensions			
• Width	160 mm	160 mm	160 mm
• Height	125 mm	125 mm	125 mm
• Depth	130 mm	130 mm	130 mm
Weight			
• Weight, approx.	750 g	750 g	750 g

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Ordering data	Order No.
CPU 315T-2 DP 256 KB work memory, 24 V DC power supply, MPI, PROFIBUS DP master/slave interface, PROFIBUS DP(DRIVE) interface; with technology/motion control functions; MMC required	**6ES7 315-6TH13-0AB0**
CPU 317T-2 DP 1024 KB work memory, 24 V DC power supply, MPI, PROFIBUS DP master/slave interface, PROFIBUS DP (DRIVE) interface; with technology/motion control functions; MMC required	**6ES7 317-6TK13-0AB0**
CPU 317TF-2 DP 1.5 MB work memory, 24 V DC power supply, MPI, PROFIBUS DP master/slave interface, PROFIBUS DP(DRIVE) interface; with technology/motion control functions; MMC required	**6ES7 317-6TF14-0AB0**
S7-Technology V4.2 Task: Option package for configuring and programming technology tasks with SIMATIC S7 CPU 3 1xT-2 DP and the SIMATIC S7 CPU 317TF-2 DP Requirements: STEP 7 V5.4 SP5 or higher Type of delivery: on DVD; incl. documentation for CPU 3 1xT-2 DP, CPU 317TF-2 DP (included on DVD)	**6ES7 864-1CC42-0YA5**
SIMATIC Micro Memory Card	
4 MB	**6ES7 953-8LM20-0AA0**
8 MB	**6ES7 953-8LP20-0AA0**
MPI cable For connecting SIMATIC S7 and the PG through MPI; 5 m in length	**6ES7 901-0BF00-0AA0**
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**
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**

		Order No.
SIMATIC manual collection Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	J	**6ES7 998-8XC01-8YE0**
SIMATIC manual collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	D	**6ES7 998-8XC01-8YE2**
Power supply connector 10 units, spare part		**6ES7 391-1AA00-0AA0**
Labeling strips 10 units, spare part		**6ES7 392-2XX00-0AA0**
Label cover 10 units, spare part		**6ES7 392-2XY00-0AA0**
S7 SmartLabel V3.0 Software for automatic labeling of modules direct from the STEP 7 project		
Single license	J	**2XV9 450-1SL03-0YX0**
Upgrade single license	J	**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**
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**
PC adapter USB For connecting a PC to SIMATIC S7-200/300/400 via USB; with USB cable (5 m)		**6ES7 972-0CB20-0XA0**

D: Subject to export regulations AL: N and ECCN: 5D992

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

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Technology CPUs

Ordering data	Order No.
RS 485 PROFIBUS DP bus connector	
• With 90° cable outlet, max. transmission rate 12 Mbit/s	
- Without PG interface	**6ES7 972-0BA12-0XA0**
- With PG interface	**6ES7 972-0BB12-0XA0**
• With 90° cable outlet for FastConnect connection system, max. transmission rate 12 Mbit/s	
- Without PG interface, 1 unit	**6ES7 972-0BA52-0XA0**
- Without PG interface, 100 units	**6ES7 972-0BA52-0XB0**
- With PG interface, 1 unit	**6ES7 972-0BB52-0XA0**
- With PG interface, 100 units	**6ES7 972-0BB52-0XB0**
• With axial cable outlet for SIMATIC OP, for connecting to PPI, MPI, PROFIBUS	**6GK1 500-0EA02**
PROFIBUS Fast Connect bus cable	**6XV1 830-0EH10**
Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m	
RS 485 repeater for PROFIBUS	**6ES7 972-0AA02-0XA0**
Transmission rate up to 12 Mbit/s; 24 V DC; IP20 enclosure	
PROFIBUS bus components	see catalogs IK PI, CA 01
For establishing MPI/PROFIBUS communication	

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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 backplane bus 5 V DC, max.	10 mA	10 mA	15 mA	100 mA	110 mA
Power losses					
Power loss, typ.	3.5 W	3.5 W	6.5 W	7 W	3.8 W
Connection method					
required front connector	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.			32	64	
- up to 60 °C, max.	16	16	16	32	16
• vertical installation					
- up to 40 °C, max.	16	16	32	32	16
Input characteristic curve acc. 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 to +5 V	-30 to +5 V
• for signal "1"	13 to 30 V	-13 to -30 V	13 to 30 V	13 to 30 V	13 to 30 V
Input current					
• for signal "1", typ.	7 mA	7 mA	7 mA	4.2 mA; typical	7 mA

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Technical specifications (continued)

	6ES7 321-1BH02-0AA0	6ES7 321-1BH50-0AA0	6ES7 321-1BL00-0AA0	6ES7 321-1BP00-0AA0	6ES7 321-1BH10-0AA0
Input delay (for rated value of input voltage)					
• for standard inputs					
- parameterizable				No	
- at "0" to "1", min.	1.2 ms	1.2 ms	1.2 ms	1.2 ms	25 µs
- at "0" to "1", max.	4.8 ms	4.8 ms	4.8 ms	4.8 ms	75 µs
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
Alarms/diagnostics/ status information					
Alarms					
• Alarms	No	No	No	No	No
• Diagnostic alarm				No	
• Process alarm				No	
Diagnostics					
• Diagnostic functions	No	No	No	No	No
Diagnostic 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
Galvanic 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 and weight					
Dimensions					
• Width	40 mm	40 mm	40 mm	40 mm	40 mm
• Height	125 mm	125 mm	125 mm	125 mm	125 mm
• Depth	120 mm	120 mm	120 mm	112 mm	120 mm
Weight					
• Weight, approx.	200 g	200 g	260 g	230 g; approx.	200 g

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Technical specifications (continued)

	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.
Current consumption				
from load voltage L+ (without load), max.	90 mA			
from backplane bus 5 V DC, max.	130 mA	100 mA	40 mA	29 mA
Power losses				
Power loss, typ.	4 W	1.5 W; at 24 V; 2,8 W at 48 V	4.3 W	4.9 W
Connection method				
required front connector	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.			8	
- up to 60 °C, max.	16	16	8; 6 to Ue 146 V	16
• vertical installation				
- up to 40 °C, max.	16	16	8	16
Input characteristic curve acc. to IEC 1131, Type 1		Yes	Yes	Yes
Input characteristic curve acc. 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; 48 to 125 V DC	
• 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; (120V, 60Hz), 16mA (230V, 50Hz)
Input delay (for rated value of input voltage)				
• for standard inputs				
- parameterizable	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	Yes	Yes	Yes	Yes
- permissible quiescent current (2-wire BEROS), max.	2 mA	1 mA	1 mA	2 mA

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Technical specifications (continued)

	6ES7 321-7BH01-0AB0	6ES7 321-1CH00-0AA0	6ES7 321-1CH20-0AA0	6ES7 321-1FH00-0AA0
Alarms/diagnostics/status information				
Alarms				
• Alarms	Yes	No	No	No
• Diagnostic alarm	Yes; Parameterizable	No	No	No
• Process alarm	Yes; Parameterizable	No	No	No
Diagnostics				
• Diagnostic functions	Yes; Parameterizable	No	No	No
Diagnostic 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 V DC
Galvanic 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 and weight				
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
Weight				
• 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 5 V DC, max.	16 mA	29 mA	100 mA
Power losses			
Power loss, typ.	4 W	4.9 W	4.9 W
Connection method			
required front connector	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
Input characteristic curve acc. to IEC 1131, Type 1		Yes	Yes
Input characteristic curve acc. to IEC 1131, Type 2	Yes		

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	6ES7 321-1EL00-0AA0	6ES7 321-1FF01-0AA0	6ES7 321-1FF10-0AA0
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); 11mA (230 V)	7.5 mA; (120 V); 17.3 mA (230 V)
Input delay (for rated value of input voltage)			
• for standard inputs			
- parameterizable	No	No	No
- at "0" to "1", max.	15 ms	25 ms	25 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
Encoder			
Connectable encoders			
• 2-wire BEROS	Yes	Yes	Yes
- permissible quiescent current (2-wire BEROS), max.	4 mA	2 mA	2 mA
Alarms/diagnostics/status information			
Alarms			
• Alarms	No	No	No
• Diagnostic alarm	No	No	No
• Process alarm	No	No	No
Diagnostics			
• Diagnostic functions	No	No	No
Diagnostic 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
Galvanic 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 and weight			
Dimensions			
• Width	40 mm	40 mm	40 mm
• Height	125 mm	125 mm	125 mm
• Depth	120 mm	120 mm	120 mm
Weight			
• Weight, approx.	300 g	240 g	240 g

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SM 321 digital input module

Ordering data	Order No.
SM 321 digital input modules	
incl. labeling strips, bus connector	
16 inputs, 24 V DC	**6ES7 321-1BH02-0AA0**
16 inputs, 24 V DC, active low	**6ES7 321-1BH50-0AA0**
32 inputs, 24 V DC	**6ES7 321-1BL00-0AA0**
64 inputs, 24 V DC, active high/ low	**6ES7 321-1BP00-0AA0**
Note: 6ES7392-4...0-0AA0 connection cable and 6ES7392-1.N00-0AA0 terminal blocks necessary.	
16 inputs, 24 to 48 V DC	**6ES7 321-1CH00-0AA0**
16 inputs, 48 to 125 V DC	**6ES7 321-1CH20-0AA0**
16 inputs, 24 V DC, for isochronous mode	**6ES7 321-1BH10-0AA0**
32 inputs, 120 V AC	**6ES7 321-1EL00-0AA0**
8 inputs, 120/230 V AC	**6ES7 321-1FF01-0AA0**
8 inputs, 120/230 V AC, single root	**6ES7 321-1FF10-0AA0**
16 inputs, 120/230 V AC	**6ES7 321-1FH00-0AA0**
16 inputs, 24 V DC, for isochronous mode, diagnostics-capable	**6ES7 321-7BH01-0AB0**
Front connectors	
20-pin, with screw contacts	
• 1 unit	**6ES7 392-1AJ00-0AA0**
• 100 units	**6ES7 392-1AJ00-1AB0**
20-pin, with 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**
S7-300 connecting cable	
For 64-channel modules; 2 units	
1 m	**6ES7 392-4BB00-0AA0**
2.5 m	**6ES7 392-4BC50-0AA0**
5 m	**6ES7 392-4BF00-0AA0**
Terminal block	
For 64-channel modules; 2 units	
With screw contacts	**6ES7 392-1AN00-0AA0**
With spring-loaded contacts	**6ES7 392-1BN00-0AA0**
Front door, elevated design	**6ES7 328-0AA00-7AA0**
e.g. for 32-channel modules; for connecting 1.3 mm^2/16 AWG conductors	

		Order No.
SIMATIC TOP connect		See page 5/290
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 direct from the STEP 7 project		
Single license	J	**2XV9 450-1SL03-0YX0**
Upgrade single license	J	**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	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC		
SIMATIC manual collection update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		
S7-300 manual		
Design, CPU data, module data, instruction list		
German		**6ES7 398-8FA10-8AA0**
English		**6ES7 398-8FA10-8BA0**

D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

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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
from backplane bus 5 V DC, max.	80 mA	70 mA	110 mA	100 mA	100 mA	70 mA
Power losses						
Power loss, typ.	4.9 W	5 W	6.6 W	6 W	6 W	5 W
Connection method						
required front connector	20-pin	20-pin	40-pin	Cable: 6ES7 392-4Bxx0-0AA0 terminal block: 6ES7 392-1xN00-0AA0	Cable: 6ES7 392-4Bxx0-0AA0 terminal block: 6ES7 392-1xN00-0AA0	20-pin
Digital outputs						
Number of digital outputs	16	16	32	64	64	8
Short-circuit protection	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+ (-53 V)	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+ (-0.5 V)	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
• 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

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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
• 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 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						
• 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
Alarms/ diagnostics/status information						
Alarms						
• Diagnostic alarm	No	No	No	No	No	Yes; parameterizable
Diagnostics						
• 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 V DC
Galvanic isolation						
Galvanic 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 and weight						
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	112 mm	112 mm	120 mm
Weight						
• Weight, approx.	190 g	200 g	260 g	230 g	230 g	210 g

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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
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; 120 / 230 V AC	230 V; 120 / 230 V AC	230 V; 120 / 230 V AC
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 5 V DC, max.	100 mA	100 mA	40 mA	100 mA	100 mA	200 mA
Power losses						
Power loss, typ.	2.8 W	7.2 W	6.8 W	8.6 W	8.6 W	8.6 W
Connection method						
required front connector	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	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+ (-1.2 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 surge 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

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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
Aggregate current of 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						
• 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
Alarms/ diagnostics/status information						
Alarms						
• Diagnostic alarm	Yes; parameterizable	No	No	No	Yes; parameterizable	No
Diagnostics						
• 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
Galvanic isolation						
Galvanic 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 and weight						
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
Weight						
• Weight, approx.	260 g	250 g	190 g	275 g	275 g	275 g

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Technical specifications (continued)

	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; 120 / 230 V AC		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 5 V DC, max.	190 mA	40 mA	40 mA	100 mA	100 mA
Power losses					
Power loss, typ.	25 W	3.2 W	4.2 W	3.5 W	4.5 W
Connection method					
required front connector	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	No		No; to be provided externally	No; to be provided externally	
Lamp load, max.	50 W	50 W	1 500 W; 230 V AC	1 500 W; 230 V AC	50 W; 230 V AC
Output voltage					
• for signal "1", min.	L1 (-0.8 V)				
Output current					
• for signal "1" rated value	1 A	2 A	5 A	5 A	2 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 surge 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 outputs (per group)					
• horizontal installation					
- up to 40 °C, max.	4 A				
- up to 60 °C, max.	3 A		5 A	5 A	8 A
• vertical installation					
- up to 40 °C, max.	4 A		5 A	5 A	8 A

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SM 322 digital output module

	6ES7 322-1FL00-0AA0	6ES7 322-1HF01-0AA0	6ES7 322-1HF10-0AA0	6ES7 322-5HF00-0AB0	6ES7 322-1HH01-0AA0
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
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: 100000; 120 V AC: 200000; 24 V DC: 300000 (at 2 A)	300 000; 300000 (24 V DC, at 2 A); 200000 (120 V AC, at 3 A); 100000 (230 V AC, at 3 A)	100 000; 100,000 (24 V DC, at 5 A), 100,000 (230 V AC, at 5 A)	100 000; 50000 (24 V DC, at 2 A); 700000 (120 V AC, at 2 A); 100000 (230 V AC, at 2 A)
Switching capacity of 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 DC); 5 A (24 V AC)	2 A; 2 A (230 V AC), 2 A (24 V DC)
Alarms/diagnostics/ status information					
Alarms					
• Diagnostic alarm	No	No	No	Yes; Parameterizable	No
Diagnostics					
• 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
Galvanic isolation					
Galvanic 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 and weight					
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
Weight					
• Weight, approx.	500 g	190 g	320 g	320 g	250 g

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Ordering data	Order No.
SM 322 digital output modules	
incl. labeling strips, bus connector	
8 outputs, 24 V DC, 2 A	**6ES7 322-1BF01-0AA0**
16 outputs, 24 V DC, 0.5 A	**6ES7 322-1BH01-0AA0**
16 outputs, 24 V DC, 0.5 A, high speed	**6ES7 322-1BH10-0AA0**
32 outputs, 24 V DC, 0.5 A	**6ES7 322-1BL00-0AA0**
64 outputs, 24 V DC, 0.3 A	**6ES7 322-1BP00-0AA0**
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	**6ES7 322-1BP50-0AA0**
Note: 6ES7392-4...0-0AA0 connection cable and 6ES7392-1.N00-0AA0 terminal blocks necessary.	
8 outputs, 24 V DC, 0.5 A, diagnostics-capable	**6ES7 322-8BF00-0AB0**
16 outputs, 24/48 V DC, 0.5 A	**6ES7 322-5GH00-0AB0**
8 outputs, 48 to 125 V DC, 1.5 A	**6ES7 322-1CF00-0AA0**
8 outputs, 120/230 V AC, 1 A	**6ES7 322-1FF01-0AA0**
8 outputs, 120/230 V AC, 2 A	**6ES7 322-5FF00-0AB0**
16 outputs, 120/230 V AC, 1 A	**6ES7 322-1FH00-0AA0**
32 outputs, 120 V AC, 1 A	**6ES7 322-1FL00-0AA0**
8 outputs, relay contacts, 2 A	**6ES7 322-1HF01-0AA0**
8 outputs, relay contacts, 5 A	**6ES7 322-1HF10-0AA0**
8 outputs, relay contacts, 5 A, with RC filter, overvoltage protection	**6ES7 322-5HF00-0AB0**
16 outputs, relay contacts, 8 A	**6ES7 322-1HH01-0AA0**
Front connectors	
20-pin, with screw contacts	
• 1 unit	**6ES7 392-1AJ00-0AA0**
• 100 units	**6ES7 392-1AJ00-1AB0**
20-pin, with 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.
S7-300 connecting cable		
For 64-channel modules; 2 units		
1 m		**6ES7 392-4BB00-0AA0**
2.5 m		**6ES7 392-4BC50-0AA0**
5 m		**6ES7 392-4BF00-0AA0**
Terminal block		
For 64-channel modules; 2 units		
With screw contacts		**6ES7 392-1AN00-0AA0**
With spring-loaded contacts		**6ES7 392-1BN00-0AA0**
Front door, elevated design		**6ES7 328-0AA00-7AA0**
e.g. for 32-channel modules; for connecting 1.3 mm^2/16 AWG conductors		
SIMATIC TOP connect		See page 5/290
Bus connectors		**6ES7 390-0AA00-0AA0**
1 unit (spare part)		
Set of fuses for SM 322		
10 fuses 8 A quick-response, 2 fuse holders; for 6ES7 322-1FF01-0AA0, 6ES7 322-1FH00-0AA0		**6ES7 973-1HD00-0AA0**
10 fuses 6.3 A; for 6ES7 322-1CF00-0AA0		**6ES7 973-1GC00-0AA0**
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 direct from the STEP 7 project		
Single license	J	**2XV9 450-1SL03-0YX0**
Upgrade single license	J	**2XV9 450-1SL03-0YX4**

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

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SM 322 digital output module

Ordering data	Order No.
Labeling sheets for machine inscription	
For 16-channel signal modules, DIN A4, for printing with laser printer; 10 units	
petrol	**6ES7 392-2AX00-0AA0**
light-beige	**6ES7 392-2BX00-0AA0**
yellow	**6ES7 392-2CX00-0AA0**
red	**6ES7 392-2DX00-0AA0**
For 32-channel signal modules, DIN A4, for printing with laser printer; 10 units	
petrol	**6ES7 392-2AX10-0AA0**
light-beige	**6ES7 392-2BX10-0AA0**
yellow	**6ES7 392-2CX10-0AA0**
red	**6ES7 392-2DX10-0AA0**

		Order No.
SIMATIC manual collection	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multi-lingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC		
SIMATIC manual collection update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		
S7-300 manual		
Design, CPU data, module data, instruction list		
German		**6ES7 398-8FA10-8AA0**
English		**6ES7 398-8FA10-8BA0**

D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

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Overview



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

Technical specifications

	6ES7 323-1BH01-0AA0	6ES7 323-1BL00-0AA0	6ES7 327-1BH00-0AB0
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 5 V DC, max.	40 mA	80 mA	60 mA
Power losses			
Power loss, typ.	3.5 W	6.5 W	3 W
Connection method			
required front connector	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			
• all mounting positions			
- Concurrently controllable inputs, up to 40 °C	8	16	16
- Concurrently controllable inputs, up to 60 °C	8	8	16
Input characteristic curve acc. 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
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

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Technical specifications (continued)

	6ES7 323-1BH01-0AA0	6ES7 323-1BL00-0AA0	6ES7 327-1BH00-0AB0
Digital outputs			
Number of digital outputs	8	16	8; can also be parameterized individually as DI
Short-circuit protection	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 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
Load resistance range			
• lower limit	48 Ω	48 Ω	48 Ω
• upper limit	4 kΩ	4 kΩ	4 kΩ
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.	2 mA	1.5 mA	1.5 mA
Alarms/diagnostics/status information			
Alarms			
• Alarms	No	No	No
Diagnostics			
• Diagnostic functions	No	No	No
Diagnostic indication LED			
• Status indicator digital output (green)	Yes	Yes	Yes
• Status indicator digital input (green)	Yes	Yes	Yes

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Technical specifications (continued)

	6ES7 323-1BH01-0AA0	6ES7 323-1BL00-0AA0	6ES7 327-1BH00-0AB0
Isolation			
Isolation checked with	500 V DC	500 V DC	500 V DC
Galvanic 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
Galvanic 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 and weight			
Dimensions			
• Width	40 mm	40 mm	40 mm
• Height	125 mm	125 mm	125 mm
• Depth	120 mm	120 mm	120 mm
Weight			
• Weight, approx.	220 g	260 g	200 g

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SM 323/SM 327 digital input/output module

Ordering data		Order No.
SM 323 digital input/output modules		
incl. labeling strips, bus connector		
8 inputs, 8 outputs		**6ES7 323-1BH01-0AA0**
16 inputs, 16 outputs		**6ES7 323-1BL00-0AA0**
SM 327 digital input/output modules		
incl. labeling strips, bus connector		
8 inputs, 8 inputs or outputs (parametrizable)		**6ES7 327-1BH00-0AB0**
Front connectors		
20-pin, with screw contacts		
• 1 unit		**6ES7 392-1AJ00-0AA0**
• 100 units		**6ES7 392-1AJ00-1AB0**
20-pin, with 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**
Front door, elevated design		**6ES7 328-0AA00-7AA0**
e.g. for 32 channel modules; enables connection of 1.3 mm^2/16 AWG wires		
SIMATIC TOP connect		see page 5/290
Bus connectors		**6ES7 390-0AA00-0AA0**
1 unit (spare part)		
Labeling strips		
10 units (spare part)		
for modules with 20-pin front connector		**6ES7 392-2XX00-0AA0**
for modules with 40-pin front connector		**6ES7 392-2XX10-0AA0**
Label cover		
10 units (spare part)		
for modules with 20-pin front connector		**6ES7 392-2XY00-0AA0**
for modules with 40-pin front connector		**6ES7 392-2XY10-0AA0**

		Order No.
S7 SmartLabel V3.0		
Software for automatic labeling of modules direct from the STEP 7 project		
Single license	J	**2XV9 450-1SL03-0YX0**
Upgrade single license	J	**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	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multi-lingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC		
SIMATIC manual collection update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		
S7-300 manual		
Design, CPU data, module data, instruction list		
German		**6ES7 398-8FA10-8AA0**
English		**6ES7 398-8FA10-8BA0**

D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

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Overview



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

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS SM 321	**16 DI 24 V DC 1 X 20-pin**	**32 DI 24 V DC 1 X 40-pin**	**16 DI 48-125 V DC 1 X 20-pin**
Order number	**6AG1 321-1BH02-2AA0**	**6AG1 321-1BL00-2AA0**	**6AG1 321-1CH20-2AA0**
Order No. based on	**6ES7 321-1BH02-0AA0**	**6ES7 321-1BL00-0AA0**	**6ES7 321-1CH20-0AA0**
Ambient temperature range	-40 ... +70 °C	-40 ... +70 °C	-25 ... +70 °C
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	Yes	Yes	Yes
Conformal coating	Coating of the printed circuit boards and the electronic components		
Technical data	The technical data of the standard product applies except for the ambient conditions.		

SIPLUS SM 321	**8 DI 120/230 V AC 1 X 20-pin**	**8 DI 120/230 V AC 1 X 40-pin**	**16 DI 120/230 V AC 1 X 20-pin**
Order number	**6AG1 321-1FF01-2AA0**	**6AG1 321-1FF10-7AA0**	**6AG1 321-1FH00-7AA0**
Order No. based on	**6ES7 321-1FF01-0AA0**	**6ES7 321-1FF10-0AA0**	**6ES7 321-1FH00-0AA0**
Ambient temperature range	-40 ... +70 °C	-25 ... +70 °C	-40 ... +70 °C
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	Yes	No	No
Conformal coating	Coating of the printed circuit boards and the electronic components		
Technical data	The technical data of the standard product applies except for the ambient conditions.		

SIPLUS SM 321	**16 DI 24 V DC 1 X 20-pin**	**16 DI 24 V DC DIAGNOSTICS**
Order number	**6AG1 321-7BH01-2AB0**	**6AG1 321-7TH00-4AB0**
Order No. based on	**6ES7 321-7BH01-0AB0**	**6ES7 321-7TH00-0AB0**
Ambient temperature range	- 25 ... +70 °C	0 ... +60 °C
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	Yes	No
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	

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SIPLUS SM 321 digital input module

Overview (continued)

Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOx < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOx < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS SM 321 digital input module		
(extended temperature range and medial exposure)		
incl. labeling strips, bus connector		
16 inputs, 24 V DC	H	**6AG1 321-1BH02-2AA0**
32 inputs, 24 V DC	H	**6AG1 321-1BL00-2AA0**
16 inputs, 48 to 120 V DC	H	**6AG1 321-1CH20-2AA0**
8 inputs, 120/230 V AC	H	**6AG1 321-1FF01-2AA0**
8 inputs, 120/230 V AC, single root	L	**6AG1 321-1FF10-7AA0**
16 inputs, 120/230 V AC		**6AG1 321-1FH00-7AA0**
16 inputs, 24 V DC, diagnostics-capable	H	**6AG1 321-7BH01-2AB0**
16 inputs, NAMUR, redundant design possible	I	**6AG1 321-7TH00-4AB0**
Accessories		See SIMATIC S7-300 digital input modules, page 5/114

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H
I: Subject to export regulations AL: N and ECCN: EAR99H
L: Subject to export regulations AL: 9I999 and ECCN: N

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Overview



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

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS SM 322	**8 DO 24 V DC, 2 A, 1 X 20-pin**	**16 DO 24 V DC, 0.5 A, 1 X 20-pin**	**32 DO 24 V DC, 0.5 A, 1 X 40-pin**
Order number	**6AG1 322-1BF01-2XB0**	**6AG1 322-1BH01-2AA0**	**6AG1 322-1BL00-2AA0**
Order No. based on	**6ES7 322-1BF01-0AA0**	**6ES7 322-1BH01-0AA0**	**6ES7 322-1BL00-0AA0**
Ambient temperature range	-25 ... +70 °C	-25 ... +70 °C	-25 ... +70 °C
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	No	Yes	Yes
Conformal coating	Coating of the printed circuit boards and the electronic components		
Technical data	The technical data of the standard product applies except for the ambient conditions.		

SIPLUS SM 322	**8 DO 48 - 125 V DC 1.5 A, 1 X 20 pin**	**8 DO 120/230 V AC 1 A, 1 X 20 pin**	**16 DO, 120/230 V AC 1 A, 1 X 20-pin**
Order number	**6AG1 322-1CF00-7AA0**	**6AG1 322-1FF01-7AA0**	**6AG1 322-1FH00-7AA0**
Order No. based on	**6ES7 322-1CF00-0AA0**	**6ES7 322-1FF01-0AA0**	**6ES7 322-1FH00-0AA0**
Ambient temperature range	-25 ... +70 °C	-25 ... +70 °C	-40 ... +70 °C
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	No	No	No
Conformal coating	Coating of the printed circuit boards and the electronic components		
Technical data	The technical data of the standard product applies except for the ambient conditions.		

SIPLUS SM 322	**8 DO (relay) 24 V DC, 5 A/230 V AC 5 A, 1 X 40-pin**	**16 RO relay contacts, 1 X 20-pin**	**8 DO 120/230 V AC 2 A, 1 X 40 pin**
Order number	**6AG1 322-1HF10-2AA0**	**6AG1 322-1HH01-2AA0**	**6AG1 322-5FF 00-4AB0**
Order No. based on	**6ES7 322-1HF10-0AA0**	**6ES7 322-1HH01-0AA0**	**6ES7 322-5FF00-0AB0**
Ambient temperature range	-25 ... +60 °C	-40 ... +70 °C	0 ... +60 °C
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	Yes	Yes	No
Conformal coating	Coating of the printed circuit boards and the electronic components		
Technical data	The technical data of the standard product applies except for the ambient conditions.		

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SIPLUS SM 322 digital output module

Overview (continued)

SIPLUS SM 322	8 RO (relay), 24 V DC, 120 - 230 V AC, 5 A, 1 X 40 pin	8 DO 24 V DC, 0.5 A, short-circuit protection, diagnostics, 1 X 20-pin	16 DO 24 V DC, 0.5 A, diagnostics, wire-break detection 0/1 signal, 1 X 40-pin
Order number	**6AG1 322-5HF00-4AB0**	**6AG1 322-8BF00-2AB0**	**6AG1 322-8BH01-2AB0**
Order No. based on	**6ES7 322-5HF00-0AB0**	**6ES7 322-8BF00-0AB0**	**6ES7 322-8BH01-0AB0**
Ambient temperature range	0 ... +60 °C	-25 ... +70 °C	-25 ... +70 °C
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	No	Yes	No
Conformal coating	Coating of the printed circuit boards and the electronic components		
Technical data	The technical data of the standard product applies except for the ambient conditions.		

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Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOx < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOx < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS SM 322 digital output module		
(extended temperature range and medial exposure)		
incl. labeling strips, bus connector		
8 outputs, 24 V DC, 2 A	H	**6AG1 322-1BF01-2XB0**
8 outputs, 24 V DC, 0.5 A, diagnostics-capable	H	**6AG1 322-8BF00-2AB0**
16 outputs, 24 V DC, 0.5 A	H	**6AG1 322-1BH01-2AA0**
32 outputs, 24 V DC, 0.5 A	L	**6AG1 322-1BL00-2AA0**
8 outputs, 48 to 125 V DC, 1.5 A	H	**6AG1 322-1CF00-7AA0**
8 outputs, relay contacts, 5 A	H	**6AG1 322-1HF10-2AA0**
8 outputs, relay contacts, 5 A, with RC filter, overvoltage protection	H	**6AG1 322-5HF00-4AB0**
8 outputs, 120/230 V AC, 1 A	H	**6AG1 322-1FF01-2AA0**
8 outputs, 120/230 V AC, 2 A	L	**6AG1 322-5FF00-4AB0**
16 outputs, 120/230 V AC, 1 A	I	**6AG1 322-1FH00-7AA0**
16 outputs, relay contacts, 8 A	L	**6AG1 322-1HH01-2AA0**
16 outputs, 24 V DC / 0.5 A, redundant design possible	L	**6AG1 322-8BH01-2AB0**
Accessories		See SIMATIC S7-300 digital output modules, page 5/121

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H
I: Subject to export regulations AL: N and ECCN: EAR99H
L: Subject to export regulations AL: 9I999 and ECCN: N

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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

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS SM 322	**8 DI/8 DO 24 V DC, 0.5 A Total current 2 A, 1 X 20-pin**
Order number	**6AG1 323-1BH01-2AA0**
Order No. based on	**6ES7 323-1BH01-0AA0**
Ambient temperature range	-40 ... +70 °C
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	Yes
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions.
Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOx < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOx < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS SM 323 digital input/ output module		
(extended temperature range and medial exposure)		
incl. labeling strips, bus connector		
8 inputs, 8 outputs	H	**6AG1 323-1BH01-2AA0**
Accessories		See SIMATIC S7-300 digital input/output modules, page 5/126

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H

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SM 331 analog input module

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 331-1KF02-0AB0	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 5 V DC, max.	50 mA	60 mA	90 mA	50 mA
Power losses				
Power loss, typ.	1 W	1.5 W	0.4 W	1.3 W
Connection method				
required front connector	20-pin	20-pin	40-pin	20-pin
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 thermocouples	200 m	200 m; max. 50 m at 50 mV	200 m; 50 m at 80 mV and 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
• -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

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Technical specifications (continued)

	6ES7 331-7KF02-0AB0	6ES7 331-7HF01-0AB0	6ES7 331-1KF02-0AB0	6ES7 331-7KB02-0AB0
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), 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	
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
Voltage input				
• permissible input voltage for voltage input (destruction limit), max.	20 V; permanent; 75 V for max. 1 s (mark to space ratio 1:20)	20 V; 20 V DC permanent, 75 V DC for max. 1 s (duty factor 1:20)	30 V; 12 V permanent, 30 V for max. 1 s	20 V; permanent; 75 V for max. 1 s (mark to space ratio 1:20)
Current input				
• permissible input current for current input (destruction limit), max.	40 mA	40 mA	40 mA	40 mA
Characteristic linearization				
• parameterizable	Yes		Yes	Yes
• for thermocouples	Type E, J, K, L, N			Type E, J, K, L, N
• for resistance thermometer	Pt100 (standard, climatic range), Ni100 (standard, climatic range)		yes; Pt100 standard/air con.; Ni100 standard/air con.; Ni1000 standard/air con.; LG-Ni1000 standard/air con.	Pt100 (standard, climatic range), Ni100 (standard, climatic range)
Temperature compensation				
• Temperature compensation parameterizable	Yes			Yes
• Internal temperature compensation	Yes			Yes
• External temperature compensation with compensations socket	Yes			Yes

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Technical specifications (continued)

	6ES7 331-7KF02-0AB0	6ES7 331-7HF01-0AB0	6ES7 331-1KF02-0AB0	6ES7 331-7KB02-0AB0
Analog value creation				
Measurement principle	integrating	Actual value encryption	integrating	integrating
Integrations and conversion time/ resolution per channel				
• Resolution with overrange (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 µs 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 kOhm, 0 to 600 kOhm	+/- 0,7 %; 150, 300, 600 Ohm
• 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 %; +/-20 mA, 0 to 20 mA, 4 to 20 mA	+/- 0,5 %; 3.2 to 20 mA
• Impedance, relative to input area	+/- 0,5 %; 150, 300, 600 Ohm		+/- 0,3 %; 0 to 6 kOhm, 0 to 600 kOhm	+/- 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)

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Technical specifications (continued)

	6ES7 331-7KF02-0AB0	6ES7 331-7HF01-0AB0	6ES7 331-1KF02-0AB0	6ES7 331-7KB02-0AB0
Alarms/diagnostics/status information				
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
Diagnostics				
• Diagnostic information readable	Yes	Yes	No	Yes
Isolation				
Isolation checked with	500 V DC	500 V DC	500 V DC	500 V DC
Galvanic isolation				
Galvanic isolation analog inputs				
• between the channels	No	No	No	No
• between the channels and the backplane bus	Yes	Yes	Yes	Yes
Dimensions and weight				
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
Weight				
• Weight, approx.	250 g	200 g	250 g	250 g

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Technical specifications (continued)

	6ES7 331-7PF01-0AB0	6ES7 331-7PF11-0AB0	6ES7 331-7PE10-0AB0	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
Current consumption					
from load voltage L+ (without load), max.	240 mA	200 mA			200 mA
from backplane bus 5 V DC, max.	100 mA	100 mA	100 mA	130 mA	100 mA
Power losses					
Power loss, typ.	4.6 W	3 W	2.2 W	0.6 W	3 W
Connection method					
required front connector	40-pin	40-pin	1x 40-pin	40-pin	40-pin
Isochronous mode					
Isochronous mode	No	No	No	No	No
Analog inputs					
Number of analog inputs	8	8	6	8	8
Number of analog inputs for resistance measurement	8				
Cable length, shielded, max.	200 m	100 m	200 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	Yes	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	Yes	No	No
• -5 V to +5 V	No	No		Yes	Yes
• -50 mV to +50 mV	No	No	Yes	No	No
• -500 mV to +500 mV	No	No	Yes	No	No
• -80 mV to +80 mV	No	No	Yes	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

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Technical specifications (continued)

	6ES7 331-7PF01-0AB0	6ES7 331-7PF11-0AB0	6ES7 331-7PE10-0AB0	6ES7 331-7NF00-0AB0	6ES7 331-7NF10-0AB0
Input ranges (rated values), thermoelements					
• Type B	No	Yes	Yes	No	No
• Type E	No	Yes	Yes	No	No
• Type J	No	Yes	Yes	No	No
• Type K	No	Yes	Yes	No	No
• Type L	No	Yes	Yes	No	No
• Type N	No	Yes	Yes	No	No
• Type R	No	Yes	Yes	No	No
• Type S	No	Yes	Yes	No	No
• Type T	No	Yes	Yes	No	No
• Type U	No	Yes	Yes	No	No
• Type TXK/TXK(L) to GOST	No	Yes	Yes	No	No
• Input resistance (Type TXK/TXK(L) to GOST)			10 MΩ		
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
Voltage input					
• permissible input voltage for voltage input (destruction limit), max.	75 V; 35 V permanent, 75 V for max. 1 s (mark to space ratio 1:20)	75 V; 20 V DC permanent, 75 V DC for max. 1 s (duty factor 1:20)	35 V; 35 V permanent, 75 V for max. 1 s (mark to space ratio 1:20)	50 V; permanent	75 V; 35 V permanent, 75 V for max. 1 s (mark to space ratio 1:20)
Current input					
• permissible input current for current input (destruction limit), max.				32 mA	40 mA
Characteristic linearization					
• parameterizable	Yes	Yes	Yes		
• for thermocouples		Type B, E, J, K, L, N, R, S. T, U, C	Type B, E, J, K, L, N, R, S. T, U, C, TXK, XK(L)		
• for resistance thermometer	Pt100, Pt200, Pt500, Pt1000, Ni100, Ni120, Ni200, Ni500, Ni1000, Cu10; (standard/ climate)				

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Technical specifications (continued)

	6ES7 331-7PF01-0AB0	6ES7 331-7PF11-0AB0	6ES7 331-7PE10-0AB0	6ES7 331-7NF00-0AB0	6ES7 331-7NF10-0AB0
Temperature compensation					
• Temperature compensation parameterizable		Yes	Yes		
• internal temperature compensation		Yes	Yes		
• external temperature compensation with compensations socket		Yes	Yes		
• external temperature compensation with Pt100		Yes	Yes		
Analog value creation					
Measurement principle	integrating	integrating	integrating	integrating	integrating
Integrations and conversion time/ resolution per channel					
• Resolution with overrange (bit including sign), max.	16 bit; Two's complement	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/15 bits + sign/15 bits + sign/15 bits + sign
• Integration time, parameterizable	Yes	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	30 / 50 / 60 / 300		10 ms (4-channel mode); 95/83/72/23 ms (8-channel mode)
• Integration time, ms			10 / 16,67 / 20 / 100		
• 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	+/- 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				

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Technical specifications (continued)

	6ES7 331-7PF01-0AB0	6ES7 331-7PF11-0AB0	6ES7 331-7PE10-0AB0	6ES7 331-7NF00-0AB0	6ES7 331-7NF10-0AB0
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				
Alarms/diagnostics/ status information					
Alarms					
• Diagnostic alarm	Yes; parameterizable per group	Yes; parameterizable per group	Yes; channel by channel	Yes; parameterizable	Yes; parameterizable
• Limit value alarm	Yes; parameterizable	Yes; parameterizable	Yes; parameterizable	Yes; parameterizable, channels 0 and 2	Yes; parameterizable all channels (end of cycle interrupt is also supported across modules)
Diagnostics					
• Diagnostic information readable	Yes	Yes	Yes	Yes	Yes
Isolation					
Isolation checked with	500 V DC	500 V DC		500 V DC	500 V AC
Galvanic isolation					
Galvanic isolation analog inputs					
• between the channels	No	No	Yes	No	No
• between the channels, in groups of	2	2	1	2	2
• between the channels and the backplane bus	Yes	Yes	Yes	Yes	Yes
Dimensions and weight					
Dimensions					
• Width	40 mm	40 mm	40 mm	40 mm	40 mm
• Height	125 mm	125 mm	125 mm	125 mm	125 mm
• Depth	120 mm	120 mm	120 mm	120 mm	120 mm
Weight					
• Weight, approx.	272 g	272 g	272 g	272 g	272 g

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SM 331 analog input module

Ordering Data		Order No.
SM 331 analog input modules		
Including labeling strips, bus connector, measuring range modules		
8 inputs, 13-bit resolution		**6ES7 331-1KF02-0AB0**
8 inputs, resolution 9/12/14 bit		**6ES7 331-7KF02-0AB0**
2 inputs, resolution 9/12/14 bit		**6ES7 331-7KB02-0AB0**
8 inputs, enhanced resolution 16 bits		**6ES7 331-7NF00-0AB0**
8 inputs, enhanced resolution 16 bits, 4-channel mode		**6ES7 331-7NF10-0AB0**
8 inputs, resolution 14 bit, for isochronous mode		**6ES7 331-7HF01-0AB0**
6 inputs, for thermal resistors, resolution 16 bits	I	**6ES7 331-7PE10-0AB0**
8 inputs, for thermal resistors		**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**
Front door, elevated design		**6ES7 328-0AA00-7AA0**
e.g. for 32-channel modules; for connecting 1.3 mm^2/16 AWG wires		
SIMATIC TOP connect		see page 5/290
Bus connectors		**6ES7 390-0AA00-0AA0**
1 unit (spare part)		
Shield connecting element		**6ES7 390-5AA00-0AA0**
80 mm wide, with 2 rows for 4 terminal elements 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**
Label cover		**6ES7 392-2XY00-0AA0**
10 units (spare part), for modules with 20-pin front connector		
Labeling strips		**6ES7 392-2XX00-0AA0**
10 units (spare part), for modules with 20-pin front connector		
S7 SmartLabel V3.0		
Software for automatic labeling of modules direct from the STEP 7 project		
Single license	J	**2XV9 450-1SL03-0YX0**
Upgrade single license	J	**2XV9 450-1SL03-0YX4**
Labeling sheets for machine labeling		
For 16-channel signal modules, DIN A4, for printing with laser printer; 10 units		
petrol		**6ES7 392-2AX00-0AA0**
light-beige		**6ES7 392-2BX00-0AA0**
yellow		**6ES7 392-2CX00-0AA0**
red		**6ES7 392-2DX00-0AA0**
For 32-channel signal modules, DIN A4, for printing with laser printer; 10 units		
petrol		**6ES7 392-2AX10-0AA0**
light-beige		**6ES7 392-2BX10-0AA0**
yellow		**6ES7 392-2CX10-0AA0**
red		**6ES7 392-2DX10-0AA0**
SIMATIC manual collection	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC		
SIMATIC manual collection update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		
S7-300 manual		
Design, CPU data, module data, instruction list		
German		**6ES7 398-8FA10-8AA0**
English		**6ES7 398-8FA10-8BA0**

D: Subject to export regulations AL: N and ECCN: 5D992
I: Subject to export regulations AL: N and ECCN: EAR99H
J: Subject to export regulations AL: N and ECCN: EAR99S

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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 5 V DC, max.	60 mA	60 mA	100 mA	120 mA
Power losses				
Power loss, typ.	3 W	3 W	6 W	3 W
Connection method				
required front connector	20-pin	20-pin	40-pin	20-pin
Analog outputs				
Number of analog outputs	2	4	8	4; Isochronous mode
Cable length, shielded, max.	200 m	200 m	200 m	200 m
Voltage output, short-circuit protection	Yes	Yes	Yes	Yes
Voltage output, short-circuit current, max.	25 mA	25 mA	25 mA	40 mA
Current output, no-load voltage, max.	18 V	18 V	18 V	18 V
Output ranges, voltage				
• 0 to 10 V	Yes	Yes	Yes	Yes
• 1 to 5 V	Yes	Yes	Yes	Yes
• -10 to +10 V	Yes	Yes	Yes	Yes
Output ranges, current				
• 0 to 20 mA	Yes	Yes	Yes	Yes
• -20 to +20 mA	Yes	Yes	Yes	Yes
• 4 to 20 mA	Yes	Yes	Yes	Yes
Load impedance (in rated range of output)				
• with voltage outputs, min.	1 kΩ	1 kΩ	1 kΩ	1 kΩ
• with voltage outputs, capacitive load, max.	1 µF	1 µF	1 µF	1 µF
• with current outputs, max.	500 Ω	500 Ω	500 Ω	500 Ω
• with current outputs, inductive load, max.	10 mH	10 mH	10 mH	1 mH

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Technical specifications (continued)

	6ES7 332-5HB01-0AB0	6ES7 332-5HD01-0AB0	6ES7 332-5HF00-0AB0	6ES7 332-7ND02-0AB0
Analog value creation				
Integration and conversion time/ resolution per channel				
• Resolution with overrange (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 %
Alarms/diagnostics/status information				
Substitute values connectable	Yes; parameterizable	Yes; parameterizable	Yes; parameterizable	Yes; Pparameterizable
Alarms				
• Diagnostic alarm	Yes; parameterizable	Yes; parameterizable	Yes; parameterizable	Yes
Diagnostics				
• Diagnostic information readable	Yes	Yes	Yes	
Isolation				
Isolation checked with	500 V DC	500 V DC	500 V DC	1500 V DC
Galvanic isolation				
Galvanic isolation analog outputs				
• between the channels and the backplane bus	Yes	Yes	Yes	Yes
Dimensions and weight				
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
Weight				
• Weight, approx.	220 g	220 g	272 g	220 g

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Ordering data		Order No.
SM 332 analog output modules		
incl. labeling strips, bus connector		
4 outputs, 11/12 bit		**6ES7 332-5HD01-0AB0**
4 outputs, 16 bit		**6ES7 332-7ND02-0AB0**
2 outputs, 11/12 bit		**6ES7 332-5HB01-0AB0**
8 outputs, 11/12 bit		**6ES7 332-5HF00-0AB0**
Front connectors		
20-pin, with screw contacts		
• 1 unit		**6ES7 392-1AJ00-0AA0**
• 100 units		**6ES7 392-1AJ00-1AB0**
20-pin, with 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**
Front door, elevated design		**6ES7 328-0AA00-7AA0**
e.g. for 32-channel modules; for connecting 1.3 mm^2/16 AWG wires		
SIMATIC TOP connect		see page 5/290
Bus connectors		
1 unit (spare part)		**6ES7 390-0AA00-0AA0**
Shield connecting element		**6ES7 390-5AA00-0AA0**
80 mm wide, with 2 rows for 4 terminal elements each		
Terminal elements		
2 units		
For 2 cables with 2 mm to 6 mm diameter		**6ES7 390-5AB00-0AA0**
For 1 cable with 3 mm to 8 mm diameter		**6ES7 390-5BA00-0AA0**
For 1 cable with 4 mm to 13 mm diameter		**6ES7 390-5CA00-0AA0**

		Order No.
Label cover		**6ES7 392-2XY00-0AA0**
10 units (spare part), for modules with 20-pin front connector		
Labeling strips		**6ES7 392-2XX00-0AA0**
10 units (spare part), for modules with 20-pin front connector		
S7 SmartLabel V3.0		
Software for automatic labeling of modules direct from the STEP 7 project		
Single license	J	**2XV9 450-1SL03-0YX0**
Upgrade single license	J	**2XV9 450-1SL03-0YX4**
Labeling sheets for machine labeling		
For 16-channel signal modules, DIN A4, for printing with laser printer; 10 units		
petrol		**6ES7 392-2AX00-0AA0**
light-beige		**6ES7 392-2BX00-0AA0**
yellow		**6ES7 392-2CX00-0AA0**
red		**6ES7 392-2DX00-0AA0**
For 32-channel signal modules, DIN A4, for printing with laser printer; 10 units		
petrol		**6ES7 392-2AX10-0AA0**
light-beige		**6ES7 392-2BX10-0AA0**
yellow		**6ES7 392-2CX10-0AA0**
red		**6ES7 392-2DX10-0AA0**
SIMATIC manual collection	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC		
SIMATIC manual collection update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		
S7-300 manual		
Design, CPU data, module data, instruction list		
German		**6ES7 398-8FA10-8AA0**
English		**6ES7 398-8FA10-8BA0**

D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

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SM 334 analog input/output module

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 5 V DC, max.	55 mA	60 mA
Power losses		
Power loss, typ.	3 W	2 W
Connection method		
required front connector	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 thermom-eters		
• Pt 100		Yes; only climatic range
Input ranges (rated values), resistors		
• 0 to 10000 Ohm		Yes
Voltage input		
• permissible input voltage for voltage input (destruction limit), max.	20 V	20 V; permanent; 75 V for max. 1 s (mark to space ratio 1:20)
Current input		
• 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	

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Technical specifications (continued)

	6ES7 334-0CE01-0AA0	6ES7 334-0KE00-0AB0
Output ranges, voltage		
• 0 to 10 V	Yes	Yes
Output ranges, current		
• 0 to 20 mA	Yes	
Load impedance (in rated range of output)		
• with voltage outputs, min.	5 kΩ	2.5 kΩ
• with voltage outputs, capacitive load, max.	1 µF	1 µF
• with current outputs, max.	300 Ω	
• with current outputs, inductive load, max.	1 mH	
Analog value creation		
Integrations and conversion time/ resolution per channel		
• Resolution with overrange (bit including sign), max.	8 bit	12 bit
• Integration time, ms		16.67/20 ms
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
• Resist.-type thermometer, relative to input area		+/- 1 %
• Voltage, relative to output area	+/- 0,6 %	+/- 1 %
• Current, relative to output area	+/- 1 %	
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
• Resist.-type thermometer, relative to input area		+/- 0,8 %
• Voltage, relative to output area	+/- 0,5 %	+/- 0,85 %
• Current, relative to output area	+/- 0,5 %	
Alarms/diagnostics/status information		
Alarms		
• Alarms	No	No
Diagnostics		
• Diagnostic functions	No	No
Isolation		
Isolation checked with	500 V DC	500 V DC
Galvanic isolation		
Galvanic isolation analog inputs		
• between the channels and the backplane bus	No	Yes
Galvanic isolation analog outputs		
• between the channels and the backplane bus	No	Yes
Dimensions and weight		
Dimensions		
• Width	40 mm	40 mm
• Height	125 mm	125 mm
• Depth	120 mm	120 mm
Weight		
• Weight, approx.	285 g	200 g

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SM 334 analog input/output module

Ordering data		Order No.
SM 334 analog input/output modules		
incl. labeling strips, bus connector		
4 inputs, 2 outputs		**6ES7 334-0CE01-0AA0**
4 inputs, 2 outputs, resistance measurement, Pt 100		**6ES7 334-0KE00-0AB0**
Front connectors		
20-pin, with screw contacts		
• 1 unit		**6ES7 392-1AJ00-0AA0**
• 100 units		**6ES7 392-1AJ00-1AB0**
20-pin, with spring-loaded terminals		
• 1 unit		**6ES7 392-1BJ00-0AA0**
• 100 units		**6ES7 392-1BJ00-1AB0**
20-pin, with FastConnect		
• 1 unit		**6ES7 392-1CJ00-0AA0**
Front door, elevated design		**6ES7 328-0AA00-7AA0**
e.g. for 32-channel modules; for connecting 1.3 mm^2/16 AWG wires		
SIMATIC TOP connect		see page 5/290
Bus connectors		**6ES7 390-0AA00-0AA0**
1 unit (spare part)		
Shield connecting element		**6ES7 390-5AA00-0AA0**
80 mm wide, with 2 rows for 4 terminal elements 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**
Label cover		**6ES7 392-2XY00-0AA0**
10 units (spare part), for modules with 20-pin front connector		
Labeling strips		**6ES7 392-2XX00-0AA0**
10 units (spare part), for modules with 20-pin front connector		
S7 SmartLabel V3.0		
Software for automatic labeling of modules direct from the STEP 7 project		
Single license	J	**2XV9 450-1SL03-0YX0**
Upgrade single license	J	**2XV9 450-1SL03-0YX4**
Labeling sheets for machine labeling		
For 16-channel signal modules, DIN A4, for printing with laser printer; 10 units		
petrol		**6ES7 392-2AX00-0AA0**
light-beige		**6ES7 392-2BX00-0AA0**
yellow		**6ES7 392-2CX00-0AA0**
red		**6ES7 392-2DX00-0AA0**
SIMATIC manual collection	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC		
SIMATIC manual collection update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		
S7-300 manual		
Design, CPU data, module data, instruction list		
German		**6ES7 398-8FA10-8AA0**
English		**6ES7 398-8FA10-8BA0**

D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

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Overview



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

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS SM 331	8 AI, 1 X 40-pin	8 AI, 1 X 40-pin	2 AI, 1 X 20-pin
Order number	**6AG1 331-1KF02-4AB0**	**6AG1 331-1KF02-7AB0**	**6AG1 331-7KB02-2AB0**
Order No. based on	**6ES7 331-1KF02-0AB0**	**6ES7 331-1KF02-0AB0**	**6ES7 331-7KB02-0AB0**
Ambient temperature range	0 ... +60 °C	-25 ... +70 °C	-25 ... +70 °C
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	No	No	No
Conformal coating	Coating of the printed circuit boards and the electronic components		
Technical data	The technical data of the standard product applies except for the ambient conditions.		

SIPLUS SM 331	8 AI, 1 X 20-pin	8 AI, 1 X 40-pin	8 AI, 1 X 40-pin
Order number	**6AG1 331-7KF02-2AB0**	**6AG1 331-7NF00-2AB0**	**6AG1 331-7NF10-2AB0**
Order No. based on	**6ES7 331-7KF02-0AB0**	**6ES7 331-7NF00-0AB0**	**6ES7 331-7NF10-0AB0**
Ambient temperature range	-25 ... +70 °C	-25 ... +70 °C	-25 ... +60 °C
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	No	Yes	No
Conformal coating	Coating of the printed circuit boards and the electronic components		
Technical data	The technical data of the standard product applies except for the ambient conditions.		

SIPLUS SM 331	8 AI, 1 X 40-pin	8 AI, 1 X 40-pin
Order number	**6AG1 331-7PF01-4AB0**	**6AG1 331-7PF11-4AB0**
Order No. based on	**6ES7 331-7PF01-0AB0**	**6ES7 331-7PF11-0AB0**
Ambient temperature range	0 ... +60 °C	0 ... +60 °C
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	No	No
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	

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SIPLUS SM 331 analog input module

Overview (continued)

Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOx < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOx < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS SM 331 analog input modules		
(extended temperature range and medial exposure)		
Including labeling strips, bus connector, measuring range modules		
8 inputs, resolution 13 bit; only medial exposure	I	**6AG1 331-1KF02-4AB0**
8 inputs, resolution 13 bit	I	**6AG1 331-1KF02-7AB0**
2 inputs, resolution 9/12/14 bit	H	**6AG1 331-7KB02-2AB0**
8 inputs, resolution 9/12/14 bit	L	**6AG1 331-7KF02-2AB0**
8 inputs, enhanced resolution 16 bit	H	**6AG1 331-7NF00-2AB0**
8 inputs, enhanced resolution 16 bit, 4-channel mode	H	**6AG1 331-7NF10-2AB0**
8 inputs, for thermal resistors	L	**6AG1 331-7PF01-4AB0**
8 inputs, for thermocouples	L	**6AG1 331-7PF11-4AB0**
Accessories		See SIMATIC S7-300 analog input modules, page 5/140

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H
I: Subject to export regulations AL: N and ECCN: EAR99H
L: Subject to export regulations AL: 9I999 and ECCN: N

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Overview



- Analog outputs
- For connection of analog actuators

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS SM 332	**2 AO 1 X 20-pin**	**4 AO 1 X 20-pin**	**8 AO 1 X 40-pin**
Order number	**6AG1 332-5HB01-2AB0**	**6AG1 332-5HD01-7AB0**	**6AG1 332-5HF00-2AB0**
Order No. based on	**6ES7 332-5HB01-0AB0**	**6ES7 332-5HD01-0AB0**	**6ES7 332-5HF00-0AB0**
Ambient temperature range	-25 ... +70 °C	-25 ... +70 °C	-25 ... +70 °C
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	Yes	No	No
Conformal coating	Coating of the printed circuit boards and the electronic components		
Technical data	The technical data of the standard product applies except for the ambient conditions.		

SIPLUS SM 332	**8 AO 1 X 40-pin**	**4 AO 1 X 20-pin**
Order number	**6AG1 332-5HF00-4AB0**	**6AG1332-7ND02-4AB0**
Order No. based on	**6ES7 332-5HF00-0AB0**	**6ES7 332-7ND02-0AB0**
Ambient temperature range	0 ... +60 °C	0 ... +60 °C
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	No	No
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	

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SIPLUS SM 332 analog output module

Overview (continued)

Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOx < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOx < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS SM 332 analog output modules		
(extended temperature range and medial exposure)		
incl. labeling strips, bus connector		
4 outputs, 11/12 bit	L	**6AG1 332-5HD01-7AB0**
4 outputs, 16 bit; only medial exposure	I	**6AG1 332-7ND02-4AB0**
2 outputs, 11/12 bit	H	**6AG1 332-5HB01-2AB0**
8 outputs, 11/12 bit	L	**6AG1 332-5HF00-2AB0**
8 outputs, 11/12 bit; only medial exposure	L	**6AG1 332-5HF00-4AB0**
Accessories		See SIMATIC S7-300 analog output modules, page 5/143

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H
I: Subject to export regulations AL: N and ECCN: EAR99H
L: Subject to export regulations AL: 9I999 and ECCN: N

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Overview



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

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS SM 334	**2 AO**
Order number	**6AG1 334-0KE00-7AB0**
Order No. based on	**6ES7 334-0KE00-0AB0**
Ambient temperature range	-25 ... + 70 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions.
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	No
Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOx < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOx < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

Ordering data	**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	**6AG1 334-0KE00-7AB0**
Accessories	See SIMATIC S7-300 analog input/output modules, page 5/146

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SM 326 F digital input module - Safety Integrated

Overview



- Digital inputs for the fail-safe SIMATIC S7 systems
- For connecting:
  - Switches and 2-wire proximity switches
  - 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 operation
  - 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
- In standard operation can be used in the same way as S7-300 modules

Technical specifications

	6ES7 326-1RF00-0AB0	6ES7 326-1BK02-0AB0
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 5 V DC, max.	90 mA	100 mA
Power losses		
Power loss, typ.	4.5 W	10 W
Connection method		
required front connector	40-pin	40-pin
Digital inputs		
Number of digital inputs	8; 8 (one-channel); 4 (two-channel)	24
Number of simultaneously controllable inputs		
• all mounting positions		
- Concurrently controllable inputs, up to 40 °C	8; vertical setup	24
- Concurrently 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
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

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Technical specifications (continued)

	6ES7 326-1RF00-0AB0	6ES7 326-1BK02-0AB0
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		Yes; if short-circuit test is deactivated
- permissible quiescent current (2-wire BEROS), max.		2 mA
Ex(i) characteristics		
Module for Ex(i) protection	Yes	
Max. values of input circuits (per channel)		
• Co (permissible external capacity), max.	3 µF	
• Io (short-circuit current), max.	13.9 mA	
• Lo (permissible external inductivity), max.	80 mH	
• Po (power of load), max.	33.1 mW	
• Uo (output no-load voltage), max.	10 V	
• Um (fault voltage), max.	60 V DC/ 30 V AC	
• Ta (permissible ambient temperature), max.	60 °C	60 °C
Alarms/diagnostics/status information		
Alarms		
• Diagnostic alarm	Yes	Yes
Diagnostics		
• Diagnostic information readable	Yes	Yes
Isolation		
Isolation checked with	500 V DC	500 V DC / 350 V AC
Galvanic 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
Standards, approvals, certificates		
Test number KEMA	99 ATEX 2671 X	
Highest safety class achievable in safety mode		
• to DIN VDE 0801	AK 4 (one channel), AK 5 und 6 (two channel)	AK 6
• acc. to EN 954	Cat. 3 (single-channel), Cat. 4 (two-channel)	Cat. 4
• acc. to IEC 61508	SIL 2 (single-channel), SIL 3 (two-channel)	SIL 3
Dimensions and weight		
Dimensions		
• Width	80 mm	80 mm
• Height	125 mm	125 mm
• Depth	120 mm	120 mm
Weight		
• Weight, approx.	482 g	442 g

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SM 326 F digital input module - Safety Integrated

Ordering Data	Order No.
F digital input module SM 326	
24 inputs, 24 V DC	**6ES7 326-1BK02-0AB0**
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 Requirements: STEP 7 V5.3 SP3 and higher	
Floating License	**6ES7 833-1FC02-0YA5**
Software Update Service	**6ES7 833-1FC00-0YX2**
Distributed Safety Upgrade	
From V5.x to V5.4; Floating license for 1 user	**6ES7 833-1FC02-0YE5**
Labeling sheet with strips for 10 electronic blocks	
• For 16-channel electronic blocks incl. add-on terminals	**6ES7 193-1BH00-0XA0**
• For 32-channel electronic blocks incl. add-on terminals	**6ES7 193-1BL00-0XA0**
Connecting cable for PROFIBUS	**6ES7 901-4BD00-0XA0**
12 Mbit/s, for connecting PG to PROFIBUS DP, pre-assembled with 2 x 9-pin Sub-D connector, 3 m	
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, FastConnect terminating resistor with isolating function, without PG socket, up to 12 Mbit/s; 1 unit	
- 1 unit	**6ES7 972-0BA52-0XA0**
- 100 units	**6ES7 972-0BA52-0XB0**
• 90° cable outlet, FastConnect terminating resistor with isolating function, with PG socket, up to 12 Mbit/s; 1 unit	
- 1 unit	**6ES7 972-0BB52-0XA0**
- 100 units	**6ES7 972-0BB52-0XB0**
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**

		Order No.
Active bus module		**6ES7 195-7HC00-0XA0**
BM 1 x 80 for 1 module with 80 mm width		
SITOP power supply module		**6ES7 307-1EA01-0AA0**
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**
SIMATIC manual collection	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC		
SIMATIC manual collection update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		

D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

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SM 326 F digital output module - Safety Integrated

Overview



- Digital outputs for the fail-safe SIMATIC S7 systems
- Two versions (1 x current sourcing, 1 x current sinking)
- For connecting solenoid valves, DC contactors and indicator lights
- With integral safety functions for fail-safe operation
- Can be used in fail-safe operation
  - Centrally: with S7-31xF DP, S7-31xF PN/DP
  - Distributed in ET 200M: with SIMATIC IM 151-7 F-CPU, S7-31xF-2 DP, S7-41xF-2 and S7-400F/FH

Technical specifications

	6ES7 326-2BF10-0AB0	6ES7 326-2BF41-0AB0
Supply voltages		
Load voltage L+		
• Rated value (DC)	24 V; 1L+, 2L+, 3L+	24 V; 1L+, 2L+, 3L+
Current consumption		
from load voltage1L+, max.	100 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 5 V DC, max.	100 mA	100 mA
Power losses		
Power loss, typ.	6 W	12 W
Connection method		
required front connector	40-pin	40-pin
Digital outputs		
Number of digital outputs	10	8
Short-circuit protection	Yes; Electronic	Yes; Electronic
Limitation of inductive shutdown voltage to		L+ (-33 V)
Lamp load, max.	5 W	5 W
Output voltage		
• for signal "1" without series diode, min.		L+ (-1.0 V)
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
• 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
• for signal "0" residual current, max.	0.5 mA	0.5 mA
Switching frequency		
• with resistive load, max.	25 Hz	30 Hz
• with inductive load, max.	25 Hz	2 Hz
• on lamp load, max.	10 Hz	10 Hz
Aggregate current of outputs (per group)		
• horizontal installation		
- up to 40 °C, max.	10 A	7.5 A
- up to 60 °C, max.	6 A	5 A
• vertical installation		
- up to 40 °C, max.	5 A	5 A
Cable length		
• Cable length, shielded, max.	1 000 m	200 m; 200 m for SIL3, AK 6, Cat 4
• Cable length unshielded, max.	600 m	

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Technical specifications (continued)

	6ES7 326-2BF10-0AB0	6ES7 326-2BF41-0AB0
Alarms/diagnostics/status information		
Alarms		
• Diagnostic alarm	Yes	Yes; Parameterizable
Diagnostics		
• Diagnostic information readable	Yes	Yes
Isolation		
Isolation checked with	370 V for 1 min	500 V DC / 350 V AC
Galvanic isolation		
Galvanic 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 power supply of the electronics	Yes	Yes
Standards, approvals, certificates		
Highest safety class achievable in safety mode		
• to DIN VDE 0801	AK 5 and 6	
• acc. to EN 954	Cat. 4	Cat. 4
• acc. to IEC 61508	SIL 3	SIL 3
Dimensions and weight		
Dimensions		
• Width	40 mm	80 mm
• Height	125 mm	125 mm
• Depth	120 mm	120 mm
Weight		
• Weight, approx.	330 g	465 g

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Ordering data	Order No.
F digital output module SM 326	
10 outputs, 24 V DC, 2 A PP; width 40 mm	**6ES7 326-2BF10-0AB0**
8 outputs, 24 V DC, 2 A PM; width 80 mm	**6ES7 326-2BF41-0AB0**
Distributed Safety V5.4 programming tool	
Task: Software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, ET 200S Requirements: STEP 7 V5.3 SP3 and higher	
Floating License	**6ES7 833-1FC02-0YA5**
Software Update Service	**6ES7 833-1FC00-0YX2**
Distributed Safety Upgrade	
From V5.x to V5.4; Floating license for 1 user	**6ES7 833-1FC02-0YE5**
Labeling sheet with strips for 10 electronic blocks	
• For 16-channel electronic blocks incl. add-on terminals	**6ES7 193-1BH00-0XA0**
• For 32-channel electronic blocks incl. add-on terminals	**6ES7 193-1BL00-0XA0**
Connecting cable for PROFIBUS	**6ES7 901-4BD00-0XA0**
12 Mbit/s, for connecting PG to PROFIBUS DP, pre-assembled with 2 x 9-pin Sub-D connector, 3 m	
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, FastConnect terminating resistor with isolating function, without PG socket, up to 12 Mbit/s; 1 unit	
- 1 unit	**6ES7 972-0BA52-0XA0**
- 100 units	**6ES7 972-0BA52-0XB0**
• 90° cable outlet, FastConnect terminating resistor with isolating function, with PG socket, up to 12 Mbit/s; 1 unit	
- 1 unit	**6ES7 972-0BB52-0XA0**
- 100 units	**6ES7 972-0BB52-0XB0**
DIN rail for active bus modules	
for max. 5 active bus modules, for function "Insertion and removal"	
• 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**

		Order No.
Active bus modules		
BM 2 x 40 for accepting 2 IO modules each 40 mm wide		**6ES7 195-7HB00-0XA0**
BM 1 x 80 for accepting 1 IO module 80 mm wide		**6ES7 195-7HC00-0XA0**
SITOP power supply module		**6ES7 307-1EA01-0AA0**
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**
SIMATIC manual collection	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC		
SIMATIC manual collection update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		

D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

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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
Product type designation	SM 336 F-AI 6x0/4 to 20 mA HART
Supply voltages	
Load voltage L+	
• Rated value (DC)	24 V
• Reverse polarity protection	Yes
Current consumption	
from backplane bus 5 V DC, max.	90 mA
from supply voltage L+, max.	150 mA; Typical
Power losses	
Power loss, typ.	4.5 W
Connection method	
required front connector	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
Current input	
• permissible input current for current input (destruction limit), max.	40 mA
Analog value creation	
Integrations and conversion time/ resolution per channel	
• Resolution with overrange (bit including sign), max.	16 bit; 15 bits + 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 %
Alarms/diagnostics/status information	
Alarms	
• Diagnostic alarm	Yes
Diagnostics	
• Diagnostic information readable	Yes
Isolation	
Isolation checked with	370 V for 1 min
Galvanic isolation	
Galvanic isolation analog inputs	
• between the channels	Yes
• between the channels and the backplane bus	Yes
• between the channels and the power supply of the electronics	Yes
Standards, approvals, certificates	
Highest safety class achievable in safety mode	
• acc. to DIN V 19250	old
• acc. to EN 954	Cat. 4
• acc. to IEC 61508	SIL 3
Dimensions and weight	
Dimensions	
• Width	40 mm
• Height	125 mm
• Depth	120 mm
Weight	
• Weight, approx.	350 g

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Ordering Data		Order No.
F analog input module SM 336		
6 inputs, 15 bit, 0/4 - 20 mA HART		**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 Requirements: STEP 7 V5.3 SP3 and higher		
Floating License		**6ES7 833-1FC02-0YA5**
Software Update Service		**6ES7 833-1FC00-0YX2**
Distributed Safety Upgrade		
From V5.x to V5.4; Floating license for 1 user		**6ES7 833-1FC02-0YE5**
Labeling sheet with strips for 10 electronic blocks		
• For 16-channel electronic blocks incl. add-on terminals		**6ES7 193-1BH00-0XA0**
• For 32-channel electronic blocks incl. add-on terminals		**6ES7 193-1BL00-0XA0**
Connecting cable for PROFIBUS		**6ES7 901-4BD00-0XA0**
12 Mbit/s, for connecting PG to PROFIBUS DP, pre-assembled with 2 x 9-pin Sub-D connector, 3 m		
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, FastConnect terminating resistor with isolating function, without PG socket, up to 12 Mbit/s; 1 unit		
- 1 unit		**6ES7 972-0BA52-0XA0**
- 100 units		**6ES7 972-0BA52-0XB0**
• 90° cable outlet, FastConnect terminating resistor with isolating function, with PG socket, up to 12 Mbit/s; 1 unit		
- 1 unit		**6ES7 972-0BB52-0XA0**
- 100 units		**6ES7 972-0BB52-0XB0**
DIN rail for active bus modules		
for max. 5 active bus modules for hot swapping function		
• 483 mm long		**6ES7 195-1GA00-0XA0**
• 530 mm long		**6ES7 195-1GF30-0XA0**
• 620 mm long		**6ES7 195-1GG30-0XA0**
• 2000 mm long		**6ES7 195-1GC00-0XA0**
Active bus module BM 2x40		**6ES7 195-7HB00-0XA0**
Bus module for accepting 2 IO modules each 40 mm wide		
SITOP power supply module		**6ES7 307-1EA01-0AA0**
for ET 200M; 120/230 V AC, 24 V DC, 5 A; Type PS 307-1E		
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**
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		
S7 SmartLabel V3.0		
Software for automatic labeling of modules direct from the STEP 7 project		
Single license	J	**2XV9 450-1SL03-0YX0**
Upgrade single license	J	**2XV9 450-1SL03-0YX4**
Labeling sheets for machine inscription		
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**
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**
SIMATIC manual collection	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC		
SIMATIC manual collection update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		

D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

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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	Yes, behind the CPU
• Standard and fail-safe modules in the tier	Yes, after the last standard module and before the first fail-safe module
Central use after CPU 31xF-2 DP or CPU 31xF-2 PN/DP in an expansion rack	
• Only fail-safe modules in the tier	Yes, after the IM 36x
• Standard and fail-safe modules in the tier	Yes, after the last standard module and before the first fail-safe module
Distributed behind the IM 153-2 with copper connection	
• Only fail-safe modules in the station	Yes, after the IM 153-2
• Standard and fail-safe modules in the station	Yes, after the last standard module and before the first fail-safe module
Distributed behind the IM 153-2 with fiber-optic connection	
• Only fail-safe modules in the station	No
• Standard and fail-safe modules in the station	Yes, after the last standard module and before the first fail-safe module

Technical specifications

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

Ordering data

	Order No.
Isolation module for simultaneous operation of fail-safe and standard modules in an ET 200M	**6ES7 195-7KF00-0XA0**
Isolation bus module for accommodating the isolating module in an ET 200M	**6ES7 195-7HG00-0XA0**

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Overview



- Digital inputs for the fail-safe SIPLUS S7 systems
- For connecting:
  - Switches and 2-wire proximity switches
  - 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 operation
  - 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
- In standard operation can be used in the same way as S7-300 modules

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS SM 326 F digital input module		
Order No.	**6AG1 326-1BK02-2AB0**	**6AG1 326-1RF00-4AB0**
Order No. based on	**6ES7 326-1BK02-0AB0**	**6AG1 326-1RF00-0AB0**
Ambient temperature range	- 25 ... + 60 °C	0 ... + 60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	
Ambient conditions		
Relative humidity	5 ... 100%, condensation allowed	

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

Ordering data		**Order No.**
SIPLUS SM 326 F digital input		
(extended temperature range and medial exposure)		
24 inputs, 24 V DC	H	**6AG1 326-1BK02-2AB0**
8 inputs, 24 V DC, NAMUR	L	**6AG1 326-1RF00-4AB0**
Accessories		See SIMATIC SM 326 F digital input, page 5/154

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H
L: Subject to export regulations AL: 9I999 and ECCN: N

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SIPLUS F digital output module SM 326 - Safety Integrated

Overview



- Digital outputs for the fail-safe SIMATIC S7 systems
- 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

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS SM 326 F digital output module		
Order No.	**6AG1 326-2BF41-2AB0**	**6AG1 326-2BF41-2AY0**
Order No. based on	**6ES7 326-2BF41-0AB0**	**6ES7 326-2BF41-0AB0**
Ambient temperature range	-25 ... +60 °C	
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions	
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	No	Yes
Ambient conditions		
Relative humidity	5 ... 100%, condensation allowed	

The technical documentation on SIPLUS can be found here: www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS SM 326 F digital output module		
(extended temperature range and medial exposure)		
8 outputs, 24 V DC, 2 A	H	**6AG1 326-2BF41-2AB0**
8 outputs, 24 V DC, 2 A (according to EN 50155)	H	**6AG1 326-2BF41-2AY0**
Accessories		See SIMATIC SM 326 F digital output module, page 5/157

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H

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Overview



- Analog inputs for the fail-safe SIPLUS S7 systems
- Applicable in the ET 200M distributed I/O device with IM 153-2 HF as well as centrally with SIPLUS 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 mA to 20 mA, 4 mA to 20 mA
  - Short-circuit proof power supply of 2 or 4-wire transmitter via the module
  - External encoder supply possible
  - Applicable in safety mode
  - HART communication
  - Firmware update using HW Config
  - Identification data

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS SM 336 F analog input module	
Order number	**6AG1 336-4GE00-4AB0**
Order No. based on	**6ES7 336-4GE00-0AB0**
Ambient temperature range	0 ... +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions.
Ambient conditions	
Relative humidity	5 ... 100%, condensation allowed

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

	Order No.
SIPLUS SM 336 F analog input module	
(medial exposure)	
6 inputs, 15 bit, 0/4 - 20 mA HART	**6AG1 336-4GE00-4AB0**
Accessories	See SIMATIC SM 336 F analog input module, page 5/159

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SIPLUS isolation module

Overview



- Permits combined operation of fail-safe signal modules in safety mode and standard S7-300 modules in the same ET 200M system.
- The isolation module is not required if the safety class SIL 3 or safety category < Cat. 4 is to be achieved.

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

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
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical specifications	The technical data of the standard product applies except for the ambient conditions.
Ambient conditions	
Relative humidity	5 ... 100%, condensation allowed

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS isolation module for simultaneous operation of fail-safe and standard modules in the same ET 200M	H	**6AG1 195-7KF00-2XA0**
Accessories		See SIMATIC S7-300 isolation module, page 5/160

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H

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Overview



- Digital inputs for signals from the Ex field
- For the connection of intrinsically safe digital equipment from the Ex field
- 4 DI NAMUR
- 4 digital inputs in 4 channel modules (single-channel isolation)
- Connectable encoder in accordance with EN 60947-5-6 and NAMUR, optionally with wired or unwired mechanical contacts
- Diagnostics and diagnostic alarm programmable

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 5 V DC, max.	80 mA
Power losses	
Power loss, typ.	1.1 W
Connection method	
required front connector	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"	0.35 to 1.2 mA
- for signal "1"	2.1 to 7 mA
Input delay (for rated value of input voltage)	
• Input frequency (with a time delay of 0.1 ms), max.	2 kHz
• for NAMUR inputs	
- parameterizable	Yes; 0.1 / 0.5 / 3 / 15 / 20 ms (plus 0.25 ms preparation time)
Cable length	
• Cable length unshielded, max.	200 m
Encoder supply	
Output voltage	via the inputs

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

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Ex digital input modules

Ordering data		Order No.
Ex digital input module		
4 inputs, isolated, NAMUR		**6ES7 321-7RD00-0AB0**
Front connectors		
20-pin, with screw contacts		
• 1 unit		**6ES7 392-1AJ00-0AA0**
• 100 units		**6ES7 392-1AJ00-1AB0**
Front door, elevated design		
e.g. for 32 channel modules; enables connection of 1.3 mm^2/16 AWG wires		**6ES7 328-0AA00-7AA0**
LK 393 cable guide		**6ES7 393-4AA00-0AA0**
Mandatory for operation in Ex-hazard areas		
Labeling strips		**6ES7 392-2XX00-0AA0**
10 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		
S7 SmartLabel V3.0		
Software for automatic labeling of modules direct from the STEP 7 project		
Single license	J	**2XV9 450-1SL03-0YX0**
Upgrade single license	J	**2XV9 450-1SL03-0YX4**

		Order No.
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	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC		
SIMATIC manual collection update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		

D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

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Overview



- Digital outputs for signals from the Ex field
- For the connection of intrinsically safe digital equipment from the Ex field
- 4 DO 24 V DC/10mA or 4 DO 15 V DC/20 mA
- 4 digital outputs in 4 channel modules (single-channel isolation)
- Diagnostics and diagnostic alarm programmable
- Substitute value behavior programmable

Technical specifications

	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 5 V DC, max.	70 mA	70 mA
Power losses		
Power loss, typ.	3 W	3 W
Connection method		
required front connector	20-pin	20-pin
Digital outputs		
Number of digital outputs	4	4
Short-circuit protection	Yes; Electronic	Yes; Electronic
• Response threshold, typ.	Output current with short-circuit protection, min. 10 mA + 10 %	Output current with short-circuit protection, min. 20.5 mA + 10 %
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 resistance range		
• upper limit	390 Ω; Two-wire connection	200 Ω; Two-wire connection
Cable length		
• Cable length unshielded, max.	200 m	200 m
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
Alarms/diagnostics/status information		
Diagnostics		
• Diagnostic information readable	Yes	Yes
• Short circuit	Yes	Yes
• Group error	Yes	Yes

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Ex digital output modules

Technical specifications (continued)

	6ES7 322-5SD00-0AB0	6ES7 322-5RD00-0AB0
Galvanic isolation		
Galvanic isolation digital outputs		
• Galvanic isolation digital outputs	Yes	Yes
• between the channels, in groups of	1	1
Standards, approvals, certificates		
Type of protection acc. to EN 50020 (CENELEC)	[EEx ib] IIC	[EEx ib] IIC
Type of protection acc. to FM	Class I, Division 2, Group A, B, C, D T4	AIS CL.1, DIV 1, GP A, B, C, D; CL.I, DIV 2, GP A, B,C, D T4
Test number PTB	Ex-96.D.2093X	Ex-96.D.2102X
Dimensions and weight		
Weight		
• Weight, approx.	230 g	230 g

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Ordering data

		Order No.
Ex digital output modules		
4 outputs, isolated, 24 V DC, 10 mA		**6ES7 322-5SD00-0AB0**
4 outputs, isolated, 15 V DC, 20 mA		**6ES7 322-5RD00-0AB0**
Front connectors		
20-pin, with screw contacts		
• 1 unit		**6ES7 392-1AJ00-0AA0**
• 100 units		**6ES7 392-1AJ00-1AB0**
Front door, elevated design		
e.g. for 32 channel modules; enables connection of 1.3 mm^2/16 AWG wires		**6ES7 328-0AA00-7AA0**
LK 393 cable guide		**6ES7 393-4AA00-0AA0**
Mandatory for operation in Ex-hazard areas		
Labeling strips		**6ES7 392-2XX00-0AA0**
10 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		
S7 SmartLabel V3.0		
Software for automatic labeling of modules direct from the STEP 7 project		
Single license	J	**2XV9 450-1SL03-0YX0**
Upgrade single license	J	**2XV9 450-1SL03-0YX4**

		Order No.
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	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC		
SIMATIC manual collection update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		

D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

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Overview



- Analog inputs for signals from the Ex field
- For the connection of intrinsically safe analog equipment from the Ex field
- 8 or 4 analog inputs in 4 channel groups (single-channel isolation)
- Measurement type and range can be selected for each channel
- Diagnostics and diagnostic alarm programmable
- Programmable threshold alarm
- HART-compatible inputs (only 6ES7331-7RD00-0AB0)

Technical specifications

	6ES7 331-7RD00-0AB0	6ES7 331-7SF00-0AB0
Supply voltages		
Load voltage L+		
• Rated value (DC)	24 V	24 V
Power supply to the transmitters		
• present	Yes	
• Rated value (DC)	13 V; at 22 mA	
• No-load voltage (DC)	25.2 V	
Current consumption		
from backplane bus 5 V DC, max.	60 mA	120 mA
from supply voltage L+, max.	150 mA	
Power losses		
Power loss, typ.	3 W	0.6 W
Connection method		
required front connector	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
• 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
Current input		
• permissible input current for current input (destruction limit), max.	40 mA	

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Technical specifications (continued)

	6ES7 331-7RD00-0AB0	6ES7 331-7SF00-0AB0
Analog value creation		
Measurement principle	Sigma Delta	Sigma Delta
Integrations and conversion time/ resolution per channel		
• Resolution with overrange (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
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 mH	40 mH
• Po (power of load), max.	431 mW	41.4 mW
• Ri, max.	50 Ω	
• Uo (output no-load voltage), max.	25.2 V	5.9 V
Errors/accuracies		
Temperature error (relative to input area)		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 x (fl +/- 1%), fl = interference frequency		
• Series mode interference (peak value of interference < rated value of input range), min.	60 dB	60 dB
• Common mode interference, min.	130 dB	130 dB
Alarms/diagnostics/status information		
Diagnostics		
• Diagnostic information readable	Yes	Yes
• Overrange	Yes	Yes
• Wire break in signal transmitter cable	Yes	Yes
• Short circuit of the signal encoder cable	Yes	Yes
Galvanic isolation		
Galvanic isolation analog inputs		
• Galvanic isolation analog inputs	Yes	Yes
Permissible potential difference		
between the inputs (UCM)	60 V DC/30 V AC when used in the hazardous area; 400 V DC/250 V AC when used in the NON-hazardous area	60 V DC/30 V AC when used in the hazardous area; 400 V DC/250 V AC when used in the NON-hazardous area
between inputs and MANA (UCM)	60 V DC/30 V AC when used in the hazardous area; 400 V DC/250 V AC when used in the NON-hazardous area	60 V DC/30 V AC when used in the hazardous area; 400 V DC/250 V AC when used in the NON-hazardous area
Standards, approvals, certificates		
Type of protection acc. to EN 50020 (CENELEC)	[EEx ib] IIC	[EEx ib] IIC
Type of protection acc. to FM	Class I, Division 2, Group A, B, C, D T4	Class I, Division 2, Group A, B, C, D T4
Test number PTB	Ex-96.D.2092X	Ex-96.D.2108X
Dimensions and weight		
Weight		
• Weight, approx.	290 g	210 g

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Ordering data		Order No.
Ex analog input modules		
4 inputs, isolated, 0/4 to 20 mA, 15 bit		**6ES7 331-7RD00-0AB0**
8/4 inputs, isolated, for thermo-couples and Pt100, Pt200, Ni100		**6ES7 331-7SF00-0AB0**
Front connectors		
20-pin, with screw contacts		
• 1 unit		**6ES7 392-1AJ00-0AA0**
• 100 units		**6ES7 392-1AJ00-1AB0**
Front door, elevated design		
e.g. for 32 channel modules; enables connection of 1.3 mm^2/16 AWG wires		**6ES7 328-0AA00-7AA0**
LK 393 cable guide		**6ES7 393-4AA00-0AA0**
Mandatory for operation in Ex-hazard areas		
Labeling strips		**6ES7 392-2XX00-0AA0**
10 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		
S7 SmartLabel V3.0		
Software for automatic labeling of modules direct from the STEP 7 project		
Single license	J	**2XV9 450-1SL03-0YX0**
Upgrade single license	J	**2XV9 450-1SL03-0YX4**

		Order No.
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	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC		
SIMATIC manual collection update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		

D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

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Ex analog output modules

Overview



- Analog outputs for signals from the Ex field
- For the connection of intrinsically safe analog equipment from the Ex field
- 4 analog outputs in 4 channel modules (single-channel isolation)
- Diagnostics and diagnostic alarm programmable

Technical specifications

	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 5 V DC, max.	80 mA
Power losses	
Power loss, typ.	4 W
Connection method	
required front connector	20-pin
Analog outputs	
Number of analog outputs	4
Cable length, shielded, max.	200 m
Voltage output, short-circuit protection	Yes
Voltage output, short-circuit current, max.	70 mA
Current output, no-load voltage, max.	14 V
Output ranges, current	
• 0 to 20 mA	Yes
• 4 to 20 mA	Yes
Connection of actuators	
• for current output 2-conductor connection	Yes
Load impedance (in rated range of output)	
• with current outputs, max.	500 Ω
Analog value creation	
Integrations and conversion time/ resolution per channel	
• Resolution with overrange (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

	6ES7 332-5RD00-0AB0
• 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 %
Alarms/diagnostics/status information	
Diagnostics	
• Diagnostic information readable	Yes
• Overrange	Yes
• Wire break in actuator cable	Yes
• Group error	Yes
Galvanic isolation	
Galvanic isolation analog outputs	
• Galvanic isolation analog outputs	Yes
Permissible potential difference	
between outputs and MANA (UCM)	60 V DC/30 V AC when used in the hazardous area; 400 V DC/ 250 V AC when used in NON-hazardous area
between the outputs (UCM)	60 V DC/30 V AC when used in the hazardous area; 400 V DC/ 250 V AC when used in NON-hazardous area
Standards, approvals, certificates	
Type of protection acc. to EN 50020 (CENELEC)	[EEx ib] IIC
Type of protection acc. to FM	Class I, Division 2, Group A, B, C, D T4
Test number PTB	Ex-96.D.2026X
Dimensions and weight	
Weight	
• Weight, approx.	280 g

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Ordering data		Order No.
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		**6ES7 392-1AJ00-0AA0**
• 100 units		**6ES7 392-1AJ00-1AB0**
Front door, elevated design		
e.g. for 32 channel modules; enables connection of 1.3 mm^2/16 AWG wires		**6ES7 328-0AA00-7AA0**
LK 393 cable guide		**6ES7 393-4AA00-0AA0**
Mandatory for operation in Ex-hazard areas		
Labeling strips		**6ES7 392-2XX00-0AA0**
10 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		
S7 SmartLabel V3.0		
Software for automatic labeling of modules direct from the STEP 7 project		
Single license	J	**2XV9 450-1SL03-0YX0**
Upgrade single license	J	**2XV9 450-1SL03-0YX4**

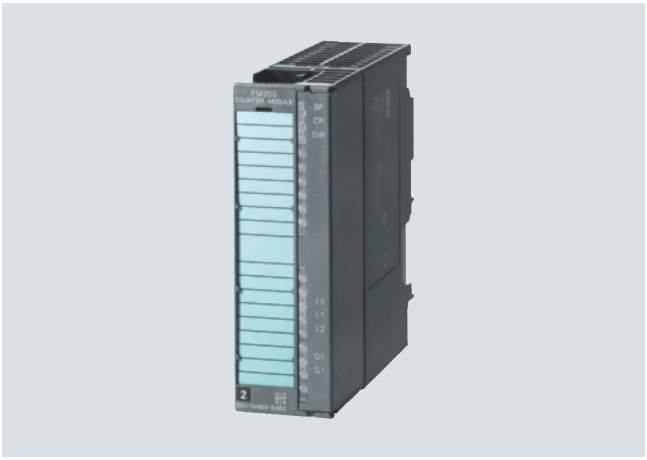
		Order No.
Labeling sheets for machine inscription		
For 16-channel signal modules, DIN A4, for printing with laser printer; 10 units		
petrol		**6ES7 392-2AX00-0AA0**
light-beige		**6ES7 392-2BX00-0AA0**
yellow		**6ES7 392-2CX00-0AA0**
red		**6ES7 392-2DX00-0AA0**
SIMATIC manual collection	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC		
SIMATIC manual collection update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		

D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

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FM 350-1 counter module

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.

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 5 V DC, max.	160 mA
Power losses	
Power loss, typ.	4.5 W
Connection method	
required front connector	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
Input current	
• for signal "1", typ.	9 mA
Digital outputs	
Number of digital outputs	2
Short-circuit protection	Yes; electronically switched
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)

	6ES7 350-1AH03-0AE0
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
Encoder	
Connectable encoders	
• Incremental encoder (symmetrical)	Yes; With 2 pulse trains offset by 90°
• Incremental encoder (asymmetrical)	Yes
• 24 V initiator	Yes
• 24 V directional element	Yes; 1 pulse train, 1 direction level
Counter	
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

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Technical specifications (continued)

	6ES7 350-1AH03-0AE0
Isolation	
Isolation checked with	500 V
Galvanic isolation	
Galvanic isolation digital inputs	
• between the channels and the backplane bus	Yes; Optocoupler
Galvanic isolation digital outputs	
• between the channels and the backplane bus	Yes; Optocoupler
Galvanic isolation counter	
• between the channels and the backplane bus	Yes; Optocoupler

	6ES7 350-1AH03-0AE0
Permissible potential difference	
between different circuits	75 V DC / 60 V AC
Dimensions and weight	
Dimensions	
• Width	40 mm
• Height	125 mm
• Depth	120 mm
Weight	
• Weight, approx.	250 g

Ordering data

		Order No.
FM 350-1 counter module		**6ES7 350-1AH03-0AE0**
with 1 channel, max. 500 kHz; for incremental encoder		
Coding plug - Range card for analog inputs		**6ES7 974-0AA00-0AA0**
Spare part		
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	J	**2XV9 450-1SL03-0YX0**
Upgrade single license	J	**2XV9 450-1SL03-0YX4**
Labeling sheets for machine inscription		See "Accessories", **page 5/308**
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**

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

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

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FM 350-2 counter module

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.

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 5 V DC, max.	100 mA
Power losses	
Power loss, typ.	10 W
Connection method	
required front connector	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
Digital outputs	
Number of digital outputs	8
Short-circuit protection	Yes
Limitation of inductive shutdown voltage to	L+ (-40 V)
Output voltage	
• for signal "1", min.	L+ (-0.8 V)

	6ES7 350-2AH01-0AE0
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 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	
• 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
Encoder	
Connectable encoders	
• Incremental encoder (asymmetrical)	Yes
• 24 V initiator	Yes
• 24 V directional element	Yes
• NAMUR encoder	Yes
• 2-wire BEROS	Yes
NAMUR encoder	
• Number of NAMUR inputs	8
• Input signal	to DIN 19 234
• Input current, for signal "0", max.	1.2 mA
• Input current, for signal "1", min.	2.1 mA
• Input delay, max.	50 µs
• Input frequency, max.	20 kHz
• Cable length, shielded, max.	100 m

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Technical specifications (continued)

	6ES7 350-2AH01-0AE0
Counter	
Counter input 24 V	
• Number	8; 32 bit or +/-31 bit
• Input voltage, for signal "0"	-3 to +5 V
• Input voltage, for signal "1"	11 to 30.2 V
• Input current, for signal "0", max. (permissible quiescent current)	2 mA
• Input current, for signal "1", typ.	9 mA
• Input delay, max.	50 µs
• Counter frequency, max.	20 kHz; Incremental encoder: 10 kHz
• Cable length, max.	100 m
Alarms/diagnostics/status information	
Alarms	
• Diagnostic alarm	Yes; Parameterizable
• Process alarm	Yes; Parameterizable
Diagnostics	
• Diagnostic functions	Yes; Diagnostic information readable

	6ES7 350-2AH01-0AE0
Galvanic isolation	
Galvanic isolation digital inputs	
• between the channels and the backplane bus	Yes; and shielding
• between the channels and the backplane bus (NAMUR)	yes, against backplane bus and shielding
Galvanic isolation digital outputs	
• between the channels and the backplane bus	Yes; and shielding
Galvanic isolation counter	
• between the channels and the backplane bus	Yes; and shielding
Dimensions and weight	
Dimensions	
• Width	80 mm
• Height	125 mm
• Depth	120 mm
Weight	
• Weight, approx.	460 g

Ordering data

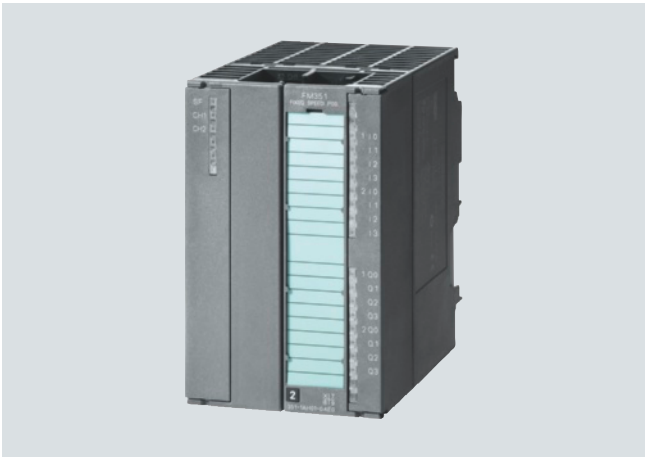
		Order No.
FM 350-2 counter module		**6ES7 350-2AH01-0AE0**
With 8 channels, max. 20 kHz; for 24 V incremental encoders and NAMUR encoders; incl. configuration package and electronic documentation on CD		
Front connector		
40-pin, with screw contacts		
• 1 unit		**6ES7 392-1AM00-0AA0**
• 100 units		**6ES7 392-1AM00-1AB0**
40-pin with 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**
Bus connectors		**6ES7 390-0AA00-0AA0**
1 unit (spare part)		
Labeling strips		**6ES7 392-2XX10-0AA0**
10 units (spare part)		
S7 SmartLabel V3.0		
Software for automatic labeling of modules based on data of the STEP 7 project		
Single license	J	**2XV9 450-1SL03-0YX0**
Upgrade single license	J	**2XV9 450-1SL03-0YX4**
Labeling sheets for machine inscription		See "Accessories", page 5/308
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 and TTL encoder, without sub D connector, UL/DESINA		**6FX5 002-2CA12-** ■ ■ ■ **0**
Length code:		
0 m		**1**
100 m		**2**
200 m		**3**
0 m		**A**
10 m		**B**
20 m		**C**
30 m		**D**
40 m		**E**
50 m		**F**
60 m		**G**
70 m		**H**
80 m		**J**
90 m		**K**
0 m		**A**
1 m		**B**
2 m		**C**
3 m		**D**
4 m		**E**
5 m		**F**
6 m		**G**
7 m		**H**
8 m		**J**
9 m		**K**

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

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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.

www.siemens.com/simatic-technology

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Technical specifications

	6ES7 351-1AH02-0AE0
Supply voltages	
Rated value	
• 24 V DC	Yes
• permissible range, lower limit (DC)	20.4 V
• permissible range, upper limit (DC)	28.8 V
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	
Current consumption, max.	350 mA
from backplane bus 5 V DC, max.	150 mA; max.
Connection method	
required front connector	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

	6ES7 351-1AH02-0AE0
Digital outputs	
Number of digital outputs	8
Functions	Rapid traverse, creep, run right, run left
Short-circuit protection	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

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Technical specifications (continued)

	6ES7 351-1AH02-0AE0
Encoder	
Connectable encoders	
• Incremental encoder (symmetrical)	Yes
• Incremental encoder (asymmetrical)	Yes
• Absolute encoder (SSI)	Yes
• 2-wire BEROS	Yes
- permissible quiescent current (2-wire BEROS), max.	2 mA; on signal "0", max. 2 mA; on signal "1", max. 6 mA
Encoder signals, incremental encoder (symmetrical)	
• Trace mark signals	A, notA, B, notB
• Zero mark signal	N, notN
• Input signal	5 V difference signal (phys. RS 422)
• Input frequency, max.	0.5 MHz
Encoder signals, incremental encoder (asymmetrical)	
• Trace mark signals	A, B
• Zero mark signal	N
• Input voltage	24 V
• Input frequency, max.	50 kHz; 50 kHz for 25 m cable length; 25 kHz for 100 m cable length

	6ES7 351-1AH02-0AE0
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
• Clock frequency, max.	1.5 MHz
• Gray code	Yes
• Cable length, shielded, max.	200 m; At max. 188 kHz
Galvanic isolation	
Galvanic isolation digital inputs	
• Galvanic isolation digital inputs	Yes
Galvanic isolation digital outputs	
• Galvanic isolation digital outputs	Yes
Dimensions and weight	
Dimensions	
• Width	80 mm
• Height	125 mm
• Depth	120 mm
Weight	
• Weight, approx.	550 g

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FM 351 positioning module

Ordering data		Order No.
FM 351 positioning module		**6ES7 351-1AH02-0AE0**
for rapid traverse and creep speed drives		
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**
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	J	**2XV9 450-1SL03-0YX0**
Upgrade single license	J	**2XV9 450-1SL03-0YX4**
Labeling sheets for machine inscription		See "Accessories", **page 5/308**
Spare part		
Shield connection element		**6ES7 390-5AA00-0AA0**
80 mm wide, with 2 rows for 4 terminals each		
Terminal elements		
2 units		
For 2 cables with 2 mm to 6 mm diameter		**6ES7 390-5AB00-0AA0**
For 1 cable with 3 mm to 8 mm diameter		**6ES7 390-5BA00-0AA0**
For 1 cable with 4 mm to 13 mm diameter		**6ES7 390-5CA00-0AA0**

	Order No.
Signal cables	
Pre-assembled for HTL encoder, UL/DESINA	**6FX5 0 ■ 2-2AL00- ■ ■ ■ ■**
Pre-assembled for SSI absolute encoder, UL/DESINA	**6FX5 0 ■ 2-2CC11- ■ ■ ■ ■**
Pre-assembled for TTL encoder 6FX2001-1, UL/DESINA	**6FX5 0 ■ 2-2CD01- ■ ■ ■ ■**
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**

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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.

www.siemens.com/simatic-technology

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Technical specifications

	6ES7 352-1AH02-0AE0
Supply voltages	
Rated value	
• 24 V DC	Yes
Current consumption	
from load voltage L+ (without load), max.	200 mA
from backplane bus 5 V DC, max.	100 mA
Connection method	
required front connector	1x 20-pin
Digital inputs	
Number of digital inputs	4
Functions	Reference point switch, set floating actual value/length measurement, brake release, enable track output no. 3
Input voltage	
• Rated value, DC	24 V
• for signal "0"	-30 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.	7 mA
Digital outputs	
Number of digital outputs	13
Functions	Cam track
Short-circuit protection	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

	6ES7 352-1AH02-0AE0
Encoder supply	
5 V encoder supply	
• 5 V	Yes
• Output current, max.	300 mA
• Cable length, max.	32 m
24 V encoder supply	
• 24 V	Yes
• Output current, max.	300 mA
• Cable length, max.	100 m
Encoder	
Connectable encoders	
• Incremental encoder (symmetrical)	Yes
• Incremental encoder (asymmetrical)	Yes
• Absolute encoder (SSI)	Yes
• 2-wire BEROS	Yes
- permissible quiescent current (2-wire BEROS), max.	2 mA
Encoder signals, incremental encoder (symmetrical)	
• Trace mark signals	A, notA, B, notB
• Zero mark signal	N, notN
• Input signal	5 V difference signal (phys. RS 422)
• Input frequency, max.	1 MHz
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

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FM 352 cam controller

Technical specifications (continued)

	6ES7 352-1AH02-0AE0
Galvanic isolation	
Galvanic isolation digital inputs	
• Galvanic isolation digital inputs	No
Galvanic isolation digital outputs	
• Galvanic isolation digital outputs	No

	6ES7 352-1AH02-0AE0
Dimensions and weight	
Dimensions	
• Width	80 mm
• Height	125 mm
• Depth	120 mm
Weight	
• Weight, approx.	550 g

Ordering data

	Order No.
FM 352 electronic cam controller	**6ES7 352-1AH02-0AE0**
Sub-D connector	**6ES5 750-2AA21**
15-pin, male	
Front connector	
20-pin, with screw contacts	
• 1 unit	**6ES7 392-1AJ00-0AA0**
• 100 units	**6ES7 392-1AJ00-1AB0**
20-pin, with 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 J	**2XV9 450-1SL03-0YX0**
Upgrade single license J	**2XV9 450-1SL03-0YX4**
Labeling sheets for machine inscription	See "Accessories", **page 5/308**

	Order No.
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 5/180**

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Overview



- The FM 352-5 high-speed Boolean processor provides extremely fast binary control and also some of the fastest switching processes ever possible (cycle time: 1 µs).
- Programming is possible with LAD or FBD.
- The available set of statements comprises bit statements (partial statement set of STEP 7), timers, counters, frequency dividers, frequency generators, shift registers.
- 12 integral DI / 8 integral DO.
- 2 versions: Current sinking or current sourcing digital outputs.
- 1 channel for connection of a 24-V incremental encoder, a 5-V incremental encoder (RS422) or an SSI absolute-value sensor.

Micro memory card required for use of the FM 352-5

Note:

Displacement measuring systems and precut/preassembled cables for counting and positioning functions are available under SIMODRIVE Sensor or Motion Connect 500.

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Technical specifications

	6ES7 352-5AH01-0AE0	6ES7 352-5AH11-0AE0
Supply voltages		
Rated value		
• 24 V DC	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 voltage1L+, max.	150 mA; typ. 60 mA	150 mA; typ. 60 mA
from load voltage 2L+ (without load), max.	200 mA; typ. 60 mA, DI/DO supply	200 mA; typ. 60 mA, DI/DO supply
from load voltage 3L+ (with encoder), max.	600 mA; typ. 80 mA plus encoder supply	600 mA; typ. 80 mA plus encoder supply
from load voltage 3L+ (without encoder), max.	200 mA; typ. 80 mA	200 mA; typ. 80 mA
from backplane bus 5 V DC, max.	135 mA; typically	135 mA; typically
Power losses		
Power loss, typ.	6.5 W	6.5 W
Memory		
Memory card, RAM	128 kbyte; required for operation, MMC	128 kbyte; required for operation, MMC
Interfaces		
Updating time	PLC interface: 1.7 ms	PLC interface: 1.7 ms
Connection method		
required front connector	1x 40-pin	1x 40-pin
Programming		
Program cycle time (scan)	1 µs	1 µs

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Technical specifications (continued)

	6ES7 352-5AH01-0AE0	6ES7 352-5AH11-0AE0
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 a time delay of 0.1 ms), max.	200 kHz	200 kHz
• Programmable digital filter delay	None, 5 µs, 10 µs, 15 µs, 20 µs, 50 µs, 1.6 ms	None, 5 µs, 10 µs, 15 µs, 20 µs, 50 µs, 1.6 ms
• 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	600 m
• Cable length unshielded, max.	100 m; Shielded cable recommended if filtering delay is set to less than 1.6 ms	100 m; Shielded cable recommended if filtering delay is set to less than 1.6 ms
Digital outputs		
Number of digital outputs	8	8
Current-sinking	Yes	No
Current-sourcing	No	Yes
Short-circuit protection	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 >55mJ	2M -45 V typ., (-40 to -55 V); comment: no protection against inductive kickback >55mJ
Lamp load, max.	5 W	5 W
Controlling a digital input	No	Yes
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
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		
• Cable length, shielded, max.	600 m	600 m
• Cable length unshielded, max.	100 m	100 m

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Technical specifications (continued)

	6ES7 352-5AH01-0AE0	6ES7 352-5AH11-0AE0
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	Yes	Yes
- permissible quiescent current (2-wire BEROS), max.	1.5 mA	1.5 mA
Encoder signals, incremental encoder (symmetrical)		
• Trace mark signals	A, notA, B, notB	A, notA, B, notB
• Zero mark signal	N, notN	N, notN
• Input signal	5 V difference signal (phys. RS 422)	5 V difference signal (phys. RS 422)
• Input frequency, max.	500 kHz	500 kHz
• Cable length, shielded, max.	100 m; 100 m at 24 V supply and 500 kHz; 32 m at 5 V supply and 500 kHz	100 m; 100 m at 24 V supply and 500 kHz; 32 m at 5 V supply and 500 kHz
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; At 125 kHz	320 m; At 125 kHz
• 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

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Technical specifications (continued)

	6ES7 352-5AH01-0AE0	6ES7 352-5AH11-0AE0
Response times		
Input and output response 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.)
Counter		
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	-2147480000	-2147480000
Counting range, upper limit	2 147 480 000	2 147 480 000
Counting mode		
• Counting mode, individual	Yes	Yes
• Counting mode, continuous	Yes	Yes
• Counting mode, periodic	Yes	Yes
Alarms/diagnostics/status information		
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
Diagnostics		
• Wire break in signal transmitter cable	Yes	Yes
• Overflow/underflow	Yes	Yes
• Missing load voltage	Yes	Yes
Galvanic 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 and 2L and encoder I/O and 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
Dimensions and weight		
Dimensions		
• Width	80 mm	80 mm
• Height	125 mm	125 mm
• Depth	120 mm	120 mm
Weight		
• 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)

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Ordering data	Order No.
FM 352-5 high-speed Boolean processor	
with current sinking digital outputs	**6ES7 352-5AH01-0AE0**
with current sourcing digital outputs	**6ES7 352-5AH11-0AE0**
Micro Memory Card	
128 KB	**6ES7 953-8LG20-0AA0**
512 KB	**6ES7 953-8LJ20-0AA0**
2 MB	**6ES7 953-8LL20-0AA0**
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**

	Order No.
Signal cables	
To HTL and TTL encoders, preassembled, without Sub-D connector	**6FX5 002-2CA12-■■■0**
To SSI absolute encoders 6FX2 001-5, preassembled, without Sub-D connector	**6FX5 002-2CC12-■■■■**
Length code:	See FM 351, page 5/180

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FM 353 positioning module

Overview



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

Technical specifications

	6ES7 353-1AH01-0AE0
Supply voltages	
Rated value	
• 24 V DC	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 method	
required front connector	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	Yes
Output voltage	
• Rated value (DC)	24 V
• for signal "1", min.	UP - 3 V

	6ES7 353-1AH01-0AE0
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
Drive interface	
Signal input I	
• Function	"Power section ready"
Signal output I	
• Type	5 V difference signal (phys. RS 422)
• Function	Direction , enable, clock pulse, current control
• Differential output voltage, min.	2 V; RL = 100 Ohm
• Differential output voltage for signal "0", max.	1 V; Io = 20 mA
• Differential output voltage, for signal "1", min.	3.7 V; Io = -20 mA
• Cable length, max.	35 m
Galvanic isolation	
Galvanic isolation digital inputs	
• Galvanic isolation digital inputs	No
Galvanic isolation digital outputs	
• Galvanic isolation digital outputs	No
Dimensions and weight	
Dimensions	
• Width	80 mm
• Height	125 mm
• Depth	118 mm
Weight	
• Weight, approx.	500 g

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Ordering data	Order No.
FM 353 positioning module For stepper motors; incl. configuration package on CD-ROM (Ge, En, Fr, It) comprising • FM 353 manual, electronic • Standard function blocks (STEP 7 interface software) • Screen form-based configuration software for FM 353 • Standard interactive screen forms for OP7/OP17	**6ES7 353-1AH01-0AE0**
FM 353 manual	
German	**6ES7 353-1AH01-8AG0**
English	**6ES7 353-1AH01-8BG0**
French	**6ES7 353-1AH01-8CG0**
Italian	**6ES7 353-1AH01-8EG0**
Edit FM Program editor for editing, loading and saving NC programs with the standard programming device/PC; German/English, on CD-ROM	**6FC5 263-0AA03-0AB0**
Connecting cables	
To stepper motor power section	**6FX8 0■2-3AC02-■■■■**
Length code:	See FM 351, **page 5/180**
Connecting cables and encoders	See Catalog NC 60, CA 01 or in the Industry Mall
Sub-D connector 15-pin, socket	**6ES5 750-2AB21**
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**

		Order No.
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	J	**2XV9 450-1SL03-0YX0**
Upgrade single license	J	**2XV9 450-1SL03-0YX4**
Labeling sheets for machine inscription		see "Accessories", **page 5/308**
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**

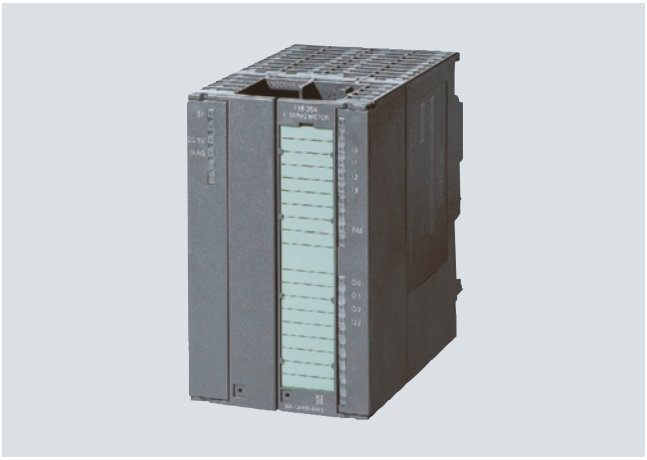
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FM 354 positioning module

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.

www.siemens.com/simatic-technology

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Technical specifications

	6ES7 354-1AH01-0AE0
Supply voltages	
Rated value	
• 24 V DC	Yes
Current consumption	
Current consumption, max.	350 mA
Connection method	
required front connector	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	Yes
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

	6ES7 354-1AH01-0AE0
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

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Technical specifications (continued)

	6ES7 354-1AH01-0AE0
Drive interface	
Signal input I	
• Type	Input loop controller message, isolated (optocoupler)
• Function	"Drive ready"
• Input voltage, rated value (DC)	24 V
• Input voltage, for signal "0"	-3 to +5 V
• Input voltage, for signal "1"	15 to 30 V
• Input current, for signal "1"	2 to 6 mA
Signal output II	
• Type	Output closed-loop controller enable (contact)
• Function	Drive disconnection for operation via contact relay
• Load	1 A/50 V/30 VA DC
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

	6ES7 354-1AH01-0AE0
Galvanic isolation	
Galvanic isolation digital inputs	
• Galvanic isolation digital inputs	No
Galvanic isolation digital outputs	
• Galvanic isolation digital outputs	No
Dimensions and weight	
Dimensions	
• Width	80 mm
• Height	125 mm
• Depth	118 mm
Weight	
• Weight, approx.	550 g

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FM 354 positioning module

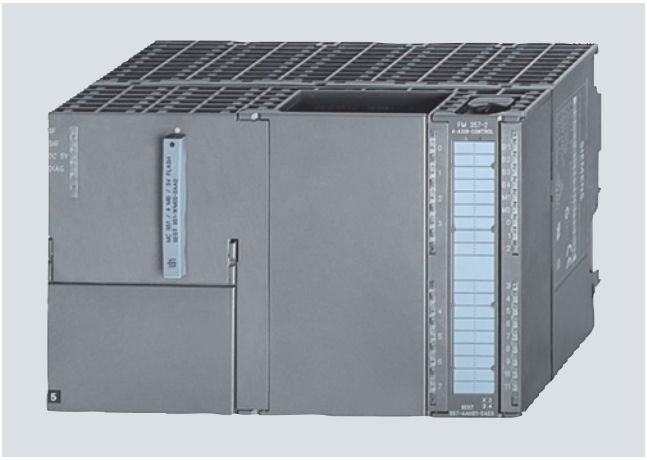
Ordering data		Order No.
FM 354 positioning module for servo motors, incl. configuration package on CD-ROM (Ge, En, Fr, It) comprising • FM 354 manual, electronic • Standard function blocks (STEP 7 interface software) • Screen form-based configuration software for FM 354 • Standard interactive screen forms for OP7/OP17	G	**6ES7 354-1AH01-0AE0**
FM 354 manual		
German		**6ES7 354-1AH01-8AG0**
English		**6ES7 354-1AH01-8BG0**
French		**6ES7 354-1AH01-8CG0**
Italian		**6ES7 354-1AH01-8EG0**
Edit FM 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 SSI absolute encoders 6FX2 001-5, preassembled		**6FX5 0□2-2CC11-□□□□**
To incremental encoders 6FX2 001-1, preassembled		**6FX5 0□2-2CD01-□□□□**
For 24 V incremental encoders, preassembled		**6FX5 0□2-2CD24-□□□□**
To SIMODRIVE 611A, preassembled		**6FX5 0□2-2CJ00-□□□□**
To SIMODRIVE 611U, preassembled		**6FX5 0□2-2CJ10-□□□□**
To SSI absolute encoders 6FX2 001-5, preassembled, without Sub-D connector		**6FX5 002-2CC12-□□□□**
To SSI absolute encoders 6FX2 001-5, preassembled, suitable for trailing		**6FX8 0□2-2CC11-□□□□**
To incremental encoders 6FX2 001-2, preassembled, suitable for trailing		**6FX8 0□2-2CD01-□□□□**
To SIMODRIVE 611A, preassembled, suitable for trailing		**6FX8 0□2-2CJ00-□□□□**
To SIMODRIVE 611U, preassembled, suitable for trailing, 1 free end		**6FX8 0□2-2CJ10-□□□□**
To SIMODRIVE 611A, preassembled, suitable for trailing, free ends		**6FX8 0□2-3AB01-□□□□**
Length code:		see FM 351, **page 5/180**

		Order No.
Encoders		see Catalogs NC 60, CA 01 or in the Industry Mall
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 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 direct from the STEP 7 project		
Single license	J	**2XV9 450-1SL03-0YX0**
Upgrade single license	J	**2XV9 450-1SL03-0YX4**
Labeling sheets for machine inscription		see "Accessories", page 5/308
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**

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Overview



- Path and positioning control for intelligent motion control of up to 4 axes
- Comprehensive range of application, from independent single positioning axes right up to interpolatory multi-axis path control
- For controlling stepper drives and controlled servo drive axes
- User-friendly commissioning with convenient parameterization tool
- Interface for SIMODRIVE 611U and MASTERDRIVES MC via isochronous PROFIBUS (not for FM 357-2H in conjunction with HT6)

Note:

Position measuring systems and preassembled connecting cables for counting and positioning functions are available under SIMODRIVE Sensor or Motion Connect 500.

Additional information is available on the Internet at:

www.siemens.com/simatic-technology

Technical specifications

	6ES7 357-4AH01-0AE0
Supply voltages	
Rated value	
• 24 V DC	Yes
Current consumption	
from backplane bus 5 V DC, max.	100 mA
Power consumption, typ.	24 W
Memory	
NC program memory	750 Kibyte
Connection method	
required front connector	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
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

	6ES7 357-4AH01-0AE0
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.	1.5 Mbit/s
• Cable length, shielded, max.	250 m; at max. 187.5 kBit/s
Positioning	
Programmable traverse speed, max.	1 000 m/min
Drive interface	
Signal output I	
• Type	5 V difference signal (phys. RS 422)
• Function	Direction , enable, clock pulse
• Differential output voltage, min.	2 V; RL = 100 Ohm
• Differential output voltage for signal "0", max.	1 V; Io = 20 mA
• Differential output voltage, for signal "1", min.	3.7 V; Io = -20 mA
• Pulse frequency	750 kHz
• Cable length, max.	50 m; 35 m in hybrid mode with servo axes

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Technical specifications (continued)

	6ES7 357-4AH01-0AE0
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
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

	6ES7 357-4AH01-0AE0
Galvanic isolation	
Galvanic isolation digital inputs	
• Galvanic isolation digital inputs	Yes
Galvanic isolation digital outputs	
• Galvanic isolation digital outputs	Yes
Dimensions and weight	
Dimensions	
• Width	200 mm
• Height	125 mm
• Depth	118 mm
Weight	
• Weight, approx.	1 200 g

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Ordering data

	Order No.
FM 357-2 positioning module G Basic unit	**6ES7 357-4AH01-0AE0**
System firmware incl. configuration package on CD-ROM, German, English, French, Italian, consisting of equipment manual (electronic), configuring software (parameterization screenforms, standard blocks, operator control and monitoring screenforms for OP17/OP27)	
FM 357-2L system firmware On memory card	**6ES7 357-4AH03-3AE0**
FM 357-2LX system firmware With additional functions; on memory card	**6ES7 357-4BH03-3AE0**
FM 357-H system firmware With additional functions for the handling sector; on memory card	**6ES7 357-4CH03-3AE0**
FM 357-2 manual	
German	**6ES7 357-4AH00-8AG0**
English	**6ES7 357-4AH00-8BG0**
French	**6ES7 357-4AH00-8CG0**
Italian	**6ES7 357-4AH00-8EG0**
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**

	Order No.
Connecting cables and encoders	See catalog NC 60, CA 01 or in the Industry Mall
Front connector	
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**
Back-up battery Li-Ion, 3.6 V/0.95 Ah	**6ES7 971-1AA00-0AA0**
Signal cable	
Pre-assembled for SSI absolute encoder, UL/DESINA	**6FX5 0■2-2CC11-■■■■**
Pre-assembled for TTL encoder 6FX2001-1, UL/DESINA	**6FX5 0■2-2CD01-■■■■**
Pre-assembled for TTL encoder 24 V, UL/DESINA	**6FX5 0■2-2CD24-■■■■**
Length code:	see FM 351, page 5/180

G: Subject to export regulations AL: N and ECCN: EAR99APP

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Overview



- 4-channel closed-loop control module for universal control tasks
- Can be used for temperature, pressure, flow and level controls
- Convenient online self-optimization for temperature controls
- Predefined controller structures
- 2 control algorithms
- 2 versions:
  - FM 355 C as continuous 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 actuators
- Continuation of control mode also possible with CPU stop or failure

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 5 V DC, max.	75 mA; typ. 50 mA	75 mA; typ. 50 mA
Power losses		
Power loss, typ.	6.5 W	5.5 W
Power loss, max.	7.8 W	6.9 W
Connection method		
required front connector	2x 20-pin	2x 20-pin
Digital inputs		
Number of digital inputs	8	8
Input characteristic curve acc. 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		8
Short-circuit protection		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)

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Technical specifications (continued)

	6ES7 355-0VH10-0AE0	6ES7 355-1VH10-0AE0
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 outputs (per group)		
• up to 60 °C, max.		400 mA
Load resistance range		
• lower limit		240 Ω
• upper limit		4 kΩ
Cable length		
• Cable length, shielded, max.		1 000 m
• Cable length unshielded, max.		600 m
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
Voltage input		
• permissible input voltage for voltage input (destruction limit), max.	30 V	30 V
Current input		
• permissible input current for current input (destruction limit), max.	40 mA	40 mA
Characteristic linearization		
• parameterizable	Yes	Yes
• for thermocouples	Type B, J, K, R, S	Type B, J, K, R, S
• for resistance thermometer	Pt100 (standard)	Pt100 (standard)
Temperature compensation		
• internal temperature compensation	Yes	Yes
• external temperature compensation with Pt100	Yes	Yes

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Technical specifications (continued)

	6ES7 355-0VH10-0AE0	6ES7 355-1VH10-0AE0
Analog outputs		
Number of analog outputs	4	
Cable length, shielded, max.	200 m; 50 m at 80 mV and thermocouples	
Voltage output, short-circuit protection	Yes	
Voltage output, short-circuit current, max.	25 mA	
Current output, no-load voltage, max.	18 V	
Output ranges, voltage		
• 0 to 10 V	Yes	
• -10 to +10 V	Yes	
Output ranges, current		
• 0 to 20 mA	Yes	
• 4 to 20 mA	Yes	
Connection of actuators		
• for voltage output 2-conductor connection	Yes	
• for current output 2-conductor connection	Yes	
Load impedance (in rated range of output)		
• with voltage outputs, min.	1 kΩ	
• with voltage outputs, capacitive load, max.	1 µF	
• with current outputs, max.	500 Ω	
• with current outputs, inductive load, max.	1 mH	
Analog value creation		
Measurement principle	integrating	integrating
Integrations and conversion time/ resolution per channel		
• Resolution with overrange (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
Errors/accuracies		
Linearity error (relative to input area)	+/- 0.05 %	+/- 0.05 %
Temperature error (relative to input area)	+/- 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 %	

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Technical specifications (continued)

	6ES7 355-0VH10-0AE0	6ES7 355-1VH10-0AE0
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 %	
Interference voltage suppression for f = n x (fl +/- 1%), fl = interference frequency		
• Series mode interference (peak value of interference < rated value of input range), min.	40 dB	40 dB
• common mode voltage (USS < 2.5 V) , min.	70 dB	70 dB
Control technology		
Number of closed-loop controllers	4	4
Alarms/diagnostics/status information		
Substitute values connectable	Yes; parameterizable	Yes; parameterizable
Isolation		
Isolation checked with	500 V DC	500 V DC
Galvanic isolation		
Galvanic 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 and weight		
Dimensions		
• Width	80 mm	80 mm
• Height	125 mm	125 mm
• Depth	120 mm	120 mm
Weight		
• Weight, approx.	470 g	470 g

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Ordering data	Order No.
FM 355 C controller module with 4 analog outputs for 4 continuous controllers	**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	**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 1 unit (spare part)	**6ES7 390-0AA00-0AA0**
Labeling strips 10 units (spare part)	**6ES7 392-2XX00-0AA0**

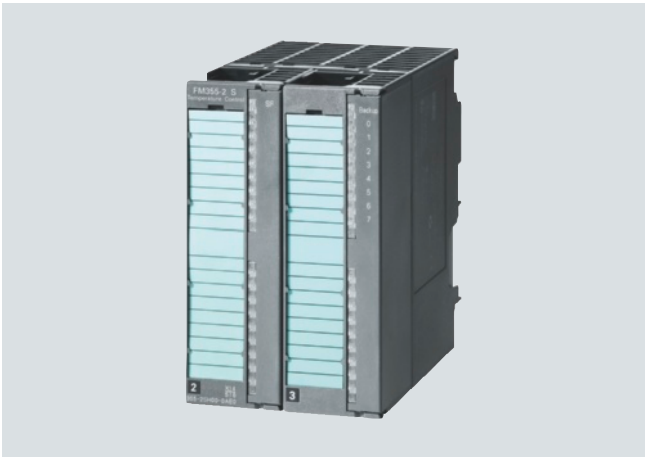
		Order No.
S7 SmartLabel V3.0		
Software for automatic labeling of modules based on data of the STEP 7 project		
Single license	J	**2XV9 450-1SL03-0YX0**
Upgrade single license	J	**2XV9 450-1SL03-0YX4**
Labeling sheets for machine inscription		See "Accessories", **page 5/308**
Slot number label Spare 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**

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FM 355-2 temperature controller module

Overview



- 4-channel closed-loop controller module specifically for temperature controls
- Including integrated and easy-to-use online self-optimization
- Heating and cooling controllers as well as combined controllers with heating and active cooling function feasible
- Ready-to-use controller structures
- 2 versions:
  - FM 355-2 C as a continuous controller;
  - FM 355-2 S as step or pulse controllers
- With 4 analog outputs (FM 355-2 C) or 8 digital inputs (FM 355-2 S) to directly control the most common final control elements
- It is possible to continue closed-loop control operation even if the CPU stops or fails

5

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 5 V DC, max.	75 mA; typ. 50 mA	75 mA; typ. 50 mA
Power losses		
Power loss, typ.	6.5 W	5.5 W
Power loss, max.	7.8 W	6.9 W
Connection method		
required front connector	2x 20-pin	2x 20-pin
Digital inputs		
Number of digital inputs	8	8
Input characteristic curve acc. 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		8
Short-circuit protection		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)

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Technical specifications (continued)

	6ES7 355-2CH00-0AE0	6ES7 355-2SH00-0AE0
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 outputs (per group)		
• up to 60 °C, max.		400 mA
Load resistance range		
• lower limit		240 Ω
• upper limit		4 kΩ
Cable length		
• Cable length, shielded, max.		1 000 m
• Cable length unshielded, max.		600 m
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
Voltage input		
• permissible input voltage for voltage input (destruction limit), max.	20 V	20 V
Current input		
• permissible input current for current input (destruction limit), max.	40 mA	40 mA
Characteristic linearization		
• parameterizable	Yes	Yes
• for thermocouples	Type B, E, J, K, R, S	Type B, E, J, K, R, S
• for resistance thermometer	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	

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Technical specifications (continued)

	6ES7 355-2CH00-0AE0	6ES7 355-2SH00-0AE0
Cable length, shielded, max.	200 m; 50 m at 80 mV and thermocouples	
Voltage output, short-circuit protection	Yes	
Voltage output, short-circuit current, max.	25 mA	
Current output, no-load voltage, max.	18 V	
Output ranges, voltage		
• 0 to 10 V	Yes	
• -10 to +10 V	Yes	
Output ranges, current		
• 0 to 20 mA	Yes	
• 4 to 20 mA	Yes	
Connection of actuators		
• for voltage output 2-conductor connection	Yes	
• for current output 2-conductor connection	Yes	
Load impedance (in rated range of output)		
• with voltage outputs, min.	1 kΩ	
• with voltage outputs, capacitive load, max.	1 µF	
• with current outputs, max.	500 Ω	
• with current outputs, inductive load, max.	1 mH	
Analog value creation		
Measurement principle	integrating	integrating
Integrations and conversion time/ resolution per channel		
• Resolution with overrange (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
Errors/accuracies		
Linearity error (relative to input area)	+/- 0.05 %	+/- 0.05 %
Temperature error (relative to input area)	+/- 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 %	

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Technical specifications (continued)

	6ES7 355-2CH00-0AE0	6ES7 355-2SH00-0AE0
Interference voltage suppression for f = n x (fl +/- 1%), fl = interference frequency		
• Series mode interference (peak value of interference < rated value of input range), min.	40 dB	40 dB
• common mode voltage (USS < 2.5 V) , min.	70 dB	70 dB
Control technology		
Number of closed-loop controllers	4	4
Alarms/diagnostics/status information		
Substitute values connectable	Yes; parameterizable	Yes; parameterizable
Isolation		
Isolation checked with	500 V DC	500 V DC
Galvanic isolation		
Galvanic 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 and weight		
Dimensions		
• Width	80 mm	80 mm
• Height	125 mm	125 mm
• Depth	120 mm	120 mm
Weight		
• Weight, approx.	470 g	470 g

Ordering data

	Order No.
FM 355-2 C temperature controller module	**6ES7 355-2CH00-0AE0**
with 4 analog outputs for 4 continuous controllers	
FM 355-2 S temperature controller module	**6ES7 355-2SH00-0AE0**
with 8 digital outputs for 4 step or pulse controllers	
Front connector	
20-pin, with screw 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)	

		Order No.
S7 SmartLabel V3.0		
Software for automatic labeling of modules based on data of the STEP 7 project		
Single license	J	**2XV9 450-1SL03-0YX0**
Upgrade single license	J	**2XV9 450-1SL03-0YX4**
Labeling sheets for machine inscription		See "Accessories", **page 5/308**
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**

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

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SM 338 POS input module

Overview



- Interface between max. 3 absolute-value sensors (SSI) and the CPU
- For provision of the displacement encoder values for further processing in STEP 7 programs
- Enables direct response of controller to encoder values in moving systems

Note:

Displacement measuring systems and precut/preassembled cables for counting and positioning functions are available under SIMODRIVE Sensor or Motion Connect 500.

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 5 V DC, max.	160 mA
Power losses	
Power loss, typ.	3 W
Connection method	
required front connector	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 "0" 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
Alarms/diagnostics/status information	
Alarms	
• Diagnostic alarm	Yes
Galvanic isolation	
Galvanic isolation	No
Dimensions and weight	
Dimensions	
• Width	40 mm
• Height	125 mm
• Depth	120 mm
Weight	
• Weight, approx.	235 g

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Ordering data		Order No.
SM 338 POS input module		**6ES7 338-4BC01-0AB0**
For position sensing with 3 SSI encoders		
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**
Front door, elevated design		**6ES7 328-0AA00-7AA0**
e.g. for 32-channel modules; for connecting 1.3 mm^2/16 AWG conductors		
SIMATIC manual collection	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC		
SIMATIC manual collection update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		
S7-300 manual		
Design, CPU data, module data, instruction list		
German		**6ES7 398-8FA10-8AA0**
English		**6ES7 398-8FA10-8BA0**
French		**6ES7 398-8FA10-8CA0**
Spanish		**6ES7 398-8FA10-8DA0**
Italian		**6ES7 398-8FA10-8EA0**
Signal cable		
Pre-assembled for SSI absolute encoder 6FX2001-5, without Sub-D connector, UL/DESINA		**6FX5 002-2CC12-■■■■**
Length code:		see FM 351, page 5/180

D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

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IM 174 PROFIBUS module

Overview



- For connecting up to 4 drives with analog setpoint interface or pulse-direction interface to a controller
- Operation with isochronous PROFIBUS DP
- Connectable drives:
  - Electrical drives
  - Hydraulic drives
  - Stepper drives
- Can be used with:
  - SIMATIC CPU 41x-2 DP, CPU 31x-2 DP, CPU 31xT-2 DP, WinAC RTX 2008
  - SIMOTION C2xx, SIMOTION P350, SIMOTION D4x5
- Can also be used with external encoders

Technical specifications

	6ES7 174-0AA10-0AA0
Supply voltages	
Rated value	
• 24 V DC	Yes
• permissible range, lower limit (DC)	20.4 V
• permissible range, upper limit (DC)	28.8 V
Current consumption	
Current consumption, max.	500 mA
from backplane bus 5 V DC, max.	100 mA
Power losses	
Power loss, typ.	12 W
Connection method	
required front connector	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"	11 to 30 V
Input current	
• for signal "0", max. (permissible quiescent current)	2 mA
• for signal "1", typ.	8 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
Digital outputs	
Number of digital outputs	8
Short-circuit protection	Yes
Switching capacity of the outputs	
• with resistive load, max.	1 A
• on lamp load, max.	30 W
Lamp load, max.	30 W
Output voltage	
• Rated value (DC)	24 V; L+
• for signal "1", min.	L+ (-3 V)
• for signal "1" (DC), max.	3 V
Output current	
• for signal "1" permissible range for 0 to 55 °C, min.	5 mA
• for signal "1" permissible range for 0 to 55 °C, max.	300 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.	500 Hz
• with inductive load, max.	0.5 Hz
Cable length	
• Cable length, shielded, max.	600 m
Relay outputs	
Number of relay outputs	4
Number of operating cycles	50 000
Switching capacity of contacts	
• with resistive load, max.	1 A
Analog outputs	
Number of analog outputs	4
Output ranges, voltage	
• -10 to +10 V	Yes
Analog value creation	
Integration and conversion time/ resolution per channel	
• Resolution with overrange (bit including sign), max.	15 bit
Encoder supply	
5 V encoder supply	
• 5 V	Yes
• Output current, max.	1.2 A
• Cable length, max.	25 m
24 V encoder supply	
• 24 V	Yes
• Output current, max.	1.4 A
• Cable length, max.	100 m
Absolute encoder (SSI) encoder supply	
• Absolute encoder (SSI)	Yes
• Cable length, max.	
- Short-circuit protection	Yes

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Technical specifications (continued)

	6ES7 174-0AA10-0AA0
Encoder	
Number of connectable encoders, max.	4
Connectable encoders	
• Incremental encoder (symmetrical)	Yes
• Absolute encoder (SSI)	Yes
• 2-wire BEROS	Yes
- permissible quiescent current (2-wire BEROS), max.	2 mA
Encoder signals, incremental encoder (symmetrical)	
• Trace mark signals	A, notA, B, notB
• Zero mark signal	N, notN
• Input signal	5 V difference signal (phys. RS 422)
• Input frequency, max.	1 MHz
• 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	CL, notCL
• Telegram length	13, 21, 24 bit
• Clock frequency, max.	187.5 KHz 1.5 MHz (parameterizable)
• Binary code	1
• Gray code	1
• Cable length, shielded, max.	250 m; 250 m at 187.5 kHz, 10 m at 1.5 MHz
Drive interface	
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	-10.5 V to +10.5 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.	50 000; at 30 V DC, 1 A
- Cable length (shielded), max.	35 m

	6ES7 174-0AA10-0AA0
Signal output I	
• Type	
- Number of relay contacts	2
• Differential output voltage, min.	
- Switching voltage, max.	30 V
• Differential output voltage for signal "0", max.	
- Switching current, max.	1 A
• Differential output voltage, for signal "1", min.	
- Switching capacity, max.	30 V·A
- Number of switching cycles, min.	at 30 V DC, 1 A
• Load impedance	
- 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
Alarms/diagnostics/status information	
Alarms	
• Diagnostic alarm	Yes
Galvanic isolation	
Galvanic isolation digital inputs	
• Galvanic isolation digital inputs	Yes; to encoders, analog outputs, DP interface; no to other DI/DOs
Galvanic isolation digital outputs	
• Galvanic isolation digital outputs	Yes; to encoders, analog outputs, DP interface; no to other DI/DOs
Dimensions and weight	
Dimensions	
• Width	160 mm
• Height	125 mm
• Depth	118 mm
Weight	
• Weight, approx.	1 kg

Ordering data

IM 174 PROFIBUS module	I	**6ES7 174-0AA10-0AA0**
PROFIBUS module for connecting analog drives and stepper drives to a controller		

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 315, page 5/180

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

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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

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
	With Ex(i) interface:
• R_{Lmin}	> 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
Dimensions	40 x 125 x 130 mm

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

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

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Ordering data	Order No.
SIWAREX U for SIMATIC S7 and ET 200M, incl. bus connector, weight 0.3 kg	
• Single-channel version [1) D)] for connecting one scale I	**7MH4 950-1AA01**
• Two-channel version [2) D)] for connecting two scales I	**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 package for SIMATIC S7 version 5.4 or higher suitable for 7MH4950-1AA01 and 7MH4950-2AA01 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 suitable for 7MH4601-1*A01 and 7MH4950-*AA01 In German and English on CD-ROM, module for the CFC and faceplate	**7MH4 683-3BA64**
SIWAREX U configuration package for PCS7 S7 version 7.0 and V7.1 suitable for 7MH4950-1AA01 and 7MH4950-2AA01 on CD-ROM • HSP Hardware Support • Package for integration of SIWAREX U in STEP 7 • Function block for the CFC chart • Faceplate • SIWATOOL U setting software • Manual	**7MH4 950-3AK61**
SIWATOOL connecting cable D I of SIWAREX U/CS with serial PC interface, for 9-pin PC interfaces (RS 232), length 3 m	**7MH4 607-8CA**
Installation material (mandatory)	
20-pin front plug with screw contacts (required for each SIWAREX module)	
Shield contact element Sufficient for two SIWAREX U modules	**6ES7 392-1AJ00-0AA0**
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	**6ES7 390-1AB60-0AA0**
480 mm	**6ES7 390-1AE80-0AA0**
530 mm	**6ES7 390-1AF30-0AA0**
830 mm	**6ES7 390-1AJ30-0AA0**
2000 mm	**6ES7 390-1BC00-0AA0**
Accessories (optional)	
PS 307 load power supplies (only required if 24 V DC is not available) 120/230 V AC; 24 V DC, incl. power connector	
PS 307-1B; 2 A	**6ES7 307-1BA00-0AA0**
PS 307-1E; 5 A	**6ES7 307-1EA00-0AA0**
PS 307-1K; 10 A	**6ES7 307-1KA00-0AA0**
Labeling strips (10 units, spare part)	**6ES7 392-2XX00-0AA0**
Remote displays (option) The digital remote displays can be connected directly to SIWAREX U through a TTY interface. The following remote displays can be used: S102, S302 Siebert Industrieelektronik GmbH P.O. Box 1180 D-66565 Eppelborn Tel.: +49 6806/980-0 Fax: +49 6806/980-999 Internet: 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**

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SIWAREX U

Ordering data

	Order No.
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.	
• With short-circuit current < 199 mA DC	**7MH4 710-5BA**
• With short-circuit current < 137 mA DC	**7MH4 710-5CA**
Cable (optional)	
Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, orange sheath to connect SIWAREX U, 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 area 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 I for TTY (connect 2 pairs of conductors in parallel), for connection of a remote display	**7MH4 407-8BD0**

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.

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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 dampened, Bessel, Butterworth (0.05 ... 20 Hz), mean-value filter
Weighing functions	
Non-automatic weighing machine	OIML R76
Automatic weighing machine	OIML R51, R61, R107
Load cells	Strain 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 EN 60529; IEC 60529	IP20
Climatic requirements	
$T_{min\ (IND)}$ ... $T_{max\ (IND)}$ (operating temperature)	
Vertical installation	-10 ... 60 °C
Horizontal installation	-10 ... 40 °C
EMC requirements	EN 61326, EN 45501, NAMUR NE21, Part 1
Dimensions	80 x 125 x 130 mm
Weight	600 g

1) For further details, see Ex interface, type SIWAREX IS

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SIWAREX FTA

Ordering data	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 • Software for legal-for-trade display in WinCC flexible • 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**

	Order No.
SIWAREX Multiscale STEP 7 software for SIWAREX FTA. Control of one or more scales for a scalable number of components and any number of recipes. Applications: batching plants, mixers in production process, CD-ROM	**7MH4 900-2AL01**
SIWAREX Multifill STEP 7 software for SIWAREX FTA. Control of filling and bagging processes for one or more filling stations and any number of materials, CD-ROM	**7MH4 900-2AM01**
SIWATOOL connecting cable from SIWAREX FTA with serial PC interface, for 9-pin PC interfaces (RS 232)	
• 2 m long	**7MH4 702-8CA**
• 5 m long	**7MH4 702-8CB**
40-pin front plug with screw contacts (required for each SIWAREX module), alternatively with spring-loaded contacts	**6ES7 392-1AM00-0AA0**
40-pin front plug with spring-loaded contacts (required for each SIWAREX module), alternatively with screw contacts	**6ES7 392-1BM01-0AA0**
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**
S7 DIN rail	
• 160 mm	**6ES7 390-1AB60-0AA0**
• 480 mm	**6ES7 390-1AE80-0AA0**
• 530 mm	**6ES7 390-1AF30-0AA0**
• 830 mm	**6ES7 390-1AJ30-0AA0**
• 2000 mm	**6ES7 390-1BC00-0AA0**
PS 307 load power supply (only required if 24 V DC is not available) 120/230 V AC; 24 V DC	
• PS 307-1B; 2 A	**6ES7 307-1BA00-0AA0**
• PS 307-1E; 5 A	**6ES7 307-1EA00-0AA0**
• PS 307-1K; 10 A	**6ES7 307-1KA00-0AA0**
MMC memory for data recording up to 16 MB	**7MH4 900-2AY20**

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Ordering data	Order No.
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.: +49 6806/980-0 Fax: +49 6806/980-999 Internet: 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	
SIWAREX JB junction box, stainless steel housing for connecting up to 4 load cells in parallel	**7MH4 710-1BA**
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 710-1EA** **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	**7MH4 710-5BA**
• With short-circuit current < 137 mA DC	**7MH4 710-5CA**

	Order No.
Cable (optional)	
Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, orange sheath to connect SIWAREX U, 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 area 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 I for TTY (connect 2 pairs of conductors in parallel), for connection of a remote display	**7MH4 407-8BD0**

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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 dampened, Bessel, Butterworth (0.05 ... 20 Hz), mean-value filter

SIWAREX FTC	
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 > 87 Ω with Ex interface
• R_{Lmax}	≤ 4010 Ω
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 EN 60529; IEC 60529	IP20
Climatic requirements	
$T_{min\ (IND)}$ ... $T_{max\ (IND)}$ (operating temperature)	
Vertical installation	-10 ... 60 °C
Horizontal installation	-10 ... 40 °C
EMC requirements	EN 61326, EN 45501, NAMUR NE21, Part 1
Dimensions	80 x 125 x 130 mm
Weight	600 g

1) For further details, see Ex interface, type SIWAREX IS

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Ordering data	Order No.
SIWAREX FTC Weighing electronics for S7-300 and ET 200M. Applications: Belt scales, force measurement, loss-in-weight scales and bulk flow meters	**7MH4 900-3AA01**
SIWAREX FTC_B Manual for belt scales • Available in a range of languages Free download from the Internet at: www.siemens.com/weighing-technology	
SIWAREX FTC_L Manual for bulk flow meters and loss-in-weight scales • Available in a range of languages Free download from the Internet at: www.siemens.com/weighing-technology	
SIWAREX FTC "Getting started" for belt scales Sample software shows beginners how to program the scales in STEP 7 for belt scale mode Free download from the Internet at: www.siemens.com/weighing-technology	
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	
SIWAREX FTC "Getting started" for loss-in-weight scales Sample software shows beginners how to program the scales in STEP 7 for loss-in-weight scale mode Free download from the Internet at: www.siemens.com/weighing-technology	
SIWAREX FTC_B configuration package for SIMATIC S7 on CD-ROM (belt scale) • HSP Hardware Support Package for integrating SIWAREX FTA/FTC in STEP 7 • "Getting started" for belt scales • Commissioning software SIWATOOL FTC_B for belt scales • Manual	**7MH4 900-3AK01**
SIWAREX FTC_L configuration package for SIMATIC S7 on CD-ROM (bulk flow meter, loss-in-weight feeder) • HSP Hardware Support Package for integrating SIWAREX FTA/FTC in STEP 7 • "Getting started" for bulk flow meters • "Getting started" for loss-in-weight feeders • Commissioning software SIWATOOL_L for bulk flow meters and loss-in-weight feeders • Manual	**7MH4 900-3AK02**
SIWAREX FTC_B configuration package for PCS 7 V6.x on CD-ROM (belt scale) • HSP Hardware Support Package for integrating SIWAREX FTA/FTC in STEP 7 • Function block for CFC • Faceplate • Commissioning software SIWATOOL FTC_B for belt scales • Manual	**7MH4 900-3AK61**
SIWAREX FTC_B configuration package for PCS 7 V7.0 on CD-ROM (belt scale) • HSP Hardware Support Package for integrating SIWAREX FTA/FTC in STEP 7 • Function block for CFC • Faceplate • Commissioning software SIWATOOL FTC_B for belt scales • Manual	**7MH4 900-3AK63**
SIWAREX FTC_L configuration package for PCS 7 V7.0 and V7.1 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 900-3AK64**
SIWATOOL connecting 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**
40-pin front plug with screw contacts (required for each SIWAREX module), alternatively with spring-loaded contacts	**6ES7 392-1AM00-0AA0**

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SIWAREX FTC

Ordering data	Order No.
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 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	**6ES7 390-1AB60-0AA0**
• 480 mm	**6ES7 390-1AE80-0AA0**
• 530 mm	**6ES7 390-1AF30-0AA0**
• 830 mm	**6ES7 390-1AJ30-0AA0**
• 2000 mm	**6ES7 390-1BC00-0AA0**
PS 307 load power supply (only required if 24 V DC is not available) 120/230 V AC; 24 V DC	
• PS 307-1B; 2 A	**6ES7 307-1BA00-0AA0**
• PS 307-1E; 5 A	**6ES7 307-1EA00-0AA0**
• PS 307-1K; 10 A	**6ES7 307-1KA00-0AA0**
MMC memory for data recording up to 16 MB	**6ES7 953-8LG11-0AA0**
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 "Belt scale"). Siebert Industrieelektronik GmbH P.O. Box 1180 D-66565 Eppelborn Tel.: +49 6806/980-0 Fax: +49 6806/980-999 Internet: 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**

	Order No.
Ex interface, type SIWAREX Pi With UL and FM approvals, but **without ATEX approval** for intrinsically-safe connection of load cells, suitable for the SIWAREX U, 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	**7MH4 710-5BA**
• With short-circuit current < 137 mA DC	**7MH4 710-5CA**
Cable (optional)	
Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, orange sheath to connect SIWAREX U, 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 … +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 area 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 I for TTY (connect 2 pairs of conductors in parallel), for connection of a remote display	**7MH4 407-8BD0**

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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, FCS200 and FC300.

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Technical specifications

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, volume flow, 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.
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 kΩ
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 … 10 kΩ
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.

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SIFLOW FC070

Technical specifications (continued)

Power	
Supply	24 V DC nominal
Tolerance	20.4 V DC … 28.8 V DC
Consumption	Max. 6 W
Fuse	T1 A/125 V, not replaceable by operator
Ambient conditions	
Ambient temperature	• Storage -40 °C … +70 °C (-40 °F … +158 °F) • Operation 0 °C ... +60 °C (32 °F ... 140 °F)
Operation conditions	Horizontally mounted rail. For vertically mounted rail, the maximum operating temperature is +45 °C (+113 °F).
Height	• Operation: -1000 … 2000 m (pressure 795 … 1080 hPa)
Enclosure	
Material	Noryl, color: anthracite
Rating	IP20/NEMA 2 according to IEC 60529
Mechanical load	According to SIMATIC standards (S7-300 devices)

Approvals	
SIFLOW FC070 Standard	CE, C-UL, ATEX II 3G EEx nA IIC
SIFLOW FC070 Ex	CE, C-UL, 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,IEC 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 "General requirements" with error criteria A in accordance with NE21
Programming tools	
SIMATIC S7	Configuration trough backplane P-BUS and PLC program
SIMATIC PCS7	Configuration trough backplane P-BUS and PLC/WinCC faceplates
SIMATIC PDM	Through Modbus port RS 232C and RS 485

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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**
40 pin plug with spring contacts	**6ES7 392-1BM01-0AA0**
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**
20 pin plug with spring contacts	**6ES7 392-1BJ00-0AA0**
Accessories	
Cable with multiplug for connecting MASS 2100, FCS200 and FC300 sensors	
• 5 m (16.4 ft)	**FDK:083H3015**
• 10 m (32.8 ft)	**FDK:083H3016**
• 25 m (82 ft)	**FDK:083H3017**
• 50 m (164 ft)	**FDK:083H3018**
• 75 m (246 ft)	**FDK:083H3054**
• 150 m (492 ft)	**FDK:083H3055**
Cable without multiplug for connecting MC2 sensors	
• 10 m (32.8 ft)	**FDK:083H3001**
• 25 m (82 ft)	**FDK:083H3002**
• 75 m (246 ft)	**FDK:083H3003**
• 150 m (492 ft)	**FDK:083H3004**

	Order No.
SIMATIC S7-300 rail The mechanical mounting rack of the SIMATIC S7-300	
• 160 mm (6.3")	**6ES7 390-1AB60-0AA0**
• 482 mm (18.9")	**6ES7 390-1AE80-0AA0**
• 530 mm (20.8")	**6ES7 390-1AF30-0AA0**
• 830 mm (32.7")	**6ES7 390-1AJ30-0AA0**
• 2000 mm (78.7")	**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 units	**6ES7 390-5BA00-0AA0**
Shield terminal element for 1 cable with 4 to 13 mm in dia. 2 units	**6ES7 390-5CA00-0AA0**
SIFLOW FC070 Demo suitcase	**A5E01075465**
Power supply	**6ES7 307-1BA00-0AA0**
Operating instructions for SITRANS F C SIFLOW FC070	
• English	**A5E00924779**
• German	**A5E00924776**
Operating instructions for SITRANS F C SIFLOW FC070 with S7	
• English	**A5E02254228**
• German	**A5E02665536**
• French	**A5E02591639**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

All literature is also available for free at:
www.siemens.com/flowdocumentation

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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:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS FM 350-1		
Order No.	**6AG1 350-1AH03-2AE0**	**6AG1 350-1AH03-2AY0**
Order No. based on	**6ES7 350-1AH03-0AE0**	**6ES7 350-1AH03-0AE0**
Ambient temperature range	-25 ... +60 °C	-25 ... +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	
Conforms with standard for electronic equipment used on rolling stock (EN 50155).	No	Yes
Ambient conditions		
Relative humidity	5 ... 100%, condensation allowed	
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)	
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA-S71.04 severity level G1; G2; G3; GX [1) 2)]	
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]	
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m), see ambient temperature range 795...658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000m) derating 20 K	

1) ISA-S71.04 severity level GX: Long-term load: SO_2 <4.8 ppm; H_2S <9.9 ppm; Cl <0.2 ppm; HCl <0.66 ppm; HF <0.12 ppm; NH <49 ppm; O_3 <0.1 ppm; NOx <5.2 ppm
Threshold/ limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOx < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

	Order No.
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	**6AG1 350-1AH03-2AE0**
Conformity to EN 50155	**6AG1 350-1AH03-2AY0**
Accessories	See SIMATIC S7-300 FM 350-1 counter module, page 5/175

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SIPLUS FM 350-2 counter module

Overview



- 8-channel intelligent counter module for universal counting and measuring tasks
- For the direct connection of 24 V incremental encoders, directional encoders, initiators or NAMUR encoders
- Comparison function with predefined benchmarks (number depending on operating mode)
- Integrated digital outputs for the reaction outcome upon reaching the benchmark
- Operating modes:
  - Infinity / Once / Periodic counting
  - Frequency and speed control
  - Period measurement
  - Dose

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS FM 350-2 counter module	
Order number	**6AG1 350-2AH01-4AE0**
Order number based on	**6ES7 350-2AH01-0AE0**
Conformal coating	Coating of the printed circuit boards and the electronic components
Ambient temperature range	0... +60 °C
Ambient conditions	Suitable for extraordinary medial exposure (e.g. chlorine sulfur atmosphere)
Technical data	The technical data of the standard product applies except for the ambient conditions.
Ambient conditions	
Relative humidity	5 ... 100%, condensation allowed
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold, fungus, and sponge spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX[1)2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080...795 hPa (-1000 ... +2000 m) see ambient temperature range 795...658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 <4.8 ppm; H_2S <9.9 ppm; Cl <0.2 ppm; HCl <0.66 ppm; HF <0.12 ppm; NH <49 ppm; O_3 <0.1 ppm; NOx <5.2 ppm
Threshold/ limit value (max. 30 min/d): SO_2 <17.8 ppm; H_2S <49.7 ppm; Cl <1.0 ppm; HCl <3.3 ppm; HF <2.4 ppm; NH <247 ppm; O_3 <1.0 ppm; NOx <10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

Technical documentation on SIPLUS is available under:

www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS FM 350-2 counter module (medial exposure) With 8 channels, max. 20 kHz; for 24 V incremental encoders and NAMUR encoders; incl. configuration package and electronic documentation on CD	H	**6AG1 350-2AH01-4AE0**
Accessories		See SIMATIC FM 350-2 counter module, page 5/177

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SIPLUS SIWAREX U

Overview



SIPLUS electronic weighing system SIWAREX U

SIPLUS SIWAREX U is a flexible weighing module for all simple weighing and force measuring tasks. The compact module can be integrated into SIPLUS automation systems without any problems.

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS SIWAREX U electronic weighing system	
Order No.	**6AG1 950-2AA01-4AA0**
Order No. based on	**7MH4 950-2AA01**
Range of ambient temperature	0 ... +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions.
Ambient conditions	
Relative humidity	5 ... 100%, condensation allowed

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS SIWAREX U	I	**6AG1 950-2AA01-4AA0**
(medial exposure) Electronic weighing system for SIMATIC S7 and ET 200M, incl. bus connector		
Accessories		see SIWAREX U, page 5/209

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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.

www.siemens.com/siplus - Support - Tools and Downloads!

Technical specifications

SIPLUS DCF 77 radio clock module	
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 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	H	**6AG1 057-1AA03-0AA0**

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SM 374 simulator

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

Technical specifications

	6ES7 374-2XH01-0AA0
Current consumption	
from backplane bus 5 V DC, max.	80 mA
Power losses	
Power loss, typ.	0.35 W
Digital inputs	
Number of digital inputs	16; Switch
Digital outputs	
Number of digital outputs	16; LEDs
Galvanic isolation	
Galvanic isolation digital inputs	
• between the channels and the backplane bus	No

	6ES7 374-2XH01-0AA0
Galvanic isolation digital outputs	
• between the channels and the backplane bus	No
Dimensions and weight	
Dimensions	
• Width	40 mm
• Height	125 mm
• Depth	120 mm
Weight	
• Weight, approx.	190 g

Ordering data

		Order No.
SM 374 simulator module		**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	J	**2XV9 450-1SL03-0YX0**
Upgrade single license	J	**2XV9 450-1SL03-0YX4**

	Order No.
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**

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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 5 V DC, max.	5 mA
Power losses	
Power loss, max.	0.03 W
Digital inputs	
Number of digital inputs	0
Digital outputs	
Number of digital outputs	0

	6ES7 370-0AA01-0AA0
Dimensions and weight	
Dimensions	
• Width	40 mm
• Height	125 mm
• Depth	120 mm
Weight	
• Weight, approx.	180 g

Ordering data

		Order No.
DM 370 dummy module incl. bus connectors, labeling strips		**6ES7 370-0AA01-0AA0**
Bus connectors 1 unit, spare part		**6ES7 390-0AA00-0AA0**
Labeling strips 10 units (spare part)		**6ES7 392-2XX00-0AA0**
Label cover 10 units (spare part)		**6ES7 392-2XY00-0AA0**
S7 SmartLabel V3.0 Software for automatic labeling of modules based on data of the STEP 7 project		
Single license	J	**2XV9 450-1SL03-0YX0**
Upgrade single license	J	**2XV9 450-1SL03-0YX4**

	Order No.
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**

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CP 340

Overview



- The economical complete solution for serial communication via point-to-point links.
- 3 versions with different transmission interfaces:
  - RS 232C (V.24)
  - 20 mA (TTY)
  - RS 422/RS 485 (X.27)
- Implemented protocols:
  - ASCII
  - 3964 (R) (not for RS 485)
  - Printer driver
- Simple parameterization via a parameterization tool integrated into STEP 7

Technical specifications

	6ES7 340-1AH02-0AE0	6ES7 340-1BH02-0AE0	6ES7 340-1CH02-0AE0
Supply voltages			
Rated value			
• 24 V DC	No; Power supply via backplane bus 5V	No; Power supply via backplane bus 5V	No; Power supply via backplane bus 5V
Current consumption			
From backplane bus 5 V DC, max.	165 mA	190 mA	165 mA
Power losses			
Power loss, typ.	0.6 W	0.85 W	0.6 W
Power loss, max.	0.85 W	0.95 W	0.85 W
Interfaces			
Number of interfaces	1; Isolated	1; Isolated	1; Isolated
Interface physics, 20 mA (TTY)		Yes	
Interface physics, RS 232C (V.24)	Yes		
Interface physics, RS 422/RS 485 (X.27)			Yes
Transmission rate, max.	19.2 kbit/s	19.2 kbit/s	19.2 kbit/s
Transmission speeds, min.	2.4 kbit/s	2.4 kbit/s	2.4 kbit/s
Connection method			
PtP	9-pin sub D connector	9-pin sub D socket	15-pin sub D socket
Power supply	over backplane bus	over backplane bus	over backplane bus
Point-to-point			
Cable length, max.	15 m	1 000 m; (100 m active, 1000 m passive)	1 200 m
Supported printers	HP-Deskjet, HP-Laserjet, IBM-Proprinter, user-defined	HP-Deskjet, HP-Laserjet, IBM-Proprinter, user-defined	HP-Deskjet, HP-Laserjet, IBM-Proprinter, user-defined
Integrated protocol driver			
• 3964 (R)	Yes	Yes	Yes
• ASCII	Yes	Yes	Yes
• customer-specific drivers reloadable	No	No	No
• RK512	No	No	No
Telegram length, max.			
• 3964 (R)	1 024 byte	1 024 byte	1 024 byte
• ASCII	1 024 byte	1 024 byte	1 024 byte

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Technical specifications (continued)

	6ES7 340-1AH02-0AE0	6ES7 340-1BH02-0AE0	6ES7 340-1CH02-0AE0
Transmission speed, 20 mA (TTY)			
• with 3964 (R) protocol, max.		19.2 kbit/s	
• with ASCII protocol, max.		9.6 kbit/s	
• with printer driver, max.,		9.6 kbit/s	
Transmission speed, RS 422/485			
• with 3964 (R) protocol, max.			19.2 kbit/s
• with ASCII protocol, max.			9.6 kbit/s
• with printer driver, max.,			9.6 kbit/s
Transmission speed, RS232			
• with 3964 (R) protocol, max.	19.2 kbit/s		
• with ASCII protocol, max.	9.6 kbit/s		
• with printer driver, max.,	9.6 kbit/s		
Software			
Block			
• FB length in RAM, max.	2 700 byte; Data communication, sending and receiving	2 700 byte; Data communication, sending and receiving	2 700 byte; Data communication, sending and receiving
Dimensions and weight			
Dimensions			
• Width	40 mm	40 mm	40 mm
• Height	125 mm	125 mm	125 mm
• Depth	120 mm	120 mm	120 mm
Weight			
• Weight, approx.	300 g	300 g	300 g

Ordering data

	Order No.
CP 340 communication processor	**6ES7 340-1AH02-0AE0**
With one RS 232 C (V.24) interface	
RS 232 connecting cable	
For linking to SIMATIC S7	
5 m	**6ES7 902-1AB00-0AA0**
10 m	**6ES7 902-1AC00-0AA0**
15 m	**6ES7 902-1AD00-0AA0**
CP 340 communication processor	**6ES7 340-1BH02-0AE0**
With one 20 mA (TTY) interface	
20 mA (TTY) connecting cable	
For linking to SIMATIC S7	
5 m	**6ES7 902-2AB00-0AA0**
10 m	**6ES7 902-2AC00-0AA0**
50 m	**6ES7 902-2AG00-0AA0**

	Order No.
CP 340 communication processor	**6ES7 340-1CH02-0AE0**
With one RS 422/485 (X.27) interface	
RS 422/485 connecting cable	
For linking to SIMATIC S7	
5 m	**6ES7 902-3AB00-0AA0**
10 m	**6ES7 902-3AC00-0AA0**
50 m	**6ES7 902-3AG00-0AA0**

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CP 341

Overview



- For quick, high-performance data exchange via point-to-point coupling
- 3 versions with different transmission physics:
  - RS 232C (V.24),
  - 20 mA (TTY),
  - RS 422/RS 485 (X.27)
- Implemented protocols: ASCII, 3964 (R), RK 512
- The following protocols can also be loaded: Modbus RTU
- Easy configuration using a parameterizing tool integrated in STEP 7

Technical specifications

	6ES7 341-1AH02-0AE0	6ES7 341-1BH02-0AE0	6ES7 341-1CH02-0AE0
Product type designation	CP341 V2 RS232	CP341 V2 TTY	CP341 V2 RS422/485
Supply voltages			
Rated value			
• 24 V DC	Yes	Yes	Yes
Current consumption			
from backplane bus 5 V DC, max.	70 mA	70 mA	70 mA
from supply voltage L+, max.	100 mA	100 mA	100 mA
Power losses			
Power loss, typ.	1.6 W	1.6 W	1.6 W
Power loss, max.	2.4 W	2.4 W	2.4 W
Interfaces			
Number of interfaces	1; Isolated	1; Isolated	1; Isolated
Interface physics, 20 mA (TTY)		Yes	
Interface physics, RS 232C (V.24)	Yes		
Interface physics, RS 422/RS 485 (X.27)			Yes
Transmission rate, max.	115.2 kbit/s	19.2 kbit/s	115.2 kbit/s
Transmission speeds, min.	0.3 kbit/s	0.3 kbit/s	0.3 kbit/s
Connection method			
PtP	9-pin sub D connector	9-pin sub D socket	15-pin sub D socket
Power 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
Supported printers	Serial printers	Serial printers	Serial printers
Integrated protocol driver			
• 3964 (R)	Yes	Yes	Yes; not with RS 485
• ASCII	Yes	Yes	Yes
• RK512	Yes	Yes	Yes; not with RS 485
Telegram length, max.			
• 3964 (R)	4 096 byte	4 096 byte	4 096 byte
• ASCII	4 096 byte	4 096 byte	4 096 byte
• RK 512	4 096 byte	4 096 byte	4 096 byte

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Technical specifications (continued)

	6ES7 341-1AH02-0AE0	6ES7 341-1BH02-0AE0	6ES7 341-1CH02-0AE0
Transmission speed, 20 mA (TTY)			
• with 3964 (R) protocol, max.		19.2 kbit/s	
• with ASCII protocol, max.		19.2 kbit/s	
• with printer driver, max.,		19.2 kbit/s	
• with RK 512 protocol, max.		19.2 kbit/s	
Transmission speed, RS 422/485			
• with 3964 (R) protocol, max.			115.2 kbit/s
• with ASCII protocol, max.			115.2 kbit/s
• with printer driver, max.,			115.2 kbit/s
• with RK 512 protocol, max.			115.2 kbit/s
Transmission speed, RS232			
• with 3964 (R) protocol, max.	115.2 kbit/s		
• with ASCII protocol, max.	115.2 kbit/s		
• with printer driver, max.,	115.2 kbit/s		
• with RK 512 protocol, max.	115.2 kbit/s		
Software			
Block			
• FB length in RAM, max.	6 100 byte; Data communication, sending and receiving	6 100 byte; Data communication, sending and receiving	6 100 byte; Data communication, sending and receiving
Dimensions and weight			
Dimensions			
• Width	40 mm	40 mm	40 mm
• Height	125 mm	125 mm	125 mm
• Depth	120 mm	120 mm	120 mm
Weight			
• Weight, approx.	300 g	300 g	300 g

Ordering data

	Order No.
CP 341 communication processor	**6ES7 341-1AH02-0AE0**
With one RS 232 C (V.24) interface	
RS 232 connecting cable	
For linking to SIMATIC S7	
5 m	**6ES7 902-1AB00-0AA0**
10 m	**6ES7 902-1AC00-0AA0**
15 m	**6ES7 902-1AD00-0AA0**
CP 341 communication processor	**6ES7 341-1BH02-0AE0**
With one 20 mA (TTY) interface	
20 mA (TTY) connecting cable	
For linking to SIMATIC S7	
5 m	**6ES7 902-2AB00-0AA0**
10 m	**6ES7 902-2AC00-0AA0**
50 m	**6ES7 902-2AG00-0AA0**

	Order No.
CP 341 communication processor	**6ES7 341-1CH02-0AE0**
With one RS 422/485 (X.27) interface	
RS 422/485 connecting cable	
For linking to SIMATIC S7	
5 m	**6ES7 902-3AB00-0AA0**
10 m	**6ES7 902-3AC00-0AA0**
50 m	**6ES7 902-3AG00-0AA0**
Loadable drivers for CP 341	
Modbus master (RTU format)	
• Single license	**6ES7 870-1AA01-0YA0**
• Single license, without software or documentation	**6ES7 870-1AA01-0YA1**
Modbus slave (RTU format)	
• Single license	**6ES7 870-1AB01-0YA0**
• Single license, without software or documentation	**6ES7 870-1AB01-0YA1**

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Loadable drivers for CP 441-2 and CP 341

Overview

- Drivers for Modbus protocol with RTU message format; communication as master or slave
- Downloadable onto CP 341 and CP 441-2 (6ES7 441-2AA04-0AE0)

Technical specifications

Parameterization software	Loadable drivers for CP 441-2 and CP 341
Type of license	Simple license, copy license
Target system	SIMATIC CP 341, SIMATIC CP 441-2

Technical specifications	Modbus Master
	• Modbus protocol with RTU format • Master/slave coupling: SIMATIC S7 is master • Function codes implemented: 01, 02, 03, 04, 05, 06, 07, 08, 11,12,15,16 • No V.24 control and signal lines • CRC polynomial: $x^{16} + x^{15} + x^2 + 1$ • Interfaces: TTY (20 mA); V.24 (RS 232 C); X.27 (RS 422/485) 2-wire or 4-wire • Receive mailbox specified on BRCV • Character delay time 3.5 characters or multiple thereof • Broadcast message possible
Adjustable parameters	• Transmission rate 300 bit/s up to 76800 bit/s (TTY up to 19200 bit/s) • Character frame • With/without RS 485 operation for 2-wire connections • With/without modem operation (ignore smudge characters) • Response monitoring time 100 ms to 25.5 s in steps of 100 ms • Factor for the character delay time 1-10 • Default setting of receive line when using the X.27 interface module

	Modbus slave
	• Modbus protocol with RTU format • Master/slave coupling: SIMATIC S7 is slave • Function codes implemented: 01, 02, 03, 04, 05, 06, 08, 15, 16 • No V.24 control and signal line • CRC polynomial: $x^{16} + x^{15} + x^2 + 1$ • Interfaces: TTY (20 mA), V.24 (RS 232C), X.27 (RS 422/485) 2-wire or 4-wire • Communications FB 180, instance DB 180 (use of a multi-instance) • Conversion of the Modbus data address to S7 data areas. Data areas which can be processed: DB, bit memories, outputs, inputs, timers, counters • Character delay time 3.5 characters or multiple thereof
Adjustable parameters	• Transmission rate 300 bit/s up to 76800 bit/s (TTY up to 19200 bit/s) • Character frame • Slave address of CP (1 to 255) • With/without RS 485 operation for 2-wire connection • With/without modem operation (ignore smudge characters) • Factor for the character delay time 1-10 • Number of work DB (for FB processing) • Enabling of memory areas for writing by the master • Default setting of receive line when using the X.27 interface module • Conversion of Modbus addresses to S7 data areas

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Ordering data	Order No.
Modbus Master V3.1	
Task: Communication via Modbus protocol with RTU format, SIMATIC S7 as master Requirements: CP 341 or CP 441-2; STEP 7 V4.02 and higher Type of delivery: Driver program/ documentation, English, German, French	
Single license	**6ES7 870-1AA01-0YA0**
Single license, without software and documentation	**6ES7 870-1AA01-0YA1**
Modbus Slave V3.1	
Task: Communication via Modbus protocol with RTU format, SIMATIC S7 as slave Requirements: CP 341 or CP 441-2; STEP 7 V4.02 and higher Type of delivery: Driver program/ documentation, English, German, French	
Single license	**6ES7 870-1AB01-0YA0**
Single license, without software and documentation	**6ES7 870-1AB01-0YA1**

		Order No.
SIMATIC manual collection	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC		
SIMATIC manual collection update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		

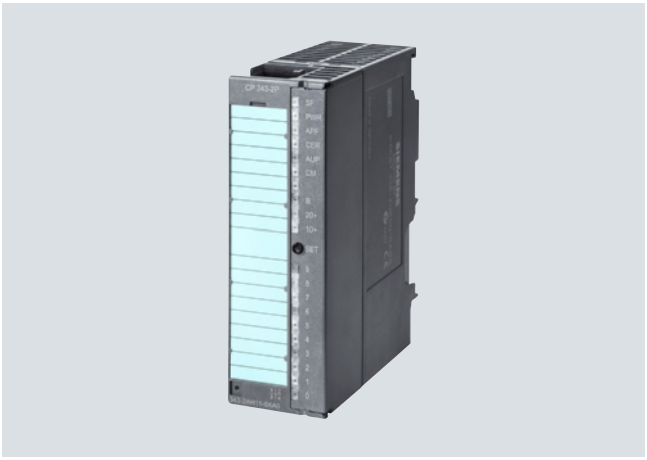
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CP 343-2 P, CP 343-2

Overview



CP 343-2 P

The CP 343-2P is the AS Interface Master for the

SIMATIC S7-300 and the local peripheral ET 200M with comfortable parameterization possibilities.

The CP 343-2 is the basic version of the module.

The CP343-2P / CP 343-2 performs the following features:

- Connection of up to 62 AS-Interface slaves
- Integrated analog value transmission (all analog profiles)
- Support for all AS Interface Master functions according to
- AS-Interface specification V3.0
- Status displays of operating states and indication of the readiness for operation of connected slaves by means of LEDs in the front plate
- Fault indications (e. . AS-Interface voltage fault, configuration fault) by means of LEDs in the front plate
- Compact enclosure in the design of the SIMATIC S7-300
- Suitable for AS-i Power24V (from product status 2 / Firmware-Version 3.1) and Standard AS-i (30 V)
- With CP343-2P additionally: Supports the configuration of the AS-Interface-network with STEP 7 V5.2 and higher

Design

The CP343-2P / CP 343-2 is connected like an I/O module to the S7-300. It has:

- two terminal connections for direct connection of the AS-Interface cable
- LEDs in the front plate for indicating the operating state and the readiness for operation of all connected and activated slaves
- Pushbuttons for switching over the operating state and for adopting the existing ACTUAL configuration as the DESIRED configuration

Function

The CP 343-2P / CP 343-2 supports all specified functions of the AS-Interface Specification V3.0.

The CP 343-2P occupies 16 bytes each in the I/O address area of the SIMATIC S7-300. The digital I/O data of the standard slaves and A slaves are saved in this area. The digital I/O data of the B slaves and the analog I/O data can be accessed with the S7 system functions for read/write data record.

If required, master calls can be performed with the command interface FC ASI_3422, e.g. read/write parameters, read/write configuration. The FC including a STEP7 sample program can be downloaded from the Internet at

http://support.automation.siemens.com/WW/view/en/5581657

Configuration

All connected AS-Interface slaves are configured at the press of a button. No further configuration of the CP is required.

With CP 343-2P additionally

The CP 343-2P also supports configuring of the AS-Interface network with STEP 7 V5.2 and higher. Specifying the AS-i configuration in HW-Config facilitates the setting of slave parameters and documentation of the plant. Uploading the ACTUAL configuration of an already configured AS-Interface network is also supported. The saved configuration cannot be overwritten at the press of a button and is therefore tamper-proof.

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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
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 communication 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 or via STEP 7 (V5.2 or higher); including manual on CD-ROM (German, English, French, Spanish, Italian); without front plate connector; complies with AS-Interface specification V3.0; dimensions (W x H x D/ mm): 40 x 125 x 120	**6GK7 343-2AH11-0XA0**
CP 343-2 communication processor Basic version for connection of SIMATIC S7-300 and ET 200M to AS-Interface; configuration of the AS-i network by means of SET-key; incl. manual on CD-ROM (German, English, French, Spanish, Italian); without front connector; complies with AS-Interface specification V3.0; dimensions (W x H x D / mm); 40 x 125 x 120	**6GK7 343-2AH01-0XA0**
Front connector, 20-pin with screw contacts	**6ES7 392-1AJ00-0AA0**
Front connector, 20-pin with spring terminal	**6ES7 392-1BJ00-0AA0**

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CP 342-5

Overview



DP-M	DP-S	FMS	PG/OP	S7/S5	
●	●		●	●	

- 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
  - 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

Technical specifications

Order No.	6GK7 342-5DA02-0XE0
Product type designation	**CP 342-5**
Transmission rate	
Transmission rate at interface 1 in accordance with PROFIBUS	9.6 Kbit/s … 12 Mbit/s
Interfaces	
Number of electrical connections	
• at interface 1 in accordance with PROFIBUS	1
• for power supply	1
Design of electrical connection	
• at interface 1 in accordance with PROFIBUS	9-pin D-sub socket (RS485)
• for power supply	4-pin terminal strip
Supply voltage, current consumption, power loss	
Type of power supply	DC
Power supply	
• 1 from backplane bus	5 V
• External	24 V
Relative positive tolerance at 24 V DC	20 %
Relative negative tolerance at 24 V DC	15 %
Current consumed	
• from backplane bus at 5 V DC, typical	0.15 A
• from external power supply with 24 V DC	
- Typical	0.25 A
- Maximum	-
Effective power loss	6.75 W

Order No.	6GK7 342-5DA02-0XE0
Product type designation	**CP 342-5**
Permitted ambient conditions	
Ambient temperature	
• During operating phase	0 … 60 °C
• During storage	-40 … +70 °C
• During transport	-40 … +70 °C
Relative humidity at 25 °C without condensation during operating phase, maximum	95 %
IP degree of protection	IP 20
Design, dimensions and weights	
Module format	S7-300 compact module, single-width
Width	40 mm
Height	125 mm
Depth	120 mm
Net weight	0.3 kg
Type of mounting: S7-300 DIN rail mounting	Yes
Product properties, functions, components in general	
Maximum number of modules per CPU	4
Number of modules - Note	-

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Technical specifications (continued)

Order No.	6GK7 342-5DA02-0XE0
Product type designation	**CP 342-5**
Performance data	
Performance data Open communication	
Number of possible connections for open communication by means of SEND/RECEIVE blocks, maximum	16
Data volume as user data per connection for open communication by means of SEND/RECEIVE blocks, maximum	240 byte
Performance data PROFIBUS DP	
Service as DP master DPV0	Yes
Number of DP slaves operable on DP master	124
Data volume	
• of address area of inputs as DP master, total	2 160 byte
• of address area of outputs as DP master, total	2 160 byte
• of address area of inputs per DP slave	244 byte
• of address area of outputs per DP slave	244 byte
• of address area of diagnostics data per DP slave	240 byte
Service as DP slave	
• DPV0	Yes
• DPV1	-
Data volume	
• of address area of inputs as DP slave, total	240 byte
• of address area of outputs as DP slave, total	240 byte
Performance data S7 communication	
Maximum number of possible connections for S7 communication	16
Number of possible connections for S7 communication - Note	-
Performance data Multiprotocol operation	
Number of active connections in multiprotocol mode	
• Maximum without DP	32
• Maximum with DP	28
Product functions Management, configuration, programming	
Configuration software required	STEP 7 V5.1 SP2 or higher

Ordering data

	Order No.
CP 342-5 communication processor Communication 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**
STEP 7 Version 5.4 Target system: SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC Requirements: Windows 2000 Prof./XP Prof. Type of delivery: 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**
RS485 PROFIBUS FastConnect bus connector With 90° cable outlet; insulation displacement technology, max. transmission rate 12 Mbit/s	
• Without PG interface	**6ES7 972-0BA50-0XA0**
• With PG interface	**6ES7 972-0BB50-0XA0**
PROFIBUS bus connector IP20 With connection to PPI, MPI, PROFIBUS	
• Without PG interface	**6ES7 972-0BA12-0XA0**
• With PG interface	**6ES7 972-0BB12-0XA0**
12M PROFIBUS bus terminal Bus terminal for connection of PROFIBUS nodes at up to 12 Mbit/s with connecting cable	**6GK1 500-0AA10**
SIMATIC S7-300 DM 370 Dummy module; used for module replacement	**6ES7 370-0AA01-0AA0**

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CP 342-5 FO

Overview



DP-M	DP-S	FMS	PG/OP	S7/S5	
●	●		●	●	

- 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

Technical specifications

Order No.	6GK7 342-5DF00-0XE0
Product type designation	**CP 342-5 FO**
Transmission rate	
Transmission rate at interface 1 in accordance with PROFIBUS	9.6 Kbit/s … 12 Mbit/s
Interfaces	
Number of optical connections at interface 1 in accordance with PROFIBUS	2
Number of electrical connections for power supply	1
Design of optical connection at interface 1 in accordance with PROFIBUS	Duplex socket
Design of electrical connection for power supply	4-pin terminal strip
Supply voltage, current consumption, power loss	
Type of power supply	DC
Power supply	
• 1 from backplane bus	5 V
• External	24 V
Relative positive tolerance at 24 V DC	20 %
Relative negative tolerance at 24 V DC	15 %
Current consumed	
• from backplane bus at 5 V DC, typical	0.15 A
• from external power supply with 24 V DC	
- Typical	0.25 A
- Maximum	-
Effective power loss	6.75 W

Order No.	6GK7 342-5DF00-0XE0
Product type designation	**CP 342-5 FO**
Permitted ambient conditions	
Ambient temperature	
• During operating phase	0 … 60 °C
• During storage	-40 … +70 °C
• During transport	-40 … +70 °C
Relative humidity at 25 °C without condensation during operating phase, maximum	95 %
IP degree of protection	IP 20
Design, dimensions and weights	
Module format	Compact module
Width	40 mm
Height	125 mm
Depth	120 mm
Net weight	0.3 kg
Product properties, functions, components General	
Maximum number of modules per CPU	4
Number of modules - Note	-
Cable length	
• With polymer cladded fiber cable, maximum	300 m
• With plastic optical fiber cable, maximum	50 m

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Technical specifications (continued)

Order No.	6GK7 342-5DF00-0XE0
Product type designation	**CP 342-5 FO**
Performance data	
Performance data Open communication	
Number of possible connections for open communication by means of SEND/RECEIVE blocks, maximum	16
Data volume as user data per connection for open communication by means of SEND/RECEIVE blocks, maximum	240 byte
Performance data PROFIBUS DP	
Service as DP master DPV0	Yes
Number of DP slaves operable on DP master	124
Data volume	
• of address area of inputs as DP master, total	2 160 byte
• of address area of outputs as DP master, total	2 160 byte
• of address area of inputs per DP slave	244 byte
• of address area of outputs per DP slave	244 byte
• of address area of diagnostics data per DP slave	240 byte
Service as DP slave	
• DPV0	Yes
• DPV1	-
Data volume	
• of address area of inputs as DP slave, total	240 byte
• of address area of outputs as DP slave, total	240 byte
Performance data S7 communication	
Maximum number of possible connections for S7 communication	16
Number of possible connections for S7 communication - Note	-
Performance data Multiprotocol operation	
Number of active connections in multiprotocol mode	
• Maximum without DP	32
• Maximum with DP	28
Product functions Management, configuration, programming	
Configuration software required	STEP 7 V5.1 SP2 or higher

Ordering data

CP 342-5 FO communication processor Communication processor for optical connection of SIMATIC S7-300 to PROFIBUS to 12 Mbit/s with electronic manual on CD-ROM	**6GK7 342-5DF00-0XE0**
STEP 7 Version 5.4 Target system: SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC Requirements: Windows 2000 Prof./XP Prof. Type of delivery: 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**
Manual for PROFIBUS networks Paper version Network architecture, components (OLM (V3), OBT, ILM), configuring and installation	
• German	**6GK1 970-5CA20-0AA0**
• English	**6GK1 970-5CA20-0AA1**
PROFIBUS Plastic Fiber Optic, Simplex connector/polishing set I 100 simplex connectors and 5 polishing sets for assembling PROFIBUS plastic fiber optic cables for the optical PROFIBUS DP	**6GK1 901-0FB00-0AA0**
PROFIBUS Plastic Fiber Optic, stripping tool set I Tools for removing the outer sheath or core sheath of Plastic Fiber Optic cables	**6GK1 905-6PA10**
Plug-in adapter For assembling the plastic Simplex connector in combination with CP 342-5 FO, IM 467 FO, IM 153-2 FO and IM 151 FO 50 units	**6ES7 195-1BE00-0XA0**

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

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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 designation	**CP 343-5**
Transmission rate	
Transmission rate at interface 1 in accordance with PROFIBUS	9.6 Kbit/s … 12 Mbit/s
Interfaces	
Number of electrical connections	
• at interface 1 in accordance with PROFIBUS	1
• for power supply	1
Design of electrical connection	
• at interface 1 in accordance with PROFIBUS	9-pin D-sub socket (RS485)
• for power supply	4-pin terminal strip
Supply voltage, current consumption, power loss	
Type of power supply	DC
Power supply	
• 1 from backplane bus	5 V
• External	24 V
Relative positive tolerance at 24 V DC	20 %
Relative negative tolerance at 24 V DC	15 %
Current consumed	
• from backplane bus at 5 V DC, typical	0.15 A
• from external power supply with 24 V DC	
- Typical	0.25 A
- Maximum	-
Effective power loss	6.75 W

Order No.	6GK7 343-5FA01-0XE0
Product type designation	**CP 343-5**
Permitted ambient conditions	
Ambient temperature	
• During operating phase	0 … 60 °C
• During storage	-40 … +70 °C
• During transport	-40 … +70 °C
Relative humidity at 25 °C without condensation during operating phase, maximum	95 %
IP degree of protection	IP 20
Design, dimensions and weights	
Module format	S7-300 compact module, single-width
Width	40 mm
Height	125 mm
Depth	120 mm
Net weight	0.3 kg
Type of mounting: S7-300 DIN rail mounting	-
Product properties, functions, components General	
Maximum number of modules per CPU	4
Number of modules - Note	-

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Technical specifications (continued)

Order No.	6GK7 343-5FA01-0XE0
Product type designation	**CP 343-5**
Performance data	
Performance data Open communication	
Number of possible connections for open communication by means of SEND/RECEIVE blocks, maximum	16
Data volume as user data per connection for open communication by means of SEND/RECEIVE blocks, maximum	240 byte
Performance data FMS functions	
Number of possible connections with FMS connection, maximum	16
Data volume of variables	
• Maximum with READ request	237 byte
• Maximum with WRITE and REPORT requests	233 byte
Number of variables	
• Configurable from server to FMS partner	256
• Loadable from server onto FMS partner	256
Performance data S7 communication	
Maximum number of possible connections for S7 communication	16
Number of possible connections for S7 communication - Note	-
Performance data Multiprotocol operation	
Number of active connections in multiprotocol mode	48
Product functions Management, configuration, programming	
Configuration software required	STEP 7 V5.1 SP3 and higher and NCM S7 for PROFIBUS

Ordering data

Ordering data	Order No.
CP 343-5 communication processor Communication 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**
STEP 7 Version 5.4 Target system: SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC Requirements: Windows 2000 Prof./XP Prof. Type of delivery: 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**
RS485 PROFIBUS FastConnect bus connector With 90° cable outlet; insulation displacement technology, max. transmission rate 12 Mbit/s	
• Without PG interface	**6ES7 972-0BA50-0XA0**
• With PG interface	**6ES7 972-0BB50-0XA0**
PROFIBUS bus connector IP20 With connection to PPI, MPI, PROFIBUS	
• Without PG interface	**6ES7 972-0BA12-0XA0**
• With PG interface	**6ES7 972-0BB12-0XA0**
12M PROFIBUS bus terminal Bus terminal for connection of PROFIBUS nodes at up to 12 Mbit/s with connecting cable	**6GK1 500-0AA10**
SIMATIC S7-300 DM 370 Dummy module; used for module replacement	**6ES7 370-0AA01-0AA0**

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CP 343-1 Lean

Overview



ISO	TCP/ UDP	PN	MRP	IT	IP-R	PG/OP	S7/S5
	●	●	●			●	●

Communication processor for connecting the SIMATIC S7-300 powerline to Industrial Ethernet networks, also as a PROFINET IO device.

Support of PG/OP communication, S7 communication, open communication (SEND/RECEIVE) and PROFINET communication.

Technical specifications

Order No.	6GK7 343-1CX10-0XE0
	CP 343-1 Lean
Transmission rate	
Transmission rate at interface 1	10 … 100 Mbit/s
Interfaces	
Number of electrical connections	
• at interface 1 in accordance with Industrial Ethernet	2
• for power supply	1
Design of electrical connection	
• at interface 1 in accordance with Industrial Ethernet	RJ45 port
• for power supply	2-pin plug-in terminal strip
Supply voltage, current consumption, power loss	
Type of power supply	DC
Power supply	
• 1 from backplane bus	5 V
• External	24 V
Relative positive tolerance at 24 V DC	20 %
Relative negative tolerance at 24 V DC	15 %
Current consumed	
• from backplane bus at 5 V DC, typical	0.2 A
• from external power supply with 24 V DC	
- Typical	0.16 A
- Maximum	0.2 A
Effective power loss	5.8 W

Order No.	6GK7 343-1CX10-0XE0
	CP 343-1 Lean
Permitted ambient conditions	
Ambient temperature	
• With vertical installation during operating phase	0 ... 40 °C
• With horizontal installation during operating phase	0 ... 60 °C
• During storage	-40 ... +70 °C
• During transport	-40 ... +70 °C
Relative humidity at 25 °C without condensation during operating phase, maximum	95 %
IP degree of protection	IP 20
Design, dimensions and weights	
Module format	S7-300 compact module, single-width
Width	40 mm
Height	125 mm
Depth	120 mm
Net weight	0.22 kg
Performance data	
Performance data Open communication	
Number of possible connections for open communication by means of SEND/RECEIVE blocks, maximum	8

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Technical specifications (continued)

Order No.	6GK7 343-1CX10-0XE0
	CP 343-1 Lean
Data volume	
• as user data per TCP connection for open communication by means of SEND/RECEIVE blocks, maximum	8 KB
• as user data per UDP connection for open IE communication by means of SEND/RECEIVE blocks, maximum	2 KB
Number of multicast stations	8
Performance data S7 communication	
Maximum number of possible connections for S7 communication	4
Number of possible connections for S7 communication - Note	-
Performance data Multiprotocol operation	
Number of active connections in multiprotocol mode	12
Performance data PROFINET communication as PN IO device	
Product function: PROFINET IO device	Yes
Data volume	
• As user data for input variables as PROFINET IO device, maximum	512 byte
• As user data for output variables as PROFINET IO device, maximum	512 byte
• As user data for input variables per submodule as PROFINET IO device	240 byte
• As user data for output variables per submodule as PROFINET IO device	240 byte
• As user data for the consistency area per submodule	240 byte
Number of submodules per PROFINET IO device	32

Order No.	6GK7 343-1CX10-0XE0
	CP 343-1 Lean
Product functions Management, configuration, programming	
Product function: MIB support	Yes
Protocol is supported	
• SNMP v1	Yes
• DCP	Yes
• LLDP	Yes
Configuration software required	STEP 7 V5.4 and higher
Product functions Diagnostics	
Product function: Web-based diagnostics	Yes
Product functions Switch	
Product feature: Switch	Yes
Product function	
• Switch-managed	No
• Configuration with STEP 7	Yes
Product functions Redundancy	
Product function	
• Ring redundancy	Yes
• Redundancy procedure MRP	Yes
Product functions Security	
Product function	
• Switching-off non-required services	Yes
• Blocking of communication via physical ports	Yes
Product functions Time	
Product function	
• SICLOCK support	Yes
• Passing-on of time synchronization	Yes
NTP Protocol is supported	Yes

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CP 343-1 Lean

Ordering data	Order No.
CP 343-1 Lean communication processor 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, MRP, integrated 2-port switch ERTEC, comprehensive diagnostics facilities, module replacement without PG, SNMP, initial commissioning over LAN; with electronic manual on CD-ROM	**6GK7 343-1CX10-0XE0**
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**
CSM 377 compact switch module 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 RJ-45 ports; external 24 V DC power supply, LED diagnostics, S7-300 module including electronic Manual on CD-ROM	**6GK7 377-1AA00-0AA0**
IE FC RJ-45 Plug 145 RJ-45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 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**
IE FC stripping tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	**6GK1 901-1GA00**
SOFTNET S7 for Industrial Ethernet Software for S7 and open communication, including OPC server, PG/OP communication and NCM PC, runtime software, software and electronic manual on CD-ROM, license key on a USB stick, Class A	
SOFTNET V8.0 for Industrial Ethernet for 32-bit Windows 7 Professional/ Ultimate; German/English up to 64 connections	
• Single license for 1 installation	**6GK1 704-1CW80-3AA0**
SOFTNET Edition 2008 for Industrial Ethernet for 32-bit Windows XP Professional SP2/3; Windows 2003 Server R2, SP2; Windows Vista Business/Ultimate SP1; Windows 2008 Server; German/English up to 64 connections	
• Single license for 1 installation	**6GK1 704-1CW71-3AA0**
• 1-year Software Update Service, with automatic extension; requirement: Current software version	**6GK1 704-1CW00-3AL0**
• Upgrade from Edition 2006 to V8.0	**6GK1 704-1CW00-3AE0**
• Upgrade from V6.0, V6.1, V6.2 or V6.3 to V8.0	**6GK1 704-1CW00-3AE1**
SOFTNET S7 Lean Edition V8 for Industrial Ethernet up to 8 connections	
• Single license for 1 installation	**6GK1 704-1LW80-3AA0**
SOFTNET S7 Lean Edition 2008 for Industrial Ethernet up to 8 connections	
• Single license for 1 installation	**6GK1 704-1LW71-3AA0**
• 1-year Software Update Service, with automatic extension; requirement: Current software version	**6GK1 704-1LW00-3AL0**
• Upgrade from Edition 2006 to V8.0	**6GK1 704-1LW00-3AE0**
• Upgrade from V6.0, V6.1, V6.2 or V6.3 to V8.0	**6GK1 704-1LW00-3AE1**
STEP 7 Version 5.4 Target system: SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC Requirements: Windows XP Professional, Vista Ultimate, Vista Business Type of dlivery: German, English, French, Spanish, Italian, including license key on USB flash drive, with electronic documentation	
• Floating license on DVD	**6ES7 810-4CC08-0YA5**
• Rental license for 50 hours	**6ES7 810-4CC08-0YA6**
• Software Update Service on DVD (requires current software version)	**6ES7 810-4BC01-0YX2**
• Floating license upgrade 3.x/4.x/5.x to V5.4; on DVD	**6ES7 810-4CC08-0YE5**
• Trial license STEP 7 V5.4; on DVD, operational for 14 days	**6ES7 810-4CC08-0YA7**

[1] The HSP for the CP 343-1 Lean (6GK7-343-1CX10 0XE0) can be directly downloaded and installed from the Internet through STEP 7 and is already included from STEP 7 Version V5.4 SP1.

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Overview



ISO	TCP/ UDP	PN	MRP	IT	IP-R	PG/OP	S7/S5
●	●	●	●			●	●

Communication processor for connecting the SIMATIC S7-300/ SINUMERIK 840D powerline to Industrial Ethernet networks, also as a PROFINET IO controller or IO device.

Support of PG/OP communication, S7 communication, open communication (SEND/RECEIVE) and PROFINET communication.

Technical specifications

Order No.	6GK7 343-1EX30-0XE0
	CP 343-1
Transmission rate	
Transmission rate at interface 1	10 … 100 Mbit/s
Interfaces	
Number of electrical connections	
• at interface 1 in accordance with Industrial Ethernet	2
• for power supply	1
Design of electrical connection	
• at interface 1 in accordance with Industrial Ethernet	RJ45 port
• for power supply	2-pin plug-in terminal strip
Supply voltage, current consumption, power loss	
Type of power supply	DC
Power supply	
• 1 from backplane bus	5 V
• External	24 V
Relative positive tolerance at 24 V DC	20 %
Relative negative tolerance at 24 V DC	15 %
Current consumed	
• from backplane bus at 5 V DC, typical	0.2 A
• from external power supply with 24 V DC	
- Typical	0.16 A
- Maximum	0.2 A
Effective power loss	5.8 W

Order No.	6GK7 343-1EX30-0XE0
	CP 343-1
Permitted ambient conditions	
Ambient temperature	
• with vertical installation during operating phase	0 … 40 °C
• with horizontal installation during operating phase	0 ... 60 °C
• During storage	-40 ... +70 °C
• During transport	-40 ... +70 °C
Relative humidity at 25 °C without condensation during operating phase, maximum	95 %
IP degree of protection	IP 20
Design, dimensions and weights	
Module format	S7-300 compact module, single-width
Width	40 mm
Height	125 mm
Depth	120 mm
Net weight	0.22 kg
Type of mounting: S7-300 DIN rail mounting	Yes

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Technical specifications (continued)

Order No.	6GK7 343-1EX30-0XE0
	CP 343-1
Performance data	
Performance data Open communication	
Number of possible connections for open communication by means of SEND/RECEIVE blocks, maximum	16
Data volume	
• as user data per ISO connection for open communication by means of SEND/RECEIVE blocks, maximum	8 KB
• as user data per ISO on TCP connection for open communication by means of SEND/RECEIVE blocks, maximum	8 KB
• as user data per TCP connection for open communication by means of SEND/RECEIVE blocks, maximum	8 KB
• as user data per UDP connection for open IE communication by means of SEND/RECEIVE blocks, maximum	2 KB
Number of multicast stations	16
Performance data S7 communication	
Maximum number of possible connections for S7 communication	16
Number of possible connections for S7 communication - Note	-
Performance data Multiprotocol operation	
Number of active connections in multiprotocol mode	32
Performance data PROFINET communication as PN IO Controller	
Total number of PN IO devices which can be operated on the PROFINET IO controller	32
Number of external PN IO lines with PROFINET, per rack	1
Data volume	
• As user data for input variables as PROFINET IO controller, maximum	1 KB
• As user data for output variables as PROFINET IO controller, maximum	1 KB
• As user data for input variables per PN IO device as PROFINET IO controller, maximum	240 byte
• As user data for output variables per PN IO device as PROFINET IO controller, maximum	240 byte
• As user data for input variables per PN IO device as PROFINET IO controller, maximum	240 byte
• As user data for output variables per PN IO device as PROFINET IO controller, maximum	240 byte

Order No.	6GK7 343-1EX30-0XE0
	CP 343-1
Performance data PROFINET communication as PN IO device	
Product function: PROFINET IO device	Yes (alternatively to PN IO controller)
Data volume	
• As user data for input variables as PROFINET IO device, maximum	512 byte
• As user data for output variables as PROFINET IO device, maximum	512 byte
• As user data for input variables per submodule as PROFINET IO device	240 byte
• As user data for output variables per submodule as PROFINET IO device	240 byte
• As user data for the consistency area per submodule	240 byte
Number of submodules per PROFINET IO device	32
Product functions Management, configuration, programming	
Product function: MIB support	Yes
Protocol is supported	
• SNMP v1	Yes
• DCP	Yes
• LLDP	Yes
Configuration software required	STEP 7 version V5.4 SP2 and higher
Product functions Diagnostics	
Product function: Web-based diagnostics	Yes
Product functions Switch	
Product feature: Switch	Yes
Product function	
• Switch-managed	No
• Configuration with STEP 7	Yes
Product functions Redundancy	
Product function	
• Ring redundancy	Yes
• Redundancy manager	No
• Redundancy procedure MRP	Yes
Product functions Security	
Product function	
• ACL - IP based	Yes
• Switching-off non-required services	Yes
• Blocking of communication via physical ports	Yes
• Log file for unauthorized access	No
Product functions Time	
Product function	
• SICLOCK support	Yes
• Passing-on of time synchronization	Yes
NTP Protocol is supported	Yes

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Ordering data	Order No.
CP 343-1 communication processor For connection of SIMATIC S7-300 to Industrial Ethernet over ISO and TCP/IP; PROFINET IO controller or PROFINET IO device, MRP, 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**
C-PLUG Removable media for easy device replacement upon failure, for receiving configuration or projects and application data, may be used in SIMATIC NET products with C-PLUG slot	**6GK1 900-0AB00**
Industrial Ethernet Switch SCALANCE X204-2 I 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 RJ-45 ports and two fiber-optic cable ports	**6GK5 204-2BB10-2AA3**
CSM 377 compact switch module 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 RJ-45 ports; external 24 V DC power supply, LED diagnostics, S7-300 module including electronic Manual on CD-ROM	**6GK7 377-1AA00-0AA0**

	Order No.
IE FC RJ-45 Plug 145 RJ-45 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**
SOFTNET S7 for Industrial Ethernet	
Software for S7 and open communication, including OPC server, PG/OP communication and NCM PC, runtime software, software and electronic manual on CD-ROM, license key on a USB stick, Class A	
SOFTNET V8.0 for Industrial Ethernet for 32-bit Windows 7 Professional/ Ultimate; German/English up to 64 connections	
• Single license for 1 installation	**6GK1 704-1CW80-3AA0**
SOFTNET Edition 2008 for Industrial Ethernet for 32-bit Windows XP Professional SP2/3; Windows 2003 Server R2, SP2; Windows Vista Business/Ultimate SP1; Windows 2008 Server; German/English up to 64 connections	
• Single license for 1 installation	**6GK1 704-1CW71-3AA0**
• 1-year Software Update Service, with automatic extension; requirement: Current software version	**6GK1 704-1CW00-3AL0**
• Upgrade from Edition 2006 to V8.0	**6GK1 704-1CW00-3AE0**
• Upgrade from V6.0, V6.1, V6.2 or V6.3 to V8.0	**6GK1 704-1CW00-3AE1**
SOFTNET S7 Lean Edition V8 for Industrial Ethernet up to 8 connections	
• Single license for 1 installation	**6GK1 704-1LW80-3AA0**
SOFTNET S7 Lean Edition 2008 for Industrial Ethernet up to 8 connections	
• Single license for 1 installation	**6GK1 704-1LW71-3AA0**
• 1-year Software Update Service, with automatic extension; requirement: Current software version	**6GK1 704-1LW00-3AL0**
• Upgrade from Edition 2006 to V8.0	**6GK1 704-1LW00-3AE0**
• Upgrade from V6.0, V6.1, V6.2 or V6.3 to V8.0	**6GK1 704-1LW00-3AE1**

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

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Ordering data	Order No.
S7-1613	
Software for S7 and open, including 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 CP 1613/CP 1613 A2/CP 1623;	
S7-1613 V8.0	
for 32-bit Windows 7 Professional/ Ultimate; German/English	
• Single license for 1 installation	**6GK1 716-1CB80-3AA0**
S7-1613 Edition 2008	
for 32-bit Windows XP Professional SP2/3; Windows 2003 Server R2, SP2; Windows Vista Business/Ultimate SP1; Windows 2008 Server; German/English	
• Single license for 1 installation	**6GK1 716-1CB71-3AA0**
• 1-year Software Update Service, with automatic extension; requirement: Current software version	**6GK1 716-1CB00-3AL0**
• Upgrade S7-1613, Edition 2006 or higher, to S7-1613 Edition 2008	**6GK1 716-1CB00-3AE0**
• Upgrade S7-1613 from V6.0, V6.1, V6.2 or V6.3 to S7-1613 V8.0	**6GK1 716-1CB00-3AE1**

	Order No.
STEP 7 Version 5.4	
Target system: SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC Requirements: Windows XP Professional, Vista Ultimate, Vista Business Type of delivery: German, English, French, Spanish, Italian, including license key on USB flash drive, with electronic documentation	
• Floating license on DVD	**6ES7 810-4CC08-0YA5**
• Rental license for 50 hours	**6ES7 810-4CC08-0YA6**
• Software Update Service on DVD (requires current software version)	**6ES7 810-4BC01-0YX2**
• Floating license upgrade 3.x/4.x/5.x to V5.4; on DVD	**6ES7 810-4CC08-0YE5**
• Trial license STEP 7 V5.4; on DVD, operational for 14 days	**6ES7 810-4CC08-0YA7**

[1] The HSP for the CP 343-1(EX30) can be directly downloaded and installed from the Internet through STEP 7 and is already included from STEP 7 Version 5.4 SP2.

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Overview



ISO	TCP/ UDP	PN	MRP	IT	IP-R	PG/OP	S7/S5
●	●	●	●	●	●	●	●

Communication processor for connecting the SIMATIC S7-300/ SINUMERIK 840D powerline to Industrial Ethernet networks, also as a PROFINET IO controller or IO device.

Support of PG/OP communication, S7 communication, open communication (SEND/RECEIVE), PROFINET communication as well as IT communication. Furthermore, the CP 343-1 Advanced, with its e-mail option and web pages that can be created by the user, offers ideal support for maintenance and quality assurance. The Internet functions such as FTP even permit coupling to a wide variety of PC-based systems. Therefore, for the S7-300, this CP is the bridge between the field level and the control level. The CP 343-1 Advanced seamlessly connects to the security structures of the office and IT world.

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Technical specifications

Order No.	6GK7 343-1GX30-0XE0
	CP 343-1 Advanced
Transmission rate	
Transmission rate	
• at interface 1	10 … 1 000 Mbit/s
• at interface 2	10 … 100 Mbit/s
Interfaces	
Number of electrical connections	
• at interface 1 in accordance with Industrial Ethernet	1
• at interface 2 in accordance with Industrial Ethernet	2
• for power supply	1
Design of electrical connection	
• at interface 1 in accordance with Industrial Ethernet	RJ45 port
• at interface 2 in accordance with Industrial Ethernet	RJ45 port
• for power supply	2-pin plug-in terminal strip
Design of swap medium C-Plug	Yes
Supply voltage, current consumption, power loss	
Type of power supply	DC
Power supply	
• 1 from backplane bus	5 V
• External	24 V
Relative positive tolerance at 24 V DC	20 %
Relative negative tolerance at 24 V DC	15 %
Current consumed	
• from backplane bus at 5 V DC, typical	0.14 A
• from external power supply with 24 V DC	
- Typical	0.48 A
- Maximum	0.62 A
Effective power loss	14.7 W

Order No.	6GK7 343-1GX30-0XE0
	CP 343-1 Advanced
Permitted ambient conditions	
Ambient temperature	
• with vertical installation during operating phase	0 … 40 °C
• with horizontal installation during operating phase	0 … 60 °C
• During storage	-40 … +70 °C
• During transport	-40 … +70 °C
Relative humidity at 25 °C without condensation during operating phase, maximum	95 %
IP degree of protection	IP 20
Design, dimensions and weights	
Module format	Compact module S7-300 double width
Width	80 mm
Height	125 mm
Depth	120 mm
Net weight	0.6 kg
Type of mounting: S7-300 DIN rail mounting	Yes
Performance data	
Performance data Open communication	
Number of possible connections for open communication by means of SEND/RECEIVE blocks, maximum	16

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Technical specifications (continued)

Order No.	6GK7 343-1GX30-0XE0
	CP 343-1 Advanced
Data volume	
• as user data per ISO connection for open communication by means of SEND/RECEIVE blocks, maximum	8 KB
• as user data per ISO on TCP connection for open communication by means of SEND/RECEIVE blocks, maximum	8 KB
• as user data per TCP connection for open communication by means of SEND/RECEIVE blocks, maximum	8 KB
• as user data per UDP connection for open IE communication by means of SEND/RECEIVE blocks, maximum	2 KB
Number of multicast stations	16
Performance data S7 communication	
Maximum number of possible connections for S7 communication	16
Number of possible connections for S7 communication - Note	-
Performance data Multiprotocol operation	
Number of active connections in multiprotocol mode	48
Performance data IT functions	
Number of possible connections	
• as client with FTP, maximum	10
• as server	
- with FTP, maximum	2
- with HTTP, maximum	4
• as e-mail client, maximum	1
Data volume as user data for e-mail, maximum	8 KB
Storage capacity of user memory	
• as flash memory file system	28 Mibyte
• as RAM	30 Mibyte
Number of possible write cycles of flash memory cells	100 000
Performance data PROFINET communication as PN IO controller	
Total number of PN IO devices which can be operated on the PROFINET IO controller	128
Number of PN IO IRT Devices which can be operated on the PROFINET IO controller	32
Number of external PN IO lines with PROFINET, per rack	1
Data volume	
• As user data for input variables as PROFINET IO controller, maximum	4 KB
• As user data for output variables as PROFINET IO controller, maximum	4 KB
• As user data for input variables per PN IO device as PROFINET IO controller, maximum	240 byte

Order No.	6GK7 343-1GX30-0XE0
	CP 343-1 Advanced
Data volume	
• As user data for output variables per PN IO device as PROFINET IO controller, maximum	240 byte
• As user data for input variables per PN IO device as PROFINET IO controller, maximum	240 byte
• As user data for output variables per PN IO device as PROFINET IO controller, maximum	240 byte
Performance data PROFINET communication as PN IO device	
Product function: PROFINET IO device	Yes
Data volume	
• As user data for input variables as PROFINET IO device, maximum	1 024 byte
• As user data for output variables as PROFINET IO device, maximum	1 024 byte
• As user data for input variables per submodule as PROFINET IO device	240 byte
• As user data for output variables per submodule as PROFINET IO device	240 byte
• As user data for the consistency area per submodule	240 byte
Number of submodules per PROFINET IO device	32
Performance data PROFINET CBA	
Number of remote connection partners with PROFINET CBA	64
Total number of connections with PROFINET CBA	1 000
Data volume	
• As user data for digital inputs with PROFINET CBA, maximum	8 KB
• As user data for digital outputs with PROFINET CBA, maximum	8 KB
• As user data for arrays and data types	
- with acyclic transmission with PROFINET CBA, maximum	8 KB
- with cyclic transmission with PROFINET CBA, maximum	250 byte
- with local connection with PROFINET CBA, maximum	2 400 byte
Performance data PROFINET CBA remote connection with acyclic transmission	
Send cycle of remote connections with acyclic transmission with PROFINET CBA	100 ms
Number of remote connections with input variables with acyclic transmission with PROFINET CBA, maximum	128
Number of remote connections with output variables with acyclic transmission with PROFINET CBA, maximum	128

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Technical specifications (continued)

Order No.	6GK7 343-1GX30-0XE0
	CP 343-1 Advanced
Data volume	
• as user data for remote connections with input variables with acyclic transmission with PROFINET CBA	8 KB
• as user data for remote connections with output variables with acyclic transmission with PROFINET CBA	8 KB
Performance data PROFINET CBA remote connection with cyclic transmission	
Send cycle of remote connections with cyclic transmission with PROFINET CBA	8 ms
Number of remote connections with input variables with cyclic transmission with PROFINET CBA, maximum	200
Number of remote connections with output variables with cyclic transmission with PROFINET CBA, maximum	200
Data volume	
• as user data for remote connections with input variables with cyclic transmission with PROFINET CBA, maximum	2 000 byte
• as user data for remote connections with output variables with cyclic transmission with PROFINET CBA, maximum	2 000 byte
Performance data PROFINET CBA HMI variables via PROFINET, acyclic	
Number of HMI stations for logging-on for HMI variables with acyclic transmission with PROFINET CBA	3
Send cycle of HMI variables with acyclic transmission with PROFINET CBA	500 ms
Number of HMI variables with acyclic transmission with PROFINET CBA, maximum	200
Data volume as user data for HMI variables with acyclic transmission with PROFINET CBA, maximum	8 KB
Performance data PROFINET CBA device-internal connections	
Maximum number of internal connections with PROFINET CBA	256
Data volume of internal connections with PROFINET CBA, maximum	2 400 byte
Maximum number of connections with constants with PROFINET CBA	200
Data volume as user data for connections with constants with PROFINET CBA, maximum	4 096 byte
Performance data PROFINET CBA PROFIBUS proxy functionality	
Performance data with PROFINET CBA PROFIBUS proxy functionality	No

Order No.	6GK7 343-1GX30-0XE0
	CP 343-1 Advanced
Product functions Management, configuration, programming	
Product function: MIB support	Yes
Protocol is supported	
• SNMP v1	Yes
• DCP	Yes
• LLDP	Yes
Configuration software	
• Required	STEP 7 V5.4 SP4 and higher
• Required for PROFINET CBA	SIMATIC IMAP V3.0 SP1 and higher
Product functions Diagnostics	
Product function: Web-based diagnostics	Yes
Product functions Switch	
Product feature: Switch	Yes
Product function	
• Switch-managed	No
• with IRT PROFINET IO Switch	Yes
• Configuration with STEP 7	Yes
Product functions Redundancy	
Product function	
• Ring redundancy	Yes
• Redundancy manager	Yes
• Redundancy procedure MRP	Yes
Product functions Security	
Product function	
• Password protection for Web applications	Yes
• ACL - IP based	Yes
• ACL - IP based for PLC/routing	Yes
• Switching-off non-required services	Yes
• Blocking of communication via physical ports	Yes
• Log file for unauthorized access	No
Product functions Time	
Product function	
• SICLOCK support	Yes
• Passing-on of time synchronization	Yes
NTP Protocol is supported	Yes

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CP 343-1 Advanced

Ordering data	Order No.
CP 343-1 Advanced communication processor I 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, diagnostics expansions, multicast, web server, HTML diagnostics, FTP server, FTP client, e-mail client, setting of CPU's clock using SIMATIC and NTP procedures, access protection through IP access list, SNMP, DHCP, initialization over LAN 10/100 Mbit/s; with electronic manual on DVD; C-PLUG included in scope of supply	**6GK7 343-1GX31-0XE0**
SOFTNET S7 for Industrial Ethernet	
Software for S7 and open communication, including OPC server, PG/OP communication and NCM PC, runtime software, software and electronic manual on CD-ROM, license key on a USB stick, Class A	
SOFTNET V8.0 for Industrial Ethernet for 32-bit Windows 7 Professional/ Ultimate; German/English up to 64 connections	
• Single license for 1 installation	**6GK1 704-1CW80-3AA0**
SOFTNET Edition 2008 for Industrial Ethernet for 32-bit Windows XP Professional SP2/3; Windows 2003 Server R2, SP2; Windows Vista Business/ Ultimate SP1; Windows 2008 Server; German/English up to 64 connections	
• Single license for 1 installation	**6GK1 704-1CW71-3AA0**
• 1-year Software Update Service, with automatic extension; requirement: Current software version	**6GK1 704-1CW00-3AL0**
• Upgrade from Edition 2006 to V8.0	**6GK1 704-1CW00-3AE0**
• Upgrade from V6.0, V6.1, V6.2 or V6.3 to V8.0	**6GK1 704-1CW00-3AE1**
SOFTNET S7 Lean Edition V8 for Industrial Ethernet up to 8 connections	
• Single license for 1 installation	**6GK1 704-1LW80-3AA0**
SOFTNET S7 Lean Edition 2008 for Industrial Ethernet up to 8 connections	
• Single license for 1 installation	**6GK1 704-1LW71-3AA0**
• 1-year Software Update Service, with automatic extension; requirement: Current software version	**6GK1 704-1LW00-3AL0**
• Upgrade from Edition 2006 to V8.0	**6GK1 704-1LW00-3AE0**
• Upgrade from V6.0, V6.1, V6.2 or V6.3 to V8.0	**6GK1 704-1LW00-3AE1**
IE FC TP standard cable GP 2 x 2 (Type A) 4-core, shielded TP installation cable for connection to IE FC RJ45 outlet / IE FC RJ45 plug; PROFINET-compliant; with UL approval; sold by the meter; max. quantity 1000 m, minimum order 20 m	**6XV1 840-2AH10**
IE FC TP standard cable GP 4 x 2 8-core, shielded TP installation cable for connection to IE FC RJ45 Modular Outlet for universal application; with UL approval; sold by the meter; max quantity 1000 m, minimum order 20 m	
• AWG 22, for connection to IE FC RJ45 Modular Outlet	**6XV1 870-2E**
• AWG 24, for connection to IE FC RJ45 Plug 4 x 2	**6XV1 878-2A**
IE FC RJ-45 Plug 180 RJ-45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation-displacement/terminal contacts for connecting Industrial Ethernet FC installation cables; with a 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1 901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1 901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1 901-1BB10-2AE0**
IE FC RJ-45 Plug 4 x 2 RJ-45 plug connector for Industrial Ethernet (10/100/1000 Mbit/s) with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1 901-1BB11-2AA0**
• 1 pack = 10 units	**6GK1 901-1BB11-2AB0**
• 1 pack = 50 units	**6GK1 901-1BB11-2AE0**

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

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Ordering data

	Order No.
IE FC stripping tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	**6GK1 901-1GA00**
CSM 377 compact switch module 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 RJ-45 ports; external 24 V DC power supply, LED diagnostics, S7-300 module including electronic Manual on CD-ROM	**6GK7 377-1AA00-0AA0**
Industrial Ethernet Switch SCALANCE X308-2 2 x 1000 Mbit/s multimode fiber-optic cable ports (SC sockets), 1 x 10/100/1000 Mbit/s RJ-45 port, 7 x 10/100 Mbit/s RJ-45 ports; for glass fiber-optic cable (multimode) up to max. 750 m	**6GK5 308-2FL00-2AA3**
STEP 7 Version 5.4 Target system: SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC Requirements: Windows XP Professional, Vista Ultimate, Vista Business Type of delivery: German, English, French, Spanish, Italian, including license key on USB flash drive, with electronic documentation	
• Floating license on DVD	**6ES7 810-4CC08-0YA5**
• Rental license for 50 hours	**6ES7 810-4CC08-0YA6**
• Software Update Service on DVD (requires current software version)	**6ES7 810-4BC01-0YX2**
• Floating license upgrade 3.x/4.x/5.x to V5.4; on DVD	**6ES7 810-4CC08-0YE5**
• Trial license STEP 7 V5.4; on DVD, operational for 14 days	**6ES7 810-4CC08-0YA7**

		Order No.
SIMATIC iMap V3.0 for configuring PROFINET CBA, 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 Type of delivery: German, English, with electronic documentation		
• Single license	D	**6ES7 820-0CC04-0YA5**
• Software Update Service	D	**6ES7 820-0CC01-0YX2**
• Upgrade to V3.0, Single license	D	**6ES7 820-0CC04-0YE5**

D: Subject to export regulations AL: N and ECCN: 5D992

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CP 343-1 ERPC

Overview



ISO	TCP/ UDP	PN	MRP	IT	IP-R	PG/OP	S7/S5
	●					●	●

The communication processor CP 343-1 ERPC (Enterprise Connect) for connecting the SIMATIC S7-300 to Industrial Ethernet networks.

Support of PG/OP communication, S7 communication, open communication (SEND/RECEIVE) and ERPC communication.

Support of a data base connection of SIMATIC S7-300 to various database systems for vertical integration using a firmware upgrade (to order separately) of the company ILS-Technology.

Technical specifications

Order No.	6GK7 343-1FX00-0XE0
Product type designation	**CP 343-1 ERPC**
Data transmission rate	
Transmission rate at interface 1	10 … 1 000 Mbit/s
Interfaces	
Number of electrical connections	
• at interface 1 in accordance with Industrial Ethernet	1
• For power supply	1
Design of electrical connection	
• at interface 1 in accordance with Industrial Ethernet	RJ45 port
• For power supply	2-pin plug-in terminal strip
Design of the swap medium C-Plug	Yes
Supply voltage, current consumption, power loss	
Type of power supply	DC
Power supply	
• 1 from backplane bus	5 V
• External	24 V
Relative positive tolerance at 24 V DC	20 %
Relative negative tolerance at 24 V DC	15 %
Current consumed	
• from backplane bus at 5 V DC, typical	0.3 A
• Maximum from external power supply for 24 V DC	0.6 A
Effective power loss	14.7 W

Order No.	6GK7 343-1FX00-0XE0
Product type designation	**CP 343-1 ERPC**
Permitted ambient conditions	
Ambient temperature	
• with vertical installation during operating phase	0 … 40 °C
• with horizontal installation during operating phase	0 … 60 °C
• During storage	-40 … +70 °C
• During transport	-40 … +70 °C
Relative humidity at 25 °C without condensation during operating phase, maximum	95 %
IP degree of protection	IP 20
Design, dimensions and weights	
Module format	Compact module S7-300 double width
Width	80 mm
Height	125 mm
Depth	120 mm
Net weight	0.8 kg
Type of mounting: S7-300 DIN rail mounting	Yes

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Technical specifications (continued)

Order No.	6GK7 343-1FX00-0XE0
Product type designation	**CP 343-1 ERPC**
Performance data	
Performance data Open communication	
Number of possible connections for open communication by means of SEND/RECEIVE blocks, maximum	8
Data volume	
• As user data per ISO on TCP connection for open communication by means of SEND/RECEIVE blocks, maximum	8 KB
• As user data per TCP connection for open communication by means of SEND/RECEIVE blocks, maximum	8 KB
• As user data per UDP connection for open IE communication by means of SEND/RECEIVE blocks, maximum	2 KB
Number of multicast stations	8
Performance data S7 communication	
Maximum number of possible connections for S7 communication	8
Number of possible connections for S7 communication - Note	plus 2 PG/OP connections and 1 diagnostics connection
Performance data Multiprotocol operation	
Number of active connections in multiprotocol mode	32
Performance data IT functions	
Number of possible write cycles of flash memory cells	100 000
Performance data ERPC functions	
Number of configurable ERPC symbols for database access	
• Per CPU, maximum	2 000
• Per logical trigger, maximum	255
Data quantity as user data and header information per logical trigger	8 KB

Order No.	6GK7 343-1FX00-0XE0
Product type designation	**CP 343-1 ERPC**
Product functions Management, configuration, programming	
Product function: MIB support	Yes
Protocol is supported	
• SNMP v1	Yes
• DCP	Yes
• LLDP	Yes
Configuration software required	STEP 7 version V5.4 SP5 and higher plus HSP
Product functions Diagnostics	
Product function: Web-based diagnostics	Yes
Product functions: Switch	
Product feature: Switch	No
Product functions Redundancy	
Product function: Ring redundancy	No
Product functions Security	
Product function	
• ACL - IP-based	Yes
• Switching-off non-required services	Yes
• Blocking of communication via physical ports	Yes
• Log file for unauthorized access	No
Product functions Time	
Product function	
• SICLOCK support	Yes
• Passing-on of time synchronization	Yes
NTP protocol is supported	Yes

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CP 343-1 ERPC

Ordering data	Order No.
Communication processor CP 343-1 ERPC (Enterprise Connect) For the connection of SIMATIC S7-300 to Industrial Ethernet and for the support of the database connection of the SIMATIC S7-300 to various databases; TCP/UDP, S7 communication, open communication (SEND/ RECEIVE), with and without RFC 1006, multicast, web server, setting of CPU's clock using SIMATIC procedures and NTP, access protection via IP access list, SNMP, DHCP, initialization over LAN 10/100/1000 Mbit/s; with electronic manual on DVD, C-PLUG included in scope of delivery	**6GK7 343-1FX00-0XE0**
SOFTNET S7 for Industrial Ethernet	
Software for S7 and open communication, including OPC server, PG/OP communication and NCM PC, runtime software, software and electronic manual on CD-ROM, license key on a USB stick, Class A	
SOFTNET V8.0 for Industrial Ethernet for 32-bit Windows 7 Professional/ Ultimate; German/English up to 64 connections	
• Single license for 1 installation	**6GK1 704-1CW80-3AA0**
SOFTNET Edition 2008 for Industrial Ethernet for 32-bit Windows XP Professional SP2/3; Windows 2003 Server R2, SP2; Windows Vista Business/Ultimate SP1; Windows 2008 Server; German/English up to 64 connections	
• Single license for 1 installation	**6GK1 704-1CW71-3AA0**
• 1-year Software Update Service, with automatic extension; requirement: Current software version	**6GK1 704-1CW00-3AL0**
• Upgrade from Edition 2006 to V8.0	**6GK1 704-1CW00-3AE0**
• Upgrade from V6.0, V6.1, V6.2 or V6.3 to V8.0	**6GK1 704-1CW00-3AE1**
SOFTNET S7 Lean Edition V8 for Industrial Ethernet up to 8 connections	
• Single license for 1 installation	**6GK1 704-1LW80-3AA0**
SOFTNET S7 Lean Edition 2008 for Industrial Ethernet up to 8 connections	
• Single license for 1 installation	**6GK1 704-1LW71-3AA0**
• 1-year Software Update Service, with automatic extension; requirement: Current software version	**6GK1 704-1LW00-3AL0**
• Upgrade from Edition 2006 to V8.0	**6GK1 704-1LW00-3AE0**
• Upgrade from V6.0, V6.1, V6.2 or V6.3 to V8.0	**6GK1 704-1LW00-3AE1**

	Order No.
Industrial Ethernet Switch SCALANCE X308-2 2 x 1000 Mbit/s multimode fiber-optic cable ports (SC sockets), 1 x 10/100/1000 Mbit/s RJ-45 port, 7 x 10/100 Mbit/s RJ-45 ports; for glass fiber-optic cable (multimode) up to max. 750 m	**6GK5 308-2FL00-2AA3**
IE FC TP standard cable GP 4 x 2 8-core, shielded TP installation cable for universal use; with UL approval; sold by the meter max. length 1000 m; minimum order quantity 20 m	
• AWG 22, for connection to IE FC RJ-45 Modular Outlet	**6XV1 870-2E**
• AWG 24, for connection to IE FC RJ-45 Plug 4 x 2	**6XV1 878-2A**
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/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1 901-1BB11-2AA0**
• 1 pack = 10 units	**6GK1 901-1BB11-2AB0**
• 1 pack = 50 units	**6GK1 901-1BB11-2AE0**
IE FC stripping tool Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables	**6GK1 901-1GA00**
STEP 7 Version 5.4 Target system: SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC Requirements: Windows XP Professional, Vista Ultimate, Vista Business Type of delivery: German, English, French, Spanish, Italian, including license key on USB flash drive, with electronic documentation	
• Floating license on DVD	**6ES7 810-4CC08-0YA5**
• Rental license for 50 hours	**6ES7 810-4CC08-0YA6**
• Software Update Service on DVD (requires current software version)	**6ES7 810-4BC01-0YX2**
• Floating license upgrade 3.x/ 4.x/5.x to V5.4; on DVD	**6ES7 810-4CC08-0YE5**
• Trial license STEP 7 V5.4; on DVD, operational for 14 days	**6ES7 810-4CC08-0YA7**
deviceWISE Embedded Edition for SIMATIC S7 Firmware expansion for database connection of the SIMATIC S7-300 complete with CP 343-1 ERPC to various ERP or MES systems	Please see deviceWISE Embedded Edition for SIMATIC S7

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Overview



- Unmanaged switch for the connection of a SIMATIC S7-300 with integral PROFINET interface or with an Industrial Ethernet CP or ET 200M to an Industrial Ethernet in an electrical linear, tree or star structure
- As many as three additional nodes can be connected
- As an unmanaged switch, the CSM 377 is used for integrating small machines into existing automation networks or for the standalone operation of the machines
- Simple, space-saving attachment to S7-300 mounting rail due to design as single-width module in S7-300 format
- Low-cost solution for implementing small, local Ethernet networks
- Rugged, industry-standard node connections with PROFINET-compliant RJ45 connectors that latch onto the enclosure to offer additional strain and bending relief

Technical specifications

Order No.	6GK7 377-1AA00-0AA0
	CSM 377
Transmission rate	
Transmission rate 1	10 Mbit/s
Transmission rate 2	100 Mbit/s
Interfaces	
Maximum number of electrical/ optical connections for network components or terminal equipment	4
Number of electrical connections	
• for network components or terminal equipment	4
• for signaling contact	-
• for power supply	1
Design of electrical connection	
• for network components or terminal equipment	RJ45 port
• for signaling contact	-
• for power supply	2-pin terminal block
Supply voltage, current consumption, power loss	
Number of optical connections	
Design of optical connection	
Type of power supply	DC
External power supply	24 V
• Minimum	19.2 V
• Maximum	28.8 V
Current consumed, maximum	0.07 A
Product component: fusing at power supply input	Yes
Design of fusing at input for power supply	0.5 A / 60 V
Effective power loss at 24 V with DC	1.6 W
Permitted ambient conditions	
Ambient temperature	
• During operating phase	0 … 60 °C
• During storage	-40 … +70 °C
• During transport	-40 … +70 °C

Order No.	6GK7 377-1AA00-0AA0
	CSM 377
Relative humidity at 25 °C without condensation during operating phase, maximum	95 %
IP degree of protection	IP 20
Design, dimensions and weights	
Design	SIMATIC S7-300 design
Width	40 mm
Height	125 mm
Depth	118 mm
Net weight	0.2 kg
• 35 mm DIN rail mounting	No
• Wall mounting	No
• S7-300 rail mounting	Yes
Type of mounting	-
Product properties, functions, components General	
Cascading with star topology	-
Product function: Switch-managed	No
Standards, specifications, approvals	
Standard	
• for EMC of FM	FM3611: Class 1, Division 2, Group A, B, C, D / T.., CL.1, Zone 2, GP. IIC, T.. Ta
• For hazardous zone	EN 60079-15, II 3 G Ex nA II T.., KEMA 06 ATEX 0021 X
• For CSA and UL safety	UL 508, CSA C22.2 No. 142
• for hazardous zone of CSA and UL	UL 1604 and UL 2279-15 (Hazardous Location)
• For emitted interference	EN 61000-6-4 (Class A)
• For noise immunity	EN 61000-6-2
Certificate of suitability	EN 61000-6-2, EN 61000-6-4
• CE mark	Yes
• C-Tick	Yes

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CSM 377 unmanaged

Ordering data

	Order No.
CSM 377 compact switch module Unmanaged switch for connecting a SIMATIC S7-300, ET200 M and up to three further nodes to Industrial Ethernet with 10/100 Mbit/s; 4 x RJ45 ports; external 24 V DC power supply, diagnostics on LEDs, S7-300 module including electronic manual on CD-ROM	**6GK7 377-1AA00-0AA0**
Accessories	
IE FC TP standard cable GP 2 x 2 (Type A) 4-core, shielded TP installation cable for connection to IE FC outlet RJ45/ IE FC RJ45 plug; PROFINET-compliant; with UL approval; sold by the meter; max. quantity 1000 m, minimum order 20 m	**6XV1 840-2AH10**
IE FC RJ45 Plug 180 2 x 2 RJ45 plug connector for Industrial Ethernet 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/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**
IE FC stripping tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	**6GK1 901-1GA00**

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Overview



- SINAUT communication module TIM for SIMATIC S7-300 for use in a wide area network (WAN)
- IP communication via secure VPN (virtual private network) using the Internet
- Wireless communication via GPRS router, GPRS modem, or radio devices
- Wired communication via Ethernet, DSL, dialup modems or dedicated line modem
- Complete migration of existing wireless, dedicated line and dial-up technology to IP-based network
- Message frame memory for complete recording of data
- Simple configuration and operation without specialist IT knowledge

Technical specifications

Order No.	6NH7 800-3BA00
Product type designation	**TIM 3V-IE**
Transmission rate	
• With Industrial Ethernet	10 … 100 Mbit/s
• In accordance with RS 232	50 … 38 400 bit/s
Interfaces	
Number of interfaces in accordance with Industrial Ethernet	1
Number of electrical connections	
• For external data transmission in accordance with RS 232	1
• For power supply	1
Design of electrical connection	
• of the Industrial Ethernet interface	RJ45 port
• at interface 1 for external data transmission	9-pin D-sub male connector (RS232)
• at interface 2 for external data transmission	-
• For power supply	2-pin, pluggable terminal strip
Design of the swap medium C-Plug	No
Supply voltage, current consumption, power loss	
Type of power supply	DC
Power supply	24 V
• Minimum	20.4 V
• Maximum	28.8 V
Current consumed	
• Maximum from backplane bus for 24 V DC	0.2 A
• Maximum from external power supply for 24 V DC	0.2 A
Effective power loss	5.8 W
Product expansion: optional backup battery	No
Battery type	-
Backup current typical	-
Backup current maximum	-

Order No.	6NH7 800-3BA00
Product type designation	**TIM 3V-IE**
Permitted ambient conditions	
Ambient temperature	
• During operating phase	0 … 60 °C
• During storage	-40 … +70 °C
• During transport	-40 … +70 °C
Relative humidity at 25 °C without condensation during operating phase, maximum	95 %
IP degree of protection	IP20
Design, dimensions and weights	
Module format	S7-300 compact module, single-width
Width	40 mm
Height	125 mm
Depth	120 mm
Net weight	0.2 kg
Product properties, functions, components General	
Number of modules - Note	Number of TIM per S7-300: 1
Cable length	
• Maximum with RS232 interface	6 m
• Maximum with RS485 interface	-
Performance data	
Performance data S7 communication	
Number of possible connections for S7 communication	
• Maximum	12
• Maximum with PG connections	4
• For OP connections, maximum	8
Service	
• SINAUT ST7 using S7 communication	Yes
• PG/OP communication	Yes

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Technical specifications (continued)

Order No.	6NH7 800-3BA00
Product type designation	**TIM 3V-IE**
Performance data Multiprotocol operation	
Number of active connections in multiprotocol mode	12
Performance data Telecontrol	
Suitability for use	
• TIM node station	No
• TIM station	Yes
• TIM control center	No
Suitability for use - Note	RS232 and Industrial Ethernet cannot be used simultaneously
Protocol is supported	
• TCP/IP	Yes
• DNP3	No
• SINAUT ST1 protocol	Yes
• SINAUT ST7 protocol	Yes
Storage capacity of S7 CPU's work memory	
• Required on CPU for TD7onCPU mode data blocks	20 Kibyte
• Required on TIM for TD7onTIM mode data blocks	0 Kibyte
Storage capacity - Note	TD7onCPU: at least 20 KB, actual requirement depends on data quantity and functional scope TD7onTIM: 0 bytes in most favorable case
Product property: buffered message frame memory	No
Transmission format	
• 11 bits for SINAUT ST1 protocol with polling	Yes
• 10 or 11 bits for SINAUT ST1 protocol with spontaneous polling	Yes
• 10 bits for SINAUT ST7 protocol with multi-master polling	Yes
• 10 or 11 bits for SINAUT ST7 protocol with polling or spontaneous polling	Yes
Operating mode with scanning of data transmission	
• With dedicated line/radio link	
- With SINAUT ST1 protocol	Polling, polling with time slot procedure
- With SINAUT ST7 protocol	Polling, polling with time slot procedure, multi-master polling with time slot procedure
• With dial-up network	
- With SINAUT ST1 protocol	Spontaneous
- With SINAUT ST7 protocol	Spontaneous
Hamming distance	
• For SINAUT ST1 protocol	4
• For SINAUT ST7 protocol	4

Order No.	6NH7 800-3BA00
Product type designation	**TIM 3V-IE**
Product functions Management, configuration, programming	
Configuration software	
• Required for CPU configuration: SINAUT TD7 block library for CPU	Yes
• Required for PG configuration: SINAUT ST7 configuration software for PG	Yes
Storage location of TIM configuration data	On the CPU
Product functions Security Virtual Private Network	
Suitability for use of Virtual Private Network	Yes
Product function	
• Password protection for VPN	Yes
• MSC client via GPRS modem with MSC capability	Yes
MSC protocol is supported	No
Number of possible connections	
• As MSC client with VPN connection	1
• As MSC server with VPN connection	0
MSC protocol supported with Virtual Private Network	-
Key length for MSC with Virtual Private Network	128 bits
Type of authentication with Virtual Private Network PSK	Yes
Virtual Private Network mode - Note	VPN mode as MSC client with MSC protocol and password protection only possible together with GPRS modem with MSC capability
Product function Time	
Product component hardware real time clock	No

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Ordering data		Order No.
TIM 3V-IE communication module With an RS232 interface for SINAUT communication via a conventional WAN or an IP-based network (WAN or LAN)		**6NH7 800-3BA00**
SINAUT ST7 engineering software, V5.1 on CD-ROM, comprising: • SINAUT ST7 engineering software V5.1 for the programming device • SINAUT TD7 function block library V2.2 for the CPU • Electronic manual in German and English	J	**6NH7 997-0CA51-0AA0**
SINAUT ST7 Engineering Software Edition 09/2009 (Upgrade) for STEP 7 V5.4 SP4, for owners of older versions of SINAUT ST7 engineering software	J	**6NH7 997-0CA50-0GA0**
Accessories		
IE FC TP standard cable GP 2 x 2 (Type A) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 Plug; PROFINET-compatible; with UL approval; sold by the meter; max. length 1000 m, minimum order quantity 20 m		**6XV1 840-2AH10**
IE FC RJ45 Plug 180 RJ45 plug-in connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface		
• 1 pack = 1 unit		**6GK1 901-1BB10-2AA0**
• 1 pack = 10 units		**6GK1 901-1BB10-2AB0**
• 1 pack = 50 units		**6GK1 901-1BB10-2AE0**
IE FC Stripping Tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables		**6GK1 901-1GA00**
Connecting cable For connecting a TIM (RS232) with a SINAUT ST7 MD2, MD3 or MD4 (RS232) modem; cable length 1.5 m		**6NH7 701-4AL**
Connecting cable For connecting a TIM (RS232) with the GSM modem MD720-3; also suitable for third-party modems or radio equipment with standard RS232 interface; cable length 2.5 m		**6NH7 701-5AN**
Connecting cable with one end open for connecting a TIM (RS232) to a third-party modem or radio unit (RS232); cable length 2.5 m		**6NH7 701-4BN**
Connecting cable For connecting two TIM modules via their RS232 interface without modems ("null modem"); cable length 6 m		**6NH7 701-0AR**

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

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TIM 3V-IE Advanced

Overview



- SINAUT communication module TIM for SIMATIC S7-300 for use in wide area network (WAN) as station, node station, and control center
- IP communication via secure VPN (virtual private network) using the Internet
- Wireless communication via GPRS router, GPRS modem or radio devices
- Wired communication via Ethernet, DSL, dialup modems or dedicated line modem
- Complete migration of existing wireless, dedicated line and dial-up technology to IP-based network
- Message frame memory for complete recording of data and support of redundant communication paths
- Simple configuration and operation without specialist IT knowledge

Technical specifications

Order-No.	6NH7 800-3CA00
Product type designation	**TIM 3V-IE Advanced**
Transmission rate	
Transmission rate with Industrial Ethernet	10 … 100 Mbit/s
Transmission rate in accordance with RS 232	50 … 38 400 bit/s
Interfaces	
Number of interfaces in accordance with Industrial Ethernet	1
Number of electrical connections	
• For external data transmission in accordance with RS 232	1
• For power supply	1
Design of electrical connection	
• of the Industrial Ethernet interface	RJ45 port
• at interface 1 for external data transmission	9-pin D-sub male connector (RS232)
• at interface 2 for external data transmission	-
• For power supply	2-pin, pluggable terminal strip
Design of the swap medium C-Plug	No
Supply voltage, current consumption, power loss	
Type of power supply	DC
Power supply	24 V
• Minimum	20.4 V
• Maximum	28.8 V
Current consumed	
• Maximum from backplane bus for 24 V DC	0.2 A
• Maximum from external power supply for 24 V DC	0.2 A
Effective power loss	5.8 W
Product expansion: optional backup battery	No

Order-No.	6NH7 800-3CA00
Product type designation	**TIM 3V-IE Advanced**
Permitted ambient conditions	
Ambient temperature	
• During operating phase	0 … 60 °C
• During storage	-40 … +70 °C
• During transport	-40 … +70 °C
Relative humidity at 25 °C without condensation during operating phase, maximum	95 %
IP degree of protection	IP20
Design, dimensions and weights	
Module format	S7-300 compact module, single-width
Width	40 mm
Height	125 mm
Depth	120 mm
Net weight	0.2 kg
Product properties, functions, components General	
Number of modules - Note	Number of TIM per S7-300: several, number depends on connection resources of S7-300 CPU
Cable length	
• Maximum with RS232 interface	6 m
• Maximum with RS485 interface	-
Performance data	
Performance data S7 communication	
Number of possible connections for S7 communication	
• Maximum	24
• Maximum with PG connections	4
• For OP connections, maximum	20
Number of possible connections for S7 communication Note	-

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Technical specifications (continued)

Order-No.	6NH7 800-3CA00
Product type designation	**TIM 3V-IE Advanced**
Service	
• SINAUT ST7 using S7 communication	Yes
• PG/OP communication	Yes
Performance data Multiprotocol operation	
Number of active connections in multiprotocol mode	24
Performance data Telecontrol	
Suitability for use	
• TIM node station	Yes
• TIM station	Yes
• TIM control center	Yes
Suitability for use - Note	RS232 and Industrial Ethernet can be used simultaneously
Protocol is supported	
• TCP/IP	Yes
• DNP3	No
• SINAUT ST1 protocol	Yes
• SINAUT ST7 protocol	Yes
Product function data buffering with connection termination	Yes
Product function data buffering with connection termination Note	32000 Data message frame
Storage capacity of S7 CPU's work memory	
• Required on CPU for TD7onCPU mode data blocks	20 Kibyte
• Required on TIM for TD7onTIM mode data blocks	0 Kibyte
Storage capacity - Note	TD7onCPU: at least 20 KB, actual requirement depends on data quantity and functional scope TD7onTIM: 0 bytes in most favorable case
Product property: buffered message frame memory	No
Transmission format	
• 11 bits for SINAUT ST1 protocol with polling	Yes
• 10 or 11 bits for SINAUT ST1 protocol with spontaneous polling	Yes
• 10 bits for SINAUT ST7 protocol with multi-master polling	Yes
• 10 or 11 bits for SINAUT ST7 protocol with polling or spontaneous polling	Yes
Operating mode with scanning of data transmission	
• With dedicated line/radio link	
- With SINAUT ST1 protocol	Polling, polling with time slot procedure
- With SINAUT ST7 protocol	Polling, polling with time slot procedure, multi-master polling with time slot procedure
• With dial-up network	
- With SINAUT ST1 protocol	Spontaneous
- With SINAUT ST7 protocol	Spontaneous
Hamming distance	
• For SINAUT ST1 protocol	4
• For SINAUT ST7 protocol	4
Product functions Management, configuration, programming	
Configuration software	
• Required for CPU configuration: SINAUT TD7 block library for CPU	Yes
• Required for PG configuration: SINAUT ST7 configuration software for PG	Yes
Storage location of TIM configuration data	On the CPU
Product functions Security Virtual Private Network	
Suitability for use of Virtual Private Network	Yes
Product function	
• Password protection for VPN	Yes
• MSC client via GPRS modem with MSC capability	Yes
MSC protocol is supported	Yes
Number of possible connections	
• As MSC client with VPN connection	1
• As MSC server with VPN connection	0
MSC protocol supported with Virtual Private Network	TCP/IP
Key length for MSC with Virtual Private Network	128 bits
Type of authentication with Virtual Private Network PSK	Yes
Virtual Private Network mode - Note	-
Product functions time	
Product component hardware real time clock	No

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TIM 3V-IE Advanced

Ordering data

		Order No.
TIM 3V-IE Advanced communication module With an RS232 interface and an RJ45 interface for SINAUT communication via a conventional WAN and an IP-based network (WAN or LAN)		**6NH7 800-3CA00**
SINAUT ST7 engineering software, V5.1 on CD-ROM, comprising: • SINAUT ST7 engineering software V5.1 for the programming device • SINAUT TD7 function block library V2.2 for the CPU • Electronic manual in German and English	J	**6NH7 997-0CA51-0AA0**
SINAUT ST7 engineering software Edition 09/2009 (Upgrade) for STEP 7 V5.4 SP4, for owners of older versions of SINAUT ST7 engineering software	J	**6NH7 997-0CA50-0GA0**
Accessories		
IE FC TP standard cable GP 2 x 2 (Type A) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 Plug; PROFINET-compatible; with UL approval; sold by the meter; max. length 1000 m, minimum order quantity 20 m		**6XV1 840-2AH10**
IE FC RJ45 Plug 180 RJ45 plug-in connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface		
• 1 pack = 1 unit		**6GK1 901-1BB10-2AA0**
• 1 pack = 10 units		**6GK1 901-1BB10-2AB0**
• 1 pack = 50 units		**6GK1 901-1BB10-2AE0**
IE FC stripping tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables		**6GK1 901-1GA00**
Connecting cable For connecting a TIM (RS232) with a SINAUT ST7 MD2, MD3 or MD4 (RS232) modem; cable length 1.5 m		**6NH7 701-4AL**
Connecting cable For connecting a TIM (RS232) with the GSM modem MD720-3; also suitable for third-party modems or radio equipment with standard RS232 interface; cable length 2.5 m		**6NH7 701-5AN**
Connecting cable with one end open for connecting a TIM (RS232) to a third-party modem or radio unit (RS232); cable length 2.5 m		**6NH7 701-4BN**
Connecting cable For connecting two TIM modules via their RS232 interface without modems ("null modem"); cable length 6 m		**6NH7 701-0AR**

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Overview



- SINAUT communication module TIM with four interfaces for SIMATIC S7-300 or as self-contained unit for the S7-400 for use in the wide area network (WAN)
- For universal use in a SINAUT station, node station and control center
- Internet communication via integrated MSC-VPN tunnel with direct connection to DSL router or operation via IPsec VPN with additional SIMATIC NET components
- Wireless communication via GPRS router, GPRS modem, or radio devices
- Wired communication via Ethernet, DSL, dialup modems or dedicated line modem
- Complete migration of existing wireless, dedicated line and dial-up technology to IP-based network
- Message frame memory for complete recording of data and support of redundant communication paths
- Simple configuration and operation without specialist IT knowledge

Technical specifications

Order-No.	6NH7 800-4BA00
Product type designation	**TIM 4R-IE**
Data transmission rate	
Data transmission rate	
• With Industrial Ethernet	10 … 100 Mbit/s
• In accordance with RS 232	50 … 38 400 bit/s
Interfaces	
Number of interfaces in accordance with Industrial Ethernet	2
Number of electrical connections	
• For external data transmission in accordance with RS 232	2
• For power supply	1
Design of electrical connection	
• of the Industrial Ethernet interface	RJ45 port
• at interface 1 for external data transmission	9-pin D-sub connector, RS232 switchable to RS485
• at interface 2 for external data transmission	9-pin D-sub connector, RS232 switchable to RS485
• For power supply	2-pin, pluggable terminal strip
Design of the swap medium C-Plug	Yes
Supply voltage, current consumption, power loss	
Type of power supply	DC
Power supply	24 V
• Minimum	20.4 V
• Maximum	28.8 V
Current consumed	
• Maximum from backplane bus for 24 V DC	0.2 A
• Maximum from external power supply for 24 V DC	0.17 A
Effective power loss	4.6 W
Product expansion: optional backup battery	Yes
Type of battery	Lithium AA / 3.6 V / 2.3 Ah

Order-No.	6NH7 800-4BA00
Product type designation	**TIM 4R-IE**
Backup current	
• Typical	100 µA
• Maximum	160 µA
Permitted ambient conditions	
Ambient temperature	
• During operating phase	0 … 60 °C
• During storage	-40 … +70 °C
• During transport	-40 … +70 °C
Relative humidity at 25 °C without condensation during operating phase, maximum	95 %
IP degree of protection	IP20
Design, dimensions and weights	
Module format	Compact module S7-300 double width
Width	80 mm
Height	125 mm
Depth	120 mm
Net weight	0.4 kg
Product properties, functions, components General	
Number of modules - Note	Number of TIM 4R-IE per S7-300/S7-400: several, number depends on connection resources of CPU
Cable length	
• Maximum with RS232 interface	6 m
• Maximum with RS485 interface	30 m
Performance data	
Performance data S7 communication	
Number of possible connections for S7 communication	
• Maximum	64
• Maximum with PG connections	2
• For OP connections, maximum	62

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Technical specifications (continued)

Order-No.	6NH7 800-4BA00
Product type designation	**TIM 4R-IE**
Number of possible connections for S7 communication	-
Note	
Service	
• SINAUT ST7 using S7 communication	Yes
• PG/OP communication	Yes
Performance data Multiprotocol operation	
Number of active connections in multiprotocol mode	128
Performance data Telecontrol	
Suitability for use	
• TIM node station	Yes
• TIM station	Yes
• TIM control center	Yes
Suitability for use - Note	-
Protocol is supported	
• TCP/IP	Yes
• DNP3	No
• SINAUT ST1 protocol	Yes
• SINAUT ST7 protocol	Yes
Product function data buffering with connection termination	Yes
Product function data buffering with connection termination Note	56000 data message frames
Storage capacity of S7 CPU's work memory	
• Required for TD7onCPU mode data blocks on CPU	20 Kibyte
• Required for TD7onTIM mode data blocks on TIM	0 Kibyte
Storage capacity - Note	TD7onCPU: at least 20 KB, actual requirement depends on data quantity and functional scope TD7onTIM: 0 bytes in most favorable case
Product property: buffered message frame memory	Yes
Transmission format	
• 11 bits for SINAUT ST1 protocol with polling	Yes
• 10 or 11 bits for SINAUT ST1 protocol with spontaneous polling	Yes
• 10 bits for SINAUT ST7 protocol with multi-master polling	Yes
• 10 or 11 bits for SINAUT ST7 protocol with polling or spontaneous polling	Yes
Operating mode with scanning of data transmission	
• With dedicated line/radio link	
- With SINAUT ST1 protocol	Polling, polling with time slot procedure
- With SINAUT ST7 protocol	Polling, polling with time slot procedure, multi-master polling with time slot procedure

Order-No.	6NH7 800-4BA00
Product type designation	**TIM 4R-IE**
Operating mode with scanning of data transmission	
• With dial-up network	
- With SINAUT ST1 protocol	Spontaneous
- With SINAUT ST7 protocol	Spontaneous
Hamming distance	
• For SINAUT ST1 protocol	4
• For SINAUT ST7 protocol	4
Product functions Management, configuration, programming	
Configuration software	
• Required for CPU configuration: SINAUT TD7 block library for CPU	Yes
• Required for PG configuration: SINAUT ST7 configuration software for PG	Yes
Storage location of TIM configuration data	On TIM-internal flash memory or on TIM in optional C-PLUG or on MMC of S7-300 CPU if TIM fitted in S7-300 PLC
Product functions Security Virtual Private Network	
Suitability for use of Virtual Private Network	Yes
Product function	
• Password protection for VPN	Yes
• MSC client via GPRS modem with MSC capability	Yes
MSC protocol is supported	Yes
Number of possible connections	
• As MSC client with VPN connection	1
• As MSC server with VPN connection	128
MSC protocol supported with Virtual Private Network	TCP/IP
Key length for MSC with Virtual Private Network	128 bits
Type of authentication with Virtual Private Network PSK	Yes
Virtual Private Network mode - Note	-
Product functions Time	
Product component: hardware real-time clock	Yes
Product property: buffered hardware real-time clock	Yes
Maximum accuracy of hardware real-time clock per day	4 s

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Ordering data		Order No.
TIM 4R-IE communication module With two combined RS232/RS485 interfaces for SINAUT communication via conventional WANs and two RJ45 interfaces for SINAUT communication via IP-based networks (WAN or LAN)		**6NH7 800-4BA00**
SINAUT ST7 engineering software V5.1 on CD-ROM, comprising: • SINAUT ST7 engineering software V5.1 for PG • SINAUT TD7 function block library V2.2 for the CPU • Electronic manual in German and English	J	**6NH7 997-0CA51-0AA0**
SINAUT ST7 engineering software Edition 09/2009 (Upgrade) for STEP 7 V5.4 SP4, for owners of older versions of SINAUT ST7 engineering software	J	**6NH7 997-0CA50-0GA0**
Accessories		
Backup battery 3.6 V/2.3 Ah for TIM 4R-IE		**6ES7 971-0BA00**
IE FC TP standard cable GP 2 x 2 (Type A) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 Plug; PROFINET-compatible; with UL approval; sold by the meter; max. length 1000 m, minimum order quantity 20 m		**6XV1 840-2AH10**
IE FC RJ45 Plug 180 RJ45 plug-in connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface		
• 1 pack = 1 unit		**6GK1 901-1BB10-2AA0**
• 1 pack = 10 units		**6GK1 901-1BB10-2AB0**
• 1 pack = 50 units		**6GK1 901-1BB10-2AE0**

	Order No.
IE FC stripping tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	**6GK1 901-1GA00**
Connecting cable For connecting a TIM (RS232) with a SINAUT ST7 MD2, MD3 or MD4 (RS232) modem; cable length 1.5 m	**6NH7 701-4AL**
Connecting cable For connecting a TIM (RS485) with a SINAUT ST7 MD2, MD3 or MD4 (RS485) modem; cable length 1.5 m	**6NH7 701-4DL**
Connecting cable For connecting a TIM (RS232) with the GSM modem MD720-3; also suitable for third-party modems or radio equipment with standard RS232 interface; cable length 2.5 m	**6NH7 701-5AN**
Connecting cable with one end open for connecting a TIM (RS232) to a third-party modem or radio unit (RS232); cable length 2.5 m	**6NH7 701-4BN**
Connecting cable For connecting two TIM modules via their RS232 interface without modems ("null modem"); cable length 6 m	**6NH7 701-0AR**
SITOP compact 24 V/ 0.6 A 1-phase power supply with wide-range input 85 … 264 V AC/110 … 300 V DC, stabilized output voltage 24 V, rated output current value 0,6 A, slim design	**6EP1 331-5BA00**
SITOP compact 24 V/ 0.6 A 1-phase power supply with wide-range input 85 … 264 V AC/110 … 300 V DC, stabilized output voltage 24 V, rated output current value 0,6 A, slim design	**6EP1 331-5BA00**

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TIM 3V-IE DNP3

Overview



In an S7 station, the communication module TIM 3V-IE DNP3 (**T**elecontrol **I**nterface **M**odule) processes the data traffic for the S7-CPU to the assigned master system SIMATIC PCS7 TeleControl V7.1 SP2 using the open protocol DNP3 (**D**istributed **N**etwork **P**rotocol).

- With the S7-300 housing, it can be fully integrated into the S7-300 system
- RS232 interface for connecting an external modem for data transmission via a conventional WAN
- RJ45 interface for data transmission via IP-based networks

Technical specifications

Order-No.	6NH7 803-3BA00-0AA0
Product type designation	**TIM 3V-IE DNP3**
Transmission rate	
Transmission rate with Industrial Ethernet	10 … 100 Mbit/s
Transmission rate in accordance with RS 232	300 … 38 400 bit/s
Interfaces	
Number of interfaces in accordance with Industrial Ethernet	1
Number of electrical connections	
• For external data transmission in accordance with RS 232	1
• for power supply	1
Design of electrical connection	
• of the Industrial Ethernet interface	RJ45 port
• at interface 1 for external data transmission	9-pin Sub-D connector (RS232)
• at interface 2 for external data transmission	-
• for power supply	2-pin, plug-in terminal strip
Design of swap medium C-Plug	No
Supply voltage, current consumption, power loss	
Type of power supply	DC
Supply voltage	24 V
• Minimum	20.4 V
• Maximum	28.8 V
Current consumed	
• Maximum from backplane bus for 24 V DC	0.2 A
• From external supply voltage at 24 V DC max.	0.2 A
Effective power loss	5.8 W
Product expansion: optional backup battery	No
Type of battery	-
Backup current, typical	-
Backup current, maximum	-

Order-No.	6NH7 803-3BA00-0AA0
Product type designation	**TIM 3V-IE DNP3**
Permissible ambient conditions	
Ambient temperature	
• During operating phase	0 … 60°C
• During storage	-40 … +70°C
• During transport	-40 … +70°C
Relative humidity at 25°C without condensation during operating phase, maximum	95%
IP degree of protection	IP20
Design, dimensions and weights	
Module format	Compact module S7-300 single-width
Width	40 mm
Height	125 mm
Depth	120 mm
Net weight	0.2 kg
Product properties, functions, components General	
Number of modules - Note	Number of TIMs per S7-300: 1
Cable length	
• With RS232 interface, maximum	6 m
• With RS485 interface, maximum	-
Performance data	
Performance data S7 communication	
Number of possible connections for S7 communication	
• Maximum	3
• For PG connections, maximum	2
• For OP connections, maximum	1
Number of possible connections for S7 communication - Note	Only via LAN
Service	
• SINAUT ST7 via S7 communication	-
• PG/OP communication	Yes

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Technical specifications (continued)

Order-No.	6NH7 803-3BA00-0AA0
Product type designation	**TIM 3V-IE DNP3**
Performance data multiprotocol operation	
Number of active connections in multiprotocol mode	-
Performance data Telecontrol	
Suitability for use	
• TIM node station	No
• TIM station	Yes
• TIM control center	No
Suitability for use - Note	-
Protocol is supported	
• TCP/IP	No
• DNP3	Yes
• SINAUT ST1 protocol	No
• SINAUT ST7 protocol	No
Number of data frames which can be saved on the TIM	-
Product function: data buffering if connection is aborted	Yes
Product function: data buffering if connection is aborted - Note	50,000 data points with one master
Storage capacity of S7 CPU RAM	
• Data blocks required on CPU for TD7onCPU mode	-
• Data blocks required on TIM for TD7onTIM mode	-
Storage capacity - Note	-
Product property: buffered message frame memory	-

Order-No.	6NH7 803-3BA00-0AA0
Product type designation	**TIM 3V-IE DNP3**
Data transfer format	
• For SINAUT ST1 protocol with polling 11 bits	-
• For SINAUT ST1 protocol with spontaneous 10 bits or 11 bits	-
• For SINAUT ST7 protocol with multi-master polling 10 bits	-
• For SINAUT ST7 protocol with polling or spontaneous 10 bits or 11 bits	-
Operating mode for scanning of data transmission	
• With dedicated line/radio link	
- With SINAUT ST1 protocol	-
- With SINAUT ST7 protocol	-
• With dial-up network	
- With SINAUT ST1 protocol	-
- With SINAUT ST7 protocol	-
Hamming distance	
• With SINAUT ST1 protocol	-
• for SINAUT ST7 protocol	-
Product functions Management, configuration, programming	
Configuration software	
• Required	SINAUT ST7 ES
Storage location of TIM configuration data	On the CPU or TIM
Product functions Time	
Product component: hardware real-time clock	Yes
Product property: buffered hardware real-time clock	Yes
Maximum accuracy of hardware real-time clock per day	4 s

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TIM 3V-IE DNP3

Ordering data		Order No.
TIM 3V-IE DNP3 communication module With an RS232 interface for SINAUT communication via a conventional WAN and an IP-based network (WAN or LAN)	I	**6NH7 803-3BA00-0AA0**
SINAUT ST7 engineering software V5.1 on CD-ROM, comprising: • SINAUT ST7 engineering software V5.1 for the PG • SINAUT TD7 block library V2.2 • Electronic manual in German and English	J	**6NH7 997-0CA51-0AA0**
SINAUT ST7 engineering software V5.1 Update from Version V5.0 to V5.1		Software download
SINAUT ST7 engineering software V5.0 Edition 09/2009 (Upgrade) for STEP 7 V5.4 SP4, for owners of older versions of SINAUT ST7 engineering software	J	**6NH7 997-0CA50-0GA0**
Accessories		
IE FC TP standard cable GP 2 x 2 (Type A) 4-core, shielded TP installation cable for connection to IE FC RJ45 outlet / IE FC RJ45 plug; PROFINET-compliant; with UL approval; sold by the meter; max. quantity 1000 m, minimum order quantity 20 m		**6XV1 840-2AH10**
IE FC RJ45 Plug 180 RJ45 plug-in connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface		
• 1 pack = 1 unit		**6GK1 901-1BB10-2AA0**
• 1 pack = 10 units		**6GK1 901-1BB10-2AB0**
• 1 pack = 50 units		**6GK1 901-1BB10-2AE0**
IE FC stripping tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables		**6GK1 901-1GA00**
Connecting cable For connecting a TIM (RS232) with a SINAUT ST7 MD2, MD3 or MD4 (RS232) modem; cable length 1.5 m		**6NH7 701-4AL**
Connecting cable For connecting a TIM (RS232) with the GSM modem MD720-3; also suitable for third-party modems or wireless equipment with standard RS232 interface; cable length 2.5 m		**6NH7 701-5AN**
Connecting cable with one end open for connecting a TIM (RS232) to a third-party modem or wireless device (RS232); cable length 2.5 m		**6NH7 701-4BN**
Connecting cable For connecting two TIM modules via their RS232 interface without modems ('Null modem'). Cable length 6 m		**6NH7 701-0AR**

I: Subject to export regulations AL: N and ECCN: EAR99H
J: Subject to export regulations AL: N and ECCN: EAR99S

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Overview



In an S7 station, the communication module TIM 4R-IE DNP3 (**T**elecontrol **I**nterface **M**odule) processes the data traffic for the S7-CPU to the assigned master system SIMATIC PCS7 TeleControl V7.1 SP2 using the open protocol DNP3 (**D**istributed **N**etwork **P**rotocol).

- With the double-width S7-300 housing, can be fully integrated into the S7-300 system
- Can be connected as a stand-alone to a SIMATIC S7-400 and SIMATIC S7-400 H System
- Two RS232/RS485 interfaces for the connection of an external modem for data transmission via a conventional WAN
- Two RJ45 interfaces for data transmission via IP-based networks
- By the use of physically separate connection paths, the module permits media redundancy without loss of data during the switchover

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Technical specifications

Order-No.	6NH7 803-4BA00-0AA0
Product type designation	**TIM 4R-IE DNP3**
Transmission rate	
Transmission rate	
• for Industrial Ethernet	10 … 100 Mbit/s
• in accordance with RS 232	300 … 115 200 bit/s
Interfaces	
Number of interfaces in accordance with Industrial Ethernet	2
Number of electrical connections	
• For external data transmission in accordance with RS 232	2
• for power supply	1
Design of electrical connection	
• of the Industrial Ethernet interface	RJ45 port
• at interface 1 for external data transmission	9-pin Sub-D connector, RS232 switchable to RS485
• at interface 2 for external data transmission	9-pin Sub-D connector, RS232 switchable to RS485
• for power supply	2-pin, plug-in terminal strip
Design of swap medium C-Plug	Yes
Supply voltage, current consumption, power loss	
Type of power supply	DC
Supply voltage	24 V
• Minimum	20.4 V
• Maximum	28.8 V
Current consumed	
• Maximum from backplane bus for 24 V DC	0.2 A
• From external supply voltage at 24 V DC max.	0.17 A
Effective power loss	4.6 W
Product expansion: optional backup battery	Yes
Type of battery	Lithium AA / 3.6 V / 2.3 Ah

Order-No.	6NH7 803-4BA00-0AA0
Product type designation	**TIM 4R-IE DNP3**
Backup current	
• Typical	100 µA
• Maximum	160 µA
Permissible ambient conditions	
Ambient temperature	
• During operating phase	0 … 60°C
• During storage	-40 … +70°C
• During transport	-40 … +70°C
Relative humidity at 25°C without condensation during operating phase, maximum	95%
IP degree of protection	IP20
Design, dimensions and weights	
Module format	Compact module S7-300 double-width
Width	80 mm
Height	125 mm
Depth	120 mm
Net weight	0.4 kg
Product properties, functions, components General	
Number of modules - Note	Number of TIMs per S7-300 / S7-400: 1
Cable length	
• With RS232 interface, maximum	6 m
• With RS485 interface, maximum	30 m
Performance data	
Performance data S7 communication	
Number of possible connections for S7 communication	
• Maximum	5
• For PG connections, maximum	2
• For OP connections, maximum	1

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TIM 4R-IE DNP3

Technical specifications (continued)

Order-No.	6NH7 803-4BA00-0AA0
Product type designation	**TIM 4R-IE DNP3**
Number of possible connections for S7 communication - Note	Only via LAN
Service	
• SINAUT ST7 via S7 communication	-
• PG/OP communication	Yes
Performance data multiprotocol operation	
Number of active connections in multiprotocol mode	-
Performance data Telecontrol	
Suitability for use	
• TIM node station	No
• TIM station	Yes
• TIM control center	No
Suitability for use - Note	-
Protocol is supported	
• TCP/IP	No
• DNP3	Yes
• SINAUT ST1 protocol	No
• SINAUT ST7 protocol	No
Number of data frames which can be saved on the TIM	-
Product function: data buffering if connection is aborted	Yes
Product function: data buffering if connection is aborted - Note	200,000 data points with one master
Storage capacity of S7 CPU RAM	
• Data blocks required on CPU for TD7onCPU mode	-
• Data blocks required on TIM for TD7onTIM mode	-
Storage capacity - Note	-
Product property: buffered message frame memory	-

Order-No.	6NH7 803-4BA00-0AA0
Product type designation	**TIM 4R-IE DNP3**
Data transfer format	
• For SINAUT ST1 protocol with polling 11 bits	-
• For SINAUT ST1 protocol with spontaneous 10 bits or 11 bits	-
• For SINAUT ST7 protocol with multi-master polling 10 bits	-
• For SINAUT ST7 protocol with polling or spontaneous 10 bits or 11 bits	-
Operating mode for scanning of data transmission	
• With dedicated line/radio link	
- With SINAUT ST1 protocol	-
- With SINAUT ST7 protocol	-
• With dial-up network	
- With SINAUT ST1 protocol	-
- With SINAUT ST7 protocol	-
Hamming distance	
• With SINAUT ST1 protocol	-
• for SINAUT ST7 protocol	-
Product functions Management, configuration, programming	
Configuration software	
• Required	SINAUT ST7 ES
Storage location of TIM configuration data	On the CPU
Product functions Time	
Product component: hardware real-time clock	Yes
Product property: buffered hardware real-time clock	Yes
Maximum accuracy of hardware real-time clock per day	4 s

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Ordering data		Order No.
TIM 4R-IE DNP3 communication module With two combined RS232/RS485 interfaces for SINAUT communication via conventional WANs and two RJ45 interfaces for SINAUT communication via IP-based networks (WAN or LAN)	I	**6NH7 803-4BA00-0AA0**
SINAUT ST7 engineering software V5.1 on CD-ROM, comprising: • SINAUT ST7 engineering software V5.1 for the PG • SINAUT TD7 block library V2.2 • Electronic manual in German and English	J	**6NH7 997-0CA51-0AA0**
SINAUT ST7 engineering software V5.1 Update from Version V5.0 to V5.1		Software download
SINAUT ST7 engineering software V5.0 Edition 09/2009 (Upgrade) for STEP 7 V5.4 SP4, for owners of older versions of SINAUT ST7 engineering software	J	**6NH7 997-0CA50-0GA0**
Accessories		
Backup battery 3.6 V/2.3 Ah for TIM 4R-IE DNP3		
IE FC TP standard cable GP 2 x 2 (Type A) 4-core, shielded TP installation cable for connection to IE FC RJ45 outlet / IE FC RJ45 plug; PROFINET-compliant; with UL approval; sold by the meter; max. quantity 1000 m, minimum order quantity 20 m		**6XV1 840-2AH10**
IE FC RJ45 Plug 180 RJ45 plug-in connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface		
• 1 pack = 1 unit		**6GK1 901-1BB10-2AA0**
• 1 pack = 10 units		**6GK1 901-1BB10-2AB0**
• 1 pack = 50 units		**6GK1 901-1BB10-2AE0**
IE FC stripping tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables		**6GK1 901-1GA00**
Connecting cable For connecting a TIM (RS232) with a SINAUT ST7 MD2, MD3 or MD4 (RS232) modem; cable length 1.5 m		**6NH7 701-4AL**
Connecting cable For connecting a TIM (RS485) with a SINAUT ST7 MD2, MD3 or MD4 (RS485) modem; cable length 1.5 m		**6NH7 701-4DL**
Connecting cable For connecting a TIM (RS232) with the GSM modem MD720-3; also suitable for third-party modems or wireless equipment with standard RS232 interface; cable length 2.5 m		**6NH7 701-5AN**
Connecting cable with one end open for connecting a TIM (RS232) to a third-party modem or wireless device (RS232); cable length 2.5 m		**6NH7 701-4BN**
Connecting cable For connecting two TIM modules via their RS232 interface without modems ('Null modem'). Cable length 6 m		**6NH7 701-0AR**
SITOP compact 24 V/ 0.6 A 1-phase power supply with wide-range input 85 to 264 V AC/ 110 to 300 V DC, stabilized output voltage 24 V, rated output current value 0.6 A, slim design		**6EP1 331-5BA00**
SITOP compact 24 V/ 0.6 A 1-phase power supply with wide-range input 85 to 264 V AC/ 110 to 300 V DC, stabilized output voltage 24 V, rated output current value 0.6 A, slim design		**6EP1 331-5BA00**

I: Subject to export regulations AL: N and ECCN: EAR99H
J: Subject to export regulations AL: N and ECCN: EAR99S

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ASM 475

Overview



The ASM 475 is a low-cost module for connecting the MOBY D, U, SIMATIC RF200, RF300, RF600 and SIMATIC MV400 identification systems to the S7-300 and ET 200M.

Technical specifications

Communication modules	ASM 475	ASM 475 (with MOBY U file handler)
Serial interface to the reader	RS422	
Connection point for reader	Max. 2 units via screw or spring-loaded terminals in the front connector	
Interface/cable length, max. connectable length	RS422 / 1 000 m, depending on reader and cable type	
Readers that can be connected	MOBY U/D, RF 200 / RF300 / RF600, MV400	MOBY U
Interface for 24 V DC	Via screw terminals in front connector	
SIMATIC S7 function blocks	FC/FB45, FC55 (multitag)	FC56
Transponder addressing	Direct access via addresses	Access via DOS-like file system
Commands	Initialize transponder, read data from transponder, write data to transponder, etc.	Format transponder, read file, write file, etc.
Supply voltage • Rated value • Permissible range	 24 V DC 20 ... 30 V DC	
Electrical isolation between S7-300 and MOBY	Yes	
Current consumption from S7 bus terminal, max.	100 mA	
Power loss, typically	1 W	
Ambient temperature		
During operation • Horizontal configuration of SIMATIC • Vertical configuration of SIMATIC	 0 ... +60 °C 0 ... +40 °C	
During transportation and storage	-40 ... +70 °C	
Dimensions W x H x D (mm)	40 x 125 x 120	
Weight	Approx. 0.2 kg	

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Ordering data	Order No.
MOBY ASM 475 communication module	**6GT2 002-0GA10**
For SIMATIC S7-300 and ET 200M, parameterizable	
Accessories	
Front connector (1 x per ASM 475)	
• with screw terminals	**6ES7 392-1AJ00-0AA0**
• with spring-loaded terminals	**6ES7 392-1BJ00-0AA0**
MOBY U connecting cable preassembled, between the ASM 475 and reader, angled connector, PUR material, in the following lengths:	
2 m	**6GT2 091-4EH20**
5 m	**6GT2 091-4EH50**
10 m	**6GT2 091-4EN10**
20 m	**6GT2 091-4EN20**
50 m	**6GT2 091-4EN50**
pre-assembled, between ASM 475 and reader, straight connector, PUR material, in the following lengths:	
2 m	**6GT2 091-6EH20**
5 m	**6GT2 091-6EH50**
10 m	**6GT2 091-6EN10**
50 m	**6GT2 091-6EN50**
MOBY D connecting cable preassembled, between ASM 475 and reader D1xS, 9-pole Sub-D plug, PUR material, CMG approved, suitable for cable carriers, in the following lengths:	
5 m	**6GT2 491-4EH50**
20 m	**6GT2 491-4EN20**
50 m	**6GT2 491-4EN50**

	Order No.
SIMATIC RF200 / RF300 / RF600 / MV400 connecting cable preassembled, between the ASM 475 and RF200 / RF300 / RF600 / MV400, IP65, straight connector, PUR material, suitable for cable carriers, CMG approval, in the following lengths[1]:	
2 m	**6GT2 891-4EH20**
5 m	**6GT2 891-4EH50**
Extension cable SIMATIC RF200 / RF300 / RF600 / MV400, PUR material, CMG approval, suitable for cable carriers, straight connector	
2 m	**6GT2 891-4FH20**
5 m	**6GT2 891-4FH50**
10 m	**6GT2 891-4FN10**
20 m	**6GT2 891-4FN20**
50 m	**6GT2 891-4FN50**
DVD "RFID Systems Software & Documentation" J	**6GT2 080-2AA20**

[1] The connecting cables can be extended using the RF300 connecting cables of type 6GT2891-0Fxxx. These connecting cables are available in the lengths 2 m, 5 m, 10 m, 20 m and 50 m.

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

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SIPLUS CP 340

Overview



- The low-cost, 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 tool integrated in STEP 7

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

5

SIPLUS CP 340 version	RS 232 (V.24)		RS 422/485 (X.27)
Order No.	**6AG1 340-1AH02-2AE0**	**6AG1 340-1AH02-2AY0**	**6AG1 340-1CH02-2AE0**
Order No. based on	**6ES7 340-1AH02-0AE0**	**6ES7 340-1AH02-0AE0**	**6ES7 340-1CH02-0AE0**
Ambient temperature range	-25 ... +60 °C	-25 ... +60 °C	-25 ... +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components		
Technical specifications	The technical data of the standard product applies except for the ambient conditions.		
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	No	Yes	No
Ambient conditions			
Relative humidity	5 ... 100%, condensation allowed		
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)		
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA-S71.04 severity level G1; G2; G3; GX [1) 2)]		
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]		
Air pressure (depending on the highest positive temperature range specified)	1080 ...795 hPa (-1000 ... +2000 m), see ambient temperature range 795...658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000m) derating 20 K		

1) ISA-S71.04 severity level GX: Long-term load: SO_2 <4.8 ppm; H_2S <9.9 ppm; Cl <0.2 ppm; HCl <0.66 ppm; HF <0.12 ppm; NH <49 ppm; O_3 <0.1 ppm; NOx <5.2 ppm
Threshold/ limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOx < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS CP 340 communication processor		
(extended temperature range and medial exposure)		
with one RS 232C interface (V.24)	L	**6AG1 340-1AH02-2AE0**
with one RS 232C interface (V.24); compliant with EN 50155	I	**6AG1 340-1AH02-2AY0**
with one RS 422/485 interface (X.27)	L	**6AG1 340-1CH02-2AE0**

	Order No.
Accessories	See SIMATIC CP 340. page 5/227

I: Subject to export regulations AL: N and ECCN: EAR99H
L: Subject to export regulations AL: 9I999 and ECCN: N

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Overview



- For fast, high-performance serial data exchange via point-to-point coupling
- 2 versions with different physical transmission characteristics:
  - RS 232C (V.24),
  - RS 422/RS 485 (X.27)
- Implemented protocols: ASCII, 3964 (R), RK 512, customized protocols (can be reloaded)
- Simple parameterization using tool integrated in STEP 7

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

5

SIPLUS CP 341	RS 232C interface (V.24)	RS 422/485 (X.27) interface
Order No.	**6AG1 341-1AH02-7AE0**	**6AG1 341-1CH02-7AE0**
Order No. based on	**6ES7 341-1AH02-0AE0**	**6ES7 341-1CH02-0AE0**
Ambient temperature range	-25 ... +70 °C	-25 ... +70 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical specifications	The technical data of the standard product applies except for the ambient conditions.	
Ambient conditions		
Relative humidity	5 ... 100%, condensation allowed	
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)	
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA-S71.04 severity level G1; G2; G3; GX [1) 2)]	
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]	
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m), see ambient temperature range 795...658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000m) derating 20 K	

1) ISA-S71.04 severity level GX: Long-term load: SO_2 <4.8 ppm; H_2S <9.9 ppm; Cl <0.2 ppm; HCl <0.66 ppm; HF <0.12 ppm; NH <49 ppm; O_3 <0.1 ppm; NOx <5.2 ppm
Threshold/ limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOx < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS CP 341 communication processor		
(extended temperature range and medial exposure)		
with RS 232C interface (V.24)	I	**6AG1 341-1AH02-7AE0**
with RS 422/485 (X.27) interface	I	**6AG1 341-1CH02-7AE0**

	Order No.
Accessories	See SIMATIC CP 341, page 5/229

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

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SIPLUS CP 342-5

Overview



DP-M	DP-S	FMS	PG/OP	S7/S5	
●	●		●	●	

- PROFIBUS DP master or slave with electrical interface for connecting the SIMATIC S7-300 and the SIMATIC C7 to PROFIBUS at up to 12 Mbit/s (including 45.45 Kbit/s)
- Communication services:
  - PROFIBUS DP-V0
  - PG/OP communication (OP multiplexing)
  - S7 communication (client, server)
  - S5-compatible communication (SEND/RECEIVE)
- Easy configuration and programming over PROFIBUS
- Cross-network programming device communication through S7 routing
- Modules can be replaced without the need for a PG

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS CP 342-5		
Order number	**6AG1 342-5DA02-2XE0**	**6AG1 342-5DA02-4XE0**
Order No. based on	**6GK7 342-5DA02-0XE0**	**6GK7 342-5DA02-0XE0**
Ambient temperature range	-25 ... +60 °C	0 ... +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	
Ambient conditions		
Relative humidity	5 ... 100 % Condensation permissible	
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)	
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1)2)]	
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]	
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K	

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOx < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOx < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS CP 342-5 communication processor		
(extended temperature range and medial exposure)		
Communication processor for electrical connection of SIMATIC S7-300 to PROFIBUS at up to 12 Mbit/s, with electronic manual on CD-ROM		
Ambient temperature range -25 ... +60 °C	L	**6AG1 342-5DA02-2XE0**
Ambient temperature range 0 ... +60 °C, only medial exposure	L	**6AG1 342-5DA02-4XE0**
Accessories		See SIMATIC CP 342-5 communication processor, page 5/235

L: Subject to export regulations AL: 9I999 and ECCN: N

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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 IO device
- Multicast by UDP
- Remote programming and initial commissioning is possible 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
- Diagnostics possibilities in STEP 7 and Web browser

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS CP 343-1 Lean		
Order number	**6AG1 343-1CX10-2XE0**	**6AG1 343-1CX10-4XE0**
Order No. based on	**6GK7 343-1CX10-0XE0**	
Ambient temperature range	-25 ... +60 °C	0 ... +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	
Ambient conditions		
Relative humidity	5 ... 100 % Condensation permissible	
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)	
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]	
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]	
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K	

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOx < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOx < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

Ordering Data	**Order No.**
SIPLUS CP 343-1 Lean communication processor (extended temperature range and medial exposure) 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	
Ambient temperature 0 ... +60 °C	**6AG1 343-1CX10-4XE0**
Ambient temperature -25 ... +60 °C	**6AG1 343-1CX10-2XE0**
Accessories	See SIMATIC CP 343-1 Lean communication processor, page 5/242

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SIPLUS CP343-1

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 RJ-45 interface for 10/100 Mbit/s full/half-duplex connection with auto-sensing/auto-negotiation and auto-crossover function
  - Integrated 2-port real-time switch ERTEC
  - Multi-protocol operation with ISO, TCP, UDP transport protocol and PROFINET IO
  - Adjustable keep alive function
- Communication services:
  - Open communication (ISO, TCP/IP, and UDP)
  - PROFINET IO-Controller or PROFINET IO-Device
  - PG/OP communication: Cross-network by means of S7 routing
  - S7 communication (client, server, multiplexing)
- Media redundancy (MRP); within an Ethernet network with ring topology, the CP supports the media redundancy procedure MRP (V2.2 or higher).
- Multicast by UDP
- IP address assignment via DHCP, simple PC tool or via the user program (e.g. HMI)
- Access protection via configurable access list
- Remote programming and commissioning via Industrial Ethernet
- Configuration with STEP 7
- Automatic setting of CPU clock setting over Ethernet with NTP or SIMATIC procedure
- Web diagnostics
- Integration in network management systems via SNMP (MIB2 diagnostics information)
- Diagnostics possibilities in STEP 7 and Web browser

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS CP 343-1		
Order No.	**6AG1 343-1EX30-4XE0**	**6AG1 343-1EX30-7XE0**
Order No. based on	**6GK7 343-1EX30-0XE0**	**6GK7 343-1EX30-0XE0**
Ambient temperature range	0 ... +60 °C	-25 ... +70 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	
Ambient conditions		
Relative humidity	5 ... 100 % Condensation permissible	
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)	
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]	
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]	
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K	

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOx < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOx < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

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Ordering data	Order No.
SIPLUS CP 343-1 communication processor	
(extended temperature range and medial exposure)	
for connecting SIMATIC S7-300 to Industrial Ethernet via ISO and TCP/IP; PROFINET IO-Controller or PROFINET IO-Device, MRP, integrated 2-port switch ERTEC; S7 communication, open communication (SEND/RECEIVE), FETCH/WRITE with or without RFC 1006, multicast, DHCP, CPU clock set via SIMATIC procedure and NTP, diagnostics, SNMP, access control via IP access list, initialization over LAN 10 /100 Mbit/s; with electronic manual on DVD	
Ambient temperature 0 ... +60 °C	**6AG1 343-1EX30-4XE0**
Ambient temperature -25 ... +70 °C	**6AG1 343-1EX30-7XE0**

	Order No.
Accessories	See SIMATIC CP 343-1 communication processor, page 5/245

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SIPLUS CP343-1 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 one RJ45 port with 10/100/1000 Mbit/s full/half-duplex with auto-sensing capability
  - PROFINET interface with two RJ45 ports 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 with UDP, including routing between both interfaces
  - PG/OP communication: Cross-network by means of S7 routing
  - S7 communication (client, server, multiplexing) including routing between both interfaces
  - IT communication: HTTP communication supports access to process data via own Web pages; e-mail client function, sending of e-mails directly from user program; FTP communication supports program-controlled FTP client communication; access to data blocks through FTP server
- 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
- Media redundancy (MRP); within an Ethernet network with ring topology, the CP supports the media redundancy procedure MRP (V2.2 or higher).
- Access protection by means of configurable IP access list
- Module replacement without programming device; all information is stored on the C-PLUG (also file system for IT functions)
- Extensive diagnostics 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

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS CP 343-1 Advanced	
Order No.	**6AG1 343-1GX30-4XE0**
Order No. based on	**6GK7 343-1GX30-0XE0**
Ambient temperature range	0 ... +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions.
Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOx < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOx < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

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Ordering data		Order No.
SIPLUS CP 343-1 Advanced communication processor (medial exposure) for connecting the 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 or without RFC 1006, diagnostics extensions, multicast, Web server, HTML diagnostics, FTP server, FTP client, e-mail client, CPU clock set via SIMATIC procedure and NTP, access control via IP access List, SNMP, DHCP, initialization over LAN 10/100 Mbit/s; with electronic manual on DVD; C-PLUG included	L	**6AG1 343-1GX30-4XE0**

Accessories	Order No.
	See SIMATIC CP 343-1 Advanced communication processor, page 5/250

L: Subject to export regulations AL: 9I999 and ECCN: N

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SIPLUS TIM 3V-IE for WAN and Ethernet

Overview



- SINAUT communication module SIPLUS TIM for SIMATIC S7-300 for use in a wide area network (WAN)
- IP communication via secure VPN (virtual private network) using the Internet
- Wireless communication via GPRS router, GPRS modem, or radio devices
- Wired communication via Ethernet, DSL, dialup modems or dedicated line modem
- Complete migration of existing wireless, dedicated line and dial-up technology to IP-based network
- Message frame memory for seamless recording of data
- Simple configuration and operation without specialist IT knowledge

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS TIM 3V-IE	
Order number	**6AG1 800-3BA00-7AA0**
Order No. based on	**6NH7 800-3BA00**
Ambient temperature range	-25 … +70 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions.
Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOx < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOx < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

	Order No.
SIPLUS TIM 3V-IE communication module With an RS232 interface for SINAUT communication via a conventional WAN or an IP-based network (WAN or LAN)	I **6AG1 800-3BA00-7AA0**
Accessories	see TIM 3V-IE for WAN and Ethernet, page 5/259

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

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Overview



- SINAUT communication module SIPLUS TIM with four interfaces for SIMATIC S7-300 or as self-contained unit for the S7-400 for use in a wide area network (WAN)
- For universal use in a SINAUT station, node station and control center
- Internet communication via integrated MSC-VPN tunnel with direct connection to DSL router or operation via IPsec VPN with additional SIMATIC NET components
- Wireless communication via GPRS router, GPRS modem, or radio devices
- Wired communication via Ethernet, DSL, dialup modems or dedicated line modem
- Complete migration of existing wireless, dedicated line and dial-up technology to IP-based network
- Message frame memory for seamless recording of data and support of redundant communication paths
- Simple configuration and operation without specialist IT knowledge

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS TIM 4R-IE	
Order number	**6AG1 800-4BA00-7AA0**
Order No. based on	**6NH7 800-4BA00**
Ambient temperature range	-25 ... +70 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions.
Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOx < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOx < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

	Order No.
SIPLUS TIM 4R-IE communication module With two combined RS232/RS485 interfaces for SINAUT communication via conventional WANs and two RJ45 interfaces for SINAUT communication via IP-based networks (WAN or LAN) I	**6AG1 800-4BA00-7AA0**
Accessories	see TIM 4R-IE for WAN and Ethernet, page 5/265

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

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Front connectors

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 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**
Front door, elevated design	**6ES7 328-0AA00-7AA0**
e.g. for 32 channel modules; enables connection of 1.3 mm^2/ 16 AWG wires	

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Overview

Wiring of SIMATIC S7 I/O modules with the sensors/actuators is a significant factor with respect to time/cost overhead, configuring, control cabinet manufacture, procurement and ease of service.

With SITOP TOP connect system cabling, this connection is established for your SIMATIC S7-300/400 simply, quickly and reliably.

With the SIMATIC TOP connect **configuration tool**, you can configure the connection between the SIMATIC S7 interface and the I/O per mouse click. The program automatically checks for plausibility and generates a parts list for the selected connection components.

www.siemens.com/simatic-tc-configurator

Design

Two cabling versions are available for the most diverse control cabinet concepts:

Fully modular connection

Each component is individually inserted.

The system consists of:

- Front connector module
- Connecting cable
- Connection modules in the following versions: Basic module, signal module and function module

Connection errors are thus practically excluded and installation overhead is minimized. Systematic connection of the SIMATIC system. The assembly overhead for the connecting cables is drastically reduced as cables sold by the meter that are either pre-assembled or that can be assembled easily can be used.

Flexible connection

Consisting of:

- Front connector with screw-type or crimp connection
- Front connector with fixed single cores
- Single cores also available with UL/CSA-certified cores

The blue wires are numbered sequentially and can be routed direct to each element in the control cabinet. The numbering of the single cores corresponds to the coding of the front connector contacts.

In comparison to conventional single wiring, there is a cost saving of 50% for assembly, since the single cores that have already been checked on the connector are fixed.

Thus, no complex pre-assembly of up to two times 46 single cores per module is necessary.

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Overview



The fully modular connection is the standard connection for the SIMATIC S7-300/400. The fully modular connection allows the peripherals to be conveniently and quickly connected to the SIMATIC S7-300/400 without errors.

Benefits

- 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

Design

Front connector module

Modified front connectors, called front connector modules, are available for connecting to the module. These are plugged into the module to be wired instead of the front connector. The front connector modules are available in many different versions. For the SIMATIC S7-300 and SIMATIC S7-400, digital or analog. The connecting cables are plugged into these front connector modules.

Connecting cable

The connecting cable is available in two different versions.

As a pre-assembled 16-pole round cable (shielded or unshielded) up to a length of 5 m, or the 16-pole round-sheath ribbon cable (with or without shield), which can be easily assembled by the user, or as 2 x 16-pole round-sheath ribbon cables (without shield).

When assembled, there are one or two insulation displacement connectors (female ribbon connectors) at both ends of the cable.

The round-sheath ribbon cable is assembled by the user with the aid of pliers (to be ordered separately). The cable transmits 8 or 2 x 8 channels over a distance of up to 30 m.

The connecting cable connects the front connector module with the connection module.

Connection module

The system has digital and analog connection modules for connecting the I/O signals. These are snapped onto the standard mounting rail.

The connection modules are available for two connection methods: with spring-loaded or screw-type terminals

Basic module:

Connection modules with basic functionality for getting the signal from the field to the module or from the module to the field quickly and easily. For digital or analog signals.

Signal module:

Expands the digital basic module with LEDs for signaling the active high signal. This makes commissioning easier for you, and you always have an overview of the signal states of your I/O. One LED signals the availability of the supply voltage.

Function module:

Digital connection modules that are fitted with relays or optocouplers.

If other voltage or power levels are required in the field , the connection module for output signals TPRo or TPOo is used. For the TPRo connection module, relays are used for the implementation. For the TPOo connection module, opto couplers are used for the implementation. This converts the 24 V DC output signal simply and reliably to another voltage or power level. If 230 V AC input signals have to be transmitted to the controller in the field, a connection module with relay TPRi is available that simply converts the 230 V AC signal to 24 V DC. This means that there is always the same voltage level on the module side.

Use with optocouplers for the TPRo relay modules

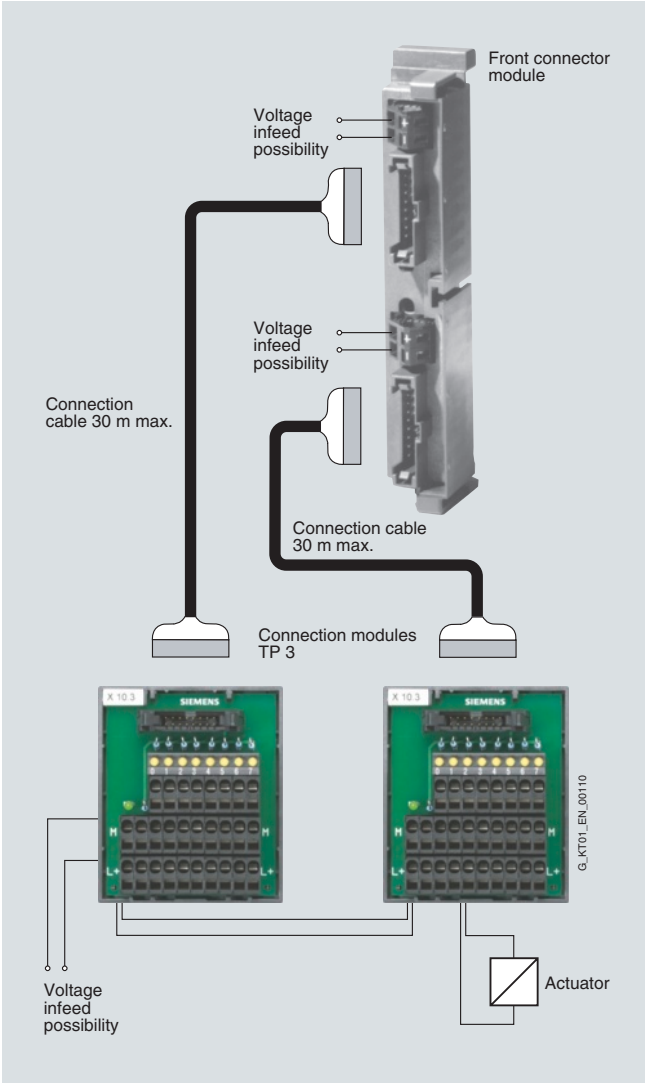
If higher switching frequencies of the relay connection module are required for the output signals, the relay can simply be replaced with an optocoupler (note technical specifications) in order to increase the switching frequency here.

Shield plate

The shield plate is latched onto the connection module for 3-core initiators or optionally onto the connection module for analog signals and then snapped onto the mounting rail with the connection module. With the terminal elements, optimal shield connection is achieved between the shielded round-sheath ribbon cable or the shielded field cables and the grounded mounting rail.

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Design (continued)



Design of the fully modular connection (16-channel in example)

Technical specifications

Technical data of front connector module	
Rated operating voltage	24 V DC
Max. permissible operating voltage	60 V DC
Max. permissible continuous current • per connector pin	1 A
Max. permissible summation current	4 A/byte
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 • flexible cables with/without wire end ferrule	 No 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 • with insulating collar	 6 mm -	
Wire-end ferrules in acc. with DIN 46228 • without insulating collar • with insulating collar 0.25 to 1.0 mm^2 • with insulating collar 1.5 mm^2	 Form A; 5 to 7 mm long - -	
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 infeed		
	Spring connection	Screw connection
	Modules up to 8 connections	
Connectable cable cross-sections • solid cables • flexible cables with/without wire end ferrule	 No 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 • with insulating collar	 6 mm -	
Wire-end ferrules in acc. with DIN 46228 • without insulating collar • with insulating collar 0.25 to 1.0 mm^2 • with insulating collar 1.5 mm^2	 Form A; 5 to 7 mm long - -	
Blade width of the screw-driver	3.5 mm (cylindrical shape)	
Tightening torque for connecting the cables	-	0.4 to 0.7 Nm

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Technical specifications connecting cable

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 module

TP1, TP3 and TPK connection module	
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

TP2 connection module	
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

TPA connection module	
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 the connection modules

TPA, TP1, TP2, TP3, TPK connection module	Spring connection	Screw connection
Connectable cable cross-sections		
• solid cables	No	
• flexible cables without wire end ferrule	0.5 to 2.5 mm^2	
• flexible cables with wire end ferrule in accordance with DIN 46228/1	0.5 to 1.5 mm^2	0.5 to 2.5 mm^2 (2.5 mm^2 with a crimp in accordance with EN 60947-1)
• flexible cables with wire end ferrule and plastic collar in accordance with DIN 46228/4	0.5 to 1.5 mm^2	
Number of cables per connection	1 or a combination of 2 cables up to the cross-sections specified above(total) in a shared wire end ferrule	
Blade width of the screwdriver	3.5 mm (cylindrical shape)	
Tightening torque for connecting the cables	-	0.4 to 0.7 Nm

Technical specifications signal module

TP1, TP3 and TPK connection module 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

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Technische Daten Signalmodul (continued)

TP2 connection module with LED	
Max. operating voltage	24 V DC
Continuous current per signal conductor	2 A
Operating temperature	0 to + 60 °C
Mounting position	Any
Air gaps and creepage distances	IEC Report 664, IEC 664 A, IEC 1131 T2, CSA C22.2 No 142 UL 508, VDE 0160 (12.90), overvoltage category II, pollution degree 3
Dimensions (W x H x D) in mm	
• for 2-ampere modules with LED 6ES7924-0BB10-0B_0	Approx. 68 x 43.2 x 80

Wiring rules for the connection modules

TP1 LED, TPK LED, TP2 LED, TP3 LED connection module	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 module

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 switching cycles
• Electrical	3 x 10^4 operating cycles at 230 V AC/2 A/ cos ϒ = 1

Connection module with relay for outputs (TPRo)	
Operating temperature	0 ... +60 °C
Mounting position	Any
Clearance and creepage distances	Basic standard IEC 60664-1; UL 508; CuI (Reference CSA C22.2 No. 142) Overvoltage category III Pollution degree 2
Dimensions (W x H x D) in mm	
6ES7924-0BD10-0B_0	Approx. 100 x 45 x 80

Connection module with optocoupler for outputs (TPOo)	
Input data	
Power supply	
Potential connection (L1/M1)	24 V DC (20.4 ... 28.8 V DC)
Status indicator "L1"	Green LED
Switching inputs	
Number	8 channels (channel 0 ... 7) with reverse polarity protection
Input voltage "off"	0 V DC (0 ... 5 V DC)
Input voltage "on"	24 V DC (15 ... 28.8 V DC)
Input current	min. 5 mA with 20 V DC, per channel
Status indicator "on"	Green LED per channel
Output data	
Power supply	
Operating voltage U_B (L2/M2, L3/M3)	24 V DC (20 ... 30 V DC) per group of 4 one V_B
U_B conditionally protected against polarity reversal [1]	Up to 30 V DC
Current consumption	approx. 10 mA for 24 V DC + output currents per group of 4
Aggregate current	max. 8 A per group of 4
Switching outputs	
Number	8 channels (channel 0 ... 7)
Short-circuit protection [2]	for U_B < 24 V DC or 24 ... 30 V DC/max. 20 A
Output voltage	typ. U_B – 1 V (for input "on")
Output current	Max. 4 A per channel
• Lamp load	max. 20 W at 24 V per channel
Demand factor per group of 4	50 %, max. 2 outputs active under full load (4 A)
Short-circuit response	Clocked output signal (approx. 2 ... 20 ms)
On/off-delay	typ. 100 µs/250 µs with resistive load
Switching frequency	max. 500 Hz with 4 A resistive load (square wave voltage, pulse/pause 1:1)
"Overload" fault indication	Red LED per channel, in the event of wire breakage or short-circuit
• Wire break indication	Active I_{out} < 0.1 A/inactive I_{out} ≥ 0.9 A

1) Protected against polarity reversal, if the ground potential of the output load is directly connected to the 0 V supply of the power supply unit

2) Not sustained short-circuit-proof, max. duration approx. 60 min.

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Technical specifications (continued)

Connection module with optocoupler for outputs (TPOo)	
Group fault messages SF1, SF2	
Monitored channels	SF1: Channels 0 ... 3, SF2: for channels 4 ... 7
Voltage U_{SF1}, U_{SF2}	
• No error at the switching output	typ. U_B – 2 V
• Wire break at the switching output	Approx. 0 V
• Short-circuit at the switching output	0 V to U_B, clocked
Current I_{SF1}, I_{SF2}	min. 4 mA/max. 200 mA
General data	
Degree of protection	IP20
Operating temperature	0 ... 60 °C
Mounting position	Any, except overhead
Connecting terminals	Screw-type or spring-loaded terminals
Stripped length	9 mm
Conductor cross-section	
• Finely stranded without end sleeve	0.5 ... 2.5 mm^2
• with end sleeve for screw-type terminals	0.5 ... 2.5 mm^2 according to DIN 46228-1
• with end sleeve for spring-loaded terminals	0.5 ... 1.5 mm^2 according to DIN 46228-1 and DIN 46228-4
Screwdriver	according to DIN 5264 B 0.6 x 3.5 mm
Tightening torque of screw-type terminals	0.4 Nm
Weight	Approx. 400 g
Dimensions (W x H x D) in mm	134 x 84 x 77

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 A/24 V DC, 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 switching cycles
• Electrical	3 x 10^6 operating cycles at 230 V AC/50 mA/cos ϒ = 1
Operating temperature	0 ... +60 °C
Mounting position	Any
Clearance 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	
6ES7924-0BE10-0B_0	Approx. 130 x 45 x 80

Wiring rules for the connection modules

TPRo and TPRi connection modules		
	Spring-loaded connection	Screw-type connection
Connectable cable cross-sections		
• Solid conductors	No	
• Flexible cables without end sleeve	0.5 ... 2.5 mm^2	
• Flexible cables with end sleeve according to DIN 46228/1	0.5 ... 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 end sleeve and plastic collar according to DIN 46228/4	0.5 ... 1.5 mm^2	
Number of conductors per connection	1 or a combination of 2 conductors up to the cross-sections specified above (total) in a shared end sleeve	
Blade width of the screwdriver	3.5 mm (cylindrical design)	
Tightening torque for connecting the cables	-	0.4 ... 0.7 Nm

Ordering data Front connect. module Order No.

Front connector module (digital 2 x 8 I/O)		
Power supply via		
• Spring-loaded terminals		**6ES7 921-3AA00-0AA0**
• Screw terminals		**6ES7 921-3AB00-0AA0**
Front connector module (digital 4 x 8 I/O)		
Power supply via		
• Spring-loaded terminals		**6ES7 921-3AA20-0AA0**
• Screw terminals	I	**6ES7 921-3AB20-0AA0**
Front connector module (1 x 8 outputs) for 2 ampere digital outputs		
Power supply via		
• Spring-loaded terminals		**6ES7 921-3AC00-0AA0**
• Screw terminals		**6ES7 921-3AD00-0AA0**
Front connector module 20-pin (analog)		
Power supply via		
• Spring-loaded terminals		**6ES7 921-3AF00-0AA0**
• Screw terminals		**6ES7 921-3AG00-0AA0**
Front connector module 40-pin (analog)		
Power supply via		
• Spring-loaded terminals		**6ES7 921-3AF20-0AA0**
• Screw terminals		**6ES7 921-3AG20-0AA0**

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Ordering data Connect. cable	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 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 mm²	
Unshielded	
30 m	**6ES7 923-0CD00-0AA0**
60 m	I **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**
Connector (female ribbon connector)	**6ES7 921-3BE10-0AA0**
16-pole, insulation displacement system, with strain relief devices; packing unit: 8 connectors and 8 cable grips	
Accessories	
Manual pliers	**6ES7 928-0AA00-0AA0**
For preparing the connectors (female ribbon connector)	

Ordering data Basic module	Order No.
TP1 connection module	
for 1-wire initiators	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-0AA10-0AB0**
• Screw terminals	**6ES7 924-0AA10-0AA0**
TP3 connection module	
for 3-wire initiators	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-0CA10-0AB0**
• Screw terminals	**6ES7 924-0CA10-0AA0**
TPK connection module	
for 2 x 8 signals	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-1AA10-0AB0**
• Screw terminals	**6ES7 924-1AA10-0AA0**
TP2 connection module	
for 2 A modules	
for 2-wire initiators	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-0BB10-0AB0**
• Screw terminals	**6ES7 924-0BB10-0AA0**
TPA connection module	
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**

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Ordering data Signal module	Order No.
TP1 connection module with LED	
for 1-wire initiators	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-0AA10-0BB0**
• Screw terminals	**6ES7 924-0AA10-0BA0**
TP3 connection module with LED	
for 3-wire initiators	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-0CA10-0BB0**
• Screw terminals	**6ES7 924-0CA10-0BA0**
TPK connection module with LED	
for 2 x 8 signals	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-1AA10-0BB0**
• Screw terminals	**6ES7 924-1AA10-0BA0**
TP2 connection module with LED	
for 2 A modules	
for 2-wire initiators	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-0BB10-0BB0**
• Screw terminals	**6ES7 924-0BB10-0BA0**
Accessories	
Labeling plates for connection modules	
Insertable labeling plate PU = 200 units	**6ES7 928-2AB00-0AA0**
Self-adhesive labeling plate PU = 200 units	**6ES7 928-2BB00-0AA0**

Ordering data Function module	Order No.
TPRo connection module for output signals	
for 2-wire connection	
Packaging unit 1 unit	
• Spring-loaded terminals	**6ES7 924-0BD10-0BB0**
• Screw-type terminals	**6ES7 924-0BD10-0BA0**
Connection module optocoupler	
Packaging unit 1 unit	
• Spring-loaded terminals	**6ES7 924-0BF10-0BB0**
• Screw-type terminals	**6ES7 924-0BF10-0BA0**
TPRi connection module for input signals	
for 2-wire connection	
Packaging unit 1 unit	
• Spring-loaded terminals	**6ES7 924-0BE10-0BB0**
• Screw-type terminals	**6ES7 924-0BE10-0BA0**
Accessories	
Labels for connection modules	
Insertable labels PU = 200 units	**6ES7 928-2AB00-0AA0**
Self-adhesive labels 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**

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Overview



The flexible connection guarantees a fast and direct connection from the input/output modules of the SIMATIC S7-300/400 to the individual elements in the cabinet.

Already attached single cores reduce the wiring effort.

The core cross-sections of 0.5 mm^2 also allow higher currents.

Technical specifications

Front connector with single cores for 16 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	20
Core cross-section	0.5 mm^2; Cu
Bundle diameter in mm	approx. 15
Core color	Blue, RAL 5010
Designation of cores	Numbered from 1 to 20 (front connector contact = core number)
Assembly	Screw-type or crimp contacts

Front connector with single cores for 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
Core color	Blue, RAL 5010
Designation of cores	Numbered from 1 to 40 (front connector contact = core number)
Assembly	Screw-type or crimp contacts

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Ordering data

	Order No.
Front connector with single cores for 16-channel digital modules SIMATIC S7-300, 20 x 0.5 mm²	
Core type H05V-K	
Screw-type version	
Packaging unit: 1 unit Length:	
• 2.5 m	**6ES7922-3BC50-0AB0**
• 3.2 m	**6ES7922-3BD20-0AB0**
• 5 m	**6ES7922-3BF00-0AB0**
• Custom lengths	On request
Packaging unit: 5 units Length:	
• 2.5 m	**6ES7922-3BC50-5AB0**
• 3.2 m	**6ES7922-3BD20-5AB0**
• 5.0 m	**6ES7922-3BF00-5AB0**
Crimp version	
Packaging unit: 1 unit Length:	
• 2.5 m	**6ES7922-3BC50-0AF0**
• 3.2 m	**6ES7922-3BD20-0AF0**
• 5.0 m	**6ES7922-3BF00-0AF0**
• Custom lengths	On request
Core type UL/CSA-certified	
Screw-type version	
Packaging unit: 1 unit Length:	
• 3.2 m	**6ES7922-3BD20-0UB0**
• 5.0 m	**6ES7922-3BF00-0UB0**

	Order No.
Front connector with single cores for 32-channel digital modules SIMATIC S7-300, 40 x 0.5 mm²	
Core type H05V-K	
Screw-type version	
Packaging unit: 1 unit Length:	
• 2.5 m	**6ES7922-3BC50-0AC0**
• 3.2 m	**6ES7922-3BD20-0AC0**
• 5.0 m	**6ES7922-3BF00-0AC0**
• Custom lengths	On request
Packaging unit: 5 units Length:	
• 2.5 m	**6ES7922-3BC50-5AC0**
• 3.2 m	**6ES7922-3BD20-5AC0**
• 5.0 m	**6ES7922-3BF00-5AC0**
Crimp version	
Packaging unit: 1 unit Length:	
• 2.5 m	**6ES7922-3BC50-0AG0**
• 3.2 m	**6ES7922-3BD20-0AG0**
• 5.0 m	**6ES7922-3BF00-0AG0**
• Custom lengths	On request
Core type UL/CSA-certified	
Screw version	
Packaging unit: 1 unit Length:	
• 3.2 m	**6ES7922-3BD20-0UC0**
• 5.0 m	**6ES7922-3BF00-0UC0**

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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

Technical specifications

	6ES7 360-3AA01-0AA0	6ES7 361-3CA01-0AA0	6ES7 365-0BA01-0AA0
Supply voltages			
Rated value			
• 24 V DC		Yes	
Current consumption			
from backplane bus 5 V DC, max.	350 mA		100 mA
from supply voltage L+, max.		500 mA	
Power losses			
Power loss, typ.	2 W	5 W	0.5 W
Hardware configuration			
Number of interfaces per CPU, max.	1	3	1; 1 pair
Dimensions and weight			
Dimensions			
• Width	40 mm	80 mm	40 mm
• Height	125 mm	125 mm	125 mm
• Depth	120 mm	120 mm	120 mm
Weight			
• 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**
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)	

		Order No.
SIMATIC manual collection	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC		
SIMATIC manual collection update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		
S7-300 manual		
Design, CPU data, module data, instruction list		
German		**6ES7 398-8FA10-8AA0**
English		**6ES7 398-8FA10-8BA0**

D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

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SIPLUS IM 365 interface module

Overview



- SIPLUS IM 365: For configuration of 1 central controller and max. 1 expansion unit

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS IM 365 interface module	
Order No.	**6AG1 365-0BA01-2AA0**
Order No. based on	**6ES7 365-0BA01-0AA0**
Ambient temperature range	-25 ... +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions.
Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOx < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOx < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data	**Order No.**
SIPLUS IM 365 interface module L (extended temperature range and medial exposure) for expansion of S7-300 with max. 1 EU; 2 modules with fixed connection cable (1 m)	**6AG1 365-0BA01-2AA0**

L: Subject to export regulations AL: 9I999 and ECCN: N

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Application area



The proven power supply in SIMATIC S7-300 design; with PS-CPU connecting comb and mounting direct on the S7 rail.

Technical specifications 1-phase, 24 DC V/2 A

Power supply, type	2 A
Order No.	**6ES7 307-1BA01-0AA0**
Input	1-phase AC
Rated voltage $V_{in\ rated}$	**120/230 V AC** Automatic range switchover
Voltage range	85 ... 132 V/170 ... 264 V
Overvoltage strength	2.3 x $U_{in\ rated}$, 1.3 ms
Mains buffering at $I_{out\ rated}$	> 20 ms at U_{in} = 93/187 V
Rated line frequency; rated line frequency range	50/60 Hz, 47 ... 63 Hz
Rated current $I_{in\ rated}$	0.9/0.5 A
Making current limitation (+25°C)	< 22 A, < 3 ms
I^2t	< 1.0 A^2s
Built-in incoming fuse	T 1.6 A/250 V (not accessible)
Recommended miniature circuit breaker (IEC 898) in the mains power input	3 A, characteristic C
Output	Controlled, isolated DC voltage
Rated voltage $V_{out\ rated}$	**24 V DC**
Total tolerance	±3%
• Static line compensation	Approx. 0.1%
• Static load compensation	Approx. 0.2%
Residual ripple	< 50 mV_{pp} (typ. < 5 mV_{pp})
Spikes (bandwidth: 20 MHz)	< 150 mV_{pp} (typ. < 20 mV_{pp})
Adjustment range	-
Status indicator	24 V OK = green LED
On/Off behavior	No overshoot of U_{out} (soft start)
Startup delay / voltage rise	< 2 s/typ. 10 ms

Power supply, type	2 A
Rated current $I_{out\ rated}$	**2 A**
Current range	
• Up to +60°C	0 ... 2 A
• Derating	-
Dynamic overcurrent on	
• Power-up on short-circuit	Typ. 9 A for 90 ms
• Short-circuit during operation	Typ. 9 A for 90 ms
Parallel switching for enhanced performance	Yes
Efficiency	
Efficiency at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 84%
Power loss at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 9 W
Closed-loop control	
Dynamic line compensation ($V_{in\ rated}$ ±15%)	Typ. ±0.1% U_{out}
Dynamic load compensation (I_{out}: 50/100/50%)	Typ. ±0.8% U_{out}
Load step settling time	
• 50 to 100%	< 1 ms (typ. 0.5 ms)
• 100 to 50%	< 1 ms (typ. 0.5 ms)
Protection and monitoring	
Output overvoltage protection	Additional control loop, shutdown at < 28.8 V, automatic restart
Current limitation	2.2 ... 2.6 A
Short-circuit protection	Electronic shutdown, automatic restart
Sustained short-circuit current rms value	< 2 A
Overload/short-circuit indicator	-

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The S7-300 version

Technical specifications 1-phase, 24 DC V/2 A (continued)

Power supply, type	2 A
Safety	
Primary/secondary isolation	Yes, safety extra low output voltage U_{out} according to EN 60950-1 and EN 50178
Protection class	Class I
Leakage current	< 3.5 mA (typ. 0.5 mA)
Safety test	Yes
CE mark	Yes
UL/cUL (CSA) approval	cULus-listed (UL 508, CSA C22.2 No. 142), File E143289
Protection against explosion	ATEX EX II 3G Ex nA II T4; UL 1604 Class I Div. 2 Group A, B, C, D
FM approval	Class I Div. 2 Group A, B, C, D T4
Marine approval	In S7-300 system
Degree of protection (EN 60529)	IP20
EMC	
Emitted interference	EN 55022 Class B
Supply harmonics limitation	Not applicable
Noise immunity	EN 61000-6-2

Power supply, type	2 A
Operating data	
Ambient temperature range	0 ... +60°C with natural convection
Transport and storage temperature range	-40 ... +85°C
Humidity class	Climate class 3K3 according to EN 60721, no condensation
Mechanics	
Connections	
• Supply input L, N, PE (DC input: L+1, M1, PE)	One screw-type terminal each for 0.5 ... 2.5 mm^2 solid/finely stranded
• Output +	2 screw-type terminals for 0.5 ... 2.5 mm^2
• Output -	2 screw-type terminals for 0.5 ... 2.5 mm^2
Dimensions (W x H x D) in mm	40 x 125 x 120
Weight, approx.	0.4 kg
Mounting	Can be mounted on S7 rail
Accessories	Mounting adapter for standard mounting rail (6EP1 971-1BA00)

Technical specifications 1-phase, 24 DC V/5 A

Power supply, type	5 A
Order No.	**6ES7 307-1EA01-0AA0**
Input	1-phase AC
Rated voltage $U_{in\ rated}$	**120/230 V AC** Automatic range switchover
Voltage range	85 ... 132 V/170 ... 264 V
Overvoltage strength	2.3 x $U_{in\ rated}$, 1.3 ms
Mains buffering at $I_{out\ rated}$	> 20 ms at U_{in} = 93/187 V
Rated line frequency; rated line frequency range	50/60 Hz; 47 ... 63 Hz
Rated current $I_{in\ rated}$	2.3/1.2 A
Making current limitation (+25°C)	< 20 A, < 3 ms
I^2t	< 1.2 A^2s
Built-in incoming fuse	T 3.15 A/250 V (not accessible)
Recommended miniature circuit breaker (IEC 898) in the mains power input	From 6 A, C characteristic
Output	Controlled, isolated DC voltage
Rated voltage $U_{out\ rated}$	**24 V DC**
Total tolerance	±3 %
• Static line compensation	Approx. 0.1%
• Static load compensation	Approx. 0.5%
Residual ripple	< 50 mV_{pp} (typ. 10 mV_{pp})
Spikes (bandwidth: 20 MHz)	< 150 mV_{pp} (typ. 20 mV_{pp})
Adjustment range	-

Power supply, type	5 A
Status indicator	24 V OK = green LED
On/Off behavior	No overshoot of U_{out} (soft start)
Startup delay/voltage rise	< 2 s/typ. 10 ms
Rated current $I_{out\ rated}$	**5 A**
Current range	
• Up to +60°C	0 ... 5 A
• Derating	-
Dynamic overcurrent on	
• Power-up on short-circuit	Typ. 20 A for 100 ms
• Short-circuit during operation	Typ. 20 A for 100 ms
Parallel switching for enhanced performance	Yes
Efficiency	
Efficiency at $U_{out\ rated}$, $I_{out\ rated}$	Approx. 87%
Power loss at $U_{out\ rated}$, $I_{out\ rated}$	Approx. 18 W
Closed-loop control	
Dynamic line compensation ($U_{in\ rated}$ ±15%)	Typ. ±0.1% U_{out}
Dynamic load compensation (I_{out}: 50/100/50%)	Typ. ±1% U_{out}
Load step settling time	
• 50 to 100%	Typ. 0.3 ms
• 100 to 50%	Typ. 0.3 ms

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Technical specifications 1-phase, 24 DC V/5 A (continued)

Power supply, type	5 A
Protection and monitoring	
Output overvoltage protection	Additional control loop, shutdown at < 28.8 V, automatic restart
Current limitation	5.5 ... 6.5 A
Short-circuit protection	Electronic shutdown, automatic restart
Sustained short-circuit current rms value	< 7 A
Overload/short-circuit indicator	-
Safety	
Primary/secondary isolation	Yes, safety extra low output voltage U_{out} according to EN 60950-1 and EN 50178
Protection class	Class I
Leakage current	< 3.5 mA (typ. 0.5 mA)
Safety test	Notified body
CE mark	Yes
UL/cUL (CSA) approval	cULus-listed (UL 508, CSA C22.2 No. 142), File E143289
Explosion protection	ATEX EX II 3G Ex nA II T4; UL 1604 Class I Div. 2 Group A, B, C, D
FM approval	Class I Div. 2 Group A, B, C, D, T 4
Marine approval	In S7-300 system
Degree of protection (EN 60529)	IP20

Power supply, type	5 A
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 and storage temperature range	-40 ... +85°C
Humidity class	Climate class 3K3 according to EN 60721, no condensation
Mechanics	
Connections	
• Supply input L, N, PE	One screw-type terminal each for 0.5 ... 2.5 mm^2 solid/finely stranded
• Output +	3 screw terminals for 0.5 ... 2.5 mm^2
• Output -	3 screw terminals for 0.5 ... 2.5 mm^2
Dimensions (W x H x D) in mm	60 x 125 x 120
Weight, approx.	0.6 kg
Mounting	Can be mounted on S7 rail
Accessories	Mounting adapter for standard mounting rail (6EP1 971-1BA00)

Technical specifications 1-phase, 24 DC V/10 A

Power supply, type	10 A
Order No.	**6ES7 307-1KA02-0AA0**
Input	1-phase AC
Rated voltage $V_{in\ rated}$	**120/230 V AC** Automatic range switchover
Voltage range	85 ... 132 V/170 ... 264 V
Overvoltage strength	2.3 x $U_{in\ rated}$, 1.3 ms
Mains buffering at $I_{out\ rated}$	> 20 ms at U_{in} = 93/187 V
Rated line frequency; rated line frequency range	50/60 Hz; 47 ... 63 Hz
Rated current $I_{in\ rated}$	4.2/1.9 A
Making current limitation (+25°C)	< 55 A, < 3 ms
I^2t	< 3.3 A^2s
Built-in incoming fuse	T 6.3 A/250 V (not accessible)
Recommended miniature circuit breaker (IEC 898) in the mains power input	From 10 A, C characteristic

Power supply, type	10 A
Output	Controlled, isolated DC voltage
Rated voltage $V_{out\ rated}$	**24 V DC**
Total tolerance	±3%
• Static line compensation	Approx. 0.1%
• Static load compensation	Approx. 0.5%
Residual ripple	< 50 mV_{pp} (typ. 15 mV_{pp})
Spikes (bandwidth: 20 MHz)	< 150 mV_{pp} (typ. 60 mV_{pp})
Adjustment range	-
Status indicator	24 V OK = green LED
On/Off behavior	No overshoot of U_{out} (soft start)
Startup delay/voltage rise	< 2 s/typ. 10 ms
Rated current $I_{out\ rated}$	**10 A**
Current range	
• Up to +60°C	0 ... 10 A
• Derating	-
Dynamic overcurrent on	
• Power-up on short-circuit	Typ. 38 A for 80 ms
• Short-circuit during operation	Typ. 38 A for 80 ms
Parallel switching for enhanced performance	Yes

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Technical specifications 1-phase, 24 DC V/10 A (continued)

Power supply, type	10 A
Efficiency	
Efficiency at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 90%
Power loss at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 27 W
Closed-loop control	
Dyn. line compensation ($V_{in\ rated}$ ±15%)	Typ. ±0.1% U_{out}
Dynamic load compensation (I_{out}: 50/100/50%)	Typ. ±2% U_{out}
Load step settling time	
• 50 to 100%	< 0.1 ms
• 100 to 50%	< 0.1 ms
Protection and monitoring	
Output overvoltage protection	Additional control loop, shutdown at < 28.8 V, automatic restart
Current limitation	11 ... 12 A
Short-circuit protection	Electronic shutdown, automatic restart
Sustained short-circuit current rms value	< 12 A
Overload/short-circuit indicator	-
Safety	
Primary/secondary isolation	Yes, safety extra low output voltage U_{out} according to EN 60950-1 and EN 50178
Protection class	Class I
Leakage current	< 3.5 mA (typ. 0.6 mA)
Safety test	Yes
CE mark	Yes

Power supply, type	10 A
UL/cUL (CSA) approval	cULus-listed (UL 508, CSA C22.2 No. 142), File E143289
Explosion protection	ATEX EX II 3G Ex nA II T4; UL 1604 Class I Div. 2 Group A, B, C, D
FM approval	Class I Div. 2, Group A, B, C, D, T4
Marine approval	In S7-300 system
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 and storage temperature range	-40 ... +85°C
Humidity class	Climate class 3K3 according to EN 60721, no condensation
Mechanics	
Connections	
• Supply input L, N, PE	One screw-type terminal each for 0.5 ... 2.5 mm^2 solid/finely stranded
• Output +	4 screw-type terminals for 0.5 ... 2.5 mm^2
• Output -	4 screw-type terminals for 0.5 ... 2.5 mm^2
Dimensions (W x H x D) in mm	80 x 125 x 120
Weight, approx.	0.8 kg
Mounting	Can be mounted on S7 rail
Accessories	Mounting adapter for standard mounting rail (6EP1 971-1BA00)

Technical specifications 1-phase, 24 DC V/5 A (Outdoor)

Power supply, type	5 A
Order No.	**6ES7 307-1EA80-0AA0** [1]
Input	1-phase AC
Rated voltage $U_{in\ rated}$	**120/230 V AC** Set by means of selector switch on device
Voltage range	93 ... 132 V/187 ... 264 V
Overvoltage strength	2.3 x $U_{in\ rated}$, 1.3 ms
Mains buffering at $I_{out\ rated}$	> 20 ms at U_{in} = 93/187 V
Rated line frequency; rated line-frequency range	50/60 Hz, 47 ... 63 Hz
Rated current $I_{in\ rated}$	2.1/1.2 A
Switch-on current limitation (+25 °C)	< 45 A, < 3 ms
I^2t	< 1.8 A^2s (typ. 1.2 A^2s)

Power supply, type	5 A
Built-in incoming fuse	T 3.15 A/250 V (not accessible)
Recommended miniature circuit breaker (IEC 898) in the mains power input	10 A or higher, Characteristic C or 6 A or higher, Characteristic D
Output	Controlled, isolated DC voltage
Rated voltage $U_{out\ rated}$	**24 V DC**
Total tolerance	±3 %
• Static line compensation	Approx. ±0.2%
• Static load compensation	Approx. ±0.4%
Residual ripple	< 150 mV_{pp} (typ. 40 mV_{pp})
Spikes (bandwidth: 20 MHz)	< 240 mV_{pp} (typ. 90 mV_{pp})
Adjustment range	-
Status indicator	24 V OK = green LED

[1] SIPLUS module 6AG1 307-1EA80-2AA0 for temperature range -25°C to +60°C and use under medium loading (e.g. chlorine-sulfate atmosphere). This SIPLUS power supply conforms with standards for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).

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Technical specifications 1-phase, 24 DC V/5 A (Outdoor) (continued)

Power supply, type	5 A
On/Off behavior	No overshoot of U_{out} (soft start)
Startup delay/voltage rise	< 3 s/typ.100 ms
Rated current $I_{out\ rated}$	**5 A**
Current range	
• Up to +60°C	0 ... 5 A
• Derating	0 ... 5 A (up to +70°C)
Dynamic overcurrent on	
• Power-up on short-circuit	Typ. 20 A for 180 ms
• Short-circuit during operation	Typ. 20 A for 80 ms
Parallel switching for enhanced performance	Not permitted
Efficiency	
Efficiency at $U_{out\ rated}$, $I_{out\ rated}$	Approx. 84%
Power loss at $U_{out\ rated}$, $I_{out\ rated}$	Approx. 23 W
Closed-loop control	
Dyn. line compensation ($U_{in\ rated}$ ±15%)	Typ. ±0.3% U_{out}
Dynamic load compensation (I_{out}: 50/100/50 %)	Typ. ±3% U_{out}
Load step settling time	
• 50 to 100%	< 5 ms (typ. 0.2 ms)
• 100 to 50%	< 5 ms (typ. 0.2 ms)
Protection and monitoring	
Output overvoltage protection	Additional control loop, shutdown at approx. 30 V, automatic restart
Current limitation	5.5 ... 6.5 A
Short-circuit protection	Electronic shutdown, automatic restart
Sustained short-circuit current rms value	< 5 A
Overload/short-circuit indicator	-

Power supply, type	5 A
Safety	
Primary/secondary isolation	Yes, safety extra low output voltage U_{out} according to EN 60950 and EN 50178, creepages and clearances > 8 mm
Safety class	Class I
Leakage current	< 3.5 mA (typ. 0.3 mA)
Safety test	Yes
CE marking	Yes
UL/cUL (CSA) approval	UL-listed (UL 508) File E143289, CSA (CSA C22.2 No.
Protection against explosion	-
FM approval	-
Marine approval	-
Degree of protection (EN 60529)	IP20
EMC	
Emitted interference	EN 55011 Class A
Supply harmonics limitation	-
Noise immunity	EN 61000-6-2
Operating data	
Ambient temperature range	-25 ... +70°C with natural convection
Transport and storage temperature range	-40 ... +85°C
Humidity class	Climate class 3K5 according to EN 60721, transient condensation permitted
Mechanics	
Connections	
• Supply input L, N, PE	One screw-type terminal each for 0.5 ... 2.5 mm^2 solid/finely stranded
• Output +	3 screw terminals for 0.5 ... 2.5 mm^2
• Output -	3 screw terminals for 0.5 ... 2.5 mm^2
Dimensions (W x H x D) in mm	80 x 125 x 120
Weight, approx.	0.57 kg
Mounting	Snaps onto S7 rail
Accessories	Mounting adapter for standard mounting rail (6ES7 390-6BA00-0AA0)

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The S7-300 version

Ordering data	Order No.
PS 307 load power supply	
incl. connecting comb	
120/230 V AC; 24 V DC	
Output current 2 A (dimensions 40 x 125 x 120)	**6ES7 307-1BA01-0AA0**
Output current 5 A (dimensions 60 x 125 x 120)	**6ES7 307-1EA01-0AA0**
Output current 10 A (dimensions 80 x 125 x 120)	**6ES7 307-1KA02-0AA0**
Accessories	
Mounting adapter	**6EP1 971-1BA00**
for snap mounting of the new PS 307 onto 35 mm DIN rails (EN 50022)	
Spare part	

		Order No.
SIMATIC S7-300 Outdoor		**6ES7 307-1EA80-0AA0**
Stabilized power supply PS 307 Input: 120/230 V AC Output: 24 V DC/5 A		
SIPLUS S7-300 PS 307	L	**6AG1 307-1EA80-2AA0**
-25 …+70 °C with conformal coating EN 50155 certified based on 6ES7 307-1EA80-0AA0 Stabilized power supply Input: 120/230 V AC Output: 24 V DC/5 A		
Accessories		
SIMATIC S7-300 mounting adapter		**6ES7 390-6BA00-0AA0**
for snap mounting of the PS 307 onto 35 mm DIN rails		

L: Subject to export regulations AL: 9I999 and ECCN: N

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SIPLUS S7-300 PS 305

Overview



Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS S7-300 PS 305	
Order number	**6AG1 305-1BA80-2AA0**
Order No. based on	**6ES7 305-1BA80-0AA0**
Conformal coating	Coating of the printed circuit boards and the electronic components
Ambient temperature range	-25 … +70 °C
Ambient conditions	Suitable for extraordinary medial exposure (e.g. chlorine sulfur atmosphere)
Technical data	The technical data of the standard product applies except for the ambient conditions.
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	Yes

Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOx < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOx < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here: www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS S7-300 PS 305 load power supply for temperature range -25 to +70 °C and use under medial load (e.g. sulfur chloride atmosphere). Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).		
24-110 V DC/24 V DC; 2 A	L	**6AG1 305-1BA80-2AA0**

L: Subject to export regulations AL: 9I999 and ECCN: N

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SIPLUS S7-300 PS 307, 5 A

Overview



Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS S7-300 PS 307, 5 A	
Order number	**6AG1 307-1EA01-7AA0**
Order number based on	**6ES7 307-1EA01-0AA0**
Conformal coating	Coating of the printed circuit boards and the electronic components
Ambient temperature range	-25 ... +70 °C
Technical data	The technical data of the standard product applies except for the ambient conditions.
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	Yes

Ambient conditions	
Relative humidity	5 ... 100%, condensation allowed
Biologically active substances	Conformity with EN 60721-3-3, Class 3B3 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1)2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOx < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 14.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOx < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

For further technical documentation on SIPLUS, see:
www.siemens.com/siplus-extreme

Ordering data

	Order No.
SIPLUS S7-300 PS 307 load power supply, 5 A Incl. connection bracket 120/230 V AC; 24 V DC Output current 5 A (dimensions 60 x 125 x 120)	**6AG1 307-1EA01-7AA0**

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SIPLUS S7-300 PS 307, 5 A outdoor

Overview



Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS S7-300 PS 307	
Order number	**6AG1 307-1EA80-2AA0**
Order number based on	**6ES7 307-1EA80-0AA0**
Conformal coating	Coating of the printed circuit boards and the electronic components
Ambient temperature range	-25 ... +70 °C
Technical data	The technical data of the standard product applies except for the ambient conditions.
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	Yes

Ambient conditions	
Relative humidity	5 ... 100%, condensation allowed
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1)2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

[1)] ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOx < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 14.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOx < 10.4 ppm

[2)] The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

For further technical documentation on SIPLUS, see:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS S7-300 PS 307 load power supply, 5 A, outdoor		
For temperature range -25 °C to +70 °C and use under medial exposure (e.g. sulfur chloride atmosphere). Compliant with standard for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).		
120/230 V AC / 24 V DC; 5 A	L	**6AG1 307-1EA80-2AA0**

L: Subject to export regulations AL: 9I999 and ECCN: N

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SIPLUS S7-300 PS 307, 10 A

Overview



Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS S7-300 PS 307, 10 A	
Order number	**6AG1 307-1KA02-7AA0**
Order number based on	**6ES7 307-1KA02-0AA0**
Conformal coating	Coating of the printed circuit boards and the electronic components
Ambient temperature range	-25 ... +70 °C
Technical data	The technical data of the standard product applies except for the ambient conditions.
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	No

Ambient conditions	
Relative humidity	5 ... 100%, condensation allowed
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1)2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOx < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 14.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOx < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

For further technical documentation on SIPLUS, see:
www.siemens.com/siplus-extreme

Ordering data

	Order No.
SIPLUS S7-300 PS 307 load power supply, 10 A Incl. connection bracket 120/230 V AC; 24 V DC Output current 10 A (dimensions 80 x 125 x 120)	**6AG1 307-1KA02-7AA0**

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Overview



- The mechanical mounting rack of the SIMATIC S7-300
- For accommodating the modules
- Can be screwed onto the wall

Ordering data	Order No.
DIN rail	
160 mm	**6ES7 390-1AB60-0AA0**
482 mm	**6ES7 390-1AE80-0AA0**
530 mm	**6ES7 390-1AF30-0AA0**
830 mm	**6ES7 390-1AJ30-0AA0**
2000 mm	**6ES7 390-1BC00-0AA0**

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Labeling sheets

Overview

Labeling sheets

- Film sheets for application-specific labeling of SIMATIC S7-300 I/O modules with commercial laser printers
- Single-color films, tear-resistant, dirt-resistant
- Easy handling:
  - Pre-perforated labeling sheets in DIN A4 format to allow easy separation of the labeling strips
  - The separated strips can be inserted directly into the I/O modules
- Different colors for distinction between module types or preferred areas of application: The labeling sheets are available in the colors petrol, light beige, red and yellow. Yellow is reserved for failsafe systems.

Labeling strips

- Petrol-colored writable plastic strips
- For insertion in the front connector
- Spare part, 10 units

Label cover

- Petrol-colored film
- To cover and hold user-made labeling strips on normal paper
- Accessories, 10 units

Technical specifications

Labeling sheets for S7-300	
Dimensions	DIN A4
Labeling strips per sheet, pre-perforated	10
Weight, approx.	0.1 kg

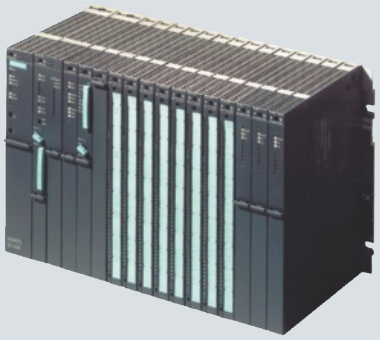
Ordering data

	Order No.
Labeling sheets	
for 16-channel signal modules, DIN A4, for printing with laser printer; 10 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**
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**

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SIMATIC S7-400

6



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Brochures

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

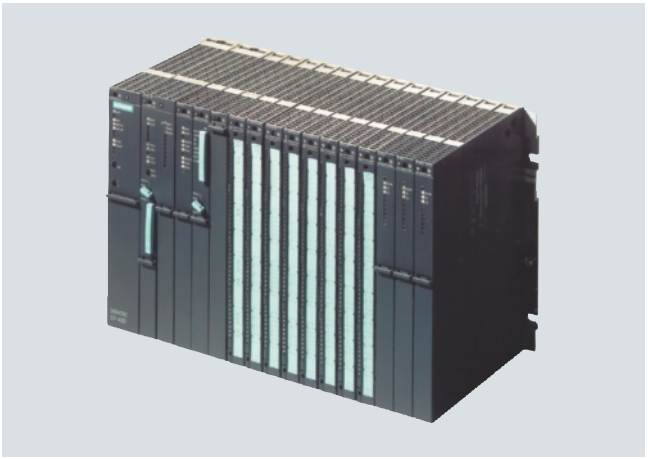
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S7-400/S7-400H/S7-400F/FH

Overview

The S7-400 is the most powerful PLC in the family of SIMATIC controllers. It enables successful automation solutions with Totally Integrated Automation (TIA). The S7-400 is an automation platform for system solutions in production and process engineering, and it is characterized primarily by its modularity and performance reserves.



S7-400

- 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 connections.
- 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 controller. Multicomputing distributes the overall performance power of an S7-400. For example, complex tasks can be divided into technologies such as open-loop control, computing or communication, and assigned to different CPUs. And every 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 a host of communication lines. This enables, for example, division into one communication path for HMI and programming tasks, one for high-performance and equidistant motion control components, and one for a "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. For this purpose, high-level languages such as SCL and graphical engineering tools for sequential controls, state graph programs and technology-oriented diagrams are available, for example.



S7-400H

- Fault-tolerant automation system with redundant design.
- For applications with high fail-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 I/Os with standard availability: single-sided configuration.
- Hot stand-by: automatic reaction-free switching to the standby unit in the event of a fault.
- Configuration with two separate or one divided central rack.
- Connection of switched I/O via redundant PROFIBUS DP.

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Overview (continued)



S7-400F/FH

- Failsafe automation system for plants with increased safety requirements
- Complies with safety requirements to SIL 3 in accordance with IEC 61508, AK6 in accordance with DIN V 19250 and Cat. 4 in accordance with EN 954-1
- If required, also fault tolerant through redundant design
- Without additional wiring of the safety-related I/O:
- Safety-relevant communication via PROFIBUS DP with PROFIsafe profile
- Based on S7-400H and ET 200M with fail-safe modules
- Standard modules for non-safety-related applications can also be used in the automation system
- Isolation module for joint use of fail-safe and standard modules in safety mode in one ET 200M

Technical specifications

General technical specifications	
Degree of protection	IP20
Ambient temperature	0 to 60 °C
Relative humidity	5 to 95%, no condensation
Atmospheric pressure	1080 to 795 hPa (corresponds to an altitude of 1000 m to 2000 m)
Electromagnetic compatibility	
• Interference immunity	According to EN 61000-6-2
• Emitted interference	According to EN 61000-6-4
Mechanical load	
• Vibration, test according to / tested with	IEC 60068-2-6 (sine) 10 to 58 Hz; constant amplitude 0.075 mm; 58 to 500 Hz; constant acceleration 1 g; duration of oscillation: 10 frequency sweeps per axis in each direction of the three mutually perpendicular axes
• Shock, test according to / tested with	IEC 60068-2-27 Type of shock: Half-sine; strength of the shock 10 g (peak value), duration 6 ms direction of shock: 100 shocks in each of the 3 mutually perpendicular axes.

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

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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	6ES7 412-2EK06-0AB0
Product type designation	CPU 412-1	CPU 412-2	CPU 412-2 PN
Product version			
Hardware product version	03	03	01
Firmware version	V5.3	V5.3	V6.0
Associated programming package	STEP7 V 5.3 SP2 or higher with HW update	STEP7 V 5.3 SP2 or higher with HW update	STEP7 V5.5 or higher/iMap V3.0 + iMap STEP7 Add-on V3.0 SP5 or higher
Supply voltages			
Rated value			
• 24 V DC	No; Power supply via system power supply	No; Power supply via system power supply	No; Power supply via system power supply
Feeding of external backup voltage to CPU	5 to 15 V DC	5 to 15 V DC	5 to 15 V DC
Current consumption			
from backplane bus 5 V DC, max.	0.6 A	1.1 A	1.3 A
from interface 5 V DC, max.	90 mA	90 mA; At each DP interface	90 mA; At the DP interface
Power losses			
Power loss, typ.	2.5 W	4.5 W	5.5 W
Power loss, max.	3 W	5 W	6.5 W
Backup battery			
Battery operation	not relevant	not relevant	not relevant
• Backup current, typ.	125 µA; (up to 40 °C)	125 µA; (up to 40 °C)	125 µA; (up to 40 °C)
• Backup current, max.	300 µA	550 µA	450 µA
Memory			
Work memory			
• integrated (for program)	144 Kibyte	256 Kibyte	0.5 Mbyte
• integrated (for data)	144 Kibyte	256 Kibyte	0.5 Mbyte
• expandable	No	No	No
Load memory			
• expandable FEPROM	Yes; with Memory Card (FLASH)	Yes; with Memory Card (FLASH)	Yes; with Memory Card (FLASH)
• expandable FEPROM, max.	64 Mbyte	64 Mbyte	64 Mbyte
• integrated RAM, max.	512 Kibyte	512 Kibyte	512 Kibyte
• expandable RAM	Yes; with Memory Card (RAM)	Yes; with Memory Card (RAM)	Yes; with Memory Card (RAM)
• 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

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Technical specifications (continued)

	6ES7 412-1XJ05-0AB0	6ES7 412-2XJ05-0AB0	6ES7 412-2EK06-0AB0
CPU-blocks			
DB			
• Number, max.	1 500; Number range: 1 to 16,000	3 000; Number range: 1 to 16,000	3 000; Number range: 1 to 16,000
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte
FB			
• Number, max.	750; Number range: 0 to 7999	1 500; Number range: 0 to 7999	1 500; Number range: 0 to 7999
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte
FC			
• Number, max.	750; Number range: 0 to 7999	1 500; Number range: 0 to 7999	1 500; 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.	75 ns	75 ns	75 ns
for word operations, min.	75 ns	75 ns	75 ns
for fixed point arithmetic, min.	75 ns	75 ns	75 ns
for floating point arithmetic, min.	225 ns	225 ns	225 ns
Counters, timers and their retentivity			
S7 counter			
• Number	2 048	2 048	2 048
• Retentivity			
- adjustable	Yes	Yes	Yes
- lower limit	0	0	0
- upper limit	2 047	2 047	2 047
- preset	Z 0 to Z 7	Z 0 to Z 7	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
• Number	Unlimited (limited only by work memory)	Unlimited (limited only by work memory)	Unlimited (limited only by work memory)
S7 times			
• Number	2 048	2 048	2 048
• Retentivity			
- 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
• Number	Unlimited (limited only by work memory)	Unlimited (limited only by work memory)	Unlimited (limited only by work memory)

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Technical specifications (continued)

	6ES7 412-1XJ05-0AB0	6ES7 412-2XJ05-0AB0	6ES7 412-2EK06-0AB0
Data areas and their retentivity			
retentive 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.	4 Kibyte; Size of bit memory address area	4 Kibyte; Size of bit memory address area	4 Kibyte; Size of bit memory address area
• Retentivity available	Yes	Yes	Yes
• Number of clock memories	8; (in 1 memory byte)	8; (in 1 memory byte)	8; (in 1 memory byte)
Data blocks			
• Number, max.	1 500; Number range: 1 to 16,000	3 000; Number range: 1 to 16,000	3 000; Number range: 1 to 16,000
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte
Local data			
• adjustable, max.	8 Kibyte	8 Kibyte	8 Kibyte
• preset	4 Kibyte	4 Kibyte	4 Kibyte
Address area			
I/O address area			
• overall	4 Kibyte	4 Kibyte	4 Kibyte
• Outputs	4 Kibyte	4 Kibyte	4 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		4 Kibyte	
- DP interface, outputs		4 Kibyte	
- PN interface, inputs			4 Kibyte
- PN interface, outputs			4 Kibyte
Process image			
• Inputs, adjustable	4 Kibyte	4 Kibyte	4 Kibyte
• Outputs, adjustable	4 Kibyte	4 Kibyte	4 Kibyte
• Inputs, preset	128 byte	128 byte	128 kbyte
• Outputs, preset	128 byte	128 byte	128 Kibyte
• 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	32 768	32 768	32 768
• Outputs	32 768	32 768	32 768
• Inputs, of which central	32 768	32 768	32 768
• Outputs, of which central	32 768	32 768	32 768
Analog channels			
• Inputs	2 048	2 048	2 048
• Outputs	2 048	2 048	2 048
• Inputs, of which central	2 048	2 048	2 048
• Outputs, of which central	2 048	2 048	2 048

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Technical specifications (continued)

	6ES7 412-1XJ05-0AB0	6ES7 412-2XJ05-0AB0	6ES7 412-2EK06-0AB0
Hardware configuration			
connectable OPs	31	31	47
Central devices, max.	1	1	1
Expansion devices, max.	21	21	21
Multicomputing	Yes; 4 CPUs max. (with UR1 or UR2)	Yes; 4 CPUs max. (with UR1 or UR2)	Yes; 4 CPUs max. (with UR1 or UR2)
Interface modules			
• Number of connectable IMs (total), max.	6	6	6
• Number of connectable IM 460s, max.	6	6	6
• Number of connectable IM 463s, max.	4; IM 463-2	4; IM 463-2	4; IM 463-2
Number of DP masters			
• integrated	1	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 not suitable for use with CP 443-5 Ext. and CP443-1 EX4x, EX20, GX20 (in PNIO mode)	No; IM 467 not suitable for use with CP 443-5 Ext. and CP443-1 EX4x, EX20, GX20 (in PNIO mode)	No; IM 467 not suitable for use with CP 443-5 Ext. and CP443-1 EX4x, EX20, GX20 (in PNIO mode)
• via interface module	0	0	0
• Number of pluggable S5 modules (via adapter capsule in central device), max.	6	6	6
Number of IO controllers			
• integrated	0	0	1
• via CP	4; No mixed operation of CP443-1 EX40 and CP443-1 EX 41/EX20/GX20, max. 4 in central controller	4; No mixed operation of CP443-1 EX40 and CP443-1 EX 41/EX20/GX20, max. 4 in central controller	4; No mixed operation of CP443-1 EX40 and CP443-1 EX 41/EX20/GX20, max. 4 in central controller
Number of operable FMs and CPs (recommended)			
• FM	Limited by number of slots and number of connections	Limited by number of slots and number of connections	Limited by number of slots and number of connections
• CP, point-to-point	CP 440: Limited by number of slots; CP 441: Limited by number of slots and number of connections	CP 440: Limited by number of slots; CP 441: Limited by number of slots and number of connections	CP 440: Limited by number of slots; CP 441: Limited by 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 CPs max. or IMs as DP master, 4 PN controller maximum	14; In total max. 10 CPs as DP master and PN controller, of which up to 10 IMs or CPs as DP master and up to 4 CPs as PN controller
Time			
Clock			
• Hardware clock (real-time clock)	Yes	Yes	Yes
• battery-backed and synchronizable	Yes	Yes	Yes
• Resolution	1 ms	1 ms	1 ms
Runtime meter			
• Number	16	16	16
Clock synchronization			
• supported	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	No; Via CP	No; Via CP	Yes; as client
• to IF 964 DP	No	No	

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Technical specifications (continued)

	6ES7 412-1XJ05-0AB0	6ES7 412-2XJ05-0AB0	6ES7 412-2EK06-0AB0
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)	47; Max. 47 with Alarm_S/SQ and Alarm_D/DQ (OPs); max. 8 with Alarm, Alarm_8, Alarm_8P, Notify and Notify_8 (e.g. WinCC)
Symbol-related messages	Yes	Yes	Yes
SCAN procedure	Yes	Yes	Yes
Number of messages			
• overall, max.	512	512	512
Block related messages	Yes	Yes	Yes
Process diagnostic messages	Yes	Yes	Yes
Alarm 8-blocks	Yes	Yes	Yes
Process control messages	Yes	Yes	Yes
Test commissioning functions			
Status/control			
• Status/control variable	Yes; Up to 16 variable tables	Yes; Up to 16 variable tables	Yes; Up to 16 variable tables
Forcing			
• Forcing	Yes	Yes	Yes
Status block	Yes; Up to 2 simultaneously	Yes; Up to 2 simultaneously	Yes; Up to 16 simultaneously
Single step	Yes	Yes	Yes
Number of breakpoints	4	4	16
Diagnostic buffer			
• present	Yes	Yes	Yes
• Number of entries, max.	200	400	400
- adjustable	Yes	Yes	Yes
- preset	120	120	120
Service data			
• can be read out			Yes
Communication functions			
PG/OP communication	Yes	Yes	Yes
Data record routing	Yes	Yes	Yes
Routing	Yes; S7 routing	Yes; S7 routing	Yes; S7 routing
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
• User data per job, max.	76 byte	76 byte	76 byte
S7 communication			
• supported	Yes	Yes	Yes
• as server	Yes	Yes	Yes
• as client	Yes	Yes	Yes
• User data per job, max.	64 Kibyte	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 FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5	Yes; Via FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5
• User 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

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Technical specifications (continued)

	6ES7 412-1XJ05-0AB0	6ES7 412-2XJ05-0AB0	6ES7 412-2EK06-0AB0
Web server			
• supported	No	No	Yes
• Number of HTTP clients			5
• User-defined websites			Yes
Open IE communication			
• TCP/IP			Yes; Via integrated PROFINET interface and loadable FBs
- Number of connections, max.			46
- Data length, max.			32 Kibyte
- Several passive connections per port, supported			Yes
• ISO-on-TCP (RFC1006)	Via CP 443-1 Adv. and loadable FB	Via CP 443-1 and loadable FB	Yes; Via integrated PROFINET interface or CP 443-1 Adv. and loadable FBs
- Number of connections, max.			46
- Data length, max.	1452 bytes via CP 443-1 Adv.	1452 bytes via CP 443-1 Adv.	32 Kibyte; 1452 bytes via CP 443-1 Adv.
• UDP			Yes; Via integrated PROFINET interface and loadable FBs
- Number of connections, max.			46
- Data length, max.			1 472 byte
Number of connections			
• overall	32	32	48
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
• Data length of all incoming connections master/slave, max.			45 000 byte
• Data length of all outgoing connections master/slave, max.			45 000 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			
- Sampling frequency: Sampling time, min.			200 ms; Depending on preset communcation load, number of interconnections and data length used
- Number of incoming interconnections			250
- Number of outgoing interconnections			250
- Data length of all incoming interconnections, max.			8 000 byte
- Data length of all outgoing interconnections, max.			8 000 byte
- Data length per connection, max.			2 000 byte

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Technical specifications (continued)

	6ES7 412-1XJ05-0AB0	6ES7 412-2XJ05-0AB0	6ES7 412-2EK06-0AB0
• Remote interconnections with cyclic 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.			450 byte
• HMI variables via PROFINET (acyclic)			
- Number of stations that can log on for HMI variables (PN OPC/iMap)			2x PN OPC/1x iMap
- HMI variable updating			500 ms
- Number of HMI variables			1 000
- Data length of all HMI variables, max.			32 000 byte
• PROFIBUS proxy functionality			
- supported			Yes; 32 PROFIBUS slaves max. connectable
- Data length per connection, max.			240 byte; Slave-dependent
1st interface			
Type of interface	Integrated	Integrated	Integrated
Physics	RS 485 / PROFIBUS + MPI	RS 485 / PROFIBUS + MPI	RS 485 / PROFIBUS + MPI
Isolated	Yes	Yes	Yes
Power supply to interface (15 to 30 V DC), max.	150 mA	150 mA	150 mA
Number of connection resources	MPI: 32, DP: 16	MPI: 32, DP: 16	MPI: 32, DP: 16
Functionality			
• MPI	Yes	Yes	Yes
• DP master	Yes	Yes	Yes
• DP slave	Yes	Yes	Yes
MPI			
• Number of connections	32; if a diagnostic repeater is used on the line, the number of connection resources on the line is reduced by 1	32; if a diagnostic repeater is used on the line, the number of connection resources on the line is reduced by 1	32; if a diagnostic repeater is used on the line, the number of connection resources on the line is reduced by 1
• Services			
- PG/OP communication	Yes	Yes	Yes
- Routing	Yes	Yes	Yes
- Global data communication	Yes	Yes	Yes
- S7 basic communication	Yes	Yes	Yes
- S7 communication	Yes	Yes	Yes
- S7 communication, as client	Yes	Yes	Yes
- S7 communication, as server	Yes	Yes	Yes
• Transmission rate, max.	12 Mbit/s	12 Mbit/s	12 Mbit/s

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Technical specifications (continued)

	6ES7 412-1XJ05-0AB0	6ES7 412-2XJ05-0AB0	6ES7 412-2EK06-0AB0
DP master			
• Number of connections, max.	16; if a diagnostic repeater is used on the line, the number of connection resources on the line is reduced by 1	16; if a diagnostic repeater is used on the line, the number of connection resources on the line is reduced by 1	16; 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	No	No	No
- S7 basic communication	Yes	Yes	Yes
- S7 communication	Yes	Yes	Yes
- S7 communication, as client	Yes	Yes	Yes
- S7 communication, as server	Yes	Yes	Yes
- Equidistance mode support	Yes	Yes	Yes
- Isochronous mode	Yes	Yes	Yes
- SYNC/FREEZE	Yes	Yes	Yes
- Activation/deactivation of DP slaves	Yes	Yes	Yes
- Direct data exchange (slave-to-slave communication)	Yes	Yes	Yes
- DPV1	Yes	Yes	Yes
• Transmission rate, 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
• User data per DP slave			
- User data per DP slave, max.	244 byte	244 byte	244 byte
- Inputs, max.	244 byte	244 byte	244 byte
- Outputs, max.	244 byte	244 byte	244 byte
- Slots, max.	244	244	244
- per slot, max.	128 byte	128 byte	128 byte
DP slave			
• Number of connections	16	16	16
• Services			
- PG/OP communication	Yes; with interface active	Yes; with interface active	Yes; with interface active
- S7 routing	Yes; With interface active	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
- S7 communication, as client	Yes	Yes	Yes
- S7 communication, as server	Yes	Yes	Yes
- Direct data exchange (slave-to-slave communication)	No	No	No
- DPV1	No	No	No
• GSD file	http://support.automation.siemens.com/WW/view/en/113652	http://support.automation.siemens.com/WW/view/en/113652	http://support.automation.siemens.com/WW/view/en/113652
• Transmission rate, max.	12 Mbit/s	12 Mbit/s	12 Mbit/s
• Automatic baud rate search	No	No	No
• Transfer memory			
- Inputs	244 byte	244 byte	244 byte
- Outputs	244 byte	244 byte	244 byte
• Address area, max.	32; Virtual slots	32; Virtual slots	32; Virtual slots
• User data per address area, max.	32 byte	32 byte	32 byte
• User data per address area, of which consistent, max.	32 byte	32 byte	32 byte

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Technical specifications (continued)

	6ES7 412-1XJ05-0AB0	6ES7 412-2XJ05-0AB0	6ES7 412-2EK06-0AB0
2nd interface			
Type of interface		Integrated	PROFINET
Physics		RS 485 / PROFIBUS	Ethernet RJ45
Isolated		Yes	Yes
Integrated switch			Yes
Number of ports			2
Power supply to interface (15 to 30 V DC), max.		150 mA	
Automatic detection of transmission speed			Yes; Autosensing
Autonegotiation			Yes
Autocrossing			Yes
Media redundancy			
• supported			Yes
• Switchover time on line break, typically			200 ms
• Number of stations in the ring, max.			50
Change of IP address at runtime, supported			Yes; Assignment by higher-level IO controller or by the user program with SFB104 "IP_CONF"
Number of connection resources		16	48
Functionality			
• DP master		Yes	No
• DP slave		Yes	No
• PROFINET IO controller			Yes
• PROFINET IO device			Yes
• PROFINET CBA			Yes
• Open IE communication			Yes
• Web server			Yes
- Number of HTTP clients			5
• Local Operating Network			No
DP master			
• Number of connections, max.		16	
• Services			
- PG/OP communication		Yes	
- Routing		Yes	
- Global data communication		No	
- S7 basic communication		Yes	
- S7 communication		Yes	
- S7 communication, as client		Yes	
- S7 communication, as server		Yes	
- Equidistance mode support		Yes	
- Isochronous mode		Yes	
- SYNC/FREEZE		Yes	
- Activation/deactivation of DP slaves		Yes	
- Direct data exchange (slave-to-slave communication)		Yes	
- DPV1		Yes	
• Transmission rate, max.		12 Mbit/s	
• Number of DP slaves, max.		64	
• Address area			
- Inputs, max.		4 Kibyte	
- Outputs, max.		4 Kibyte	

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Technical specifications (continued)

	6ES7 412-1XJ05-0AB0	6ES7 412-2XJ05-0AB0	6ES7 412-2EK06-0AB0
• User data per DP slave			
- User 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		16	
• Services			
- Routing		Yes	
- Programming		Yes	
• 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 area, max.		32	
• User data per address area, max.		32 byte	
• User data per address area, of which consistent, max.		32 byte	
PROFINET IO controller			
• Services			
- PG/OP communication			Yes
- S7 routing			Yes
- S7 communication			Yes
- Isochronous mode			Yes; Only with IRT and the High Performance option
- Open IE communication			Yes
• Transmission rate, min.			10 Mbit/s
• Transmission rate, max.			100 Mbit/s
• Number of connectable IO devices, max.			256
• Max. number of connectable IO devices for RT			256
- of which in line, max.			256
• Number of IO devices with IRT and the option "high flexibility"			256
- of which in line, max.			61
• Number of IO devices with IRT and the option "high performance", max.			64
- of which in line, max.			64
• IRT, supported			Yes
• Shared device, supported			Yes
• Prioritized startup supported			Yes
- Number of IO devices, max.			32
• Activation/deactivation of IO devices			Yes
- Number of IO devices that can be simultaneously activated/deactivated, max.			8
• IO devices changing during operation (partner ports), supported			Yes
- Max. number of IO devices per tool			8; 8 parallel calls of the SFC 12 "D_ACT_DP" possible per line. Max. 32 IO devices changing during operation (partner ports) are supported.

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Technical specifications (continued)

	6ES7 412-1XJ05-0AB0	6ES7 412-2XJ05-0AB0	6ES7 412-2EK06-0AB0
• Device replacement without swap medium			Yes
• Send clock times			250 µs, 500 µs, 1 ms, 2 ms, 4 ms additionally with IRT with high performance: 250 µs to 4 ms in 125 µs frame
• Updating time			250 µs to 512 ms; minimum value depends on preset communication share for PROFINET IO, on the number of IO devices and on the amount of configured user data, see PROFINET system description
• Address area			
- Inputs, max.			4 Kibyte
- Outputs, max.			4 Kibyte
• User data per address area, max.			
- User data consistency, max.			1 024 byte
PROFINET IO device			
• Services			
- PG/OP communication			Yes
- S7 routing			Yes
- S7 communication			Yes
- Isochronous mode			No
- Open IE communication			Yes
- IRT, supported			Yes
- Prioritized startup supported			Yes
- Shared device, supported			Yes
- Number of IO controllers with shared device, max.			2
• Transfer memory			
- Inputs, max.			1 440 byte; Per IO controller with shared device
- Outputs, max.			1 440 byte; Per IO controller with shared device
• Submodules			
- Number, max.			64
- User data per submodule, max.			1 024 byte
PROFINET CBA			
• acyclic transmission			Yes
• cyclic transmission			Yes
Open IE communication			
• Open IE communication, supported			Yes
• Number of connections, max.			46
• Local port numbers used at the system end			0, 20, 21, 25, 80, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65534, 65535
• Keep-alive function, supported			Yes
Isochronous mode			
Isochronous mode	Yes; For PROFIBUS only	Yes; For PROFIBUS only	Yes; Via PROFIBUS DP or PROFINET interface
Number of DP masters with isochronous mode	1	2	1
User data per isochronous slave, max.	244 byte	244 byte	244 byte
Equidistance	Yes	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	1.5 ms; 0.5 ms without use of SFC 126, 127
Max. cycle	32 ms	32 ms	32 ms

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Technical specifications (continued)

	6ES7 412-1XJ05-0AB0	6ES7 412-2XJ05-0AB0	6ES7 412-2EK06-0AB0
CiR - Configuration in RUN			
CiR synchronization time, basic load	100 ms	100 ms	100 ms
CiR synchronization time, time per I/O slave	30 µs; Time per I/O byte	200 µs; Time per I/O byte	30 µs; Time per I/O byte
Programming			
Configuration software			
• STEP 7	Yes	Yes	Yes
Programming language			
• STEP 7	Yes	Yes	Yes
• LAD	Yes	Yes	Yes
• FBD	Yes	Yes	Yes
• STL	Yes	Yes	Yes
• SCL	Yes	Yes	Yes
• CFC	Yes	Yes	Yes
• GRAPH	Yes	Yes	Yes
• HiGraph®	Yes	Yes	Yes
Nesting levels	7	7	7
Know-how protection			
• User program protection/password protection	Yes	Yes	Yes
• Block encryption			Yes; With S7 block privacy
EMC			
Emission of radio interference acc. to EN 55 011			
• Limit value class A, for use in industrial areas	Yes		Yes
• Limit value class B, for use in residential areas	No		No
Dimensions			
Required slots	1	1	1
Dimensions and weight			
Dimensions			
• Width	25 mm	25 mm	25 mm
• Height	290 mm	290 mm	290 mm
• Depth	219 mm	219 mm	219 mm
Weight			
• Weight, approx.	0.7 kg	0.7 kg	750 g

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Ordering data	Order No.
CPU 412-1	**6ES7 412-1XJ05-0AB0**
Work memory 288 KB, power supply 24 V DC, MPI/PROFIBUS DP master interface, slot for memory card, incl. slot number labels	
CPU 412-2	**6ES7 412-2XJ05-0AB0**
Work memory 512 KB, power supply 24 V DC, MPI/PROFIBUS DP master interface, slot for memory card, incl. slot number labels	
CPU 412-2 PN	**6ES7 412-2EK06-0AB0**
Work memory 1 MB, power supply 24 V DC, MPI/PROFIBUS DP master interface, PROFINET interface, slot for memory card, incl. slot number labels	
Memory card RAM	
64 KB	**6ES7 952-0AF00-0AA0**
256 KB	**6ES7 952-1AH00-0AA0**
1 MB	**6ES7 952-1AK00-0AA0**
2 MB	**6ES7 952-1AL00-0AA0**
4 MB	**6ES7 952-1AM00-0AA0**
8 MB	**6ES7 952-1AP00-0AA0**
16 MB	**6ES7 952-1AS00-0AA0**
64 MB	**6ES7 952-1AY00-0AA0**
FEPROM memory card	
64 KB	**6ES7 952-0KF00-0AA0**
256 KB	**6ES7 952-0KH00-0AA0**
1 MB	**6ES7 952-1KK00-0AA0**
2 MB	**6ES7 952-1KL00-0AA0**
4 MB	**6ES7 952-1KM00-0AA0**
8 MB	**6ES7 952-1KP00-0AA0**
16 MB	**6ES7 952-1KS00-0AA0**
32 MB	**6ES7 952-1KT00-0AA0**
64 MB	**6ES7 952-1KY00-0AA0**
MPI cable	**6ES7 901-0BF00-0AA0**
for connection of SIMATIC S7 and PG via MPI; 5 m in length	
Slot number labels	**6ES7 912-0AA00-0AA0**
1 set (spare part)	
Manual "SIMATIC S7-400 programmable controller"	
incl. instruction list	
German	**6ES7 498-8AA05-8AA0**
English	**6ES7 498-8AA05-8BA0**
S7-400 operation list	
German	**6ES7 498-8AA05-8AN0**
English	**6ES7 498-8AA05-8BN0**

		Order No.
Manual "Communication for SIMATIC S7-300/-400"		
German		**6ES7 398-8EA00-8AA0**
English		**6ES7 398-8EA00-8BA0**
French		**6ES7 398-8EA00-8CA0**
Spanish		**6ES7 398-8EA00-8DA0**
Italian		**6ES7 398-8EA00-8EA0**
SIMATIC manual collection	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC		
SIMATIC manual collection update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		
Brochure "SIMATIC S7-400 programmable controller - Design and application"		
German		**6ES7 498-8AA00-8AB0**
English		**6ES7 498-8AA00-8BB0**
RS 485 bus connector with 90° cable outlet		
Max. 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 972-0BA42-0XA0**
With PG interface		**6ES7 972-0BB42-0XA0**
RS 485 bus connector with 90° cable outlet for Fast Connect system		
Max. transfer rate 12 Mbit/s		
Without PG interface		
• 1 unit		**6ES7 972-0BA52-0XA0**
• 100 units		**6ES7 972-0BA52-0XB0**
With PG interface		
• 1 unit		**6ES7 972-0BB52-0XA0**
• 100 units		**6ES7 972-0BB52-0XB0**
RS 485 bus connector with axial cable outlet		
For SIMATIC OP, for connection to PPI, MPI, PROFIBUS		**6GK1 500-0EA02**
PROFIBUS FastConnect bus cable		
Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m		**6XV1 830-0EH10**

D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

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Overview



- CPUs for high demands in the mid-level performance range
- Applicable for plants with additional demands on programming scope and processing speed
- Integrated PROFINET functions in CPU 414-3 PN/DP

Technical specifications

	6ES7 414-2XK05-0AB0	6ES7 414-3XM05-0AB0	6ES7 414-3EM06-0AB0
Product type designation	CPU 414-2	CPU 414-3	CPU414-3 PN/DP
Product version			
Hardware product version	03	03	01
Firmware version	V5.3	V5.3	V6.0
associated programming package	STEP7 V 5.3 SP2 or higher with HW update	STEP7 V 5.3 SP2 or higher with HW update	STEP7 V5.5 or higher/iMap V3.0 + iMap STEP7 Add-on V3.0 SP5 or higher
Supply voltages			
Rated value			
• 24 V DC	No; Power supply via system power supply	No; Power supply via system power supply	No; Power supply via system power supply
Feeding of external backup voltage to CPU	5 to 15 V DC	5 to 15 V DC	5 to 15 V DC
Current consumption			
from backplane bus 5 V DC, max.	1.1 A	1.3 A	1.5 A
from interface 5 V DC, max.	90 mA; At each DP interface	90 mA; At each DP interface	90 mA; At each DP interface
Power losses			
Power loss, typ.	4.5 W	5.5 W	6.5 W
Power loss, max.	5 W	6 W	7.5 W
Backup battery			
Battery operation	not relevant	not relevant	not relevant
• Backup current, typ.	125 µA; (up to 40 °C)	125 µA	125 µA; (up to 40 °C)
• Backup current, max.	550 µA	550 µA	450 µA
Memory			
Work memory			
• integrated (for program)	0.5 Mbyte	1.4 Mbyte	2 Mbyte
• integrated (for data)	0.5 Mbyte	1.4 Mbyte	2 Mbyte
• expandable	No	No	No
Load memory			
• expandable FEPROM	Yes; with Memory Card (FLASH)	Yes; with Memory Card (FLASH)	Yes; with Memory Card (FLASH)
• expandable FEPROM, max.	64 Mbyte	64 Mbyte	64 Mbyte
• integrated RAM, max.	512 Kibyte	512 Kibyte	512 Kibyte
• expandable RAM	Yes; with Memory Card (RAM)	Yes; with Memory Card (RAM)	Yes; with Memory Card (RAM)
• 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

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Technical specifications (continued)

	6ES7 414-2XK05-0AB0	6ES7 414-3XM05-0AB0	6ES7 414-3EM06-0AB0
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
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 7999	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
Counters, timers and their retentivity			
S7 counter			
• Number	2 048	2 048	2 048
• Retentivity			
- adjustable	Yes	Yes	Yes
- lower limit	0	0	0
- upper limit	2 047	2 047	2 047
- preset	Z 0 to Z 7	Z 0 to Z 7	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
• Number	Unlimited (limited only by work memory)	Unlimited (limited only by work memory)	Unlimited (limited only by work memory)
S7 times			
• Number	2 048	2 048	2 048
• Retentivity			
- 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
• Number	Unlimited (limited only by work memory)	Unlimited (limited only by work memory)	Unlimited (limited only by work memory)

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Technical specifications (continued)

	6ES7 414-2XK05-0AB0	6ES7 414-3XM05-0AB0	6ES7 414-3EM06-0AB0
Data areas and their retentivity			
retentive 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; Size of bit memory address area	8 Kibyte; Size of bit memory address area	8 Kibyte; Size of bit memory address area
• Retentivity available	Yes	Yes	Yes
• Number of clock memories	8; (in 1 memory byte)	8; (in 1 memory byte)	8; (in 1 memory byte)
Data blocks			
• 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
Local data			
• adjustable, max.	16 Kibyte	16 Kibyte	16 Kibyte
• preset	8 Kibyte	8 Kibyte	8 Kibyte
Address area			
I/O address area			
• overall	8 Kibyte	8 Kibyte	8 Kibyte
• Outputs	8 Kibyte	8 Kibyte	8 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	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 configuration			
connectable OPs	31	31	63
Central devices, max.	1	1	1
Expansion devices, max.	21	21	21
Multicomputing	Yes; 4 CPUs max. (with UR1 or UR2)	Yes; 4 CPUs max. (with UR1 or UR2)	Yes; 4 CPUs max. (with UR1 or UR2)
Interface modules			
• 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

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Technical specifications (continued)

	6ES7 414-2XK05-0AB0	6ES7 414-3XM05-0AB0	6ES7 414-3EM06-0AB0
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 not suitable for use with CP 443-5 Ext. and CP443-1 EX4x, EX20, GX20 (in PNIO mode)	No; IM 467 not suitable for use with CP 443-5 Ext. and CP443-1 EX4x, EX20, GX20 (in PNIO mode)	No; IM 467 not suitable for use with CP 443-5 Ext. and CP443-1 EX4x, EX20, GX20 (in PNIO 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	0	0	1
• via CP	4; No mixed operation of CP443-1 EX40 and CP443-1 EX 41/EX20/ GX20, max. 4 in central controller	4; No mixed operation of CP443-1 EX40 and CP443-1 EX 41/EX20/ GX20, max. 4 in central controller	4; No mixed operation of CP443-1 EX40 and CP443-1 EX 41/EX20/ GX20, max. 4 in central controller
Number of operable FMs and CPs (recommended)			
• FM	Limited by number of slots and number of connections	Limited by number of slots and number of connections	Limited by number of slots and number of connections
• CP, point-to-point	CP 440: limited by number of slots; CP 441: limited by number of connections	CP 440: limited by number of slots; CP 441: limited by number of connections	CP 440: Limited by number of slots; CP 441: Limited by 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 CPs max. or IMs as DP master, 4 PN controller maximum	14; In total max. 10 CPs as DP master and PN controller, of which up to 10 IMs or CPs as DP master and up to 4 CPs as PN controller
Time			
Clock			
• Hardware clock (real-time clock)	Yes	Yes	Yes
• Battery-backed and synchronizable	Yes	Yes	Yes
• Resolution	1 ms	1 ms	1 ms
Runtime meter			
• Number	16	16	16
Clock synchronization			
• supported	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	No; via CP	No; via CP	Yes; as client
• to IF 964 DP	No	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)	63; max. 63 with Alarm_S/SQ and Alarm_D/DQ (OPs); max. 8 with Alarm, Alarm_8, Alarm_8P, Notify and Notify_8 (e.g. WinCC)
Symbol-related messages	Yes	Yes	Yes
SCAN procedure	Yes	Yes	Yes
Number of messages			
• overall, max.	512	512	512
Block related messages	Yes	Yes	Yes
Process diagnostic messages	Yes	Yes	Yes
Alarm 8-blocks	Yes	Yes	Yes
Process control messages	Yes	Yes	Yes

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Technical specifications (continued)

	6ES7 414-2XK05-0AB0	6ES7 414-3XM05-0AB0	6ES7 414-3EM06-0AB0
Test commissioning functions			
Status/control			
• Status/control variable	Yes; Up to 16 variable tables	Yes; Up to 16 variable tables	Yes; Up to 16 variable tables
Forcing			
• Forcing	Yes	Yes	Yes
Status block	Yes; Up to 2 simultaneously	Yes; Up to 2 simultaneously	Yes; Up to 16 simultaneously
Single step	Yes	Yes	Yes
Number of breakpoints	4	4	16
Diagnostic buffer			
• present	Yes	Yes	Yes
• Number of entries, max.	400	3 200	3 200
- adjustable	Yes	Yes	Yes
- preset	120	120	120
Service data			
• can be read out			Yes
Communication functions			
PG/OP communication	Yes	Yes	Yes
Data record routing	Yes	Yes	Yes
Routing	Yes; S7 routing	Yes; S7 routing	Yes; S7 routing
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
• User data per job, max.	76 byte	76 byte	76 byte
S7 communication			
• supported	Yes	Yes	Yes
• as server	Yes	Yes	Yes
• as client	Yes	Yes	Yes
• User data per job, max.	64 Kibyte	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 FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5	Yes; Via FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5
• User 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			
• supported	No	No	Yes
• Number of HTTP clients			5
• User-defined websites			Yes
Open IE communication			
• TCP/IP			Yes; Via integrated PROFINET interface and loadable FBs
- Number of connections, max.			62
- Data length, max.			32 Kibyte
- Several passive connections per port, supported			Yes

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Technical specifications (continued)

	6ES7 414-2XK05-0AB0	6ES7 414-3XM05-0AB0	6ES7 414-3EM06-0AB0
• ISO-on-TCP (RFC1006)	Via CP 443-1 and loadable FB	Via CP 443-1 and loadable FB	Yes; Via integrated PROFINET interface or CP 443-1 Adv. and loadable FBs
- Number of connections, max.			62
- Data length, max.	1452 bytes via CP 443-1 Adv.	1452 bytes via CP 443-1 Adv.	32 Kibyte; 1452 bytes via CP 443-1 Adv.
• UDP			Yes; Via integrated PROFINET interface and loadable FBs
- Number of connections, max.			62
- Data length, max.			1 472 byte
Number of connections			
• overall	32	32	64
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
• Data length of all incoming connections master/slave, max.			45 000 byte
• Data length of all outgoing connections master/slave, max.			45 000 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			
- Sampling frequency: Sampling time, min.			200 ms; Depending on preset communcation load, number of interconnections and data length used
- Number of incoming interconnections			250
- Number of outgoing interconnections			250
- Data length of all incoming interconnections, max.			8 000 byte
- Data length of all outgoing interconnections, max.			8 000 byte
- Data length per connection, max.			2 000 byte
• Remote interconnections with cyclic 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.			450 byte

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Technical specifications (continued)

	6ES7 414-2XK05-0AB0	6ES7 414-3XM05-0AB0	6ES7 414-3EM06-0AB0
• HMI variables via PROFINET (acyclic)			
- Number of stations that can log on for HMI variables (PN OPC/iMap)			2x PN OPC/1x iMap
- HMI variable updating			500 ms
- Number of HMI variables			1 000
- Data length of all HMI variables, max.			32 000 byte
• PROFIBUS proxy functionality			
- supported			Yes; 32 PROFIBUS slaves max. connectable
- Data length per connection, max.			240 byte; Slave-dependent
1st interface			
Type of interface	Integrated	Integrated	Integrated
Physics	RS 485 / PROFIBUS + MPI	RS 485 / PROFIBUS + MPI	RS 485 / PROFIBUS + MPI
Isolated	Yes	Yes	Yes
Power supply to interface (15 to 30 V DC), max.	150 mA	150 mA	150 mA
Number of connection resources	MPI: 32, DP: 16	MPI: 32, DP: 16	MPI: 32, DP: 16
Functionality			
• MPI	Yes	Yes	Yes
• DP master	Yes	Yes	Yes
• DP slave	Yes	Yes	Yes
MPI			
• Number of connections	32; if a diagnostic repeater is used on the line, the number of connection resources on the line is reduced by 1	32; if a diagnostic repeater is used on the line, the number of connection resources on the line is reduced by 1	32; if a diagnostic repeater is used on the line, the number of connection resources on the line is reduced by 1
• Services			
- PG/OP communication	Yes	Yes	Yes
- Routing	Yes	Yes	Yes
- Global data communication	Yes	Yes	Yes
- S7 basic communication	Yes	Yes	Yes
- S7 communication	Yes	Yes	Yes
- S7 communication, as client	Yes	Yes	Yes
- S7 communication, as server	Yes	Yes	Yes
• Transmission rate, max.	12 Mbit/s	12 Mbit/s	12 Mbit/s
DP master			
• Number of connections, max.	16; if a diagnostic repeater is used on the line, the number of connection resources on the line is reduced by 1	16; if a diagnostic repeater is used on the line, the number of connection resources on the line is reduced by 1	16; 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	No	No	No
- S7 basic communication	Yes	Yes	Yes
- S7 communication	Yes	Yes	Yes
- S7 communication, as client	Yes	Yes	Yes
- S7 communication, as server	Yes	Yes	Yes
- Equidistance mode support	Yes	Yes	Yes
- Isochronous mode	Yes	Yes	Yes
- SYNC/FREEZE	Yes	Yes	Yes
- Activation/deactivation of DP slaves	Yes	Yes	Yes
- Direct data exchange (slave-to-slave communication)	Yes	Yes	Yes
- DPV1	Yes	Yes	Yes

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Technical specifications (continued)

	6ES7 414-2XK05-0AB0	6ES7 414-3XM05-0AB0	6ES7 414-3EM06-0AB0
• Transmission rate, 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
• User data per DP slave			
- User data per DP slave, max.	244 byte	244 byte	244 byte
- Inputs, max.	244 byte	244 byte	244 byte
- Outputs, max.	244 byte	244 byte	244 byte
- Slots, max.	244	244	244
- per slot, max.	128 byte	128 byte	128 byte
DP slave			
• Number of connections	16	16	16
• Services			
- PG/OP communication	Yes; with interface active	Yes; with interface active	Yes; with interface active
- S7 routing	Yes; With interface active	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
- S7 communication, as client	Yes	Yes	Yes
- S7 communication, as server	Yes	Yes	Yes
- Direct data exchange (slave-to-slave communication)	No	No	No
- DPV1	No	No	No
• GSD file	http://support.automation.siemens.com/WW/view/en/113652	http://support.automation.siemens.com/WW/view/en/113652	http://support.automation.siemens.com/WW/view/en/113652
• Transmission rate, max.	12 Mbit/s	12 Mbit/s	12 Mbit/s
• Automatic baud rate search	No	No	No
• Transfer memory			
- Inputs	244 byte	244 byte	244 byte
- Outputs	244 byte	244 byte	244 byte
• Address area, max.	32; Virtual slots	32; Virtual slots	32; Virtual slots
• User data per address area, max.	32 byte	32 byte	32 byte
• User data per address area, of which consistent, max.	32 byte	32 byte	32 byte
2nd interface			
Type of interface	Integrated	Integrated	PROFINET
Physics	RS 485 / PROFIBUS	RS 485 / PROFIBUS	Ethernet RJ45
Isolated	Yes	Yes	Yes
Integrated switch			Yes
Number of ports			2
Power supply to interface (15 to 30 V DC), max.	150 mA	150 mA	
Automatic detection of transmission speed			Yes; Autosensing
Autonegotiation			Yes
Autocrossing			Yes
Media redundancy			
• supported			Yes
• Switchover time on line break, typically			200 ms
• Number of stations in the ring, max.			50
Change of IP address at runtime, supported			Yes; Assignment by higher-level IO controller or by the user program with SFB104 "IP_CONF"

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Technical specifications (continued)

	6ES7 414-2XK05-0AB0	6ES7 414-3XM05-0AB0	6ES7 414-3EM06-0AB0
Number of connection resources	16	16	64
Functionality			
• DP master	Yes	Yes	No
• DP slave	Yes	Yes	No
• PROFINET IO controller			Yes
• PROFINET IO device			Yes
• PROFINET CBA			Yes
• Open IE communication			Yes
• Web server			Yes
- Number of HTTP clients			5
• Local Operating Network			No
DP master			
• Number of connections, max.	16	16	
• Services			
- PG/OP communication	Yes	Yes	
- Routing	Yes	Yes	
- Global data communication	No	No	
- S7 basic communication	Yes	Yes	
- S7 communication	Yes	Yes	
- S7 communication, as client	Yes	Yes	
- S7 communication, as server	Yes	Yes	
- Equidistance mode support	Yes	Yes	
- Isochronous mode	Yes	Yes	
- SYNC/FREEZE	Yes	Yes	
- Activation/deactivation of DP slaves	Yes	Yes	
- Direct data exchange (slave-to-slave communication)	Yes	Yes	
- DPV1	Yes	Yes	
• Transmission rate, 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	
• User data per DP slave			
- User data per DP slave, max.	244 byte	244 byte	
- Inputs, max.	244 byte	244 byte	
- Outputs, max.	244 byte	244 byte	
- Slots, max.	244	244	
- per slot, max.	128 byte	128 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 rate, max.	12 Mbit/s	12 Mbit/s	
• Transfer memory			
- Inputs	244 byte	244 byte	
- Outputs	244 byte	244 byte	
• Address area, max.	32	32	
• User data per address area, max.	32 byte	32 byte	
• User data per address area, of which consistent, max.	32 byte	32 byte	

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Technical specifications (continued)

	6ES7 414-2XK05-0AB0	6ES7 414-3XM05-0AB0	6ES7 414-3EM06-0AB0
PROFINET IO controller			
• Services			
- PG/OP communication			Yes
- S7 routing			Yes
- S7 communication			Yes
- Isochronous mode			Yes; only with IRT and the High Performance option
- Open IE communication			Yes
• Transmission rate, min.			10 Mbit/s
• Transmission rate, max.			100 Mbit/s
• Number of connectable IO devices, max.			256
• Max. number of connectable IO devices for RT			256
- of which in line, max.			256
• Number of IO devices with IRT and the option "high flexibility"			256
- of which in line, max.			61
• Number of IO devices with IRT and the option "high performance", max.			64
- of which in line, max.			64
• IRT, supported			Yes
• Shared device, supported			Yes
• Prioritized startup supported			Yes
- Number of IO devices, max.			32
• Activation/deactivation of IO devices			Yes
- Number of IO devices that can be simultaneously activated/ deactivated, max.			8
• IO devices changing during operation (partner ports), supported			Yes
- Max. number of IO devices per tool			8; 8 parallel calls of the SFC 12 "D_ACT_DP" possible per line. Max. 32 IO devices changing during operation (partner ports) are supported.
• Device replacement without swap medium			Yes
• Send clock times			250 µs, 500 µs, 1 ms, 2 ms, 4 ms additionally with IRT with high performance: 250 µs to 4 ms in 125 µs frame
• Updating time			250 µs to 512 ms; minimum value depends on preset communication share for PROFINET IO, on the number of IO devices and on the amount of configured user data, see PROFINET system description
• Address area			
- Inputs, max.			8 Kibyte
- Outputs, max.			8 Kibyte
• User data per address area, max.			
- User data consistency, max.			1 024 byte

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Technical specifications (continued)

	6ES7 414-2XK05-0AB0	6ES7 414-3XM05-0AB0	6ES7 414-3EM06-0AB0
PROFINET IO device			
• Services			
- PG/OP communication			Yes
- S7 routing			Yes
- S7 communication			Yes
- Isochronous mode			No
- Open IE communication			Yes
- IRT, supported			Yes
- Prioritized startup supported			Yes
- Shared device, supported			Yes
- Number of IO controllers with shared device, max.			2
• Transfer memory			
- Inputs, max.			1 440 byte; Per IO controller with shared device
- Outputs, max.			1 440 byte; Per IO controller with shared device
• Submodules			
- Number, max.			64
- User data per submodule, max.			1 024 byte
PROFINET CBA			
• acyclic transmission			Yes
• cyclic transmission			Yes
Open IE communication			
• Open IE communication, supported			Yes
• Number of connections, max.			62
• Local port numbers used at the system end			0, 20, 21, 25, 80, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65534, 65535
• Keep-alive function, supported			Yes
3rd interface			
Type of interface		Pluggable interface module (IF), technical specifications as for 2nd interface	Pluggable interface module (IF)
Plug-in interface modules		IF 964-DP (MLFB: 6ES7964-2AA04-0AB0)	IF 964-DP (MLFB: 6ES7964-2AA04-0AB0)
Physics		RS 485 / PROFIBUS	RS 485 / PROFIBUS
Isolated		Yes	Yes
Power supply to interface (15 to 30 V DC), max.		150 mA	150 mA
automatic detection of transmission speed		No	No
Number of connection resources		16	16
Functionality			
• MPI		No	No
• DP master		Yes	Yes
• DP slave		Yes	Yes

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Technical specifications (continued)

	6ES7 414-2XK05-0AB0	6ES7 414-3XM05-0AB0	6ES7 414-3EM06-0AB0
DP master			
• Number of connections, max.		16	16
• Services			
- PG/OP communication		Yes	Yes
- Routing		Yes; S7 routing	Yes; S7 routing
- Global data communication		No	No
- S7 basic communication		No	Yes
- S7 communication		Yes	Yes
- S7 communication, as client		Yes	Yes
- S7 communication, as server		Yes	Yes
- Equidistance mode support		Yes	Yes
- Isochronous mode		Yes	Yes
- SYNC/FREEZE		Yes	Yes
- Activation/deactivation of DP slaves		Yes	Yes
- Direct data exchange (slave-to-slave communication)		Yes	Yes
- DPV0		Yes	Yes
- DPV1		Yes	Yes
• Transmission rate, max.		12 Mbit/s	12 Mbit/s
• Transmission rate, min.		9.6 kbit/s	9.6 kbit/s
• Number of DP slaves, max.		96	96
• Address area			
- Inputs, max.		6 Kibyte	6 Kibyte
- Outputs, max.		6 Kibyte	6 Kibyte
• User data per DP slave			
- User data per DP slave, max.		244 byte	244 byte
- Inputs, max.		244 byte	244 byte
- Outputs, max.		244 byte	244 byte
- Slots, max.		244	244
- per slot, max.		128 byte	128 byte
DP slave			
• Number of connections		16	16
• Services			
- PG/OP communication		Yes	Yes
- S7 routing		Yes; With active interface	Yes; With active interface
- Global data communication		No	No
- S7 basic communication		No	No
- S7 communication		Yes	Yes
- S7 communication, as client		Yes	Yes
- S7 communication, as server		Yes	Yes
- SYNC/FREEZE		No	No
- Direct data exchange (slave-to-slave communication)		No	No
- DPV1		No	No
- Status/control		Yes; When interface active	Yes; When interface active
• GSD file		http://support.automation.siemens.com/WW/view/en/113652	http://support.automation.siemens.com/WW/view/en/113652
• Transmission rate, min.		9.6 kbit/s	9.6 kbit/s
• Transmission rate, max.		12 Mbit/s	12 Mbit/s
• Automatic baud rate search		No	No
• Transfer memory			
- Inputs		244 byte	244 byte
- Outputs		244 byte	244 byte
• Address areas, max.		32	32; Virtual slots
• User data per address area, max.		32 byte	32 byte
• User data per address area, of which consistent, max.		32 byte	32 byte

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Technical specifications (continued)

	6ES7 414-2XK05-0AB0	6ES7 414-3XM05-0AB0	6ES7 414-3EM06-0AB0
Isochronous mode			
Isochronous mode	Yes; For PROFIBUS only	Yes; For PROFIBUS only	Yes; Via PROFIBUS DP or PROFINET interface
Number of DP masters with isochronous mode	2	3	2
User 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; 0.5 ms without use of SFC 126, 127
Max. cycle	32 ms	32 ms	32 ms
CiR - Configuration in RUN			
CiR synchronization time, basic load	100 ms	100 ms	100 ms
CiR synchronization time, time per I/O slave	15 µs; Time per I/O byte	15 µs	15 µs; Time per I/O byte
programming			
Configuration software			
• STEP 7	Yes	Yes	Yes
Programming language			
• STEP 7	Yes	Yes	Yes
• LAD	Yes	Yes	Yes
• FBD	Yes	Yes	Yes
• STL	Yes	Yes	Yes
• SCL	Yes	Yes	Yes
• CFC	Yes	Yes	Yes
• GRAPH	Yes	Yes	Yes
• HiGraph®	Yes	Yes	Yes
Nesting levels	7	7	7
Know-how protection			
• User program protection/password protection	Yes	Yes	Yes
• Block encryption			Yes; With S7 block Privacy
EMC			
Emission of radio interference acc. to EN 55 011			
• Limit value class A, for use in industrial areas			Yes
• Limit value class B, for use in residential areas			No
Dimensions			
Required slots	1	2	2
Dimensions and weight			
Dimensions			
• Width	25 mm	50 mm	50 mm
• Height	290 mm	290 mm	290 mm
• Depth	219 mm	219 mm	219 mm
Weight			
• Weight, approx.	0.7 kg	0.9 kg	900 g

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Ordering data	Order No.
CPU 414-2	**6ES7 414-2XK05-0AB0**
Work memory 1 MB, power supply 24 V DC, MPI/PROFIBUS DP master interface, slot for memory card, incl. slot number labels	
CPU 414-3	**6ES7 414-3XM05-0AB0**
Work 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	
CPU 414-3 PN/DP	**6ES7 414-3EM06-0AB0**
Work memory 4 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	
Memory card RAM	
64 KB	**6ES7 952-0AF00-0AA0**
256 KB	**6ES7 952-1AH00-0AA0**
1 MB	**6ES7 952-1AK00-0AA0**
2 MB	**6ES7 952-1AL00-0AA0**
4 MB	**6ES7 952-1AM00-0AA0**
8 MB	**6ES7 952-1AP00-0AA0**
16 MB	**6ES7 952-1AS00-0AA0**
64 MB	**6ES7 952-1AY00-0AA0**
FEPROM memory card	
64 KB	**6ES7 952-0KF00-0AA0**
256 KB	**6ES7 952-0KH00-0AA0**
1 MB	**6ES7 952-1KK00-0AA0**
2 MB	**6ES7 952-1KL00-0AA0**
4 MB	**6ES7 952-1KM00-0AA0**
8 MB	**6ES7 952-1KP00-0AA0**
16 MB	**6ES7 952-1KS00-0AA0**
32 MB	**6ES7 952-1KT00-0AA0**
64 MB	**6ES7 952-1KY00-0AA0**
MPI cable	**6ES7 901-0BF00-0AA0**
for connection of SIMATIC S7 and PG via MPI; 5 m in length	

		Order No.
IF 964-DP interface module		**6ES7 964-2AA04-0AB0**
To connect an additional DP line; for CPU 414-3, CPU 414-3 PN/DP, CPU 416-3, CPU 416-3 PN/DP, CPU 417-4		
Slot number labels		**6ES7 912-0AA00-0AA0**
1 set (spare part)		
Manual "SIMATIC S7-400 programmable controller"		
incl. instruction list		
German		**6ES7 498-8AA05-8AA0**
English		**6ES7 498-8AA05-8BA0**
S7-400 operation list		
German		**6ES7 498-8AA05-8AN0**
English		**6ES7 498-8AA05-8BN0**
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	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC		
SIMATIC manual collection update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		
Brochure "SIMATIC S7-400 programmable controller - Design and application"		
German		**6ES7 498-8AA00-8AB0**
English		**6ES7 498-8AA00-8BB0**

D: Subject to export regulations AL: N and ECCN: 5D992

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

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Ordering data	Order No.
PROFIBUS bus components	
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 972-0BA42-0XA0**
With PG interface	**6ES7 972-0BB42-0XA0**
RS 485 bus connector with 90° cable outlet for Fast Connect system	
Max. transfer rate 12 Mbit/s	
without PG interface	
• 1 unit	**6ES7 972-0BA52-0XA0**
• 100 units	**6ES7 972-0BA52-0XB0**
with PG interface	
• 1 unit	**6ES7 972-0BB52-0XA0**
• 100 units	**6ES7 972-0BB52-0XB0**
RS 485 bus connector with axial cable outlet	
For SIMATIC OP, for connection to PPI, MPI, PROFIBUS	**6GK1 500-0EA02**
PROFIBUS FastConnect bus cable	
Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m	**6XV1 830-0EH10**
RS 485 repeater for PROFIBUS	**6ES7 972-0AA02-0XA0**
Transfer rate up to 12 Mbit/s; 24 V DC; IP20 enclosure	

	Order No.
PROFINET bus components	
IE FC TP standard cable GP 2x2	**6XV1 840-2AH10**
4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug; PROFINET-compatible; with UL approval;	
Sold by the meter	
FO standard cable GP (50/125)	**6XV1 873-2A**
Standard cable, splittable, UL approval, sold by the meter	
SCALANCE X204-2 Industrial Ethernet switch I	**6GK5 204-2BB10-2AA3**
Industrial Ethernet Switches with integral SNMP access, web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbit/s RJ45 ports and two FO ports	
IE FC RJ45 plugs	
RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables	
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**
PROFIBUS/PROFINET bus components	see Catalogs IK PI, CA 01
For establishing MPI/PROFIBUS/ PROFINET communication	

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

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Overview



- High-performance CPUs in the high-end performance range
- Applicable for plants with high requirements in the high-end performance range
- Integrated PROFINET functions in CPU 416-3 PN/DP

Technical specifications

	6ES7 416-2XN05-0AB0	6ES7 416-3XR05-0AB0	6ES7 416-3ES06-0AB0
Product type designation			CPU416-3 PN/DP
Product version			
Hardware product version			01
Firmware version	V5.0	V5.0	V6.0
Associated programming package	STEP7 V 5.3 SP2 or higher with HW update	STEP7 V 5.3 SP2 or higher with HW update	STEP7 V5.5 or higher/iMap V3.0 + iMap STEP7 Add-on V3.0 SP5 or higher
Supply voltages			
Rated value			
• 24 V DC			No; Power supply via system power supply
Feeding of external backup voltage to CPU	5 to 15 V DC	5 to 15 V DC	5 to 15 V DC
Current consumption			
from backplane bus 5 V DC, max.	1.1 A	1.3 A	1.5 A
from interface 5 V DC, max.	90 mA; at each DP interface	90 mA; at each DP interface	90 mA; at each DP interface
Power losses			
Power loss, typ.	4 W	4.5 W	6.5 W
Power loss, max.			7.5 W
Backup battery			
Battery operation			not relevant
• Backup current, typ.	125 µA; valid up to 40°C	125 µA; valid up to 40°C	125 µA; (up to 40 °C)
• Backup current, max.	550 µA	550 µA	450 µA
Memory			
Work memory			
• integrated (for program)	2.8 Mbyte	5.6 Mbyte	8 Mbyte
• integrated (for data)	2.8 Mbyte	5.6 Mbyte	8 Mbyte
• expandable	No	No	No
Load memory			
• expandable FEPROM	Yes	Yes	Yes; with Memory Card (FLASH)
• expandable FEPROM, 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; all data
• without battery	No	No	No

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Technical specifications (continued)

	6ES7 416-2XN05-0AB0	6ES7 416-3XR05-0AB0	6ES7 416-3ES06-0AB0
CPU-blocks			
DB			
• Number, max.	10 000; Number range: 1 to 16000	10 000; Number range: 1 to 16000	10 000; Number range: 1 to 16000
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte
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 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	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
Counters, timers and their retentivity			
S7 counter			
• Number	2 048	2 048	2 048
• Retentivity			
- adjustable	Yes	Yes	Yes
- lower limit	0	0	0
- upper limit	2 047	2 047	2 047
- preset	Z 0 to Z 7	Z 0 to Z 7	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
• Number			Unlimited (limited only by work memory)
S7 times			
• Number	2 048	2 048	2 048
• Retentivity			
- 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
• Number			Unlimited (limited only by work memory)

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Technical specifications (continued)

	6ES7 416-2XN05-0AB0	6ES7 416-3XR05-0AB0	6ES7 416-3ES06-0AB0
Data areas and their retentivity			
retentive data area, total	Total working and load memory (with backup battery)	Total working and load memory (with backup battery)	Total working and load memory (with backup battery)
Flag			
• Number, max.	16 Kibyte	16 Kibyte	16 Kibyte; Size of bit memory address area
• Retentivity available	Yes	Yes	Yes
• Number of clock memories	8; (in 1 memory byte)	8; (in 1 memory byte)	8; (in 1 memory byte)
Data blocks			
• Number, max.	10 000; Number range: 1 to 16000	10 000; Number range: 1 to 16000	10 000; Number range: 1 to 16000
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte
Local data			
• adjustable, max.	32 Kibyte	32 Kibyte	32 Kibyte
• preset	16 Kibyte	16 Kibyte	16 Kibyte
Address area			
I/O address area			
• overall	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

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Technical specifications (continued)

	6ES7 416-2XN05-0AB0	6ES7 416-3XR05-0AB0	6ES7 416-3ES06-0AB0
Hardware configuration			
connectable OPs	63	63	95
Central devices, max.	1	1	1
Expansion devices, max.	21	21	21
Multicomputing	Yes; 4 CPUs max. (with UR1 or UR2)	Yes; 4 CPUs max. (with UR1 or UR2)	Yes; 4 CPUs max. (with UR1 or UR2)
Interface modules			
• Number of connectable IMs (total), max.	6	6	6
• Number of connectable IMs 460, max.	6	6	6
• Number of connectable IMs 463, max.	4; IM 463-2	4; IM 463-2	4; IM 463-2
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 not suitable for use with CP 443-5 Ext. and CP443-1 EX4x, EX20, GX20 (in PNIO 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; No mixed operation of CP443-1 EX40 and CP443-1 EX 41/EX20/ GX20, max. 4 in central controller
Number of operable FMs and CPs (recommended)			
• FM	Limited by number of slots and number of connections	Limited by number of slots and number of connections	Limited by number of slots or number of connections
• CP, point-to-point	Limited by number of slots and number of connections	Limited by number of slots and number of connections	CP 440: Limited by number of slots; CP 441: Limited by 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; In total max. 10 CPs as DP master and PN controller, of which up to 10 IMs or CPs as DP master and up to 4 CPs as PN controller
Time			
Clock			
• Hardware clock (real-time clock)	Yes	Yes	Yes
• battery-backed and synchronizable	Yes	Yes	Yes
• Resolution	1 ms	1 ms	1 ms
Runtime meter			
• Number	8	8	16
Clock synchronization			
• supported	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

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Technical specifications (continued)

	6ES7 416-2XN05-0AB0	6ES7 416-3XR05-0AB0	6ES7 416-3ES06-0AB0
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)	95; Max. 95 with Alarm_S/SQ and Alarm_D/DQ (OPs); max. 8 with Alarm, Alarm_8, Alarm_8P, Notify and Notify_8 (e.g. WinCC)
Symbol-related messages	Yes	Yes	Yes
SCAN procedure			Yes
Number of messages			
• overall, max.	1 024	1 024	1 024
Block related messages	Yes	Yes	Yes
Process diagnostic messages			Yes
Alarm 8-blocks	Yes	Yes	Yes
Process control messages	Yes	Yes	Yes
Test commissioning functions			
Status/control			
• Status/control variable	Yes	Yes	Yes; Up to 16 variable tables
Forcing			
• Forcing	Yes	Yes	Yes
Status block	Yes	Yes	Yes; Up to 16 simultaneously
Single step	Yes	Yes	Yes
Number of breakpoints	4	4	16
Diagnostic buffer			
• present	Yes	Yes	Yes
• Number of entries, max.	3 200	3 200	3 200
- adjustable	Yes	Yes	Yes
- preset	120	120	120
Service data			
• can be read out			Yes
Communication functions			
PG/OP communication	Yes	Yes	Yes
Data record routing			Yes
Routing	Yes	Yes	Yes; S7 routing
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
• User data per job, max.	76 byte	76 byte	76 byte
S7 communication			
• supported	Yes	Yes	Yes
• as server			Yes
• as client			Yes
• User 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 FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5
• User 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

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Technical specifications (continued)

	6ES7 416-2XN05-0AB0	6ES7 416-3XR05-0AB0	6ES7 416-3ES06-0AB0
Web server			
• supported	No; Via CP	No; Via CP	Yes
• Number of HTTP clients			5
• User-defined websites			Yes
Open IE communication			
• TCP/IP			Yes; Via integrated PROFINET interface and loadable FBs
- Number of connections, max.			94
- Data length, max.			32 Kibyte
- Several passive connections per port, supported			Yes
• ISO-on-TCP (RFC1006)	Via CP 443-1 Adv. and loadable FB	Via CP 443-1 Adv. and loadable FB	Yes; Via integrated PROFINET interface or CP 443-1 and loadable FBs
- Number of connections, max.			94
- Data length, max.	1452	1452	32 Kibyte; 1452 bytes via CP 443-1 Adv.
• UDP			Yes; Via integrated PROFINET interface and loadable FBs
- Number of connections, max.			94
- Data length, max.			1 472 byte
Number of connections			
• overall	64	64	96
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			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 und PROFIBUS interconnections, max.			16 000 byte
• Data length per connection, max.			2 000 byte
• Remote interconnections with acyclic transmission			
- Sampling frequency: Sampling time, min.			200 ms; depending on preset communcation load, number of interconnections and data length used
- Number of incoming interconnections			500
- Number of outgoing interconnections			500
- Data length of all incoming interconnections, max.			16 000 byte
- Data length of all outgoing interconnections, max.			16 000 byte
- Data length per connection, max.			2 000 byte

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Technical specifications (continued)

	6ES7 416-2XN05-0AB0	6ES7 416-3XR05-0AB0	6ES7 416-3ES06-0AB0
• Remote interconnections with cyclic 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.			450 byte
• HMI variables via PROFINET (acyclic)			
- Number of stations that can log on 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			
Type of interface	Integrated	Integrated	Integrated
Physics	RS 485 / PROFIBUS	RS 485 / PROFIBUS	RS 485 / PROFIBUS + MPI
Isolated	Yes	Yes	Yes
Power supply to interface (15 to 30 V DC), max.	150 mA	150 mA	150 mA
Number of connection resources	MPI: 44, DP: 32	MPI: 44, DP: 32	MPI: 44, DP: 32
Functionality			
• MPI	Yes	Yes	Yes
• DP master	Yes	Yes	Yes
• DP slave	Yes	Yes	Yes
MPI			
• Number of connections	44	44	44; 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
- S7 communication, as client			Yes
- S7 communication, as server			Yes
• Transmission rate, max.	12 Mbit/s	12 Mbit/s	12 Mbit/s

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Technical specifications (continued)

	6ES7 416-2XN05-0AB0	6ES7 416-3XR05-0AB0	6ES7 416-3ES06-0AB0
DP master			
• Number of connections, max.	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	No	No	No
- S7 basic communication	Yes	Yes	Yes
- S7 communication	Yes	Yes	Yes
- S7 communication, as client			Yes
- S7 communication, as server			Yes
- Equidistance mode support	Yes	Yes	Yes
- Isochronous mode			Yes
- SYNC/FREEZE	Yes	Yes	Yes
- Activation/deactivation of DP slaves	Yes	Yes	Yes
- Direct data exchange (slave-to-slave communication)	Yes	Yes	Yes
- DPV1			Yes
• Transmission rate, 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
• User data per DP slave			
- User data per DP slave, max.	244 byte	244 byte	244 byte
- Inputs, max.	244 byte	244 byte	244 byte
- Outputs, max.	244 byte	244 byte	244 byte
- Slots, max.	244	244	244
- per slot, max.	128 byte	128 byte	128 byte
DP slave			
• Number of connections	32	32	32
• Services			
- PG/OP communication	Yes	Yes	Yes; with interface active
- Routing	Yes	Yes	
- S7 routing			Yes; With interface active
- Global data communication			No
- S7 basic communication			No
- S7 communication			Yes
- S7 communication, as client			Yes
- S7 communication, as server			Yes
- Direct data exchange (slave-to-slave communication)			No
- DPV1			No
• GSD file	http://support.automation.siemens.com/WW/view/en/113652	http://support.automation.siemens.com/WW/view/en/113652	http://support.automation.siemens.com/WW/view/en/113652
• Transmission rate, max.	12 Mbit/s	12 Mbit/s	12 Mbit/s
• Automatic baud rate search			No
• Transfer memory			
- Inputs	244 byte	244 byte	244 byte
- Outputs	244 byte	244 byte	244 byte
• Address area, max.	32	32	32; Virtual slots
• User data per address area, max.	32 byte	32 byte	32 byte
• User data per address area, of which consistent, max.	32 byte	32 byte	32 byte

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Technical specifications (continued)

	6ES7 416-2XN05-0AB0	6ES7 416-3XR05-0AB0	6ES7 416-3ES06-0AB0
2nd interface			
Type of interface	Integrated	Integrated	PROFINET
Physics	RS 485 / PROFIBUS	RS 485 / PROFIBUS	Ethernet RJ45
Isolated	Yes	Yes	Yes
Integrated switch			Yes
Number of ports			2
Power supply to interface (15 to 30 V DC), max.	150 mA	150 mA	
Automatic detection of transmission speed			Yes; Autosensing
Autonegotiation			Yes
Autocrossing			Yes
Media redundancy			
• supported			Yes
• Switchover time on line break, typically			200 ms
• Number of stations in the ring, max.			50
Change of IP address at runtime, supported			Yes; Assignment by higher-level IO controller or by the user program with SFB104 "IP_CONF"
Number of connection resources	32	32	96
Functionality			
• DP master	Yes	Yes	No
• DP slave	Yes	Yes	No
• PROFINET IO controller			Yes
• PROFINET IO device			Yes
• PROFINET CBA			Yes
• Open IE communication			Yes
• Web server			Yes
- Number of HTTP clients			5
• Local Operating Network			No
DP master			
• Number of connections, max.	32	32	
• Services			
- PG/OP communication	Yes	Yes	
- Routing	Yes	Yes	
- Global data communication	No	No	
- S7 basic communication	Yes	Yes	
- S7 communication	Yes	Yes	
- Equidistance mode support	Yes	Yes	
- SYNC/FREEZE	Yes	Yes	
- Activation/deactivation of DP slaves	Yes	Yes	
- Direct data exchange (slave-to-slave communication)	Yes	Yes	
• Transmission rate, 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	
• User data per DP slave			
- User data per DP slave, max.	244 byte	244 byte	
- Inputs, max.	244 byte	244 byte	
- Outputs, max.	244 byte	244 byte	
- Slots, max.	244	244	
- per slot, max.	128 byte	128 byte	

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Technical specifications (continued)

	6ES7 416-2XN05-0AB0	6ES7 416-3XR05-0AB0	6ES7 416-3ES06-0AB0
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 rate, max.	12 Mbit/s	12 Mbit/s	
• Transfer memory			
- Inputs	244 byte	244 byte	
- Outputs	244 byte	244 byte	
• Address area, max.	32	32	
• User data per address area, max.	32 byte	32 byte	
• User data per address area, of which consistent, max.	32 byte	32 byte	
PROFINET IO controller			
• Services			
- PG/OP communication			Yes
- S7 routing			Yes
- S7 communication			Yes
- Isochronous mode			Yes; Only with IRT and the High Performance option
- Open IE communication			Yes
• Transmission rate, min.			10 Mbit/s
• Transmission rate, max.			100 Mbit/s
• Number of connectable IO devices, max.			256
• Max. number of connectable IO devices for RT			256
- of which in line, max.			256
• Number of IO devices with IRT and the option "high flexibility"			256
- of which in line, max.			61
• Number of IO devices with IRT and the option "high performance", max.			64
- of which in line, max.			64
• IRT, supported			Yes
• Shared device, supported			Yes
• Prioritized startup supported			Yes
- Number of IO devices, max.			32
• Activation/deactivation of IO devices			Yes
- Number of IO devices that can be simultaneously activated/deactivated, max.			8
• IO devices changing during operation (partner ports), supported			Yes
- Max. number of IO devices per tool			8; 8 parallel calls of the SFC 12 "D_ACT_DP" possible per line. Max. 32 IO devices changing during operation (partner ports) are supported.
• Device replacement without swap medium			Yes
• Send clock times			250 µs, 500 µs, 1 ms, 2 ms, 4 ms additionally with IRT with high performance: 250 µs to 4 ms in 125 µs frame

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Technical specifications (continued)

	6ES7 416-2XN05-0AB0	6ES7 416-3XR05-0AB0	6ES7 416-3ES06-0AB0
• Updating time			250 µs to 512 ms; minimum value depends on preset communication share for PROFINET IO, on the number of IO devices and on the amount of configured user data, see PROFINET system description
• Address area			
- Inputs, max.			8 Kibyte
- Outputs, max.			8 Kibyte
• User data per address area, max.			
- User data consistency, max.			1 024 byte
PROFINET IO device			
• Services			
- PG/OP communication			Yes
- S7 routing			Yes
- S7 communication			Yes
- Isochronous mode			No
- Open IE communication			Yes
- IRT, supported			Yes
- Prioritized startup supported			Yes
- Shared device, supported			Yes
- Number of IO controllers with shared device, max.			2
• Transfer memory			
- Inputs, max.			1 440 byte; Per IO controller with shared device
- Outputs, max.			1 440 byte; Per IO controller with shared device
• Submodules			
- Number, max.			64
- User data per submodule, max.			1 024 byte
PROFINET CBA			
• acyclic transmission			Yes
• cyclic transmission			Yes
Open IE communication			
• Open IE communication, supported			Yes
• Number of connections, max.			94
• Local port numbers used at the system end			0, 20, 21, 25, 80, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65534, 65535
• Keep-alive function, supported			Yes
3rd interface			
Type of interface		Pluggable interface module (IF), technical specifications as for 2nd interface	Pluggable interface module (IF)
Plug-in interface modules		IF 964-DP (MLFB: 6ES7964-2AA04-0AB0)	IF 964-DP (MLFB: 6ES7964-2AA04-0AB0)
Physics			RS 485 / PROFIBUS
Isolated			Yes
Power supply to interface (15 to 30 V DC), max.			150 mA
Automatic detection of transmission speed			No
Number of connection resources			32
Functionality			
• MPI			No
• DP master			Yes
• DP slave			Yes

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Technical specifications (continued)

	6ES7 416-2XN05-0AB0	6ES7 416-3XR05-0AB0	6ES7 416-3ES06-0AB0
DP master			
• Number of connections, max.			32
• Services			
- PG/OP communication			Yes
- Routing			Yes; S7 routing
- Global data communication			No
- S7 basic communication			Yes
- S7 communication			Yes
- S7 communication, as client			Yes
- S7 communication, as server			Yes
- Equidistance mode support			Yes
- Isochronous mode			Yes
- SYNC/FREEZE			Yes
- Activation/deactivation of DP slaves			Yes
- Direct data exchange (slave-to-slave communication)			Yes
- DPV0			Yes
- DPV1			Yes
• Transmission rate, max.			12 Mbit/s
• Transmission rate, min.			9.6 kbit/s
• Number of DP slaves, max.			125
• Address area			
- Inputs, max.			8 Kibyte
- Outputs, max.			8 Kibyte
• User data per DP slave			
- User 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			
- PG/OP communication			Yes
- S7 routing			Yes; With active interface
- Global data communication			No
- S7 basic communication			No
- S7 communication			Yes
- S7 communication, as client			Yes
- S7 communication, as server			Yes
- SYNC/FREEZE			No
- Direct data exchange (slave-to-slave communication)			No
- DPV1			No
- Status/control			Yes; When interface active
• GSD file			http://support.automation.siemens.com/WW/view/en/113652
• Transmission rate, min.			9.6 kbit/s
• Transmission rate, max.			12 Mbit/s
• Automatic baud rate search			No
• Transfer memory			
- Inputs			244 byte
- Outputs			244 byte
• Address areas, max.			32; Virtual slots
• User data per address area, max.			32 byte
• User data per address area, of which consistent, max.			32 byte

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Technical specifications (continued)

	6ES7 416-2XN05-0AB0	6ES7 416-3XR05-0AB0	6ES7 416-3ES06-0AB0
Isochronous mode			
Isochronous mode	Yes	Yes	Yes; Via PROFIBUS DP or PROFINET interface
Number of DP masters with isochronous mode			2
User 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; 0.5 ms without use of SFC 126, 127
Max. cycle	32 ms	32 ms	32 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	10 µs; Time per I/O byte
Programming			
Configuration software			
• STEP 7	Yes	Yes	Yes
Programming language			
• STEP 7			Yes
• LAD	Yes	Yes	Yes
• FBD	Yes	Yes	Yes
• STL	Yes	Yes	Yes
• SCL	Yes	Yes	Yes
• CFC	Yes	Yes	Yes
• GRAPH	Yes	Yes	Yes
• HiGraph®	Yes	Yes	Yes
Nesting levels	7	7	7
Know-how protection			
• User program protection/password protection	Yes	Yes	Yes
• Block encryption			Yes; With S7 block Privacy
EMC			
Emission of radio interference acc. to EN 55 011			
• Limit value class A, for use in industrial areas			Yes
• Limit value class B, for use in residential areas			No
Dimensions			
Required slots	1	2	2
Dimensions and weight			
Dimensions			
• Width	25 mm	50 mm	50 mm
• Height	290 mm	290 mm	290 mm
• Depth	219 mm	219 mm	219 mm
Weight			
• Weight, approx.	720 g	880 g	900 g

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Ordering data	Order No.
CPU 416-2 Work 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**
CPU 416-3 Work 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**
CPU 416-3 PN/DP Work memory 16 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 416-3ES06-0AB0**
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 connection of SIMATIC S7 and PG via MPI; 5 m in length	**6ES7 901-0BF00-0AA0**
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**
Slot number labels 1 set (spare part)	**6ES7 912-0AA00-0AA0**

		Order No.
Manual "SIMATIC S7-400 programmable controller"		
incl. instruction list		
German		**6ES7 498-8AA05-8AA0**
English		**6ES7 498-8AA05-8BA0**
S7-400 operation list		
German		**6ES7 498-8AA05-8AN0**
English		**6ES7 498-8AA05-8BN0**
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 Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	J	**6ES7 998-8XC01-8YE0**
SIMATIC manual collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	D	**6ES7 998-8XC01-8YE2**
Brochure "SIMATIC S7-400 programmable controller - Design and application"		
German		**6ES7 498-8AA00-8AB0**
English		**6ES7 498-8AA00-8BB0**
PROFIBUS bus components		
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 972-0BA42-0XA0**
With PG interface		**6ES7 972-0BB42-0XA0**

D: Subject to export regulations AL: N and ECCN: 5D992

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Ordering data	Order No.
RS 485 bus connector with 90° cable outlet for Fast Connect system	
Max. transfer rate 12 Mbit/s	
without PG interface	
• 1 unit	**6ES7 972-0BA52-0XA0**
• 100 units	**6ES7 972-0BA52-0XB0**
with PG interface	
• 1 unit	**6ES7 972-0BB52-0XA0**
• 100 units	**6ES7 972-0BB52-0XB0**
RS 485 bus connector with axial cable outlet	
For SIMATIC OP, for connection to PPI, MPI, PROFIBUS	**6GK1 500-0EA02**
PROFIBUS FastConnect bus cable	
Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m	**6XV1 830-0EH10**
RS 485 repeater for PROFIBUS	**6ES7 972-0AA02-0XA0**
Transfer rate up to 12 Mbit/s; 24 V DC; IP20 enclosure	

	Order No.
PROFINET bus components	
IE FC TP standard cable GP 2x2	**6XV1 840-2AH10**
4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug; PROFINET-compatible; with UL approval;	
Sold by the meter	
FO standard cable GP (50/125)	**6XV1 873-2A**
Standard cable, splittable, UL approval, sold by the meter	
SCALANCE X204-2 Industrial Ethernet switch I	**6GK5 204-2BB10-2AA3**
Industrial Ethernet Switches with integral SNMP access, web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbit/s RJ45 ports and two FO ports	
IE FC RJ45 plugs	
RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables	
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**
PROFIBUS/PROFINET bus components	see Catalogs IK PI, CA 01
For establishing MPI/PROFIBUS/ PROFINET communication	

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Overview



- The most powerful SIMATIC S7-400 CPU
- Can be used in the most sophisticated installations in the upper performance range
- With two connection slots for IF modules

Technical specifications

	6ES7 417-4XT05-0AB0
Product version	
Firmware version	V5.0
Associated programming package	STEP7 V 5.3 SP2 or higher with HW update
Supply voltages	
Feeding of external backup voltage to CPU	5 to 15 V DC
Current consumption	
from backplane bus 5 V DC, max.	1.8 A
Power losses	
Power loss, max.	6 W
Backup battery	
Battery operation	
• Backup current, typ.	225 µA; Valid up to 40°C
• Backup current, max.	750 µA
Memory	
Work memory	
• 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.	16000; Number range: 1 to 16000
• Size, max.	64 Kibyte
FB	
• Number, max.	8000; Number range: 0 to 7999
• Size, max.	64 Kibyte

	6ES7 417-4XT05-0AB0
FC	
• Number, max.	8 000; Number range: 0 to 7999
• 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
Counters, timers and their retentivity	
S7 counter	
• Number	2048
• Retentivity	
- adjustable	Yes
- lower limit	0
- upper limit	2047
- preset	Z 0 to Z 7
• Counting range	
- lower limit	0
- upper limit	999
IEC counter	
• present	Yes
• Type	SFB
S7 times	
• Number	2048
• Retentivity	
- adjustable	Yes
- lower limit	0
- upper limit	2047
- preset	No times retentive
• Time range	
- lower limit	10 ms
- upper limit	9990 s

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Technical specifications (continued)

	6ES7 417-4XT05-0AB0
IEC timer	
• present	Yes
• Type	SFB
Data areas and their retentivity	
retentive data area, total	Total working and load memory (with backup battery)
Flag	
• Number, max.	16 Kibyte
• Retentivity available	Yes
• Number of clock memories	8; (in 1 memory byte)
Data blocks	
• Number, max.	16000; Number range: 1 to 16000
• Size, max.	64 Kibyte
Local data	
• adjustable, max.	64 Kibyte
• preset	32 Kibyte
Address area	
I/O address area	
• overall	16 Kibyte
• Outputs	16 Kibyte
• of which, distributed	
- MPI/DP interface, 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
Hardware configuration	
Connectable OPs	63
Central devices, max.	1
Expansion devices, max.	21
Multicomputing	Yes; 4 CPUs max. (with UR1 or UR2)

	6ES7 417-4XT05-0AB0
Interface modules	
• Number of connectable IMs (total), max.	6
• Number of connectable IMs 460, max.	6
• Number of connectable IMs 463, 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 by number of slots and number of connections
• CP, point-to-point	Limited by 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
• battery-backed and synchronizable	Yes
• Resolution	1 ms
Runtime meter	
• Number	8
Clock synchronization	
• supported	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
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
Process control messages	Yes

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Technical specifications (continued)

	6ES7 417-4XT05-0AB0
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
• User data per job, max.	76 byte
S7 communication	
• supported	Yes
• User data per job, max.	64 Kibyte
S5-compatible communication	
• supported	Yes; (via CP max. 10 and FC AG_SEND and FC AG_RECV)
• User data per job, max.	8 Kibyte
Standard communication (FMS)	
• supported	Yes; Via CP and loadable FB
Web server	
• supported	No; Via CP
Open IE communication	
• ISO-on-TCP (RFC1006)	Via CP 443-1 Adv. and loadable FB
- Data length, max.	1452
Number of connections	
• overall	64
1st interface	
Type of interface	Integrated
Physics	RS 485 / PROFIBUS
Isolated	Yes
Power supply to interface (15 to 30 V DC), max.	150 mA
Number of connection resources	MPI: 44, DP: 32
Functionality	
• MPI	Yes
• DP master	Yes
• DP slave	Yes

	6ES7 417-4XT05-0AB0
MPI	
• Number of connections	44
• Services	
- PG/OP communication	Yes
- Routing	Yes
- Global data communication	Yes
- S7 basic communication	Yes
- S7 communication	Yes
• Transmission rate, 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 mode support	Yes
- SYNC/FREEZE	Yes
- Activation/deactivation of DP slaves	Yes
- Direct data exchange (slave-to-slave communication)	Yes
• Transmission rate, max.	12 Mbit/s
• Number of DP slaves, max.	32
• Address area	
- Inputs, max.	2 Kibyte
- Outputs, max.	2 Kibyte
• User data per DP slave	
- User 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	
- PG/OP communication	Yes
- Routing	Yes
• 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 area, max.	32
• User data per address area, max.	32 byte
• User data per address area, of which consistent, max.	32 byte
2nd interface	
Type of interface	Integrated
Physics	RS 485 / PROFIBUS
Isolated	Yes
Power supply to interface (15 to 30 V DC), max.	150 mA
Number of connection resources	32

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Technical specifications (continued)

	6ES7 417-4XT05-0AB0
Functionality	
• DP master	Yes
• DP slave	Yes
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 mode support	Yes
- SYNC/FREEZE	Yes
- Activation/deactivation of DP slaves	Yes
- Direct data exchange (slave-to-slave communication)	Yes
• Transmission rate, max.	12 Mbit/s
• Number of DP slaves, max.	125
• Address area	
- Inputs, max.	8 Kibyte
- Outputs, max.	8 Kibyte
• User data per DP slave	
- User 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
- Programming	Yes
• 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 area, max.	32
• User data per address area, max.	32 byte
• User data per address area, of which consistent, max.	32 byte
3rd interface	
Type of interface	Pluggable interface module (IF), technical specifications as for 2nd interface
Plug-in interface modules	IF 964-DP (MLFB: 6ES7964-2AA04-0AB0)
4th interface	
Type of interface	Pluggable interface module (IF), technical specifications as for 2nd interface
Plug-in interface modules	IF 964-DP (MLFB: 6ES7964-2AA04-0AB0)

	6ES7 417-4XT05-0AB0
Isochronous mode	
Isochronous mode	Yes
User data per isochronous slave, max.	244 byte
Equidistance	Yes
Shortest clock pulse	1 ms; 0.5 ms without use of SFC 126, 127
Max. cycle	32 ms
CiR - Configuration in RUN	
CiR synchronization time, basic load	100 ms
CiR synchronization time, time per I/O slave	40 µs
Programming	
Configuration software	
• STEP 7	Yes
Programming language	
• LAD	Yes
• FBD	Yes
• STL	Yes
• SCL	Yes
• CFC	Yes
• GRAPH	Yes
• HiGraph®	Yes
Nesting levels	7
Know-how protection	
• User program protection/ password protection	Yes
Dimensions	
Required slots	2
Dimensions and weight	
Dimensions	
• Width	50 mm
• Height	290 mm
• Depth	219 mm
Weight	
• Weight, approx.	920 g

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Ordering data	Order No.
CPU 417-4	**6ES7 417-4XT05-0AB0**
Work memory 30 MB, power supply 24 V DC, MPI/PROFIBUS DP master interface, PROFIBUS DP master interface, module slots for up to 2 additional IF modules, slot for memory card, incl. slot number labels	
Memory card RAM	
64 KB	**6ES7 952-0AF00-0AA0**
256 KB	**6ES7 952-1AH00-0AA0**
1 MB	**6ES7 952-1AK00-0AA0**
2 MB	**6ES7 952-1AL00-0AA0**
4 MB	**6ES7 952-1AM00-0AA0**
8 MB	**6ES7 952-1AP00-0AA0**
16 MB	**6ES7 952-1AS00-0AA0**
64 MB	**6ES7 952-1AY00-0AA0**
FEPROM memory card	
64 KB	**6ES7 952-0KF00-0AA0**
256 KB	**6ES7 952-0KH00-0AA0**
1 MB	**6ES7 952-1KK00-0AA0**
2 MB	**6ES7 952-1KL00-0AA0**
4 MB	**6ES7 952-1KM00-0AA0**
8 MB	**6ES7 952-1KP00-0AA0**
16 MB	**6ES7 952-1KS00-0AA0**
32 MB	**6ES7 952-1KT00-0AA0**
64 MB	**6ES7 952-1KY00-0AA0**
MPI cable	**6ES7 901-0BF00-0AA0**
for connection of SIMATIC S7 and PG via MPI; 5 m in length	
IF 964-DP interface module	**6ES7 964-2AA04-0AB0**
To connect an additional DP line; for CPU 414-3, CPU 414-3 PN/DP, CPU 416-3, CPU 416-3 PN/DP, CPU 417-4	
Slot number labels	**6ES7 912-0AA00-0AA0**
1 set (spare part)	
Manual "SIMATIC S7-400 programmable controller"	
incl. instruction list	
German	**6ES7 498-8AA05-8AA0**
English	**6ES7 498-8AA05-8BA0**
S7-400 operation list	
German	**6ES7 498-8AA05-8AN0**
English	**6ES7 498-8AA05-8BN0**

		Order No.
Manual "Communication for SIMATIC S7-300/-400"		
German		**6ES7 398-8EA00-8AA0**
English		**6ES7 398-8EA00-8BA0**
French		**6ES7 398-8EA00-8CA0**
Spanish		**6ES7 398-8EA00-8DA0**
Italian		**6ES7 398-8EA00-8EA0**
SIMATIC manual collection	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC		
SIMATIC manual collection update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		
Brochure "SIMATIC S7-400 programmable controller - Design and application"		
German		**6ES7 498-8AA00-8AB0**
English		**6ES7 498-8AA00-8BB0**
RS 485 bus connector with 90° cable outlet		
Max. 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 972-0BA42-0XA0**
With PG interface		**6ES7 972-0BB42-0XA0**
RS 485 bus connector with 90° cable outlet for Fast Connect system		
Max. transfer rate 12 Mbit/s		
without PG interface		
• 1 unit		**6ES7 972-0BA52-0XA0**
• 100 units		**6ES7 972-0BA52-0XB0**
with PG interface		
• 1 unit		**6ES7 972-0BB52-0XA0**
• 100 units		**6ES7 972-0BB52-0XB0**
RS 485 bus connector with axial cable outlet		
For SIMATIC OP, for connection to PPI, MPI, PROFIBUS		**6GK1 500-0EA02**
PROFIBUS FastConnect bus cable		
Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m		**6XV1 830-0EH10**

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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

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

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	SIPLUS CPU 416-3	
Order number	**6AG1 416-3XR05-4AB0**	**6AG1 416-3ER05-4AB0**
Order No. based on	**6ES7 416-3XR05-4AB0**	**6ES7 416-3ER05-4AB0**
Range of ambient temperature	0 ... +60 °C	
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions	
Ambient conditions		
Relative humidity	5 ... 100 % Condensation permissible	
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)	
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1)2)]	
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]	
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K	

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS CPU 416-3 (medial exposure) Power supply 24 V DC, MPI/ PROFIBUS DP master interface, PROFIBUS DP master interface, module slot for 1 IF module, slot for memory card, including mounting position labels 11.2 MB work memory	H	**6AG1 416-3XR05-4AB0**
SIPLUS CPU 416-3 PN/DP (medial exposure) Power supply 24 V DC, MPI/ PROFIBUS DP master interface, PROFINET interface, module slot for 1 IF module, slot for memory card, including mounting position labels 11.2 MB work memory	H	**6AG1 416-3ER05-4AB0**
Accessories		See SIMATIC CPU 416-3, CPU 416-3 PN/DP, page 6/45

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H

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Overview



The most powerful SIMATIC S7-400 CPU

- Applicable for plants with maximum requirements in the high-end performance range
- With 2 connection slots for IF modules

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

	SIPLUS CPU 417-4
Order number	**6AG1 417-4XT05-4AB0**
Order No. based on	**6ES7 417-4XT05-0AB0**
Ambient temperature range	0 ... +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions

Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1)2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS CPU 417-4 (medial exposure) Power supply 24 V DC, MPI/ PROFIBUS DP master interface, PROFIBUS DP master interface, module slots for 2 additional IF modules, slot for memory card, including mounting position labels 30 MB work memory	H	**6AG1 417-4XT05-4AB0**
Accessories		see SIMATIC CPU 417-4, page 6/51

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H

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Overview



- For constructing a fail-safe automation system for plants with increased safety requirements
- CPUs for high demands in the mid-level performance range
- Applicable for plants with additional demands on programming scope and processing speed
- 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
- Integrated PROFINET functions in CPU 414F-3 PN/DP
- Multi-processor mode is possible
- Safety-related communication with distributed I/O devices over PROFIBUS DP or PROFINET IO with PROFIsafe profile
- Fail-safe I/O modules can be connected in a distributed manner via the integrated interfaces (DP and PN with CPU 416F-3 PN/DP) and/or through communication modules (CP 443-5 Extended and CP 443-1 Adv.)
- Central and distributed use of standard modules for non-safety-oriented applications

Technical specifications

	6ES7 414-3FM06-0AB0
Product type designation	CPU 414F-3 PN/DP
Product version	
Hardware product version	01
Firmware version	V6.0
Associated programming package	STEP7 V5.5 or higher/iMap V3.0 + iMap STEP7 Add-on V3.0 SP5 or higher
Supply voltages	
Rated value	
• 24 V DC	No; Power supply via system power supply
Feeding of external backup voltage to CPU	5 to 15 V DC
Current consumption	
from backplane bus 5 V DC, max.	1.5 A
from interface 5 V DC, max.	90 mA; At each DP interface
Power losses	
Power loss, typ.	6.5 W
Power loss, max.	7.5 W
Backup battery	
Battery operation	not relevant
• Backup current, typ.	125 µA; (up to 40 °C)
• Backup current, max.	450 µA
Memory	
Work memory	
• integrated (for program)	2 Mbyte
• integrated (for data)	2 Mbyte
• expandable	No

	6ES7 414-3FM06-0AB0
Load memory	
• expandable FEPROM	Yes; with Memory Card (FLASH)
• expandable FEPROM, max.	64 Mbyte
• integrated RAM, max.	512 Kibyte
• expandable RAM	Yes; with Memory Card (RAM)
• expandable RAM, max.	64 Mbyte
Backup	
• present	Yes
• with battery	Yes; all data
• without battery	No
CPU-blocks	
DB	
• Number, max.	6 000; Number range: 1 to 16000
• Size, max.	64 Kibyte
FB	
• Number, max.	3 000; Number range: 0 to 7999
• Size, max.	64 Kibyte
FC	
• Number, max.	3 000; Number range: 0 to 7999
• Size, max.	64 Kibyte
OB	
• Size, max.	64 Kibyte
Nesting depth	
• per priority class	24
• additional within an error OB	1

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Technical specifications (continued)

	6ES7 414-3FM06-0AB0
CPU processing times	
for bit operations, min.	45 ns
for word operations, min.	45 ns
for fixed point arithmetic, min.	45 ns
for floating point arithmetic, min.	135 ns
Counters, timers and their retentivity	
S7 counter	
• Number	2 048
• Retentivity	
- adjustable	Yes
- lower limit	0
- upper limit	2 047
- preset	Z 0 to Z 7
• Counting range	
- lower limit	0
- upper limit	999
IEC counter	
• present	Yes
• Type	SFB
• Number	Unlimited (limited only by work memory)
S7 times	
• Number	2 048
• Retentivity	
- 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
• Number	Unlimited (limited only by work memory)
Data areas and their retentivity	
retentive data area, total	Total working and load memory (with backup battery)
Flag	
• Number, max.	8 Kibyte; Size of bit memory address area
• Retentivity available	Yes
• Number of clock memories	8; (in 1 memory byte)
Data blocks	
• Number, max.	6 000; Number range: 1 to 16,000
• Size, max.	64 Kibyte
Local data	
• adjustable, max.	16 Kibyte
• preset	8 Kibyte

	6ES7 414-3FM06-0AB0
Address area	
I/O address area	
• overall	8 Kibyte
• Outputs	8 Kibyte
• of which, distributed	
- MPI/DP interface, inputs	2 Kibyte
- MPI/DP interface, outputs	2 Kibyte
- DP interface, inputs	6 Kibyte
- DP interface, outputs	6 Kibyte
- PN interface, inputs	8 Kibyte
- PN interface, outputs	8 Kibyte
Process image	
• Inputs, adjustable	8 Kibyte
• Outputs, adjustable	8 Kibyte
• Inputs, preset	256 byte
• Outputs, preset	256 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	65 536
• Outputs	65 536
• Inputs, of which central	65 536
• Outputs, of which central	65 536
Analog channels	
• Inputs	4 096
• Outputs	4 096
• Inputs, of which central	4 096
• Outputs, of which central	4 096
Hardware configuration	
connectable OPs	63
Central devices, max.	1
Expansion devices, max.	21
Multicomputing	Yes; 4 CPUs max. (with UR1 or UR2)
Interface modules	
• 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	1
• via IM 467	4
• via CP	10; CP 443-5 Extended
• Mixed mode IM + CP permitted	No; IM 467 not suitable for use with CP 443-5 Ext. and CP443-1 EX4x, EX20, GX20 (in PNIO mode)
• via interface module	1; IF 964-DP
• Number of pluggable S5 modules (via adapter capsule in central device), max.	6

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Technical specifications (continued)

	6ES7 414-3FM06-0AB0
Number of IO controllers	
• integrated	1
• via CP	4; No mixed operation of CP443-1 EX40 and CP443-1 EX 41/EX20/ GX20, max. 4 in central controller
Number of operable FMs and CPs (recommended)	
• FM	Limited by number of slots and number of connections
• CP, point-to-point	CP 440: Limited by number of slots; CP 441: Limited by number of slots and number of connections
• PROFIBUS and Ethernet CPs	14; In total max. 10 CPs as DP master and PN controller, of which up to 10 IMs or CPs as DP master and up to 4 CPs as PN controller
Time	
Clock	
• Hardware clock (real-time clock)	Yes
• battery-backed and synchronizable	Yes
• Resolution	1 ms
Runtime meter	
• Number	16
Clock synchronization	
• supported	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	Yes; as client
• to IF 964 DP	Yes
S7 message functions	
Number of login stations for message functions, max.	63; max. 63 with Alarm_S/SQ and Alarm_D/DQ (OPs); max. 8 with Alarm, Alarm_8, Alarm_8P, Notify and Notify_8 (e.g. WinCC)
Symbol-related messages	Yes
SCAN procedure	Yes
Number of messages	
• overall, max.	512
Block related messages	Yes
Process diagnostic messages	Yes
Alarm 8-blocks	Yes
Process control messages	Yes
Test commissioning functions	
Status/control	
• Status/control variable	Yes; up to 16 variable tables
Forcing	
• Forcing	Yes
Status block	Yes; up to 16 simultaneously
Single step	Yes

	6ES7 414-3FM06-0AB0
Number of breakpoints	16
Diagnostic buffer	
• present	Yes
• Number of entries, max.	3 200
- adjustable	Yes
- preset	120
Service data	
• can be read out	Yes
Communication functions	
PG/OP communication	Yes
Data record routing	Yes
Routing	Yes; S7 routing
Global data communication	
• supported	Yes
• Size of GD packets, max.	54 byte
S7 basic communication	
• supported	Yes
• User data per job, max.	76 byte
S7 communication	
• supported	Yes
• as server	Yes
• as client	Yes
• User data per job, max.	64 Kibyte
S5-compatible communication	
• supported	Yes; Via FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5
• User data per job, max.	8 Kibyte
Standard communication (FMS)	
• supported	Yes; Via CP and loadable FB
Web server	
• supported	Yes
• Number of HTTP clients	5
• User-defined websites	Yes
Open IE communication	
• TCP/IP	Yes; Via integrated PROFINET interface and loadable FBs
- Number of connections, max.	62
- Data length, max.	32 Kibyte
- Several passive connections per port, supported	Yes
• ISO-on-TCP (RFC1006)	Yes; Via integrated PROFINET interface or CP 443-1 Adv. and loadable FBs
- Number of connections, max.	62
- Data length, max.	32 Kibyte; 1452 bytes via CP 443-1 Adv.
• UDP	Yes; Via integrated PROFINET interface and loadable FBs
- Number of connections, max.	62
- Data length, max.	1 472 byte
Number of connections	
• overall	64

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Technical specifications (continued)

	6ES7 414-3FM06-0AB0
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
• Data length of all incoming connections master/slave, max.	45 000 byte
• Data length of all outgoing connections master/slave, max.	45 000 byte
• Number of device-internal and PROFIBUS interconnections	1 000
• Data length of device-internal und PROFIBUS interconnections, max.	16 000 byte
• Data length per connection, max.	2 000 byte
• Remote interconnections with acyclic transmission	
- Sampling frequency: Sampling time, min.	200 ms; Depending on preset communcation load, number of interconnections and data length used
- Number of incoming interconnections	250
- Number of outgoing interconnections	250
- Data length of all incoming interconnections, max.	8 000 byte
- Data length of all outgoing interconnections, max.	8 000 byte
- Data length per connection, max.	2 000 byte
• Remote interconnections with cyclic 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.	450 byte
• HMI variables via PROFINET (acyclic)	
- Number of stations that can log on for HMI variables (PN OPC/ iMap)	2x PN OPC/1x iMap
- HMI variable updating	500 ms
- Number of HMI variables	1 000
- Data length of all HMI variables, max.	32 000 byte
• PROFIBUS proxy functionality	
- supported	Yes; 32 PROFIBUS slaves max. connectable
- Data length per connection, max.	240 byte; Slave-dependent

	6ES7 414-3FM06-0AB0
1st interface	
Type of interface	Integrated
Physics	RS 485 / PROFIBUS + MPI
Isolated	Yes
Power supply to interface (15 to 30 V DC), max.	150 mA
Number of connection resources	MPI: 32, DP: 16
Functionality	
• MPI	Yes
• DP master	Yes
• DP slave	Yes
MPI	
• Number of connections	32; if a diagnostic repeater is used on the line, the number of connection resources on the line is reduced by 1
• Services	
- PG/OP communication	Yes
- Routing	Yes
- Global data communication	Yes
- S7 basic communication	Yes
- S7 communication	Yes
- S7 communication, as client	Yes
- S7 communication, as server	Yes
• Transmission rate, max.	12 Mbit/s
DP master	
• Number of connections, max.	16; if a diagnostic repeater is used on the line, the number of connection resources on the line is reduced by 1
• Services	
- PG/OP communication	Yes
- Routing	Yes
- Global data communication	No
- S7 basic communication	Yes
- S7 communication	Yes
- S7 communication, as client	Yes
- S7 communication, as server	Yes
- Equidistance mode support	Yes
- Isochronous mode	Yes
- SYNC/FREEZE	Yes
- Activation/deactivation of DP slaves	Yes
- Direct data exchange (slave-to-slave communication)	Yes
- DPV1	Yes
• Transmission rate, max.	12 Mbit/s
• Number of DP slaves, max.	32
• Address area	
- Inputs, max.	2 Kibyte
- Outputs, max.	2 Kibyte
• User data per DP slave	
- User data per DP slave, max.	244 byte
- Inputs, max.	244 byte
- Outputs, max.	244 byte
- Slots, max.	244
- per slot, max.	128 byte

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Technical specifications (continued)

	6ES7 414-3FM06-0AB0
DP slave	
• Number of connections	16
• Services	
- PG/OP communication	Yes; with interface active
- S7 routing	Yes; With interface active
- Global data communication	No
- S7 basic communication	No
- S7 communication	Yes
- S7 communication, as client	Yes
- S7 communication, as server	Yes
- Direct data exchange (slave-to-slave communication)	No
- DPV1	No
• GSD file	http://support.automation.siemens.com/WW/view/en/113652
• Transmission rate, max.	12 Mbit/s
• Automatic baud rate search	No
• Transfer memory	
- Inputs	244 byte
- Outputs	244 byte
• Address area, max.	32; Virtual slots
• User data per address area, max.	32 byte
• User data per address area, of which consistent, max.	32 byte
2nd interface	
Type of interface	PROFINET
Physics	Ethernet RJ45
Isolated	Yes
Integrated switch	Yes
Number of ports	2
Automatic detection of transmission speed	Yes; Autosensing
Autonegotiation	Yes
Autocrossing	Yes
Media redundancy	
• supported	Yes
• Switchover time on line break, typically	200 ms
• Number of stations in the ring, max.	50
Change of IP address at runtime, supported	Yes; Assignment by higher-level IO controller or by the user program with SFB104 "IP_CONF"
Number of connection resources	64
Functionality	
• DP master	No
• DP slave	No
• PROFINET IO controller	Yes
• PROFINET IO device	Yes
• PROFINET CBA	Yes
• Open IE communication	Yes
• Web server	Yes
- Number of HTTP clients	5
• Local Operating Network	No

	6ES7 414-3FM06-0AB0
PROFINET IO controller	
• Services	
- PG/OP communication	Yes
- S7 routing	Yes
- S7 communication	Yes
- Isochronous mode	Yes; Only with IRT and the High Performance option
- Open IE communication	Yes
• Transmission rate, min.	10 Mbit/s
• Transmission rate, max.	100 Mbit/s
• Number of connectable IO devices, max.	256
• Max. number of connectable IO devices for RT	256
- of which in line, max.	256
• Number of IO devices with IRT and the option "high flexibility"	256
- of which in line, max.	61
• Number of IO devices with IRT and the option "high performance", max.	64
- of which in line, max.	64
• IRT, supported	Yes
• Shared device, supported	Yes
• Prioritized startup supported	Yes
- Number of IO devices, max.	32
• Activation/deactivation of IO devices	Yes
- Number of IO devices that can be simultaneously activated/ deactivated, max.	8
• IO devices changing during operation (partner ports), supported	Yes
- Max. number of IO devices per tool	8; 8 parallel calls of the SFC 12 "D_ACT_DP" possible per line. Max. 32 IO devices changing during operation (partner ports) are supported.
• Device replacement without swap medium	Yes
• Send clock times	250 µs, 500 µs, 1 ms, 2 ms, 4 ms additionally with IRT with high performance: 250 µs to 4 ms in 125 µs frame
• Updating time	250 µs to 512 ms; minimum value depends on preset communication share for PROFINET IO, on the number of IO devices and on the amount of configured user data, see PROFINET system description
• Address area	
- Inputs, max.	8 Kibyte
- Outputs, max.	8 Kibyte
• User data per address area, max.	
- User data consistency, max.	1 024 byte

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Technical specifications (continued)

	6ES7 414-3FM06-0AB0
PROFINET IO device	
• Services	
- PG/OP communication	Yes
- S7 routing	Yes
- S7 communication	Yes
- Isochronous mode	No
- Open IE communication	Yes
- IRT, supported	Yes
- Prioritized startup supported	Yes
- Shared device, supported	Yes
- Number of IO controllers with shared device, max.	2
• Transfer memory	
- Inputs, max.	1 440 byte; Per IO controller with shared device
- Outputs, max.	1 440 byte; Per IO controller with shared device
• Submodules	
- Number, max.	64
- User data per submodule, max.	1 024 byte
PROFINET CBA	
• acyclic transmission	Yes
• cyclic transmission	Yes
Open IE communication	
• Open IE communication, supported	Yes
• Number of connections, max.	62
• Local port numbers used at the system end	0, 20, 21, 25, 80, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65534, 65535
• Keep-alive function, supported	Yes
3rd interface	
Type of interface	Pluggable interface module (IF)
Plug-in interface modules	IF 964-DP (MLFB: 6ES7964-2AA04-0AB0)
Physics	RS 485 / PROFIBUS
Isolated	Yes
Power supply to interface (15 to 30 V DC), max.	150 mA
Automatic detection of transmission speed	No
Number of connection resources	16
Functionality	
• MPI	No
• DP master	Yes
• DP slave	Yes

	6ES7 414-3FM06-0AB0
DP master	
• Number of connections, max.	16
• Services	
- PG/OP communication	Yes
- Routing	Yes; S7 routing
- Global data communication	No
- S7 basic communication	Yes
- S7 communication	Yes
- S7 communication, as client	Yes
- S7 communication, as server	Yes
- Equidistance mode support	Yes
- Isochronous mode	Yes
- SYNC/FREEZE	Yes
- Activation/deactivation of DP slaves	Yes
- Direct data exchange (slave-to-slave communication)	Yes
- DPV0	Yes
- DPV1	Yes
• Transmission rate, max.	12 Mbit/s
• Transmission rate, min.	9.6 kbit/s
• Number of DP slaves, max.	96
• Address area	
- Inputs, max.	6 Kibyte
- Outputs, max.	6 Kibyte
• User data per DP slave	
- User 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	16
• Services	
- PG/OP communication	Yes
- S7 routing	Yes; With active interface
- Global data communication	No
- S7 basic communication	No
- S7 communication	Yes
- S7 communication, as client	Yes
- S7 communication, as server	Yes
- SYNC/FREEZE	No
- Direct data exchange (slave-to-slave communication)	No
- DPV1	No
- Status/control	Yes; When interface active
• GSD file	http://support.automation.siemens.com/WW/view/en/113652
• Transmission rate, min.	9.6 kbit/s
• Transmission rate, max.	12 Mbit/s
• Automatic baud rate search	No
• Transfer memory	
- Inputs	244 byte
- Outputs	244 byte
• Address areas, max.	32; Virtual slots
• User data per address area, max.	32 byte
• User data per address area, of which consistent, max.	32 byte

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Technical specifications (continued)

	6ES7 414-3FM06-0AB0
Isochronous mode	
Isochronous mode	Yes; Via PROFIBUS DP or PROFINET interface
Number of DP masters with isochronous mode	2
User data per isochronous slave, max.	244 byte
Equidistance	Yes
Shortest clock pulse	1 ms; 0.5 ms without use of SFC 126, 127
Max. cycle	32 ms
CiR - Configuration in RUN	
CiR synchronization time, basic load	100 ms
CiR synchronization time, time per I/O slave	15 µs; Time per I/O byte
Programming	
Configuration software	
• STEP 7	Yes
Programming language	
• STEP 7	Yes
• LAD	Yes
• FBD	Yes
• STL	Yes
• SCL	Yes
• CFC	Yes
• GRAPH	Yes
• HiGraph®	Yes

	6ES7 414-3FM06-0AB0
Nesting levels	7
Know-how protection	
• User program protection/ password protection	Yes
• Block encryption	Yes; With S7 block privacy
EMC	
Emission of radio interference acc. to EN 55 011	
• Limit value class A, for use in industrial areas	Yes
• Limit value class B, for use in residential areas	No
Dimensions	
Required slots	2
Dimensions and weight	
Dimensions	
• Width	50 mm
• Height	290 mm
• Depth	219 mm
Weight	
• Weight, approx.	900 g

Ordering data

	Order No.
CPU 414F-3 PN/DP	**6ES7 414-3FM06-0AB0**
for setting up safety-related automation system; work memory 4 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	
Option package S7 F Distributed Safety V5.4	
for generating fail-safe programs for the S7-300F/400F	
Floating license	**6ES7 833-1FC02-0YA5**
Upgrade from V5.x to V5.4	**6ES7 833-1FC02-0YE5**
Software Update Service	**6ES7 833-1FC00-0YX2**
Memory Card RAM	
64 KB	**6ES7 952-0AF00-0AA0**
256 KB	**6ES7 952-1AH00-0AA0**
1 MB	**6ES7 952-1AK00-0AA0**
2 MB	**6ES7 952-1AL00-0AA0**
4 MB	**6ES7 952-1AM00-0AA0**
8 MB	**6ES7 952-1AP00-0AA0**
16 MB	**6ES7 952-1AS00-0AA0**
64 MB	**6ES7 952-1AY00-0AA0**

	Order No.
FEPROM memory card	
64 KB	**6ES7952-0KF00-0AA0**
256 KB	**6ES7952-0KH00-0AA0**
1 MB	**6ES7 952-1KK00-0AA0**
2 MB	**6ES7 952-1KL00-0AA0**
4 MB	**6ES7 952-1KM00-0AA0**
8 MB	**6ES7 952-1KP00-0AA0**
16 MB	**6ES7 952-1KS00-0AA0**
32 MB	**6ES7 952-1KT00-0AA0**
64 MB	**6ES7 952-1KY00-0AA0**
MPI cable	**6ES7 901-0BF00-0AA0**
for connection of SIMATIC S7 and PG via MPI; 5 m in length	
IF 964-DP interface module	**6ES7 964-2AA04-0AB0**
For connecting an additional DP line	
Slot number labels	**6ES7 912-0AA00-0AA0**
1 set (spare part)	
Manual "SIMATIC S7-400 programmable controller"	
incl. instruction list	
German	**6ES7 498-8AA05-8AA0**
English	**6ES7 498-8AA05-8BA0**

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Ordering data		Order No.
S7-400 operation list		
German		**6ES7 498-8AA05-8AN0**
English		**6ES7 498-8AA05-8BN0**
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	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC		
SIMATIC manual collection update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		
Brochure "SIMATIC S7-400 programmable controller - Design and application"		
German		**6ES7 498-8AA00-8AB0**
English		**6ES7 498-8AA00-8BB0**
PROFIBUS bus components		
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 972-0BA42-0XA0**
With PG interface		**6ES7 972-0BB42-0XA0**
RS 485 bus connector with 90° cable outlet for Fast Connect system		
Max. transfer rate 12 Mbit/s		
without PG interface		
• 1 unit		**6ES7 972-0BA52-0XA0**
• 100 units		**6ES7 972-0BA52-0XB0**
with PG interface		
• 1 unit		**6ES7 972-0BB52-0XA0**
• 100 units		**6ES7 972-0BB52-0XB0**

		Order No.
RS 485 bus connector with axial cable outlet		
For SIMATIC OP, for connection to PPI, MPI, PROFIBUS		**6GK1 500-0EA02**
PROFIBUS FastConnect bus cable		
Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m		**6XV1 830-0EH10**
RS 485 repeater for PROFIBUS		**6ES7 972-0AA02-0XA0**
Transfer rate up to 12 Mbit/s; 24 V DC; IP20 enclosure		
PROFINET bus components		
IE FC TP standard cable GP 2x2		**6XV1 840-2AH10**
4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug; PROFINET-compatible; with UL approval;		
Sold by the meter		
FO standard cable GP (50/125)		**6XV1 873-2A**
Standard cable, splittable, UL approval, sold by the meter		
SCALANCE X204-2 Industrial Ethernet Switch	I	**6GK5 204-2BB10-2AA3**
Industrial Ethernet Switches with integral SNMP access, Web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbit/s RJ45 ports and two FO ports		
IE FC RJ45 plugs		
RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables		
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**
PROFIBUS/PROFINET bus components		see Catalogs IK PI, CA 01
For establishing MPI/PROFIBUS/ PROFINET communication		

D: Subject to export regulations AL: N and ECCN: 5D992
I: Subject to export regulations AL: N and ECCN: EAR99H
J: Subject to export regulations AL: N and ECCN: EAR99S

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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 CPU416F-3 PN/DP) and/or through communication modules (CP443-5 Ext. and CP443-1 Adv.)
- Standard modules for non-safety-related applications can be operated centrally and decentralized

Technical specifications

	6ES7 416-2FN05-0AB0	6ES7 416-3FS06-0AB0
Product type designation		CPU416F-3 PN/DP
Product version		
Hardware product version		01
Firmware version		V6.0
associated programming package		STEP7 V5.5 or higher/iMap V3.0 + iMap STEP7 Add-on V3.0 SP5 or higher
CiR - Configuration in RUN		
CiR synchronization time, basic load	100 ms	100 ms
CiR synchronization time, time per I/O slave	40 µs	10 µs; Time per I/O byte
• 24 V DC		No; Power supply via system power supply
from backplane bus 5 V DC, max.	1.1 A	1.5 A
from interface 5 V DC, max.	90 mA; at each DP interface	90 mA; at each DP interface
Power losses		
Power loss, typ.	4 W	6.5 W
Power loss, max.		7.5 W
Memory		
Work memory		
• integrated	5.6 Mbyte	16 Mbyte
• integrated (for program)	2.8 Mbyte	8 Mbyte
• integrated (for data)	2.8 Mbyte	8 Mbyte
• expandable	No	No
Load memory		
• expandable FEPROM	Yes	Yes; with Memory Card (FLASH)
• expandable FEPROM, max.	64 Mbyte	64 Mbyte
• integrated RAM, max.	1 Mbyte	1 Mbyte
• expandable RAM	Yes	Yes; with Memory Card (RAM)
• expandable RAM, max.	64 Mbyte	64 Mbyte
Backup		
• present	Yes	Yes
• with battery	Yes	Yes; all data
• without battery	No	No
CPU-blocks		
DB		
• Number, max.	10000; Number range: 1 to 16,000	10000; Number range: 1 to 16000
• Size, max.	64 Kibyte	64 Kibyte
FB		
• Number, max.	5000; Number range: 0 to 7999	5000; Number range: 0 to 7999
• Size, max.	64 Kibyte	64 Kibyte

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Technical specifications (continued)

	6ES7 416-2FN05-0AB0	6ES7 416-3FS06-0AB0
FC		
• Number, max.	5 000; Number range: 0 to 7999	5 000; Number range: 0 to 7999
• 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
Counters, timers and their retentivity		
S7 counter		
• Number	2 048	2 048
• Retentivity		
- 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
• Number		Unlimited (limited only by work memory)
S7 times		
• Number	2 048	2 048
• Retentivity		
- 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
• Number		Unlimited (limited only by work memory)
Data areas and their retentivity		
Retentive 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; Size of bit memory address area
• Retentivity available	Yes	Yes
• Retentivity preset	MB 0 to MB 15	MB 0 to MB 15
• Number of clock memories	8; (in 1 memory byte)	8; (in 1 memory byte)
Local data		
• adjustable, max.	32 Kibyte	32 Kibyte
• preset	16 Kibyte	16 Kibyte

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Technical specifications (continued)

	6ES7 416-2FN05-0AB0	6ES7 416-3FS06-0AB0
Address area		
I/O address area		
• overall	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
- PN interface, inputs		8 Kibyte
- PN interface, outputs		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
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 configuration		
Expansion devices, max.	21	21
Multicomputing	Yes; 4 CPUs max. (with UR1 or UR2)	Yes; 4 CPUs max. (with UR1 or UR2)
Interface modules		
• 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	1
• 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 not suitable for use with CP 443-5 Ext. and CP443-1 EX4x, EX20, GX20 (in PNIO mode)
• via interface module	0	1; IF 964-DP
• Number of pluggable S5 modules (via adapter capsule in central device), max.	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; No mixed operation of CP443-1 EX40 and CP443-1 EX 41/EX20/GX20, max. 4 in central controller

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Technical specifications (continued)

	6ES7 416-2FN05-0AB0	6ES7 416-3FS06-0AB0
Number of operable FMs and CPs (recommended)		
• FM	Limited by number of slots and number of connections	Limited by number of slots or number of connections
• CP, point-to-point	Limited by number of slots and number of connections	CP 440: Limited by number of slots; CP 441: Limited by 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; In total max. 10 CPs as DP master and PN controller, of which up to 10 IMs or CPs as DP master and up to 4 CPs as PN controller
Time		
Clock		
• Hardware clock (real-time clock)	Yes	Yes
• battery-backed and synchronizable	Yes	Yes
• Resolution	1 ms	1 ms
• Deviation per day (buffered), max.	1.7 s; Power off	1.7 s; Power off
• Deviation per day (unbuffered) max.	8.6 s; For power On	8.6 s; For power On
Runtime meter		
• Number	8	16
• Number/Number range	0 to 7	0 to 15
• Range of values	0 to 32767 hours	SFCs 2, 3 and 4: 0 to 32767 hours SFC 101: 0 to 2^31 - 1 hours
• Granularity	1 hour	1 hour
• retentive	Yes	Yes
Clock synchronization		
• supported	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	Yes; as client
• to IF 964 DP		Yes
Interfaces		
Number of USB interfaces		0
1st interface		
Type of interface	Integrated	Integrated
Physics	RS 485 / PROFIBUS	RS 485 / PROFIBUS + MPI
Isolated	Yes	Yes
Power supply to interface (15 to 30 V DC), max.	150 mA	150 mA
Number of connection resources	MPI: 44, DP: 32	MPI: 44, DP: 32
Functionality		
• MPI	Yes	Yes
• DP master	Yes	Yes
• DP slave	Yes	Yes
MPI		
• Number of connections	44	44; 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	Yes	Yes
- S7 basic communication	Yes	Yes
- S7 communication	Yes	Yes
- S7 communication, as client		Yes
- S7 communication, as server		Yes
• Transmission rate, max.	12 Mbit/s	12 Mbit/s

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Technical specifications (continued)

	6ES7 416-2FN05-0AB0	6ES7 416-3FS06-0AB0
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
- Global data communication	No	No
- S7 basic communication	Yes	Yes
- S7 communication	Yes	Yes
- S7 communication, as client		Yes
- S7 communication, as server		Yes
- Equidistance mode support	Yes	Yes
- Isochronous mode		Yes
- SYNC/FREEZE	Yes	Yes
- Activation/deactivation of DP slaves	Yes	Yes
- Direct data exchange (slave-to-slave communication)	Yes	Yes
- DPV1		Yes
• Transmission rate, 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
• User data per DP slave		
- User data per DP slave, max.	244 byte	244 byte
- Inputs, max.	244 byte	244 byte
- Outputs, max.	244 byte	244 byte
- Slots, max.	244	244
- per slot, max.	128 byte	128 byte
DP slave		
• Number of connections	32	32
• Services		
- PG/OP communication	Yes	Yes; with interface active
- S7 routing		Yes; with interface active
- Global data communication		No
- S7 basic communication		No
- S7 communication		Yes
- S7 communication, as client		Yes
- S7 communication, as server		Yes
- Direct data exchange (slave-to-slave communication)		No
- DPV1		No
• GSD file	http://support.automation.siemens.com/WW/view/en/113652	http://support.automation.siemens.com/WW/view/en/113652
• Transmission rate, max.	12 Mbit/s	12 Mbit/s
• Automatic baud rate search		No
• Transfer memory		
- Inputs	244 byte	244 byte
- Outputs	244 byte	244 byte
• Address area, max.	32	32; Virtual slots
• User data per address area, max.	32 byte	32 byte
• User data per address area, of which consistent, max.	32 byte	32 byte
2nd interface		
Type of interface	Integrated	PROFINET
Physics	RS 485 / PROFIBUS	Ethernet RJ45
Isolated	Yes	Yes
Integrated switch		Yes
Number of ports		2
Power supply to interface (15 to 30 V DC), max.	150 mA	
Automatic detection of transmission speed		Yes; Autosensing

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Technical specifications (continued)

	6ES7 416-2FN05-0AB0	6ES7 416-3FS06-0AB0
Autonegotiation		Yes
Autocrossing		Yes
Media redundancy		
• supported		Yes
• Switchover time on line break, typically		200 ms
• Number of stations in the ring, max.		50
Change of IP address at runtime, supported		Yes; Assignment by higher-level IO controller or by the user program with SFB104 "IP_CONF"
Number of connection resources	32	96
Functionality		
• DP master	Yes	No
• DP slave	Yes	No
• PROFINET IO controller		Yes
• PROFINET IO device		Yes
• PROFINET CBA		Yes
• Local Operating Network		No
DP master		
• Number of connections, max.	32	
• Services		
- PG/OP communication	Yes	
- Global data communication	No	
- S7 basic communication	Yes	
- S7 communication	Yes	
- Equidistance mode support	Yes	
- SYNC/FREEZE	Yes	
- Activation/deactivation of DP slaves	Yes	
- Direct data exchange (slave-to-slave communication)	Yes	
• Transmission rate, max.	12 Mbit/s	
• Number of DP slaves, max.	125	
• Address area		
- Inputs, max.	8 Kibyte	
- Outputs, max.	8 Kibyte	
• User data per DP slave		
- User 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		
• 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 area, max.	32	
• User data per address area, max.	32 byte	
• User data per address area, of which consistent, max.	32 byte	
PROFINET IO controller		
• Services		
- PG/OP communication		Yes
- S7 routing		Yes
- S7 communication		Yes
- Isochronous mode		Yes; Only with IRT and the High Performance option
- Open IE communication		Yes
• Transmission rate, max.		100 Mbit/s

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Technical specifications (continued)

	6ES7 416-2FN05-0AB0	6ES7 416-3FS06-0AB0
• Number of connectable IO devices, max.		256
• Max. number of connectable IO devices for RT		256
- of which in line, max.		256
• Number of IO devices with IRT and the option "high flexibility"		256
- of which in line, max.		61
• Number of IO devices with IRT and the option "high performance", max.		64
- of which in line, max.		64
• IRT, supported		Yes
• Shared device, supported		Yes
• Prioritized startup, supported		Yes
- Number of IO devices, max.		32
• Activation/deactivation of IO devices		Yes
- Number of IO devices that can be simultaneously activated/deactivated, max.		8
• IO devices changing during operation (partner ports), supported		Yes
- Max. number of IO devices per tool		8; 8 parallel calls of the SFC 12 "D_ACT_DP" possible per line. Max. 32 IO devices changing during operation (partner ports) are supported.
• Device replacement without swap medium		Yes
• Send clock times		250 µs, 500 µs, 1 ms, 2 ms, 4 ms additionally with IRT with high performance: 250 µs to 4 ms in 125 µs frame
• Updating time		250 µs to 512 ms; minimum value depends on preset communication share for PROFINET IO, on the number of IO devices and on the amount of configured user data, see PROFINET system description
• Address area		
- Inputs, max.		8 Kibyte
- Outputs, max.		8 Kibyte
• User data per address area, max.		
- User data consistency, max.		1 024 byte
PROFINET IO device		
• Services		
- PG/OP communication		Yes
- S7 routing		Yes
- S7 communication		Yes
- Isochronous mode		No
- Open IE communication		Yes
- IRT, supported		Yes
- Prioritized startup supported		Yes
- Shared device, supported		Yes
- Number of IO controllers with shared device, max.		2
• Transfer memory		
- Inputs, max.		1 440 byte; Per IO controller with shared device
- Outputs, max.		1 440 byte; Per IO controller with shared device
• Submodules		
- Number, max.		64
- User data per submodule, max.		1 024 byte
Open IE communication		
• Open IE communication, supported		Yes
• Number of connections, max.		94
• Local port numbers used at the system end		0, 20, 21, 25, 80, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65534, 65535
• Keep-alive function, supported		Yes

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Technical specifications (continued)

	6ES7 416-2FN05-0AB0	6ES7 416-3FS06-0AB0
3rd interface		
Type of interface		Pluggable interface module (IF)
Plug-in interface modules		IF 964-DP (MLFB: 6ES7964-2AA04-0AB0)
Physics		RS 485 / PROFIBUS
Isolated		Yes
Power supply to interface (15 to 30 V DC), max.		150 mA
Automatic detection of transmission speed		No
Number of connection resources		32
Functionality		
• MPI		No
• DP master		Yes
• DP slave		Yes
DP master		
• Number of connections, max.		32
• Services		
- PG/OP communication		Yes
- Global data communication		No
- S7 basic communication		Yes
- S7 communication		Yes
- S7 communication, as client		Yes
- S7 communication, as server		Yes
- Equidistance mode support		Yes
- Isochronous mode		Yes
- SYNC/FREEZE		Yes
- Activation/deactivation of DP slaves		Yes
- Direct data exchange (slave-to-slave communication)		Yes
- DPV1		Yes
• Transmission rate, max.		12 Mbit/s
• Number of DP slaves, max.		125
• Address area		
- Inputs, max.		8 Kibyte
- Outputs, max.		8 Kibyte
• User data per DP slave		
- User 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		
- PG/OP communication		Yes
- S7 routing		Yes; With active interface
- Global data communication		No
- S7 basic communication		No
- S7 communication		Yes
- S7 communication, as client		Yes
- S7 communication, as server		Yes
- Direct data exchange (slave-to-slave communication)		No
- DPV1		No
• GSD file		http://support.automation.siemens.com/WW/view/en/113652
• Transmission rate, max.		12 Mbit/s
• Automatic baud rate search		No
• Transfer memory		
- Inputs		244 byte
- Outputs		244 byte
• Address areas, max.		32; Virtual slots
• User data per address area, max.		32 byte
• User data per address area, of which consistent, max.		32 byte

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Technical specifications (continued)

	6ES7 416-2FN05-0AB0	6ES7 416-3FS06-0AB0
Communication functions		
PG/OP communication	Yes	Yes
• Number of connectable OPs without message processing	63	95
• Number of connectable OPs with message processing	63; When using alarm_S and alarm_D	95; When using Alarm_S/SQ and Alarm_D/DQ
Data record routing		Yes
Global data communication		
• supported	Yes	Yes
• Number of GD packets, transmitter, max.	16	16
• Number of GD packets, receiver, max.	32	32
• Size of GD packets, max.	54 byte	54 byte
• Size of GD packet (of which consistent), max.	1 variable	1 variable
S7 basic communication		
• supported	Yes	Yes
• User data per job, max.	76 byte	76 byte
• User data per job (of which consistent), max.	1 variable	1 variable
S7 communication		
• supported	Yes	Yes
• as server		Yes
• as client		Yes
• User data per job, max.	64 Kibyte	64 Kibyte
• User data per job (of which consistent), max.	462 byte; 1 variable	462 byte; 1 variable
S5-compatible communication		
• supported	Yes; (via CP max. 10 and FC AG_SEND and FC AG_RECV)	Yes; Via FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5
• User data per job, max.	8 Kibyte	8 Kibyte
• User data per job (of which consistent), max.	240 byte	240 byte
• Number of simultaneous AG-SEND/AG-RECV orders per CPU, max.	64/64	64/64
Standard communication (FMS)		
• supported	Yes; Via CP and loadable FB	Yes; Via CP and loadable FB
Open IE communication		
• TCP/IP		Yes; Via integrated PROFINET interface and loadable FBs
- Number of connections, max.		94
- Data length, max.		32 Kibyte
- Several passive connections per port, supported		Yes
• ISO-on-TCP (RFC1006)	Via CP 443-1 Adv. and loadable FB	Yes; Via integrated PROFINET interface or CP 443-1 and loadable FBs
- Number of connections, max.		94
- Data length, max.	1452	32 Kibyte; 1452 bytes via CP 443-1 Adv.
• UDP		Yes; Via integrated PROFINET interface and loadable FBs
- Number of connections, max.		94
- Data length, max.		1 472 byte
Webserver		
• supported	No; Via CP	Yes
• Number of HTTP clients		5
• User-defined websites		Yes
PROFINET CBA (at set setpoint communication load)		
• Setpoint for the CPU communication load		20 %
• Number of remote interconnection partners		32
• Number of functions, master/slave		150
• Total of all Master/Slave connections		6 000

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Technical specifications (continued)

	6ES7 416-2FN05-0AB0	6ES7 416-3FS06-0AB0
• 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 und PROFIBUS interconnections, max.		16 000 byte
• Data length per connection, max.		2 000 byte
• Remote interconnections with acyclic transmission		
- Sampling frequency: Sampling time, min.		200 ms; Depending on preset communcation load, number of interconnections and data length used
- Number of incoming interconnections		500
- Number of outgoing interconnections		500
- Data length of all incoming interconnections, max.		16 000 byte
- Data length of all outgoing interconnections, max.		16 000 byte
- Data length per connection, max.		2 000 byte
• Remote interconnections with cyclic 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.		450 byte
• HMI variables via PROFINET (acyclic)		
- Number of stations that can log on 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
Number of connections		
• overall	64	96
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)	95; Max. 95 with Alarm_S/SQ and Alarm_D/DQ (OPs); max. 8 with Alarm, Alarm_8, Alarm_8P, Notify and Notify_8 (e.g. WinCC)
Symbol-related messages	Yes	Yes
SCAN procedure		Yes
Number of messages		
• overall, max.	1 024	1 024
Block related messages	Yes	Yes
Process diagnostic messages		Yes
Simultaneously active Alarm-S blocks, max.	200	1 000; Simultaneously active alarm_S/SQ blocks or alarm_D/DQ blocks
Alarm 8-blocks	Yes	Yes
• Number of instances for alarm 8 and S7 communication blocks, max.	1 800	4 000
• Preset, max.	600	600
Process control messages	Yes	Yes

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Technical specifications (continued)

	6ES7 416-2FN05-0AB0	6ES7 416-3FS06-0AB0
Test commissioning functions		
Status/control		
• Status/control variable	Yes	Yes; Up to 16 variable tables
• Variables	Inputs/outputs, memory bits, DB, distributed I/Os, timers, counters	Inputs/outputs, memory bits, DB, distributed I/Os, timers, counters
• Number of variables, max.	70	70; Status/control
Forcing		
• Forcing	Yes	Yes
• Force, variables	Inputs/outputs, bit memories, distributed I/Os	Inputs/outputs, bit memories, distributed I/Os
• Number of variables, max.	512	512
Status block	Yes	Yes; Up to 16 simultaneously
Single step	Yes	Yes
Number of breakpoints	4	16
Diagnostic buffer		
• present	Yes	Yes
• Number of entries, max.	3 200	3 200
- adjustable	Yes	Yes
- preset	120	120
Isochronous mode		
Isochronous mode	Yes	Yes; Via PROFIBUS DP or PROFINET interface
Number of DP masters with isochronous mode		2
User 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; 0.5 ms without use of SFC 126, 127
Max. cycle	32 ms	32 ms
Standards, approvals, certificates		
Configuration software		
• STEP 7	Yes	Yes
Programming		
• Programming language		
- LAD	Yes	Yes
- FBD	Yes	Yes
- STL	Yes	Yes
- SCL	Yes	Yes
- CFC	Yes	Yes
- GRAPH	Yes	Yes
- HiGraph®	Yes	Yes
• Command set	See instruction list	See instruction list
• Nesting levels	7	7
Know-how protection		
• User program protection/password protection	Yes	Yes
• Block encryption		Yes; With S7 block Privacy
Dimensions and weight		
Required slots	1	2
Dimensions		
• Width	25 mm	50 mm
• Height	290 mm	290 mm
• Depth	219 mm	219 mm
Weight		
• Weight, approx.	720 g	900 g

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Ordering data	Order No.
CPU 416F-2	**6ES7 416-2FN05-0AB0**
For configuring safety-related automation systems; 5.6 MB RAM, 24 V DC power supply, MPI/PROFIBUS DP master interface, PROFIBUS DP master interface, slot for memory card, incl. slot number labels	
CPU 416F-3 PN/DP	
For configuring safety-related automation systems; 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	
11.2 MB work memory	**6ES7 416-3FR05-0AB0**
16 MB work memory	**6ES7 416-3FS06-0AB0**
Option package S7 F Distributed Safety V5.4	
for generating fail-safe programs for the S7-300F	
Floating license	**6ES7 833-1FC02-0YA5**
Upgrade from V5.x to V5.4	**6ES7 833-1FC02-0YE5**
Software Update Service	**6ES7 833-1FC00-0YX2**
Memory card RAM	
64 KB	**6ES7 952-0AF00-0AA0**
256 KB	**6ES7 952-1AH00-0AA0**
1 MB	**6ES7 952-1AK00-0AA0**
2 MB	**6ES7 952-1AL00-0AA0**
4 MB	**6ES7 952-1AM00-0AA0**
8 MB	**6ES7 952-1AP00-0AA0**
16 MB	**6ES7 952-1AS00-0AA0**
64 MB	**6ES7 952-1AY00-0AA0**
FEPROM memory card	
64 KB	**6ES7952-0KF00-0AA0**
256 KB	**6ES7952-0KH00-0AA0**
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**

		Order No.
MPI cable		**6ES7 901-0BF00-0AA0**
for connection of SIMATIC S7 and PG via MPI; 5 m in length		
IF 964-DP interface module		**6ES7 964-2AA04-0AB0**
For connecting an additional DP line		
Slot number labels		**6ES7 912-0AA00-0AA0**
1 set (spare part)		
Manual "SIMATIC S7-400 programmable controller"		
incl. instruction list		
German		**6ES7 498-8AA05-8AA0**
English		**6ES7 498-8AA05-8BA0**
S7-400 operation list		
German		**6ES7 498-8AA05-8AN0**
English		**6ES7 498-8AA05-8BN0**
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	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC		
SIMATIC manual collection update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		
Brochure "SIMATIC S7-400 programmable controller - Design and application"		
German		**6ES7 498-8AA00-8AB0**
English		**6ES7 498-8AA00-8BB0**

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

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Ordering data

	Order No.
PROFIBUS bus components	
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 972-0BA42-0XA0**
With PG interface	**6ES7 972-0BB42-0XA0**
RS 485 bus connector with 90° cable outlet for Fast Connect system	
Max. transfer rate 12 Mbit/s	
without PG interface	
• 1 unit	**6ES7 972-0BA52-0XA0**
• 100 units	**6ES7 972-0BA52-0XB0**
with PG interface	
• 1 unit	**6ES7 972-0BB52-0XA0**
• 100 units	**6ES7 972-0BB52-0XB0**
RS 485 bus connector with axial cable outlet	
For SIMATIC OP, for connection to PPI, MPI, PROFIBUS	**6GK1 500-0EA02**
PROFIBUS FastConnect bus cable	
Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m	**6XV1 830-0EH10**
RS 485 repeater for PROFIBUS	**6ES7 972-0AA02-0XA0**
Transfer rate up to 12 Mbit/s; 24 V DC; IP20 enclosure	

	Order No.
PROFINET bus components	
IE FC TP standard cable GP 2x2	**6XV1 840-2AH10**
4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug; PROFINET-compatible; with UL approval;	
Sold by the meter	
FO standard cable GP (50/125)	**6XV1 873-2A**
Standard cable, splittable, UL approval, sold by the meter	
SCALANCE X204-2 Industrial Ethernet Switch I	**6GK5 204-2BB10-2AA3**
Industrial Ethernet Switches with integral SNMP access, web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbit/s RJ45 ports and two FO ports	
IE FC RJ45 plugs	
RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables	
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**
PROFIBUS/PROFINET bus components	see Catalogs IK PI, CA 01
For establishing MPI/PROFIBUS/ PROFINET communication	

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Overview CPU 412H



- 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 414H



- 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 connection slots for sync modules

Overview CPU 417H



- 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 connection slots for sync modules

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Technical specifications

	6ES7 412-3HJ14-0AB0	6ES7 414-4HM14-0AB0	6ES7 417-4HT14-0AB0
Product version			
Hardware product version	1	1	1
Firmware version	V4.5	V4.5	V4.5
associated programming package	STEP7 V 5.3 SP2 or higher with HW update	STEP7 V 5.3 SP2 or higher with HW update	STEP7 V 5.3 SP2 or higher with HW update
Supply voltages			
Rated value			
• 24 V DC	No; Power supply via system power supply	No; Power supply via system power supply	No; Power supply via system power supply
Feeding of external backup voltage to CPU	5 to 15 V DC	5 to 15 V DC	5 to 15 V DC
Current consumption			
from backplane bus 5 V DC, max.	1.5 A	1.7 A	1.8 A
from interface 5 V DC, max.	90 mA; At each DP interface	90 mA; At each DP interface	90 mA; At each DP interface
Power losses			
Power loss, typ.	5.5 W	6 W	6.5 W
Backup battery			
Battery operation			
• Backup current, typ.	190 µA; Valid up to 40°C	190 µA; Valid up to 40°C	970 µA; Valid up to 40°C
• Backup current, max.	660 µA	660 µA	1 980 µA
Memory			
Work memory			
• 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 FEPROM	Yes	Yes	Yes
• expandable FEPROM, 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 to 4095	4 095; Number range: 1 to 4095	8 191; Number range: 1 - 8191
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte
FB			
• Number, max.	2 048; Number range: 0 to 2047	2 048; Number range: 0 to 2047	6 144; Number range: 0 - 6143
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte
FC			
• Number, max.	2 048; Number range: 0 to 2047	2 048; Number range: 0 to 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

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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
Counters, timers and their retentivity			
S7 counter			
• Number	2 048	2 048	2 048
• Retentivity			
- adjustable	Yes	Yes	Yes
- lower limit	0	0	0
- upper limit	2 047	2 047	2 047
- preset	Z 0 to Z 7	Z 0 to Z 7	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
• Retentivity			
- 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 retentivity			
retentive 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
• Retentivity available	Yes	Yes	Yes
• Number of clock memories	8; (in 1 memory byte)	8; (in 1 memory byte)	8; (in 1 memory byte)
Data blocks			
• Number, max.	4 095; Number range: 1 to 4095	4 095; Number range: 1 to 4095	8 191; Number range: 1 - 8191
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte
Local data			
• adjustable, max.	16 Kibyte	16 Kibyte	64 Kibyte
• preset	8 Kibyte	8 Kibyte	32 Kibyte
Address area			
I/O address area			
• overall	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

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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 configuration			
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
Interface modules			
• Number of connectable IMs (total), max.	6	6	6
• Number of connectable IMs 460, max.	6	6	6
• Number of connectable IMs 463, 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 by number of slots and number of connections	See manual Automation System S7-400H fault-tolerant systems. Limited by number of slots and number of connections	See manual Automation System S7-400H fault-tolerant systems. Limited by number of slots and number of connections
• CP, point-to-point	See manual Automation System S7-400H fault-tolerant systems. Limited by number of slots and number of connections	See manual Automation System S7-400H fault-tolerant systems. Limited by number of slots and number of connections	See manual Automation System S7-400H fault-tolerant systems. Limited by 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
Time			
Clock			
• Hardware clock (real-time clock)	Yes	Yes	Yes
• battery-backed and synchronizable	Yes	Yes	Yes
• Resolution	1 ms	1 ms	1 ms
Runtime meter			
• Number	8	8	8

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Technical specifications (continued)

	6ES7 412-3HJ14-0AB0	6ES7 414-4HM14-0AB0	6ES7 417-4HT14-0AB0
Clock synchronization			
• supported	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
Process 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
• User 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)
• User 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

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Technical specifications (continued)

	6ES7 412-3HJ14-0AB0	6ES7 414-4HM14-0AB0	6ES7 417-4HT14-0AB0
1st interface			
Type of interface	Integrated	Integrated	Integrated
Physics	RS 485 / PROFIBUS + MPI	RS 485 / PROFIBUS + MPI	RS 485 / PROFIBUS + MPI
Isolated	Yes	Yes	Yes
Power supply to interface (15 to 30 V DC), max.	150 mA	150 mA	150 mA
Number of connection resources	MPI: 16, DP: 16	MPI: 32, DP: 32	MPI: 44, DP: 32
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
- S7 communication, as client			Yes
- S7 communication, as server			Yes
• Transmission rate, 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 mode support	No	No	No
- SYNC/FREEZE	No	No	No
- Activation/deactivation of DP slaves	No	No	No
- Direct data exchange (slave-to-slave communication)	No	No	No
• Transmission rate, 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
• User data per DP slave			
- User data per DP slave, max.	244 byte	244 byte	244 byte
- Inputs, max.	244 byte	244 byte	244 byte
- Outputs, max.	244 byte	244 byte	244 byte
- Slots, max.	244	244	244
- per slot, max.	128 byte	128 byte	128 byte
DP slave			
• Number of connections	No configuration of CPU as DP slave		

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Technical specifications (continued)

	6ES7 412-3HJ14-0AB0	6ES7 414-4HM14-0AB0	6ES7 417-4HT14-0AB0
2nd interface			
Type of interface		Integrated	Integrated
Physics		RS 485 / PROFIBUS + MPI	RS 485 / PROFIBUS + MPI
Isolated		Yes	Yes
Power supply to interface (15 to 30 V DC), max.		150 mA	150 mA
Number of connection resources		16	32
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
- Global data communication		No	No
- S7 basic communication		No	No
- S7 communication		Yes	Yes
- Equidistance mode support		No	No
- SYNC/FREEZE		No	No
- Activation/deactivation of DP slaves		No	
- Direct data exchange (slave-to-slave communication)		No	No
• Transmission rate, 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
• User data per DP slave			
- User data per DP slave, max.		244 byte	244 byte
- Inputs, max.		244 byte	244 byte
- Outputs, max.		244 byte	244 byte
- Slots, max.		244	244
- per slot, max.		128 byte	128 byte
3rd interface			
Type of interface	Pluggable synchronization submodule (FO)	Pluggable synchronization submodule (FO)	Pluggable synchronization submodule (FO)
Plug-in 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
4th interface			
Type of interface	Pluggable synchronization submodule (FO)	Pluggable synchronization submodule (FO)	Pluggable synchronization submodule (FO)
Plug-in 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			
Isochronous mode	No		
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

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Technical specifications (continued)

	6ES7 412-3HJ14-0AB0	6ES7 414-4HM14-0AB0	6ES7 417-4HT14-0AB0
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
• FBD	Yes	Yes	Yes
• STL	Yes	Yes	Yes
• SCL	Yes	Yes	Yes
• CFC	Yes	Yes	Yes
• GRAPH	Yes	Yes	Yes
• HiGraph®	Yes	Yes	Yes
Nesting levels	8	8	8
Know-how protection			
• User program protection/password protection	Yes	Yes	Yes
Dimensions			
Required slots	2	2	2
Dimensions and weight			
Dimensions			
• Width	50 mm	50 mm	50 mm
• Height	290 mm	290 mm	290 mm
• Depth	219 mm	219 mm	219 mm
Weight			
• Weight, approx.	990 g	995 g	995 g

Ordering data

	Order No.
CPU 412-3H For S7-400H and S7-400F/FH; 768 KB work memory, combined MPI/PROFIBUS DP master interface, 2 slots for sync modules, slot for memory card, incl. slot number labels	**6ES7 412-3HJ14-0AB0**
CPU 412-3H system bundle 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	
412H system bundle, 1 MB, 120/230 V AC, 10 A	**6ES7 400-0HR00-4AB0**
412H system bundle, 1 MB, 24/48/60 V DC, 10 A I	**6ES7 400-0HR50-4AB0**
CPU 414-4H For S7-400H and S7-400F/FH; 2.8 MB work memory, MPI/ PROFIBUS DP master interface, 2 slots for sync modules, slot for memory card, incl. slot number labels	**6ES7 414-4HM14-0AB0**

	Order No.
CPU 417-4H For S7-400H and S7-400F/FH; 30 MB work memory, MPI/ PROFIBUS DP master interface, 2 slots for sync modules, slot for memory card, incl. slot number labels	**6ES7 417-4HT14-0AB0**
Memory card RAM	
1 MB	**6ES7 952-1AK00-0AA0**
2 MB	**6ES7 952-1AL00-0AA0**
4 MB	**6ES7 952-1AM00-0AA0**
8 MB	**6ES7 952-1AP00-0AA0**
16 MB	**6ES7 952-1AS00-0AA0**
64 MB	**6ES7 952-1AY00-0AA0**
FEPROM memory card	
1 MB	**6ES7 952-1KK00-0AA0**
2 MB	**6ES7 952-1KL00-0AA0**
4 MB	**6ES7 952-1KM00-0AA0**
8 MB	**6ES7 952-1KP00-0AA0**
16 MB	**6ES7 952-1KS00-0AA0**
32 MB	**6ES7 952-1KT00-0AA0**
64 MB	**6ES7 952-1KY00-0AA0**

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Ordering data		Order No.
MPI cable For connecting SIMATIC S7 and the PG through MPI; 5 m in length		**6ES7 901-0BF00-0AA0**
Slot number labels 1 set (spare part)		**6ES7 912-0AA00-0AA0**
S7 F systems RT license For processing safety-related user programs, for one S7 400H-based system each with CPU 412-3H, CPU 414-4H or CPU 417-4H		**6ES7 833-1CC00-6YX0**
S7 F systems V6.1 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 XP Prof SP2/ SP3, Windows Server 2003 SP2 2 languages (German, English) Type of delivery: Certificate of License as well as software and electronic documentation on CD		**6ES7 833-1CC02-0YA5**
S7 F systems upgrade from V5.x/V6.0 to V6.1 2 languages (German, English), Floating License for 1 user Type of delivery: Certificate of License as well as software and electronic documentation on CD		**6ES7 833-1CC02-0YE5**
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 Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	J	**6ES7 998-8XC01-8YE0**
SIMATIC manual collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	D	**6ES7 998-8XC01-8YE2**
Brochure "SIMATIC S7-400 automation system - design and application"		
German		**6ES7 498-8AA00-8AB0**
English		**6ES7 498-8AA00-8BB0**
RS 485 bus connector with 90° cable outlet		
Max. transmission rate 12 Mbit/s		
Without PG interface		**6ES7 972-0BA12-0XA0**
With PG interface		**6ES7 972-0BB12-0XA0**
RS 485 bus connector with angled cable outlet		
Max. transmission rate 12 Mbit/s		
Without PG interface		**6ES7 972-0BA42-0XA0**
With PG interface		**6ES7 972-0BB42-0XA0**
Max. transmission rate 1.5 Mbit/s		
Without PG interface		**6ES7 972-0BA30-0XA0**
RS 485 bus connector with 90° cable outlet for FastConnect connection system		
Max. transmission rate 12 Mbit/s		
Without PG interface		
• 1 unit		**6ES7 972-0BA52-0XA0**
• 100 units		**6ES7 972-0BA52-0XB0**
With PG interface		
• 1 unit		**6ES7 972-0BB52-0XA0**
• 100 units		**6ES7 972-0BB52-0XB0**
RS 485 bus connector with axial cable outlet		
For SIMATIC OP, for connecting to PPI, MPI, PROFIBUS		**6GK1 500-0EA02**
PROFIBUS FastConnect bus cable Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m		**6XV1 830-0EH10**

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

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Sync-module for coupling the CPU 41xH

Overview



- For coupling the two CPU 41xH in the S7-400H subunits.
- Can be plugged directly into the CPU

Technical specifications

	6ES7 960-1AA04-0XA0	6ES7 960-1AB04-0XA0
Current consumption		
from CPU, max.	210 mA	250 mA
Power losses		
Power loss, typ.	1.1 mW	1.3 mW
Dimensions and weight		
Dimensions		
• Width	25 mm	25 mm
• Height	53 mm	53 mm
• Depth	140 mm	140 mm
Weight		
• Weight, approx.	65 g	65 g

Ordering data

		Order No.
Sync module		
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	I	**6ES7 960-1AA04-0XA0**
For 6ES7 414-4HM14-0AB0 and 6ES7 417-4HT14-0AB0; for patch and installation cables, can be used for fiber-optic cables up to 10 km in length	I	**6ES7 960-1AB04-0XA0**

	Order No.
Fiber-optic connecting cable	
For Sync module 6ES7 960-1Ax04-0XA0	
• 1 m	**6ES7 960-1AA04-5AA0**
• 2 m	**6ES7 960-1AA04-5BA0**
• 10 m	**6ES7 960-1AA04-5KA0**
For Sync module 6ES7 960-1AB04-0XA0; fiber-optic monomode LC/LC duplex crossed 9/125 µ (max. 10 km)	On request

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Overview



- Bus coupler for the transition from a redundant PROFIBUS DP master system to a single-channel PROFIBUS DP master system
- To connect devices with a single PROFIBUS DP interface to the redundant PROFIBUS DP master system of the SIMATIC S7-400H

Technical specifications

	6ES7 153-2BA02-0XB0
Power supply	
Input current	
• Rated value at 24 V DC	650 mA
Output voltage	
• Rated value, 5 V DC	Yes
Output current	
• for backplane bus (5 V DC), max.	1.5 A
Supply voltages	
Rated value	
• 24 V DC	Yes
• permissible range (ripple included), lower limit (DC)	20.4 V
• permissible range (ripple included), upper limit (DC)	28.8 V
External protection for supply cables (recommendation)	2.5 A
Mains buffering	
• Mains/voltage failure stored energy time	5 ms
Current consumption	
Current consumption, max.	600 mA
Inrush current, typ.	3 A
I^2t	0.1 $A^2 \cdot s$
Power losses	
Power loss, typ.	5.5 W
Address area	
Addressing volume	
• Outputs	244 byte
• Inputs	244 byte
Hardware configuration	
Number of modules per DP slave interface module, max.	12

	6ES7 153-2BA02-0XB0
Communication functions	
Bus protocol/transmission protocol	PROFIBUS DP to EN 50170
Interfaces	
PROFIBUS DP, output current, max.	70 mA
Interface physics, RS 485	Yes
Interface physics, FOC	No
Connection method	
PROFIBUS DP	9-pin sub D
PROFIBUS DP	
Transmission procedure	RS 485
Transmission rate, max.	12 Mbit/s
Node addresses	1 to 125 permitted
Automatic detection of transmission speed	Yes
SYNC capability	Yes
FREECE capability	Yes
Direct data exchange (slave-to-slave communication)	Yes; Sender
1st interface	
DP slave	
• GSD file	SI04801.GSG
• Automatic baud rate search	Yes
Programming	
Configuration software	
• STEP 7	Yes; STEP 7 / COM PROFIBUS / non-Siemens tools via GSD file

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Technical specifications (continued)

	6ES7 153-2BA02-0XB0
Time stamping	
Accuracy	1 ms; 1ms at up to 8 modules; 10ms at up to 12 modules
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
Time format	RFC 1119
Time resolution	0.466 ns
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
Isolation	
Isolation checked with	Isolation voltage 500 V
Environmental requirements	
Operating temperature	
• Min.	0 °C
• Max.	60 °C
Air pressure	
• Operating altitude above sea level, max.	3 000 m
Degree of protection	
IP20	Yes
General information	
Vendor identification (VendorID)	801Eh
Dimensions and weight	
Dimensions	
• Width	40 mm
• Height	125 mm
• Depth	117 mm
Weight	
• Weight, approx.	360 g

	6ES7 197-1LB00-0XA0
Product type designation	
Requirements for DP master system	
• Length of parameter assignment message	244 byte
Supply voltages	
Description	via bus module
Rated value	
• permissible range, lower limit (DC)	20.4 V
• permissible range, upper limit (DC)	28.8 V
Protocols	
PROFIBUS DP protocol	Yes
PROFIBUS DP	
Properties of the lower-level DP master systems	
• Transmission rate, 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
Alarms/diagnostics/status information	
Status indicator	No
Alarms	
• Alarms	No
Diagnostics	
• Diagnostic functions	Yes
Galvanic isolation	
to lower-level DP master system	Yes
Dimensions and weight	
Dimensions	
• Width	40 mm
• Height	125 mm
• Depth	130 mm
Weight	
• Weight, approx.	200 g

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Ordering data	Order No.
For use with STEP 7 from V5.4 or PCS 7 from V7.0:	
Y-Link I For connecting single-channel DP slaves to SIMATIC S7-400H; consisting of 2 IM 153 interface modules (6ES7 153-2BA02-0XB0), 1 Y coupler (6ES7 197-1LB00-0XA0), 1 BM IM/IM bus module (6ES7 195-7HD80-0XA0), 1 BM Y coupler bus module (6ES7 654-7HY00-0XA0)	**6ES7 197-1LA04-0XA0**

	Order No.
For use with PCS 7 V6.0 or higher:	
Y-Link I For connecting single-channel DP slaves to SIMATIC S7-400H; consisting of 2 IM 153 interface modules (6ES7 153-2BA82-0XB0), 1 Y coupler (6ES7 197-1LB00-0XA0), 1 BM IM/IM bus module (6ES7 195-7HD80-0XA0), 1 BM Y coupler bus module (6ES7 654-7HY00-0XA0)	**6ES7 197-1LA11-0XA0**
Accessories	
Mounting rail For assembling the Y link with active bus modules	
• Length 483 mm	**6ES7 195-1GA00-0XA0**
• Length 530 mm	**6ES7 195-1GF30-0XA0**

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Overview



- CPU for SIMATIC S7-400H and S7-400F/FH
- Usable in high-availability systems S7-400H
- Usable with F runtime license as F-capable CPU in S7-400F/FH safety-related systems
- Features a combined MPI/PROFIBUS DP master interface
- Features 2 connection slots for sync modules

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS CPU 412H	
Order number	**6AG1 412-3HJ14-4AB0**
Order No. based on	**6ES7 412-3HJ14-0AB0**
Ambient temperature range	0 ... +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions.

Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

	Order No.
SIPLUS CPU 412-3H (medial exposure) for S7-400H and S7-400F/FH; 768 KB work memory, combined MPI/PROFIBUS DP master interface, 2 slots for sync modules, slot for memory card, including the mounting position labels	**6AG1 412-3HJ14-4AB0**
Accessories	See SIMATIC CPU 412-3H, page 6/82

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Overview



CPU for SIMATIC S7-400H and S7-400F/FH

- Usable in high-availability systems S7-400H
- Usable with F runtime license as F-capable CPU in S7-400F/FH safety-related systems
- With integral PROFIBUS DP master interface
- Features 2 connection slots for sync modules

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS CPU 414-4H	
Order number	**6AG1 414-4HM14-4AB0**
Order No. based on	**6ES7 414-4HM14-0AB0**
Ambient temperature range	0 ... +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions.

Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1)2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

SIPLUS CPU 414-4H (medial exposure) For S7-400H and S7-400F/FH; work memory 2.8 MB, MPI/ PROFIBUS DP master interface, 2 slots for synchronization modules, slot for memory card, incl. slot number labels	L	**6AG1 414-4HM14-4AB0**
Accessories		See SIMATIC CPU 414-4H, page 6/82

L: Subject to export regulations AL: 9I999 and ECCN: N

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Overview



CPU for SIMATIC S7-400H and S7-400F/FH

- Usable in high-availability systems S7-400H
- Usable with F runtime license as F-capable CPU in S7-400F/FH safety-related systems
- With integral PROFIBUS DP master interface
- Features 2 connection slots for sync modules

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

	SIPLUS CPU 417H
Order number	**6AG1 417-4HT14-4AB0**
Order No. based on	**6ES7 417-4HT14-0AB0**
Ambient temperature range	0 ... +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions

Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS CPU 417H (medial exposure) for S7-400H and S7-400F/FH; 30 MB work memory, MPI/ PROFIBUS DP master interface, 2 slots for sync modules, slot for memory card, incl. slot number labels	H	**6AG1 417-4HT14-4AB0**
Accessories		See SIMATIC CPU 417-4H, page 6/82

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H

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Overview



- For linking the two CPUs 414-4H/417-4H in the subunits of the S7-400H
- Can be plugged direct into the CPU

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS sync module (up to 10 m)	
Order number	**6AG1 960-1AA04-4XA0**
Order number based on	**6ES7 960-1AA04-0XA0**
Ambient temperature range	0 ... +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions.

Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

SIPLUS Sync module (medial exposure) for coupling the CPU 41xH for S7-400H/F/FH; 2 modules required per CPU;	L	**6AG1 960-1AA04-4XA0**
Accessories		See SIMATIC Sync module, page 6/84

L: Subject to export regulations AL: 9I999 and ECCN: N

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SIPLUS Y-Link for S7-400H

Overview



- Bus coupler for transition from a redundant PROFIBUS DP master system to a single-channel PROFIBUS DP master system
- For connection of devices with only one PROFIBUS DP interface to the redundant PROFIBUS DP master system of the SIMATIC S7-400H

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

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	SIPLUS Y-Link for S7-400H	SIPLUS S7 BUS MODULE BM Y-coupler
Order No.	**6AG1 197-1LA11-4XA0**	**6AG1 654-7HY00-7XA0**
Order No. based on	**6ES7 197-1LA11-0XA0**	**6ES7 654-7HY00-0XA0**
Ambient temperature range	0 °C to +60 °C	-25 °C to +70 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	
Ambient conditions		
Relative humidity	5 ... 100 % Condensation permissible	
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)	
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]	
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]	
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K	

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
For use with STEP 7 from V5.4 or PCS 7 from V7.0:		
SIPLUS Y-Link for S7-400H (medial exposure) for connecting single-channel DP slaves to SIMATIC S7-400H; consisting of 2 IM 153 interface modules, 1 Y-coupler, 1 BM IM/IM bus module, 1 BM Y-coupler bus module	H	**6AG1 197-1LA11-4XA0**

		Order No.
Accessories		
SIPLUS S7 BUS MODULE BM Y-coupler (medial exposure)	L	**6AG1 654-7HY00-7XA0**
Additional accessories		See SIMATIC Y-Link, page 6/87

L: Subject to export regulations AL: 9I999 and ECCN: N

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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
- The following connection options are available for each S7-400 CPU:
  - A PROFIBUS module in the CPUs 414-3, 414(F)-3 PN/DP, 416-3, 416(F)-3 PN/DP
  - Two PROFIBUS modules in the CPU 417-4

Note:

Can only be used with CPUs 6ES7 414-3XM05-0AB0, 6ES7 414-3EM05-0AB0, 6ES7 414-3EM06-0AB0, 6ES7 414-3FM06-0AB0, 6ES7 416-3XR05-0AB0, 6ES7 416-3ER05-0AB0, 6ES7 416-3ES06-0AB0, 6ES7 416-3FS06-0AB0 and 6ES7 417-4XT05-0AB0.

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.
Power losses	
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: 1200 m max.; at 12 Mbit/s: 100 m max.
1st interface	
Physics	RS 485
Isolated	Yes
Functionality	
• DP master	Yes; Default setting
• DP slave	Yes
DP master	
• Services	
- PG/OP communication	Yes
- Equidistance mode support	Yes
- SYNC/FREEZE	Yes
- Direct data exchange (slave-to-slave communication)	Yes
• Transmission rate, max.	12 Mbit/s
• Transmission rate, 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
• User data per DP slave	
- Inputs, max.	244 byte
- Outputs, max.	244 byte
Dimensions and weight	
Dimensions	
• Width	26 mm
• Height	54 mm
• Depth	130 mm
Weight	
• Weight, approx.	65 g

Ordering data

	Order No.
IF-964 DP interface module	**6ES7 964-2AA04-0AB0**
Interface module with integral PROFIBUS DP master interface	

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Overview



- To connect distributed I/O via PROFIBUS DP
- Max. transmission rate 12 Mbit/s
- Electrically isolated RS-485 interface
- Connection via 9-pin Sub-D socket
- Depending on the S7-400 CPU, one or two PROFIBUS modules are pluggable:
  - CPU 414-3/416-3: 1 module
  - CPU 417-4: 2 modules

Notes:

Can only be used with the CPUs 6AG1 416-3XR05-4AB0, 6AG1 416-3ER05-4AB0 and 6AG1 417-4XT05-4AB0.

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

	IF-964 DP SIPLUS PROFIBUS module
Order No.	**6AG1 964-2AA04-2AB0**
Order No. based on	**6ES7 964-2AA04-0AB0**
Ambient temperature range	-25 ... +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions.
Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
IF-964 DP SIPLUS interface module (extended temperature range and medial exposure) Interface module with integrated PROFIBUS DP master interface	L	**6AG1 964-2AA04-2AB0**

L: Subject to export regulations AL: 9I999 and ECCN: N

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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 5 V DC, max.	130 mA	20 mA	200 mA	80 mA	150 mA
from supply voltage L+, max.	120 mA				
Power losses					
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					
• all mounting positions					
- Concurrently controllable inputs, up to 40 °C	16	32	32	16	16
- Concurrently 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

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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					
- parameterizable	Yes				Yes
- Rated value					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	Yes	Yes	Yes	Yes	Yes
- permissible quiescent current (2-wire BEROS), max.	3 mA	1.5 mA	1 mA	5 mA; AC: 5 mA	0.5 mA; 0.5 to 2 mA
Alarms/diagnostics/ status information					
Alarms					
• Diagnostic alarm	Yes; Parameterizable				Yes; Parameterizable
• Process alarm	Yes; Parameterizable				Yes; Parameterizable
Diagnostics					
• 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
Galvanic isolation					
Galvanic isolation digital inputs					
• between the channels, in groups of	8	32	8	4	1
• between the channels and the backplane bus	Yes	Yes	Yes	Yes	Yes
Dimensions and weight					
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
Weight					
• Weight, approx.	600 g	500 g	600 g	650 g	600 g

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Ordering data		Order No.
SM 421 digital input modules		
16 inputs, 24 V DC, with process/ diagnostic alarm		**6ES7 421-7BH01-0AB0**
32 inputs, 24 V DC		**6ES7 421-1BL01-0AA0**
32 inputs, 120 V AC/DC		**6ES7 421-1EL00-0AA0**
16 inputs, 120/230 V AC/DC, inputs according to IEC 1131-2 Type 2		**6ES7 421-1FH20-0AA0**
16 inputs, 24 to 60 V AC/DC, with process/diagnostic alarm		**6ES7 421-7DH00-0AB0**
Front connectors		
48-pin		
• with screw contacts, 1 unit	I	**6ES7 492-1AL00-0AA0**
• with screw contacts, 84 units	F	**6ES7 492-1AL00-1AB0**
• with spring-loaded terminals, 1 unit		**6ES7 492-1BL00-0AA0**
• with crimp contacts, 1 unit	I	**6ES7 492-1CL00-0AA0**
• with crimp contacts, 84 units		**6ES7 492-1CL00-1AB0**
SIMATIC TOP connect		see page 6/164; Information about which components can be used for the respective module, see Industry 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	J	**2XV9 450-1SL03-0YX0**
Upgrade single license	J	**2XV9 450-1SL03-0YX4**

		Order No.
Labeling sheets for machine inscription		
DIN A4, for printing using laser printer; pack of 10		
petrol		**6ES7 492-2AX00-0AA0**
light-beige		**6ES7 492-2BX00-0AA0**
yellow		**6ES7 492-2CX00-0AA0**
red		**6ES7 492-2DX00-0AA0**
SIMATIC manual collection	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC		
SIMATIC manual collection update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		
Manual "SIMATIC S7-400 programmable controller"		
incl. instruction list		
German		**6ES7 498-8AA05-8AA0**
English		**6ES7 498-8AA05-8BA0**

D: Subject to export regulations AL: N and ECCN: 5D992
F: Subject to export regulations AL: N and ECCN: EAR99
I: Subject to export regulations AL: N and ECCN: EAR99H
J: Subject to export regulations AL: N and ECCN: EAR99S

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SM 422 digital output module

Overview



- Digital outputs for the SIMATIC S7-400
- For connecting solenoid valves, contactors, low-power motors, lamps and motor starters

Technical specifications

	6ES7 422-1FH00-0AA0	6ES7 422-1HH00-0AA0	6ES7 422-1BH11-0AA0	6ES7 422-1BL00-0AA0	6ES7 422-7BL00-0AB0
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 5 V DC, max.	400 mA	1 A	160 mA	200 mA	200 mA
Power losses					
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	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)
Output current					
• for signal "1" rated value	2 A	5 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

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Technical specifications (continued)

	6ES7 422-1FH00-0AA0	6ES7 422-1HH00-0AA0	6ES7 422-1BH11-0AA0	6ES7 422-1BL00-0AA0	6ES7 422-7BL00-0AB0
• 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 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					
• 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 (15 AC / 13 DC); 3000000 mechanical			
Switching capacity of 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)			
Alarms/diagnostics/ status information					
Alarms					
• Diagnostic alarm					Yes; Parameterizable
Diagnostics					
• Diagnostics					Yes; internal/ external fault
Isolation					
Isolation checked with	1500 V AC	1500 V AC	500 V DC	500 V DC	500 V DC
Galvanic isolation					
Galvanic isolation digital outputs					
• between the channels, in groups of	4	2	8	32	8
• between the channels and the backplane bus	Yes	Yes	Yes	Yes	Yes
Dimensions and weight					
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
Weight					
• Weight, approx.	800 g	700 g	600 g	600 g	600 g

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SM 422 digital output module

Ordering data		Order No.
SM 422 digital output modules		
16 outputs, 24 V DC; 2 A		**6ES7 422-1BH11-0AA0**
32 outputs, 24 V DC; 0.5 A		**6ES7 422-1BL00-0AA0**
32 outputs, 24 V DC, 0.5 A; with diagnostics		**6ES7 422-7BL00-0AB0**
16 outputs, 120/230 V AC; 2 A		**6ES7 422-1FH00-0AA0**
16 outputs, relay contacts		**6ES7 422-1HH00-0AA0**
Front connectors		
48-pin		
• with screw contacts, 1 unit	I	**6ES7 492-1AL00-0AA0**
• with screw contacts, 84 units	F	**6ES7 492-1AL00-1AB0**
• with spring-loaded terminals, 1 unit		**6ES7 492-1BL00-0AA0**
• with crimp contacts, 1 unit	I	**6ES7 492-1CL00-0AA0**
• with crimp contacts, 84 units		**6ES7 492-1CL00-1AB0**
SIMATIC TOP connect		see page 6/164 Information about which components can be used for the respective module, see Industry 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	J	**2XV9 450-1SL03-0YX0**
Upgrade single license	J	**2XV9 450-1SL03-0YX4**

		Order No.
Labeling sheets for machine inscription		
DIN A4, for printing using laser printer; pack of 10		
petrol		**6ES7 492-2AX00-0AA0**
light-beige		**6ES7 492-2BX00-0AA0**
yellow		**6ES7 492-2CX00-0AA0**
red		**6ES7 492-2DX00-0AA0**
SIMATIC manual collection	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC		
SIMATIC manual collection update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		
Manual "SIMATIC S7-400 programmable controller"		
incl. instruction list		
German		**6ES7 498-8AA05-8AA0**
English		**6ES7 498-8AA05-8BA0**

D: Subject to export regulations AL: N and ECCN: 5D992
F: Subject to export regulations AL: N and ECCN: EAR99
I: Subject to export regulations AL: N and ECCN: EAR99H
J: Subject to export regulations AL: N and ECCN: EAR99S

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Overview



- Digital inputs for SIMATIC S7-400
- For connection of switches and 2-wire proximity switches (BEROs)

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS SM 421 digital input module	
Order number	**6AG1 421-1BL01-2AA0**
Order No. based on	**6ES7 421-1BL01-0AA0**
Ambient temperature range	-25 ... +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions

Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS SM 421 digital input modules		
(extended temperature range and medial exposure)		
32 inputs, 24 V DC	L	**6AG1 421-1BL01-2AA0**
Accessories		See SIMATIC S7-400 digital input modules, page 6/97

L: Subject to export regulations AL: 9I999 and ECCN: N

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SIPLUS SM 422 digital output module

Overview



- Digital outputs for SIMATIC S7-400
- For connecting solenoid valves, contactors, small-power motors, lamps and motor starters

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS SM 422 digital input module	
Order number	**6AG1 422-1BL00-2AA0**
Order No. based on	**6ES7 422-1BL00-0AA0**
Ambient temperature range	-25 ... +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions

Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS SM 422 digital output modules		
(extended temperature range and medial exposure)		
32 outputs, 24 V DC	L	**6AG1 422-1BL00-2AA0**
Accessories		See SIMATIC S7-400 digital output modules, page 6/100

L: Subject to export regulations AL: 9I999 and ECCN: N

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Overview



- Analog inputs for the SIMATIC S7-400
- For connection of voltage and current sensors, thermocouples, resistors and resistance thermometers
- Resolution from 13 to 16 bit

Technical specifications

	6ES7 431-0HH00-0AB0	6ES7 431-1KF20-0AB0	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 5 V DC, max.	100 mA	1 000 mA	350 mA	600 mA
Power losses				
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

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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 Ohm
Voltage input				
• permissible input voltage for voltage input (destruction limit), max.	20 V; 20 V DC permanent, 75 V DC for max. 1 s (duty factor 1:20)	18 V; 18 V permanent, 75 V for 1 ms (mark to space ratio 1:20)	50 V	18 V; 18 V permanent, 75 V for 1 ms (mark to space ratio 1:20)
Current input				
• permissible input current for current input (destruction limit), max.	40 mA	40 mA; permanent	50 mA; 40 mA permanent	40 mA; permanent
Characteristic linearization				
• parameterizable				Yes
• for thermocouples				Type B, E, J, K, L, N, R, S, T, U
• for resistance thermometer				Pt100, Pt200, Pt500, Pt1000, Ni100, Ni1000
Temperature compensation				
• internal temperature compensation				No
• external temperature compensation with compensations socket				Yes
• external temperature compensation with Pt100				Yes
• dynamic reference temperature value				Yes

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Technical specifications (continued)

	6ES7 431-0HH00-0AB0	6ES7 431-1KF20-0AB0	6ES7 431-1KF00-0AB0	6ES7 431-1KF10-0AB0
Analog value creation				
Integrations and conversion time/ resolution per channel				
• Resolution with overrange (bit including sign), max.	13 bit	14 bit; 14 / 14 / 14	13 bit	14 bit; with activated filtering: 16 bits
• Integration time, parameterizable	Yes	Yes	Yes	Yes
• Basic conversion time, ms	55 / 65 ms	52 µs	23 / 25 ms	20.1 / 23.5 ms
• Integration time, ms	50 / 60 ms		16.7 / 20 ms	16.7 / 20 ms
- additional conversion time for wire break monitoring				4.3 ms
- additional conversion time for resistance measurement				40.2 / 47 ms
- additional conversion time for wire break monitoring and resistance measurement				5.5 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 %; +/-20 mA, 0 to 20 mA, 4 to 20 mA
• Resistance, relative to input area		+/- 1 %	+/- 1,25 %; 0 to 500 Ohm (4-conductor measurement, in range of 600 Ohm)	+/- 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 to 20 mA	+/- 0,7 %; at +/-20 mA, 4 to 20 mA	+/- 0,15 %; +/-20 mA, 0 to 20 mA, 4 to 20 mA

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Technical specifications (continued)

	6ES7 431-0HH00-0AB0	6ES7 431-1KF20-0AB0	6ES7 431-1KF00-0AB0	6ES7 431-1KF10-0AB0
• Impedance, relative to input area		+/- 0,7 %; 0 to 600 Ohm	+/- 0,8 %; 0 to 500 Ohm (4-conductor measurement, in range of 600 Ohm)	+/- 0,15 %; +/-0.15% at 0 to 48 Ohm (4-conductor measurement), 0 to 150 Ohm (4-conductor measurement), 0 to 300 Ohm (4-conductor measurement), 0 to 600 Ohm (4-conductor measurement), 0 to 5000 Ohm (4-conductor measurement, in range of 6000 Ohm); +/-0.3% at 0 to 300 Ohm (3-conductor measurement), 0 to 600 Ohm (3-conductor measurement), 0 to 5000 Ohm (3-conductor measurement, in range of 6000 Ohm)
• Resistance-type thermometer, relative to input area				+/- 0,3 %
Isolation				
Isolation checked with	500 V DC between bus and local ground	2120 V DC between bus and analog part; 500 V DC between bus and local ground; 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
Galvanic isolation				
Galvanic isolation analog inputs				
• Galvanic isolation analog inputs	No	Yes; internal/external	Yes; internal/external	Yes; internal/external
• between the channels	No	No	No	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 and weight				
Dimensions				
• Width	25 mm	25 mm	25 mm	25 mm
• Height	290 mm	290 mm	290 mm	290 mm
• Depth	210 mm	210 mm	210 mm	210 mm
Weight				
• Weight, approx.	500 g	500 g	500 g	500 g

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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 5 V DC, max.	700 mA	1 200 mA	650 mA
Power losses			
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	

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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 Ohm		
Voltage input			
• permissible input voltage for voltage input (destruction limit), max.	18 V; 18 V permanent, 75 V for 1 ms (mark to space ratio 1:20)	35 V; 35 V permanent, 75 V for max. 1 s (mark to space ratio 1:20)	35 V; 35 V permanent, 75 V for max. 1 s (mark to space ratio 1:20)
Current input			
• permissible input current for current input (destruction limit), max.	40 mA	32 mA	
Characteristic linearization			
• parameterizable	Yes	Yes	Yes
• for thermocouples	Type B, E, J, K, L, N, R, S, T, U	Type B, E, J, K, L, N, R, S, T, U	
• for resistance thermometer	Pt100, Pt200, Pt500, Pt1000, Ni100, Ni1000		Pt100, Pt200, Pt500, Pt1000, Ni100, Ni1000; different characteristics selectable (Europe/U.S.)
Temperature compensation			
• internal temperature compensation		Yes	
• external temperature compensation with compensations socket	Yes	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 overrange (bit including sign), max.	16 bit; 16 / 16 / 16	16 bit	16 bit
• Integration time, parameterizable	Yes	Yes	Yes
• Basic conversion time, ms	6 / 20.1 / 23.5 ms	10 / 16.7 / 20 / 100	8 / 23 / 25 ms
• 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

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Technical specifications (continued)

	6ES7 431-7QH00-0AB0	6ES7 431-7KF00-0AB0	6ES7 431-7KF10-0AB0
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 %	
• Resistance, relative to input area	+/- 0,3 %; +/-0.3% at 0 to 48 Ohm (4-conductor measurement), 0 to 150 Ohm (4-conductor measurement), 0 to 300 Ohm (4-conductor measurement), 0 to 600 Ohm (4-conductor measurement), 0 to 5000 Ohm (4-conductor measurement, in range of 6000 Ohm); +/-0.4% at 0 to 300 Ohm (3-conductor measurement), 0 to 600 Ohm (3-conductor measurement), 0 to 5000 Ohm (3-conductor measurement, in range of 6000 Ohm);		
• Resistance-type thermometer, relative to input area	+/- 0,4 %		+/-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 %	
• Impedance, relative to input area	+/- 0,15 %; +/-0.15% at 0 to 48 Ohm (4-conductor measurement), 0 to 150 Ohm (4-conductor measurement), 0 to 300 Ohm (4-conductor measurement), 0 to 5000 Ohm (4-conductor measurement, in range of 6000 Ohm); +/-0.3% at 0 to 300 Ohm (3-conductor measurement), 0 to 600 Ohm (3-conductor measurement), 0 to 5000 Ohm (3-conductor measurement, in range of 6000 Ohm)		
• Resistance-type thermometer, relative to input area	+/- 0,3 %		+/-0.2 °C
Alarms/diagnostics/status information			
Alarms			
• Diagnostic alarm	Yes; Parameterizable	Yes; Parameterizable	Yes; Parameterizable
• Limit value alarm	Yes; Parameterizable	Yes	Yes
Diagnostics			
• Diagnostics	Yes; Parameterizable	Yes	Yes

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Technical specifications (continued)

	6ES7 431-7QH00-0AB0	6ES7 431-7KF00-0AB0	6ES7 431-7KF10-0AB0
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
Galvanic isolation			
Galvanic isolation analog inputs			
• Galvanic 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 and weight			
Dimensions			
• Width	25 mm	25 mm	25 mm
• Height	290 mm	290 mm	290 mm
• Depth	210 mm	210 mm	210 mm
Weight			
• Weight, approx.	500 g	650 g	650 g

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Ordering data		Order No.
SM 431 analog input 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 temper-ature sensors		**6ES7 431-7KF10-0AB0**
Front connectors		
48-pin		
• with screw contacts, 1 unit	I	**6ES7 492-1AL00-0AA0**
• with screw contacts, 84 units	F	**6ES7 492-1AL00-1AB0**
• with spring-loaded terminals, 1 unit		**6ES7 492-1BL00-0AA0**
• with crimp contacts, 1 unit	I	**6ES7 492-1CL00-0AA0**
• with crimp contacts, 84 units		**6ES7 492-1CL00-1AB0**
1 unit; for 6ES7 431-7KF00-0AB0; spare part, included in scope of delivery		**6ES7431-7KF00-6AA0**
SIMATIC TOP connect		see page 6/164; Information about which compo-nents can be used for the respective module, see Industry Mall 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		

		Order No.
S7 SmartLabel V3.0		
Software for automatic labeling of modules direct from the STEP 7 project		
Single license	J	**2XV9 450-1SL03-0YX0**
Upgrade single license	J	**2XV9 450-1SL03-0YX4**
Labeling sheets for machine inscription		
DIN A4, for printing using laser printer; 10 units		
petrol		**6ES7 492-2AX00-0AA0**
light-beige		**6ES7 492-2BX00-0AA0**
yellow		**6ES7 492-2CX00-0AA0**
red		**6ES7 492-2DX00-0AA0**
SIMATIC manual collection	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC		
SIMATIC manual collection update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		
Manual "SIMATIC S7-400 programmable controller"		
incl. instruction list		
German		**6ES7 498-8AA05-8AA0**
English		**6ES7 498-8AA05-8BA0**

D: Subject to export regulations AL: N and ECCN: 5D992
F: Subject to export regulations AL: N and ECCN: EAR99
I: Subject to export regulations AL: N and ECCN: EAR99H
J: Subject to export regulations AL: N and ECCN: EAR99S

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SM 432 analog output module

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 5 V DC, max.	150 mA
from supply voltage L+, max.	400 mA
Power losses	
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 kΩ
• with voltage outputs, capacitive load, max.	1 µF
• with current outputs, max.	500 Ω; 600 Ohm if common-mode-voltage reduced to <1 V
Analog value creation	
Integrations and conversion time/ resolution per channel	
• Resolution with overrange (bit including sign), max.	13 bit
• Conversion time (per channel)	420 µs; 420 µs in the ranges 1 to 5 V and 4 to 20 mA; 300 µs in all ranges

	6ES7 432-1HF00-0AB0
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
Alarms/diagnostics/status information	
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
Galvanic isolation	
Galvanic isolation analog outputs	
• between the channels and the backplane bus	Yes
Dimensions	
Required slots	1
Dimensions and weight	
Dimensions	
• Width	25 mm
• Height	290 mm
• Depth	210 mm
Weight	
• Weight, approx.	650 g

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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 unit	I	**6ES7 492-1AL00-0AA0**
• with screw contacts, 84 units	F	**6ES7 492-1AL00-1AB0**
• with spring-loaded terminals, 1 unit		**6ES7 492-1BL00-0AA0**
• with crimp contacts, 1 unit	I	**6ES7 492-1CL00-0AA0**
• with crimp contacts, 84 units		**6ES7 492-1CL00-1AB0**
SIMATIC TOP connect		see page 6/164; Information about which components can be used for the respective module, see Industry 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	J	**2XV9 450-1SL03-0YX0**
Upgrade single license	J	**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**

		Order No.
SIMATIC manual collection	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC		
SIMATIC manual collection update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		
Manual "SIMATIC S7-400 programmable controller"		
incl. instruction list		
German		**6ES7 498-8AA05-8AA0**
English		**6ES7 498-8AA05-8BA0**

D: Subject to export regulations AL: N and ECCN: 5D992
F: Subject to export regulations AL: N and ECCN: EAR99
I: Subject to export regulations AL: N and ECCN: EAR99H
J: Subject to export regulations AL: N and ECCN: EAR99S

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SIPLUS SM 431 analog input module

Overview



- Analog inputs for SIMATIC S7-400
- For connecting voltage sensors and current sensors, thermocouples, resistors and resistance thermometers
- Resolution 13 to 16 bit

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS SM 431 analog input module	
Order number	**6AG1 431-0HH00-4AB0**
Order No. based on	**6ES7 431-0HH00-0AB0**
Ambient temperature range	0 ... +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions

Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

Ordering data	**Order No.**
SIPLUS SM 431 analog input module (medial exposure) 16 inputs, non-floating, 13 bit	**6AG1 431-0HH00-4AB0**
Accessories	See SIMATIC S7-400 analog input modules, page 6/111

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Overview



- Analog outputs for SIMATIC S7-400
- For connection of analog actuators

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS SM 432 analog output module	
Order number	**6AG1 432-1HF00-4AB0**
Order No. based on	**6ES7 432-1HF00-0AB0**
Range of ambient temperature	0 ... +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions.

Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS SM 432 analog output module (medial exposure) 8 outputs, floating, 13 bit	L	**6AG1 432-1HF00-4AB0**
Accessories		See SIMATIC S7-400 analog output modules, page 6/113

L: Subject to export regulations AL: 9I999 and ECCN: N

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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.

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 5 V DC, max.	450 mA
Power losses	
Power loss, typ.	9 W
Connection method	
required front connector	1x 48-pin
Digital inputs	
Number of digital inputs	6
Functions	1 for gate start, 1 for gate stop, 1 for setting the counter
Input voltage	
• for signal "0"	-28.8 to +5 V
• for signal "1"	+11 to +28.8 V
Input current	
• for signal "1", typ.	9 mA
Input delay (for rated value of input voltage)	
• Input frequency (with a time delay of 0.1 ms), max.	200 kHz
• for standard inputs	
- parameterizable	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	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

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Technical specifications (continued)

	6ES7 450-1AP00-0AE0
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
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
Counter	
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
Galvanic isolation	
Galvanic isolation digital inputs	
• between the channels and the backplane bus	Yes; Optocoupler
Galvanic isolation digital outputs	
• between the channels and the backplane bus	Yes; Optocoupler
Galvanic isolation counter	
• between the channels and the backplane bus	Yes; Optocoupler
Permissible potential difference	
between different circuits	75 V DC / 60 V AC
Dimensions and weight	
Dimensions	
• Width	25 mm
• Height	290 mm
• Depth	210 mm
Weight	
• 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 unit	I	**6ES7 492-1AL00-0AA0**
• with screw contacts, 84 units	F	**6ES7 492-1AL00-1AB0**
• with spring-loaded terminals, 1 unit		**6ES7 492-1BL00-0AA0**
• with crimp contacts, 1 unit	I	**6ES7 492-1CL00-0AA0**
• with crimp contacts, 84 units		**6ES7 492-1CL00-1AB0**
Front covers for CPU and function modules		**6ES7 492-1XL00-0AA0**
Spare part		

F: Subject to export regulations AL: N and ECCN: EAR99
I: Subject to export regulations AL: N and ECCN: EAR99H

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FM 451 positioning module

Overview



- Three-channel positioning module for rapid/slow-action drives
- 4 digital outputs per channel for motor control
- Displacement measurement incremental or synchronous-serial

Note:

Displacement measuring systems and precut/preassembled cables for counting and positioning functions are available under SIMODRIVE Sensor or Motion Connect 500.

www.siemens.com/simatic-technology

Technical specifications

	6ES7 451-3AL00-0AE0
Supply voltages	
Rated value	
• 24 V DC	Yes
Current consumption	
Current consumption, max.	550 mA
Connection method	
required front connector	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	Yes
Output voltage	
• for signal "1", min.	UP - 3 V
Output current	
• for signal "1" permissible range for 0 to 55 °C, max.	600 mA; with UPmax
• for signal "0" residual current, max.	0.5 mA
Encoder supply	
5 V encoder supply	
• 5 V	Yes
• Output current, max.	210 mA
• Cable length, max.	35 m; at max. 210 mA
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
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
Galvanic isolation	
Galvanic isolation digital inputs	
• Galvanic isolation digital inputs	Yes
Galvanic isolation digital outputs	
• Galvanic isolation digital outputs	Yes

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Technical specifications (continued)

	6ES7 451-3AL00-0AE0
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

	6ES7 451-3AL00-0AE0
Degree of protection	
IP20	Yes
Dimensions and weight	
Dimensions	
• Width	50 mm
• Height	290 mm
• Depth	210 mm
Weight	
• 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 unit	I	**6ES7 492-1AL00-0AA0**
• with screw contacts, 84 units	F	**6ES7 492-1AL00-1AB0**
• with spring-loaded terminals, 1 unit		**6ES7 492-1BL00-0AA0**
• with crimp contacts, 1 unit	I	**6ES7 492-1CL00-0AA0**
• with crimp contacts, 84 units		**6ES7 492-1CL00-1AB0**
Front covers for CPU and function modules		**6ES7 492-1XL00-0AA0**
Spare part		
Signal cable		
Pre-assembled for HTL encoder, UL/DESINA		**6FX5 0 ■ 2-2AL00- ■ ■ ■ ■**
Pre-assembled for SSI absolute encoder, UL/DESINA		**6FX5 0 ■ 2-2CC11- ■ ■ ■ ■**
Pre-assembled for TTL encoder 6FX2001-1, UL/DESINA		**6FX5 0 ■ 2-2CD01- ■ ■ ■ ■**
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**

	Order No.
Signal cable (continued)	
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- ■ ■ ■ ■**
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**

F: Subject to export regulations AL: N and ECCN: EAR99
I: Subject to export regulations AL: N and ECCN: EAR99H

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FM 452 cam controller

Overview



- Very 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 synchronous-serial position feedback

Note:

We offer position measuring systems and preassembled connecting cables for counting and positioning functions under SIMODRIVE Sensor or Motion Connect 500.

www.siemens.com/simatic-technology

Technical specifications

	6ES7 452-1AH00-0AE0
Supply voltages	
Rated value	
• 24 V DC	Yes
Current consumption	
Current consumption, max.	500 mA
Connection method	
Required front connector	1x 48-pin
Digital inputs	
Number of digital inputs	11
Functions	Reference point switch, flying actual value setting/length measurement, brake release, enable track output no. 3 to 10
Input voltage	
• Rated value, DC	24 V
• for signal "0"	-28.8 to +5 V
• for signal "1"	11 to 28.8 V
Input current	
• for signal "0", max. (permissible quiescent current)	2 mA
• for 2-wire BERO	
- for signal "1", typ.	9 mA
Digital outputs	
Number of digital outputs	16
Functions	Cam track
Short-circuit protection	Yes
Output voltage	
• Rated value (DC)	24 V
• for signal "1", min.	UP - 0.8 V
Output current	
• for signal "1" permissible range for 0 to 55 °C, max.	600 mA; with UPmax
• for signal "0" residual current, max.	0.5 mA
Encoder supply	
5 V encoder supply	
• 5 V	Yes
• Output current, max.	300 mA
• Cable length, max.	32 m
24 V encoder supply	
• 24 V	Yes
• Output current, max.	300 mA
• Cable length, max.	100 m
Encoder	
Connectable encoders	
• Incremental encoder (symmetrical)	Yes
• Incremental encoder (asymmetrical)	Yes
• Absolute encoder (SSI)	Yes
• 2-wire BEROS	Yes

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Technical specifications (continued)

	6ES7 452-1AH00-0AE0
Encoder signals, incremental encoder (symmetrical)	
• Trace mark signals	A, notA, B, notB
• Zero mark signal	N, notN
• Input signal	5 V difference signal (phys. RS 422)
• Input frequency, max.	1 MHz
Encoder signals, incremental encoder (asymmetrical)	
• Trace mark signals	A, B
• Zero mark signal	N
• Input voltage	24 V
• Input frequency, max.	50 kHz; 50 kHz for 25 m cable length; 25 kHz for 100 m cable length
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
Galvanic isolation	
Galvanic isolation digital inputs	
• Galvanic isolation digital inputs	No
Galvanic 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	
IP20	Yes
Dimensions and weight	
Dimensions	
• Width	25 mm
• Height	290 mm
• Depth	210 mm
Weight	
• Weight, approx.	650 g

Ordering data

		Order No.
FM 452 electronic cam controller		**6ES7 452-1AH00-0AE0**
Front covers for CPU and function modules		**6ES7 492-1XL00-0AA0**
Spare part		
Front connector		
48-pin		
• with screw contacts, 1 unit	I	**6ES7 492-1AL00-0AA0**
• with screw contacts, 84 units	F	**6ES7 492-1AL00-1AB0**
• with spring-loaded terminals, 1 unit		**6ES7 492-1BL00-0AA0**
• with crimp contacts, 1 unit	I	**6ES7 492-1CL00-0AA0**
• with crimp contacts, 84 units		**6ES7 492-1CL00-1AB0**
Signal cable		
Pre-assembled for HTL and TTL encoder, without Sub-D connector, UL/DESINA		**6FX5 002-2CA12-■■■■**
Pre-assembled for SSI absolute encoder 6FX2001-5, without Sub-D connector, UL/DESINA		**6FX5 002-2CC12-■■■■**
Length code		see FM 451, **page 6/119**

F: Subject to export regulations AL: N and ECCN: EAR99
I: Subject to export regulations AL: N and ECCN: EAR99H

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FM 453 positioning module

Overview



- Positioning module for servo and/or stepper motors in machines with high clock-pulse rates
- Can be used for simple point-to-point positioning and for complex traversing profiles
- Up to 3 independent motors can be controlled

Note:

We offer position measuring systems and preassembled connecting cables for counting and positioning functions under SIMODRIVE Sensor or Motion Connect 500.

Further information can be found on the Internet at:

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 voltage1L+, max.	1 A; with 24 V position encoder; 1 A for 5 V position encoder
from load voltage 2L+ to 4L+, max.	2 A; per channel
from backplane bus 5 V DC, max.	1.6 A; rated current
Power losses	
Power loss, max.	8 W
Connection method	
required front connector	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	
- at "0" to "1", max.	15 µs; via input voltage range, 8 µs at 24 V DC
- 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	Yes
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
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 Ui < 1 V, Ii = 2mA

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Technical specifications (continued)

	6ES7 453-3AH00-0AE0
Signal output I	
• Type	5 V (phys. RS 422)
• Function	Clock pulse, direction, enable, current control
• Differential output voltage, min.	2 V; RL = 100 Ohm
• Differential output voltage for signal "0", max.	1.1 V; Io = 30 mA
• Differential output voltage, for signal "1", min.	3.7 V; Io = -30 mA
• Load impedance	55 Ω
• Pulse frequency	200 kHz; 500 kHz available soon
• Cable length, max.	35 m; 35 m 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
Galvanic isolation	
Galvanic isolation digital inputs	
• Galvanic isolation digital inputs	Yes; Optocoupler
Galvanic 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	
IP20	Yes
Dimensions and weight	
Dimensions	
• Width	50 mm
• Height	290 mm
• Depth	210 mm
Weight	
• Weight, approx.	1 620 g

Ordering data

		Order No.
FM 453 positioning module		**6ES7 453-3AH00-0AE0**
with 3 channels/axes		
Setpoint connecting cable		
for 3 servo motors		**6FX2 002-3AD01-■■■■**
for 3 stepper motors		**6FX2002-3AB04-■■■■**
for 2 servo motors / 1 stepper motor		**6FX2002-3AB02-■■■■**
for 1 servo motor / 2 stepper motors		**6FX2002-3AB03-■■■■**
Length code		see FM 451, **page 6/119**
Front connector		
48-pin		
• with screw contacts, 1 unit	I	**6ES7 492-1AL00-0AA0**
• with screw contacts, 84 units	F	**6ES7 492-1AL00-1AB0**
• with spring-loaded terminals, 1 unit		**6ES7 492-1BL00-0AA0**
• with crimp contacts, 1 unit	I	**6ES7 492-1CL00-0AA0**
• with crimp contacts, 84 units		**6ES7 492-1CL00-1AB0**

	Order No.
Front covers for CPU and function modules	**6ES7 492-1XL00-0AA0**
Spare part	
Signal cable	
Pre-assembled for SSI absolute encoder, UL/DESINA	**6FX5 0■2-2CC11-■■■■**
Pre-assembled for TTL encoder 6FX2001-1, UL/DESINA	**6FX5 0■2-2CD01-■■■■**
Pre-assembled for TTL encoder 24 V, UL/DESINA	**6FX5 0■2-2CD24-■■■■**
Length code	see FM 451, **page 6/119**

F: Subject to export regulations AL: N and ECCN: EAR99
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FM 455 controller module

Overview



- 16-channel closed-loop control module for universal control tasks
- Can be used for temperature, pressure and flow controls
- Convenient online self-optimization for temperature controls
- Predefined controller structures
- 2 control algorithms
- 2 versions:
  - FM 455 C as continuous controller
  - FM 455 S as step or pulse controller
- With 16 analog outputs (FM 455 C) or 32 digital outputs (FM 455 S) for actuators

Technical specifications

	6ES7 455-0VS00-0AE0	6ES7 455-1VS00-0AE0
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
Power losses		
Power loss, typ.	12 W	10.7 W
Power loss, max.	17.3 W	16.2 W
Connection method		
required front connector	2x 48-pin	2x 48-pin
Digital inputs		
Number of digital inputs	16	16
Input characteristic curve acc. 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		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)

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Technical specifications (continued)

	6ES7 455-0VS00-0AE0	6ES7 455-1VS00-0AE0
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 resistance range		
• lower limit		240 Ω
• upper limit		4 kΩ
Cable length		
• Cable length, shielded, max.		1 000 m
• Cable length unshielded, max.		600 m
Analog inputs		
Number of analog inputs	16; with thermocouples or 2-wire connection; 8 with Pt 100 or 4-wire connection	16; with thermocouples or 2-wire connection; 8 with Pt 100 or 4-wire connection
Cable length, shielded, max.	200 m; 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
Voltage input		
• permissible input voltage for voltage input (destruction limit), max.	20 V	20 V
Current input		
• permissible input current for current input (destruction limit), max.	40 mA	40 mA
Characteristic linearization		
• parameterizable	Yes	Yes
• for thermocouples	Type B, J, K, R, S	Type B, J, K, R, S
• for resistance thermometer	Pt100 (standard)	Pt100 (standard)
Temperature compensation		
• internal temperature compensation	Yes; parameterizable	Yes; parameterizable
• external temperature compensation with Pt100	Yes; parametrizable	Yes; parametrizable

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Technical specifications (continued)

	6ES7 455-0VS00-0AE0	6ES7 455-1VS00-0AE0
Analog outputs		
Number of analog outputs	16	
Cable length, shielded, max.	200 m; 50 m at 80 mV and thermocouples	
Voltage output, short-circuit protection	Yes	
Voltage output, short-circuit current, max.	25 mA	
Current output, no-load voltage, max.	18 V	
Output ranges, voltage		
• 0 to 10 V	Yes	
• -10 to +10 V	Yes	
Output ranges, current		
• 0 to 20 mA	Yes	
• -20 to +20 mA	Yes	
• 4 to 20 mA	Yes	
Connection of actuators		
• for voltage output 2-conductor connection	Yes	
• for current output 2-conductor connection	Yes	
Load impedance (in rated range of output)		
• with voltage outputs, min.	1 kΩ	
• with voltage outputs, capacitive load, max.	1 µF	
• with current outputs, max.	500 Ω	
• with current outputs, inductive load, max.	1 mH	
Analog value creation		
Measurement principle	integrating	integrating
Integrations and conversion time/ resolution per channel		
• Resolution with overrange (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; with 12 bits: 16 2/3 ms at 60 Hz, 20 ms at 50 Hz; with 14 bits: 100 ms at 50 and 60 Hz	16.67 ms; with 12 bits: 16 2/3 ms at 60 Hz, 20 ms at 50 Hz; with 14 bits: 100 ms at 50 and 60 Hz
Settling time		
• for resistive load	0.2 ms	0.1 ms
• for capacitive load	3.3 ms	3.3 ms
• for inductive load	0.5 ms	0.5 ms
Encoder		
Connection of signal encoders		
• for voltage measurement	Yes	Yes
• for current measurement as 4-wire transducer	Yes	Yes
Connectable encoders		
• 2-wire BEROS	Yes	Yes
- permissible quiescent current (2-wire BEROS), max.	1.5 mA	1.5 mA
Errors/accuracies		
Linearity error (relative to input area)	+/- 0.05 %	+/- 0.05 %
Temperature error (relative to input area)	+/- 0.005 %/K	+/- 0.005 %/K
Linearity error (relative to output area)	+/- 0.05 %	
Temperature error (relative to output area)	+/- 0.02 %/K	

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Technical specifications (continued)

	6ES7 455-0VS00-0AE0	6ES7 455-1VS00-0AE0
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 %	
Interference voltage suppression for f = n x (fl +/- 1%), fl = interference frequency		
• Series mode interference (peak value of interference < rated value of input range), min.	40 dB	40 dB
• common mode voltage (USS < 2.5 V) , min.	70 dB	70 dB
Control technology		
Number of closed-loop controllers	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
Alarms/diagnostics/status information		
Substitute values connectable	Yes; Parameterizable	Yes; Parameterizable
Isolation		
Isolation checked with	500 V DC	500 V DC
Galvanic isolation		
Galvanic 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 and weight		
Dimensions		
• Width	50 mm	50 mm
• Height	290 mm	290 mm
• Depth	210 mm	210 mm
Weight		
• Weight, approx.	1 400 g	1 400 g

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**

		Order No.
Front connectors		
48-pin		
• with screw contacts, 1 unit	I	**6ES7 492-1AL00-0AA0**
• with screw contacts, 84 units	F	**6ES7 492-1AL00-1AB0**
• with spring-loaded terminals, 1 unit		**6ES7 492-1BL00-0AA0**
• with crimp contacts, 1 unit	I	**6ES7 492-1CL00-0AA0**
• with crimp contacts, 84 units		**6ES7 492-1CL00-1AB0**

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FM 458-1 DP application module

Overview



SIMATIC FM 458-1 DP integrated in SIMATIC S7-400

- Designed for high-performance and user-configurable closed-loop control tasks in the SIMATIC S7-400.
- Can be adapted to individual requirements as required, such as: Controlling, computing, closed-loop control as well as motion control. Can therefore be used flexibly for a wide variety of applications.
- Extensive library with approx. 300 function blocks: E.g. simple functions such as AND, ADD and OR through to complex GMC (general motion control) blocks as virtual master or gear functions.
- User-friendly graphical configuration with the SIMATIC engineering tool CFC (Continuous Function Chart) and the D7-SYS add-on software package: Optimum code generation by the 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 leading automation system for decades. In contrast to other function modules with static structures/functions, the FM 458-1 DP application module can be configured flexibly and adapted to individual requirements.

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Overview



- Basic module for handling arithmetic, closed-loop control and open-loop control tasks
- PROFIBUS DP interface for connection of distributed I/O and drives
- Modular design with expansion modules for I/O and communication

Technical specifications

	6DD1 607-0AA2
Supply voltages	
Rated value	
• 5 V DC	Yes
• 24 V DC	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.	1.5 A
Current consumption, max.	3 A
Backup battery	
Battery operation	yes
• Backup 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 (slave-to-slave communication)	Yes
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
Alarms/diagnostics/status information	
Alarms	
• Alarms	Yes
Galvanic isolation	
Galvanic isolation digital inputs	
• Galvanic isolation digital inputs	No; only via optional interface modules
Dimensions	
Required slots	1
Dimensions and weight	
Weight	
• Weight, approx.	1 000 g

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Ordering data

	Order No.
FM 458-1 DP application module	**6DD1 607-0AA2**
Basic module for computing, closed-loop control and open-loop control tasks; with PROFIBUS DP interface	
Micro Memory Card	
for FM 458-1 DP basic module	
2 MB	**6ES7 953-8LL20-0AA0**
4 MB	**6ES7 953-8LM20-0AA0**
8 MB	**6ES7 953-8LP20-0AA0**
FM 458-1 DP Know-How-Protect	**6DD1 607-0GA0**
for protection of technological application modules against unauthorized copying	
SC 64 interface cable	**6DD1 684-0GE0**
To connect FM 458-1 to the serial port of a programming device/ PC	
SB10 interface module	**6DD1 681-0AE2**
To connect 8 binary I/Os to FM 458-1 DP	
SB61 interface module	**6DD1 681-0EB3**
To connect 8 binary I/Os to FM 458-1 DP, input voltage: 24/48 V DC	
SU12 interface module	**6DD1 681-0AJ1**
To connect 10 signals to FM 458-1 DP	
RS 485 bus connector with 90° cable outlet	
Max. transmission rate 12 Mbit/s	
Without PG interface	**6ES7 972-0BA12-0XA0**
With PG interface	**6ES7 972-0BB12-0XA0**

	Order No.
RS 485 bus connector with angled cable outlet	
Max. transmission rate 12 Mbit/s	
Without PG interface	**6ES7 972-0BA42-0XA0**
With PG interface	**6ES7 972-0BB42-0XA0**
RS 485 bus connector with 90° cable outlet for FastConnect connection system	
Max. transmission rate 12 Mbit/s	
Without PG interface	
• 1 unit	**6ES7 972-0BA52-0XA0**
• 100 units	**6ES7 972-0BA52-0XB0**
With PG interface	
• 1 unit	**6ES7 972-0BB52-0XA0**
• 100 units	**6ES7 972-0BB52-0XB0**
PROFIBUS FastConnect bus cable	
Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m	**6XV1 830-0EH10**
Preferred lengths:	
20 m	**6XV1 830-0EN20**
50 m	**6XV1 830-0EN50**
100 m	**6XV1 830-0ET10**

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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	
• 5 V DC	Yes
• 24 V DC	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	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	
Integrations and conversion time/ resolution per channel	
• Resolution with overrange (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 multiturn-encoder with SSI (synchronous serial) or EnDat interface

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Technical specifications (continued)

	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)
Galvanic isolation	
Galvanic isolation digital inputs	
• Galvanic isolation digital inputs	No
Galvanic isolation digital outputs	
• Galvanic isolation digital outputs	No
Galvanic isolation analog inputs	
• Galvanic isolation analog inputs	No
Galvanic isolation analog outputs	
• Galvanic isolation analog outputs	No
Dimensions	
Required slots	1
Dimensions and weight	
Weight	
• Weight, approx.	1 kg

Ordering data

	Order No.
EXM 438-1 input/output expansion for direct exchange of digital and analog signals between FM 458-1 DP and the plant	**6DD1 607-0CA1**
SB10 interface module To connect 8 binary inputs or outputs to FM 458-1 DP	**6DD1 681-0AE2**
SB61 interface module To connect 8 binary inputs to FM 458-1 DP, input voltage: 24/48 V DC	**6DD1 681-0EB3**
SB71 interface module To connect 8 binary outputs to FM 458-1 DP, output voltage: 24/48 V DC	**6DD1 681-0DH1**
SU12 interface module To connect 10 signals to FM 458-1 DP	**6DD1 681-0AJ1**
SU13 interface module To connect 50 signals to FM 458-1 DP	**6DD1 681-0GK0**
SC 62 interface cable To connect EXM 438-1 with up to 5 SBxx or SU12	**6DD1 684-0GC0**
SC 63 interface cable To connect EXM 438-1 with an SU13	**6DD1 684-0GD0**

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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	
• 5 V DC	Yes
Current consumption	
Current consumption, typ.	0.8 A
Dimensions	
Required slots	1
Dimensions and weight	
Weight	
• Weight, approx.	0.8 kg

Ordering data

	Order No.
EXM 448 universal communication expansion For fast communication, for example, with drives; with free slot for MASTERDRIVES option module	**6DD1 607-0EA0**

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FM 458-1 DP application module
EXM 448-2 universal communication expansion

Overview



- Optional plug-in expansion module for the FM 458-1 DP basic module
- For high-speed communication over up to 2 SIMOLINK interfaces
- For coupling several FM 458-1 DP application modules in synchronism with the sampling time

Technical specifications

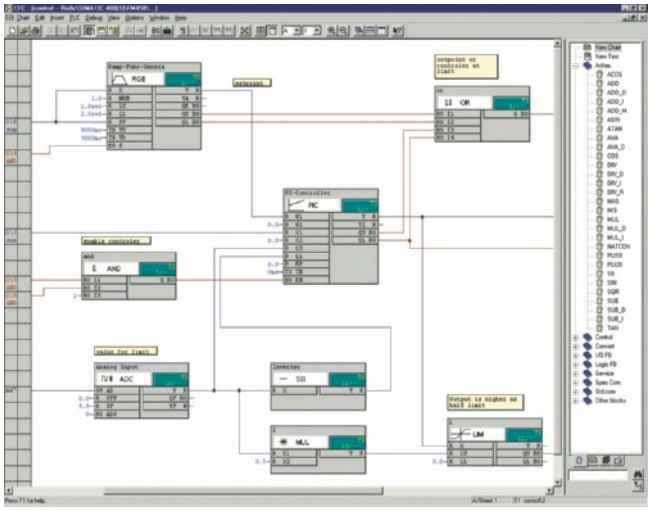
	6DD1 607-0EA2
Supply voltages	
Rated value	
• 5 V DC	Yes
Current consumption	
Current consumption, typ.	0.6 A
Dimensions	
Required slots	1
Dimensions and weight	
Weight	
• Weight, approx.	0.9 kg

Ordering data

	Order No.
EXM 448-2 universal communication expansion For high-speed communication with drives; for establishing two SIMOLINK fiber optic connections	**6DD1 607-0EA2**

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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 V7.1 Task: Function block library for configuring closed-loop control and automation tasks Target system: SIMATIC S7-400/FM 458/ SIMATIC TDC/T400/SIMADYN Requirements: Windows 2000/XP Type of delivery: on CD, German, English, with electronic documentation		
Floating license		**6ES7 852-0CC02-0YA5**
Upgrade License V5.x and higher		**6ES7 852-0CC02-0YE5**
Software Update Service		**6ES7 852-0CC01-0YL5**
SIMATIC D7 FB Gen V2.1 Function block generator	J	**6DD1 805-5DA0**
SIMATIC manual collection Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	J	**6ES7 998-8XC01-8YE0**
SIMATIC manual collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	D	**6ES7 998-8XC01-8YE2**

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Overview SC64 interface cable



(Similar to figure)
Interface cable for FM 458-1 DP basic module and SB10, SB60, SB61 and SU12 interface modules.

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



Similar to figure.

The interface module is used to connect 8 digital inputs or outputs.

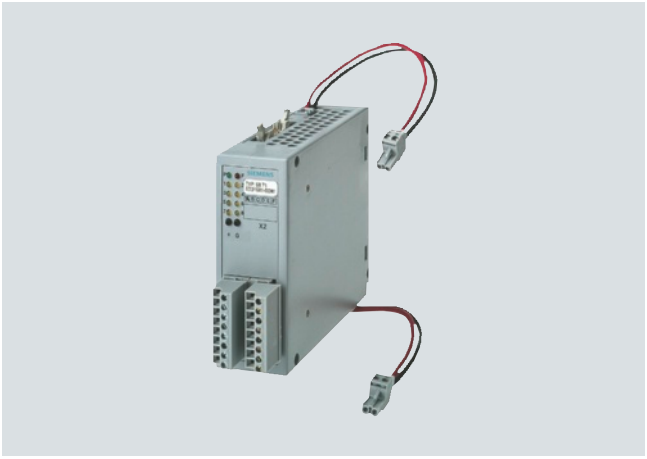
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Overview SB10 interface module



It is used to connect 8 digital inputs with conversion from 24/48 V DC to 24 V DC.

Overview SB71 interface module



The interface module is used to connect 8 digital outputs with conversion of the 24 V DC voltage on the module side to a max. of 24/48 V DC on the plant side using transistors.

Overview SU12 interface module



The interface module is used to connect 10 signals; there is no electronic conversion.

Overview SU13 interface module



This interface module can be used to connect 50 signals; there is no electronic conversion.

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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 • Input voltage	8 24/48 V DC
Electrical isolation	Yes, via optocoupler
Max. cable cross-section	1.5 mm^2
Dimensions (W x H x D) in mm	45 x 130 x 156
Weight	0.32 kg
Technical specifications SB71 interface module	
Number of digital outputs • Output voltage, max	8 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.
SC64 interface cable between the FM 458-1 DP (X2) module and an SBxx or SU12 interface module, 2 m long	**6DD1 684-0GE0**
SC62 interface cable between the SM500 or EXM 438-1 module and a max. of 5 interface moduls SB10, SB60, SB70, SB61 SB71 and/or SU12, 2 m long	**6DD1 684-0GC0**
SC63 interface cable between an SM500 or EXM 438-1 module and SU13 interface module, 2 m long	**6DD1 684-0GD0**
SB10 interface module 8 digital inputs/outputs, 24 V DC	**6DD1 681-0AE2**
SB61 interface module 8 digital inputs, 24/48 V DC	**6DD1 681-0EB3**
SB71 interface module 8 digital outputs with transistors, 24/48 V DC	**6DD1 681-0DH1**
SU12 interface module with plug-in terminal, 10-pin	**6DD1 681-0AJ1**
SU13 interface module with screw-plug-in terminal	**6DD1 681-0GK0**

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Overview



- Two-channel, intelligent counter module for simple counting tasks
- For direct connection of incremental encoders
- Comparison functions with two definable comparison values
- Integrated digital outputs for the output of the reaction on reaching the comparison values

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

Order Number	**6AG1 450-1AP00-4AE0**
SIPLUS counter module FM 450-1	
Order No. based on	**6ES7 450-1AP00-0AE0**
Ambient temperature range	0 ... +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions.

Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

Note:

We offer incremental sensors and preassembled connecting cables for counting and positioning functions under SIMODRIVE Sensor or Motion Connect 500.

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

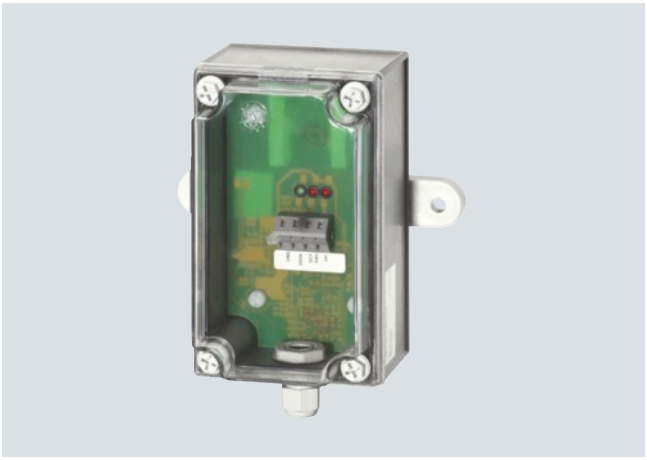
		Order No.
SIPLUS FM 450-1 counter module (medial exposure) with 2 channels, max. 500 kHz; for incremental encoder	L	**6AG1 450-1AP00-4AE0**
Accessories		See SIMATIC FM 450-1, page 6/117

L: Subject to export regulations AL: 9I999 and ECCN: N

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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 programmable controllers 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.

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 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	H	**6AG1 057-1AA03-0AA0**

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H

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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	
• 5 V DC	Yes
• 24 V DC	Yes
Current consumption	
from backplane bus 5 V DC, max.	360 mA
Power losses	
Power loss, typ.	1.7 W
Memory	
Memory requirements per interface in memory 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
Programming	
Configuration software	
• STEP 7	Yes; own parameter assignment forms
Dimensions and weight	
Dimensions	
• Width	25 mm
• Height	290 mm
• Depth	210 mm
Weight	
• Weight, approx.	600 g

Ordering data

	Order No.
CP 440 communication 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**

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CP 441-1, CP 441-2

Overview



- For powerful, high-speed serial communication via point-to-point connections
- 2 versions:
  - CP 441-1 with 1 variable interface for simple point-to-point connection
  - CP 441-2 with 2 variable interfaces for powerful point-to-point connection
- Plug-in interface modules for different transmission interfaces: RS 232C (V.24) , 20 mA (TTY) or RS 422/RS 485 (X.27)
- Implemented protocols: ASCII, 3964 (R), printer drivers; CP 441-2 additionally has RK 512 and customized protocols (retrofittable)
- Simple parameterization via a parameterization tool integrated into STEP 7

Technical specifications

	6ES7 441-1AA04-0AE0	6ES7 441-2AA04-0AE0
Supply voltages		
Rated value		
• 5 V DC	Yes	Yes
• 24 V DC	Yes	Yes
Current consumption		
from backplane bus 5 V DC, max.	600 mA; without interface module	600 mA; without interface module
Power losses		
Power loss, typ.	0.3 W	0.3 W
Memory		
Memory requirements per interface in memory card of S7-CPU	1 to 5 KB for parameters; 0 to 55 KB for message texts	1 to 5 KB for parameters; 0 to 55 KB for message texts; 0 to 64 KB for loadable drivers
Interfaces		
Number of interfaces	1; variable	2; variable
Interface physics, 20 mA (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 modules		
• 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 5V	300 mA
Point-to-point		
supported printers	HP-Deskjet, HP-Laserjet, IBM-Proprinter, user-defined	HP-Deskjet, HP-Laserjet, IBM-Proprinter, user-defined
Transmission rate, 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

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Technical specifications (continued)

	6ES7 441-1AA04-0AE0	6ES7 441-2AA04-0AE0
Transmission speed, RS 422/485		
• with 3964 (R) protocol, max.	38.4 kbit/s	115.2 kbit/s
• with ASCII protocol, max.	38.4 kbit/s	115.2 kbit/s
• with printer driver, max.,	38.4 kbit/s	115.2 kbit/s
• with RK 512 protocol, max.		115.2 kbit/s
Transmission speed, RS232		
• with 3964 (R) protocol, max.	38.4 kbit/s	115.2 kbit/s
• with ASCII protocol, max.	38.4 kbit/s	115.2 kbit/s
• with printer driver, max.,	38.4 kbit/s	115.2 kbit/s
• with RK 512 protocol, max.		115.2 kbit/s
Programming		
Configuration software		
• STEP 7	Yes; own parameter assignment forms	Yes; own parameter assignment forms
Dimensions and weight		
Dimensions		
• Width	25 mm	25 mm
• Height	290 mm	290 mm
• Depth	210 mm	210 mm
Weight		
• Weight, approx.	800 g; Interface module: 100 g	720 g; Interface module: 100 g

Ordering data

	Order No.
CP 441-1 communication module	**6ES7 441-1AA04-0AE0**
With 1 variable interface for interface modules; including configuration package on CD	
CP 441-2 communication module	**6ES7 441-2AA04-0AE0**
With 2 variable interfaces for interface modules; 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**

	Order No.
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**

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Loadable drivers for CP 441-2 and CP 341

Overview

- Drivers for Modbus protocol with RTU message format; communication as master or slave
- Downloadable onto CP 341 and CP 441-2 (6ES7 441-2AA04-0AE0)

Technical specifications

Parameterization software	**Loadable drivers for CP 441-2 and CP 341**
Type of license	Simple license, copy license
Target system	SIMATIC CP 341, SIMATIC CP 441-2

Technical specifications	**Modbus Master**
	• Modbus protocol with RTU format
	• Master/slave coupling: SIMATIC S7 is master
	• Function codes implemented: 01, 02, 03, 04, 05, 06, 07, 08, 11,12,15,16
	• No V.24 control and signal lines
	• CRC polynomial: $x^{16} + x^{15} + x^2 + 1$
	• Interfaces: TTY (20 mA); V.24 (RS 232 C); X.27 (RS 422/485) 2-wire or 4-wire
	• Receive mailbox specified on BRCV
	• Character delay time 3.5 characters or multiple thereof
	• Broadcast message possible
Adjustable parameters	• Transmission rate 300 bit/s up to 76800 bit/s (TTY up to 19200 bit/s)
	• Character frame
	• With/without RS 485 operation for 2-wire connections
	• With/without modem operation (ignore smudge characters)
	• Response monitoring time 100 ms to 25.5 s in steps of 100 ms
	• Factor for the character delay time 1-10
	• Default setting of receive line when using the X.27 interface module

	Modbus slave
	• Modbus protocol with RTU format
	• Master/slave coupling: SIMATIC S7 is slave
	• Function codes implemented: 01, 02, 03, 04, 05, 06, 08, 15, 16
	• No V.24 control and signal line
	• CRC polynomial: $x^{16} + x^{15} + x^2 + 1$
	• Interfaces: TTY (20 mA), V.24 (RS 232C), X.27 (RS 422/485) 2-wire or 4-wire
	• Communications FB 180, instance DB 180 (use of a multi-instance)
	• Conversion of the Modbus data address to S7 data areas. Data areas which can be processed: DB, bit memories, outputs, inputs, timers, counters
	• Character delay time 3.5 characters or multiple thereof
Adjustable parameters	• Transmission rate 300 bit/s up to 76800 bit/s (TTY up to 19200 bit/s)
	• Character frame
	• Slave address of CP (1 to 255)
	• With/without RS 485 operation for 2-wire connection
	• With/without modem operation (ignore smudge characters)
	• Factor for the character delay time 1-10
	• Number of work DB (for FB processing)
	• Enabling of memory areas for writing by the master
	• Default setting of receive line when using the X.27 interface module
	• Conversion of Modbus addresses to S7 data areas

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Ordering data	Order No.
Modbus Master V3.1	
Task: Communication via Modbus protocol with RTU format, SIMATIC S7 as master Requirements: CP 341 or CP 441-2; STEP 7 V4.02 and higher Type of delivery: Driver program/documentation, English, German, French	
Single license	**6ES7 870-1AA01-0YA0**
Single license, without software and documentation	**6ES7 870-1AA01-0YA1**
Modbus Slave V3.1	
Task: Communication via Modbus protocol with RTU format, SIMATIC S7 as slave Requirement: CP 341 or CP 441-2; STEP 7 V4.02 and higher Type of delivery: Driver program/documentation, English, German, French	
Single license	**6ES7 870-1AB01-0YA0**
Single license, without software and documentation	**6ES7 870-1AB01-0YA1**

		Order No.
SIMATIC manual collection	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC		
SIMATIC manual collection update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		

D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

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CP 443-5 Basic

Overview



DP-M	DP-S	FMS	PG/OP	S7/S5	
		●	●	●	

- 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

Technical specifications

Order No.	6GK7 443-5FX02-0XE0
Product type designation	**CP 443-5 Basic**
Transmission rate	
Transmission rate at interface 1 in accordance with PROFIBUS	9.6 Kbit/s … 12 Mbit/s
Interfaces	
Number of electrical connections at interface 1 in accordance with PROFIBUS	1
Design of electrical connection at interface 1 in accordance with PROFIBUS	9-pin D-sub socket (RS485)
Supply voltage, current consumption, power loss	
Type of power supply	DC
Power supply 1 from backplane bus	5 V
Relative symmetrical tolerance at 5 V DC	5 %
Current input from backplane bus with 5 V DC, typical	1.2 A
Effective power loss	6.5 W
Permitted ambient conditions	
Ambient temperature	
• During operating phase	0 … +60 °C
• During storage	-40 … +70 °C
• During transport	-40 … +70 °C
Relative humidity at 25 °C without condensation during operating phase, maximum	95 %
IP degree of protection	IP 20
Design, dimensions and weights	
Module format	S7-400 compact module, single-width
Width	25 mm
Height	290 mm
Depth	210 mm
Net weight	0.7 kg
Product properties, functions, components in general	
Maximum number of modules per CPU	14
Number of modules - Note	-

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Technical specifications (continued)

Order No.	6GK7 443-5FX02-0XE0
Product type designation	**CP 443-5 Basic**
Performance data	
Performance data Open communication	
Number of possible connections for open communication by means of SEND/RECEIVE blocks, maximum	32
Data volume as user data per connection for open communication by means of SEND/RECEIVE blocks, maximum	240 byte
Performance data FMS functions	
Number of possible connections with FMS connection, maximum	48
Data volume of variables	
• Maximum with READ request	237 byte
• Maximum with WRITE request	233 byte
Number of variables	
• Configurable from server to FMS partner	512
• Loadable from server onto FMS partner	2 640
Performance data S7 communication	
Maximum number of possible connections for S7 communication	48
Number of possible connections for S7 communication - Note	-
Performance data Multiprotocol operation	
Number of possible connections, of which 2 reserved for PG/OP communication in multiprotocol mode, maximum	59
Product functions Management, configuration, programming	
Configuration software required	STEP 7 V5.2 SP1 and higher and NCM S7 for PROFIBUS

Ordering data

Ordering data	Order No.
CP 443-5 communication processor Communication processor for connection of S7-400 to PROFIBUS, FMS, open communication, PG/OP and S7 communication; with electronic manual on CD-ROM	**6GK7 443-5FX02-0XE0**
STEP 7 Version 5.4 Target system: SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC Requirements: Windows 2000 Prof./XP Prof. Type of delivery: German, English, French, Spanish, Italian; incl. 3.5" authorization disk, 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**
RS485 PROFIBUS FastConnect bus connector With 90° cable outlet; insulation displacement technology, max. transmission rate 12 Mbit/s	
• Without PG interface	**6ES7 972-0BA50-0XA0**
• With PG interface	**6ES7 972-0BB50-0XA0**
PROFIBUS bus connector IP20 With connection to PPI, MPI, PROFIBUS	
• Without PG interface	**6ES7 972-0BA12-0XA0**
• With PG interface	**6ES7 972-0BB12-0XA0**
12M PROFIBUS bus terminal Bus terminal for connection of PROFIBUS nodes up to 12 Mbit/s with plug-in cable	**6GK1 500-0AA10**

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CP 443-5 Extended

Overview



DP-M	DP-S	FMS	PG/OP	S7/S5	
●			●	●	

- PROFIBUS DP master with electrical interface for connection of SIMATIC S7-400 to PROFIBUS up to 12 Mbit/s (incl. 45.45 kbit/s)
- 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 via PROFIBUS
- Cross-network programming device communication through S7 routing
- Can be easily integrated into the SIMATIC S7-400 system
- Module replacement without PG
- SIMATIC H system operation for redundant S7 communication or DP master communication
- Data record routing (PROFIBUS DP)
- Adding or modifying distributed I/O during operation

Technical specifications

Order No.	**6GK7 443-5DX04-0XE0**
Product type designation	**CP 443-5 Extended**
Transmission rate	
Transmission rate at interface 1 in accordance with PROFIBUS	9.6 Kbit/s … 12 Mbit/s
Interfaces	
Number of electrical connections at interface 1 in accordance with PROFIBUS	1
Design of electrical connection at interface 1 in accordance with PROFIBUS	9-pin D-sub socket (RS485)
Supply voltage, current consumption, power loss	
Type of power supply	DC
Power supply 1 from backplane bus	5 V
Relative symmetrical tolerance at 5 V DC	5 %
Current input from backplane bus with 5 V DC, typical	1.3 A
Effective power loss	6.5 W
Permitted ambient conditions	
Ambient temperature	
• During operating phase	0 … +60 °C
• During storage	-40 … +70 °C
• During transport	-40 … +70 °C
Relative humidity at 25 °C without condensation during operating phase, maximum	95 %
IP degree of protection	IP 20
Design, dimensions and weights	
Module format	S7-400 compact module, single-width
Width	25 mm
Height	290 mm
Depth	210 mm
Net weight	0.7 kg
Product properties, functions, components General	
Maximum number of modules per CPU	14
Number of modules - Note	The number of CPs which can be used as DP masters depends of the number of CP 443-1 Advanced used in the S7-400 station as PROFINET IO-Controllers. A total of 10 CPs can be used, as PROFINET IO-Controller (CP 443-1 Advanced) -> maximum 4, as DP master (CP 443-5 Extended) -> maximum 10

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Technical specifications (continued)

Order No.	6GK7 443-5DX04-0XE0
Product type designation	**CP 443-5 Extended**
Performance data	
Performance data Open communication	
Number of possible connections for open communication by means of SEND/RECEIVE blocks, maximum	32
Data volume as user data per connection for open communication by means of SEND/RECEIVE blocks, maximum	240 byte
Performance data PROFIBUS DP	
Service as DP master DPV1	Yes
Number of DP slaves operable on DP master	125
Data volume	
• of address area of inputs as DP master, total	4 096 byte
• of address area of outputs as DP master, total	4 096 byte
• of address area of inputs per DP slave	244 byte
• of address area of outputs per DP slave	244 byte
Performance data S7 communication	
Maximum number of possible connections for S7 communication	48
Number of possible connections for S7 communication - Note	-
Performance data Multiprotocol operation	
Number of active connections in multiprotocol mode	
• Maximum without DP	59
• Maximum with DP	55
Product functions Management, configuration, programming	
Configuration software required	STEP 7 V5.4 SP4 and higher and NCM S7 for PROFIBUS

Ordering data

	Order No.
CP 443-5 Extended communication processor	
for connection of the SIMATIC S7-400 to PROFIBUS	
Extended version for PROFIBUS DP; with electronic manual on CD-ROM	**6GK7 443-5DX04-0XE0**
STEP 7 Version 5.4	
Target system: SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC Requirements: Windows 2000 Prof./XP Prof. Type of delivery: German, English, French, Spanish, Italian; incl. 3.5" authorization disk, 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**
RS485 PROFIBUS FastConnect bus connector	
With 90° cable outlet; insulation displacement technology, max. transmission rate 12 Mbit/s	
• Without PG interface	**6ES7 972-0BA50-0XA0**
• With PG interface	**6ES7 972-0BB50-0XA0**
PROFIBUS bus connector IP20	
With connection to PPI, MPI, PROFIBUS	
• Without PG interface	**6ES7 972-0BA12-0XA0**
• With PG interface	**6ES7 972-0BB12-0XA0**
12M PROFIBUS bus terminal	**6GK1 500-0AA10**
Bus terminal for connection of PROFIBUS nodes at up to 12 Mbit/s with connecting cable	

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CP 443-1

Overview



ISO	TCP/ UDP	PN	MRP	IT	IP-R	PG/OP	S7/S5
●	●	●	●	●		●	●

G_IK10_XX_10192

Communication processor for connecting the SIMATIC S7-400 to Industrial Ethernet networks and PROFINET IO controllers or in SIMATIC H systems.

Support of PG/OP communication, S7 communication, open communication (SEND/RECEIVE), PROFINET communication, and IT communication. Furthermore, the communication processor can also be used for redundant S7 communication in SIMATIC H systems and also for fail-safe applications (PROFIsafe) in combination with an S7-400 F-CPU.

Technical specifications

Order No.	6GK7 443-1EX20-0XE0
	CP 443-1
Transmission rate	
Transmission rate at interface 1	10 … 100 Mbit/s
Interfaces	
Number of electrical connections at interface 1 in accordance with Industrial Ethernet	2
Design of electrical connection at interface 1 in accordance with Industrial Ethernet	RJ45 port
Supply voltage, current consumption, power loss	
Type of power supply	DC
Power supply 1 from backplane bus	5 V
Relative symmetrical tolerance at 5 V DC	5 %
Current input from backplane bus with 5 V DC, typical	1.4 A
Effective power loss	8.6 W
Permitted ambient conditions	
Ambient temperature	
• During operating phase	0 … 60 °C
• During storage	-40 … +70 °C
• During transport	-40 … +70 °C
Relative humidity at 25 °C without condensation during operating phase, maximum	95 %
IP degree of protection	IP 20
Design, dimensions and weights	
Module format	S7-400 compact module, single-width
Width	25 mm
Height	290 mm
Depth	210 mm
Net weight	0.7 kg
Product properties, functions, components in general	
Maximum number of modules per CPU	14
Number of modules - Note	Max. 4 as PN IO Ctrl.

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Technical specifications (continued)

Order No.	6GK7 443-1EX20-0XE0
	CP 443-1
Performance data	
Performance data Open communication	
Number of possible connections for open communication by means of SEND/RECEIVE blocks, maximum	64
Data volume	
• as user data per ISO connection for open communication by means of SEND/RECEIVE blocks, maximum	8 KB
• as user data per ISO on TCP connection for open communication by means of SEND/ RECEIVE blocks, maximum	8 KB
• as user data per TCP connection for open communication by means of SEND/RECEIVE blocks, maximum	8 KB
• as user data per UDP connection for open IE communication by means of SEND/RECEIVE blocks, maximum	2 KB
Number of possible connections for open communication by means of T blocks, maximum	64
Data volume as user data per ISO on TCP connection for open communication by means of T blocks, maximum	1 452 byte
Number of multicast nodes	-
Performance data S7 communication	
Number of possible connections for S7 communication	
• Maximum	128
• Maximum with PG connections	2
Number of possible connections for S7 communication - Note	When using several CPUs
Performance data Multiprotocol operation	
Number of active connections in multiprotocol mode	128
Performance data PROFINET communication as PN IO controller	
Product function: PROFINET IO controller	-
Total number of PN IO devices which can be operated on the PROFINET IO controller	128
Number of PN IO IRT Devices which can be operated on the PROFINET IO controller	32
Number of external PN IO lines with PROFINET, per rack	4

Order No.	6GK7 443-1EX20-0XE0
	CP 443-1
Data volume	
• As user data for input variables as PROFINET IO controller, maximum	4 KB
• As user data for output variables as PROFINET IO controller, maximum	4 KB
• As user data for input variables per PN IO device as PROFINET IO controller, maximum	240 byte
• As user data for output variables per PN IO device as PROFINET IO controller, maximum	240 byte
• As user data for input variables per PN IO device as PROFINET IO controller, maximum	240 byte
• As user data for output variables per PN IO device as PROFINET IO controller, maximum	240 byte
Product functions Management, configuration, programming	
Product function: MIB support	Yes
Protocol is supported	
• SNMP v1	Yes
• DCP	Yes
• LLDP	Yes
Configuration software required	STEP 7 V5.4 SP4 and higher
Product functions Diagnostics	
Product function: Web-based diagnostics	Yes
Product functions Switch	
Product feature: Switch	Yes
Product function	
• Switch-managed	No
• with IRT PROFINET IO Switch	Yes
• Configuration with STEP 7	Yes
Product functions Redundancy	
Product function	
• Ring redundancy	Yes
• Redundancy manager	Yes
• Redundancy procedure MRP	Yes
Product functions Security	
Product function	
• ACL - IP based	Yes
• Switching-off non-required services	Yes
• Blocking of communication via physical ports	Yes
• Log file for unauthorized access	No
Product functions Time	
Product function	
• SICLOCK support	Yes
• Passing-on of time synchronization	Yes
Protocol is supported NTP	Yes

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Ordering data	Order No.
CP 443-1 communication processor For connecting SIMATIC S7-400 to Industrial Ethernet through TCP/IP, ISO and UDP; PROFINET IO controller, MRP; integrated real-time switch ERTEC with two ports; 2 x RJ-45 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	**6GK7 443-1EX20-0XE0**
SOFTNET S7 for Industrial Ethernet	
Software for S7 and open communication, including OPC server, PG/OP communication and NCM PC, runtime software, software and electronic manual on CD-ROM, license key on a USB stick, Class A	
SOFTNET V8.0 for Industrial Ethernet for 32-bit Windows 7 Professional/ Ultimate; German/English	
up to 64 connections	
• Single license for 1 installation	**6GK1 704-1CW80-3AA0**
SOFTNET Edition 2008 for Industrial Ethernet for 32-bit Windows XP Professional SP2/3; Windows 2003 Server R2, SP2; Windows Vista Business/Ultimate SP1; Windows 2008 Server; German/English	
up to 64 connections	
• Single license for 1 installation	**6GK1 704-1CW71-3AA0**
• 1-year Software Update Service, with automatic extension; requirement: Current software version	**6GK1 704-1CW00-3AL0**
• Upgrade from Edition 2006 to V8.0	**6GK1 704-1CW00-3AE0**
• Upgrade from V6.0, V6.1, V6.2 or V6.3 to V8.0	**6GK1 704-1CW00-3AE1**
SOFTNET S7 Lean Edition V8 for Industrial Ethernet	
up to 8 connections	
• Single license for 1 installation	**6GK1 704-1LW80-3AA0**
SOFTNET S7 Lean Edition 2008 for Industrial Ethernet	
up to 8 connections	
• Single license for 1 installation	**6GK1 704-1LW71-3AA0**
• 1-year Software Update Service, with automatic extension; requirement: Current software version	**6GK1 704-1LW00-3AL0**
• Upgrade from Edition 2006 to V8.0	**6GK1 704-1LW00-3AE0**
• Upgrade from V6.0, V6.1, V6.2 or V6.3 to V8.0	**6GK1 704-1LW00-3AE1**

	Order No.
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**
SCALANCE X204-2 Industrial Ethernet switch I 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 RJ-45 ports and two fiber-optic cable ports	**6GK5 204-2BB10-2AA3**
IE FC RJ45 Plug 180 2x2 RJ-45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation-displacement/terminal contacts for connecting Industrial Ethernet FC installation cables; with a 180° cable outlet; for network components and CPs/ CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1 901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1 901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1 901-1BB10-2AE0**
IE FC stripping tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	**6GK1 901-1GA00**
STEP 7 Version 5.4 Target system: SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC Requirements: Windows XP Professional, Vista Ultimate, Vista Business Type of delivery: German, English, French, Spanish, Italian, including license key on USB flash drive, with electronic documentation	
• Floating license on DVD	**6ES7 810-4CC08-0YA5**
• Rental license for 50 hours	**6ES7 810-4CC08-0YA6**
• Software Update Service on DVD (requires current software version)	**6ES7 810-4BC01-0YX2**
• Floating license upgrade 3.x/4.x/5.x to V5.4; on DVD	**6ES7 810-4CC08-0YE5**
• Trial license STEP 7 V5.4; on DVD, operational for 14 days	**6ES7 810-4CC08-0YA7**

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

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Overview



ISO	TCP/ UDP	PN	MRP	IT	IP-R	PG/OP	S7/S5
●	●	●	●	●	●	●	●

Communication processor for connecting the SIMATIC S7-400 to Industrial Ethernet networks and PROFINET IO controllers or in SIMATIC H systems.

Support of PG/OP communication, S7 communication, open communication (SEND/RECEIVE), PROFINET communication, and IT communication. Furthermore, the communication processor can also be used for redundant S7 communication in SIMATIC H systems and also for fail-safe applications (PROFIsafe) in combination with an S7-400 F-CPU. Furthermore, the CP 443-1 Advanced, with its e-mail option and web pages that can be created by the user, offers ideal support for maintenance and quality assurance. The Internet functions such as FTP even permit the coupling to many different PC-based systems. Therefore, for the S7-400, this CP is the bridge between the field level and control level. The CP 443-1 Advanced is seamlessly connected to the security structures of the office and IT world.

Technical specifications

Order No.	6GK7 443-1GX20-0XE0 CP 443-1 Advanced
Transmission rate	
Transmission rate	
• at interface 1	10 … 1 000 Mbit/s
• at interface 2	10 … 100 Mbit/s
Interfaces	
Number of electrical connections	
• at interface 1 in accordance with Industrial Ethernet	1
• at interface 2 in accordance with Industrial Ethernet	4
Design of electrical connection	
• at interface 1 in accordance with Industrial Ethernet	RJ45 port
• at interface 2 in accordance with Industrial Ethernet	RJ45 port
Design of swap medium C-Plug	Yes
Supply voltage, current consumption, power loss	
Type of power supply	DC
Power supply 1 from backplane bus	5 V
Relative symmetrical tolerance at 5 V DC	5 %
Current input from backplane bus with 5 V DC, typical	1.8 A
Effective power loss	7.25 W
Permitted ambient conditions	
Ambient temperature	
• During operating phase	0 … 60 °C
• During storage	-40 … +70 °C
• During transport	-40 … +70 °C
Relative humidity at 25 °C without condensation during operating phase, maximum	95 %
IP degree of protection	IP 20
Design, dimensions and weights	
Module format	S7-400 compact module, single-width
Width	25 mm
Height	290 mm
Depth	210 mm
Net weight	0.7 kg
Product properties, functions, components in general	
Maximum number of modules per CPU	14
Number of modules - Note	Max. 4 as PN IO Ctrl.
Performance data	
Performance data Open communication	
Number of possible connections for open communication	
• by means of SEND/RECEIVE blocks, maximum	64
• by means of T blocks, maximum	64
Data volume	
• as user data per ISO connection for open communication by means of SEND/RECEIVE blocks, maximum	8 Kibyte
• as user data, per ISO on TCP connection for open communication	
- by means of SEND/RECEIVE blocks, maximum	8 Kibyte
- by means of T blocks, maximum	1 452 byte
• as user data per TCP connection for open communication by means of SEND/RECEIVE blocks, maximum	8 Kibyte
• as user data per UDP connection for open IE communication by means of SEND/RECEIVE blocks, maximum	2 Kibyte

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Technical specifications (continued)

Order No.	6GK7 443-1GX20-0XE0 CP 443-1 Advanced
Number of multicast stations	-
Performance data S7 communication	
Number of possible connections for S7 communication	
• Maximum	128
• Maximum with PG connections	2
Number of possible connections for S7 communication - Note	When using several CPUs
Performance data Multiprotocol operation	
Number of active connections in multiprotocol mode	128
Performance data IT functions	
Number of possible connections	
• as client with FTP, maximum	20
• as server	
- with FTP, maximum	10
- with HTTP, maximum	4
• as e-mail client, maximum	1
Data volume as user data for e-mail, maximum	8 Kibyte
Storage capacity of user memory	
• as flash memory file system	30 Mibyte
• as RAM	16 Mibyte
• as RAM additionally buffered by central backup battery	512 Kibyte
Number of possible write cycles of flash memory cells	100 000
Performance data PROFINET communication as PN IO controller	
Product function: PROFINET IO controller	Yes
Total number of PN IO devices which can be operated on the PROFINET IO controller	128
Number of PN IO IRT Devices which can be operated on the PROFINET IO controller	32
Number of external PN IO lines with PROFINET, per rack	4

Order No.	6GK7 443-1GX20-0XE0 CP 443-1 Advanced
Data volume	
• As user data for input variables as PROFINET IO controller, maximum	4 Kibyte
• As user data for output variables as PROFINET IO controller, maximum	4 Kibyte
• As user data for input variables per PN IO device as PROFINET IO controller, maximum	240 byte
• As user data for output variables per PN IO device as PROFINET IO controller, maximum	240 byte
• As user data for input variables per PN IO device as PROFINET IO controller, maximum	240 byte
• As user data for output variables per PN IO device as PROFINET IO controller, maximum	240 byte
Performance data PROFINET CBA	
Number of remote connection partners with PROFINET CBA	64
Total number of connections with PROFINET CBA	600
Data volume	
• As user data for digital inputs with PROFINET CBA, maximum	8 Kibyte
• As user data for digital outputs with PROFINET CBA, maximum	8 Kibyte
• As user data for arrays and data types	
- with acyclic transmission with PROFINET CBA, maximum	8 KB
- with cyclic transmission with PROFINET CBA, maximum	250 byte
- with local connection with PROFINET CBA, maximum	2 400 byte
Performance data PROFINET CBA remote connection with acyclic transmission	
Updating time of remote connections with acyclic transmission with PROFINET CBA	100 ms
Number of remote connections with input variables with acyclic transmission with PROFINET CBA, maximum	150
Number of remote connections with output variables with acyclic transmission with PROFINET CBA, maximum	150

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Technical specifications (continued)

Order No.	6GK7 443-1GX20-0XE0
	CP 443-1 Advanced
Data volume	
• as user data for remote connections with input variables with acyclic transmission with PROFINET CBA	8 KB
• as user data for remote connections with output variables with acyclic transmission with PROFINET CBA	8 KB
Performance data PROFINET CBA remote connection with cyclic transmission	
Updating time of remote connections with cyclic transmission with PROFINET CBA	10 ms
Number of remote connections with input variables with cyclic transmission with PROFINET CBA, maximum	250
Number of remote connections with output variables with cyclic transmission with PROFINET CBA, maximum	250
Data volume	
• as user data for remote connections with input variables with cyclic transmission with PROFINET CBA, maximum	2 000 byte
• as user data for remote connections with output variables with cyclic transmission with PROFINET CBA, maximum	2 000 byte
Performance data PROFINET CBA HMI variables via PROFINET, acyclic	
Number of HMI stations for logging-on for HMI variables with acyclic transmission with PROFINET CBA	3
Updating time of HMI variables with acyclic transmission with PROFINET CBA	500 ms
Number of HMI variables with acyclic transmission with PROFINET CBA, maximum	200
Data volume as user data for HMI variables with acyclic transmission with PROFINET CBA, maximum	8 KB
Performance data PROFINET CBA device-internal connections	
Maximum number of internal connections with PROFINET CBA	300
Data volume of internal connections with PROFINET CBA, maximum	2 400 byte
Performance data PROFINET CBA connections with constants	
Maximum number of connections with constants with PROFINET CBA	500

Order No.	6GK7 443-1GX20-0XE0
	CP 443-1 Advanced
Data volume as user data for connections with constants with PROFINET CBA, maximum	4 000 byte
Performance data PROFINET CBA PROFIBUS proxy functionality	
Performance data with PROFINET CBA PROFIBUS proxy functionality	No
Product functions Management, configuration, programming	
Product function: MIB support	Yes
Protocol is supported	
• SNMP v1	Yes
• DCP	Yes
• LLDP	Yes
Configuration software	
• Required	STEP 7 V5.4 SP4 and higher
• Required for PROFINET CBA	SIMATIC IMAP V3.0 SP1 and higher
Product functions Diagnostics	
Product function: Web-based diagnostics	Yes
Product functions Switch	
Product feature: Switch	Yes
Product function	
• Switch-managed	No
• with IRT PROFINET IO Switch	Yes
• Configuration with STEP 7	Yes
Product functions Redundancy	
Product function	
• Ring redundancy	Yes
• Redundancy manager	Yes
• Redundancy procedure MRP	Yes
Product functions Security	
Product function	
• Password protection for Web applications	Yes
• ACL - IP based	Yes
• ACL - IP based for PLC/routing	Yes
• Switching-off non-required services	Yes
• Blocking of communication via physical ports	Yes
• Log file for unauthorized access	No
Product functions Time	
Product function	
• SICLOCK support	Yes
• Passing-on of time synchronization	Yes
Protocol is supported NTP	Yes

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CP 443-1 Advanced

Ordering data	Order No.
CP 443-1 Advanced communication 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 via SIMATIC procedure or NTP, access protection via IP access list, FTP client/server, HTTP server, HTML diagnostics, SNMP, DHCP, e-mail, data storage on C-PLUG; PROFINET interface: 4 x RJ-45 (10/100 Mbit/s) over switch; Gigabit interface: 1 x RJ-45 (10/100/1000 Mbit/s); with electronic manual on DVD	
• For use with SIMATIC S7-400 CPU, V5.2 and higher;	**6GK7 443-1GX20-0XE0**
SOFTNET S7 for Industrial Ethernet	
Software for S7 and open communication, including OPC server, PG/OP communication and NCM PC, runtime software, software and electronic manual on CD-ROM, license key on a USB stick, Class A	
SOFTNET V8.0 for Industrial Ethernet	
for 32-bit Windows 7 Professional/ Ultimate; German/English	
up to 64 connections	
• Single license for 1 installation	**6GK1 704-1CW80-3AA0**
SOFTNET Edition 2008 for Industrial Ethernet	
for 32-bit Windows XP Professional SP2/3; Windows 2003 Server R2, SP2; Windows Vista Business/Ultimate SP1; Windows 2008 Server; German/English	
up to 64 connections	
• Single license for 1 installation	**6GK1 704-1CW71-3AA0**
• 1-year Software Update Service, with automatic extension; requirement: Current software version	**6GK1 704-1CW00-3AL0**
• Upgrade from Edition 2006 to V8.0	**6GK1 704-1CW00-3AE0**
• Upgrade from V6.0, V6.1, V6.2 or V6.3 to V8.0	**6GK1 704-1CW00-3AE1**
SOFTNET S7 Lean Edition V8 for Industrial Ethernet	
up to 8 connections	
• Single license for 1 installation	**6GK1 704-1LW80-3AA0**
SOFTNET S7 Lean Edition 2008 for Industrial Ethernet	
up to 8 connections	
• Single license for 1 installation	**6GK1 704-1LW71-3AA0**
• 1-year Software Update Service, with automatic extension; requirement: Current software version	**6GK1 704-1LW00-3AL0**
• Upgrade from Edition 2006 to V8.0	**6GK1 704-1LW00-3AE0**
• Upgrade from V6.0, V6.1, V6.2 or V6.3 to V8.0	**6GK1 704-1LW00-3AE1**
IE FC TP standard cable GP 2x2 (type A)	**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 in meters, max. quantity 1000 m, minimum order 20 m	
IE FC TP standard cable GP 4x2	
8-core, shielded TP installation cable for connection to IE FC RJ45 Modular Outlet for universal application; with UL approval; sold by the meter, max quantity 1000 m, minimum order 20 m	
• AWG 22, for connection to IE FC RJ-45 Modular Outlet	**6XV1 870-2E**
• AWG 24, for connection to IE FC RJ-45 Plug 4 x 2	**6XV1 878-2A**
IE FC RJ45 Plug 180 2x2	
RJ-45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation-displacement/terminal contacts for connecting Industrial Ethernet FC installation cables; with a 180° cable outlet; for network components and CPs/ CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1 901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1 901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1 901-1BB10-2AE0**

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Ordering data		Order No.
IE FC RJ-45 Plug 4 x 2		
RJ-45 plug connector for Industrial Ethernet (10/100/1000 Mbit/s) with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface		
• 1 pack = 1 unit		**6GK1 901-1BB11-2AA0**
• 1 pack = 10 units		**6GK1 901-1BB11-2AB0**
• 1 pack = 50 units		**6GK1 901-1BB11-2AE0**
IE FC stripping tool		**6GK1 901-1GA00**
Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables		
Industrial Ethernet Switch SCALANCE X204-2	I	**6GK5 204-2BB10-2AA3**
with four 10/100 Mbit/s RJ-45 ports and two fiber-optic cable ports		
Industrial Ethernet Switch SCALANCE X308-2		
2 x 1000 Mbit/s multimode fiber-optic cable ports (SC sockets), 1 x 10/100/1000 Mbit/s RJ-45 port, 7 x 10/100 Mbit/s RJ-45 ports; for glass fiber-optic cable (multimode) up to 750 m max.		
STEP 7 Version 5.4		
Target system: SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC Requirements: Windows XP Professional, Vista Ultimate, Vista Business Type of delivery: German, English, French, Spanish, Italian, including license key on USB flash drive, with electronic documentation		
• Floating license on DVD		**6ES7 810-4CC08-0YA5**
• Rental license for 50 hours		**6ES7 810-4CC08-0YA6**
• Software Update Service on DVD (requires current software version)		**6ES7 810-4BC01-0YX2**
• Floating license upgrade 3.x/4.x/5.x to V5.4; on DVD		**6ES7 810-4CC08-0YE5**
• Trial license STEP 7 V5.4; on DVD, operational for 14 days		**6ES7 810-4CC08-0YA7**
SIMATIC iMap V3.0		
for configuring PROFINET CBA, 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 and higher Type of delivery: German, English, with electronic documentation		
• Single license	D	**6ES7 820-0CC04-0YA5**
• Software Update Service	D	**6ES7 820-0CC01-0YX2**
• Upgrade to V3.0, Single license	D	**6ES7 820-0CC04-0YE5**

D: Subject to export regulations AL: N and ECCN: 5D992
I: Subject to export regulations AL: N and ECCN: EAR99H

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SIPLUS CP 443-5 Extended

Overview



DP-M	DP-S	FMS	PG/OP	S7/S5	
●			●	●	

- 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
  - S5-compatible communication (SEND/RECEIVE)
- Clock 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

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS CP 443-5-Extended	
Order number	**6AG1 443-5DX04-4XE0**
Order No. based on	**6GK7 443-5DX04-0XE0**
Ambient temperature range	0 ... +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions
Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS CP 443-5 Extended communication processor (medial exposure) for connection of the SIMATIC S7-400 to PROFIBUS Extended version for PROFIBUS DP; with electronic manual on CD-ROM	L	**6AG1 443-5DX04-4XE0**
Accessories		See SIMATIC CP 443-5 Extended, page 6/149

L: Subject to export regulations AL: 9I999 and ECCN: N

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Overview



ISO	TCP/ UDP	PN	MRP	IT	IP-R	PG/OP	S7/S5
●	●	●	●	●		●	●

G_IK10_XX_10192

- The connection for the SIMATIC S7-400 to Industrial Ethernet
  - 2 x RJ-45 interface for 10/100 Mbit/s full/half-duplex connection with auto-sensing/auto-negotiation and auto-crossover 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: Cross-network by means of S7 routing
  - S7 communication
- Media redundancy (MRP); within an Ethernet network with ring topology, the CP supports the media redundancy procedure MRP.
- Multicast by UDP
- Access protection via configurable access list
- Support for fail-safe programmable controllers together with SIMATIC S7-400 CPU 416F-3PN/DP
- Module replacement without PG
- SIMATIC H system operation for redundant S7 communication
- Configuration with STEP 7
- Diagnostic possibilities in STEP 7 and via Web browser
- Automatic CPU-clock setting via Industrial Ethernet with NTP or SIMATIC procedure
- Integration of network management systems via SNMP (MIB II diagnostic information)

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS CP 443-1	
Order No.	**6AG1 443-1EX20-4XE0**
Order No. based on	**6GK7 443-1EX20-0XE0**
Ambient temperature range	0 ... +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions
Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS CP 443-1 communication processor (medial exposure) For connecting SIMATIC S7-400 to Industrial Ethernet through TCP/IP, ISO and UDP; PROFINET IO controller, MRP; integrated real-time switch ERTEC with two ports; 2 x RJ-45 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	L	**6AG1 443-1EX20-4XE0**
Accessories		See SIMATIC CP 443-1, page 6/152

L: Subject to export regulations AL: 9I999 and ECCN: N

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SIPLUS CP 443-1 Advanced

Overview



ISO	TCP/ UDP	PN	MRP	IT	IP-R	PG/OP	S7/S5
●	●	●	●	●	●	●	●

- The connection for the 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 one RJ45 port with 10/100/ 1000 Mbit/s full/half-duplex with auto-sensing capability
  - PROFINET interface with four RJ45 ports with 10/100 Mbit/s full/half duplex with autosensing and auto-crossover functionality via 4-port switch
- Communication services via both interfaces
  - Open communication (ISO, TCP/IP and UDP), multicast with UDP, including routing between both interfaces
  - PG/OP communication: Cross-network by means of S7 routing
  - S7 communication (client, server, multiplexing) including routing between both interfaces
  - IT communication: HTTP communication supports access to process data via own web pages; e-mail client function, sending of e-mails with authentication directly from user program; FTP communication supports program-controlled FTP client communication; access to data blocks through FTP server
- 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 the prioritized startup of PROFINET IO devices
  - Configuration with STEP 7
- Media redundancy (MRP); within an Ethernet network with ring topology, the CP supports the media redundancy procedure MRP.
- Access protection by means of configurable IP access list
- Module replacement without programming device; all information is stored on the C-PLUG (also file system for IT functions)
- Extensive diagnostics functions for all modules in the rack
- Integration into network management systems through the support of SNMP V1 MIB-II
- SIMATIC H system operation for redundant S7 communication
- Operation in fail-safe applications (PROFIsafe) in combination with SIMATIC S7-400 CPU 416F

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS CP 443-1 Advanced	
Order No.	**6AG1 443-1GX20-4XE0**
Order No. based on	**6GK7 443-1GX20-0XE0**
Ambient temperature range	0 ... +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions
Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

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Ordering data		Order No.
SIPLUS CP 443-1 Advanced communication processor (medial exposure) 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 via SIMATIC procedure or NTP, access protection via IP access list, FTP client/server, HTTP server, HTML diagnostics, SNMP, DHCP, e-mail, data storage on C-PLUG; PROFINET interface: 4 x RJ-45 (10/100 Mbit/s) over switch; Gigabit interface: 1 x RJ-45 (10/100/1000 Mbit/s); with electronic manual on DVD		
• For use with SIMATIC S7-400 CPU, V5.2 and higher	H	**6AG1 443-1GX20-4XE0**

Accessories	Order No.
	See SIMATIC CP 443-1 Advanced, page 6/156

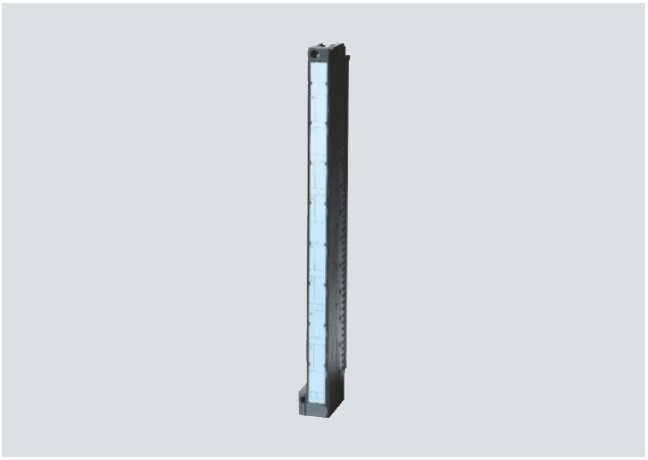
H: Subject to export regulations AL: 9I999 and ECCN: EAR99H

6

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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	I	**6ES7 492-1AL00-0AA0**
• With spring-loaded terminals		**6ES7 492-1BL00-0AA0**
• With crimp contacts	I	**6ES7 492-1CL00-0AA0**
48-pin for signal modules, function modules; 84 units per pack		
• With screw contacts	F	**6ES7 492-1AL00-1AB0**
• With crimp contacts		**6ES7 492-1CL00-1AB0**
for 6ES7 431-7KF00-0AB0; spare part, included in scope of delivery; 1 unit		**6ES7 431-7KF00-6AA0**
Crimp contacts		**6XX3 070**
250 units		
Pliers		**6XX3 071**
for crimping the contacts		
Front cover for front connector	I	**6ES7 492-2XL00-0AA0**
6 units		
Connection terminal for modules		**6ES7 490-1BA00-0AA0**
6 units		
Manual "SIMATIC S7-400 automation system"		
incl. instruction list		
German		**6ES7 498-8AA05-8AA0**
English		**6ES7 498-8AA05-8BA0**
SIMATIC manual collection	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC		
SIMATIC manual collection update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		

D: Subject to export regulations AL: N and ECCN: 5D992
F: Subject to export regulations AL: N and ECCN: EAR99
I: Subject to export regulations AL: N and ECCN: EAR99H
J: Subject to export regulations AL: N and ECCN: EAR99S

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Overview

Wiring of SIMATIC S7 I/O modules with the sensors/actuators is a significant factor with respect to time/cost overhead, configuring, control cabinet manufacture, procurement and ease of service.

With SITOP TOP connect system cabling, this connection is established for your SIMATIC S7-300/400 simply, quickly and reliably.

With the SIMATIC TOP connect **configuration tool**, you can configure the connection between the SIMATIC S7 interface and the I/O per mouse click. The program automatically checks for plausibility and generates a parts list for the selected connection components.

www.siemens.com/simatic-tc-configurator

Design

Two cabling versions are available for the most diverse control cabinet concepts:

Fully modular connection

Each component is individually inserted.

The system consists of:

- Front connector module
- Connecting cable
- Connection modules in the following versions: Basic module, signal module and function module

Connection errors are thus practically excluded and installation overhead is minimized. Connect systematically the SIMATIC system. The assembly overhead for the connecting cables is drastically reduced as cables sold by the meter that are either pre-assembled or that can be assembled easily can be used.

Flexible connection

Consisting of:

- Front connector with screw-type or crimp connection
- Front connector with fixed single cores
- Single cores also available with UL/CSA-certified cores

The blue wires are numbered sequentially and can be routed direct to each element in the control cabinet. The numbering of the single cores corresponds to the coding of the front connector contacts.

In comparison to conventional single wiring, there is a cost saving of 50% for assembly, since the single cores that have already been checked on the connector are fixed.

Thus no complex pre-assembly of up to two times 46 single cores per module is necessary.

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Overview



The fully modular connection is the standard connection for the SIMATIC S7-300/400. The fully modular connection allows the peripherals to be conveniently and quickly connected to the SIMATIC S7-300/400 without errors.

Benefits

- Easy plug-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

Design

Front connector module

Modified front connectors, called front connector modules, are available for connecting to the module. These are plugged into the module to be wired instead of the front connector. The front connector modules are available in many different versions. For the SIMATIC S7-300 and SIMATIC S7-400, digital or analog. The connecting cables are plugged into these front connector modules.

Connecting cable

The connecting cable is available in two different versions.

As a pre-assembled 16-pole round cable (shielded or unshielded) up to a length of 5 m, or the 16-pole round-sheath ribbon cable (with or without shield), which can be easily assembled by the user, or as 2 x 16-pole round-sheath ribbon cables (without shield).

When assembled, there are one or two insulation displacement connectors (female ribbon connectors) at both ends of the cable.

The round-sheath ribbon cable is assembled by the user with the aid of pliers (to be ordered separately). The cable transmits 8 or 2 x 8 channels over a distance of up to 30 m.

The connecting cable connects the front connector module with the connection module.

Connection module

The system has digital and analog connection modules for connecting the I/O signals. These are snapped onto the standard mounting rail.

The connection modules are available for two connection methods: with spring-loaded or screw-type terminals

Basic module:

Connection modules with basic functionality for getting the signal from the field to the module or from the module to the field quickly and easily. For digital or analog signals.

Signal module:

Expands the digital basic module with LEDs for signaling the active high signal. This makes commissioning easier for you, and you always have an overview of the signal states of your I/O. One LED signals the availability of the supply voltage.

Function module:

Digital connection modules that are fitted with relays or opto-couplers.

If other voltage or power levels are required in the field, the connection module for output signals TPRo or TPOo is used. For the TPRo connection module, relays are used for the implementation. For the TPOo connection module, optocouplers are used for the implementation. This converts the 24 V DC output signal simply and reliably to another voltage or power level. If 230 V AC input signals have to be transmitted to the controller in the field, a connection module with relay TPRi is available that simply converts the 230 V AC signal to 24 V DC. This means that there is always the same voltage level on the module side.

Use with optocouplers for the TPRo relay modules

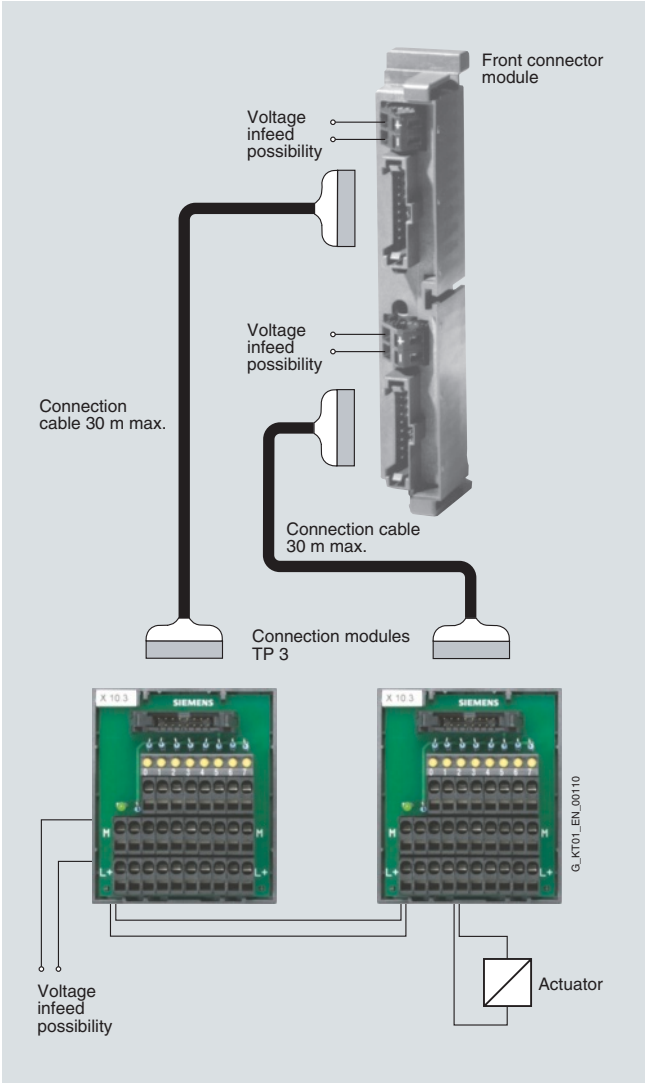
If higher switching frequencies of the relay connection module are required for the output signals, the relay can simply be replaced with an optocoupler (note technical specifications) in order to increase the switching frequency here.

Shield plate

The shield plate is latched onto the connection module for 3-core initiators or optionally onto the connection module for analog signals and then snapped onto the mounting rail with the connection module. With the terminal elements, optimal shield connection is achieved between the shielded round-sheath ribbon cable or the shielded field cables and the grounded mounting rail.

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Design (continued)



Design of the fully modular connection (16-channel in example)

Technical specifications Front Connector Module

Technical data of front connector module	
Rated operating voltage	24 V DC
Max. permissible operating voltage	60 V DC
Max. permissible continuous current • per connector pin	1 A
Max. permissible summation current	4 A/byte (power supply)
Permissible ambient temperature	0 to + 60 °C
Test voltage	0.5 kV, 50 Hz, 60 s
Air gaps and creepage distances	IEC 664 (1980), IEC 664 A (1981), in accordance with DIN VDE 0110 (01.89), overvoltage class II, pollution degree 2

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 according to DIN 46228	
without insulating collar	Form A; 5 to 7 mm long
• with insulating collar 0.25 to 1.0 mm^2	-
• with insulating collar 1.5 mm^2	-
Blade width of the screwdriver	3.5 mm (cylindrical shape)
Tightening torque for connecting the cables	0.4 to 0.7 Nm

	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 to 0.75 mm^2
Number of cables per connection	1 or a combination of 2 conductors up to 0.75 mm^2 (total) in a common wire end ferrule
Max. diameter of the cable insulation	2.0 mm
Stripping length of the wires	
without insulating collar	6 mm
• with insulating collar	-
Wire-end ferrules to DIN 46228	
without insulating collar	Form A; 5 to 7 mm long
• with insulating collar 0.25 to 1.0 mm^2	-
• with insulating collar 1.5 mm^2	-
Blade width of the screwdriver	3.5 mm (cylindrical shape)
Tightening torque for connecting the cables	0.4 to 0.7 Nm

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Technical specifications Connecting Cable

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 Module

TP1, TP3 and TPK connection module	
Max. operating voltage	60 V DC
Continuous current per signal	1 A
Max. summation current (voltage infeed)	4 A/byte
Operating temperature	0 to + 60°C
Mounting position	Any
Air gaps and creepage distances	IEC Report 664, IEC 664 A, IEC 1131 T2, CSA C22.2 No 142 UL 508, VDE 0160 (12.90), overvoltage category II, pollution degree 3
Dimensions (W x H x D) in mm	
• 1-wire connection 6ES7924-0AA10-0A_0	Approx. 55 x 43.2 x 63
• for 3-wire initiators 6ES7924-0CA10-0A_0	Approx. 68 x 43.2 x 80
• for 2 x 8 signals 6ES7924-1AA10-0A_0	Approx. 100 x 43.2 x 80

TP2 connection module	
Max. operating voltage	60 V DC
Continuous current signal conductor	2 A
Operating temperature	0 to + 60°C
Mounting position	Any
Air gaps and creepage distances	IEC Report 664, IEC 664 A, IEC 1131 T2, CSA C22.2 No 142 UL 508, VDE 0160 (12.90), overvoltage category II, pollution degree 3
Dimensions (W x H x D) in mm	
• for 2 ampere modules 6ES7924-0BB10-0A_0	Approx. 68 x 43.2 x 80

TPA connection module	
Max. operating voltage	60 V DC
Continuous current signal conductor	1 A
Operating temperature	0 to + 60°C
Mounting position	Any
Air gaps and creepage distances	IEC Report 664, IEC 664 A, IEC 1131 T2, CSA C22.2 No 142 UL 508, VDE 0160 (12.90), overvoltage category II, pollution degree 3
Dimensions (W x H x D) in mm	
• for 2 analog modules 6ES7924-0CC10-0A_0	Approx. 68 x 43.2 x 80

Wiring rules for the front connector modules

TPA, TP1, TP2, TP3, TPK connection module	Spring connection	Screw connection
Connectable cable cross-sections		
• solid cables	No	
• flexible cables without wire end ferrule	0.5 to 2.5 mm^2	
• flexible cables with wire end ferrule in accordance with DIN 46228/1	0.5 to 1.5 mm^2	0.5 to 2.5 mm^2 (2.5 mm^2 with a crimp in accordance with EN 60947-1)
• flexible cables with wire end ferrule and plastic collar in accordance with DIN 46228/4	0.5 to 1.5 mm^2	
Number of cables per connection	1 or a combination of 2 cables up to the cross-sections specified above (total) in a shared wire end ferrule	
Blade width of the screwdriver	3.5 mm (cylindrical shape)	
Tightening torque for connecting the cables	-	0.4 to 0.7 Nm

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Technical specifications Signal Module

TP1, TP3 and TPK connection module with LED	
Max. operating voltage	24 V DC
Continuous current per signal	1 A
Max. summation current (voltage infeed)	4 A/byte
Operating temperature	0 to + 60 °C
Mounting position	Any
Air gaps and creepage distances	IEC Report 664, IEC 664 A, IEC 1131 T2, CSA C22.2 No 142 UL 508, VDE 0160 (12.90), overvoltage category II, pollution degree 3
Dimensions (W x H x D) in mm	
• 1-wire connection with LED 6ES7924-0AA10-0B_0	Approx. 55 x 43.2 x 63
• for 3-wire initiators with LED 6ES7924-0CA10-0B_0	Approx. 68 x 43.2 x 80
• for 2 x 8 signals with LED 6ES7924-1AA10-0B_0	Approx. 100 x 43.2 x 80

TP2 connection module with LED	
Max. operating voltage	24 V DC
Continuous current per signal conductor	2 A
Operating temperature	0 to + 60 °C
Mounting position	Any
Air gaps and creepage distances	IEC Report 664, IEC 664 A, IEC 1131 T2, CSA C22.2 No 142 UL 508, VDE 0160 (12.90), overvoltage category II, pollution degree 3
Dimensions (W x H x D) in mm	
• for 2-ampere modules with LED 6ES7924-0BB10-0B_0	Approx. 68 x 43.2 x 80

Wiring rules for the front connector modules

TP1 LED, TPK LED, TP2 LED, TP3 LED connection module	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 Module

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 switching cycles
• Electrical	3 x 10^4 operating cycles at 230 V AC/2 A/ cos φ = 1
Operating temperature	0 ... +60 °C
Mounting position	Any
Clearance and creepage distances	Basic standard IEC 60664-1; UL 508; CuI (Reference CSA C22.2 No. 142) Overvoltage category III Pollution degree 2
Dimensions (W x H x D) in mm	
6ES7924-0BD10-0B_0	Approx. 100 x 45 x 80

Connection module with optocoupler for outputs (TPOo)	
Input data	
Power supply	
Potential connection (L1/M1)	24 V DC (20.4 ... 28.8 V DC)
Status indicator "L1"	Green LED
Switching inputs	
Number	8 channels (channel 0 ... 7) with reverse polarity protection
Input voltage "off"	0 V DC (0 ... 5 V DC)
Input voltage "on"	24 V DC (15 ... 28.8 V DC)
Input current	min. 5 mA with 20 V DC, per channel
Status indicator "on"	Green LED per channel
Output data	
Power supply	
Operating voltage U_B (L2/M2, L3/M3)	24 V DC (20 ... 30 V DC) per group of 4 one V_B
U_B conditionally protected against polarity reversal [1]	Up to 30 V DC
Current consumption	approx. 10 mA for 24 V DC + output currents per group of 4
Aggregate current	max. 8 A per group of 4
Switching outputs	
Number	8 channels (channel 0 ... 7)
Short-circuit protection [2]	for U_B < 24 V DC or 24 ... 30 V DC/max. 20 A

[1] Protected against polarity reversal, if the ground potential of the output load is directly connected to the 0 V supply of the power supply unit

[2] Not sustained short-circuit-proof, max. duration approx. 60 min.

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Technical specifications Function Module (continued)

Connection module with optocoupler for outputs (TPOo)	
Output voltage	typ. U_B – 1 V (for input "on")
Output current • Lamp load	Max. 4 A per channel max. 20 W at 24 V per channel
Demand factor per group of 4	50 %, max. 2 outputs active under full load (4 A)
Short-circuit response	Clocked output signal (approx. 2 ... 20 ms)
On/off-delay	typ. 100 µs/250 µs with resistive load
Switching frequency	max. 500 Hz with 4 A resistive load (square wave voltage, pulse/pause 1:1)
"Overload" fault indication	Red LED per channel, in the event of wire breakage or short-circuit
• Wire break indication	Active I_{out} < 0.1 A / inactive I_{out} ≥ 0.9 A
Group fault messages SF1, SF2	
Monitored channels	SF1: Channels 0 ... 3, SF2: for channels 4 ... 7
Voltage U_{SF1}, U_{SF2}	
• No error at the switching output	typ. U_B – 2 V
• Wire break at the switching output	Approx. 0 V
• Short-circuit at the switching output	0 V to U_B, clocked
Current I_{SF1}, I_{SF2}	min. 4 mA/max. 200 mA
General data	
Degree of protection	IP20
Operating temperature	0 ... 60 °C
Mounting position	Any, except overhead
Connecting terminals	Screw-type or spring-loaded terminals
Stripped length	9 mm
Conductor cross-section	
• Finely stranded without end sleeve	0.5 ... 2.5 mm^2
• with end sleeve for screw-type terminals	0.5 ... 2.5 mm^2 according to DIN 46228-1
• with end sleeve for spring-loaded terminals	0.5 ... 1.5 mm^2 according to DIN 46228-1 and DIN 46228-4
Screwdriver	according to DIN 5264 B 0.6 x 3.5 mm
Tightening torque of screw-type terminals	0.4 Nm
Weight	Approx. 400 g
Dimensions (W x H x D) in mm	134 x 84 x 77

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 A/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 switching cycles
• Electrical	3 x 10^6 operating cycles at 230 V AC/50 mA/cos ϒ = 1
Operating temperature	0 ... +60 °C
Mounting position	Any
Clearance and creepage distances	Basic standard IEC 60664-1; UL 508; CuI (Reference CSA C22.2 No. 142) Overvoltage category III Pollution degree 2
Dimensions (W x H x D) in mm	
6ES7924-0BE10-0B_0	Approx. 130 x 45 x 80

Wiring rules for the connection modules

TPRo and TPRi connection modules		
	Spring-loaded connection	Screw-type connection
Connectable cable cross-sections		
• Solid conductors	No	
• Flexible cables without end sleeve	0.5 ... 2.5 mm^2	
• Flexible cables with end sleeve according to DIN 46228/1	0.5 ... 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 end sleeve and plastic collar according to DIN 46228/4	0.5 ... 1.5 mm^2	
Number of conductors per connection	1 or a combination of 2 conductors up to the cross-sections specified above (total) in a shared end sleeve	
Blade width of the screwdriver	3.5 mm (cylindrical design)	
Tightening torque for connecting the cables	-	0.4 ... 0.7 Nm

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Ordering data Front Connect. Module

	Order No.
Front connector module (digital 4 x 8 I/O)	
Voltage infeed via	
• Screw terminals	**6ES7921-4AB00-0AA0**
Front connector module (2 x 8 outputs) for 2 ampere digital outputs	
Voltage infeed via	
• Screw terminals	**6ES7921-4AD00-0AA0**
Front connector module (analog)	
Voltage infeed via	
• Screw terminals	**6ES7921-4AG00-0AA0**

Ordering data Connect. Cable

	Order No.
Pre-assembled round cable	
16-pole, 0.14 mm^2	
Unshielded	
0.5 m	**6ES7 923-0BA50-0CB0**
1.0 m	**6ES7 923-0BB00-0CB0**
1.5 m	**6ES7 923-0BB50-0CB0**
2.0 m	**6ES7 923-0BC00-0CB0**
2.5 m	**6ES7 923-0BC50-0CB0**
3.0 m	**6ES7 923-0BD00-0CB0**
4.0 m	**6ES7 923-0BE00-0CB0**
5.0 m	**6ES7 923-0BF00-0CB0**
Shielded	
1.0 m	**6ES7 923-0BB00-0DB0**
2.0 m	**6ES7 923-0BC00-0DB0**
2.5 m	**6ES7 923-0BC50-0DB0**
3.0 m	**6ES7 923-0BD00-0DB0**
4.0 m	**6ES7 923-0BE00-0DB0**
5.0 m	**6ES7 923-0BF00-0DB0**
Round-sheath ribbon cable	
16-pole, 0.14 mm^2	
Unshielded	
30 m	**6ES7 923-0CD00-0AA0**
60 m I	**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**
Connector (female ribbon connector)	**6ES7 921-3BE10-0AA0**
16-pole, insulation displacement system, with strain relief devices; packing unit: 8 connectors and 8 cable grips	
Accessories	
Pliers	**6ES7 928-0AA00-0AA0**
For preparing the connectors (female ribbon connector)	

Ordering Data Basic Module

	Order No.
TP1 connection module	
for 1-wire initiators	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-0AA10-0AB0**
• Screw terminals	**6ES7 924-0AA10-0AA0**
TP3 connection module	
for 3-wire initiators	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-0CA10-0AB0**
• Screw terminals	**6ES7 924-0CA10-0AA0**
TPK connection module	
for 2 x 8 signals	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-1AA10-0AB0**
• Screw terminals	**6ES7 924-1AA10-0AA0**
TP2 connection module	
for 2 A modules	
for 2-wire initiators	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-0BB10-0AB0**
• Screw terminals	**6ES7 924-0BB10-0AA0**
TPA connection module	
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**

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

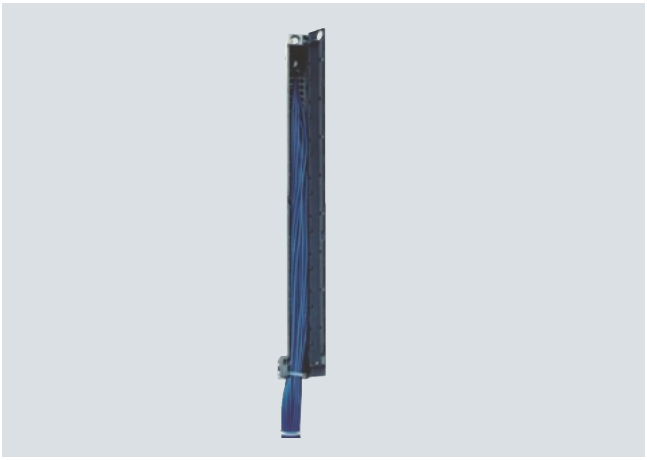
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Ordering data Signal Module	Order No.
TP1 connection module with LED	
for 1-wire initiators	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-0AA10-0BB0**
• Screw terminals	**6ES7 924-0AA10-0BA0**
TP3 connection module with LED	
for 3-wire initiators	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-0CA10-0BB0**
• Screw terminals	**6ES7 924-0CA10-0BA0**
TPK connection module with LED	
for 2 x 8 signals	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-1AA10-0BB0**
• Screw terminals	**6ES7 924-1AA10-0BA0**
TP2 connection module with LED	
for 2 A modules	
for 2-wire initiators	
Packaging unit (1 unit)	
• Spring terminals	**6ES7 924-0BB10-0BB0**
• Screw terminals	**6ES7 924-0BB10-0BA0**
Accessories	
Labeling plates for connection modules	
Insertable labeling plate PU = 200 units	**6ES7 928-2AB00-0AA0**
Self-adhesive labeling plate PU = 200 units	**6ES7 928-2BB00-0AA0**

Ordering data Function Module	Order No.
TPRo connection module for output signals	
for 2-wire connection	
Packaging unit 1 unit	
• Spring-loaded terminals	**6ES7 924-0BD10-0BB0**
• Screw-type terminals	**6ES7 924-0BD10-0BA0**
Connection module optocoupler	
Packaging unit 1 unit	
• Spring-loaded terminals	**6ES7 924-0BF10-0BB0**
• Screw-type terminals	**6ES7 924-0BF10-0BA0**
TPRi connection module for input signals	
for 2-wire connection	
Packaging unit 1 unit	
• Spring-loaded terminals	**6ES7 924-0BE10-0BB0**
• Screw-type terminals	**6ES7 924-0BE10-0BA0**
Accessories	
Labels for connection modules	
Insertable labels PU = 200 units	**6ES7 928-2AB00-0AA0**
Self-adhesive labels 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**

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Overview



The flexible connection guarantees a fast and direct connection from the input/output modules of the SIMATIC S7-300/400 to the individual elements in the cabinet.

Already attached single cores reduce the wiring effort.

The core cross-sections of 0.5 mm^2 also allow higher currents.

Technical specifications

Front connector with single cores	
Rated operating voltage	24 V DC
Max. permissible continuous current with simultaneous load of 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
Core color	Blue, RAL 5010
Designation of cores	Numbered 3 to 48 (adapter contact = core number)
Assembly	Screw-type or crimp contacts

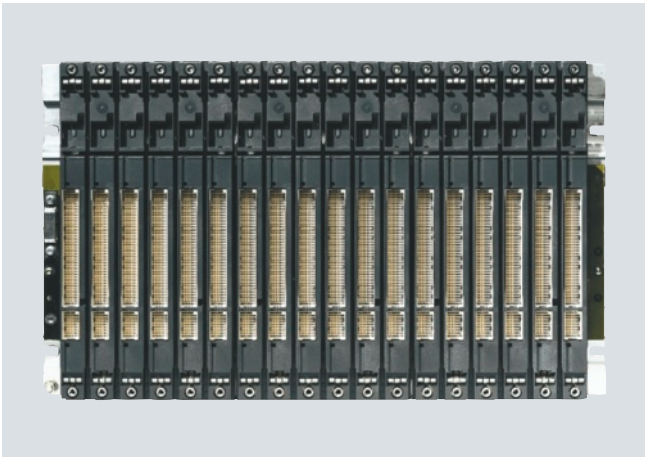
Ordering data

Ordering data	Order No.
Front connector with single cores for 32-channel module SIMATIC S7-400, 46 x 0.5 mm^2	
Core type H05V-K	
Screw connection	
Packaging unit: 1 unit Length:	
• 2.5 m	**6ES7 922-4BC50-0AD0**
• 3.2 m	**6ES7 922-4BD20-0AD0**
• 5 m	**6ES7 922-4BF00-0AD0**
• Custom lengths	On request
Packaging unit: 5 units Length:	
• 2.5 m	**6ES7 922-4BC50-5AD0**
• 3.2 m	**6ES7 922-4BD20-5AD0**
• 5 m	**6ES7 922-4BF00-5AD0**
Crimp connection	
Packaging unit: 1 unit Length:	
• 2.5 m	**6ES7 922-4BC50-0AE0**
• 3.2 m	**6ES7 922-4BD20-0AE0**
• 5 m	**6ES7 922-4BF00-0AE0**
• Custom lengths	On request
Packaging unit: 5 units Length:	
• 2.5 m	**6ES7 922-4BC50-5AE0**
• 3.2 m	**6ES7 922-4BD20-5AE0**
• 5 m	**6ES7 922-4BF00-5AE0**
Core type UL/CSA-certified	
Screw-type version	
Packaging unit: 1 unit	
• 3.2 m	**6ES7 922-4BD20-0UD0**
• 5 m	**6ES7 922-4BF00-0UD0**
• Custom lengths	On request

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Racks

Overview



- The basic mechanical framework of the SIMATIC S7-400/S7-400H
- For accommodating the modules, supplying them with operating voltage and connecting them via the backplane bus
- Several versions for configuring central controllers and expansion racks

UR1 (Universal Rack)

- For 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 via 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 configuration						
Number of single-width slots, max.	18	18	9	9	18; 2 segments with 8 or 10 slots	4
Rack						
• C bus	Yes	Yes	Yes	Yes	Yes	Yes
• P bus	Yes	Yes	Yes	Yes	Yes	Yes
Dimensions and weight						
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
Weight						
• Weight, aprox.	4 200 g	3 000 g	2 200 g	1 500 g	4 200 g	750 g

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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 configuration						
Number of single-width slots, max.	18	18	18	18	9	9
Rack						
• C bus	Yes	Yes				
• P bus	Yes	Yes	Yes	Yes	Yes	Yes
Dimensions and weight						
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
Weight						
• Weight, aprox.	4 200 g	3 000 g	4 200 g	2 500 g	2 200 g	1 250 g

Ordering data

	Order No.
UR1 rack for central and expansion units, 18 slots	**6ES7 400-1TA01-0AA0**
UR1 rack, aluminum version for central and expansion units, 18 slots	**6ES7 400-1TA11-0AA0**
UR2 rack for central and expansion units, 9 slots	**6ES7 400-1JA01-0AA0**
UR2 rack, aluminum version for central and expansion units, 9 slots	**6ES7 400-1JA11-0AA0**
CR2 rack for segmented central units,18 slots, 2 local segments	**6ES7 401-2TA01-0AA0**
CR3 rack for central and expansion units, 4 slots; optimized for distributed automation solutions	**6ES7 401-1DA01-0AA0**
UR2-H rack for separated central units, 18 slots	**6ES7 400-2JA00-0AA0**
UR2-H rack, aluminum version for separated central units, 18 slots	**6ES7 400-2JA10-0AA0**
ER1 rack for expansion units, P bus only,18 slots	**6ES7 403-1TA01-0AA0**
ER1 rack, aluminum version 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 rack, aluminum version for expansion units, P bus only, 9 slots	**6ES7 403-1JA11-0AA0**
Slot cover 10 units (spare part)	**6ES7 490-1AA00-0AA0**

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Fan subassembly

Overview



- Fans for the SIMATIC S7-400
- Necessary when using modules that generate an extremely large amount of heat

Technical specifications

	6ES7 408-1TA01-0XA0	6ES7 408-1TB00-0XA0
Supply voltages		
Rated value		
• 24 V DC	Yes	
• permissible range, lower limit (DC)	19.2 V	
• permissible range, upper limit (DC)	30 V	
• 120 V AC		Yes
• 230 V AC		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
Power losses		
Power loss, max.	11 W	20 W
Relay outputs		
Rated input voltage of relay L+ (DC)	24 V	24 V
Switching capacity of contacts		
• with resistive load, max.	200 mA	200 mA
Dimensions and weight		
Dimensions		
• Width	482.5 mm	482.5 mm
• Height	109.5 mm	109.5 mm
• Depth	235 mm	235 mm
Weight		
• 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 units	

	Order No.
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	

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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	
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

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SIPLUS racks

Overview



- The mechanical basic structure of SIPLUS S7-400/S7-400H
- For accommodating the modules, operating voltage supply, and connection of the modules via a backplane bus
- Several versions for setting up central controllers and expansion units.
- SIPLUS rack material: Aluminum

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

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SIPLUS S7-400 rack			
Order No.	**6AG1 400-1JA11-4AA0**	**6AG1 400-1TA11-4AA0**	**6AG1 400-2JA10-4AA0**
Order No. based on	**6ES7 400-1JA11-0AA0**	**6ES7 400-1TA11-0AA0**	**6ES7 400-2JA10-0AA0**
Ambient temperature range	0 ... +60 °C		
Conformal coating	Coating of the printed circuit boards and the electronic components		
Technical data	The technical data of the standard product applies except for the ambient conditions		
Ambient conditions			
Relative humidity	5 ... 100 % Condensation permissible		
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)		
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]		
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]		
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K		

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS S7-400 rack		
UR1 aluminum rack		
for central controllers and expansion units, 18 slots		**6AG1 400-1TA11-4AA0**
UR2 rack		
for central controllers and expansion units, 9 slots	H	**6AG1 400-2JA10-4AA0**

	Order No.
UR2 aluminum rack	
for central controllers and expansion units, 9 slots	**6AG1 400-1JA11-4AA0**
Accessories	See SIMATIC rack S7-400, page 6/173

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Overview



- Send interface module for central expansion to 5 m
- Transmission of P and C 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 5 V DC, max.	140 mA
Power losses	
Power loss, max.	700 mW
Hardware configuration	
Cable length between first and last interface module, max.	5 m
Dimensions and weight	
Dimensions	
• Width	25 mm
• Height	290 mm
• Depth	217 mm
Weight	
• 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**

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IM 461-0

Overview



- Receive interface module for centralized expansion up to 5 m
- Transmission of P and C 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 5 V DC, max.	290 mA
Power losses	
Power loss, max.	1 450 mW
Hardware configuration	
Cable length between first and last interface module, max.	5 m
Dimensions and weight	
Dimensions	
• Width	25 mm
• Height	290 mm
• Depth	217 mm
Weight	
• 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	

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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 5 V DC, max.	85 mA
Power losses	
Power loss, max.	425 mW
Hardware configuration	
Cable length between first and last interface module, max.	1.5 m
Dimensions and weight	
Dimensions	
• Width	25 mm
• Height	290 mm
• Depth	217 mm
Weight	
• Weight, approx.	600 g

Ordering data

	Order No.
IM 460-1 interface module	**6ES7 460-1BA01-0AB0**
Send interface module for central connection up to 1.5 m; with 5 V power supply, without C bus transmission	
468-3 connecting cable	
between IM 460-1 and IM 461-1;	
0.75 m	**6ES7 468-3AH50-0AA0**
1.5 m	**6ES7 468-3BB50-0AA0**

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IM 461-1

Overview



- Receive interface module 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 5 V DC, max.	120 mA
Power losses	
Power loss, max.	600 mW
Hardware configuration	
Cable length between first and last interface module, max.	1.5 m
Dimensions and weight	
Dimensions	
• Width	25 mm
• Height	290 mm
• Depth	217 mm
Weight	
• Weight, approx.	610 g

Ordering data

	Order No.
IM 461-1 interface module	**6ES7 461-1BA01-0AA0**
Receive IM for central coupling up to max. 1.5 m; without C bus transfer	
468-3 connecting cable	
For connecting IM 460-1 and IM 461-1	
0.75 m	**6ES7 468-3AH50-0AA0**
1.5 m	**6ES7 468-3BB50-0AA0**

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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 5 V DC, max.	1 550 mA
Power losses	
Power loss, max.	7 750 mW
Hardware configuration	
Cable length between first and last interface module, max.	102.25 m
Dimensions and weight	
Dimensions	
• Width	25 mm
• Height	290 mm
• Depth	217 mm
Weight	
• 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**

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IM 461-3

Overview



- Receive interface module 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 5 V DC, max.	620 mA
Power losses	
Power loss, max.	3 100 mW
Hardware configuration	
Cable length between first and last interface module, max.	102.25 m
Dimensions and weight	
Dimensions	
• Width	25 mm
• Height	290 mm
• Depth	217 mm
Weight	
• 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	

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Overview



- Send interface module 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 5 V DC, max.	1 320 mA
Power losses	
Power loss, max.	6 600 mW
Hardware configuration	
Cable length between first and last interface module, max.	600 m
Dimensions and weight	
Dimensions	
• Width	25 mm
• Height	290 mm
• Depth	217 mm
Weight	
• Weight, approx.	360 g

Ordering data

	Order No.
IM 463-2 interface module	**6ES7 463-2AA00-0AA0**
Receiving IM for distributed coupling of SIMATIC S5-EUs up to max. 600 m	

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SIPLUS IM 460-0

Overview



- Send interface module for centralized expansion up to 5 m
- Transfer from P and C Bus
- Plug into central controller
- You may connect up to 8 expansion units (max. 4 per port)
- Usable exclusively with IM 461-0

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS IM 460-0	
Order number	**6AG1 460-0AA01-2AB0**
Order No. based on	**6ES7 460-0AA01-0AB0**
Ambient temperature range	-25 ... +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions.
Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS IM 460-0 interface module (extended temperature range and medial exposure) Send IM for central coupling up to 5 m; with C bus transfer	L	**6AG1 460-0AA01-2AB0**
Accessories		See SIMATIC IM 460-0, page 6/177

L: Subject to export regulations AL: 9I999 and ECCN: N

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Overview



- Receive interface module for central extension up to 5 m
- Transfer from P and C Bus
- Pluggable in extension device
- Usable exclusively with IM 460-0

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS IM 461	
Order No.	**6AG1 461-0AA01-2AA0**
Order No. based on	**6AG1 461-0AA01-2AA0**
Ambient temperature range	-25 ... +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions.
Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS IM 461-0 interface module (extended temperature range and medial exposure) Receiver IM for central coupling up to 5 m; with C bus transfer	L	**6AG1 461-0AA01-2AA0**
Accessories		See SIMATIC IM 461-0, page 6/178

L: Subject to export regulations AL: 9I999 and ECCN: N

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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
Product type designation	PS405, 24 V DC, 5 V DC/ 4 A	PS405, 24/48/60 V DC, 5 V DC/10 A	PS405,24/48/60 V DC, 5 V DC/10 A,RED	PS405, 24/48/60 V DC, 5 V DC/20 A
Power supply				
Input voltage				
• Rated value, 24 V DC	Yes	Yes	Yes	Yes
• Rated value, 48 V DC	Yes	Yes	Yes	Yes
• Rated value, 60 V DC	Yes	Yes	Yes	Yes
• permissible range, lower limit (DC)	19.2 V; dynamic 18.5 V	19.2 V; dynamic 18.5 V	19.2 V; dynamic 18.5 V	19.2 V; dynamic 18.5 V
• permissible range, upper limit (DC)	72 V; dynamic 75.5 V	72 V; dynamic 75.5 V	72 V; dynamic 75.5 V	72 V; dynamic 75.5 V
Input current				
• Rated value at 24 V DC	2 A	4 A	4 A	7 A
• Rated value at 48 V DC	1 000 mA	2 A	2 A	3.2 A
• Rated value at 60 V DC	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, 5 V DC	Yes	Yes	Yes	Yes
• Rated value, 24 V DC	Yes	Yes	Yes	Yes
Output current				
• for backplane bus (5 V DC), 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 (24 V DC), max.	0.5 A; idling-proof	1 A; idling-proof	1 A; idling-proof	1 A; idling-proof
• Short-circuit protection	Yes	Yes	Yes	Yes
Supply voltages				
Mains buffering				
• Mains/voltage failure stored energy time	20 ms	20 ms	20 ms	20 ms
• Mains buffering according to NAMUR recommendation	Yes	Yes	Yes	Yes
Current consumption				
Power consumption, typ.	48 W	95 W	95 W	168 W

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Technical specifications (continued)

	6ES7 405-0DA02-0AA0	6ES7 405-0KA02-0AA0	6ES7 405-0KR02-0AA0	6ES7 405-0RA02-0AA0
Power losses				
Power loss, typ.	16 W	20 W	20 W	44 W
Backup battery				
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 method				
Connecting cables/cross sections	3 x 1.5 mm2, solid or stranded wire with end sleeve, external diameter 3 to 9 mm	3 x 1.5 mm2, solid or stranded wire with end sleeve, external diameter 3 to 9 mm	3 x 1.5 mm2, solid or stranded wire with end sleeve, external diameter 3 to 9 mm	3 x 1.5 mm2, solid or stranded wire with end sleeve, external diameter 3 to 9 mm
Galvanic isolation				
primary/secondary	Yes	Yes	Yes	Yes
Degree of protection				
Protection class	1; with protective conductor	1; with protective conductor	1; with protective conductor	1; with protective conductor
Standards, approvals, certificates				
FM approval	Yes; Ta: 0 °C to 60 °C T4	Yes; Ta: 0 °C to 60 °C T4	Yes; Ta: 0 °C to 60 °C T4	Yes; Ta: 0 °C to 60 °C T4
Dimensions				
Required slots	1	2	2	2
Dimensions and weight				
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
Weight				
• 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
Product type designation			PS407, UC 120/230 V, 5 V DC/10 A,RED.	PS407, UC 120/230 V, 5 V DC/20 A
Power supply				
Input voltage				
• Rated value, 110 V DC	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, 230 V DC	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, 120 V AC	Yes	Yes	Yes	Yes
• Rated value, 230 V AC	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
• Line 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 110 V DC	350 mA; at 120 V DC	1 A; at 120 V DC	1 A; at 120 V DC	1.4 A; at 120 V DC
• Rated value at 230 V DC	190 mA	0.5 A	0.5 A	0.7 A
• Rated value at 120 V AC	0.42 A	0.9 A	0.9 A	1.4 A
• Rated value at 230 V AC	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

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Technical specifications (continued)

	6ES7 407-0DA02-0AA0	6ES7 407-0KA02-0AA0	6ES7 407-0KR02-0AA0	6ES7 407-0RA02-0AA0
Output voltage				
• Rated value, 5 V DC	Yes	Yes	Yes	Yes
• Rated value, 24 V DC	Yes	Yes	Yes	Yes
Output current				
• for backplane bus (5 V DC), 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 (24 V DC), max.	0.5 A; idling-proof	1 A; idling-proof	1 A; idling-proof	1 A; idling-proof
• Short-circuit protection	Yes	Yes	Yes	Yes
Supply voltages				
Mains buffering				
• Mains/voltage failure stored energy time	20 ms	20 ms	20 ms	20 ms
• Mains buffering according to NAMUR recommendation	Yes	Yes	Yes	Yes
Current consumption				
Power consumption, typ.	52 W	95 W	95 W	158 W
Power losses				
Power loss, typ.	20 W	20 W	20 W	35 W
Backup battery				
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 method				
Connecting cables/cross sections	3 x 1.5 mm^2, solid or stranded wire with end sleeve, external diameter 3 to 9 mm	3 x 1.5 mm^2, solid or stranded wire with end sleeve, external diameter 3 to 9 mm	3 x 1.5 mm^2, solid or stranded wire with end sleeve, external diameter 3 to 9 mm	3 x 1.5 mm^2, solid or stranded wire with end sleeve, external diameter 3 to 9 mm
Galvanic isolation				
primary/secondary	Yes	Yes	Yes	Yes
EMC				
Compliance with line harmonic distortion limits				
• Observance of line harmonic distortion acc. to IEC 61000-3-2, IEC 61000-3-3	Yes	Yes	Yes	Yes
Degree of protection				
Protection class	1; with protective conductor	1; with protective conductor	1; with protective conductor	1; with protective conductor
Standards, approvals, certificates				
FM approval	Yes; Ta: 0 °C to 60 °C T4	Yes; Ta: 0 °C to 60 °C T4	Yes; Ta: 0 °C to 60 °C T4	Yes; Ta: 0 °C to 60 °C T4
Dimensions				
Required slots	1	2	2	2
Dimensions and weight				
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
Weight				
• Weight, approx.	760 g	1 200 g	1 200 g	1 300 g

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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	L	**6AG1 405-0KA02-2AA0**
Power plug for PS 405		**6ES7 490-0AA00-0AA0**
Spare part		
Backup battery		**6ES7 971-0BA00**
Type AA; 3.6 V/2.3 Ah		
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	L	**6AG1 407-0KA02-4AA0**
10 A, redundant	H	**6AG1 407-0KR02-4AA0**
Power plug for PS 407		**6ES7 490-0AB00-0AA0**
Spare part		
Backup battery		**6ES7 971-0BA00**
Type AA; 3.6 V/2.3 Ah		
SITOP power supplies		See Catalog KT 01
For the 24 V supply of actuators or sensors		
Add-on modules and DC-UPS		See Catalog KT 01
To increase system availability		

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H
L: Subject to export regulations AL: 9I999 and ECCN: N

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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 petrol, 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 units

Technical specifications

	6ES7 492-2AX00-0AA0	6ES7 492-2BX00-0AA0	6ES7 492-2CX00-0AA0	6ES7 492-2DX00-0AA0
Dimensions and weight				
Weight				
• Weight, approx.	2 g	2 g	2 g	2 g

	6ES7 492-2XX00-0AA0
Dimensions and weight	
Weight	
• Weight, approx.	72 g

Ordering data

	Order No.
Labeling sheets	
DIN A4, for printing using laser printer; 10 units	
Petrol	**6ES7 492-2AX00-0AA0**
Light beige	**6ES7 492-2BX00-0AA0**
Yellow	**6ES7 492-2CX00-0AA0**
Red	**6ES7 492-2DX00-0AA0**

	Order No.
Cover film for labeling strips	**6ES7 492-2XX00-0AA0**
10 units (spare part)	

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Overview

Cover film for labeling strips

- Petrol-colored film for covering and fixing user-created labeling strips
- On standard paper
- Spare part

Measuring range module for analog input modules

- Plug-in module for selecting the input ranges for analog modules
- 1 module for 2 inputs
- Spare part

Module slot cover

- Cover plates for unassigned slots in module mounting racks
- Spare part, 10 units

Power plug

- Plug for connecting of the PS 405 and PS 407 power supply modules to the line supply
- Spare part

Exchangeable fan

- Fan unit for installation in the fan subassembly
- Spare part

Exchangeable monitoring unit

- Electronic monitoring unit for the fan subassembly
- Spare part

Exchangeable power supply unit

- Power supply unit for installation in the fan subassembly
- Spare part

Ordering data

Ordering data	Order No.
Cover foil for labeling strip 10 units (spare part)	**6ES7 492-2XX00-0AA0**
Range card for analog input modules 1 card for 2 inputs; 2 units (spare part)	**6ES7 974-0AA00-0AA0**
Slot covers for racks; 10 units (spare part)	**6ES7 490-1AA00-0AA0**
Power plug for PS 405 Spare part	**6ES7 490-0AA00-0AA0**
Power plug for PS 407 Spare part	**6ES7 490-0AB00-0AA0**
Replacement fan Spare part	**6ES7 408-1TA00-6AA0**

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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 8 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.

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Technical specifications

	6ES7 153-1AA03-0XB0	6ES7 153-2BA02-0XB0	6ES7 153-2BA82-0XB0
Power supply			
Input voltage			
• Rated value, 24 V DC	Yes		
• permissible range, lower limit (DC)	20.4 V		
• permissible range, upper limit (DC)	28.8 V		
Input current			
• Rated value at 24 V DC	625 mA	650 mA	650 mA
Output voltage			
• Rated value, 5 V DC	Yes	Yes	Yes
Output current			
• for backplane bus (5 V DC), max.	1 A	1.5 A	1.5 A
Supply voltages			
Rated value			
• 24 V DC		Yes	Yes
• permissible range (ripple included), lower limit (DC)	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
external protection for supply cables (recommendation)	not necessary	2.5 A	2.5 A
Mains buffering			
• Mains/voltage failure stored energy time	5 ms	5 ms	5 ms
Current consumption			
Current consumption, max.	350 mA; At 24 V DC	600 mA	600 mA
Inrush current, typ.	2.5 A	3 A	3 A
I^2t	0.1 $A^2 \cdot s$	0.1 $A^2 \cdot s$	0.1 $A^2 \cdot s$

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Technical specifications (continued)

	6ES7 153-1AA03-0XB0	6ES7 153-2BA02-0XB0	6ES7 153-2BA82-0XB0
Power losses			
Power loss, typ.	3 W	5.5 W	5.5 W
Address area			
Addressing volume			
• Outputs	128 byte	244 byte	244 byte
• Inputs	128 byte	244 byte	244 byte
Hardware configuration			
Number of modules per DP slave interface module, max.	8	12	12
Communication functions			
Bus protocol/transmission protocol	PROFIBUS DP to EN 50170	PROFIBUS DP to EN 50170	PROFIBUS DP to EN 50170
Interfaces			
PROFIBUS DP, output current, max.	90 mA	70 mA	70 mA
Interface physics, RS 485	Yes	Yes	Yes
Interface physics, FOC	No	No	No
Connection method			
PROFIBUS DP	9-pin sub D socket	9-pin sub D	9-pin sub D
PROFIBUS DP			
Transmission procedure	RS 485	RS 485	RS 485
Transmission rate, max.	12 Mbit/s	12 Mbit/s	12 Mbit/s
Node addresses	1 to 125 permitted	1 to 125 permitted	1 to 125 permitted
Automatic detection of transmission speed	Yes	Yes	Yes
SYNC capability	Yes	Yes	Yes
FREECE capability	Yes	Yes	Yes
Direct data exchange (slave-to-slave communication)	Yes; Sender	Yes; Sender	Yes; Sender
1st interface			
DP slave			
• GSD file	(for DPV1) SIEM801D.GSD; SI01801D.GSG	SI04801.GSG	SI0480E.GSG
• Automatic baud rate search	Yes	Yes	Yes
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; 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
Number of message buffers		15	15
Messages per message buffer		20	20
Number of stampable digital inputs, max.		128; Max. 128 signals/station; max. 32 signals/slot	128; Max. 128 signals/station; max. 32 signals/slot
Time format		RFC 1119	RFC 1119
Time resolution		0.466 ns	0.466 ns
Time interval for transmitting the message buffer if a message is present		1 000 ms	1 000 ms
Time stamp on signal change		rising / falling edge as signal entering or exiting	rising / falling edge as signal entering or exiting

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Technical specifications (continued)

	6ES7 153-1AA03-0XB0	6ES7 153-2BA02-0XB0	6ES7 153-2BA82-0XB0
Isolation			
Isolation checked with	Isolation voltage 500 V	Isolation voltage 500 V	Isolation voltage 500 V
Environmental requirements			
Operating temperature			
• Min.	0 °C	0 °C	-25 °C
• Max.	60 °C	60 °C	60 °C
Air pressure			
• Operating altitude above sea level, max.	3 000 m	3 000 m	3 000 m
Degree of protection			
IP20	Yes	Yes	Yes
General information			
Vendor identification (VendorID)	801Dh	801Eh	801Eh
Dimensions and weight			
Dimensions			
• Width	40 mm	40 mm	40 mm
• Height	125 mm	125 mm	125 mm
• Depth	117 mm	117 mm	117 mm
Weight			
• Weight, approx.	360 g	360 g	360 g

	6ES7 195-7HD10-0XA0
Accessories	
belongs to product	ET 200M
Dimensions and weight	
Dimensions	
• Width	97 mm
• Height	92 mm
• Depth	30 mm
Weight	
• Weight, approx.	133 g

	6ES7 195-7HA00-0XA0	6ES7 195-7HB00-0XA0	6ES7 195-7HC00-0XA0
Dimensions and weight			
Dimensions			
• Width	97 mm	97 mm	97 mm
• Height	92 mm	92 mm	92 mm
• Depth	30 mm	30 mm	30 mm
Weight			
• Weight, approx.	111 g	140 g	127 g

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Ordering data	Order No.
IM 153-1 interface module	
Slave interface module for connecting an ET 200M to PROFIBUS DP	
• Standard temperature range	**6ES7 153-1AA03-0XB0**
IM 153-2 interface module	
Slave interface module for connecting an ET 200M to PROFIBUS DP; also for use in redundant systems	
• High Feature	**6ES7 153-2BA02-0XB0**
• High Feature with extended temperature range	**6ES7 153-2BA82-0XB0**
Active IM 153 /IM 153 bus module	**6ES7 195-7HD10-0XA0**
For two IM 153-2 High Feature modules for designing redundant systems	
Bus module for ET 200M	
• To accommodate a power supply and an IM 153 module for the hot-swapping function during RUN time, incl. bus module cover	**6ES7 195-7HA00-0XA0**
• To accommodate two 40-mm wide I/O modules for the hot-swapping function	**6ES7 195-7HB00-0XA0**
• To accommodate one 80-mm wide I/O module for the hot-swapping function	**6ES7 195-7HC00-0XA0**
ET 200M redundancy bundle	**6ES7153-2AR03-0XA0**
Comprising two IM 153-2 High Feature modules and one IM 153/IM 153 bus module	
Accessories	
PROFIBUS bus connector	
90° outgoing cable, terminating resistor with disconnecting function, up to 12 Mbit/s, FastConnect	
Without PG interface	
• 1 unit	**6ES7 972-0BA52-0XA0**
• 100 units	**6ES7 972-0BA52-0XB0**
With PG interface	
• 1 unit	**6ES7 972-0BB52-0XA0**
• 100 units	**6ES7 972-0BB52-0XB0**

		Order No.
SIMATIC DP DIN rail for ET 200M		
Accommodates up to 5 bus modules; for hot-swapping function		
• Length: 483 mm (19“)		**6ES7 195-1GA00-0XA0**
• Length: 530 mm		**6ES7 195-1GF30-0XA0**
• Length: 620 mm		**6ES7 195-1GG30-0XA0**
• Length: 2000 mm		**6ES7 195-1GC00-0XA0**
SIMATIC S7-300 DIN rail		
• Length: 160 mm		**6ES7 390-1AB60-0AA0**
• Length: 480 mm (19“)		**6ES7 390-1AE80-0AA0**
• Length: 530 mm		**6ES7 390-1AF30-0AA0**
• Length: 830 mm		**6ES7 390-1AJ30-0AA0**
• Length: 2000 mm		**6ES7 390-1BC00-0AA0**
S7 manual collection	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multi-language: S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication)		
S7 manual collection, update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates		

D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

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SIPLUS IM 153-1/153-2

Overview



Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

	SIPLUS IM 153-1	SIPLUS IM 153-2	SIPLUS IM 153-2
Order number	**6AG1 153-1AA03-2XB0**	**6AG1 153-2BA02-7XY0**	**6AG1 153-2BA02-7XB0**
Order No. based on	**6ES7 153-1AA03-0XB0**	**6ES7 153-2BA02-0XB0**	**6ES7 153-2BA02-0XB0**
Ambient temperature range	-40 ... +70 °C Startup temperature -25 °C	-25 ... +60 °C	-40 ... +70 °C Startup temperature -25 °C
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	No	Yes	No
Conformal coating	Coating of the printed circuit boards and the electronic components		
Technical data	The technical data of the standard product applies except for the ambient conditions.		

SIPLUS bus module	for accommodating a PS and an IM 153	for accommodating two 40 mm wide I/O modules
Order number	**6AG1 195-7HA00-2XA0**	**6AG1 195-7HB00-7XA0**
Order No. based on	**6ES7 195-7HA00-0XA0**	**6ES7 195-7HB00-0XA0**
Ambient temperature range	-25 ... +70 °C	-25 ... +70 °C
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	No	Yes
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	

SIPLUS bus module	for accommodating an 80 mm module	for accommodating 2 IM 153-2
Order number	**6AG1 195-7HC00-2XA0**	**6AG1 195-7HD10-2XA0**
Order No. based on	**6ES7 195-7HC00-0XA0**	**6ES7 195-7HD10-0XA0**
Ambient temperature range	-25 ... +70 °C	-25 ... +70 °C
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	No	Yes
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	

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Overview (continued)

Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

Ordering data

IM 153-1 interface module		
Slave interface module for connecting an ET 200M to PROFIBUS DP		
• Standard temperature range	L	**6AG1 153-1AA03-2XB0**
IM 153-2 interface module		
Slave interface module for connecting an ET 200M to PROFIBUS DP; also for use in redundant systems		
• High Feature	H	**6AG1 153-2BA02-7XB0**
Active IM 153/IM 153 bus module		**6AG1 195-7HD10-2XA0**
For two IM 153-2 High Feature modules for designing redundant systems		
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**
• To accommodate two 40 mm wide I/O modules for the hot-swapping function		**6AG1 195-7HB00-7XA0**
• To accommodate one 80 mm wide I/O module for the hot swapping function		**6AG1 195-7HC00-2XA0**
Accessories		See SIMATIC ET 200M IM 153-1/153-2, page 6/195

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H
L: Subject to export regulations AL: 9I999 and ECCN: N

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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	Yes, behind the CPU
• Standard and fail-safe modules in the tier	Yes, after the last standard module and before the first fail-safe module
Central use after CPU 31xF-2 DP or CPU 31xF-2 PN/DP in an expansion rack	
• Only fail-safe modules in the tier	Yes, after the IM 36x
• Standard and fail-safe modules in the tier	Yes, after the last standard module and before the first fail-safe module
Distributed behind the IM 153-2 with copper connection	
• Only fail-safe modules in the station	Yes, after the IM 153-2
• Standard and fail-safe modules in the station	Yes, after the last standard module and before the first fail-safe module
Distributed behind the IM 153-2 with fiber-optic connection	
• Only fail-safe modules in the station	No
• Standard and fail-safe modules in the station	Yes, after the last standard module and before the first fail-safe module

Technical specifications

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

Ordering data

	Order No.
Isolation module for simultaneous operation of fail-safe and standard modules in an ET 200M	**6ES7 195-7KF00-0XA0**
Isolation bus module for accommodating the isolating module in an ET 200M	**6ES7 195-7HG00-0XA0**

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Overview



- Permits combined operation of fail-safe signal modules in safety mode and standard S7-300 modules in the same ET 200M system.
- The isolation module is not required if the safety class SIL 3 or safety category < Cat. 4 is to be achieved.

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

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
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical specifications	The technical data of the standard product applies except for the ambient conditions.
Ambient conditions	
Relative humidity	5 ... 100%, condensation allowed

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Technical specifications

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

Ordering data

		Order No.
SIPLUS isolation module	H	**6AG1 195-7KF00-2XA0**
for simultaneous operation of fail-safe and standard modules in the same ET 200M		
Accessories		See SIMATIC S7-300 isolation module, page 6/198

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H

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Fail-safe 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 according to IEC 61508, AK 4, AK 6 according to DIN V 19250, category 3, 4 according to EN 954-1
- Use in standard mode with high diagnostics requirements
- Also suitable for redundant operation

For further information see chapter 5, page 5/150.

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Embedded controller



7/2 **SIMATIC S7-modular embedded controller**
7/2 EC31
7/12 Expansion modules
7/13 SIPLUS S7-modular embedded controller

7/14 **Embedded Box PC bundles**
7/14 SIMATIC IPC427C bundles

7/17 **Embedded Panel PC bundles**
7/17 SIMATIC HMI IPC477C bundles

7/21 **Communication**
7/21 CP 5603
7/25 CP 1604

Brochures

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

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

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SIMATIC S7-modular embedded controller

EC31

Overview



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

www.siemens.com/simatic/printmaterial

- Get off to a fast start in automation solutions with embedded PC platforms.
  - Ready-to-use SIMATIC WinAC RTX or WinAC RTX F preinstalled on EC31
  - Prepared for use in a SIMATIC environment with PROFINET and Industrial Ethernet
  - Commissioning by specialist automation personnel as with the S7-300
  - Configuring and programming with SIMATIC STEP 7 over Industrial Ethernet
  - Optional visualization
- Modular expansion capability:
  Central expansion with
  - S7-300 I/O (SM modules of S7-300)
  - Expansion modules for additional PC interfaces, e.g. DVI-I, USB, Gigabit Ethernet networks and memory card slots, as well as PCI-104
- Rugged operation
  - Hard-disk-free operation based on flash disk and Windows Embedded Standard
  - Fan-free operation
- Flexibility of a PC-based automation environment
  - Free memory space on flash disk can be used for other PC applications
  - Use of WinAC ODK with SIMATIC WinAC RTX and WinAC RTX F (read-only in safety-related program part)
  - Connection option for USB devices
  - Memory capacity expandable using multimedia card
- Data retentivity for WinAC RTX and RTX F without uninterruptible power supply (UPS)

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Technical specifications

	6ES7 677-1DD10-0BA0	6ES7 677-1DD10-0BB0	6ES7 677-1FD00-0FB0	6ES7 677-1DD10-0BF0	6ES7 677-1DD10-0BG0	6ES7 677-1DD10-0BH0
Product type designation	SIMATIC S7-mEC, EC31	S7-mEC, EC31-RTX	S7-mEC, EC31-RTX F	S7-mEC, EC31-HMI/RTX 128PT	S7-mEC, EC31-HMI/RTX 512PT	S7-mEC, EC31-HMI/RTX 2048PT
Product version						
Hardware product version	01	01	04	01	01	01
Firmware version	V2.0	V2.0	V1.3	V2.0	V2.0	V2.0
PC configuration						
Computer platform	SIMATIC S7 modular embedded controller	SIMATIC S7 modular embedded controller	SIMATIC S7 modular embedded controller	SIMATIC S7 modular embedded controller	SIMATIC S7 modular embedded controller	SIMATIC S7 modular embedded controller
Processor selection	Intel Core Duo 1.2 GHz	Intel Core Duo 1.2 GHz	Intel Core Duo 1.2 GHz	Intel Core Duo 1.2 GHz	Intel Core Duo 1.2 GHz	Intel Core Duo 1.2 GHz
Work memory	1 GB RAM	1 GB RAM	1 GB RAM	1 GB RAM	1 GB RAM	1 GB RAM
Flash Disk	4 GB	4 GB	2 GB	4 GB	4 GB	4 GB
Operating systems	Windows Embedded Standard 2009	Windows Embedded Standard 2009	Windows XP embedded SP2 FP2007	Windows Embedded Standard 2009	Windows Embedded Standard 2009	Windows Embedded Standard 2009
Power supply						
Input voltage						
• Rated value, 24 V DC	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
Input current						
• Rated value at 24 V DC	without backplane bus and USB power supply	without backplane bus and USB power supply	800 mA; without backplane bus and USB power supply	without backplane bus and USB power supply	without backplane bus and USB power supply	without backplane bus and USB power supply

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Technical specifications (continued)

	6ES7 677-1DD10-0BA0	6ES7 677-1DD10-0BB0	6ES7 677-1FD00-0FB0	6ES7 677-1DD10-0BF0	6ES7 677-1DD10-0BG0	6ES7 677-1DD10-0BH0
Supply voltages						
Mains buffering						
• Mains/voltage failure stored energy time	5 ms	5 ms	5 ms	5 ms	5 ms	5 ms
Power losses						
Power loss, typ.			34 W			
Memory						
Memory type	256 KB non-volatile memory for retentive data	512 KB non-volatile memory for retentive data	512 KB non-volatile memory for retentive data	512 KB non-volatile memory for retentive data	512 KB non-volatile memory for retentive data	512 KB non-volatile memory for retentive data
CPU-blocks						
DB						
• Number, max.		Max. code size and max. data size: 4 MB each	Max. code size and max. data size: 4 MB each	Max. code size and max. data size: 4 MB each	Max. code size and max. data size: 4 MB each	Max. code size and max. data size: 4 MB each
• Size, max.		64 Kibyte	64 Kibyte	64 Kibyte	64 Kibyte	64 Kibyte
FB						
• Number, max.		Max. code size and max. data size: 4 MB each	Max. code size and max. data size: 4 MB each	Max. code size and max. data size: 4 MB each	Max. code size and max. data size: 4 MB each	Max. code size and max. data size: 4 MB each
• Size, max.		64 Kibyte	64 Kibyte	64 Kibyte	64 Kibyte	64 Kibyte
FC						
• Number, max.		Max. code size and max. data size: 4 MB each	Max. code size and max. data size: 4 MB each	Max. code size and max. data size: 4 MB each	Max. code size and max. data size: 4 MB each	Max. code size and max. data size: 4 MB each
• Size, max.		64 Kibyte	64 Kibyte	64 Kibyte	64 Kibyte	64 Kibyte
OB						
• Number, max.		Max. code size and max. data size: 4 MB each	Max. code size and max. data size: 4 MB each	Max. code size and max. data size: 4 MB each	Max. code size and max. data size: 4 MB each	Max. code size and max. data size: 4 MB each
• Size, max.		64 Kibyte	64 Kibyte	64 Kibyte	64 Kibyte	64 Kibyte
• Number of free cycle OBs		1; OB 1	1; OB 1	1; OB 1	1; OB 1	1; OB 1
• Number of time alarm OBs		1; OB 10	1; OB 10	1; OB 10	1; OB 10	1; OB 10
• Number of delay alarm OBs		1; OB 20	1; OB 20	1; OB 20	1; OB 20	1; OB 20
• Number of time alarm OBs		9; OB 30-38	9; OB 30-38	9; OB 30-38	9; OB 30-38	9; OB 30-38
• Number of process alarm OBs		1; OB 40	1; OB 40	1; OB 40	1; OB 40	1; OB 40
• Number of startup OBs		2; OB 100, 102	2; OB 100, 102	2; OB 100, 102	2; OB 100, 102	2; OB 100, 102
• Number of asynchronous error OBs		7; OB 80, 82-85, 86, 88	7; OB 80, 82-85, 86, 88	7; OB 80, 82-85, 86, 88	7; OB 80, 82-85, 86, 88	7; OB 80, 82-85, 86, 88
• Number of synchronous error OBs		2; OB 121, 122	2; OB 121, 122	2; OB 121, 122	2; OB 121, 122	2; OB 121, 122
Nesting depth						
• per priority class		24	24	24	24	24
• additional within an error OB		24	24	24	24	24

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Technical specifications (continued)

	6ES7 677-1DD10-0BA0	6ES7 677-1DD10-0BB0	6ES7 677-1FD00-0FB0	6ES7 677-1DD10-0BF0	6ES7 677-1DD10-0BG0	6ES7 677-1DD10-0BH0
CPU processing times						
for bit operations, min.		0.004 µs; typ.	0.004 µs; typ.	0.004 µs; typ.	0.004 µs; typ.	0.004 µs; typ.
for fixed point arithmetic, min.		0.003 µs; typ.	0.003 µs; typ.	0.003 µs; typ.	0.003 µs; typ.	0.003 µs; typ.
for floating point arithmetic, min.		0.004 µs; typ.	0.004 µs; typ.	0.004 µs; typ.	0.004 µs; typ.	0.004 µs; typ.
Counters, timers and their retentivity						
S7 counter						
• Number		2 048	2 048	2 048	2 048	2 048
• Retentivity						
- adjustable		Yes	Yes	Yes	Yes	Yes
- lower limit		0	0	0	0	0
- upper limit		2 047	2 047	2 047	2 047	2 047
- preset		8	8	8	8	8
• Counting range						
- adjustable		Yes	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
S7 times						
• Number		2 048	2 048	2 048	2 048	2 048
• Retentivity						
- adjustable		Yes	Yes	Yes	Yes	Yes
- lower limit		0	0	0	0	0
- upper limit		2 047	2 047	2 047	2 047	2 047
• 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 retentivity						
retentive data area, total		512 KB	512 KB	512 KB	512 KB	512 KB
Flag						
• Number, max.		16 Kibyte	16 Kibyte	16 Kibyte	16 Kibyte	16 Kibyte
• of which retentive without battery		MB 0 to MB 16383	MB 0 to MB 16383	MB 0 to MB 16383	MB 0 to MB 16383	MB 0 to MB 16383
• Retentivity preset		MB 0 to MB 15	MB 0 to MB 15	MB 0 to MB 15	MB 0 to MB 15	MB 0 to MB 15
• Number of clock memories		8	8	8	8	8
Data blocks						
• Number, max.		Max. code size and max. data size: 4 MB each	Max. code size and max. data size: 4 MB each	Max. code size and max. data size: 4 MB each	Max. code size and max. data size: 4 MB each	Max. code size and max. data size: 4 MB each
• Size, max.		64 Kibyte	64 Kibyte	64 Kibyte	64 Kibyte	64 Kibyte

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Technical specifications (continued)

	6ES7 677-1DD10-0BA0	6ES7 677-1DD10-0BB0	6ES7 677-1FD00-0FB0	6ES7 677-1DD10-0BF0	6ES7 677-1DD10-0BG0	6ES7 677-1DD10-0BH0
Address area						
I/O address area						
• Overall		16 Kibyte	16 Kibyte	16 Kibyte	16 Kibyte	16 Kibyte
• Outputs		16 Kibyte	16 Kibyte	16 Kibyte	16 Kibyte	16 Kibyte
• of which, distributed						
- Inputs			8 Kibyte			
- Outputs			8 Kibyte			
Process image						
• Inputs, adjustable		16 Kibyte	16 Kibyte	8 Kibyte	8 Kibyte	8 Kibyte
• Outputs, adjustable		16 Kibyte	16 Kibyte	8 Kibyte	8 Kibyte	8 Kibyte
• Inputs, default		512 byte	512 byte	512 byte	512 byte	512 byte
• Outputs, default		512 byte	512 byte	512 byte	512 byte	512 byte
Subprocess images						
• Number of subprocess images, max.		15	15	15	15	15
Digital channels						
• Inputs		128 000	128 000	128 000	128 000	128 000
• Outputs		128 000	128 000	128 000	128 000	128 000
Analog channels						
• Inputs		8 000	8 000	8 000	8 000	8 000
• Outputs		8 000	8 000	8 000	8 000	8 000
Time						
Clock						
• Hardware clock (real-time clock)		Yes; Resolution: 1 s	Yes; Resolution: 1 s	Yes; Resolution: 1 s	Yes; Resolution: 1 s	Yes; Resolution: 1 s
Clock synchronization						
• supported		Yes	Yes	Yes	Yes	Yes
• on Ethernet via NTP		Yes	Yes	Yes	Yes	Yes
S7 message functions						
Number of login stations for message functions, max.		62; The alarm functions cannot currently be used for central bus modules	62; The alarm functions cannot currently be used for central bus modules	62; The alarm functions cannot currently be used for central bus modules	62; The alarm functions cannot currently be used for central bus modules	62; The alarm functions cannot currently be used for central bus modules
Process diagnostic messages		Yes; Alarm_S	Yes; Alarm_S	Yes; Alarm_S	Yes; Alarm_S	Yes; Alarm_S
Test commissioning functions						
Status/control						
• Status/control variable		Yes	Yes	Yes	Yes	Yes
Forcing						
• Forcing		No	No	No	No	No
Diagnostic buffer						
• present		Yes	Yes	Yes	Yes	Yes
Monitoring functions						
Status LEDs		Yes	Yes	Yes	Yes	Yes

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Technical specifications (continued)

	6ES7 677-1DD10-0BA0	6ES7 677-1DD10-0BB0	6ES7 677-1FD00-0FB0	6ES7 677-1DD10-0BF0	6ES7 677-1DD10-0BG0	6ES7 677-1DD10-0BH0
Communication functions						
PG/OP communication		Yes	Yes	Yes	Yes	Yes
Global data communication						
• supported		No	No	No	No	No
S7 basic communication						
• supported		No	No	No	No	No
S7 communication						
• supported		Yes	Yes	Yes	Yes	Yes
• as server		Yes	Yes	Yes	Yes	Yes
• as client		Yes	Yes	Yes	Yes	Yes
Open IE communication						
• TCP/IP		Yes; Via integrated PROFINET interface (X1) and loadable FBs	Yes; Via integrated PROFINET interface and loadable FBs	Yes; Via integrated PROFINET interface (X1) and loadable FBs	Yes; Via integrated PROFINET interface (X1) and loadable FBs	Yes; Via integrated PROFINET interface (X1) and loadable FBs
- Number of connections, max.		32	32	32	32	32
- Data length, max.			8 192 byte			
• ISO-on-TCP (RFC1006)		Yes; Via integrated PROFINET interface (X1) and loadable FBs	No	Yes; Via integrated PROFINET interface (X1) and loadable FBs	Yes; Via integrated PROFINET interface (X1) and loadable FBs	Yes; Via integrated PROFINET interface (X1) and loadable FBs
- Number of connections, max.		32		32	32	32
• UDP		Yes; Via integrated PROFINET interface (X1) and loadable FBs	Yes; Via integrated PROFINET interface and loadable FBs	Yes; Via integrated PROFINET interface (X1) and loadable FBs	Yes; Via integrated PROFINET interface (X1) and loadable FBs	Yes; Via integrated PROFINET interface (X1) and loadable FBs
- Number of connections, max.		32	32	32	32	32
- Data length, max.			1 472 byte			
Number of connections						
• overall		64	64	64	64	64
• usable for PG communication						
- reserved for PG communication		1	1	1	1	1
• usable for OP communication						
- reserved for OP communication		1	1	1	1	1
1st interface						
Type of interface		PROFINET	PROFINET	PROFINET	PROFINET	PROFINET
Physics		2x RJ45	2x RJ45	2x RJ45	2x RJ45	2x RJ45
automatic detection of transmission speed		Yes	Yes	Yes	Yes	Yes
Autonegotiation		Yes	Yes	Yes	Yes	Yes
Autocrossing		Yes	Yes	Yes	Yes	Yes
Number of connection resources		32	32	32	32	32

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Technical specifications (continued)

	6ES7 677-1DD10-0BA0	6ES7 677-1DD10-0BB0	6ES7 677-1FD00-0FB0	6ES7 677-1DD10-0BF0	6ES7 677-1DD10-0BG0	6ES7 677-1DD10-0BH0
Functionality						
• MPI			No			
• DP master			No			
• DP slave			No			
• PROFINET IO device		No	No	No	No	No
• PROFINET IO controller		Yes	Yes	Yes	Yes	Yes
• PROFINET CBA		Yes	Yes	Yes	Yes	Yes
• Open IE communication		Yes	Yes	Yes	Yes	Yes
• Point-to-point connection			No			
PROFINET IO controller						
• Services						
- PG/OP communication		Yes	Yes	Yes	Yes	Yes
- S7 routing		Yes	Yes	Yes	Yes	Yes
- S7 communication		Yes	Yes	Yes	Yes	Yes
- Isochronous mode		Yes	No	Yes	Yes	Yes
• Number of connectable IO devices, max.		256	256	256	256	256
• Max. number of connectable IO devices for RT		256		256	256	256
- of which in line, max.		256		256	256	256
• Number of IO devices with IRT and the option "high flexibility"			64			
• IRT, supported		Yes	Yes	Yes	Yes	Yes
• Prioritized startup supported		Yes	Yes	Yes	Yes	Yes
- Number of IO devices, max.			32			
• Activation/deactivation of IO devices		Yes	Yes	Yes	Yes	Yes
- Number of IO devices that can be simultaneously activated/deactivated, max.			8			
• IO devices changing during operation (partner ports), supported		Yes	Yes	Yes	Yes	Yes
- Max. number of IO devices per tool		8	8	8	8	8
• Device replacement without swap medium		Yes		Yes	Yes	Yes
• Send cycles		Adjustable: 250 µs, 500 µs and 1 ms	Adjustable: 250 µs, 500 µs and 1 ms	Adjustable: 250 µs, 500 µs and 1 ms	Adjustable: 250 µs, 500 µs and 1 ms	Adjustable: 250 µs, 500 µs and 1 ms
• Updating times		250 µs - 128 ms (at signal cycle 250 µs); 500 µs - 256 ms (at signal cycle 500 µs); 1 ms - 512 ms (at signal cycle 1 ms)	250 µs - 128 ms (at signal cycle 250 µs); 500 µs - 256 ms (at signal cycle 500 µs); 1 ms - 512 ms (at signal cycle 1 ms)	250 µs - 128 ms (at signal cycle 250 µs); 500 µs - 256 ms (at signal cycle 500 µs); 1 ms - 512 ms (at signal cycle 1 ms)	250 µs - 128 ms (at signal cycle 250 µs); 500 µs - 256 ms (at signal cycle 500 µs); 1 ms - 512 ms (at signal cycle 1 ms)	250 µs - 128 ms (at signal cycle 250 µs); 500 µs - 256 ms (at signal cycle 500 µs); 1 ms - 512 ms (at signal cycle 1 ms)

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Technical specifications (continued)

	6ES7 677-1DD10-0BA0	6ES7 677-1DD10-0BB0	6ES7 677-1FD00-0FB0	6ES7 677-1DD10-0BF0	6ES7 677-1DD10-0BG0	6ES7 677-1DD10-0BH0
PROFINET IO controller						
• Address area						
- Inputs, max.			16 Kibyte			
- Outputs, max.			16 Kibyte			
• User data per address area, max.			2 Kibyte			
- User data consistency, max.			256 byte			
PROFINET CBA						
• acyclic transmission		Yes	Yes	Yes	Yes	Yes
• cyclic transmission		Yes	Yes	Yes	Yes	Yes
Open IE communication						
• Open IE communication, supported		Yes	Yes	Yes	Yes	Yes
• Number of connections, max.			32			
• Local port numbers used at the system end		0, 20, 21, 23, 25, 80, 102, 135, 161, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535	0, 20, 21, 23, 25, 80, 102, 135, 161, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535	0, 20, 21, 23, 25, 80, 102, 135, 161, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535	0, 20, 21, 23, 25, 80, 102, 135, 161, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535	0, 20, 21, 23, 25, 80, 102, 135, 161, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535
PROFINET functions						
• Detection of accessible nodes, supported		Yes; DCP	Yes; DCP	Yes; DCP	Yes; DCP	Yes; DCP
• Assignment of the IP address, supported		Yes; DCP	Yes; DCP	Yes; DCP	Yes; DCP	Yes; DCP
• Assignment of the device name, supported		Yes; DCP	Yes; DCP	Yes; DCP	Yes; DCP	Yes; DCP
• Topology recognition, supported		Yes; LLDP, LLDP MIB, SNMP	Yes; LLDP, LLDP MIB, SNMP	Yes; LLDP, LLDP MIB, SNMP	Yes; LLDP, LLDP MIB, SNMP	Yes; LLDP, LLDP MIB, SNMP
• Extended network diagnostics with Standard MIB II, supported		Yes; Standard MIB II, SNMP	Yes; Standard MIB II, SNMP	Yes; Standard MIB II, SNMP	Yes; Standard MIB II, SNMP	Yes; Standard MIB II, SNMP
2nd interface						
Type of interface		Integrated Ethernet interface	Integrated Ethernet interface	Integrated Ethernet interface	Integrated Ethernet interface	Integrated Ethernet interface
Physics		Ethernet RJ45	Ethernet RJ45	Ethernet RJ45	Ethernet RJ45	Ethernet RJ45
Automatic detection of transmission speed		Yes	Yes	Yes	Yes	Yes
Autonegotiation		Yes	Yes	Yes	Yes	Yes
Autocrossing		No	No	No	No	No
Number of connection resources		32	32	32	32	32

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Technical specifications (continued)

	6ES7 677-1DD10-0BA0	6ES7 677-1DD10-0BB0	6ES7 677-1FD00-0FB0	6ES7 677-1DD10-0BF0	6ES7 677-1DD10-0BG0	6ES7 677-1DD10-0BH0
Functionality						
• PROFINET IO controller		No	No	No	No	No
• PROFINET IO device		No	No	No	No	No
• PROFINET CBA		No	No	No	No	No
• PROFINET CBA-SRT		No	No	No	No	No
PROFINET functions						
• Detection of accessible nodes, supported		Yes; DCP		Yes; DCP	Yes; DCP	Yes; DCP
• Assignment of the IP address, supported		Yes; DCP		Yes; DCP	Yes; DCP	Yes; DCP
• Assignment of the device name, supported		Yes; DCP		Yes; DCP	Yes; DCP	Yes; DCP
• Topology recognition, supported		Yes; LLDP, LLDP MIB, SNMP		Yes; LLDP, LLDP MIB, SNMP	Yes; LLDP, LLDP MIB, SNMP	Yes; LLDP, LLDP MIB, SNMP
• Extended network diagnostics with Standard MIB II, supported		Yes; Standard MIB II, SNMP		Yes; Standard MIB II, SNMP	Yes; Standard MIB II, SNMP	Yes; Standard MIB II, SNMP
Programming						
Configuration software						
• STEP 7		Yes; As of V5.5 + HW update/iMap V3.0 SP1	Yes; STEP7 V5.4 SP5 or higher + HSP135 as basic requirement for the HSP178 for WinAC RTX F 2009 on Embedded Controller / iMap V3.0 SP1	Yes; As of V5.5 + HW update/iMap V3.0 SP1	Yes; As of V5.5 + HW update/iMap V3.0 SP1	Yes; As of V5.5 + HW update/iMap V3.0 SP1
Programming language						
• STEP 7		Yes	Yes; V5.4 SP5	Yes	Yes	Yes
• LAD		Yes	Yes	Yes	Yes	Yes
• FBD		Yes	Yes	Yes	Yes	Yes
• STL		Yes	Yes	Yes	Yes	Yes
• SCL		Yes	Yes	Yes	Yes	Yes
• CFC		Yes	Yes	Yes	Yes	Yes
• GRAPH		Yes	Yes	Yes	Yes	Yes
• HiGraph®		Yes	Yes	Yes	Yes	Yes
Installed software						
Visualization				WinCC flexible RT 2008 SP2, incl. Sm@rtAccess, recipes, archives options	WinCC flexible RT 2008 SP2, incl. Sm@rtAccess, recipes, archives options	WinCC flexible RT 2008 SP2, incl. Sm@rtAccess, recipes, archives options
Control		SIMATIC WinAC RTX 2010	SIMATIC WinAC RTX F 2009	SIMATIC WinAC RTX 2010	SIMATIC WinAC RTX 2010	SIMATIC WinAC RTX 2010
Communication		Yes	Yes	Yes	Yes	Yes

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Technical specifications (continued)

	6ES7 677-1DD10-0BA0	6ES7 677-1DD10-0BB0	6ES7 677-1FD00-0FB0	6ES7 677-1DD10-0BF0	6ES7 677-1DD10-0BG0	6ES7 677-1DD10-0BH0
EMC						
Emission of radio interference acc. to EN 55 011						
• Limit value class A, for use in industrial areas	Yes	Yes	Yes	Yes	Yes	Yes
Environmental requirements						
Operating temperature						
• Min.	0 °C	0 °C	0 °C	0 °C	0 °C	0 °C
• Max.	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C
Storage/transport temperature						
• Min.	-40 °C	-40 °C	-40 °C	-40 °C	-40 °C	-40 °C
• Max.	70 °C	70 °C	70 °C	70 °C	70 °C	70 °C
Vibrations						
• Operation, checked according to IEC 60068-2-6	Yes	Yes	Yes	Yes	Yes	Yes
• Transport checked according to IEC 60068-2-6	Yes	Yes	Yes	Yes	Yes	Yes
Shock test						
• checked according to IEC 60068-2-27	Yes	Yes	Yes	Yes	Yes	Yes
• checked according to IEC 60068-2-29	Yes	Yes	Yes	Yes	Yes	Yes
Shock testing						
• Checked according to IEC 60068-2-29	Yes	Yes	Yes	Yes	Yes	Yes
• Operation, checked according to IEC 60068-2-29	Operation, checked according to IEC 60068-2-27	Operation, checked according to IEC 60068-2-27	Operation, checked according to IEC 60068-2-27	Operation, checked according to IEC 60068-2-27	Operation, checked according to IEC 60068-2-27	Operation, checked according to IEC 60068-2-27
• Storage/transport, checked according to IEC 60068-2-29	Yes	Yes	Yes	Yes	Yes	Yes
Degree of protection						
IP20	Yes	Yes	Yes	Yes	Yes	Yes
Standards, approvals, certificates						
CE mark	Yes	Yes	Yes	Yes	Yes	Yes
CSA approval	Yes; included in cULus	Yes; included in cULus	Yes; included in cULus	Yes; included in cULus	Yes; included in cULus	Yes; included in cULus
C-TICK	Yes	Yes	Yes	Yes	Yes	Yes
cULus	Yes	Yes	Yes	Yes	Yes	Yes
FM approval	Yes	Yes	Yes	Yes	Yes	Yes
Dimensions and weight						
Dimensions						
• Width	160 mm	160 mm	160 mm	160 mm	160 mm	160 mm
• Height	125 mm	125 mm	125 mm	125 mm	125 mm	125 mm
• Depth	115 mm	115 mm	115 mm	115 mm	115 mm	115 mm
Weight						
• Weight	1.5 kg; Approx.	1.5 kg; Approx.	1.5 kg; Approx.	1.5 kg; Approx.	1.5 kg; Approx.	1.5 kg; Approx.

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Ordering data

		Order No.
SIMATIC S7-modular embedded controller		
EC31 Intel CoreDuo 1.2 GHz processor Memory configuration: 1 GB RAM, 4 GB Flash Disk; interfaces: 1 Industrial Ethernet port, 2 PROFINET ports, 2 USB ports, 1 slot for multimedia card; Software: Windows Embedded Standard preinstalled, Software Development Kit (SDK) for creating C/C++ applications with accesses to central I/O modules	C	**6ES7 677-1DD10-0BA0**
EC31-RTX Intel CoreDuo 1.2 GHz processor Memory configuration: 1 GB RAM, 4 GB Flash Disk; interfaces: 1 Industrial Ethernet port, 2 PROFINET ports, 2 USB ports, 1 slot for multimedia card; Software: Windows Embedded Standard and WinAC RTX 2010 preinstalled	C	**6ES7 677-1DD10-0BB0**
EC31-RTX F Intel CoreDuo 1.2 GHz processor Memory configuration: 1 GB RAM, 4 GB Flash Disk; interfaces: 1 Industrial Ethernet port, 2 PROFINET ports, 2 USB ports, 1 slot for multimedia card; Software: Windows Embedded Standard and WinAC RTX F 2010 preinstalled	C	**6ES7 677-1FD10-0FB0**
EC31-HMI/RTX Intel CoreDuo 1.2 GHz processor Memory configuration: 1 GB RAM, 4 GB Flash Disk; interfaces: 1 Industrial Ethernet port, 2 PROFINET ports, 2 USB ports, 1 slot for multimedia card; Software: Windows Embedded Standard, WinAC RTX 2010, SIMATIC SOFTNET-S7/V7.0 Lean preinstalled		
• With WinCC flexible 2008 RT 128 PT	C	**6ES7 677-1DD10-0BF0**
• With WinCC flexible 2008 RT 512 PT	C	**6ES7 677-1DD10-0BG0**
• With WinCC flexible 2008 RT 2048 PT	C	**6ES7 677-1DD10-0BH0**
Accessories		
EM PCI-104 expansion module For fitting up to 3 additional PCI-104 cards	I	**6ES7 677-1DD40-1AA0**
EM PC expansion module Additional connection options: 2 USB interfaces, 1 Gigabit Ethernet interface, 1 serial interface, 1 slot for CF card, 1 slot for SD card/Micro Memory Card	I	**6ES7 677-1DD50-2AA0**

C: Subject to export regulations AL: N and ECCN: 5D002ENCU
I: Subject to export regulations AL: N and ECCN: EAR99H

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Expansion modules

Overview



- Expansion modules for SIMATIC S7-modular Embedded Controller EC31
  - EM PCI-104 for additionally accommodating up to 3 PCI-104 cards
  - EM PC with additional PC interfaces and slots for memory media

Technical specifications

	6ES7 677-1DD40-1AA0	6ES7 677-1DD50-2AA0
Product type designation	EM PCI-104	EM PC
Product version		
Hardware product version	01	01
Power supply		
Input voltage		
• Rated value, 24 V DC	Yes; Optional: external infeed	
• Permissible range, lower limit (DC)	20.4 V	
• Permissible range, upper limit (DC)	28.8 V	
Current consumption		
from expansion bus	100 mA	580 mA
Power losses		
Power loss, typ.	2.4 W; without inserted PCI-104 cards	9 W
Power loss, max.		14 W
Alarms/diagnostics/status information		
Diagnostics		
• Diagnostic functions	Yes; POWER LED, status LED	Yes; POWER LED, CARD LED for indicating access to SD/MMC
EMC		
Emission of radio interference acc. to EN 55 011		
• Limit value class A, for use in industrial areas	Yes	Yes
Environmental requirements		
Operating temperature		
• Min.	0 °C	0 °C
• Max.	50 °C	50 °C
Storage/transport temperature		
• Min.	-40 °C	-40 °C
• Max.	70 °C	70 °C
Vibrations		
• Operation, checked according to IEC 60068-2-6	Yes	Yes
• Transport, checked according to IEC 60068-2-6	Yes	Yes
Shock test		
• Checked according to IEC 60068-2-27	Yes	Yes
• Checked according to IEC 60068-2-29	Yes	Yes
Shock test		
• Checked according to IEC 60068-2-29	Yes	Yes
• Operation, checked according to IEC 60068-2-29	Yes	Yes
• Storage/transport, checked according to IEC 60068-2-29	Yes	Yes
Degree of protection		
IP20	Yes	Yes
Standards, approvals, certificates		
CE mark	Yes	Yes
CSA approval	Yes	Yes
C-TICK	Yes	Yes
cULus	Yes	Yes
FM approval	Yes	Yes
Dimensions and weight		
Dimensions		
• Width	120 mm; Without bus connector extension bus	80 mm; Without bus connector extension bus
• Height	125 mm; Without external voltage connecting terminal	125 mm
• Depth	115 mm	115 mm
Weight		
• Weight	0.5 kg	0.4 kg

Ordering data

		Order No.
EM PCI-104 expansion module For fitting up to 3 additional PCI-104 cards	I	**6ES7 677-1DD40-1AA0**
EM PC expansion module Additional connection options: 2 USB interfaces, 1 Gigabit Ethernet interface, 1 serial interface, 1 slot for CF card, 1 slot for SD card/Micro Memory Card	I	**6ES7 677-1DD50-2AA0**

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

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Overview



- Get off to a fast start in automation solutions with embedded PC platforms.
  - Ready-to-use SIMATIC WinAC RTX or WinAC RTX F preinstalled on EC31
  - Prepared for use in a SIMATIC environment with PROFINET and Industrial Ethernet
  - Commissioning by specialist automation personnel as with the S7-300
  - Configuring and programming with SIMATIC STEP 7 over Industrial Ethernet
  - Optional visualization
- Modular expansion capability:
  Central expansion with
  - S7-300 I/O (SM modules of S7-300)
  - Expansion modules for additional PC interfaces, e.g. DVI-I, USB, Gigabit Ethernet networking and memory card slots, as well as PCI-104
- Rugged operation
  - Disk-free operation based on flash disk and Windows XP embedded
  - Fan-free operation
- Flexibility of a PC-based automation environment
  - Free memory space on flash disk can be used for other PC applications
  - Use of WinAC ODK with SIMATIC WinAC RTX and WinAC RTX F (read-only in safety-related program part)
  - Connection option for USB devices
  - Memory capacity expandable using multimedia card
- Data retentivity for WinAC RTX and RTX F without uninterruptible power supply (UPS)

	SIPLUS S7-modular embedded controller EC31
Order No.	**6AG1 677-1DD00-4BA0**
Order No. based on	**6ES7 677-1DD00-0BA0**
Ambient temperature range	0 ... +50 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical specifications	The technical data of the standard product applies except for the ambient conditions.

SIPLUS S7-modular embedded controller

	SIPLUS S7-modular embedded controller EC31-RTX
Order No.	**6AG1 677-1DD00-4BB0**
Order No. based on	**6ES7 677-1DD00-0BB0**
Ambient temperature range	0 ... +50 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical specifications	The technical data of the standard product applies except for the ambient conditions.
Ambient conditions	
Relative humidity	5 … 100 % Condensation permissible
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500m) derating 10 K 658 … 540 hPa (+3500 … +5000m) derating 20 K

Ordering data

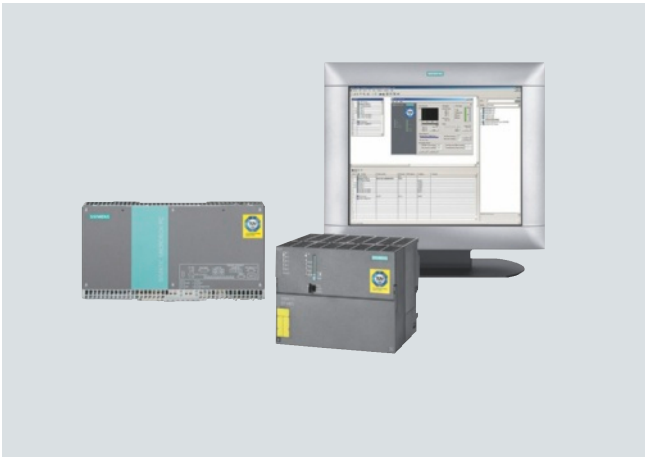
		Order No.
SIPLUS S7-modular embedded controller		
EC31 (medial exposure) Intel CoreDuo 1.2 GHz processor Memory: 1 GB RAM, 4 GB flash disk; interfaces: 1 Industrial Ethernet port, 2 PROFINET ports, 2 USB ports, 1 multimedia card slot; software: Windows Embedded Standard pre-installed, Software Development Kit (SDK) for creating C/C++ applications with access to central I/O modules	C	**6AG1 677-1DD10-4BA0**
EC31-RTX (medial exposure) Intel CoreDuo 1.2 GHz processor Memory: 1 GB RAM, 4 GB flash disk; interfaces: 1 Industrial Ethernet port, 2 PROFINET ports, 2 USB ports, 1 multimedia card slot; software: Windows Embedded Standard and WinAC RTX 2010 preinstalled	C	**6AG1 677-1DD00-4BB0**
Accessories		See SIMATIC S7-modular Embedded Controller, page 7/11

C: Subject to export regulations AL: N and ECCN: 5D002ENCU

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SIMATIC IPC427C bundles

Overview



- Get off to a fast start in automation solutions with embedded PC platforms.
  - SIMATIC WinAC RTX or SIMATIC WinAC RTX F preinstalled on SIMATIC IPC427C and ready for use
  - PROFINET, PROFIBUS and Industrial Ethernet prepared for use in a SIMATIC environment
  - Optional WinCC flexible for visualization tasks in parallel with SIMATIC WinAC RTX.
  - Configuration and programming with SIMATIC STEP 7 via Industrial Ethernet, PROFINET, or PROFIBUS
- Safety requirements up to SIL 3 in accordance with IEC 61508/ 62061 or EN ISO 13849-1 up to PL e can be implemented with WinAC RTX F.
- Rugged operation
  - Operation without a hard disk, based on Compact Flash Card (CF Card) or Solid State Drive and Windows Embedded Standard
  - Fan-free operation
  - 128 KB of retentive data for WinAC RTX, also without uninterruptible power supply (UPS)
- Flexibility of a PC-based automation environment
  - Free memory space on CF Card can be used for other PC applications
  - Use of WinAC ODK with SIMATIC WinAC RTX or SIMATIC WinAC RTX F (read-only for fail-safe program section)
  - Connection option for USB devices, flat panel monitor or screen
  - PCI 104 cards can be plugged in
- High-performance service concept
  - Replacement parts for preferred types available from stock
- New hardware basis SIMATIC IPC427C
- Cost-effective versions with PROFINET, based on the standard Ethernet interface
- Current product versions of the pre-installed software:
  - SIMATIC WinAC RTX 2010 or SIMATIC WinAC RTX F 2010
  - SIMATIC WinCC flexible 2008 SP2
  - SIMATIC NET Edition 2008

Ordering data

		Order No.								
SIMATIC IPC427C bundles										
All versions with SIMATIC WinAC RTX 2010 (F) and WinCC flexible 2008										
SIMATIC IPC427C bundles	C	**6ES7 675-1D**	■	■	**0-**	■	■	■	**0**	
Processor										
• Celeron M, 1.2 GHz, 2x PROFINET (IE) [1]			**A**							
• Celeron M, 1.2 GHz, 2x PROFINET (IE), 1x PROFIBUS [1]			**B**							
• Core2 Solo, 1.2 GHz, 2x PROFINET (IE) [1]			**E**							
• Core2 Solo, 1.2 GHz, 2x PROFINET (IE), 1x PROFIBUS [1]			**F**							
• Core2 Solo, 1.2 GHz, 1x PROFINET (IE), PROFINET (RT/IRT) 3 ports			**G**							
• Core2 Duo, 1.2 GHz, 2x PROFINET (IE) [1]			**J**							
• Core2 Duo, 1.2 GHz, 2x PROFINET (IE), 1x PROFIBUS [1]			**K**							
• Core2 Duo, 1.2 GHz, 1x PROFINET (IE), PROFINET (RT/IRT) 3 ports			**L**							
Work memory										
• 1 GB RAM				**2**						
• 2 GB RAM [1]				**3**						
• 4 GB RAM				**4**						
Mass storage, internal										
• Without (can only be ordered with externally accessible mass storage) [1]						**0**				
• 250 GB HDD SATA, additionally with externally accessible CF						**1**				
• 32 GB Solid State Disk SATA, Windows Embedded 2009 and software pre-installed						**2**				
• 4 GB internal CompactFlash, Windows Embedded 2009 and software pre-installed [1]						**6**				
• 8 GB internal CompactFlash, Windows Embedded 2009 and software pre-installed [1]						**7**				
Externally accessible mass storage										
• Without (can only be ordered with internal mass storage) [1]							**A**			
• 4 GB CompactFlash, Windows Embedded 2009 and software pre-installed [1]							**D**			
• 8 GB CompactFlash, Windows Embedded 2009 and software pre-installed [1]							**E**			

[1] Replacement hardware units available in exchange

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Ordering data		Order No.
SIMATIC IPC427C bundles		
All versions with SIMATIC WinAC RTX 2010 (F) and WinCC flexible 2008		
SIMATIC IPC427C bundles	C	**6ES7 675-1D ■■ 0- ■■■ 0**
Software configurations [1]		
• WinAC RTX		**B**
• WinCC flexible RT 128 PT		**C**
• WinCC flexible RT 512 PT		**D**
• WinCC flexible RT 2048 PT		**E**
• WinCC flexible RT 4096 PT		**F**
• WinAC RTX, WinCC flexible RT 128 PT		**K**
• WinAC RTX, WinCC flexible RT 512 PT		**L**
• WinAC RTX, WinCC flexible RT 2048 PT		**M**
• WinAC RTX, WinCC flexible RT 4096 PT		**N**
• WinAC RTX F		**P**
• WinAC RTX F, WinCC flexible RT 128 PT		**R**
• WinAC RTX F, WinCC flexible RT 512 PT		**S**
• WinAC RTX F, WinCC flexible RT 2048 PT		**T**
• WinAC RTX F, WinCC flexible RT 4096 PT		**U**

[1] Replacement hardware units available in exchange

Delivery versions (from stock)		
Replacement hardware units available in exchange		
SIMATIC IPC427C bundle with WinAC RTX 2010		
Core2 Solo processor, 1.2 GHz, 2x PROFINET (IE), 1x PROFIBUS, 2 GB RAM, 4 GB CompactFlash	C	**6ES7 675-1DF30-0DB0**
Core2 Duo processor, 1.2 GHz, 2x PROFINET (IE), 1x PROFIBUS, 2 GB RAM, 4 GB CompactFlash	C	**6ES7 675-1DK30-0DB0**
Core2 Duo processor, 1.2 GHz, 2x PROFINET (IE), 1x PROFIBUS, 2 GB RAM, 8 GB CompactFlash	C	**6ES7 675-1DK30-0EP0**
SIMATIC IPC427C bundle with WinAC RTX 2010 and WinCC flexible 2008 512 PT		
Core2 Duo processor, 1.2 GHz, 2x PROFINET (IE), 1x PROFIBUS, 2 GB RAM, 4 GB CompactFlash	C	**6ES7 675-1DK30-0DL0**

		Order No.
SIMATIC IPC427C Bundles with SIMATIC WinCC RT, V7.0 SP2 incl. Update 1		
SIMATIC IPC427C bundles		
Fan-free, 4 x USB 2.0 (500 mA), 1 x COM (RS 232), 24 V DC power supply with On/Off switch, 2 x PROFINET (IE), Windows Embedded 2009 pre-installed, SIMATIC WinCC V7.0 SP2 incl. Update1 Runtime pre-installed		
Client configurations		
Processor Celeron M 1.2 GHz, 1 GB SDRAM-DDR3, 4 GB CF Card, runtime license 128 PT	C	**6ES7 675-1DA20-6AX0**
Client and single-user station configurations		
Processor Core2 Solo 1.2 GHz, 2 GB SDRAM-DDR3, 8 GB CF Card, runtime license 128 PT	C	**6ES7 675-1DE30-7AX0**
Processor Core2 Solo 1.2 GHz, PROFIBUS DP, 2 GB SDRAM-DDR3, 8 GB CF Card, runtime license 128 PT	C	**6ES7 675-1DF30-7AX0**
Single-user station configurations	C	**6ES7 675-1DK40- ■ A ■ 0**
Core2 Duo processor 1.2 GHz, PROFIBUS DP, 4 GB SDRAM-DDR3		
• 8 GB CF Card		**7**
• 32 GB SSD		**2**
• Runtime license 128 PT		**X**
• Runtime license 2048 PT		**W**

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SIMATIC IPC427C bundles

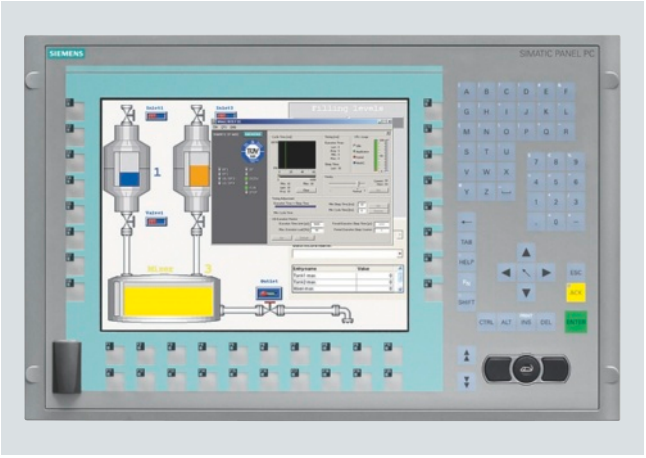
Ordering data		Order No.
Accessories		
CP 5603 Microbox Package	I	**6GK1 560-3AU00**
Package for using the PROFIBUS CP 5603 in Microbox PCs; comprising a CP 5603 module and a Microbox expansion frame		
CP 1604 Microbox Package		**6GK1 160-4AU00**
Package for using the PROFINET CP 1604 in Microbox PCs; comprising CP 1604, connection board, power supply and expansion frame for Microbox PC; implemented with Development Kit DK-16xx PN IO; NCM P		
Expansion kit PC/104	I	**6AG4 070-0BA00-0XA0**
Expansion frame incl. mounting hardware; 6 units		
CompactFlash Cards		
4 GB	I	**6ES7 648-2BF02-0XG0**
8 GB	I	**6ES7 648-2BF02-0XH0**

		Order No.
SIMATIC PC keyboard		
German/international, USB connection		**6ES7 648-0CB00-0YA0**
German/international, USB connection, with 4-way USB HUB	I	**6ES7 648-0CD00-0YA0**
SIMATIC PC USB mouse	I	**6ES7 790-0AA01-0XA0**
Optical, 3 buttons, with PS/2 adapter		
SIMATIC IPC USB FlashDrive	I	**6ES7 648-0DC50-0AA0**
8 GB (SLC), USB 2.0, incl. SIMATIC IPC BIOS manager, bootable, metal housing		
SIMATIC IPC Service USB FlashDrive		**6AV7 672-8JD01-0AA0**
8 GB (SLC), USB 2.0, incl. SIMATIC IPC Image & Partition Creator and SIMATIC IPC BIOS manager (pre-installed), bootable, metal enclosure		
Portrait assembly kit	I	**6ES7 648-1AA20-0YB0**
Interfaces to the front		

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Overview



Embedded PC platform with extremely high industrial compatibility for demanding tasks in the field of PC-based automation

- Maintenance-free (no rotating components such as fan and hard disk)
- Rugged construction: The PC is resistant to even the harshest mechanical stress and is extremely reliable in operation
- Battery-backed retentive memory onboard
- Compact design (only 61-69 mm installation depth for 12"-19")
- High investment protection
- Fast integration capability

The following versions are available:

- Built-in versions
  - 12" and 15" TFT Touch
  - 12" and 15" TFT Key
  - 19" Touch
- Support arm versions
  - PRO 15" and 19" Touch
    Fully-enclosed device to IP65 degree of protection for mounting on a support arm/stand.

Technical specifications

	6AV7 884..	6AV7 883..PRO
General features		
Processors	Intel Celeron M 1.2 GHz, Intel Core2 Solo 1.2 GHz or Core2 Duo 1.2 GHz	Intel Celeron M 1.2 GHz, Intel Core2 Solo 1.2 GHz or Core2 Duo 1.2 GHz
Memory type	DDR3-RAM	DDR3-RAM
Work memory	1 GB, 2 GB or 4 GB	1 GB, 2 GB or 4 GB
Free slots	1 x CF card slot (externally accessible)	1 x CF card slot (externally accessible)
Operating system	Windows Embedded Standard 2009 (EN/DE) or Windows XP Professional Multi-Language	Windows Embedded Standard 2009 (EN/DE) or Windows XP Professional Multi-Language
Additional OS information	Language: EN/DE	Language: EN/DE
SIMATIC Software	Optionally with pre-installed bundle software SIMATIC WinCC flexible 2008 SP2 and/or WinAC RTX 2010 SIMATIC WinAC RTX F 2010 SIMATIC WinCC as Web Client or single-user station	Optionally with pre-installed bundle software SIMATIC WinCC flexible 2008 SP2 and/or WinAC RTX 2010 SIMATIC WinAC RTX F 2010 SIMATIC WinCC as Web Client or single-user station
Drives		
Disk drive	Optionally via external USB floppy disk drive	Optionally via external USB floppy disk drive
Optical drives	Possible as external drive via USB	Possible as external drive via USB
Hard drive/mass storage	CompactFlash drive with 2, 4 or 8 GB and/or SSD (Solid State Drive) with 32 GB	CompactFlash drive with 2, 4 or 8 GB and/or SSD (Solid State Drive) with 32 GB
Interfaces		
Graphics interface	DVI-I for additional display unit: Color depth 32 bits	DVI-I for additional display unit: Color depth 32 bits
Connection for keyboard/mouse	USB / USB	USB / USB
Serial interface	COM1: 1 x V.24 (RS232)	COM1: 1 x V.24 (RS232)
PROFIBUS/MPI	Optionally onboard, isolated, max. 12 Mbit/s, no plug-in card required, CP5611-compatible, not upgradeable	Optionally onboard, isolated, max. 12 Mbit/s, no plug-in card required, CP5611-compatible, not upgradeable
PROFINET (RT/IRT)	Optional: 3 x RJ45, CP1616-compatible; not upgradeable	Optional: 3 x RJ45, CP1616-compatible; not upgradeable
USB	1 x on front, 4 x on rear, USB 2.0 (500 mA)	1 x on front, 4 x on rear, USB 2.0 (500 mA)
PROFINET (IE), Ethernet	onboard, 2 x 10/100/1000 Mbit (RJ45 with/without PROFIBUS), 1 x 10/100/1000 Mbit (RJ45 with PROFINET), no plug-in card required	onboard, 2 x 10/100/1000 Mbit (RJ45 with/without PROFIBUS), 1 x 10/100/1000 Mbit (RJ45 with PROFINET), no plug-in card required
Multimedia	No	No
Supply voltage		
Supply voltage	24 V DC	24 V DC
Monitoring functions		
Temperature	Yes	Yes

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SIMATIC HMI IPC477C bundles

Technical specifications (continued)

	6AV7 884..	6AV7 883..PRO
Watchdog	Yes	Yes
DiagBit (similar to S.M.A.R.T.)	Yes (for CF cards and SSD)	Yes (for CF cards and SSD)
Status LEDs	Yes (on rear)	Yes
Front side according to EN 60529	IP65 (on the front) acc. to EN 60529 and NEMA4	IP65 all around according to EN 60529 and NEMA4
Ambient conditions		
Vibration load during operation	Checked in accordance with IEC 60068-2-6: 10 - 58 Hz: 0.075 mm, 58 to 200 Hz: 9.8 m/s² (1 g)	Checked in accordance with IEC 60068-2-6: 10 - 58 Hz: 0.075 mm, 58 to 200 Hz: 9.8 m/s² (1 g)
Shock load during operation	Checked in accordance with IEC 60068-2-7: 50 m/s² (5 g), 30 ms, 100 shocks	Checked in accordance with IEC 60068-2-7: 50 m/s² (5 g), 30 ms, 100 shocks
Relative humidity	Checked in accordance with IEC 60068-78, IEC 60068-2-30: 5% to 80% at 25 °C (no condensation)	Checked in accordance with IEC 60068-78, IEC 60068-2-30: 5% to 80% at 25 °C (no condensation)
Maximum permissible installation angle +/-	30° over vertical	45° over vertical
Ambient temperature during operation	0 °C … +50 °C in maximum configuration; no fan	15“: 0 °C … +45 °C in maximum configuration; no fan 19“: 0 °C … +40 °C in maximum configuration; no fan
Certifications & standards		
Approvals	CE, cULus(508), Marine	CE, cULus(508)
EMC	CE, 55022A, EN 61000-6-4, EN 61000-6-2	CE, 55022A, EN 61000-6-4, EN 61000-6-2

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	6AV7 884-0	6AV7 884-1	6AV7 884-2	6AV7 884-3	6AV7 884-5	6AV7 883-6 (PRO)	6AV7 883-7 (PRO)
Front plate	12" TFT Touch	12" TFT Key	15" TFT Touch	15" TFT Key	19" TFT Touch	15" TFT Touch	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	1024 x 768	1280 x 1024
MTBF of backlighting (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	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	No	No
Alphanumeric keyboard	No	Yes	No	Yes	No	No	No
Touch screen (analog/resistive)	Yes	No	Yes	No	Yes	Yes	Yes
Mouse on front	No	Yes	No	Yes	No	No	No
Design							
Centralized configuration	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Distributed configuration	No	No	No	No	No	No	No
Dimensions							
Mounting dimensions in centralized configuration (W x H x D, without optical drive) in mm	368 x 290 x 61	450 x 290 x 61	450 x 290 x 64	450 x 321 x 59	450 x 380 x 71	400 x 310 x 98	483 x 400 x 115
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)	483 x 400 (19", 9 HU)	483 x 400 (19", 9 HU)
Weight	6.1 kg	6.6 kg	7.0 kg	6.6 kg	7.2 kg	7.4 kg	10.9 kg
General features							
Accessories	Touch protective membranes	Insertable strips for keyboard	Touch protective membranes	Insertable strips for keyboard	Touch protective membranes	Touch protective membranes	Touch protective membranes
Power loss in maximum configuration	24 V DC: max. 45 W	24 V DC: max. 45 W	24 V DC: max. 55 W	24 V DC: max. 55 W	24 V DC: max. 60 W	24 V DC: max. 55 W	24 V DC: max. 55 W

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Ordering data

Bundles with WinAC RTX 2010 and WinCC flexible 2008 SP2

(Built-to-order version, delivery time max. 15 business days and with identified repair, if not preferred type)

		Order No.
SIMATIC HMI IPC477C PRO Embedded and fan-free with fully enclosed IP65 enclosure 4 x USB (500 mA), 24 V DC power supply with On/ Off switch	C	6AV7 883- ■ A ■ ■ ■ - ■ ■ ■ 0
SIMATIC HMI IPC477C Without fan 5 x USB 2.0 (500 mA), one of which on the front 1 x COM (RS232) 24 V DC power supply with On/ Off switch	C	6AV7 884- ■ A ■ ■ ■ - ■ ■ ■ 0
Front Plate		
• 12" TFT Touch [1]		0
• 12" TFT Key		1
• 15" TFT Touch [1]		2
• 15" TFT Key		3
• 19" TFT Touch [1]		5
• 15" TFT Touch (IP65 enclosure; PRO)		6
• 19" TFT Touch (IP65 enclosure; PRO)		7
Processors and fieldbus		
• Celeron M 1.2 GHz, 2 x PROFINET (IE) [1]		A
• Celeron M1 1.2 GHz, 2 x PROFINET (IE), 1 x PROFIBUS DP 12 [1]		B
• Core2 Solo 1.2 GHz, 2 x PROFINET (IE) [1]		D
• Core2 Solo 1.2 GHz, 2 x PROFINET (IE), 1 x PROFIBUS DP 12 [1]		E
• Core2 Solo 1.2 GHz, 1 x PROFINET (IE), 1 x PROFINET (3 ports) [1]		F
• Core2 Duo 1.2 GHz, 2 x PROFINET (IE) [1]		G
• Core2 Duo 1.2 GHz, 2 x PROFINET (IE), 1 x PROFIBUS DP 12 [1]		H
• Core2 Duo 1.2 GHz, 1 x PROFINET (IE), 1 x PROFINET (3 ports) [1]		J
Work memory (DDR3 RAM), 1 bank		
• 1 GB		1
• 2 GB [1]		2
• 4 GB		3
Second mass storage (installed and formatted)		
• Without [1]		0
• CompactFlash 2 GB (only with Windows Embedded Standard 2009) [1]		2
• CompactFlash 4 GB [1]		3
• CompactFlash 8 GB [1]		4
• SSD (Solid State Drive) min. 32 GB		6

		Order No.
SIMATIC HMI IPC477C PRO	C	6AV7 883- ■ A ■ ■ ■ - ■ ■ ■ 0
SIMATIC HMI IPC477C	C	6AV7 884- ■ A ■ ■ ■ - ■ ■ ■ 0
Mass storage (installed, Windows Embedded Standard 2009 (EN/DE) preinstalled, optionally with SIMATIC software)		
• CompactFlash 2 GB [1]		2
• CompactFlash 4 GB [1]		3
• CompactFlash 8 GB [1]		4
• SSD (Solid State Drive) min. 32 GB		6
Operating system		
• Windows Embedded 2009, pre-installed [1]		B A
• Windows XP Professional Multi Language, only with SSD; without SIMATIC software		D A
Software packages, only with CF 4 GB or higher [1]		
• with operating system and RTX WinAC RTX 2010 pre-installed and configured		B B
• with operating system and HMI WinCC flexible 2008 SP2 RT (incl. archives/recipes) pre-installed and configured		
- Number of tags 128 PT		B C
- Number of tags 512 PT		B D
- Number of tags 2048 PT		B E
- Number of tags 4096 PT		B F
• with operating system and HMI/ RTX WinCC flexible 2008 SP2 RT (incl. archives/recipes) and WinAC RTX 2010 pre-installed and configured		
- Number of tags 128 PT		B K
- Number of tags 512 PT		B L
- Number of tags 2048 PT		B M
- Number of tags 4096 PT		B N
• with operating system and RTX F WinAC RTX 2010 pre-installed and configured		B P
• with operating system and HMI/ RTX F WinCC flexible 2008 SP2 RT (incl. archives/recipes) and WinAC RTX F 2010 pre-installed and configured		
- Number of tags 128 PT		B R
- Number of tags 512 PT		B S
- Number of tags 2048 PT		B T
- Number of tags 4096 PT		B U

[1] Preferred versions with repaired replacement device from stock

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Embedded Panel PC bundles

SIMATIC HMI IPC477C bundles

Ordering data — Order No.

Bundles with WinCC V7.0 SP2, incl. Update 1

("Built to order" with delivery time of max. 14 business days, for hardware only repairs are possible)

		Order No.
SIMATIC HMI IPC477C Without fan 4 x USB 2.0 on rear, 1 x USB 2.0 on front, 1 x COM (RS232), 2 x 10/100/1000 Mbit/s Ethernet (RJ45); software pre-installed on CF/SSD: Windows Embedded Standard, SIMATIC WinCC V7.0 SP1	C	**6AV7 884- ■ A ■ ■ 0 - ■ B ■ 0**
SIMATIC HMI IPC477C PRO Fan-free, 4 x USB 2.0 (500 mA), 1 x USB 2.0 on front (not on PRO), 1 x COM (RS 232), 24 V DC power supply with On/Off switch, 2 x PROFINET (IE), Windows Embedded 2009 pre-installed SIMATIC WinCC V7.0 SP2 incl. Update 1 Runtime pre-installed	C	**6AV7 883- ■ A ■ ■ 0 - ■ B ■ 0**
Front plate		
• 15" TFT Touch	C	**6AV7 884- 2**
• 19" TFT Touch	C	**6AV7 884- 5**
• 15" TFT Touch PRO	C	**6AV7 883- 6**
• 19" TFT Touch PRO	C	**6AV7 883- 7**
Client configurations		
Processor Celeron M 1.2 GHz, 1 GB DDR3 RAM, 4 GB CF Card, runtime license 128 PT		**A 1 3 X**
Client and single-user station configurations		
Processor Core2 Solo 1.2 GHz, 2 GB SDRAM-DDR3, 8 GB CF Card, runtime license 128 PT		**D 2 4 X**
Processor Core2 Solo 1.2 GHz, PROFIBUS DP, 2 GB SDRAM-DDR3, 8 GB CF Card, runtime license 128 PT		**E 2 4 X**
Single-user station configurations		
SIMATIC HMI IPC477C	C	**6AV7 884- ■ A H 3 0 - ■ B ■ 0**
SIMATIC HMI IPC477C PRO	C	**6AV7 883- ■ A H 3 0 - ■ B ■ 0**
Core2 Duo processor 1.2 GHz, PROFIBUS DP, 4 GB SDRAM-DDR3		
• 8 GB CF Card		**4**
• 32 GB SSD		**6**
• Runtime license 128 PT		**X**
• Runtime license 2048 PT		**W**

Note:

Other ready-to-use SIMATIC HMI IPC477Cs can be found in the catalog ST 80/ST, Panel PC chapter under HMI IPC477C.

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D: Subject to export regulations AL: N and ECCN: 5D992
I: Subject to export regulations AL: N and ECCN: EAR99H
J: Subject to export regulations AL: N and ECCN: EAR99S

Accessories — Order No.

		Order No.
Protective film for Panel PCs 477/577/677 For protecting the touch screen against dirt/scratches		
• for 12" Touch		**6AV7 671-2BA00-0AA0**
• for 15" Touch (not for PRO)		**6AV7 671-4BA00-0AA0**
• for 19" Touch		**6AV7 672-1CE00-0AA0**
Labeling membranes for Panel PCs 477/577/677 For labeling soft keys and function keys, blank, supplied in 10 units		**6AV7 672-0DA00-0AA0**
Touch pen Captive pen for operation of the touch devices, mounting of the support on the control cabinet or direct on the PRO unit	I	**6AV7 672-1JB00-0AA0**
Expansion components		
SIMATIC IPC DiagMonitor V4.2 Software tool for monitoring SIMATIC PCs, incl. manual, on CD-ROM (German/English)	J	**6ES7 648-6CA04-2YX0**
SIMATIC IPC Image & Partition Creator V3.1 Software tool for preventive data backup and hard disk partitioning for SIMATIC PCs, incl. manual on CD-ROM (German, English)	D	**6ES7 648-6AA03-1YA0**
SIMATIC IPC USB FlashDrive 8 GB, USB 2.0, metal enclosure, bootable	I	**6ES7 648-0DC50-0AA0**
SIMATIC IPC Service USB FlashDrive 8 GB, USB 2.0, metal enclosure, bootable With: BIOS Manager, Image & Partition Creator pre-installed, incl. CD	J	**6AV7 672-8JD01-0AA0**
USB disk drive 3.5" with 1 m connecting cable	I	**6FC5 235-0AA05-1AA2**
Industrial USB Hub 4 4 x USB 2.0, IP65 for control cabinet door or DIN rail	I	**6AV6 671-3AH00-0AX0**
CompactFlash Card		
• 2 GB	I	**6ES7 648-2BF02-0XF0**
• 4 GB	I	**6ES7 648-2BF02-0XG0**
• 8 GB	I	**6ES7 648-2BF02-0XH0**

Please be sure to note:

The HMI IPC477C is delivered as standard with an inserted CF card. The licenses are located on the supplied USB flash drive.

Note:

Further complete turnkey solutions (software pre-installed and configured) based on the Microbox PC can be found under SIMATIC PC based Control.

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CP 5603

Overview



DP-M	DP-S	FMS	OPC	PG/OP	S7/S5
●	●	●	●	●	●

- PCI-104 interface card with own microprocessor for connecting embedded systems with PCI-104 interface to PROFIBUS at up to 12 Mbit/s
- Function compatible with CP 5613 A2
- Communication services:
  - PROFIBUS DP master Class 1 and 2 or DP slave according to IEC 61158/61784
  - PG/OP communication with STEP 5 and STEP 7
  - S7 communication with S7-5613 software package HARDNET S7
  - Open communication (SEND/RECEIVE) based on the FDL interface
  - PROFIBUS FMS according to IEC 61158/61784 with FMS-613 software package
- Extensive diagnostics options for installation, commissioning and operation of the module
- Event and filter mechanism for reducing the load on the host CPU
- Multiprotocol operation and parallel operation of up to three CPs
- The appropriate OPC server and configuration tools are included in the scope of delivery of the respective communication software
- Linux-based development kit with driver sources for integration into "non-Windows" environments

Note:
FMS-5613 supports up to two CP 5603/CP 5613 A2/5614 A2/CP 5623/CP 5624 processors

Technical specifications

Order No.	6GK1 560-3AA00
Product type designation	**CP 5603**
Data transmission rate	
Transmission rate at interface 1 in accordance with PROFIBUS	9.6 Kbit/s ... 12 Mbit/s
Interfaces	
Number of electrical connections at interface 1 in accordance with PROFIBUS	1
Design of electrical connection	
• at interface 1 in accordance with PROFIBUS	9-pin D-sub socket (RS 485)
• of the backplane bus	PCI-104 (32 bit)
Supply voltage, current consumption, power loss	
Type of power supply	DC
Supply voltage 1 from backplane bus	5 V
Relative symmetric tolerance at 5 V DC	5 %
Current consumption 1 from backplane bus with DC, maximum	0.66 A
Effective power loss	3.3 W
Permitted ambient conditions	
Ambient temperature	
• During operating phase	0 … 70 °C
• During storage	-40 … +70 °C
• During transport	-40 … +70 °C
Relative humidity at 25 °C without condensation during operating phase, maximum	85 %
IP degree of protection	IP00
Design, dimensions and weights	
Module format	PCI -104
Width	90 mm
Height	21 mm
Depth	96 mm
Net weight	80 g
Type of mounting	Screw mounting
Product properties, functions, components in general	
Number of plug-in cards of same design which can be inserted per PC station	3
Number of modules - Note	FMS-5613 supports a maximum of two CP 5603 / CP 5613 A2 / CP 5614 A2 / CP 5623 / CP 5624 processors
Performance data	
Performance data Open communication	
Software required for open communication by means of SEND/ RECEIVE	FDL driver included in scope of delivery of CP
Number of possible connections for open communication by means of SEND/RECEIVE, maximum	80

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Technical specifications (continued)

Order No.	6GK1 560-3AA00
Product type designation	**CP 5603**
Performance data for PROFIBUS DP master	
Software required for DP master function	No
Service as DP master	
• DPV0	Yes
• DPV1	Yes
• DPV2	Yes
Number of DP slaves operable on DP master	124
Data volume	
• of address area of inputs as DP master, total	30 256 byte
• of address area of outputs as DP master, total	30 256 byte
• of address area of inputs per DP slave	244 byte
• of address area of outputs per DP slave	244 byte
• of address area of diagnostics data per DP slave	244 byte
Performance data for PROFIBUS DP slave	
Software required for DP slave function	No
Service as DP slave	
• DPV0	Yes
• DPV1	Yes
Data volume	
• of address area of inputs as DP slave, total	244 byte
• of address area of outputs as DP slave, total	244 byte
Performance data FMS functions	
Software required for FMS communication	Yes, HARDNET-FMS (FMS-5613)
Number of possible connections with FMS connection, maximum	40

Order No.	6GK1 560-3AA00
Product type designation	**CP 5603**
Performance data S7 communication	
Software required for S7 communication	Yes, HARDNET-S7 (S7-5613)
Number of possible connections for S7/PG communication, maximum	50
Performance data Multiprotocol operation	
Number of active connections for multiprotocol operation	50
Number of configurable connections per PC station	207
Product functions Management, configuration, programming	
Configuration software required	NCM PC included in scope of delivery
Product functions Diagnostics	
Product function: Port diagnostics	Yes
Standards, specifications, approvals	
Standard	
• For EMC	2004/108/EC
• For CSA and UL safety	CAN/CSA C22.2 & UL 60950-1, UL 508
• For emitted interference	EN 61000-6-3, EN 61000-6-4
• For noise immunity	EN 61000-6-1, EN 61000-6-2
Certificate of suitability	
• CE mark	Yes
• C-Tick	Yes
Accessories	
Accessories	Optional: Expansion frame for SIMATIC Microbox and withdrawable drawer for SIMATIC S7 modular embedded controller

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Ordering data		Order No.
CP 5603 communication processor PCI-104 card for connection to PROFIBUS incl. DP-Base software with NCM PC; DP-RAM interface for DP master or DP slave, incl. PG and FDL protocols; single license for 1 installation, runtime software, software and electronic manual on CD-ROM, Class A, for operating system support see SIMATIC NET software; German/English	I	**6GK1 560-3AA00**
Software upgrade for CP 5603, CP 5613 A2 and CP 5623 on edition 2008 or V8.1		**6GK1 561-3AA01-3AE0**
CP 5603 Microbox Package For use of CP 5603 in Microbox 420/427B/427C; consisting of CP 5603 module and Microbox expansion frame	I	**6GK1 560-3AU00**
CP 5603 expansion frame for use in Microbox 420/427B/ 427C with mounting material		**6GK1 560-3AA00-0AU0**
CP 5603 mEC Package For use of CP 5603 in SIMATIC S7-MEC; consisting of CP 5603 and withdrawable unit for CP 5603 for installation in the EM PCI-104 expansion module of the SIMATIC S7-MEC	I	**6GK1 560-3AE00**
CP 5603 insert plate Metal plate with RS485 cutout for inserting for the S7 modular embedded controller		**6GK1 560-3AA00-0AE0**
HARDNET-PB DP development kit Software HARDNET-PB DP Development kit for CP 5603, CP 5613, CP 5613 A2, CP 5623, CP 5613 FO, CP 5614, CP 5614 A2, CP 5624; for integration into other operating system environments on systems with a PCI slot		See www.siemens.com/simatic-net/dk5613
HARDNET-PB DP Software for DP, incl. PG and FDL protocol, OPC server and NCM PC; runtime software, software and electronic manual on CD-ROM, license key on USB flash drive, Class A; for CP 5603, CP 5613 A2, CP 5623, CP 5614 A2, CP 5624;		
HARDNET-PB DP V8.1 for 32/64 bit; Windows 7 Professional/Ultimate; for 64 bit; Windows 2008 Server R2; English/German		
• Single license for 1 installation	D	**6GK1 713-5DB08-1AA0**
DP-5613 Edition 2008 for 32 bit Windows XP Professional SP2/3; Windows 2003 Server R2, SP2; Windows Vista Business/Ultimate SP1; Windows 2008 Server; English/German		
• Single license for 1 installation		**6GK1 713-5DB71-3AA0**
• Software Update Service for 1 year, with automatic extension; requirement: Current software version		**6GK1 713-5DB00-3AL0**
• Upgrade from DP-5613 Edition 2006 or 2007 to DP-5613 Edition 2008 or HARDNET DP V8.1		**6GK1 713-5DB00-3AE0**
• Upgrade from DP-5613, V6.0, V6.1, V6.2 or V6.3 to DP-5613 Edition 2008 or HARDNET DP V8.1		**6GK1 713-5DB00-3AE1**
HARDNET S7 Software for S7 communication, incl. PG and FDL protocol, OPC server and NCM PC; runtime software, software and electronic manual on USB flash drive, Class A; for CP 5603, CP 5613 A2, CP 5623, CP 5614 A2, CP 5624;		
HARDNET-PB S7 V8.1 for 32/64 bit; Windows 7 Professional/Ultimate; or 64 bit; Windows 2008 Server R2; English/German		
• Single license for 1 installation	D	**6GK1 713-5CB08-1AA0**
S7-5613 Edition 2008 for 32 bit Windows XP Professional SP2/3; Windows 2003 Server R2, SP2; Windows Vista Business/Ultimate SP1; Windows 2008 Server; English/German		
• Single license for 1 installation		**6GK1 713-5CB71-3AA0**
• Software Update Service for 1 year, with automatic extension; requirement: Current software version		**6GK1 713-5CB00-3AL0**
• Upgrade from S7-5613 Edition 2006 or 2007 to S7-5613 Edition 2008 or HARDNET S7 V8.1		**6GK1 713-5CB00-3AE0**
• Upgrade from S7-5613 V6.0, V6.1, V6.2 or V6.3 to S7-5613 Edition 2008 or HARDNET S7 V8.1		**6GK1 713-5CB00-3AE1**

D: Subject to export regulations AL: N and ECCN: 5D992

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

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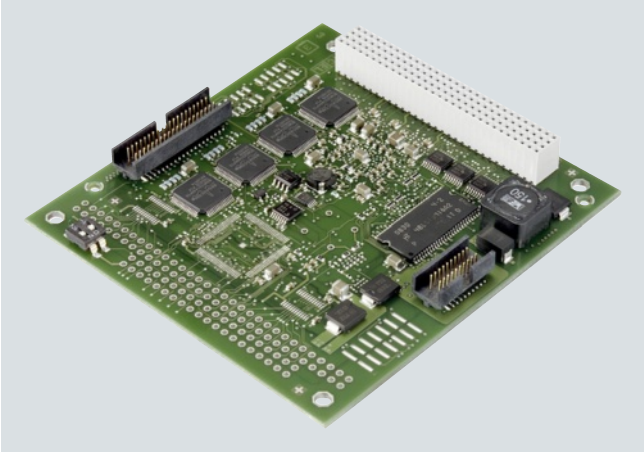
Ordering data

	Order No.
FMS-5613 Edition 2008	
Software for FMS protocol incl. PG/OP communication; FDL, FMS-OPC server and NCM PC; runtime software, software and electronic manual on USB stick, Class A, for 32-bit Windows XP Professional SP2/3; Windows 2003 Server R2, SP2; Windows Vista Business/Ultimate SP1; Windows 2008 Server; for CP 5603, CP 5613, CP 5613 A2, CP 5623, CP 5613 FO, CP 5614, CP 5614 A2, CP 5624; German/English	
• Single license for 1 installation	**6GK1 713-5FB71-3AA0**
• Software Update Service for 1 year, with automatic extension; requirement: Current software version	**6GK1 713-5FB00-3AL0**
• Upgrade FMS-5613 Edition 2006 or 2007 to FMS-5613 Edition 2008	**6GK1 713-5FB00-3AE0**
• Upgrade FMS-5613 V6.0, V6.1, V6.2 or V6.3 to FMS-5613 Edition 2008	**6GK1 713-5FB00-3AE1**

	Order No.
PROFIBUS FC standard cable GP	**6XV1 830-0EH10**
Standard type with special design for quick assembly, 2-core, shielded, sold in meters; delivery unit max. 1000 m, minimum order 20 m	
PROFIBUS FastConnect bus connector RS485 Plug 180	**6GK1 500-0FC10**
With 180° cable outlet, insulation displacement	
12M PROFIBUS bus terminal	**6GK1 500-0AA10**
Bus terminal for connection of PROFIBUS stations up to 12 Mbit/s with plug-in cable 1.5 m long	
PROFIBUS FastConnect stripping tool	**6GK1 905-6AA00**
Preset stripping tool for fast stripping of PROFIBUS FastConnect bus cables	

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Overview



ISO	TCP/ UDP	PN	MRP	OPC	PG/OP	S7/S5	IT
	●	●	●				

- PCI-104 module for connecting PCI-104 systems to PROFINET IO
- Full/half duplex with autonegotiation
- With Ethernet real-time ASIC ERTEC 400
- Integral 4-port real-time switch
- Communication services:
  - PROFINET IO controller and/or PROFINET IO device
  - Support of IRT in motion control applications
- High performance through direct memory access
- Integration in network management systems through the support of SNMP
- Comprehensive diagnostics possibilities for installation, start-up and operation of the module
- Powerful configuration tools are included in the scope of delivery of module

Technical specifications

Order No.	6GK1 160-4AA00
Product type designation	**CP 1604**
Transmission rate	
Transmission rate at interface 1	10 … 100 Mbit/s
Interfaces	
Number of electrical connections	
• at interface 1 in accordance with Industrial Ethernet	4
• for power supply	1
Design of electrical connection	
• at interface 1 in accordance with Industrial Ethernet	RJ45 port via connection board
• of backplane bus	PCI-104 (32 bit)
• for power supply	4-pin terminal block via power supply board
Supply voltage, current consumption, power loss	
Type of power supply	DC
Type of power supply: optional external supply	Yes
Power supply	
• 1 from backplane bus	5 V
• External	- …
Power supply - Note	Optional external supply and external supply voltage alternatively via power supply board (optional accessory)
Relative symmetrical tolerance	
• At 5 V with DC	5 %
• At 24 V with DC	20 %
Current consumed	
• Max. 1 from backplane bus with DC	0.8 A
• Maximum from external power supply with 24 V DC	0.3 A
Effective power loss	4 W
• Maximum with switch mode	4.1 W
Permitted ambient conditions	
Ambient temperature	
• During operating phase	5 … 55 °C
• During storage	-20 … +60 °C
• During transport	-20 … +60 °C
Relative humidity at 25 °C without condensation during operating phase, maximum	95 %
IP degree of protection	IP00
Design, dimensions and weights	
Module format	PCI-104
Width	90 mm
Height	24 mm
Net weight	110 g
Product properties, functions, components General	
Number of plug-in cards of same design which can be inserted per PC station	1
Number of modules - Note	-

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Technical specifications (continued)

Order No.	6GK1 160-4AA00
Product type designation	**CP 1604**
Performance data	
Performance data PROFINET communication as PN IO controller	
Software required for PROFINET IO communication	No
Total number of PN IO devices which can be operated on the PROFINET IO controller	128
Number of PN IO IRT devices which can be operated on the PROFINET IO controller	64
Data volume	
• As user data for input variables as PROFINET IO controller, maximum	8 192 byte
• As user data for output variables as PROFINET IO controller, maximum	8 192 byte
• As user data for input variables per PN IO device as PROFINET IO controller, maximum	1 433 byte
• As user data for output variables per PN IO device as PROFINET IO controller, maximum	1 433 byte
Performance data PROFINET communication as PN IO device	
Data volume	
• As user data for input variables as PROFINET IO device, maximum	1 433 byte
• As user data for output variables as PROFINET IO device, maximum	1 433 byte
• As user data for input variables per submodule as PROFINET IO device	254 byte
• As user data for output variables per submodule as PROFINET IO device	254 byte
• As user data for the consistency area per submodule	254 byte
Number of submodules per PROFINET IO device	64

Order No.	6GK1 160-4AA00
Product type designation	**CP 1604**
Product functions Management, configuration, programming	
Product function: MIB support	Yes
Protocol is supported	
• SNMP v1	Yes
• DCP	Yes
• LLDP	Yes
Configuration software required	NCM PC included in scope of delivery
Product functions Diagnostics	
Product function	
• Web-based diagnostics	Yes
• Port diagnostics	Yes
Product functions Switch	
Product feature: Switch	Yes
Product function: Switch-managed	No
Product function with IRT PROFINET IO Switch	Yes
Product functions Redundancy	
Product function	
• Ring redundancy	Yes
• Redundancy manager	Yes
• Redundancy procedure MRP	Yes
Standards, specifications, approvals	
Standard	
• For EMC	89/336/EEC
• For CSA and UL safety	CAN/CSA C22.2 & UL 60950-1
• For emitted interference	EN 61000-6-3, EN 61000-6-4
• For noise immunity	EN 61000-6-1, EN 61000-6-2
Certificate of suitability	
• CE mark	Yes
• C-Tick	Yes
Accessories	
Accessories	Optional: Connection Board for CP 1604, Power Supply Board for CP 1604, Development Kit

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Ordering data	Order No.
CP 1604 communication processor PCI-104 card (32-bit) with ASIC ERTEC 400 for connecting PCI-104 systems to PROFINET IO with 4-port real-time switch (RJ45); incl. IO-Base software for PROFINET IO-Controller 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; other operating systems by means of DK-16xx PN IO Development Kit German/English	**6GK1 160-4AA00**
CP 1604 Microbox Package Package for implementing the CP 1604 in the SIMATIC Microbox PC; comprising the CP 1604, connection board, power supply and expansion frames for Microbox PC; for use with Development Kit DK-16xx PN IO; NCM PC	**6GK1 160-4AU00**
Accessories	
Connection board for CP 1604 I Connection board for CP 1604 with four RJ45 sockets incl. connecting cable	**6GK1 160-4AC00**
Power supply for CP 1604 Redundant power supply for CP 1604 for operating the integral 4-port switch of the CP 1604 with the PC-104 system switched off; incl. connecting cable	**6GK1 160-4AP00**

	Order No.
HARDNET-PN IO development kit Software development kit for CP 1616/CP 1604; driver and IO-Base software for CP 1616/CP 1604 as PN IO controller and IO device in source code for transfer to other PC-based operating systems; including executable example code for SUSE Linux 10, Windows XP Professional and Windows 7	see www.siemens.com/simatic-net/dk16xx
IE TP Cord RJ45/RJ45 TP cable 4 x 2 with 2 RJ45 connectors	
• 0.5 m	**6XV1 870-3QE50**
• 1 m	**6XV1 870-3QH10**
• 2 m	**6XV1 870-3QH20**
• 6 m	**6XV1 870-3QH60**
• 10 m	**6XV1 870-3QN10**
SCALANCE X204IRT Managed Industrial Ethernet switches; isochronous real time, LED diagnostics, error signaling contact with SET button, redundant power supply 4 x 10/100 Mbit/s RJ45 ports	**6GK5 204-0BA00-2BA3**

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SIMATIC PC-based controller



8/2 **SIMATIC PC-based controller**
8/2 SIMATIC WinAC RTX
8/9 SIMATIC WinAC RTX F
8/16 SIMATIC WinAC ODK

Brochures

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

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

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SIMATIC PC-based controller

SIMATIC WinAC RTX

Overview



- SIMATIC WinAC RTX: Optimized for applications that require a high degree of flexibility and integration capability.
- The software solution for tasks that require hard deterministic behavior and high performance.
- With real-time expansion for assuring deterministic behavior for the control section.

New with WinAC RTX 2010:

- Operation under Windows 7
- Web server
- New PROFINET functions:
  - Isochronous mode
  - Shared Device
  - Media redundancy
  - IP configuration

Technical specifications

	6ES7 671-0RC08-0YA0
Product type designation	SIMATIC WinAC RTX 2010
Product version	
Hardware product version	-
Firmware version	V4.6
associated programming package	STEP7 as of V5.5 + HW update / iMap V3.0 SP1
Memory	
Work memory	
• integrated (for program)	4 Mbyte; Adjustable; depends on Non Paged Memory Pool
• integrated (for data)	4 Mbyte; Adjustable; depends on Non Paged Memory Pool
Load memory	
• integrated RAM, max.	8 Mbyte; Adjustable; depends on Non Paged Memory Pool
CPU-blocks	
DB	
• Number, max.	65 535; Limited only by RAM set for data
• Size, max.	64 Kibyte
FB	
• Number, max.	65 536; Limited only by RAM set for code
• Size, max.	64 Kibyte
FC	
• Number, max.	65 536; Limited only by RAM set for code
• Size, max.	64 Kibyte
OB	
• Number, max.	Limited only by RAM set for code
• Size, max.	64 Kibyte
• Number of free cycle OBs	1; OB 1
• Number of time alarm OBs	1; OB 10
• Number of delay alarm OBs	1; OB 20

	6ES7 671-0RC08-0YA0
OB	
• Number of time alarm OBs	9; OB 30-38
• Number of process alarm OBs	1; OB 40
• Number of ODK OBs	3; OB 52-54
• Number of DPV1 alarm OBs	3; OB 55-57
• Number isochronous mode OBs	2; OB 61-62
• Number of startup OBs	2; OB 100, 102
• Number of asynchronous error OBs	7; OB 80, 82-85, 86, 88
• Number of synchronous error OBs	2; OB 121, 122
Nesting depth	
• per priority class	24
• additional within an error OB	24
CPU processing times	
for bit operations, min.	0.004 µs; typ.
for fixed point arithmetic, min.	0.003 µs; typ.
for floating point arithmetic, min.	0.004 µs; typ.
Reference platform	Pentium IV, 2.4 GHz
Counters, timers and their retentivity	
S7 counter	
• Number	2 048
• Retentivity	
- can be set	Yes
- lower limit	0
- upper limit	2 047
- preset	8
• Counting range	
- can be set	Yes
- lower limit	0
- upper limit	999
IEC counter	
• present	Yes
• Type	SFB
• Number	Unlimited (limited only by RAM capacity)

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Technical specifications (continued)

	6ES7 671-0RC08-0YA0
S7 times	
• Number	2 048
• Retentivity	
- can be set	Yes
- lower limit	0
- upper limit	2 047
- preset	0
• Time range	
- lower limit	10 ms
- upper limit	9 990 s
IEC timer	
• present	Yes
• Type	SFB
• Number	Unlimited (limited only by RAM capacity)
Data areas and their retentivity	
Retentivity without UPS and PS Extension Board	128 KB with SIMATIC IPC427C and HMI IPC477C; further SIMATIC PCs on request
Retentivity with UPS	all data
Flag	
• Number, max.	16 Kibyte
• of which retentive	MB 0 to MB 16383
• Retentivity preset	MB 0 to MB 15
• Number of clock memories	8
Data blocks	
• Number, max.	Limited only by available retentive memory (NVRAM, or file storage)
• Size, max.	64 Kibyte
• Retentivity adjustable	Yes; via non-retain property on DB
• Retentivity preset	Yes
Local data	
• adjustable, max.	64 Kibyte
• preset	32 Kibyte
• per priority class, max.	61 440 byte
Address area	
I/O address area	
• overall	16 Kibyte
• Outputs	16 Kibyte
• of which, distributed	
- DP interface, inputs	16 Kibyte
- DP interface, outputs	16 Kibyte
- PN interface, inputs	16 Kibyte
- PN interface, outputs	16 Kibyte
Process image	
• Inputs, adjustable	8 Kibyte
• Outputs, adjustable	8 Kibyte
• Inputs, default	512 byte
• Outputs, default	512 byte
Subprocess images	
• Number of subprocess images, max.	15
Digital channels	
• Inputs	128 000
• Outputs	128 000

	6ES7 671-0RC08-0YA0
Analog channels	
• Inputs	8 000
• Outputs	8 000
Hardware configuration	
Submodules	
• Number of submodules, max	4
• of which PROFIBUS, max.	4; Supported interfaces: see 1st and 2nd interface
• of which Industrial Ethernet, max.	1; Supported interfaces: see 3rd and 4th interface
Number of operable FMs and CPs (recommended)	
• FM	FM distributed: FM 350-1 / 350-2, FM 351, FM 352, FM 353, FM 355 / 355-2
• CP, point-to-point	2; CP 340, CP 341 distributed
• CP, LAN	Over PC CP
Time	
Clock	
• Hardware clock (real-time clock)	Yes
• battery-backed and synchronizable	Yes
Runtime meter	
• Number	8
Clock synchronization	
• supported	Yes
• to PC-CP, slave	Yes
• on Ethernet via NTP	Yes
S7 message functions	
Number of login stations for message functions, max.	62
SCAN procedure	No
Process diagnostic messages	Yes; ALARM_S, ALARM_SQ, ALARM_D, ALARM_DQ
simultaneously active Alarm-S blocks, max.	20; of a total of 20 for all SFCs
Alarm 8-blocks	Yes
• Number of instances for alarm 8 and S7 communication blocks, max.	4 000
Process control messages	No
Test commissioning functions	
Status/control	
• Status/control variable	Yes
Forcing	
• Forcing	No
Status block	Yes
Single step	Yes
Number of breakpoints	20
Diagnostic buffer	
• present	Yes
• Number of entries, max.	3 200
- can be set	Yes
- preset	120

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SIMATIC PC-based controller

SIMATIC WinAC RTX

Technical specifications (continued)

	6ES7 671-0RC08-0YA0
Communication functions	
PG/OP communication	Yes
Data record routing	Yes; Only with CP 5611 or integrated PROFIBUS interface of the SIMATIC PC
Routing	Yes
Global data communication	
• supported	No
S7 basic communication	
• supported	No
S7 communication	
• supported	Yes
• as server	Yes
• as client	Yes
• User data per job, max.	64 Kibyte; When using BSEND/ USEND
Web server	
• supported	Yes
• Number of HTTP clients	2
• User-defined websites	No
Open IE communication	
• TCP/IP	Yes
- Number of connections, max.	32
- Data length for connection type 01H, max.	Not supported
- Data length for connection type 11H, max.	65 534 byte
- Data length, max.	65 534 byte
• ISO-on-TCP (RFC1006)	Yes
- Number of connections, max.	32
- Data length, max.	65 534 byte
• UDP	Yes
- Number of connections, max.	32
- Data length, max.	1 472 byte
Number of connections	
• overall	96
• usable for PG communication	
- reserved for PG communication	1
• usable for OP communication	
- reserved for OP communication	1
PROFINET CBA (at set setpoint communication load)	
• Setpoint for the CPU communication load	20 %
• Number of remote interconnection partners	64
• Number of functions, master/ slave	30
• Total of all Master/Slave connections	1 000
• Data length of all incoming connections master/slave, max.	6 800 byte
• Data length of all outgoing connections master/slave, max.	6 800 byte
• Number of device-internal and PROFIBUS interconnections	500

	6ES7 671-0RC08-0YA0
PROFINET CBA (at set setpoint communication load)	
• Data length of device-internal und PROFIBUS interconnections, max.	4 000 byte
• Data length per connection, max.	1 400 byte
• Remote interconnections with acyclic transmission	
- Sampling frequency: Sampling time, 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.	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 stations that can log on for HMI variables (PN OPC/iMap)	3
- 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
1st interface	
Type of interface	CP 5611-A2, CP 5621, integrated PB interface of the SIMATIC PC
Max. no. of simultaneously operable CPs	1
Physics	RS 485 / PROFIBUS
Isolated	Yes
Power supply to interface (15 to 30 V DC), max.	does not exist
Number of connection resources	8
Functionality	
• MPI	No
• DP master	Yes
• DP slave	No

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Technical specifications (continued)

	6ES7 671-0RC08-0YA0
DP master	
• Number of connections, max.	8
• Services	
- PG/OP communication	Yes
- Routing	Yes
- Global data communication	No
- S7 basic communication	No
- S7 communication	Yes
- S7 communication, as client	Yes
- S7 communication, as server	Yes
- Equidistance mode support	Yes; Only in conjunction with isochronous mode
- Isochronous mode	Yes
- SYNC/FREEZE	Yes
- Activation/deactivation of DP slaves	Yes
- Direct data exchange (slave-to-slave communication)	Yes
- DPV0	Yes
- DPV1	Yes
• Transmission rate, max.	12 Mbit/s
• Number of DP slaves, max.	64
• Address area	
- Inputs, max.	16 Kibyte
- Outputs, max.	16 Kibyte
• User data per DP slave	
- Inputs, max.	244 byte
- Outputs, max.	244 byte
2nd interface	
Type of interface	CP 5613, CP 5613-A2, CP 5603
Max. no. of simultaneously operable CPs	4
Physics	RS 485 / PROFIBUS
Isolated	Yes
Functionality	
• MPI	No
• DP master	Yes
• DP slave	No
DP master	
• Number of connections, max.	50
• Services	
- PG/OP communication	Yes
- Routing	Yes
- Global data communication	No
- S7 basic communication	No
- S7 communication	Yes
- S7 communication, as client	Yes
- S7 communication, as server	Yes
- Equidistance mode support	Yes; Only in conjunction with isochronous mode
- Isochronous mode	Yes
- SYNC/FREEZE	Yes
- Activation/deactivation of DP slaves	Yes

	6ES7 671-0RC08-0YA0
DP master	
• Services	
- Direct data exchange (slave-to-slave communication)	Yes
- DPV0	Yes
- DPV1	Yes
• Transmission rate, max.	12 Mbit/s
• Number of DP slaves, max.	125
• Address area	
- Inputs, max.	16 Kibyte
- Outputs, max.	16 Kibyte
• User data per DP slave	
- Inputs, max.	244 byte
- Outputs, max.	244 byte
3rd interface	
Type of interface	PROFINET
Max. no. of simultaneously operable CPs	1; Intel Pro/1000 (Intel 82571EB, 82573L, 82574L, 82541PI; non-shared IRQ required); integrated IE interface SIMATIC PC 4x7B, 6x7B, 8x7B, IPC4x7C, IPC6x7C, IPC8x7C
Physics	Ethernet
Isolated	Yes
Integrated switch	No
Number of ports	1
automatic detection of transmission speed	Yes; 10/100 Mbit/s
Autonegotiation	Yes
Autocrossing	Yes
Media redundancy	
• supported	No
Functionality	
• PROFINET IO Controller	Yes
• PROFINET IO Device	No
• PROFINET CBA	Yes
• Open IE communication	Yes
PROFINET IO Controller	
• Services	
- PG/OP communication	Yes
- Routing	Yes; S7 routing
- S7 communication	Yes
- Isochronous mode	No
- Open IE communication	Yes
• Transmission rate, min.	100 Mbit/s
• Transmission rate, max.	100 Mbit/s
• Max. number of connectable IO devices for RT	128
- of which in line, max.	128

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SIMATIC PC-based controller

SIMATIC WinAC RTX

Technical specifications (continued)

	6ES7 671-0RC08-0YA0
PROFINET IO Controller	
• IRT, supported	No
• Prioritized startup supported	Yes
- Number of IO Devices, max.	32
• Activation/deactivation of IO Devices	Yes
- Number of IO Devices that can be simultaneously activated/deactivated, max.	8
• IO Devices changing during operation (partner ports), supported	Yes
• Device replacement without swap medium	Yes
• Send clock times	1 ms
• Updating time	1 - 512 ms (minimum value depends on communication share set for PROFINET I/O, on the number of I/O devices, and on the volume of configured user data)
• Address area	
- Inputs, max.	16 Kibyte
- Outputs, max.	16 Kibyte
• User data per address area, max.	2 kbyte
- User data consistency, max.	256 byte
SIMATIC communication	
• PG/OP communication	Yes
• S7 routing	Yes
• S7 communication	Yes
• Number of connections, max.	16
Open IE communication	
• Open IE communication, supported	Yes
• Number of connections, max.	32
• Local port numbers used at the system end	0, 20, 21, 23, 25, 80, 102, 135, 161, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535
• Keep-alive function, supported	Yes
4th interface	
Type of interface	PROFINET
Max. no. of simultaneously operable CPs	1; CP 1616 (HW release 8 or above), CP 1604 (HW release 7 or higher), integrated PN interface of SIMATIC PC and S7-mEC
Physics	Ethernet
Isolated	Yes
Integrated switch	Yes
Number of ports	3
automatic detection of transmission speed	Yes; 10/100 Mbit/s
Autonegotiation	Yes
Autocrossing	Yes
Media redundancy	
• supported	Yes
• Switchover time on line break, typically	200 ms
• Number of stations in the ring, max.	50

	6ES7 671-0RC08-0YA0
Change of IP address at runtime, supported	Yes
Number of connection resources	32
Functionality	
• PROFINET IO Controller	Yes
• PROFINET IO device	No
• PROFINET CBA	Yes
• Open IE communication	Yes
• Web server	Yes
PROFINET IO Controller	
• Services	
- PG/OP communication	Yes
- Routing	Yes; S7 routing
- S7 communication	Yes
- Isochronous mode	Yes
- Open IE communication	Yes
• Transmission rate, min.	100 Mbit/s
• Transmission rate, max.	100 Mbit/s
• Max. number of connectable IO Devices for RT	256
- of which in line, max.	256
• Number of IO Devices with IRT and the option "high flexibility"	64
- of which in line, max.	32
• Number of IO Devices with IRT and the option "high performance", max.	64
- of which in line, max.	32
• IRT, supported	Yes
• Prioritized startup supported	Yes
- Number of IO Devices, max.	32
• Activation/deactivation of IO Devices	Yes
- Number of IO Devices that can be simultaneously activated/deactivated, max.	8
• IO Devices changing during operation (partner ports), supported	Yes
• Device replacement without swap medium	Yes
• Send clock times	250 µs, 500 µs, 1 ms
• Updating time	0.25...512 depending on the send cycle
• Address area	
- Inputs, max.	16 Kibyte
- Outputs, max.	16 Kibyte
• User data per address area, max.	2 kbyte
- User data consistency, max.	256 byte
SIMATIC communication	
• PG/OP communication	Yes
• S7 routing	Yes
• S7 communication	Yes
• Number of connections, max.	32
Open IE communication	
• Open IE communication, supported	Yes
• Number of connections, max.	32
• Local port numbers used at the system end	0, 20, 21, 25, 80, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65534, 65535

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Technical specifications (continued)

	6ES7 671-0RC08-0YA0
Isochronous mode	
Isochronous mode	Yes
Number of DP masters with isochronous mode	2
User data per isochronous slave, max.	128 byte
Equidistance	Yes
Shortest clock pulse	2.2 ms; 2.2 ms without partial process image; 2.2 ms with partial process image
Programming	
Programming language	
• STEP 7	Yes; As of V5.5, Engineering Tools (optional)
• LAD	Yes
• FBD	Yes
• STL	Yes
• SCL	Yes
• CFC	Yes
• GRAPH	Yes
• HiGraph®	Yes
Nesting levels	8
Know-how protection	
• User program protection/ password protection	Yes
Software libraries	
• Easy Motion Control	Yes
• Software redundancy	Yes; As of V1.2, only operation of WinAC RTX with WinAC RTX
Open Development interfaces	
• CCX (Custom Code Extension)	Yes; WinAC ODK V4.2 or higher
• SMX (Shared Memory Extension)	Yes; WinAC ODK V4.2 or higher
- Inputs	4 Kibyte
- Outputs	4 Kibyte
• CMI (Controller Management Interface)	Yes; WinAC ODK V4.2 or higher
Number of simultaneously active SFCs	
• DPSYC_FR	20; of a total of 20 for all SFCs
• D_ACT_DP	20; of a total of 20 for all SFCs
• RD_REC	20; of a total of 20 for all SFCs

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Number of simultaneously active SFCs	
• WR_REC	20; of a total of 20 for all SFCs
• WR_PARM	20; of a total of 20 for all SFCs
• PARM_MOD	20; of a total of 20 for all SFCs
• WR_DPARM	20; of a total of 20 for all SFCs
• DPNRM_DG	20; of a total of 20 for all SFCs
• RDSYSST	20; of a total of 20 for all SFCs
Number of simultaneously active SFBs	
• RD_REC	20; of a total of 20 for all SFBs
• WR_REC	20; of a total of 20 for all SFBs
Hardware requirements	
Hardware required	PC with color monitor, keyboard, mouse or pointing device for Windows
Required memory on hard disk, min.	100 Mbyte
Work memory, min.	1 Gbyte
Processor	Intel Celeron M, 900 MHz or compatible
• Multi-processor system	Yes; Dual Pentium, CoreDuo, Core2Duo or compatible
• Hyper-threading	Yes
Operating systems	
Operating system	
• Windows NT 4.0	No
• Windows 2000	No
• Windows XP	Yes; Professional, SP2 and SP3
• Windows XP embedded	Yes; With the delivery image of the SIMATIC PC
- Supported HAL types under Windows XP	ACPI uniprocessor PC, ACPI multiprocessor PC, MPS multiprocessor PC
• Windows embedded Standard 7	No
• Windows 7	Yes; Professional, Enterprise, Ultimate (only 32 bit)
• Windows Vista	No
Dimensions and weight	
Weight	
• Weight, approx.	100 g; with packaging

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SIMATIC PC-based controller

SIMATIC WinAC RTX

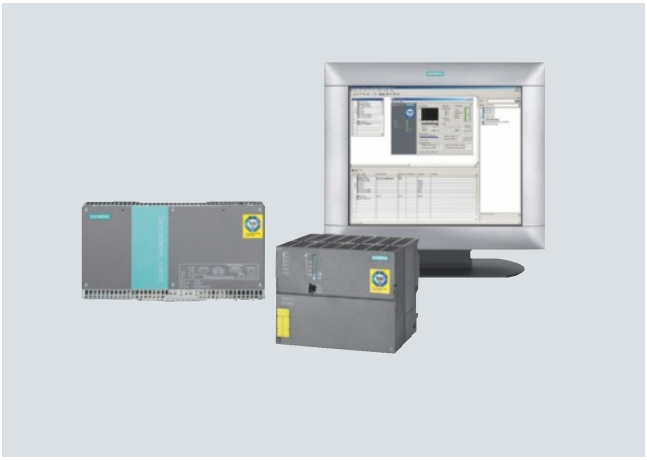
Ordering data

		Order No.
SIMATIC WinAC RTX 2010 Software PLC for PC-based automation tasks with stringent deterministic requirements; PROFIBUS and PROFINET; CD-ROM with electronic documentation d, e, f; single license, executable under Windows XP SP2 and SP3 as well as Windows 7 (32 bit)	J	**6ES7 671-0RC08-0YA0**
SIMATIC WinAC RTX 2010 Upgrade For upgrading from basic/RTX V3.x, V4.0, V4.1 2005, 2008 and 2009; single license, executable under Windows XP SP2 and SP3 and Windows 7 (32 bit)	J	**6ES7 671-0RC08-0YE0**
CP 5611 A2 communication processor PCI card (32 bit) for connection of a programming device or PC to PROFIBUS		**6GK1 561-1AA01**
CP 5621 communication processor		
• PCI Express x1 card (32 bit) for connection of a programming device or PC to PROFIBUS	C	**6GK1 562-1AA00**
• PCI Express x1 card (32 bit) CP 5621 and MPI cable, 5 m	C	**6GK1 562-1AM00**
CP 5603 Microbox Package Comprising CP 5603 module and Microbox expansion frame	I	**6GK1 560-3AU00**
CP 5613 A2 communication processor PCI card (32 bit; 3.3 V/5 V) for connection to PROFIBUS incl. DP-Base software with NCM PC; DP-RAM interface for DP master, incl. PG and FDL protocol; single license for 1 installation, runtime software, software and electronic manual on CD-ROM, Class A, for 32 bit Windows 2000 Professional/ Server, Windows XP Professional, German/English		**6GK1 561-3AA01**
CP 5623 communication processor PCI Express x1 card (32 bit) for connection to PROFIBUS incl. DP-Base software with NCM PC; DP-RAM interface for DP master or DP slave, incl. PG and FDL protocols; single license for 1 installation, runtime software, software and electronic manual on CD-ROM, Class A, for operating system support see SIMATIC NET software; German/English	C	**6GK1562-3AA00**
CP 1616 communication processor PCI Card (32 bit; 3.3/5 V universal key) 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		**6GK1 161-6AA01**
CP 1604 Microbox Package Package for implementing the CP 1604 in the SIMATIC Microbox PC; comprising the CP 1604, connection board, power supply and expansion frame for Microbox PC; for use with Development Kit DK-16xx PN IO; NCM PC		**6GK1 160-4AU00**

C: Subject to export regulations AL: N and ECCN: 5D002ENCU
I: Subject to export regulations AL: N and ECCN: EAR99H
J: Subject to export regulations AL: N and ECCN: EAR99S

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Overview



- SIMATIC WinAC RTX F:
  Optimized for applications that demand a high degree of flexibility and integration capability and that must also satisfy safety requirements up to SIL 3 (IEC 61508).
- The software solution for tasks that require hard deterministic behavior and high performance.
- With real-time expansion for assuring deterministic behavior for the control section.
- Distributed I/O can be connected over PROFIBUS and/or PROFINET, also safety-related over PROFIsafe.

Technical specifications

	6ES7 671-1RC08-0YA0
Product type designation	SIMATIC WinAC RTX F 2010
Product version	
Hardware product version	-
Firmware version	V4.6
associated programming package	STEP7 as of V5.5 + HW update / iMap V3.0 SP1 / option package S7 Distributed Safety V5.4 + SP5 / S7 F Configuration Pack V5.5 + SP6 + HF1
Memory	
Work memory	
• integrated (for program)	4 Mbyte; Adjustable; depends on Non Paged Memory Pool
• integrated (for data)	4 Mbyte; Adjustable; depends on Non Paged Memory Pool
Load memory	
• integrated RAM, max.	Adjustable; depends on Non Paged Memory Pool
CPU-blocks	
DB	
• Number, max.	65 535; Limited only by RAM set for data
• Size, max.	64 Kibyte
FB	
• Number, max.	65 536; Limited only by RAM set for code
• Size, max.	64 Kibyte
FC	
• Number, max.	65 536; Limited only by RAM set for code
• Size, max.	64 Kibyte
OB	
• Number, max.	Limited only by RAM set for code
• Size, max.	64 Kibyte
• Number of free cycle OBs	1; OB 1
• Number of time alarm OBs	1; OB 10

	6ES7 671-1RC08-0YA0
OB	
• Number of delay alarm OBs	1; OB 20
• Number of time alarm OBs	9; OB 30-38
• Number of process alarm OBs	1; OB 40
• Number of ODK OBs	3; OB 52-54
• Number of DPV1 alarm OBs	3; OB 55-57
• Number isochronous mode OBs	2; OB 61-62
• Number of startup OBs	2; OB 100, 102
• Number of asynchronous error OBs	7; OB 80, 82-85, 86, 88
• Number of synchronous error OBs	2; OB 121, 122
Nesting depth	
• per priority class	24
• additional within an error OB	24
CPU processing times	
for bit operations, min.	0.004 µs; typ.
for fixed point arithmetic, min.	0.003 µs; typ.
for floating point arithmetic, min.	0.004 µs; typ.
Reference platform	Pentium IV, 2.4 GHz
Counters, timers and their retentivity	
S7 counter	
• Number	2 048
• Retentivity	
- adjustable	Yes
- lower limit	0
- upper limit	2 047
- preset	8
• Counting range	
- adjustable	Yes
- lower limit	0
- upper limit	999
IEC counter	
• present	Yes
• Type	SFB
• Number	Unlimited (limited only by RAM capacity)

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SIMATIC PC-based controller

SIMATIC WinAC RTX F

Technical specifications (continued)

	6ES7 671-1RC08-0YA0
S7 times	
• Number	2 048
• Retentivity	
- adjustable	Yes
- lower limit	0
- upper limit	2 047
- preset	0
• Time range	
- lower limit	10 ms
- upper limit	9 990 s
IEC timer	
• present	Yes
• Type	SFB
• Number	Unlimited (limited only by RAM capacity)
Data areas and their retentivity	
Retentivity without UPS and PS Extension Board	128 KB with SIMATIC IPC427C and HMI IPC477C; further SIMATIC PCs on request
Retentivity with UPS	all data
Flag	
• Number, max.	16 Kibyte
• of which retentive	MB 0 to MB 16383
• Retentivity preset	MB 0 to MB 15
• Number of clock memories	8
Data blocks	
• Number, max.	Limited only by available retentive memory (NVRAM, or file storage)
• Size, max.	64 Kibyte
• Retentivity adjustable	Yes; via non-retain property on DB
• Retentivity preset	Yes
Local data	
• adjustable, max.	64 Kibyte
• preset	32 Kibyte
• per priority class, max.	61 440 byte
Address area	
I/O address area	
• overall	16 Kibyte
• Outputs	16 Kibyte
• of which, distributed	
- DP interface, inputs	16 Kibyte
- DP interface, outputs	16 Kibyte
- PN interface, inputs	16 Kibyte
- PN interface, outputs	16 Kibyte
Process image	
• Inputs, adjustable	8 Kibyte
• Outputs, adjustable	8 Kibyte
• Inputs, default	512 byte
• Outputs, default	512 byte
Subprocess images	
• Number of subprocess images, max.	15
Digital channels	
• Inputs	128 000
• Outputs	128 000

	6ES7 671-1RC08-0YA0
Analog channels	
• Inputs	8 000
• Outputs	8 000
Hardware configuration	
Submodules	
• Number of submodules, max	4
• of which PROFIBUS, max.	4; Supported interfaces: see 1st and 2nd interface
• of which Industrial Ethernet, max.	1; Supported interfaces: see 3rd and 4th interface
Number of operable FMs and CPs (recommended)	
• FM	4; FM distributed: FM 350-1, FM 350-2, FM 351, FM 352 / FM 352-5, FM 353, FM 354, FM 355, FM 355-2
• CP, point-to-point	2; CP 340, CP 341 distributed
• CP, LAN	Over PC CP
Time	
Clock	
• Hardware clock (real-time clock)	Yes
• battery-backed and synchronizable	Yes
Runtime meter	
• Number	8
Clock synchronization	
• supported	Yes
• to PC-CP, slave	Yes
• on Ethernet via NTP	Yes
S7 message functions	
Number of login stations for message functions, max.	62
SCAN procedure	No
Process diagnostic messages	Yes; ALARM_S, ALARM_SQ, ALARM_D, ALARM_DQ
simultaneously active Alarm-S blocks, max.	20; of a total of 20 for all SFCs
Alarm 8-blocks	Yes
• Number of instances for alarm 8 and S7 communication blocks, max.	4 000
Process control messages	No
Test commissioning functions	
Status/control	
• Status/control variable	Yes
Forcing	
• Forcing	No
Status block	Yes
Single step	Yes
Number of breakpoints	20
Diagnostic buffer	
• present	Yes
• Number of entries, max.	3 200
- adjustable	Yes
- preset	120

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Technical specifications (continued)

	6ES7 671-1RC08-0YA0
Communication functions	
PG/OP communication	Yes
Data record routing	Yes; Only with CP 5611 or integrated PROFIBUS interface of the SIMATIC PC
Routing	Yes
Global data communication	
• supported	No
S7 basic communication	
• supported	No
S7 communication	
• supported	Yes
• as server	Yes
• as client	Yes
• User data per job, max.	64 Kibyte; Depends on which block is used: BSEND/USEND or PUT/GET
Web server	
• Supported	Yes
• Number of HTTP clients	2
• User-defined websites	No
Open IE communication	
• TCP/IP	Yes
- Number of connections, max.	32
- Data length for connection type 01H, max.	Not supported
- Data length, max.	65 534 byte
• ISO-on-TCP (RFC1006)	Yes
- Number of connections, max.	32
- Data length, max.	65 534 byte
• UDP	Yes
- Number of connections, max.	32
- Data length, max.	1 472 byte
Number of connections	
• overall	96
• usable for PG communication	
- reserved for PG communication	1
• usable for OP communication	
- reserved for OP communication	1
PROFINET CBA (at set setpoint communication load)	
• Setpoint for the CPU communication load	20 %
• Number of remote interconnection partners	64
• Number of functions, master/slave	30
• Total of all Master/Slave connections	1 000
• Data length of all incoming connections master/slave, max.	6 800 byte
• Data length of all outgoing connections master/slave, max.	6 800 byte
• Number of device-internal and PROFIBUS interconnections	500
• Data length of device-internal und PROFIBUS interconnections, max.	4 000 byte
• Data length per connection, max.	1 400 byte

	6ES7 671-1RC08-0YA0
PROFINET CBA (at set setpoint communication load)	
• Remote interconnections with acyclic transmission	
- Sampling frequency: Sampling time, 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.	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 stations that can log on for HMI variables (PN OPC/ iMap)	3
- 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
1st interface	
Type of interface	CP 5611-A2, CP 5621, integrated PB interface of the SIMATIC PC
Max. no. of simultaneously operable CPs	1
Physics	RS 485 / PROFIBUS
Isolated	Yes
Power supply to interface (15 to 30 V DC), max.	does not exist
Number of connection resources	8
Functionality	
• MPI	No
• DP master	Yes
• DP slave	No

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SIMATIC PC-based controller

SIMATIC WinAC RTX F

Technical specifications (continued)

	6ES7 671-1RC08-0YA0
DP master	
• Number of connections, max.	8
• Services	
- PG/OP communication	Yes
- Routing	Yes
- Global data communication	No
- S7 basic communication	No
- S7 communication	Yes
- S7 communication, as client	Yes
- S7 communication, as server	Yes
- Equidistance mode support	Yes; Only in conjunction with isochronous mode
- Isochronous mode	Yes
- SYNC/FREEZE	Yes
- Activation/deactivation of DP slaves	Yes
- Direct data exchange (slave-to-slave communication)	Yes
- DPV0	Yes
- DPV1	Yes
• Transmission rate, max.	12 Mbit/s
• Number of DP slaves, max.	64
• Address area	
- Inputs, max.	16 Kibyte
- Outputs, max.	16 Kibyte
• User data per DP slave	
- Inputs, max.	244 byte
- Outputs, max.	244 byte
2nd interface	
Type of interface	CP 5613, CP 5613-A2, CP 5603, CP 5623
Max. no. of simultaneously operable CPs	4
Physics	RS 485 / PROFIBUS
Isolated	Yes
Functionality	
• MPI	No
• DP master	Yes
• DP slave	No
DP master	
• Number of connections, max.	50
• Services	
- PG/OP communication	Yes
- Routing	Yes
- Global data communication	No
- S7 basic communication	No
- S7 communication	Yes
- S7 communication, as client	Yes
- S7 communication, as server	Yes
- Equidistance mode support	Yes; Only in conjunction with isochronous mode
- Isochronous mode	Yes
- SYNC/FREEZE	Yes
- Activation/deactivation of DP slaves	Yes
- Direct data exchange (slave-to-slave communication)	Yes
- DPV0	Yes
- DPV1	Yes

	6ES7 671-1RC08-0YA0
DP master	
• Transmission rate, max.	12 Mbit/s
• Number of DP slaves, max.	125
• Address area	
- Inputs, max.	16 Kibyte
- Outputs, max.	16 Kibyte
• User data per DP slave	
- Inputs, max.	244 byte
- Outputs, max.	244 byte
3rd interface	
Type of interface	PROFINET
Max. no. of simultaneously operable CPs	1; Intel Pro/1000 (Intel 82571EB, 82573L, 82574L, 82541PI; non-shared IRQ required); integrated IE interface SIMATIC PC 4x7B, 6x7B, 8x7B, IPC4x7C, IPC6x7C, IPC8x7C
Physics	Ethernet
Isolated	Yes
Integrated switch	No
Number of ports	1
Automatic detection of transmission speed	Yes; 10/100 Mbit/s
Autonegotiation	Yes
Autocrossing	Yes
Media redundancy	
• supported	No
Functionality	
• PROFINET IO controller	Yes
• PROFINET IO device	No
• PROFINET CBA	Yes
• Open IE communication	Yes
PROFINET IO controller	
• Services	
- PG/OP communication	Yes
- Routing	Yes; S7 routing
- S7 communication	Yes
- Isochronous mode	No
- Open IE communication	Yes
• Transmission rate, min.	100 Mbit/s
• Transmission rate, max.	100 Mbit/s
• Number of connectable IO devices, max.	128
• Number of connectable IO devices for RT, max.	128
- of which in line, max.	128
• IRT, supported	No
• Prioritized startup supported	Yes
- Number of IO devices, max.	32
• Activation/deactivation of IO devices	Yes
- Number of IO devices that can be simultaneously activated/deactivated, max.	8

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Technical specifications (continued)

	6ES7 671-1RC08-0YA0
PROFINET IO controller	
• IO devices changing during operation (partner ports), supported	Yes
• Device replacement without swap medium	Yes
• Send clock times	1 ms
• Updating time	1 - 512 ms (minimum value depends on communication share set for PROFINET I/O, on the number of I/O devices, and on the volume of configured user data)
• Address area	
- Inputs, max.	16 Kibyte
- Outputs, max.	16 Kibyte
• User data per address area, max.	2 Kibyte
- User data consistency, max.	256 byte
SIMATIC communication	
• PG/OP communication	Yes
• S7 routing	Yes
• S7 communication	Yes
• Number of connections, max.	16
Open IE communication	
• Open IE communication, supported	Yes
• Number of connections, max.	32
• Local port numbers used at the system end	0, 20, 21, 23, 25, 80, 102, 135, 161, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535
• Keep-alive function, supported	Yes
4th interface	
Type of interface	PROFINET
Max. no. of simultaneously operable CPs	1; CP 1616 (HW release 8 or above), CP 1604 (HW release 7 or higher), integrated PN interface of SIMATIC PC and S7-mEC
Physics	Ethernet
Isolated	Yes
Integrated switch	Yes
Number of ports	3
Automatic detection of transmission speed	Yes; 10/100 Mbit/s
Autonegotiation	Yes
Autocrossing	Yes
Media redundancy	
• supported	Yes
• Switchover time on line break, typically	200 ms
• Number of stations in the ring, max.	50
Change of IP address at runtime, supported	Yes
Number of connection resources	32
Functionality	
• PROFINET IO controller	Yes
• PROFINET IO device	No
• PROFINET CBA	Yes
• Open IE communication	Yes
• Web server	Yes

	6ES7 671-1RC08-0YA0
PROFINET IO controller	
• Services	
- PG/OP communication	Yes
- Routing	Yes; S7 routing
- S7 communication	Yes
- Isochronous mode	Yes
- Open IE communication	Yes
• Transmission rate, min.	100 Mbit/s
• Transmission rate, max.	100 Mbit/s
• Number of connectable IO devices, max.	256
• Number of connectable IO devices for RT, max.	256
- of which in line, max.	256
• Number of IO devices with IRT and the option "high flexibility"	64
- of which in line, max.	32
• Number of IO devices with IRT and the option "high performance", max.	64
- of which in line, max.	64
• IRT, supported	Yes
• Shared device, supported	Yes
• Prioritized startup supported	Yes
- Number of IO devices, max.	32
• Activation/deactivation of IO devices	Yes
- Number of IO devices that can be simultaneously activated/ deactivated, max.	8
• IO devices changing during operation (partner ports), supported	Yes
• Device replacement without swap medium	Yes
• Send clock times	250 µs, 500 µs, 1 ms
• Updating time	0.25...512 depending on the send cycle
• Address area	
- Inputs, max.	16 Kibyte
- Outputs, max.	16 Kibyte
• User data per address area, max.	2 Kibyte
- User data consistency, max.	256 byte
SIMATIC communication	
• PG/OP communication	Yes
• S7 routing	Yes
• S7 communication	Yes
• Number of connections, max.	32
Open IE communication	
• Open IE communication, supported	Yes
• Number of connections, max.	32
• Local port numbers used at the system end	0, 20, 21, 25, 80, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65534, 65535
Isochronous mode	
Isochronous mode	Yes
Number of DP masters with isochronous mode	2
User data per isochronous slave, max.	128 byte

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SIMATIC PC-based controller

SIMATIC WinAC RTX F

Technical specifications (continued)

	6ES7 671-1RC08-0YA0
Equidistance	Yes
Shortest clock pulse	2.2 ms; 2.2 ms without partial process image; 2.2 ms with partial process image
Programming	
Programming language	
• STEP 7	Yes; As of V5.5 + HW update/S7 F Configuration Pack V5.5 + SP6 + HF1/option package S7 Distributed Safety V5.4 + SP5 or higher
• LAD	Yes
• FBD	Yes
• STL	Yes
• SCL	Yes
• CFC	Yes
• GRAPH	Yes
• HiGraph®	Yes
Nesting levels	8
Know-how protection	
• User program protection/ password protection	Yes
• Block encryption	No
Software libraries	
• Easy Motion Control	Yes
• Software redundancy	Yes; As of V1.2, only for operation of WinAC RTX (F) with WinAC RTX (F)
Open Development interfaces	
• CCX (Custom Code Extension)	Yes; WinAC ODK V4.2 or higher
• SMX (Shared Memory Extension)	Yes; WinAC ODK V4.2 or higher
- Inputs	4 Kibyte
- Outputs	4 Kibyte
• CMI (Controller Management Interface)	Yes; WinAC ODK V4.2 or higher
Number of simultaneously active SFCs	
• DPSYC_FR	20; of a total of 20 for all SFCs
• D_ACT_DP	20; of a total of 20 for all SFCs
• RD_REC	20; of a total of 20 for all SFCs
• WR_REC	20; of a total of 20 for all SFCs
• WR_PARM	20; of a total of 20 for all SFCs
• PARM_MOD	20; of a total of 20 for all SFCs
• WR_DPARM	20; of a total of 20 for all SFCs
• DPNRM_DG	20; of a total of 20 for all SFCs
• RDSYSST	20; of a total of 20 for all SFCs

	6ES7 671-1RC08-0YA0
Number of simultaneously active SFBs	
• RD_REC	20; of a total of 20 for all SFBs
• WR_REC	20; of a total of 20 for all SFBs
Hardware requirements	
Hardware required	PC with color monitor, keyboard, mouse or pointing device for Windows
Required memory on hard disk, min.	100 Mbyte
Work memory, min.	1 Gbyte
Processor	Intel Celeron M 900 MHz or compatible (older PC systems with Programmable Interrupt Controllers (PIC) are not suitable for WinAC RTX F 2010.)
• Multi-processor system	No
• Hyper-threading	Yes
Operating systems	
Operating system	
• Windows NT 4.0	No
• Windows 2000	No
• Windows XP	Yes; Professional, SP2 and SP3
• Windows XP embedded	Yes; With the delivery image of the SIMATIC PC
- Supported HAL types under Windows XP	ACPI uniprocessor PC, ACPI multiprocessor PC, MPS multiprocessor PC
• Windows embedded Standard 7	No
• Windows 7	Yes; Professional, Enterprise, Ultimate (only 32 bit)
• Windows Vista	No
Dimensions and weight	
Weight	
• Weight, approx.	100 g; with packaging

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Ordering data

		Order No.
SIMATIC WinAC RTX F 2010	J	**6ES7 671-1RC08-0YA0**
SIMATIC WinAC RTX F 2010 upgrade	I	**6ES7 671-1RC08-0YE0**
CP 5611 A2 communication processor PCI card (32 bit) for connection of a programming device or PC to PROFIBUS		**6GK1 561-1AA01**
CP 5621 communication processor		
PCI Express x1 card (32 bit) for connection of a programming device or PC to PROFIBUS	C	**6GK1 562-1AA00**
PCI Express x1 card (32 bit) CP 5621 and MPI cable, 5 m	C	**6GK1 562-1AM00**
CP 5603 Microbox Package Comprising CP 5603 module and Microbox expansion frame	I	**6GK1 560-3AU00**
CP 5613 A2 communication processor PCI card (32 bit; 3.3 V/5 V) for connection to PROFIBUS incl. DP-Base software with NCM PC; DP-RAM interface for DP master, incl. PG and FDL protocol; single license for 1 installation, runtime software, software and electronic manual on CD-ROM, Class A, for 32 bit Windows 2000 Professional/ Server, Windows XP Professional, German/English		**6GK1 561-3AA01**
CP 5623 communication processor PCI Express x1 card (32 bit) for connection to PROFIBUS incl. DP-Base software with NCM PC; DP-RAM interface for DP master or DP slave, incl. PG and FDL protocols; single license for 1 installation, runtime software, software and electronic manual on CD-ROM, Class A, for operating system support see SIMATIC NET software; German/English	C	**6GK1 562-3AA00**
CP 1616 communication processor PCI Card (32 bit; 3.3/5 V universal key) 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		**6GK1 161-6AA01**
CP 1604 Microbox Package Package for implementing the CP 1604 in the SIMATIC Microbox PC; comprising the CP 1604, connection board, power supply and expansion frame for Microbox PC; for use with Development Kit DK-16xx PN IO; NCM PC		**6GK1 160-4AU00**

C: Subject to export regulations AL: N and ECCN: 5D002ENCU
I: Subject to export regulations AL: N and ECCN: EAR99H
J: Subject to export regulations AL: N and ECCN: EAR99S

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SIMATIC PC-based controller

SIMATIC WinAC ODK

Overview



- SIMATIC WinAC software PLCs support powerful interfaces which permit close meshing of the control task with PC-based applications.
- WinAC ODK allows the user to develop applications or to integrate already existing applications into the control task.

New with WinAC ODK V4.2:

- CCX interface:
  - New SFB 65003 for asynchronous execution of ODK applications
  - Expansion of data access functions
  - Creation of Windows DLL with C# and VB
- SMX interface:
  - Access to the Shared Memory interface under IntervalZero RTX
  - Expansion of data access functions
  - Creation of Windows applications with C# and VB
- Supports MS Visual Studio 2005 and 2008 (under Windows)

8

Technical specifications

	6ES7 806-1CC03-0BA0
Product type designation	SIMATIC WinAC ODK V4.2
Programming	
Open Development interfaces	
• CCX (Custom Code Extension)	Yes; WinAC RTX 2008 (V4.4) or higher; programming languages: Microsoft Visual C++ V6.0 SP5 or higher, .net 2003, 2005, 2008; Microsoft Visual Basic 2005, 2008; Microsoft Visual C# 2005, 2008
• SMX (Shared Memory Extension)	Yes; WinAC RTX 2008 (V4.4) or higher; programming languages: Microsoft Visual C++ V6.0 SP5 or higher, .net 2003, 2005, 2008; Microsoft Visual Basic 2005, 2008; Microsoft Visual C# 2005, 2008
• CMI (Controller Management Interface)	Yes; WinAC RTX 2005 SP2 (V4.3) or higher; programming languages: Microsoft Visual C++ V6.0 SP5 or higher, .net 2003, 2005, 2008; Microsoft Visual Basic V6.0 SP5 or higher, .net 2003, 2005, 2008; Microsoft Visual C# .net 2003, 2005, 2008
Hardware requirements	
Hardware required	PC with color monitor, keyboard, mouse or pointing device for Windows
Required memory on hard disk, min.	30 Mbyte
Work memory, min.	512 Mbyte
Processor	Intel Pentium 800 MHz
Software requirement	
Software required	Microsoft Visual Developer Studio, for details see interfaces; CCX and SMX realtime applications in addition: IntervalZero SDK V8.1 (SDK version must match the WinAC RTX version)
Operating systems	
Operating system	
• Windows XP	Yes; Professional, SP2 and SP3
Dimensions and weight	
Weight	
• Weight, approx.	200 g

Ordering data

		Order No.
SIMATIC WinAC ODK V4.2		
for integration of C/C++ code in WinAC PLCs, executable under Windows XP SP2 or SP3; CD-ROM with electronic documentation		
Single license	J	**6ES7 806-1CC03-0BA0**

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

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SIMATIC ET 200 distributed I/O

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Brochures

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

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

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SIMATIC ET 200 distributed I/O

Overview



SIMATIC ET 200 offers the right solution for every application

With SIMATIC ET 200 a wide range of distributed I/O systems is available - for solutions in the control cabinet or without a control cabinet directly at the machine, as well as for applications in hazardous areas. The modular design makes it possible to scale and expand the ET 200 systems simply and in small stages. Already integrated add-on modules reduce costs, and at the same time offer a widely diverse range of possible applications. You can choose from many different combination options: Digital and analog inputs/outputs, intelligent modules with CPU functionality, safety systems, motor starters, pneumatic devices, frequency converters, as well as various different technology modules (e.g. for counting, positioning).

Communication over PROFIBUS and PROFINET, uniform engineering, transparent diagnostic possibilities as well as optimal interfacing to SIMATIC Controllers and HMI units prove the unique integration of Totally Integrated Automation.

PROFIBUS

PROFIBUS is the international standard (IEC 61158/61784) for the field level. It is the only fieldbus to allow communication both in manufacturing applications and in process-oriented applications.

PROFIBUS is used to connect field devices, e.g. distributed I/O devices or drives, to automation systems such as SIMATIC S7, SIMOTION, SINUMERIK, or PCs.

PROFIBUS is standardized in accordance with IEC 61158 and is a powerful, open and rugged fieldbus system with short response times. PROFIBUS is available in different forms for various applications.

PROFIBUS DP (distributed I/O)

PROFIBUS DP is used for connecting distributed field devices, e.g. SIMATIC ET 200, or drives with extremely fast response times. PROFIBUS DP is used when sensors/actuators are distributed at the machine or in the plant (e.g. field level).

PROFINET

PROFINET is the open, cross-vendor Industrial Ethernet standard (IEC 61158/61784) for automation.

Based on Industrial Ethernet, PROFINET enables direct communication between field devices (IO devices) and controllers (IO controllers), up to and including the solution of isochronous drive controls for motion control applications.

As PROFINET is based on Standard Ethernet according to IEEE 802.3, any devices from the field level to the management level can be connected.

In this way, PROFINET enables system-wide communication, supports plant-wide engineering and applies IT standards, such as Web server or FTP, right down to field level. Tried and tested fieldbus systems, such as PROFIBUS or AS-Interface, can be easily integrated without any modification to the existing devices.

AS-Interface

AS-Interface, the international standard (IEC 62026/EN 50295) which, as an alternative to the cable harness, links especially cost-effective sensors and actuators by means of a two-wire line. This two-wire line is also used to supply the individual stations with power. Thus, the AS-Interface is the ideal partner for the PROFIBUS DP fieldbus.

SIMATIC ET 200 Configurator

Just a mouse click away from a tailor-made I/O station: With the SIMATIC ET 200 Configurator

First class support is even provided for configuring the ET 200 station with the ET 200 Configurator. The software tool guides the user through the configuring process and automatically creates order lists complete with accessories. It also assists with compliance with limits such as load currents, slot rules and parameters.

The configuration created in the ET 200 Configurator can be imported into STEP 7 without any problems. This reduces the engineering costs and saves double inputs.

The software tool is structured in a clear, intuitive manner: Six configuring layers make the work easy and convenient.

- General notes: General station data as well as a graphical presentation of the configured station
- Module selection: Guided selection of modules, through module suggestions
- Limits: Station size, weight, number of modules, load voltage, parameters, etc. are all displayed
- Accessories: Guided selection of the necessary accessories (module-specific or station-wide)
- Potential distribution: Graphical presentation of the potentials within a station
- Parts list: Automatic generation of a clearly understandable parts list simplifies the ordering process

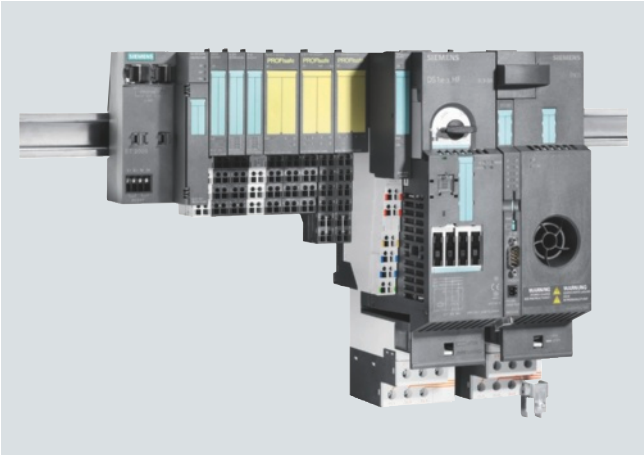
The ET 200 configurator is a component of the SIMATIC Selection Tool, which is available as a configurator in the Industry Mall.

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

www.siemens.com/simatic/printmaterial

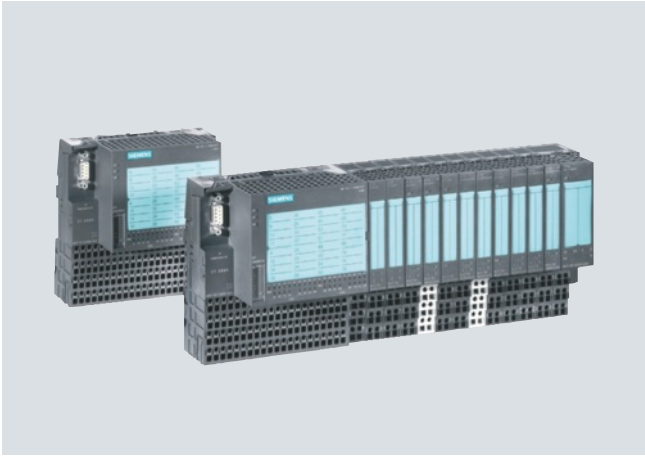
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Overview



SIMATIC ET 200S

- Distributed I/O system to degree of protection IP20 with minimal wiring outlay, also for extremely time-critical tasks such as high-speed closed-loop controls
- Can be used with integrated S7-CPU as mini PLC:
  - also available as fail-safe PROFIsafe version
  - with optional lower-level PROFIBUS DP
- Discretely-modular design for exact adaptation to the automation task in hand.
- Interface modules available with PROFIBUS DP or PROFINET interfaces
- Can be combined from digital and analog in/output modules, technology modules, motor starters and frequency converters for the control of drives up to 7.5 or 4 kW.
- Exchange of modules during operation (hot swapping), permanent wiring with multi-conductor connection
- Channel-specific diagnostics for high availability
- Can be supplied with integrated fiber optic interface if required
- Transmission rates up to 12 Mbit/s
- FastConnect using unstripped quick connection technology, screw or spring-loaded terminals
- Ex approval to Cat. 3 for Zone 2 acc. to ATEX100 a
- Slot reservation with spare modules
- Fail-safe DI modules with safety-related signal processing according to PROFIsafe
- Option handling – for simplest management of machine options



SIMATIC ET 200S COMPACT

- Block I/O to degree of protection IP20 with 32 channels, comprising terminal block and electronic block
- Discretely modular expansion to maximum of 128 channels or 12 modules
- The complete ET 200S module spectrum can be used (with the exception of PROFIsafe modules)
- Separation of terminal connections and electronics with permanent wiring
- Screw-type and spring-loaded terminal connections
- Standard terminal block with 2-wire connection system; 3-wire and 4-wire systems available using additional terminals
- Mounting on standard rail
- Hot swapping of expansion modules
- Communication via PROFIBUS
- Up to 100 byte inputs and outputs (address space)

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Introduction

Technical specifications

General technical specifications	
Degree of protection	IP20
Ambient temperature	0 … 60 °C
Vibration resistance	2 *g* permanently, 5 *g* temporarily (motor starter max. 2 *g*)
Maximum configuration (none of the limits listed below must be exceeded)	
• Number of modules per IM 151, max.	IM 151-1 BASIC: Up to 12 modules
	IM 151-1 COMPACT: Up to 12 modules
	IM 151-1 STANDARD: Up to 63 modules
	IM 151-1 HIGH-FEATURE: Up to 63 modules
	IM 151-7 CPU: Up to 63 modules
	IM 151-3 PN: Up to 63 modules
• Line width, max.	IM 151-1 BASIC: Up to 2 m
	IM 151-1 COMPACT: Up to 2 m
	IM 151-1 STANDARD: Up to 2 m
	IM 151-1 HIGH-FEATURE: Up to 2 m
	IM 151-7 CPU: Up to 1 m
	IM 151-3 PN: Up to 2 m
• User data length	Depending on the number and type of connected modules
	IM 151-1 BASIC: Up to 88 byte for inputs and outputs
	IM 151-1 COMPACT: Up to 100 byte for inputs and outputs
	IM 151-1 STANDARD: Up to 244 byte for inputs and outputs
	IM 151-1 HIGH-FEATURE: Up to 244 byte for inputs and outputs
	IM 151-7 CPU: Not relevant
	IM 151-3 PN: 256 byte
• Parameter length	Depending on the number and type of connected modules
	IM 151-1 BASIC: 198 byte
	IM 151-1 COMPACT: 218 byte
	IM 151-1 STANDARD: Up to 244 byte
	IM 151-1 HIGH-FEATURE: Up to 244 byte
	IM 151-7 CPU: Not relevant
	IM 151-3 PN: Not relevant

General technical specifications	
Requirements of the DP master system	
• PROFIBUS DP master	In accordance with EN 50170
• Parameter length	>32 byte, depending on the number and type of connected modules
• User data length	Depending on the number and type of connected modules
• diagnostic length	17 … 64 byte (adjustable)
Standards and approvals	
• PROFIBUS	EN 50170, Volume 2
• IEC 1131	IEC 1131, Part 2
• UL	acc. to UL508 standard, File No. E 116536/E 75310 (AC modules)
• C-Tick	AS/NZS 2064 (Class A)
• CSA	acc. to standard C22.2 No. 142, File No. LR 48323/LR 44226 (AC modules)
• cULus for hazardous locations	acc. to UL 508 standard, File No. E 116536 acc. to hazardous locations UL 1604, File no. E 222109 acc. to CSA C22.2 standard, No. 142
• FM	Standard Class No. 3611, Class I, Division 2, Group A, B, C, D, Class I, Zone 2, Group IIC (without motor starter and frequency converter)
• Shipbuilding	American Bureau of Shipping
	Bureau Veritas
	Det Norske Veritas
	Germanischer Lloyd
	Lloyds Register of Shipping
	Nippon Kaiji Kyokai
	(without motor starters and frequency converters)
• Ex approval Cat. 3 (for Zone 2 acc. to ATEX–100a)	EN 50021
	(without frequency converters)

Within the context of converting SIMATIC from UL / CSA to cULus, the ET 200S modules will also be converted

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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 version		
Associated programming package		STEP 7 V5.2 + SP1 or higher with HW update
Supply voltages		
Rated value		
• permissible range, lower limit (DC)	20.4 V	
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 (5 V DC), max.		700 mA
from supply voltage 1L+, max.		250 mA; 280 mA with DP master module
Power losses		
Power loss, typ.		3.3 W
Memory		
Work memory		
• 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
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

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Technical specifications (continued)

	6ES7 151-7AB00-0AB0	6ES7 151-7AA20-0AB0
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
Counters, timers and their retentivity		
S7 counter		
• Number	256	256
• Retentivity		
- adjusted		Yes
- lower limit		0
- upper limit		255
- preset		Z 0 to Z 7
• Counting range		
- adjusted	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
• Retentivity		
- adjusted		Yes
- lower limit		0
- upper limit		255
- preset		No retentivity
• Time range		
- lower limit	10 ms	10 ms
- upper limit	9 990 s	9 990 s
IEC timer		
• Type		SFB
• Number		Unlimited (limited only by RAM capacity)
Data areas and their retentivity		
Retentive data area in total (incl. times, counters, flags), max.	4 Kibyte	64 Kibyte
Flag		
• Number, max.	256 byte	256 byte
• Retentivity available		Yes
• Retentivity 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
Address area		
I/O address area		
• Overall		2 048 byte
• Outputs		2 048 byte
Process image		
• Inputs		128 byte; Not adjustable
• Outputs		128 byte; Not adjustable

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Technical specifications (continued)

	6ES7 151-7AB00-0AB0	6ES7 151-7AA20-0AB0
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 configuration		
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
• Battery-backed and synchronizable		Yes
• Backup time		6 wk; At 40 °C ambient temperature, typically
• Deviation per day, max.		10 s
Runtime meter		
• Number		1
• Number/Number range		0
• Range of values		0 to 2^31 hours (when using SFC 101)
• Granularity		1 hour
• Retentive		Yes; Must be restarted at each restart
Clock synchronization		
• supported		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; Depending on the configured connections for PG/OP and S7 basic communication
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 variables, max.		30
• of which control variables, max.		14
Forcing		
• Forcing		Yes
Status block		Yes

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Technical specifications (continued)

	6ES7 151-7AB00-0AB0	6ES7 151-7AA20-0AB0
Single step		Yes
Number of breakpoints		2
Diagnostic buffer		
• Present	Yes	Yes
• Number of entries, max.	100	100
- adjusted		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
S7 basic communication		
• Supported		Yes
• User data per job, max.		76 byte
• User data per job (of which consistent), max.		76 byte; 76 byte (with X_SEND or X_RCV); 64 byte (with X_PUT or X_GET as server)
S7 communication		
• supported		Yes
• as server		Yes
• as client		No
• User data per job, max.		180 byte
• User 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		Integrated 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 connection		No
MPI		
• Number of connections		12; Notice: 12 connections per CPU, not per interface

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Technical specifications (continued)

	6ES7 151-7AB00-0AB0	6ES7 151-7AA20-0AB0
MPI		
• Services		
- PG/OP communication		Yes
- Routing		Yes; With master module
- Global data communication		Yes
- S7 basic communication		Yes
- S7 communication		Yes
- S7 communication, as client		No
- S7 communication, as server		Yes
• Transmission rate, max.		12 Mbit/s
DP slave		
• Number of connections	11	12; Notice: 12 connections per CPU, not per interface
• Services		
- Routing		Yes; Only when interface active and in master mode
- Direct data exchange (slave-to-slave communication)	Yes	Yes
- DPV1		No
• GSD file	www.siemens.com/profibus-gsd	www.siemens.com/profibus-gsd
• Transmission rate, max.	12 Mbit/s	12 Mbit/s
• Automatic baud rate search		Yes; only with passive interface
• Transfer memory		
- Inputs		244 byte
- Outputs		244 byte
• Address area, max.		32
• User data per address area, max.		32 byte; Up to max. size of the transfer memory
2nd interface		
Type of interface		External interface via master module 6ES7138-4HA00-0AB0
Physics		RS 485
Isolated		Yes
Power supply to interface (15 to 30 V DC), max.		No
Functionality		
• MPI		No
• DP master		Yes
• Local Operating Network		No
DP master		
• Number of connections, max.		12; Notice: 12 connections per CPU, not per interface
• Services		
- PG/OP communication		Yes
- Routing		Yes
- Global data communication		No
- S7 basic communication		Yes; I blocks only
- S7 communication		Yes
- S7 communication, as client		No
- S7 communication, as server		Yes
- Equidistance mode support		Yes
- SYNC/FREEZE		Yes
- Activation/deactivation of DP slaves		Yes
- Direct data exchange (slave-to-slave communication)		Yes
- DPV1		Yes
• Transmission rate, max.		12 Mbit/s
• Number of DP slaves, max.		32; Per station
• Address area		
- Inputs, max.		2 Kibyte
- Outputs, max.		2 Kibyte
• User data per DP slave		
- Inputs, max.		244 byte
- Outputs, max.		244 byte

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Technical specifications (continued)

	6ES7 151-7AB00-0AB0	6ES7 151-7AA20-0AB0
Isochronous mode		
Isochronous mode		No
Programming		
Configuration rules		max. 63 I/O 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		Yes
• LAD		Yes
• FBD		Yes
• STL		Yes
• SCL	Yes	Yes; Optional
• GRAPH		Yes; Optional
Command set	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
Nesting levels	8	8
Know-how protection		
• 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
Galvanic isolation		
between load voltage and all other switching components		Yes
between PROFIBUS DP and all other circuit components		Yes
Permissible potential difference		
between different circuits		75 V DC / 60 V AC
Environmental requirements		
Operating temperature		
• Min.	0 °C	
Dimensions and weight		
Dimensions		
• Width	60 mm	60 mm; DP master module: 35 mm
• Height	119.5 mm	119.5 mm
• Depth	75 mm	75 mm
Weight		
• Weight, approx.	200 g	200 g; DP master module: Approx. 100 g

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Ordering data	Order No.
IM 151-7 CPU FO interface module (48 K) Including termination module	**6ES7 151-7AB00-0AB0**
IM 151-7 CPU interface module (96 K) Including termination module	**6ES7 151-7AA20-0AB0**
Accessories	
MMC 64 KB [1] for program backup	**6ES7 953-8LF20-0AA0**
MMC 128 KB [1] for program backup	**6ES7 953-8LG20-0AA0**
MMC 512 KB [1] for program backup	**6ES7 953-8LJ20-0AA0**
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 e.g. for MMC with USB interface	**6ES7 792-0AA00-0XA0**
PG with integrated MMC interface	On request

	Order No.
Label sheets DIN A4 (10 units) Each sheet contains 60 labeling strips for I/O modules and 20 labeling strips for interface modules	
• petrol	**6ES7 193-4BH00-0AA0**
• red	**6ES7 193-4BD00-0AA0**
• yellow	**6ES7 193-4BB00-0AA0**
• light beige	**6ES7 193-4BA00-0AA0**
ET 200S distributed I/O system manuals are available on the Internet as PDF files: www.siemens.com/simatic-docu	
Termination module as spare part for ET 200S	**6ES7 193-4JA00-0AA0**
SIMATIC S5, 35 mm DIN rail	
• Length: 483 mm for 19" cabinets	**6ES5 710-8MA11**
• Length: 530 mm for 600 mm cabinets	**6ES5 710-8MA21**
• Length: 830 mm for 900 mm cabinets	**6ES5 710-8MA31**
• 2 m long	**6ES5 710-8MA41**

[1] An MMC is essential for operating the CPU

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Interface modules with CPU IM 151-8 PN/DP CPU

Overview



- Interface module for SIMATIC ET 200S with integrated CPU S7-314
- For high-performance control solutions in ET 200S
- Increase of the availability of systems and machines
- PROFINET IO controller for up to 128 IO devices
- PROFINET I-Device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or non-Siemens PROFINET IO controller
- PROFINET interface with integrated 3-port switch
- Isochronous mode on PROFINET
- With many communication options: PG/OP communication, PROFINET IO, PROFINET CBA, open IE communication (TCP, ISO-on-TCP and UDP), web server and S7-communication (with loadable FBs)
- Fast, simple and end-to-end programming of a system with modular programs via STEP 7
- Compact SIMATIC Micro Memory Card (MMC)
- Optional PROFIBUS master for 32 PROFIBUS DP slaves (with master interface 6ES7138-4HA00-0AB0)
- Fail-safe IM 151-8F PN/DP CPU PROFIsafe available

Note:
SIMATIC Micro Memory Card required for operation of CPU.

Technical specifications

	6ES7 151-8AB00-0AB0	6ES7 151-8AB01-0AB0
Product version		
Associated programming package	STEP7 V5.4 SP4 or higher	STEP7 V 5.5 or higher
Supply voltages		
Rated value		
• permissible range, lower limit (DC)	20.4 V	20.4 V
External protection for supply cables (recommendation)	24 V DC/16 A miniature circuit breaker with type B and C tripping characteristics. Note: The 24 V DC/16 A miniature circuit breaker with type B tripping characteristics trips before the device protection fuse. The 24 V DC/16 A miniature circuit breaker with type C tripping characteristics trips	24 V DC/16 A miniature circuit breaker with type B and C tripping characteristics. Note: A 24 V DC/16 A miniature circuit breaker with type B tripping characteristics trips before and with type C tripping characteristic after the device protection fuse.
Mains buffering		
• Mains/voltage failure stored energy time	5 ms	5 ms
Current consumption		
Inrush current, max.	1.8 A; typ.	1.8 A; typ.
I^2t	0.21 $A^2 \cdot s$	0.13 $A^2 \cdot s$
Current output to backplane bus (5 V DC), max.	700 mA	700 mA
from supply voltage 1L+, max.	380 mA; 460 mA with DP master module	352 mA; 426 mA with DP master module
Power losses		
Power loss, typ.	5.5 W	5.5 W
Memory		
Work memory		
• integrated	128 Kibyte; For program and data	192 Kibyte; For program and data
• expandable	No	No
• size of retentive memory for retentive data blocks	64 kbyte	64 kbyte
Load memory		
• pluggable (MMC)	Yes	Yes
• pluggable (MMC), max.	8 Mbyte	8 Mbyte

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Technical specifications (continued)

	6ES7 151-8AB00-0AB0	6ES7 151-8AB01-0AB0
CPU-blocks		
Number of blocks (total)	1 024; (DBs, FCs, FBs); the maximum number of loadable blocks can be reduced by the MMC used.	1 024; (DBs, FCs, FBs); the maximum number of loadable blocks can be reduced by the MMC used.
DB		
• Number, max.	511; Number range: 1 to 511	1 024; Number range: 1 to 16,000
• Size, max.	64 Kibyte	64 Kibyte
FB		
• Number, max.	1 024; Number range: 0 to 2047	1 024; Number range: 0 to 7,999
• Size, max.	64 Kibyte	64 Kibyte
FC		
• Number, max.	1 024; Number range: 0 to 2047	1 024; Number range: 0 to 7,999
• Size, max.	64 Kibyte	64 Kibyte
OB		
• Size, max.	64 Kibyte	64 Kibyte
Nesting depth		
• per priority class	16	16
• additional within an error OB	4	4
CPU processing times		
for bit operations, min.	0.1 µs	0.06 µs
for word operations, min.	0.2 µs	0.12 µs
for fixed point arithmetic, min.	2 µs	0.16 µs
for floating point arithmetic, min.	3 µs	0.59 µs
Counters, timers and their retentivity		
S7 counter		
• Number	256	256
• Retentivity		
- adjusted	Yes	Yes
- lower limit	0	0
- upper limit	255	255
- preset	Z 0 to Z 7	Z 0 to Z 7
• Counting range		
- adjusted	Yes	Yes
- lower limit	0	0
- upper limit	999	999
IEC counter		
• Type	SFB	SFB
• Number	Unlimited (limited only by RAM capacity)	Unlimited (limited only by RAM capacity)
S7 times		
• Number	256	256
• Retentivity		
- adjusted	Yes	Yes
- lower limit	0	0
- upper limit	255	255
- preset	No retentivity	No retentivity
• Time range		
- lower limit	10 ms	10 ms
- upper limit	9 990 s	9 990 s
IEC timer		
• Type	SFB	SFB
• Number	Unlimited (limited only by RAM capacity)	Unlimited (limited only by RAM capacity)

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Technical specifications (continued)

	6ES7 151-8AB00-0AB0	6ES7 151-8AB01-0AB0
Data areas and their retentivity		
Flag		
• Number, max.	256 byte	256 byte
• Retentivity available	Yes	Yes
• Retentivity preset	MB 0 to MB 15	MB 0 to MB 15
• Number of clock memories	8; 1 memory byte	8; 1 memory byte
Data blocks		
• Number, max.	511; Number range: 1 to 511	1 024; Number range: 1 to 16,000
• Size, max.	64 Kibyte	64 Kibyte
• Retentivity adjustable	Yes; via non-retain property on DB	Yes; via non-retain property on DB
• Retentivity preset	Yes	Yes
Local data		
• per priority class, max.	510 byte; per priority class	32 768 byte; 2048 byte max. per block
Address area		
I/O address area		
• Overall	2 048 byte	2 048 byte
• Outputs	2 048 byte	2 048 byte
• of which, distributed		
- Inputs	2 048 byte	2 048 byte
- Outputs	2 048 byte	2 048 byte
Process image		
• Inputs, adjustable	2 048 byte	2 048 byte
• Outputs, adjustable	2 048 byte	2 048 byte
• Inputs, preset	128 byte	128 byte
• Outputs, preset	128 byte	128 byte
Subprocess images		
• Number of subprocess images, max.	None	1; With PROFINET IO, the length of the user data is limited to 1600 byte
Digital channels		
• Inputs	16 336	16 336
• Outputs	16 336	16 336
• Inputs, of which central	496	496
• Outputs, of which central	496	496
Analog channels		
• Inputs	1 021	1 021
• Outputs	1 021	1 021
• Inputs, of which central	124	124
• Outputs, of which central	124	124
Hardware configuration		
Number of mounting rails that can be used	1	1
Max. length of mounting rail	Station width: <= 1 m or < 2 m	Station width: <= 1 m or < 2 m
Number of modules per system, max.	63; Centralized	63; Centralized
Time		
Clock		
• Hardware clock (real-time clock)	Yes	Yes
• Battery-backed and synchronizable	Yes	Yes
• Backup time	6 wk; At 40 °C ambient temperature, typically	6 wk; At 40 °C ambient temperature, typically
• Behavior of the clock following POWER-ON		Clock continues running after POWER OFF
• Behavior of the clock following expiry of backup period	Clock continues to run with the time at which the power failure occurred	Clock continues to run with the time at which the power failure occurred
• Deviation per day, max.	10 s	10 s; Typ.: 2 s

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Technical specifications (continued)

	6ES7 151-8AB00-0AB0	6ES7 151-8AB01-0AB0
Runtime meter		
• Number	1	1
• Number/Number range	0	0
• 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
• Retentive	Yes; must be restarted at each restart	Yes; must be restarted at each restart
Clock synchronization		
• supported	Yes	Yes
• to MPI, master	No	No
• to MPI, slave	No	No
• to DP, master	Yes; with DP master module	Yes; with DP master module
• to DP, slave	Yes; with DP master module	Yes; with DP master module
• in AS, master	No	No
• in AS, slave	No	No
• on Ethernet via NTP	Yes; as client	Yes; as client
S7 message functions		
Number of login stations for message functions, max.	12; depending on the configured connections for PG/OP and S7 basic communication	12; depending on the configured connections for PG/OP and S7 basic communication
Process diagnostic messages	Yes; ALARM_S, ALARM_SC, ALARM_SQ, ALARM_D, ALARM_DQ	Yes; ALARM_S, ALARM_SC, ALARM_SQ, ALARM_D, ALARM_DQ
Simultaneously active Alarm-S blocks, max.	300	300
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 variables, max.	30	30
• of which control variables, max.	14	14
Forcing		
• Forcing	Yes	Yes
Status block	Yes	Yes; up to 2 simultaneously
Single step	Yes	Yes
Number of breakpoints	2	4
Diagnostic buffer		
• Present	Yes	Yes
• Number of entries, max.	500	500
- adjusted	No	No
- Of which powerfail-proof	100; only the last 100 entries are retained	100; only the last 100 entries are retained
Monitoring functions		
Status LEDs		Yes
Communication functions		
PG/OP communication	Yes	Yes
Data record routing	Yes; with DP master module	Yes; with DP master module
Routing	Yes; with DP master module	Yes; with DP master module
Global data communication		
• supported	No	No
S7 basic communication		
• Supported	Yes; I blocks	Yes; I blocks
• User data per job, max.	76 byte	76 byte
• User data per job (of which consistent), max.	76 byte	76 byte

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Technical specifications (continued)

	6ES7 151-8AB00-0AB0	6ES7 151-8AB01-0AB0
S7 communication		
• Supported	Yes	Yes
• as server	Yes	Yes
• as client	Yes; via integrated PN interface and loadable FBs	Yes; via integrated PN interface and loadable FBs
• User data per job, max.	180 byte	See online help of STEP 7 (shared parameters of the SFBs/FBs and of the SFCs/FCs of S7 Communication)
• User data per job (of which consistent), max.	64 byte	
S5-compatible communication		
• supported	No	
Standard communication (FMS)		
• supported	No	
Web server		
• Supported	Yes	Yes
• Number of HTTP clients	5	5
• User-defined websites		Yes
Open IE communication		
• TCP/IP	Yes; via integrated PROFINET interface and loadable FBs	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.	8	8
- Data length for connection type 01H, max.	1 460 byte	1 460 byte
- Data length for connection type 11H, max.	8 192 byte	32 768 byte
- Several passive connections per port, supported		Yes
• ISO-on-TCP (RFC1006)	Yes; via integrated PROFINET interface and loadable FBs	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.	8	8
- Data length, max.	8 192 byte	32 768 byte
• UDP	Yes; via integrated PROFINET interface and loadable FBs	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.	8	8
- Data length, max.	1 472 byte	1 472 byte
Number of connections		
• overall	12	12
• usable for PG communication	11	11
- reserved for PG communication	1	1
- adjustable for PG communication, min.	1	1
• usable for OP communication	11	11
- reserved for OP communication	1	1
- adjustable for OP communication, min.	1	1
• usable for S7 basic communication	10	10
- reserved for S7 basic communication	0	0
- adjustable for S7 basic communication, min.	0	0
• usable for S7 communication	10; with loadable FBs	10; with loadable FBs
- adjustable for S7 communication, max.	10	10
• max. total number of instances	32	32
• usable for routing	4; with DP master module	4; with DP master module
PROFINET CBA (at set setpoint communication load)		
• Setpoint for the CPU communication load	50 %	50 %
• Number of remote interconnection partners	32	32
• Number of functions, master/slave	30	30
• Total of all master/slave connections	1 000	1 000
• Data length of all incoming connections master/slave, max.	4 000 byte	4 000 byte

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Technical specifications (continued)

	6ES7 151-8AB00-0AB0	6ES7 151-8AB01-0AB0
PROFINET CBA (at set setpoint communication load)		
• Data length of all outgoing connections master/slave, max.	4 000 byte	4 000 byte
• Number of device-internal and PROFIBUS interconnections	500	500
• Data length of device-internal und PROFIBUS interconnections, max.	4 000 byte	4 000 byte
• Data length per connection, max.	1 400 byte	1 400 byte
• Remote interconnections with acyclic transmission		
- Sampling frequency: Sampling time, min.	500 ms	500 ms
- Number of incoming interconnections	100	100
- Number of outgoing interconnections	100	100
- Data length of all incoming interconnections, max.	2 000 byte	2 000 byte
- Data length of all outgoing interconnections, max.	2 000 byte	2 000 byte
- Data length per connection, max.	1 400 byte	1 400 byte
• Remote interconnections with cyclic transmission		
- Transmission frequency: Transmission interval, min.	1 ms	1 ms
- Number of incoming interconnections	200	200
- Number of outgoing interconnections	200	200
- Data length of all incoming interconnections, max.	2 000 byte	2 000 byte
- Data length of all outgoing interconnections, max.	2 000 byte	2 000 byte
- Data length per connection, max.	250 byte	450 byte
• HMI variables via PROFINET (acyclic)		
- Number of stations that can log on 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	200
- Data length of all HMI variables, max.	2 000 byte	2 000 byte
• PROFIBUS proxy functionality		
- supported	Yes	Yes
- Number of linked PROFIBUS devices	16	16
- Data length per connection, max.	240 byte; slave-dependent	240 byte; slave-dependent
1st interface		
Type of interface	PROFINET	PROFINET
Physics	Ethernet	Ethernet
Isolated	Yes	Yes
Integrated switch	Yes	Yes
Number of ports	3; RJ45	3; RJ45
Automatic detection of transmission speed	Yes	Yes
Autonegotiation	Yes	Yes
Autocrossing	Yes	Yes
Media redundancy		
• Supported		Yes
• Switchover time on line break, typically		200 ms; PROFINET MRP
• Number of stations in the ring, max.		50
Change of IP address at runtime, supported		Yes

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Technical specifications (continued)

	6ES7 151-8AB00-0AB0	6ES7 151-8AB01-0AB0
Functionality		
• MPI	No	No
• DP master	No	No
• DP slave	No	No
• PROFINET IO device	No	Yes; Also simultaneously with IO controller functionality
• PROFINET IO controller	Yes	Yes; also simultaneously with IO device functionality
• PROFINET CBA	Yes	Yes
• Open IE communication	Yes	Yes
• Web server	Yes	Yes
- Number of HTTP clients	5	5
• Point-to-point connection	No	No
PROFINET IO controller		
• Services		
- PG/OP communication	Yes	Yes
- Routing	Yes; with DP master module	Yes; with DP master module
- S7 communication	Yes; with loadable FBs	Yes; with loadable FBs
- Isochronous mode	No	Yes; OB 61; only for PROFINET IO
- Open IE communication	Yes; Via TCP/IP, ISO on TCP, and UDP	Yes; Via TCP/IP, ISO on TCP, and UDP
• Transmission rate, max.	100 Mbit/s; full duplex	100 Mbit/s; full duplex
• Number of connectable IO devices, max.	128	128
• Max. number of connectable IO devices for RT	128	128
- of which in line, max.	128	128
• Number of IO devices with IRT and the option "high flexibility"	128	128
- of which in line, max.	61	61
• Number of IO devices with IRT and the option "high performance", max.		64
- of which in line, max.		64
• IRT, supported	Yes	Yes
- Shared device, supported		Yes
• Prioritized startup supported	Yes	Yes
- Number of IO devices, max.	32	32
• Activation/deactivation of IO devices	Yes	Yes
- Number of IO devices that can be simultaneously activated/deactivated, max.	8	8
• IO devices changing during operation (partner ports), supported	Yes	Yes
- Max. number of IO devices per tool	8	8
• Device replacement without swap medium	Yes	Yes
• Send cycles	Adjustable: 250 µs, 500 µs and 1 ms	250 µs, 500 µs,1 ms; 2 ms, 4 ms (not in the case of IRT with "high flexibility" option)
• Updating time	Minimum value depends on communication share set for PROFINET I/O, on the number of I/O devices, and on the number of configured user data units.	Minimum value depends on communication share set for PROFINET I/O, on the number of I/O devices, and on the number of configured user data units.
• Updating times	250 µs - 128 ms (at signal cycle 250 µs); 500µs - 256 ms (at signal cycle 500 µs); 1 ms - 512 ms (at signal cycle 1 ms)	250 µs to 512 ms (depends on operating mode; for more details, refer to Operating Instructions, "Interface Module IM151-8 PN/DP CPU")
• Address area		
- Inputs, max.	2 kbyte	2 kbyte
- Outputs, max.	2 kbyte	2 kbyte
• User data per address area, max.		
- User data consistency, max.	254 byte; with PROFINET I/O	1 024 byte; with PROFINET I/O
PROFINET IO device		
• Services		
- PG/OP communication		Yes
- Routing		Yes
- S7 communication		Yes; With loadable FBs
- Isochronous mode		No
- Open IE communication		Yes; Via TCP/IP, ISO on TCP, UDP
- IRT, supported		Yes

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Technical specifications (continued)

	6ES7 151-8AB00-0AB0	6ES7 151-8AB01-0AB0
PROFINET IO device		
• Services		
- PROFIenergy, supported		Yes; With SFB 73 / 74 prepared for loadable PROFIenergy standard FB for I-Device
- Shared device, supported		Yes
- Number of IO controllers with shared device, max.		2
• Transfer memory		
- Inputs, max.		1 440 byte; Per IO controller with shared device
- Outputs, max.		1 440 byte; Per IO controller with shared device
• Submodules		
- Number, max.		64
- User data per submodule, max.		1 024 byte
PROFINET CBA		
• acyclic transmission	Yes	Yes
• cyclic transmission	Yes	Yes
Open IE communication		
• Open IE communication, supported	Yes; Via TCP/IP, ISO on TCP, and UDP	Yes; Via TCP/IP, ISO on TCP, and UDP
• Number of connections, max.	8	8
• Local port numbers used at the system end	0, 20, 21, 23, 25, 80, 102, 135, 161, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535	0, 20, 21, 23, 25, 80, 102, 135, 161, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535
2nd interface		
Type of interface	External interface via master module 6ES7138-4HA00-0AB0	External interface via master module 6ES7138-4HA00-0AB0
Physics	RS 485	RS 485
Isolated	Yes	Yes
Power supply to interface (15 to 30 V DC), max.	No	No
Functionality		
• MPI	No	No
• DP master	Yes	Yes
• DP slave	No	No
• PROFINET IO controller	No	No
• PROFINET IO device	No	No
• PROFINET CBA	No	No
• Open IE communication	No	No
• Web server	No	No
• Local Operating Network	No	
DP master		
• Number of connections, max.	12; Notice: 12 connections per CPU, not per interface	
• 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 mode support	Yes	Yes
- Isochronous mode	No	No
- SYNC/FREEZE	Yes	Yes
- Activation/deactivation of DP slaves	Yes	Yes
- Number of DP slaves that can be simultaneously activated/deactivated, max.	8	8
- Direct data exchange (slave-to-slave communication)	Yes	Yes
- DPV1	Yes	Yes

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Technical specifications (continued)

	6ES7 151-8AB00-0AB0	6ES7 151-8AB01-0AB0
• Transmission rate, max.	12 Mbit/s	12 Mbit/s
• Number of DP slaves, max.	32; Per station	32; Per station
• Address area		
- Inputs, max.	2 048 byte	2 048 byte
- Outputs, max.	2 048 byte	2 048 byte
• User data per DP slave		
- Inputs, max.	244 byte	244 byte
- Outputs, max.	244 byte	244 byte
Isochronous mode		
Isochronous mode	No	No
Programming		
Programming language		
• STEP 7	Yes; V5.4 SP4	Yes; V5.5 or higher
• LAD	Yes	Yes
• FBD	Yes	Yes
• STL	Yes	Yes
• SCL	Yes; optional	Yes; optional
• CFC	Yes; optional	Yes; optional
• GRAPH	Yes; optional	Yes; optional
• HiGraph®	Yes; optional	Yes; optional
Command set	See instruction list	See instruction list
Nesting levels	8	8
Know-how protection		
• User program protection/password protection	Yes	Yes
• Block encryption		Yes; With S7 block Privacy
System functions (SFC)	See instruction list	See instruction list
System function blocks (SFB)	See instruction list	See instruction list
Alarms/diagnostics/status information		
Alarms		
• Alarms	Yes	Yes
Diagnostics		
• Diagnostic functions	Yes	Yes
Diagnostic indication LED		
• Bus activity PROFINET P1-LINK (green)	Yes	Yes
• Bus activity PROFINET P2-LINK (green)	Yes	Yes
• Bus activity PROFINET P3-LINK (green)	Yes	Yes
• Bus error (red)	Yes	Yes
• Maintenance information MT (yellow)	Yes	Yes
• Group error SF (red)	Yes	Yes
• Monitoring 24 V voltage supply ON (green)	Yes	Yes
Isolation		
Isolation checked with	500 V DC	500 V DC
Galvanic isolation		
between load voltage and all other switching components	Yes	
between PROFIBUS DP and all other circuit components	Yes	Yes
Permissible potential difference		
between different circuits	75 V DC / 60 V AC	75 V DC / 60 V AC
Dimensions and weight		
Dimensions		
• Width	120 mm; DP master module: 35 mm	120 mm; DP master module: 35 mm
• Height	119.5 mm	119.5 mm
• Depth	75 mm	75 mm
Weight		
• Weight, approx.	320 g; DP master module: Approx. 100 g	320 g; DP master module: Approx. 100 g

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Ordering data	Order No.
IM 151-8F PN/DP CPU interface module (192 K) I including termination module	**6ES7 151-8AB01-0AB0**
Accessories	
MMC 64 kByte [1] for program backup	**6ES7 953-8LF20-0AA0**
MMC 128 kByte [1] for program backup	**6ES7 953-8LG20-0AA0**
MMC 512 kByte [1] for program backup	**6ES7 953-8LJ20-0AA0**
MMC 2 MByte [1] for program backup and/or firmware update	**6ES7 953-8LL20-0AA0**
MMC 4 MByte [1] for program backup	**6ES7 953-8LM20-0AA0**
MMC 8 MByte [1] for program backup	**6ES7 953-8LP20-0AA0**
External prommer for MMC, among others, with USB interface	**6ES7 792-0AA00-0XA0**
PG with integrated MMC interface	On request
Label sheets DIN A4 (10 units) Each sheet contains 60 label strips for I/O modules and 20 label strips for interface modules	
• petrol	**6ES7 193-4BH00-0AA0**
• red	**6ES7 193-4BD00-0AA0**
• yellow	**6ES7 193-4BB00-0AA0**
• light beige	**6ES7 193-4BA00-0AA0**

	Order No.
ET 200S distributed I/O system manuals are available on the Internet as PDF files www.siemens.com/simatic-docu	
Termination module as spare part for ET 200S	**6ES7 193-4JA00-0AA0**
SIMATIC S5, 35 mm DIN rail	
• Length: 483 mm for 19" cabinets	**6ES5 710-8MA11**
• Length: 530 mm for 600 mm cabinets	**6ES5 710-8MA21**
• Length: 830 mm for 900 mm cabinets	**6ES5 710-8MA31**
• 2 m long	**6ES5 710-8MA41**
Industrial Ethernet FC RJ45 Plug 180 RJ45 connector for Industrial Ethernet with rugged metal enclosure and integrated insulation displacement contacts for connecting the Industrial Ethernet FC installation cables; with 180° cable outlet	
• 1 unit	**6GK1 901-1BB10-2AA0**
• 10 units	**6GK1 901-1BB10-2AB0**
• 50 units	**6GK1 901-1BB10-2AE0**
Industrial Ethernet FastConnect Installation Cable	
• Fast Connect Standard Cable	**6XV1 840-2AH10**
• Fast Connect Trailing Cable	**6XV1 840-3AH10**
• Fast Connect Marine Cable	**6XV1 840-4AH10**
Industrial Ethernet FastConnect Stripping Tool	**6GK1 901-1GA00**

[1] An MMC is essential to operate the CPU

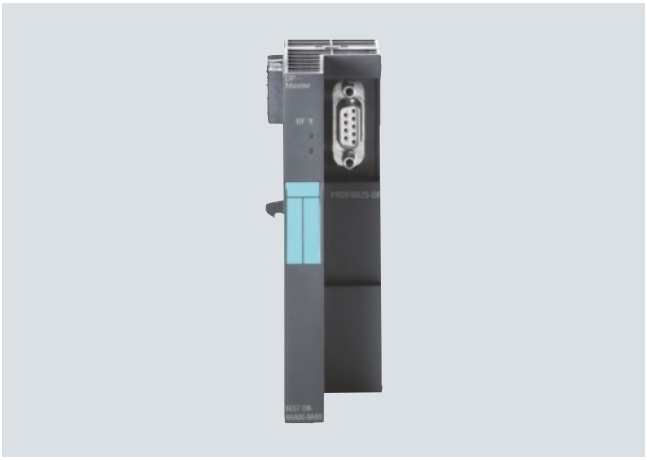
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Interface modules with CPU
Master interface module for IM 151 CPU

Overview



PROFIBUS DP master interface module for IM 151-7(F) CPU/IM 151-8(F) PN/DP CPU interface modules

- Integrated 12 Mbit/s PROFIBUS DP master interface in copper design
- Facilitates parallel operation of two PROFIBUS DP interfaces on one IM 151-7 CPU
- Enables operation of a PROFIBUS DP interface on an IM 151-8(F) PN/DP CPU
- Increases the availability of plants and machinery
- Functionality corresponds to the interface of an S7-300 CPU 314-2 DP configured as DP master

Programming is with STEP7 from Version V5.2 with Service Pack 1.

Technical specifications

	6ES7 138-4HA00-0AB0
Hardware configuration	
Number of modules per CPU	1
Dimensions and weight	
Dimensions	
• Width	35 mm
• Height	119.5 mm
• Depth	75 mm
Weight	
• Weight, approx.	100 g

Ordering data

	Order No.
Master interface module for IM 151-7 CPU / IM 151-7 F CPU / IM 151-8 PN/DP CPU / IM 151-8 F PN/DP CPU interface modules	**6ES7 138-4HA00-0AB0**
Accessories	
Label sheets DIN A4 (10 units)	
Each sheet contains 60 label strips for I/O modules and 20 label strips for interface modules	
• petrol	**6ES7 193-4BH00-0AA0**
• red	**6ES7 193-4BD00-0AA0**
• yellow	**6ES7 193-4BB00-0AA0**
• light beige	**6ES7 138-4BA00-0AA0**
ET 200S distributed I/O system manuals	
are available in the Internet as PDF files:	
www.siemens.com/simatic-docu	

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Overview



- Interface module for SIMATIC ET 200S with integrated S7-CPU 314
- For high-performance control solutions in ET 200S
- Increase of the availability of systems and machines
- Programming via PROFIBUS DP
- Compact SIMATIC micro memory card (MMC)
- Integrated 12 Mbit/s PROFIBUS DP slave/MPI interface in Cu version
- Integrated CPU based on the CPU S7-314
- IM 151-7 CPU FO available
- Fail-safe IM 151-7 F CPU PROFIsafe available
- Alternatively as IM 151-8 (F) PN/DP CPU with PROFINET interface

Micro Memory Card required for CPU operation.

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

	SIPLUS IM 151-7 CPU
Order No.	**6AG1151-7AA20-7AB0**
Order No. based on	**6ES7151-7AA20-0AB0**
Ambient temperature range	-25 °C to +70 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions.
Relative humidity	5 … 100 %, condensation permitted
Ambient conditions	
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080...795 hPa (-1000 ... +2000 m) See ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) Derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

Ordering data

	Order No.
SIPLUS IM 151-7 CPU interface module (96 K) H	**6AG1 151-7AA20-7AB0**
(extended temperature range and medial exposure)	
Including termination module	
Accessories	See SIMATIC IM 151-7 CPU interface module, page 9/13

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SIPLUS interface modules with CPU
SIPLUS IM 151-8 PN/DP CPU

Overview



- Interface module for SIMATIC ET 200S with integrated CPU S7-314
- For high-performance control solutions in ET 200S
- Increase in the availability of systems and machines
- PROFINET IO-Controller for up to 128 IO-Devices
- PROFINET I-Device for connecting the CPU as an intelligent PROFINET device with a SIMATIC or third-party PROFINET I/O-Controller
- PROFINET interface with integrated 3-port switch
- Isochronous mode on PROFINET
- With many communication options: PG/OP communication, PROFINET IO, PROFINET CBA, open IE communication (TCP, ISO-on-TCP and UDP), Web server and S7 communication (with loadable FBs)
- Fast, simple and uniform programming of a system with modular programs via STEP 7
- Compact SIMATIC micro memory card (MMC)
- Optional PROFIBUS master for 32 PROFIBUS DP slaves (with master interface 6ES7 138-4HA00-0AB0)
- Fail-safe IM 151-8F PN/DP CPU PROFIsafe available

Micro Memory Card required for CPU operation.

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS IM 151-8 PN/DP CPU		
Order No.	**6AG1 151-8AB00-4AB0**	**6AG1 151-8AB00-7AB0**
Order No. based on	**6ES7 151-8AB00-0AB0**	**6ES7 151-8AB00-0AB0**
Ambient temperature range	0 ... +60 °C	-25 ... +70 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	

SIPLUS IM 151-8 PN/DP CPU	
Ambient conditions:	
• Relative humidity	5 ... 100%, condensation allowed
• Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores fauna)
• Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
• Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
• Air pressure (depending on the highest positive temperature range specified)	1080...795 hPa (-1000 ... +2000 m) See ambient temperature range 795…658 hPa (+2000 … +3500 m) Derating 10 K 658...540 hPa (+3500 ... +5000m) Derating 20K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 <4.8 ppm; H_2S <9.9 ppm; Cl <0.2 ppm; HCl <0.66 ppm; HF <0.12 ppm; NH <49 ppm; O_3 <0.1 ppm; NOX <5.2 ppm
Threshold / limit value (max. 30 min/d): SO_2 <17.8 ppm; H_2S <49.7 ppm; Cl <1.0 ppm; HCl <3.3 ppm; HF <2.4 ppm; NH <247 ppm; O_3 <1.0 ppm; NOX <10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

Ordering data

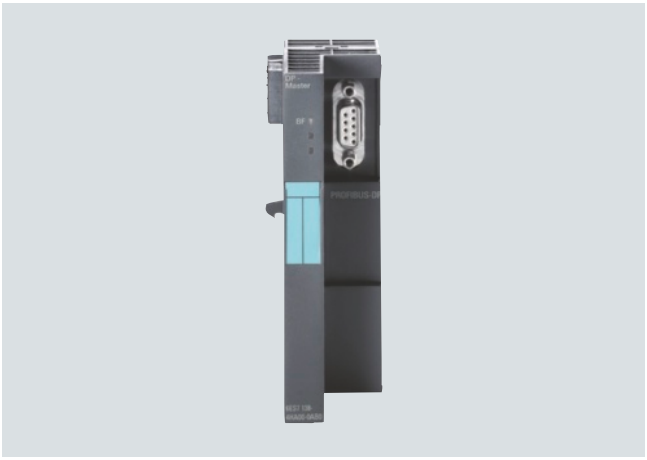
		Order No.
SIPLUS interface module IM 151-8 PN/DP CPU		
(extended temperature range and medial exposure)		
Including termination module		
• For areas with extreme medial stress (conformal coating)	I	**6AG1 151-8AB00-4AB0**
• For areas with extreme medial stress (conformal coating); ambient temperature -25 ... +70 °C	H	**6AG1 151-8AB00-7AB0**
Accessories		See SIMATIC IM 151-8 PN/DP CPU interface module, page 9/23

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SIPLUS interface modules with CPU
SIPLUS master interface module for IM 151 CPU

Overview



PROFIBUS DP master interface module for interface module IM 151-7 (R) CPU / IM 151-8 (F) PN/DP CPU

- Integrated 12 Mbit/s PROFIBUS DP master interface in Cu version
- Allows parallel operation of two PROFIBUS DP interfaces on one IM 151-7 CPU
- Allows operation of one PROFIBUS DP interface with an IM 151-8 (F) PN/DP CPU
- Increase in availability of systems and machines
- Functionality in accordance with a DP master configured interface of an S7-314 CPU

Programming is performed with STEP 7 from version V5.2 with Service Pack 1.

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

	SIPLUS master interface module for IM 151 CPU
Order number	**6AG1 138-4HA00-7AB0**
Order No. based on	**6ES7 138-4HA00-0AB0**
Ambient temperature range	-25 °C to +70 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions.
Ambient conditions	
Relative humidity	5 … 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 … +2000 m) See ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 … 540 hPa (+3500 … +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

Ordering data	**Order No.**
Master interface module for SIPLUS IM 151-7 CPU / IM 151-7 F CPU / IM 151-8 PN/DP CPU / IM 151-8 F PN/DP CPU interface modules H (extended temperature range and medial exposure)	**6AG1 138-4HA00-7AB0**
Accessories	See SIMATIC master interface module for IM 151 CPU, page 9/24

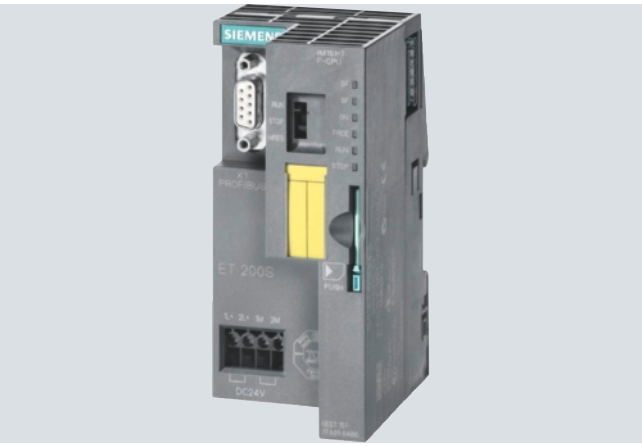
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Interface modules with fail-safe CPU IM 151-7 F-CPU

Overview



- Interface module with integrated fail-safe CPU for SIMATIC ET 200S
- With DP/MPI interface
- For design of a fail-safe automation system for plants with increased safety requirements
- Complies with safety requirements up to SIL 3 according to IEC 61508, IEC 62061 and Cat. 4 according to EN 954-1
- Fail-safe I/O modules can be connected in a distributed configuration through DP master modules (PROFIsafe)
- The fail-safe I/O modules of ET200S PROFIsafe can be connected in a centralized configuration
- Standard modules can be used for non-safety-relevant applications

Note:

Micro Memory Card required for operation of CPU.

Technical specifications

	6ES7 151-7FA20-0AB0
Product version	
associated programming package	STEP 7 V5.2 + SP1 or higher with HW update
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
• Short-circuit protection	Yes
• Reverse polarity protection	Yes
Current consumption	
Current output to backplane bus (5 V DC), max.	700 mA
from supply voltage 1L+, max.	250 mA; 280 mA with DP master module
Power losses	
Power loss, typ.	3.3 W
Memory	
Work memory	
• integrated	128 Kibyte; For program and data
• expandable	No
Load memory	
• pluggable (MMC)	Yes
• pluggable (MMC), max.	8 Mbyte
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.	511; Number range: 1 to 511
• Size, max.	16 Kibyte
FB	
• Number, max.	1 024; Number range: 0 to 2047
• Size, max.	16 Kibyte

	6ES7 151-7FA20-0AB0
FC	
• Number, max.	1 024; Number range: 0 to 2047
• Size, max.	16 Kibyte
OB	
• Size, max.	16 Kibyte
Nesting depth	
• per priority class	8
• additional within an error OB	4
CPU processing times	
for bit operations, min.	0.1 µs
for word operations, min.	0.2 µs
for fixed point arithmetic, min.	2 µs
for floating point arithmetic, min.	3 µs
Counters, timers and their retentivity	
S7 counter	
• Number	256
• Retentivity	
- adjusted	Yes
- lower limit	0
- upper limit	255
- preset	Z 0 to Z 7
• Counting range	
- adjusted	Yes
- lower limit	0
- upper limit	999
IEC counter	
• Type	SFB
• Number	Unlimited (limited only by RAM capacity)
S7 times	
• Number	256
• Retentivity	
- adjusted	Yes
- lower limit	0
- upper limit	255
- preset	No retentivity

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Technical specifications (continued)

	6ES7 151-7FA20-0AB0
S7 times	
• Time range	
- lower limit	10 ms
- upper limit	9 990 s
IEC timer	
• Type	SFB
• Number	Unlimited (limited only by RAM capacity)
Data areas and their retentivity	
retentive data area in total (incl. times, counters, flags), max.	64 Kibyte
Flag	
• Number, max.	256 byte
• Retentivity available	Yes
• Retentivity 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
Address area	
I/O address area	
• Overall	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
Hardware configuration	
Number of modules per system, max.	63; Centralized
Time	
Clock	
• Hardware clock (real-time clock)	Yes
• Battery-backed and synchronizable	Yes
• Backup time	6 wk; at 40 °C ambient temperature, typically
• Deviation per day, max.	10 s
Runtime meter	
• Number	1
• Number/Number range	0
• Range of values	0 to 2^31 hours (when using SFC 101)
• Granularity	1 hour
• Retentive	Yes; must be restarted at each restart

	6ES7 151-7FA20-0AB0
Clock synchronization	
• supported	Yes
• to MPI, master	Yes
• to MPI, slave	Yes
• in AS, master	No
• in AS, slave	No
S7 message functions	
Number of login stations for message functions, max.	12; depending on the configured connections for PG/OP and S7 basic communication
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 variables, max.	30
• of which control variables, max.	14
Forcing	
• Forcing	Yes
Status block	Yes
Single step	Yes
Number of breakpoints	2
Diagnostic buffer	
• Present	Yes
• Number of entries, max.	100
- adjusted	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
S7 basic communication	
• supported	Yes
• User data per job, max.	76 byte
• User data per job (of which consistent), max.	76 byte; 76 byte (with X_SEND or X_RCV); 64 byte (with X_PUT or X_GET as server)
S7 communication	
• supported	Yes
• as server	Yes
• as client	No
• User data per job, max.	180 byte
• User data per job (of which consistent), max.	64 byte

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Technical specifications (continued)

	6ES7 151-7FA20-0AB0
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	Integrated 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; active / passive
• Point-to-point connection	No
MPI	
• Number of connections	12; Notice: 12 connections per CPU, not per interface
• Services	
- PG/OP communication	Yes
- Routing	Yes; with master module
- Global data communication	Yes
- S7 basic communication	Yes
- S7 communication	Yes
- S7 communication, as client	No
- S7 communication, as server	Yes
• Transmission rate, max.	12 Mbit/s
DP slave	
• Number of connections	12; Notice: 12 connections per CPU, not per interface
• Services	
- Routing	Yes; only when interface active and in master mode
- Direct data exchange (slave-to-slave communication)	Yes
- DPV1	No
• GSD file	www.siemens.com/profibus-gsd
• Transmission rate, max.	12 Mbit/s
• Automatic baud rate search	Yes; only with passive interface
• Transfer memory	
- Inputs	244 byte
- Outputs	244 byte

	6ES7 151-7FA20-0AB0
DP slave	
• Address area, max.	32
• User data per address area, max.	32 byte; up to max. size of the transfer memory
2nd interface	
Type of interface	External interface via master module 6ES7138-4HA00-0AB0
Physics	RS 485
Isolated	Yes
Power supply to interface (15 to 30 V DC), max.	No
Functionality	
• MPI	No
• DP master	Yes
• Local Operating Network	No
DP master	
• Number of connections, max.	12; Notice: 12 connections per CPU, not per interface
• Services	
- PG/OP communication	Yes
- Routing	Yes
- Global data communication	No
- S7 basic communication	Yes; I blocks only
- S7 communication	Yes
- S7 communication, as client	No
- S7 communication, as server	Yes
- Equidistance mode support	Yes
- SYNC/FREEZE	Yes
- Activation/deactivation of DP slaves	Yes
- Direct data exchange (slave-to-slave communication)	Yes
- DPV1	Yes
• Transmission rate, max.	12 Mbit/s
• Number of DP slaves, max.	32; Per station
• Address area	
- Inputs, max.	2 Kibyte
- Outputs, max.	2 Kibyte
• User data per DP slave	
- Inputs, max.	244 byte
- Outputs, max.	244 byte
Isochronous mode	
Isochronous mode	No
Programming	
Configuration rules	max. 63 I/O 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	Yes
• LAD	Yes
• FBD	Yes
• STL	Yes
• SCL	Yes; optional
• GRAPH	Yes; optional

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Technical specifications (continued)

	6ES7 151-7FA20-0AB0
Command set	See instruction list
Nesting levels	8
Know-how protection • User program protection/ password protection	Yes
System functions (SFC)	See instruction list
System function blocks (SFB)	See instruction list
Isolation Isolation checked with	500 V DC
Galvanic isolation between load voltage and all other switching components	Yes
between PROFIBUS DP and all other circuit components	Yes

	6ES7 151-7FA20-0AB0
Permissible potential difference between different circuits	75 V DC / 60 V AC
Dimensions and weight Dimensions	
• Width	60 mm; DP master module: 35 mm
• Height	119.5 mm
• Depth	75 mm
Weight • Weight, approx.	200 g; DP master module: Approx. 100 g

Ordering data

	Order No.
IM151-7 F CPU interface module For configuring a fail-safe automation system	**6ES7 151-7FA20-0AB0**
Accessories	
Distributed Safety V5.4 programming tool Task: Software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, ET 200S Requirements: 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 V5.3; Floating license for 1 user	**6ES7 833-1FC02-0YE5**
MMC 64 kByte for program backup	**6ES7 953-8LF20-0AA0**
MMC 128 kByte for program backup	**6ES7 953-8LG20-0AA0**
MMC 512 kByte for program backup	**6ES7 953-8LJ20-0AA0**
MMC 2 MByte for program backup and/or firmware update	**6ES7 953-8LL20-0AA0**
MMC 4 MByte for program backup	**6ES7 953-8LM20-0AA0**
External prommer for MMC with USB interface	**6ES7 792-0AA00-0XA0**
Termination module as spare part for ET 200S	**6ES7 193-4JA00-0AA0**
SIMATIC S5, 35 mm DIN rail	
• Length: 483 mm for 19" cabinets	**6ES5 710-8MA11**
• Length: 530 mm for 600 mm cabinets	**6ES5 710-8MA21**
• Length: 830 mm for 900 mm cabinets	**6ES5 710-8MA31**
• 2 m long	**6ES5 710-8MA41**

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ET 200S

Interface modules with fail-safe CPU IM 151-8 F PN/DP CPU

Overview



- Interface module for SIMATIC ET 200S with integrated fail-safe CPU
- For constructing a fail-safe automation system for plants with increased safety requirements
- Complies with safety requirements up to SIL 3 according to IEC 61508, IEC 62061, up to PLe according to ISO 13849-1:2006 and up to Cat. 4 according to EN 954-1
- For high-performance control solutions in ET 200S
- Increase of the availability of systems and machines
- PROFINET IO-Controller for up to 128 IO-Devices
- PROFINET interface with integrated 3-port switch
- With many communication options: PG/OP communication, PROFINET IO, PROFINET CBA, open IE communication (TCP, ISO-on-TCP and UDP), web server and S7-communication (with loadable FBs)
- Fast, simple and uniform programming of a system with modular programs via STEP 7
- Compact SIMATIC Micro Memory Card (MMC)
- Optional PROFIBUS master for 32 PROFIBUS DP slaves (with master interface 6ES7138-4HA00-0AB0)

Note:

SIMATIC Micro Memory Card required for operation of CPU.

Technical specifications

	6ES7 151-8FB01-0AB0
Product version	
associated programming package	STEP 7 V 5.5 or higher, Distributed Safety V 5.4 SP4
Supply voltages	
Rated value	
• permissible range, lower limit (DC)	20.4 V
external protection for supply cables (recommendation)	24 V DC/16 A miniature circuit breaker with type B and C tripping characteristics. Note: A 24 V DC/ 16 A miniature circuit breaker with type B tripping characteristics trips before and with type C tripping characteristic after the device protection fuse.
Mains buffering	
• Mains/voltage failure stored energy time	5 ms
Current consumption	
Inrush current, max.	1.8 A; typ.
I^2t	0.13 $A^2 \cdot s$
Current output to backplane bus (DC 5 V), max.	700 mA
from supply voltage 1L+, max.	352 mA; 426 mA with DP master module
Power losses	
Power loss, typ.	5.5 W
Memory	
Work memory	
• integrated	256 Kibyte; For program and data
• expandable	No
• size of retentive memory for retentive data blocks	64 kbyte

	6ES7 151-8FB01-0AB0
Load memory	
• pluggable (MMC)	Yes
• pluggable (MMC), max.	8 Mbyte
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.	1 024; Number range: 1 to 16,000
• Size, max.	64 Kibyte
FB	
• Number, max.	1 024; Number range: 0 to 7,999
• Size, max.	64 Kibyte
FC	
• Number, max.	1 024; Number range: 0 to 7,999
• Size, max.	64 Kibyte
OB	
• Size, max.	64 Kibyte
Nesting depth	
• per priority class	16
• additional within an error OB	4
CPU processing times	
for bit operations, min.	0.06 µs
for word operations, min.	0.12 µs
for fixed point arithmetic, min.	0.16 µs
for floating point arithmetic, min.	0.59 µs

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Technical specifications (continued)

	6ES7 151-8FB01-0AB0
Counters, timers and their retentivity	
S7 counter	
• Number	256
• Retentivity	
- adjusted	Yes
- lower limit	0
- upper limit	255
- preset	Z 0 to Z 7
• Counting range	
- adjusted	Yes
- lower limit	0
- upper limit	999
IEC counter	
• Type	SFB
• Number	Unlimited (limited only by RAM capacity)
S7 times	
• Number	256
• Retentivity	
- adjusted	Yes
- lower limit	0
- upper limit	255
- preset	No retentivity
• Time range	
- lower limit	10 ms
- upper limit	9 990 s
IEC timer	
• Type	SFB
• Number	Unlimited (limited only by RAM capacity)
Data areas and their retentivity	
Flag	
• Number, max.	256 byte
• Retentivity available	Yes
• Retentivity preset	MB 0 to MB 15
• Number of clock memories	8; 1 memory byte
Data blocks	
• Number, max.	1 024; Number range: 1 to 16,000
• Size, max.	64 Kibyte
• Retentivity adjustable	Yes; via non-retain property on DB
• Retentivity preset	Yes
Local data	
• per priority class, max.	32 768 byte; 2048 byte max. per block
Address area	
I/O address area	
• Overall	2 048 byte
• Outputs	2 048 byte
• of which, distributed	
- Inputs	2 048 byte
- Outputs	2 048 byte
Process image	
• Inputs, adjustable	2 048 byte
• Outputs, adjustable	2 048 byte
• Inputs, preset	128 byte
• Outputs, preset	128 byte

	6ES7 151-8FB01-0AB0
Subprocess images	
• Number of subprocess images, max.	1; With PROFINET IO, the length of the user data is limited to 1600 byte
Digital channels	
• Inputs	16 336
• Outputs	16 336
• Inputs, of which central	496
• Outputs, of which central	496
Analog channels	
• Inputs	1 021
• Outputs	1 021
• Inputs, of which central	124
• Outputs, of which central	124
Hardware configuration	
Number of mounting rails that can be used	1
Max. length of mounting rail	Station width: <= 1 m or < 2 m
Number of modules per system, max.	63; Centralized
Time	
Clock	
• Hardware clock (real-time clock)	Yes
• Battery-backed and synchronizable	Yes
• Backup time	6 wk; At 40 °C ambient temperature, typically
• Behavior of the clock following POWER-ON	Clock continues running after POWER OFF
• Behavior of the clock following expiry of backup period	Clock continues to run with the time at which the power failure occurred
• Deviation per day, max.	10 s; Typ.: 2 s
Runtime meter	
• Number	1
• Number/Number range	0
• Range of values	0 to 2^31 hours (when using SFC 101)
• Granularity	1 hour
• Retentive	Yes; Must be restarted at each restart
Clock synchronization	
• supported	Yes
• to MPI, master	No
• to MPI, slave	No
• to DP, master	Yes; with DP master module
• to DP, slave	Yes; with DP master module
• in AS, master	No
• in AS, slave	No
• on Ethernet via NTP	Yes; as client
S7 message functions	
Number of login stations for message functions, max.	12; Depending on the configured connections for PG/OP and S7 basic communication
Process diagnostic messages	Yes; ALARM_S, ALARM_SC, ALARM_SQ, ALARM_D, ALARM_DQ
Simultaneously active Alarm-S blocks, max.	300

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Technical specifications (continued)

	6ES7 151-8FB01-0AB0
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 variables, max.	30
• of which control variables, max.	14
Forcing	
• Forcing	Yes
Status block	Yes; up to 2 simultaneously
Single step	Yes
Number of breakpoints	4
Diagnostic buffer	
• Present	Yes
• Number of entries, max.	500
- adjusted	No
- of which powerfail-proof	100; Only the last 100 entries are retained
Monitoring functions	
Status LEDs	Yes
Communication functions	
PG/OP communication	Yes
Data record routing	Yes; with DP master module
Routing	Yes; with DP master module
Global data communication	
• supported	No
S7 basic communication	
• supported	Yes; I blocks
• User data per job, max.	76 byte
• User data per job (of which consistent), max.	76 byte
S7 communication	
• supported	Yes
• as server	Yes
• as client	Yes; via integrated PN interface and loadable FBs
• User data per job, max.	See online help of STEP 7 (shared parameters of the SFBs/FBs and of the SFCs/FCs of S7 Communication)
Web server	
• supported	Yes
• Number of HTTP clients	5
• User-defined websites	Yes
Open IE communication	
• TCP/IP	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.	8
- Data length for connection type 01H, max.	1 460 byte
- Data length for connection type 11H, max.	32 768 byte
- Several passive connections per port, supported	Yes
• ISO-on-TCP (RFC1006)	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.	8
- Data length, max.	32 768 byte

	6ES7 151-8FB01-0AB0
Open IE communication	
• UDP	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.	8
- Data length, max.	1 472 byte
Number of connections	
• overall	12
• usable for PG communication	11
- reserved for PG communication	1
- Adjustable for PG communication, min.	1
• usable for OP communication	11
- reserved for OP communication	1
- adjustable for OP communication, min.	1
• usable for S7 basic communication	10
- Reserved for S7 basic communication	0
- adjustable for S7 basic communication, min.	0
• usable for S7 communication	10; with loadable FBs
- Adjustable for S7 communication, max.	10
• Max. total number of instances	32
• usable for routing	4; max.
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
• Number of device-internal and PROFIBUS interconnections	500
• Data length of device-internal und PROFIBUS interconnections, max.	4 000 byte
• Data length per connection, max.	1 400 byte
• Remote interconnections with acyclic transmission	
- Sampling frequency: Sampling time, 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.	1 ms

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Technical specifications (continued)

	6ES7 151-8FB01-0AB0
• Remote interconnections with cyclic transmission	
- 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 stations that can log on 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
1st interface	
Type of interface	PROFINET
Physics	Ethernet
Isolated	Yes
Integrated switch	Yes
Number of ports	3; RJ45
Automatic detection of transmission speed	Yes
Autonegotiation	Yes
Autocrossing	Yes
Media redundancy	
• supported	Yes
• Switchover time on line break, typically	200 ms; PROFINET MRP
• Number of stations in the ring, max.	50
Change of IP address at runtime, supported	Yes
Functionality	
• MPI	No
• DP master	No
• DP slave	No
• PROFINET IO device	Yes; also simultaneously with IO controller functionality
• PROFINET IO controller	Yes; also simultaneously with IO device functionality
• PROFINET CBA	Yes
• Open IE communication	Yes
• Web server	Yes
- Number of HTTP clients	5
• Point-to-point connection	No
PROFINET IO controller	
• Services	
- PG/OP communication	Yes
- Routing	Yes; with DP master module
- S7 communication	Yes; with loadable FBs

	6ES7 151-8FB01-0AB0
• Services	
- Isochronous mode	Yes; OB 61; only for PROFINET IO
- Open IE communication	Yes; Via TCP/IP, ISO on TCP, and UDP
• Transmission rate, max.	100 Mbit/s; full duplex
• Number of connectable IO devices, max.	128
• Max. number of connectable IO devices for RT	128
- of which in line, max.	128
• Number of IO devices with IRT and the option "high flexibility"	128
- of which in line, max.	61
• Number of IO devices with IRT and the option "high performance", max.	64
- of which in line, max.	64
• IRT, supported	Yes
- Shared device, supported	Yes
• Prioritized startup supported	Yes
- Number of IO devices, max.	32
• Activation/deactivation of IO devices	Yes
- Number of IO devices that can be simultaneously activated/deactivated, max.	8
• IO devices changing during operation (partner ports), supported	Yes
- Max. number of IO devices per tool	8
• Device replacement without swap medium	Yes
• Send cycles	250 µs, 500 µs,1 ms; 2 ms, 4 ms (not in the case of IRT with "high flexibility" option)
• Updating time	Minimum value depends on communication share set for PROFINET I/O, on the number of I/O devices, and on the number of configured user data.
• Updating times	250 µs to 512 ms (depends on operating mode; for more details, refer to Operating Instructions, "Interface Module IM151-8 PN/DP CPU")
• Address area	
- Inputs, max.	2 kbyte
- Outputs, max.	2 kbyte
• User data per address area, max.	
- User data consistency, max.	1 024 byte; with PROFINET I/O
PROFINET IO device	
• Services	
- PG/OP communication	Yes
- Routing	Yes
- S7 communication	Yes; With loadable FBs
- Isochronous mode	No
- Open IE communication	Yes; Via TCP/IP, ISO on TCP, UDP
- IRT, supported	Yes
- PROFIenergy, supported	Yes; With SFB 73 / 74 prepared for loadable PROFIenergy standard FB for I-Device
- Shared device, supported	Yes
- Number of IO controllers with shared device, max.	2

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Technical specifications (continued)

	6ES7 151-8FB01-0AB0
• Transfer memory	
- Inputs, max.	1 440 byte; Per IO controller with shared device
- Outputs, max.	1 440 byte; Per IO controller with shared device
• Submodules	
- Number, max.	64
- User data per submodule, max.	1 024 byte
PROFINET CBA	
• acyclic transmission	Yes
• cyclic transmission	Yes
Open IE communication	
• Open IE communication, supported	Yes; Via TCP/IP, ISO on TCP, and UDP
• Number of connections, max.	8
• Local port numbers used at the system end	0, 20, 21, 23, 25, 80, 102, 135, 161, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535
2nd interface	
Type of interface	External interface via master module 6ES7138-4HA00-0AB0
Physics	RS 485
Isolated	Yes
Power supply to interface (15 to 30 V DC), max.	No
Functionality	
• MPI	No
• DP master	Yes
• DP slave	No
• PROFINET IO controller	No
• PROFINET IO device	No
• PROFINET CBA	No
• Open IE communication	No
• Web server	No
DP master	
• Services	
- PG/OP communication	Yes
- Routing	Yes
- Global data communication	No
- S7 basic communication	Yes; I blocks only
- S7 communication	Yes
- S7 communication, as client	No
- S7 communication, as server	Yes
- Equidistance mode support	Yes
- Isochronous mode	No
- SYNC/FREEZE	Yes
- Activation/deactivation of DP slaves	Yes
- Number of DP slaves that can be simultaneously activated/ deactivated, max.	8
- Direct data exchange (slave-to-slave communication)	Yes
- DPV1	Yes
• Transmission rate, max.	12 Mbit/s
• Number of DP slaves, max.	32; Per station
• Address area	
- Inputs, max.	2 048 byte
- Outputs, max.	2 048 byte

	6ES7 151-8FB01-0AB0
• User data per DP slave	
- Inputs, max.	244 byte
- Outputs, max.	244 byte
Isochronous mode	
Isochronous mode	No
Programming	
Programming language	
• STEP 7	Yes; V5.5 or higher
• LAD	Yes
• FBD	Yes
• STL	Yes
• SCL	Yes; optional
• CFC	Yes; optional
• GRAPH	Yes; optional
• HiGraph®	Yes; optional
Command set	See instruction list
Nesting levels	8
Know-how protection	
• User program protection/ password protection	Yes
• Block encryption	Yes; with S7 block Privacy
System functions (SFC)	See instruction list
System function blocks (SFB)	See instruction list
Alarms/diagnostics/status information	
Alarms	
• Alarms	Yes
Diagnostics	
• Diagnostic functions	Yes
Diagnostic indication LED	
• Bus activity PROFINET P1-LINK (green)	Yes
• Bus activity PROFINET P2-LINK (green)	Yes
• Bus activity PROFINET P3-LINK (green)	Yes
• Bus error (red)	Yes
• Maintenance information MT (yellow)	Yes
• Group error SF (red)	Yes
• Monitoring 24 V voltage supply ON (green)	Yes
Isolation	
Isolation checked with	500 V DC
Galvanic isolation	
between PROFIBUS DP and all other circuit components	Yes
Permissible potential difference	
between different circuits	75 V DC / 60 V AC
Dimensions and weight	
Dimensions	
• Width	120 mm; DP master module: 35 mm
• Height	119.5 mm
• Depth	75 mm
Weight	
• Weight, approx.	320 g; DP master module: approx. 100 g

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Technical specifications (continued)

	6ES7 151-8FB00-0AB0
Product type designation	IM151-8F PN/DP
Product version	
Associated programming package	STEP7 V 5.4 SP4 or higher, Distributed Safety V5.4 SP4 or higher
Supply voltages	
Rated value	
• permissible range, lower limit (DC)	20.4 V
External protection for supply cables (recommendation)	24 V DC/16 A miniature circuit breaker with type B and C tripping characteristics. Note: The 24 V DC/16 A miniature circuit breaker with type B tripping characteristics trips before the device protection fuse. The 24 V DC/16 A miniature circuit breaker with type C tripping characteristics trips
Mains buffering	
• Mains/voltage failure stored energy time	5 ms
Current consumption	
Inrush current, max.	1.8 A; typ.
I^2t	0.21 $A^2 \cdot s$
Current output to backplane bus (DC 5 V), max.	700 mA
from supply voltage 1L+, max.	380 mA; 460 mA with DP master module
Power losses	
Power loss, typ.	5.5 W
Memory	
Work memory	
• integrated	192 Kibyte; For program and data
• expandable	No
• Size of retentive memory for retentive data blocks	64 kbyte
Load memory	
• pluggable (MMC)	Yes
• pluggable (MMC), max.	8 Mbyte
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.	511; Number range: 1 to 511
• Size, max.	64 Kibyte
FB	
• Number, max.	1 024; Number range: 0 to 2047
• Size, max.	64 Kibyte
FC	
• Number, max.	1 024; Number range: 0 to 2047
• Size, max.	64 Kibyte
OB	
• Size, max.	64 Kibyte
Nesting depth	
• per priority class	16
• additional within an error OB	4

	6ES7 151-8FB00-0AB0
CPU processing times	
for bit operations, min.	0.1 µs
for word operations, min.	0.2 µs
for fixed point arithmetic, min.	2 µs
for floating point arithmetic, min.	3 µs
Counters, timers and their retentivity	
S7 counter	
• Number	256
• Retentivity	
- adjusted	Yes
- lower limit	0
- upper limit	255
- preset	Z 0 to Z 7
• Counting range	
- adjusted	Yes
- lower limit	0
- upper limit	999
IEC counter	
• Type	SFB
• Number	Unlimited (limited only by RAM capacity)
S7 times	
• Number	256
• Retentivity	
- adjusted	Yes
- lower limit	0
- upper limit	255
- preset	No retentivity
• Time range	
- lower limit	10 ms
- upper limit	9 990 s
IEC timer	
• Type	SFB
• Number	Unlimited (limited only by RAM capacity)
Data areas and their retentivity	
Flag	
• Number, max.	256 byte
• Retentivity available	Yes
• Retentivity 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.	64 Kibyte
• Retentivity adjustable	Yes; via non-retain property on DB
• Retentivity preset	Yes
Local data	
• per priority class, max.	510 byte; per priority class
Address area	
I/O address area	
• Overall	2 048 byte
• Outputs	2 048 byte
• of which, distributed	
- Inputs	2 048 byte
- Outputs	2 048 byte

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Technical specifications (continued)

	6ES7 151-8FB00-0AB0
Process image	
• Inputs, adjustable	2 048 byte
• Outputs, adjustable	2 048 byte
• Inputs, preset	128 byte
• Outputs, preset	128 byte
Subprocess images	
• Number of subprocess images, max.	None
Digital channels	
• Inputs	16 336
• Outputs	16 336
• Inputs, of which central	496
• Outputs, of which central	496
Analog channels	
• Inputs	1 021
• Outputs	1 021
• Inputs, of which central	124
• Outputs, of which central	124
Hardware configuration	
Number of mounting rails that can be used	1
Max. length of mounting rail	Station width: <= 1 m or < 2 m
Number of modules per system, max.	63; Centralized
Time	
Clock	
• Hardware clock (real-time clock)	Yes
• Battery-backed and synchronizable	Yes
• Backup time	6 wk; At 40 °C ambient temperature, typically
• Behavior of the clock following expiry of backup period	Clock continues to run with the time at which the power failure occurred
• Deviation per day, max.	10 s
Runtime meter	
• Number	1
• Number/Number range	0
• Range of values	0 to 2^31 hours (when using SFC 101)
• Granularity	1 hour
• Retentive	Yes; must be restarted at each restart
Clock synchronization	
• supported	Yes
• to MPI, master	No
• to MPI, slave	No
• to DP, master	Yes; with DP master module
• to DP, slave	Yes; with DP master module
• in AS, master	No
• in AS, slave	No
• on Ethernet via NTP	Yes; as client
S7 message functions	
Number of login stations for message functions, max.	12; depending on the configured connections for PG/OP and S7 basic communication
Process diagnostic messages	Yes; ALARM_S, ALARM_SC, ALARM_SQ, ALARM_D, ALARM_DQ
Simultaneously active Alarm-S blocks, max.	300

	6ES7 151-8FB00-0AB0
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 variables, max.	30
• of which control variables, max.	14
Forcing	
• Forcing	Yes
Status block	Yes
Single step	Yes
Number of breakpoints	2
Diagnostic buffer	
• Present	Yes
• Number of entries, max.	500
- adjusted	No
- of which powerfail-proof	100; only the last 100 entries are retained
Communication functions	
PG/OP communication	Yes
Data record routing	Yes; with DP master module
Routing	Yes; with DP master module
Global data communication	
• supported	No
S7 basic communication	
• supported	Yes; I blocks
• User data per job, max.	76 byte
• User data per job (of which consistent), max.	76 byte
S7 communication	
• supported	Yes
• as server	Yes
• as client	Yes; via integrated PN interface and loadable FBs
• User data per job, max.	180 byte
• User data per job (of which consistent), max.	64 byte
S5-compatible communication	
• supported	No
Standard communication (FMS)	
• supported	No
Web server	
• supported	Yes
• Number of HTTP clients	5
Open IE communication	
• TCP/IP	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.	8
- Data length for connection type 01H, max.	1 460 byte
- Data length for connection type 11H, max.	8 192 byte
• ISO-on-TCP (RFC1006)	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.	8
- Data length, max.	8 192 byte

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Technical specifications (continued)

	6ES7 151-8FB00-0AB0
• UDP	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.	8
- Data length, max.	1 472 byte
Number of connections	
• overall	12
• usable for PG communication	11
- reserved for PG communication	1
- Adjustable for PG communication, min.	1
• usable for OP communication	11
- reserved for OP communication	1
- adjustable for OP communication, min.	1
• usable for S7 basic communication	10
- Reserved for S7 basic communication	0
- adjustable for S7 basic communication, min.	0
• usable for S7 communication	10; with loadable FBs
- Adjustable for S7 communication, max.	10
• max. total number of instances	32
• usable for routing	4; with DP master module
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
• Number of device-internal and PROFIBUS interconnections	500
• Data length of device-internal und PROFIBUS interconnections, max.	4 000 byte
• Data length per connection, max.	1 400 byte
• Remote interconnections with acyclic transmission	
- Sampling frequency: Sampling time, 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.	1 ms

	6ES7 151-8FB00-0AB0
• Remote interconnections with cyclic transmission	
- 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.	250 byte
• HMI variables via PROFINET (acyclic)	
- Number of stations that can log on 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
1st interface	
Type of interface	PROFINET
Physics	Ethernet
Isolated	Yes
Integrated switch	Yes
Number of ports	3; RJ45
Automatic detection of transmission speed	Yes
Autonegotiation	Yes
Autocrossing	Yes
Functionality	
• MPI	No
• DP master	No
• DP slave	No
• PROFINET IO device	No
• PROFINET IO controller	Yes
• PROFINET CBA	Yes
• Open IE communication	Yes
• Web server	
- Number of HTTP clients	5
• Point-to-point connection	No
PROFINET IO controller	
• Services	
- PG/OP communication	Yes
- Routing	Yes; with DP master module
- S7 communication	Yes; with loadable FBs
- Isochronous mode	No
- Open IE communication	Yes; via TCP/IP, ISO on TCP, and UDP
• Transmission rate, max.	100 Mbit/s; full duplex
• Number of connectable IO devices, max.	128
• Max. number of connectable IO devices for RT	128
- of which in line, max.	128

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Technical specifications (continued)

	6ES7 151-8FB00-0AB0
PROFINET IO controller	
• Number of IO devices with IRT and the option "high flexibility"	128
- of which in line, max.	61
• IRT, supported	Yes
• Prioritized startup supported	Yes
- Number of IO devices, max.	32
• Activation/deactivation of IO devices	Yes
- Number of IO devices that can be simultaneously activated/ deactivated, max.	8
• IO devices changing during operation (partner ports), supported	Yes
- Max. number of IO devices per tool	8
• Device replacement without swap medium	Yes
• Send cycles	Adjustable: 250 µs, 500 µs and 1 ms
• Updating time	Minimum value depends on communication share set for PROFINET I/O, on the number of I/O devices, and on the number of configured user data units.
• Updating times	250 µs - 128 ms (at signal cycle 250 µs); 500µs - 256 ms (at signal cycle 500 µs); 1 ms - 512 ms (at signal cycle 1 ms)
• Address area	
- Inputs, max.	2 kbyte
- Outputs, max.	2 kbyte
• User data per address area, max.	
- User data consistency, max.	254 byte; with PROFINET I/O
PROFINET CBA	
• acyclic transmission	Yes
• cyclic transmission	Yes
Open IE communication	
• Open IE communication, supported	Yes; Via TCP/IP, ISO on TCP, and UDP
• Number of connections, max.	8
• Local port numbers used at the system end	0, 20, 21, 23, 25, 80, 102, 135, 161, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535
2nd interface	
Type of interface	External interface via master module 6ES7138-4HA00-0AB0
Physics	RS 485
Isolated	Yes
Power supply to interface (15 to 30 V DC), max.	No
Functionality	
• MPI	No
• DP master	Yes
• DP slave	No
• PROFINET IO controller	No
• PROFINET IO device	No
• PROFINET CBA	No
• Open IE communication	No
• Web server	No
• Local Operating Network	No

	6ES7 151-8FB00-0AB0
DP master	
• Number of connections, max.	12; Notice: 12 connections per CPU, not per interface
• Services	
- PG/OP communication	Yes
- Routing	Yes
- Global data communication	No
- S7 basic communication	Yes; I blocks only
- S7 communication	Yes
- S7 communication, as client	No
- S7 communication, as server	Yes
- Equidistance mode support	Yes
- Isochronous mode	No
- SYNC/FREEZE	Yes
- Activation/deactivation of DP slaves	Yes
- Direct data exchange (slave-to-slave communication)	Yes
- DPV1	Yes
• Transmission rate, max.	12 Mbit/s
• Number of DP slaves, max.	32; Per station
• Address area	
- Inputs, max.	2 048 byte
- Outputs, max.	2 048 byte
• User data per DP slave	
- Inputs, max.	244 byte
- Outputs, max.	244 byte
Isochronous mode	
Isochronous mode	No
Programming	
Programming language	
• STEP 7	Yes; V5.4 SP4
• LAD	Yes
• FBD	Yes
• STL	Yes
• SCL	Yes; optional
• CFC	Yes; optional
• GRAPH	Yes; optional
• HiGraph®	Yes; optional
Command set	See instruction list
Nesting levels	8
Know-how protection	
• User program protection/ password protection	Yes
System functions (SFC)	See instruction list
System function blocks (SFB)	See instruction list
Alarms/diagnostics/status information	
Alarms	
• Alarms	Yes
Diagnostics	
• Diagnostic functions	Yes

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Technical specifications (continued)

	6ES7 151-8FB00-0AB0
Diagnostic indication LED	
• Bus activity PROFINET P1-LINK (green)	Yes
• Bus activity PROFINET P2-LINK (green)	Yes
• Bus activity PROFINET P3-LINK (green)	Yes
• Bus error (red)	Yes
• Maintenance information MT (yellow)	Yes
• Group error SF (red)	Yes
• Monitoring 24 V voltage supply ON (green)	Yes
Isolation	
Isolation checked with	500 V DC

	6ES7 151-8FB00-0AB0
Galvanic isolation	
between load voltage and all other switching components	Yes
between PROFIBUS DP and all other circuit components	Yes
Permissible potential difference	
between different circuits	75 V DC / 60 V AC
Dimensions and weight	
Dimensions	
• Width	120 mm; DP master module: 35 mm
• Height	119.5 mm
• Depth	75 mm
Weight	
• Weight, approx.	320 g; DP master module: approx. 100 g

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Interface modules with fail-safe CPU IM 151-8 F PN/DP CPU

Ordering data	Order No.
IM 151-8F PN/DP CPU interface module (256 K) Including termination module	**6ES7 151-8FB01-0AB0**
Distributed Safety V5.4 programming tool Task: Software for configuring fail-safe application programs for SIMATIC S7-300F, S7-400F, ET 200S Requirements: STEP 7 V5.3 SP3 and higher	
Floating license	**6ES7 833-1FC02-0YA5**
Software Update Service	**6ES7 833-1FC00-0YX2**
Distributed Safety Upgrade From V5.3 to V5.4; Floating license for 1 user	**6ES7 833-1FC02-0YE5**
Accessories	
MMC 64 KB [1] for program backup	**6ES7 953-8LF20-0AA0**
MMC 128 KB [1] for program backup	**6ES7 953-8LG20-0AA0**
MMC 512 KB [1] for program backup	**6ES7 953-8LJ20-0AA0**
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 e.g. for MMC with USB interface	**6ES7 792-0AA00-0XA0**
PG with integrated MMC interface	On request

	Order No.
Label sheets DIN A4 (10 units) Each sheet contains 60 labeling strips for I/O modules and 20 labeling strips for interface modules	
• petrol	**6ES7 193-4BH00-0AA0**
• red	**6ES7 193-4BD00-0AA0**
• yellow	**6ES7 193-4BB00-0AA0**
• light beige	**6ES7 193-4BA00-0AA0**
ET 200S distributed I/O system manuals are available on the Internet as PDF files: www.siemens.com/simatic-docu	
Termination module as spare part for ET 200S	**6ES7 193-4JA00-0AA0**
SIMATIC S5, 35 mm DIN rail	
• Length: 483 mm for 19" cabinets	**6ES5 710-8MA11**
• Length: 530 mm for 600 mm cabinets	**6ES5 710-8MA21**
• Length: 830 mm for 900 mm cabinets	**6ES5 710-8MA31**
• 2 m long	**6ES5 710-8MA41**
Industrial Ethernet 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 unit	**6GK1 901-1BB10-2AA0**
• 10 units	**6GK1 901-1BB10-2AB0**
• 50 units	**6GK1 901-1BB10-2AE0**
Industrial Ethernet FastConnect installation cables	
• Fast Connect standard cable	**6XV1 840-2AH10**
• Fast Connect trailing cable	**6XV1 840-3AH10**
• Fast Connect marine cable	**6XV1 840-4AH10**
Industrial Ethernet FastConnect stripping tool	**6GK1 901-1GA00**

[1] An MMC is essential for operating the CPU

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Overview



- Interface module with integrated fail-safe CPU for SIMATIC ET 200S
- With DP/MPI interface
- For configuring a fail-safe automation system for plants with increased safety requirements
- Complies with safety requirements up to SIL 3 according to IEC 61508, IEC 62061 and Cat. 4 according to EN 954-1
- Fail-safe I/O modules can be connected in a distributed configuration through DP master modules (PROFIsafe)
- The fail-safe I/O modules of ET 200S PROFIsafe can be connected in a centralized configuration
- Standard modules can be used for non-safety-relevant applications

Note: Micro Memory Card required for operation of CPU.

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

	SIPLUS IM 151-7 F CPU Standard interface module
Order No.	**6AG1 151-7FA20-2AB0**
Order No. based on	**6ES7 151-7FA20-0AB0**
Ambient temperature range	-25 ... +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical specifications	The technical data of the standard product applies except for the ambient conditions.
Ambient conditions	
Relative humidity	5 ... 100%, condensation allowed

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

Ordering data

	Order No.
SIPLUS IM 151-7 F CPU interface module I (extended temperature range and medial exposure) For configuring a fail-safe automation system	**6AG1 151-7FA20-2AB0**
Accessories	See SIMATIC IM151-7 F CPU interface module, page 9/31

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

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SIPLUS interface modules with fail-safe CPU
SIPLUS IM 151-8 F PN/DP CPU

Overview



- Interface module for SIPLUS ET 200S with integrated CPU S7-314
- For high-performance control solutions in ET 200S
- Increase in the availability of systems and machines
- PROFINET IO-Controller for up to 128 IO-Devices
- PROFINET I-Device for connecting the CPU as an intelligent PROFINET device with a SIMATIC or third-party PROFINET I/O-Controller
- PROFINET interface with integrated 3-port switch
- Isochronous mode on PROFINET
- With many communication options: PG/OP communication, PROFINET IO, PROFINET CBA, open IE communication (TCP, ISO-on-TCP and UDP), Web server and S7 communication (with loadable FBs)
- Fast, simple and uniform programming of a system with modular programs via STEP 7
- Compact SIMATIC micro memory card (MMC)
- Optional PROFIBUS master for 32 PROFIBUS DP slaves (with master interface 6ES7138-4HA00-0AB0)
- Fail-safe IM 151-8F PN/DP CPU PROFIsafe available

SIMATIC Micro Memory Card required for operation of the CPU.

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS IM 151-8 F PN/DP CPU	
Order No.	**6AG1 151-8FB00-2AB0**
Order No. based on	**6ES7 151-8FB00-0AB0**
Ambient temperature range	-25 ... +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions.
Ambient conditions:	
Relative humidity	5 … 100% Condensation permissible

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

Ordering data

	Order No.
Interface module SIPLUS IM 151-8F PN/DP CPU I (extended temperature range and medial exposure) Including termination module	**6AG1 151-8FB00-2AB0**
Accessories	See SIMATIC IM 151-8F PN/DP CPU interface module, page 9/42

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

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Overview



- Interface module for linking the ET 200S to PROFIBUS DP
- Handles all data exchange with the PROFIBUS DP master
- 6 versions:
  - IM151-1 BASIC (RS485)
  - IM151-1 COMPACT 32DI DC24V (RS485)
  - IM151-1 COMPACT 16DI DC24V / 16DO DC24V/0.5A (RS485)
  - IM151-1 STANDARD (RS485)
  - IM151-1 STANDARD (FO)
  - IM151-1 HIGH FEATURE (RS485)
- Delivery including connection module

The main differences between the IM151-1 versions:

	IM151-1 BASIC	IM151-1 COMPACT	IM151-1 STANDARD	IM151-1 FO STANDARD	IM151-1 HIGH FEATURE
Order number 6ES7 151-	1CA00-0AB0	1CA00-1BL00 1CA00-3BL00	1AA05-0AB0	1AB05-0AB0	1BA02-0AB0
Integral I/O	-	32 DI 16DI / 16 DO	-	-	-
Maximal number of I/O modules	12	12	63	63	63
Maximum station width	2 m	2 m	2 m	1 m	2 m
Maximal number of parameters	198 byte	218 byte	244 byte	244 byte	244 byte
Maximum address space for inputs and outputs	88 byte each	100 byte each	244 byte	128 byte	Depending on the DP master: 244 byte or not relevant
Maximum diagnostic length	6 to 43 byte	6 to 44 byte	6 to 122 byte	6 to 64 byte	6 to 128 byte
Protocol	DP V0	DP V0	DP V0 and DP V1	DP V0	DP V0 and DP V1
DP connection type	RS485	RS485	RS485	Fiber-optic cable	RS485
Firmware update	No	No	Yes	No	Yes
Option handling	No	No	Yes	Yes	Yes
Isochronous mode	No	No	No	No	Yes
Maximum address volume per module	8 byte	8 byte	32 byte	8 byte	32 byte
Identification data	No	No	Yes	No	Yes
Use of fail-safe modules (PROFIsafe)	No	No	No	No	Yes
I-slave-to-slave communication	No	No	No	No	Yes

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Technical specifications

	6ES7 151-1AA05-0AB0	6ES7 151-1AB05-0AB0	6ES7 151-1BA02-0AB0	6ES7 151-1CA00-0AB0
Supply voltages				
Supply voltage of electronics 1L+				
• Rated value (DC)	24 V	24 V	24 V	24 V
• Reverse polarity protection	Yes	Yes	Yes	Yes
Mains buffering, min.	20 ms	20 ms	20 ms	No
Current consumption				
Current output to backplane bus (5 V DC), max.		700 mA		
from supply voltage 1L+, max.	200 mA	200 mA	200 mA	70 mA
Power losses				
Power loss, typ.	3.3 W	3.3 W	3.3 W	1.5 W
Address area				
Addressing volume				
• Outputs	244 byte	244 byte	244 byte	88 byte
• Inputs	244 byte	244 byte	244 byte	88 byte
Interfaces				
PROFIBUS DP, output current, max.	80 mA			80 mA
Interface physics, RS 485	Yes; 9-pin sub D socket		Yes	Yes; 9-pin sub D socket
Interface physics, FOC		Yes; 4x Simplex socket		
Protocols				
PROFIBUS DP protocol	Yes	Yes	Yes	Yes
PROFIBUS DP				
Transmission rate, max.	12 Mbit/s; 9.6 /19.2 / 45.45 / 93.75 / 187.5 / 500 Kbit/s; 1.5 / 3 / 6 / 12 Mbit/s	12 Mbit/s; 9.6 /19.2 / 45.45 / 93.75 / 187.5 / 500 Kbit/s; 1.5 / 12 Mbit/s	12 Mbit/s	12 Mbit/s; 9.6 /19.2 /45.45 / 93.75 /187.5 / 500 Kbit/s; 1.5 / 3 / 6 / 12 Mbit/s
Cable length, max.	1 200 m	2 m		
SYNC capability	Yes	Yes	Yes	Yes
FREECE capability	Yes	Yes	Yes	Yes
Direct data exchange (slave-to-slave communication)	Yes	Yes	Yes	Yes
Isochronous mode				
Isochronous mode	No	No	Yes	No
Alarms/diagnostics/status information				
Alarms				
• Alarms	Yes	Yes	Yes	No
Diagnostics				
• Diagnostic functions	Yes	Yes	Yes	Yes
Diagnostic indication LED				
• Bus fault BF (red)	Yes	Yes	Yes	Yes
• Group error SF (red)	Yes	Yes	Yes	Yes
• Monitoring 24 V voltage supply ON (green)	Yes	Yes	Yes	Yes
Isolation				
Isolation checked with	500 V DC	57 V DC / 60 V AC	500 V DC	500 V DC
Galvanic isolation				
between backplane bus and electronics	No	No	No	No
between electronic block and PROFIBUS DP	Yes		Yes	Yes
between supply voltage and electronics	No	No	No	No

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Technical specifications (continued)

	6ES7 151-1AA05-0AB0	6ES7 151-1AB05-0AB0	6ES7 151-1BA02-0AB0	6ES7 151-1CA00-0AB0
Permissible potential difference				
between different circuits	75 V DC / 60 V AC	500 V DC	75 V DC / 60 V AC	75 V DC / 60 V AC
General information				
Vendor identification (VendorID)	806Ah	806Bh		80F3h
Dimensions and weight				
Dimensions				
• Width	45 mm	45 mm	45 mm	45 mm
• Height	119.5 mm	119.5 mm	119.5 mm	119.5 mm
• Depth	75 mm	75 mm	75 mm	75 mm
Weight				
• Weight, approx.	150 g	150 g	150 g	150 g

	6ES7 151-1CA00-1BL0	6ES7 151-1CA00-3BL0
Supply voltages		
Supply voltage of electronics 1L+		
• Rated value (DC)	24 V	24 V
• Reverse polarity protection	Yes	Yes
Current consumption		
from supply voltage 1L+, max.	100 mA; 100	100 mA
Address area		
Addressing volume		
• Outputs	100 byte	100 byte
• Inputs	100 byte	100 byte
Interfaces		
PROFIBUS DP, output current, max.		80 mA
Interface physics, RS 485	Yes	Yes
Interface physics, FOC	No	No
Connection method		
Inputs/outputs		Screw-type and spring-loaded terminals, permanent wiring; 3 and 4-wire connection
Protocols		
PROFIBUS DP protocol	Yes	Yes
TCP/IP protocol		No
PROFINET IO		No
PROFIBUS DP		
Transmission procedure	RS 485	RS 485
Cable length, max.	1 200 m	1 200 m
Direct data exchange (slave-to-slave communication)	Yes	Yes
PROFINET IO		
Transmission rate, max.		12 Mbit/s
Isochronous mode		
Isochronous mode	No	No
Digital inputs		
Quantity/binary inputs	32	16
Input voltage		
• Rated value, DC	24 V	24 V
• for signal "0"	-30 to +5 V	-30 to +5 V
• for signal "1"	13 to 30 V	13 to 30 V
Input current		
• for signal "1", typ.	4 mA; at 24 V min. 2 mA	3 mA

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Technical specifications (continued)

	6ES7 151-1CA00-1BL0	6ES7 151-1CA00-3BL0
Input delay (for rated value of input voltage)		
• for standard inputs		
- at "0" to "1", min.	3 ms	3 ms
- at "0" to "1", max.	3 ms	3 ms
Cable length		
• Cable length unshielded, max.	1 000 m	1 000 m
Digital outputs		
Quantity/binary outputs	0	16
Functionality/short-circuit strength		Yes
Limitation of inductive shutdown voltage to		L+ (-55 to -60 V)
Lamp load, max.		5 W
Controlling a digital input		Yes
Output current		
• for signal "1" permissible range for 0 to 60 °C, min.		7 mA
• for signal "0" residual current, max.		0.5 mA
Output delay with resistive load		
• 0 to "1", max.		0.5 ms
• 1 to "0", max.		1.3 ms
Switching frequency		
• with resistive load, max.		100 Hz
• with inductive load, max.		2 Hz
• on lamp load, max.		10 Hz
Aggregate current of outputs (per group)		
• up to 60 °C, max.		2 A
Cable length		
• Cable length unshielded, max.		1 000 m
Encoder		
Connectable encoders		
• 2-wire BEROS		Yes
- permissible quiescent current (2-wire BEROS), max.		1.5 mA
Alarms/diagnostics/status information		
Alarms		
• Alarms	No	No
Diagnostics		
• Diagnostic functions	Yes	Yes
Diagnostic indication LED		
• Run mode RUN (green)		Yes
• Group error SF (red)	Yes	Yes
• Status indicator digital output (green)		Yes
• Status indicator digital input (green)		Yes
• Monitoring 24 V voltage supply ON (green)	Yes	Yes
• Connection to network LINK (green)		No
• Transmit/receive RX/TX (yellow)		No
Isolation		
Isolation checked with	500 V DC	500 V DC
Galvanic isolation		
between backplane bus and electronics		No
between supply voltage and electronics		No
Galvanic isolation digital inputs		
• Galvanic isolation digital inputs		No
Galvanic isolation digital outputs		
• Galvanic isolation digital outputs		Yes

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Technical specifications (continued)

	6ES7 151-1CA00-1BL0	6ES7 151-1CA00-3BL0
Degree of protection		
IP20	Yes	Yes
General information		
Vendor identification (VendorID)		8200H
Dimensions and weight		
Dimensions and weight		
• Width	120 mm	120 mm
• Height	81 mm	81 mm
• Depth	758 mm; 58	58 mm
Weight		
• Weight, approx.		230 g; EB only

Ordering data

	Order No.
IM 151-1 BASIC interface module for ET 200S; transfer rates up to 12 Mbit/s; max. 12 power, electronic and motor start modules can be connected; bus connection via 9-pin sub D incl. termination module	**6ES7 151-1CA00-0AB0**
IM 151-1 COMPACT 32 DI 24 V DC interface module for ET 200S; transfer rates up to 12 Mbit/s; max. 32 digital inputs, can be expanded by max. 12 power, electronic and motor start modules; bus connection via 9-pin sub D incl. termination module	**6ES7 151-1CA00-1BL0**
IM 151-1 COMPACT 16 DI 24 V DC / 16 DO 24 V/0.5 A interface module for ET 200S; transfer rates up to 12 Mbit/s; max. 16 digital inputs and 16 digital outputs, can be expanded by max. 12 power, electronic and motor start modules; bus connection via 9-pin sub D incl. termination module	**6ES7 151-1CA00-3BL0**
IM 151-1 STANDARD interface module for ET 200S; transfer rates up to 12 Mbit/s; data volumes 244 byte each for inputs and outputs, max. 63 power, electronic and motor start modules can be connected; bus connection via 9-pin sub D incl. termination module	**6ES7 151-1AA05-0AB0**
IM 151-1 FO STANDARD interface module I for ET 200S, transfer rates up to 12 Mbit/s; data volumes 244 byte each for inputs and outputs; max. 63 power, electronic and starter modules can be connected; bus connection via integrated fiber-optic cable incl. termination module	**6ES7 151-1AB05-0AB0**

	Order No.
IM 151-1 HIGH FEATURE interface module for ET 200S; transfer rate up to 12 Mbit/s; data volumes 244 byte each for I/O, up to 63 modules can be connected; connection of PROFIsafe modules, isochronous mode; bus connection via 9-pin sub D incl. termination module	**6ES7 151-1BA02-0AB0**
Accessories	
TM-C120S terminal module Terminal module for ET 200S COMPACT, screw-type terminals	**6ES7 193-4DL10-0AA0**
TM-C120C terminal module Terminal module for ET 200S COMPACT, spring-loaded terminals	**6ES7 193-4DL00-0AA0**
TE-U120S4x10 add-on terminal Add-on terminal for TM-C120x terminal modules of ET 200S COMPACT; screw-type terminals for 3-wire connection; please order two for 4-wire connection Can also be attached to TM-E/ TM-P, provided at least 120 mm of the construction width attains the same overall height as the terminal module	**6ES7 193-4FL10-0AA0**
TE-U120C4x10 add-on terminal Add-on terminal for TM-C120x terminal modules of ET 200S COMPACT; spring-loaded terminals for 3-wire connection; please order two for 4-wire connection Can also be attached to TM-E/ TM-P, provided at least 120 mm of the construction width attains the same overall height as the terminal module	**6ES7 193-4FL00-0AA0**
ET 200S distributed I/O system manuals are available on the Internet as PDF files: www.siemens.com/simatic-docu	

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

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Interface modules without CPU
IM 151-1

Ordering data

		Order No.
SIMATIC Manual Collection	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multi-language: S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication)		
SIMATIC Manual Collection – Update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates		
PROFIBUS DP bus connector RS 485		
With 90° cable outlet for FastConnect connection system, max. transfer rate 12 Mbit/s		
Without PG interface		
• 1 unit		**6ES7 972-0BA52-0XA0**
• 100 units		**6ES7 972-0BA52-0XB0**
With PG interface		
• 1 unit		**6ES7 972-0BB52-0XA0**
• 100 units		**6ES7 972-0BB52-0XB0**
100 Simplex connectors	I	**6GK1 901-0FB00-0AA0**
For plastic fiber-optic cable incl. 5 polishing sets		
50 plug adapters		**6ES7 195-1BE00-0XA0**
For 2 Simplex connectors each		

	Order No.
Label sheets DIN A4 (10 units)	
Each sheet contains 60 labeling strips for I/O modules and 20 labeling strips for interface modules	
• petrol	**6ES7 193-4BH00-0AA0**
• red	**6ES7 193-4BD00-0AA0**
• yellow	**6ES7 193-4BB00-0AA0**
• light beige	**6ES7 193-4BA00-0AA0**
Label sheets DIN A4 (10 units)	
Can be used for ET 200S COMPACT. Each sheet has 10 labeling strips	
• beige	**6ES7 193-4BA10-0AA0**
• yellow	**6ES7 193-4BB10-0AA0**
• red	**6ES7 193-4BD10-0AA0**
• petrol	**6ES7 193-4BH10-0AA0**
Termination module	**6ES7 193-4JA00-0AA0**
as spare part for ET 200S	
Power supply connector	
Spare part; for connecting the 24 V DC supply voltage	
• with push-in terminals	**6ES7 193-4JB00-0AA0**
• with screw-type terminals	**6ES7 193-4JB50-0AA0**
SIMATIC S5, 35 mm DIN rail	
• Length: 483 mm for 19" cabinets	**6ES5 710-8MA11**
• Length: 530 mm for 600 mm cabinets	**6ES5 710-8MA21**
• Length: 830 mm for 900 mm cabinets	**6ES5 710-8MA31**
• Length: 2 m	**6ES5 710-8MA41**

D: Subject to export regulations AL: N and ECCN: 5D992
I: Subject to export regulations AL: N and ECCN: EAR99H
J: Subject to export regulations AL: N and ECCN: EAR99S

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Overview



- Interface module for linking the ET 200S to PROFINET
- Handles all data exchange with the PROFINET I/O Controller
- 3 versions:
  - IM151-3 PN STANDARD
  - IM151-3 PN HIGH FEATURE and IM 151-3 PN FO: supports, in contrast to the STANDARD version, the operation of PROFIsafe F modules
- with integrated 2-port switch for line topology
- Delivery including termination module

Note:
Micro Memory Card required for operation depending on the configuration.

Technical specifications

	6ES7 151-3AA23-0AB0	6ES7 151-3BA23-0AB0
Supply voltages		
Supply voltage of electronics 1L+		
• Rated value (DC)	24 V	24 V
• Reverse polarity protection	Yes	Yes
Mains/voltage failure jumpering, min.	20 ms	20 ms
Current consumption		
from supply voltage 1L+, max.	250 mA	250 mA
Current consumption/power loss		
Power loss, typ.	2.5 W	2.5 W
Address area		
Adressing volume		
• Outputs	256 byte	256 byte
• Inputs	256 byte	256 byte
Interfaces		
Automatic detection of transmission speed	Yes	Yes
Connection point		
RJ45	Yes	Yes
Protocols		
PROFINET IO	Yes	Yes
PROFINET IO		
Transmission speed, max.	100 MBit/s	100 MBit/s
Isochronous mode		
Isochronouos mode	Yes	Yes
Status information/alarms/diagnostics		
Alarms		
• Alarms	Yes	Yes
Diagnostics		
• Diagnostic functions	Yes	Yes
Diagnostic indication LED		
• Bus error BF (red)	Yes	Yes
• Collective error SF (red)	Yes	Yes
• Monitoring 24 V voltage supply ON (green)	Yes	Yes
• Connection to network LINK (green)	Yes	Yes
• Maintenance (yellow)	Yes	Yes

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Technical specifications (continued)

	6ES7 151-3AA23-0AB0	6ES7 151-3BA23-0AB0
Galvanic isolation		
between backplane bus and electronics	No	No
between supply voltage and electronics	No	No
between Ethernet and electronics	Yes	Yes
General information		
Vendor identification (VendorID)	002AH	002AH
Device identifier (DeviceID)	0301	0301H
Dimensions		
Dimensions		
• Width	60 mm	60 mm
• Height	119.5 mm	119.5 mm
• Depth	75 mm	75 mm
Weights		
• Weight, approx.	120 g	135 g

Ordering data

	Order No.
IM 151-3 PN interface module	
For ET 200S; transfer rates up to 100 Mbit/s; data volume depends on the number of modules inserted, up to 63 modules can be connected, bus connection through RJ45	**6ES7 151-3AA23-0AB0**
IM 151-3 PN PROFINET High Feature interface module	
for ET 200S; transfer rate up to 100 Mbit/s; max. 63 modules up to 2 m wide can be connected; bus connection via RJ45, incl. termination module	**6ES7 151-3BA23-0AB0**
IM 151-3 FO interface module	**6ES7 151-3BB23-0AB0**
for ET 200S; with 2 PROFINET FO-interfaces and integrated 2-port switch, max. 63 modules up to 2 m wide can be connected, incl. termination module	
Accessories	
Industrial Ethernet FC RJ45 Plug 90	
RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 90° cable outlet	
1 unit	**6GK1 901-1BB20-2AA0**
10 units	**6GK1 901-1BB20-2AB0**
50 units	**6GK1 901-1BB20-2AE0**
Industrial Ethernet FastConnect installation cables	
Fast Connect standard cable	**6XV1 840-2AH10**
Fast Connect trailing cable	**6XV1 840-3AH10**
Fast Connect marine cable	**6XV1 840-4AH10**

	Order No.
Termination Kits	
SC RJ POF Plug Assembly case for on-site assembly of SC RJ plugs consisting of stripping tool, kevlar cutter, microscope, abrasive paper, grinding support	**6GK1 900-0ML00-0AA0**
IE SC RJ POF Plug Screw-in plug for on-site assembly to POF fiber optic cable (1 pack = 20 units)	**6GK1 900-0MB00-0AC0**
IE SC RJ Refill Set POF Refill set for Termination Kit SC RJ POF Plug, consisting of abrasive paper and grinding plate (set of 5)	**6GK1 900-0MN00-0AA0**
SC RJ POF Plug Assembly case for on-site assembly of SC RJ plugs consisting of stripping tool, buffer stripping tool, kevlar cutter, fiber breaking tool, microscope	**6GK1 900-0NL00-0AA0**
Industrial Ethernet SC RJ PCF Plug Screw-in plug for on-site assembly to PCF fiber optic cable (1 pack = 10 units)	**6GK1 900-0NB00-0AC0**
Industrial Ethernet Fast Connect stripping tool	**6GK1 901-1GA00**
MMC 64 KB [1]	**6ES7 953-8LF20-0AA0**
For storing the device name	
MMC 128 KB [1]	**6ES7 953-8LG20-0AA0**
For storing the device name	
MMC 512 KB [1]	**6ES7 953-8LJ20-0AA0**
For storing the device name	

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Ordering data

		Order No.
MMC 2 MB [1]		**6ES7 953-8LL20-0AA0**
For storing the device name and/or firmware update		
MMC 4 MB [1]		**6ES7 953-8LM20-0AA0**
For storing the device name and/or firmware update		
MMC 8 MB [1]		**6ES7 953-8LP20-0AA0**
For storing the device name and/or firmware update		
ET 200S distributed I/O system manuals		
are available on the Internet as PDF files:		
www.siemens.com/simatic-docu		
SIMATIC Manual Collection	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multi-language: S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication)		
SIMATIC Manual Collection – Update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates		

		Order No.
Label sheets DIN A4 (10 units)		
Each sheet contains 60 labeling strips for I/O modules and 20 labeling strips for interface modules		
• petrol		**6ES7 193-4BH00-0AA0**
• red		**6ES7 193-4BD00-0AA0**
• yellow		**6ES7 193-4BB00-0AA0**
• light beige		**6ES7 193-4BA00-0AA0**
Termination module		**6ES7 193-4JA00-0AA0**
as spare part for ET 200S		
Power supply connector		
Spare part; for connecting the 24 V DC supply voltage		
• with push-in terminals		**6ES7 193-4JB00-0AA0**
• with screw-type terminals		**6ES7 193-4JB50-0AA0**
DIN rail 35 mm		
• Length: 483 mm for 19" cabinets		**6ES5 710-8MA11**
• Length: 530 mm for 600 mm cabinets		**6ES5 710-8MA21**
• Length: 830 mm for 900 mm cabinets		**6ES5 710-8MA31**
• 2 m long		**6ES5 710-8MA41**
Industrial Ethernet Switches		
Managed Industrial Ethernet Switches; Isochronous real time, LED diagnostics, fault signaling contact with SET button, redundant power supply		
• SCALANCE X202-2P IRT; 2 x 10/100 Mbit/s RJ45 ports, 2 x 100 Mbit/s POF/PCF SC RJ	I	**6GK5 202-2BH00-2BA3**
• SCALANCE X201-3P IRT; 1 x 10/100 Mbit/s RJ45 ports, 3 x 100 Mbit/s POF/PCF SC RJ	I	**6GK5 201-3BH00-2BA3**
• SCALANCE X200-4P IRT; 4 x 100 Mbit/s POF/PCF SC RJ	I	**6GK5 200-4AH00-2BA3**

[1] For operating the IM 151-3, an MMC is essential

D: Subject to export regulations AL: N and ECCN: 5D992

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

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

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SIPLUS interface modules without CPU
SIPLUS IM 151-1

Overview



- Interface module for linking the ET 200S to PROFIBUS DP
- Handles all data exchange with the PROFIBUS DP master

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

	SIPLUS IM 151-1 Standard	SIPLUS IM 151-1 High Feature
Order number	**6AG1 151-1AA05-7AB0**	**6AG1 151-1BA02-2AB0**
Order No. based on	**6ES7 151-1AA05-0AB0**	**6ES7 151-1BA02-0AB0**
Ambient temperature range	-25 ... +70 °C	-25 ... +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	

	SIPLUS IM 151-1 Standard	SIPLUS IM 151-1 High Feature
Ambient conditions		
Relative humidity	5 ... 100 % Condensation permissible	
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)	
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]	
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]	
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K	

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS IM 151-1 STANDARD interface module (extended temperature range and medial exposure) for ET 200S; transfer rates up to 12 Mbit/s; data volumes 244 byte each for inputs and outputs, max. 63 power, electronic and motor start modules can be connected; bus connection via 9-pin D-sub incl. termination module	I	**6AG1 151-1AA05-7AB0**
SIPLUS IM 151-1 HIGH FEATURE interface module (extended temperature range and medial exposure) for ET 200S; transfer rate up to 12 Mbit/s; data volumes 244 byte each for inputs and outputs, up to 63 modules can be connected; connection of PROFIsafe modules, isochronous mode (clock synchronization); bus connection via 9-pin Sub-D incl. termination module	H	**6AG1 151-1BA02-2AB0**
Accessories		See SIMATIC IM 151-1, page 9/49

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H
I: Subject to export regulations AL: N and ECCN: EAR99H

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Overview



- Interface module for connection of ET 200S PROFINET
- Handles all data exchange with the PROFINET I/O Controller
- IM 151-3 PN STANDARD
- With integrated 2-port switch for line topology

Micro Memory Card required for CPU operation.

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

	SIPLUS IM 151-3 PN
Order number	**6AG1 151-3AA23-2AB0**
Order number based on	**6ES7 151-3AA23-0AB0**
Ambient temperature range	-25 ... +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions.
Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

Technical documentation on SIPLUS is available under:

www.siemens.com/siplus-extreme

Ordering data	**Order No.**
SIPLUS IM 151-3 PN interface module (extended temperature range and medial exposure) For ET 200S; transfer rates up to 100 Mbit/s; data volume depends on the number of modules inserted, up to 63 modules can be connected, bus connection through RJ45	H **6AG1 151-3AA23-2AB0**
Accessories	See SIMATIC IM 151-3 PN interface module, page 9/52

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H

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Overview



- For monitoring and, depending on the version, fusing the load and sensor supply voltage
- Can be plugged onto TM-P terminal modules with automatic coding
- Diagnostic message for voltage and blown fuse (can be switched off via configuration)
- PM-E 24 V DC Standard
  - load voltage diagnostics
- PM-E 24 V DC High Feature
  - load voltage and reverse voltage diagnostics
  - with status information
  - option handling (only in combination with the IM 151-1 Standard, IM 151-1 FO Standard and IM 151-1 High Feature)
- 24 to 48 V DC PM-E power module
  - load voltage diagnostics
  - with status information
  - option handling (only in combination with the IM 151-1 Standard, IM 151-1 FO Standard and IM 151-1 High Feature)
- PM-E 24 V DC to 230 V AC power module
  - power module for universal use
  - with integral replaceable fuse
  - with status information
  - option handling (only in combination with the IM 151-1 Standard, IM 151-1 FO Standard and IM151-1 High Feature)

Technical specifications

	6ES7 138-4CA01-0AA0	6ES7 138-4CB11-0AB0
Product type designation	PM-E 24 V DC	
Power supply		
Current carrying capacity		
• Current carrying capacity up to 60 °C, max.	10 A	
Supply voltages		
Load voltage L+		
• Rated value (DC)	24 V	
• Short-circuit protection	No; external (e.g. automatic circuit breaker), tripping characteristic C	
• Reverse polarity protection	Yes	
Current consumption		
from load voltage 1L+ (without load), max.	4 mA	
Power losses		
Power loss, typ.	0.1 W	
Parameter		
Remark	3 byte	
Missing load voltage	Disable / enable	
Alarms/diagnostics/status information		
Diagnostics		
• Diagnostics	Yes	
• Missing load voltage	Yes	
Diagnostic indication LED		
• Rated load voltage PWR (green)	Yes	
• Group error SF (red)	Yes	
Isolation		
Isolation checked with	500 V DC	
Galvanic isolation		
primary/secondary	Yes; between rated load voltage and backplane bus, between power modules	
Dimensions and weight		
Dimensions		
• Width	15 mm	15 mm
• Height	81 mm	81 mm
• Depth	52 mm	52 mm
Weight		
• Weight, approx.	35 g	

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Technical specifications (continued)

	6ES7 138-4CA50-0AB0
Product type designation	PM-E 24 to 48 V DC
Power supply	
Current carrying capacity	
• Current carrying capacity up to 60 °C, max.	10 A
Supply voltages	
Load voltage L+	
• Rated values	24 to 48 V DC
• Short-circuit protection	No; external (e.g. automatic circuit breaker), tripping characteristic B, C
• Reverse polarity protection	Yes
Current consumption	
from load voltage 1L+ (without load), max.	12 mA
Power losses	
Power loss, typ.	500 W; mW
Parameter	
Remark	3 byte
Missing load voltage	Disable / enable
Alarms/diagnostics/status information	
Diagnostics	
• Diagnostics	Yes
• Missing load voltage	Yes
Diagnostic indication LED	
• Rated load voltage PWR (green)	Yes
• Group error SF (red)	Yes
Isolation	
Isolation checked with	500 V DC
Galvanic isolation	
primary/secondary	Yes; between rated load voltage and backplane bus, between power modules
Dimensions and weight	
Dimensions	
• Width	15 mm
• Height	81 mm
• Depth	52 mm
Weight	
• Weight, approx.	35 g

Ordering data

	Order No.
PM-E 24 V DC Standard power module [1]	
For electronic modules; with diagnostics	
1 unit	**6ES7 138-4CA01-0AA0**
5 units	**6ES7 138-4CA01-1AA0**
PM-E 24 V DC High Feature power module [1] I	**6ES7 138-4CA60-0AB0**
For electronic modules; with diagnostics	
24 … 48 V DC PM-E power module	
For electronic modules; with diagnostics, with status bit "load voltage" present	
1 unit	**6ES7 138-4CA50-0AB0**
5 units	**6ES7 138-4CA50-1AB0**
Power module PM-E 24 … 48 V DC, 42 … 230 V AC	**6ES7 138-4CB11-0AB0**
For electronic modules; with diagnostics and fuse	
Accessories	
Label sheets DIN A4 (10 units)	
Each sheet contains 60 label strips for I/O modules and 20 label strips for interface modules	
• petrol	**6ES7 193-4BH00-0AA0**
• red	**6ES7 193-4BD00-0AA0**
• yellow	**6ES7 193-4BB00-0AA0**
• light beige	**6ES7 193-4BA00-0AA0**

[1] Can be used for all electronic and technology modules except 2 DI 120 V AC / 2 DI 230 V AC / 2 DO 120/230 V AC

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

Selection tool for terminal modules

Power modules	TM-P terminal modules for power modules			
Screw-type terminal type designation	TM-P15S23-A1	TM-P15S23-A0	TM-P15S22-01	TM-P30S44-A0
Order No.: 6ES7 193...	4CC20-0AA0	4CD20-0AA0	4CE00-0AA0	4CK20-0AA0
Spring-loaded terminal type designation	TM-P15C23-A1	TM-P15C23-A0	TM-P15C22-01	TM-P30C44-A0
Order No.: 6ES7 193...	4CC30-0AA0	4CD30-0AA0	4CE10-0AA0	4CK30-0AA0
FastConnect type designation	TM-P15N23-A1	TM-P15N23-A0	TM-P15N22-01	Soon to come
Order No.: 6ES7 193...	4CC70-0AA0	4CD70-0AA0	4CE60-0AA0	
PM-E 24 V DC	•	•	•	
PM-E 24 … 48 V DC	•	•	•	
PM-E 24 V DC/120/230 V AC	•	•	•	
PM-E F 24 V DC PROFIsafe				•

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Overview



- Applicable only on IM 151-1 Standard interface modules as of 6ES7151-1AA04-0AB0 and IM 151-1 High Feature as of 6ES7151-1BA02-0AB0
- Suitable for all TM-E terminal modules (15 mm and 30 mm construction width)
- Reserves one slot for any electronic module. The spare module is inserted into the reserved slot of the ET 200S configuration.
- Terminal module can be wired up for the function to be used later
- The spare module has no connection to the terminals of the TM-E terminal module. The TM-E terminal module can therefore by completely wired up and prepared for its future purpose.
- Parameterizable diagnostic response with IM 151-1 STANDARD and IM 151-1 HIGH FEATURE
- Facilitates retroffiting of I/O modules during operation
- Options can be released via the PLC program without the need for re-engineering

Technical specifications

	6ES7 138-4AA01-0AA0	6ES7 138-4AA11-0AA0
Power losses		
Power loss, typ.	0.025 W	0.025 W
Address area		
Occupied address area		
• Inputs	according to configured module	according to configured module
Digital inputs		
Number of digital inputs	0	0
Parameter		
Remark	according to configured module	according to configured module
Alarms/diagnostics/status information		
Diagnostics		
• Diagnostic functions	No	No
Diagnostic indication LED		
• Status indicator digital input (green)	No	No
Dimensions and weight		
Dimensions		
• Width	15 mm	30 mm
• Height	81 mm	81 mm
• Depth	52 mm	52 mm
Weight		
• Weight, approx.	33 g	55 g

Ordering data

	Order No.
Spare modules for ET 200S	
for reserving unused slots	
• 15 mm overall width (5 units)	**6ES7 138-4AA01-0AA0**
• 30 mm overall width (1 unit)	**6ES7 138-4AA11-0AA0**

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Overview

- Potential isolation module with 4 outputs
- Output current 5 A per output / 10 A per module
- Nominal load voltage: According to the load voltage on the power module of this load voltage group
- Is suitable for all terminal modules TM-E (construction width 15 mm)

Technical specifications

Potential isolation module	6ES7138-4FD00-0AA0
Module-specific data	
Supported synchronous operation	no
Number of outputs	4
Cable length	
• Unshielded	max. 600 m
• Shielded	max. 1000 m
Parameter length	1 byte
Voltages, Currents, Potentials	
Nominal load voltage L+ (from power module)	24 … 48 V DC; 24 AC … 230 V
• Polarity reversal protection	no
Total current of the outputs (per module)	max. 10 A
Potential isolation	
• Between the channels	no
• Between the channels and backplane bus	Yes
Permissible potential difference	
• Between the supply voltage and the backplane bus	75 V DC, 240 V AC
Isolation tested	
• Between the supply voltage and the backplane bus	500 V DC, 1500 V AC
Diagnostic alarm	no
Data for selecting an actuator	
Short-circuit protection for the output	No, possible via PM-E or external
Dimensions and weight	
Dimensions W × H × D (mm, the total dimensions depend on the selected terminal module)	15 x 81 x 52
Weight	Approx. 33 g

Ordering data

	Order No.
Potential isolation module for ET 200S I for preparing the load voltage on additional terminals, 15 mm construction width, 1 unit	**6ES7138-4FD00-0AA0**
Accessories for labeling	
Label sheets DIN A4 (10 units) Each sheet contains 60 label strips for I/O modules and 20 label strips for interface modules	
• petrol	**6ES7 193-4BH00-0AA0**
• red	**6ES7 193-4BD00-0AA0**
• yellow	**6ES7 193-4BB00-0AA0**
• light beige	**6ES7 193-4BA00-0AA0**

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

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Overview



- 2, 4 and 8-channel digital inputs and outputs for the ET 200S
- Can be plugged onto TM-E terminal modules with automatic coding
- High-feature versions for enhanced plant availability, additional functions and comprehensive diagnostics
- Hot swapping of modules possible during operation

Technical specifications

	6ES7 131-4BB01-0AA0	6ES7 131-4BB01-0AB0	6ES7 131-4BD01-0AA0	6ES7 131-4BD01-0AB0	6ES7 131-4BD51-0AA0	6ES7 131-4BF00-0AA0
Supply voltages						
Rated value						
• 24 V DC	Yes; from power module	Yes; from power module	Yes; from power module	Yes; from power module	Yes; from power module	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
• reverse polarity protection	Yes	Yes	Yes	Yes	Yes	Yes
Current consumption						
from backplane bus 3.3 V DC, max.	10 mA	10 mA	10 mA	10 mA		10 mA
from supply voltage L+, max.	Dependent on encoder	Dependent on encoder	Dependent on encoder	Dependent on encoder	Dependent on encoder	Dependent on encoder
Power losses						
Power loss, typ.	0.4 W	0.4 W	0.7 W	0.7 W	0.7 W	1.2 W
Address area						
Address space per module						
• with packing	2 bit	2 bit	4 bit	4 bit	4 bit	
• without packing	1 byte	1 byte	1 byte	1 byte	1 byte	1 byte
Isochronous mode						
Isochronous mode						Yes; TWE = 3000 us
Digital inputs						
Number of digital inputs	2	2	4	4	4	8
Number of simultaneously controllable inputs						8
Input characteristic curve acc. to IEC 1131, Type 1	Yes	Yes	Yes	Yes	Yes	Yes; 2-wire sensors connectable
Input voltage						
• rated value, DC	24 V	24 V	24 V	24 V	24 V	24 V
• for signal "0"	-30 to +5 V	-30 to +5 V	-30 to +5 V	-30 to +5 V	-5 to +30 V	-30 to +5 V
• for signal "1"	15 to 30 V	11 to 30 V	15 to 30 V	11 to 30 V	-15 to -30V	15 to 30 V
Input current						
• for signal "1", typ.	7 mA; at 24 V	8 mA	7 mA; at 24 V	8 mA	7 mA; at 24 V	5 mA

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Technical specifications (continued)

	6ES7 131-4BB01-0AA0	6ES7 131-4BB01-0AB0	6ES7 131-4BD01-0AA0	6ES7 131-4BD01-0AB0	6ES7 131-4BD51-0AA0	6ES7 131-4BF00-0AA0
Input delay (for rated value of input voltage)						
• for standard inputs						
- parameterizable	No	Yes; 0.1 / 0.5 / 3 / 15 ms	No	Yes; 0.1 / 0.5 / 3 / 15 ms	No	No
- at "0" to "1", min.	2 ms; typically 3 ms	0.05 / 0.4 / 2.7 / 14.85	2 ms; typically 3 ms	0.05 / 0.4 / 2.7 / 14.85	2 ms; typically 3 ms	2 ms
- at "0" to "1", max.	4.5 ms	0.15 / 0.6 / 3.3 / 15,15	4.5 ms	0.15 / 0.6 / 3.3 / 15,15	4.5 ms	4.5 ms
- at "1" to "0", min.	2 ms; typically 3 ms	0.05 / 0.4 / 2.7 / 14.85	2 ms; typically 3 ms	0.05 / 0.4 / 2.7 / 14.85	2 ms; typically 3 ms	2 ms
- at "1" to "0", max.	4.5 ms	0.15 / 0.6 / 3.3 / 15.15	4.5 ms	0.15 / 0.6 / 3.3 / 15.15	4.5 ms	4.5 ms
Cable length						
• 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
Encoder supply						
Number of outputs						0; no encoder supply
Output voltage	min. L+ (-0.5 V), under load	min. L+ (-0.5 V), under load	min. L+ (-0.5 V), under load	min. L+ (-0.5 V), under load	max. M +0.5 V, under load	
Output current, rated value	500 mA	500 mA	500 mA	500 mA	500 mA	
Output current, permissible range	0 to 500 mA	0 to 500 mA	0 to 500 mA	0 to 500 mA	0 to 500 mA	
Short-circuit protection		Yes; electronic		Yes; electronic		
Encoder						
Connectable encoders						
• 2-wire BEROS	Yes	Yes	Yes	Yes	Yes	Yes
- permissible quiescent current (2-wire BEROS), max.	1.5 mA	1.5 mA	1.5 mA	1.5 mA	1.5 mA	1.5 mA
Parameter						
Remark	1 byte	3 byte	1 byte	3 byte	1 byte	3-byte parameter (not accessible for the user)
Diagnostics: short circuit		Disable/enable		Disable/enable		
Alarms/ diagnostics/status information						
Diagnostics						
• Diagnostic functions	No	Yes	No	Yes	No	No
• Short circuit		Yes; Short-circuit of outputs to ground; module by module		Yes; Short-circuit of outputs to ground; module by module		
Diagnostic indication LED						
• Group error SF (red)	No	Yes	No	Yes	No	
• Status indicator digital input (green)	Yes; per channel	Yes; per channel	Yes; per channel	Yes; per channel	Yes; per channel	Yes

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Technical specifications (continued)

	6ES7 131-4BB01-0AA0	6ES7 131-4BB01-0AB0	6ES7 131-4BD01-0AA0	6ES7 131-4BD01-0AB0	6ES7 131-4BD51-0AA0	6ES7 131-4BF00-0AA0
Isolation						
Isolation checked with	500 V DC	500 V DC	500 V DC	500 V DC	500 V DC	500 V DC
Galvanic isolation						
Galvanic isolation digital inputs						
• between the channels	No	No	No	No	No	No
• between the channels and the backplane bus	Yes	Yes	Yes	Yes	Yes	Yes
Permissible potential difference						
between different circuits	75 V DC / 60 V AC	75 V DC / 60 V AC	75 V DC / 60 V AC	75 V DC / 60 V AC	75 V DC / 60 V AC	75 V DC / 60 V AC
Dimensions and weight						
Dimensions						
• Width	15 mm	15 mm	15 mm	15 mm	15 mm	15 mm
• Height	81 mm	81 mm	81 mm	81 mm	81 mm	81 mm
• Depth	52 mm	52 mm	52 mm	52 mm	52 mm	52 mm
Weight						
• Weight, approx.	35 g	35 g	35 g	35 g	35 g	35 g

	6ES7 131-4RD02-0AB0	6ES7 131-4EB00-0AB0	6ES7 131-4FB00-0AB0	6ES7 131-4CD02-0AB0	6ES7 131-4BF50-0AA0
Supply voltages					
Rated value					
• 24 V DC	Yes; From power module			Yes	Yes; from power module
• permissible range, lower limit (DC)	24 V			20.4 V	20.4 V
• permissible range, upper limit (DC)	48 V			28.8 V	28.8 V
• 24 V AC	Yes				
• 120 V AC		Yes; from power module			
• 230 V AC			Yes		
• permissible range, lower limit (AC)	24 V				
• permissible range, upper limit (AC)	48 V				
• reverse polarity protection	Yes; AC or DC automatic				Yes
Current consumption					
from backplane bus 3.3 V DC, max.	10 mA	6 mA	6 mA		
from supply voltage L+, max.	Dependent on encoder			Dependent on encoder	Dependent on encoder
from supply voltage L1, max.		Dependent on encoder	Dependent on encoder		
Power losses					
Power loss, typ.	0.7 W	0.5 W	0.7 W	1.6 W	1.2 W
Address area					
Address space per module					
• with packing	4 bit	2 bit	2 bit	4 bit	
• without packing	1 byte	1 byte	1 byte	1 byte	
Isochronous mode					
Isochronous mode	Yes	No	No		Yes

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Technical specifications (continued)

	6ES7 131-4RD02-0AB0	6ES7 131-4EB00-0AB0	6ES7 131-4FB00-0AB0	6ES7 131-4CD02-0AB0	6ES7 131-4BF50-0AA0
Digital inputs					
Number of digital inputs	4	2	2	4	8
Number of NAMUR inputs				4	
Number of simultaneously controllable inputs				4	
Parallel switching of inputs				No	
Input characteristic curve acc. to IEC 1131, Type 1	Yes	Yes	Yes		Yes
Input voltage					
• Rated value, AC		120 V	230 V		
• Rated value, DC					24 V
• Rated value, UC	24 V; 24 to 48 V UC				
• for signal "0"	-6 to 6 V DC, 0 to 5 V AC	0 to 20 V AC	0 to 40 V AC		30 to -5 V
• for signal "1"	-15 to -57.6 V DC; -15 to 57.6 V DC; 15 to 48 V AC	79 to 132 V AC	164 to 264 V AC		-15 to -30 V
• Frequency range	47 to 63 Hz	47 to 63 Hz	47 to 63 Hz		
Input current					
• for signal "1", typ.	10 mA; 4 to 10 mA	3 mA; 3 to 9 mA	5 mA; 5 to 15 mA		6 mA; at 24 V
• for 10 k switched contact					
- for signal "0"				0.35 to 1.2 mA	
- for signal "1"				2.1 to 7 mA	
• for unswitched contact					
- for signal "0", max. (permissible quiescent current)				0.5 mA	
- for signal "1"				typ. 8 mA	
• for NAMUR encoders					
- for signal "0"				0.35 mA to 1.2 mA	
- for signal "1"				2.1 to 7 mA	
Input delay (for rated value of input voltage)					
• for standard inputs					
- parameterizable					No
- at "0" to "1", min.		15 ms	15 ms		2 ms
- at "0" to "1", max.	15 ms			4.6 µs	4.5 ms
- at "1" to "0", min.		25 ms	45 ms		2 ms
- at "1" to "0", max.	15 ms			4.6 µs	4.5 ms
Encoder connection					
• Fixed current limitation for wire break monitoring, min.	18 kΩ; Rated voltage 24 V (15 V to 35 V); rated voltage 48 V (30 V to 60 V): 39 kOhm				
Cable length					
• Cable length, shielded, max.	1 000 m	1 000 m	1 000 m	200 m	1 000 m
• Cable length unshielded, max.	600 m	600 m	600 m		600 m
Encoder supply					
Number of outputs				1	
Output voltage	min. L+ (-0.5 V), under load			min. 8.2 V, loaded	

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Technical specifications (continued)

	6ES7 131-4RD02-0AB0	6ES7 131-4EB00-0AB0	6ES7 131-4FB00-0AB0	6ES7 131-4CD02-0AB0	6ES7 131-4BF50-0AA0
Output current, rated value	500 mA			45 mA	
Output current, permissible range	0 to 500 mA				
Short-circuit protection	Yes; per module			Yes; electronic	
Encoder					
Connectable encoders					
• 2-wire BEROS	Yes	No	No		Yes
- permissible quiescent current (2-wire BEROS), max.	2 mA; (0.5 to 2 mA), a minimum load current is necessary for wire break diagnostics.	1 mA	2 mA		1.5 mA
Parameter					
Remark		3 byte	3 byte	12 byte	3 byte
Alarms/diagnostics/ status information					
Alarms					
• Diagnostic alarm				Yes; adjusted	
• Process alarm				No	
Diagnostics					
• Diagnostic functions	Yes; parameterizable	No	No	Yes; diagnostic alarm	No
• Diagnostic information readable				Yes	
• Short circuit		No	No		
Diagnostic indication LED					
• Group error SF (red)	Yes			Yes	No
• Status indicator digital input (green)	Yes; per channel	Yes; per channel	Yes; per channel	Yes; per channel	Yes; per channel
Isolation					
Isolation checked with	2500 V DC	2500 V DC	4000 V DC	500 V DC	500 V DC
Galvanic isolation					
Galvanic isolation digital inputs					
• between the channels	No	No	No	No	No
• between the channels and the backplane bus	Yes	Yes	Yes	Yes	Yes
• between the channels and the load voltage L+				Yes	
Permissible potential difference					
between different circuits	75 V DC / 60 V AC			75 V DC / 60 V AC	75 V DC / 60 V AC
between M internally and the inputs		1500 V AC	1500 V AC		
Dimensions and weight					
Dimensions					
• Width	15 mm	15 mm	15 mm	15 mm	15 mm
• Height	81 mm	81 mm	81 mm	81 mm	81 mm
• Depth	52 mm	52 mm	52 mm	52 mm	52 mm
Weight					
• Weight, approx.	35 g	31 g	31 g	35 g	35 g

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Technical specifications (continued)

	6ES7 132-4BB01-0AB0	6ES7 132-4BB01-0AA0	6ES7 132-4BB31-0AB0	6ES7 132-4BB31-0AA0	6ES7 132-4BD00-0AB0	6ES7 132-4BD02-0AA0
Supply voltages						
Reverse voltage protection	Yes; when using the same load voltage as on the power module	Yes; when using the same load voltage as on the power module	Yes; when using the same load voltage as on the power module	Yes; when using the same load voltage as on the power module	Yes; when using the same load voltage as on the power module	Yes; when using the same load voltage as on the power module
Load voltage L+						
• Rated value (DC)	24 V; from power module	24 V; from power module	24 V; from power module	24 V; from power module	24 V; from power module	24 V; from PM
• Reverse polarity protection	Yes; polarity reversal can lead to the digital outputs being connected through	Yes; polarity reversal can lead to the digital outputs being connected through	Yes; polarity reversal can lead to the digital outputs being connected through	Yes; polarity reversal can lead to the digital outputs being connected through	Yes; polarity reversal can lead to the digital outputs being connected through	Yes; polarity reversal can lead to the digital outputs being connected through
Current consumption						
from load voltage L+ (without load), max.	5 mA; per channel	5 mA; per module	5 mA; per channel	5 mA; per channel	5 mA; per channel	10 mA; per channel
from backplane bus 3.3 V DC, max.	10 mA	10 mA	10 mA	10 mA	10 mA	10 mA
Power losses						
Power loss, typ.	0.4 W	0.4 W	1.4 W	1.4 W		0.8 W
Address area						
Address space per module						
• with packing	2 bit	2 bit	2 bit	2 bit	4 bit	4 bit
• without packing	1 byte	1 byte	1 byte	1 byte	1 byte	1 byte
Isochronous mode						
Isochronous mode	Yes	No	Yes	No	Yes	Yes
Digital inputs						
Cable length						
• Cable length, shielded, max.					1 000 m	
• Cable length unshielded, max.					600 m	
Digital outputs						
Number of digital outputs	2	2	2	2	4	4
Short-circuit protection	Yes; per channel	Yes; per channel	Yes; per channel	Yes; per channel	Yes; per channel	Yes; per channel
• Response threshold, typ.	1.5 A	0.7 to 1.8 A	4 A	2.8 to 7.2 A	0.7 to 1.5 A	1 to 1.5 A
Limitation of inductive shutdown voltage to	-55 to -60 V, typ. L+( )	-55 to -60 V, typ. L+( )	-55 to -60 V, typ. L+( )	-55 to -60 V, typ. L+( )	-55 to -60 V, L+( )	(L+)-55 to -60 V
Lamp load, max.	2.5 W	5 W	5 W	10 W	5 W	5 W
Controlling a digital input	Yes	Yes	Yes	Yes	Yes	Yes
Output voltage						
• for signal "1", min.	L+ (-1 V)	L+ (-1 V)	L+ (-1 V)	L+ (-1 V)	L+ (-1 V)	L+ (-1 V)
Output current						
• for signal "1" rated value	0.5 A	0.5 A	2 A	2 A	0.5 A	0.5 A
• for signal "1" permissible range for 0 to 60 °C, min.	7 mA	7 mA	7 mA	7 mA	7 mA	7 mA
• for signal "1" permissible range for 0 to 60 °C, max.	600 mA	600 mA	2.4 A	2.4 A	600 mA	600 mA
• for signal "0" residual current, max.	0.3 mA	0.3 mA	0.5 mA	0.5 mA	0.3 mA	0.3 mA

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Technical specifications (continued)

	6ES7 132-4BB01-0AB0	6ES7 132-4BB01-0AA0	6ES7 132-4BB31-0AB0	6ES7 132-4BB31-0AA0	6ES7 132-4BD00-0AB0	6ES7 132-4BD02-0AA0
Output delay with resistive load						
• 0 to "1", max.	100 µs	200 µs	100 µs	200 µs	100 µs	45 µs; typical value
• 1 to "0", max.	400 µs	1.3 ms	400 µs	1.3 ms	300 µs	90 µs; typical value
Parallel switching of 2 outputs						
• for increased power	No	No	No	No	No	No
• for redundant control of a load	Yes; per module	Yes; per module	Yes; per module	Yes; per module	Yes; per module	Yes; per module
Switching frequency						
• with resistive load, max.	100 Hz	100 Hz	100 Hz	100 Hz	100 Hz	800 Hz
• with inductive load, max.	2 Hz	2 Hz	2 Hz; 0.5 H	2 Hz; 0.5 H	2 Hz	2 Hz
• on lamp load, max.	10 Hz	10 Hz	10 Hz	10 Hz	10 Hz	10 Hz
Aggregate current of outputs (per group)						
• up to 60 °C, max.	1 A	1 A	4 A	4 A	2 A	2 A
Load resistance range						
• lower limit	48 Ω	48 Ω	12 Ω	12 Ω	48 Ω	48 Ω
• upper limit	3 400 Ω	3 400 Ω	3 400 Ω	3 400 Ω	3 400 Ω	3 400 Ω
Cable length						
• 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
Parameter						
Remark	3 byte	1 byte	3 byte	1 byte		1 byte
Diagnostics: wire break	Disable/enable		Disable/enable			
Diagnostics: short circuit	Disable/enable		Disable/enable			
Behavior on CPU/ Master STOP, channel-wise	Substitute a value / keep last value		Substitute a value / keep last value			
Alarms/ diagnostics/status information						
Substitute values connectable	Yes; 0/1		Yes; 0/1			
Diagnostics						
• Diagnostic functions	Yes; can be read out	No	Yes; can be read out	No	Yes	No
• Wire break	Yes; channel by channel		Yes; channel by channel			
• Short circuit	Yes; channel by channel		Yes; channel by channel		Yes; module-wise	
Diagnostic indication LED						
• Group error SF (red)	Yes		Yes		Yes; SF-LED (red)	
• Status indicator digital output (green)	Yes	Yes	Yes	Yes	Yes; per channel	Yes
Isolation						
Isolation checked with	500 V DC	500 V DC	500 V DC	500 V DC	500 V DC	500 V DC

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Technical specifications (continued)

	6ES7 132-4BB01-0AB0	6ES7 132-4BB01-0AA0	6ES7 132-4BB31-0AB0	6ES7 132-4BB31-0AA0	6ES7 132-4BD00-0AB0	6ES7 132-4BD02-0AA0
Galvanic isolation						
Galvanic isolation digital outputs						
• between the channels	No	No	No	No	No	No
• between the channels and the backplane bus	Yes	Yes	Yes	Yes	Yes	Yes
Dimensions and weight						
Dimensions						
• Width	15 mm	15 mm	15 mm	15 mm	15 mm	15 mm
• Height	81 mm	81 mm	81 mm	81 mm	81 mm	81 mm
• Depth	52 mm	52 mm	52 mm	52 mm	52 mm	52 mm
Weight						
• Weight, approx.	40 g	40 g	40 g	40 g	40 g	40 g

	6ES7 132-4BF00-0AB0	6ES7 132-4BF00-0AA0
Supply voltages		
Reverse voltage protection	Yes; when using the same load voltage as on the power module	Yes
Load voltage L+		
• Rated value (DC)	24 V; from power module	24 V
• Reverse polarity protection	Yes; polarity reversal can lead to the digital outputs being connected through	Yes
Current consumption		
from load voltage L+ (without load), max.	5 mA; per channel	5 mA; per channel
from backplane bus 3.3 V DC, max.	10 mA	10 mA
Power losses		
Power loss, typ.		1.5 W
Address area		
Address space per module		
• with packing	not relevant	
• without packing	1 byte	1 byte
Isochronous mode		
Isochronous mode	Yes	Yes; jitter incumbered < 100us
Digital inputs		
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	8	8
Short-circuit protection	Yes; per channel	Yes; per channel
• Response threshold, typ.	0.7 to 1.9 A	o.k.
Limitation of inductive shutdown voltage to	L+ -(47 to 60 V)	o.k.
Lamp load, max.	5 W	5 W
Controlling a digital input	Yes	Yes
Output voltage		
• for signal "1", min.	L+ (-1.0 V)	o.k.
Output current		
• for signal "1" rated value	0.5 A	0.5 A
• for signal "1" permissible range for 0 to 60 °C, min.	7 mA	7 mA
• for signal "1" permissible range for 0 to 60 °C, max.	600 mA	600 mA
• for signal "0" residual current, max.	0.3 mA	0.3 mA

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Technical specifications (continued)

	6ES7 132-4BF00-0AB0	6ES7 132-4BF00-0AA0
Output delay with resistive load		
• 0 to "1", max.	300 µs	300 µs
• 1 to "0", max.	600 µs	600 µs
Parallel switching of 2 outputs		
• for increased power	No	No
• for redundant control of a load	Yes; per module	Yes
Switching frequency		
• with resistive load, max.	100 Hz	100 Hz
• with inductive load, max.	2 Hz	2 Hz
• on lamp load, max.	10 Hz	10 Hz
Aggregate current of outputs (per group)		
• horizontal installation		
- up to 60 °C, max.	4 A	
• vertical installation		
- up to 40 °C, max.	4 A; at 55°C and 24V DC	
• up to 60 °C, max.		4 A
Load resistance range		
• lower limit	48 Ω	48 Ω
• upper limit	3 400 Ω	3 400 Ω
Cable length		
• Cable length, shielded, max.	1 000 m	1 000 m
• Cable length unshielded, max.	600 m	600 m
Parameter		
Remark	1 byte	3-byte parameter (not accessible for the user)
Alarms/diagnostics/status information		
Diagnostics		
• Diagnostic functions	Yes	No
• Short circuit	Yes; module-wise	
Diagnostic indication LED		
• Group error SF (red)	Yes; SF-LED (red)	
• Status indicator digital output (green)	Yes; per channel	Yes
Isolation		
Isolation checked with	500 V DC	500 V DC
Galvanic isolation		
Galvanic isolation digital outputs		
• between the channels	No	No
• between the channels and the backplane bus	Yes	Yes
Dimensions and weight		
Dimensions		
• Width	15 mm	15 mm
• Height	81 mm	81 mm
• Depth	52 mm	52 mm
Weight		
• Weight, approx.	40 g	40 g

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Technical specifications (continued)

	6ES7 132-4BB30-0AB0	6ES7 132-4BD32-0AA0	6ES7 132-4FB01-0AB0	6ES7 132-4HB01-0AB0	6ES7 132-4HB12-0AB0
Supply voltages					
Reverse voltage protection	Yes; when using the same load voltage as on the power module	Yes; when using the same load voltage as on the power module	Yes; when using the same load voltage as on the power module		
Load voltage L+					
• Rated value (DC)	24 V; from power module	24 V; from power module	24 V; from power module	24 V; from power module	24 V; from power module
• Reverse polarity protection	Yes	Yes	Yes	Yes	Yes
Current consumption					
from load voltage L+ (without load), max.	5 mA; per channel	10 mA; per channel	30 mA	30 mA	30 mA
from backplane bus 3.3 V DC, max.	10 mA	10 mA	18 mA	10 mA	10 mA
Power losses					
Power loss, typ.	1.4 W	1.6 W	4 W	0.6 W	0.6 W
Address area					
Address space per module					
• with packing	2 bit	4 bit	2 bit	2 bit	2 bit
• without packing	1 byte	1 byte	1 byte	1 byte	1 byte
Isochronous mode					
Isochronous mode	Yes	Yes		No	No
Digital outputs					
Number of digital outputs	2	4	2	2	2
Short-circuit protection	Yes; per channel	Yes; per channel	Yes; via fuse in power module	No; external fuse, max. 6 A quick-acting	No; external fuse, max. 6 A quick-acting
• Response threshold, typ.	4 A	2.8 to 7.2 A			
Limitation of inductive shutdown voltage to	-55 to -60 V	Typ. L+ (-55 to -60 V)	-55 to -60 V	No	No
Lamp load, max.	5 W	10 W	100 W		
Controlling a digital input	Yes	Yes	Yes; possible	Yes	Yes
Output voltage					
• for signal "1", min.	L+ (-1 V)	L+ (-1.0 V)	L+ (-1.5 V)		
Output current					
• for signal "1" rated value	2 A	2 A	2 A	5 A	5 A
• for signal "1" permissible range for 0 to 60 °C, min.	7 mA	7 mA	0.1 mA		
• for signal "1" permissible range for 0 to 60 °C, max.	2.4 A	2.4 A	2.2 A		
• for signal "1" minimum load current				8 mA	8 mA
• for signal "0" residual current, max.	0.5 mA	0.5 mA	3 mA		
Output delay with resistive load					
• 0 to "1", max.	100 µs	50 µs; typically 45µs	15 ms		
• 1 to "0", max.	400 µs	120 µs; typically 90µs	15 ms		
Parallel switching of 2 outputs					
• for increased power	No	No	No	No	No
• for redundant control of a load	Yes; per module	Yes; per module	Yes; per module	No	No

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Technical specifications (continued)

	6ES7 132-4BB30-0AB0	6ES7 132-4BD32-0AA0	6ES7 132-4FB01-0AB0	6ES7 132-4HB01-0AB0	6ES7 132-4HB12-0AB0
Switching frequency					
• with resistive load, max.	100 Hz	1 000 Hz	10 Hz	2 Hz	2 Hz
• with inductive load, max.	2 Hz; 0.5 H	2 Hz; at 0.5H	0.5 Hz	0.5 Hz	0.5 Hz
• on lamp load, max.	10 Hz	10 Hz	1 Hz	2 Hz	2 Hz
Aggregate current of outputs (per group)					
• vertical installation					
- up to 40 °C, max.		4 A; at 55°C and 24V DC			
• up to 40 °C, max.			2 A		
• up to 50 °C, max.			1.5 A		
• up to 60 °C, max.	4 A	4 A	1 A		
Load resistance range					
• lower limit	12 Ω	12 Ω			
• upper limit	3 400 Ω	3 400 Ω			
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
Relay outputs					
Switching capacity of contacts					
• Thermal continuous current, max.				5 A	5 A
Parameter					
Remark	3 byte	1 byte	3 byte	3 byte	3 byte
Diagnostics: wire break	Disable/enable				
Diagnostics: short circuit	Disable / enable				
Behavior on CPU/Master STOP, channel-wise	Substitute a value/ keep last value, 0/1		Substitute a value/ keep last value, 0/1	Substitute a value / keep last value	
Alarms/diagnostics/ status information					
Substitute values connectable	Yes; 0/1			Yes; 0/1	Yes; 0/1
Diagnostics					
• Diagnostic functions	Yes; can be read out	No	No	No	No
• Wire break	Yes; channel by channel				
• Short circuit	Yes; channel by channel				
Diagnostic indication LED					
• Group error SF (red)	Yes				
• Status indicator digital output (green)	Yes	Yes	Yes	Yes	Yes
Isolation					
Isolation checked with	500 V DC	500 V DC	2500 V DC		
tested with					
• Channels against backplane bus and load voltage L+				1500 V AC	2500 V DC
• Load voltage L+ against backplane bus				500 V DC	500 V DC

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Technical specifications (continued)

	6ES7 132-4BB30-0AB0	6ES7 132-4BD32-0AA0	6ES7 132-4FB01-0AB0	6ES7 132-4HB01-0AB0	6ES7 132-4HB12-0AB0
Galvanic isolation					
Galvanic isolation digital outputs					
• between the channels	No	No	No	Yes	Yes
• between the channels and the backplane bus	Yes	Yes	Yes	Yes	Yes
• between the channels and the load voltage L+				Yes	Yes
Permissible potential difference					
between different circuits	75 V DC / 60 V AC				
Dimensions and weight					
Dimensions					
• Width	15 mm	15 mm	15 mm	15 mm	15 mm
• Height	81 mm	81 mm	81 mm	81 mm	81 mm
• Depth	52 mm	52 mm	52 mm	52 mm	52 mm
Weight					
• Weight, approx.	40 g	40 g	37 g	50 g	50 g

	6ES7 132-4BF50-0AA0	6ES7 132-4BD50-0AA0
Supply voltages		
Reverse voltage protection	Yes; when using the same correctly polarized load voltage as on the power module	Yes; when using the same load voltage as
Load voltage L+		
• Rated value (DC)	24 V; from power module	24 V; from power module
• Reverse polarity protection	Yes	Yes
Current consumption		
from load voltage L+ (without load), max.	5 mA	5 mA; per channel
from backplane bus 3.3 V DC, max.	10 mA	10 mA
Power losses		
Power loss, typ.	1.5 W	0.8 W
Address area		
Address space per module		
• with packing		4 bit
• without packing	1 byte	1 byte
Isochronous mode		
Isochronous mode	Yes	Yes
Digital inputs		
Cable length		
• Cable length, shielded, max.		1 000 m
• Cable length unshielded, max.		600 m
Digital outputs		
Number of digital outputs	8	4
Short-circuit protection	Yes; per channel	Yes; per channel
• Response threshold, typ.	1.5 A	
Limitation of inductive shutdown voltage to	Typ. 47 V	
Lamp load, max.	5 W	5 W
Controlling a digital input	Yes	Yes

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Technical specifications (continued)

	6ES7 132-4BF50-0AA0	6ES7 132-4BD50-0AA0
Output voltage		
• for signal "1", min.	Max. 1 V	1 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.	700 mA	700 mA
• for signal "0" residual current, max.	5 µA	5 µA
Output delay with resistive load		
• 0 to "1", max.	300 µs	300 µs
• 1 to "0", max.	600 µs	600 µs
Parallel switching of 2 outputs		
• for increased power	No	No
• for redundant control of a load	Yes; per module	Yes; per module
Switching frequency		
• with resistive load, max.	100 Hz	100 Hz
• with inductive load, max.	0.5 Hz	0.5 Hz
• on lamp load, max.	10 Hz	10 Hz
Aggregate current of outputs (per group)		
• up to 60 °C, max.	4 A	2 A
Load resistance range		
• lower limit	48 Ω	48 Ω
• upper limit	3 400 Ω	3 400 Ω
Cable length		
• Cable length, shielded, max.	1 000 m	
• Cable length unshielded, max.	600 m	
Parameter		
Remark	3 byte	1 byte
Alarms/diagnostics/status information		
Diagnostics		
• Diagnostic functions	No	No
Diagnostic indication LED		
• Status indicator digital output (green)	Yes	Yes
Isolation		
Isolation checked with	500 V DC	500 V DC
Galvanic isolation		
Galvanic isolation digital outputs		
• between the channels	No	No
• between the channels and the backplane bus	Yes	Yes
Dimensions and weight		
Dimensions		
• Width	15 mm	15 mm
• Height	81 mm	81 mm
• Depth	52 mm	52 mm
Weight		
• Weight, approx.	40 g	40 g

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Ordering data		Order No.
Digital input modules		
Ordering unit 5 units		
• 2 DI 24 V DC Standard	I	**6ES7 131-4BB01-0AA0**
• 2 DI 24 V DC High Feature		**6ES7 131-4BB01-0AB0**
• 4 DI 24 V DC Standard		**6ES7 131-4BD01-0AA0**
• 4 DI 24 V DC High Feature		**6ES7 131-4BD01-0AB0**
• 2 DI 120 V AC		**6ES7 131-4EB00-0AB0**
• 2 DI 230 V AC		**6ES7 131-4FB00-0AB0**
• 4 DI 24 ... 48 V UC	I	**6ES7 131-4CD02-0AB0**
• 4 DI 24 V DC SOURCE INPUT		**6ES7 131-4BD51-0AA0**
Ordering unit 1 unit		
• 4 DI 24 V DC NAMUR	I	**6ES7 131-4RD02-0AB0**
• 8 DI 24 V DC Standard		**6ES7 131-4BF00-0AA0**
• 8 DI, 24 V DC, standard SOURCE INPUT	I	**6ES7 131-4BF50-0AA0**
Digital output modules		
Ordering unit 5 units		
• 2 DO 24 V DC/0.5 A Standard		**6ES7 132-4BB01-0AA0**
• 2 DO 24 V DC/0.5 A High Feature		**6ES7 132-4BB01-0AB0**
• 2 DO 24 V DC/2 A Standard		**6ES7 132-4BB31-0AA0**
• 2 DO 24 V DC/2 A High Feature	I	**6ES7 132-4BB31-0AB0**
• 4 DO 24 V DC/0.5 A Standard		**6ES7 132-4BD02-0AA0**
• 4 DO, 24 V DC / 0.5 A Standard SOURCE OUTPUT	I	**6ES7 132-4BD50-0AA0**
• 4 DO 24 V DC/0.5 A High Feature	I	**6ES7 132-4BD00-0AB0**
• 8 DO 24 V DC/0.5 A High Feature	I	**6ES7 132-4BF00-0AB0**
• 4 DO 24 V DC/2 A Standard		**6ES7 132-4BD32-0AA0**
• 4 DO 24 V DC/2 A High Feature		**6ES7 132-4BD30-0AB0**
• 2 DO 24 to 230 V AC/2 A		**6ES7 132-4FB01-0AB0**
• 2 DO 24 V DC to 230 V AC/5 A relay, NO contact		**6ES7 132-4HB01-0AB0**
• 2 DO 24...48 V DC/5 A, 24...230 V AC/5 A relay, changeover contact	I	**6ES7 132-4HB12-0AB0**
Ordering unit 1 unit		
• 2 DO 24...48 V DC/5 A, 24...230 V AC/5 A relay, changeover contact, with manual operation	I	**6ES7 132-4HB50-0AB0**
• 8 DO 24 V DC/0.5 A Standard		**6ES7 132-4BF00-0AA0**
• 8 DO, 24 V DC / 0.5 A Standard SOURCE OUTPUT	I	**6ES7 132-4BF50-0AA0**

Accessories	Order No.
Label sheets DIN A4 (10 units)	
Each sheet contains 60 labeling strips for I/O modules and 20 labeling strips for interface modules	
• petrol	**6ES7 193-4BH00-0AA0**
• red	**6ES7 193-4BD00-0AA0**
• yellow	**6ES7 193-4BB00-0AA0**
• light beige	**6ES7 193-4BA00-0AA0**

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

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Overview



- Analog inputs and outputs for the ET 200S
- Can be plugged onto TM-E terminal modules with automatic coding
- High-feature versions with enhanced performance, precision and resolution
- High-speed versions with extremely fast, isochronous cycle times.
- Hot swapping of modules possible during operation

Note:

Consult the configuring guide for selection of the appropriate TM-E terminal modules.

Technical specifications

	6ES7 134-4FB01-0AB0	6ES7 134-4LB02-0AB0	6ES7 134-4GB01-0AB0	6ES7 134-4GB52-0AB0
Supply voltages				
Load voltage L+				
• Rated value (DC)	24 V; from power module	24 V	24 V; from power module	24 V
• Short-circuit protection				Yes
• Reverse polarity protection	Yes	Yes	Yes; destruction limit 35 mA per channel	Yes
Power supply to the transmitters				
• present		No		Yes
• short-circuit proof				Yes
Current consumption				
from load voltage L+ (without load), max.	30 mA	55 mA	80 mA	225 mA
from backplane bus 3.3 V DC, max.	10 mA	10 mA	10 mA	10 mA
Power losses				
Power loss, typ.	0.6 W	0.85 W	0.6 W	2.5 W
Address area				
Address space per module				
• Address space per module, max.	4 byte	4 byte	4 byte	4 byte
Isochronous mode				
Isochronous mode	No	Yes	No	Yes
Analog inputs				
Number of analog inputs	2	2	2	2
Cable length, shielded, max.	200 m	200 m	200 m	200 m
Cycle time (all channels) max.	Number of active channels per module x basic conversion time	0.5 ms; 0.5 ms for 2 channels without noise suppression, 18 / 21 ms per channel with noise suppression	Number of active channels per module x basic conversion time	0.25 ms
Technical unit for temperature measurement adjustable				
• Voltage	Yes	Yes	No	No
• Current	No	No	Yes	Yes
• Thermocouple	No	No	No	No
• Resistance thermometer	No	No	No	No
• Resistance	No	No	No	No

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Technical specifications (continued)

	6ES7 134-4FB01-0AB0	6ES7 134-4LB02-0AB0	6ES7 134-4GB01-0AB0	6ES7 134-4GB52-0AB0
Input ranges (rated values), voltages				
• 1 to 5 V	Yes	Yes		
• Input resistance (1 to 5 V)		800 kΩ		
• -10 V to +10 V	Yes	Yes		
• Input resistance (-10 V to +10 V)		800 kΩ		
• -5 V to +5 V	Yes	Yes		
• Input resistance (-5 V to +5 V)		800 kΩ		
Input ranges (rated values), currents				
• 0 to 20 mA				Yes
• Input resistance (0 to 20 mA)				106 Ω
• 4 to 20 mA			Yes; on 50 Ohm	Yes
Voltage input				
• permissible input voltage for voltage input (destruction limit), max.	35 V; 35 V permanent; 75 V for max. 1 ms (mark to space ratio 1:20)	35 V; 35 V permanent; 75 V for max. 1 ms		
Current input				
• permissible input current for current input (destruction limit), max.			40 mA	
Analog value creation				
Measurement principle	integrating		integrating	
Integration and conversion time/ resolution per channel				
• Resolution with overrange (bit including sign), max.	14 bit; +/-10 V: 13 bit + sign, +/-5 V: 13 bit + sign; 1 to 5 V: 13 bit	16 bit; 0 to 5 V: 15 bit, +/-10 V: 16 bit, +/-5 V: 16 bit	13 bit; 4 to 20 mA: 13 bit	16 bit
• Integration time, parameterizable		Yes		
• Integration time, ms	16.7 / 20 ms		16.7 / 20 ms	
• Interference voltage suppression for interference frequency f1 in Hz	60 / 50 Hz	60 / 50 Hz / no	60 / 50 Hz	
• Conversion time (per channel)	65 ms; 55 / 65 ms	0.04 ms; without noise suppression 17/20 ms per channel with error	65 ms; 55 / 65 ms	
Smoothing of measured values				
• parameterizable	Yes; in four stages by means of digital filtering	Yes; in 4 stages: 1 x, 4 x, 16 x, 32 x cycle time	Yes; in four stages by means of digital filtering	Yes
• Step: None	Yes; 1 x cycle time	Yes; 1 x	Yes; 1 x cycle time	Yes; 1
• Step: Low	Yes; 4 x cycle time	Yes; 4 x	Yes; 4 x cycle time	Yes; 4
• Step: Medium	Yes; 32 x cycle time	Yes; 16 x	Yes; 32 x cycle time	Yes; 16
• Step: High	Yes; 64 x cycle time	Yes; 32 x	Yes; 64 x cycle time	Yes; 32
Encoder				
Connection of signal encoders				
• for voltage measurement		Yes		
• for current measurement as 2-wire transducer				Yes
• Burden of 2-wire transmitter, max.			750 Ω	

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Technical specifications (continued)

	6ES7 134-4FB01-0AB0	6ES7 134-4LB02-0AB0	6ES7 134-4GB01-0AB0	6ES7 134-4GB52-0AB0
Errors/accuracies				
Linearity error (relative to input area)	+/- 0.01 %	+/- 0.01 %	+/- 0.01 %	+/- 0.03 %
Temperature error (relative to input area)	+/- 0.01 %/K	+/- 0.003 %/K	+/- 0.005 %/K	+/- 0.01 %/K
Crosstalk between the inputs, min.	-50 dB	-100 dB	-50 dB	50 dB
Repeat accuracy in settled status at 25 °C (relative to input area)	+/- 0.05 %	+/- 0.01 %	+/- 0.05 %	+/- 0.1 %
Operational limit in overall temperature range				
• Voltage, relative to input area	+/- 0.6 %	+/- 0.1 %; 0.2% without interference frequency suppression		
• Current, relative to input area			+/- 0.6 %	+/- 0.3 %
Basic error limit (operational limit at 25 °C)				
• Voltage, relative to input area	+/- 0.4 %	+/- 0.05 %; 0.1% without interference frequency suppression		
• Current, relative to input area			+/- 0.4 %	+/- 0.2 %
Interference voltage suppression for f = n x (fl +/- 1%), fl = interference frequency				
• Series mode interference (peak value of interference < rated value of input range), min.	70 dB	90 dB	70 dB	
• Common mode voltage (USS < 2.5 V) , min.	90 dB	100 dB		
Parameter				
Remark	4 byte	12 byte, 4 byte in compatibility mode	4 byte	
Diagnostics: wire break	Disable / enable (only in measuring range 1 to 5 V)			At 4 to 20 mA
Measurement type/range	deactivated / +/-5 V / 1 to 5 V / +/-10 V	deactivated / +/-5 V / 1 to 5 V / +/-10 V	deactivated / 4 to 20 mA	4 to 20 mA, 0 to 20 mA
Interference frequency suppression				No
Group diagnostics	Disable/enable	Disable/enable	Disable/enable	1
Overflow/underflow	Disable/enable	Disable/enable	Disable/enable	1
Alarms/diagnostics/status information				
Alarms				
• Process alarm		Yes		Yes
Diagnostics				
• Diagnostic functions		Yes		Yes
• Wire break	Yes; measuring range 1 to 5 V only	Yes; measuring range 1 to 5 V only	Yes	Yes; at 4 to 20 mA
• Group error	Yes	Yes	Yes	Yes
• Overflow/underflow	Yes	Yes	Yes	Yes
Diagnostic indication LED				
• Group error SF (red)	Yes	Yes	Yes	Yes

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Technical specifications (continued)

	6ES7 134-4FB01-0AB0	6ES7 134-4LB02-0AB0	6ES7 134-4GB01-0AB0	6ES7 134-4GB52-0AB0
Isolation				
Isolation checked with	500 V DC	500 V DC	500 V DC	
Galvanic isolation				
Galvanic isolation analog inputs				
• between the channels	No	No; however, increased permissible potential difference between the inputs.	No	No
• between the channels and the backplane bus	Yes	Yes	Yes	Yes
• between the channels and the load voltage L+	Yes	Yes	No	Yes
Permissible potential difference				
between the inputs (UCM)		140 V DC/100 V AC		
between inputs and MANA (UCM)	2 V AC PP			
between MANA and M internally (UISO)	75 V DC / 60 V AC			75 V DC, 60 V AC
Dimensions				
Module width, max.		15 mm		15 mm
Dimensions and weight				
Dimensions				
• Width	15 mm	15 mm	15 mm	15 mm
• Height	81 mm	81 mm	81 mm	81 mm
• Depth	52 mm	52 mm	52 mm	52 mm
Weight				
• Weight, approx.	40 g	45 g	40 g	

	6ES7 134-4GB11-0AB0	6ES7 134-4MB02-0AB0	6ES7 134-4GD00-0AB0	6ES7 134-4FB52-0AB0	6ES7 134-4GB62-0AB0
Supply voltages					
Load voltage L+					
• Rated value (DC)	24 V; from power module	24 V	24 V; from power module	24 V	24 V
• Short-circuit protection					Yes
• Reverse polarity protection		Yes	Yes	Yes	Yes
Power supply to the transmitters					
• present		Yes	Yes		Yes
• short-circuit proof		Yes	Yes; approx. 200 mA for module		Yes
Current consumption					
from load voltage L+ (without load), max.	30 mA	48 mA	125 mA	80 mA	80 mA; without load
from backplane bus 3.3 V DC, max.	10 mA	10 mA	10 mA	10 mA	10 mA
Power losses					
Power loss, typ.	0.6 W	1.2 W	0.6 W	1.9 W	1.9 W
Address area					
Address space per module					
• Address space per module, max.	4 byte	4 byte	8 byte	4 byte	4 byte
Isochronous mode					
Isochronous mode	No	Yes	No	Yes	Yes

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Technical specifications (continued)

	6ES7 134-4GB11-0AB0	6ES7 134-4MB02-0AB0	6ES7 134-4GD00-0AB0	6ES7 134-4FB52-0AB0	6ES7 134-4GB62-0AB0
Analog inputs					
Number of analog inputs	2	2	4	2	2
Cable length, shielded, max.	200 m	200 m	200 m	200 m	200 m
Cycle time (all channels) max.	Number of active channels per module x basic conversion time	0.5 ms; 0.5 ms for 2 channels without noise suppression, 18 / 21 ms per channel with noise suppression	40 ms; 33 to 40 ms	250 µs	250 µs
Technical unit for temperature measurement adjustable					
• Voltage	No	No	No	Yes	No
• Current	Yes	Yes	Yes	No	Yes
• Thermocouple	No	No	No	No	No
• Resistance thermometer	No	No	No	No	No
• Resistance	No	No	No	No	No
Input ranges (rated values), voltages					
• 1 to 5 V				Yes	
• Input resistance (1 to 5 V)				120 kΩ	
• -10 V to +10 V				Yes	
• Input resistance (-10 V to +10 V)				120 kΩ	
• -2.5 V to +2.5 V				Yes	
• Input resistance (-2.5 V to +2.5 V)				120 kΩ	
• -5 V to +5 V				Yes	
• Input resistance (-5 V to +5 V)				120 kΩ	
Input ranges (rated values), currents					
• 0 to 20 mA					Yes
• Input resistance (0 to 20 mA)					106 Ω
• -20 to +20 mA	Yes; 50 Ohm	Yes			Yes
• 4 to 20 mA	Yes; 50 Ohm	Yes	Yes; on 25 Ohm		Yes
Voltage input					
• permissible input voltage for voltage input (destruction limit), max.				35 V; permanent	
Current input					
• permissible input current for current input (destruction limit), max.	40 mA	50 mA	30 mA; limited electronically		30 mA
Analog value creation					
Measurement principle	integrating	Sigma Delta	integrating		
Integrations and conversion time/ resolution per channel					
• Resolution with overrange (bit including sign), max.	14 bit; +/-20 mA: 14 bit, 4 to 20 mA: 13 bit	16 bit; as required	13 bit; 4 to 20 mA: 13 bit	16 bit; 15 bit: 1 to 5 V; +/-2.5 V; 16 bit: +/-10 V; +/-5 V	16 bit

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Technical specifications (continued)

	6ES7 134-4GB11-0AB0	6ES7 134-4MB02-0AB0	6ES7 134-4GD00-0AB0	6ES7 134-4FB52-0AB0	6ES7 134-4GB62-0AB0
Integrations and conversion time/ resolution per channel					
• Integration time, parameterizable		Yes	Yes		
• Integration time, ms	16.7 / 20 ms		16.67/20 ms		
• Interference voltage suppression for interference frequency f1 in Hz	60 / 50 Hz	60 / 50 Hz / no	60 / 50 Hz		
• Conversion time (per channel)	65 ms; 55 / 65 ms	0.04 ms; without noise suppression 17/20 ms per channel with error			
Smoothing of measured values					
• parameterizable	Yes; in four stages by means of digital filtering	Yes; in 4 stages: 1 x, 4 x, 16 x, 32 x cycle time	Yes; in 4 stages	Yes	Yes
• Step: None	Yes; 1 x cycle time	Yes; 1 x	Yes; 1 x cycle time	Yes; 1 x cycle time	Yes; 1 x cycle time
• Step: Low	Yes; 4 x cycle time	Yes; 4 x	Yes; 4 x cycle time	Yes; 4 x cycle time	Yes; 4 x cycle time
• Step: Medium	Yes; 32 x cycle time	Yes; 16 x	Yes; 16 x cycle time	Yes; 16 x cycle time	Yes; 16 x cycle time
• Step: High	Yes; 64 x cycle time	Yes; 32 x	Yes; 32 x cycle time	Yes; 32 x cycle time	Yes; 32 x cycle time
Encoder supply					
Number of outputs					2
Output voltage					24 V
Output current, rated value					90 mA; per channel
Output current, permissible range					0 to 90 mA
Short-circuit protection					Yes
Encoder					
Connection of signal encoders					
• for voltage measurement				Yes	
• for current measurement as 2-wire transducer					No
• burden of 2-wire transmitter, max.	750 Ω	750 Ω	750 Ω		
Errors/accuracies					
Linearity error (relative to input area)	+/- 0.01 %	+/- 0.03 %	+/- 0.01 %	+/- 0.03 %	+/- 0.03 %
Temperature error (relative to input area)	+/- 0.005 %/K	+/- 0.03 %/K	+/- 0.003 %/K	+/- 0.01 %/K	+/- 0.01 %/K
Crosstalk between the inputs, min.	-50 dB	-100 dB	-50 dB	-50 dB	-50 dB
Repeat accuracy in settled status at 25 °C (relative to input area)	+/- 0.05 %	+/- 0.01 %	+/- 0.05 %	+/- 0.1 %	+/- 0.1 %
Operational limit in overall temperature range					
• Voltage, relative to input area				+/- 0.3 %	
• Current, relative to input area	+/- 0.6 %	+/- 0.1 %; 0.2% without interference frequency suppression	+/- 0.4 %		+/- 0.3 %

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Technical specifications (continued)

	6ES7 134-4GB11-0AB0	6ES7 134-4MB02-0AB0	6ES7 134-4GD00-0AB0	6ES7 134-4FB52-0AB0	6ES7 134-4GB62-0AB0
Basic error limit (operational limit at 25 °C)					
• Voltage, relative to input area				+/- 0.2 %	
• Current, relative to input area	+/- 0.4 %	+/- 0.05 %; 0.1% without interference frequency suppression	+/- 0.3 %		+/- 0.2 %
Interference voltage suppression for f = n x (fl +/- 1%), fl = interference frequency					
• Series mode interference (peak value of interference < rated value of input range), min.	70 dB	90 dB	70 dB		
• common mode voltage (USS < 2.5 V) , min.		100 dB			
Parameter					
Remark	4 byte	12 byte, 4 byte in compatibility mode	7 byte	12 byte, 4 byte in compatibility mode	
Diagnostics: wire break	Disable / enable (only in measuring range 4 to 20 mA)	Disable / enable	1		At 4 to 20 mA
Measurement type/ range	deactivated / +/- 20 mA / 4 to 20 mA	deactivated / +/- 20 mA / 4 to 20 mA	1	Deactivated / +/-5 V / 1 to 5 V / +/-10 V / +/- 2.5 V	4 to 20 mA, 0 to 20 mA, +/-20 mA
Group diagnostics	Disable / enable	Disable / enable	1	Disable / enable	Yes
Overflow/underflow	Disable / enable	Disable / enable	1	Disable / enable	Yes
Alarms/diagnostics/ status information					
Alarms					
• Process alarm		Yes		Yes	Yes
Diagnostics					
• Diagnostic functions		Yes	Yes; can be read out	Yes	Yes
• Diagnostic information readable				Yes	Yes
• Wire break	Yes; measuring range 4 to 20 mA only	Yes; measuring range 4 to 20 mA only	Yes; measuring range 1 to 5 V only	Yes; at 1 to 5 V	Yes; only with measuring range 4 to 20 mA
• Group error	Yes	Yes	Yes	Yes	Yes
• Overflow/underflow	Yes	Yes	Yes	Yes	Yes
Diagnostic indication LED					
• Group error SF (red)	Yes	Yes	Yes	Yes	Yes
Isolation					
Isolation checked with	500 V DC		500 V DC	500 V DC	
Galvanic isolation					
Galvanic isolation analog inputs					
• between the channels	No	No; however, increased permissible potential difference between the inputs.	No	No	No
• between the channels and the backplane bus	Yes	Yes	Yes	Yes	Yes
• between the channels and the load voltage L+	No	Yes	No	Yes	Yes

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Technical specifications (continued)

	6ES7 134-4GB11-0AB0	6ES7 134-4MB02-0AB0	6ES7 134-4GD00-0AB0	6ES7 134-4FB52-0AB0	6ES7 134-4GB62-0AB0
Permissible potential difference between MANA and M internally (UISO)					75 V DC, 60 V AC
Dimensions Module width, max.		15 mm		15 mm	15 mm
Dimensions and weight Dimensions					
• Width	15 mm	15 mm	15 mm	15 mm	15 mm
• Height	81 mm	81 mm	81 mm	81 mm	81 mm
• Depth	52 mm	52 mm	52 mm	52 mm	52 mm
Weight					
• Weight, approx.	40 g	45 g	40 g	45 g	45 g

	6ES7 134-4JB01-0AB0	6ES7 134-4JB51-0AB0	6ES7 134-4JD00-0AB0	6ES7 134-4NB01-0AB0	6ES7 134-4NB51-0AB0
Supply voltages Load voltage L+					
• Rated value (DC)	24 V; from power module	24 V; from power module	24 V; from power module	24 V; from power module	24 V; from power module
• Reverse polarity protection	Yes	Yes	Yes	Yes	Yes
Power supply to the transmitters					
• present		Yes			
• short-circuit proof		Yes			
Current consumption from load voltage L+ (without load), max.	30 mA	30 mA	30 mA	30 mA	30 mA
from backplane bus 3.3 V DC, max.	10 mA	10 mA	10 mA	10 mA	10 mA
Power losses Power loss, typ.	0.6 W	0.6 W	0.6 W	0.6 W	0.6 W
Address area Address space per module					
• Address space per module, max.	4 byte	8 byte	8 byte	4 byte	4 byte
Isochronous mode Isochronous mode	No	No	No		No
Analog inputs Number of analog inputs	2	4; 2 for 3 or 4-wire connection	4	2	2
Cable length, shielded, max.	50 m	200 m	50 m	50 m	200 m
Constant measurement current for resistance-type transmitter, typ.		1.67 mA			1.25 mA
Cycle time (all channels) max.	Number of active channels per module x basic conversion time	Number of active channels per module x basic conversion time	Number of active channels per module x basic conversion time	Number of active channels per module x basic conversion time	Number of active channels per module x basic conversion time
Technical unit for temperature measurement adjustable	No	No	No	Yes	Yes
• Voltage	Yes		Yes	Yes	Yes
• Current				No	No
• Thermocouple	Yes		Yes	Yes	Yes
• Resistance thermometer		Yes		No	Yes
• Resistance		Yes		No	Yes

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Technical specifications (continued)

	6ES7 134-4JB01-0AB0	6ES7 134-4JB51-0AB0	6ES7 134-4JD00-0AB0	6ES7 134-4NB01-0AB0	6ES7 134-4NB51-0AB0
Input ranges (rated values), voltages					
• -80 mV to +80 mV	Yes		Yes	Yes	
• Input resistance (-80 mV to +80 mV)	1 MΩ		1 MΩ	1 MΩ	
Input ranges (rated values), thermoelements					
• Type B	Yes		Yes	Yes	
• Input resistance (Type B)	1 MΩ		1 MΩ	1 MΩ	
• Type C				Yes	
• Input resistance (Type C)				1 MΩ	
• Type E	Yes		Yes	Yes	
• Input resistance (Type E)	1 MΩ		1 MΩ	1 MΩ	
• Type J	Yes		Yes	Yes	
• Input resistance (type J)	1 MΩ		1 MΩ	1 MΩ	
• Type K	Yes		Yes	Yes	
• Input resistance (Type K)	1 MΩ		1 MΩ	1 MΩ	
• Type L	Yes		Yes	Yes	
• Input resistance (Type L)	1 MΩ		1 MΩ	1 MΩ	
• Type N	Yes		Yes	Yes	
• Input resistance (Type N)	1 MΩ		1 MΩ	1 MΩ	
• Type R	Yes		Yes	Yes	
• Input resistance (Type R)	1 MΩ		1 MΩ	1 MΩ	
• Type S	Yes		Yes	Yes	
• Input resistance (Type S)	1 MΩ		1 MΩ	1 MΩ	
• Type T	Yes		Yes	Yes	
• Input resistance (Type T)	1 MΩ		1 MΩ	1 MΩ	
Input ranges (rated values), resistance thermometers					
• Cu 10					Yes
• Input resistance (Cu 10)					10 MΩ
• Ni 100		Yes; standard/climate			Yes
• Input resistance (Ni 100)		2 000 kΩ			10 MΩ
• Ni 1000					Yes
• Input resistance (Ni 1000)					10 MΩ
• Ni 120					Yes
• Input resistance (Ni 120)					10 MΩ
• Ni 200					Yes
• Input resistance (Ni 200)					10 MΩ
• Ni 500					Yes
• Input resistance (Ni 500)					10 MΩ
• Pt 100		Yes; standard / climate			Yes
• Input resistance (Pt 100)		2 000 kΩ			10 MΩ

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Technical specifications (continued)

	6ES7 134-4JB01-0AB0	6ES7 134-4JB51-0AB0	6ES7 134-4JD00-0AB0	6ES7 134-4NB01-0AB0	6ES7 134-4NB51-0AB0
Input ranges (rated values), resistance thermometers					
• Pt 1000					Yes
• Input resistance (Pt 1000)					10 MΩ
• Pt 200					Yes
• Input resistance (Pt 200)					10 MΩ
• Pt 500					Yes
• Input resistance (Pt 500)					10 MΩ
Input ranges (rated values), resistors					
• 0 to 150 Ohm		Yes			Yes
• Input resistance (0 to 150 Ohm)		2 000 kΩ			10 MΩ
• 0 to 300 Ohm		Yes			Yes
• Input resistance (0 to 300 Ohm)		2 000 kΩ			10 MΩ
• 0 to 600 Ohm		Yes			Yes
• Input resistance (0 to 600 Ohm)		2 000 kΩ			10 MΩ
• 0 to 3000 Ohm					Yes
• Input resistance (0 to 3000 Ohm)					10 MΩ
Voltage input					
• permissible input voltage for voltage input (destruction limit), max.	10 V; permanent	9 V	10 V; permanent	20 V; +/-20 V, permanent	9 V
Characteristic linearization					
• parameterizable	Yes; type B, E, J, K, L, N, R, S, T to IEC 584	Yes; for Pt100, Ni100	Yes; type B, E, J, K, L, N, R, S, T to IEC 584	Yes	Yes; for Ptxxx, Nixxx
• for thermocouples				Type B, C, E, J, K, L, N, R, S, T to IEC 584	
• for resistance thermometer		Pt100 (standard, climatic range), Ni100 (standard, climatic range)			Ptxxx, Nixxx
Temperature compensation					
• internal temperature compensation	Not possible		Not possible	Yes; possible with TM-E15S24-AT, TM-E15C24-AT	Yes
• external temperature compensation with compensations socket	Yes; possible, one external compensating box per channel		Yes; possible, one external compensating box per channel	Yes; one external compensating box per channel	
Analog value creation					
Measurement principle	integrating	integrating	integrating	integrating	integrating (Sigma-Delta)
Integrations and conversion time/ resolution per channel					
• Resolution with overrange (bit including sign), max.	16 bit; 15 bit + sign	16 bit; 150 Ohm: 14 bit; 300, 600 Ohm: 15 bit, Pt100, Ni100: 16 bit	16 bit; 15 bit + sign	16 bit	16 bit; for Pt100, Ni100, Ni120, Pt200, Ni200, Pt 500, Ni 500, Pt1000, Ni1000, Cu10: 15 bit + sign; for 150, 300, 600, 3000 Ohm: 15 bit; for PTC: 1 bit

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Technical specifications (continued)

	6ES7 134-4JB01-0AB0	6ES7 134-4JB51-0AB0	6ES7 134-4JD00-0AB0	6ES7 134-4NB01-0AB0	6ES7 134-4NB51-0AB0
Integrations and conversion time/ resolution per channel					
• Integration time, parameterizable	Yes	Yes	Yes		
• Integration time, ms	16.7 / 20 ms	16.7 / 20 ms	16.7 / 20 ms	16.7 / 20 ms	16.7 / 20 ms
• Interference voltage suppression for interference frequency f1 in Hz	60 / 50 Hz	60 / 50 Hz	60 / 50 Hz	60 / 50 Hz	60 / 50 Hz
• Conversion time (per channel)	55 / 65 ms (additional 20 ms on activated wire-break test)	66 / 80 ms; additional conversion time for diagnostic wire break test	65 ms; 55 / 65 ms (additional 20 ms on activated wire-break test)	66 ms; 66 / 80 ms; additional conversion time for diagnostic wire break test	Basic conversion time incl. integration time: 50 / 60 ms; additional conversion time for diagnostic wire break test: 5 / 5 ms; additional conversion time for line compensation with 3-core connection: 50/60 ms
Smoothing of measured values					
• parameterizable	Yes; in four stages by means of digital filtering	Yes; in four stages by means of digital filtering	Yes; in four stages by means of digital filtering	Yes; in four stages by means of digital filtering	Yes; in four stages by means of digital filtering
• Step: None	Yes; 1 x cycle time	Yes; 1 x cycle time	Yes; 1 x cycle time	Yes; 1 x cycle time	Yes; 1 x cycle time
• Step: Low	Yes; 4 x cycle time	Yes; 4 x cycle time	Yes; 4 x cycle time	Yes; 4 x cycle time	Yes; 4 x cycle time
• Step: Medium	Yes; 32 x cycle time	Yes; 32 x cycle time	Yes; 32 x cycle time	Yes; 32 x cycle time	Yes; 32 x cycle time
• Step: High	Yes; 64 x cycle time	Yes; 64 x cycle time	Yes; 64 x cycle time	Yes; 64 x cycle time	Yes; 64 x cycle time
Encoder					
Connection of signal encoders					
• for voltage measurement	Yes		Yes		
• for resistance measurement with 2-conductor connection		Yes			Yes
• for resistance measurement with 3-conductor connection		Yes			Yes; internal compensation of the line resistances
• for resistance measurement with 4-conductor connection		Yes			Yes
Errors/accuracies					
Linearity error (relative to input area)	+/- 0.01 %	+/- 0.01 %	+/- 0.01 %	+/- 0.01 %	+/- 0.01 %
Temperature error (relative to input area)	+/- 0.005 %/K	+/- 0.005 %/K	+/- 0.005 %/K	+/- 0.005 %/K	+/- 0.0009 %/K
Crosstalk between the inputs, min.	-50 dB	-50 dB	-50 dB	-50 dB	-50 dB
Repeat accuracy in settled status at 25 °C (relative to input area)	+/- 0.05 %	+/- 0.05 %	+/- 0.05 %	+/- 0.05 %	+/- 0.05 %

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Technical specifications (continued)

	6ES7 134-4JB01-0AB0	6ES7 134-4JB51-0AB0	6ES7 134-4JD00-0AB0	6ES7 134-4NB01-0AB0	6ES7 134-4NB51-0AB0
Operational limit in overall temperature range					
• Voltage, relative to input area	+/- 0.6 %		+/- 0.6 %	+/- 0.1 %; +/-1.5 K for thermocouples, +/-7 K for thermocouples type C,+/-2.5 K with static thermal state (ambient temperature change < 0.3 K/min)	
• Resistance-type thermometer, relative to input area		+/- 0.6 %			Resistance-type transmitter: +/-0.1%; Pt100, Pt200, Pt500, Pt1000 standard: +/-1.0 K; Pt100, Pt200, Pt500, Pt1000 climate: +/-0.25 K; Ni100, Ni120, Ni200, Ni500, Ni1000 standard and climate: +/-0.4 K; Cu10 +/-1.5 K
Basic error limit (operational limit at 25 °C)					
• Voltage, relative to input area	+/- 0.4 %		+/- 0.4 %	+/- 0.05 %; +/-1 K with thermocouples, +/-5 K with thermocouples type C, +/-1.5 K with static thermal state (ambient temperature change < 0.3 K/min)	
• Resistance-type thermometer, relative to input area		+/- 0.4 %			Resistance-type transmitter: +/-0.05%; Pt100, Pt200, Pt500, Pt1000 standard: +/-0.6 K; Pt100, Pt200, Pt500, Pt1000 climate: +/-0.13 K; Ni100, Ni120, Ni200, Ni500, Ni1000 standard and climate: +/-0.2 K; Cu10 +/-1 K
Interference voltage suppression for f = n x (fl +/- 1%), fl = interference frequency					
• Series mode interference (peak value of interference < rated value of input range), min.	70 dB	70 dB	70 dB	70 dB	70 dB
• common mode voltage (USS < 2.5 V) , min.	90 dB	90 dB	90 dB	90 dB	90 dB
Parameter					
Remark	4 byte		4 byte	4 byte	7 byte
Diagnostics: wire break	Disable / enable (wire break is detected only in thermocouples)	Disable / enable	Disable / enable (wire break is detected only in thermocouples)	Disable / enable (wire break is detected only in thermocouples)	Disable / enable

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Technical specifications (continued)

	6ES7 134-4JB01-0AB0	6ES7 134-4JB51-0AB0	6ES7 134-4JD00-0AB0	6ES7 134-4NB01-0AB0	6ES7 134-4NB51-0AB0
Measurement type/ range	Deactivated/ +/- 80 mV/ TC-EL Type T (Cu-CuNi)/ TC-EL Type K (NiCr-Ni)/ TC-EL Type B (PtRh-PtRh)/ TC-EL Type c (Wer-Wer) TC-EL Type N (NiCrSi-NiSi)/ TC-EL Type E (NiCr-CuNi)/ TC-EL Type R (PtRh-Pt)/ TC-EL Type S (PtRh-Pt)/ TC-EL Type J (Fe-Cu-Ni)/ TC	deactivated/150 Ohm/ ; 300 Ohm/600 Ohm/ Pt100 climatic/ Pt100 standard; Ni100 standard / Ni100 climatic, 2, 3 or 4-wire	Deactivated/ +/- 80 mV/ TC-EL Type T (Cu-CuNi)/ TC-EL Type K (NiCr-Ni)/ TC-EL Type B (PtRh-PtRh)/ TC-EL Type c (Wer-Wer) TC-EL Type N (NiCrSi-NiSi)/ TC-EL Type E (NiCr-CuNi)/ TC-EL Type R (PtRh-Pt)/ TC-EL Type S (PtRh-Pt)/ TC-EL Type J (Fe-Cu-Ni)/ TC	Deactivated/ +/- 80 mV/ TC-EL Type T (Cu-CuNi)/ TC-EL Type K (NiCr-Ni)/ TC-EL Type B (PtRh-PtRh)/ TC-EL Type c (Wer-Wer) TC-EL Type N (NiCrSi-NiSi)/ TC-EL Type E (NiCr-CuNi)/ TC-EL Type R (PtRh-Pt)/ TC-EL Type S (PtRh-Pt)/ TC-EL Type J (Fe-Cu-Ni)/ TC	deactivated/ 150 Ohm/ 300 Ohm/ 600 Ohm/Pt100/ Pt200/ Pt500/ Pt1000 each standard or climate range/ Ni100/ Ni120/ Ni200/ Ni500/ Ni1000 each standard or climate range/ Cu10 each standard or climate range / PTC
Group diagnostics	Disable / enable	Disable / enable	Disable / enable	Disable / enable	Disable / enable
Overflow/underflow	Disable/enable	Disable/enable	Disable/enable	Disable/enable	Disable/enable
Comparison point	none / RTD		none / RTD	none / yes, internal	
Comparison point number	none / 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8		none / 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8		
Unit	Celsius		Celsius	Celsius / Fahrenheit	
Alarms/diagnostics/ status information					
Diagnostics					
• Diagnostic functions	Yes; can be read out	Yes; can be read out	Yes; can be read out		
• Diagnostic information readable	Yes		Yes		
• Wire break	Yes; a break in the wire is only detected for thermocouples	Yes	Yes; a break in the wire is only detected for thermocouples	Yes; only thermo-couples	Yes
• Group error	Yes	Yes	Yes	Yes	Yes
• Overflow/underflow	Yes	Yes	Yes	Yes	Yes
Diagnostic indication LED					
• Group error SF (red)	Yes	Yes	Yes	Yes	Yes
Isolation					
Isolation checked with	500 V DC	500 V DC	500 V DC	500 V DC	500 V DC
Galvanic isolation					
Galvanic isolation analog inputs					
• between the channels	No	No	No	No	No
• between the channels and the backplane bus	Yes	Yes	Yes	Yes	Yes
• between the channels and the load voltage L+	Yes	Yes	Yes	Yes	Yes
Permissible potential difference					
between inputs and MANA (UCM)	2 V AC PP		2 V AC PP	140 V DC/100 V AC	
between MANA and M internally (UISO)	75 V DC / 60 V AC	75 V DC / 60 V AC	75 V DC / 60 V AC	75 V DC / 60 V AC	75 V DC / 60 V AC
Dimensions and weight					
Dimensions					
• Width	15 mm	15 mm	15 mm	15 mm	15 mm
• Height	81 mm	81 mm	81 mm	81 mm	81 mm
• Depth	52 mm	52 mm	52 mm	52 mm	52 mm
Weight					
• Weight, approx.	40 g	40 g	40 g	40 g	40 g

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Technical specifications (continued)

	6ES7 135-4FB01-0AB0	6ES7 135-4FB52-0AB0	6ES7 135-4LB02-0AB0
Supply voltages			
Load voltage L+			
• Rated value (DC)	24 V; from power module	24 V; from power module	24 V
• Reverse polarity protection	Yes	Yes	Yes
Current consumption			
from load voltage L+ (without load), max.	130 mA	100 mA	80 mA
from backplane bus 3.3 V DC, max.	10 mA	10 mA	10 mA
Power losses			
Power loss, max.	2 W	2 W	1.2 W
Address area			
Address space per module			
• Address space per module, max.	4 byte	4 byte	4 byte
Isochronous mode			
Isochronous mode		Yes	Yes
Analog outputs			
Number of analog outputs	2	2	2
Cable length, shielded, max.	200 m	200 m; max. 20m for TWA 100µs	200 m; 100m if Twa < 2ms
Voltage output, short-circuit protection	Yes	Yes	Yes
Voltage output, short-circuit current, max.	25 mA	25 mA	25 mA
Cycle time (all channels) max.	1.5 ms	0.25 ms	0.5 ms; at max. 0.5 µF
Output ranges, voltage			
• 1 to 5 V	Yes	Yes	Yes; -5 to +5 V also implemented
• -10 to +10 V	Yes	Yes; +/-5V as well	Yes
Connection of actuators			
• for voltage output 2-conductor connection	Yes; without compensation of the line resistances	Yes; without compensation of the line resistances	Yes
• for voltage output 4-conductor connection	Yes	Yes	Yes
Load impedance (in rated range of output)			
• with voltage outputs, min.	1 kΩ	1 kΩ	1 kΩ
• with voltage outputs, capacitive load, max.	1 µF	1 µF; 0.1µF for Twa=0.1ms	0.5 µF
Destruction limits against externally applied voltages and currents			
• Voltages at the outputs towards MANA	15 V; max. 15 V permanent; 75 V for max. 1 s (mark to space ratio 1:20)	15 V; max. 15 V for max. 5 hours, 75 V for max. 1 s	15 V; as required
• Current, max.	50 mA; DC	30 mA; DC	
Analog value creation			
Integrations and conversion time/ resolution per channel			
• Resolution with overrange (bit including sign), max.	14 bit; 1 to 5 V: 12 bit, +/-10 V: 13 bit + sign	16 bit; 1 to 5 V: 14 bit, +/-10 V: 15 bit + sign, +/-5 V: 14 bit + sign	16 bit; 15 bit + sign
Settling time			
• for resistive load	0.1 ms	0.05 ms	0.2 ms
• for capacitive load	0.5 ms	0.05 ms	0.5 ms; at max. 0.5µF
• for inductive load	0.5 ms	0.05 ms	0.5 ms
Errors/accuracies			
Output ripple (based on output area, bandwidth 0 to 50 kHz)	+/- 0.02 %	+/- 0.02 %	+/- 0.02 %

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Technical specifications (continued)

	6ES7 135-4FB01-0AB0	6ES7 135-4FB52-0AB0	6ES7 135-4LB02-0AB0
Linearity error (relative to output area)	+/- 0.02 %	+/- 0.03 %	+/- 0.01 %
Temperature error (relative to output area)	+/- 0.01 %/K	+/- 0.01 %/K	
Crosstalk between the outputs, min.		60 dB	60 dB
Repeat accuracy in settled status at 25 °C (relative to output area)	+/- 0.05 %	+/- 0.03 %	+/- 0.01 %
Operational limit in overall temperature range			
• Voltage, relative to output area	+/- 0.4 %	+/- 0.2 %	+/- 0.1 %
Basic error limit (operational limit at 25 °C)			
• Voltage, relative to output area	+/- 0.2 %	+/- 0.01 %	+/- 0.05 %
Parameter			
Remark	7 byte	7	7 byte
Output type/range	deactivated / 1 to 5 V / +/ -10 V	deactivated / 1 to 5 V / +/ -10 V / +/- 5 V	deactivated / 1 to 5 V / +/ -10 V / +/- 5 V
Diagnostics: short circuit	Disable / enable	Disable / enable	Disable / enable
Interference frequency suppression			no
Group diagnostics	Disable / enable	Disable / enable	Disable / enable
Behavior on CPU/Master STOP	Output current and de-energized/ substitute a value/keep last value	Output current and de-energized/ substitute a value/keep last value	Output current and de-energized/ substitute a value/keep last value
Alarms/diagnostics/status information			
Substitute values connectable	Yes; 0 to 65535 (range of values must be within the rated range)	Yes; 0 to 65535 (range of values must be within the rated range)	Yes
Diagnostics			
• Diagnostic functions		Yes	
• Diagnostic information readable		Yes	Yes
• Wire break		No	
• Short circuit	Yes	Yes	Yes
• Group error	Yes	Yes	Yes
Diagnostic indication LED			
• Group error SF (red)	Yes	Yes	Yes
Isolation			
Isolation checked with			500 V DC
Galvanic isolation			
Galvanic isolation analog outputs			
• between the channels	No	No	No
• between the channels and the backplane bus	Yes	Yes	Yes
• between the channels and the load voltage L+	Yes	Yes	Yes
Permissible potential difference			
between MANA and M internally (UISO)	75 V DC / 60 V AC	75 V DC / 60 V AC	75 V DC / 60 V AC
Dimensions and weight			
Dimensions			
• Width	15 mm	15 mm	15 mm
• Height	81 mm	81 mm	81 mm
• Depth	52 mm	52 mm	52 mm
Weight			
• Weight, approx.	40 g	40 g	40 g

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Technical specifications (continued)

	6ES7 135-4GB01-0AB0	6ES7 135-4MB02-0AB0	6ES7 135-4GB52-0AB0
Supply voltages			
Load voltage L+			
• Rated value (DC)	24 V; from power module	24 V	24 V
• Reverse polarity protection	Yes	Yes	Yes
Current consumption			
from load voltage L+ (without load), max.	150 mA	80 mA	150 mA; with load
from backplane bus 3.3 V DC, max.	10 mA	10 mA	10 mA
Power losses			
Power loss, max.	2 W	1.2 W	2.4 W; typical
Address area			
Address space per module			
• Address space per module, max.	4 byte	4 byte	4 byte
Isochronous mode			
Isochronous mode		Yes	Yes
Analog outputs			
Number of analog outputs	2	2	2
Cable length, shielded, max.	200 m	200 m; 100m if Twa < 2ms	200 m; max. 20m for TWA 100µs
Current output, no-load voltage, max.	18 V	18 V	18 V
Cycle time (all channels) max.	1.5 ms	0.5 ms	250 µs
Output ranges, current			
• -20 to +20 mA	Yes	Yes	Yes
• 4 to 20 mA	Yes	Yes	Yes
Connection of actuators			
• for current output 2-conductor connection	Yes	Yes	Yes
• for current output 4-conductor connection	No	No	
Load impedance (in rated range of output)			
• with current outputs, max.	500 Ω	500 Ω	500 Ω
• with current outputs, inductive load, max.	1 mH	1 mH	1 mH; for TWA 100µs
Destruction limits against externally applied voltages and currents			
• Voltages at the outputs towards MANA	15 V; max. 15 V permanent; 75 V for max. 1 s (mark to space ratio 1:20)		
• Current, max.	50 mA; DC	50 mA	15 mA; max. 15 V/5 hours (higher voltages not permissible even briefly)
Analog value creation			
Integrations and conversion time/ resolution per channel			
• Resolution with overrange (bit including sign), max.	14 bit; 4 to 20 mA: 13 bit, +/-20 mA: 14 bit	16 bit	16 bit
Settling time			
• for resistive load	0.1 ms	0.3 ms	0.05 ms
• for capacitive load	0.5 ms	1 ms	0.05 ms; at a load of up to 500 Ohm/100 nF and a max. cable length of 20 m
• for inductive load	0.5 ms	0.5 ms	0.05 ms
Ex(i) characteristics			
Max. values of output circuits (per channel)			
• Uo (output no-load voltage), max.	18 V		

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Technical specifications (continued)

	6ES7 135-4GB01-0AB0	6ES7 135-4MB02-0AB0	6ES7 135-4GB52-0AB0
Errors/accuracies			
Output ripple (based on output area, bandwidth 0 to 50 kHz)	+/- 0.02 %	+/- 0.02 %	+/- 0.02 %
Linearity error (relative to output area)	+/- 0.02 %	+/- 0.01 %	+/- 0.03 %; with resistive load
Temperature error (relative to output area)	+/- 0.01 %/K	+/- 0.003 %/K	+/- 0.01 %/K
Crosstalk between the outputs, min.		60 dB	-60 dB
Repeat accuracy in settled status at 25 °C (relative to output area)	+/- 0.05 %	+/- 0.01 %	+/- 0.03 %
Operational limit in overall temperature range			
• Current, relative to output area	+/- 0.5 %	+/- 0.1 %	+/- 0.2 %; Specified value applies for loads from 200 to 350 Ohm, deviating operational limits for loads up to 200 Ohm and from 350 to 500 Ohm with up to 0.4%
Basic error limit (operational limit at 25 °C)			
• Current, relative to output area	+/- 0.3 %	+/- 0.05 %	+/- 0.1 %; Specified value applies for loads from 200 to 350 Ohm, deviating basic error limits for loads up to 200 Ohm and from 350 to 500 Ohm with up to 0.3%
Parameter			
Remark	7 byte	7 byte	7 byte
Output type/range	deactivated / +/-20 mA / 4 to 20 mA	deactivated / +/-20 mA / 4 to 20 mA	deactivated / +/-20 mA / 4 to 20 mA
Diagnostics: wire break	Disable / enable	Disable / enable	Disable / enable
Interference frequency suppression		disable / enable	
Group diagnostics	Disable / enable	Disable / enable	Disable / enable
Behavior on CPU/Master STOP	Output current and de-energized/ substitute a value/keep last value	Output current and de-energized/ substitute a value/keep last value	Output current and de-energized/ substitute a value/keep last value
Alarms/diagnostics/status information			
Substitute values connectable	Yes; 0 to 65535 (range of values must be within the rated range)	Yes	Yes
Diagnostics			
• Diagnostic functions			Yes
• Diagnostic information readable		Yes	Yes
• Wire break	Yes	Yes	Yes
• Group error	Yes	Yes	Yes
Diagnostic indication LED			
• Group error SF (red)	Yes	Yes	Yes
Isolation			
Isolation checked with		500 V DC	500 V DC
Galvanic isolation			
Galvanic isolation analog outputs			
• Galvanic isolation analog outputs		Yes	Yes
• between the channels	No	No	No
• between the channels and the backplane bus	Yes	Yes	Yes
• between the channels and the load voltage L+	Yes	Yes	Yes

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Technical specifications (continued)

	6ES7 135-4GB01-0AB0	6ES7 135-4MB02-0AB0	6ES7 135-4GB52-0AB0
Permissible potential difference between MANA and M internally (UISO)	75 V DC / 60 V AC	75 V DC / 60 V AC	75 V DC / 60 V AC
Dimensions and weight			
Dimensions			
• Width	15 mm	15 mm	15 mm
• Height	81 mm	81 mm	81 mm
• Depth	52 mm	52 mm	52 mm
Weight			
• Weight, approx.	40 g	40 g	45 g

Ordering data

	Order No.
Analog input modules	
Ordering unit 1 unit	
• 2 AI U High Speed I	**6ES7 134-4FB52-0AB0**
• 2 AI U Standard I	**6ES7 134-4FB01-0AB0**
• 2 AI U High Feature I	**6ES7 134-4LB02-0AB0**
• 2 AI I Standard 2-wire I	**6ES7 134-4GB01-0AB0**
• 2 AI I High Speed 2-wire I	**6ES7 134-4GB52-0AB0**
• 2 AI High Speed 4-wire I	**6ES7 134-4GB62-0AB0**
• 2 AI I Standard 4-wire I	**6ES7 134-4GB11-0AB0**
• 2 AI I High Feature 2-wire/4-wire (15 bit + sign) I	**6ES7 134-4MB02-0AB0**
• 2 AI RTD standard	**6ES7 134-4JB51-0AB0**
• 2 AI TC Standard	**6ES7 134-4JB01-0AB0**
• 2 AI RTD High Feature	**6ES7 134-4NB51-0AB0**
• 2 AI TC High Feature I	**6ES7 134-4NB01-0AB0**
• 4 AI Standard 2-wire I	**6ES7 134-4GD00-0AB0**
• 4 AI TC Standard I	**6ES7 134-4JD00-0AB0**
Analog output modules	
Ordering unit 1 unit	
• 2 AO U Standard I	**6ES7 135-4FB01-0AB0**
• 2 AO U High Speed I	**6ES7 135-4FB52-0AB0**
• 2 AO U High Feature I	**6ES7 135-4LB02-0AB0**
• 2 AO I Standard I	**6ES7 135-4GB01-0AB0**
• 2 AO I High Speed I	**6ES7 135-4GB52-0AB0**
• 2 AO I High Feature I	**6ES7 135-4MB02-0AB0**

	Order No.
Accessories for labeling	
Label sheets DIN A4 (10 units)	
Each sheet contains 60 labeling strips for I/O modules and 20 labeling strips for interface modules	
• petrol	**6ES7 193-4BH00-0AA0**
• red	**6ES7 193-4BD00-0AA0**
• yellow	**6ES7 193-4BB00-0AA0**
• light beige	**6ES7 193-4BA00-0AA0**
Accessories for system-integrated shield connection	
Shield connection element	**6ES7 193-4GA00-0AA0**
Ordering unit 5 units	
For plugging into TM-E and TM-P	
Shield clamps	**6ES7 193-4GB00-0AA0**
Ordering unit 5 units	
For 3 × 10 mm busbars	
Grounding terminal	**8WA2 868**
Ordering unit 1 unit	
For cable cross-sections up to 25 mm^2	
3 × 10 mm busbars	**8WA2 842**
Ordering unit 1 unit	

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Technology modules
SSI module

Overview



- 1-channel module for connecting SSI sensors to the ET 200S
- For position decoding and simple positioning tasks
- With two comparison operations with specifiable comparison values (standard mode)
- With a digital input for latching actual values (standard mode)
- Can be plugged into TM-E terminal module with automatic coding
- Fast mode for high-speed acquisition of encoder values (e.g. for drive controls)
- Module replacement possible during operation and when live (hot swapping)
- Simple parameterization without additional software

Note:
We supply positioning systems and prepared connection cables for counting and positioning functions as SIMODRIVE Sensors or Motion Connect 500
(also visit www.siemens.com/simatic-technology)

Technical specifications

	6ES7 138-4DB03-0AB0
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
• Reverse polarity protection	Yes
Current consumption	
from load voltage L+ (without load), max.	40 mA
Power losses	
Power loss, typ.	1 W
Hardware configuration	
Module exchange	
• Hot swapping the IM-DP	Yes
• Module exchange under process voltage	Yes
Digital inputs	
Number of digital inputs	1
Input voltage	
• for signal "0"	-30 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.	9 mA
Cable length	
• Cable length, shielded, max.	50 m
Encoder supply	
24 V encoder supply	
• 24 V	Yes
• Short-circuit protection	Yes
• Output current, max.	500 mA
Absolute encoder (SSI) encoder supply	
• Absolute encoder (SSI)	Yes
• Output voltage	L+ (-0.8 V)
• Output current, max.	500 mA
- Short-circuit protection	Yes
Encoder	
Number of connectable encoders, max.	1
Connectable encoders	
• Absolute encoder (SSI)	Yes
Encoder signals, absolute encoder (SSI)	
• Telegram length	13, 14, 16, 21, 24 & 25 bit
• Binary code	Yes
• Gray code	Yes
• Cable length, shielded, max.	320 m; At 125 kHz
• Monoflop time	16/32/48/64 µs
Alarms/diagnostics/status information	
Diagnostic indication LED	
• Group error SF (red)	Yes
• Status indicator digital input (green)	Yes
• Status indicator backward counting (green)	Yes
• Status indicator forward counting (green)	Yes
Galvanic isolation	
Galvanic isolation digital inputs	
• Galvanic isolation digital inputs	No; same potential with L+ and SSI
Galvanic isolation counter	
• between the channels and the backplane bus	Yes
• between the channels and the load voltage L+	No
Dimensions and weight	
Dimensions	
• Width	15 mm
• Height	81 mm
• Depth	52 mm
Weight	
• Weight, approx.	40 g

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Ordering data

	Order No.
SSI module	**6ES7 138-4DB03-0AB0**
for connecting absolute encoders with an SSI interface	
Accessories	
Label sheets DIN A4 (10 units)	
Each sheet contains 60 label strips for I/O modules and 20 label strips for interface modules	
• petrol	**6ES7 193-4BH00-0AA0**
• red	**6ES7 193-4BD00-0AA0**
• yellow	**6ES7 193-4BB00-0AA0**
• light beige	**6ES7 193-4BA00-0AA0**

	Order No.
Signal cable	
Preassembled for SSI absolute encoder 6FX2001-5, without Sub-D connector, UL/DESINA	**6FX5 002-2CC12-....**

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Technology modules
2 PULSE pulse generator

Overview



- 2-channel pulse generator and timer module for ET 200S
- For controlling final control elements, valves, heating elements, etc.
- Pulse-width modulation (PWM)
- Pulse trains
- Pulse chains
- Frequency output
- Time-precise switching signals to 24 V DC output
- Measurement of output current
- Isochronous mode

Technical specifications

	6ES7 138-4DD01-0AB0
Supply voltages	
Load voltage L+	
• Rated value (DC)	24 V; from power module
• Reverse polarity protection	Yes
Current consumption	
from load voltage L+ (without load), max.	40 mA
from backplane bus 3.3 V DC, max.	10 mA
Power losses	
Power loss, typ.	1.8 W
Digital inputs	
Number of digital inputs	2
Input characteristic curve acc. to IEC 1131, Type 2	Yes
Input voltage	
• Rated value, DC	24 V
• for signal "0"	-30 to +5 V
• for signal "1"	11 to 30 V
Input current	
• for signal "1", typ.	9 mA
Input delay (for rated value of input voltage)	
• Input frequency (with a time delay of 0.1 ms), max.	20 kHz
• Minimum pulse width for program reactions	100 µs
Cable length	
• Cable length, shielded, max.	100 m
Digital outputs	
Number of digital outputs	2
Short-circuit protection	Yes
• Response threshold, typ.	10 A
Limitation of inductive shutdown voltage to	L+ (-50 to -65 V)
Lamp load, max.	10 W
Accuracy of pulse duration	+/- (time period x 100 ppm), +/-100 µs with a load <= 50 Ohm
Minimum pulse duration	100 µs
Controlling a digital input	Yes
Output voltage	
• for signal "1", min.	L+ (-1 V)
Output current	
• for signal "1" rated value	2 A
• for signal "1" permissible range for 0 to 60 °C, min.	7 mA
• for signal "1" permissible range for 0 to 60 °C, max.	2 A
• for signal "0" residual current, max.	0.5 mA
Output delay with resistive load	
• 0 to "1", max.	100 µs
• 1 to "0", max.	200 µs
Switching frequency	
• with resistive load, max.	5 kHz
• with inductive load, max.	2 Hz
• on lamp load, max.	10 Hz
Cable length	
• Cable length, shielded, max.	1 000 m
• Cable length unshielded, max.	600 m
Encoder supply	
Output voltage	L+ (-0.8 V)
Output current, rated value	500 mA
Short-circuit protection	Yes
Encoder	
Connectable encoders	
• 2-wire BEROS	Yes
- permissible quiescent current (2-wire BEROS), max.	2 mA
Pulse generator	
Number of channels	2; 1 digital input and 1 digital output per channel
Alarms/diagnostics/status information	
Diagnostic indication LED	
• Group error SF (red)	Yes
• Status indicator digital output (green)	Yes
• Status indicator digital input (green)	Yes

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Technical specifications (continued)

	6ES7 138-4DD01-0AB0
Isolation	
Isolation checked with	500 V DC
Galvanic isolation	
Galvanic isolation digital inputs	
• between the channels	No
• between the channels and the backplane bus	Yes
Galvanic isolation digital outputs	
• between the channels	No
• between the channels and the backplane bus	Yes
Permissible potential difference	
between different circuits	75 V DC / 60 V AC
Dimensions and weight	
Dimensions	
• Width	15 mm
• Height	81 mm
• Depth	52 mm
Weight	
• Weight, approx.	40 g

Ordering data

Pulse generator and timer module 2PULSE	**6ES7 138-4DD01-0AB0**
For ET 200S	
Accessories	
Label sheets DIN A4 (10 units)	
Each sheet contains 60 labeling strips for I/O modules and 20 labeling strips for interface modules	
• petrol	**6ES7 193-4BH00-0AA0**
• red	**6ES7 193-4BD00-0AA0**
• yellow	**6ES7 193-4BB00-0AA0**
• light beige	**6ES7 193-4BA00-0AA0**

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Overview



- 1-channel module for ET 200S for controlled positioning of a stepper motor
- Operating modes: absolute and relative positioning, reference point approach, set reference point and speed mode
- Connection of power units with pulse/direction interface by means of 5 V differential signals up to 510 kHz
- External stop with/without ramp via digital input
- Status display and error indication via LEDs:
  Errors during positioning and statuses of the digital inputs are indicated by means of LEDs and displayed at the interface to the master
- Isochronous mode

Technical specifications

	6ES7 138-4DC01-0AB0
Supply voltages	
Load voltage L+	
• Rated value (DC)	24 V
Power losses	
Power loss, typ.	1.5 W
Digital inputs	
Number of digital inputs	2
Functions	Reference cams, pulse suppression, external stop, limit switch
Repeat frequency, max.	100 Hz
Input characteristic curve acc. to IEC 1131, Type 2	Yes
Input voltage	
• Rated value, DC	24 V
• for signal "0"	-30 to +5 V (-15% / +20%)
• for signal "1"	11 to 30 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.	4 ms
- at "1" to "0", max.	4 ms
Cable length	
• Cable length, shielded, max.	1 000 m
• Cable length unshielded, max.	600 m
Encoder	
Connectable encoders	
• 2-wire BEROS	Yes
Drive technology	
Cable length, max.	100 m; twisted and shielded in pairs
Step-by-step controllers	
Connection for stepper motors	Differential signals for pulses (PULSE, notPULSE) and direction (DIR, notDIR) to RS422
Number of stepper motor channels	1
Alarms/diagnostics/ status information	
Diagnostic indication LED	
• Description	1 green LED for status indication "Ready for positioning jobs"
• Positioning mode POS (green)	Yes
• Group error SF (red)	Yes
• Status indicator digital input (green)	Yes
Dimensions and weight	
Dimensions	
• Width	15 mm
• Height	81 mm
• Depth	52 mm
Weight	
• Weight, approx.	40 g

Ordering data

	Order No.
1STEP stepper module I for simple positioning tasks with stepper motor axes	**6ES7 138-4DC01-0AB0**
Accessories	
Label sheets DIN A4 (10 units) Each sheet contains 60 labeling strips for I/O modules and 20 labeling strips for interface modules	
• petrol	**6ES7 193-4BH00-0AA0**
• red	**6ES7 193-4BD00-0AA0**
• yellow	**6ES7 193-4BB00-0AA0**
• light beige	**6ES7 193-4BA00-0AA0**

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Overview



- The positioning module 1 POS U is a single-channel positioning module for ET 200S for positioning of adjusting and operating axes
- For controlled positioning by means of digital outputs according to the rapid traverse/creep speed principle
- With position value recording for
  - Incremental encoders with 5 V differential signals or 24 V signals or for SSI encoders
  - Dosing operation (single evaluation of encoder signal A only)
- Reference point approach, set actual value
- Parameter change during operation
  - Switchover difference
  - Switch-off difference
- Functions
  - Jog:
    Direct specification of control signals by the master
  - Travel:
    Absolute or relative
  - Axes:
    For linear and rotary axes
  - Latch function:
    Saving the current actual value by setting a digital input

Note

We offer position measuring systems and preassembled connecting cables for counting and positioning functions under the names SIMODRIVE Sensor or Motion Connect 500.

Technical specifications

	6ES7 138-4DL00-0AB0
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
• Reverse polarity protection	Yes
Current consumption	
from load voltage L+ (without load), max.	50 mA
from backplane bus 3.3 V DC, max.	10 mA
Power losses	
Power loss, typ.	2 W
Digital inputs	
Input characteristic curve acc. to IEC 1131, Type 2	Yes
Input voltage	
• Rated value, DC	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)	2 mA
• for signal "1", typ.	9 mA
Cable length	
• Cable length unshielded, max.	50 m
Digital outputs	
Short-circuit protection	Yes
• Response threshold, typ.	0.7 to 1.8 A
Limitation of inductive shutdown voltage to	yes; L+ -(55 to 60 V)
Lamp load, max.	5 W
Controlling a digital input	Yes
Output voltage	
• Rated value (DC)	24 V
• for signal "0" (DC), max.	3 V
• for signal "1", min.	L+ (-1 V)
Output current	
• for signal "1" permissible range for 0 to 60 °C, min.	7 mA
• for signal "1" permissible range for 0 to 60 °C, max.	600 mA
• for signal "0" residual current, max.	0.3 mA
Output delay with resistive load	
• 0 to "1", max.	typically 150 µs
• 1 to "0", max.	typically 150 µs
Switching frequency	
• with resistive load, max.	100 Hz
• with inductive load, max.	2 Hz
• on lamp load, max.	10 Hz
Cable length	
• Cable length, shielded, max.	1 000 m
• Cable length unshielded, max.	600 m
Encoder supply	
5 V encoder supply	
• 5 V	No
24 V encoder supply	
• 24 V	Yes
• Short-circuit protection	Yes
• Output current, max.	500 mA
Absolute encoder (SSI) encoder supply	
• Absolute encoder (SSI)	Yes
• Output voltage	L+ (-0.8 V)
• Output current, max.	500 mA
• Cable length, max.	
- Short-circuit protection	Yes
Encoder	
Number of connectable encoders, max.	1
Connectable encoders	
• Incremental encoder (symmetrical)	Yes
• Incremental encoder (asymmetrical)	Yes
• Absolute encoder (SSI)	Yes
• 2-wire BEROS	Yes; type 2

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Technical specifications (continued)

	6ES7 138-4DL00-0AB0
Encoder signals, incremental encoder (symmetrical)	
• Encoder signal 5 V	
- Signal level	to RS-422
- Terminating resistor	330 Ω
- Differential input voltage, min.	1 V
- Input frequency, max.	500 kHz
- Cable length, shielded, max.	50 m
• Encoder signal 24 V	
- Rated value 24 V DC	Yes
- Input voltage for signal "0"	5 V
- Input voltage for signal "1"	30 V
- Input current, for signal "0", max. (permissible quiescent current)	2 mA
- Input current for signal "1", typ.	9 mA
- Input frequency, max.	100 kHz
- Cable length, shielded, max.	50 m
Encoder signals, absolute encoder (SSI)	
• Cable length, shielded, max.	320 m at 125 kHz, 160 m at 250 kHz, 60 m at 500 kHz, 20 m at 1 MHz, 8 m at 2 MHz, twisted in pairs and shielded
• Updating the encoder value	
- Telegram runtime at 13 bit, min.	7 ms
- Telegram runtime at 25 bit, min.	13 ms
• Monoflop time	64 ms
Response times	
Send cycle of the feedback messages	1 ms
Latch	In the case of incremental encoders: typ. 400 ms; in the case of SSI encoders: typ. 400 ms + age of the encoder value:
Response time at switchover/ switchoff time	In the case of incremental encoders: output delay + 30 µs; in the case of SSI encoders: output delay + message frame runtime + 30 ms
Alarms/diagnostics/status information	
Diagnostic indication LED	
• Actual value falling DN (green)	Yes
• Actual value rising UP (green)	Yes
• Positioning mode POS (green)	Yes
• Group error SF (red)	Yes
• Status indicator digital input (green)	Yes
Galvanic isolation	
between backplane bus and all other circuit components	Yes
between the channels and backplane bus	Yes
Dimensions and weight	
Dimensions	
• Width	30 mm
• Height	81 mm
• Depth	52 mm
Weight	
• Weight, approx.	65 g

Ordering data

	Order No.
1 POS U positioning module	**6ES7 138-4DL00-0AB0**
Single-channel positioning module for ET 200S for positioning the adjustment and operation axes	

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Overview



- 1-channel 32-bit intelligent counter module for universal count tasks and time-based measuring tasks
- For the direct connection of 24 V incremental sensors or initiators
- Comparison function with predefinable comparison values
- Integrated digital output to output the reaction when the comparison value is attained
- Can be plugged into TM-E terminal module with automatic coding
- Module replacement possible during operation and under power (hot swapping)
- Simple parameterization without additional software

Note:
Siemens is able to offer distance measuring systems and pre-assembled connecting cables for counting and positioning functions in the product ranges SIMODRIVE Sensor and Motion Connect 500.

Technical specifications

	6ES7 138-4DA04-0AB0
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
• Reverse polarity protection	Yes
Current consumption	
from load voltage L+ (without load), max.	42 mA
from backplane bus 3.3 V DC, max.	10 mA
Power losses	
Power loss, typ.	1 W
Hardware configuration	
Module exchange	
• Hot swapping the IM-DP	Yes
• Module exchange under process voltage	Yes
Digital inputs	
Number of digital inputs	1
Functions	Gate control, synchronization, latch function
Input characteristic curve acc. to IEC 1131, Type 2	Yes
Input voltage	
• Rated value, DC	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)	2 mA
• for signal "1", typ.	9 mA
Input delay (for rated value of input voltage)	
• for standard inputs	
- at "0" to "1", max.	2.5 µs; Filter off: 2.5 µs (200 kHz), filter on: 25 µs (20 kHz)
Cable length	
• Cable length, shielded, max.	100 m; Filter 20 kHz: 100 m, filter 200 kHz: 50 m

	6ES7 138-4DA04-0AB0
Digital outputs	
Number of digital outputs	1
Short-circuit protection	Yes
• Response threshold, typ.	2.6 A to 4 A
Limitation of inductive shutdown voltage to	L+ (-50 to -60 V)
Lamp load, max.	5 W
Controlling a digital input	Yes
Output voltage	
• Rated value (DC)	24 V
• for signal "0" (DC), max.	3 V
• for signal "1", min.	L+ (-1 V)
Output current	
• for signal "1" permissible range for 0 to 40 °C, min.	5 mA
• for signal "1" permissible range for 0 to 40 °C, max.	2 000 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.	500 mA; 1000 mA at 50 °C
• for signal "0" residual current, max.	0.5 mA
Output delay with resistive load	
• 0 to "1", max.	100 µs
Switching frequency	
• with resistive load, max.	100 Hz
• with inductive load, max.	2 Hz
• on lamp load, max.	10 Hz
Cable length	
• Cable length, shielded, max.	1 000 m
• Cable length unshielded, max.	600 m
Encoder supply	
24 V encoder supply	
• 24 V	Yes; L+ (-0.8 V)
• Short-circuit protection	Yes
• Output current, max.	500 mA
Encoder	
Number of connectable encoders, max.	1

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Technical specifications (continued)

	6ES7 138-4DA04-0AB0
Connectable encoders	
• Incremental encoder (asymmetrical)	Yes
• 24 V initiator	Yes
• 2-wire BEROS	Yes
Counter	
Number of counter inputs	1; 32 bit
Minimum pulse width	2.5 µs; Filter off: 2.5 µs (200 kHz), Filter on: 25 µs (20 kHz)
Frequency measurement	
Measurement range, min.	0.1 Hz
Measurement range, max.	100 kHz
Cycle duration measurement	
Measuring range, lower limit	10 µs
Measuring range, upper limit	120 s
Speed measurement	
Measurement range, min. (lower limit)	1 1/min
Measurement range, max. (upper limit)	25 000 1/min
Parameter	
Remark	16 byte
Alarms/diagnostics/status information	
Diagnostics	
• Diagnostic functions	Yes

	6ES7 138-4DA04-0AB0
Diagnostic indication LED	
• Group error SF (red)	Yes
• Status indicator digital output (green)	Yes
• Status indicator digital input (green)	Yes
• Status indicator backward counting (green)	Yes
• Status indicator forward counting (green)	Yes
Galvanic isolation	
Galvanic isolation digital inputs	
• Galvanic isolation digital inputs	No; only opposite shielding
Galvanic isolation counter	
• between the channels and the backplane bus	Yes
• between the channels and the load voltage L+	No
Dimensions and weight	
Dimensions	
• Width	15 mm
• Height	81 mm
• Depth	52 mm
Weight	
• Weight, approx.	40 g

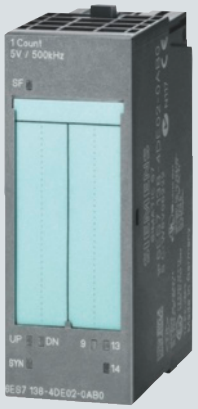
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Ordering data

	Order No.
1 COUNT 24 V/100 kHz counter module For universal counting and measuring tasks with ET 200S	**6ES7 138-4DA04-0AB0**
Accessories	
Label sheets DIN A4 (10 units) Each sheet contains 60 label strips for I/O modules and 20 label strips for interface modules	
• petrol	**6ES7 193-4BH00-0AA0**
• red	**6ES7 193-4BD00-0AA0**
• yellow	**6ES7 193-4BB00-0AA0**
• light beige	**6ES7 193-4BA00-0AA0**
Shield connection element For TM-P and TM-E terminal modules, as fixing for busbars 3 x 10 mm, 5 units	**6ES7 193-4GA00-0AA0**
Shield clamps For connecting braided cable shields to the busbar, 5 units	**6ES7 193-4GB00-0AA0**
SIMODRIVE sensor incremental encoder Externally mounted encoder, optical, incremental with HTL level, operating voltage 10 to 30 V	
• With synchronous flange, universal axial/radial cable outlet with connector	
- 100 pulses/revolution	**6FX2 001-4DA10**
- 500 pulses/revolution	**6FX2 001-4DA50**
- 1000 pulses/revolution	**6FX2 001-4DB00**
- 2500 pulses/revolution	**6FX2 001-4DC50**
• With synchronous flange, radial flange outlet	
- 100 pulses/revolution	**6FX2 001-4FA10**
- 500 pulses/revolution	**6FX2 001-4FA50**
- 1000 pulses/revolution	**6FX2 001-4FB00**
- 2500 pulses/revolution	**6FX2 001-4FC50**
• With synchronous flange, axial flange outlet	
- 100 pulses/revolution	**6FX2 001-4HA10**
- 500 pulses/revolution	**6FX2 001-4HA50**
- 1000 pulses/revolution	**6FX2 001-4HB00**
- 2500 pulses/revolution	**6FX2 001-4HC50**
• With clamping flange, universal axial/radial cable outlet with connector	
- 100 pulses/revolution	**6FX2 001-4NA10**
- 500 pulses/revolution	**6FX2 001-4NA50**
- 1000 pulses/revolution	**6FX2 001-4NB00**
- 2500 pulses/revolution	**6FX2 001-4NC50**
• With clamping flange, radial flange outlet	
- 100 pulses/revolution	**6FX2 001-4QA10**
- 500 pulses/revolution	**6FX2 001-4QA50**
- 1000 pulses/revolution	**6FX2 001-4QB00**
- 2500 pulses/revolution	**6FX2 001-4QC50**
• With clamping flange, axial flange outlet	
- 100 pulses/revolution	**6FX2 001-4SA10**
- 500 pulses/revolution	**6FX2 001-4SA50**
- 1000 pulses/revolution	**6FX2 001-4SB00**
- 2500 pulses/revolution	**6FX2 001-4SC50**
Signal cable Pre-assembled for HTL and TTL encoder, without Sub-D connector, UL/DESINA	**6FX5 002-2CA12-....**

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Overview



- 1-channel 32-bit intelligent counter module for universal count tasks and time-based measuring tasks
- For direct connection of 5 V incremental encoders (RS 422)
- Comparison function with predefinable comparison values
- 2 integrated digital outputs to output the response upon reaching the comparison value
- Can be plugged into TM-E terminal module with automatic coding
- Module replacement possible during operation and under power (hot swapping)
- Simple parameterization without additional software

Note:
Siemens is able to offer distance measuring systems and pre-assembled connecting cables for counting and positioning functions in the product ranges SIMODRIVE Sensor and Motion Connect 500.

Technical specifications

	6ES7 138-4DE02-0AB0
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
• Reverse polarity protection	Yes
Current consumption	
from load voltage L+ (without load), max.	45 mA
from backplane bus 3.3 V DC, max.	10 mA
Power losses	
Power loss, typ.	2 W
Hardware configuration	
Module exchange	
• Hot swapping the IM-DP	Yes
• Module exchange under process voltage	Yes
Digital inputs	
Number of digital inputs	1
Functions	Gate control, synchronization, latch function
Input characteristic curve acc. to IEC 1131, Type 2	Yes
Input voltage	
• Rated value, DC	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)	2 mA
• for signal "1", typ.	9 mA
Input delay (for rated value of input voltage)	
• for standard inputs	
- at "0" to "1", max.	2.5 µs
Cable length	
• Cable length, shielded, max.	50 m

	6ES7 138-4DE02-0AB0
Digital outputs	
Number of digital outputs	2
Short-circuit protection	Yes
• Response threshold, typ.	2.6 A to 4 A
Limitation of inductive shutdown voltage to	L+ (-50 to -60 V)
Lamp load, max.	10 W
Controlling a digital input	Yes
Output voltage	
• Rated value (DC)	24 V
• for signal "0" (DC), max.	3 V
• for signal "1", min.	L+ (-1 V)
Output current	
• for signal "1" rated value	2 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.	2.4 A
• for signal "0" residual current, max.	0.5 mA
Output delay with resistive load	
• 0 to "1", max.	100 µs
Switching frequency	
• with resistive load, max.	100 Hz
• with inductive load, max.	2 Hz
• on lamp load, max.	10 Hz
Cable length	
• Cable length, shielded, max.	1 000 m
• Cable length unshielded, max.	600 m
Encoder supply	
24 V encoder supply	
• 24 V	Yes; L+ (-0.8 V)
• Short-circuit protection	Yes
• Output current, max.	500 mA

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Technical specifications (continued)

	6ES7 138-4DE02-0AB0
Encoder	
Number of connectable encoders, max.	1
Connectable encoders	
• Incremental encoder (symmetrical)	Yes
• 2-wire BEROS	Yes
Encoder signals, incremental encoder (symmetrical)	
• Trace mark signals	A, notA, B, notB, A and B offset by 90°
• Zero mark signal	N, notN
• Input signal	5 V difference signal (phys. RS 422)
• Input frequency, max.	650 kHz
• Cable length, shielded, max.	50 m; > 500kHz: 30 m
Counter	
Number of counter inputs	1; 32 bit
Frequency measurement	
Measurement range, min.	0.1 Hz
Measurement range, max.	500 kHz
Cycle duration measurement	
Measuring range, lower limit	10 µs
Measuring range, upper limit	120 s
Speed measurement	
Measurement range, min. (lower limit)	1 1/min
Measurement range, max. (upper limit)	25 000 1/min
Parameter	
Remark	16 byte

	6ES7 138-4DE02-0AB0
Alarms/diagnostics/status information	
Diagnostics	
• Diagnostic functions	Yes
Diagnostic indication LED	
• Group error SF (red)	Yes
• Status indicator digital output (green)	Yes
• Status indicator digital input (green)	Yes
• Status indicator backward counting (green)	Yes
• Status indicator forward counting (green)	Yes
• Synchronization SYN (green)	Yes
Galvanic isolation	
Galvanic isolation digital inputs	
• Galvanic isolation digital inputs	No; only opposite shielding
Galvanic isolation counter	
• between the channels and the backplane bus	Yes
• between the channels and the load voltage L+	No
Dimensions and weight	
Dimensions	
• Width	30 mm
• Height	81 mm
• Depth	52 mm
Weight	
• Weight, approx.	65 g

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Ordering data

	Order No.
1 COUNT 5 V/500 kHz counter module	**6ES7 138-4DE02-0AB0**
For universal counting and measuring tasks with ET 200S	
Accessories	
Label sheets DIN A4 (10 units)	
Each sheet contains 60 label strips for I/O modules and 20 label strips for interface modules	
• petrol	**6ES7 193-4BH00-0AA0**
• red	**6ES7 193-4BD00-0AA0**
• yellow	**6ES7 193-4BB00-0AA0**
• light beige	**6ES7 193-4BA00-0AA0**
Shield connection element	**6ES7 193-4GA00-0AA0**
For TM-P and TM-E terminal modules, as fixing for busbars 3 x 10 mm, 5 units	
Shield clamps	**6ES7 193-4GB00-0AA0**
For connecting braided cable shields to the busbar, 5 units	

	Order No.
SIMODRIVE Incremental shaft encoder	
with RS 422 (TTL), operating voltage 10 to 30 V	
• With synchronous flange, universal axial/radial cable outlet with connector	
- 500 pulses/revolution	**6FX2 001-2DA50**
- 1000 pulses/revolution	**6FX2 001-2DB00**
- 1024 pulses/revolution	**6FX2 001-2DB02**
- 1250 pulses/revolution	**6FX2 001-2DB25**
- 1500 pulses/revolution	**6FX2 001-2DB50**
- 2000 pulses/revolution	**6FX2 001-2DC00**
- 2048 pulses/revolution	**6FX2 001-2DC04**
- 2500 pulses/revolution	**6FX2 001-2DC50**
- 3600 pulses/revolution	**6FX2 001-2DD60**
- 5000 pulses/revolution	**6FX2 001-2DF00**
• With synchronous flange, radial flange outlet	
- 500 pulses/revolution	**6FX2 001-2FA50**
- 1000 pulses/revolution	**6FX2 001-2FB00**
- 1024 pulses/revolution	**6FX2 001-2FB02**
- 1250 pulses/revolution	**6FX2 001-2FB25**
- 1500 pulses/revolution	**6FX2 001-2FB50**
- 2000 pulses/revolution	**6FX2 001-2FC00**
- 2048 pulses/revolution	**6FX2 001-2FC04**
- 2500 pulses/revolution	**6FX2 001-2FC50**
- 3600 pulses/revolution	**6FX2 001-2FD60**
- 5000 pulses/revolution	**6FX2 001-2FF00**

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Ordering data	Order No.
• With synchronous flange, axial flange outlet	
- 500 pulses/revolution	**6FX2 001-2HA50**
- 1000 pulses/revolution	**6FX2 001-2HB00**
- 1024 pulses/revolution	**6FX2 001-2HB02**
- 1250 pulses/revolution	**6FX2 001-2HB25**
- 1500 pulses/revolution	**6FX2 001-2HB50**
- 2000 pulses/revolution	**6FX2 001-2HC00**
- 2048 pulses/revolution	**6FX2 001-2HC04**
- 2500 pulses/revolution	**6FX2 001-2HC50**
- 3600 pulses/revolution	**6FX2 001-2HD60**
- 5000 pulses/revolution	**6FX2 001-2HF00**
• With clamping flange, universal axial/radial cable outlet with connector	
- 500 pulses/revolution	**6FX2 001-2NA50**
- 1000 pulses/revolution	**6FX2 001-2NB00**
- 1024 pulses/revolution	**6FX2 001-2NB02**
- 1250 pulses/revolution	**6FX2 001-2NB25**
- 1500 pulses/revolution	**6FX2 001-2NB50**
- 2000 pulses/revolution	**6FX2 001-2NC00**
- 2048 pulses/revolution	**6FX2 001-2NC04**
- 2500 pulses/revolution	**6FX2 001-2NC50**
- 3600 pulses/revolution	**6FX2 001-2ND60**
- 5000 pulses/revolution	**6FX2 001-2NF00**

	Order No.
• With clamping flange, radial flange outlet	
- 500 pulses/revolution	**6FX2 001-2QA50**
- 1000 pulses/revolution	**6FX2 001-2QB00**
- 1024 pulses/revolution	**6FX2 001-2QB02**
- 1250 pulses/revolution	**6FX2 001-2QB25**
- 1500 pulses/revolution	**6FX2 001-2QB50**
- 2000 pulses/revolution	**6FX2 001-2QC00**
- 2048 pulses/revolution	**6FX2 001-2QC04**
- 2500 pulses/revolution	**6FX2 001-2QC50**
- 3600 pulses/revolution	**6FX2 001-2QD60**
- 5000 pulses/revolution	**6FX2 001-2QF00**
• With clamping flange, axial flange outlet	
- 500 pulses/revolution	**6FX2 001-2SA50**
- 1000 pulses/revolution	**6FX2 001-2SB00**
- 1024 pulses/revolution	**6FX2 001-2SB02**
- 1250 pulses/revolution	**6FX2 001-2SB25**
- 1500 pulses/revolution	**6FX2 001-2SB50**
- 2000 pulses/revolution	**6FX2 001-2SC00**
- 2048 pulses/revolution	**6FX2 001-2SC04**
- 2500 pulses/revolution	**6FX2 001-2SC50**
- 3600 pulses/revolution	**6FX2 001-2SD60**
- 5000 pulses/revolution	**6FX2 001-2SF00**
Signal cable	
Pre-assembled for HTL and TTL encoder, without Sub-D connector, UL/DESINA	**6FX5 002-2CA12-....**

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Overview



- 1-channel module for serial data exchange through point-to-point connection
- For message frames max. 200 byte long
- RS 232C, RS 422, RS 485
- 2 versions
  - ASCII and 3964(R) protocol
  - Modbus and USS protocol
- Parameter assignment through GSD file or STEP 7 (V5.1 and higher)

Technical specifications

	6ES7 138-4DF01-0AB0	6ES7 138-4DF11-0AB0
Supply voltages		
Load voltage L+		
• Rated value (DC)	24 V	24 V
Current consumption		
from backplane bus 24 V DC, max.	80 mA; typ. 20 mA	80 mA
from backplane bus 3.3 V DC, max.	10 mA	10 mA
Power losses		
Power loss, typ.	1.2 W	1.2 W
Memory		
Standard blocks	5 100 byte; S_SEND 2700, S_RCV 2400, S_XON 2600, S_RTS 2600, S_V24 2700, S_VSTAT 1800, S_VSET 1800	11 100 byte; Modbus: S_SEND 2700, S_RCV 2400, S_MODB 6000; USI: S_SEND 2700, S_RCV 2400, S_USST 1900, S_USSR 2600, S_USSI 1500
Interfaces		
Number of interfaces	1	1
RS 232C	Yes; RS 232C signals: 8 (TxD, RxD, RTS, CTS, DTR, DSR, DCD, PE)	Yes; RS 232C signals: 8 (TxD, RxD, RTS, CTS, DTR, DSR, DCD, PE)
RS 422/RS485	Yes; RS-422 signals: 5 (TxD(A), RxD(A), TxD(B), RxD(B), PE); RS-485 signals: 3 (R/T(A), R/T(B), PE)	Yes; RS-422 signals: 5 (TxD(A), RxD(A), TxD(B), RxD(B), PE); RS-485 signals: 3 (R/T(A), R/T(B), PE)
RS 232, cable length, shielded, max.	15 m	15 m
RS 422/485, cable length, shielded, max.	1 200 m	1 200 m
Point-to-point		
Integrated protocol driver		
• 3964 (R)	Yes	
• ASCII	Yes	
• MODBUS		Yes
• Transmission speed, Modbus protocol, max.		115.2 kbit/s; half duplex: 110, 300, 600, 1200, 2400, 4800, 9600, 19,200, 38.400, 57,600, 76,800, 115,200 bit/s
• USS		Yes
• Transmission speed, USS protocol, max.		115.2 kbit/s; half duplex: 110, 300, 600, 1200, 2400, 4800, 9600, 19,200, 38,400, 57,600, 76,800, 115,200 bit/s
Transmission speed, RS 422/485		
• with 3964 (R) protocol, max.	115.2 kbit/s; half duplex: 110, 300, 600, 1200, 2400, 4800, 9600, 19,200, 38,400, 57,600, 76,800, 115,200 bit/s	
• with ASCII protocol, max.	115.2 kbit/s; full duplex: 110, 300, 600, 1200, 2400, 4800, 9600, 19,200, 38,400, 57,600, 76,800, 115,200 bit/s	

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Technical specifications (continued)

	6ES7 138-4DF01-0AB0	6ES7 138-4DF11-0AB0
Transmission speed, RS232		
• with 3964 (R) protocol, max.	115.2 kbit/s; half duplex: 110, 300, 600, 1200, 2400, 4800, 9600, 19,200, 38,400, 57,600, 76,800, 115,200 bit/s	
• with ASCII protocol, max.	115.2 kbit/s; full duplex: 110, 300, 600, 1200, 2400, 4800, 9600, 19,200, 38,400, 57,600, 76,800, 115,200 bit/s	
Character frame (adjustable)		
• Bits per character	7 or 8	8
• Number of start/stop bits	1 or 2	1 or 2 (USS only 1)
• Bits per character frame	10	10 or 11 (USS only 11 bit)
• Parity	none, odd, even, any	none, odd, even (USI even only)
Number of byte per PLC sampling cycle		
• Data quantity per PLC sampling cycle, receiving	32 byte; with IM151-1 Standard as of 6ES7 151-1AA04-0AB0; with IM151-1 High Feature as of 6ES7 151-1BA01-0AB0; otherwise 8 byte	32 byte; with IM151-1 Standard as of 6ES7 151-1AA04-0AB0; with IM151-1 High Feature as of 6ES7 151-1BA01-0AB0; otherwise 8 byte
• Data quantity per PLC sampling cycle, transmitting	32 byte; With IM151-1 Standard as of 6ES7 151-1AA04-0AB0; with IM151-1 High Feature as of 6ES7 151-1BA01-0AB0; otherwise 8 byte	32 byte; With IM151-1 Standard as of 6ES7 151-1AA04-0AB0; with IM151-1 High Feature as of 6ES7 151-1BA01-0AB0; otherwise 8 byte
Alarms/diagnostics/status information		
Diagnostic indication LED		
• Receive RxD (green)	Yes	Yes
• Group error SF (red)	Yes	Yes
• Transmit TxD (green)	Yes	Yes
Galvanic isolation		
Electrical isolation interface		
• between 422/485 and internal power supply	Yes	Yes
• between RS 232 and internal power supply	Yes	Yes
Environmental requirements		
Operating temperature		
• Min.	0 °C	0 °C
• max.	60 °C	60 °C
Storage/transport temperature		
• Min.	-40 °C	-40 °C
• max.	70 °C	70 °C
Dimensions and weight		
Dimensions		
• Width	15 mm	15 mm
• Height	81 mm	81 mm
• Depth	52 mm	52 mm
Weight		
• Weight, approx.	50 g	50 g

Ordering data

	Order No.
1SI interface module	
• ASCII and 3964(R) protocols	**6ES7 138-4DF01-0AB0**
• Modbus and USS protocols	**6ES7 138-4DF11-0AB0**
Accessories	
TM-E15S 26-A1 terminal module	**6ES7 193-4CA40-0AA0**
Ordering unit 5 units	
TM-E15S 26-A1 terminal module	**6ES7 193-4CA50-0AA0**
Ordering unit 5 units	
TM-E15N24-A1 terminal module	**6ES7 193-4CA80-0AA0**
Ordering unit 5 units	
TM-E15S24-01 terminal module	**6ES7 193-4CB20-0AA0**
Ordering unit 5 units	
TM-E15C24-01 terminal module	**6ES7 193-4CB30-0AA0**
Ordering unit 5 units	
TM-E15N24-01 terminal module	**6ES7 193-4CB70-0AA0**
Ordering unit 5 units	

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Overview



SIWAREX CS weighing electronics

SIWAREX CS 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. Data can be accessed directly in the SIMATIC.

Technical specifications

SIWAREX CS	
Integration in automation systems	
S7-400, S7-300, C7	Through ET 200S
IM151-7 CPU	Through backplane bus
Automation systems from other manufacturers (possible with limitations)	Through ET 200S
Communication interfaces	SIMATIC S7 (ET 200S backplane bus), RS 232, TTY
Connection of remote displays (through TTY serial interface)	Display for weight value
Adjustment of scales settings	Using SIMATIC S7/C7 IM151-7 CPU or SIWATOOL CS PC parameterization software (RS 232)
Measuring accuracy	
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
Digital filter	0.05 … 5 Hz (in 7 steps), mean-value filter
Weighing functions	
Weight values	Gross, net
Limit values	2 (min./max.)
Zero setting function	Per command
Tare function	Per command
Tare specification	Per command
Load cells	Strain gages in 4-wire or 6-wire system

SIWAREX CS	
Load cell powering	
Supply voltage U_s (rated value)	6 V DC typical
Max. supply current	≤ 68 mA
Permissible load impedance	
• R_{Lmin}	> 87 Ω
• R_{Lmax}	< 4010 Ω
	With SIWAREX IS Ex interface:
• 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	1 000 m
Intrinsically-safe load cell powering	Optional (SIWAREX IS Ex interface)
External load cell powering	Possible up to 24 V
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.
Supply voltage 24 V DC	
Rated voltage	24 V DC
Max. current consumption	150 mA
IP degree of protection to EN 60529; IEC 60529	IP20
Climatic requirements	
$T_{min\ (IND)}$ to $T_{max\ (IND)}$ (operating temperature)	
Vertical installation	-10 ... +60 °C
Horizontal installation	-10 ... +40 °C
EMC requirements according to	EN 61326, EN 45501 NAMUR NE21, Part 1
Dimensions	80 x 125 x 130 mm

Ordering data

Ordering data	Order No.
SIWAREX CS Weighing electronics for scales in SIMATIC ET 200S	**7MH4 910-0AA01**
SIWAREX CS Manual available in a range of languages Free download on the Internet at: www.siemens.com/weighing-technology	
SIWAREX CS "Getting started" Sample software shows beginners how to program the scales in STEP 7. Free download on the Internet at: www.siemens.com/weighing-technology	

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Ordering data

	Order No.
Configuration package SIWAREX CS on CD-ROM for SIMATIC S7, version V5.4 or higher • Software for SIWATOOL CS scale adjustment (in a range of languages) • Manuals available on CD (in a range of languages) • SIWAREX CS "Getting started"	**7MH4 910-0AK01**
SIWATOOL connection cable I from SIWAREX U/CS with serial PC interface, for 9-pin PC interfaces (RS 232), 3 m long	**7MH4 607-8CA**
Installation material (mandatory)	
Terminal module TM-E 30 mm wide (required for each SIWAREX module)	**6ES7 193-4CG20-0AA0** **or compatible**
Shield contact element Contents 5 units, sufficient for 5 cables	**6ES7 193-4GA00-0AA0**
Shield connection terminal Contents: 5 units, sufficient for 5 cables Note: one shield connection terminal is required each for the • scales connection and • TTY interface or • RS 232 interface	**6ES7 193-4GB00-0AA0**
N busbar, galvanized 3 x 10 mm, 1.0 m long	**8WA2 842**
Feeder terminal for N busbar	**8WA2 868**
Remote displays (option) The digital remote displays can be connected directly to the SIWAREX CS through the TTY interface. The following remote display can be used: S102 Siebert Industrieelektronik GmbH P.O. Box 1180 D-66565 Eppelborn Tel.: +49 6806/980-0 Fax: +49 6806/980-999 Internet: www.siebert.de Detailed information available from manufacturer.	
Accessories	
SIWAREX JB junction box, aluminium housing for connecting up to 4 load cells in parallel, and for connecting several junction boxes	**7MH4 710-1BA**
SIWAREX JB junction box, stainless steel housing for connecting up to 4 load cells in parallel	**7MH4 710-1EA**
Ex interface, type SIWAREX Pi With UL and FM approvals, but **without ATEX approval** for intrinsically-safe connection of load cells, suitable for the SIWAREX U, 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	**7MH4 710-5BA**
• With short-circuit current < 137 mA DC	**7MH4 710-5CA**
Cable (optional)	
Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, orange sheath to connect SIWAREX U, 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 … +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 I for TTY (connect 2 pairs of conductors in parallel), for connection of a remote display	**7MH4 407-8BD0**

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

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Overview



SIWAREX CF is a transmitter for connecting strain-gauge sensors for tasks such as measuring force and torque. The compact module is easy to install in all SIMATIC automation systems. Complete data access to the current measured values is then possible via the SIMATIC.

Technical specifications

SIWAREX CF	
Integration in automation systems	
S7-400, S7-300, C7	Through ET 200S
Automation systems from other vendors	Possible through ET 200S with IM 151-1
Communication interfaces	SIMATIC S7 (ET 200S backplane bus), 8 byte, I/O area
Module parameterization	Not required (module is pre-parameterized)
Measuring properties	
Error limit to DIN 1319-1 of full-scale value at 20 °C ± 10 K	≤ 0.15 %
Signal resolution	14 bit plus 1 bit sign
Number of measurements/ second	50
Low-pass filter	Without or 2 Hz
Sensors	In accordance with the principle of expansion measurement (full bridge) 4-wire connection
Sensor feed	
Supply voltage, short-circuit-proof	6 V DC ± 5 %
Permissible sensor resistance	
• R_{Lmin}	> 250 Ω
• R_{Lmax}	< 4010 Ω

SIWAREX CF	
Permissible sensor cell coefficient	Up to 4 mV/V
Permissible range of the measuring signal	-25.2 ... +25.2 mV
Power Supply	
Rated voltage	24 V DC
Max. current consumption	150 mA
Current consumption from backplane bus	Typ. 10 mA
Connection to sensors in Ex zone 1	Optionally via SIWAREX IS Ex interface
Ex approval zone 2 and safety	ATEX 95, cUL_{us} Haz. Loc.
IP degree of protection to 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 89/386/EEC
Dimensions	30 x 80 x 50 mm

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Ordering data	Order No.
SIWAREX CF Weighing module for strain-gauge sensors in SIMATIC ET 200S (SIWAREX CF configuring package not required)	**7MH4 920-0AA01**
SIWAREX CF manual • German, English Free download on the Internet at: www.siemens.com/weighing-technology	
SIWAREX CF "Getting started" Sample software for easy acquaintance with programming in STEP 7. Free download on the Internet at: www.siemens.com/weighing-technology	
Installation material (mandatory)	
Terminal module TM-E 30 mm wide (required for each SIWAREX module)	**6ES7 193-4CG20-0AA0** **or compatible**
Shield contact element Contents 5 units, sufficient for 5 cables	**6ES7 193-4GA00-0AA0**
Shield connection terminal Content: 5 units, sufficient for 5 cables One shield terminal element is required per sensor cable	**6ES7 193-4GB00-0AA0**

	Order No.
N busbar, galvanized 3 x 10 mm, 1.5 m long	**8WA2 842**
Feeder terminal for N busbar	**8WA2 868**
Accessories	
SIWAREX EB extension box for extending sensor cables	**7MH4 710-2AA**
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 and M weighing modules. Approved for use in the EU.	
• With short-circuit current < 199 mA DC	**7MH4 710-5BA**
• With short-circuit current < 137 mA DC	**7MH4 710-5CA**
Cable (optional)	
Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, orange sheath to connect SIWAREX U, 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 … +80 °C	**7MH4 702-8AG**

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Overview



- Mechanical modules as receptacles for the electronic modules
- For setting up permanent wiring via build-as-you-go voltage buses
- Keyed connection technology to ensure an enhanced vibration resistance of up to 5 g
- Different versions for accepting power modules and electronic modules
- Replaceable terminal box (even within the station network)
- Automatic coding of the electronic modules
- Build-as-you-go shielding of the backplane bus for high data security
- Color coding facility for the terminals and for identifying the slot numbers
- Alternatively available with screw-type or spring-loaded terminals as well as with no-strip fast connection system "FastConnect" for up to 60 % faster process wiring

Ordering data

	Order No.
TM-P terminal modules for PM-E power modules	
TM-P15S23-A1 Ordering unit 1 unit 2 x 3 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals	**6ES7 193-4CC20-0AA0**
TM-P15C23-A1 Ordering unit 1 unit 2 x 3 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals	**6ES7 193-4CC30-0AA0**
TM-P15N23-A1 Ordering unit 1 unit 2 x 3 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, FastConnect	**6ES7 193-4CC70-0AA0**
TM-P15S23-A0 Ordering unit 1 unit 2 x 3 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, screw-type terminals	**6ES7 193-4CD20-0AA0**
TM-P15C23-A0 Ordering unit 1 unit 2 x 3 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, spring-loaded terminals	**6ES7 193-4CD30-0AA0**
TM-P15N23-A0 Ordering unit 1 unit 2 x 3 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, FastConnect	**6ES7 193-4CD70-0AA0**
TM-P15S22-01 Ordering unit 1 unit 2 x 2 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals	**6ES7 193-4CE00-0AA0**
TM-P15C22-01 Ordering unit 1 unit 2 x 2 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals	**6ES7 193-4CE10-0AA0**
TM-P15N22-01 Ordering unit 1 unit 2 x 2 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, FastConnect	**6ES7 193-4CE60-0AA0**
TM-P30S44-A0 Ordering unit 1 unit 7 x 2 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, screw-type terminals for PM-E F PROFIsafe	**6ES7 193-4CK20-0AA0**
TM-P30C44-A0 Ordering unit 1 unit 7 x 2 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, spring-loaded terminals for PM-E F PROFIsafe	**6ES7 193-4CK30-0AA0**
TM-E terminal module for electronic modules[1]	
TM-E15S24-A1 Ordering unit 5 units 2 x 4 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals	**6ES7 193-4CA20-0AA0**
TM-E15C24-A1 Ordering unit 5 units 2 x 4 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals	**6ES7 193-4CA30-0AA0**
TM-E15S24-01 Ordering unit 5 units 2 x 4 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals	**6ES7 193-4CB20-0AA0**

[1] Observe project planning help for selecting the suitable TM-E and TM-P

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Ordering data	Order No.
TM-E15C24-01 Ordering unit 5 units 2 x 4 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals	**6ES7 193-4CB30-0AA0**
TM-E15S23-01 Ordering unit 5 units 2 x 3 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals	**6ES7 193-4CB00-0AA0**
TM-E15C23-01 Ordering unit 5 units 2 x 3 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals	**6ES7 193-4CB10-0AA0**
TM-E15N23-01 Ordering unit 5 units 2 x 3 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, FastConnect	**6ES7 193-4CB60-0AA0**
TM-E15N24-01 Ordering unit 5 units 2 x 4 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, FastConnect	**6ES7 193-4CB70-0AA0**
TM-E15S26-A1 Ordering unit 5 units 2 x 6 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals	**6ES7 193-4CA40-0AA0**
TM-E15C26-A1 Ordering unit 5 units 2 x 6 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals	**6ES7 193-4CA50-0AA0**
TM-E15N24-A1 Ordering unit 5 units 2 x 4 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, FastConnect	**6ES7 193-4CA70-0AA0**
TM-E15N26-A1 Ordering unit 5 units 2 x 6 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, FastConnect	**6ES7 193-4CA80-0AA0**
TM-E30S44-01 Ordering unit 1 unit 4 x 4 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals	**6ES7 193-4CG20-0AA0**
TM-E30C44-01 Ordering unit 1 unit 4 x 4 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals	**6ES7 193-4CG30-0AA0**

	Order No.
TM-E30S46-A1 Ordering unit 1 unit 4 x 6 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals	**6ES7 193-4CF40-0AA0**
TM-E30C46-A1 Ordering unit 1 unit 4 x 6 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals	**6ES7 193-4CF50-0AA0**
TM-E15S24-AT Ordering unit 1 unit for internal temperature compensation with 2 AI TC High Feature, screw-type terminal	**6ES7 193-4CL20-0AA0**
TM-E15C24-AT Ordering unit 1 unit for internal temperature compensation with 2 AI TC High Feature, spring-loaded terminals	**6ES7 193-4CL30-0AA0**
Accessories for shield connection	
Shield connection element Ordering unit 5 units For plugging into TM-E and TM-P	**6ES7 193-4GA00-0AA0**
Shield clamps Ordering unit 5 units For busbar 3 × 10 mm	**6ES7 193-4GB00-0AA0**
Grounding terminal Ordering unit 1 unit for cable cross-sections up to 25 mm^2	**8WA2 868**
3 × 10 mm busbars Ordering unit 1 unit	**8WA2 842**
Accessories for coding	
Color coding plates Ordering unit 200 units for TM-P, TM-E	
• white	**6ES7 193-4LA20-0AA0**
• yellow	**6ES7 193-4LB20-0AA0**
• yellow/green	**6ES7 193-4LC20-0AA0**
• red	**6ES7 193-4LD20-0AA0**
• blue	**6ES7 193-4LF20-0AA0**
• brown	**6ES7 193-4LG20-0AA0**
• turquoise	**6ES7 193-4LH20-0AA0**
Labels, inscribed Ordering unit 1 unit	
200 units for slot numbering (1 to 20) 10 ×	**8WA8 861-0AB**
200 units for slot numbering (1 to 40) 5 ×	**8WA8 861-0AC**
200 units for slot numbering (1 to 64) 1 ×, (1 to 68) 2 ×	**8WA8 861-0DA**
Labels, blank	
200 units for slot numbering	**8WA8 848-2AY**

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I/O modules
4 IQ-Sense and 8 IQ-Sense sensor modules

Overview



- The 4 IQ-Sense sensor module is an intelligent 4-channel electronic module for the ET 200S distributed I/O in PROFIBUS DP networking systems. It is used to connect photoelectric sensors using IQ-Sense technology.
- The 8×IQ-Sense sensor module is an intelligent 8-channel I/O module for SIMATIC S7-300 and ET 200M and is used to connect photoelectric and ultrasonic sensors using IQ-Sense technology. It is possible to combine different types of sensors on one module.

Standard function blocks are available for simplified handling of a SIMATIC S7. Conventional sensors cannot be operated on these modules.

The main applications of the IQ-Sense system are found in installations and machines:

- With high availability demands
- With a high probability of interaction between sensors
- With the need for high flexibility and dynamic changing of sensor parameters.

Technical specifications

	6ES7 138-4GA00-0AB0
Supply voltages	
Load voltage L+	
• Rated value (DC)	24 V; from power module
• Reverse polarity protection	Yes
Current consumption	
from load voltage L+ (without load), max.	300 mA
Power losses	
Power loss, typ.	0.85 W
Digital inputs	
Number of digital inputs	4
Cable length	
• Cable length, shielded, max.	50 m
• Cable length unshielded, max.	50 m
Analog inputs	
Cycle time (all channels) max.	3.24 ms
Encoder	
Connectable encoders	
• Description	Photoelectric proximity switches with IQ-SENSE

	6ES7 138-4GA00-0AB0
Alarms/diagnostics/status information	
Diagnostics	
• Diagnostic functions	Yes; Diagnostic information readable
Diagnostic indication LED	
• Group error SF (red)	Yes
• Status indicator sensor channel (green)	Yes
Isolation	
Isolation checked with	500 V DC
Galvanic isolation	
Galvanic isolation digital inputs	
• between the channels	No
• between the channels and the backplane bus	Yes
Permissible potential difference	
between different circuits	75 V DC / 60 V AC
Dimensions and weight	
Dimensions	
• Width	15 mm
• Height	81 mm
• Depth	52 mm
Weight	
• Weight, approx.	35 g

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Technical specifications (continued)

	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 5 V DC, max.	150 mA; typically
Connection method	
required front connector	20-pin
Digital inputs	
Number of digital inputs	8
Cable length	
• Cable length unshielded, max.	50 m
Encoder	
Connectable encoders	
• Description	photoelectronic proximity switches and ultrasonic sensors with IQ-Sense, cycle time 2.88 to 6 ms
Alarms/diagnostics/status information	
Diagnostic indication LED	
• Status indicator digital input (green)	Yes
Isolation	
Isolation checked with	500 V DC
Galvanic isolation	
Galvanic isolation digital inputs	
• between the channels	No
• between the channels and the backplane bus	Yes
Dimensions and weight	
Dimensions and weight	
• Width	40 mm
• Height	125 mm
• Depth	120 mm
Weight	
• Weight, approx.	250 g

Ordering data

	Order No.
4 IQ-Sense sensor module	**6ES7 138-4GA00-0AB0**
8 x IQ-Sense sensor module	**6ES7 338-7XF00-0AB0**
Sensors	

Note:

Sensors for connection to the sensor module are the C40 IQ-Sense diffuse sensors, the K80 IQ-Sense retroflective sensors and the M18 IQ-Sense ultrasonic sensors.

Since July 01, 2010 the marketing and sale of these sensors has been transferred to Pepperl+Fuchs:

Pepperl+Fuchs Vertrieb Deutschland GmbH
Lilienthalstraße 200
68307 Mannheim
Germany

E-mail:fa-info@de.pepperl-fuchs.com

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Overview



- For monitoring and, depending on the version, fusing the load and sensor supply voltage
- Can be plugged onto TM-P terminal modules with automatic coding
- Diagnostic message for voltage and blown fuse (can be switched off via configuration)
- Fail-safe PM-E F PROFIsafe power module for safe switching off of sequentially plugged-in 24 V DC to 10 A digital output modules or external loads; 3 additional integrated fail-safe 24 V DC / 2 A outputs
- PM-E 24 V to 48 V DC
  - with status information and diagnostics "Load voltage present"
  - for option handling
- PM-E 24 V DC to 230 V AC
  - power module for universal use
  - for option handling

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

	PM-E 24 V DC power module
Order No.	**6AG1 138-4CA01-2AA0**
Order No. based on	**6ES7 138-4CA01-0AA0**
Ambient temperature range	-25 … +60 °C
Ambient conditions	Suitable for exceptional exposure to media (e.g. sulfur chlorine atmosphere).
Technical specifications	The technical data is identical to that of the based on modules.

	24 to 48 V DC PM-E power module
Order No.	**6AG1 138-4CA50-2AB0**
Order No. based on	**6ES7 138-4CA50-0AB0**
Ambient temperature range	-25 … +60 °C
Ambient conditions	Suitable for exceptional exposure to media (e.g. sulfur chlorine atmosphere).
Technical data	The technical data is identical to that of the based on modules.

	PM-E power module 24 to 48 V DC / 42 to 230 V AC
Order No.	**6AG1 138-4CB11-2AB0**
Order No. based on	**6ES7 138-4CB11-0AB0**
Ambient temperature range	-25 … +60 °C
Ambient conditions	Suitable for exceptional exposure to media (e.g. sulfur chlorine atmosphere).
Technical data	The technical data is identical to that of the based on modules.

Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

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Ordering data

		Order No.
PM-E power module SIPLUS (extended temperature range and medial exposure)		
PM-E 24 V DC power module [1] For electronic modules; with diagnostics	H	**6AG1 138-4CA01-2AA0**
24 to 48 V DC PM-E power module For electronic modules; with diagnostics; with status bit "load voltage" present	H	**6AG1 138-4CA50-2AB0**
PM-E power module 24 to 48 V DC, 24 to 230 V AC For electronic modules; with diagnostics and fuse	H	**6AG1 138-4CB11-2AB0**
Accessories		siehe SIMATIC PM-E power modules, **page 9/57**

[1] Can be used for all electronic and technology modules except 2 DI 120 V AC / 2 DI 230 V AC / 2 DO 120/230 V AC

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H

Selection tool for terminal modules

Power modules	TM-P terminal modules for power modules			
Screw-type terminal type designation	TM-P15S23-A1	TM-P15S23-A0	TM-P15S22-01	TM-P30S44-A0
Order number 6ES7 193...	4CC20-0AA0	4CD20-0AA0	4CE00-0AA0	4CK20-0AA0
Spring-loaded terminal type designation	TM-P15C23-A1	TM-P15C23-A0	TM-P15C22-01	TM-P30C44-A0
Order number 6ES7 193...	4CC30-0AA0	4CD30-0AA0	4CE10-0AA0	4CK30-0AA0
FastConnect type designation	TM-P15N23-A1	TM-P15N23-A0	TM-P15N22-01	Soon to come
Order number 6ES7 193...	4CC70-0AA0	4CD70-0AA0	4CE60-0AA0	
PM-E 24 V DC	•	•	•	
PM-E 24 to 48 V DC	•	•	•	
PM-E 24 V DC/120/230 V AC	•	•	•	
PM-E F 24 V DC PROFIsafe				•

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Overview



- 2, 4 and 8-channel digital inputs and outputs for the ET 200S
- Can be plugged onto TM-E terminal modules with automatic coding
- High-feature versions for enhanced plant availability, additional functions and comprehensive diagnostics
- Hot swapping of modules possible

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

	SIPLUS digital input module 4 DI 24 V DC Standard	SIPLUS digital input module 4 DI 24 V DC High Feature	SIPLUS digital input module 8 DI 24 V DC Standard
Order number	**6AG1 131-4BD01-2AA0**	**6AG1 131-4BD01-7AB0**	**6AG1 131-4BF00-7AA0**
Order number based on	**6ES7 131-4BD01-0AA0**	**6ES7 131-4BD01-0AB0**	**6ES7 131-4BF00-0AA0**
Ambient temperature range	-25 ... +60 °C	-25 ... +70 °C	
Conformal coating	Coating of the printed circuit boards and the electronic components		
Technical data	The technical data of the standard product applies except for the ambient conditions.		

	SIPLUS digital input module 8 DI SOURCE INPUT 24 V DC	SIPLUS digital output module 2 DO 24 V DC/0.5 A High Feature	SIPLUS digital output module 2 DO 24 V DC/2 A High Feature
Order number	**6AG1 131-4BF50-7AA0**	**6AG1 132-4BB01-2AB0**	**6AG1 132-4BB31-7AB0**
Order number based on	**6ES7 131-4BF50-0AA0**	**6ES7 132-4BB01-0AB0**	**6ES7 132-4BB31-0AB0**
Ambient temperature range	-40 ... +70 °C	-25 ... +60 °C	-25 ... +70 °C
Conformal coating	Coating of the printed circuit boards and the electronic components		
Technical data	The technical data of the standard product applies except for the ambient conditions.		

	SIPLUS digital output module 4 DO 24 V DC/0.5 A Standard	SIPLUS digital output module 4 DO 24 V DC/2 A Standard	SIPLUS digital output module 8 DO 24 V DC/0.5 A Standard
Order number	**6AG1 132-4BD02-7AA0**	**6AG1 132-4BD32-2AA0**	**6AG1 132-4BF00-7AA0**
Order number based on	**6ES7 132-4BD02-0AA0**	**6ES7 132-4BD32-0AA0**	**6ES7 132-4BF00-0AA0**
Ambient temperature range	-25 ... +70 °C	-25 ... +60 °C	-25 ... +70 °C
Conformal coating	Coating of the printed circuit boards and the electronic components		
Technical data	The technical data of the standard product applies except for the ambient conditions.		

	SIPLUS digital output module 8 DO 24 V DC/0.5 A Standard SOURCE OUTPUT	SIPLUS digital output module 2 DO 24 V DC to 230 V AC/5 A relay, NO contact	SIPLUS digital output module 2 DO 24...48 V DC/5 A, 24...230 V AC/5 A relay, changeover contact
Order number	**6AG1 132-4BF50-7AA0**	**6AG1 132-4HB01-2AB0**	**6AG1 132-4HB12-2AB0**
Order number based on	**6ES7 132-4BF50-0AA0**	**6ES7 132-4HB01-0AB0**	**6ES7 132-4HB12-0AB0**
Ambient temperature range	-25 ... +70 °C	-25 ... +70 °C	-25 ... +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components		
Technical data	The technical data of the standard product applies except for the ambient conditions.		

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Overview (continued)

Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

For further technical documentation on SIPLUS, see:

www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS digital input modules		
(extended temperature range and medial exposure)		
Ordering unit 5 units		
• 4 DI 24 V DC Standard		**6AG1 131-4BD01-2AA0**
• 4 DI 24 V DC High Feature	L	**6AG1 131-4BD01-7AB0**
• 8 DI 24 V DC Standard	H	**6AG1 131-4BF00-7AA0**
Ordering unit 1 unit		
• 8 DI 24 V DC Source Input	H	**6AG1 131-4BF50-7AA0**
SIPLUS digital output modules		
(extended temperature range and medial exposure)		
Ordering unit 5 units		
• 2 DO 24 V DC/0.5 A High Feature	H	**6AG1 132-4BB01-2AB0**
• 2 DO 24 V DC/2 A High Feature	H	**6AG1 132-4BB31-7AB0**
• 4 DO 24 V DC/0.5 A Standard	H	**6AG1 132-4BD02-7AA0**
• 4 DO 24 V DC/2 A Standard	H	**6AG1 132-4BD32-2AA0**
• 2 DO 24 V DC to 230 V AC/5 A relay, NO contact	H	**6AG1 132-4HB01-2AB0**
• 2 DO 24...48 V DC/5 A, 24...230 V AC/5 A relay, changeover contact	H	**6AG1 132-4HB12-2AB0**
Ordering unit 1 unit		
• 8 DO 24 V DC/0.5 A Standard	H	**6AG1 132-4BF00-7AA0**
• 8 DO, 24 V DC / 0.5 A Standard SOURCE OUTPUT	H	**6AG1 132-4BF50-7AA0**
Accessories		See SIMATIC ET 200S digital electronic modules, page 9/73

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H
L: Subject to export regulations AL: 9I999 and ECCN: N

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Overview



- Analog inputs and outputs for the ET 200S
- Can be plugged onto TM-E terminal modules with automatic coding
- High-speed versions with extremely short isochronous cycle times
- Hot swapping of modules possible

Notes:

Consult the configuring guide for selection of the appropriate TM-E terminal modules.

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

	SIPLUS analog electronic module 2 AI U Standard
Order No.	**6AG1 134-4FB01-2AB0**
Order No. based on	**6ES7 134-4FB01-0AB0**
Ambient temperature range	-25 ... +60 °C
Ambient conditions	Suitable for exceptional medial exposure (e.g. in sulfur chloride atmosphere).
Technical data	The technical data are identical with those of the based-on modules.

	SIPLUS analog electronic module 2 AI I Standard 2-wire
Order No.	**6AG1 134-4GB01-2AB0**
Order No. based on	**6ES7 134-4GB01-0AB0**
Ambient temperature range	-25 ... +60 °C
Ambient conditions	Suitable for exceptional medial exposure (e.g. in sulfur chloride atmosphere).
Technical data	The technical data are identical with those of the based-on modules.

	SIPLUS analog electronic module 2 AI I Standard 4-wire
Order No.	**6AG1 134-4GB11-2AB0**
Order No. based on	**6ES7 134-4GB11-0AB0**
Ambient temperature range	-25 ... +60 °C
Ambient conditions	Suitable for exceptional medial exposure (e.g. in sulfur chloride atmosphere).
Technical data	The technical data are identical with those of the based-on modules.

	SIPLUS analog electronic module 2 AI I High Feature
Order No.	**6AG1 134-4MB02-2AB0**
Order No. based on	**6ES7 134-4MB02-0AB0**
Ambient temperature range	-25 ... +60 °C
Ambient conditions	Suitable for exceptional medial exposure (e.g. in sulfur chloride atmosphere).
Technical data	The technical data are identical with those of the based-on modules.

	SIPLUS analog electronic module 2 AI High Speed
Order No.	**6AG1 134-4GB52-2AB0**
Order No. based on	**6ES7 134-4GB52-0AB0**
Ambient temperature range	-25 ... +60 °C
Ambient conditions	Suitable for exceptional medial exposure (e.g. in sulfur chloride atmosphere).
Technical data	The technical data are identical with those of the based-on modules.

	SIPLUS analog electronic module 4 AI I Standard 2-wire
Order No.	**6AG1 134-4GD00-2AB0**
Order No. based on	**6ES7 134-4GD00-0AB0**
Ambient temperature range	-25 ... +60 °C
Ambient conditions	Suitable for exceptional medial exposure (e.g. in sulfur chloride atmosphere).
Technical data	The technical data are identical with those of the based-on modules.

	SIPLUS analog electronic module 2 AI RTD
Order No.	**6AG1 134-4JB51-7AB0**
Order No. based on	**6ES7 134-4JB51-0AB0**
Ambient temperature range	-25 ... +60 °C
Ambient conditions	Suitable for exceptional medial exposure (e.g. in sulfur chloride atmosphere).
Technical data	The technical data are identical with those of the based-on modules.

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Overview (continued)

	SIPLUS analog electronic module 2 AI RTD High Feature
Order No.	**6AG1 134-4NB51-2AB0**
Order No. based on	**6ES7 134-4NB51-0AB0**
Ambient temperature range	-25 ... +60 °C
Ambient conditions	Suitable for exceptional medial exposure (e.g. in sulfur chloride atmosphere).
Technical data	The technical data are identical with those of the based-on modules.

	SIPLUS analog electronic module 2 AI TC High Feature
Order No.	**6AG1 134-4NB01-7AB0**
Order No. based on	**6ES7 134-4NB01-0AB0**
Ambient temperature range	0 ... +70 °C
Ambient conditions	Suitable for exceptional medial exposure (e.g. in sulfur chloride atmosphere).
Technical data	The technical data are identical with those of the based-on modules.

	SIPLUS analog electronic module 2 AO U Standard
Order No.	**6AG1 135-4FB01-2AB0**
Order No. based on	**6ES7 135-4FB01-0AB0**
Ambient temperature range	-25 ... +60 °C
Ambient conditions	Suitable for exceptional medial exposure (e.g. in sulfur chloride atmosphere).
Technical data	The technical data are identical with those of the based-on modules.

	SIPLUS analog electronic module 2 AO U High Feature
Order No.	**6AG1 135-4LB02-7AB0**
Order No. based on	**6ES7 135-4LB02-0AB0**
Ambient temperature range	-25 ... +60 °C
Ambient conditions	Suitable for exceptional medial exposure (e.g. in sulfur chloride atmosphere).
Technical data	The technical data are identical with those of the based-on modules.

	SIPLUS analog electronic module 2 AO U High Feature
Technical data	The technical data are identical with those of the based-on modules.

	SIPLUS analog electronic module 2 AO I Standard
Order No.	**6AG1 135-4GB01-2AB0**
Order No. based on	**6ES7 135-4GB01-0AB0**
Ambient temperature range	-25 ... +70 °C
Ambient conditions	Suitable for exceptional medial exposure (e.g. in sulfur chloride atmosphere).
Technical data	The technical data are identical with those of the based-on modules.

Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

Ordering data

		Order No.
SIPLUS analog input modules		
(extended temperature range and medial exposure)		
• 2 AI U Standard	L	**6AG1 134-4FB01-2AB0**
• 2 AI I Standard 2-wire	H	**6AG1 134-4GB01-2AB0**
• 2 AI I Standard 4-wire	H	**6AG1 134-4GB11-2AB0**
• 2 AI I High Feature 2-wire/4-wire (15 bit + sign)		**6AG1 134-4MB02-2AB0**
• 2 AI High Speed 2-wire	H	**6AG1 134-4GB52-2AB0**
• 4 AI Standard 2-wire	H	**6AG1 134-4GD00-2AB0**
• 2 AI RTD Standard	I	**6AG1 134-4JB51-7AB0**
• 2 AI RTD High Feature	H	**6AG1 134-4NB51-2AB0**
• 2 AI TC High Feature	I	**6AG1 134-4NB01-7AB0**
SIPLUS analog output modules		
• 2 AO U Standard	H	**6AG1 135-4FB01-2AB0**
• 2 AO U High Feature	H	**6AG1 135-4LB02-7AB0**
• 2 AO I Standard	H	**6AG1 135-4GB01-2AB0**
Accessories		See SIMATIC ET 200S analog electronic modules, page 9/91

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H
I: Subject to export regulations AL: N and ECCN: EAR99H
L: Subject to export regulations AL: 9I999 and ECCN: N

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Overview



- 1-channel module for serial data communication via point-to-point link
- For message frames max. 200 byte long
- RS-232C, RS-422, RS-485
- 2 versions
  - ASCII and 3964 (R) protocols
  - Modbus and USS protocols
- Configuration via GSD file or STEP 7 (from V5.1)

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS 1SI interface module		
Order No.	**6AG1 138-4DF01-7AB0**	**6AG1 138-4DF11-7AB0**
Order No. based on	**6ES7 138-4DF01-0AB0**	**6ES7 138-4DF11-0AB0**
Ambient temperature range	-25 °C to +70 °C	
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	
Ambient conditions		
• Relative humidity	5 … 100 % condensation permitted	
• Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)	
• Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA –S71.04 severity level G1; G2; G3; GX [1) 2)]	
• Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]	
• Air pressure (depending on the highest positive temperature range specified)	1080...795 hPa (-ET 200pro ... +2000 m) See ambient temperature range 795…658 hPa (+2000 … +3500 m) Derating 10 K 658...540 hPa (+3500 ... +5000m) Derating 20K	

1) ISA-S71.04 severity level GX: Long-term load: SO_2 <4.8 ppm H_2S <9.9 ppm; Cl <0.2 ppm; HCl <0.66 ppm; HF <0.12 ppm; NH <49 ppm; O_3 <0.1 ppm; NO x <5.2 ppm
Threshold/ limit value (max. 30 min/d): SO_2 <17.8 ppm; H_2S <49.7 ppm; Cl <1.0 ppm; HCl <3.3 ppm; HF <2.4 ppm; NH <247 ppm; O_3 <1.0 ppm; NOX <10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

Ordering data		Order No.
1 SI interface module		
(extended temperature range and medial exposure)		
• ASCII and 3964(R) protocols	L	**6AG1 138-4DF11-7AB0**
• Modbus and USS protocols	H	**6AG1 138-4DF01-7AB0**
Accessories		See SIMATIC 1 SI interface module, page 9/105

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H
L: Subject to export regulations AL: 9I999 and ECCN: N

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Overview



- Single-channel, intelligent 32 bit counter module for universal counting and measuring tasks
- For direct connection of 24 V incremental encoders or initiators
- Comparison functions with definable comparison values
- Integrated digital output for output of the response on reaching the comparison value
- Can be plugged onto TM-E terminal modules with automatic coding
- Hot swapping of modules possible
- Simple parameterization without additional software

Notes:

Position measuring systems and preassembled connecting cables for the counting and positioning functions are provided by SIMODRIVE Sensor or Motion Connect 500.

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

	SIPLUS 1 COUNT counter module 24 V/100 kHz
Order No.	**6AG1 138-4DA04-2AB0**
Order No. based on	**6ES7 138-4DA04-0AB0**
Ambient temperature range	-25 °C to +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions.
Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS 1 COUNT counter module 24 V/100 kHz (extended temperature range and medial exposure) For universal counting and measuring tasks with ET 200S	H	**6AG1 138-4DA04-2AB0**
Accessories		See SIMATIC 1 COUNT counter module 24 V/100 kHz, page 9/100

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H

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Overview



- Mechanical modules as receptacles for the electronic modules
- For setting up permanent wiring via build-as-you-go voltage buses
- Positive-fit connection technology to ensure enhanced vibration resistance of up to 5 g
- Different versions as receptacles for power modules and electronic modules
- Replaceable terminal box (even within the station network)
- Automatic coding of the electronic modules
- Build-as-you-go shielding of the backplane bus for high data security
- Color coding facility for the terminals and for identifying the slot numbers
- Alternatively available with screw-type or spring-loaded terminals as well as with no-strip fast connection system "FastConnect" for up to 60% quicker process wiring

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

	SIPLUS DP TM-P12S23-A0
Order No.	**6AG1 193-4CD20-2AA0**
Order No. based on	**6ES7 193-4CD20-0AA0**
Ambient temperature range	-25 ... +60 °C
Ambient conditions	Suitable for exceptional medial exposure (e.g. in sulfur chloride atmosphere).
Technical data	The technical data are identical with those of the based-on modules.

	SIPLUS DP TM-P15C23-A1
Order No.	**6AG1 193-4CD30-2AA0**
Order No. based on	**6ES7 193-4CD30-0AA0**
Ambient temperature range	-25 ... +60 °C
Ambient conditions	Suitable for exceptional medial exposure (e.g. in sulfur chloride atmosphere).
Technical data	The technical data are identical with those of the based-on modules.

	SIPLUS DP TM-P15C22-01
Order No.	**6AG1 193-4CE10-2AA0**
Order No. based on	**6ES7 193-4CE10-0AA0**
Ambient temperature range	-40 ... +70 °C
Ambient conditions	Suitable for exceptional medial exposure (e.g. in sulfur chloride atmosphere).
Technical data	The technical data are identical with those of the based-on modules.

	SIPLUS DP TM-E15C23-01
Order No.	**6AG1 193-4CB10-7AA0**
Order No. based on	**6ES7 193-4CB10-0AA0**
Ambient temperature range	0 ... +70 °C
Ambient conditions	Suitable for exceptional medial exposure (e.g. in sulfur chloride atmosphere).
Technical data	The technical data are identical with those of the based-on modules.

	SIPLUS DP TM-E15N24-01
Order No.	**6AG1 193-4CB70-7AA0**
Order No. based on	**6ES7 193-4CB70-0AA0**
Ambient temperature range	-40 … +70 °C
Ambient conditions	Suitable for exceptional medial exposure (e.g. in sulfur chloride atmosphere).
Technical data	The technical data are identical with those of the based-on modules.

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Overview (continued)

	SIPLUS DP TM-E15C24-A1
Order No.	**6AG1 193-4CA30-2AA0**
Order No. based on	**6ES7 193-4CA30-0AA0**
Ambient temperature range	-25 ... +60 °C
Ambient conditions	Suitable for exceptional medial exposure (e.g. in sulfur chloride atmosphere).
Technical data	The technical data are identical with those of the based-on modules.

	SIPLUS DP TM-E15C24-A1
Order No.	**6AG1 193-4CB30-2AA0**
Order No. based on	**6ES7 193-4CB30-0AA0**
Ambient temperature range	-25 ... +60 °C
Ambient conditions	Suitable for exceptional medial exposure (e.g. in sulfur chloride atmosphere).
Technical data	The technical data are identical with those of the based-on modules.

	SIPLUS DP TM-E15S26-A1
Order No.	**6AG1 193-4CA40-2AA0**
Order No. based on	**6ES7 193-4CA40-0AA0**
Ambient temperature range	-25 ... +60 °C
Ambient conditions	Suitable for exceptional medial exposure (e.g. in sulfur chloride atmosphere).
Technical data	The technical data are identical with those of the based-on modules.

	SIPLUS DP TM-E15C26-A1
Order No.	**6AG1 193-4CA50-2AA0**
Order No. based on	**6ES7 193-4CA50-0AA0**
Ambient temperature range	-25 ... +60 °C
Ambient conditions	Suitable for exceptional medial exposure (e.g. in sulfur chloride atmosphere).
Technical data	The technical data are identical with those of the based-on modules.

	SIPLUS DP TM-E30C44-01
Order No.	**6AG1 193-4CG30-2AA0**
Order No. based on	**6ES7 193-4CG30-0AA0**
Ambient temperature range	-25 ... +60 °C
Ambient conditions	Suitable for exceptional medial exposure (e.g. in sulfur chloride atmosphere).
Technical data	The technical data are identical with those of the based-on modules.

	SIPLUS DP TM-E30C46-A1
Order No.	**6AG1 193-4CF50-7AA0**
Order No. based on	**6ES7 193-4CF50-0AA0**
Ambient temperature range	-40 ... +70 °C
Ambient conditions	Suitable for exceptional medial exposure (e.g. in sulfur chloride atmosphere).
Technical data	The technical data are identical with those of the based-on modules.

	SIPLUS DP TM-E15C24-AT
Order No.	**6AG1 193-4CL30-7AA0**
Order No. based on	**6ES7 193-4CL30-0AA0**
Ambient temperature range	0 ... +70 °C
Ambient conditions	Suitable for exceptional medial exposure (e.g. in sulfur chloride atmosphere).
Technical data	The technical data are identical with those of the based-on modules.

Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

For further technical documentation on SIPLUS, see:
www.siemens.com/siplus-extreme

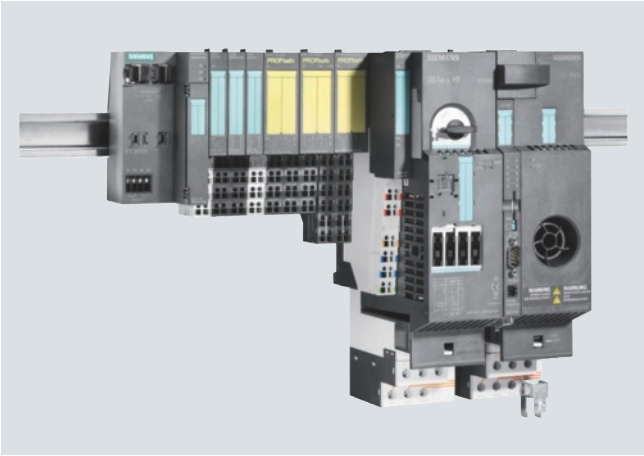
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Ordering data

	Order No.
TM-P terminal modules for PM-E power modules	
(extended temperature range and medial exposure)	
SIPLUS ET 200S TM-P15C23-A0 Ordering unit: 1 unit 2 x 3 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, screw connection	**6AG1 193-4CD20-2AA0**
SIPLUS ET 200S TM-P15C23-A0 Ordering unit: 1 unit 2 x 3 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, spring-loaded terminals	**6AG1 193-4CD30-2AA0**
SIPLUS ET 200S TM-P15C22-01 Ordering unit: 1 unit 2 × 2 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals	**6AG1 193-4CE10-2AA0**
TM-E terminal modules for electronic modules (extended temperature range and medial exposure)	
SIPLUS ET 200S TM-E15C23-01 Ordering unit: 5 units 2 × 3 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals	**6AG1 193-4CB10-7AA0**
SIPLUS ET 200S TM-E15N24-01 Ordering unit: 5 units 2 × 4 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, FastConnect	**6AG1 193-4CB70-7AA0**
SIPLUS ET 200S TM-E15C24-A1 Ordering unit: 5 units 2 × 4 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals	**6AG1 193-4CA30-2AA0**
SIPLUS ET 200S TM-E15C24-01 Ordering unit: 5 units 2 × 4 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals	**6AG1 193-4CB30-2AA0**
SIPLUS ET 200S TM-E15S26-A1 Ordering unit: 5 units 2 × 6 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals	**6AG1 193-4CA40-2AA0**
SIPLUS ET 200S TM-E15C26-A1 Ordering unit: 5 units 2 × 6 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals	**6AG1 193-4CA50-2AA0**
SIPLUS ET 200S TM-E30C44-01 Ordering unit: 1 unit 4 × 4 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals	**6AG1 193-4CG30-2AA0**
SIPLUS ET 200S TM-E30C46-A1 Ordering unit: 1 unit 4 × 6 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals	**6AG1 193-4CF50-7AA0**
SIPLUS ET 200S TM-E15C24-AT Ordering unit: 1 unit For internal temperature compensation with 2 AI TC High Feature, spring-loaded terminals	**6AG1 193-4CL30-7AA0**
Accessories for shield connection	
Shield connection element Ordering unit: 5 units For plugging into TM-E and TM-P	**6ES7 193-4GA00-0AA0**
Shield clamps Ordering unit: 5 units For busbar 3 × 10 mm	**6ES7 193-4GB00-0AA0**
Ground terminal Ordering unit: 1 unit For cable cross-sections up to 25 mm^2	**8WA2 868**
Busbars 3 x 10 mm Ordering unit: 1 unit	**8WA2 842**
Accessories for coding	
Color coding plates Ordering unit: 200 units for TM-P, TM-E	
• White	**6ES7 193-4LA20-0AA0**
• Yellow	**6ES7 193-4LB20-0AA0**
• Yellow/green	**6ES7 193-4LC20-0AA0**
• Red	**6ES7 193-4LD20-0AA0**
• Blue	**6ES7 193-4LF20-0AA0**
• Brown	**6ES7 193-4LG20-0AA0**
• Turquoise	**6ES7 193-4LH20-0AA0**
Labels, inscribed Ordering unit: 1 set	
200 units for slot numbering (1 ... 20) 10 x	**8WA8 861-0AB**
200 units for slot numbering (1 ... 40) 5 x	**8WA8 861-0AC**
200 units for slot numbering (1 ... 64) 1 x, (1 ... 68) 2 x	**8WA8 861-0DA**
Labels, blank	
200 units for slot numbering	**8WA8 848-2AY**

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Overview



The fail-safe SIMATIC S7 CPUs, plus the fail-safe signal modules of SIMATIC ET 200S / ET200 / 200pro/ ET200eco and ET200M have been specially developed for distributed applications in manufacturing systems. Thanks to the discrete structure of the F I/Os, safety technology is only applied where actually required. The new system replaces conventional electromechanical components, such as:

- Freely programmable safe linking of sensors to actuators;
- Selective safe shutdown of actuators;
- Hybrid configurations of F modules (F stands for fail-safe) and standard modules in a station;
- Single-bus concept, F signals and standard signals are transferred over one bus medium (PROFIBUS DP, PROFINET).

Totally Integrated Automation (TIA)

Safety technology (Safety Integrated) is a component of Totally Integrated Automation resulting in the total integration of safety and standard automation (SIMATIC S7).

Whereas today, standard automation (conventional PLCs) and safety automation (electromechanics) are still separate, these two worlds are growing closer together to form one uniform, integrated overall system.

Siemens can therefore present itself as a complete supplier for automation engineering for which safety technology is part of the standard automation and uniformity exists throughout the complete system.

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Fail-safe I/O modules
PM-E F PROFIsafe F power module

Overview



Fail-safe PM-E F PROFIsafe power modules for safety shutdown of standard digital output modules.

- Up to 2 fail-safe digital outputs onboard (source/sink outputs, up to 2A, up to SIL3/Cat. 4)
- The standard digital output modules can be shut down up to Cat.3 (EN 954) and SIL 2 (IEC61508) up to 10 A. The following modules can be used down-circuit of the power modules.
  - 2DO / 0.5 A ST 6ES7 132-4BB01-0AA0
  - 2 DO / 2 A ST 6ES7 132-4BB31-0AA0
  - 2 DO / 0.5 A HF 6ES7 132-4BB01-0AB0
  - 2 DO / 2 A HF 6ES7 132-4BB31-0AB0
  - 4 DO / 0.5 A ST 6ES7 132-4BD01-0AA0
  - 4 DO / 2 A ST 6ES7 132-4BD31-0AA0

The modules support PROFIsafe, both in PROFIBUS, and in PROFINET configurations. They can be used with all fail-safe SIMATIC S7-CPUs.

Technical specifications

	6ES7 138-4CF03-0AB0	6ES7 138-4CF42-0AB0
Power supply		
Current carrying capacity		
• Current carrying capacity up to 30 °C, max.		10 A
• Current carrying capacity up to 40 °C, max.	10 A	8 A
• Current carrying capacity up to 60 °C, max.	6 A	7 A
Supply voltages		
Load voltage L+		
• Rated value (DC)	24 V	24 V
• Reverse polarity protection	No	No
Current consumption		
from load voltage L+ (without load), max.	Typ. 100 mA	Typ. 100 mA
from backplane bus 24 V DC, max.	28 mA	28 mA
Power losses		
Power loss, typ.	4 W	4 W
Address area		
Address space per module		
• without packing	5 byte; input and output in each case	5 byte; input and output in each case
Digital inputs		
Cable length		
• Cable length, shielded, max.	200 m	200 m
• Cable length unshielded, max.	200 m	200 m
Digital outputs		
Number of digital outputs	2	1; Relay
Short-circuit protection	Yes; Electronic	No
• Response threshold, typ.	Response threshold (short-circuit): 5 to 12 A; response threshold (external short-circuit to ground): 5 to 12 A; response threshold (external short-circuit to P potential): 25 to 45 A	
Limitation of inductive shutdown voltage to	L+ (-2x 47 V)	
Lamp load, max.	10 W	100 W
Controlling a digital input	No	Yes
Output voltage		
• for signal "1", min.	L+ (-2.0 V), current-sourcing switch: L+ (-1.5 V), voltage drop at current-sinking switch: max. 0.5 V	

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Technical specifications (continued)

	6ES7 138-4CF03-0AB0	6ES7 138-4CF42-0AB0
Output current		
• for signal "1" rated value	2 A	
• for signal "1" permissible range for 0 to 60 °C, min.	20 mA	
• for signal "1" permissible range for 0 to 60 °C, max.	2.4 A	
• for signal "0" residual current, max.	0.5 mA	
Parallel switching of 2 outputs		
• for increased power	No	
• for redundant control of a load	No	
Switching frequency		
• with resistive load, max.	30 Hz	2 Hz
• with inductive load, max.	0.1 Hz	0.1 Hz; with inductive load according to IEC 947-5-1, 13 DC/15 AC
• on lamp load, max.	10 Hz	2 Hz
Aggregate current of outputs (per group)		
• horizontal installation		
- up to 40 °C, max.	10 A	10 A
- up to 55 °C, max.	7 A	8 A
- up to 60 °C, max.	6 A	7 A
• vertical installation		
- up to 40 °C, max.	6 A	8 A
Load resistance range		
• lower limit	12 Ω	
• upper limit	1 kΩ	
Cable length		
• Cable length, shielded, max.	200 m	
• Cable length unshielded, max.	200 m	
Relay outputs		
Switching capacity of contacts		
• at ohmic load, up to 50 °C, max.	10 A	10 A
Alarms/diagnostics/status information		
Diagnostics		
• Diagnostic functions	Yes	Yes
• Diagnostic information readable	Yes	Yes
• Diagnostics	Yes	
• Wire break	Yes	No
• Short circuit	Yes	Yes
• Missing load voltage	Yes	Yes
Diagnostic indication LED		
• Rated load voltage PWR (green)	Yes	Yes
• Group error SF (red)	Yes	Yes
• Status indicator digital output (green)	Yes	Yes
Isolation		
Isolation checked with	500 V DC	500 V DC
tested with		
• Channels against backplane bus and load voltage L+	500 V DC	500 V DC
Galvanic isolation		
Galvanic isolation digital outputs		
• between the channels	No	No
• between the channels and the backplane bus	Yes	Yes
• between the channels and the load voltage L+	No	No
Standards, approvals, certificates		
Highest safety class achievable in safety mode		
• acc. to EN 954	Up to Cat. 4	With Std-DO: max. Cat.3, without Std-DO max. Cat.4 depending on configuration
• acc. to IEC 61508	Up to SIL 3	With Std-DO: max. SIL 2, without Std-DO max. SIL 3 depending on configuration

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Technical specifications (continued)

	6ES7 138-4CF03-0AB0	6ES7 138-4CF42-0AB0
Dimensions and weight		
Dimensions		
• Width	30 mm	30 mm
• Height	81 mm	81 mm
• Depth	52 mm	52 mm
Weight		
• Weight, approx.	88 g	80 g

Ordering data

	Order No.
PM-E F pm power module PROFIsafe, 24 V DC for safe shutdown of digital output modules	**6ES7 138-4CF03-0AB0**
PM-E F pp power module PROFIsafe, 24 V DC for safe shutdown of digital output modules	**6ES7 138-4CF42-0AB0**
Accessories	
IM 151-1 HIGH FEATURE interface module for ET 200S; transfer rate up to 12 Mbit/s; data volumes 244 byte each for I/O, up to 63 modules can be connected; connection of PROFIsafe modules, isochronous mode; bus connection via 9-pin Sub-D incl. terminating module	**6ES7151-1BA02-0AB0**
IM 151-3 PN HF interface module for ET 200S; transfer rate up to 100 Mbit/s; max. 63 I/O modules up to 2 m wide can be connected; 2 x bus connection via RJ45 connector, incl. terminating module	**6ES7 151-3BA23-0AB0**
IM 151-3 PN FO interface module for ET 200S; 2 PROFINET FO interfaces, integrated 2-port switch, max. 63 I/O modules up to 2 m wide can be connected, incl. terminating module	**6ES7 151-3BB23-0AB0**

		Order No.
Terminal modules for power modules		
TM-P30S44-A0 Ordering unit 1 unit 7 x 2 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, screw-type terminals for PM-E F PROFIsafe		**6ES7 193-4CK20-0AA0**
TM-P30C44-A0 Ordering unit 1 unit 7 x 2 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, spring-loaded terminals for PM-E F PROFIsafe		**6ES7 193-4CK30-0AA0**
Distributed Safety V5.4 programming tool Task: Software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, ET 200S Requirements: 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 V5.3; Floating license for 1 user		**6ES7 833-1FC02-0YE5**
SIMATIC Manual Collection	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, five languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET		
SIMATIC Manual Collection update service for 1 year	D	**6ES7 998-8XC01-8YE2**

D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

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Overview



Digital inputs/outputs for the fail-safe SIMATIC S7 systems

Fail-safe digital input module

- For fail-safe reading of sensor information (1 or 2 channels)
- Provides integral discrepancy evaluation for 2-out-of-2 signals
- 2 internal sensor supplies (incl. test function) onboard
- Certified up to Cat. 4 (EN954-1), SIL 3 (IEC 61508), PL e (ISO 13849)

Fail-safe digital output module

- Fail-safe 2-channel activation (sink/source output) by actuators
- Actuators can be driven by up to 2 A
- Certified up to Cat. 4 (EN954-1), SIL 3 (IEC 61508), PL e (ISO 13849)

Fail-safe digital hybrid module

- 4 fail-safe inputs/3 fail-safe outputs
- Certified up to Cat. 3 (EN954-1), SIL 2 (IEC 61508), PL d (ISO 13849)

The modules support PROFIsafe, both in PROFIBUS, and in PROFINET configurations.
They can be used with all fail-safe SIMATIC S7 CPUs.

Technical specifications

	6ES7 138-4FA04-0AB0
Supply voltages	
Rated value	
• 24 V DC	Yes
• permissible range, lower limit (DC)	20.4 V
• permissible range, upper limit (DC)	28.8 V
• Reverse polarity protection	No
Power losses	
Power loss, typ.	4 W
Address area	
Occupied address area	
• Outputs	4 byte
• Inputs	6 byte
Digital inputs	
Number of digital inputs	8; 8 single channel, 4 two-channel
Number of simultaneously controllable inputs	8
Input characteristic curve acc. to IEC 1131, Type 1	Yes
Input voltage	
• Rated value, DC	24 V
• for signal "0"	-30 to +5 V
• for signal "1"	15 to 30 V
Input current	
• for signal "1", typ.	3.7 mA
Input delay (for rated value of input voltage)	
• for standard inputs	
- parameterizable	Yes
- at "0" to "1", min.	0.3 ms
- at "0" to "1", max.	17 ms
- at "1" to "0", min.	0.3 ms
- at "1" to "0", max.	17 ms

	6ES7 138-4FA04-0AB0
Cable length	
• Cable length, shielded, max.	200 m
• Cable length unshielded, max.	200 m
Encoder supply	
Number of outputs	2
Output voltage	min. L+ (-1.5 V)
Output current, rated value	300 mA
Output current, permissible range	0 to 300 mA
Short-circuit protection	Yes; electronic (response threshold 0.7 A to 1.8 A)
Encoder	
Connectable encoders	
• 2-wire BEROS	No
Alarms/diagnostics/status information	
Alarms	
• Diagnostic alarm	Yes
Diagnostics	
• Diagnostic functions	Yes
• Diagnostic information readable	Yes
• Short circuit	Yes
diagnostic indication LED	
• Group error SF (red)	Yes
• Status indicator digital input (green)	Yes
Isolation	
Isolation checked with	500 V DC

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Technical specifications (continued)

	6ES7 138-4FA04-0AB0
Galvanic isolation	
Galvanic isolation digital inputs	
• between the channels	No
• between the channels and the backplane bus	Yes
• between the channels and the load voltage L+	No
Permissible potential difference	
between M internally and the inputs	75 V DC/60 V AC

	6ES7 138-4FA04-0AB0
Standards, approvals, certificates	
Highest safety class achievable in safety mode	
• acc. to EN 954	Cat. 3 (single-channel), Cat. 4 (two-channel)
• acc. to IEC 61508	SIL 2 (single-channel), SIL 3 (two-channel)
Dimensions and weight	
Dimensions	
• Width	30 mm
• Height	81 mm
• Depth	52 mm
Weight	
• Weight, approx.	78 g

	6ES7 138-4FB03-0AB0
Supply voltages	
Load voltage L+	
• Rated value (DC)	24 V
• Reverse polarity protection	No
Current consumption	
from load voltage L+ (without load), max.	typ. 100 mA
from backplane bus 3.3 V DC, max.	28 mA
Power losses	
Power loss, typ.	3.5 W
Digital outputs	
Number of digital outputs	4
Short-circuit protection	Yes; electronic
Limitation of inductive shutdown voltage to	Typ. (2L+) -47 V
Lamp load, max.	10 W
Controlling a digital input	No
Output voltage	
• for signal "1", min.	L+ (-2.0 V), current sourcing switch: L+ (-1.5 V), voltage drop on current sinking switch: max. 0.5 V
Output current	
• for signal "1" rated value	2 A
• for signal "1" permissible range for 0 to 60 °C, min.	20 mA
• for signal "1" permissible range for 0 to 60 °C, max.	2.4 A
• for signal "0" residual current, max.	0.5 mA; Current sourcing switch: max. 0.5 mA; current sinking switch: max. 4 mA
Parallel switching of 2 outputs	
• for increased power	No
• for redundant control of a load	No
Switching frequency	
• with resistive load, max.	30 Hz
• with inductive load, max.	0.1 Hz
• on lamp load, max.	10 Hz

	6ES7 138-4FB03-0AB0
Aggregate current of outputs (per group)	
• horizontal installation	
- up to 40 °C, max.	6 A
- up to 55 °C, max.	5 A
- up to 60 °C, max.	4 A
• vertical installation	
- up to 40 °C, max.	4 A
Load resistance range	
• lower limit	12 Ω
• upper limit	1 kΩ
Cable length	
• Cable length, shielded, max.	200 m
• Cable length unshielded, max.	200 m
Alarms/diagnostics/status information	
Diagnostics	
• Diagnostic functions	Yes
• Wire break	Yes
• Short circuit	Yes
diagnostic indication LED	
• Group error SF (red)	Yes
• Status indicator digital output (green)	Yes
Isolation	
Isolation checked with	500 V DC
checked with	
• Channels against backplane bus and load voltage L+	1500 V AC
Galvanic isolation	
Galvanic isolation digital outputs	
• between the channels	No
• between the channels and the backplane bus	Yes
• between the channels and the load voltage L+	No

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Technical specifications (continued)

	6ES7 138-4FB03-0AB0
Standards, approvals, certificates	
Highest safety class achievable in safety mode	
• acc. to EN 954	Cat. 4
• acc. to IEC 61508	SIL 3
Dimensions and weight	
Dimensions	
• Width	30 mm
• Height	81 mm
• Depth	52 mm
Weight	
• Weight, approx.	85 g

Ordering data

	Order No.
4/8 F-DI electronic module PROFIsafe 24 V DC 30 mm construction width, up to Category 4 (EN954-1)	**6ES7 138-4FA04-0AB0**
4 F-DO electronic module PROFIsafe 24 V DC/2A 30 mm construction width, up to Category 4 (EN954-1)	**6ES7 138-4FB03-0AB0**
4 F-DI / 3 F-DO electronic module PROFIsafe 24 V DC/2A 30 mm construction width, up to Category 3 (EN954-1) / SIL 2 (IEC 62061)	**6ES7 138-4FC01-0AB0**
Accessories	
Terminal modules for electronic modules	See F terminal modules, page 9/134
IM 151-1 High Feature interface module for ET 200S; transmission rate up to 12 Mbit/s; max. 63 modules can be connected, with isochronous mode, bus connection via 9-pin Sub-D connector incl. terminating module	**6ES7 151-1BA02-0AB0**
IM 151-3 PN HF interface module for ET 200S; transfer rate up to 100 Mbit/s; max. 63 I/O modules up to 2 m wide can be connected; 2 x bus connection via RJ45 connector, incl. terminating module	**6ES7 151-3BA23-0AB0**
IM 151-3 PN FO interface module for ET 200S; 2 PROFINET FO interfaces, integrated 2-port switch, max. 63 I/O modules up to 2 m wide can be connected, incl. terminating module	**6ES7 151-3BB23-0AB0**

		Order No.
Distributed Safety V5.4 programming tool Task: Software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, ET 200S Requirements: 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 V5.3; Floating license for 1 user		**6ES7 833-1FC02-0YE5**
SIMATIC Manual Collection Electronic manuals on DVD, multi-language: S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication)	J	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection – Update service for 1 year Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates	D	**6ES7 998-8XC01-8YE2**

D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

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Overview



The digital electronic module 1 F-RO 24 V DC/5A 24 ... 230 V AC/5A has the following characteristics

- 1 relay output (2 NO contacts)
- Output current 5 A
- Rated load voltage 24 V DC and 24 to 230 V AC
- The control circuit of the two safety relays must be routed from the outside to the respective terminals.

The attainable safety integrity level is SIL3 (IEC61508), when the control of the F-RO module is implemented via a fail-safe output (e.g. EM 4F-DO 24 V DC/2A PROFIsafe).

Technical specifications

	6ES7 138-4FR00-0AA0
Supply voltages	
Load voltage L+	
• Rated value (DC)	24 V; Supply via fail-safe output, e.g. of an F-DO
Current consumption	
from load voltage L+ (without load), max.	100 mA; from control voltage
from backplane bus 3.3 V DC, max.	10 mA
Power losses	
Power loss, typ.	2.1 W
Address area	
Address space per module	
• with packing	2 bit
• without packing	1 byte
Digital inputs	
Cable length	
• Cable length unshielded, max.	10 m; control cable
Digital outputs	
Number of digital outputs	1
Short-circuit protection	No; 6 A external fuse of duty category gL/gG
Controlling a digital input	Yes
Output current	
• for signal "1" rated value	5 A
• for signal "1" minimum load current	5 mA
Switching frequency	
• with resistive load, max.	2 Hz
• with inductive load, max.	0.1 Hz
Aggregate current of outputs (per group)	
• horizontal installation	
- up to 40 , max.	8 A
- up to 55 °C, max.	6 A; at 50 °C
- up to 60 °C, max.	5 A; up to max. 24.8 V
• vertical installation	
- up to 40 °C, max.	6 A

	6ES7 138-4FR00-0AA0
Cable length	
• Cable length, shielded, max.	200 m
• Cable length unshielded, max.	200 m
Relay outputs	
Switching capacity of contacts	
• Thermal continuous current, max.	5 A
Alarms/diagnostics/status information	
diagnostic indication LED	
• Status indicator digital output (green)	Yes
Galvanic isolation	
Galvanic isolation digital outputs	
• between the channels	Yes
• between the channels and the backplane bus	Yes
• between the channels and the load voltage L+	Yes; between channels and control voltage
Standards, approvals, certificates	
Highest safety class achievable in safety mode	
• acc. to EN 954	to Cat. 4
• acc. to IEC 61508	up to SIL 3
Dimensions and weight	
Dimensions	
• Width	30 mm
• Height	81 mm
• Depth	52 mm
Weight	
• Weight, approx.	90 g

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Ordering data	Order No.
1 F-RO electronic module 24 V DC/5A 24 … 230 V AC/5A	**6ES7 138-4FR00-0AA0**
Accessories	
Terminal modules for electronic modules	See F terminal modules, page 9/134
IM 151-1 High Feature interface module for ET 200S; transmission rate up to 12 Mbit/s; max. 63 modules can be connected, with isochronous mode, bus connection via 9-pin Sub-D connector incl. terminating module	**6ES7 151-1BA02-0AB0**
IM 151-3 PN HF interface module for ET 200S; transfer rate up to 100 Mbit/s; max. 63 I/O modules up to 2 m wide can be connected; 2 x bus connection via RJ45 connector, incl. terminating module	**6ES7 151-3BA23-0AB0**
IM 151-3 PN FO interface module for ET 200S; 2 PROFINET FO interfaces, integrated 2-port switch, max. 63 I/O modules up to 2 m wide can be connected, incl. terminating module	**6ES7 151-3BB23-0AB0**

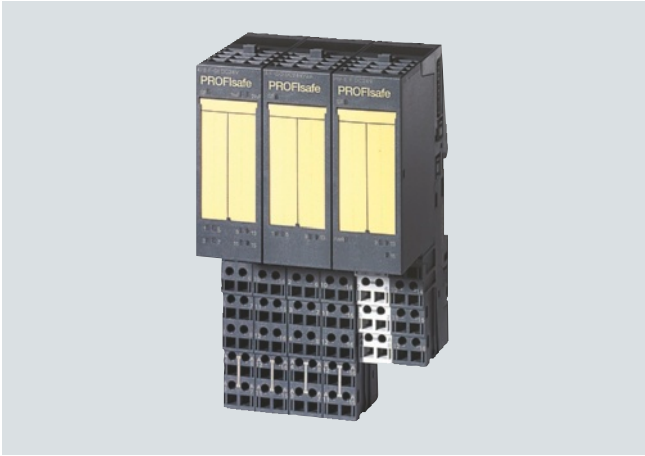
		Order No.
Distributed Safety V5.4 programming tool Task: Software for configuring of fail-safe user programs for SIMATIC S7-300F, S7-400F, ET 200S Requirements: STEP 7 V5.3 SP3 and higher		
Floating license		**6ES7 833-1FC02-0YA5**
Software Update Service		**6ES7 833-1FC00-0YX2**
Distributed Safety Upgrade from V5.x to V5.3; Floating license for 1 user		**6ES7 833-1FC02-0YE5**
SIMATIC Manual Collection Electronic manuals on DVD, multi-language: S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication)	J	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection – Update service for 1 year Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates	D	**6ES7 998-8XC01-8YE2**

D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

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Overview



- Mechanical modules as receptacles for the electronic modules
- For setting up permanent wiring through self-configuring voltage buses
- Keyed connection technology to ensure an enhanced vibration resistance of up to 5 g
- Different versions to accommodate power modules and electronic modules
- Replaceable terminal box (even within the station network)
- Automatic coding of the electronic modules
- Self-shielding of the backplane bus for high data security
- Color coding facility for the terminals and for identifying the slot numbers
- Alternatively available with screw-type or spring-loaded terminals
- For up to 60 % faster process wiring also with FastConnect connection method (av. soon)

Ordering data

Terminal modules for power modules	
TM-P15S23-A1 Ordering unit 1 unit 2 x 3 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals	**6ES7 193-4CC20-0AA0**
TM-P15C23-A1 Ordering unit 1 unit 2 x 3 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals	**6ES7 193-4CC30-0AA0**
TM-P15S23-A0 Ordering unit 1 unit 2 x 3 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, screw-type terminals	**6ES7 193-4CD20-0AA0**
TM-P15C23-A0 Ordering unit 1 unit 2 x 3 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, spring-loaded terminals	**6ES7 193-4CD30-0AA0**
TM-P15S22-01 Ordering unit 1 unit 2 x 2 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals	**6ES7 193-4CE00-0AA0**
TM-P15C22-01 Ordering unit 1 unit 2 x 2 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals	**6ES7 193-4CE10-0AA0**
TM-P30S44-A0 Ordering unit 1 unit 7 x 2 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, screw-type terminals for PM-E F PROFIsafe	**6ES7 193-4CK20-0AA0**
TM-P30C44-A0 Ordering unit 1 unit 7 x 2 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, spring-loaded terminals for PM-E F PROFIsafe	**6ES7 193-4CK30-0AA0**

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Ordering data	Order No.
Terminal modules for electronic modules	
TM-E30S44-01 Ordering unit 1 unit 4 x 4 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals	**6ES7 193-4CG20-0AA0**
TM-E30C44-01 Ordering unit 1 unit 4 x 4 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals	**6ES7 193-4CG30-0AA0**
TM-E30S46-A1 Ordering unit 1 unit 4 x 6 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals	**6ES7 193-4CF40-0AA0**
TM-E30C46-A1 Ordering unit 1 unit 4 x 6 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals	**6ES7 193-4CF50-0AA0**

	Order No.
Accessories	
Color coding plates	
Ordering unit 200 units for TM-P, TM-E	
• white	**6ES7 193-4LA20-0AA0**
• yellow	**6ES7 193-4LB20-0AA0**
• yellow/green	**6ES7 193-4LC20-0AA0**
• red	**6ES7 193-4LD20-0AA0**
• blue	**6ES7 193-4LF20-0AA0**
• brown	**6ES7 193-4LG20-0AA0**
• turquoise	**6ES7 193-4LH20-0AA0**
Grounding terminal	**8WA2 868**
Ordering unit 1 unit For cable cross-sections up to 25 mm^2	
3 × 10 mm busbars	**8WA2 842**
Ordering unit 1 unit	
Labels, inscribed	
Ordering unit 1 set	
• 200 units for slot numbering (1 to 20) 10 ×	**8WA8 861-0AB**
• 200 units for slot numbering (1 to 40) 5 ×	**8WA8 861-0AC**
• 200 units for slot numbering (1 to 64) 1 ×, (1 to 68) 2 ×	**8WA8 861-0DA**
Labels, blank	
200 units for slot numbering	**8WA8 848-2AY**

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Overview



Digital inputs/outputs for the fail-safe SIMATIC S7 systems

Fail-safe digital input module

- For fail-safe reading of sensor information (1 or 2 channels)
- Provides integral discrepancy evaluation for 2-out-of-2 signals
- 2 internal sensor supplies (incl. test function) onboard

Fail-safe digital output module

- Fail-safe 2-channel activation (sink/source output) by actuators
- Actuators can be controlled up to 2 A

All modules are certified up to Cat. 4 (EN 954-1) and up to SIL 3 (IEC 61508).

The modules support PROFIsafe, both in PROFIBUS and in PROFINET configurations.

They can be used with all fail-safe SIMATIC S7-CPUs.

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

	SIPLUS electronic module 4 F-DO, PROFIsafe 24 V DC/2 A	SIPLUS electronic module 4/8 F-DI, PROFIsafe 24 V DC
Order number	**6AG1 138-4FA04-2AB0**	**6AG1 138-4FB03-2AB0**
Order No. based on	**6ES7 138-4FA04-0AB0**	**6ES7 138-4FB03-0AB0**
Ambient temperature range	-25 ... +60 °C	
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	
Ambient conditions		
Relative humidity	5 ... 100%, condensation allowed	

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

Ordering data

		Order No.
F electronic modules SIPLUS (extended temperature range and medial exposure)		
4/8 F DI electronic module, PROFIsafe 24 V DC, 30 mm construction width, up to Category 4 (EN 954-1)	H	**6AG1 138-4FA04-2AB0**
4 F-DO electronic module, PROFIsafe 24 V DC/2 A, 30 mm construction width, up to Category 4 (EN 954-1)	I	**6AG1 138-4FB03-2AB0**
Accessories		See SIMATIC F electronic modules, page 9/131

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H
I: Subject to export regulations AL: N and ECCN: EAR99H

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Overview



The electronic module 4SI IO-Link is an IO-Link master and supports the easy integration of sensors and actuators from different manufacturers in the multifunctional, distributed I/O system SIMATIC ET 200S on a total of four ports.

Features

- Up to 4 IO-Link devices can be connected to each IO-Link master module (3-wire connection)
- Up to 4 standard actuators or sensors (2-wire/3-wire connection) can be connected.
- The electronic module 4SI IO-Link is 15 mm in width and can be used with the following universal terminal modules:
  - TM-E15S26-A1 (screw-type terminal)
  - TM-E15C26-A1 (spring-loaded terminal)
  - TM-E15N26-A1 (Fast Connect)
- Supports firmware update (STEP 7 V5.4 SP4 and higher)

Ordering data

	Order No.
4SI electronic module IO-Link I IO-Link master, Screw terminal, spring-loaded terminal or Fast Connect	**6ES7 138-4GA50-0AB0**

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

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IO-Link master modules
4SI SIRIUS electronic module

Overview



The electronic module 4SI SIRIUS supports easy, cost-effective connection of SIRIUS switching devices with IO-Link to the multi-functional, distributed I/O system SIMATIC ET 200S on a total of four ports.

Features

- Up to 4 SIRIUS switching devices (max. 16 for groups of four) can be connected to each IO-Link SIRIUS module using IO-Link (3-wire connection).
- The electronic module 4SI SIRIUS is 15 mm in width and can be used with the following universal terminal modules:
  - TM-E15S26-A1 (screw-type terminal)
  - TM-E15C26-A1 (spring-loaded terminal)
  - TM-E15N26-A1 (Fast Connect)
- Supports firmware update (STEP 7 V5.4 SP5 and higher).

Ordering data

	Order No.
4SI SIRIUS electronic module for connecting SIRIUS switching devices to ET 200S; 4 ports. Screw terminal, spring-loaded terminal or Fast Connect connection method	**6RK1 005-0LB00-0AA0**

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Overview

ET 200S motor starter in the ET 200S I/O system

The SIMATIC ET 200S is the multifunctional and bit-modular I/O system with degree of protection IP20 and can be precisely adapted to the automation task.

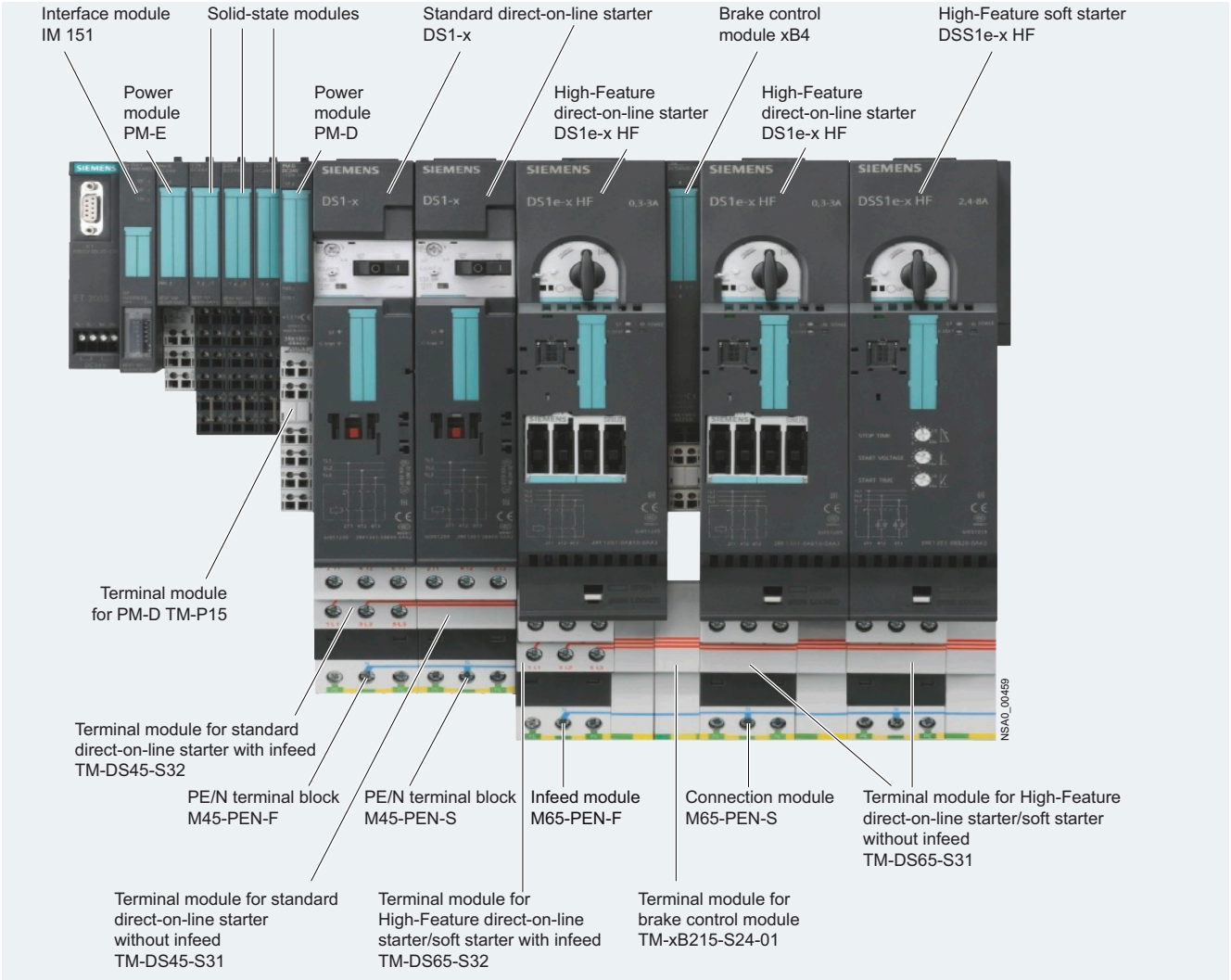
Interface modules (IM) are used for connecting the ET 200S to PROFIBUS DP or PROFINET. If interface modules with integrated S7-CPU are used, the ET 200S can be used as small controller.

The ET 200S can be made up of components from a comprehensive range of digital and analog input or output modules, technology modules, IO-Link master modules, pneumatic connections, or motor starters and frequency converters for the control of drives.

The device can be replaced easily and quickly thanks to permanent wiring and automatic reparameterization. Hot swapping during operation of the plant, i.e. removing and inserting the modules without previous disconnection, in combination with in-depth diagnostic information, guarantees a high availability of the automation system.

The ET 200S motor starters are connected to the controller through the fieldbus, either via PROFIBUS or PROFINET, by means of IM modules which are also available with CPU functionality and parameterized.

The motor starters of the ET 200S can be used to protect and switch any three-phase current loads. Due to the communication interface, they are optimally suited for use in distributed control cabinets or control boxes.



Interaction of the ET 200S motor starter components in the ET 200S I/O system

Motor starter versions

The ET 200S motor starters are available as direct, reversing or soft starters:

- **Standard motor starter** up to 5.5 kW (direct and reversing starter)
- **High Feature motor starter** up to 7.5 kW (direct, reversing and direct soft starter)
- **Fail-safe motor starter** up to 7.5 kW (direct and reversing starter)
  - Properties of the High Feature motor starter
  - Fail-safe functionality

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Overview (continued)

Innovation of the ET 200S High Feature motor starters

The ET 200S High Feature motor starters were completely innovated and now support acyclic services on PROFIBUS and PROFINET, as well as PROFIenergy on PROFINET.

They are now:
- Even more flexible - flexible parameterization
- Integrated in TIA (Totally Integrated Automation) even more
- Even more transparent - due to comprehensive diagnostic data records
- Even more predictive - due to maintenance functions
- Energy-efficient - through PROFIenergy

Basic functionality of the ET 200S motor starters

All versions of the ET 200S motor starters offer the following functionality. The specific functionality beyond this is described for the respective versions.

- Completely pre-wired motor starters for switching and protecting any three-phase current loads up to 7.5 kW at 400 V AC and 500 V AC
- With self-assembling 40/50 A energy bus, i.e. one-time infeed of load voltage for a group of motors
- All supply voltages are connected only once, i.e. automatically connected to the next module when mounted side-by-side
- Hot swapping is permissible
- Integrated inputs and outputs for control and status signaling
- Control of the motor starter from the controller and of the diagnostic status via cyclic process image
- Diagnostic capability for active monitoring of the switching and protection functions
- The signal states in the process image of the motor starter provide information about protective devices (short circuit or overload), the switching status of contactor(s) or soft starters, and system errors.
- Interface for controlling an expansion module, e.g. Brake Control Modules xB1...xB4 for controlling mechanical brakes in three-phase motors for 24 V DC and 500 V DC.
- Brake Control Module xB5 and xB6 for 400 V AC
- Can be combined with safety technology for use in safety-relevant plant units (IEC 62 061 and ISO 13 849-1)

Mouting

Since the motor starters are completely pre-wired, up to 80% of the wiring overhead can be saved. The control cabinets can be set up much quicker and require much less space.

Expansions are possible without problems by subsequently adding terminal modules.

Due to their modular terminal design (10 mm^2), they also replace any previously required marshalling wiring. Due to the permanent wiring and hot swapping function (removing and inserting while energized), a motor starter can be replaced within seconds, if necessary. The motor starters are therefore ideal for use in applications with especially high availability requirements.

Parameterization and configuration

Configuration is facilitated considerably due to the bit-modular design.

The parts list for each load feeder is reduced to two important positions if the ET 200S motor starters are used: the passive terminal module and the motor starter.The ET 200S is therefore optimally suited for modular machine concepts.

All ET 200S motor starters are set up without fuse protection. Contactors or soft starters are controlled via the integrated outputs. The inputs of the motor starter evaluate the signal states of the protective devices (short circuit or overload), the switching state of contactor(s) or soft starters, and system errors.

The circuit breaker message can be freely parameterized with regard to a group fault message (group faults when circuit breaker is "off"/group fault message when circuit breaker is "off" only when there is an "on" command from the motor starter).

Brake Control Modules and optional digital inputs and outputs

With one of the optional Brake Control Modules (xB1-xB6), which are arranged to the right next to a motor starter, a mechanical holding brake on a three-phase motor can be activated from the process image of the motor starter.

The Brake Control Modules xB1-xB4 can be used to control both motors with 24 V DC brakes (xB1, xB3) as well as 500 V DC brakes (xB2, xB4).

The xB5 modules (without digital input) and xB6 modules (with two digital inputs) were newly incorporated for activating a mechanical holding brake with a rated operational voltage of 400 V AC. This supports a further motor brake voltage usually found on the market.

The 24 V DC brakes have an external supply and can be vented independently of the switching state of the motor starter. By contrast the 500 V DC brakes mostly have a direct supply from the terminal board of the motor through a rectifier module and therefore cannot be vented when the motor starter is switched off. These brakes cannot be used in combination with the DSS1e-x motor starter (soft starter).

The outputs of the brake control modules can be used alternatively for other purposes, e.g. for controlling DC valves.

With two locally acting inputs optionally available on the brake control modules (xB3, xB4) and another two on the control module of the High-Feature motor starter it is possible to realize autonomous special functions which work independently of the bus and the higher-level control system, e.g. as a quick stop on gate valve controls. In parallel with this, the states of these inputs are signaled to the control system.

Power supply via terminal modules

The power is supplied via the terminal modules for motor starters:

- The auxiliary voltages are supplied once via the PM-D or PM-DFx power module, which is to be plugged in to the left of the first motor starter..
- The load voltage is supplied at the first (left) TM-xxxxS32 terminal module of a motor starter. The other TM-xxxxS31 terminal modules are automatically supplied with power via the integrated energy bus when they are added.
  If the energy bus is fully utilized with 40 A for the Standard motor starter or 50 A for the High Feature motor starter, a new infeed must be set up via another TM-xxxxS32 terminal module.

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Overview (continued)

TM-DS and TM-RS terminal modules for motor starters

- Mechanical modules in which the motor starter and expansion modules are inserted
- For constructing the permanent wiring and self-assembling voltage bus
- For connecting the motor connection cables
- Positive-locking connection to ensure enhanced vibration resistance

Terminal modules are purely mechanical components for accommodating the ET 200S peripherals. The self-assembling voltage buses integrated in the terminal modules reduce wiring outlay to the single infeed. All modules following on the right are automatically supplied upon plugging the terminal modules together. The robust design and keyed connection technology enables use in harsh industrial conditions.

The TM-DS and TM-RS terminal modules are available in various versions for the Standard motor starters and the High-Feature motor starters.

The terminal modules with the suffix "-S32"

- The terminal modules with the suffix "-S32" have connection terminals for feeding into the integrated 40 A/50 A power bus and connection terminals for the motor connection cable. They are mounted at the beginning (left) of a power bus segment.
- An "-S32" terminal module is plugged in to set up a new load group.
- Three caps for sealing the energy bus contacts on the last terminal module of a segment are included in the delivery kit of the "-S32" terminal modules.
- Optionally expandable with PE/N blocks

The terminal modules with the suffix "-S31"

- The terminal modules with the suffix "-S31" have only connection terminals for the motor connection cable. These terminal modules follow on the right after a "-S32" terminal module.
- Optionally expandable with PE/N modules

All connecting terminals of the terminal modules for motor starters are equipped with 10 mm^2 screw-type terminals.

Power module (page 9/152)

PM-D power modules are used for monitoring the two 24 V DC auxiliary voltages for the group of motor starters following on the right or for supplying power to the group of frequency converters following on the right.

TM-P terminal module for PM-D power module (page 9/153)

- Connection by means of screw terminals
- Light colored enclosure for visual distinction
- Always before the first TM-DS/TM-RS

ET 200S safety motor starter with integrated safety technology

The safety-oriented, communication-capable ET 200S motor starters offer a suitable solution for any safety application. The portfolio ranges from a simple local safety solution to the user-friendly version with PROFIsafe, which can be used in combination with a safe controller (see Safety Module local and PROFIsafe, page 9/157).

The safety technology is an integral and thus pre-wired component.

The ET 200S Safety motor starters Solutions comprise:

- Safety modules (page 9/158)
- Standard motor starters (page 9/145)
- High-Feature motor starters (page 9/148)
- Fail-safe motor starters (page 9/154)

System configuration with ET 200S motor starters

When setting up an ET 200S station with motor starters, a distinction can be made between the following configurations:

- Conventional ET 200S motor starter solution, comprising:
  - PM-D module
  - Standard motor starter or High Feature motor starter
- ET 200S safety motor starter solution, local (see page 9/157)
- ET 200S safety motor starter solutions, PROFIsafe (see page 9/161)

SIRIUS Motor Starter Block Library for SIMATIC PCS 7

With the SIRIUS motor starter PCS 7 block library, SIRIUS ET 200S motor starters (direct and reversing starters, direct-on-line soft starters) can be easily and simply integrated into the SIMATIC PCS 7 process control system. The SIRIUS motor starter PCS 7 block library contains the diagnostics and driver blocks corresponding to the SIMATIC PCS 7 diagnostics and driver concept as well as the elements (symbols and faceplates) required for operator control and process monitoring. See catalog IC 10 Chapter 12 "Parametrization, Configuration and Visualization with SIRIUS".

Configuration tool for ET 200S station

The "SIMATIC Selection Tool" permits the quick and targeted selection of SIMATIC hardware. It is available for free as configurator in the Siemens Industry Mall. Configure your stations (e.g. S7-1200, S7-300, S7-400, S7-400H) and select the desired distributed I/O (e.g. ET 200S, ET 200pro). Transfer the parts list you received to the shopping cart of the Industry Mall and use it to place orders quickly, conveniently and without errors.

Detailed information on the ET200S system can be found at:

www.siemens.com/ET200S

There you will also find a link to the SIMATIC Selection Tool.

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Overview (continued)

	 SIMATIC ET 200S Standard motor starter	 SIMATIC ET 200S High Feature motor starter[1)]
Device functions (firmware features)		
Slave on the bus		
Fieldbus	✓ Depends on interface module	
Parameter assignment		
PROFIBUS/PROFINET data sets	--	✓
Parameter assignment via data set start-up	--	✓
Diagnostics		
Acyclic using data sets	--	✓
Diagnostic interrupt support	✓	
Diagnostics via PROFIBUS/PROFINET	--	✓ See manual
Process image		
Process image	✓ 3I/3O	✓ 16I/7O
Required address space per module	✓ 4 bit	✓ 2 byte
Data channels		
Manual mode local interface	--	✓ Through module
Motor Starter ES via local interface	--	✓ From end of 2011
Motor Starter ES via bus	--	✓ From end of 2011
Data sets (acyclic)		
Parameter assignment	--	✓
Support of PROFIenergy profile	--	✓ Measurement of motor current and tripping during idle times
Diagnostics	--	✓
Measured values	--	✓
Statistics	--	✓
Commands	--	✓
Min/max pointer	--	✓
Logbook	--	✓
Device identification	--	✓
I&M data	--	✓
Inputs		
Quantity	✓ Maximum 2, via xB3, xB4, xB6	✓ Maximum 4, 2 via xB3, xB4, xB6 and 2 via module 2DI 24 V DC COM
• of which in process image	--	✓ 4
Input action	✓ End position CCW, CW	✓ Parameterizable: flexible
Quick stop	--	✓ Parameterizable
Outputs		
Quantity	✓ Internal, for controlling brake control module	
Output action	✓ Brake	
Brake output with add-on module		
Motor brake voltage brake control module	✓ 24 V DC: xB1/xB3, 500 V DC: xB2/xB4, 400 V AC: xB5/xB6	
Motor protection		
Overload protection	✓ Thermal, range 1:1.3	✓ Electronic, wide range 1:10
Overload warning	-- Only tripping	✓
Short-circuit protection	✓ Circuit breaker	✓
Full motor protection	--	
Motor protection, response to thermal motor model overload	--	✓ Parameterizable: Tripping without restart, tripping with restart, warning
Automatic reset	--	
Temperature sensor	--	
Emergency start function	-- (✓ with Control Unit 3RK1 903-0CG00)	✓

✔ Function available; -- Function not available.

[1)] The specified device functions are only completely applicable for the innovative .-0AB4 starters.

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Overview (continued)





	SIMATIC ET 200S Standard motor starter	SIMATIC ET 200S High Feature motor starter[1)]
Device functions (firmware features)		
Device function		
Disconnecting means	✓ Rocker switch	✓ Circuit breaker
Circuit breaker message	✓	✓ Parameterizable
Current limit monitoring, lower	--	✓ Parameterizable, increment 3.125 %, 18.75 ... 100 %
Current limit monitoring, upper	--	✓ Parameterizable, increment 3.125 %, 50 ... 150 % (400% for the new -0AB4 starters)
Zero-current detection	--	✓ Parameterizable: warning, trip
Blocking protection/tripping of blocking current	--	✓ Parameterizable
Asymmetry	✓	✓ Parameterizable: warning, trip
Load type	--	✓ Parameterizable: 1-phase and 3-phase
Tripping class	✓ CLASS 10	✓ Parameterizable (via Motorstarter ES, DS) for DS1e-x and RS1e-x: Class 5 (10A),10, 15, 20 for DSS1e-x: Class 5 (10A), 10
Protection against voltage failure	✓	✓ Parameterizable: activated / deactivated
Local diagnostic functions via LEDs		
"C-STAT" switching state	✓ Red/green/yellow LEDs	
Group error "GE"	✓ Red LEDs	
"DEVICE" status	--	✓ Red/green/yellow LEDs
Auxiliary switch for enabling circuit of ET 200S – Safety engineering already integrated (Use up to SIL 3 (IEC 61 508) or up to category 4 (DIN EN ISO 13 849-1))	-- Fail-safe kit is required	3 Apart from DSS1e-x (for this max. category 1 achievable)

✔ Function available; -- Function not available

1) The specified device functions are only completely applicable for the innovative .-0AB4 starters.

	ET 200S Standard motor starter DS1-x, RS1-x	ET 200S High Feature motor starter DS1e-x, RS1e-x	 DSS1e-x
Device functions (firmware features)			
Control function soft starter			
Soft start function	--		✓
Bypass function	--		
Starting time	--		✓ Locally adjustable, not via bus 0 ... 20 s
Stopping time	--		✓ Locally adjustable, not via bus 0 ... 20 s
Stopping mode	--		✓ Locally adjustable, not via bus
Start voltage	--		✓ Locally adjustable, not via bus 30 ... 100% of U_e
Stop voltage	--		✓ Locally adjustable, not via bus
Trace	--		

✔ Function available; -- Function not available

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Technical specifications

		Standard motor starters	High Feature motor starters	
		DS1-x, RS1-x	DS1e-x, RS1e-x	DSS1e-x
Mechanics and environment				
Motor starters for connection to ET 200S, max.[1]		42	17	
Mounting dimensions (W x H x D)				
• Direct-on-line starters	mm	45 x (265 + 45) x (120 + 27); (45: PE/N module; 27: Auxil. switch contactor from F-Kit)	65 x (290 + 45) x (150 + 23); (45: PE/N module; 23: Control module)	
• Reversing starters	mm	90 x (265 + 45) x (120 + 27); (45: PE/N module; 27: Aux. switch contactor from F-Kit)	130 x (290 + 45) x (150 + 23); (45: PE/N module; 23: Control module)	
Permissible ambient temperature				
• During operation	°C	0 ... +60, from +40 with derating	0 ... +60 with horizontal mounting up to +40	
• During storage	°C	-40 ... +70	-40 ... +70	
• Permissible mounting positions	°C	Vertical, horizontal with derating	Vertical, horizontal	
Weight				
• Direct-on-line/reversing starter incl. terminal module	kg	1.0/1.6	1.6/2.2	1
• Direct-on-line/reversing starter incl. terminal block PE/N		1.1/1.8	1.7/2.3	1.1
Vibration resistance acc. to IEC 60068, Part 2-6	g	2		
Shock resistance acc. to IEC 60068, Part 2-27	g/ms	Square 5/11		
Conductor cross-section				
• Solid	mm^2	2 x (1 ... 2.5)[2]; 2 x (2.5 ... 6)[2], according to IEC 60947: max. 1 x 10		
• Finely stranded with end sleeve	mm^2	2 x (1 ... 2.5)[2]; 2 x (2.5 ... 6)[2]		
• AWG cables, solid or stranded	AWG	2 x (14 ...10)		
Degree of protection		IP20, finger-safe (this also applies to terminal modules on a dismounted motor starter)		
Mechanical endurance				
• Motor starter protectors	Operating cycles	100 000		
• Contactor		30 million	10 million	--
• Contactor with safety functionality (F-Kit)		10 million	--	--
Electrical specifications				
Power consumption				
• From auxiliary circuit L+/M (U_1)	mA	Approx. 20	Approx. 40	
• From auxiliary circuit A1/A2 (U_2)	mA	Approx. 100	Approx. 1 700 (80 ms long), approx. 350 (after 80 ms)	Approx. 30
Rated operational current for TM-D terminal modules I_e	A	40	50	
Rated operational voltage U_e	V	400		
Approval to VDE 0106 Part 101	V	Yes, up to 500		Yes, up to 480
CSA and U_L approval	V	Yes, up to 600		Yes, up to 480
Rated operational current I_e for motor starters				
• AC-1/2/3 at 60 °C				
- At 400 V	A	12	16	3 / 8 / 16
- At 500 V	A	9	11	--
• AC-4 at 60 °C				
- At 400 V	A	4,1	9	--
Rated short-circuit breaking capacity	kA	50 at 400 V		
Power of induction motors at 500 V	kW	5.5	7.5	
Utilization categories		AC-1, AC-2, AC-3, AC-4		
Protective separation between main and auxiliary circuits	V	400, acc. to VDE 0106, Part 101		
Positively-driven operation of contactor relay (NC)		Yes		--
Trip class		CLASS 10	CLASS 10/20, can be parameterized	0.3 ... 3 A: CLASS 10/10A, can be parameterized 2.4 ... 8 A: CLASS 10A 2.4 ... 16 A: CLASS 10A
Type of coordination		Up to 1.6 A: 2 / Up to 12 A: 1	Up to 16 A: 2	Up to 16 A: 1
Electrical endurance				
• Motor starter protector	h	100 000		
• Contactor		See manual		--
Permissible switching frequency with a starting time t_A = 0.1 s and a relative ON period t_{OP} = 50 %	1/h	< 80	See manual	
Induction protection		Already installed		

[1] Additional limits: Process image, max. design width 2 m.

[2] If two different conductor cross-sections are connected to one clamping point, both cross-sections must lie in the range specified. If identical cross-sections are used, this restriction does not apply.

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Overview

Functionality of the Standard motor starters

- For basic functionality, see ET 200S Motor Starter and Safety Motor Starter, General Data, Overview, page 9/140
- Direct and reversing starter up to 5.5 kW
- Energy bus up to 40 A
- With circuit breaker/contactor assembly
- Integrated disconnect functions via circuit breakers
- Can be combined with local safety technology for use in safety-relevant plant units with fail-safe kit and PM-D F modules (see Accessories, page 9/169)

Device functions (Firmware Features)

See Motor starters and safety motor starters ET 200S, General data, Overview, page 9/142.

Technical specifications

See Motor starters and safety motor starters ET 200S, General data, page 9/144.

Ordering data

	Induction motor 4-pole at 400 V AC, standard output *P*	Setting range of the electronic release		Order No.
	kW	A		
Standard motor starters, with diagnostics, electromechanical, fuseless, expandable with brake control module				
 DS1-x	***DS1-x direct-on-line starters***			
	< 0.06	0.14 ... 0.20	F	**3RK1 301-0BB00-0AA2**
	0.06	0.18 ... 0.25	F	**3RK1 301-0CB00-0AA2**
	0.09	0.22 ... 0.32	F	**3RK1 301-0DB00-0AA2**
	0.10	0.28 ... 0.40	F	**3RK1 301-0EB00-0AA2**
	0.12	0.35 ... 0.50	F	**3RK1 301-0FB00-0AA2**
	0.18	0.45 ... 0.63	F	**3RK1 301-0GB00-0AA2**
	0.21	0.55 ... 0.80	F	**3RK1 301-0HB00-0AA2**
	0.25	0.70 ... 1.00	F	**3RK1 301-0JB00-0AA2**
	0.37	0.90 ... 1.25	F	**3RK1 301-0KB00-0AA2**
	0.55	1.1 ... 1.6	F	**3RK1 301-1AB00-0AA2**
	0.75	1.4 ... 2.0	F	**3RK1 301-1BB00-0AA2**
	0.90	1.8 ... 2.5	F	**3RK1 301-1CB00-0AA2**
	1.1	2.2 ... 3.2	F	**3RK1 301-1DB00-0AA2**
	1.5	2.8 ... 4.0	F	**3RK1 301-1EB00-0AA2**
	1.9	3.5 ... 5.0	F	**3RK1 301-1FB00-0AA2**
	2.2	4.5 ... 6.3	F	**3RK1 301-1GB00-0AA2**
	3.0	5.5 ... 8.0	F	**3RK1 301-1HB00-0AA2**
	4.0	7 ... 10	F	**3RK1 301-1JB00-0AA2**
	5.5	9 ... 12	F	**3RK1 301-1KB00-0AA2**
 RS1-x	***RS1-x reversing starters***			
	< 0.06	0.14 ... 0.20	F	**3RK1 301-0BB00-1AA2**
	0.06	0.18 ... 0.25	F	**3RK1 301-0CB00-1AA2**
	0.09	0.22 ... 0.32	F	**3RK1 301-0DB00-1AA2**
	0.10	0.28 ... 0.40	F	**3RK1 301-0EB00-1AA2**
	0.12	0.35 ... 0.50	F	**3RK1 301-0FB00-1AA2**
	0.18	0.45 ... 0.63	F	**3RK1 301-0GB00-1AA2**
	0.21	0.55 ... 0.80	F	**3RK1 301-0HB00-1AA2**
	0.25	0.70 ... 1.00	F	**3RK1 301-0JB00-1AA2**
	0.37	0.90 ... 1.25	F	**3RK1 301-0KB00-1AA2**
	0.55	1.1 ... 1.6	F	**3RK1 301-1AB00-1AA2**
	0.75	1.4 ... 2.0	F	**3RK1 301-1BB00-1AA2**
	0.90	1.8 ... 2.5	F	**3RK1 301-1CB00-1AA2**
	1.1	2.2 ... 3.2	F	**3RK1 301-1DB00-1AA2**
	1.5	2.8 ... 4.0	F	**3RK1 301-1EB00-1AA2**
	1.9	3.5 ... 5.0	F	**3RK1 301-1FB00-1AA2**
	2.2	4.5 ... 6.3	F	**3RK1 301-1GB00-1AA2**
	3.0	5.5 ... 8.0	F	**3RK1 301-1HB00-1AA2**
	4.0	7 ... 10	F	**3RK1 301-1JB00-1AA2**
	5,5	9 ... 12	F	**3RK1 301-1KB00-1AA2**

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Übersicht

TM-DS, TM-RS terminal modules
(See also Motor starters and safety motor starters ET 200S, General data, section Terminal modules, Overview, page 9/140)

- "–S32" version with supply terminals: 2 x 3 x 10 mm² screw terminals for power bus and motor feeder
- "–S31" version without supply terminals: 1 x 3 x 10 mm² screw terminals for motor feeder
- Optionally expandable with PE/N modules (see Accessories)
- Applies only to Standard motor starters: For applications with high motor currents (> 6.3 A) or high ambient temperatures (> 40 °C) it is recommended to use the DM-V15 distance module (see Accessories) between two DS1-x motor starters

Technical specifications

TM-DS45 and TM-DS65/TM-FDS65 terminal modules

		TM-DS45	TM-DS65/TM-FDS65
Dimensions			
• Mounting dimensions (W x H x D)	mm	45 x 264 x 100	65 x 290 x 100
• Height with PE/N terminal block	mm	306	332
• Depth with motor starter	mm	127	150
• Depth with motor starter and F-Kit (safety technology)	mm	152	--
• Depth with motor starter and 2DI control module	mm	--	173
Rated voltages, currents and frequencies for the power bus			
• Rated insulation voltage U_i	V	690	
• Rated operational voltage U_e	V	500 AC	
• Rated impulse withstand voltage U_{imp}	kV	6	
• Rated operational current I_e	A	40	50
• Rated frequency	Hz	50/60	
Conductor cross-sections			
• Solid	mm²	2 x (1 ... 2.5)[1] or 2 x (2.5 ... 6)[1]	
• Finely stranded with end sleeve	mm²	1 x 10 or 2 x (1 ... 2.5)[1] or 2 x (2.5 ... 6)[1] Acc. to IEC 60947	
• AWG cables, solid or stranded	AWG	2 x (14 ... 10)	
• With additional three-phase feeder terminal if required			
- Solid or stranded	mm²	1 x 2.5 ... 25	
- Finely stranded with end sleeve	mm²	1 x 2.5 ... 25	
- AWG cables, solid or stranded	AWG	1 x 12 ... 4	
Wiring			
• Required tool		Standard screwdriver size 2 and Pozidriv 2	
• Tightening torque	Nm	2.0 ... 2.5	

[1] If two different conductor cross-sections are connected to one clamping point, both cross-sections must lie in the range specified. If identical cross-sections are used, this restriction does not apply.

TM-RS90 and TM-RS130/TM-FRS130 terminal module

		TM-RS90	TM-RS130/TM-FRS130
Dimensions			
• Mounting dimensions (W x H x D)	mm	90 x 264 x 100	130 x 290 x 100
• Height with PE/N	mm	306	332
• Depth with motor starter	mm	127	150
• Depth with motor starter and F-Kit (safety technology)	mm	152	--
• Depth with motor starter and 2DI control module	mm	--	173
Rated voltages, currents and frequencies for the power bus			
• Rated insulation voltage U_i	V	690	
• Rated operational voltage U_e	V	500 AC	
• Rated impulse withstand voltage U_{imp}	kV	6	
• Rated operational current I_e	A	40	50
• Rated frequency	Hz	50/60	

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Technical specifications (continued)

TM-RS90 and TM-RS130/TM-FRS130 terminal module

		TM-RS90	TM-RS130/TM-FRS130
Conductor cross-sections			
• Solid	mm^2	2 x (1 ... 2.5)[1] or 2 x (2.5 ... 6)[1]	
• Finely stranded with end sleeve	mm^2	1 x 10 or 2 x (1 ... 2.5)[1] or 2 x (2.5 ... 6)[1] Acc. to IEC 60947	
• AWG cables, solid or stranded	AWG	2 x (14 ... 10)	
• With additional three-phase feeder terminal if required			
- Solid or stranded	mm^2	1 x 2.5 ... 25	
- Finely stranded with end sleeve	mm^2	1 x 2.5 ... 25	
- AWG cables, solid or stranded	AWG	1 x 12 ... 4	
Wiring			
• Required tool		Standard screwdriver size 2 and Pozidriv 2	
• Tightening torque	Nm	2.0 ... 2.5	

[1] If two different conductor cross-sections are connected to one clamping point, both cross-sections must lie in the range specified. If identical cross-sections are used, this restriction does not apply.

Ordering data

		Version	Order No.
Terminal modules for standard motor starters			
 3RK1 903-0AB00	**TM-DS45-S32** **for DS1-x direct-on-line starters** with incoming power bus connection including three caps for terminating the power bus	F	**3RK1 903-0AB00**
 3RK1 903-0AB10	**TM-DS45-S31** **for DS1-x direct-on-line starters** without incoming power bus connection		**3RK1 903-0AB10**
 3RK1 903-0AC00	**TM-RS90-S32** **for RS1-x reversing starters** with incoming power bus connection including three caps for terminating the power bus		**3RK1 903-0AC00**
	TM-RS90-S31 **for RS1-x reversing starters** without incoming power bus connection	F	**3RK1 903-0AC10**

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Overview

Functionality of the High Feature motor starters

- For basic functionality, see Motor Starters and Safety Motor Starters ET 200S, General Data, Overview, page 9/140
- Direct, reversing or soft starter up to 7.5 kW
- Available with wide range and in 3 setting ranges (0.3...3 A, 2.4...8 A, 2.4...16 A)
- With a combination of starter circuit breakers, electronic overload protection (parameterizable), and contactor or soft starter
- Energy bus up to 50 A
- Upper and lower current limits for plant and process monitoring
- Integrated motor blocking protection, residual current detection, and asymmetry detection
- The current motor current is measured and transmitted for diagnostics in the cyclic process image
- Control of the motor starter from the controller and detailed diagnostic status via cyclic process image
- Optional digital inputs available in the cyclic process image and functions can be flexibly assigned so that they can be adapted to any application
- Detection of the switching state of the starter circuit breaker via auxiliary switches and of the switching state of the contactor via a current flow analysis
- Integrated disconnect function via starter circuit breaker
- Local safety equipment possible (for the HF starter without an fail-safe kit, because the function of the fail-safe kit is already integrated)
- 2DI LC COM control module can be plugged in on the front to provide 2 additional parameterizable digital inputs
- Optional "Motor Starter ES" software for user-friendly commissioning and diagnostics - as of 11/2011 also available for the innovated .-0AB4 starters (see page 9/180)
- PROFIenergy capable[1)]
  - Providing the motor current in PROFIenergy-Format
  - Shutdown during idle times
- Support of all acyclic DPV1 services on PROFIBUS and PROFINET[1)]
  - Changing of parameters during operation, e.g. rated operational current parameters
  - Reading and writing of acyclic data for accurate diagnostics of the device and of the system status analysis process

[1)] Only for the innovated .-0AB4 starters

Selective protection concept for
ET 200S High Feature motor starters

Thanks to the selective protection concept (separate short circuit and overload tripping) with electronic overload analysis, a number of additional advantages are gained with the High Feature motor starters, which quickly pay off especially in production processes with high plant downtime costs:

- Only two versions up to 7.5 kW - thus reducing the ordering and stockkeeping overhead
- All of the settings can be parameterized via the bus - which means full TIA capability
- Separate indication of overload and short circuit - allows selective diagnostics
- Overload can be acknowledged by means of a remote reset - ideal for highly automated plants
- Current asymmetry monitoring - full monitoring of the motor
- Blocking protection - full monitoring of the motor
- Emergency start function in the event of an overload - operability in an emergency
- Current value transmission via bus - monitoring of application
- Current limit monitoring
- Parameterizable trip class - overload tripping can be adapted to application
- Assignment type 2 - still capable of functioning after 50 kA short circuit
- Very long lifespan of contact piece



ET 200S High Feature Motor starter: DS1e-x direct starter
(innovated .-0AB4 starter)



ET 200S High Feature motor starter: DSS1e-x
(innovated .-0AB4 starter)



ET 200S High Feature motor starter: Reversing starter RS1e-x
(innovated .-0AB4 starter)

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Overview (continued)

PROFIenergy for ET 200S High Feature motor starter[1)]

Rising energy costs, far-reaching ecological problems around the world, and the looming climate change require a more conscious use of energy.

PROFIenergy permits an active and effective energy management.

PROFIenergy is a multi-vendor and cross-vendor profile on PROFINET standardized by PI[1)] and supports the shutdown of electronic devices during idle times and the read-out of measured values.

The ET 200S HF motor starter provides the motor current in the PROFIenergy format and shuts down during idle times..

1) The manufacturer and users of the standardized communication technologies PROFIBUS und PROFINET have joined forces in PI (PROFIBUS International).

Support of the acyclic services on PROFIBUS and PROFINET[1)]

The ET 200S HF motor starters now also provide comprehensive diagnostic data via datasets by means of the acyclic services. The new capability of reading out data from the motor starter for monitoring the devices, plants or the process is available and comprehensive. The motor starter provides three internal logbooks for device faults, trip actions of the motor starter, and events that are provided with a time stamp. These can be read out from the motor starter as needed. They provide the plant operator with comprehensive information about the system status and the process and they can be used to improve them.

1) Only for the innovated .-0AB4 starters

The maximum internal current values or the number of motor starter activations, for example, can be read out using the min/max pointer and statistical data functions. This allows process deviations to be monitored or even an initial commissioning can be optimized.

Plant monitoring for the user is facilitated due to available statistical data or measured values.

All of the statuses of the motor starter such as the device status, the device configuration and the communication status are contained in the device diagnostics data record, thus ensuring central device and plant monitoring.

On the one hand, information (I&M) on the module used and, on the other hand, data (I&M) that is defined during the configuration such as the location designations are saved in the motor starter using the Installation and Maintenance functions (I&M). They are used to clear faults or to detect hardware changes in a system or to check the system configuration.

Supported data records:
- DS 0 S7-V1-system diagnostics (S7 diagnostic alarm)
- DS 72, 73, 75 Logbooks, device faults, trip actions, events
- DS 92 Device diagnostics
- DS 93 Command
- DS 94 Measured values
- DS 95 Statistics
- DS 96 Min/max pointer
- DS 100 Device identification
- DS 131 Device parameters
- DS 134 Maintenance
- DS 165 Comment
- DS 226 PROFIenergy technology function
- DS 231 I&M 0 (= Device identification)
- DS 232 I&M 1 (= Item designation)
- DS 233 I&M 2 (= Installation)
- DS 234 I&M 3 (= Description)

Device functions (Firmware Features)

See ET 200S Motor Starter and Safety Motor Starter, General Data, Overview, page 9/142.

Technical specifications

See ET 200S Motor Starter and Safety Motor Starter, General Data, Technical Specifications, page 9/144.

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Ordering data

High Feature motor starter in present version (".-0AA4 starter")

	Setting range of the electronic release A		Order No.
High-Feature motor starters, with diagnostics, solid-state overload protection, fuseless, expandable with brake control module			
 DS1e-x	***DS1e-x direct-on-line starters***		
	0.3 ... 3		**3RK1 301-0AB10-0AA4**
	2.4 ... 8		**3RK1 301-0BB10-0AA4**
	2.4 ... 16		**3RK1 301-0CB10-0AA4**
	RS1e-x reversing starters		
	0.3 ... 3		**3RK1 301-0AB10-1AA4**
	2.4 ... 8		**3RK1 301-0BB10-1AA4**
	2.4 ... 16		**3RK1 301-0CB10-1AA4**
	DSS1e-x soft starters		
	0.3 ... 3	F	**3RK1 301-0AB20-0AA4**
	2.4 ... 8		**3RK1 301-0BB20-0AA4**
	2.4 ... 16		**3RK1 301-0CB20-0AA4**

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

High Feature motor starter in completely innovated version (".-0AB4 starter") available from June 1, 2011[1)]

	Setting range of the electronic release A	Order No.
High Feature motor starters, with diagnostics, solid-state overload protection, fuseless, expandable with brake control module		
 DS1e-x	***DS1e-x direct starters***	
	0.3 ... 3	**3RK1 301-0AB10-0AB4**
	2.4 ... 8	**3RK1 301-0BB10-0AB4**
	2.4 ... 16	**3RK1 301-0CB10-0AB4**
	S1e-x reversing starters	
	0.3 ... 3	**3RK1 301-0AB10-1AB4**
	2.4 ... 8	**3RK1 301-0BB10-1AB4**
	2.4 ... 16	**3RK1 301-0CB10-1AB4**
	DSS1e-x soft starters	
	0.3 ... 3	**3RK1 301-0AB20-0AB4**
	2.4 ... 8	**3RK1 301-0BB20-0AB4**
	2.4 ... 16	**3RK1 301-0CB20-0AB4**

1) Due to the technical compatability of the present and current motor starters, there will be a change with 6 months bridging time. In case of replacement, the innovate motor starter runs in the DPV0 mode as the present motor starter also does.

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Overview

TM-DS, TM-RS terminal modules
(See also Motor starters and safety motor starters ET 200S, General data, Overview, section Terminal modules, page 9/140)

- "–S32" version with supply terminals: 2 x 3 x 10 mm² screw terminals for power bus and motor feeder
- "–S31" version without supply terminals: 1 x 3 x 10 mm² screw terminals for motor feeder
- Optionally expandable with PE/N modules (see Accessories)

Technical specifications

See "Technical Specifications" on "Standard terminal modules", page 9/146

Ordering data

	Version		Order No.
Terminal modules for High Feature motor starters			
 3RK1 903-0AK00	**TM-DS65-S32** **for DS1e-x and DSS1e-x direct-on-line starters** with incoming power bus connection including three caps for terminating the power bus	F	**3RK1 903-0AK00**
	TM-DS65-S31 **for DS1e-x and DSS1e-x direct-on-line starters** without incoming power bus connection	F	**3RK1 903-0AK10**
	TM-RS130-S32 **for RS1e-x reversing starters** with incoming power bus connection including three caps for terminating the power bus	F	**3RK1 903-0AL00**
	TM-RS130-S31 **for RS1e-x reversing starters** without incoming power bus connection	F	**3RK1 903-0AL10**

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Overview

- Disconnection of a complete group of motor starters is possible without any additional outlay (safety category 1 according to ISO 13849-1)
- PM-D power modules are plugged onto the TM-P15 terminal modules. (A PM-D power module must be followed by at least one motor starter or one frequency converter.)

PM-D power modules are used for monitoring the two 24 V DC auxiliary voltages for the group of motor starters following on the right or for supplying power to the group of frequency converters following on the right. The voltage is fed in through TM-D terminal modules to the self-assembling potential bars.

A voltage failure is signaled through PROFIBUS diagnostics to the higher-level master. Additional LEDs inform locally about the status of the auxiliary voltages.

The separation of auxiliary voltages for signal checkback and power section actuation enables the entire group to be shut down while maintaining the diagnostic capability.

Technical specifications

		PM-D power module 3RK1 903-0BA00
Rated control supply voltage U_s up to 60 °C	V	20.4 ... 28
Rated operational current I_e		
• Recommended short-circuit protection	A	10
• Melting fuse	A	10
• Miniature circuit breakers	A	10, tripping characteristic B
Power consumption from the backplane bus	mA	≤ 10
Supplying		
• Motor starters		Yes
• Frequency converters		Yes
• Motor starters for safety technology		No
• Solid-state modules		No
• Ex(i) modules		No
Alarms		None
Diagnostic functions		Yes
• System fault/device fault		Red "SF" LED
• Monitoring the supply voltage for solid-state modules U_1		Green "PWR" LED
• Monitoring the supply voltage for contactors U_2		Green "CON" LED
• diagnostic information can be read out		Yes
Conductor cross-sections		
• Flexible with end sleeve	mm^2	1.5
• Rigid	mm^2	2.5
Mounting dimensions (W x H x D)	mm	15 x 195.5 x 117.5

9

Ordering data

	Version		Order No.
Power module			
 3RK1 903-0BA00	**PM-D power module** for 24 V DC with diagnostics	F	**3RK1 903-0BA00**

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

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Overview

Terminal module for power module

For supplying load and sensor voltage to the self-assembling potential bars of the Standard motor starters, High-Feature motor starters and frequency converters. Power modules for voltage monitoring are plugged onto TM-P modules. TM-P modules can be used any number of times within the ET 200S. A power module must always be plugged upstream from the first motor starter/frequency converter.

Ordering data

	Version	Order No.
Terminal module for power module		
 3RK1 903-0AA00	**TM-P15 S27-01 terminal module** for PM-D power module	**3RK1 903-0AA00**

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Overview



Fail-safe motor starter ET 200S: F-DS1e-x direct-on-line starter

The fail-safe motor starter has been developed on the basis of the High-Feature motor starter (.-0AA4 starter). It differs in that, in addition to a motor starter protector and contactor assembly, a safe solid-state evaluation circuit is installed for error detection purposes which makes the motor starter fail-safe.

If the contactor to be switched fails in an EMERGENCY-STOP case, the evaluation electronics detects a fault and opens the motor starter protector in the motor starter through a shunt release in a fail-safe manner. The second redundant shutdown component is therefore no longer a main contactor, as is generally the case, but the motor starter protector installed in the motor.

All functions of the High-Feature starter are already integrated

The new fail-safe motor starters are characterized by easy, space-saving assembly as well as minimal wiring outlay.

Like the High-Feature starters, the fail-safe motor starters have a switching capacity of up to 7.5 kW (16 A) which is achieved with just two motor starter versions. Another important feature is the high availability due to the high short-circuit strength (type of coordination "2").

Use

The fail-safe motor starter is predestined for use in combination with PROFIsafe (see figure ET 200S Safety Motor Starter Solution PROFIsafe with fail-safe Motor Starters on page 6/162). Another field of application is in combination with ASIsafe or safety relays (see example 2 on page 9/160 fail-safe Motor Starters with ASIsafe and 3TK28).

High degree of flexibility with safety technology

PROFIsafe solution with PM-D F PROFIsafe

In EMERGENCY-STOP applications, the fail-safe motor starters are selectively switched off through the upstream PM-D F PROFIsafe safety module. For each safety module, six switch-off groups can be formed. In the first delivery stage, the fail-safe freely-programmable logic of the SIMATIC controller is used to interface with the relevant fail-safe sensor technology. The interface between PROFIsafe and installations that use conventional safety technologies is implemented through the F-CM fail-safe contact multiplier with four floating contacts.

Solution local with PM-D FX1

Fail-safe motor starter with safety relay (Version 1) or ASIsafe (Version 2, see example 2, page 9/160):
Signals with relevance for safety can be input to ET 200S through a PM-D F X1 infeed terminal module through the enabling circuits of the AS-i Safety Monitor or the safety relay to control the fail-safe motor starters which then selectively switch off the downstream motors.

Technical specifications

F-DS1e-x direct-on-line starters/F-RS1e-x reversing starter

			F-DS1e-x direct-on-line starters	F-RS1e-x reversing starters
Dimensions				
Dimensions (W x H x D)		mm	65 x 290 x 150 (incl. terminal module)	130 x 290 x 150 (incl. terminal module)
Height with PE/N module		mm	332	
Depth with 2DI control module (not safe)		mm	173	
Module-specific data				
Type of coordination			Type 2 up to $I_e \leq 16$ A at 400 V	
Internal power supply			U1 (from PM-D F/PM-DF X1)	
Maximum achievable safety class • Acc. to IEC 61508 • Acc. to VDE 0801 • Acc. to EN 954-1			 SIL 3 Shutdown class 6 (AK6) Category 4	
Safety characteristics				
Low demand • Test interval 3 months • Test interval 6 months	PFD_{AVG} (10a)		 3.5×10^{-5} 8.0×10^{-5}	
High demand/continuous mode • Test interval 3 months • Test interval 6 months	PFH	1/h 1/h	 8.1×10^{-10} 1.8×10^{-9}	
Proof-test interval		Years	10	

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Technical specifications (continued)

F-DS1e-x direct-on-line starters/F-RS1e-x reversing starter

		F-DS1e-x direct-on-line starters	F-RS1e-x reversing starters
Voltages, currents, potentials			
Switching capacity		Up to 7.5 kW at 400 V AC in three setting ranges:	
	A	0.3 ... 3	
	A	2.4 ... 8	
	A	2.4 ... 16	
Status, alarms, diagnostics			
Status display		SF, DEVICE and C-STAT, SG1 ... SG6	
Diagnostic functions			
Group fault display		Red LED (SF)	
Diagnostic information can be read out		Available	
Control circuit			
Rated operational voltage for electronics U_1	V	24 DC (20.4 ... 28.8 DC)	24 DC (21.6 ... 26.4 DC)
Reverse polarity protection for electronics U_1		Yes	
Rated operational voltage for contactor U_2	V	24 DC (20.4 ... 28.8 DC)	
Reverse polarity protection for contactor U_2		Yes	
Power consumption			
• From electronics supply U_1	mA	Approx. 40	Approx. 100
• From contactor supply U_2			
- Pickup	A	1.7 (for 80 ms)	--
- Hold	mA	max. 350	--
• From SG1 up to 6			
- Pickup	mA	250 (for 200 ms)	
- Hold	mA	max. 55	
• Test function of the shunt release/starter protector (50 ms) from U_1	A	Approx. 1.5	
• From the backplane bus	mA	Approx. 20	
Main circuit			
Rated operational voltage U_e			
• Acc. to VDE 0106, part 1014, IEC 60947-1, EN 60947-1	V	500 AC	
• Protective separation between main and auxiliary circuits	V	400	
• UL, CSA	V	600 AC	
Rated insulation voltage U_i	V	500 AC	
Rated impulse withstand voltage U_{imp}	kV	6	
Rated frequency	Hz	50/60	

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Ordering data

	Version		Order No.
Fail-safe motorstarter ET 200S			
 F-DS1e-x direct-on-line starter	**F-DS1e-x direct-on-line starters** Fail-safe direct-on-line starters up to 7.5 kW at 400 V AC Mechanically switching Solid-state UE protection		
	• 0.3 ... 3 A		**3RK1 301-0AB13-0AA4**
	• 2.4 ... 8 A		**3RK1 301-0BB13-0AA4**
	• 2.4 ... 16 A		**3RK1 301-0CB13-0AA4**
	F-RS1e-x reversing starters Fail-safe reversing starters up to 7.5 kW at 400 V AC Mechanically switching Solid-state UE protection, fuseless		
	• 0.3 ... 3 A		**3RK1 301-0AB13-1AA4**
	• 2.4 ... 8 A		**3RK1 301-0BB13-1AA4**
	• 2.4 ... 16 A		**3RK1 301-0CB13-1AA4**
Terminal modules for fail-safe motor starters			
	TM-FDS65-S32-01/S31-01 terminal module for F-DS1e-x direct-on-line starters with coding		
	• With incoming power bus connection (TM-FDS65-S32-01)	F	**3RK1 903-3AC00**
	• Without incoming power bus connection (TM-FDS65-S31-01)	F	**3RK1 903-3AC10**
	TM-FRS130-S32-01/S31-01 terminal module for F-RS1e-x reversing starter with coding		
	• With incoming power bus connection (TM-FRS130-S32-01)	F	**3RK1 903-3AD00**
	• Without incoming power bus connection (TM-FRS130-S31-01)	F	**3RK1 903-3AD10**

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Overview

ET 200S Safety motor starters Solutions local/PROFIsafe

The ET 200S Safety motor starter Solutions are used as preferred in all production and process automation fields in which the enhancement of plant availability and flexibility plays a key role.

- **Safety motor starters Solutions local** are used as preferred from the safety technology point of view for locally restricted safety applications. These motor starters are not dependent on a safe control system.
- **Safety motor starters Solutions PROFIsafe** are often found by contrast in safety applications of the more complex type that are interlinked. In this case a safe control system is used with the bus systems PROFINET or PROFIBUS with the PROFIsafe profile.

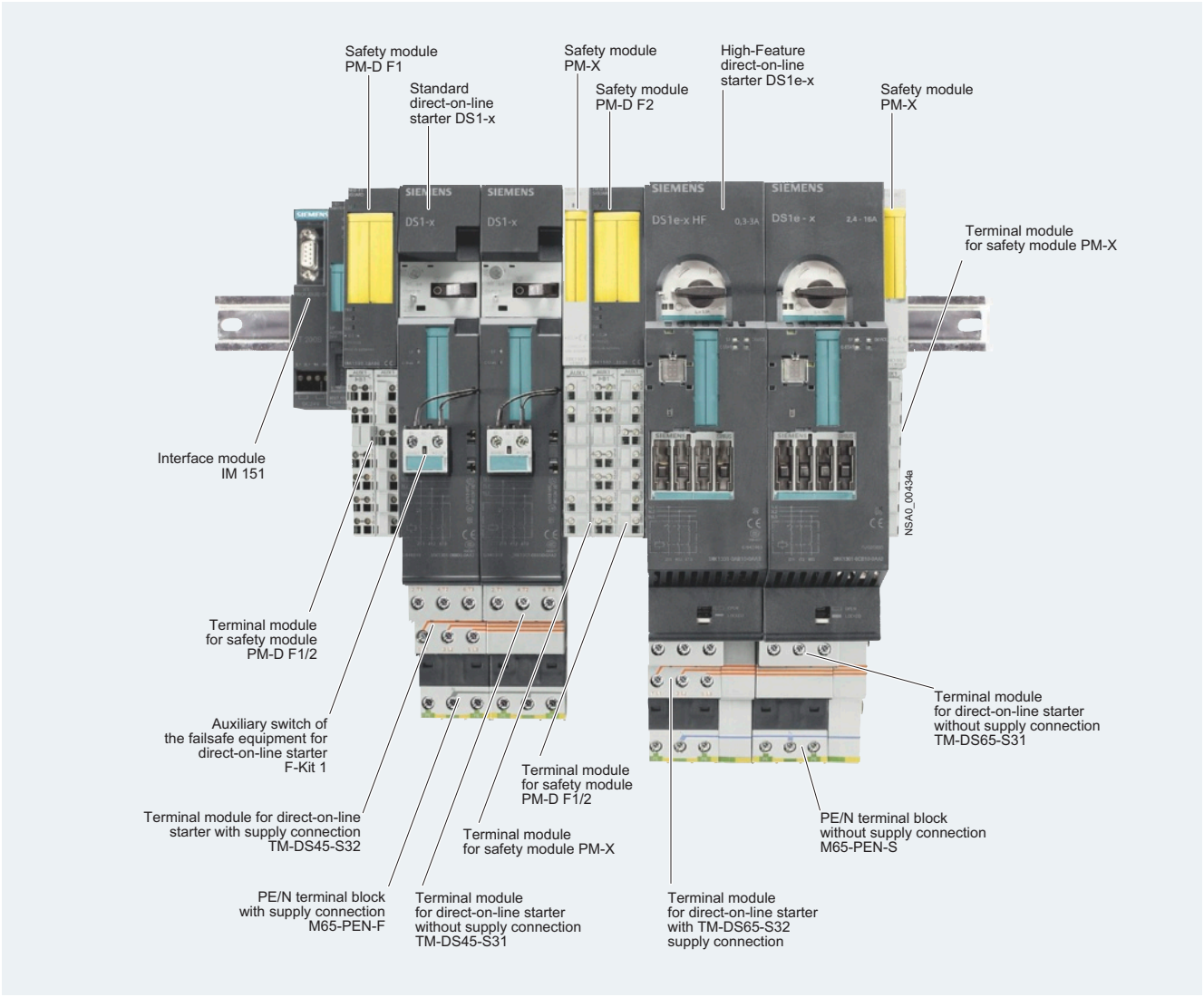
The ET 200S Safety motor starters Solutions comprise:
- Safety modules (page 9/158)
- Standard motor starters (page 9/145)
- High-Feature motor starters (page 9/148)
- Fail-safe motor starters (page 9/154)

With the ET 200S Solutions safety motor starters there is no complicated and hence cost-intensive configuring and wiring compared to the conventional safety systems. The ET 200S Solutions safety motor starters are designed for Category 4 according to ISO 13849-1 or SIL 3 IEC 62061.

They enable the use of safety-oriented direct-on-line starters or reversing starters in the SIMATIC ET 200S distributed peripherals system on PROFINET or PROFIBUS. The fine modular architecture of the system permits optimum imaging of machine or plant applications.

Within an ET 200S station, the Solutions safety motor starters can also be combined with Standard motor starters or High Feature motor starters without safety functions or the SIMATIC ET 200S FC frequency converters up to max. 4 kW up to Category 3 according to ISO 13849-1 or SIL 2 according to IEC 62061.

Safety motor starter ET 200S Solution local



Interplay of ET 200S safety motor starters Solutions local components

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Overview (continued)

Components for Safety motor starter ET 200S Solution local

The Safety motor starters ET 200S Solutions local comprise:

Version 1 (see Example 1, page 9/160):
- Safety modules PMD-F1 ... 5
- PM-X module
- Standard motor starter or High Feature motor starter

Version 2 (see Example 2, page 9/160):
- Safety module PM-D FX1
- Fail-safe motor starter

Functionality of the Safety motor starters ET 200S Solutions local

- For use of Standard, High-Feature or fail-safe motor starters in systems with safety categories 2 to 4 (according to ISO 13849-1)
- Can also be used in combination with external safety relays
- Can also be used to activate external safety systems
- No complex wiring for conventional safety technology
- Safety module available for function-monitored and automatic starting
- Safety module available for Stop category 0 and 1
- Safety module for monitoring the auxiliary voltages for motor starters
- Safety modules can be plugged into the TM-PF30 terminal modules

With the Safety motor starters Solution local, the highest safety category according to ISO 13849-1 and IEC 62061 can be achieved.This means that it is possible to use it for analyzing EMERGENCY STOP circuits or for protective door monitoring and also for delayed shutdown. Using the contact multiplier, the safety-relevant signals can also be made available to external systems.

All standard safety applications can be covered by combining different TM-PF30 terminal modules. Of course, the ET 200S motor starters can also be used in combination with external safety relays or ASIsafe.

With the Safety Motor Starter Solutions local, up to 80 % of wiring is saved compared to conventional safety systems with local safety applications.

Several safety circuits can be set up using the Safety motor starters Solution local. The safety sensors are directly connected to the safety modules locally. These safety modules take over the task of the otherwise obligatory safety relay and shut down the downstream motor starters depending on the respective selected function. The cross connections required for this are already integrated in the system and do not require additional wiring. All messages of the safety modules are automatically forwarded as diagnostic messages, e.g. when there is a cross circuit in the EMERGENCY STOP circuit.

The safety module evaluates the signal state of the connected safety sensors and, using the integrated safety relays, shuts down the group(s) of downstream motor starters. The shutdown function is monitored by the module, and the auxiliary voltages likewise.

Safety-relevant system alarms, e.g. caused by actuating the EMERGENCY STOP switch or a missing auxiliary voltage, are automatically generated and reported to the interface module. It assigns a unique ID to the error. Such errors can be identified and localized via the PROFIBUS DP diagnostic module without a great deal of programming overhead.

PM-D F1/F2/F3/F4/F5 safety modules

- PM-D F1/F2/F3/F4 safety modules monitor auxiliary voltages and contain the complete functionality of a safety relay:
  - PM-D F1: For evaluation of EMERGENCY-STOP circuits with the function "monitored start".
  - PM-D F2 : For monitoring of protective doors with the function "automatic start".
  - PM-D F3 : Expansion to PM-D F1/F2 for time-delayed disconnection.
  - PM-D F4: For expansion of safety circuits with other ET 200S motor starters, e.g. in a different line.
  - PM-D F5: Transmits the status from PM-D F1 ... 4 through four floating enabling circuits to external safety equipment (contact multipliers)
- The PM-D F1 and PM-D F2 modules can be combined with the PM-D F3 or PM-D F4 modules.
- A PM-D F5 can be positioned at any point between a PM-D F1 ... 4 and a PM-X[1].
- Safety modules monitor the U1 and U2 auxiliary voltages. A voltage failure is relayed as a diagnostic signal over the bus.
  - No additional PM-D safety module is required when the safety modules are used.
  - Each safety circuit, beginning with a PM-D F1 ... 4, must be terminated with one PM-X[1] each.

[1] see Accessories for Safety Module local, page 9/173



Safety Module PM-D F1

PM-D FX1 Safety module

The PM-D FX1 safety module is used to supply 1 to 6 switch-off groups. The supply voltage can be activated via 1 to 6 external safety shutdown devices (either ASIsafe Monitor or 3TK28 safety relays). This safety module is used for applications with external safety shutdown devices as needed for fully selective safety shutdown of fail-safe motor starters/frequency converters (see example 2, page 9/160).

Terminal modules for safety module (TM-PF30)

For supplying load and sensor voltage to the potential bars of the motor starters, and for connection of the 2-channel sensor circuit (e.g. EMERGENCY-STOP pushbutton) and a reset button. Different terminal modules are available for the configuration of separate safety circuits or for the cascading of safety circuits, and for applications with time-delayed disconnection. (see page 9/167).

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Overview (continued)

Terminal module (TM-X)

For connection of an external infeed contactor (2nd shutdown possibility). With terminals for contactor coil and feedback contact. Is always required to terminate a group of safety-oriented motor starters.

Fail-safe Kit

The fail-safe Kit (F-Kit) must be added to each Standard motor starter in a safety segment in order to monitor the switching function.

F-Kit 1 supplements the DS1-x direct-on-line starter, F-Kit 2 the RS1-x reversing starter.

The F-Kits are comprised of:

- Contact supports for the terminal modules
- One or two auxiliary switch blocks for the contactor/contactors of the motor starter
- Connecting cables

High-Feature motor starters and their terminal modules come as standard with the functionality of the F-Kits integrated.

Components needed for applications with safety requirements

Components needed	Maximum achievable safety integrity according to ISO 13849-1 or IEC 62061				
	ISO 13849-1	PL b/c, category 1	PL c, category 2	PL d[1], category 3	PL d/PL e[1], category 4
	IEC 62061	SIL 1	SIL 1	SIL 2	SIL 3
PM-D		✓	--	--	--
PM-D F1/-F2/-F4		--	✓	✓	✓
PM-D F3		--	✓	✓	--
F-Kit 1 / F-Kit 2		--	✓[2]	✓[2]	✓[2]
PM-X		--	✓	✓	✓
PM-D FX1		--	✓	✓	✓

[1] An external incoming supply contactor is needed in the main circuit (2-channel).

[2] F-Kit is only need for the Motor starter Standard; for Motor starter High Feature it is already integrated.

Possible combinations of safety and terminal modules

Terminal module	PM-D F1	PM-D F2	PM-D F3	PM-D F4	PM-D F5	PM-X	PM-DFX1	FCM
TM-PF30 S47-B0	✓	✓	--	--	--	--	--	--
TM-PF30 S47-B1	✓	✓	--	--	--	--	--	--
TM-PF30 S47-C0	--	--	✓	✓	--	--	--	--
TM-PF30 S47-C1	--	--	✓	✓	--	--	--	--
TM-PF30 S47-D0	--	--	--	--	✓	--	--	--
TM-X15 S27-01	--	--	--	--	--	✓	--	--
TM-PFX30 S47-G0	--	--	--	--	--	--	✓	--
TM-PFX30 S47-G1	--	--	--	--	--	--	✓	--
TM-FCM30 S47	--	--	--	--	--	--	--	✓

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Overview (continued)

Examples

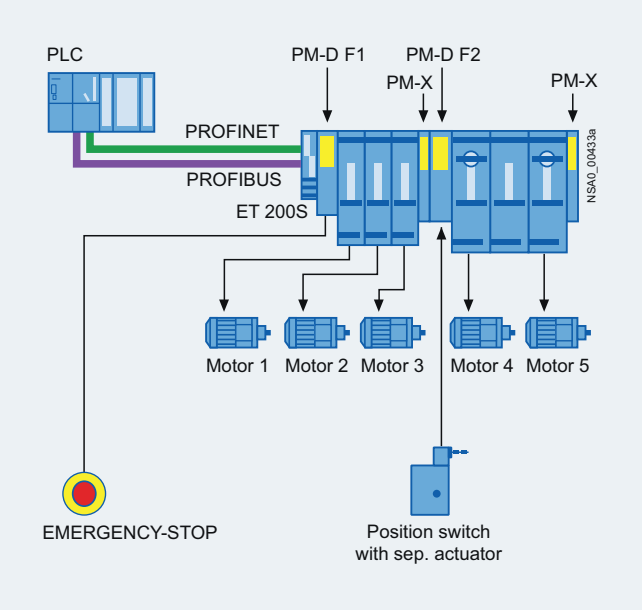
The diverse possible uses of the safety motor starter Solutions local are presented in the manual SIMATIC ET 200S Motor Starters in the context of typical sample applications.

Safety functional examples for easy, quick and low-cost implementations of applications with Safety motor starters Solutions local are available on the Internet:

You can find more information on the Internet:

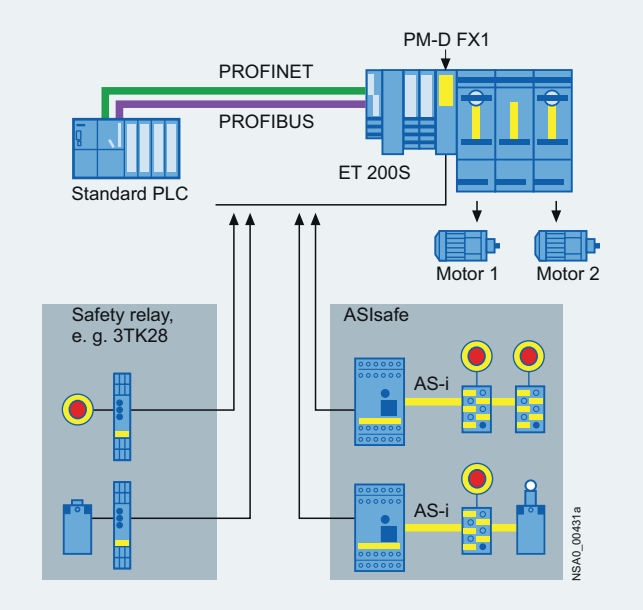
www.siemens.com/ET200S-Motorstarter

Example 1:



ET 200S safety motor starter Solutions local with 2 safety circuits (= switch-off groups), Standard motor starters and High-Feature motor starters.

Example 2:



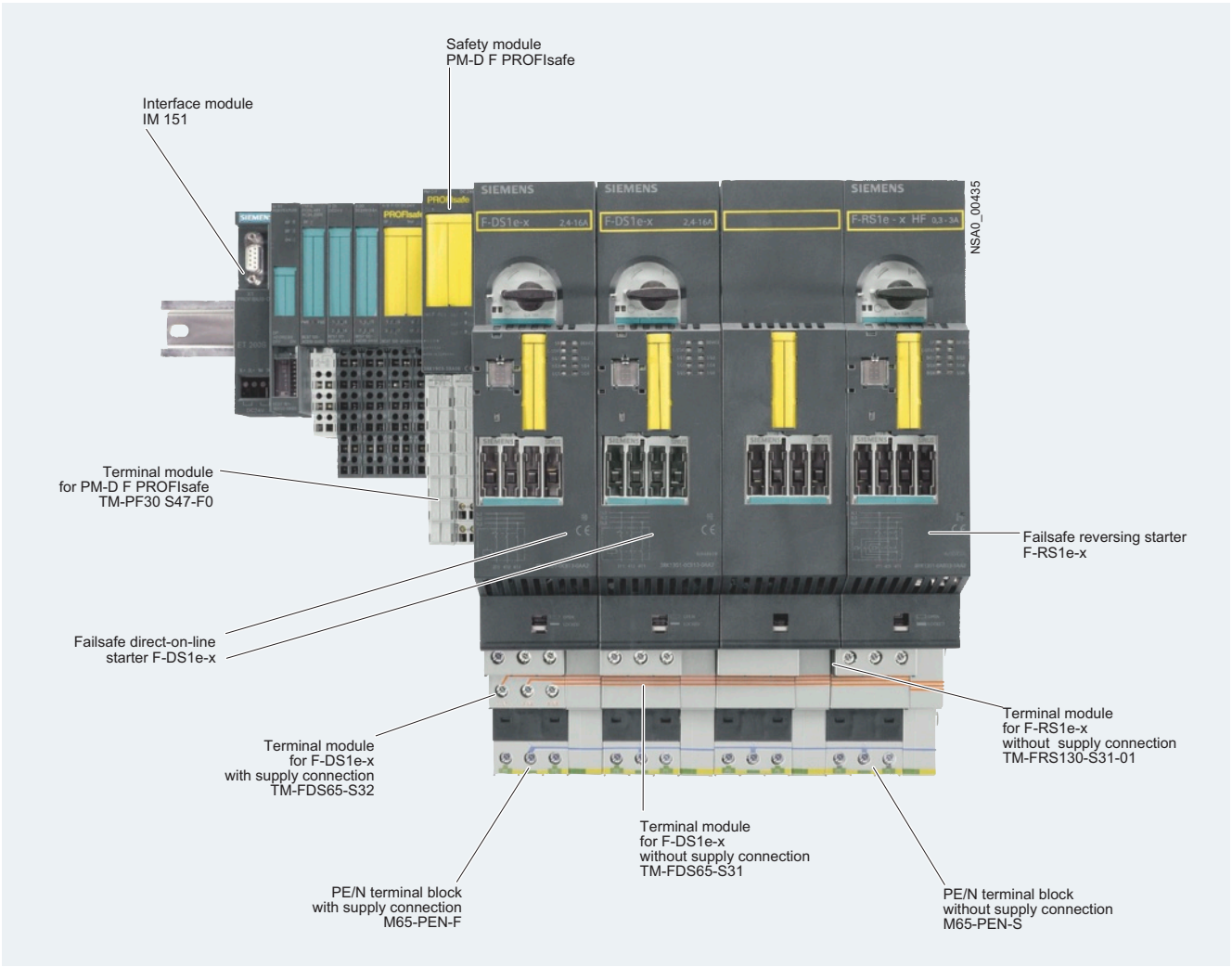
ET 200S safety motor starter Solutions local with 2 external safety assemblies (= safety relays or ASIsafe monitors) and with fail-safe motor starters (PM-DFX1 application). 2 of the 6 available safe switch-off groups are used.

Signals with relevance for safety can be input to ET 200S through a PM-DFX1 infeed terminal module through the enabling circuits of the ASIsafe monitor or the safety relay to control the fail-safe motor starters which then selectively switch off the downstream motors.

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Overview (continued)

Safety Motor starter ET 200S Solutions PROFIsafe



Interplay of ET 200S Safety motor starter Solutions PROFIsafe components

Components for Safety motor starter ET 200S Solution PROFIsafe

The Safety motor starters ET 200S Solutions PROFIsafe consist of (see example, page 9/162):

- PMD-F PROFIsafe safety modules
- Fail-safe motor starter
- Safe control with the PROFINET or PROFIBUS bus systems with the PROFIsafe profile

Functionality of the Safety motor starter ET 200S Solutions PROFIsafe

- For the use of fail-safe motor starters in plants with safety category 2 to 4 according to ISO 13849-1 and SIL 2 and 3 acc. to IEC 62061. The use of Standard or High-Feature motor starters is also possible with certain assemblies
- High flexibility (any assignment of sensors to motor starters using the PLC)
- Full selectivity of disconnection of the fail-safe motor starters
- No complex wiring for conventional safety systems, e.g. no in-feed contactors even in the highest safety category
- Can also be used to activate external safety systems through F-CM contact multiplier
- Safety module available for any safety function
- Safety module available for Stop category 0 and 1
- Safety module for monitoring the auxiliary voltages for motor starters
- Safety modules can be plugged into the TM-PF30 terminal modules

Sensor and actuator assignment are freely configurable within the framework of the distributed safety concept:

The logic of the safety functions is implemented by software. Safety-oriented PROFIsafe communication and the use of a safety-oriented control system are required. Integration of the safety technology in the standard automation is realized through a single bus system (see Advantages of PROFIsafe), using PROFIBUS as well as PROFINET.

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Overview (continued)

High degree of flexibility with safety technology Fail-safe motor starters for PROFIsafe

In EMERGENCY-STOP applications, the fail-safe motor starters are selectively switched off through the upstream PM-D F PROFIsafe safety module. For each safety module, six switch-off groups can be formed. In the first delivery stage, the fail-safe freely-programmable logic of the SIMATIC controller is used to interface with the relevant fail-safe sensor technology.

Contact multiplier F-CM

The interface between PROFIsafe and installations that use conventional safety technologies is implemented through the F-CM fail-safe contact multiplier with four floating contacts

PM-D F PROFIsafe safety modules

The PM-D F PROFIsafe safety module receives the shutdown signal from the interface module of the ET 200S and safely switches off 1 to 6 switch-off groups. This safety module is used in PROFIsafe applications where there is a need for the selective safety shutdown of fail-safe motor starters/frequency converters.

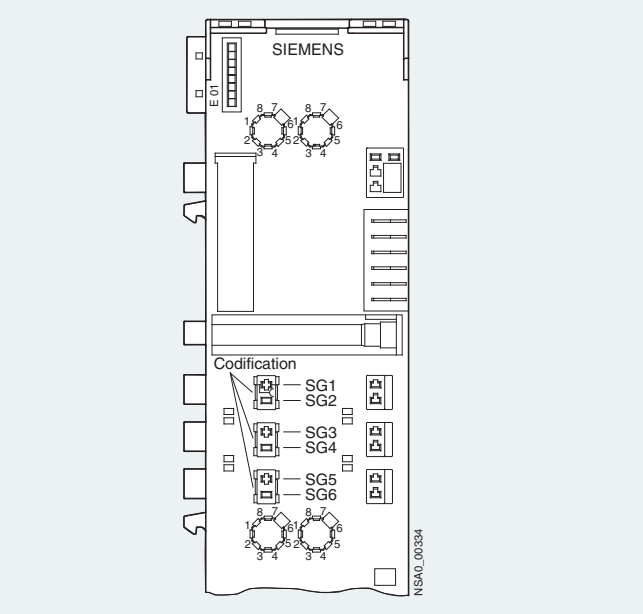


PM-D F PROFIsafe with TM-PF30 S47-F0 terminal modules

Terminal modules

The terminal assignment of the terminal modules for safe motor starters corresponds to the terminal assignment of the 45 and 65 mm terminal modules. The terminal modules for safe motor starters have a coding module in addition. This enables the safe motor starter to be assigned to one of the six switch-off groups.

The terminal module contains three coding elements which fully cover the three coding openings in the terminal module. The labeled coding element contains (in the chamber marked with the dash) the busbar tap; the non-labeled coding elements are used only to cover the coding openings. Switch-off group 1 (AG1 or SG1) is coded in the delivery state. The coding can be changed to switch-off group 2 by releasing the coding element and turning it through 180°. Changing the coding to switch-off group 3 is possible by exchanging the labeled and blank coding elements. In this case the dash on the labeled coding element must correlate with the dash of the required switch-off group (symbolized busbar).



The fail-safe motor starters are assigned to one of the six switch-off groups.

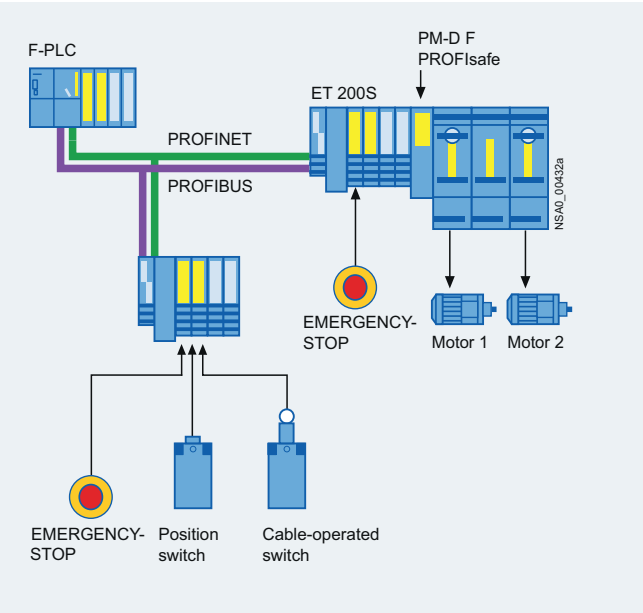
Example:

The diverse possible uses of the Safety motor starter Solutions PROFIsafe are presented in the manual SIMATIC ET 200S Motor Starters in the context of typical sample applications.

Safety functional examples for easy, quick and low-cost implementations of applications with safety motor starters Solution PROFIsafe are available on the Internet:

You can find more information on the Internet at:

www.siemens.com/ET200S



ET 200S Safety Motor starter Solution PROFIsafe with motor starters fail-safe and fully selective disconnection (PM-DF PROFIsafe application)

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Overview (continued)

Within an ET 200S station the fail-safe motor starters are assigned to one of 6 safety segments. For plants with distributed configuration, the shutdown signals of these safety segments are preferably issued by a higher-level, safety-oriented control system via PROFIsafe. This permits the greatest flexibility for assigning the motor starters to different safety circuits.

Alternatively, an ET 200S F CPU can also be used for control purposes.

If a safety-oriented SIMATIC CPU is used, the ET 200S is available as a safety-oriented peripheral. Nevertheless, in such a station it is possible to configure conventional motor starters and input/output modules mixed with modules with safety functions.

Thanks to the PROFIsafe profile, the safety functions are available in the complete network, which means that the Safety motor starter Solutions PROFIsafe enable the selective disconnection of fail-safe motor starters or the disconnection of a group of Standard and High-Feature motor starters regardless of where and on which peripheral station the safe control devices were connected. As such, this solution provides an unprecedented level of flexibility and reduction of wiring for applications in wide-spread plants or with a sporadic demand for changes in the assignment of safety segments.

The Solution PROFIsafe safety motor starters are ideally suited for safety concepts with Cat. 2 to 4 according to ISO 13849-1 or up to SIL 3 according to IEC 62061.

Each safety module switches up to 6 switch-off groups for fail-safe motor starters/frequency converters.

Technical specifications

PM-D F1, F2, F3, F4 and F5 safety modules		
Mechanical endurance	Operating cycles	10×10^6
Electrical endurance		200 000 at I_e
Utilization categories		DC-13
Control times		
• Minimum command duration	ms	200
• Recovery time	s	< 1
• Off-delay	ms	30
Control circuit U_1		
• Rated control supply voltage U_S	V	24 DC
• Operating range DC up to 60 °C		0.85 ... 1.2 x U_s
• Power consumption	W	2.4
• Recommended short-circuit protection		gG 2 A
• Output OUT+/OUT- for control of expansion modules		24 V DC/< 50 mA (PTC fuse)
Switched auxiliary circuit U_2		
• Rated control supply voltage U_S	V	24 DC
• Operating range DC up to 60 °C		0.85 ... 1.2 x U_s
• Rated operational current I_e (13 ... 24 V DC)	A	4
• Uninterrupted thermal current I_{th}	A	5
Recommended short-circuit protection for enabling and signaling circuits		Fuse links: NH type 3NA, DIAZED type 5SB, NEOZED type 5SE Operational class gG 6 A
Supplying		
• Motor starters		Yes
• Solid-state modules		No
• Ex(i) modules		No
• BG certification		Yes
• UL-, CSA certification		Yes
Cable length for EMERGENCY-STOP and ON pushbuttons	m	Max. 1 000
Mounting dimensions (W x H x D)	mm	30 x 196.5 x 117.5 (incl. terminal module)
Enabling circuits with PM-D F5		4 (floating)

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Technical specifications (continued)

PM-D FX1 safety module (infeed terminal module)		
Dimensions		
Mounting dimensions (W x H x D)	mm	30 x 196.5 x 117.5 (incl. terminal module)
Module-specific data		
Ambient temperature	°C	0 ... +60
Degree of protection		IP20
Maximum achievable safety classes		
• IEC 62508		SIL 3
• DIN V 19250		Shutdown class 5 and 6
• EN 954-1		Category 4
Safety characteristics		
Proof-test interval		10 years
Voltages, currents, potentials		
Rated control supply voltage U_s	V	21.6 ... 26.4 DC up to 60 °C
Rated operational current I_e	A	6 Internal protection with 7 A melting fuse (quick)
Recommended upstream short-circuit protection	A	Melting fuse gG 6.3
Supplying		
• Fail-safe motor starters		Yes
• Fail-safe frequency converters		Yes
• Solid-state modules		No
• Ex[i] modules		No
Power consumption		
• From the backplane bus	mA	≤ 10
• From U_1	mA	≤ 35
• From SGx	mA	≤ 15
Status, alarms, diagnostics		
Alarms		None
Diagnostic functions		
• Group fault/device fault		Red "SF" LED
• Monitoring the supply voltage for solid-state modules U1 (PWR)		Green PWR LED
• Monitoring of six switch-off groups		Green LED SG1 ... SG6
• diagnostic information can be read out		Yes
Standards, approvals		
• TÜV		Yes
• UL-, CSA certification		Yes

F-CM contact multipliers		
Dimensions		
Dimensions (W x H x D)	mm	30 x 196.5 x 117.5 (incl. terminal module)
Module-specific data		
Number of relay outputs		4 (4 x 1-channel or 2 x 2-channel safe coupling/contact multiplication)
Internal power supply for bar		U1 (from PM-D F/PM-D FX1)
Maximum achievable safety class		
• Acc. to IEC 61508		SIL3
• Acc. to VDE 0801		AK 6
• Acc. to EN 954		Cat. 4
Voltages, currents, potentials		
Switching capacity of the relay outputs		Utilization category DC-13 (I_e/U_e): 1.5 A / 24 V
Electrical separation		
• Between outputs and backplane bus		Yes
• Between outputs and power supply		Yes
• Between outputs		Yes
• Between outputs/power supply and shield		Yes
Status, alarms, diagnostics		
Status display		PWR and STAT
Alarms: diagnostic alarm		None
diagnostic functions		Yes
• Group fault display		Red LED (SF)
• Diagnostic information can be read out		Available
• Monitoring the supply voltage for solid-state modules U_1 (PWR)		Green PWR LED
• Monitoring the switching state of the enabling circuit		Red/green STAT LED

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Technical specifications (continued)

PM-D F PROFIsafe safety modules		
Dimensions		
Dimensions (W x H x D)	mm	30 x 196.5 x 117.5 (incl. terminal module)
Module-specific data		
Number of outputs, source input		6 switch-off groups (safety group 1 ... 6)
Internal power supply for bar		U1
Assigned address range		
• In PAE	byte	5
• In PAA	byte	5
Maximum achievable safety class		
• Acc. to IEC 61508		SIL3
• Acc. to VDE 0801		AK 6
• Acc. to EN 954		Cat. 4
Voltages, currents, potentials		
Control supply voltage	V	24 DC
Electrical separation		
• Between outputs and backplane bus		Yes
• Between outputs and power supply		No
• Between outputs		No
• Between outputs/power supply and shield		Yes
Status, alarms, diagnostics		
Status display		Green LED per SG Green LED for electronics supply Green LED for load voltage
Alarms: Diagnostic alarm		"TO"
Diagnostic functions		
• Group fault display		Red LED (SF)
• Diagnostic information can be read out		Available
Settings		
Module address		Diverse: 1. Using a safety-oriented parameter in the parameterization message frame over the backplane bus 2. Using the 10-pole DIL switch (binary-coded) on the left side of the module The received address is then compared with the DIL switch setting.

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Ordering data

	Version		Order No.
Safety modules local			
 3RK1 903-3DA00	**PM-D F1** With diagnostics Safety module for EMERGENCY-STOP application Monitored start	F	**3RK1 903-1BA00**
	PM-D F2 With diagnostics Safety module for protective door monitoring Automatic start	F	**3RK1 903-1BB00**
	PM-D F3 With diagnostics Safety module for expanding PM-D F1/2 for another voltage group Time-delayed 0 to 15 s		**3RK1 903-1BD00**
	PM-D F4 With diagnostics Safety module for expanding PM-D F1/2 for another voltage group		**3RK1 903-1BC00**
	PM-D F5 With diagnostics Safety module for expanding PM-D F1...4 with four floating enabling circuits Contact multipliers		**3RK1 903-1BE00**
	PM-D FX1 With diagnostics Infeed terminal module for supply of 1 to 6 switch-off groups	F	**3RK1 903-3DA00**
	FC-M contact multipliers With 4 safe floating contacts		**3RK1 903-3CA00**
PROFIsafe safety modules			
	PM-D F PROFIsafe safety modules For PROFIBUS and PROFINET For fail-safe motor starters For fail-safe contact multipliers With six switch-off groups (SG1 to SG6)	F	**3RK1 903-3BA01**
	F-CM contact multipliers With 4 safe floating contacts		**3RK1 903-3CA00**

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

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Overview

Terminal module for safety modules PM-D F1/F2/F3/F4/F5

For supplying load and sensor voltage to the self-assembling potential bars of the Standard motor starters, High-Feature motor starters and frequency converters. Safety modules for voltage monitoring are plugged onto TM-P modules. TM-P modules can be used any number of times within the ET 200S. A safety module must always be plugged upstream from the first motor starter.

Different safety circuits can be functionally separated or else cascaded using different terminal modules. Each group in such a case must be terminated with a PM-X connection module.

TM-PF30 S47-B1

The terminal module is always positioned at the beginning of a safety segment and accommodates the PM-DF1 safety module for EMERGENCY-STOP applications or the PM-DF2 safety module for protective door monitorings. The 24 V supply voltages for the electronics (U1) and those for supplying the contactors (U2) of the motor starters must be connected along with the 2-channel connection of the safety sensors (e.g. EMERGENCY-STOP pushbuttons) to this terminal module. Connections for the ON button (enabling) and safe output of the safety module are available in addition.

TM-PF30 S47-B0

The terminal module is used to cascade lower level safety segments and accommodates the PM-DF1 safety module for EMERGENCY-STOP applications or the PM-DF2 safety module for protective door monitorings. No other auxiliary voltage has to be connected to this terminal module. The supply comes from the preceding PM-DF1 or PM-DF2 module over the potential bars of the terminal modules. Once the potential of the preceding safety module is disconnected, this sub-potential also has no voltage.

TM-PF30 S47-C1

The terminal module is always positioned at the beginning of a safety segment expansion in a new station, e.g. at an interlace point. It accommodates the PM-D F3 safety module for time-delayed shutdown or the PM-D F4 safety module for direct shutdown in separately located ET 200S stations. The 24 V supply voltages for the electronics (U1) and those for supplying the contactors (U2) are fed in new. The shutdown command from an upstream ET 200S station is received through a safe input. Separate terminals are available to connect the feedback circuit to the upstream ET 200S station. No safety sensors can be connected to this terminal module.

TM-PF30 S47-C0

The terminal module is used to cascade lower level safety segments and accommodates the PM-D F3 safety module for time-delayed shutdown or the PM-D F4 safety module. Only the U2 supply voltage for the contactors must be connected to this terminal module. The U1 supply comes from the preceding safety module (sub-potential group) over the potential bars of the terminal modules. No safety sensors can be connected to this terminal module.

TM-PF30 S47-D0

The terminal module is used to accommodate the PM-D F5 safety module. On this terminal module, safe signals can be relayed to external systems through four groups, each with two safety relay contacts configured with redundancy. The terminal module must always be positioned between one of the above mentioned terminal modules and a terminal module for the TM-X connection module. No safety sensors can be connected to this terminal module.

Terminal modules for PM-X safety module (TM-X)

TM-X15 S27-01

For connection of an external infeed contactor (second shutdown option) for category 3 and 4. The connection module (PM-X Safety Module) is plugged on the right alongside the last motor starter of a safety segment. On the TM-X terminal module there are the terminals for connecting the positively driven NC contact of the contactors as well as the terminals for connecting the contactor coil. If no contactor with redundant switching is required, e.g. for category 2 (ISO 13849-1), the feedback circuit has to be closed at these terminals with a jumper. In applications with external safety relays it is also used instead of the safety module as interface to the external safety relay.

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Terminal modules for safety modules local and PROFIsafe

Technical specifications

TM-PFX30 S47/TM-PF30 S47 terminal module		
Dimensions		
Mounting dimensions (W x H x D)	mm	30 x 196.5 x 102
Depth with power module	mm	117.5
Insulation voltages and rated currents		
Insulation voltage	V	500
Rated operational voltage	V	24 DC
Rated operational current	A	10
Conductor cross-sections		
Solid	mm^2	1 x (0.14 ... 2.5), according to IEC 60947 1 x 2.5
Finely stranded with end sleeve	mm^2	1 x (0.14 ... 1.5), according to IEC 60947
AWG cables, solid or stranded	AWG	1 x (18 ... 22)
Wiring		
Required tool		Standard screwdriver size 1
Tightening torque	Nm	0.4 ... 0.7

Ordering data


3RK1 903-1AA00

Version		Order No.
Terminal modules for safety modules local		
Terminal modules		
TM-PF30 S47-B1 For PM-D F1/2 Safety Modules With infeed U1/U2 and sensor connection	F	**3RK1 903-1AA00**
TM-PF30 S47-B0 For PM-D F1/2 Safety Modules With sensor connection	F	**3RK1 903-1AA10**
TM-PF30 S47-C1 For PM-D F3/4 Safety Modules With infeed U1/U2 and control input IN+/IN-	F	**3RK1 903-1AC00**
TM-PF30 S47-C0 For PM-D F3/4 Safety Modules With infeed U2		**3RK1 903-1AC10**
TM-PF30 S47-D0 For PM-D F5 Safety Modules		**3RK1 903-1AD10**
TM-X15 S27-01 For PM-X Safety Module	F	**3RK1 903-1AB00**
TM-P15-S27-01 terminal module For PM-D power module		**3RK1 903-0AA00**
TM-PFX30 S47-G0/G1 terminal module For PM-D FX1 safety modules (infeed terminal module)		
• Infeed left (TM-PFX30 S47-G0)	F	**3RK1 903-3AE10**
• Infeed center (TM-PFX30 S47-G1)	F	**3RK1 903-3AE00**
TM-FCM30 S47-F01 terminal module For F-CM contact multipliers		**3RK1 903-3AB10**
Terminal modules for Safety modules PROFIsafe		
TM-PF30 S47-F0 terminal module For PM-D F PROFIsafe safety modules	F	**3RK1 903-3AA00**
TM-FCM30 S47-F01 terminal module For F-CM contact multipliers		**3RK1 903-3AB10**

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

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Overview

Accessories for Standard motor starters

Control kit

The control kit for the Standard motor starter provides the possibility of testing the motor during start-up or service by actuating the motor starter protector. Using the control kit with the motor starter protector tripped, the contactor is mechanically locked in ON position.

Control unit

With the control unit the contactor coils of the Standard motor starter can be directly controlled using 24 V DC. The motor starter can thus be started as normal using a on-site control point without PLC or bus.

Note:
The control unit cannot be used in combination with the safety system or a brake control module.

DM-V15 distance module

- Passive module without bus connection and terminals
- Does not need a separate terminal module
- Follows a TM-DS45 or TM-RS90 or TM-xB if required
- Does not need to be taken into account when configuring the GSD file

The distance module is available for applications with high motor currents or high ambient temperatures involving Standard motor starters. It can be used to the right and left of a DS1-x direct-on-line starter or to the right of an xB1-4 brake module in order to improve heat removal to the side. The distance module is a completely passive module and does not need to be taken into account with regard to the control system during configuration. Details of the distance module can be found in the manual "SIMATIC ET 200S". If you have any queries concerning the use of the distance module, contact the Technical Support for Siemens Industrial Controls (fax: +49(0)911/895-5907).

Accessories for High-Feature motor starters

2DI 24 V DC COM control module

The 2DI 24 V DC COM control module is plugged onto the interface on the front of the motor starter. The module provides two inputs which can receive signals from the process and be assigned directly to the starter.

The functionality can be selected from a list of various control functions as part of the PROFIBUS parameterization. On-site control point, emergency start and quick stop, for example, are available as functions. The signal levels can also be parameterized (NO/NC). For more extensive control functions the two inputs of a xB3 or x4 brake control module, which is plugged in alongside on the right, can be integrated in addition. The signal states of all inputs are transmitted in parallel with the internal use to the higher-level control system.

When a motor starter is replaced, the parameterization is automatically transmitted by download to the new starter. The inputs on the motor starter ensure autonomous operation, e.g. in the event of PLC failure, on the one hand and short response times through direct processing in the starter on the other hand. Another advantage results from the direct assignment of functions to modular machine concepts.

The 2DI 24 V DC COM control module has in addition a PC interface for connecting the Switch ES Motor Starter parameterization and diagnostic software (Version 2.0 and higher). The module works solely on High-Feature motor starters with ES Motor Starter interface. The Logo!-PC cable is used as connecting cable between the 2DI 24 V DC COM control module and the High-Feature motor starter.

Accessories for Standard and High-Feature motor starters

PE/N bridge module

PE/N bridge modules are used to bridge gaps in the PE/N bus which are caused, for example, by using brake control modules, PM-D(F) power modules or a PM-X connection module. If a bridge module is used, the supply must not be fed in anew. They are available in widths of 15 and 30 mm.

L123 bridge modules

The L123 bridge modules are used to bridge gaps in the power bus (see above). They are available in widths of 15 and 30 mm.

Brake control module

for motors with mechanical brake (see also motor starters and safety motor starters ET 200S, General data, Overview, section Brake Control Module, page 9/140)

Terminal modules for brake control modules

The TM-xB terminal modules are used to accommodate the xB1, xB2, xB3 and xB4 brake control modules. The TM-xB terminal module must always follow directly after a terminal module for Standard motor starters, High-Feature motor starters or frequency converters as control of the solid-state braking switch is provided through an output of the motor starter/frequency converter. The xB215 terminal modules for the brake control modules have not only the terminals for connecting the cable for the motor brake but also the terminals of the two local acting inputs. These local inputs are not evaluated by a frequency converter, which is why the xB215 terminal module can only be switched behind a motor starter.

Accessories for Standard, High Feature, Fail-safe

PE/N terminal block

The PE/N terminal block is required for direct connection of the protective conductor in the motor cable without intermediate terminals. It is plugged together with the terminal module for motor starters or frequency converters before the latter is mounted on the standard mounting rail. With two PE terminals and one N terminal the "-F" version is connected to the "-S32" terminal modules for motor starters or frequency converters. The "-S" version is combined with the "-S31" terminal module. The "F" terminal modules are delivered with two caps for closing the PE/N bus contacts on the final terminal module of a segment. The modules for the Standard motor starters have a width of 45 mm and the modules for the High-Feature motor starters and frequency converters have a width of 65 mm.

There is no electrical connection between the terminals of the PE/N terminal block and the integrated shielding of the frequency converter. The PE/N terminal block must therefore not be used for the shielding of the motor cable.

Accessories for Safety Module local

The fail-safe Kit (F-Kit) is needed for Standard motor starters in a safety segment (see Safety Module local and PROFIsafe, Overview, page 9/159).

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Technical specifications

xB1, xB2, xB3, xB4, xB5, xB6 Brake Control Modules

		xB1	xB3	xB2	xB4	xB5	xB6
Dimensions (W x H x D)	mm	15 x 196.5 x 125.5 including terminal module on 7.5 mm standard mounting rail					
Rated operational voltage	V	24 DC		500 DC (min. 100)		400 AC	
Energy supply		Externally through terminal module		From brake rectifier through terminal module		External through terminal module	
Rated operational current	A	4		0.7		0.5	
Reverse polarity protection		No, in the event of polarity reversal the brake is released and the overload/short-circuit protection is not effective				Not relevant	
Overload/short-circuit protection		Yes, solid-state				1 A safety fuse	
Conductor cross-section of the terminal module for the brake control module	mm^2	1 x 2.5 without end sleeve 1 x 1.5 with end sleeve					
Number of outputs		0	1 (used internally)	0	1 (used internally)	0	1 (used internally)
Number of inputs		0	2	0	2	0	2
Address space needed per module							
• With summary		0	2 bit	0	2 bit	0	2 bit
• Without summary		0	1 byte	0	1 byte	0	1 byte
Diagnostic functions							
• Group fault "SF"		Red LED					
• Switching state for brake "STAT"		Yellow LED					
• Inputs 1 and 5		--	Green LED	--	Green LED	--	Green LED
Parameters (default values underlined)							
• Brake overload diagnostics		--	Disable/Enable	--	Disable/Enable	--	
• Input delay	ms	--	0 / 0.1 / 0.5 / 3 / 15	--	0 / 0.1 / 0.5 / 3 / 15	--	0 / 0.1 / 0.5 / 3 / 15

Ordering data

	Version	Order No.
Accessories for Standard motor starters		
 3RK1 903-0CA00	**Control kit** for manually operating the contactor contacts during start-up and servicing (one set contains five control kits)	**3RK1 903-0CA00**
 3RK1 903-0CG00	**Control unit** for direct contactor control (manual control) 24 V DC	**3RK1 903-0CG00**
 3RK1 903-0CD00	**DM-V15 distance module** **for DS1-x direct-on-line starters with high temperatures or high current loading** 15 mm wide	**3RK1 903-0CD00**

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Ordering data (continued)

	Version		Order No.
Accessories for Standard motor starters			
 3RK1 903-2AA00	**PE/N M45-PEN-F terminal block** 45 mm wide including two caps in combination with TM-DS45-S32 / TM-RS90-S32		**3RK1 903-2AA00**
 3RK1 903-2AA10	**PE/N M45-PEN-S terminal block** 45 mm wide in combination with TM-DS45-S31 / TM-RS90-S31		**3RK1 903-2AA10**
Accessories for High-Feature motor starters			
 3RK1 903-0CH20	**2DI LC COM control module** Digital input module with 2 inputs (cable length up to 100 m) for local motor starter functions for mounting onto the front of motor starters, operational voltage 24 V DC (supplied from U_1), short-circuit proof, floating contact with serial interface for connecting motor starters ES, connection using LOGO!-PC cable	F	**3RK1 903-0CH20**
	LOGO! PC cable for connecting the High-Feature motor starter with ES interface switch to a PC		**6ED1 057-1AA00-0BA0**
 3RK1 922-3BA00	**Hand-held device** for ET 200S High-Feature motor starters, (also for ET 200pro and ECOFAST), for on-site operation. A serial interface cable must be ordered separately.		**3RK1 922-3BA00**
	M65-PEN-F terminal block 65 mm wide, including two caps, in combination with TM-DS65-S32 / TM-RS130-S32		**3RK1 903-2AC00**
	M65-PEN-S terminal block 65 mm wide, in combination with TM-DS65-S31 / TM-RS130-S31		**3RK1 903-2AC10**
Accessories for Standard / High-Feature motor starters			
 3RK1 903-0AH00	**M15-PE/N bridge module** 15 mm wide for bridging a 15 mm module		**3RK1 903-0AH00**
 3RK1 903-0AJ00	**M30-PE/N bridge module** 30 mm wide for bridging a 30 mm module		**3RK1 903-0AJ00**

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Ordering data (continued)

	Version		Order No.
Accessories for Standard motor starters			
 3RK1 903-0AE00	**M15-L123 bridge module** 15 mm wide for bridging a 15 mm module		**3RK1 903-0AE00**
 3RK1 903-0AF00	**M30-L123 bridge module** 30 mm wide for bridging a 30 mm module		**3RK1 903-0AF00**
 3RK1 903-0AF20	**Sealing caps** for L123 bridge modules and PE/N		**3RK1 903-0AF20**
 3RK1 903-0CB00	**Brake control modules** for motors with mechanical brakes		
	• **xB1 for motor starters** 24 V DC/4 A	F	**3RK1 903-0CB00**
	• **xB2 for motor starters** 500 V DC/0.7 A		**3RK1 903-0CC00**
	• **xB3 for motor starters** 24 V DC / 4 A / 2 DI 24 V DC local control with diagnostics, with two inputs	F	**3RK1 903-0CE00**
	• **xB4 for motor starters** 500 V DC / 0.7 A / 2 DI 24 V DC local control with diagnostics, with two inputs	F	**3RK1 903-0CF00**
	• **xB5 for motor starter** 400 V AC without digital input		**3RK1 903-0CJ00**
	• **xB6 for motor starter** 400 V AC wth two digital inputs		**3RK1 903-0CK00**
	Terminal modules for brake control modules		
	• **TM-xB15 S24-01** for xB1 or xB2		**3RK1 903-0AG00**
	• **TM-xB215 S24-01** for xB3 or xB4	F	**3RK1 903-0AG01**
Accessories for fail-safe motor starters			
	PE/N M65-PEN-F terminal blocks With incoming connection, with caps		**3RK1 903-2AC00**
	M65-PEN-S terminal blocks without incoming connection		**3RK1 903-2AC10**
Accessories for power module			
	Color coding plates 6 x 200 color coding plates for terminal modules One set contains 10 strips of 20 color coding plates per color		
	• White		**6ES7 193-4LA10-0AA0**
	• Yellow		**6ES7 193-4LB10-0AA0**
	• Yellow and green		**6ES7 193-4LC10-0AA0**
	• Red		**6ES7 193-4LD10-0AA0**
	• Blue		**6ES7 193-4LF10-0AA0**
	• Brown		**6ES7 193-4LG10-0AA0**

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Ordering data (continued)

	Version		Order No.
Accessories for safety modules local			
 3RK1 903-1CA00	**PM-X safety module (connection module)** With diagnostics, plugged-in on TM-X15 S27-01 Module for connecting a safety group and for connecting an external infeed contactor or for the connection to an external safety circuit	F	**3RK1 903-1CB00**
	F-Kit 1 Fail-safe equipment for DS1-x[1] Standard motor starters	F	**3RK1 903-1CA00**
 3RK1 903-1CA01	**F-Kit 2** Fail-safe equipment for RS1-x[1] Standard motor starters	F	**3RK1 903-1CA01**

[1] The function of the fail-safe kit is already integrated into High-Feature motor starters.

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Overview



Components of the ET 200S FC frequency converter

Application

- New application possibilities are opened up for the ET 200S system where permanent control of the speed of asynchronous motors is required.
- The frequency converter handles frequency control and vector control for more complex drive tasks. In addition, the converter also supports torque control for conveyor applications, winding and unwinding drives, as well as hoisting gear. Together with a motor encoder, the range extends up to closed-loop controls for exact control of speeds and torques.
- The advantages of line-commutated power regeneration are primarily evident in continuous regenerative operation. Examples include unwinding units, lowering of loads with hoisting gear, or electric braking of large centrifugal masses.
- Together with an intelligent header module (IM 151 CPU) and the ET 200S FC frequency converter, the I/O station is expanded to become a complete automation solution for machine modules and plant sections.

Technical specifications

	Control unit	Converter power modules		
	ICU24	IPM25, FS A Frame size A	IPM25, FS B Frame size B	
Selection features				
Integral safety functions according to Category 3 of EN 954-1 or according to SIL2 of IEC 61508	-	-	-	
Output	-	0.75 kW	2.2 kW	4.0 kW
Rated input current (at 50° C ambient temperature)	-	1.9 A	5.7 A	9.6 A
Rated output current (at 50° C ambient temperature)	-	2.1 A	5.9 A	10.2 A
Mounting dimensions (W x H x D) in mm (including terminal module)	15 x 220 x 156	65 x 290 x 156	130 x 290 x 156	
Electrical data				
Line voltage	380 V to 480 V 3 AC +10 % / -10 %			
Line frequency	47 Hz to 63 Hz			
Overload capability	• Overload current 1.5 x rated output current (i.e. 150 % overload capability) for 60 s, cycle time 300 s • Overload current 2 x rated output current (i.e. 200 % overload capability) for 3 s, cycle time 300 s			
Output frequency	0 Hz to 650 Hz			
Pulse frequency	8 kHz (standard), 2 kHz to 16 kHz (in 2 kHz steps)			
Standard short circuit current rating SCCR (Short Circuit Current Rating) [1]	10 kA			
Skipped frequency range	1, programmable			
Converter efficiency	≥96 % at rated load of the motor			
Typical power loss at 420 V input voltage [2] and motor with rated load (motor and regenerative mode)	10 W	40 W (Pulse frequency 8 kHz) 65 W (Pulse frequency 16 kHz) 30 W (Pulse frequency 4 kHz)	110 W 140 W 80 W	160 W 200 W 130 W
Typical power loss at 420 V input voltage [2] and motor during no-load operation, 50 Hz	10 W	35 W (Pulse frequency 8 kHz)	70 W	110 W

[1] Applies to industrial industrial control cabinet installations according to NEC Article 409 / UL 508A.

[2] The power loss varies according to the input voltage.

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Technical specifications (continued)

Interfaces	• Connection to PROFIBUS or PROFINET over the ET 200S backplane bus • RS232 interface with USS protocol for commissioning on the PC using the STARTER commissioning software • Slot for an optional memory card (MMC) for uploading or downloading parameter settings • PTC/KTY84 interface for motor temperature monitoring • Speed sensor interface (Sub-D connector) for unipolar HTL incremental position encoder	
Functions		
Control method	• *V/f* control – linear ($M \sim n$) with/without flux current control (FCC), quadratic ($M \sim n^2$) or parameterizable • Vector control – with or without encoder • Torque control	
Operating functions	Jogging mode, free function blocks (FFB), positioning deceleration ramp, automatic restart following interruption due to power failure, bumpless connection of converter to rotating motor	
Braking functions	• Regenerative braking operation without brake chopper and pulsed resistor • Control of an electrical holding brake via an optional Brake Control Module	
Protection features for	Undervoltage, overvoltage, ground faults, short circuits, stall prevention, thermal motor protection I^2t, converter overtemperature, motor blocking protection	
Connectable motors	• Low-voltage asynchronous motors • Motor cable lengths: max. 50 m (shielded) max. 100 m (unshielded) If an output reactor or an LC filter is used, longer cable lengths are possible	
Mechanical data		
Degree of protection	IP20	
Operating temperature	• With vertical design of station	-10 °C to + 40 °C
	• With horizontal design of station	-10 °C to + 50 °C/to +60 °C with derating
Standards		
Compliance with standards	UL, cUL, CE, c-tick, according to low-voltage directive 2006/95/EG, EMC directive 89/336/EEC	

Derating data

Pulse frequency

Output	Rated output current in A at a pulse frequency of							
kW	2 kHz	4 kHz	6 kHz	8 kHz	10 kHz	12 kHz	14 kHz	16 kHz
0.75	2.1	2.1	2.1	2.1	1.05	1.05	1.05	1.05
2.2	5.9	5.9	5.9	5.9	5.3	5.3	5.3	5.3
4.0	10.2	10.2	10.2	10.2	5.1	5.1	5.1	5.1

The current data apply to an ambient temperature of 50 °C unless specified otherwise.

Ordering data

			Order No.
	**ICU24 control unit** • Control modes: *V/f*, FCC, SLVC, VC with encoder, torque control • Motor encoder input: HTL unipolar • Motor temperature input: PTC/KTY	F	**6SL3 244-0SA00-1AA1**
	**IPM25 converter power module** 380 V – 480 V 3 AC +10/-10 % 47 Hz - 63 Hz Overload: 150 % 60 s 200 % 3 s Power: 0.75 kW	E	**6SL3 225-0SE17-5UA3**

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

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Ordering data

		Order No.
	**IPM25 converter power module** 380 V – 480 V 3 AC +10/-10 % 47 Hz - 63 Hz Overload: 150 % 60 s 200 % 3 s Power:	
	2.2 kW	E **6SL3 225-0SE22-2UA3**
	4.0 kW	E **6SL3 225-0SE24-0UA3**

Necessary components and accessories:

Accessories		Order No.
TM-ICU15 terminal module for IC24/ICU24F Control Unit		**3RK1 903 3EA10**
TM-IPM65 terminal module for IPM25 power unit, 0.75 kW of frequency converter		
• with supply cable connection for power bus (TM-IPM65-S32)		**3RK1 903-3EC00**
• without supply cable connection for power bus (TM-IPM65-S31)		**3RK1 903-3EC10**
TM-IPM130 terminal module for IPM25 power unit, 2.2 kW and 4.0 kW of frequency converter		
• with supply cable connection for power bus (TM-IPM130-S32)		**3RK1 903-3ED00**
• without supply cable connection for power bus (TM-IPM130-S31)		**3RK1 903-3ED10**
EMC filter for frequency converter connected upstream of common power bus of the frequency converter in order to achieve EMC class A, EMC-compliant design with shielded motor cables necessary		
• 25 A rated current	F	**6SL3 203-0BE22-5AA0**
• 50 A rated current	F	**6SL3 203-0BE25-0AA0**
Output reactor for IPM25 power unit		
• 0.75 kW		**6SE6 400-3TC00-4AD2**
• 2.2 kW and 4.0 kW		**6SE6 400-3TC01-0BD3**
LC filter for IPM25 power unit		
• 0.75 kW		**6SE6 400-3TD00-4AD0**
• 2.2 kW and 4.0 kW		**6SE6 400-3TD01-0BD0**
Brake control modules ffor motors with mechanical brake See also page 9/169 ff.		
• **xB1** for frequency converter 24 V DC / 4 A	F	**3RK1 903-0CB00**
• **xB2** for frequency converter 500 V DC / 0.7 A		**3RK1 903-0CC00**

		Order No.
Terminal module for brake control modules		
• **TM-xB15 S24-01** for xB1 or xB2 See also page 9/172		**3RK1 903-0AG00**
RS232/null-modem cable (5 m) Connecting cable for commissioning the ET 200S FC frequency converter with the "STARTER" PC tool		**6ES7 901-1BF00-0XA0**
PM-D power module for 24 V DC with diagnostics See also page 9/152	F	**3RK1 903-0BA00**
TM-P15 S27-01 terminal module for PM-D power module See also page 9/153		**3RK1 903-0AA00**
MMC parameter memory for frequency converter suitable for MMC slot of the ICU24 / ICU24F Control Unit; other memory cards not accepted	E	**6SL3 254-0AM00-0AA0**
IOP Handheld for use with SIMATIC ET 200S FC frequency converter or SIMATIC ET 200pro FC Included in the scope of delivery: • IOP • Handheld housing • Batteries (4 AA) • Charger (international) • RS232 connecting cable (Length 3 m, can only be used for SINAMICS G120 and SIMATIC ET 200S FC) • USB cable (length 1 m)	E	**6SL3 255-0AA00-4HA0**

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Overview



Components of the ET 200S FC fail-safe frequency converter

Application

- When stepless speed control of induction motors is required, new applications are opened up for the ET 200S system.
- The frequency converter handles both frequency control and vector control for more complex drive tasks. In addition, the converter also supports torque control in conveyor applications, winding and unwinding drives as well as hoists. With a motor encoder, the range also includes closed-loop control for precise speed and torque control.
- The advantages of the line-commutated energy feedback are primarily evident in continuous regenerative operation. Examples include unwinding units, lowering of loads with hoisting gear, or electric braking of large centrifugal masses.
- In combination with an intelligent module head (IM 151 CPU) and the ET 200S FC frequency converter, the I/O station matures to a complete automation solution for machine modules and plant sections.
- The integrated safety functions considerably reduce the overhead for drive solutions in plant sections which pose a potential danger. Monitoring of the safely reduced speed in encoderless standard induction motors is unique in drive engineering.

Technical specifications

	Control unit	Converter Power Modules		
	ICU24F	IPM25, FS A Frame size A	IPM25, FS B Frame size B	
Selection features				
• Integral safety functions according to Category 3 of EN 954-1 or according to SIL2 of IEC 61508	• Safe Torque Off (STO) • Safely Limited Speed (SLS)[1] • Safe Stop 1 (SS1) [1]	-	-	
• Output	-	0.75 kW	2.2 kW	4.0 kW
• Rated input current (at 50 °C ambient temperature)	-	1.9 A	5.7 A	9.6 A
• Rated output current (at 50 °C ambient temperature)	-	2.1 A	5.9 A	10.2 A
• Mounting dimensions (W x H x D) in mm (including terminal module)	15 x 220 x 156	65 x 290 x 156	130 x 290 x 156	
Electrical data				
Line voltage	380 V to 480 V 3 AC + 10 %/-10 %			
Line frequency	47 Hz to 63 Hz			
Overload capability	• Overload current 1.5 x rated output current (i.e. 150 % overload) for 60 s, cycle time 300 s • Overload current 2 x rated output current (i.e. 200 % overload) for 3 s, cycle time 300 s			
Output frequency	0 Hz to 650 Hz			
Pulse frequency	8 kHz (standard), 2 kHz to 16 kHz (in 2 kHz steps)			
Standard short circuit current rating SCCR (Short Circuit Current Rating) [2]	10 kA			
Skipped frequency range	1, programmable			
Converter efficiency	≥96 % at rated load of the motor			

[1] The safety functions "Safely Limited Speed" and "Safe Stop 1" are certified for asynchronous motors without encoders - these safety functions are not permitted for pull-through loads as in the case of lifting gear and winders.

[2] Applies to industrial control cabinet installations according to NEC Article 409 / UL 508A.

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Technical specifications (continued)

Typical power loss at 420 V input voltage [1] and motor with rated load (motor and regenerative mode)	10 W	40 W (Pulse frequency 8 kHz) 65 W (Pulse frequency 16 kHz) 30 W (Pulse frequency 4 kHz)	110 W 140 W 80 W	160 W 200 W 130 W
Typical power loss at 420 V input voltage [1] and motor during no-load operation, 50 Hz	10 W	35 W (Pulse frequency 8 kHz)	70 W	110 W
Interfaces	• Connection to PROFIBUS or PROFINET over the ET 200S backplane bus • RS232 interface with USS protocol for commissioning on the PC using the STARTER commissioning software • Activation of the integrated safety functions via PROFIsafe (PM-D F PROFIsafe) or terminals (PM-D F X1) • Slot for an optional memory card (MMC) for uploading or downloading parameter settings • PTC/KTY84 interface (Sub-D connector) for motor temperature monitoring • Speed sensor interface (Sub-D connector) for unipolar HTL incremental position encoder			
Functions				
Open-loop/closed-loop control procedure	• *V/f* control – linear ($M \sim n$) with/without flux current control (FCC), quadratic ($M \sim n^2$) or parameterizable • Vector control – with or without encoder • Torque control			
Operating functions	Jogging mode, free function blocks (FFB), positioning deceleration ramp, automatic restart following interruption due to power failure, bumpless connection of converter to rotating motor			
Braking functions	• Regenerative braking operation without brake chopper and pulse resistor • Control of an electromechanical holding brake via an optional Brake Control Module			
Protective functions	Undervoltage, overvoltage, ground faults, short circuits, stall prevention, motor thermal protection (I^2t, or sensor) inverter overtemperature, motor blocking protection			
Connectable motors	• Low-voltage asynchronous motors • Motor cable lengths: max. 50 m (shielded) max. 100 m (unshielded) If an output reactor or an LC filter is used, longer cable lengths are possible			
Mechanical data				
Degree of protection	IP20			
Operating temperature	With vertical design of station	-10 °C to +40 °C		
	With horizontal design of station	-10 °C to +50 °C/to +60 °C with derating		
Standards				
Compliance with standards	UL, cUL, CE, c-tick, low-voltage directive 73/23/EEC, EMC directive 89/336/EEC			

[1] The power loss varies according to the input voltage.

Derating data

Pulse frequency

Output	Rated output current in A at a pulse frequency of							
kW	2 kHz	4 kHz	6 kHz	8 kHz	10 kHz	12 kHz	14 kHz	16 kHz
0.75	2.1	2.1	2.1	2.1	1.05	1.05	1.05	1.05
2.2	5.9	5.9	5.9	5.9	5.3	5.3	5.3	5.3
4.0	10.2	10.2	10.2	10.2	5.1	5.1	5.1	5.1

The current data apply to an ambient temperature of 50 °C unless specified otherwise.

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Ordering data

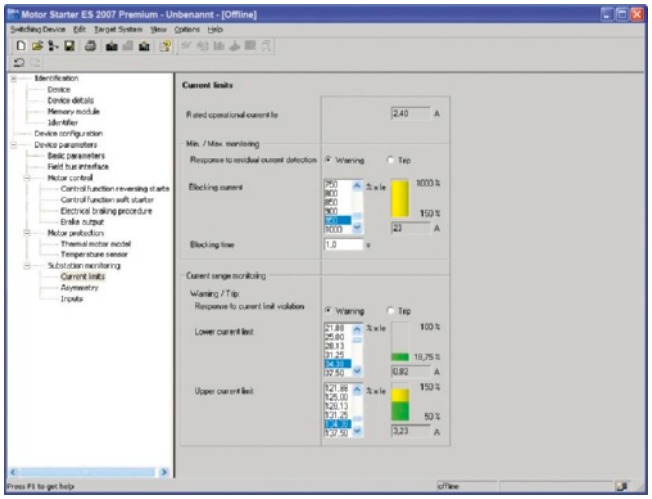
			Order No.
	**ICU24F control unit** • Control modes: *V/f*, FCC, SLVC, VC with encoder, torque control • Motor encoder input: HTL unipolar • Motor temperature input: PTC/KTY • Integrated safety functions	F	**6SL3 244-0SA01-1AA1**
	**IPM25 converter power module** 380 V – 480 V 3 AC +10/-10 % 47 Hz – 63 Hz Overload: 150 % 60 s 200 % 3 s Power: 0.75 kW	E	**6SL3 225-0SE17-5UA3**
	**IPM25 converter power module** 380 V – 480 V 3 AC +10/-10 % 47 Hz – 63 Hz Overload: 150 % 60 s 200 % 3 s Power: 2.2 kW	E	**6SL3 225-0SE22-2UA3**
	4.0 kW	E	**6SL3 225-0SE24-0UA3**

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For required components and accessories see Frequency converter ET 200S FC, page 9/176

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Overview



Motor starter ES for parameterization, monitoring, diagnostics and testing of motor starters

Motor starter ES is used for start-up, parameterization, diagnostics, documentation and the preventative maintenance of the motor starters in the SIMATIC ET 200S, ET 200pro, ECOFAST and M200D product families.

Interfacing is performed

- over the local interface on the device
- with PROFIBUS DP V1 capable motor starters from any point in PROFIBUS or in PROFINET (applies for ET 200pro/ ECOFAST/M200D)
- With PROFINET capable motor starters from any point in PROFINET or in PROFIBUS (applies to M200D)

Using Motor starter ES, the communication-capable motor starters are easily parameterized during start-up, monitored during normal operation and successfully diagnosed for service purposes.

Preventative maintenance is supported by a function for reading out diverse statistical data (e.g.operating hours, operating cycles, cut-off currents, etc.). The user is supported during these procedures with comprehensive Help functions and plain text displays.

Motor starter ES can either be used as a stand-alone program or it can be integrated into STEP 7 via an object manager.

Types of delivery and license

Motor starter ES is available as follows:

- Floating license – the license for any one user at any one time
  - Authorizes any one user
  - Independent of the number of installations (unlike the single license which is allowed to be installed once only)
  - Only the actual use of the program has to be licensed
  - Trial license (free use of all program functions for 14 days for test and evaluation purposes, included on every product CD, available in the download file of the SIRIUS ES program in the Service&Support portal).

Following delivery versions are available in addition for Motor starter ES 2007:

- Upgrade
  Switching from an old to a new version with expanded functions, e.g. upgrade from Motor starter ES 2006 to Motor Starter ES 2007
- Powerpack
  Special pack for switching within the same software version to a more powerful version with more functionality, e.g. Powerpack Motor starter ES 2007 for switching from Standard to Premium
- Software Update Service
  To keep you up to date at all times we offer a special service which supplies you automatically with all service packs and upgrades
- License Download
  User-friendly license key download from our Mall (currently only for customers from Germany) as an easy and quick way for you to receive additional licenses for your software.

System requirements

ES 2007 Motor starter planning, start-up and diagnostic software for ECOFAST Motor Starter, SIMATIC ET 200S High-Feature Starter, SIMATIC ET 200pro Starter and M200D (AS-i Standard, PROFIBUS, PROFINET)	
Operating system	Windows XP Professional (Service Pack 2, Service Pack 3), Windows 7 Professional (32 bit), Enterprise (32 bit), Ultimate (32 bit)
Processor	≥ Pentium 800 MHz/1 GHz (Windows 7)
RAM	≥ 512 MB/≥ 1 GB (Windows 7)
Monitor resolution	≥ 1024 x 768
Free space on hard disk	≥ 400 Mbyte
CD-ROM/DVD drive	Yes (only for installation from CD)
Serial interface (COM)	Yes
PC cable/parameterization cable/connection cable	Yes
PROFIBUS card/PROFIBUS processor	Optional, for parameterization and diagnostics through PROFIBUS
Ethernet interface/PROFINET card	Optional, for parameterization and diagnostics through PROFINET

[1] Additional free storage is recommended, e.g. for page file.

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Ordering data

ES 2007 Motor starter planning, start-up and diagnostic software

for ECOFAST Motor Starter, SIMATIC ET 200S Starter High Feature Starter, SIMATIC ET 200pro Starter and M200D (AS-i Standard, PROFIBUS, PROFINET)

	Version	Order No.
Basic Motor starter ES 2007		
	Floating license for one user E-SW, software and documentation on CD, 3 languages (English/German/French), communication via system interface	
	• License key on USB stick, class A, incl. CD	**3ZS1 310-4CC10-0YA5**
	• License key download, class A, without CD	**3ZS1 310-4CE10-0YB5**
Standard Motor starter ES 2007		
	Floating license for one user E-SW, software and documentation on CD, 3 languages (English/German/French), communication via system interface	
	• License key on USB stick, class A, incl. CD	**3ZS1 310-5CC10-0YA5**
	• License key download, class A, without CD	**3ZS1 310-5CE10-0YB5**
Premium Motor starter ES 2007		
	Floating license for one user E-SW, software and documentation on CD, 3 languages (English/German/French), communication via system interface or PROFIBUS	
	• License key on USB stick, class A, incl. CD	**3ZS1 310-6CC10-0YA5**
	• License key download, class A, without CD	**3ZS1 310-6CE10-0YB5**

Accessories

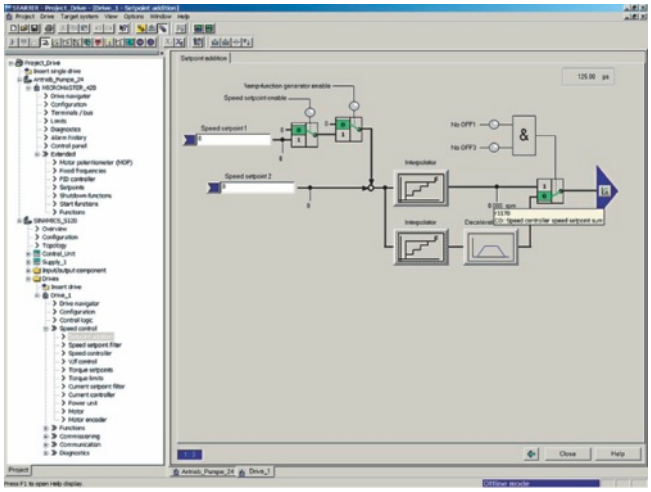
	Version	Order No.
Optional accessories		
	for ET 200S High Feature Motor starter	
	• Control module 2DI DC 24 V COM, for ET 200S High Feature starter, starter Fail-safe A	F **3RK1 903-0CH10**
	• LOGO! PC cable	**6ED1 057-1AA00-0BA0**
	for ET 200pro and MD200D Motor starter	
	RS232 interface cable, serial data connection between ET 200pro MS/FC, M200D and Laptop/PC/PG or MS	**3RK1 922-2BP00**
	for ECOFAST High Feature Motor starter (interface cable)	
	PC cable	**3RK1 911-0BN20**
	USB-to-serial-adapter	D **3UF7 946-0AA00-0**
	for connecting a serial PC cable (for connection to serial PC interface/RS 232) recommended for use in connection with SIMOCODE pro 3UF7, modular safety system 3RK3, soft starter 3RW44, Motor starter ET 200S/ECOFAST/ET 200pro, AS-i safety monitor, AS-i analyzer	

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Software
STARTER commissioning tool

Overview



The user-friendly STARTER commissioning tool can be used for:

- Commissioning,
- Optimizing and
- Diagnostics

This software can be operated either as a standalone PC application, integrated in SIMATIC STEP 7 with TIA compatibility via Drive ES Basic, or it can be integrated into the SCOUT engineering system (for SIMOTION). The basic functions and handling are the same in both cases.

In STARTER, MICROMASTER 4 devices and the SIMATIC ET 200S FC and SIMATIC ET 200pro FC frequency converters are also supported in addition to the SINAMICS drives.

The project wizards can be used to create the drives within the structure of the project tree.

Beginners are supported by solution-based dialog guidance, whereby a standard graphics-based display maximizes clarity when setting the drive parameters.

First commissioning is guided by a wizard which makes all the basic settings in the drive. Therefore, getting a motor up and running is merely a question of setting a few of the drive parameters as part of the drive configuration process.

The individual settings required are made using graphics-based parameterization screens, which also precisely visualize the principle of operation of the drive.

Examples of individual settings that can be made include:

- How terminals are used
- Bus interface
- Setpoint channel (e.g., fixed setpoints)
- Closed-loop speed control (e.g., ramp-function generator, limits)
- BICO interconnections
- Diagnostic

For experts, the expert list can be used to specifically and quickly access individual parameters at any time. An individual compilation of frequently used parameters can be saved in dedicated user lists.

In addition, the following functions are available for optimization purposes:

- Self-optimization of the controller settings (depending on drive unit)
- Trace (for SINAMICS S120 only)

Diagnostic functions provide information about:

- Control/status words
- Parameter status
- Conditions of use
- Communication states

Performance features

- User-friendly: only a small number of settings need to be made for successful first commissioning: The motor starts to rotate
- Solution-based dialog-based user guidance simplifies commissioning
- Self-optimization functions reduce manual effort for optimization

Minimum hardware and software requirements

PG or PC Pentium III min. 800 MHz (recommended > 1 GHz)

512 MB work memory (1 GB recommended)

Screen resolution 1024 × 768 pixels, 16 bit color depth

Free hard disk memory: min. 2 GB

Microsoft Windows 2000 SP4

Microsoft Windows 2003 Server SP1, SP2

Microsoft Windows XP Professional SP2, SP3

Microsoft Windows Vista Business SP1 [1)]

Microsoft Windows Vista Ultimate SP1 [1)]

Microsoft Internet Explorer V6.0 or higher

[1)] DCC cannot be used. STARTER can be used on these operating systems only if it does not include the DCC option.

Ordering data

	Order No.
STARTER commissioning tool For SINAMICS and MICROMASTER on DVD-ROM English, French, German, Italian, Spanish	**6SL3 072-0AA00-0AG0**

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Application



- Modular I/O system with degree of protection IP20, particularly suitable for user-specific and complex automation tasks
- Can be expanded with S7-300 automation system signal, communication and function modules
- Applicable Ex analog input or output modules with HART optimize the ET 200M for use in process engineering
- Can be used in redundant systems (S7-400H, S7-400F/FH)
- Consists of a PROFIBUS DP IM 153 connection, up to eight or twelve I/O modules of the S7-300 automation system (assembly with bus connections or active bus modules) and if required a power supply
- Modules can be replaced during operation (hot swapping) with the bus modules active
- Can be supplied with integrated fiber optic interface if required
- Transmission rates up to 12 Mbit/s
- Ex approval to Cat. 3 for Zone 2 acc. to ATEX100 a
- Fail-safe digital in/outputs as well as analog inputs for safety-oriented signal processing in accordance with PROFIsafe
- Support of modules with expanded user data, e.g. HART modules with HART minor variables

Technical specifications

General technical data ET 200M	
Connection system	Screw connection, spring-loaded connection and FastConnect with permanent wiring
Degree of protection	IP20
Ambient temperature on vertical wall (preferred mounting position)	
• with horizontal assembly	0 … +60 °C
• with other assembly	0 … +40 °C
Relative humidity	5 … 95% (RH stress level 2 according to IEC 1131-2)
Air pressure	795 … 1080 hPa
Mechanical stress	
• Vibrations	IEC 68, parts 2 - 6: 10 … 57 Hz (constant amplitude 0.075 mm) 57 … 150 Hz (constant acceleration 1 g)
• Shock	IEC 68, parts 2 - 27 half-sine, 15 g, 11 ms

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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 8 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 1ms.

Technical specifications

	6ES7 153-1AA03-0XB0	6ES7 153-2BA02-0XB0	6ES7 153-2BA82-0XB0
Power supply			
Input voltage			
• rated value, 24 V DC	Yes		
• permissible range, lower limit (DC)	20.4 V		
• permissible range, upper limit (DC)	28.8 V		
Input current			
• rated value at 24 V DC	625 mA	650 mA	650 mA
Output voltage			
• rated value, 5 V DC	Yes	Yes	Yes
Output current			
• for backplane bus (5 V DC), max.	1 A	1.5 A	1.5 A
Supply voltages			
Rated value			
• 24 V DC		Yes	Yes
• permissible range (ripple included), lower limit (DC)	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
External protection for supply cables (recommendation)	not necessary	2.5 A	2.5 A
Mains buffering			
• Mains/voltage failure stored energy time	5 ms	5 ms	5 ms
Current consumption			
Current consumption, max.	350 mA; At 24 V DC	600 mA	600 mA
Inrush current, typ.	2.5 A	3 A	3 A
I^2t	0.1 $A^2 \cdot s$	0.1 $A^2 \cdot s$	0.1 $A^2 \cdot s$

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Technical specifications (continued)

	6ES7 153-1AA03-0XB0	6ES7 153-2BA02-0XB0	6ES7 153-2BA82-0XB0
Power losses			
Power loss, typ.	3 W	5.5 W	5.5 W
Address area			
Addressing volume			
• Outputs	128 byte	244 byte	244 byte
• Inputs	128 byte	244 byte	244 byte
Hardware configuration			
Number of modules per DP slave interface, max.	8	12	12
Communication functions			
Bus protocol/transmission protocol	PROFIBUS DP to EN 50170	PROFIBUS DP to EN 50170	PROFIBUS DP to EN 50170
Interfaces			
PROFIBUS DP, output current, max.	90 mA	70 mA	70 mA
Interface physics, RS 485	Yes	Yes	Yes
Interface physics, FOC	No	No	No
Connection method			
PROFIBUS DP	9-pin sub D socket	9-pin sub D	9-pin sub D
PROFIBUS DP			
Transmission procedure	RS 485	RS 485	RS 485
Transmission rate, max.	12 Mbit/s	12 Mbit/s	12 Mbit/s
Node addresses	1 to 125 permitted	1 to 125 permitted	1 to 125 permitted
Automatic detection of transmission speed	Yes	Yes	Yes
SYNC capability	Yes	Yes	Yes
FREECE capability	Yes	Yes	Yes
Direct data exchange (slave-to-slave communication)	Yes; Sender	Yes; Sender	Yes; Sender
1st interface			
DP slave			
• GSD file	(for DPV1) SIEM801D.GSD; SI01801D.GSG	SI04801.GSG	SI0480E.GSG
• Automatic baud rate search	Yes	Yes	Yes
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; 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
Number of message buffers		15	15
Messages per message buffer		20	20
Number of stampable digital inputs, max.		128; Max. 128 signals/station; max. 32 signals/slot	128; Max. 128 signals/station; max. 32 signals/slot
Time format		RFC 1119	RFC 1119
Time resolution		0.466 ns	0.466 ns
Time interval for transmitting the message buffer if a message is present		1 000 ms	1 000 ms
Time stamp on signal change		rising / falling edge as signal entering or exiting	rising / falling edge as signal entering or exiting

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Technical specifications (continued)

	6ES7 153-1AA03-0XB0	6ES7 153-2BA02-0XB0	6ES7 153-2BA82-0XB0
Isolation			
Isolation checked with	Isolation voltage 500 V	Isolation voltage 500 V	Isolation voltage 500 V
Environmental requirements			
Operating temperature			
• Min.	0 °C	0 °C	-25 °C
• max.	60 °C	60 °C	60 °C
Air pressure			
• Operating altitude above sea level, max.	3 000 m	3 000 m	3 000 m
Degree of protection			
IP20	Yes	Yes	Yes
General information			
Vendor identification (VendorID)	801Dh	801Eh	801Eh
Dimensions and weight			
Dimensions			
• Width	40 mm	40 mm	40 mm
• Height	125 mm	125 mm	125 mm
• Depth	117 mm	117 mm	117 mm
Weight			
• Weight, approx.	360 g	360 g	360 g

	6ES7 195-7HD10-0XA0
Accessories	
belongs to product	ET 200M
Dimensions and weight	
Dimensions	
• Width	97 mm
• Height	92 mm
• Depth	30 mm
Weight	
• Weight, approx.	133 g

	6ES7 195-7HA00-0XA0	6ES7 195-7HB00-0XA0	6ES7 195-7HC00-0XA0
Dimensions and weight			
Dimensions			
• Width	97 mm	97 mm	97 mm
• Height	92 mm	92 mm	92 mm
• Depth	30 mm	30 mm	30 mm
Weight			
• Weight, approx.	111 g	140 g	127 g

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Ordering data	Order No.
IM 153-1 interface module	
Slave interface for connecting an ET 200M to PROFIBUS DP	
• Standard temperature range	**6ES7 153-1AA03-0XB0**
IM 153-2 interface module	
Slave interface for connecting an ET 200M to PROFIBUS DP; also for use in redundant systems	
• High Feature	**6ES7 153-2BA02-0XB0**
• High Feature with extended temperature range	**6ES7 153-2BA82-0XB0**
Active IM 153 /IM 153 bus module	**6ES7 195-7HD10-0XA0**
For two IM 153-2 High Feature modules for designing redundant systems	
Bus module for ET 200M	
• To accommodate a power supply and an IM 153 module for the hot-swapping function during RUN time, incl. bus module cover	**6ES7 195-7HA00-0XA0**
• To accommodate two 40-mm wide I/O modules for the hot-swapping function	**6ES7 195-7HB00-0XA0**
• To accommodate one 80-mm wide I/O module for the hot-swapping function	**6ES7 195-7HC00-0XA0**
ET 200M redundancy bundle	**6ES7153-2AR03-0XA0**
Comprising two IM 153-2 High Feature modules and one IM 153/IM 153 bus module	

Accessories		Order No.
PROFIBUS bus connector		
90° outgoing cable, terminating resistor with disconnecting function, up to 12 Mbit/s, FastConnect		
Without PG interface		
• 1 unit		**6ES7 972-0BA52-0XA0**
• 100 units		**6ES7 972-0BA52-0XB0**
With PG interface		
• 1 unit		**6ES7 972-0BB52-0XA0**
• 100 units		**6ES7 972-0BB52-0XB0**
SIMATIC DP DIN rail for ET 200M		
Accommodates up to 5 bus modules; for hot-swapping function		
• Length: 483 mm (19“)		**6ES7 195-1GA00-0XA0**
• Length: 530 mm		**6ES7 195-1GF30-0XA0**
• Length: 620 mm		**6ES7 195-1GG30-0XA0**
• Length: 2000 mm		**6ES7 195-1GC00-0XA0**
SIMATIC S7-300 DIN rail		
• Length: 160 mm		**6ES7 390-1AB60-0AA0**
• Length: 480 mm (19“)		**6ES7 390-1AE80-0AA0**
• Length: 530 mm		**6ES7 390-1AF30-0AA0**
• Length: 830 mm		**6ES7 390-1AJ30-0AA0**
• Length: 2000 mm		**6ES7 390-1BC00-0AA0**
S7 Manual Collection	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multi-language: S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication)		
S7 Manual Collection, update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates		

D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

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Interface modules IM 153-4 PN

Overview



- To connect ET 200M to PROFINET IO (via copper line, RJ45) as an IO device
- 2 versions:
  - IM 153-4 PN STANDARD
  - IM 153-4 PN HIGH FEATURE: supports, in contrast to the STANDARD version, the operation of PROFIsafe F and HART modules
- Integrated 2-port switch
- 12 modules per station
- Usable I/O capacity: 192 byte each
- Active bus backplane to hot-swap modules available as an option
- Baud rate 10 Mbit/s / 100 Mbit/s (autonegotiation / full duplex)
- I&M functions in accordance with PROFIBUS International guideline order no. 3.502, Version V1.1

Note:
Micro Memory Card with at least 64 KB required if not all the stations in the network support LLDP (Link Layer Discovery Protocol; proximity detection).

Technical specifications

	6ES7 153-4AA01-0XB0	6ES7 153-4BA00-0XB0
Power supply		
Output voltage		
• Rated value, 5 V DC	Yes	Yes
Output current		
• for backplane bus (5 V DC), max.	1.5 A	1.5 A
Supply voltages		
Rated value		
• 24 V DC	Yes	Yes
• permissible range (ripple included), lower limit (DC)	20.4 V	18.5 V
• permissible range (ripple included), upper limit (DC)	28.8 V	30.2 V
External protection for supply cables (recommendation)	In a construction with grounded reference potential, a fuse is necessary for redundant interface modules (Recommendation: 2.5 A)	In a construction with grounded reference potential, a fuse is necessary for redundant interface modules (Recommendation: 2.5 A)
Mains buffering		
• Mains/voltage failure stored energy time	5 ms	5 ms
Current consumption		
Current consumption, max.	600 mA	600 mA
Inrush current, typ.	4 A	4 A
I^2t	0.09 $A^2 \cdot s$	0.09 $A^2 \cdot s$
Power losses		
Power loss, typ.	6 W; typical	6 W; typical
Address area		
Addressing volume		
• Outputs	192 byte	192 byte
• Inputs	192 byte	672 byte; extended HART user data
Hardware configuration		
Number of modules per DP slave interface, max.	12	12
Communication functions		
Bus protocol/transmission protocol	PN IO	PN IO
Alarms/diagnostics/status information		
Diagnostic indication LED		
• Connection to network LINK (green)	Yes	Yes
• Transmit/receive RX/TX (yellow)	Yes	Yes
Isolation		
Isolation checked with	500 V DC	Between Profinet and 24 V supply: 1500 V AC Between functional grounding and 24 V supply: 500 V DC

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Technical specifications (continued)

	6ES7 153-4AA01-0XB0	6ES7 153-4BA00-0XB0
Environmental requirements		
Operating temperature		
• Min.	0 °C	0 °C
• Max.	60 °C	60 °C
Air pressure		
• Operating altitude above sea level, max.	2 000 m	2 000 m
Degree of protection		
IP20	Yes	Yes
General information		
Vendor identification (VendorID)	002AH	002AH
Device identifier (DeviceID)	0302H	0302H
Dimensions and weight		
Dimensions		
• Width	40 mm	40 mm
• Height	125 mm	125 mm
• Depth	118 mm	118 mm
Weight		
• Weight, approx.	215 g; approx.	215 g

Ordering data

	Order No.
IM 153-4 PN interface module	
I/O device to connect an ET 200M to PROFINET	
Standard	**6ES7 153-4AA01-0XB0**
High Feature	**6ES7 153-4BA00-0XB0**
Accessories	
Bus modules for ET 200M	
• To accommodate a power supply and an IM 153 for the hot-swapping function during RUN, incl. bus module cover	**6ES7 195-7HA00-0XA0**
• To accommodate two 40-mm wide I/O modules for the hot-swapping function	**6ES7 195-7HB00-0XA0**
• To accommodate one 80-mm wide I/O module for the hot-swapping function	**6ES7 195-7HC00-0XA0**
SIMATIC Micro Memory Card	
64 KB[1]	**6ES7 953-8LF20-0AA0**
SIMATIC DP DIN rail for ET 200M	
Accommodates up to 5 bus modules; for hot-swapping function	
• Length: 483 mm (19“)	**6ES7 195-1GA00-0XA0**
• Length: 530 mm	**6ES7 195-1GF30-0XA0**
• Length: 620 mm	**6ES7 195-1GG30-0XA0**
• Length: 2000 mm	**6ES7 195-1GC00-0XA0**
SIMATIC S7-300 DIN rail	
Length: 160 mm	**6ES7 390-1AB60-0AA0**
Length: 480 mm (19“)	**6ES7 390-1AE80-0AA0**
Length: 530 mm	**6ES7 390-1AF30-0AA0**
Length: 830 mm	**6ES7 390-1AJ30-0AA0**
Length: 2000 mm	**6ES7 390-1BC00-0AA0**

		Order No.
S7 Manual Collection	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multi-language: S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication)		
S7 Manual Collection update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates		
Industrial Ethernet FC RJ45 Plug 180		
RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet		
1 unit		**6GK1 901-1BB10-2AA0**
10 units		**6GK1 901-1BB10-2AB0**
50 units		**6GK1 901-1BB10-2AE0**
Industrial Ethernet Fast Connect installation cables		
• Fast Connect standard cable		**6XV1 840-2AH10**
• Fast Connect trailing cable		**6XV1 840-3AH10**
• Fast Connect marine cable		**6XV1 840-4AH10**
Industrial Ethernet Fast Connect		
Stripping Tool		**6GK1 901-1GA00**

[1] To operate the IM153-4, an MMC is required with at least 64 KB memory. Cards with higher memory capacity may also be used.

D: Subject to export regulations AL: N and ECCN: 5D992

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

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Overview



Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

	SIPLUS IM 153-1	SIPLUS IM 153-2	SIPLUS IM 153-2
Order number	**6AG1 153-1AA03-2XB0**	**6AG1 153-2BA02-7XY0**	**6AG1 153-2BA02-7XB0**
Order No. based on	**6ES7 153-1AA03-0XB0**	**6ES7 153-2BA02-0XB0**	**6ES7 153-2BA02-0XB0**
Ambient temperature range	-40 ... +70 °C Startup temperature -25 °C	-25 ... +60 °C	-40 ... +70 °C Startup temperature -25 °C
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	No	Yes	No
Conformal coating	Coating of the printed circuit boards and the electronic components		
Technical data	The technical data of the standard product applies except for the ambient conditions.		

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SIPLUS bus module	for accommodating a PS and an IM 153	for accommodating two 40 mm wide I/O modules
Order number	**6AG1 195-7HA00-2XA0**	**6AG1 195-7HB00-7XA0**
Order No. based on	**6ES7 195-7HA00-0XA0**	**6ES7 195-7HB00-0XA0**
Ambient temperature range	-25 ... +70 °C	-25 ... +70 °C
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	No	Yes
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	

SIPLUS bus module	for accommodating an 80 mm module	for accommodating 2 IM 153-2
Order number	**6AG1 195-7HC00-2XA0**	**6AG1 195-7HD10-2XA0**
Order No. based on	**6ES7 195-7HC00-0XA0**	**6ES7 195-7HD10-0XA0**
Ambient temperature range	-25 ... +70 °C	-25 ... +70 °C
Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1).	No	Yes
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	

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Overview (continued)

Ambient conditions	
Relative humidity	5 ... 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

Ordering data

		Order No.
IM 153-1 interface module		
Slave interface for connecting an ET 200M to PROFIBUS DP		
• Standard temperature range	L	**6AG1 153-1AA03-2XB0**
IM 153-2 interface module		
Slave interface for connecting an ET 200M to PROFIBUS DP; also for use in redundant systems		
• High Feature	H	**6AG1 153-2BA02-7XB0**
Active IM 153/IM 153 bus module		**6AG1 195-7HD10-2XA0**
For two IM 153-2 High Feature modules for designing redundant systems		
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**
• To accommodate two 40 mm wide I/O modules for the hot-swapping function		**6AG1 195-7HB00-7XA0**
• To accommodate one 80 mm wide I/O module for the hot swapping function		**6AG1 195-7HC00-2XA0**
Accessories		See SIMATIC ET 200M IM 153-1/153-2, page 9/187

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H
L: Subject to export regulations AL: 9I999 and ECCN: N

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Overview



- For connection of ET 200M as IO device to PROFINET IO (copper, RJ-45)
- 2 versions:
  - IM 153-4 PN STANDARD
  - IM 153-4 PN HIGH FEATURE: additionally to the STANDARD version, operation of PROFIsafe F and HART modules
- Integrated 2-port switch
- 12 modules per station
- Usable I/O quantity structure: 192 byte each
- Active backplane bus for hot swapping of modules optionally available
- Baud rate 10 Mbit/s / 100 Mbit/s (Autonegotiation/Full Duplex)
- I&M functions according to PNO-Guideline Order-No. 3.502, Version V1.1

Notes:

Micro Memory Card with min. 64 KB required if not all participants in the network support LLDP (Link Layer Discovery Protocol; neighbor detection).

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

	SIPLUS ET 200 M IM 153-4 PN
Order number	**6AG1 153-4AA01-7XB0**
Order No. based on	**6ES7 153-4AA01-0XB0**
Ambient temperature range	-25 °C ... + 70 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions.
Ambient conditions	
Relative humidity	5 … 100 % Condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 … +2000 m) See ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K658 … 540 hPa (+3500 … +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here: www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS ET 200 M interface connection IM 153-4 PN (extended temperature range and medial exposure) IO device to connect an ET 200M to PROFINET[1)]	H	**6AG1 153-4AA01-7XB0**
Accessories		See SIMATIC ET 200M interface module IM 153-4 PN, page 9/189

1) To operate the IM153-4, an MMC is required with at least 64 KB memory. Cards with higher memory capacity may also be used.

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H

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Overview digital modules



- Digital inputs/outputs
- For flexible adaptation of the controller to the respective task
- For connecting digital sensors and actuators

For further information see SIMATIC S7-300, Chapter 5.

Overview analog modules



- Analog inputs and outputs
- For solving even more complex tasks with analog process signals
- For connecting analog actuators and sensors without additional amplifiers

For further information see SIMATIC S7-300, Chapter 5.

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I/O modules
Analog input module with HART

Overview



- Can only be plugged into ET 200M with IM 153-2 and IM 153-2 FO
- 8 AI HART
- Redundancy switching
- Firmware update
- HART minor variables

Technical specifications

	6ES7 331-7TF01-0AB0
Supply voltages	
Load voltage L+	
• Rated value (DC)	24 V
• Reverse polarity protection	Yes
Current consumption	
from load voltage L+ (without load), max.	20 mA
from backplane bus 5 V DC, max.	120 mA
Current consumption/ power loss	
Power loss, typ.	1.5 W
Connection method	
Required front connector	20-pin
Isochronous mode	
Isochronous mode	No
Analog inputs	
Number of analog inputs	8
Cable length, shielded, max.	800 m
Input ranges (rated values), currents	
• 0 to 20 mA	Yes
Current input	
• permissible input current for current input (destruction limit), max.	40 mA
Analog value creation	
Measurement principle	Sigma Delta
Integrations and conversion time/ resolution per channel	
• Resolution with overrange (bit including sign), max.	16 bit
• Integration time, parameterizable	Yes
• Integration time, ms	20 ms@50 Hz/16.6 ms@60 Hz/ 100 ms@100 Hz
• Basic conversion time, including integration time, ms	65ms@50Hz / 55ms@60Hz / 305ms@100Hz
• Interference voltage suppression for interference frequency f1 in Hz	60 / 50 / 10 Hz

	6ES7 331-7TF01-0AB0
Encoder	
Connection of signal encoders	
• for current measurement as 2-wire transducer	Yes
• for current measurement as 4-wire transducer	Yes
Errors/accuracies	
Operational limit in overall temperature range	
• Current, relative to input area	+/- 0.15 %
Basic error limit (operational limit at 25 °C)	
• Current, relative to input area	+/- 0.1 %
Alarms/diagnostics/status information	
Alarms	
• Diagnostic alarm	Yes
• Limit value alarm	Yes
Diagnostics	
• Diagnostic information readable	Yes
Isolation	
Isolation checked with	500
Galvanic isolation	
Galvanic isolation analog inputs	
• between the channels	No
• between the channels, in groups of	8
• between the channels and the backplane bus	Yes
Dimensions and weight	
Dimensions and weight	
• Width	40 mm
• Height	125 mm
• Depth	117 mm
Weight	
• Weight, approx.	205 g

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Ordering data	Order No.
SM 331 HART analog input module	**6ES7 331-7TF01-0AB0**
8 inputs, 0/4 … 20 mA, HART for ET 200M with IM 153-2 interface module	
Accessories	
Front connectors	
• 20-pin, with screw-type contacts	
- 1 unit	**6ES7 392-1AJ00-0AA0**
- 100 units	**6ES7 392-1AJ00-1AB0**
• 20-pin, with spring contacts	
- 1 unit	**6ES7 392-1BJ00-0AA0**
- 100 units	**6ES7 392-1BJ00-1AB0**
• 20-pin, with FastConnect	
- 1 unit	**6ES7 392-1CJ00-0AA0**
LK 393 cable guide	**6ES7 393-4AA00-0AA0**
Mandatory for operation in hazardous areas	
SIMATIC DP DIN rail for ET 200M	
For insertion of up to 5 bus modules for	
• Length: 483 mm (19“)	**6ES7 195-1GA00-0XA0**
• Length: 530 mm	**6ES7 195-1GF30-0XA0**
SIMATIC S7-300 DIN rail	
• Length: 160 mm	**6ES7 390-1AB60-0AA0**
• Length: 480 mm (19“)	**6ES7 390-1AE80-0AA0**
• Length: 530 mm	**6ES7 390-1AF30-0AA0**
• Length: 830 mm	**6ES7 390-1AJ30-0AA0**
• Length: 2000 mm	**6ES7 390-1BC00-0AA0**

		Order No.
Label cover		**6ES7 392-2XY00-0AA0**
(10 units, spare part) for signal modules (not 32-channel modules), function modules and CPU 312 IFM		
Labeling strips		**6ES7 392-2XX00-0AA0**
(10 units, spare part) for signal modules (not 32-channel modules), function modules and CPU 312 IFM		
S7-SmartLabel V3.0		
Software for machine labeling of modules directly from the STEP 7 project		
Single license	J	**2XV9 450-1SL03-0YX0**
Upgrade single license	J	**2XV9 450-1SL03-0YX4**
Labeling sheets for machine printing		
For 16-channel signal modules, DIN A4, for printing with laser printers; 10 units		
petrol		**6ES7 392-2AX00-0AA0**
light beige		**6ES7 392-2BX00-0AA0**
yellow		**6ES7 392-2CX00-0AA0**
red		**6ES7 392-2DX00-0AA0**

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

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Overview



- For plugging into ET 200M exclusively with IM 153-2 and IM 153-2 FO
- 8 AO HART
- Redundancy switching
- Firmware update
- HART minor variables

Technical specifications

	6ES7 332-8TF01-0AB0
Supply voltages	
Load voltage L+	
• Rated value (DC)	24 V
Current consumption	
from load voltage L+ (without load), max.	350 mA
from backplane bus 5 V DC, max.	110 mA
Power losses	
Power loss, typ.	6 W
Connection method	
Required front connector	20-pin
Analog outputs	
Number of analog outputs	8
Cable length, shielded, max.	800 m
Current output, no-load voltage, max.	24 V
Output ranges, current	
• 0 to 20 mA	Yes
• -20 to +20 mA	No
• 4 to 20 mA	Yes
Load impedance (in rated range of output)	
• with current outputs, max.	750 Ω
• with current outputs, inductive load, max.	10 mH
Analog value creation	
Integrations and conversion time/ resolution per channel	
• Resolution with overrange (bit including sign), max.	16 bit
Settling time	
• for resistive load	0.1 ms
• for inductive load	0.5 ms

	6ES7 332-8TF01-0AB0
Errors/accuracies	
Operational limit in overall temperature range	
• Current, relative to output area	+/- 0.2 %
Basic error limit (operational limit at 25 °C)	
• Current, relative to output area	+/- 0.1 %
Alarms/diagnostics/status information	
Substitute values connectable	Yes
Alarms	
• Diagnostic alarm	Yes
Diagnostics	
• Diagnostic information readable	Yes
Isolation	
Isolation checked with	500 V DC
Galvanic isolation	
Galvanic isolation analog outputs	
• between the channels and the backplane bus	Yes
Dimensions and weight	
Dimensions	
• Width	40 mm
• Height	125 mm
• Depth	117 mm
Weight	
• Weight, approx.	220 g

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Ordering data	Order No.
SM 332 HART analog output module HART analog output, 8 outputs, 0/4 … 20 mA, HART for ET 200M with IM 153-2	**6ES7 332-8TF01-0AB0**
Accessories	
Front connector (1 unit) 20-pin, with screw contacts	**6ES7 392-1AJ00-0AA0**
LK 393 cable guide Mandatory for operation in hazardous areas	**6ES7 393-4AA00-0AA0**
SIMATIC DP mounting rail for ET 200M For mounting of up to 5 bus modules for	
• Length: 483 mm	**6ES7 195-1GA00-0XA0**
• Length: 530 mm	**6ES7 195-1GF30-0XA0**
SIMATIC S7-300 mounting rail	
• Length: 160 mm	**6ES7 390-1AB60-0AA0**
• Length: 480 mm	**6ES7 390-1AE80-0AA0**
• Length: 530 mm	**6ES7 390-1AF30-0AA0**
• Length: 830 mm	**6ES7 390-1AJ30-0AA0**
• Length: 2000 mm	**6ES7 390-1BC00-0AA0**
Label cover (10 units, spare part) for signal modules (not 32-channel modules), function modules and CPU 312 IFM	**6ES7 392-2XY00-0AA0**
Labeling strips (10 units, spare part) for signal modules (not 32-channel modules), function modules and CPU 312 IFM	**6ES7 392-2XX00-0AA0**

		Order No.
S7 Manual Collection Electronic manuals on DVD, multi-language: S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication)	J	**6ES7 998-8XC01-8YE0**
S7 Manual Collection update service for 1 year Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates	D	**6ES7 998-8XC01-8YE2**
S7-SmartLabel V3.0 Software for machine labeling of modules directly from the STEP 7 project		
Single License	J	**2XV9 450-1SL03-0YX0**
Upgrade Single License	J	**2XV9 450-1SL03-0YX4**
Labeling sheets for machine printing For 16-channel signal modules, DIN A4, for printing with laser printers; 10 units		
petrol		**6ES7 392-2AX00-0AA0**
light beige		**6ES7 392-2BX00-0AA0**
yellow		**6ES7 392-2CX00-0AA0**
red		**6ES7 392-2DX00-0AA0**

D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

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I/O modules
Ex analog input module with HART

Overview



- For connecting HART devices in hazardous areas
- Can only be plugged into ET 200M
- 2 AI HART, Ex
- 2 inputs in 2 channel groups (single-channel isolation)
- Measurement type/range can be selected for each channel
- Diagnostics and diagnostic alarm parameterizable

Technical specifications

	6ES7 331-7TB00-0AB0
Supply voltages	
Load voltage L+	
• Rated value (DC)	24 V
• Reverse polarity protection	Yes
Power supply to the transmitters	
• Present	Yes
• Rated value (DC)	15 V; at 22 mA
• Short-circuit proof	Yes; approx. 30 mA
• No-load voltage (DC)	29.6 V
Current consumption	
from backplane bus 5 V DC, max.	100 mA
from supply voltage L+, max.	180 mA
Power losses	
Power loss, typ.	4.5 W
Analog inputs	
Number of analog inputs	2
Cable length, shielded, max.	400 m
• Current	Yes
Input ranges (rated values), currents	
• 0 to 20 mA	Yes
• Input resistance (0 to 20 mA)	50 Ω
• 4 to 20 mA	Yes
• Input resistance (4 to 20 mA)	50 Ω
Current input	
• Permissible input current for current input (destruction limit), max.	40 mA
Analog value creation	
Measurement principle	Sigma Delta
Integrations and conversion time/ resolution per channel	
• Resolution with overrange (bit including sign), max.	16 bit; 10 to 15 bit + sign
• Integration time, parameterizable	Yes
• Integration time, ms	2.5 / 16.67 / 20 / 100 ms
• Basic conversion time, including integration time, ms	2.5 / 16.67 / 20 / 100 (1 channel enabled); 7.5 / 50 / 60 / 300 (2 channels enabled)
• Interference voltage suppression for interference frequency f1 in Hz	10 / 50 / 60 / 400 Hz

	6ES7 331-7TB00-0AB0
Encoder	
Connection of signal encoders	
• for current measurement as 2-wire transducer	Yes
• for current measurement as 4-wire transducer	Yes
Ex(i) characteristics	
Module for Ex(i) protection	Yes
Max. values of input circuits (per channel)	
• Co (permissible external capacity), max.	62 nF
• Io (short-circuit current), max.	96.1 mA
• Lo (permissible external inductivity), max.	3 mH
• Po (power of load), max.	511 mW
• Uo (output no-load voltage), max.	26 V
• Um (fault voltage), max.	250 V; DC
• Ta (permissible ambient temperature), max.	0.6 °C
Errors/accuracies	
Linearity error (relative to input area)	+/- 0.01 %
Temperature error (relative to input area)	+/- 0.01 %
Crosstalk between the inputs, min.	130 dB
Repeat accuracy in settled status at 25 °C (relative to input area)	+/- 0.05 %
Operational limit in overall temperature range	
• Current, relative to input area	+/- 0.45 %; from 0/4 to 20 mA
Basic error limit (operational limit at 25 °C)	
• Current, relative to input area	+/- 0.1 %; From 0/4 to 20 mA
Interference voltage suppression for f = n x (fI +/- 1%), fI = interference frequency	
• Series mode interference (peak value of interference < rated value of input range), min.	60 dB
• Common mode interference, min.	130 dB

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Technical specifications (continued)

	6ES7 331-7TB00-0AB0
Alarms/diagnostics/status information	
Alarms	
• Diagnostic alarm	Yes; parameterizable
• Limit value alarm	Yes; parameterizable, channels 0 and 1
Diagnostics	
• Diagnostic functions	Yes; can be set in parameters, red LED, alarm message
• Diagnostic information readable	Yes
• Overrange	Yes; red LED, signal
• Wire break in signal transmitter cable	Yes; red LED, signal
• Short circuit of the signal encoder cable	Yes; red LED, signal
• HART communication active	Yes; green LED (H)
Diagnostic indication LED	
• Group error SF (red)	Yes
• Channel error indicator F (red)	Yes
Isolation	
tested with	
• Channels against backplane bus and load voltage L+	1500 V AC
• Channels among one another	1500 V AC
• Load voltage L+ against backplane bus	500 V DC
Galvanic isolation	
between the channels and backplane bus	Yes
Galvanic isolation analog inputs	
• Galvanic isolation analog inputs	Yes
Galvanic isolation analog outputs	
• between the channels	Yes
• between the channels and the load voltage L+	Yes
Permissible potential difference	
between the inputs (UCM)	60 V DC / 30 V AC
Environmental requirements	
Operating temperature	
• max.	60 °C
Standards, approvals, certificates	
FM approval	Available soon
Type of protection acc. to EN 50020 (CENELEC)	[EEx ib] IIC
Type of protection acc. to FM	Class I, Division 2, Group A, B, C, D T4; Class I, Zone 2, Group IIC T4
Test number KEMA	KEMA 97; ATEX3039 X
Type of protection acc. to KEMA	II3 (2) G Eex nA [ib] IIC T4
Dimensions and weight	
Dimensions	
• Width	40 mm
• Height	125 mm
• Depth	120 mm
Weight	
• Weight, approx.	260 g

Ordering data

		Order No.
SM 331 HART analog input module	I	**6ES7 331-7TB00-0AB0**
2 inputs, 0/4 … 20 mA, HART for ET 200M with IM 153-2 interface module		
Accessories		
Front connector[1]		
20-pin, with screw contacts		
• 1 unit		**6ES7 392-1AJ00-0AA0**
• 100 units		**6ES7 392-1AJ00-1AB0**
LK 393 cable guide		**6ES7 393-4AA00-0AA0**
Mandatory for operation in hazardous areas		
SIMATIC DP mounting rail for ET 200M		
For mounting of up to 5 bus modules for		
• Length: 483 mm		**6ES7 195-1GA00-0XA0**
• Length: 530 mm		**6ES7 195-1GF30-0XA0**
SIMATIC S7-300 mounting rail		
• Length: 160 mm		**6ES7 390-1AB60-0AA0**
• Length: 480 mm		**6ES7 390-1AE80-0AA0**
• Length: 530 mm		**6ES7 390-1AF30-0AA0**
• Length: 830 mm		**6ES7 390-1AJ30-0AA0**
• Length: 2000 mm		**6ES7 390-1BC00-0AA0**
Label cover		**6ES7 392-2XY00-0AA0**
(10 units, spare part) for signal modules (not 32-channel modules), function modules and CPU 312 IFM		
Labeling strips		**6ES7 392-2XX00-0AA0**
(10 units, spare part) for signal modules (not 32-channel modules), function modules and CPU 312 IFM		
S7-SmartLabel V3.0		
Software for machine labeling of modules directly from the STEP 7 project		
Single License	J	**2XV9 450-1SL03-0YX0**
Upgrade Single License	J	**2XV9 450-1SL03-0YX4**
Labeling sheets for machine printing		
For 16-channel signal modules, DIN A4, for printing with laser printers; 10 units		
petrol		**6ES7 392-2AX00-0AA0**
light beige		**6ES7 392-2BX00-0AA0**
yellow		**6ES7 392-2CX00-0AA0**
red		**6ES7 392-2DX00-0AA0**

[1] A connector with spring-loaded terminals cannot be used if the cable guide is used.

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

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

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I/O modules
Ex analog output module with HART

Overview



- For using HART devices in hazardous areas
- Can only be plugged into ET 200M
- 2 AO HART, Ex
- 2 current outputs in 2 channel groups (single-channel isolation)
- Output type and range can be selected for each channel
- Diagnostics and diagnostic alarm parameterizable
- Read-back capability of the analog outputs

Technical specifications

	6ES7 332-5TB00-0AB0
Supply voltages	
Load voltage L+	
• Rated value (DC)	24 V
• Reverse polarity protection	Yes
Current consumption	
from backplane bus 5 V DC, max.	100 mA
from supply voltage L+, max.	150 mA
Power losses	
Power loss, typ.	3.5 W
Analog outputs	
Number of analog outputs	2
Cable length, shielded, max.	400 m
Voltage output, short-circuit protection	Yes
Current output, no-load voltage, max.	19 V
Cycle time (all channels) max.	5 ms
Output ranges, current	
• 0 to 20 mA	Yes
• 4 to 20 mA	Yes
Connection of actuators	
• for current output 2-conductor connection	Yes
Load impedance (in rated range of output)	
• with current outputs, max.	650 Ω
• with current outputs, inductive load, max.	7.5 mH
Destruction limits against externally applied voltages and currents	
• Voltages at the outputs towards MANA	max. 17 V / -0.5 V
• Current, max.	60 mA / -1 A
Analog value creation	
Integrations and conversion time/ resolution per channel	
• Resolution with overrange (bit including sign), max.	12 bit; Output value; 8 bit (+ sign) read back value
• Conversion time (per channel)	40 ms

	6ES7 332-5TB00-0AB0
Settling time	
• for resistive load	2.5 ms
• for capacitive load	4 ms
• for inductive load	2.5 ms
Ex(i) characteristics	
Module for Ex(i) protection	Yes
Max. values of output circuits (per channel)	
• Co (permissible external capacity), max.	230 nF
• Io (short-circuit current), max.	66 mA
• Lo (permissible external inductivity), max.	7.5 mH
• Po (power of load), max.	506 mW
• Uo (output no-load voltage), max.	19 V
• Um (fault voltage), max.	60 V; DC
• Ta (permissible ambient temperature), max.	60 °C
Errors/accuracies	
Output ripple (based on output area, bandwidth 0 to 50 kHz)	+/- 0.02 %
Linearity error (relative to output area)	+/- 0.03 %
Temperature error (relative to output area)	+/- 0.01 %
Crosstalk between the outputs, min.	130 dB
Repeat accuracy in settled status at 25 °C (relative to output area)	+/- 0.005 %
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	+/- 0.15 %

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Technical specifications (continued)

	6ES7 332-5TB00-0AB0
Alarms/diagnostics/status information	
Substitute values connectable	Yes; Parameterizable
Alarms	
• Diagnostic alarm	Yes; Parameterizable
Diagnostics	
• Diagnostic functions	Yes; Parameterizable
• Diagnostic information readable	Yes
• Diagnostics	Yes
• Overrange	Yes
• Wire break	Yes; as of output value > 0.5 mA
• Wire break in actuator cable	Yes
• HART communication active	Yes; green LED (H)
Diagnostic indication LED	
• Group error SF (red)	Yes; Additional group message per channel
• Channel error indicator F (red)	Yes; per channel
Isolation	
tested with	
• Channels against backplane bus and load voltage L+	1500 V AC
• Channels among one another	1500 V AC
• Load voltage L+ against backplane bus	500 V DC

	6ES7 332-5TB00-0AB0
Galvanic isolation	
between the channels and backplane bus	Yes
Galvanic isolation analog outputs	
• Galvanic isolation analog outputs	Yes
• between the channels	Yes
• between the channels and the load voltage L+	Yes
Permissible potential difference	
between the outputs (UCM)	60 V DC/30 V AC
between M internally and the outputs	60 V DC / 30 V AC
Standards, approvals, certificates	
FM approval	Available soon
Type of protection acc. to EN 50020 (CENELEC)	[EEx ib] IIC
Type of protection acc. to FM	Class I, Division 2, Group A, B, C, D T4; Class I, Zone 2, Group IIC T4
Test number KEMA	97 ATEX 2359 X
Type of protection acc. to KEMA	II3 (2) G Eex nA [ib] IIC T4
Dimensions and weight	
Dimensions	
• Width	40 mm
• Height	125 mm
• Depth	120 mm
Weight	
• Weight, approx.	280 g

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I/O modules
Ex analog output module with HART

Ordering data		Order No.
SM 332 HART analog output module HART analog output, 8 outputs, 0/4 … 20 mA, HART for ET 200M with IM 153-2	I	**6ES7 332-5TB00-0AB0**
Accessories		
Front connectors 20-pin, with screw contacts		
• 1 unit		**6ES7 392-1AJ00-0AA0**
• 100 units		**6ES7 392-1AJ00-1AB0**
LK 393 cable guide Mandatory for operation in hazardous areas		**6ES7 393-4AA00-0AA0**
SIMATIC DP mounting rail for ET 200M For mounting of up to 5 bus modules for		
• Length: 483 mm		**6ES7 195-1GA00-0XA0**
• Length: 530 mm		**6ES7 195-1GF30-0XA0**
SIMATIC S7-300 mounting rail		
• Length: 160 mm		**6ES7 390-1AB60-0AA0**
• Length: 480 mm		**6ES7 390-1AE80-0AA0**
• Length: 530 mm		**6ES7 390-1AF30-0AA0**
• Length: 830 mm		**6ES7 390-1AJ30-0AA0**
• Length: 2000 mm		**6ES7 390-1BC00-0AA0**
Label cover (10 units, spare part) for signal modules (not 32-channel modules), function modules and CPU 312 IFM		**6ES7 392-2XY00-0AA0**
Labeling strips (10 units, spare part) for signal modules (not 32-channel modules), function modules and CPU 312 IFM		**6ES7 392-2XX00-0AA0**

		Order No.
S7-SmartLabel V3.0 Software for machine labeling of modules directly from the STEP 7 project		
Single License	J	**2XV9 450-1SL03-0YX0**
Upgrade Single License	J	**2XV9 450-1SL03-0YX4**
Labeling sheets for machine printing For 16-channel signal modules, DIN A4, for printing with laser printers; 10 units		
petrol		**6ES7 392-2AX00-0AA0**
light beige		**6ES7 392-2BX00-0AA0**
yellow		**6ES7 392-2CX00-0AA0**
red		**6ES7 392-2DX00-0AA0**
S7 Manual Collection Electronic manuals on DVD, multi-language: S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication)	J	**6ES7 998-8XC01-8YE0**
S7 Manual Collection update service for 1 year Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates	D	**6ES7 998-8XC01-8YE2**

D: Subject to export regulations AL: N and ECCN: 5D992
I: Subject to export regulations AL: N and ECCN: EAR99H
J: Subject to export regulations AL: N and ECCN: EAR99S

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Overview



- Can only be plugged into ET 200M with IM153-2 and IM 153-2 FO
- 8 AI HART
- Redundant connection
- Firmware update
- HART secondary variables

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS analog input module with HART		
Order No.	**6AG1 331-7TF01-7AB0**	**6AG1 331-7TF01-4AB0**
Order No. based on	**6ES7 331-7TF01-0AB0**	**6ES7 331-7TF01-0AB0**
Ambient temperature range	-25 °C to +70 °C	0 °C to +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	
Ambient conditions		
• Relative humidity	5 … 100 % Condensation permissible	
• Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)	
• Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]	
• Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]	
• Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 … +2000 m) See ambient temperature range 795...658 hPa (+2000 ... +3500 m) Derating 10 K 658...540 hPa (+3500 ... +5000m) Derating 20K	

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm Threshold / limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

Ordering data

		Order No.
SM 331 HART analog input module		
(extended temperature range and medial exposure)		
8 inputs, 0/4 to 20 mA, HART for ET 200M with IM 153-2 interface module	H	**6AG1 331-7TF01-7AB0**
8 inputs, 0/4 to 20 mA, HART for ET 200M with IM 153-2 interface module; only medial exposure	H	**6AG1 331-7TF01-4AB0**
Accessories		see SIMATIC ET 200M analog module with HART, page 9/195

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H

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SIPLUS I/O modules
SIPLUS analog output module with HART

Overview



- Pluggable exclusively in ET 200M with IM 153-2 and IM 153-2 FO
- 8 AI HART
- Redundant connection
- Firmware update
- HART secondary variables

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS S7-300 SM332 8AO HART		
Order No.	**6AG1 332-8TF01-2AB0**	**6AG1 332-8TF01-4AB0**
Order No. based on	**6ES7 332-8TF01-0AB0**	**6ES7 332-8TF01-0AB0**
Ambient temperature range	-25 °C to +60 °C	0 °C to +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	
Ambient conditions		
• Relative humidity	5 … 100 %, condensation permitted	
• Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)	
• Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]	
• Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]	
• Air pressure (depending on the highest positive temperature range specified)	1080...795 hPa (-1000 ... +2000 m) See ambient temperature range 795…658 hPa (+2000 … +3500 m) Derating 10 K 658...540 hPa (+3500 ... +5000m) Derating 20K	

1) ISA-S71.04 severity level GX: Long-term load: SO_2 <4.8 ppm; H_2S <9.9 ppm; Cl <0.2 ppm; HCl <0.66 ppm; HF <0.12 ppm; NH <49 ppm; O_3 <0.1 ppm; NOX <5.2 ppm Threshold / limit value (max. 30 min/d): SO_2 <17.8 ppm; H_2S <49.7 ppm; Cl <1.0 ppm; HCl <3.3 ppm; HF <2.4 ppm; NH <247 ppm; O_3 <1.0 ppm; NOX <10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

Ordering data

		Order No.
SIPLUS SM 332 analog output module with HART		
(medial exposure)		
HART analog output, 8 outputs, 0/4 - 20 mA, HART for ET 200M, with IM 153-2	H	**6AG1 332-8TF01-4AB0**
Additionally with expanded temperature range	H	**6AG1 332-8TF01-2AB0**
Accessories		See SIMATIC SM 332 analog output module with HART, page 9/197

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H

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Overview



- For connecting HART devices in hazardous areas.
- Can only be plugged into ET 200M
- 2 AI HART, Ex
- 2 inputs in 2 channel groups (single-channel isolation)
- Measurement type/range can be selected for each channel
- Programmable diagnostics and diagnostic interrupt

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS Ex analog input module with HART		
Order No.	**6AG1 331-7TB00-7AB0**	**6AG1 331-7TB00-4AB0**
Order No. based on	**6ES7 331-7TB00-0AB0**	**6ES7 331-7TB00-0AB0**
Ambient temperature range	-25 °C to +70 °C	0 °C to +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	
Ambient conditions		
• Relative humidity	5 … 100 % Condensation permissible	
• Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)	
• Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]	
• Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]	
• Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 … +2000 m) See ambient temperature range 795...658 hPa (+2000 ... +3500 m) Derating 10 K 658...540 hPa (+3500 ... +5000m) Derating 20K	

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm Threshold / limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

Ordering data

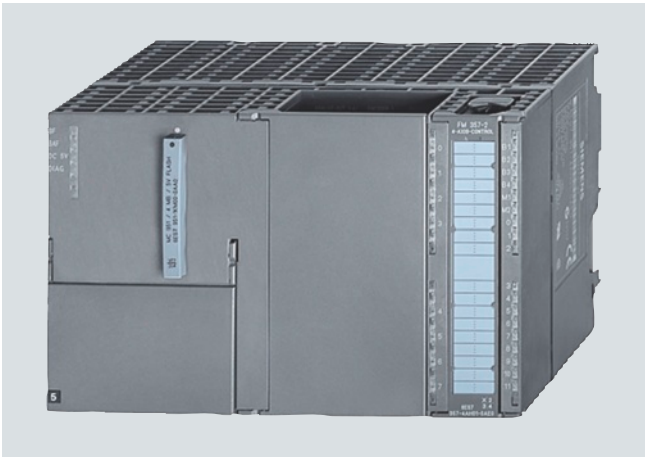
		Order No.
SM 331 HART analog input module		
(extended temperature range and medial exposure)		
2 inputs, 0/4 to 20 mA, HART for ET 200M with IM 153-2 interface module	I	**6AG1 331-7TB00-7AB0**
2 inputs, 0/4 to 20 mA, HART for ET 200M with IM 153-2 interface module; only medial exposure	H	**6AG1 331-7TB00-4AB0**
Accessories		see SIMATIC ET 200M Ex analog input module with HART, page 9/199

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H
I: Subject to export regulations AL: N and ECCN: EAR99H

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Function modules

Overview



Function modules unburden the CPU of work-intensive tasks such as counting, positioning and controlling

Module spectrum

- Counter modules
- Positioning modules for rapid traverse and creep speed drives
- Positioning modules for stepper motors
- Positioning modules for servo motors
- Positioning and continuous path modules
- SSI position detection modules
- Electronic cam controllers
- High-speed Boolean processor
- Control modules

Function modules	
Counting	FM 350-1 counter module FM 350-2 counter module
Positioning • of rapid traverse and creep speed drives • of stepper motors • of servo motors	 FM 351 positioning module FM 353 positioning module FM 354 positioning module
Position and path control	FM 357-2 path and position control module[1)]
SSI position detection	SM 338 POS input modules
Electronic cam control	FM352 electronic cam controller
High speed logic operation	FM 352-5 high speed Boolean processor
Controlling	FM 355 controller module FM 355-2 temperature controller module
Weighing and proportioning electronics	SIWAREX

1) Not for ET 200M

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Overview (continued)

Applicability with ET 200M distributed I/O device

Almost all function modules can be used in the ET 200M distributed I/O device. In doing so, the following details must be observed:

		For plugging in behind IM 153-1 (6ES7 153-1AA03-0XB0)		For plugging in behind IM 153-2 (6ES7 153-2BA02-0XB0)		For plugging in behind IM 153-2 FO (6ES7 153-2BB00-0XB0)		For plugging in behind IM 153-4 PN (6ES7 153-4AA00-0XB0)
		configurable with						
Module	**Order No.**	**STEP 7[1]**	**GSD[2]**	**STEP 7[1]**	**GSD[2]**	**STEP 7[1]**	**GSD[2]**	**STEP 7[1]**
FM 350-1 counter module	6ES7 350-1AH03-0AE0	❑	--	❑	--	❑	--	❑
FM 350-2 counter module	6ES7 350-2AH01-0AE0	❑	--	❑	--	❑	--	❑
FM 351 positioning module	6ES7 351-1AH01-0AE0	❑	--	❑	--	❑	--	❑
FM 352 cam controller	6ES7 352-1AH02-0AE0	❑	--	❑	--	❑	--	❑
FM 352-5 high speed Boolean processor	6ES7 352-5AH00-0AE0	❑[3]	❑	❑[3]	❑	❑[3]	❑	❑
FM 352-5 high speed Boolean processor	6ES7 352-5AH10-0AE0	❑[3]	❑	❑[3]	❑	❑[3]	❑	❑
FM 353 positioning module	6ES7 353-1AH01-0AE0	--	--	❑	--	❑	--	--
FM 354 positioning module	6ES7 354-1AH01-0AE0	--	--	❑	--	❑	--	--
FM 355 C controller module	6ES7 355-0VH10-0AE0	--	--	❑	--	❑	--	❑
FM 355 S controller module	6ES7 355-1VH10-0AE0	--	--	❑	--	❑	--	❑
FM 355-2 C temperature controller module	6ES7 355-2CH00-0AE0	❑	--	❑	--	❑	--	❑
FM 355-2 S temperature controller module	6ES7 355-2SH00-0AE0	❑	--	❑	--	❑	--	❑
SM 338 POS input module	6ES7 338-4BC01-0AB0	❑	❑	❑	❑	❑	❑	❑

❑: configurable
--: not configurable

[1] Configuration using the meta-knowledge integrated into STEP 7 (in hardware catalog under PROFIBUS DP > ET200M > IM 153-1 / IM 153-2 or PROFINET IO > I/O > ET 200M > IM153-4 PN).

[2] Configuration using GSD file
(after installation of the GSD file configurable from the Hardware Catalog under PROFIBUS DP > Additional field devices > I/O > ET200M).
During configuration on the CP 342-5 as DP master, S5 (IM 308C) as DP master or external masters, the GSD file must be configured.

[3] Visible and configurable only with the corresponding configuration package in STEP 7.

Note:

Position measurement systems and prefabricated connecting cables for counter and positioning function are offered under SIMODRIVE Sensor and Motion Connect 500.

www.siemens.com/simatic-technology

For further information see SIMATIC S7-300, Chapter 5.

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Special modules, communication

Overview special modules



The special modules offer functions for diagnostics as well as commissioning to the user.

For further information see SIMATIC S7-300, Chapter 5.

Overview Communication



- Communication modules for data exchange using point-to-point coupling
- Communication modules for the connection of identification systems

For further information see SIMATIC S7-300, Chapter 5.

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Overview



The ASM 475 is a low-cost module for connecting the MOBY D, U, SIMATIC RF200, RF300, RF600 and SIMATIC MV400 identification systems to the S7-300 and ET 200M.

Technical specifications

Communication modules	ASM 475	ASM 475 (with MOBY U file handler)
Serial interface to the reader	RS422	
Connection point for reader	Max. 2 units via screw or spring-loaded terminals in the front connector	
Interface/cable length, max. connectable length	RS422 / 1 000 m, depending on reader and cable type	
Readers that can be connected	MOBY U/D, RF 200 / RF300 / RF600, MV400	MOBY U
Interface for 24 V DC	Via screw terminals in front connector	
SIMATIC S7 function blocks	FC/FB45, FC55 (multitag)	FC56
Transponder addressing	Direct access via addresses	Access via DOS-like file system
Commands	Initialize transponder, read data from transponder, write data to transponder, etc.	Format transponder, read file, write file, etc.
Supply voltage • Rated value • Permissible range	 24 V DC 20 ... 30 V DC	
Electrical isolation between S7-300 and MOBY	Yes	
Current consumption from S7 bus terminal, max.	100 mA	
Power loss, typically	1 W	
Ambient temperature		
During operation • Horizontal configuration of SIMATIC • Vertical configuration of SIMATIC	 0 ... +60 °C 0 ... +40 °C	
During transportation and storage	-40 ... +70 °C	
Dimensions W x H x D (mm)	40 x 125 x 120	
Weight	Approx. 0.2 kg	

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ASM 475

Ordering data	Order No.
MOBY ASM 475 communication module for SIMATIC S7-300 and ET 200M, parameterizable	**6GT2 002-0GA10**
Accessories	
Front connector (1 x per ASM 475)	
• with screw terminals	**6ES7 392-1AJ00-0AA0**
• with spring-loaded terminals	**6ES7 392-1BJ00-0AA0**
MOBY U connecting cable preassembled, between the ASM 475 and reader, angled connector, PUR material, in the following lengths:	
2 m	**6GT2 091-4EH20**
5 m	**6GT2 091-4EH50**
10 m	**6GT2 091-4EN10**
20 m	**6GT2 091-4EN20**
50 m	**6GT2 091-4EN50**
pre-assembled, between ASM 475 and reader, straight connector, PUR material, in the following lengths:	
2 m	**6GT2 091-6EH20**
5 m	**6GT2 091-6EH50**
10 m	**6GT2 091-6EN10**
50 m	**6GT2 091-6EN50**
MOBY D connecting cable preassembled, between ASM 475 and reader D1xS, 9-pole Sub-D plug, PUR material, CMG approved, suitable for cable carriers, in the following lengths:	
5 m	**6GT2 491-4EH50**
20 m	**6GT2 491-4EN20**
50 m	**6GT2 491-4EN50**

	Order No.
SIMATIC RF200 / RF300 / RF600/ MV400 connecting cable preassembled, between the ASM 475 and RF200 / RF300 / RF600 / MV400, IP65, straight connector, PUR material, suitable for cable carriers, CMG approval, in the following lengths[1]:	
2 m	**6GT2 891-4EH20**
5 m	**6GT2 891-4EH50**
Extension cable SIMATIC RF200 / RF300 / RF600 / MV400, PUR material, CMG approval, suitable for cable carriers, straight connector	
2 m	**6GT2 891-4FH20**
5 m	**6GT2 891-4FH50**
10 m	**6GT2 891-4FN10**
20 m	**6GT2 891-4FN20**
50 m	**6GT2 891-4FN50**
DVD "RFID Systems Software & Documentation" J	**6GT2 080-2AA20**

[1] The connecting cables can be extended using the RF300 connecting cables of type 6GT2891-4Fxxx. These connecting cables are available in the lengths 2 m, 5 m, 10 m, 20 m and 50 m.

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

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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

For further information see SIMATIC S7-300, Chapter 5.

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ET 200L

Application



ET 200L is a small, compact I/O device with degree of protection IP20.

The ET 200L is mainly used for applications in the low-end performance range which require few inputs/outputs as well as for applications where space is limited.

The ET 200L is a passive node (slave) on PROFIBUS DP with transmission rates up to 1.5 Mbit/s.

Technical specifications

	6ES7 131-1BH01-0XB0	6ES7 131-1BL01-0XB0
Supply voltages		
Rated value		
• 24 V DC	Yes	Yes
• Reverse polarity protection	Yes	Yes
Hardware configuration		
Rack		
• Required terminal block	TB 16L	TB 32L
Connection method		
Inputs/outputs	Screw-type and spring-loaded terminals, permanent wiring; standard: 2-wire connection, optional: 3 and 4-wire connection	Screw-type and spring-loaded terminals, permanent wiring; standard: 2-wire connection, optional: 3 and 4-wire connection
PROFIBUS DP		
Transmission rate, max.	1.5 Mbit/s	1.5 Mbit/s
Direct data exchange (slave-to-slave communication)	Yes; Transmitter (for digital outputs and hybrid modules ET 200L: not for L-SC or IM-SC)	Yes; Transmitter (for digital outputs and hybrid modules ET 200L: not for L-SC or IM-SC)
Digital inputs		
Number of digital inputs	16	32
Input voltage		
• Rated value, DC	24 V	24 V
• for signal "0"	-30 to +5 V	-30 to +5 V
• for signal "1"	13 to 30 V	13 to 30 V
Input current		
• for signal "1", typ.	5 mA	5 mA
Input delay (for rated value of input voltage)		
• for standard inputs		
- at "0" to "1", min.	2 ms	2 ms
- at "0" to "1", max.	4.5 ms	4.5 ms
Cable length		
• Cable length for NAMUR input, shielded, max.	1 000 m	1 000 m
Galvanic isolation		
between PROFIBUS DP and all other circuit components	Yes	Yes
Galvanic isolation digital inputs		
• between the channels	No	No
• between the channels and PROFIBUS DP	Yes	Yes

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Technical specifications (continued)

	6ES7 131-1BH01-0XB0	6ES7 131-1BL01-0XB0
Environmental requirements		
Operating temperature		
• Horizontal installation, min.	0 °C	0 °C
• Horizontal installation, max.	60 °C; 40°C for other mountings	60 °C; 40°C for other mountings
Air pressure		
• Permissible range, min.	795 hPa	795 hPa
• Permissible range, max.	1 080 hPa	1 080 hPa
Relative humidity		
• Operation, min.	5 %	5 %
• Operation, max.	95 %; RH class 2 in accordance with IEC 1131-2	95 %; RH class 2 in accordance with IEC 1131-2
Vibrations		
• Operation, checked according to IEC 60068-2-6	Yes; IEC 68, Part 2-6; 10 to 57 Hz; (constant amplitude 0.075 mm); 57 to 150 Hz; (constant acceleration 1 g)	Yes; IEC 68, Part 2-6; 10 to 57 Hz; (constant amplitude 0.075 mm); 57 to 150 Hz; (constant acceleration 1 g)
Shock test		
• checked according to IEC 60068-2-27	Yes; IEC 68, Part 2-27; half-sine, 15 g, 11 ms	Yes; IEC 68, Part 2-27; half-sine, 15 g, 11 ms
Degree of protection		
IP20	Yes	Yes
Dimensions and weight		
Dimensions		
• Width	145 mm	145 mm
• Height	60 mm	60 mm
• Depth	60.5 mm	60.5 mm

	6ES7 132-1BH00-0XB0	6ES7 132-1BL00-0XB0
Supply voltages		
Rated value		
• 24 V DC	Yes	Yes
• Reverse polarity protection	Yes	Yes
Mains buffering, min.	20 ms	20 ms
Load voltage 2L+		
• Rated value (DC)	24 V; 1L+, 2L+, 3L+	24 V; 1L+, 2L+, 3L+
Current consumption		
from load voltage L1 (without load), max.	50 mA; per load group (L1+ or L2+ / L3+)	100 mA; per load group (L1+ or L2+ / L3+)
from supply voltage L+, max.	70 mA; L4+ / L5+	70 mA; L4+ / L5+
Power losses		
Power loss, typ.	5 W	7 W
Hardware configuration		
Rack		
• Required terminal block	TB 16L	TB 32L
Communication functions		
Bus protocol/transmission protocol	PROFIBUS DP	PROFIBUS DP
Connection method		
Inputs/outputs	Screw-type and spring-loaded terminals, permanent wiring; standard: 2-wire connection, optional: 3 and 4-wire connection	Screw-type and spring-loaded terminals, permanent wiring; standard: 2-wire connection, optional: 3 and 4-wire connection
PROFIBUS DP		
Transmission rate, max.	1.5 Mbit/s	1.5 Mbit/s
SYNC capability	Yes	Yes
Direct data exchange (slave-to-slave communication)	Yes; Transmitter (for digital outputs and hybrid modules ET 200L: not for L-SC or IM-SC)	Yes; Transmitter (for digital outputs and hybrid modules ET 200L: not for L-SC or IM-SC)

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Technical specifications (continued)

	6ES7 132-1BH00-0XB0	6ES7 132-1BL00-0XB0
Digital outputs		
Number of digital outputs	16	32
Short-circuit protection	Yes; Electronic	Yes; Electronic
Response threshold, typ.	0.7 A	0.7 A
Limitation of inductive shutdown voltage to	typ. (L1+ or L2+ / L3+) -55 V	typ. (L1+ or L2+ / L3+) -55 V
Lamp load, max.	5 W	5 W
Controlling a digital input	Yes	Yes
Output voltage		
• rated value (DC)	24 V	24 V
• for signal "1", min.	Ua - 3 V	Ua - 3 V
Output current		
• for signal "1" rated value	0.5 A	0.5 A
• for signal "1" permissible range for 0 to 60 °C, max.	0.5 A	0.5 A
• for signal "0" residual current, max.	1 mA	1 mA
Output delay with resistive load		
• 0 to "1", max.	50 ms	50 ms
• 1 to "0", max.	200 ms	200 ms
Parallel switching of 2 outputs		
• for increased power	No	No
• for redundant control of a load	Yes; only outputs of the same group	Yes; only outputs of the same group
Switching frequency		
• with resistive load, max.	100 Hz	100 Hz
• with inductive load, max.	0.5 Hz	0.5 Hz
• on lamp load, max.	8 Hz	8 Hz
Aggregate current of outputs (per group)		
• all other mounting positions		
- up to 40 °C, max.	2 A	2 A
• up to 60 °C, max.	4 A	4 A
• up to 40 °C, max.	3 000 mA	3 000 mA
• horizontal arrangement, up to 60 °C, max.	2 000 mA	2 000 mA
Load resistance range		
• lower limit	41 Ω	41 Ω
• upper limit	28 000 Ω	28 000 Ω
Cable length		
• Cable length, shielded, max.	1 000 m	1 000 m
• Cable length unshielded, max.	600 m	600 m
Alarms/diagnostics/status information		
Alarms		
• Alarms	No	No
Diagnostics		
• Diagnostic functions	Yes	Yes
Diagnostic indication LED		
• Bus fault BF (red)	Yes	Yes
• Status indicator digital output (green)	Yes	Yes
• Status indicator digital input (green)	Yes	Yes
• Monitoring 24 V voltage supply ON (green)	Yes	Yes
Isolation		
Isolation checked with	500 V DC	500 V DC
Galvanic isolation		
between PROFIBUS DP and all other circuit components	Yes	Yes

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Technical specifications (continued)

	6ES7 132-1BH00-0XB0	6ES7 132-1BL00-0XB0
Galvanic isolation digital outputs		
• between the channels	No	No
• between the channels and PROFIBUS DP	Yes; Optocoupler	Yes
Environmental requirements		
Operating temperature		
• Horizontal installation, min.	0 °C	0 °C
• Horizontal installation, max.	60 °C; 40°C for other mountings	60 °C; 40°C for other mountings
Air pressure		
• Permissible range, min.	795 hPa	795 hPa
• Permissible range, max.	1 080 hPa	1 080 hPa
Relative humidity		
• Operation, min.	5 %	5 %
• Operation, max.	95 %; RH class 2 in accordance with IEC 1131-2	95 %; RH class 2 in accordance with IEC 1131-2
Vibrations		
• Operation, checked according to IEC 60068-2-6	Yes; IEC 68, Part 2-6; 10 to 57 Hz; (constant amplitude 0.075 mm); 57 to 150 Hz; (constant acceleration 1 g)	Yes; IEC 68, Part 2-6; 10 to 57 Hz; (constant amplitude 0.075 mm); 57 to 150 Hz; (constant acceleration 1 g)
Shock test		
• checked according to IEC 60068-2-27	Yes; IEC 68, Part 2-27; half-sine, 15 g, 11 ms	Yes; IEC 68, Part 2-27; half-sine, 15 g, 11 ms
Degree of protection		
IP20	Yes	Yes
General information		
Vendor identification (VendorID)	0016h	0011h
Dimensions and weight		
Dimensions		
• Width	145 mm	145 mm
• Height	60 mm	60 mm
• Depth	60.5 mm	60.5 mm
Weight		
• Weight, approx.	130 g	150 g

	6ES7 133-1BL01-0XB0
Supply voltages	
Rated value	
• 24 V DC	Yes
• Reverse polarity protection	Yes
Hardware configuration	
Rack	
• Required terminal block	TB 32L
Connection method	
Inputs/outputs	Screw-type and spring-loaded terminals, permanent wiring; standard: 2-wire connection, optional: 3 and 4-wire connection
PROFIBUS DP	
Transmission rate, max.	1.5 Mbit/s
Direct data exchange (slave-to-slave communication)	Yes; Transmitter (for digital outputs and hybrid modules ET 200L: not for L-SC or IM-SC)
Digital inputs	
Number of digital inputs	16
Input voltage	
• rated value, DC	24 V
• for signal "0"	-30 to +5 V
• for signal "1"	13 to 30 V

	6ES7 133-1BL01-0XB0
Input current	
• for signal "1", typ.	5 mA
Input delay (for rated value of input voltage)	
• for standard inputs	
- at "0" to "1", min.	2 ms
- at "0" to "1", max.	4.5 ms
Cable length	
• Cable length for NAMUR input, shielded, max.	1 000 m
Digital outputs	
Number of digital outputs	16
Short-circuit protection	Yes; Electronic
Output voltage	
• rated value (DC)	24 V
• for signal "1", min.	Ua - 3 V
Output current	
• for signal "1" permissible range for 0 to 60 °C, max.	0.5 mA
• for signal "0" residual current, max.	1 mA
Switching frequency	
• with resistive load, max.	100 Hz
• with inductive load, max.	0.5 Hz
• on lamp load, max.	8 Hz

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Technical specifications (continued)

	6ES7 133-1BL01-0XB0
Aggregate current of outputs (per group)	
• up to 60 °C, max.	4 A
Cable length	
• Cable length, shielded, max.	1 000 m
Galvanic isolation	
between PROFIBUS DP and all other circuit components	Yes
Galvanic isolation digital inputs	
• between the channels	No
• between the channels and PROFIBUS DP	Yes
Environmental requirements	
Operating temperature	
• horizontal installation, min.	0 °C
• horizontal installation, max.	60 °C; 40°C for other mountings
Air pressure	
• permissible range, min.	795 hPa
• permissible range, max.	1 080 hPa

	6ES7 133-1BL01-0XB0
Relative humidity	
• Operation, min.	5 %
• Operation, max.	95 %; RH class 2 in accordance with IEC 1131-2
Vibrations	
• Operation, checked according to IEC 60068-2-6	Yes; IEC 68, Part 2-6; 10 to 57 Hz; (constant amplitude 0.075 mm); 57 to 150 Hz; (constant acceleration 1 g)
Shock test	
• checked according to IEC 60068-2-27	Yes; IEC 68, Part 2-27; half-sine, 15 g, 11 ms
Degree of protection	
IP20	Yes
Dimensions and weight	
Dimensions	
• Width	145 mm
• Height	60 mm
• Depth	60.5 mm

	6ES7 193-1CH00-0XA0	6ES7 193-1CH10-0XA0	6ES7 193-1CH20-0XA0	6ES7 193-1CL00-0XA0	6ES7 193-1CL10-0XA0
Dimensions and weight					
Dimensions					
• Width	145 mm	145 mm	191 mm	191 mm	191 mm
• Height	100 mm; Height with electronics block from top edge of DIN rail (with bus connector 6ES7 972-0CA30-0XA0): 82 mm	100 mm; Height with electronics block from top edge of DIN rail (with bus connector 6ES7 972-0CA30-0XA0): 82 mm	100 mm; Height with electronics block from top edge (with bus connector): 98.5 mm	100 mm; Height with electronics block from top edge of DIN rail (with bus connector 6ES7 972-0CA30-0XA0): 82 mm	100 mm; Height with electronics block from top edge of DIN rail (with bus connector 6ES7 972-0CA30-0XA0): 82 mm
• Depth	40.5 mm	40.5 mm	40.5 mm	40.5 mm	40.5 mm
Weight					
• Weight, approx.	230 g	230 g	283 g	350 g	350 g

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Ordering data

	Order No.
Electronic block for ET 200L	
with digital inputs/outputs for 24 V DC	
• 16 DI	**6ES7 131-1BH01-0XB0**
• 32 DI	**6ES7 131-1BL01-0XB0**
• 16 DO; 0.5 A	**6ES7 132-1BH00-0XB0**
• 32 DO; 0.5 A	**6ES7 132-1BL00-0XB0**
• 16 DI/16 DO; 0.5 A	**6ES7 133-1BL01-0XB0**
Terminal block for ET 200L and ET 200L-SC	
for mounting the electronic blocks	
TB 16L	
• 16 channels, screw-type terminals	**6ES7 193-1CH00-0XA0**
• 16 channels, spring-loaded terminals	**6ES7 193-1CH10-0XA0**
TB 32L	
• 32 channels, screw-type terminals	**6ES7 193-1CL00-0XA0**
• 32 channels, spring-loaded terminals	**6ES7 193-1CL10-0XA0**
Add-on terminal for ET 200L and ET 200L-SC	
16 channels; 1 tier	
• Screw-type terminals	**6ES7 193-1FH20-0XA0**
• Spring-loaded terminals	**6ES7 193-1FH50-0XA0**
16 channels; 2 tiers	
• Screw-type terminals	**6ES7 193-1FH30-0XA0**
• Spring-loaded terminals	**6ES7 193-1FH60-0XA0**
32 channels; 1 tier	
• Screw-type terminals	**6ES7 193-1FL20-0XA0**
• Spring-loaded terminals	**6ES7 193-1FL50-0XA0**
32 channels; 2 tiers	
• Screw-type terminals	**6ES7 193-1FL30-0XA0**
• Spring-loaded terminals	**6ES7 193-1FL60-0XA0**

Accessories	Order No.
Labeling sheet with strips for 10 electronic blocks for	
• 16-channel electronic blocks incl. add-on terminals	**6ES7 193-1BH00-0XA0**
• 32-channel electronic blocks incl. add-on terminals	**6ES7 193-1BL00-0XA0**
PROFIBUS bus connector	
• 90° cable outlet, FastConnect terminating resistor with isolating function, without PG socket, up to 12 Mbit/s 1 unit	**6ES7 972-0BA52-0XA0**
• 90° cable outlet, FastConnect terminating resistor with isolating function, without PG socket, up to 12 Mbit/s 100 units	**6ES7 972-0BA52-0XB0**
• Angular outgoing cable, insulation displacement terminals, without bus terminating resistor, without PG connection socket, up to 1.5 Mbit/s	**6ES7 972-0BA30-0XA0**
• 90° cable outlet, FastConnect terminating resistor with isolating function, with PG socket, up to 12 Mbit/s 1 unit	**6ES7 972-0BB52-0XA0**
• 90° cable outlet, FastConnect terminating resistor with isolating function, with PG socket, up to 12 Mbit/s 100 units	**6ES7 972-0BB52-0XB0**

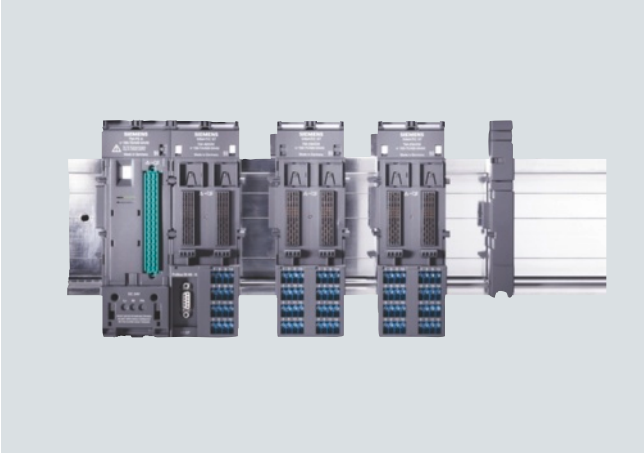
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Introduction

Overview







- Fail-safe distributed I/O system to IP30 degree of protection for use in hazardous gaseous and dusty areas, i.e. in Zones 1 and 2 as well as 21 and 22
- Sensors and actuators can also be situated directly in Zone 0 or 20.
- Individual configuration and flexible expansion with the modular design for optimization to the respective automation task
- Independent wiring enables prewiring without the electronics connected
- Optimized for integration into process control systems (e.g. SIMATIC PCS 7)
- Parameters can be assigned using SIMATIC PDM
- Optimal integration of HART field devices (HART transparency)
- Fail-safe digital inputs and outputs as well as analog inputs for the safety-related signal processing according to PROFIsafe
- Connection to PROFIBUS DP via isolating transformers
- Module replacement (hot swapping) and configuration expansion (Configuration in Run) possible during operation
- Extensive diagnostic possibilities
- Condensation-proof modules in temperature range -20°C to +70°C
- EMC in accordance with NE 21 (on Namur recommendation)
- Full redundancy of PROFIBUS and power supply

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Technical specifications

General		
Degree of protection	IP30	
Ambient temperature	-20°C … +70°C	
Medial load	In accordance with ISA-S71.04 severity level G1 ;G2 ;G3 (with the exception of NH3 here only Level G2)	
EMC	Electromagnetic compatibility in accordance with NE21	
Vibration-proof	0.5 g permanently, 1 g periodically	
Approvals, standards		
• ATEX	II 2 G (1) GD	Ex de [ia/ib] IIC T4
	I M2	Ex de [ia/ib] I
• IECEx	Zone 1	Ex de [ia/ib] IIC T4
• INMETRO	Zone 1	BR-Ex de [ia/ib] IIC T4
• cFMus	Class I,II,II	NI Division 2, Groups A, B, C, D, E, F, G T4
		AIS Division 1, Groups A, B, C, D, E, F, G
	Class I	Zone 1, AEx de [ia/ib] IIC T4
• cULus	Class I,II,II	Division 2, Groups A, B, C, D, E, F, G T4
		providing int. safe circuits for Division
		1, Groups A, B, C, D, E, F, G
	Class I	Zone 1, AEx de [ia/ib] IIC T4
• PROFIBUS	EN 50170, Volume 2	
• IEC	IEC 61131, Part 2	
• CE	In accordance with 94/9/EG (ATEX 100a), 89/336/EEC and 73/23/EEC	
• Shipbuilding approval	Classification companies • ABS (American Bureau of Shipping) • BV (Bureau Veritas) • DNV (Det Norske Veritas) • GL (Germanischer Lloyd) • LRS (Lloyds Register of Shipping) • Class NK (Nippon Kaiji Kyokai)	

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IM 152-1 interface module

Overview



- The IM 152 interface module is plugged onto the corresponding terminal module TM-IM/EM (to be ordered separately). For redundant operation, two IM 152 are used. They are plugged onto the TM-IM/IM.
- The interface module IM 152 has the following properties:
  - Connects the ET 200iSP to PROFIBUS DP
  - Prepares data for the fitted electronic modules
  - The PROFIBUS address of ET 200iSP can be adjusted by switch
  - Slot for MMC
  - Firmware updating over PROFIBUS DP or MMC
- Shutting down the 24 V DC supply voltage at the terminal module TM-PS also shuts down the interface module IM 152.
- The maximum address size is 244 byte inputs and 244 byte outputs.

Technical specifications

	6ES7 152-1AA00-0AB0
Supply voltages	
Mains buffering, min.	f
Current consumption	
from supply voltage 1L+, max.	30 mA
Current consumption/ power loss	
Power loss, typ.	0.5 W
Interfaces	
Interface physics, RS 485	Yes; (intrinsically safe)
Protocols	
PROFIBUS DP protocol	Yes
PROFIBUS DP	
Transmission rate, max.	1.5 Mbit/s; 9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 Kbit/s
SYNC capability	Yes
FREECE capability	Yes
Direct data exchange (slave-to-slave communication)	Yes; Slave to slave as publisher
Isochronous mode	
Isochronous mode	No
Alarms/diagnostics/status information	
Alarms	
• Alarms	Yes
• Acyclic function, interrupts	Yes
• Acyclic function, parameters	Yes
Diagnostics	
• Diagnostic functions	Yes
Diagnostic indication LED	
• Bus fault BF (red)	Yes
• Group error SF (red)	Yes
• Monitoring 24 V voltage supply ON (green)	Yes

	6ES7 152-1AA00-0AB0
Time stamping	
Description	for each digital input, digital input module, total ET 200iS
Accuracy	20 ms
Number of stampable digital inputs, max.	64; for accuracy class 20 ms
Time format	RFC 1119 Internet (ISP)
Time resolution	1 ms
Time interval for transmitting the message buffer if a message is present	1 000 ms
Time stamp on signal change	rising / falling edge as signal entering or exiting
Galvanic isolation	
between supply voltage and electronics	Yes
Standards, approvals, certificates	
CE mark	Yes
Type of protection acc. to EN 50020 (CENELEC)	II2 G Ex ib IIC T4 and I M2 Ex ib I
Type of protection acc. to KEMA	04 ATEX 1243
General information	
Vendor identification (VendorID)	8110H
Dimensions and weight	
Dimensions and weight	
• Width	30 mm
• Height	129 mm
• Depth	136.5 mm
Weight	
• Weight, approx.	245 g

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Technical specifications (continued)

	6ES7 193-7AA00-0AA0	6ES7 193-7AA10-0AA0	6ES7 193-7AB00-0AA0
Standards, approvals, certificates			
CE mark	No	No	No
Type of protection acc. to EN 50020 (CENELEC)	No	No	No
Test number KEMA	04 ATEX 2242	04 ATEX 2242	04 ATEX 2242
Dimensions and weight			
Dimensions and weight			
• Width	60 mm	60 mm	60 mm
• Height	190 mm	190 mm	190 mm
• Depth	52 mm	52 mm	52 mm
Weight			
• Weight, approx.	235 g	235 g	195 g

Ordering data

	Order No.
IM 152	
• ET 200iSP-IM 152-1	**6ES7 152-1AA00-0AB0**
Terminal module for IM 152 incl. termination module	
• TM-IM/EM60S I	**6ES7 193-7AA00-0AA0**
• TM-IM/EM60C I	**6ES7 193-7AA10-0AA0**
• TM-IM/IM	**6ES7 193-7AB00-0AA0**
Accessories	
ET 200iSP manual	
• German	**6ES7 152-1AA00-8AA0**
• English	**6ES7 152-1AA00-8BA0**
Connectors	**6ES7 972-0DA60-0XA0**
PROFIBUS connector with active terminating resistor	
for RS 485-IS circuit; 1.5 Mbit/s	
RS 485-IS coupler	**6ES7 972-0AC80-0XA0**
Isolating transformer for coupling of PROFIBUS DP and PROFIBUS RS 485-IS	
Labeling sheet	
DIN A4, perforated, each consisting of 10 sheets of 30 strips each for electronic modules, and 20 strips each for IM 152	
• petrol	**6ES7 193-7BH00-0AA0**
• red	**6ES7 193-7BD00-0AA0**
• yellow	**6ES7 193-7BB00-0AA0**
• light beige	**6ES7 193-7BA00-0AA0**
Labels, inscribed	
Ordering unit: 1 set with 200 units each for slot numbering	
• 10 x slots 1 to 2	**8WA8 861-0AB**
• 5 x slots 1 to 40	**8WA8 861-0AC**
• 1 x slot 1 to 64 2 x slots 1 to 68	**8WA8 861-0DA**

	Order No.
Labels, blank	**8WA8 848-2AY**
Ordering unit: 1 set with 200 units each for slot numbering	
S7-300 mounting rails	
Standard rail 585 mm	**6ES7 390-1AF85-0AA0**
Standard rail 885 mm	**6ES7 390-1AJ85-0AA0**
Stainless steel enclosure IP66 for hazardous zone 1 in protection class EEx e	
Empty enclosure without installation of modules, for use in a gaseous area, IP65 (IP54 when using a breather gland)	
• Wall enclosure 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in a gaseous area, with 3 rows of M16 cable entries (41 units) and 2 rows of blanking plugs	**6DL2 804-0AD30**
• Wall enclosure 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in a gaseous area, with 5 rows of M16 cable entries (66 units)	**6DL2 804-0AD50**
• Wall enclosure 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in a gaseous area, with 3 rows of M16 cable entries (68 units) and 2 rows of blanking plugs	**6DL2 804-0AE30**
• Wall enclosure 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in a gaseous area, with 5 rows of M16 cable entries (111 units)	**6DL2 804-0AE50**
Empty enclosure without installation of modules, for use in a dusty area, IP65	
• Wall enclosure 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in a dusty area, with 3 rows of M16 cable entries (41 units) and 2 rows of blanking plugs	**6DL2 804-0DD30**

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

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IM 152-1 interface module

Ordering data

		Order No.
Empty enclosure without installation of modules, for use in a dusty area, IP65		
• Wall enclosure 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in a dusty area, with 5 rows of M16 cable entries (66 units)		**6DL2 804-0DD50**
• Wall enclosure 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in a dusty area, with 3 rows of M16 cable entries (68 units) and 2 rows of blanking plugs		**6DL2 804-0DE30**
• Wall enclosure 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in a dusty area, with 5 rows of M16 cable entries (111 units)		**6DL2 804-0DE50**
Enclosure with installation of ET 200iSP modules for use in a gaseous area, IP65 (IP54 when using a breather gland); ET 200iSP components must be ordered separately		
• Wall enclosure 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in a gaseous area, with 3 rows of M16 cable entries (41 units) and 2 rows of blanking plugs	I	**6DL2 804-1AD30**
• Wall enclosure 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in a gaseous area, with 5 rows of M16 cable entries (66 units)	I	**6DL2 804-1AD50**
• Wall enclosure 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in a gaseous area, with 3 rows of M16 cable entries (68 units) and 2 rows of blanking plugs	I	**6DL2 804-1AE30**
Enclosure with installation of ET 200iSP modules for use in a gaseous area, IP65 (IP54 when using a breather gland); ET 200iSP components must be ordered separately		
• Wall enclosure 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in a gaseous area, with 5 rows of M16 cable entries (111 units)	I	**6DL2 804-1AE50**
Enclosure with installation of modules, for use in a dusty area, IP65; the ET 200iSP components must be ordered separately		
• Wall enclosure 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in a dusty area, with 3 rows of M16 cable entries (41 units) and 2 rows of blanking plugs	I	**6DL2 804-1DD30**
• Wall enclosure 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in a dusty area, with 5 rows of M16 cable entries (66 units)	I	**6DL2 804-1DD50**
• Wall enclosure 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in a dusty area, with 3 rows of M16 cable entries (68 units) and 2 rows of blanking plugs	I	**6DL2 804-1DE30**
• Wall enclosure 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in a dusty area, with 5 rows of M16 cable entries (111 units)	I	**6DL2 804-1DE50**

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Overview



The power supply (PS) is plugged into the associated terminal module TM-PS-A or TM-PS-B (with redundancy; to be ordered separately).

The power supply unit fulfills the following functions:

- It provides reliable isolated power supply for the ET 200iSP with the necessary operating voltages for
  - logic (through the backplane bus)
  - PROFIBUS DP interface of IM 152-1
  - power bus (for supplying the electronic modules)
- Takes over the safety limit of the output voltage
- Has an explosion-proof metal enclosure (explosion protection EEx d)
- Can be redundantly configured

Technical specifications

	6ES7 138-7EA01-0AA0	6ES7 138-7EC00-0AA0
Supply voltages		
Load voltage L+		
• Rated value (DC)	24 V	
• Reverse polarity protection	Yes	
Load voltage L1		
• Rated value (AC)		230 V; 120/230 V AC
• Permissible range, lower limit (AC)		85 V
• Permissible range, upper limit (AC)		264 V
• Permissible frequency range, lower limit		47 Hz
• Permissible frequency range, upper limit		63 Hz
Current consumption		
from supply voltage L+, max.	4 A	
from supply voltage L1, max.		1.04 A; at rated voltage 230 V AC:0.45A at rated voltage 120 V AC:0.75A
Power losses		
Power loss, typ.	20 W	5 W; 5W + 1.2 x total power losses of the electronic modules
Power loss, max.		21.3 W
Ex(i) characteristics		
Max. values of input circuits (per channel)		
• Um (fault voltage), max.	250 V; DC	264 V; AC/DC
Alarms/diagnostics/status information		
Status indicator	Yes	Yes
Alarms		
• Alarms	No	No
Diagnostics		
• Diagnostic information readable	Yes; via IM 152	Yes; via IM 152
Diagnostic indication LED		
• Group error SF (red)	No	No
Galvanic isolation		
primary/secondary	Yes	Yes
between supply voltage and electronics	Yes	No

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Technical specifications (continued)

	6ES7 138-7EA01-0AA0	6ES7 138-7EC00-0AA0
Standards, approvals, certificates		
CE mark	Yes	Yes
Type of protection acc. to EN 50020 (CENELEC)	Ex de [ib]IIC T4	Ex de [ib]IIC T4
Type of protection acc. to KEMA	04 ATEX 2263	09 ATEX 0156
Dimensions and weight		
Dimensions		
• Width	60 mm	60 mm
• Height	190 mm	190 mm
• Depth	136.5 mm	136.5 mm
Weight		
• Weight, approx.	2 700 g	2 700 g

	6ES7 193-7DA10-0AA0	6ES7 193-7DB10-0AA0	6ES7 193-7DA20-0AA0	6ES7 193-7DB20-0AA0
Standards, approvals, certificates				
CE mark			Yes	Yes
Type of protection acc. to EN 50020 (CENELEC)			II 2 G (1) GD and I M2 Ex e [ia/ib] IIC T4; Ex e [ia/ib] I	II 2 G (1) GD and I M2 Ex e [ia/ib] IIC T4; Ex e [ia/ib] I
Test number KEMA			04 ATEX 2242	04 ATEX 2242
Dimensions and weight				
Dimensions and weight				
• Width	60 mm	60 mm	60 mm	60 mm
• Height	190 mm	190 mm	190 mm	190 mm
• Depth	52 mm	52 mm	52 mm	52 mm
Weight				
• Weight, approx.			230 g	230 g

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Ordering data

	Order No.
PS 24 V DC power supply module I	**6ES7 138-7EA01-0AA0**
TM-PS-A Standard terminal module	**6ES7 193-7DA10-0AA0**
TM-PS-B terminal module for redundant operation	**6ES7 193-7DB10-0AA0**

	Order No.
PS 120/230 V AC power supply module I	**6ES7 138-7EC00-0AA0**
TM-PS-A UC Standard terminal module I	**6ES7 193-7DA20-0AA0**
TM-PS-B UC terminal module for redundant operation I	**6ES7 193-7DB20-0AA0**

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Overview



- The electronic modules are plugged into the associated terminal modules that must be ordered separately (with screw-type or spring-loaded terminals).
- When plugged in, the modules are automatically uniquely coded mechanically.
- Modules can be replaced under potentially explosive conditions during runtime.

Technical specifications

	6ES7 131-7RF00-0AB0
Supply voltages	
Rated value	
• permissible range, lower limit (DC)	20.4 V
• permissible range, upper limit (DC)	28.8 V
Digital inputs	
Number of inputs	8
Number of NAMUR inputs	8
Input delay (for rated value of input voltage)	
• for standard inputs	
- at "0" to "1", min.	2.8 µs
- at "0" to "1", max.	3.5 µs
- at "1" to "0", min.	2.8 ms
- at "1" to "0", max.	3.5 µs
Cable length	
• Cable length, shielded, max.	500 m
Encoder	
Number of connectable encoders, max.	8
Connectable encoders	
• NAMUR encoder	Yes
NAMUR encoder	
• Input current, for signal "0", max.	1.2 mA
• Input current, for signal "1", min.	2.1 mA
Integrated Functions	
Frequency meter	Yes
Frequency measurement	Yes; (Gate time) 50 ms; 200 ms; 1 s
Number of frequency meters	2
Counter	
Number of counter inputs	2; normal and periodic count function
Input frequency, max.	5 kHz; with a cable length of 20 m: 5 kHz; with a cable length of 100 m: 1 kHz; with a cable length of 200 m: 500 Hz

	6ES7 131-7RF00-0AB0
Alarms/diagnostics/status information	
Alarms	
• Diagnostic alarm	Yes; Parameterizable
• Process alarm	No
Diagnostics	
• Diagnostic functions	Yes
• Diagnostic information readable	Yes
• Short circuit	Yes; R load < 150 Ohm with NAMUR sensor/sensor and NAMUR changeover contact/ sensor to DIN 19234
diagnostic indication LED	
• Group error SF (red)	Yes
Galvanic isolation	
Galvanic isolation digital inputs	
• between the channels	No
• between the channels and the backplane bus	Yes
Permissible potential difference	
between different circuits	60 V DC / 30 V AC
Standards, approvals, certificates	
CE mark	Yes
Type of protection acc. to EN 50020 (CENELEC)	II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I
Type of protection acc. to KEMA	04 ATEX 1248
Dimensions and weight	
Dimensions and weight	
• Width	30 mm
• Height	129 mm
• Depth	136.5 mm
Weight	
• Weight, approx.	255 g

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Technical specifications (continued)

	6ES7 132-7RD01-0AB0	6ES7 132-7RD11-0AB0	6ES7 132-7RD22-0AB0
Current consumption			
from load voltage L+ (without load), max.	340 mA; with actuator supply	300 mA	
from backplane bus 3.3 V DC, max.	10 mA	10 mA	
Power losses			
Power loss, typ.	2.5 W	2.1 W	2.8 W
Address area			
Address space per module			
• without packing	2 byte	2 byte	2 byte
Digital inputs			
Cable length			
• Cable length, shielded, max.			20 m
• Cable length unshielded, max.			20 m
Digital outputs			
Number of digital outputs	4; additionally 1 intrinsically-safe input for H shutdown	4; additionally 1 intrinsically-safe input for H shutdown	4; additionally 1 intrinsically-safe input for H shutdown
Short-circuit protection	Yes; Ex i function	Yes	Yes
No-load voltage Uao (DC)	23.1 V	17.4 V	17.4 V
Internal resistor Ri	275 Ω	150 Ω	167 Ω
Trend key points E			
• Voltage Ue (DC)	17.1 V	13.2 V	10.7 V
• Current Ie	20 mA	27 mA	40 mA; 80 mA when outputs connected in parallel
Output current			
• for signal "1" rated value	0.02 A	0.03 A	
Output delay with resistive load			
• 0 to "1", max.	2 ms	2 ms	2 ms
• 1 to "0", max.	1.5 ms	1.5 ms	1.5 ms
Parallel switching of 2 outputs			
• for increased power	No; for Ex reasons not possible; nor for predecessor	Yes	Yes
Switching frequency			
• with resistive load, max.	100 Hz	100 Hz	100 Hz
• with inductive load, max.	2 Hz	2 Hz	2 Hz
Cable length			
• Cable length, shielded, max.	500 m	500 m	500 m
• Cable length unshielded, max.	500 m	500 m	500 m
Ex(i) characteristics			
Max. values of output circuits (per channel)			
• Co (permissible external capacity), max.			241 nF; for IIC, 1507nF for IIB
• Io (short-circuit current), max.			118 mA
• Lo (permissible external inductivity), max.			1.7 mH; For IIC, 10.4 mH for IIB
• Po (power of load), max.			572 mW
• Uo (output no-load voltage), max.			19.4 V
• Ta (permissible ambient temperature), max.	70 °C	70 °C	

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Technical specifications (continued)

	6ES7 132-7RD01-0AB0	6ES7 132-7RD11-0AB0	6ES7 132-7RD22-0AB0
Parameter			
Remark		14 byte	
Diagnostics: wire break	yes	yes	yes
Diagnostics: short circuit	yes	yes	yes
Behavior on CPU/Master STOP, channel-wise	yes	yes	Substitute a value/keep last value
Interrupts/diagnostics/status information			
Status indicator			Yes
Substitute values connectable			Yes
Alarms			
• Alarms		No	No
• Diagnostic alarm	Yes	Yes	Yes; parameterizable
Diagnostics			
• Diagnostic functions	Yes	Yes	
• Diagnostic information readable	Yes	Yes	Yes
• Wire break	Yes; R > 10 kOhm, I < 100 µA	Yes	Yes; R > 10 kOhm, I < 100 µA
• Short circuit	Yes; R< 800 Ohm (one output), R< 40 Ohm (outputs connected in parallel)	Yes	Yes; R< 80 Ohm (one output), R< 40 Ohm (outputs connected in parallel)
diagnostic indication LED			
• Group error SF (red)	Yes	Yes	Yes
• Status indicator digital output (green)	Yes	Yes	Yes; per channel
Galvanic isolation			
Galvanic isolation digital outputs			
• between the channels			No
• between the channels and the backplane bus			Yes
• between the channels and the load voltage L+			Yes
Permissible potential difference			
between different circuits			60 V DC/30 V AC
Standards, approvals, certificates			
CE mark	Yes	Yes	Yes
Type of protection acc. to EN 50020 (CENELEC)	II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I	II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I	
Type of protection acc. to KEMA	not relevant	not relevant	04 ATEX 1249
Dimensions and weight			
Dimensions			
• Width	30 mm	30 mm	30 mm
• Height	129 mm	129 mm	129 mm
• Depth	136.5 mm	136.5 mm	136.5 mm
Weight			
• Weight, approx.	255 g	255 g	255 g

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Technical specifications (continued)

	6ES7 132-7GD00-0AB0	6ES7 132-7GD10-0AB0	6ES7 132-7GD21-0AB0	6ES7 132-7GD30-0AB0
Current consumption				
from load voltage L+ (without load), max.	340 mA; with actuator supply	300 mA; with actuator supply	400 mA	400 mA
from backplane bus 3.3 V DC, max.	10 mA	10 mA		
Power losses				
Power loss, typ.	2.5 W	2.1 W	2.8 W	2.8 W
Address area				
Address space per module				
• without packing	2 byte	2 byte	2 byte	2 byte
Digital inputs				
Cable length				
• Cable length, shielded, max.			20 m	20 m
• Cable length unshielded, max.			20 m	20 m
Digital outputs				
Number of digital outputs	4; additionally 1 intrinsically-safe input for L shutdown	4; additionally 1 intrinsically-safe input for L shutdown	4; additionally 1 intrinsically-safe input for L shutdown	4; additionally 1 intrinsically-safe input for L shutdown
Short-circuit protection	Yes; Ex i function	Yes; Ex i function	Yes	Yes
No-load voltage Uao (DC)	23.1 V	17.4 V	17.4 V	25.5 V
Internal resistor Ri		150 Ω	167 Ω	260 Ω
Trend key points E				
• Voltage Ue (DC)	17.1 V	13.2 V	10.7 V	19.8 V
• Current Ie	20 mA	27 mA; 54 mA when outputs connected in parallel	40 mA	22 mA
Output current				
• for signal "1" rated value	0.02 A	0.02 A		
Output delay with resistive load				
• 0 to "1", max.	2 ms	2 ms	2 ms	2 ms
• 1 to "0", max.	1.5 ms	1.5 ms	1.5 ms	1.5 ms
Parallel switching of 2 outputs				
• for increased power	No; for Ex reasons not possible; nor for predecessor	Yes	Yes	No
Switching frequency				
• with resistive load, max.	100 Hz	100 Hz	100 Hz	100 Hz
• with inductive load, max.	2 Hz	2 Hz	2 Hz	2 Hz
Cable length				
• Cable length, shielded, max.	500 m	500 m	500 m	500 m
• Cable length unshielded, max.	500 m	500 m	500 m	500 m
Ex(i) characteristics				
Max. values of output circuits (per channel)				
• Co (permissible external capacity), max.			241 nF; for IIC, 1507nF for IIB	81 nF; for IIC, 651nF for IIB
• Io (short-circuit current), max.			118 mA	110 mA
• Lo (permissible external inductivity), max.			1.7 mH; For IIC, 10.4 mH for IIB	1.7 mH; For IIC, 11.5 mH for IIB
• Po (power of load), max.			572 mW	764 mW
• Uo (output no-load voltage), max.			19.4 V	27.9 V
• Ta (permissible ambient temperature), max.	70 °C	70 °C		

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Technical specifications (continued)

	6ES7 132-7GD00-0AB0	6ES7 132-7GD10-0AB0	6ES7 132-7GD21-0AB0	6ES7 132-7GD30-0AB0
Parameter				
Remark	14 byte	14 byte		
Diagnostics: wire break	yes	yes	yes	yes
Diagnostics: short circuit	yes	yes	yes	yes
Behavior on CPU/Master STOP, channel-wise	yes	yes	Substitute a value/keep last value	Substitute a value/keep last value
Alarms/diagnostics/status information				
Status indicator			Yes	Yes
Substitute values connectable			Yes	Yes
Alarms				
• Alarms			No	
• Diagnostic alarm	Yes	Yes	Yes; parameterizable	Yes; parameterizable
Diagnostics				
• Diagnostic functions	Yes	Yes		
• Diagnostic information readable	Yes	Yes	Yes	Yes
• Wire break	Yes; R > 10 kOhm, I < 100 µA	Yes; R > 10 kOhm, I < 100 µA	Yes; R > 10 kOhm, I < 100 µA	Yes; R > 10 kOhm, I < 100 µA
• Short circuit	Yes; R< 80 Ohm (one output), R< 40 Ohm (outputs connected in parallel)	Yes; R< 800 Ohm (one output), R< 40 Ohm (outputs connected in parallel)	Yes; R< 80 Ohm (one output), R< 40 Ohm (outputs connected in parallel)	Yes; R < 80 Ohm
diagnostic indication LED				
• Group error SF (red)	Yes	Yes	Yes	Yes
• Status indicator digital output (green)	Yes	Yes	Yes; per channel	Yes; per channel
Galvanic isolation				
Galvanic isolation digital outputs				
• between the channels			No	No
• between the channels and the backplane bus			Yes	Yes
• between the channels and the load voltage L+			Yes	Yes
Permissible potential difference				
between different circuits			60 V DC/30 V AC	60 V DC/30 V AC
Standards, approvals, certificates				
CE mark	Yes	Yes	Yes	Yes
Type of protection acc. to EN 50020 (CENELEC)	II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I	II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I	II 2 G (1) GD and I M2 Ex ib[ia][iaD] IIC T4; Ex ib [ia] I	II 2 G (1) GD and I M2 Ex ib[ia][iaD] IIC T4; Ex ib [ia] I
Type of protection acc. to KEMA	Not relevant	Not relevant	04 ATEX 1249	04 ATEX 1249
Dimensions and weight				
Dimensions				
• Width	30 mm	30 mm	30 mm	30 mm
• Height	129 mm	129 mm	129 mm	129 mm
• Depth	136.5 mm	136.5 mm	136.5 mm	136.5 mm
Weight				
• Weight, approx.	255 g	255 g	255 g	255 g

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Technical specifications (continued)

	6ES7 132-7HB00-0AB0
Current consumption	
from load voltage L+ (without load), max.	120 mA
Current consumption/ power loss	
Power loss, typ.	1 W
Digital outputs	
Quantity/binary outputs	2
Functionality/short-circuit strength	Yes
Output current	
• for signal "1" rated value	2 A
Output delay with resistive load	
• 0 to "1", max.	8 ms
• 1 to "0", max.	3 ms
Parallel switching of 2 outputs	
• for increased power	No
• for redundant control of a load	No
Switching frequency	
• with resistive load, max.	0.5 Hz; see data in manual
• with inductive load, max.	0.2 Hz; see data in manual
Cable length	
• Cable length, shielded, max.	500 m
• Cable length unshielded, max.	500 m
Relay outputs	
Switching capacity of contacts	
• at ohmic load, up to 60 °C, max.	2 A; see data in manual
• thermal continuous current, max.	2 A; see data in manual
Ex(i) characteristics	
Max. values of output circuits (per channel)	
• Uo (output no-load voltage), max.	60 V
• Um (fault voltage), max.	250 V
• Ta (permissible ambient temperature), max.	70 °C

	6ES7 132-7HB00-0AB0
Alarms/diagnostics/status information	
Substitute values connectable	Yes
Alarms	
• Alarms	No
• Diagnostic alarm	Yes
• Process alarm	No
Diagnostics	
• Diagnostic information readable	Yes
• Wire break	No; cannot be determined in contact power circuit
• Short circuit	No; cannot be determined in contact power circuit
diagnostic indication LED	
• Group error SF (red)	Yes
• Status indicator digital output (green)	Yes; per channel
Galvanic isolation	
Galvanic isolation digital outputs	
• between the channels	Yes
• between the channels and the backplane bus	Yes
• between the channels and the load voltage L+	Yes; channels and power bus
Standards, approvals, certificates	
CE mark	Yes
Type of protection acc. to EN 50020 (CENELEC)	II 2 G and I M2 Ex eibmb IIC T4; Ex eibmb I
Type of protection acc. to KEMA	07 ATEX 0180
Dimensions and weight	
Dimensions and weight	
• Width	30 mm
• Height	129 mm
• Depth	136.5 mm
Weight	
• Weight, approx.	280 g

	6ES7 193-7CA00-0AA0	6ES7 193-7CA10-0AA0	6ES7 193-7CB00-0AA0
Standards, approvals, certificates			
CE mark	No	No	Yes
Type of protection acc. to EN 50020 (CENELEC)	No	No	II 2 G and I M2 Ex deib IIC T4; Ex deib I
Test number KEMA	04 ATEX 2242	04 ATEX 2242	07 ATEX 0205
Dimensions and weight			
Dimensions and weight			
• Width	60 mm	60 mm	60 mm
• Height	190 mm	190 mm	190 mm
• Depth	52 mm	52 mm	52 mm
Weight			
• Weight, approx.	275 g	275 g	340 g

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Ordering data

		Order No.
Digital input modules		
8 x DI Namur		
Digital input module 8 DI NAMUR	I	**6ES7 131-7RF00-0AB0**
Digital output modules for EEX i		
4 x DO; 1 additional intrinsically safe input for "H" shut-off		
Digital output module 4 DO 23.1 V DC/20 mA	I	**6ES7 132-7RD01-0AB0**
Digital output module 4 DO 17.4 V DC/27 mA	I	**6ES7 132-7RD11-0AB0**
Digital output module 4 DO 17.4 V DC/40 mA	I	**6ES7 132-7RD22-0AB0**
4 x DO; 1 additional intrinsically safe input for "L" shut-off		
Digital output module 4 DO 23.1 V DC/20 mA	I	**6ES7 132-7GD00-0AB0**
Digital output module 4 DO 17.4 V DC/27 mA	I	**6ES7 132-7GD10-0AB0**
Digital output module 4 DO 17.4 V DC/40 mA	I	**6ES7 132-7GD21-0AB0**
Digital output module 4 DO 25.4 V DC/22 mA	I	**6ES7 132-7GD30-0AB0**
Digital output modules for EEX e		
Digital output module 2 DO relay, 60 V UC, 2 A		**6ES7 132-7HB00-0AB0**
Terminal modules		
TM-EM/EM60S	I	**6ES7 193-7CA00-0AA0**
For accommodating all electronic modules except 2 DO relay; screw-type terminals		
TM-EM/EM60C	I	**6ES7 193-7CA10-0AA0**
For accommodating all electronic modules except 2 DO relay; spring-loaded terminals		
TM-RM/RM 60S		**6ES7 193-7CB00-0AA0**
For accommodating digital output module 2 DO relay and spare modules; screw-type terminal		
Accessories		
ET 200iSP manual		
• German		**6ES7 152-1AA00-8AA0**
• English		**6ES7 152-1AA00-8BA0**
Connectors		
PROFIBUS connector with active terminating resistor		**6ES7 972-0DA60-0XA0**
For RS 485-IS circuit; 1.5 Mbit/s		
RS 485-IS coupler		**6ES7 972-0AC80-0XA0**
Isolating transformer for coupling of PROFIBUS DP and PROFIBUS RS 485-IS		

	Order No.
Labeling sheet	
DIN A4, perforated, each consisting of 10 sheets of 30 strips each, used for electronic modules and 20 strips, used for IM 151	
• petrol	**6ES7 193-7BH00-0AA0**
• red	**6ES7 193-7BD00-0AA0**
• yellow	**6ES7 193-7BB00-0AA0**
• light beige	**6ES7 193-7BA00-0AA0**
Labels, inscribed	
Ordering unit 1 set with 200 units each for slot numbering	
• 10 x slots 1 to 2	**8WA8 861-0AB**
• 5 x slots 1 to 40	**8WA8 861-0AC**
Labels, blank	**8WA8 848-2AY**
Ordering unit 1 set with 200 units each for slot numbering	
S7-300 mounting rails	
Standard rail 585 mm	**6ES7 390-1AF85-0AA0**
Standard rail 885 mm	**6ES7 390-1AJ85-0AA0**
Stainless steel enclosure IP66 for hazardous zone 1 in protection class EEx e	
Empty enclosure without installation of modules, for use in gaseous area, IP65 (IP54 when using a breather gland)	
• Wall enclosure 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in gaseous area, with 3 rows of M16 cable entries (41 units) and 2 rows of blanking plugs	**6DL2 804-0AD30**
• Wall enclosure 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in gaseous area, with 5 rows of M16 cable entries (66 units)	**6DL2 804-0AD50**
• Wall enclosure 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in gaseous area, with 3 rows of M16 cable entries (68 units) and 2 rows of blanking plugs	**6DL2 804-0AE30**
• Wall enclosure 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in gaseous area, with 5 rows of M16 cable entries (111 units)	**6DL2 804-0AE50**

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

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Digital electronic modules

Ordering data

		Order No.
Empty enclosure without installation of modules, for use in dusty area, IP65		
• Wall enclosure 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in dusty area, with 3 rows of M16 cable entries (41 units) and 2 rows of blanking plugs		**6DL2 804-0DD30**
• Wall enclosure 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in dusty area, with 5 rows of M16 cable entries (66 units)		**6DL2 804-0DD50**
• Wall enclosure 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in dusty area, with 3 rows of M16 cable entries (68 units) and 2 rows of blanking plugs		**6DL2 804-0DE30**
• Wall enclosure 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in dusty area, with 5 rows of M16 cable entries (111 units)		**6DL2 804-0DE50**
Enclosure with installation of ET 200iSP modules for use in gaseous area, IP65 (IP54 when using a breather gland); ET 200iSP components must be ordered separately		
• Wall enclosure 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in gaseous area, with 3 rows of M16 cable entries (41 units) and 2 rows of blanking plugs	I	**6DL2 804-1AD30**
• Wall enclosure 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in gaseous area, with 5 rows of M16 cable entries (66 units)	I	**6DL2 804-1AD50**
• Wall enclosure 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in gaseous area, with 3 rows of M16 cable entries (68 units) and 2 rows of blanking plugs	I	**6DL2 804-1AE30**
• Wall enclosure 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in gaseous area, with 5 rows of M16 cable entries (111 units)	I	**6DL2 804-1AE50**

		Order No.
Enclosure with installation of modules, for use in dusty area, IP65; the ET 200iSP components must be ordered separately		
• Wall enclosure 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in dusty area, with 3 rows of M16 cable entries (41 units) and 2 rows of blanking plugs	I	**6DL2 804-1DD30**
• Wall enclosure 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in dusty area, with 5 rows of M16 cable entries (66 units)	I	**6DL2 804-1DD50**
• Wall enclosure 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in dusty area, with 3 rows of M16 cable entries (68 units) and 2 rows of blanking plugs	I	**6DL2 804-1DE30**
• Wall enclosure 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in dusty area, with 5 rows of M16 cable entries (111 units)	I	**6DL2 804-1DE50**

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Overview



- The electronic modules are plugged into the associated terminal modules that must be ordered separately (with screw-type or spring-loaded terminals)
- When plugged in, the modules are automatically uniquely coded mechanically
- Modules can be replaced under potentially explosive conditions during runtime

Technical specifications

	6ES7 134-7SD00-0AB0	6ES7 134-7SD51-0AB0	6ES7 134-7TD00-0AB0	6ES7 134-7TD50-0AB0
Supply voltages				
Power supply to the transmitters				
• short-circuit proof			Yes	
• supply current, max.			23 mA; per channel	
Current consumption				
from supply voltage L+, max.	30 mA	22 mA	320 mA	30 mA
Current consumption/ power loss				
Power loss, typ.	0.4 W	0.4 W	2.7 W	0.4 W
Analog inputs				
Number of analog inputs	4	4	4	4
Cable length, shielded, max.	50 m	500 m	500 m	500 m
Cycle time (all channels) max.	Number of active channels per module x basic conversion time	Number of active channels per module x basic conversion time	Number of active channels per module x basic conversion time	Number of active channels per module x basic conversion time
Technical unit for temperature measurement adjustable	Yes	Yes	Yes	Yes
• Voltage	Yes	No	No	No
• Current	No	No	Yes	Yes
• Thermocouple	Yes	No	No	No
• Resistance thermometer	No	Yes	No	No
• Resistance	No	Yes	No	No
Input ranges (rated values), voltages				
• -80 mV to +80 mV	Yes			
• Input resistance (-80 mV to +80 mV)	1 000 kΩ			
Input ranges (rated values), currents				
• 4 to 20 mA			Yes	Yes; min. 295 Ohm

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Technical specifications (continued)

	6ES7 134-7SD00-0AB0	6ES7 134-7SD51-0AB0	6ES7 134-7TD00-0AB0	6ES7 134-7TD50-0AB0
Input ranges (rated values), thermoelements				
• Type B	Yes			
• Input resistance (Type B)	1 000 kΩ			
• Type C	Yes			
• Input resistance (Type C)	1 000 kΩ			
• Type E	Yes			
• Input resistance (Type E)	1 000 kΩ			
• Type J	Yes			
• Input resistance (type J)	1 000 kΩ			
• Type K	Yes			
• Input resistance (Type K)	1 000 kΩ			
• Type L	Yes			
• Input resistance (Type L)	1 000 kΩ			
• Type N	Yes			
• Input resistance (Type N)	1 000 kΩ			
• Type R	Yes			
• Input resistance (Type R)	1 000 kΩ			
• Type S	Yes			
• Input resistance (Type S)	1 000 kΩ			
• Type T	Yes			
• Input resistance (Type T)	1 000 kΩ			
• Type U	Yes			
• Input resistance (Type U)	1 000 kΩ			
Input ranges (rated values), resistance thermometers				
• Ni 100		Yes		
• Input resistance (Ni 100)		2 000 kΩ		
• Pt 100		Yes		
• Input resistance (Pt 100)		2 000 kΩ		
Input ranges (rated values), resistors				
• 0 to 600 Ohm		Yes; also 1000 Ohm		
• Input resistance (0 to 600 Ohm)		1 000 kΩ		
Current input				
• permissible input current for current input (destruction limit), max.			90 mA	50 mA
Characteristic linearization				
• parameterizable	Yes	Yes		
• for thermocouples	1			
• for resistance thermometer		yes		
Temperature compensation				
• internal temperature compensation	Yes; via supplied TC sensor module			
• external temperature compensation with compensations socket	Yes; via temperature value, acquired by an analog module of the same ET 200iSP station			

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Technical specifications (continued)

	6ES7 134-7SD00-0AB0	6ES7 134-7SD51-0AB0	6ES7 134-7TD00-0AB0	6ES7 134-7TD50-0AB0
Analog value creation				
Measurement principle	integrating (Sigma-Delta)	integrating (Sigma-Delta)	integrating (Sigma-Delta)	integrating (Sigma-Delta)
Integrations and conversion time/ resolution per channel				
• Resolution with overrange (bit including sign), max.	16 bit	16 bit	13 bit	12 bit; + sign
• Integration time, parameterizable	Yes	Yes	No	Yes
• Basic conversion time, including integration time, ms	80 ms at 50 Hz; 66 ms at 60 Hz	80 ms at 50 Hz; 66 ms at 60 Hz		30
- additional conversion time for wire break monitoring	5	5		
• Interference voltage suppression for interference frequency f1 in Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Smoothing of measured values				
• parameterizable	Yes; in 4 stages	Yes; in 4 stages	Yes; in 4 stages	Yes; in 4 stages
• Step: None	Yes; 1 x cycle time	Yes; 1 x cycle time	Yes; 1 x cycle time	Yes; 1 x cycle time
• Step: Low	Yes; 4 x cycle time	Yes; 4 x cycle time	Yes; 4 x cycle time	Yes; 4 x cycle time
• Step: Medium	Yes; 32 x cycle time	Yes; 32 x cycle time	Yes; 32 x cycle time	Yes; 32 x cycle time
• Step: High	Yes; 64 x cycle time	Yes; 64 x cycle time	Yes; 64 x cycle time	Yes; 64 x cycle time
Encoder				
Connection of signal encoders				
• for current measurement as 2-wire transducer			Yes	
• 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		
• Burden of 2-wire transmitter, max.			750 Ω	
Errors/accuracies				
Linearity error (relative to input area)	+/- 0.015 %	+/- 0.015 %	+/- 0.015 %	+/- 0.015 %
Temperature error (relative to input area)	+/- 0.02 %	+/- 0.02 %	+/- 0.005 %/K	+/- 0.005 %/K
Crosstalk between the inputs, min.	-50 dB	-50 dB	-50 dB	-50 dB
Repeat accuracy in settled status at 25 °C (relative to input area)	+/- 0.01 %	+/- 0.01 %	+/- 0.01 %	+/- 0.01 %
Operational limit in overall temperature range				
• Voltage, relative to input area	+/- 0.15 %			
• Current, relative to input area			+/- 0.15 %	+/- 0.15 %
• Resistance-type thermometer, relative to input area		+/- 0.15 %; Applies for resistances standard +/- 0.8K climatic +/- 0.3K		

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Technical specifications (continued)

	6ES7 134-7SD00-0AB0	6ES7 134-7SD51-0AB0	6ES7 134-7TD00-0AB0	6ES7 134-7TD50-0AB0
Basic error limit (operational limit at 25 °C)				
• Voltage, relative to input area	+/- 0.1 %			
• Current, relative to input area			+/- 0.1 %	+/- 0.1 %
• Resistance-type thermometer, relative to input area		+/- 0.1 %; applies for resistances standard +/- 0.5K climatic +/- 0.2K		
Interference voltage suppression for f = n x (fl +/- 1%), fl = interference frequency				
• Series mode interference (peak value of interference < rated value of input range), min.	70 dB	70 dB	70 dB	70 dB
• Common mode interference, min.	90 dB	90 dB		
Alarms/diagnostics/status information				
Alarms				
• Diagnostic alarm	Yes; parameterizable	Yes	Yes; parameterizable	Yes; parameterizable
• Limit value alarm	Yes; parameterizable	Yes	Yes; parameterizable	Yes; parameterizable
Diagnostics				
• Diagnostic information readable	Yes	Yes	Yes	Yes
• Wire break		Yes	Yes	Yes
• Short circuit		Yes	Yes	
• Group error		Yes		
Diagnostic indication LED				
• Group error SF (red)	Yes	Yes	Yes	Yes
Galvanic isolation				
Galvanic isolation analog inputs				
• between the channels	Yes; functional, yes	No	No	No
• between the channels and the backplane bus	Yes	Yes	Yes	Yes
• between the channels and the load voltage L+		Yes; channels and Power Bus		
Standards, approvals, certificates				
CE mark	Yes	Yes	Yes	Yes
Type of protection acc. to EN 50020 (CENELEC)	II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I	II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I	II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I	II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I
Type of protection acc. to KEMA	04 ATEX 1246	04 ATEX 1247	04 ATEX 1244	04 ATEX 1245
Dimensions and weight				
Dimensions and weight				
• Width	30 mm	30 mm	30 mm	30 mm
• Height	129 mm	129 mm	129 mm	129 mm
• Depth	136.5 mm	136.5 mm	136.5 mm	136.5 mm
Weight				
• Weight, approx.	230 g	230 g	230 g	230 g

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Technical specifications (continued)

	6ES7 135-7TD00-0AB0
Current consumption	
from load voltage1L+, max.	330 mA
Power losses	
Power loss, max.	2.7 W
Analog outputs	
Number of analog outputs	4
Cable length, shielded, max.	500 m
Output ranges, current	
• 4 to 20 mA	Yes
Connection of actuators	
• for current output 2-conductor connection	Yes
Load impedance (in rated range of output)	
• with current outputs, max.	750 Ω
Analog value creation	
Integrations and conversion time/ resolution per channel	
• Resolution with overrange (bit including sign), max.	14 bit
Settling time	
• for resistive load	4 ms
• for capacitive load	40 ms
• for inductive load	40 ms
Errors/accuracies	
Linearity error (relative to output area)	+/- 0.015 %
Temperature error (relative to output area)	+/- 0.005 %/K
Crosstalk between the outputs, min.	-50 dB
Repeat accuracy in settled status at 25 °C (relative to output area)	+/- 0.01 %

	6ES7 135-7TD00-0AB0
Operational limit in overall temperature range	
• Current, relative to output area	+/- 0.15 %
Basic error limit (operational limit at 25 °C)	
• Current, relative to output area	+/- 0.1 %
Alarms/diagnostics/status information	
Substitute values connectable	Yes
Alarms	
• Diagnostic alarm	Yes
Diagnostics	
• Diagnostic information readable	Yes
• Wire break	Yes
• Short circuit	Yes
Diagnostics indication LED	
• Group error SF (red)	Yes
Galvanic isolation	
Galvanic isolation analog outputs	
• between the channels	No
• between the channels and the backplane bus	Yes
Standards, approvals, certificates	
Type of protection acc. to EN 50020 (CENELEC)	II2 G (1) GD Ex ib[ia] IIC T4 and I M2 Ex ib[ia] I
Type of protection acc. to KEMA	04 ATEX 1250
Dimensions and weight	
Dimensions	
• Width	30 mm
• Height	129 mm
• Depth	136.5 mm
Weight	
• Weight, approx.	265 g

	6ES7 193-7CA00-0AA0	6ES7 193-7CA10-0AA0	6ES7 193-7CB00-0AA0
Standards, approvals, certificates			
CE mark	No	No	Yes
Type of protection acc. to EN 50020 (CENELEC)	No	No	II 2 G and I M2 Ex deib IIC T4; Ex deib I
Test number KEMA	04 ATEX 2242	04 ATEX 2242	07 ATEX 0205
Dimensions and weight			
Dimensions and weight			
• Width	60 mm	60 mm	60 mm
• Height	190 mm	190 mm	190 mm
• Depth	52 mm	52 mm	52 mm
Weight			
• Weight, approx.	275 g	275 g	340 g

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Analog electronic modules

Ordering data		Order No.
Analog input modules		
4 AI I 2WIRE HART	I	**6ES7 134-7TD00-0AB0**
4 AI I 4WIRE HART		**6ES7 134-7TD50-0AB0**
4 AI RTD		**6ES7 134-7SD51-0AB0**
4 AI TC		**6ES7 134-7SD00-0AB0**
Analog output modules		
4 AO I HART	I	**6ES7 135-7TD00-0AB0**
Terminal modules		
TM-EM/EM60S	I	**6ES7 193-7CA00-0AA0**
Terminal module E60S (screw-type terminal)		
TM-EM/EM60C	I	**6ES7 193-7CA10-0AA0**
Terminal module E60C (spring-loaded terminal)		
Accessories		
ET 200iSP manual		
• German		**6ES7 152-1AA00-8AA0**
• English		**6ES7 152-1AA00-8BA0**
Connectors		
PROFIBUS connector with active terminating resistor		**6ES7 972-0DA60-0XA0**
For RS 485-IS circuit; 1.5 Mbit/s		
RS 485-IS coupler		**6ES7 972-0AC80-0XA0**
Isolating transformer for coupling of PROFIBUS DP and PROFIBUS RS 485-IS		
Labeling sheet		
DIN A4, perforated, each consisting of 10 sheets of 30 strips each, used for electronic modules and 20 strips, used for IM 151		
• petrol		**6ES7 193-7BH00-0AA0**
• red		**6ES7 193-7BD00-0AA0**
• yellow		**6ES7 193-7BB00-0AA0**
• light beige		**6ES7 193-7BA00-0AA0**
Labels, inscribed		
Ordering unit 1 set with 200 units each for slot numbering		
• 10 x slots 1 to 2		**8WA8 861-0AB**
• 5 x slots 1 to 40		**8WA8 861-0AC**
Labels, blank		**8WA8 848-2AY**
Ordering unit 1 set with 200 units each for slot numbering		
S7-300 mounting rails		
Standard rail 585 mm		**6ES7 390-1AF85-0AA0**
Standard rail 885 mm		**6ES7 390-1AJ85-0AA0**

	Order No.
Stainless steel enclosure IP66 for hazardous zone 1 in protection class EEx e	
Empty enclosure without installation of modules, for use in a gaseous area, IP65 (IP54 when using a breather gland)	
• Wall enclosure 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in a gaseous area, with 3 rows of M16 cable entries (41 units) and 2 rows of blanking plugs	**6DL2 804-0AD30**
• Wall enclosure 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in a gaseous area, with 5 rows of M16 cable entries (66 units)	**6DL2 804-0AD50**
• Wall enclosure 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in a gaseous area, with 3 rows of M16 cable entries (68 units) and 2 rows of blanking plugs	**6DL2 804-0AE30**
• Wall enclosure 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in a gaseous area, with 5 rows of M16 cable entries (111 units)	**6DL2 804-0AE50**
Empty enclosure without installation of modules, for use in a dusty area, IP65	
• Wall enclosure 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in a dusty area, with 3 rows of M16 cable entries (41 units) and 2 rows of blanking plugs	**6DL2 804-0DD30**
• Wall enclosure 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in a dusty area, with 5 rows of M16 cable entries (66 units)	**6DL2 804-0DD50**
• Wall enclosure 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in a dusty area, with 3 rows of M16 cable entries (68 units) and 2 rows of blanking plugs	**6DL2 804-0DE30**
• Wall enclosure 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in a dusty area, with 5 rows of M16 cable entries (111 units)	**6DL2 804-0DE50**

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Ordering data

		Order No.
Enclosure with installation of ET 200iSP modules for use in a gaseous area, IP65 (IP54 when using a breather gland); ET 200iSP components must be ordered separately		
• Wall enclosure 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in a gaseous area, with 3 rows of M16 cable entries (41 units) and 2 rows of blanking plugs	I	**6DL2 804-1AD30**
• Wall enclosure 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in a gaseous area, with 5 rows of M16 cable entries (66 units)	I	**6DL2 804-1AD50**
• Wall enclosure 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in a gaseous area, with 3 rows of M16 cable entries (68 units) and 2 rows of blanking plugs	I	**6DL2 804-1AE30**
• Wall enclosure 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in a gaseous area, with 5 rows of M16 cable entries (111 units)	I	**6DL2 804-1AE50**

		Order No.
Enclosure with installation of modules, for use in a dusty area, IP65; the ET 200iSP components must be ordered separately		
• Wall enclosure 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in a dusty area, with 3 rows of M16 cable entries (41 units) and 2 rows of blanking plugs	I	**6DL2 804-1DD30**
• Wall enclosure 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in a dusty area, with 5 rows of M16 cable entries (66 units)	I	**6DL2 804-1DD50**
• Wall enclosure 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in a dusty area, with 3 rows of M16 cable entries (68 units) and 2 rows of blanking plugs	I	**6DL2 804-1DE30**
• Wall enclosure 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in a dusty area, with 5 rows of M16 cable entries (111 units)	I	**6DL2 804-1DE50**

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Fail-safe electronic modules
F digital input module

Overview



- Digital inputs for fail-safe SIMATIC S7 systems
- Can be used in the distributed ET 200iSP I/O device with IM 152-1

The digital electronic module 8 F-DI Ex NAMUR has the following features:

- Suitable for the connection of encoders from the hazardous area
- 8 inputs 1-channel (SIL2/Category 3/PLe) or 4 inputs 2-channel (SIL3/Category 4/PLe)
- Isolated from the power bus/backplane bus
- Suitable for the following sensors:
  - According to IEC 60947-5-6 or NAMUR (with diagnostic evaluation)
  - Wired mechanical contacts (with diagnostic evaluation)
  - Unwired mechanical contacts (with deactivated diagnostics)
- Programmable diagnostic interrupt
- Diagnostic buffer integrated in module
- Firmware update
- Identification data I&M
- Channel-selective passivation
- Supports time stamping
- Can only be used in safety mode

Technical specifications

	6ES7 138-7FN00-0AB0
Current consumption	
from supply voltage L+, max.	150 mA; (int. power bus)
Power losses	
Power loss, typ.	1.4 W
Address area	
Occupied address area	
• Outputs	4 byte
• Inputs	6 byte
FH technology	
Module for fail-safe applications	Yes
Digital inputs	
Number of digital inputs	8
Number of NAMUR inputs	8
Input current	
• for signal "1", typ.	9.5 mA
Input delay (for rated value of input voltage)	
• for standard inputs	
- at "0" to "1", min.	0.7 ms
- at "0" to "1", max.	16 ms; Parameterizable
- at "1" to "0", min.	0.7 ms
- at "1" to "0", max.	16 ms; Parameterizable
Cable length	
• Cable length, shielded, max.	500 m
• Cable length unshielded, max.	200 m
Encoder supply	
Number of outputs	8
Output voltage	8 V DC

	6ES7 138-7FN00-0AB0
Encoder	
Number of connectable encoders, max.	8
Connectable encoders	
• NAMUR encoder	Yes
NAMUR encoder	
• Input current, for signal "0", max.	1.2 mA
• Input current, for signal "1", min.	2.1 mA
Parameter	
Diagnostics: wire break	Channel by channel
Diagnostics: short circuit	Channel by channel
Alarms/diagnostics/status information	
Status indicator	Yes
Alarms	
• Diagnostic alarm	Yes; Parameterizable
• Process alarm	No
Diagnostics	
• Diagnostic functions	Yes
• Diagnostic information readable	Yes
• Wire break	Yes; NAMUR encoders or single contact with 10 kOhm parallel resistor
• Short circuit	Yes; R load < 150 Ohm with NAMUR sensor/sensor and NAMUR changeover contact/ sensor to DIN 19234
Diagnostic indication LED	
• Group error SF (red)	Yes

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Technical specifications (continued)

	6ES7 138-7FN00-0AB0
Isolation	
Isolation checked with	350 V AC/1 min between the shield and backplane bus connection 350 V AC/1 min between the shield and I/O 2830 V AC/1 min between backplane bus connection and I/O
Galvanic isolation	
between the channels and backplane bus	Yes
Galvanic isolation digital inputs	
• between the channels	No
• between the channels and the backplane bus	Yes
Permissible potential difference	
between different circuits	60 V DC / 30 V AC
Standards, approvals, certificates	
CE mark	Yes

	6ES7 138-7FN00-0AB0
Type of protection acc. to EN 50020 (CENELEC)	II 2 G (1) GD Ex ib[ia Ga][ia IIIC Da] IIC T4 Gb and I M2 Ex ib[ia Ma] I Mb
Type of protection acc. to KEMA	10 ATEX 0056
Highest safety class achievable in safety mode	
• acc. to EN 954	Cat. 3 (single-channel), Cat. 4 (two-channel)
• acc. to IEC 61508	SIL 3
• Performance level acc. to EN ISO 13849-1	PLe
Dimensions and weight	
Dimensions	
• Width	30 mm
• Height	129 mm
• Depth	136.5 mm
Weight	
• Weight, approx.	288 g

Ordering data

	Order No.
F digital input modules	
8 F-DI Ex NAMUR I	**6ES7 138-7FN00-0AB0**
Terminal modules	
TM-EM/EM60S I	**6ES7 193-7CA00-0AA0**
Terminal module E60S (screw-type terminal)	
TM-EM/EM60C I	**6ES7 193-7CA10-0AA0**
Terminal module E60C (spring-loaded terminal)	
Accessories	
ET 200iSP Manual	
• German	**6ES7 152-1AA00-8AA0**
• English	**6ES7 152-1AA00-8BA0**
Cable connector	
PROFIBUS cable connector with active terminating resistor	**6ES7 972-0DA60-0XA0**
For RS 485-IS electric circuit; 1.5 Mbit/s	
RS 485-IS coupler	**6ES7 972-0AC80-0XA0**
Isolating transformer for connection of PROFIBUS DP and PROFIBUS RS 485-IS	
Labeling sheet	
DIN A4, perforated, each consisting of 10 sheets of 30 strips each, can be used for electronic modules, and 20 strips each, can be used for IM 151	
• petrol	**6ES7 193-7BH00-0AA0**
• red	**6ES7 193-7BD00-0AA0**
• yellow	**6ES7 193-7BB00-0AA0**
• light beige	**6ES7 193-7BA00-0AA0**

	Order No.
Labels, inscribed	
Ordering unit: 1 set with 200 units each for slot numbering	
• 10 x slots 1 to 2	**8WA8 861-0AB**
• 5 x slots 1 to 40	**8WA8 861-0AC**
Labels, not inscribed	**8WA8 848-2AY**
Ordering unit: 1 set with 200 units each for slot numbering	
Distributed Safety V5.4 programming tool	
Task: Software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, ET 200S Requirements: STEP 7 V5.3 SP3 and higher	
Floating License	**6ES7 833-1FC02-0YA5**
Software Update Service (requires current software version)	**6ES7 833-1FC00-0YX2**
S7 F Systems RT License	**6ES7 833-1CC00-6YX0**
For processing safety-related user programs, for one AS 412F/FH, AS 414F/FH or AS 417F/FH	

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Ordering data

		Order No.
S7 F Systems V6.1 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/SP3, Windows Server 2003 SP2 2 languages (German, English) Type of delivery: Certificate of License as well as software and electronic documentation on CD		**6ES7 833-1CC02-0YA5**
SIMATIC Safety Matrix Tool V6.2 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, Type of delivery: Certificate of License and authorization diskette for Safety Matrix Tool and Safety Matrix Viewer; software and electronic documentation on CD		
Floating License for 1 installation	J	**6ES7 833-1SM02-0YA5**
Floating License upgrade from V5.x/V6.x to V6.2	J	**6ES7 833-1SM02-0YE5**
SIMATIC Safety Matrix Editor V6.2 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	J	**6ES7 833-1SM42-0YA5**
SIMATIC Safety Matrix Viewer V6.2 for SIMATIC PCS 7 Operation and monitoring of the Safety Matrix in the SIMATIC PCS 7 environment with several operator control levels 2 languages (English/German), runs under Windows 2000 Professional, Windows XP Professional, Windows 2003 Server Type of delivery: Certificate of License and authorization diskette; software and electronic documentation on CD		
Floating License for 1 installation	J	**6ES7 833-1SM62-0YA5**
Floating License upgrade from V6.x to V6.2	J	**6ES7 833-1SM62-0YE5**

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Overview



- Digital outputs for fail-safe SIMATIC S7 systems
- Can be used in the distributed ET 200iSP I/O device with IM 152-1

The digital electronic module 4 F-DO Ex 17.4 V/40 mA has the following properties:

- Suitable for the connection of actuators from the hazardous area
- 4 outputs, PP-switching (SIL3/Category 4/PLe)
- Isolated from the power bus/backplane bus
- Max. output current 40 mA
- Rated load voltage 17.4 V DC
- Short-circuit, overload and wire-break monitoring
- Suitable for Ex i solenoid valves, DC current relays and actuators
- To increase the power rating, two digital outputs can be connected in parallel for one actuator
- Programmable diagnostics
- Programmable diagnostic interrupt
- Diagnostic buffer integrated in module
- Firmware update
- Identification data I&M
- Channel-selective passivation
- Can only be used in safety mode

Technical specifications

	6ES7 138-7FD00-0AB0
Current consumption	
from load voltage L+ (without load), max.	510 mA; (int. power bus)
Power losses	
Power loss, typ.	5.3 W; max.
Digital outputs	
Number of digital outputs	4
Short-circuit protection	Yes
• Response threshold, typ.	Depending on the "short-circuit level" parameter
Controlling a digital input	No
No-load voltage Uao (DC)	17.4 V
Internal resistor Ri	167 Ω
Trend key points E	
• Voltage Ue (DC)	10 V
• Current Ie	40 mA
Output voltage	
• for signal "1", min.	max. 17.4 V
Output current	
• for signal "0" residual current, max.	10 µA
Parallel switching of 2 outputs	
• for increased power	Yes
• for redundant control of a load	No
Switching frequency	
• with resistive load, max.	30 Hz
• with inductive load, max.	2 Hz
Load resistance range	
• lower limit	270 Ω
• upper limit	18 kΩ
Cable length	
• Cable length, shielded, max.	500 m
• Cable length unshielded, max.	500 m

	6ES7 138-7FD00-0AB0
Parameter	
Diagnosis: wire break	yes
Diagnosis: short circuit	yes
Alarms/diagnostics/status information	
Status indicator	Yes
Substitute values connectable	Yes
Alarms	
• Diagnostic alarm	Yes; Parameterizable
Diagnostics	
• Diagnostic information readable	Yes
• Wire break	Yes
• Short circuit	Yes
Diagnostic indication LED	
• Group error SF (red)	Yes
• Status indicator digital output (green)	Yes
Isolation	
Isolation checked with	370 V for 1 min
Galvanic isolation	
Galvanic isolation digital outputs	
• between the channels	No
• between the channels and the backplane bus	Yes
• between the channels and the load voltage L+	Yes
Permissible potential difference	
between different circuits	60 V DC/30 V AC

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Technical specifications (continued)

	6ES7 138-7FD00-0AB0
Standards, approvals, certificates	
CE mark	Yes
Type of protection acc. to EN 50020 (CENELEC)	II 2 G (1) GD Ex ib[ia Ga][ia IIIC Da] IIC T4 GB and I M2 Ex ib[ia Ma] I Mb
Type of protection acc. to KEMA	10 ATEX 0057
Highest safety class achievable in safety mode	
• acc. to EN 954	Up to Cat. 4
• acc. to IEC 61508	SIL 3
• Performance level acc. to EN ISO 13849-1	PLe

	6ES7 138-7FD00-0AB0
Dimensions and weight	
Dimensions	
• Width	30 mm
• Height	129 mm
• Depth	136.5 mm
Weight	
• Weight, approx.	285 g

Ordering data

	Order No.
Digital output module	
4 F-DO Ex 17.4 V/40 mA I	**6ES7 138-7FD00-0AB0**
Terminal modules	
TM-EM/EM60S I	**6ES7 193-7CA00-0AA0**
Terminal module E60S (screw-type terminal)	
TM-EM/EM60C I	**6ES7 193-7CA10-0AA0**
Terminal module E60C (spring-loaded terminal)	
Accessories	
ET 200iSP Manual	
• German	**6ES7 152-1AA00-8AA0**
• English	**6ES7 152-1AA00-8BA0**
Cable connector	
PROFIBUS cable connector with active terminating resistor	**6ES7 972-0DA60-0XA0**
For RS 485-IS electric circuit; 1.5 Mbit/s	
RS 485-IS coupler	**6ES7 972-0AC80-0XA0**
Isolating transformer for connection of PROFIBUS DP and PROFIBUS RS 485-IS	
Labeling sheet	
DIN A4, perforated, each consisting of 10 sheets of 30 strips each, can be used for electronic modules, and 20 strips each, can be used for IM 151	
• petrol	**6ES7 193-7BH00-0AA0**
• red	**6ES7 193-7BD00-0AA0**
• yellow	**6ES7 193-7BB00-0AA0**
• light beige	**6ES7 193-7BA00-0AA0**

	Order No.
Labels, inscribed	
Ordering unit: 1 set with 200 units each for slot numbering	
• 10 x slots 1 to 2	**8WA8 861-0AB**
• 5 x slots 1 to 40	**8WA8 861-0AC**
Labels, not inscribed	**8WA8 848-2AY**
Ordering unit: 1 set with 200 units each for slot numbering	
Distributed Safety V5.4 programming tool	
Task: Software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, ET 200S Requirements: STEP 7 V5.3 SP3 and higher	
Floating License	**6ES7 833-1FC02-0YA5**
Software Update Service (requires current software version)	**6ES7 833-1FC00-0YX2**
S7 F Systems RT License	**6ES7 833-1CC00-6YX0**
For processing safety-related user programs, for one AS 412F/FH, AS 414F/FH or AS 417F/FH	

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Ordering data		Order No.
S7 F Systems V6.1 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/SP3, Windows Server 2003 SP2 2 languages (German, English) Type of delivery: Certificate of License as well as software and electronic documentation on CD		**6ES7 833-1CC02-0YA5**
SIMATIC Safety Matrix Tool V6.2 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, Type of delivery: Certificate of License and authorization diskette for Safety Matrix Tool and Safety Matrix Viewer; software and electronic documentation on CD		
Floating License for 1 installation	J	**6ES7 833-1SM02-0YA5**
Floating License upgrade from V5.x/V6.x to V6.2	J	**6ES7 833-1SM02-0YE5**
SIMATIC Safety Matrix Editor V6.2 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	J	**6ES7 833-1SM42-0YA5**
SIMATIC Safety Matrix Viewer V6.2 for SIMATIC PCS 7 Operation and monitoring of the Safety Matrix in the SIMATIC PCS 7 environment with several operator control levels 2 languages (English/German), runs under Windows 2000 Professional, Windows XP Professional, Windows 2003 Server Type of delivery: Certificate of License and authorization diskette; software and electronic documentation on CD		
Floating License for 1 installation	J	**6ES7 833-1SM62-0YA5**
Floating License upgrade from V6.x to V6.2	J	**6ES7 833-1SM62-0YE5**

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Fail-safe electronic modules
F analog input module

Overview



- Analog inputs for fail-safe SIMATIC S7 systems
- Can be used in the distributed ET 200iSP I/O device with IM 152-1

The analog electronic module 4 F-AI Ex HART has the following properties:

- Suitable for the connection of encoders from the hazardous area
- 4 analog inputs 1-channel (SIL2/Cat.3/PLe) or 4 inputs 2-channel (SIL3/Category 4/PLe, with two 4 F-AI Ex HART modules)
- Electrical isolation between channels and the backplane bus
- Input ranges:
  - 0 to 20 mA
  - 4 to 20 mA
- Suitable for the following sensors:
  - 2-wire transducers
  - HART field devices
- Programmable diagnostics
- Programmable diagnostic interrupt
- Diagnostic buffer integrated in module
- HART communication (HART protocol versions 5, 6, 7)
- Firmware update
- Identification data I&M
- Can only be used in safety mode

Technical specifications

	6ES7 138-7FA00-0AB0
Supply voltages	
Power supply to the transmitters	
• short-circuit proof	Yes
• Supply current, max.	25 mA; Plus 4 mA per channel
Current consumption	
from supply voltage L+, max.	490 mA; (int. power bus)
Power losses	
Power loss, typ.	5.4 W; max.
Address area	
Address space per module	
• Address space per module, max.	16 byte; 12 byte in the I area / 4 byte in the O area
Analog inputs	
Number of analog inputs	4
Cable length, shielded, max.	500 m
Cycle time (all channels) max.	See data in manual
Technical unit for temperature measurement adjustable	
• Voltage	No
• Current	Yes
• Thermocouple	No
• Resistance thermometer	No
• Resistance	No
Input ranges (rated values), currents	
• 4 to 20 mA	Yes; and 0 to 20 mA
Analog value creation	
Measurement principle	integrating (Sigma-Delta)

	6ES7 138-7FA00-0AB0
Integrations and conversion time/ resolution per channel	
• Resolution with overrange (bit including sign), max.	16 bit
• Integration time, parameterizable	Yes
• Interference voltage suppression for interference frequency f1 in Hz	50 / 60 Hz
Smoothing of measured values	
• parameterizable	Yes; in 4 stages
• Step: None	Yes; 1 x cycle time
• Step: Low	Yes; 4 x cycle time
• Step: Medium	Yes; 32 x cycle time
• Step: High	Yes; 64 x cycle time
Encoder	
Connection of signal encoders	
• for current measurement as 2-wire transducer	Yes
• burden of 2-wire transmitter, max.	750 Ω
Errors/accuracies	
Linearity error (relative to input area)	+/- 0.015 %
Temperature error (relative to input area)	+/- 0.005 %/K
Crosstalk between the inputs, min.	-50 dB
Repeat accuracy in settled status at 25 °C (relative to input area)	+/- 0.015%

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Technical specifications (continued)

	6ES7 138-7FA00-0AB0
Operational limit in overall temperature range	
• Current, relative to input area	+/- 0.35%
Basic error limit (operational limit at 25 °C)	
• Current, relative to input area	+/- 0.1 %
Interference voltage suppression for f = n x (fl +/- 1%), fl = interference frequency	
• Series mode interference (peak value of interference < rated value of input range), min.	40 dB
• Common mode interference, min.	50 dB
Alarms/diagnostics/status information	
Alarms	
• Diagnostic alarm	Yes; Parameterizable
Diagnostics	
• Diagnostic information readable	Yes
• Wire break	Yes
• Short circuit	Yes
Diagnostic indication LED	
• Group error SF (red)	Yes
Galvanic isolation	
Galvanic isolation analog inputs	
• between the channels	No
• between the channels and the backplane bus	Yes
• between the channels and the load voltage L+	Yes; Power bus

	6ES7 138-7FA00-0AB0
Permissible potential difference	
between the inputs (UCM)	60 V DC / 30 V AC
Standards, approvals, certificates	
CE mark	Yes
Type of protection acc. to EN 50020 (CENELEC)	II 2 G (1) GD Ex ib[ia Ga][ia IIIC Da] IIC T4 GB and I M2 Ex ib[ia Ma] I Mb
Type of protection acc. to KEMA	10 ATEX 0058
• acc. to EN 954	Cat. 3 (single-channel), Cat. 4 (two-channel)
• acc. to IEC 61508	SIL 3
• Performance level acc. to EN ISO 13849-1	PLe
Dimensions and weight	
Dimensions	
• Width	30 mm
• Height	129 mm
• Depth	136.5 mm
Weight	
• Weight, approx.	299 g

Ordering data

		Order No.
F analog input module		
4 F-AI Ex HART	I	**6ES7 138-7FA00-0AB0**
Terminal modules		
TM-EM/EM60S	I	**6ES7 193-7CA00-0AA0**
Terminal module E60S (screw-type terminal)		
TM-EM/EM60C	I	**6ES7 193-7CA10-0AA0**
Terminal module E60C (spring-loaded terminal)		
Accessories		
ET 200iSP Manual		
• German		**6ES7 152-1AA00-8AA0**
• English		**6ES7 152-1AA00-8BA0**
Cable connector		
PROFIBUS cable connector with active terminating resistor		**6ES7 972-0DA60-0XA0**
For RS 485-IS electric circuit; 1.5 Mbit/s		

	Order No.
RS 485-IS coupler	**6ES7 972-0AC80-0XA0**
Isolating transformer for connection of PROFIBUS DP and PROFIBUS RS 485-IS	
Labeling sheet	
DIN A4, perforated, each consisting of 10 sheets of 30 strips each, can be used for electronic modules, and 20 strips each, can be used for IM 151	
• petrol	**6ES7 193-7BH00-0AA0**
• red	**6ES7 193-7BD00-0AA0**
• yellow	**6ES7 193-7BB00-0AA0**
• light beige	**6ES7 193-7BA00-0AA0**
Labels, inscribed	
Ordering unit: 1 set with 200 items each for slot numbering	
• 10 x slots 1 to 2	**8WA8 861-0AB**
• 5 x slots 1 to 40	**8WA8 861-0AC**

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Ordering data

	Order No.
Labels, not inscribed Ordering unit: 1 set with 200 units each for slot numbering	**8WA8 848-2AY**
Distributed Safety V5.4 programming tool Task: Software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, ET 200S Requirements: STEP 7 V5.3 SP3 and higher	
Floating License	**6ES7 833-1FC02-0YA5**
Software Update Service (requires current software version)	**6ES7 833-1FC00-0YX2**
S7 F Systems RT License For processing safety-related user programs, for one AS 412F/FH, AS 414F/FH or AS 417F/FH	**6ES7 833-1CC00-6YX0**
S7 F Systems V6.1 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/SP3, Windows Server 2003 SP2 2 languages (German, English) Type of delivery: Certificate of License as well as software and electronic documentation on CD	**6ES7 833-1CC02-0YA5**
SIMATIC Safety Matrix Tool V6.2 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, Type of delivery: Certificate of License and authorization diskette for Safety Matrix Tool and Safety Matrix Viewer; software and electronic documentation on CD	
J Floating License for 1 installation	**6ES7 833-1SM02-0YA5**
J Floating License upgrade from V5.x/V6.x to V6.2	**6ES7 833-1SM02-0YE5**
J **SIMATIC Safety Matrix Editor V6.2** 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	**6ES7 833-1SM42-0YA5**
SIMATIC Safety Matrix Viewer V6.2 for SIMATIC PCS 7 Operation and monitoring of the Safety Matrix in the SIMATIC PCS 7 environment with several operator control levels 2 languages (English/German), runs under Windows 2000 Professional, Windows XP Professional, Windows 2003 Server Type of delivery: Certificate of License and authorization diskette; software and electronic documentation on CD	
J Floating License for 1 installation	**6ES7 833-1SM62-0YA5**
J Floating License upgrade from V6.x to V6.2	**6ES7 833-1SM62-0YE5**

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

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ET 200iSP watchdog module

Overview



- The watchdog module will be plugged onto the (to be ordered separately) associated terminal module (screw connection or spring-loaded connection).
- Modules can be replaced under potentially explosive conditions during runtime.

Technical specifications

	6ES7 138-7BB00-0AB0
Supply voltages	
Rated value	
• permissible range, lower limit (DC)	20.4 V
• permissible range, upper limit (DC)	28.8 V
Digital inputs	
Number of inputs	0
Dimensions and weight	
Dimensions	
• Width	30 mm
• Height	129 mm
• Depth	136,5 mm

Ordering data

		Order No.
Watchdog module	I	**6ES7 138-7BB00-0AB0**
Terminal modules		
TM-EM/EM60S	I	**6ES7 193-7CA00-0AA0**
Terminal module E60S (screw-type terminal)		
TM-EM/EM60C	I	**6ES7 193-7CA10-0AA0**
Terminal module E60S (spring-loaded terminal)		
Accessories		
ET 200iSP product manual		
• German		**6ES7 152-1AA00-8AA0**
• English		**6ES7 152-1AA00-8BA0**

Connectors	
PROFIBUS connector with active termination resistor	**6ES7 972-0DA60-0XA0**
for RS485-IS circuit; 1.5 Mbit/s	
RS 485-IS Coupler	**6ES7 972-0AC80-0XA0**
Isolating transformer for coupling from PROFIBUS DP and PROFIBUS RS 485-IS	
Labeling sheet	
DIN A4, perforated, each consisting of 10 sheets of 30 strips each, used for electronic modules and 20 strips, used for IM 151	
• petrol	**6ES7 193-7BH00-0AA0**
• red	**6ES7 193-7BD00-0AA0**
• yellow	**6ES7 193-7BB00-0AA0**
• light beige	**6ES7 193-7BA00-0AA0**
Labels, inscribed	
Ordering unit 1 set with 200 units each for slot numbering	
• 10 x slots 1 to 2	**8WA8 861-0AB**
• 5 x slots 1 to 40	**8WA8 861-0AC**
Labels, blank	**8WA8 848-2AY**
Ordering unit 1 set with 200 units each for slot numbering	
S7-300 mounting rail	
Standard rail 585 mm	**6ES7 390-1AF85-0AA0**
Standard rail 885 mm	**6ES7 390-1AJ85-0AA0**
Stainless steel enclosure IP66 for Ex-Zone 1 in protection class EEx e,	
Empty housing without installation of modules, for use in a gaseous area, IP65 (IP54 when using a breather gland)	
• Wall housing 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in a gaseous area, with 3 rows of M16 cable glands (41 units) and 2 rows of blanking plugs	**6DL2 804-0AD30**
• Wall housing 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in a gaseous area, with 5 rows of M16 cable glands (66 units)	**6DL2 804-0AD50**

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ET 200iSP watchdog module

Ordering data	Order No.
Empty housing without installation of modules, for use in a gaseous area, IP65 (IP54 when using a breather gland)	
• Wall housing 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in a gaseous area, with 3 rows of M16 cable glands (68 units) and 2 rows of blanking plugs	**6DL2 804-0AE30**
• Wall housing 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in a gaseous area, with 5 rows of M16 cable glands (111 units)	**6DL2 804-0AE50**
Empty housing without installation of modules, for use in a dusty area, IP65	
• Wall housing 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in a dusty area, with 3 rows of M16 cable glands (41 units) and 2 rows of blanking plugs	**6DL2 804-0DD30**
• Wall housing 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in a dusty area, with 5 rows of M16 cable glands (66 units)	**6DL2 804-0DD50**
• Wall housing 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in a dusty area, with 3 rows of M16 cable glands (68 units) and 2 rows of blanking plugs	**6DL2 804-0DE30**
• Wall housing 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in a dusty area, with 5 rows of M16 cable glands (111 units)	**6DL2 804-0DE50**
Enclosure with installation of ET 200iSP modules for use in a gaseous area, IP65 (IP54 when using a breather gland), ET 200iSP components must be ordered separately	
• Wall housing 650 x 450 x 230, I for installation of max. 15 ET 200iSP modules, for use in a gaseous area, with 3 rows of M16 cable glands (41 units) and 2 rows of blanking plugs	**6DL2 804-1AD30**
Enclosure with installation of ET 200iSP modules for use in a gaseous area, IP65 (IP54 when using a breather gland), ET 200iSP components must be ordered separately	
• Wall housing 650 x 450 x 230, I for installation of max. 15 ET 200iSP modules, for use in a gaseous area, with 5 rows of M16 cable glands (66 units)	**6DL2 804-1AD50**
• Wall housing 950 x 450 x 230, I for installation of max. 25 ET 200iSP modules, for use in a gaseous area, with 3 rows of M16 cable glands (68 units) and 2 rows of blanking plugs	**6DL2 804-1AE30**
• Wall housing 950 x 450 x 230, I for installation of max. 25 ET 200iSP modules, for use in a gaseous area, with 5 rows of M16 cable glands (111 units)	**6DL2 804-1AE50**
Enclosure with installation of modules, for use in a dusty area, IP65, the ET 200iSP components must be ordered separately	
• Wall housing 650 x 450 x 230, I for installation of max. 15 ET 200iSP modules, for use in a dusty area, with 3 rows of M16 cable glands (41 units) and 2 rows of blanking plugs	**6DL2 804-1DD30**
• Wall housing 650 x 450 x 230, I for installation of max. 15 ET 200iSP modules, for use in a dusty area, with 5 rows of M16 cable glands (66 units)	**6DL2 804-1DD50**
• Wall housing 950 x 450 x 230, I for installation of max. 25 ET 200iSP modules, for use in a dusty area, with 3 rows of M16 cable glands (68 units) and 2 rows of blanking plugs	**6DL2 804-1DE30**
• Wall housing 950 x 450 x 230, I for installation of max. 25 ET 200iSP modules, for use in a dusty area, with 5 rows of M16 cable glands (111 units)	**6DL2 804-1DE50**

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Overview



- The spare module is plugged onto the relevant terminal module (to be ordered separately; screw-type or spring-loaded connection).
- Modules can be replaced under potentially explosive conditions during runtime.

Technical specifications

	6ES7 138-7AA00-0AA0
Standards, approvals, certificates	
CE mark	Yes
Type of protection acc. to EN 50020 (CENELEC)	II2 G EEx ib IIC T4
Test number KEMA	04 ATEX 1251
Dimensions and weight	
Dimensions and weight	
• Width	30 mm
• Height	129 mm
• Depth	136.5 mm
Weight	
• Weight, approx.	180 g

	6ES7 193-7CA00-0AA0	6ES7 193-7CA10-0AA0	6ES7 193-7CB00-0AA0
Standards, approvals, certificates			
CE mark	No	No	Yes
Type of protection acc. to EN 50020 (CENELEC)	No	No	II 2 G and I M2 Ex deib IIC T4; Ex deib I
Test number KEMA	04 ATEX 2242	04 ATEX 2242	07 ATEX 0205
Dimensions and weight			
Dimensions and weight			
• Width	60 mm	60 mm	60 mm
• Height	190 mm	190 mm	190 mm
• Depth	52 mm	52 mm	52 mm
Weight			
• Weight, approx.	275 g	275 g	340 g

Ordering data

		Order No.
Spare module	I	**6ES7 138-7AA00-0AA0**
Terminal modules		
TM-EM/EM 60S	I	**6ES7 193-7CA00-0AA0**
Terminal module E60S (screw-type terminal)		
TM-EM/EM 60C	I	**6ES7 193-7CA10-0AA0**
Terminal module E60C (spring-loaded terminal)		
TM-RM/RM 60S		**6ES7 193-7CB00-0AA0**
for accommodating digital output module 2 DO relay and spare modules; screw-type terminal		
Accessories		
ET 200iSP manual		
• German		**6ES7 152-1AA00-8AA0**
• English		**6ES7 152-1AA00-8BA0**
Connectors		
PROFIBUS connector with active terminating resistor		**6ES7 972-0DA60-0XA0**
for RS 485-IS circuit; 1.5 Mbit/s		
RS 485-IS coupler		**6ES7 972-0AC80-0XA0**
Isolating transformer for coupling of PROFIBUS DP and PROFIBUS RS 485-IS		
Labeling sheet		
DIN A4, perforated, each consisting of 10 sheets of 30 strips each, used for electronic modules and 20 strips, used for IM 151		
• petrol		**6ES7 193-7BH00-0AA0**
• red		**6ES7 193-7BD00-0AA0**
• yellow		**6ES7 193-7BB00-0AA0**
• light beige		**6ES7 193-7BA00-0AA0**
Labels, inscribed		
Ordering unit 1 set with 200 units each for slot numbering		
• 10 x slots 1 to 2		**8WA8 861-0AB**
• 5 x slots 1 to 40		**8WA8 861-0AC**
Labels, blank		**8WA8 848-2AY**
Ordering unit 1 set with 200 units each for slot numbering		
S7-300 mounting rails		
Standard rail 585 mm		**6ES7 390-1AF85-0AA0**
Standard rail 885 mm		**6ES7 390-1AJ85-0AA0**

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Spare module

Ordering data

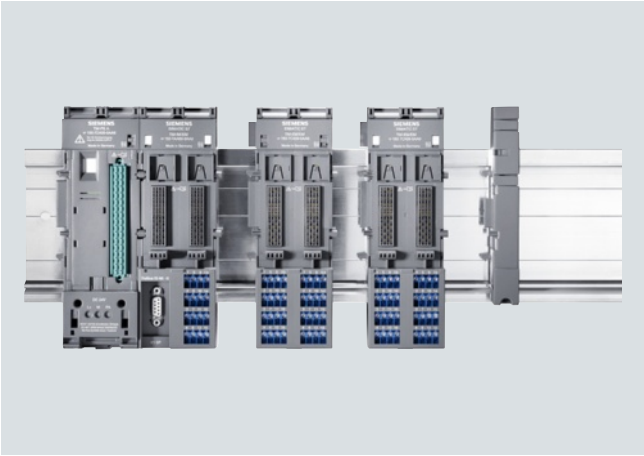
	Order No.
Stainless steel enclosure IP66 for hazardous zone 1 in protection class EEx e	
Empty enclosure without installation of modules, for use in a gaseous area, IP65 (IP54 when using a breather gland)	
• Wall enclosure 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in a gaseous area, with 3 rows of M16 cable entries (41 units) and 2 rows of blanking plugs	**6DL2 804-0AD30**
• Wall enclosure 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in a gaseous area, with 5 rows of M16 cable entries (66 units)	**6DL2 804-0AD50**
• Wall enclosure 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in a gaseous area, with 3 rows of M16 cable entries (68 units) and 2 rows of blanking plugs	**6DL2 804-0AE30**
• Wall enclosure 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in a gaseous area, with 5 rows of M16 cable entries (111 units)	**6DL2 804-0AE50**
Empty enclosure without installation of modules, for use in a dusty area, IP65	
• Wall enclosure 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in a dusty area, with 3 rows of M16 cable entries (41 units) and 2 rows of blanking plugs	**6DL2 804-0DD30**
• Wall enclosure 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in a dusty area, with 5 rows of M16 cable entries (66 units)	**6DL2 804-0DD50**
• Wall enclosure 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in a dusty area, with 3 rows of M16 cable entries (68 units) and 2 rows of blanking plugs	**6DL2 804-0DE30**
• Wall enclosure 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in a dusty area, with 5 rows of M16 cable entries (111 units)	**6DL2 804-0DE50**

		Order No.
Enclosure with installation of ET 200iSP modules for use in a gaseous area, IP65 (IP54 when using a breather gland); ET 200iSP components must be ordered separately		
• Wall enclosure 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in a gaseous area, with 3 rows of M16 cable entries (41 units) and 2 rows of blanking plugs	I	**6DL2 804-1AD30**
• Wall enclosure 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in a gaseous area, with 5 rows of M16 cable entries (66 units)	I	**6DL2 804-1AD50**
• Wall enclosure 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in a gaseous area, with 3 rows of M16 cable entries (68 units) and 2 rows of blanking plugs	I	**6DL2 804-1AE30**
• Wall enclosure 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in a gaseous area, with 5 rows of M16 cable entries (111 units)	I	**6DL2 804-1AE50**
Enclosure with installation of modules, for use in a dusty area, IP65; the ET 200iSP components must be ordered separately		
• Wall enclosure 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in a dusty area, with 3 rows of M16 cable entries (41 units) and 2 rows of blanking plugs	I	**6DL2 804-1DD30**
• Wall enclosure 650 x 450 x 230, for installation of max. 15 ET 200iSP modules, for use in a dusty area, with 5 rows of M16 cable entries (66 units)	I	**6DL2 804-1DD50**
• Wall enclosure 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in a dusty area, with 3 rows of M16 cable entries (68 units) and 2 rows of blanking plugs	I	**6DL2 804-1DE30**
• Wall enclosure 950 x 450 x 230, for installation of max. 25 ET 200iSP modules, for use in a dusty area, with 5 rows of M16 cable entries (111 units)	I	**6DL2 804-1DE50**

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Overview



- Mechanical modules for accommodating the power supply unit, interface and electronic modules
- For setting up the fixed wiring via self-assembling voltage buses
- Different versions for accommodating electronic modules
- Automatic encoding of the electronic modules
- Self-assembling shielding of the backplane bus for high data security
- Alternatively with screw or spring-loaded terminals

Ordering data

		Order No.
TM-PS terminal modules		
TM-PS A for accommodating a 24 V DC power supply		**6ES7 193-7DA10-0AA0**
TM-PS A UC for accommodating a 110/230 V AC power supply	I	**6ES7 193-7DA20-0AA0**
TM-PS B for accommodating an additional, redundant 24 V DC power supply		**6ES7 193-7DB10-0AA0**
TM-PS B UC for accommodating an additional, redundant 110/230 V AC power supply	I	**6ES7 193-7DB20-0AA0**
TM-IM/xx terminal modules		
TM-IM/EM60S for accommodating the IM152-1 and an electronic module, including power termination module; screw terminals	I	**6ES7 193-7AA00-0AA0**
TM-IM/EM60S for accommodating the IM152-1 and an electronic module, including power termination module; screw terminals, black	I	**6ES7 193-7AA20-0AA0**
TM-IM/EM60C for accommodating the IM152-1 and an electronic module, including power termination module; spring-loaded terminals	I	**6ES7 193-7AA10-0AA0**
TM-IM/IM for accommodating two IM152-1 modules in redundant mode, including power termination module		**6ES7 193-7AB00-0AA0**

		Order No.
TM-EM/EM terminal modules		
TM-EM/EM60S for accommodating two electronic modules, screw terminals	I	**6ES7 193-7CA00-0AA0**
TM-EM/EM60S for accommodating two electronic modules, screw terminals, black	I	**6ES7 193-7CA20-0AA0**
TM-EM/EM60C for accommodating two electronic modules, spring-loaded terminals	I	**6ES7 193-7CA10-0AA0**
TM-RM/RM terminal module		
TM-RM/RM for accommodating two relay modules, screw terminals		**6ES7 193-7CB00-0AA0**

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RS 485-IS coupler

Overview



- Coupler for converting PROFIBUS DP into PROFIBUS RS485-IS intrinsically safe (protection type intrinsically safe i)
- Required for connecting intrinsically safe PROFIBUS DP stations (e.g. ET 200iS, ET 200iSP) and on all third-party devices that have an Ex i DP connection
- Additional use as a repeater in the hazardous area
- Acts as a safety barrier
- Passive bus node, configuration not required
- Certified according to ATEX 100a

Technical specifications

Technical specifications RS 485-IS Coupler	
Dimensions and weight	
Dimensions W x H x D (mm)	80 x 125 x 130
Weight	Approx. 500 g
Technical specifications – General	
Degree of protection	IP20
Ambient temperature	- 20 °C … + 60 °C
Standards and approvals	
• PROFIBUS	IEC 61784-1: 2002 Ed1 CP 3/1
• EU directive	94/9/EG (ATEX 100a)
• CENELEC	II 3 (2) G EEx nA[ib] IIC T4
• UL and CSA	Class I, Division2, Group A, B, C, D T4 Class I Zone 2, Group IIC T4 AIS Class I, Divison 1, Group A, B, C, D [Aexib] IIC, Class I, Zone1, 2, Group IIC
• FM	Class I, Division2, Group A, B, C, D T4 Class I Zone 2, Group IIC T4 AIS Class I, Divison 1, Group A, B, C, D [Aexib] IIC, Class I, Zone1, 2, Group IIC
• IEC	IEC61131-2, Part 2
• CE	Conforming with 89/336/EWG Conforming with 73/23/EWG
• Ship-building certification	Classification companies • ABS (American Bureau of Shipping) • BV (Bureau Veritas) • DNV (Det Norske Veritas) • GL (Germanischer Lloyd) • LRD (Lloyds Register of Shipping) • Class NK (Nippon Kaiji Kyokai)
Module-specific data	
Data transmission rate on PROFIBUS DP, PROFIBUS RS 485-IS	9.6; 19.2; 45.45; 93.75; 187.5; 500 kbit/s 1.5 Mbit/s
Bus protocol	PROFIBUS DP
Voltages, currents, potentials	
Nominal supply voltage for RS 485-IS coupler	24 V DC (20.4 … 28.8 V)
• Polarity reversal protection	Yes
• Voltage drop bypass	Min. 5 ms

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Technical specifications (continued)

Technical specifications RS 485-IS Coupler		
Potential isolation for 24 V power supply		
• to PROFIBUS DP	Yes	
- tested with	500 V DC	
• to PROFIBUS RS 485-IS	Yes	
- tested with	500 V AC	
Current consumption RS 485-IS coupler (24 V DC), max.	150 mA	
Power loss of the module, typically	3 Watts	
Status, alarms, diagnostics		
Status display	No	
Alarms	None	
Diagnostic functions	Yes	
• Bus monitoring PROFIBUS DP (primary)	Yellow LED "DP1"	
• Bus monitoring PROFIBUS RS 485-IS (secondary)	Yellow LED "DP2"	
• Monitoring 24 V power supply	Green LED "ON"	
Technical safety notice		
V_{DC}	±4.2 V	
I_{SC}	±93 mA	
P_0	0.1 Watts	
V_{max}	±4.2 V	
L_I	0	
C_i	0	
U_m	250 V AC	
T_a	–25 ... +60 °C	
RS 485-IS segment		
Permitted cable length on a single line	RS 485-IS	DP Ex i
• 9.6 ... 187.5 kbit/s	1000 m	200 m
• 500 kbit/s	400 m	200 m
• 1.5 Mbit/s	200 m	200 m
Number of PROFIBUS DP nodes that can be connected, max.	31	16
PROFIBUS RS 485-IS bus termination switch	integrated, can be added	

Ordering data

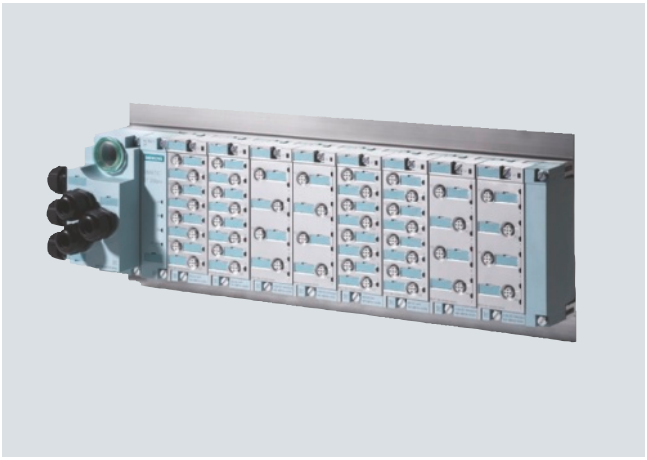
	Order No.
RS 485-IS coupler Isolating transformer for coupling PROFIBUS DP to PROFIBUS RS 485-IS	**6ES7 972-0AC80-0XA0**
Accessories	
PROFIBUS cable connector with active terminating resistor for RS 485-IS electric circuit; 1.5 Mbit/s	**6ES7 972-0DA60-0XA0**
PROFIBUS cable connector for the intrinsically safe PROFIBUS, 1.5 Mbit/s	**6ES7 972-0BA30-0XA0**

	Order No.
Mounting rail	
160 mm	**6ES7 390-1AB60-0AA0**
482 mm	**6ES7 390-1AE80-0AA0**
530 mm	**6ES7 390-1AF30-0AA0**
830 mm	**6ES7 390-1AJ30-0AA0**
2000 mm	**6ES7 390-1BC00-0AA0**
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 order quantity 20 m	**6XV1 830-0EH10**

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Introduction

Overview



- Distributed I/O system with degree of protection IP65/67 for cabinet-free use at the machine.
- Small, multifunctional complete solution: Digital inputs/outputs, fail-safe modules, motor starters up to 5.5 kW, etc.
- Communication over PROFIBUS or PROFINET
- Mixed arrangement of fail-safe and standard modules in the same station
- Freely selectable connection technique: Direct, ECOFAST or M12 7/8"
- Power module for easy implementation of load groups
- Module replacement during operation (hot swapping)
- Easy installation as well as permanent wiring
- Data transmission rates of up to 12 Mbit/s
- Extensive diagnostics: Module-specific or channel-specific
- Intelligent motor starters for starting and protection of motors and loads up to 5.5 kW
  - Versions: Direct and reversing starters - Standard and High-Feature
- Fail-safe modules with safety-related signal processing according to PROFIsafe

Technical specifications

General technical specifications	
Electronic modules	• Digital inputs/outputs
	• Analog inputs
	• Analog outputs
Motor starter	
Cables and connections	M12 and M8 round connector with standard assignment for actuator/ sensor
Transmission rate, max.	12 Mbit/s (PROFIBUS DP), 100 Mbit/s (PROFINET IO)
Supply voltage	24 V DC
Current consumption of one ET 200pro (internal and encoder supply, non-switched voltage), up to 55 °C, max.	≤ 5 A
Current consumption of one ET 200pro per infeed (IM, PM, switched voltage, up to 55 °C, max.)	10 A
For overall configuration with looping through (several ET 200pro), up to 55 °C, max.	16 A (with connecting module, directly)
Degree of protection	IP65/66/IP67 for interface, digital and analog modules
Material	Thermoplastic (reinforced with glass fiber)
Ambient conditions	
Temperature	from 0 … 55 °C (-25 °C on request)
Relative humidity	from 5 … 100%
Atmospheric pressure	from 795 … 1080 hPa
Mechanical stress	
• Vibrations	Vibration test conforming to IEC 60068, Part 2-6 (sinusoidal) • Constant acceleration 5 g, occasionally 10 g for interface, digital and analog modules • 2 g motor starters
• Shock	• Shock test according to IEC 680068 Part 2 - 27, half-sine, 30 g, 18 ms duration for interface, digital and analog modules • 15 g, 11 ms duration for motor starters
Approvals	UL, CSA or cULus

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Overview



Interface modules for handling communication between the ET 200pro and the higher-level master over PROFIBUS DP.

Technical specifications

	6ES7 154-1AA01-0AB0	6ES7 154-2AA01-0AB0
Supply voltages		
Supply voltage of electronics 1L+		
• Rated value (DC)	24 V	24 V
• Short-circuit protection	Yes; over exchangeable fuses	Yes; over exchangeable fuses
• Reverse polarity protection	Yes; against destruction	Yes; against destruction
Rated value		
• 24 V DC	Yes	Yes
• Permissible range, lower limit (DC)	20.4 V	20.4 V
• Permissible range, upper limit (DC)	28.8 V	28.8 V
Current consumption		
from supply voltage 1L+, max.	200 mA	200 mA
Power losses		
Power loss, typ.	5 W	5 W
Address area		
Addressing volume		
• Outputs	244 byte	244 byte
• Inputs	244 byte	244 byte
PROFIBUS DP		
Automatic detection of transmission speed	Yes	Yes
1st interface		
Type of interface	PROFIBUS DP	PROFIBUS DP
Physics	RS 485	RS 485
Functionality		
• DP slave	Yes	Yes
DP slave		
• Services		
- SYNC/FREEZE	Yes	Yes
- Direct data exchange (slave-to-slave communication)	Yes	Yes
• Transmission rate, min.	9.6 kbit/s	9.6 kbit/s
• Transmission rate, max.	12 Mbit/s	12 Mbit/s
Parameter		
DPV1 operation	possible	possible
Process alarm	parameterizable	parameterizable
Swapping interrupt	parameterizable	parameterizable
Startup if setpoint not equal to actual configuration	parameterizable	parameterizable

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Technical specifications (continued)

	6ES7 154-1AA01-0AB0	6ES7 154-2AA01-0AB0
Alarms/diagnostics/status information		
Diagnostic indication LED		
• Bus fault BF (red)	Yes	Yes
• Group error SF (red)	Yes	Yes
• Monitoring 24 V voltage supply ON (green)	Yes	Yes
• Load voltage monitoring 24 V DC (green)	Yes	Yes
Isolation		
Isolation checked with	500 V DC	500 V DC
Galvanic isolation		
between supply voltage and electronics	Yes	Yes
Environmental requirements		
Operating temperature		
• Min.	-25 °C	-25 °C
• Max.	55 °C	55 °C
Storage/transport temperature		
• Min.	-40 °C	-40 °C
• Max.	70 °C	70 °C
Degree of protection		
IP67	Yes	Yes
General information		
Vendor identification (VendorID)	8118H	8119H
Dimensions and weight		
Dimensions		
• Width	90 mm	90 mm
• Height	130 mm	130 mm
• Depth	59.3 mm	59.3 mm
Weight		
• Weight, approx.	375 g	375 g

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Ordering data

	Order No.
IM154-1 interface module I For ET 200pro; for communication between ET 200pro and higher-level masters over PROFIBUS DP	**6ES7 154-1AA01-0AB0**
IM154-2 High Feature interface module I For ET 200pro; for communication between ET 200pro and higher-level masters over PROFIBUS DP; support of PROFIsafe	**6ES7 154-2AA01-0AB0**
Accessories	
CM IM DP ECOFAST connection module I For connecting PROFIBUS DP and the 24 V power supply to PROFIBUS interface modules, 2 ECOFAST Cu connections	**6ES7 194-4AA00-0AA0**
CM IM DP direct connection module I For connecting PROFIBUS DP and the 24 V power supply directly to the PROFIBUS interface modules, up to six M20 screwed cable glands	**6ES7 194-4AC00-0AA0**

	Order No.
CM IM DP M12, 7/8" connection module For connecting PROFIBUS DP and the 24 V power supply to PROFIBUS interface modules, 2 x M12 and 2 x 7/8"	**6ES7 194-4AD00-0AA0**
Accessories for CM IM DP ECOFAST	
PROFIBUS ECOFAST hybrid cable, preassembled With 2 ECOFAST connectors, trailing-type cable 2 x CU 0.64 mm^2 and 4 x Cu 1.5 mm^2	
• 1.5 m long	**6XV1 830-7BH15**
• 3.0 m long	**6XV1 830-7BH30**
• 5.0 m long	**6XV1 830-7BH50**
• 10 m long	**6XV1 830-7BN10**
• 15 m long	**6XV1 830-7BN15**
• 20 m long	**6XV1 830-7BN20**
• 25 m long	**6XV1 830-7BN25**
• 30 m long	**6XV1 830-7BN30**
• 35 m long	**6XV1 830-7BN35**
• 40 m long	**6XV1 830-7BN40**
• 45 m long	**6XV1 830-7BN45**
• 50 m long	**6XV1 830-7BN50**

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Ordering data	Order No.
PROFIBUS ECOFAST hybrid cable GP, preassembled	
With 2 ECOFAST connectors, trailing-type cable 2 x CU 0.64 mm^2 and 4 x Cu 1.5 mm^2	
• 1.5 m long	**6XV1 860-3PH15**
• 3.0 m long	**6XV1 860-3PH30**
• 5.0 m long	**6XV1 860-3PH50**
• 10 m long	**6XV1 860-3PN10**
• 15 m long	**6XV1 860-3PN15**
• 20 m long	**6XV1 860-3PN20**
• 25 m long	**6XV1 860-3PN25**
• 30 m long	**6XV1 860-3PN30**
• 35 m long	**6XV1 860-3PN35**
• 40 m long	**6XV1 860-3PN40**
• 45 m long	**6XV1 860-3PN45**
• 50 m long	**6XV1 860-3PN50**
PROFIBUS ECOFAST hybrid cable, non-assembled	
Trailing-type cable 2 x CU 0.64 mm^2 and 4 x Cu 1.5 mm^2	
• 50 m long	**6XV1 830-7AN50**
• 100 m long	**6XV1 830-7AT10**
PROFIBUS ECOFAST hybrid cable GP, non-assembled	
Trailing-type cable 2 x CU 0.64 mm^2 and 4 x Cu 1.5 mm^2	
• 50 m long	**6XV1 860-4PN50**
• 100 m long	**6XV1 860-4PT10**
PROFIBUS ECOFAST hybrid connector 180	
ECOFAST Cu, 2 x Cu, 4 x 1.5 mm^2, HANBRID connector	
• with male insert, 5 per pack	**6GK1 905-0CA00**
• with female insert, 5 per pack	**6GK1 905-0CB00**
PROFIBUS ECOFAST hybrid connector angular	
ECOFAST Cu, 2 x Cu, 4 x 1.5 mm^2, HANBRID connector	
• with male insert, 5 per pack	**6GK1 905-0CC00**
• with female insert, 5 per pack	**6GK1 905-0CD00**
Accessories for CM IM DP direct	
PROFIBUS trailing cable	**6XV1 830-3EH10**
Max. acceleration 4 m/s^2, at least 3,000,000 bending cycles, bending radius 60 mm, 2-core shielded, sold by the meter, minimum order quantity 20 m, maximum order quantity 1000 m	
PROFIBUS FC Food bus cable	**6XV1 830-0GH10**
With PE sheath for use in the food and beverages industry, 2-core, shielded, sold by the meter, minimum order quantity 20 m, maximum order quantity 1000 m	
PROFIBUS FC Robust bus cable	**6XV1 830-0JH10**
With PUR sheath for use under conditions of extreme mechanical stress and aggressive chemicals, 2-core, shielded, sold by the meter, minimum order quantity 20 m, maximum order quantity 1000 m	
Power line	**6XV1 830-8AH10**
5-core, 5 x 1.5 mm^2, trailing type, sold by the meter, minimum order quantity 20 m, maximum order quantity 1000 m	
Accessories for CM IM DP M12, 7/8"	
PROFIBUS M12 connecting cable	
Preassembled with two M12 connectors, 5-pin	
• 1.5 m long	**6XV1 830-3DH15**
• 2.0 m long	**6XV1 830-3DH20**
• 3.0 m long	**6XV1 830-3DH30**
• 5.0 m long	**6XV1 830-3DH50**
• 10 m long	**6XV1 830-3DN10**
• 15 m long	**6XV1 830-3DN15**
7/8" connecting cable to power supply	
5-core, 5 x 1.5 mm^2, trailing type, preassembled with two 7/8" connectors, 5-pin	
• 1.5 m long	**6XV1 822-5BH15**
• 2.0 m long	**6XV1 822-5BH20**
• 3.0 m long	**6XV1 822-5BH30**
• 5.0 m long	**6XV1 822-5BH50**
• 10 m long	**6XV1 822-5BN10**
• 15 m long	**6XV1 822-5BN15**
M12 cable connector	
For ET 200eco, with axial cable outlet	
• with male insert, 5 per pack	**6GK1 905-0EA00**
• with female insert, 5 per pack	**6GK1 905-0EB00**
PROFIBUS M12 bus termination connector	**6GK1 905-0EC00**
with pin insert	
7/8" cable connector	
For ET 200eco, with axial cable outlet	
• with male insert, 5 per pack	**6GK1 905-0FA00**
• with female insert, 5 per pack	**6GK1 905-0FB00**
M12 sealing cap	**3RX9 802-0AA00**
For protection of unused M12 connections with ET 200pro	
Sealing cap 7/8"	**6ES7 194-3JA00-0AA0**
For protecting unused 7/8" connections for ET 200pro; 10 units per pack	

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Ordering data

	Order No.
General accessories	
ET 200pro rack	
• Narrow, for interface, electronic and power modules	
- 500 mm	**6ES7 194-4GA00-0AA0**
- 1000 mm	**6ES7 194-4GA60-0AA0**
- 2000 mm, can be cut to length	**6ES7 194-4GA20-0AA0**
• Compact, for interface, electronics and power modules	
- 500 mm	**6ES7 194-4GC70-0AA0**
- 1000 mm	**6ES7 194-4GC60-0AA0**
- 2000 mm, can be cut to length	**6ES7 194-4GC20-0AA0**
• Wide, for interface, electronics, power modules and motor starters	
- 500 mm	**6ES7 194-4GB00-0AA0**
- 1000 mm	**6ES7 194-4GB60-0AA0**
- 2000 mm, can be cut to length	**6ES7 194-4GB20-0AA0**
• Wide, for I/O modules and motor starters	
- 500 mm	**6ES7 194-4GD00-0AA0**
- 1000 mm	**6ES7 194-4GD10-0AA0**
- 2000 mm	**6ES7 194-4GD20-0AA0**
Spare fuse 12.5 A quick-response, for interface and power modules, 10 items per package unit	**6ES7 194-4HB00-0AA0**

		Order No.
PROFIBUS Fast Connect bus cable Standard type with special design for fast assembly, 2-core, shielded, sold by the meter; max. length that can be supplied 1000 m, minimum order quantity 20 m		**6XV1 830-0EH10**
PROFIBUS Hybrid Standard Cable GP Standard PROFIBUS hybrid cable with 2 energy cables (1.5 mm^2) for supplying data and energy for ET 200pro		**6XV1 860-2R**
Technical product data For CAX applications, one-off license		**6ES7 991-0CD01-0YX0**
SIMATIC Manual Collection Electronic manuals on DVD, multi-language: S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication)	J	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection – Update service for 1 year Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates	D	**6ES7 998-8XC01-8YE2**

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Overview



Interface module for processing the communication between ET 200pro and a higher-level controller over PROFINET IO.

Technical specifications

	6ES7 154-4AB10-0AB0
Supply voltages	
Supply voltage of electronics 1L+	
• Rated value (DC)	24 V
• Short-circuit protection	Yes; fuse in lower part is exchangeable, the fuse on the IM-LP is not
• Reverse polarity protection	Yes; against destruction
Rated value	
• 24 V DC	Yes
• permissible range, lower limit (DC)	20.4 V; Unit [V]
• permissible range, upper limit (DC)	28.8 V; Unit [V]
Current consumption	
from backplane bus 3.3 V DC, max.	Not applicable
from supply voltage 1L+, max.	400 mA; dependent on terminal module, typ. maximum value for FO connection method, full load on RWB and 20.4 V input voltage
Power losses	
Power loss, typ.	6 W; dependent on terminal module, typ. maximum value for CU connection method, full load on RWB, for FO the value is approx. 0.7 W higher
Memory	
Micro Memory Card	No; internal memory medium
Address area	
Addressing volume	
• Outputs	256 byte
• Inputs	256 byte
Interfaces	
automatic detection of transmission speed	Yes
Protocols	
PROFINET IO	Yes

	6ES7 154-4AB10-0AB0
PROFINET IO	
Transmission rate, max.	100 Mbit/s
Services	ARP, PING, SNMP
Parameter	
Diagnostic alarm	1
Process alarm	1
Swapping interrupt	1
identifier-related diagnostic data	1
Module status	1
Channel-related diagnostics	1
Startup if setpoint not equal to actual configuration	1
Hot swapping of modules	1
Alarms/diagnostics/status information	
Diagnostic indication LED	
• Bus fault BF (red)	Yes; additional LEDs (MAINT, P1/2 LINK, P1/2 RX/TX) available
• Group error SF (red)	Yes
• Monitoring 24 V voltage supply ON (green)	Yes
• Load voltage monitoring DC 24 V (green)	Yes
Isolation	
Isolation checked with	500 V DC
Galvanic isolation	
between backplane bus and electronics	No
between supply voltage and electronics	Yes

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Technical specifications (continued)

	6ES7 154-4AB10-0AB0
Environmental requirements	
Operating temperature	
• Min.	-25 °C
• max.	55 °C
Storage/transport temperature	
• Min.	-40 °C
• max.	70 °C
Degree of protection	
IP65	Yes
IP66	Yes
IP67	Yes

	6ES7 154-4AB10-0AB0
General information	
Vendor identification (VendorID)	0x002A
Device identifier (DeviceID)	0x0305
Dimensions and weight	
Dimensions	
• Width	90 mm
• Height	130 mm
• Depth	59.3 mm
Weight	
• Weight, approx.	490 g

Ordering data

	Order No.
IM 154-4 PN High Feature interface module For communication between ET 200pro and higher-level controllers over PROFINET IO; support of PROFIsafe	**6ES7 154-4AB10-0AB0**
Accessories	
CM IM PN connection module M12, 7/8" For connecting PROFINET PN and 24 V power supply to PROFINET interface modules, 2 x M12 and 2 x 7/8"	**6ES7 194-4AJ00-0AA0**
CM IM PN connection module 2xRJ45 I For connecting PROFINET PN and 24 V power supply to PROFINET interface modules, 2 x RJ45 and 2 x push-pull power connector	**6ES7 194-4AF00-0AA0**
CM IM PN 2xSCRJ FO connection module I For connecting PROFINET PN and 24 V power supply to PROFINET interface modules, 2 x SCRJ FO and 2 x push-pull power connector	**6ES7 194-4AG00-0AA0**
M12 sealing cap For protection of unused M12 connections with ET 200pro	**3RX9 802-0AA00**
IE M12 connecting cables Preassembled, with two M12 connectors, up to 85 m	
• 0.3 m long	**6XV1 870-8AE30**
• 0.5 m long	**6XV1 870-8AE50**
• 1.0 m long	**6XV1 870-8AH10**
• 1.5 m long	**6XV1 870-8AH15**
• 2.0 m long	**6XV1 870-8AH20**
• 3.0 m long	**6XV1 870-8AH30**
• 5.0 m long	**6XV1 870-8AH50**
• 10 m long	**6XV1 870-8AN10**
• 15 m long	**6XV1 870-8AN15**
• Other special lengths with 90° or 180° cable outlet	see http://support.automation.siemens.com/WW/view/en/26999294

	Order No.
7/8" sealing caps 1 pack = 10 units	**6ES7 194-3JA00-0AA0**
7/8" connecting cable to power supply 5-core, 5 x 1.5 mm^2, trailing type, preassembled with two 7/8" connectors, 5-pin, up to 50 m	
• 1.5 m long	**6XV1 822-5BH15**
• 2.0 m long	**6XV1 822-5BH20**
• 3.0 m long	**6XV1 822-5BH30**
• 5.0 m long	**6XV1 822-5BH50**
• 10 m long	**6XV1 822-5BN10**
• 15 m long	**6XV1 822-5BN15**
• Other special lengths with 90° or 180° cable outlet	see http://support.automation.siemens.com/WW/view/en/26999294
Power line 5-core, 5 x 1.5 mm^2, trailing type, sold by the meter, minimum order quantity 20 m, maximum order quantity 1000 m	**6XV1 830-8AH10**
7/8" cable connector For ET 200eco, with axial cable outlet	
• with male insert, 5 per pack	**6GK1 905-0FA00**
• with female insert, 5 per pack	**6GK1 905-0FB00**
Industrial Ethernet FastConnect installation cables	
• **IE FC TP Standard Cable GP 2 x 2**; Sold by the meter, max. order quantity 1000 m; Minimum order quantity 20 m	**6XV1 840-2AH10**
• **IE FC TP Trailing Cable 2 x 2**; Sold by the meter, max. order quantity 1000 m; Minimum order quantity 20 m	**6XV1 840-3AH10**
• **IE FC TP Trailing Cable GP 2 x 2**; Sold by the meter, max. order quantity 1000 m; Minimum order quantity 20 m	**6XV1 870-2D**

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Ordering data		Order No.
Industrial Ethernet FastConnect installation cables		
• **IE TP Torsion Cable GP 2 x 2**; Sold by the meter, max. order quantity 1000 m; Minimum order quantity 20 m		**6XV1 870-2F**
• **IE FC TP Marine Cable 2 x 2**; Sold by the meter, max. order quantity 1000 m; Minimum order quantity 20 m		**6XV1 840-4AH10**
IE RJ45 Plug PRO		
RJ45 plug in IP65/67-rated design for on-site assembly, plastic housing, insulation/ displacement connection system, for SCALANCE X-200IRT PRO and ET200pro: 1 pack = 1 unit		**6GK1901-1BB10-6AA0**
IE SC RJ POF Plug PRO		
SC RJ plug for POF fibers in IP65/ 67-rated design for on-site assembly, plastic housing, for SCALANCE X-200IRT PRO and ET200pro 1 pack = 1 unit		**6GK1900-0MB00-6AA0**
IE SC RJ PCF Plug PRO		
SC RJ plug for PCF fibers in IP65/ 67-rated design for on-site assembly, plastic housing, for SCALANCE X-200IRT PRO 1 pack = 1 unit		**6GK1900-0NB00-6AA0**
Power Plug PRO		
5-pole power plug for 2 x 24 V power supply in IP65/67-rated design, for on-site assembly, plastic housing, for SCALANCE X-200IRT and ET200 pro 1 pack = 1 unit		**6GK1907-0AB10-6AA0**
IE panel feedthrough		
Control cabinet feedthrough for converting M12 D-coded connection system (IP65) to RJ45 connection system (IP20)		
• 1 pack = 5 units	I	**6GK1 901-0DM20-2AA5**
Push-Pull cable connector		**6GK1 907-0AB10-6AA0**
For 1L+/ 2L+, unassembled		
Cover caps for Push-Pull RJ45 female connectors		**6ES7 194-4JD50-0AA0**
5 units per pack		

		Order No.
General accessories		
ET 200pro rack		
• Narrow, for interface, electronics and power modules		
- 500 mm		**6ES7 194-4GA00-0AA0**
- 1000 mm		**6ES7 194-4GA60-0AA0**
- 2000 mm, can be cut to length		**6ES7 194-4GA20-0AA0**
• Compact, for interface, electronics and power modules		
- 500 mm		**6ES7 194-4GC70-0AA0**
- 1000 mm		**6ES7 194-4GC60-0AA0**
- 2000 mm, can be cut to length		**6ES7 194-4GC20-0AA0**
• Wide, for interface, electronics, power modules and motor starters		
- 500 mm		**6ES7 194-4GB00-0AA0**
- 1000 mm		**6ES7 194-4GB60-0AA0**
- 2000 mm, can be cut to length		**6ES7 194-4GB20-0AA0**
• Wide, for I/O modules and motor starters		
- 500 mm		**6ES7 194-4GD00-0AA0**
- 1000 mm		**6ES7 194-4GD10-0AA0**
- 2000 mm		**6ES7 194-4GD20-0AA0**
Spare fuse		**6ES7 194-4HB00-0AA0**
12.5 A quick-response, for interface and power modules, 10 units per package unit		
SIMATIC Manual Collection	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multi-language: S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication)		
SIMATIC Manual Collection – Update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates		

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Interface modules
IM 154-6 PN IWLAN

Overview



Interface module for handling communication between ET 200pro and host PROFINET IO controllers over Industrial Wireless LAN (IWLAN) radio networks for 2.4 GHz or 5 GHz with data transfer rates up to 54 Mbit/s.

- Protection against illegal access, espionage, tapping and falsification through use of effective encryption mechanisms
- Fast exchange of devices through use of interchangeable medium MICRO MEMORY CARD

Technical specifications

IM 154-6 PN IWLAN interface module	6ES7 154-6AB00-0AB0 6ES7 154-6AB50-0AB0
Supply voltage for electronic components 1L+	
• Rated value	24 V DC
• Valid range, lower limit	20.4 V DC
• Valid range, upper limit	28.8 V DC
• Short-circuit protection	Yes; replaceable fuse
• Reverse polarity protection	Yes; against destruction
• Max. infeed current	5 A
Load voltage 2L+	
• Rated value (DC)	24 V DC
• Lower limit of permissible range (DC)	20.4 V DC
• Upper limit of permissible range (DC)	28.8 V DC
• Short-circuit protection	Yes, for potential group
• Reverse polarity protection	Yes; against destruction
• Max. infeed current	8 A
Current consumption from supply voltage 1L+, typ.	335 mA
Power loss, typ.	8.5 W
Memory type	Micro Memory Card, is required
Address range/address volume	
• Outputs	256 byte
• Inputs	256 byte
Reports	
• PROFINET IO	Yes
• Industrial Wireless LAN	Yes
PROFINET IO services	ARP, PING, SNMP
Industrial Wireless LAN	
• Transmission rate, max.	54 Mbit/s
• Standards for wireless communication	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11h (not valid for 6ES7 154-6AB50-0AB0) IEEE 802.11e IEEE 802.11i
• Radio frequency for WLAN in 2.4 GHz frequency band	2.4 ... 2.4835 GHz
• Radio frequency for WLAN in 5 GHz frequency band	5.15 ... 5.825 GHz
• Transmission method	Direct Sequence Spread Spectrum (DSSS) Complementary Code Keying (CCK) Orthogonal Frequency Division Multiplexing (OFDM)
• Supported IWLAN services	Current approvals can be found in the Internet at http://support.automation.siemens.com/WW/view/en/19812553
• Connection for external antenna	
Parameters	
• Diagnostic interrupt	Yes
• Maintenance alarm	Yes
• Hardware interrupt	Yes
• Swapping interrupt	Yes
• Identifier-related diagnostic data	Yes
• Module status	Yes
• Channel-specific diagnostics	Yes
• Start-up if preset configuration is not equal to actual configuration	Yes
• Module replacement during operation	Yes
Diagnostic indication (LED)	Yes
• Group fault (red)	Yes
• Bus fault (red)	Yes
• Maintenance information (yellow)	Yes
• Monitoring 24 V power supply ON (green)	Yes
• Load voltage monitoring 24 V DC (green)	Yes
• Connection to an Access Point R1 LINK (green)	Yes
• Data exchange R1 RX/TX (yellow)	Yes
• Connection to a PG/PC (green)	Yes
• Data exchange with a PG/PC (yellow)	Yes

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Technical specifications (continued)

IM 154-6 PN IWLAN interface module	6ES7 154-6AB00-0AB0 6ES7 154-6AB50-0AB0
Insulation tested at	500 V DC
Isolation	
• Between the backplane bus and supply voltage 1L+ and 2L+	Yes
• Between Ethernet and supply voltage 1L+ and 2L+	Yes
• Between the supply voltage and electronic components	Yes
Operating temperature	
• Minimum	-25 °C
• Maximum	55 °C

IM 154-6 PN IWLAN interface module	6ES7 154-6AB00-0AB0 6ES7 154-6AB50-0AB0
Storage/transport temperature	
• Minimum	-40 °C
• Maximum	70 °C
Degree of protection	IP65, IP66, IP67
General information	
• Manufacturer's code (VendorID)	0x002A
• Device ID	0x0305
Dimensions	
• Width	135 mm
• Height	130 mm
• Depth	60 mm
Weight, approx.	1085 g

Ordering data

	Order No.
IM 154-6 PN HF IWLAN interface module	
For communication between ET 200pro and host controllers over Industrial Wireless LAN (IWLAN) radio networks; support of PROFIsafe	
With various national approvals; refer to the current list of approvals I	**6ES7 154-6AB00-0AB0**
With approval for USA I	**6ES7 154-6AB50-0AB0**
Antennas with omnidirectional characteristic	
Mounting directly on IM154-6 PN HF IWLAN	
• ANT IM 154-6 IWLAN; 2 units I	**6ES7 194-4MA00-0AA0**
For wall or pipe mounting	
• ANT 792-6MN; rod antenna N-Connect female 2.4 GHz; 1 unit	**6GK5 792-6MN00-0AA6**
• ANT793-6MN; rod antenna N-Connect female 5 GHz; 1 unit	**6GK5 793-6MN00-0AA6**
For use with the RCoax antenna system	
• ANT 792-4DN; RCoax N-Connect female 2.4 GHz; 1 unit	**6GK5 792-4DN00-0AA6**
• ANT793-4MN; RCoax N-Connect female 5 GHz; 1 unit	**6GK 5793-4MN00-0AA6**
Antenna cables IWLAN RCoax; N-Connect / R-SMA	
1 m long	**6XV1 875-5CH10**
2 m long	**6XV1 875-5CH20**
5 m long	**6XV1 875-5CH50**
10 m long	**6XV1 875-5CN10**
IWLAN terminating resistor 50 Ohm for second R-SMA antenna socket, 3 units	**6GK5 795-1TR10-0AA6**

	Order No.
Accessories	
7/8" connecting cable to power supply	
5-core, 5 x 1.5 mm^2, trailing type, pre-assembled with two 7/8" connectors	
1.5 m long	**6XV1 822-5BH15**
2.0 m long	**6XV1 822-5BH20**
3.0 m long	**6XV1 822-5BH30**
5.0 m long	**6XV1 822-5BH50**
10 m long	**6XV1 822-5BN10**
15 m long	**6XV1 822-5BN15**
• Other special lengths with 90° or 180° cable outlet	See http://support.automation.siemens.com/WW/view/en/26999294
Power line	**6XV1 830-8AH10**
5-core, 5 x 1.5 mm^2, trailing type, sold by the meter, minimum order quantity 20 m, maximum order quantity 1000 m	
7/8" cable connector	**6GK1 905-0FB00**
For ET 200eco, with axial cable outlet; with socket insert, pack of 5	
Twisted Pair cables 4x2 with RJ45 connectors	
0.5 m long	**6XV1 870-3QE50**
1 m long	**6XV1 870-3QH10**
2 m long	**6XV1 870-3QH20**
6 m long	**6XV1 870-3QH60**
10 m long	**6XV1 870-3QN10**

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Ordering data Order No. Order No. (continued)

Crossed Twisted Pair cables 4x2 with RJ45 connectors	
0.5 m long	**6XV1 870-3RE50**
1 m long	**6XV1 870-3RH10**
2 m long	**6XV1 870-3RH20**
6 m long	**6XV1 870-3RH60**
10 m long	**6XV1 870-3RN10**
IE FC RJ45 Plug 180	
180° cable outlet; for line components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1 901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1 901-1BB10-2AB0**
IE FC RJ45 Plug 90	
90° cable outlet; e.g. for ET 200S	
• 1 pack = 1 unit	**6GK1 901-1BB20-2AA0**
• 1 pack = 10 units	**6GK1 901-1BB20-2AB0**
General accessories	
ET 200pro rack	
• Narrow, for interface, electronics and power modules	
- 500 mm	**6ES7 194-4GA00-0AA0**
- 1000 mm	**6ES7 194-4GA60-0AA0**
- 2000 mm, can be cut to length	**6ES7 194-4GA20-0AA0**
• Compact, for interface, electronics and power modules	
- 500 mm	**6ES7 194-4GC70-0AA0**
- 1000 mm	**6ES7 194-4GC60-0AA0**
- 2000 mm, can be cut to length	**6ES7 194-4GC20-0AA0**
• Wide, for interface, electronics, power modules and motor starters	
- 500 mm	**6ES7 194-4GB00-0AA0**
- 1000 mm	**6ES7 194-4GB60-0AA0**
- 2000 mm, can be cut to length	**6ES7 194-4GB20-0AA0**
• Wide, for I/O modules and motor starters	
- 500 mm	**6ES7 194-4GD00-0AA0**
- 1000 mm	**6ES7 194-4GD10-0AA0**
- 2000 mm	**6ES7 194-4GD20-0AA0**

Spare fuse		**6ES7 194-4HB00-0AA0**
12.5 A quick-response, for interface and power modules, 10 units per package unit		
Labels		**3RT1 900-1SB20**
20 x 7 mm, pale turquoise, 340 units per pack		
SIMATIC Micro Memory Card		
• 64 KB		**6ES7 953-8LF20-0AA0**
• 128 KB		**6ES7 953-8LG20-0AA0**
• 512 KB		**6ES7 953-8LJ20-0AA0**
SIMATIC Manual Collection	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilanguage: S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication)		
SIMATIC Manual Collection – Update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates		

D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

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Overview



- CPU with PLC functionality equivalent to S7-315-2 PN/DP provides distributed intelligence for preprocessing
- Interface module for exchanging pre-processed I/O data between the ET 200pro and a higher-level master/IO controller via PROFIBUS DP/PROFINET IO
- PROFINET IO controller to operate distributed I/Os on PROFINET
- Component based Automation (CBA) on PROFINET
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component Based Automation (CBA)
- PROFINET interface with 3-port switch
- Isochronous mode on PROFIBUS or PROFINET
- Integral Web server with the option of creating user-defined Web sites
- CPU with PLC functionality equivalent to S7-315-2 PN/DP provides distributed intelligence for preprocessing
- Interface module to exchange preprocessed I/O data from ET 200pro with a higher-level master through PROFIBUS DP
- Fast, simple and end-to-end programming of a system with modular programs via STEP 7
- Fail-safe IM 154-8F PN/DP CPU PROFIsafe available

Micro Memory Card required for operation of CPU.

Technical specifications

	6ES7 154-8AB01-0AB0
Product version	
associated programming package	STEP7 V 5.5 or higher
Supply voltages	
external protection for supply cables (recommendation)	MCB 24 V DC / 16A with trippingIO controller characteristic Type B and C (see ET 200pro manual)
Current consumption	
Current consumption (rated value)	350 mA; typical
Current consumption (in no-load operation), typ.	250 mA; Typical, current consumption for CPU in STOP state
Inrush current, typ.	2 A; typical
I^2t	0.25 $A^2 \cdot s$;typical
Power losses	
Power loss, typ.	8.5 W; typical
Memory	
Work memory	
• integrated	384 Kibyte
• expandable	No
Load memory	
• pluggable (MMC)	Yes
• pluggable (MMC), max.	8 Mbyte
Backup	
• present	Yes; ensured by MMC (maintenance-free)
• without battery	Yes; program and data
CPU-blocks	
DB	
• Number, max.	1 024; Number range: 1 to 16,000
• Size, max.	64 Kibyte

	6ES7 154-8AB01-0AB0
FB	
• Number, max.	1 024; Number range: 0 to 7,999
• Size, max.	64 Kibyte
FC	
• Number, max.	1 024; Number range: 0 to 7,999
• Size, max.	64 Kibyte
OB	
• Size, max.	64 Kibyte
Nesting depth	
• per priority class	16
• additional within an error OB	4
CPU processing times	
for bit operations, min.	0.05 µs
for word operations, min.	0.09 µs
for fixed point arithmetic, min.	0.12 µs
for floating point arithmetic, min.	0.45 µs
Counters, timers and their retentivity	
S7 counter	
• Number	256
• Retentivity	
- adjusted	Yes
- lower limit	0
- upper limit	255
• Counting range	
- adjusted	Yes
- lower limit	0
- upper limit	999

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Technical specifications (continued)

	6ES7 154-8AB01-0AB0
IEC counter	
• present	Yes
• Type	SFB
S7 times	
• Number	256
• Retentivity	
- adjusted	Yes
- lower limit	0
- upper limit	255
- preset	No retentivity
• Time range	
- lower limit	10 ms
- upper limit	9 990 s
IEC timer	
• present	Yes
• Type	SFB
• Number	Unlimited (limited only by RAM capacity)
Data areas and their retentivity	
Flag	
• Number, max.	2 048 byte
• Retentivity available	Yes; MB 0 to MB 2047
• Number of clock memories	8
Data blocks	
• Number, max.	1 024; Number range: 1 to 16,000
• Size, max.	64 Kibyte
• Retentivity adjustable	Yes; via non-retain property on DB
• Retentivity preset	yes
Local data	
• per priority class, max.	32 768 byte; 2048 byte max. per block
Address area	
I/O address area	
• overall	2 048 byte
• Outputs	2 048 byte
• of which, distributed	
- Inputs	2 048 byte
- Outputs	2 048 byte
Process image	
• Inputs, adjustable	2 048 byte
• Outputs, adjustable	2 048 byte
• Inputs, preset	128 byte
• Outputs, peset	128 byte
Subprocess images	
• Number of subprocess images, max.	1; With PROFINET IO, the length of the user data is limited to 1600 byte
Digital channels	
• Inputs	16 384
• Outputs	16 384
• Inputs, of which central	128
• Outputs, of which central	64
Analog channels	
• Inputs	1 024
• Outputs	1 024
• Inputs, of which central	64
• Outputs, of which central	64

	6ES7 154-8AB01-0AB0
Hardware configuration	
Racks, max.	1
Modules per rack, max.	16; expansion width max. 1m
Number of DP masters	
• integrated	1
Time	
Clock	
• Hardware clock (real-time clock)	Yes
• battery-backed and synchronizable	Yes
• Deviation per day, max.	10 s; typ.: 2 s
Runtime meter	
• Number	1
• Number/Number range	0
• Range of values	0 to 2^31 hours (when using SFC 101)
• Granularity	1 h
• Retentive	Yes; must be restarted at each restart
Clock synchronization	
• supported	Yes
• to MPI, master	Yes
• to MPI, slave	Yes
• to DP, master	Yes; with DP slave only slave clock
• to DP, slave	Yes
• on Ethernet via NTP	Yes; as client
S7 message functions	
Number of login stations for message functions, max.	16; depending on the connections configured for PG/OP and S7 basic communication
Process diagnostic messages	Yes
simultaneously active Alarm-S blocks, max.	300
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 variables, max.	30
• of which control variables, max.	14
Forcing	
• Forcing	Yes
Status block	Yes; up to 2 simultaneously
Single step	Yes
Number of breakpoints	4
Diagnostic buffer	
• present	Yes
• Number of entries, max.	500; only the last 100 entries are retentive at power on/off
- adjusted	No
- preset	10

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Technical specifications (continued)

	6ES7 154-8AB01-0AB0
Monitoring functions	
Status LEDs	Yes
Communication functions	
PG/OP communication	Yes
Routing	Yes
Global data communication	
• supported	Yes
• Size of GD packets, max.	22 byte
S7 basic communication	
• supported	Yes
S7 communication	
• supported	Yes
Web server	
• supported	Yes
• Number of HTTP clients	5
• User-defined websites	Yes
Open IE communication	
• TCP/IP	Yes; Via integrated PROFINET interface and loadable FBs
- Number of connections, max.	8
- Data length, max.	32 768 byte; 1460 byte with connection type 01H; 32768 byte with connection type 11H
- Several passive connections per port, supported	Yes
• ISO-on-TCP (RFC1006)	Yes
- Number of connections, max.	8
- Data length, max.	32 768 byte
• UDP	Yes
- Number of connections, max.	8
- Data length, max.	1 472 byte
Number of connections	
• overall	16
• usable for PG communication	15
• usable for OP communication	15
• usable for S7 basic communication	14
• usable for routing	X1 as MPI: max. 10; X1 as DP master: max. 24; X1 as DP slave (active): max. 14; X2 as PROFINET: 24 max.
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
• Number of device-internal and PROFIBUS interconnections	500
• Data length of device-internal und PROFIBUS interconnections, max.	4 000 byte
• Data length per connection, max.	1 400 byte

	6ES7 154-8AB01-0AB0
• Remote interconnections with acyclic transmission	
- Sampling frequency: Sampling time, 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.	1 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 stations that can log on 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
1st interface	
Type of interface	Integrated RS 485 interface
Physics	RS 485/connection: 2 x M12 b-coded
Isolated	Yes
Power supply to interface (15 to 30 V DC), max.	May only be used for external terminating resistor
Functionality	
• MPI	Yes
• DP master	Yes
• DP slave	Yes
• Point-to-point connection	No
MPI	
• Services	
- PG/OP communication	Yes
- Routing	Yes
- Global data communication	Yes
- S7 basic communication	Yes
- S7 communication	Yes
- S7 communication, as client	No
- S7 communication, as server	Yes
• Transmission rate, max.	12 Mbit/s

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Technical specifications (continued)

	6ES7 154-8AB01-0AB0
DP master	
• Services	
- PG/OP communication	Yes
- Routing	Yes
- Global data communication	No
- S7 basic communication	Yes; I blocks only
- S7 communication	Yes
- S7 communication, as client	No
- S7 communication, as server	Yes; connection configured on one side only
- Equidistance mode support	Yes
- Isochronous mode	Yes; OB 61 - isochronous mode is possible either on DP or PROFINET IO (not simultaneously)
- SYNC/FREEZE	Yes
- Activation/deactivation of DP slaves	Yes
- Direct data exchange (slave-to-slave communication)	Yes; As subscriber
- DPV1	Yes
• Transmission rate, max.	12 Mbit/s
• Number of DP slaves, max.	124
• Address area	
- Inputs, max.	2 048 byte
- Outputs, max.	2 048 byte
• User data per DP slave	
- Inputs, max.	244 byte
- Outputs, max.	244 byte
DP slave	
• Services	
- Routing	Yes; with active interface
- Global data communication	No
- S7 basic communication	No
- S7 communication	Yes
- S7 communication, as client	No
- S7 communication, as server	Yes; connection configured on one side only
- Direct data exchange (slave-to-slave communication)	Yes
- DPV1	No
• Transmission rate, max.	12 Mbit/s
• Transfer memory	
- Inputs	244 byte
- Outputs	244 byte
• Address area, max.	32
• User data per address area, max.	32 byte
2nd interface	
Type of interface	PROFINET
Physics	Ethernet (2 x M12 d-coded; 1 x RJ45)
Isolated	Yes; Galvanic isolation for P3 is implemented in IM154-8, for P1 and P2 in CM
Integrated switch	Yes
Number of ports	3
automatic detection of transmission speed	Yes; 10/100 Mbit/s
Autonegotiation	Yes
Autocrossing	Yes

	6ES7 154-8AB01-0AB0
Media redundancy	
• supported	Yes
• Switchover time on line break, typically	200 ms; PROFINET MRP
• Number of stations in the ring, max.	50
Change of IP address at runtime, supported	Yes
Functionality	
• MPI	No
• DP master	No
• DP slave	No
• PROFINET IO controller	Yes; also simultaneously with IO device functionality
• PROFINET IO device	Yes; also simultaneously with IO controller functionality
• PROFINET CBA	Yes
• Open IE communication	Yes; Via TCP/IP, ISO on TCP, UDP
• Web server	Yes
PROFINET IO controller	
• Services	
- PG/OP communication	Yes
- Routing	Yes
- S7 communication	Yes; with loadable FBs, max. configurable connections: 14, max. number of instances: 32
- Isochronous mode	Yes; OB 61 - isochronous mode is possible either on DP or PROFINET IO (not simultaneously)
- Open IE communication	Yes; Via TCP/IP, ISO on TCP, UDP
• Transmission rate, max.	100 Mbit/s
• Number of connectable IO devices, max.	128
• Max. number of connectable IO devices for RT	128
- of which in line, max.	128
• Number of IO devices with IRT and the option "high flexibility"	128
- of which in line, max.	61
• Number of IO devices with IRT and the option "high performance", max.	64
- of which in line, max.	64
• IRT, supported	Yes
• Shared device, supported	Yes
• Prioritized startup supported	Yes
- Number of IO devices, max.	32
• Activation/deactivation of IO devices	Yes
- Number of IO devices that can be simultaneously activated/ deactivated, max.	8
• IO devices changing during operation (partner ports), supported	Yes
- Max. number of IO devices per tool	8
• Device replacement without swap medium	Yes
• Send clock times	250 µs, 500 µs,1 ms; 2 ms, 4 ms (not in the case of IRT with "high flexibility" option)

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Technical specifications (continued)

	6ES7 154-8AB01-0AB0
• Updating time	250 µs to 512 ms (depending on the operating mode, see "IM 154-8 CPU Interface Module" operating instructions for more details)
• Address area	
- Inputs, max.	2 048 byte
- Outputs, max.	2 048 byte
• User data per address area, max.	
- User data consistency, max.	1 024 byte
PROFINET IO device	
• Services	
- PG/OP communication	Yes
- Routing	Yes
- S7 routing	Yes
- S7 communication	Yes; with loadable FBs, max. configurable connections: 14, max. number of instances: 32
- Isochronous mode	No
- Open IE communication	Yes; via TCP/IP, ISO on TCP, UDP
- IRT, supported	Yes
- PROFIenergy, supported	Yes; with SFB 73 / 74 prepared for loadable PROFIenergy standard FB for I-Device
- Shared device, supported	Yes
- Number of IO controllers with shared device, max.	2
• Transfer memory	
- Inputs, max.	1 440 byte; per IO controller with shared device
- Outputs, max.	1 440 byte; per IO controller with shared device
• Submodules	
- Number, max.	64
- User data per submodule, max.	1 024 byte
PROFINET CBA	
• acyclic transmission	Yes
• cyclic transmission	Yes
Open IE communication	
• Open IE communication, supported	Yes
• Number of connections, max.	8
• Local port numbers used at the system end	0, 20, 21, 23, 25, 80, 102, 135, 161, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535
• Keep-alive function, supported	Yes

	6ES7 154-8AB01-0AB0
Isochronous mode	
Isochronous mode	Yes; via PROFIBUS DP or PROFINET interface
Programming	
Programming language	
• STEP 7	Yes; V5.5 or higher
• LAD	Yes
• FBD	Yes
• STL	Yes
• SCL	Yes
• CFC	Yes
• GRAPH	Yes
• HiGraph®	Yes
Command set	see instruction list
Nesting levels	8
Know-how protection	
• User program protection/ password protection	Yes
• Block encryption	Yes; With S7 block Privacy
System functions (SFC)	See instruction list
System function blocks (SFB)	See instruction list
Galvanic isolation	
between backplane bus and electronics	No
between backplane bus and all other circuit components	Yes
between supply and all other circuits	Yes
Standards, approvals, certificates	
CE mark	Yes
CSA approval	No
C-TICK	Yes
cULus	Yes
FM approval	No
Dimensions and weight	
Dimensions	
• Width	135 mm
• Height	130 mm
• Depth	65 mm; 60 mm without cover for RJ45 socket; 65 mm with cover for RJ45 socket
Weight	
• Weight, approx.	720 g

Ordering data

	Order No.
IM 154-8 PN/DP CPU interface module, V3.2 I	**6ES7 154-8AB01-0AB0**
PROFINET IO controller to operate distributed I/Os on PROFINET, with integrated PLC functionality	
Accessories	
MMC 64 KB [1]	**6ES7 953-8LF20-0AA0**
For program backup	
MMC 128 KB [1]	**6ES7 953-8LG20-0AA0**
For program backup	
MMC 512 KB [1]	**6ES7 953-8LJ20-0AA0**
For program backup	
MMC 2 MB [1]	**6ES7 953-8LL20-0AA0**
for program backup and/or firmware updates	
MMC 4 MB [1]	**6ES7 953-8LM20-0AA0**
For program backup	
MMC 8 MB [1]	**6ES7 953-8LP20-0AA0**
For program backup	

[1] An MMC is essential for operating the CPU

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Ordering data		Order No.
Connection module		**6ES7 194-4AN00-0AA0**
For CPU IM154-8 PN/DP, with 4 x M12 and 2 x 7/8", to connect PROFINET and PROFIBUS DP		
SCALANCE X-200 Industrial Ethernet Switches		
With integral SNMP access, Web diagnostics, copper cable diagnostics and PROFINET diagnostics, for setting up linear, star and ring structures SCALANCE X208PRO, in degree of protection IP65, with eight 10/100 Mbit/s M12 ports, incl. eleven M12 dust caps		**6GK5 208-0HA00-2AA6**
Industrial Ethernet FC RJ45 Plug 90		
RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 90° cable outlet		
1 unit		**6GK1 901-1BB20-2AA0**
10 units		**6GK1 901-1BB20-2AB0**
Industrial Ethernet 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 unit		**6GK1 901-1BB10-2AA0**
10 units		**6GK1 901-1BB10-2AB0**
50 units		**6GK1 901-1BB10-2AE0**
Industrial Ethernet Fast Connect installation cables		
• Fast Connect standard cable		**6XV1 840-2AH10**
• Fast Connect trailing cable		**6XV1 840-3AH10**
• Fast Connect marine cable		**6XV1 840-4AH10**
Industrial Ethernet FastConnect installation cables		
• **IE FC TP Trailing Cable GP 2 x 2**; Sold by the meter, max. order quantity 1000 m; Minimum order quantity 20 m		**6XV1 870-2D**
• **IE TP Torsion Cable GP 2 x 2**; Sold by the meter, max. order quantity 1000 m; Minimum order quantity 20 m		**6XV1 870-2F**
Industrial Ethernet Fast Connect		
Stripping Tool		**6GK1 901-1GA00**

		Order No.
IE Connecting Cable M12-180/ M12-180		
Preassembled IE FC TP Trailing Cable GP 2 x 2 (PROFINET Type C) with two 4-pin M12 plugs (4-pin, D-coded), degree of protection IP65/IP67, length:		
0.3 m		**6XV1 870-8AE30**
0.5 m		**6XV1 870-8AE50**
1.0 m		**6XV1 870-8AH10**
1.5 m		**6XV1 870-8AH15**
2.0 m		**6XV1 870-8AH20**
3.0 m		**6XV1 870-8AH30**
5.0 m		**6XV1 870-8AH50**
10 m		**6XV1 870-8AN10**
15 m		**6XV1 870-8AN15**
PROFINET M12 connecting cable, trailing cable preassembled at both ends with angled M12 connectors (male insert)		
3.0 m	F	**3RK1 902-2NB30**
5.0 m	F	**3RK1 902-2NB50**
10 m	F	**3RK1 902-2NC10**
PROFINET M12 connecting cable, trailing cable preassembled at one end with angled M12 connector (male insert at one end, other end unconnected)		
3.0 m	F	**3RK1 902-2HB30**
5.0 m	F	**3RK1 902-2HB50**
10 m	F	**3RK1 902-2HC10**
IE FC M12 Plug PRO		
PROFINET M12 plug connector, D-coded with fast connection system, axial cable outlet		
1 unit	I	**6GK1 901-0DB20-6AA0**
8 units	I	**6GK1 901-0DB20-6AA8**
PROFINET M12 plug connector, D-coded, angled		**3RK1 902-2DA00**
IE panel feedthrough		
Cabinet feedthrough for converting from the M12 connection system (D-coded, IP65/IP67) to the RJ45 connection system (IP20), 1 pack = 5 units	I	**6GK1 901-0DM20-2AA5**

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Ordering data

		Order No.
7/8" connecting cable to power supply		
5-core, 5 x 1.5 mm², trailing type, preassembled with two 7/8" connectors (axial cable outlet), 5-pin, up to 50 m		
• 1.5 m long		**6XV1 822-5BH15**
• 2.0 m long		**6XV1 822-5BH20**
• 3.0 m long		**6XV1 822-5BH30**
• 5.0 m long		**6XV1 822-5BH50**
• 10 m long		**6XV1 822-5BN10**
• 15 m long		**6XV1 822-5BN15**
• Other special lengths with 90° or 180° cable outlet		siehe http://support.automation.siemens.com/WW/view/en/26999294
power cable, can be trailed, 5 x 1.5 mm², preassembled at both ends with 7/8" angled connectors (female insert at one end, male insert at the other end)		
• 3.0 m long	F	**3RK1 902-3NB30**
• 5.0 m long	F	**3RK1 902-3NB50**
• 10 m long	F	**3RK1 902-3NC10**
• Power cable, can be trailed, 5 x 1.5 mm², preassembled at one end with 7/8" angled connector with female insert (female insert at one end, other end unconnected)		
• 3.0 m long	F	**3RK1 902-3GB30**
• 5.0 m long	F	**3RK1 902-3GB50**
• 10 m long	F	**3RK1 902-3GC10**
Power line		**6XV1 830-8AH10**
5-core, 5 x 1.5 mm², trailing type, sold by the meter, minimum order quantity 20 m, maximum order quantity 1000 m		
7/8" cable connector		
For ET 200eco, with axial cable outlet		
• with male insert, 5 per pack		**6GK1 905-0FA00**
• with female insert, 5 per pack		**6GK1 905-0FB00**
• angled, with female insert, 1 unit	F	**3RK1 902-3DA00**
• angled, with male insert, 1 unit	F	**3RK1 902-3BA00**
7/8" cover cap, 10 per pack		**6ES7 194-3JA00-0AA0**
Twisted Pair cables 4x2 with RJ45 connectors		
0.5 m long		**6XV1 870-3QE50**
1 m long		**6XV1 870-3QH10**
2 m long		**6XV1 870-3QH20**
6 m long		**6XV1 870-3QH60**
10 m long		**6XV1 870-3QN10**
Crossed Twisted Pair cables 4x2 with RJ45 connectors		
0.5 m long		**6XV1 870-3RE50**
1 m long		**6XV1 870-3RH10**
2 m long		**6XV1 870-3RH20**
6 m long		**6XV1 870-3RH60**
10 m long		**6XV1 870-3RN10**

		Order No.
M12 sealing cap		**3RX9 802-0AA00**
For protection of unused M12 connections with ET 200pro		
M12 sealing caps with female thread	I	**6ES7 194-4JD60-0AA0**
5 units		
PROFIBUS M12 connecting cable		
Preassembled, with two 5-pole M12 connectors/sockets, up to 100 m; length:		
• 1.5 m		**6XV1 830-3DH15**
• 2.0 m		**6XV1 830-3DH20**
• 3.0 m		**6XV1 830-3DH30**
• 5.0 m		**6XV1 830-3DH50**
• 10 m		**6XV1 830-3DN10**
• 15 m		**6XV1 830-3DN15**
Other special lengths with 90° or 180° cable outlet		See http://support.automation.siemens.com/WW/view/en/26999294
M12 bus termination connector for PROFIBUS, female insert		**6GK1 905-0ED00**
M12 bus termination connector for PROFIBUS, male insert		**6GK1 905-0EC00**
M12 plug connector, axial outlet, with male insert		**6GK1 905-0EA00**
PROFIBUS FC Standard Cable GP		**6XV1 830-0EH10**
Standard type specially designed for fast assembly, 2-core, shielded,		
Sold by the meter; Max. delivery unit 1000 m, Minimum order quantity 20 m		
PROFIBUS FC Trailing Cable		**6XV1 830-3EH10**
2-core, shielded		
PROFIBUS FC Food Cable		**6XV1 830-0GH10**
2-core, shielded		
Sold by the meter; Max. delivery unit 1000 m, Minimum order quantity 20 m		
PROFIBUS FC Robust Cable		**6XV1 830-0JH10**
2-core, shielded		
Sold by the meter; Max. delivery unit 1000 m, Minimum order quantity 20 m		
PROFIBUS M12 cable connector		
5-pole, B-coded, metal casing, 1 pack = 5 units		
• Female insert		**6GK1 905-0EB00**

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Interface modules
IM 154-8 F PN/DP CPU

Overview



- Interface module for SIMATIC ET 200pro with integrated fail-safe CPU
- CPU with PLC functionality equivalent to CPU S7-315F PN/DP; with distributed intelligence for preprocessing
- For constructing a fail-safe automation system for plants with increased safety requirements
- Complies with safety requirements up to SIL 3 according to IEC 61508, IEC 62061, up to PLe according to ISO 13849-1:2006 and Cat. 4 according to EN 954-1
- For high-performance control solutions in ET 200pro
- Increase of the availability of systems and machines
- Integral Web server with the option of creating user-defined Web sites
- Isochronous mode on PROFIBUS or PROFINET
- PROFINET IO controller for up to 128 IO devices
- PROFINET interface with integrated 3-port switch
- With many communication options: PG/OP communication, PROFINET IO, PROFINET CBA, open IE communication (TCP, ISO-on-TCP and UDP), web server and S7-communication (with loadable FBs)
- Fast, simple and end-to-end programming of a system with modular programs via STEP 7
- Compact SIMATIC Micro Memory Card (MMC)

Note:
SIMATIC Micro Memory Card required for operation of CPU.

Technical specifications

	6ES7 154-8FB01-0AB0
Product version	
associated programming package	STEP 7 V 5.5 or higher, Distributed Safety V 5.4 SP4
Supply voltages	
external protection for supply cables (recommendation)	MCB 24 V DC / 16 A with tripping characteristic Type B and C (see ET 200pro manual)
Current consumption	
Current consumption (rated value)	350 mA; typical
Current consumption (in no-load operation), typ.	250 mA; typical, current consumption for CPU in STOP state
Inrush current, typ.	2 A; typical
I^2t	0.25 $A^2 \cdot s$; typical
Power losses	
Power loss, typ.	8.5 W; typical
Memory	
Work memory	
• integrated	512 Kibyte
• expandable	No
Load memory	
• pluggable (MMC)	Yes
• pluggable (MMC), max.	8 Mbyte
Backup	
• present	Yes; ensured by MMC (maintenance-free)
• without battery	Yes; program and data
CPU-blocks	
DB	
• Number, max.	1 024; Number range: 1 to 16,000
• Size, max.	64 Kibyte
FB	
• Number, max.	1 024; number range: 0 to 7,999
• Size, max.	64 Kibyte
FC	
• Number, max.	1 024; number range: 0 to 7,999
• Size, max.	64 Kibyte
OB	
• Size, max.	64 Kibyte
Nesting depth	
• per priority class	16
• additional within an error OB	4
CPU processing times	
for bit operations, min.	0.05 µs
for word operations, min.	0.09 µs
for fixed point arithmetic, min.	0.12 µs
for floating point arithmetic, min.	0.45 µs
Counters, timers and their retentivity	
S7 counter	
• Number	256
• Retentivity	
- adjusted	Yes
- lower limit	0
- upper limit	255
• Counting range	
- adjusted	Yes
- lower limit	0
- upper limit	999
IEC counter	
• present	Yes
• Type	SFB

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Technical specifications (continued)

	6ES7 154-8FB01-0AB0
S7 times	
• Number	256
• Retentivity	
- adjusted	Yes
- lower limit	0
- upper limit	255
- preset	No retentivity
• Time range	
- lower limit	10 ms
- upper limit	9 990 s
IEC timer	
• present	Yes
• Type	SFB
• Number	Unlimited (limited only by RAM capacity)
Data areas and their retentivity	
Flag	
• Number, max.	2 048 byte
• Retentivity available	Yes; MB 0 to MB 2047
• Number of clock memories	8
Data blocks	
• Number, max.	1 024; Number range: 1 to 16,000
• Size, max.	64 Kibyte
• Retentivity adjustable	Yes; via non-retain property on DB
• Retentivity preset	yes
Local data	
• per priority class, max.	32 768 byte; 2048 byte max. per block
Address area	
I/O address area	
• overall	2 048 byte
• Outputs	2 048 byte
• of which, distributed	
- Inputs	2 048 byte
- Outputs	2 048 byte
Process image	
• Inputs, adjustable	2 048 byte
• Outputs, adjustable	2 048 byte
• Inputs, preset	128 byte
• Outputs, preset	128 byte
Subprocess images	
• Number of subprocess images, max.	1; With PROFINET IO, the length of the user data is limited to 1600 byte
Digital channels	
• Inputs	16 384
• Outputs	16 384
• Inputs, of which central	128
• Outputs, of which central	64
Analog channels	
• Inputs	1 024
• Outputs	1 024
• Inputs, of which central	64
• Outputs, of which central	64

	6ES7 154-8FB01-0AB0
Hardware configuration	
Racks, max.	1
Modules per rack, max.	16; Expansion width max. 1 m
Number of DP masters	
• integrated	1
Time	
Clock	
• Hardware clock (real-time clock)	Yes
• battery-backed and synchronizable	Yes
• Deviation per day, max.	10 s; typ.: 2 s
Runtime meter	
• Number	1
• Number/Number range	0
• Range of values	0 to 2^31 hours (when using SFC 101)
• Granularity	1 h
• retentive	Yes; must be restarted at each restart
Clock synchronization	
• supported	Yes
• to MPI, master	Yes
• to MPI, slave	Yes
• to DP, master	Yes; with DP slave only slave clock
• to DP, slave	Yes
• on Ethernet via NTP	Yes; as client
S7 message functions	
Number of login stations for message functions, max.	16; depending on the connections configured for PG/OP and S7 basic communication
Process diagnostic messages	Yes
Smultaneously active Alarm-S blocks, max.	300
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 variables, max.	30
• of which control variables, max.	14
Forcing	
• Forcing	Yes
Status block	Yes; up to 2 simultaneously
Single step	Yes
Number of breakpoints	4
Diagnostic buffer	
• Present	Yes
• Number of entries, max.	500; only the last 100 entries are retentive at power on/off
- adjusted	No
- preset	10
Monitoring functions	
Status LEDs	Yes

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Technical specifications (continued)

	6ES7 154-8FB01-0AB0
Communication functions	
PG/OP communication	Yes
Routing	Yes
Global data communication	
• supported	Yes
• Size of GD packets, max.	22 byte
S7 basic communication	
• supported	Yes
S7 communication	
• supported	Yes
Web server	
• supported	Yes
• Number of HTTP clients	5
• User-defined websites	Yes
Open IE communication	
• TCP/IP	Yes; Via integrated PROFINET interface and loadable FBs
- Number of connections, max.	8
- Data length, max.	32 768 byte; 1460 byte with connection type 01H; 32768 byte with connection type 11H
- Several passive connections per port, supported	Yes
• ISO-on-TCP (RFC1006)	Yes
- Number of connections, max.	8
- Data length, max.	32 768 byte
• UDP	Yes
- Number of connections, max.	8
- Data length, max.	1 472 byte
Number of connections	
• overall	16
• usable for PG communication	15
• usable for OP communication	15
• usable for S7 basic communication	14
• usable for routing	X1 as MPI: max. 10; X1 as DP master: max. 24; X1 as DP slave (active): max. 14; X2 as PROFINET: 24 max.
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
• Number of device-internal and PROFIBUS interconnections	500
• Data length of device-internal und PROFIBUS interconnections, max.	4 000 byte
• Data length per connection, max.	1 400 byte

	6ES7 154-8FB01-0AB0
• Remote interconnections with acyclic transmission	
- Sampling frequency: Sampling time, 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.	1 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 stations that can log on 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
1st interface	
Type of interface	Integrated RS 485 interface
Physics	RS 485/connection: 2 x M12 b-coded
Isolated	Yes
Power supply to interface (15 to 30 V DC), max.	May only be used for external terminating resistor
Functionality	
• MPI	Yes
• DP master	Yes
• DP slave	Yes
• Point-to-point connection	No
MPI	
• Services	
- PG/OP communication	Yes
- Routing	Yes
- Global data communication	Yes
- S7 basic communication	Yes
- S7 communication	Yes
- S7 communication, as client	No
- S7 communication, as server	Yes
• Transmission rate, max.	12 Mbit/s

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Technical specifications (continued)

	6ES7 154-8FB01-0AB0
DP master	
• Services	
- PG/OP communication	Yes
- Routing	Yes
- Global data communication	No
- S7 basic communication	Yes; I blocks only
- S7 communication	Yes
- S7 communication, as client	No
- S7 communication, as server	Yes; connection configured on one side only
- Equidistance mode support	Yes
- Isochronous mode	Yes; OB 61 - isochronous mode is possible either on DP or PROFINET IO (not simultaneously)
- SYNC/FREEZE	Yes
- Activation/deactivation of DP slaves	Yes
- Direct data exchange (slave-to-slave communication)	Yes; as subscriber
- DPV1	Yes
• Transmission rate, max.	12 Mbit/s
• Number of DP slaves, max.	124
• Address area	
- Inputs, max.	2 048 byte
- Outputs, max.	2 048 byte
• User data per DP slave	
- Inputs, max.	244 byte
- Outputs, max.	244 byte
DP slave	
• Services	
- Routing	Yes; with active interface
- Global data communication	No
- S7 basic communication	No
- S7 communication	Yes
- S7 communication, as client	No
- S7 communication, as server	Yes; connection configured on one side only
- Direct data exchange (slave-to-slave communication)	Yes
- DPV1	No
• Transmission rate, max.	12 Mbit/s
• Transfer memory	
- Inputs	244 byte
- Outputs	244 byte
• Address area, max.	32
• User data per address area, max.	32 byte
2nd interface	
Type of interface	PROFINET
Physics	Ethernet (2 x M12 d-coded; 1 x RJ45)
Isolated	Yes; galvanic isolation for P3 is implemented in IM154-8, for P1 and P2 in CM
Integrated switch	Yes
Number of ports	3
automatic detection of transmission speed	Yes; 10/100 Mbit/s
Autonegotiation	Yes
Autocrossing	Yes

	6ES7 154-8FB01-0AB0
Media redundancy	
• supported	Yes
• Switchover time on line break, typically	200 ms; PROFINET MRP
• Number of stations in the ring, max.	50
Change of IP address at runtime, supported	Yes
Functionality	
• MPI	No
• DP master	No
• DP slave	No
• PROFINET IO controller	Yes; also simultaneously with IO device functionality
• PROFINET IO device	Yes; also simultaneously with IO controller functionality
• PROFINET CBA	Yes
• Open IE communication	Yes; via TCP/IP, ISO on TCP, UDP
• Web server	Yes
PROFINET IO controller	
• Services	
- PG/OP communication	Yes
- Routing	Yes
- S7 communication	Yes; with loadable FBs, max. configurable connections: 14, max. number of instances: 32
- Isochronous mode	Yes; OB 61 - isochronous mode is possible either on DP or PROFINET IO (not simultaneously)
- Open IE communication	Yes; via TCP/IP, ISO on TCP, UDP
• Transmission rate, max.	100 Mbit/s
• Number of connectable IO devices, max.	128
• Max. number of connectable IO devices for RT	128
- of which in line, max.	128
• Number of IO devices with IRT and the option "high flexibility"	128
- of which in line, max.	61
• Number of IO devices with IRT and the option "high performance", max.	64
- of which in line, max.	64
• IRT, supported	Yes
• Prioritized startup supported	Yes
- Number of IO devices, max.	32
• Activation/deactivation of IO devices	Yes
- Number of IO devices that can be simultaneously activated/ deactivated, max.	8
• IO devices changing during operation (partner ports), supported	Yes
- Max. number of IO devices per tool	8
• Device replacement without swap medium	Yes
• Send clock times	250 µs, 500 µs,1 ms; 2 ms, 4 ms (not in the case of IRT with "high flexibility" option)

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Technical specifications (continued)

	6ES7 154-8FB01-0AB0
• Updating time	250 µs to 512 ms (depending on the operating mode, see "IM 154-8 CPU Interface Module" operating instructions for more details)
• Address area	
- Inputs, max.	2 048 byte
- Outputs, max.	2 048 byte
• User data per address area, max.	
- User data consistency, max.	1 024 byte
PROFINET IO device	
• Services	
- PG/OP communication	Yes
- Routing	Yes
- S7 routing	Yes
- S7 communication	Yes; with loadable FBs, max. configurable connections: 14, max. number of instances: 32
- Isochronous mode	No
- Open IE communication	Yes; via TCP/IP, ISO on TCP, UDP
- IRT, supported	Yes
- PROFIenergy, supported	Yes; with SFB 73 / 74 prepared for loadable PROFIenergy standard FB for I-Device
- Shared device, supported	Yes
- Number of IO controllers with shared device, max.	2
• Transfer memory	
- Inputs, max.	1 440 byte; per IO controller with shared device
- Outputs, max.	1 440 byte; per IO controller with shared device
• Submodules	
- Number, max.	64
- User data per submodule, max.	1 024 byte
PROFINET CBA	
• acyclic transmission	Yes
• cyclic transmission	Yes
Open IE communication	
• Open IE communication, supported	Yes
• Number of connections, max.	8
• Local port numbers used at the system end	0, 20, 21, 23, 25, 80, 102, 135, 161, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535
• Keep-alive function, supported	Yes
Isochronous mode	
Isochronous mode	Yes; Via PROFIBUS DP or PROFINET interface

	6ES7 154-8FB01-0AB0
Programming	
Programming language	
• STEP 7	Yes; V5.5 or higher
• LAD	Yes
• FBD	Yes
• STL	Yes
• SCL	Yes
• CFC	Yes
• GRAPH	Yes
• HiGraph®	Yes
Command set	see instruction list
Nesting levels	8
Know-how protection	
• User program protection/ password protection	Yes
• Block encryption	Yes; with S7 block Privacy
System functions (SFC)	See instruction list
System function blocks (SFB)	See instruction list
Galvanic isolation	
between backplane bus and electronics	No
between backplane bus and all other circuit components	Yes
between supply and all other circuits	Yes
Standards, approvals, certificates	
CE mark	Yes
CSA approval	No
C-TICK	Yes
cULus	Yes
FM approval	No
Dimensions and weight	
Dimensions	
• Width	135 mm
• Height	130 mm
• Depth	65 mm; 60 mm without cover for RJ45 socket; 65 mm with cover for RJ45 socket
Weight	
• Weight, approx.	720 g

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Ordering data	Order No.
IM 154-8 F PN/DP CPU interface module, V3.2	**6ES7 154-8FB01-0AB0**
Fail-safe PROFINET IO controller to operate distributed I/Os on PROFINET, with integrated PLC functionality	
Distributed Safety V5.4 programming tool	
Task: Software for configuring fail-safe application programs for SIMATIC S7-300F, S7-400F, ET 200S	
Requirements: 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 V5.3 to V5.4; Floating license for 1 user	
Accessories	
MMC 64 KB [1]	**6ES7 953-8LF20-0AA0**
for program backup	
MMC 128 KB [1]	**6ES7 953-8LG20-0AA0**
for program backup	
MMC 512 KB [1]	**6ES7 953-8LJ20-0AA0**
for program backup	
MMC 2 MB [1]	**6ES7 953-8LL20-0AA0**
for program backup and/or firmware updates	
MMC 4 MB [1]	**6ES7 953-8LM20-0AA0**
for program backup	
MMC 8 MB [1]	**6ES7 953-8LP20-0AA0**
for program backup	
Connection module	**6ES7 194-4AN00-0AA0**
For CPU IM154-8 PN/DP, with 4 x M12 and 2 x 7/8", to connect PROFINET and PROFIBUS DP	
SCALANCE X-200 Industrial Ethernet Switches	
With integral SNMP access, Web diagnostics, copper cable diagnostics and PROFINET diagnostics, for setting up linear, star and ring structures SCALANCE X208PRO, in degree of protection IP65, with eight 10/100 Mbit/s M12 ports, incl. eleven M12 dust caps	**6GK5 208-0HA00-2AA6**

[1] An MMC is essential for operating the CPU

	Order No.
Industrial Ethernet FC RJ45 Plug 90	
RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 90° cable outlet	
1 unit	**6GK1 901-1BB20-2AA0**
10 units	**6GK1 901-1BB20-2AB0**
Industrial Ethernet 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 unit	**6GK1 901-1BB10-2AA0**
10 units	**6GK1 901-1BB10-2AB0**
50 units	**6GK1 901-1BB10-2AE0**
Industrial Ethernet Fast Connect installation cables	
• Fast Connect standard cable	**6XV1 840-2AH10**
• Fast Connect trailing cable	**6XV1 840-3AH10**
• Fast Connect marine cable	**6XV1 840-4AH10**
Industrial Ethernet FastConnect installation cables	
• **IE FC TP Trailing Cable GP 2 x 2**; Sold by the meter, max. order quantity 1000 m; Minimum order quantity 20 m	**6XV1 870-2D**
• **IE TP Torsion Cable GP 2 x 2**; Sold by the meter, max. order quantity 1000 m; Minimum order quantity 20 m	**6XV1 870-2F**
Industrial Ethernet Fast Connect	
Stripping Tool	**6GK1 901-1GA00**

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Ordering data

		Order No.
IE Connecting Cable M12-180/ M12-180		
Preassembled IE FC TP Trailing Cable GP 2 x 2 (PROFINET Type C) with two 4-pin M12 plugs (4-pin, D-coded), degree of protection IP65/IP67, length:		
0.3 m		**6XV1 870-8AE30**
0.5 m		**6XV1 870-8AE50**
1.0 m		**6XV1 870-8AH10**
1.5 m		**6XV1 870-8AH15**
2.0 m		**6XV1 870-8AH20**
3.0 m		**6XV1 870-8AH30**
5.0 m		**6XV1 870-8AH50**
10 m		**6XV1 870-8AN10**
15 m		**6XV1 870-8AN15**
PROFINET M12 connecting cable, trailing cable preassembled at both ends with angled M12 connectors (male insert)		
3.0 m	F	**3RK1 902-2NB30**
5.0 m	F	**3RK1 902-2NB50**
10 m	F	**3RK1 902-2NC10**
PROFINET M12 connecting cable, trailing cable preassembled at one end with angled M12 connector (male insert at one end, other end unconnected)		
3.0 m	F	**3RK1 902-2HB30**
5.0 m	F	**3RK1 902-2HB50**
10 m	F	**3RK1 902-2HC10**
IE FC M12 Plug PRO		
PROFINET M12 plug connector, D-coded with fast connection system, axial cable outlet		
1 unit	I	**6GK1 901-0DB20-6AA0**
8 units	I	**6GK1 901-0DB20-6AA8**
PROFINET M12 plug connector, D-coded, angled		**3RK1 902-2DA00**
IE panel feedthrough		
Cabinet feedthrough for converting from the M12 connection system (D-coded, IP65/IP67) to the RJ45 connection system (IP20), 1 pack = 5 units	I	**6GK1 901-0DM20-2AA5**

		Order No.
7/8" connecting cable to power supply		
5-core, 5 x 1.5 mm^2, trailing type, preassembled with two 7/8" connectors (axial cable outlet), 5-pin, up to 50 m		
• 1.5 m long		**6XV1 822-5BH15**
• 2.0 m long		**6XV1 822-5BH20**
• 3.0 m long		**6XV1 822-5BH30**
• 5.0 m long		**6XV1 822-5BH50**
• 10 m long		**6XV1 822-5BN10**
• 15 m long		**6XV1 822-5BN15**
• Other special lengths with 90° or 180° cable outlet		See support.automation.siemens.com/WW/view/en/26999294
Power cable, can be trailed, 5 x 1.5 mm^2, preassembled at both ends with 7/8" angled connectors (female insert at one end, male insert at the other end)		
• 3.0 m long	F	**3RK1 902-3NB30**
• 5.0 m long	F	**3RK1 902-3NB50**
• 10 m long	F	**3RK1 902-3NC10**
• Power cable, can be trailed, 5 x 1.5 mm^2, preassembled at one end with 7/8" angled connector with female insert (female insert at one end, other end unconnected)		
• 3.0 m long	F	**3RK1 902-3GB30**
• 5.0 m long	F	**3RK1 902-3GB50**
• 10 m long	F	**3RK1 902-3GC10**
Power line		**6XV1 830-8AH10**
5-core, 5 x 1.5 mm^2, trailing type, sold by the meter, minimum order quantity 20 m, maximum order quantity 1000 m		
7/8" cable connector		
For ET 200eco, with axial cable outlet		
• with male insert, 5 per pack		**6GK1 905-0FA00**
• with female insert, 5 per pack		**6GK1 905-0FB00**
• angled, with female insert, 1 unit	F	**3RK1 902-3DA00**
• angled, with male insert, 1 unit	F	**3RK1 902-3BA00**
7/8" cover cap, 10 per pack		**6ES7 194-3JA00-0AA0**
Twisted Pair cables 4x2 with RJ45 connectors		
0.5 m long		**6XV1 870-3QE50**
1 m long		**6XV1 870-3QH10**
2 m long		**6XV1 870-3QH20**
6 m long		**6XV1 870-3QH60**
10 m long		**6XV1 870-3QN10**

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Ordering data	Order No.
Crossed Twisted Pair cables 4x2 with RJ45 connectors	
0.5 m long	**6XV1 870-3RE50**
1 m long	**6XV1 870-3RH10**
2 m long	**6XV1 870-3RH20**
6 m long	**6XV1 870-3RH60**
10 m long	**6XV1 870-3RN10**
M12 sealing cap	**3RX9 802-0AA00**
For protection of unused M12 connections with ET 200pro	
M12 sealing caps with female thread I	**6ES7 194-4JD60-0AA0**
5 units	
PROFIBUS M12 connecting cable	
Preassembled, with two 5-pole M12 connectors/sockets, up to 100 m; length:	
• 1.5 m	**6XV1 830-3DH15**
• 2.0 m	**6XV1 830-3DH20**
• 3.0 m	**6XV1 830-3DH30**
• 5.0 m	**6XV1 830-3DH50**
• 10 m	**6XV1 830-3DN10**
• 15 m	**6XV1 830-3DN15**
Other special lengths with 90° or 180° cable outlet	See http://support.automation.siemens.com/WW/view/en/26999294
M12 bus termination connector for PROFIBUS, female insert	**6GK1 905-0ED00**
M12 bus termination connector for PROFIBUS, male insert	**6GK1 905-0EC00**
M12 plug connector, axial outlet, with male insert	**6GK1 905-0EA00**

	Order No.
PROFIBUS FC S tandard Cable GP	**6XV1 830-0EH10**
Standard type specially designed for fast assembly, 2-core, shielded,	
Sold by the meter; Max. delivery unit 1000 m, Minimum order quantity 20 m	**6XV1 830-3EH10**
PROFIBUS FC Trailing Cable	
2-core, shielded	**6XV1 830-0GH10**
PROFIBUS FC Food Cable	
2-core, shielded	
Sold by the meter; Max. delivery unit 1000 m, Minimum order quantity 20 m	**6XV1 830-0JH10**
PROFIBUS FC Robust Cable	
2-core, shielded	
Sold by the meter; Max. delivery unit 1000 m, Minimum order quantity 20 m	
PROFIBUS M12 cable connector	
5-pole, B-coded, metal casing, 1 pack = 5 units	**6GK1 905-0EB00**
• Female insert	**6GK1 905-0ED00**

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

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Overview



- Expansion modules with digital inputs/outputs for connection of actuators/sensors
- With scalable diagnostics
  - Standard modules with module-specific diagnostics
  - High-feature module with channel-specific diagnostics and parameterizable input delay or hardware interrupts
- Double or single assignment can be implemented for each M12 in the case of the 8DI and 8DO module by selecting CM IO 4 x M12 or CM IO 8 x M12

Technical specifications

	6ES7 141-4BF00-0AA0	6ES7 141-4BF00-0AB0	6ES7 141-4BH00-0AA0
Supply voltages			
Rated value			
• 24 V DC	Yes	Yes	Yes
• permissible range, lower limit (DC)	20.4 V	20.4 V	20.4 V
• permissible range, upper limit (DC)	28.8 V	28.8 V	28.8 V
• Reverse polarity protection	Yes; against destruction; encoder power supply outputs applied with reversed polarity	Yes; against destruction; load increasing	Yes; against destruction; encoder power supply outputs applied with reversed polarity
Current consumption			
from backplane bus 3.3 V DC, max.	20 mA	40 mA	20 mA
from supply voltage 1L+, max.	20 mA	20 mA	30 mA
Power losses			
Power loss, typ.	2.5 W	2.5 W	3 W
Address area			
Occupied address area			
• Inputs	1 byte	1 byte	2 byte
FH technology			
Module for fail-safe applications	No	No	
Isochronous mode			
Isochronous mode	No	No	
Digital inputs			
Number of digital inputs	8	8	16
Number of simultaneously controllable inputs			
• all mounting positions			
- up to 55 °C, max.	8	8	16
Input characteristic curve acc. to IEC 1131, Type 1	Yes	No	Yes
Input characteristic curve acc. to IEC 1131, Type 2	No	Yes	
Input voltage			
• Rated value, DC	24 V	24 V	24 V
• for signal "0"	-3 to +5 V	-3 to +5 V	-3 to +5 V
• for signal "1"	13 to 30 V	11 to 30 V	11 to 30 V
Input current			
• for signal "1", typ.	7 mA	7 mA	4 mA

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Technical specifications (continued)

	6ES7 141-4BF00-0AA0	6ES7 141-4BF00-0AB0	6ES7 141-4BH00-0AA0
Input delay (for rated value of input voltage)			
• for standard inputs			
- parameterizable	No	Yes	No
- at "0" to "1", min.	1.2 ms	0.5 ms; 0.5 ms/ 3ms/ 15 ms/ 20 ms	1.2 ms
- at "0" to "1", max.	4.8 ms	20 ms	4.8 ms
- at "1" to "0", min.	1.2 ms	0.5 ms; 0.5 ms/3 ms/15 ms/20 ms	0.7 ms
- at "1" to "0", max.	4.8 ms	20 ms	3 ms
Cable length			
• Cable length, shielded, max.	30 m	30 m	30 m
• Cable length unshielded, max.	30 m	30 m	30 m
Encoder supply			
Number of outputs	8	8	8
Output current			
• up to 55 °C, max.	1 A	1 A	1 A
Encoder			
Connectable encoders			
• 2-wire BEROS	Yes	Yes	Yes
- permissible quiescent current (2-wire BEROS), max.	1.5 mA	1.5 mA	1.5 mA
Parameter			
Diagnostic alarm		yes	
Process alarm		for 6 channels	
Diagnostics: wire break		channel by channel	
Diagnostics: short circuit	Sensor supply to M; module by module	channel by channel	
Alarms/diagnostics/status information			
Diagnostics			
• Diagnostic functions	Yes	Yes; channel by channel, parameterizable	Yes
• Diagnostic information readable	Yes	Yes	Yes
• Wire break		Yes; monitoring, I < 0.3 mA	
• Short circuit	Yes; Sensor supply to M; module by module	Yes	Yes; sensor supply to M; module by module
• Group error			Yes
diagnostic indication LED			
• Group error SF (red)	Yes	Yes	Yes
• Status indicator digital input (green)	Yes; per channel	Yes; per channel	Yes; per channel
Isolation			
Isolation checked with	500 V DC	500 V DC	500 V DC
Galvanic isolation			
Galvanic isolation digital inputs			
• between the channels	No	No	No
• between the channels and the backplane bus	Yes	Yes	Yes
Permissible potential difference between different circuits	75 V DC / 60 V AC	75 V DC / 60 V AC	75 V DC / 60 V AC
Degree of protection IP65	Yes	Yes	
IP66	Yes	Yes	
IP67	Yes	Yes	Yes
Dimensions and weight			
Dimensions			
• Width	45 mm	45 mm	45 mm
• Height	130 mm	130 mm	130 mm
• Depth	35 mm	35 mm; without terminal module	35 mm
Weight			
• Weight, approx.	140 g	140 g	140 g

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Technical specifications (continued)

			6ES7 142-4BF00-0AA0
Supply voltages			
Load voltage 2L+			
• Rated value (DC)	24 V	24 V	24 V
• Short-circuit protection	Yes; per channel, electronic	Yes; per channel, electronic	Yes; per channel, electronic
• Reverse polarity protection	Yes; against destruction; load increasing	Yes; against destruction; load increasing	Yes; against destruction; load increasing
Current consumption			
from load voltage 2L+ (without load), max.	20 mA	40 mA	30 mA
from backplane bus 3.3 V DC, max.	20 mA	40 mA	30 mA
Power losses			
Power loss, typ.	2 W	2.5 W	2 W
Address area			
Address space per module			
• with packing	4 bit	4 bit	8 bit
• without packing	1 byte	1 byte	1 byte
FH technology			
Module for fail-safe applications	No	No	No
Digital outputs			
Number of digital outputs	4	4	8
Short-circuit protection	Yes; per channel, electronic	Yes; per channel, electronic	Yes; per channel, electronic
• Response threshold, typ.	3	3	0.7
Limitation of inductive shutdown voltage to	2L+ (-47 V)	2L+ (-47 V)	2L+ (-47 V)
Lamp load, max.	10 W	10 W	5 W
Controlling a digital input	Yes	Yes	Yes; isolation between 1L+ and 2L+ is no longer provided, as 1M and 2M are jumpered
Output voltage			
• for signal "1", min.	2L+ (-0.8 V)	2L+ (-0.8 V)	2L+ (-0.8 V)
Output current			
• for signal "1" rated value	2 A	2 A	0.5 A
• for signal "0" residual current, max.	0.5 mA	0.5 mA	0.5 mA
Parallel switching of 2 outputs			
• for increased power	No	No	No
• for redundant control of a load	Yes	Yes	Yes
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.	1 Hz	1 Hz	1 Hz
Aggregate current of outputs (per group)			
• up to 55 °C, max.	4 A	4 A	4 A
Load resistance range			
• lower limit	12 Ω	12 Ω	48 Ω
• upper limit	4 kΩ	4 kΩ	4 kΩ
Cable length			
• Cable length, shielded, max.	30 m	30 m	30 m
• Cable length unshielded, max.	30 m	30 m	30 m

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Technical specifications (continued)

			6ES7 142-4BF00-0AA0
Parameter			
Diagnostics: wire break		channel by channel	
Diagnostics: short circuit		channel by channel	
Behavior on CPU/Master STOP		channel by channel	
Alarms/diagnostics/status information			
Substitute values connectable		Yes	
Alarms			
• Diagnostic alarm		Yes	
Diagnostics			
• Diagnostic functions	Yes	Yes	Yes
• Diagnostic information readable	Yes	Yes	Yes
• Wire break		Yes	
• Short circuit	Yes; short-circuit of outputs to M; module by module	Yes	Yes; short-circuit of outputs to M; module by module
Diagnostic indication LED			
• Group error SF (red)	Yes	Yes	Yes
• Status indicator digital output (green)	Yes	Yes	Yes
• Channel error indicator F (red)		Yes	
Isolation			
Isolation checked with	500 V DC	500 V DC	500 V DC
Galvanic isolation			
between backplane bus and all other circuit components		Yes	
between the channels and backplane bus		Yes	
Galvanic isolation digital outputs			
• between the channels	No	No	No
• between the channels and the backplane bus	Yes	Yes	Yes
Permissible potential difference			
between different circuits		75 V DC / 60 V AC	
Dimensions and weight			
Dimensions			
• Width	45 mm	45 mm	45 mm
• Height	130 mm	130 mm	130 mm
• Depth	35 mm	35 mm; without terminal module	35 mm
Weight			
• Weight, approx.	140 g	140 g	140 g

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Technical specifications (continued)

	6ES7 143-4BF00-0AA0
Supply voltages	
Rated value	
• 24 V DC	Yes
• permissible range, lower limit (DC)	20.4 V
• permissible range, upper limit (DC)	28.8 V
• Reverse polarity protection	Yes
Load voltage 2L+	
• Rated value (DC)	24 V
• permissible range, lower limit (DC)	20.4 V
• permissible range, upper limit (DC)	28.8 V
• Reverse polarity protection	Yes
Current consumption	
from load voltage 1L+ (unswitched voltage)	20 mA
from load voltage 2L+, max.	20 mA
Power losses	
Power loss, typ.	3 W
Digital inputs	
Number of digital inputs	4
Number of simultaneously controllable inputs	
• all mounting positions	
- Concurrently controllable inputs, up to 60 °C	4; Up to 55 °C
Input characteristic curve acc. to IEC 1131, Type 3	Yes
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)	1.5 mA
• for signal "1", typ.	7 mA
Input delay (for rated value of input voltage)	
• for standard inputs	
- at "0" to "1", max.	4.8 ms
- at "1" to "0", max.	4.8 ms
Cable length	
• Cable length unshielded, max.	30 m
Digital outputs	
Number of digital outputs	8; 4 DO fixed, 4 DIO parameterizable
• in groups of	2
Short-circuit protection	Yes; per channel, electronic
• Response threshold, typ.	0.7 A
Limitation of inductive shutdown voltage to	Typ. (L1+, L2+) -47 V

	6ES7 143-4BF00-0AA0
Switching capacity of the outputs	
• on lamp load, max.	5 W
Controlling a digital input	Yes
Output current	
• for signal "1" rated value	0.5 A
• for signal "0" residual current, max.	0.5 mA
Parallel switching of 2 outputs	
• for increased power	No
• for redundant control of a load	Yes
Switching frequency	
• with resistive load, max.	100 Hz
• with inductive load, max.	0.5 Hz
• on lamp load, max.	1 Hz
Aggregate current of outputs (per group)	
• up to 55 °C, max.	2 A
Cable length	
• Cable length unshielded, max.	30 m
Encoder supply	
Number of outputs	4
Output current, rated value	1 A
24 V encoder supply	
• Short-circuit protection	Yes
Alarms/diagnostics/status information	
Status indicator	Yes; Green LED
Alarms	
• Diagnostic alarm	Yes
Diagnostics	
• Diagnostic functions	Yes
• Diagnostic information readable	Yes
• Short circuit	Yes; short-circuit of outputs to ground; module by module
• Short circuit encoder supply	Yes; per module
• Group error	Yes
Isolation	
tested with	
• 24 V DC circuits	500 V
Galvanic isolation	
between the load voltages	Yes
between load voltage and all other switching components	Yes
Galvanic isolation digital inputs	
• between the channels	No
Permissible potential difference	
between different circuits	75 V DC/60 V AC
Dimensions and weight	
Dimensions	
• Width	45 mm
• Height	130 mm
• Depth	35 mm
Weight	
• Weight	140 g

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Ordering data	Order No.
8 DI digital input module I 24 V DC, with module-specific diagnostics, including bus module. Connection module must be ordered separately	**6ES7 141-4BF00-0AA0**
8 DI High Feature digital input module I 24 V DC, with channel-specific diagnostics, including bus module Connection module must be ordered separately	**6ES7 141-4BF00-0AB0**
16 DI digital input module 24 V DC, with module-specific diagnostics, including bus module. Connection module 6ES7 194-4CB50-0AA0 must be ordered separately	**6ES7 141-4BH00-0AA0**
4 DO digital output module 24 V DC, 2 A, with module-specific diagnostics, including bus module. Connection module must be ordered separately	**6ES7 142-4BD00-0AA0**
4 DO High Feature digital output module 24 V DC, 2 A, with channel-specific diagnostics, including bus module. Connection module must be ordered separately I	**6ES7 142-4BD00-0AB0**
8 DO digital output module 24 V DC, 0.5 A, with module-specific diagnostics, including bus module. Connection module must be ordered separately	**6ES7 142-4BF00-0AA0**
Digital input and output module 4 DIO / 4 DO I 24 V DC, 0.5 A, with module-specific diagnostics, including bus module. Connection module must be ordered separately	**6ES7 143-4BF00-0AA0**
Accessories	
CM IO 4 x M12 connection module 4 M12 sockets for connecting digital or analog sensors or actuators to ET 200pro	**6ES7 194-4CA00-0AA0**
CM IO 4 x M12 inverse connection module 4 sockets M12 for connection of digital actuators to ET 200pro (4 DO and 4 DO HF); 2 x M12 singly occupied, 2 x M12 doubly occupied	**6ES7 194-4CA50-0AA0**
CM IO 8 x M12 connection module 8 M12 sockets for connecting digital sensors or actuators to ET 200pro	**6ES7 194-4CB00-0AA0**
CM IO 8 x M12D connection module 8 M12 sockets for connecting digital sensors or actuators to ET 200pro	**6ES7 194-4CB50-0AA0**
CM IO 8 x M8 connection module I 8 sockets M8 for connection of digital sensors or actuators to ET 200pro	**6ES7 194-4EB00-0AA0**
CM IO 2 x M12 connection module I 2 M12 8-pin sockets; for use with: EM 8 DI, 24 V DC and 8 DO, 24 V DC/0.5 A	**6ES7 194-4FB00-0AA0**
CM IO 1 x M23 connection module I 1 socket M23; for use with: EM 8 DI, 24 V DC and 8 DO, 24 V DC/0.5 A	**6ES7 194-4FA00-0AA0**
Module identification labels For color coding of the CM IOs in the colors of white, red, blue and green; pack with 100 units each	**6ES7 194-4HA00-0AA0**
M12 sealing cap For protection of unused M12 connections with ET 200pro	**3RX9 802-0AA00**
Labels 20 x 7, pale turquoise, 340 units per pack	**3RT1 900-1SB20**
Y circular connector M12 For double connection of sensors via a single cable, 5-pole; cannot be used for F DI 4/8	**6ES7 194-1KA01-0XA0**
Y cable M12 For double connection of I/O by means of a single-cable on ET200, 5-pole	**6ES7 194-6KA00-0XA0**
M8 sealing cap For IP 67 modules	**3RK1 901-1PN00**

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Overview



- Expansion modules with analog inputs and outputs for connecting sensors/actuators
- With diagnostic functionality, limit values and substitute values

Technical specifications

	6ES7 144-4FF00-0AB0	6ES7 144-4GF00-0AB0	6ES7 144-4JF00-0AB0	6ES7 144-4PF00-0AB0
Supply voltages				
Load voltage L+				
• Rated value (DC)	24 V	24 V	24 V	24 V
• Reverse polarity protection	Yes; against destruction	Yes; against destruction	Yes; against destruction	Yes; against destruction
Current consumption				
from load voltage L+ (without load), max.				34 mA; typ.
from backplane bus 3.3 V DC, max.	10 mA	10 mA	10 mA; typically	20 mA; typically
Power losses				
Power loss, typ.	1.1 W	1.1 W	0.7 W	0.7 W
Address area				
Address space per module				
• Address space per module, max.	8 byte	8 byte	8 byte	8 byte
Analog inputs				
Number of analog inputs	4	4	4	4
Cable length, shielded, max.	30 m	30 m	30 m	30 m
Constant measurement current for resistance-type transmitter, typ.			1.25 mA; 1.25 / 0.5 mA depending on measuring range	
Cycle time (all channels) max.	267 ms	267 ms	83 ms; 83 ms at 50 Hz; 69 ms at 60 Hz	Number of active channels per module x basic conversion time
Technical unit for temperature measurement adjustable			Yes	
Input ranges				
• Voltage	Yes	Yes	No	Yes
• Current	No	Yes	No	
• Thermocouple	No	No	No	Yes
• Resistance thermometer	No	No	Yes	
• Resistance	No	No	Yes	

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Technical specifications (continued)

	6ES7 144-4FF00-0AB0	6ES7 144-4GF00-0AB0	6ES7 144-4JF00-0AB0	6ES7 144-4PF00-0AB0
Input ranges (rated values), voltages				
• 1 to 5 V	Yes			
• -10 V to +10 V	Yes			
• Input resistance (-10 V to +10 V)	100 kΩ			
• -5 V to +5 V	Yes			
• -80 mV to +80 mV				Yes
• Input resistance (-80 mV to +80 mV)				10 MΩ
Input ranges (rated values), currents				
• -20 to +20 mA		Yes		
• Input resistance (-20 to +20 mA)		50 Ω		
• 4 to 20 mA		Yes		
• Input resistance (4 to 20 mA)		50 Ω		
Input ranges (rated values), thermoelements				
• Type B				Yes
• Input resistance (Type B)				10 MΩ
• Type E				Yes
• Input resistance (Type E)				10 MΩ
• Type J				Yes
• Input resistance (type J)				10 MΩ
• Type K				Yes
• Input resistance (Type K)				10 MΩ
• Type L				Yes
• Input resistance (Type L)				10 MΩ
• Type N				Yes
• Input resistance (Type N)				10 MΩ
• Type R				Yes
• Input resistance (Type R)				10 MΩ
• Type S				Yes
• Input resistance (Type S)				10 MΩ
• Type T				Yes
• Input resistance (Type T)				10 MΩ
Input ranges (rated values), resistance thermometers				
• Cu 10			No	
• Ni 100			Yes	
• Input resistance (Ni 100)			10 000 kΩ	
• Ni 1000			Yes	
• Input resistance (Ni 1000)			10 000 kΩ	
• Ni 120			Yes	
• Input resistance (Ni 120)			10 000 kΩ	
• Ni 200			Yes	
• Input resistance (Ni 200)			10 000 kΩ	

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Technical specifications (continued)

	6ES7 144-4FF00-0AB0	6ES7 144-4GF00-0AB0	6ES7 144-4JF00-0AB0	6ES7 144-4PF00-0AB0
Input ranges (rated values), resistance thermometers				
• Ni 500			Yes	
• Input resistance (Ni 500)			10 000 kΩ	
• Pt 100			Yes	
• Input resistance (Pt 100)			10 000 kΩ	
• Pt 1000			Yes	
• Input resistance (Pt 1000)			10 000 kΩ	
• Pt 200			Yes	
• Input resistance (Pt 200)			10 000 kΩ	
• Pt 500			Yes	
• Input resistance (Pt 500)			10 000 kΩ	
Input ranges (rated values), resistors				
• 0 to 150 Ohm			Yes	
• Input resistance (0 to 150 Ohm)			10 000 kΩ	
• 0 to 300 Ohm			Yes	
• Input resistance (0 to 300 Ohm)			10 000 kΩ	
• 0 to 600 Ohm			Yes	
• Input resistance (0 to 600 Ohm)			10 000 kΩ	
• 0 to 3000 Ohm			Yes	
• Input resistance (0 to 3000 Ohm)			10 000 kΩ	
Voltage input				
• permissible input voltage for voltage input (destruction limit), max.	35 V			20 V
Current input				
• permissible input current for current input (destruction limit), max.		40 mA		
Characteristic linearization				
• parameterizable			Yes	
• for resistance thermometer			Ptxxx, Nixxx	
Temperature compensation				
• internal temperature compensation				Yes
• external temperature compensation with compensations socket				Yes
Analog value creation				
Measurement principle	integrating	integrating	integrating	integrating
Integrations and conversion time/ resolution per channel				
• Resolution with overrange (bit including sign), max.	15 bit; at +/- 10 V, at +/- 5 V; 14 bit at 0 to 10 V, at 1 to 5 V	15 bit; at +/- -20 mA; 14 bit at 0 to 20 mA, 4 to 20 mA	15 bit; at 150, 300, 600 und 3000 Ohm; otherwise 15 bit + sign	15 bit; + sign
• Integration time, ms	20 / 16,667	20 / 16,667	20 / 16,667	2.5/16.67/20/100 ms
• Interference voltage suppression for interference frequency f1 in Hz	50/60 Hz	50/60 Hz	50/60 Hz	10/50/60/400 Hz
• Conversion time (per channel)	67 ms	67 ms	20.625 ms; 20.625 ms at 50 Hz; 17.25 ms at 60 Hz	4.7/19/22/102 ms

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Technical specifications (continued)

	6ES7 144-4FF00-0AB0	6ES7 144-4GF00-0AB0	6ES7 144-4JF00-0AB0	6ES7 144-4PF00-0AB0
Smoothing of measured values				
• parameterizable	Yes	Yes	Yes	Yes
• Step: None	Yes; 1 x cycle time	Yes; 1 x cycle time	Yes; 1 x cycle time	Yes; 1 x cycle time
• Step: Low	Yes; 4 x cycle time	Yes; 4 x cycle time	Yes; 4 x cycle time	Yes; 4 x cycle time
• Step: Medium	Yes; 16 x cycle time	Yes; 16 x cycle time	Yes; 16 x cycle time	Yes; 16 x cycle time
• Step: High	Yes; 64 x cycle time	Yes; 64 x cycle time	Yes; 64 x cycle time	Yes; 64 x cycle time
Encoder supply				
Short-circuit protection	Yes; per module, electronic to frame	Yes; per module, electronic to frame		
Encoder				
Connection of signal encoders				
• for current measurement as 2-wire transducer		Yes		
• for current measurement as 4-wire transducer		Yes		
• for resistance measurement with 2-conductor connection			Yes; line resistances are also measured	
• for resistance measurement with 3-conductor connection			Yes	
• for resistance measurement with 4-conductor connection			Yes	
Errors/accuracies				
Linearity error (relative to input area)	+/- 0.01 %	+/- 0.01 %	+/- 0.05 %	
Temperature error (relative to input area)	+/- 0.002 %/K	+/- 0.002 %/K	+/- 0.002 %/K	Positive temperature
Crosstalk between the inputs, min.	-50 dB	-50 dB	-50 dB	-90 dB; max.
Repeat accuracy in settled status at 25 °C (relative to input area)	+/- 0.025 %	+/- 0.025 %	+/- 0.015 %	
Operational limit in overall temperature range				
• Voltage, relative to input area	+/- 0.15 %			Positive temperature
• Current, relative to input area		+/- 0.15 %		
• Resistance-type thermometer, relative to input area			+/- 0.175 %	
Basic error limit (operational limit at 25 °C)				
• Voltage, relative to input area	+/- 0.1 %			
• Current, relative to input area		+/- 0.1 %		
• Resistance-type thermometer, relative to input area			+/- 0.125 %	
Interference voltage suppression for f = n x (fl +/- 1%), fl = interference frequency				
• Series mode interference (peak value of interference < rated value of input range), min.	50 dB	50 dB	50 dB	42 dB
• common mode voltage (USS < 2.5 V) , min.	70 dB; Interference voltage < 5 V	70 dB; Interference voltage < 5 V	70 dB; Interference voltage < 5 V	85 dB; Interference voltage < 10 V
Parameter				
Diagnostics: wire break			1	
Load voltage			No	

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Technical specifications (continued)

	6ES7 144-4FF00-0AB0	6ES7 144-4GF00-0AB0	6ES7 144-4JF00-0AB0	6ES7 144-4PF00-0AB0
Measurement type/range			R4L / R3L / R2L/ TR4L / TR3L / TR2L	Deactivated/ +/- 80 mV/ TC-EL Type T (Cu-CuNi)/ TC-EL Type K (NiCr-Ni)/ TC-EL Type B (PtRh-PtRh)/ TC-EL Type N (NiCrSi-NiSi)/ TC-EL Typ E (NiCr-CuNi)/ TC-EL Type R (PtRh-Pt)/ TC-EL Type S (PtRh-Pt)/ TC-EL Type J (Fe-Cu-Ni)/ TC-EL Type L (Fe-CuNi)
Interference frequency suppression			50/60 Hz	10/50/60/400 Hz
Group diagnostics			1	Yes
Overflow/underflow			1	Yes
Comparison point				None/internal/RTD(0)/dyn. ref. temp./fix. ref. temp.
Unit			Degrees C / Degrees F	°C/°F/K
Alarms/diagnostics/status information				
Alarms				
• Diagnostic alarm	Yes; parameterizable	Yes; parameterizable	Yes; parameterizable	Yes; parameterizable
• Limit value alarm		Yes		
• Process alarm	Yes; (limit value alarm), can be parameterized for channel 0	Yes; (limit value alarm), can be parameterized for channel 0	No	No
Diagnostics				
• Diagnostics		Yes		
• Wire break	Yes; at 1 to 5 V	Yes; at 4 to 20 mA	Yes	No
• Short circuit	Yes; at 1 to 5 V	Yes; at 4 to 20 mA		
• Group error		Yes	Yes	
• Overflow/underflow			Yes	Yes
Diagnostic indication LED				
• Group error SF (red)	Yes	Yes	Yes	Yes
Isolation				
Isolation checked with	500 V DC	500 V DC	500 V DC	500 V DC
Galvanic isolation				
Galvanic isolation analog inputs				
• between the channels	No	No	No	No
• between the channels and the backplane bus	Yes	Yes	Yes	Yes
• between the channels and the load voltage L+				Yes
Permissible potential difference				
between the inputs (UCM)			5 Vpp AC	20 Vpp AC
between inputs and MANA (UCM)	5 Vpp AC	5 Vpp AC		
between MANA and M internally (UISO)	500 V DC	500 V DC	500 V DC	
Dimensions and weight				
Dimensions				
• Width	45 mm	45 mm	45 mm	45 mm
• Height	130 mm	130 mm	130 mm	130 mm
• Depth	35 mm	35 mm	35 mm	35 mm
Weight				
• Weight, approx.	150 g	150 g	150 g	150 g

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Technical specifications (continued)

	6ES7 145-4FF00-0AB0	6ES7 145-4GF00-0AB0
Supply voltages		
Load voltage L+		
• Rated value (DC)	24 V	24 V
• Reverse polarity protection	Yes; against destruction	Yes; against destruction
Current consumption		
from backplane bus 3.3 V DC, max.	10 mA	10 mA
Address area		
Address space per module		
• Address space per module, max.	8 byte	8 byte
Analog outputs		
Number of analog outputs	4	4
Cable length, shielded, max.	30 m	30 m
Voltage output, short-circuit protection	Yes; per channel, electronic to chassis	Yes; per module, electronic to chassis
Voltage output, short-circuit current, max..	50 mA	
Current output, no-load voltage, max.		16 V
Cycle time (all channels) max.	3 ms	3 ms
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
Connection of actuators		
• for voltage output 2-conductor connection	Yes	
• for voltage output 4-conductor connection	Yes	
• for current output 2-conductor connection		Yes
• for current output 4-conductor connection		Yes
Load impedance (in rated range of output)		
• with voltage outputs, min.	1 000 Ω	
• with voltage outputs, capacitive load, max.	1 µF	
• with current outputs, max.		600 Ω
• with current outputs, inductive load, max.		1 mH
Destruction limits against externally applied voltages and currents		
• Voltages at the outputs towards MANA	16 V; permanent	
• Current, max.		100 mA
Analog value creation		
Integrations and conversion time/ resolution per channel		
• Resolution with overrange (bit including sign), max.	15 bit; at -10 to +10 V; 14 bit at 1 to 5 V; 15 bit at 0 to 10 V	15 bit; at +/- 20 mA; 14 bit at 0 to 20 mA; 15 bit at 4 to 20 mA
• Conversion time (per channel)	0.7 ms	0.7 ms
Settling time		
• for resistive load	0.1 ms	0.1 ms
• for capacitive load	6 ms	
• for inductive load		1 ms

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Technical specifications (continued)

	6ES7 145-4FF00-0AB0	6ES7 145-4GF00-0AB0
Errors/accuracies		
Output ripple (based on output area, bandwidth 0 to 50 kHz)	+/- 0.02 %	+/- 0.02 %
Linearity error (relative to output area)	+/- 0.1 %	+/- 0.1 %
Temperature error (relative to output area)	+/- 0.01 %	+/- 0.01 %
Repeat accuracy in settled status at 25 °C (relative to output area)	+/- 0.05 %	+/- 0.05 %
Operational limit in overall temperature range		
• Voltage, relative to output area	+/- 0.2 %	
• Current, relative to output area		+/- 0.2 %
Basic error limit (operational limit at 25 °C)		
• Voltage, relative to output area	+/- 0.15 %	
• Current, relative to output area		+/- 0.15 %
Parameter		
Output type/range	1	1
Diagnosis: wire break		1
Diagnosis: short circuit	Outputs; sensor supply to M	Encoder supply to M
Group diagnostics	1	1
Behavior on CPU/Master STOP	1	1
Alarms/diagnostics/status information		
Substitute values connectable	Yes	Yes
Alarms		
• Diagnostic alarm	Yes; parameterizable	Yes; parameterizable
• Process alarm	No	No
Diagnostics		
• Diagnostic functions		Yes
• Diagnostic information readable	Yes	
• Wire break	No	Yes; per channel, not in zero range
• Short circuit	Yes; per channel, not in zero range	
• Short circuit encoder supply	Yes; per module	Yes; per module
Diagnostic indication LED		
• Group error SF (red)	Yes	Yes
Galvanic isolation		
Galvanic isolation analog outputs		
• between the channels	No	No
• between the channels and the backplane bus	Yes	Yes
Dimensions and weight		
Dimensions		
• Width	45 mm	45 mm
• Height	130 mm	130 mm
• Depth	35 mm	35 mm
Weight		
• Weight, approx.	150 g	150 g

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Ordering data	Order No.
4AI U analog input module High Feature, ±10 V; ±5 V; 0 to 10 V; 1 to 5 V, channel-specific diagnostics, including bus module. Connection module must be ordered separately	**6ES7 144-4FF00-0AB0**
4AI I analog input module High Feature, ±20 mA; 0 to 20 mA; 4 to 20 mA, channel-specific diagnostics, including bus module. Connection module must be ordered separately	**6ES7 144-4GF00-0AB0**
4AI RTD analog input module High Feature; resistances: 150, 300, 600 and 3000 Ohm; resistance thermometer: Pt100, 200, 500, 1000, Ni100, 120, 200, 500 and 1000; channel-discrete diagnostics, incl. bus module. Connection module must be ordered separately	**6ES7 144-4JF00-0AB0**
Analog input module 4AI TC High Feature; thermocouples: Type B, E, J, K, L, N, R, S, T; voltage measurement: ±80 mV; channel diagnostics, including bus module. Connection module must be ordered separately	**6ES7 144-4PF00-0AB0**
4AO U analog output module I High Feature, ±10 V; 0 to 10 V; 1 to 5 V, channel-specific diagnostics, including bus module. Connection module must be ordered separately	**6ES7 145-4FF00-0AB0**
4AO I analog output module I High Feature, ±20 mA; 0 to 20 mA; 4 to 20 mA, channel-specific diagnostics, including bus module. Connection module must be ordered separately	**6ES7 145-4GF00-0AB0**
Accessories	
CM IO 4 x M12 connection module 4 M12 sockets for connecting digital or analog sensors or actuators to ET 200pro	**6ES7 194-4CA00-0AA0**
M12 compensation connectors I with integral PT100 for reference point compensation when connecting thermocouples	**6ES7 194-4AB00-0AA0**
Module identification labels For color coding of the CM IOs in the colors of white, red, blue and green; pack with 100 units each	**6ES7 194-4HA00-0AA0**
M12 sealing cap For protection of unused M12 connections with ET 200pro	**3RX9 802-0AA00**

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Overview



Fail-safe digital inputs/outputs with degree of protection IP65/66/67 for application on the machine level without control cabinet

Fail-safe digital inputs

- For fail-safe reading of sensor information (1 or 2 channels)
- Provide integral discrepancy evaluation for 2-out-of-2 signals
- Internal sensor supplies (incl. test function) available

Fail-safe digital outputs

- Fail-safe 2-channel activation (sink/source output) by actuators
- Actuators can be driven by up to 2 A

All modules are certified up to Cat. 4 (EN954-1) and up to SIL 3 (IEC 61508) and feature detailed diagnostics.

The modules support PROFIsafe, both in PROFIBUS, and in PROFINET configurations. They can be used with IM 151-7 F CPU, CPU31xF-2 DP, CPU31xF-2 PN/DP and CPU416F-2.

Technical specifications

	6ES7 148-4FA00-0AB0	6ES7 148-4FC00-0AB0
Supply voltages		
Rated value		
• permissible range, lower limit (DC)	20.4 V	20.4 V
• permissible range, upper limit (DC)	28.8 V	28.8 V
Digital inputs		
Number of digital inputs	16	8
Dimensions and weight		
Dimensions		
• Width	90 mm	90 mm
• Height	130 mm	130 mm
• Depth	65 mm	65 mm

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Ordering data

	Order No.
Fail-safe digital input module 8/16 F-DI PROFIsafe I 24 V DC, including bus module Connection module must be ordered separately	**6ES7 148-4FA00-0AB0**
Fail-safe digital input/output module 4/8 F-DI, 4 F-DO 2 A I 24 V DC, including bus module Connection module must be ordered separately	**6ES7 148-4FC00-0AB0**
Fail-safe electronic module F-Switch PROFIsafe I Three fail-safe PP-switching outputs for safe switching of the rear panel busbar (2L+, F0, F1); two fail-safe digital inputs, 45 mm; usable up to cat. 4 (EN 954)/SIL3 (IEC 61508)	**6ES7 148-4FS00-0AB0**

	Order No.
Accessories	
Connection module I For the fail-safe electronic module F-switch PROFIsafe	**6ES7 194-4DA00-0AA0**
Connection module For the fail-safe electronic module 4/8 F-DI/4 F DO, 24 V DC/2 A	**6ES7 194-4DC00-0AA0**
Connection module For the fail-safe electronic module 8/16 F-DI, 24 V DC/2 A	**6ES7 194-4DD00-0AA0**
PROFIBUS DP interface module IM154-2 I Including termination module	**6ES7 154-2AA01-0AB0**
PROFINET interface module IM154-4 PN Including termination module	**6ES7 154-4AB10-0AB0**
M12 sealing cap For protection of unused M12 connections with ET 200pro	**3RX9 802-0AA00**

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Overview



- PM-E 24 V DC power module

Technical specifications

	6ES7 148-4CA00-0AA0
Power supply	
Input voltage	
• Rated value, 24 V DC	Yes
Current carrying capacity	
• Current carrying capacity, max.	10 A; up to 55 °C (on the internal busbars of the ET 200pro)
Supply voltages	
Load voltage 2L+	
• Short-circuit protection	Yes; via an exchangeable fuse in the power module
• Reverse polarity protection	Yes; against destruction
Parameter	
Missing load voltage	Potential group of the power module
Alarms/diagnostics/status information	
Diagnostics	
• Diagnostic functions	Yes
• Diagnostic information readable	Yes
• Missing load voltage	Yes
Diagnostic indication LED	
• Group error SF (red)	Yes
• Load voltage monitoring DC 24 V (green)	Yes
Isolation	
Isolation checked with	500 V DC
Degree of protection	
IP65	Yes
IP66	Yes
IP67	Yes
Dimensions and weight	
Dimensions	
• Width	15 mm
• Height	81 mm
• Depth	52 mm
Weight	
• Weight, approx.	35 g

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Ordering data	Order No.
PM-E 24 V DC power module I For backfeed and group formation of the 24 V DC load supply for electronic modules within an ET 200pro station.	**6ES7 148-4CA00-0AA0**
Accessories	
CM PM-E ECOFAST connecting module For backfeed of 24 V load voltage, 1 ECOFAST Cu connection	**6ES7 194-4BA00-0AA0**
CM PM-E direct connecting module For backfeed of 24 V load voltage, up to 2 M20 screwed cable glands	**6ES7 194-4BC00-0AA0**
CM PM-E 7/8" connecting module For backfeed of 24 V load voltage, 1 x 7/8"	**6ES7 194-4BD00-0AA0**
CM PM-E PP connection module I For supplying 24-V load voltage, 2 x push-pull, with spare fuse	**6ES7 194-4BE00-0AA0**
Spare fuse 12.5 A quick-response, for interface and power modules, 10 items per package item	**6ES7 194-4HB00-0AA0**
PROFIBUS ECOFAST hybrid cable, copper Trailing-type cable (PUR casing) with two shielded copper cables for PROFIBUS DP and four copper cores of 1.5 mm^2 in cross-section	
Unassembled	
• 50 m	**6XV1 830-7AN50**
• 100 m	**6XV1 830-7AT10**
Preassembled with ECOFAST male and female connector, fixed length	
• 1.5 m	**6XV1 830-7BH15**
• 3 m	**6XV1 830-7BH30**
• 5 m	**6XV1 830-7BH50**
• 10 m	**6XV1 830-7BN10**
• 15 m	**6XV1 830-7BN15**
• 20 m	**6XV1 830-7BN20**
• 25 m	**6XV1 830-7BN25**
• 30 m	**6XV1 830-7BN30**
• 35 m	**6XV1 830-7BN35**
• 40 m	**6XV1 830-7BN40**
• 45 m	**6XV1 830-7BN45**
• 50 m	**6XV1 830-7BN50**

Order No.
PROFIBUS ECOFAST hybrid cable, GP Trailing-type cable with 4 x copper cores and 2 x copper cores, shielded, with UL approval
Unassembled
• 50 m **6XV1 860-4PN50**
• 100 m **6XV1 860-4PT10**
Preassembled with ECOFAST male and female connector
• 1.5 m **6XV1 860-3PH15**
• 3 m **6XV1 860-3PH30**
• 5 m **6XV1 860-3PH50**
• 10 m **6XV1 860-3PN10**
• 15 m **6XV1 860-3PN15**
• 20 m **6XV1 860-3PN20**
• 25 m **6XV1 860-3PN25**
• 30 m **6XV1 860-3PN30**
• 35 m **6XV1 860-3PN35**
• 40 m **6XV1 860-3PN40**
• 45 m **6XV1 860-3PN45**
• 50 m **6XV1 860-3PN50**
ECOFAST cable connector, for user assembly Female connector; ordering unit 5 units — **6GK1 905-0CB00**
PROFIBUS ECOFAST hybrid plug, angled With 2 x shielded copper cores and 4 x 1.5 mm2 copper cores; 5 units; with assembly instructions; female insert — **6GK1 905-0CD00**
Push-Pull cable connector For 1L+/ 2L+, unassembled — **6GK1 907-0AB10-6AA0**
Cover caps for Push-Pull female connectors 5 units — **6ES7 194-4JA50-0AA0**
Accessories for CM PM-E direct
Power line 5-core, 5 x 1.5 mm^2, trailing type, sold by the meter, minimum order quantity 20 m, maximum order quantity 1000 m — **6XV1 830-8AH10**
Accessories for CM PM-E 7/8"
7/8" connecting cable to power supply 5-core, 5 x 1.5 mm^2, trailing type, pre-assembled with two 7/8" connectors, 5-pin
• 1.5 m long **6XV1 822-5BH15**
• 2.0 m long **6XV1 822-5BH20**
• 3.0 m long **6XV1 822-5BH30**
• 5.0 m long **6XV1 822-5BH50**
• 10 m long **6XV1 822-5BN10**
• 15 m long **6XV1 822-5BN15**
7/8" cable connector With axial cable outlet
• with female insert, 5 per pack **6GK1 905-0FB00**

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Overview



- PM-O 2x 24 V DC power module

Technical specifications

	6ES7 148-4CA60-0AA0
Power supply	
Current carrying capacity	
• Current carrying capacity, max.	Output current 2 A for 1L+ and 6 A for 2L+
Supply voltages	
Supply voltage from power module	
• Rated value (DC)	24 V
Load voltage 2L+	
• Short-circuit protection	Yes
• Reverse polarity protection	Yes; against destruction
Parameter	
Remark	Diagnosis short circuit implemented after M for 1L+
Alarms/diagnostics/status information	
Diagnostics	
• Diagnostic functions	Yes
• Diagnostic information readable	Yes
• Fuse blown	No; Indirect diagnosis (short circuit after M for 1L+), since electronic fuse
• Missing load voltage	No

	6ES7 148-4CA60-0AA0
Diagnostic indication LED	
• Rated load voltage PWR (green)	No
• Group error SF (red)	Yes
• Load voltage monitoring 24 V DC (green)	No; signalled in IM or in PM
Isolation	
Isolation checked with	500 V DC
Galvanic isolation	
primary/secondary	No
Degree of protection	
IP65	Yes
IP66	Yes
IP67	Yes
Dimensions and weight	
Dimensions	
• Width	45 mm
• Height	130 mm
• Depth	35 mm
Weight	
• Weight, approx.	150 g

Ordering data

	Order No.
PM-O 2 x 24 V DC power module For drawing the 24 V load voltage 2L+ and electronic/encoder supply voltage 1L+ within an ET 200pro station.	**6ES7 148-4CA60-0AA0**

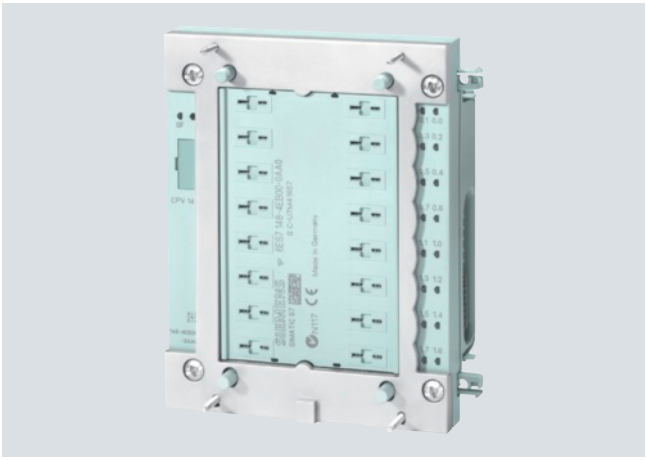
	Order No.
Accessories	
CM PM-O PP connection module I For drawing the 24 V load voltage and electronic/encoder supply voltage, 2 x push-pull connector	**6ES7 194-4BH00-0AA0**
Push-Pull cable connector For 1L+/ 2L+, unassembled	**6GK1 907-0AB10-6AA0**
Cover caps for Push-Pull female connectors 5 units	**6ES7 194-4JA50-0AA0**

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I/O modules
ET 200pro pneumatic interface

Overview



- Interface for holding an original FESTO CPV 10 or CPV 14 compact performance valve terminal
- For using the ET 200pro in applications with flexible pneumatics
- Highly flexible pneumatics due to a variety of valve functions and choice of flow rates

Technical specifications

	6ES7 148-4EA00-0AA0	6ES7 148-4EB00-0AA0
Supply voltages		
Load voltage 2L+		
• Rated value (DC)	24 V	24 V
• Short-circuit protection	Yes	Yes
• Reverse polarity protection	Yes	Yes
Current consumption		
from load voltage 2L+ (without load), max.	20 mA	20 mA
from backplane bus 3.3 V DC, max.	25 mA	25 mA
Power losses		
Power loss, typ.	2.6 W	3.7 W
Address area		
Address space per module		
• without packing	2 byte	2 byte
Digital outputs		
Number of digital outputs	16	16
Output current		
• for signal "1" rated value	12 mA	16 mA
Switching frequency		
• with inductive load, max.	25 Hz	20 Hz
Aggregate current of outputs (per group)		
• up to 55 °C, max.	250 mA; only up to 50 °C, limited by valves	330 mA; only up to 50 °C, limited by valves
Load resistance range		
• lower limit	500 Ω	500 Ω
• upper limit	2 500 Ω	2 500 Ω
Parameter		
Remark	Diagnostic load voltage 2L+	Diagnostic load voltage 2L+
Behavior on CPU/Master STOP	no	
Alarms/diagnostics/status information		
Alarms		
• Diagnostic alarm	Yes	Yes
Diagnostics		
• Diagnostic functions	Yes	Yes
• Diagnostic information readable	Yes	Yes
Diagnostic indication LED		
• Group error SF (red)	Yes	Yes
• Status indicator digital output (green)	Yes	Yes

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Technical specifications (continued)

	6ES7 148-4EA00-0AA0	6ES7 148-4EB00-0AA0
Isolation		
Isolation checked with	500 V DC	500 V DC
tested with		
• Load voltage L+ against backplane bus	500 V DC	500 V DC
Galvanic isolation		
between backplane bus and all other circuit components	Yes	Yes
between the channels and backplane bus	Yes	Yes
Galvanic isolation digital outputs		
• between the channels and the backplane bus	Yes	Yes
Permissible potential difference		
between different circuits	75 V DC / 60 V AC	75 V DC / 60 V AC
Dimensions and weight		
Dimensions		
• Width	90 mm	120 mm
• Height	130 mm	152 mm
• Depth	47 mm	47 mm

Ordering data

		Order No.
EM 148-P pneumatic interface		
DO 16 x P/CPV 10 for direct accomodation of FESTO valve terminal CPV 10 16 DO x P	I	**6ES7 148-4EA00-0AA0**
DO 16 x P/CPV 14 for direct accomodation of FESTO valve terminal CPV 14 16 DO x P	I	**6ES7 148-4EB00-0AA0**

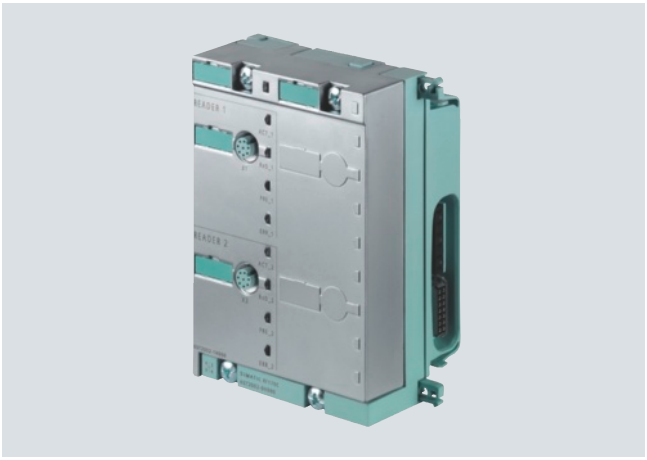
	Order No.
FESTO CPV10 valve terminal	To be purchased by FESTO
FESTO CPV 14 valve terminal	To be purchased by FESTO
	FESTO AG & Co Ruiterstr. 82 D-73732 Esslingen
	More addresses in the Internet at: www.festo.de

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Overview



The SIMATIC RF170C is a communication module for connecting the SIMATIC identification systems to the ET 200pro distributed I/O system. The readers (SLGs) of all RFID systems as well as the MV400 code-reading systems can be operated on the SIMATIC RF170C.

Thanks to its high degree of protection and ruggedness, ET 200pro is particularly suitable for machine-level use. The modular structure with PROFIBUS and PROFINET connection systems allows them to be used in all applications. The uniform plug-in connection system ensures rapid commissioning.

Technical specifications

Communication module	SIMATIC RF170C
Ambient temperature	
• During operation	-25 … 55 °C
• During storage	-40 … +70 °C 20 K/h
Relative humidity	5 … max. 100%
Atmospheric pressure	795 … 1 080 hPa
Resistance to shock	as for ET 200pro
Vibration	as for ET 200pro
Supply voltage	
• Rated value	24 V DC
• Permissible range	20.4 … 28.8 V DC
Current consumption	
• Without reader	typ. 130 mA
• With 2 readers	Max. 1 000 mA
Enclosure	
• Degree of protection	IP67
• Enclosure material	Thermoplastic (fiberglass reinforced)
• Housing color	IP Basic 714
Dimensions W x H x D (mm)	
• SIMATIC RF170C without connection block	90 x 130 x 35
• SIMATIC RF170C with connection block	90 x 130 x 60
Weight	
• Without connection block	Approx. 270 g
• With connection block	Approx. 770 g
Serial reader interface (gross transmission rate) MOBY U/D, RF200 / RF300 / RF600	19 200, 57 600, 115 200 bit/s
Connectors	2 x connector plug M12, 8-pin
Cable length to reader	
• Standard length	2 m
• Optional preassembled cables	5 m, 10 m, 20 m, 50 m
• Self-assembled cables	Reader-dependent, up to 1 000 m
Supply voltage to reader	24 V
Max. current; 2 readers connected	0.4 A per reader
Max. current; 1 readers connected	0.8 A per reader

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Ordering data		Order No.
SIMATIC RF170C communication module For connecting to the distributed I/O system ET 200pro	I	**6GT2 002-0HD00**
Accessories		
Connection block for SIMATIC RF170C For connecting 2 readers via an M12 connector	I	**6GT2 002-1HD00**
Reader cable for MOBY U PUR material, CMG approved, suitable for cable carriers		
2 m		**6GT2 091-4FH20**
5 m		**6GT2 091-4FH50**
Reader cable for MOBY D PUR material, CMG approved, suitable for cable carriers, 2 m		**6GT2 691-4FH20**
Reader cable for SIMATIC RF200 / RF300 / RF600 / MV400 Or extension cable MOBY U/D and SIMATIC RF200 / RF300 / RF600 / MV400, PUR material, CMG approved, suitable for cable carriers, straight connector		
2 m		**6GT2 891-4FH20**
5 m		**6GT2 891-4FH50**
10 m		**6GT2 891-4FN10**
20 m		**6GT2 891-4FN20**
50 m		**6GT2 891-4FN50**
M12 Reader cable SIMATIC RF200 / RF300 pre-assembled, between ASM 456, RF170C, RF180C, RF182C and reader, material PUR, plug angled at reader, 2 m		**6GT2 891-4JH20**
M12 sealing caps for unused reader connections 10 units minimum order quantity, price per 100 units		**3RX9 802-0AA00**
DVD "RFID Systems Software & Documentation"	J	**6GT2 080-2AA20**

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SIMATIC ET200pro PS

Overview



SIMATIC ET200pro PS, the power supply unit with degree of protection IP67, is used as electronic/encoder and load voltage supply for the new I/O device. With signaling contact for "24 V OK" and "Overtemperature" as well as a second connector for looping through the input voltage.

Technical specifications

Order No.	6ES7 148-4PC00-0HA0
Product	**SIMATIC ET200pro PS**
Power supply, type	**24 V/8 A**
Input	
Input	3-phase AC
Voltage range	340 … 550 V
Note	320 ... 340 V for max. 1 min
Wide-range input	Yes
Overvoltage resistance	Implemented internally with varistors
Mains buffering at Iout rated, min.	15 ms
Mains buffering	at V_{in} = 400 V
Rated line frequency • 1 • 2	 50 Hz 60 Hz
Rated line range	45 … 66 Hz
Input current • at nominal level of the input voltage 400 V nominal value	 0.5 A
Switch-on current limiting (+25 °C), max.	40 A
Duration of current limiting at 25 °C • typical • maximum	
Inrush current A^2s	3.5 $A^2 \cdot s$
Built-in incoming fuse	internal, 4 A
Protection in the mains power input (IEC 898)	Required: Circuit breaker 2.2 ... 3.2 A 3RV1021-1DA10 or 3RV1721-1DD10 (UL 489)
Output	
Output	controlled, isolated DC voltage
Rated voltage	24 V
Total tolerance, static ±	3 %
Static mains compensation, approx.	0.5 %
Static load balancing, approx.	0.5 %

Order No.	6ES7 148-4PC00-0HA0
Product	**SIMATIC ET200pro PS**
Power supply, type	**24 V/8 A**
Residual ripple peak-peak, max.	200 mV
Residual ripple peak-peak, typ.	
Spikes peak-peak, max. (bandwidth: 20 MHz) • max.	250 mV
Product feature output voltage adjustable	No
Output voltage setting	-
Status display	Green LED for 24 V OK
Signaling	max. 30 V, 10 mA; Power-Good (High-Pegel 1L+ for Vout in range 21.3 ... 29 V); Overtemperature warning at least 30 s before switch-off (high level 1L+ when the max. internal temperature is exceeded)
On/off behavior	Overshoot of Vout < 2 %
Startup delay, max.	1.5 s
Voltage rise, typ.	40 ms
Rated current value Iout rated	8 A
Current range	0 A
Current range up to +55 °C	8 A
delivered active power typ.	192 W
short-term overload current at short-circuit during run-up typical	50 A
Duration of overloading ability for excess current on short-circuiting during the start-up	100 ms
Short-term overload current at short-circuit during operation typical	50 A
Duration of overloading ability for excess current on short-circuiting during the operational phase	100 ms
Parallel switching for enhanced performance	No

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Technical specifications (continued)

Order No.	6ES7 148-4PC00-0HA0
Product	**SIMATIC ET200pro PS**
Power supply, type	**24 V/8 A**
Efficiency	
Efficiency at Vout rated, Iout rated, approx.	88 %
Power loss at Vout rated, Iout rated, approx.	25 W
Closed-loop control	
Dynamic mains compensation (Vin rated ±15 %), max.	0.5 %
Dynamic load smoothing (Iout: 50/100/50 %), Uout ± typ.	1 %
Setting time maximum	2 ms
Protection and monitoring	
Output overvoltage protection	< 33 V
Current limitation, typ.	9.4 A
Characteristic feature of the output short-circuit protected	Yes
Short-circuit protection	Electronic shutdown, automatic restart
Enduring short circuit current Effective level	
• maximum	10 A
Overload/short-circuit indicator	-
Safety	
Primary/secondary isolation	Yes
Potential separation	Protective extra low output voltage Vout according to EN 60950-1 and EN 50178
Protection class	Class I
stray current	
• maximum	3.5 mA
• typical	0.4 mA
CE mark	Yes
UL/CSA approval	No
UL/cUL (CSA) approval	in preparation
FM approval	No
CB approval	Yes
Marine approval	-
Degree of protection (EN 60529)	IP67, enclosure type 4 indoor

Order No.	6ES7 148-4PC00-0HA0
Product	**SIMATIC ET200pro PS**
Power supply, type	**24 V/8 A**
EMC	
Emitted interference	EN 55022 Class A
Supply harmonics limitation	-
Noise immunity	EN 61000-6-2
Operating data	
Ambient temparature	
• in operation	-25 … +55 °C
Note	with natural convection
Ambient temparature	
• on transport	-40 … +70 °C
Ambient temparature	
• in storage	-40 … +70 °C
Humidity class according to EN 60721	Climate class 3K3, no condensation
Mechanics	
Connection technology	screw-type terminals
Connections	
• Supply input	L1, L2, L3, PE: Plug connector HAN Q4/2
• Output	L+, M: 2 x 1.5 mm² each (4-pole cable for +/- with open, labeled ends, 4 x 1.5 mm²)
• Auxiliary	Alarm signals: M12 plug-in connector 5-pin
Width of the housing	310 mm
Height of the housing	135 mm
Depth of the housing	90 mm
Weight, approx.	2.8 kg
Product feature of the housing housing for side-by-side mounting	No
Type of fixing	
• wall-mounting	Yes
• cap rail mounting	No
Type of attachment S7-300 rail mounting	No
Installation	Can be mounted onto ET200pro mounting rail
Electrical accessories	Power connector (Input: 3RK1911-2BE30 (6 mm²)) (Output: 3RK1911-2BF10 (4 mm²))

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SIMATIC ET200pro PS

Ordering data

		Order No.
SIMATIC ET 200pro PS	I	**6ES7 148-4PC00-0HA0**
Stabilized power supply in the design of the distributed I/O system, permitting the loop-through of energy to further modules; with degree of protection IP67; input: 400-480 V 3 AC Output: 24 V DC/8 A		

		Order No.
Accessories		
Power connection plug		
For connecting to the distributed I/O system		
• For X1 (6 mm^2)		**3RK1 911-2BE30**
• For X2 (6 mm^2)		**3RK1 911-2BF10**
Sealing cap		
For 9-pole power sockets		
• X2 (1 unit)		**3RK1 902-0CJ0**
• X2 (10 units)	F	**3RK1 902-0CK00**

F: Subject to export regulations AL: N and ECCN: EAR99
I: Subject to export regulations AL: N and ECCN: EAR99H

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Overview





ET 200pro FC Standard frequency converter and converter with integral safety functions

- Two versions with and without integral safety functions
- 1.1 kW output (1.5 kW at max. 45 °C ambient temperature)
- Sensorless vector control, frequency control or torque control
- Integral brake control 180 V DC
- Regenerative feedback
- Power is looped through using jumpers with 25 A per segment
- Easy parameterization over the bus
- Extensive diagnostics

Technical specifications

ET 200pro frequency converter with integral safety functions	
Selection features	
Integral safety functions according to Category 3 of EN 954-1 and according to SIL 2 of IEC 61508	• Safe Torque Off (STO) • Safely Limited Speed (SLS)[1)] • Safe Stop 1 (SS1) [1)] • Activation of the integral safety functions through Safety Local Isolator Module F-RSM or via F-Switch PROFIsafe
Electrical data	
Line voltage	380 V to 480 V 3 AC +10 % / -10 %
Output (at 0 °C to 55 °C ambient temperature)	1.1 kW
Rated input current (at 0 °C to 55 °C ambient temperature)	2.0 A
Rated output current (at 0 °C to 55 °C ambient temperature)	3.5 A
Output (at 0 °C to 45 °C ambient temperature)	1.5 kW
Rated input current (at 0 °C to 45 °C ambient temperature)	2.5 A
Rated output current (at 0 °C to 45 °C ambient temperature)	3.9 A
Line frequency	47 Hz to 63 Hz
Overload capability	• Overload current 1.5 x rated output current (i.e. 150 % overload) for 60 s, cycle time 300 s • Overload current 2 x rated output current (i.e. 200 % overload) for 3 s, cycle time 300 s
Output frequency	0 Hz to 650 Hz
Pulse frequency	4 kHz (standard), 2 kHz to 16 kHz (in 2 kHz steps)
SCCR (Short Circuit Current Rating)[2)]	10 kA
Skipped frequency range	1, programmable
Converter efficiency	≥96 %
Interfaces	• Connection to PROFIBUS (PROFINET available soon) over the ET 200pro backplane bus • Optical interface with USS protocol for optical RS232 connecting cable • Slot for an optional memory card (MMC) for uploading or downloading parameter settings • PTC/KTY84 interface for motor temperature monitoring

1) The safety functions "Safely Limited Speed" and "Safe Stop 1" are certified for asynchronous motors without encoders - these safety functions are not permitted for pull-through loads as in the case of lifting gear and winders.

2) Valid for industrial control cabinet installation according to NEC Article 409 / UL 508A.

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Technical specifications (continued)

ET 200pro frequency converter with integral safety functions	
Functions	
Open-loop/closed-loop control procedure	• *V/f* control – linear (*M*~*n*) with/ without flux current control (FCC), quadratic (*M*~*n*^{2}) or parameterizable • Vector closed-loop control without encoder • Closed-loop torque control
Operating functions	Jogging mode, free function blocks (FFB), positioning deceleration ramp, automatic restart following interruption due to power failure, bumpless connection of converter to rotating motor
Braking functions	• Regenerative braking operation without brake chopper and pulse resistor • Contol of an electromagnetic holding brake 180 V DC
Protective functions	Undervoltage, overvoltage, ground faults, short circuits, stall prevention, thermal motor protection (I^2t, or sensor), converter overtemperature, motor blocking protection
Connectable motors	• Low-voltage asynchronous motors • Motor cable lengths: max. 15 m (shielded)

ET 200pro frequency converter with integral safety functions	
Mechanical data	
Degree of protection	IP65
Operating temperature	0 °C to +55 °C Increased output at 0 °C to +45 °C
Mounting position	Vertical wall mounting (vertical alignment of the cooling fins)
Mounting dimensions (W x H x D) in mm (including terminal module)	155 x 230 x 213
Weight	4.0 kg
Standards	
Compliance with standards	UL, cUL, CE, low voltage directive 2006/95/EG, EMC directive 89/336/EEC

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Derating data

Pulsfrequenz

Ambient temperature °C	Rated output current in A at a pulse frequency of							
	2 kHz	4 kHz	6 kHz	8 kHz	10 kHz	12 kHz	14 kHz	16 kHz
0 … 55 (1.1 kW)	3.5	3.5	2.8	2.2	1.6	1.1	0.5	-
0 … 45 (1.5 kW)	3.9	3.9	3.9	3.9	3.4	3.0	2.6	2.2

Ordering data

			Order No.
	**ET 200pro FC frequency converter with integral safety functions** 380 V – 480 V 3 AC +10/-10 % 47 Hz – 63 Hz Overload: 150 % 60 s 200 % 3 s Output: 1.1 kW (0 ° … 55 °C) 1.5 kW (0 ° … 45 °C)	E	**6SL3 235-0TE21-1SB0**

E: Subject to export regulations AL: 9I999 and ECCN: EAR99

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Ordering data

			Order No.
	**ET 200pro FC Standard frequency converter** 380 V – 480 V 3 AC +10/-10 % 47 Hz – 63 Hz 150 %, 60s 200 % 3s Output: 1.1 kW (0 ° … 55 °C) 1.5 kW (0 ° … 45 °C)	E	**6SL3 235-0TE21-1RB0**
	Backplane bus module to hold the frequency converter	E	**6SL3 260-2TA00-0AA0**

E: Subject to export regulations AL: 9I999 and ECCN: EAR99

Accessories:

Accessories	Order No.
Connector set	
for energy supply, HAN Q4/22	
2.5mm²	**3RK1 911-2BE50**
4.0 mm²	**3RK1 911-2BE10**
6.0 mm²	**3RK1 911-2BE30**
Motor cables	
Motor cables prefabricated at one end For motors with brake and temperature sensor with HAN Q8 connector, shielded	(HTG: supplied from the Harting Company) (ZKT: supplied from the KnorrTec Company)
Cross-section 1 mm²	
• Length 1.5 m	**ZKT: 70018601000150**
• Length 3 m	**ZKT: 70018601000300**
• Length 5 m	**ZKT: 70018601000500**
• Length 10 m	**ZKT: 70018601001000**
Cross-section 1.5 mm²	
• Length 1.5 m	**HTG: 61 88 201 0288**
• Length 3 m	**HTG: 61 88 201 0289**
• Lengthe 5 m	**HTG: 61 88 201 0290**
• Length 10 m	**HTG: 61 88 201 0299**
	Further selected accessories are available from Siemens Solution Partners. Select “Distributed Field Installation System” as technology in the “Solution Partner Finder”. www.siemens.com/automation/partnerfinder
Frequency converter connector for motor cable, shielded, HAN Q8	**6ES7 194-1AB01-0XA0**

		Order No.
Power jumper plug for 400 V power transmission to following 400 V modules		**3RK1 922-2BQ00**
USB interface cable for communication with a PC (2.5 m long)	E	**6SL3 555-0PA00-2AA0**
RS232 interface cable for parameterizing the converter with the STARTER tool via a direct point-to-point connection		**3RK1 922-2BP00**
IOP Handheld For use with SINAMICS G120, SINAMICS G110D, SINAMICS G120D, SIMATIC ET 200S FC or SIMATIC ET 200pro FC Included in the scope of delivery: • IOP • Handheld housing • Rechargeable batteries (4 × AA) • Charging unit (international) • RS232 connecting cable (3 m long, can only be used for SINAMICS G120 and SIMATIC ET 200S FC) • USB cable (1 m long)	E	**6SL3 255-0AA00-4HA0**
Memory card (MMC) for parameter settings of the ET 200S FC and ET 200pro FC If required, the complete parameter settings of the frequency converter can be saved on a memory card (MMC). When servicing, the plant is immediately ready for use again after replacing the frequency converter and inserting the memory card.	E	**6SL3 254-0AM00-0AA0**

E: Subject to export regulations AL: 9I999 and ECCN: EAR99

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Overview



ET 200pro motor starter: Isolator module, Standard starter and High-Feature starter mounted on a wide module rack

Motor starters

- Only two versions up to 5.5 kW
- All settings can be parameterized by bus
- Comprehensive diagnostic signals
- Overload can be acknowledged by remote reset
- Current unbalance monitoring
- Stall protection
- Emergency start function in the event of overload
- Current value transmission by bus
- Current limit monitoring
- Direct-on-line or reversing starters
- Power bus can be plugged in using the new HAN Q4/2
- Plug-in connectors
- Conductor cross-sections up to 6 x 4 mm^2
- 25 A per segment (power looped through using jumper plug)
- In the Standard and High-Feature versions (with 4 DI onBoard)
- Electromechanical switching and electronic switching
- Electronic starter for direct activation or with integrated smooth-starter function
- Supplied with 400 V AC brake contact as an option.

Isolator modules

The isolator module with switch disconnector function is used for safe disconnection of the 400 V operational voltage during repair work in the plant and provides an integrated group fusing function (i.e. additional group short-circuit protection for all subsequently supplied motor starters).

Depending on the power distribution concept, all stations can be equipped with an isolator module as an option.

Safety applications

Safety local isolator module

With the Safety local modules
- Safety local isolator module and
- 400 V disconnecting module

it is possible to achieve safety category 4/SIL 3 with an appropriate connection.

Safety Solution PROFIsafe

With the Safety PROFIsafe modules
- F-Switch and
- 400 V disconnecting module

it is likewise possible to achieve safety category 4/SIL 3 with an appropriate connection.

Motor Starter ES software

The Motor Starter ES software is used the for parameterization, monitoring, diagnostics and testing of motor starters.
See page 9/180.

Application

With the ET 200pro motor starters, any AC loads can be protected and switched. They are an integral part of ET 200pro and have the high degree of protection IP65. This makes them ideal for operation in modular, distributed peripherals without control cabinets or control enclosures.

The ET 200pro motor starters are available both with mechanical as well as electronic contacts

The ET 200pro electromechanical starters are offered as direct (DSe/DSe) and reversing starters (RSe/RSe) in the High-Feature version with the following equipment:
- 4 digital inputs
- Device versions with or without control for externally fed brakes with 400 V AC
- With expanded parameterization capabilities.

The ET 200pro electronic starters are offered as direct (DSe/DSe) and reversing starters (RSe/RSe) in the High-Feature version with the following equipment:
- 4 digital inputs
- With soft-start and smooth ramp-down function
- With the deactivated smooth start function as an electronic starter for applications with a high level of switching frequency
- Device versions with or without control for externally fed brakes with 400 V AC
- With expanded parameterization capabilities.

As the result of the protection concept with solid-state overload evaluation and the use of SIRIUS controls size S00, additional advantages are realized on the standard and High-Feature motor starters - advantages which soon make themselves positively felt particularly in manufacturing processes with high plant stoppage costs:

- Configuration is made easier by the fine modular structure. When using the ET 200pro motor starters, the list of parts per load feeder is reduced to two main units: the bus module and the motor starter. This makes the ET 200pro ideal for modular machine concepts or solutions for conveying systems and in machine-tool building.
- Expansions are easily possible through the subsequent adding of modules. The innovative plug-in technology also does away with the wiring needed up to now. Through the hot swapping function (disconnection and connection during operation) a motor starter can be replaced within seconds if necessary, without having to shut down the ET 200pro station and with it the process in the plant. The motor starters are therefore recommendable in particular for applications with special demands on availability. Storage costs are optimized in addition by the low level of variance (2 units up to 5.5 kW).

The ordering option for motor starters with a 400 V AC brake output provides the possibility of controlling motors with 400 V AC brakes. With four locally acting inputs available on the High-Feature motor starter it is possible to realize autonomous special functions which work independently of the bus and the higher level control system, e.g. as a quick stop on gate valve controls or limit position disconnectors. In parallel with this, the states of these inputs are signaled to the control system.

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Overview (continued)

When using the optional isolator module with switch disconnector and group fusing function for the ET 200pro, the 400 V supply of the motor starters can be switched on and off directly in the field, i.e. locally.

The Motor Starter ES software is available for the parameterization and diagnostics.
See Chapter 12 "Planning, Configuration and Visualization with SIRIUS".

Technical specifications

		Standard motor starters	High-Feature motor starters	
		DSe, RSe	DSe, RSe	sDSSte, sDSte, sRSSte, sRSte
Device functions				
Parameterizable rated operational current		Yes		
Parameterizable current limit values		No	Yes, 2 limit values	
Parameterizable response in case of current limit violation		No	Yes	
Zero current monitoring		Yes		
Parameterizable response in case of zero current violation		Yes		
Parameterizable current unbalance limit		No, fixed limit value (30 % x I_e)	Yes, 30 % ... 60 % x I_e	
Parameterizable response in case of unbalance limit violation		Yes		
Motor blocking monitoring		No	Yes	
Parameterizable blocking current limit		No	Yes, 150 % ... 1000 % x I_e	
Parameterizable blocking time limit	s	No	Yes, 1 ... 5	
Current value transmission		Yes		
Group warning diagnostics		No	Yes, parameterizable	
Group diagnostics		Yes, parameterizable		
Emergency start		Yes		
Digital inputs • Parameterizable input signal • Parameterizable input level • Parameterizable input signal delay • Parameterizable input signal extension • Parameterizable input control actions	 ms ms 	No No No No No No	Yes, 4 inputs Yes, latching/ non-latching Yes, NC contacts/NO contacts Yes, 10 ... 80 Yes, 0 ... 200 Yes, 12 different actions	
400 V brake output		Yes, ordering option		
Parameterizable brake enabling delay	s	Yes, -2.5 ... 2.5		
Parameterizable holding time of the brake during stopping	s	Yes, 0 ... 25		
Parameterizable start-up type		No		Yes
Parameterizable ramp-down time		No		Yes
Parameterizable starting voltage		No		Yes
Parameterizable stopping voltage		No		Yes
Local device interface		Yes		
Firmware update		Yes, by trained personnel		
Thermal motor model		Yes		
Parameterizable trip class		No, CLASS 10 fixed	Yes, CLASS 5, 10, 15, 20	
Parameterizable response in case of overload of thermal motor model		No	Yes, 3 possible states	
Advance warning limit for motor heating	%	No	Yes, parameterizable 0 ... 95	
Advance warning limit time-related trip reserve	s	No	Yes, parameterizable 0 ... 500	
Parameterizable recovery time	min	No	Yes, 1 ... 30	
Parameterizable protection against voltage failure		No, permanently integrated	Yes	
Reversing start function		Yes, ordering option		
Parameterizable interlock time for reversing starters		No, 150 ms fixed	Yes, 0 ... 60s	
Integrated logbook functions		Yes, 3 device logbooks		
Integrated statistics data memory		Yes		
Parameterizable response in case of CPU / master stop		Yes		
Device indications • Group fault • Switching state • Device status • Digital inputs		 SF LED (red) STATE LED (red, yellow, green) DEVICE LED (red, yellow, green) No	 IN 1 ... IN 4, LED	

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Technical specifications (continued)

		Standard motor starters	High-Feature motor starters	
		Mechanical switching without inputs	Mechanical switching with inputs	Electronic switching with inputs and soft starter function
Technology designation[4]		DSe, RSe	DSe, RSe	sDSSte, sDSte, sRSSte, sRSte
Mechanics and environment				
Motor starters that can be connected to ET 200pro or modules with width of 110 mm		max. 8		
Mounting dimensions (W x H x D)				
• Direct-on-line starter and reversing starter	mm	110 x 230 x 150		110 x 230 x 160
Permissible ambient temperature				
• During operation	°C	-25 ... +55, from +40 with derating		
• During storage	°C	-40 ... +70		
Permissible mounting positions		Vertical, horizontal		
Vibration resistance acc. to IEC 60068, Part 2-6		2 *g*		
Shock resistance acc. to IEC 60068 Part 2-27		Half-sine 15 *g*/11 ms		
Degree of protection		IP65		
Pollution degree		3, IEC 60664 (IEC 61131)		
Electrical specifications				
Power consumption at 24 V DC				
• From auxiliary circuit L+/M (U1)	mA	Approx. 40		
• From auxiliary circuit A1/A2 (U2)	mA	Approx. 200		
Rated operational current for power bus I_e	A	25		
Rated operational voltage U_e	V AC	400 (50/60 Hz)		
• Approval according to EN 60947-1, Appendix N	V AC	Up to 400 (50/60 Hz)		Up to 400 (50/60 Hz)
• Approval according to CSA and UL	V AC	Up to 600 (50/60 Hz)		Up to 480 (50/60 Hz)
Approval				
• VDE 0106, Part 101	V	Up to 400		Up to 480
• CSA and UL approval	V	Up to 600		Up to 480
Conductor cross-sections				
• Incoming energy supply	mm^2	Max. 6 x 4		
Touch protection		Finger-safe		
Rated impulse withstand voltage U_{imp}	kV	6		
Rated insulation voltage U_i	V	400		
Rated operational current for starters I_e				
• AC-1/2/3 at 40 °C				
- At 400 V	A	0.15 ... 2.0/1.5 ... 12.0		0.15 ... 2.0/1.5 ... 12.0[1]
- At 500 V	A	0.15 ... 2.0/1.5 ... 9.0		
• AC-4 at 40 °C				
- At 400 V	A	0.15 ... 2.0/1.5 ... 4.0		
Rated short-circuit breaking capacity	kA	100 at 400 V		
Type of coordination acc. to IEC 60947-4-1		1		
Power of induction motors at 400 V	kW	Max. 5.5		Max. 5.5/4[2]
Utilization categories		AC-1, AC-2, AC-3, AC-4		AC-53a[3] (max. 9 A with deactivated soft start function up to CLASS 10)
Protective separation between main and auxiliary circuits	V	400, Acc. to EN 60947-1, Appendix N		
Endurance of contactor				
• Mechanical		30 million operating cycles		--
• Electrical		Up to 10 million operating cycles; dependent on the current loading (see Manual)		--
Reliable switching frequency		Dependent on the current loading, motor starting time and relative ON period (see Manual)		
Operating times at 0.85 ... 1.1 x U_e				
• Closing delay	ms	11 ... 50		--
• Opening delay	ms	5 ... 45		--

1) **Caution!**
With deactivated soft starter control function the permissible rated operational current is reduced to 9 A up to CLASS 10.

2) With parameterization as electronic starter max. 4 kW.

3) 8-hour operation.

4) DS ... direct-on-line starter
RS ... reversing starter
DSS . direct-on-line soft starters
RSS . reversing starter
e ..... electronic motor protection
te ..... full motor protection (thermal + electronic)
s ..... electronic switching with semiconductor

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Ordering data

	Version	Order No.
Standard motor starters, mechanical Motor protection: thermal model		
 DSe Standard	**DSe direct-on-line starters**[1]	
	• Without brake output	**3RK1 304-5□S40-4AA0**
	• With brake output 400 V AC	**3RK1 304-5□S40-4AA3**
	RSe reversing starters[1]	
	• Without brake output	**3RK1 304-5□S40-5AA0**
	• With brake output 400 V AC	**3RK1 304-5□S40-5AA3**
High-Feature motor starters, mechanical Motor protection: thermal model		
 RSe High-Feature	**DSe direct-on-line starters**[1]	
	• Without brake output and with 4 inputs	**3RK1 304-5□S40-2AA0**
	• With brake output 400 V AC and 4 inputs	**3RK1 304-5□S40-2AA3**
	RSe reversing starters[1]	
	• Without brake output and with 4 inputs	**3RK1 304-5□S40-3AA0**
	• With brake output 400 V AC and 4 inputs	**3RK1 304-5□S40-3AA3**
	Setting range Rated operational current	
	• 0.15 ... 2.0 A	**K**
	• 1.5 ... 12.0 A	**L**
High-Feature motor starters, electronic Full motor protection, comprising thermal motor protection and thermistor motor protection		
 sRSSte High-Feature	**sDSSte/sDSte direct-on-line starters**[1)2)]	
	• Without brake output and with 4 inputs	**3RK1 304-5□S70-2AA0**
	• With brake output 400 V AC and 4 inputs	**3RK1 304-5□S70-2AA3**
	sRSSte/sRSte reversing starters[1)2)]	
	• Without brake output and with 4 inputs	**3RK1 304-5□S70-3AA0**
	• With brake output 400 V AC and 4 inputs	**3RK1 304-5□S70-3AA3**
	Setting range Rated operational current	
	• 0.15 ... 2.0 A	**K**
	• 1.5 ... 12.0 A	**L**

1) Only functions when used together with the backplane bus module and the wide module rack. The backplane bus module and the wide module rack must be ordered separately (see "Accessories for motor starters ET 200pro").

2) Delivery time class A for setting range rated operational current 0.15 ... 2.0 A

3) The solid-state motor starters can be used not only as solid-state motors starters with a high level of switching frequency but also as fully fledged soft starters for soft starting and smooth ramp-down. The changeover from motor starter to soft starter takes place through reparameterization in HW Config.
Depending on the setting, this results in the following current ranges:
- Parameterization as solid-state starter: 0.15 ... 2 A and 1.5 ... 9 A (4 kW)
- Parameterization as soft starter: 0.15 ... 2 A and 1.5 ... 12 A (5.5 kW).

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ET 200pro isolator module

Overview

The isolator module with integrated group fusing function (i.e. additional group short-circuit protection for all subsequently supplied motor starters) and switch disconnector function is used for safe disconnection of the 400 V operational voltage in the plant.

Depending on the power distribution concept, all stations can be equipped with an isolator module as an option.

The isolator module is available in addition in a safety version (see Safety local isolator module, page 9/315):

The following properties apply to the isolator module:
- Increase of plant availability through fast replacement of units (easy mounting and plug-in technology)
- Cabinet-free construction thanks to high degree of protection IP65.

Technical Specifications

		Isolator modules
General data		
Mounting dimensions (W x H x D) • Direct-on-line starter and reversing starter	mm	110 x 230 x 170
Permissible ambient temperature • During operation • During storage	°C °C	-25 ... +55 -40 ... +70
Permissible mounting positions		Any
Vibration resistance acc. to IEC 60068 Part 2-6		2 *g*
Shock resistance acc. to IEC 60068 Part 2-27		Half-sine 15 *g*/11 ms
Power consumption • From auxiliary circuit L+/M (U1) • From auxiliary circuit A1/A2 (U2)	mA	Approx. 20 --
Rated operational current for power bus I_e	A	25
Rated operational voltage U_e	V	400
Approvals according to • DIN VDE 0106, Part 101 • CSA and UL	 V V	 Up to 500 Up to 600
Conductor cross-sections • Incoming energy supply	mm^2	Max. 6 x 4

		Isolator modules
Degree of protection		IP65
Touch protection		Finger-safe
Pollution degree		3, IEC 60664 (IEC 61131)
Rated impulse withstand voltage U_{imp}	kV	6
Rated insulation voltage U_i	V	400
Rated operational current for starters I_e • AC-1/2/3 at 40 °C - At 400 V - At 500 V	 A A	 25 25
Rated short-circuit breaking capacity	kA	50 at 400 V
Type of coordination acc. to IEC 60947-4-1		2
Protective separation between main and auxiliary circuits	V	400, to VDE 0106 Part 101
Device functions • Group diagnostics		 Yes, parameterizable
Device indications • Group fault		 SF LED (red)

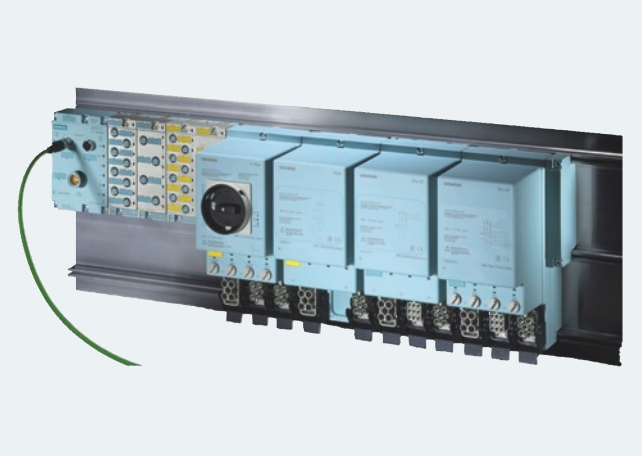
Ordering data

	Version	Order No.
ET 200pro isolator modules, mechanical		
 3RK1 304-0HS00-6AA0	**Isolator modules**[1] Rated operational current 25 A	**3RK1 304-0HS00-6AA0**

[1] Only functions when used together with the related 110 mm backplane bus module and the wide module rack. The backplane bus module and the wide module rack must be ordered separately (see "Accessories formotor starters ET 200pro").

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Overview



ET 200pro motor starter: Safety local isolator module, disconnecting module, Standard starter and High-Feature starter mounted on a wide module rack

Safety local isolator module

The Safety local isolator module is a repair switch with integrated safety evaluation functions that can be parameterized using DIP switches.

It is used for:
- Connection of a 1 or 2-channel EMERGENCY-STOP circuit up to Category 3-4/SIL 3 (protective door or EMERGENCY-STOP pushbuttons) and parameterizable start behavior
- Control of the 400 V disconnecting module by means of a safety rail signal

400 V disconnecting module

The 400 V disconnecting module enables the safe disconnection of an operational voltage of 400 V up to Category 3-4/SIL 3. For operation in a Safety Solution local application it functions only in combination with the Safety local isolator module.

For operation in a Safety PROFIsafe application it functions only in combination with the F-Switch.

F-Switch

Fail-safe digital inputs/outputs in degree of protection IP65/66/67 for near-machine, cabinet-free use.

Fail-safe digital inputs

- For the fail-safe reading in of sensor information (1-/2-channel)
- Including integrated discrepancy evaluation for 2v2 signals
- Internal sensor supplies (incl. testing) available

Fail-safe digital outputs

- 3 fail-safe PP-switching outputs for safe switching of the backplane bus bars

The F-Switch is certified up to Category 4 (EN 954-1) and up to SIL 3 (IEC 61508) and has detailed diagnostics.

It supports PROFIsafe in PROFIBUS configurations as well as in PROFINET configurations.

Application

Safety local isolator module

The Safety local isolator module features the same functions as a standard isolator module with an additional local safety function.

The Safety local isolator module contains a 3TK28 41 module and is equipped with M12 terminals for the connection of external safety components.

Terminals 1 and 2 can be used to connect either 1-channel or 2-channel EMERGENCY-STOP circuits or protective door circuits (IN 1, IN 2).

For monitored starts, an external START switch can be connected to terminal 3.

The required safety functions can be set using 2 slide switches located under the left M12 opening.

In the event of an EMERGENCY-STOP, the Safety local isolator module trips the downstream 400 V disconnecting module. This safely isolates the 400 V circuit up to Category 4/SIL 3.

In combination with the 400 V disconnecting module, the Safety local isolator module can be used for safety applications up to Category 4/SIL 3 according to EN ISO 13849-1 / IEC 61508 1-4.

400 V disconnecting module

The 400 V disconnecting module can be used for local safety applications in combination with the Safety local isolator module, and for PROFIsafe safety applications in combination with the F-Switch.

It contains 2 contactors connected in series for the safety-oriented disconnection of the main circuit.

The auxiliary circuit supply of the device is implemented via a safety busbar in the backplane module.

The 400 V disconnecting module can be used in combination with the Safety local isolator module or with the F-Switch for safety applications up to Cat. 4/SIL 3 according to EN ISO 13849-1/IEC 61508 1-4.

F-Switch

The F-Switch is a fail-safe solid-state module for PROFIsafe safety applications. It has two fail-safe inputs and outputs for safe switching of the 24 V supply over backplane bus bars. In combination with the 400 V disconnecting module it can be used in PROFIsafe applications for the fail-safe disconnection of ET 200pro motor starters up to Category 4/SIL 3.

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Technical specifications

		Safety local isolator module	400 V disconnecting module
General data			
Mounting dimensions (W x H x D) in mm • Direct-on-line starter and reversing starter	mm	110 x 230 x 170	110 x 230 x 150
Permissible ambient temperature • During operation • During storage	 °C °C	 -25 ... +55 -40 ... +70	
Permissible mounting positions		Any	
Vibration resistance acc. to IEC 60068, Part 2-6		2 *g*	
Shock resistance acc. to IEC 60068 Part 2-27		Half-sine 15 *g*/11 ms	
Power consumption • From auxiliary circuit L+/M (U1) • From auxiliary circuit A1/A2 (U2)	 mA	 Approx. 20 --	
Rated operational current for power bus I_e	A	25	
Rated operational voltage U_e	V	400 (50/60 Hz)	
Approval to DIN VDE 0106 Part 101	V	Up to 500	
CSA and UL approval	V	Up to 600	
Conductor cross-sections Incoming energy supply	 mm^2	 Max. 6 x 4	
Degree of protection		IP65	
Touch protection		Finger-safe	
Pollution degree		3, IEC 60664 (IEC 61131)	
Rated impulse withstand voltage U_{imp}	kV	6	
Rated insulation voltage U_i	V	400	
Rated operational current for starter I_e • AC-1/2/3 at 40 °C - At 400 V - At 500 V	 A A	 16 16	 25 25
Rated short-circuit breaking capacity	kA	50 at 400 V	
Type of coordination acc. to IEC 60947-4-1		2	
Protective separation between main and auxiliary circuits	V	400, acc. to VDE 0106 Part 101	
Operating times at 0.85 ... 1.1 x U_e • Closing delay • Opening delay	 ms ms	 -- --	 25 ... 100 7 ... 10
Device functions • Group diagnostics		 Yes, parameterizable	
Device indications • Group fault		 SF LED (red)	

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Ordering data

	Version	Order No.
Safety modules ET 200pro		
 3RK1 304-0HS00-7AA0	**Safety local isolator modules**[1)2)] Rated operational current 16 A	**3RK1 304-0HS00-7AA0**
 3RK1 304-0HS00-8AA0	**400 V disconnecting modules**[3)4)] Rated operational current 25 A	**3RK1 304-0HS00-8AA0**
 6ES7 148-1FS00-0AB0	**F-Switch PROFIsafe** 24 V DC, including bus module Connection module to be ordered separately	**6ES7 148-4FS00-0AB0**
	Connection modules for F-Switch 24 V DC	I **6ES7 194-4DA00-0AA0**

1) The Safety local isolator module only functions when used together with the 400 V disconnecting module.

2) Only in combination with the special backplane bus module for the Safety local isolator module (see "Accessories for motor starters ET 200pro").

3) The 400 V disconnecting module only functions when used together with the Safety local isolator module or with the F-Switch.

4) Only functions when used together with the backplane bus module and the wide module rack. The backplane bus module and the wide module rack must be ordered separately (see "Accessories for motor starters ET 200pro").

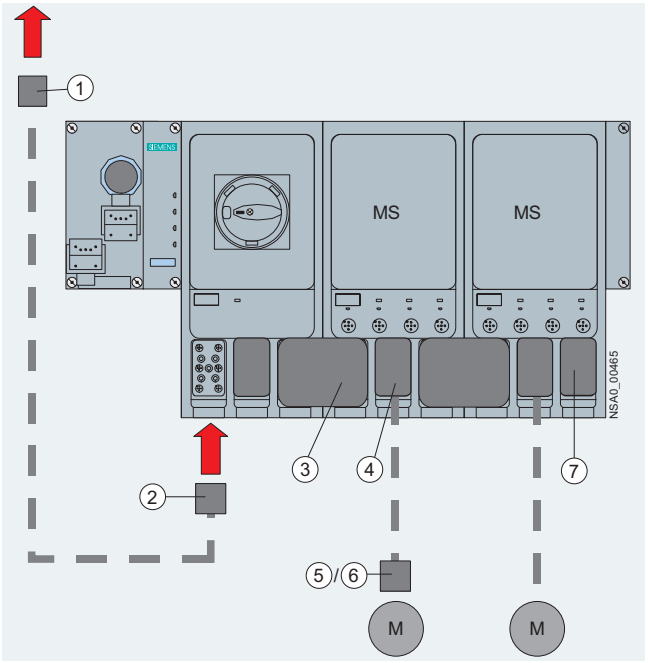
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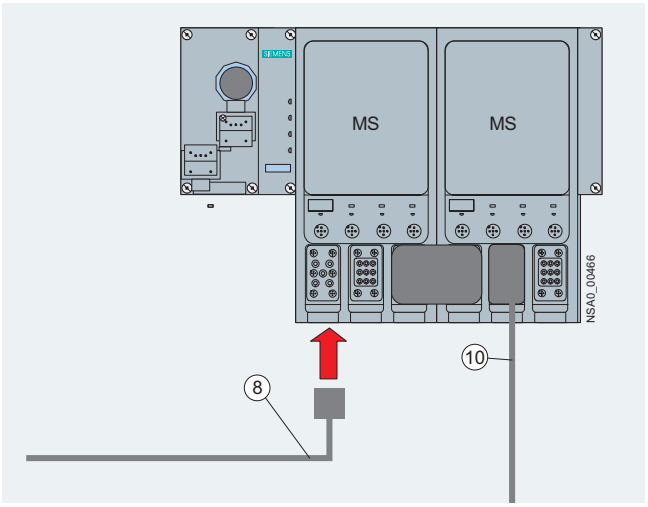
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Accessories for ET 200pro motor starters

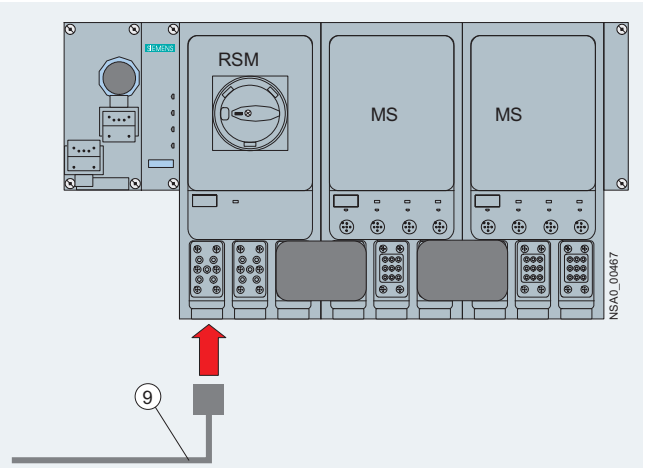
Overview



Basic design of an motor starter ET 200pro



Infeed on the motor starter ET 200pro



Infeed on the RSM isolator module

Legend:

① Power feeder plug (see page 9/319)
② Power connection plug (see page 9/319)
③ Power jumper plug (see page 9/319)
④ Motor connection plug (see page 9/319)
⑤ Motor plug (see page 9/319)
⑥ Motor plug with EMC suppressor circuit (see page 9/319)
⑦ Power loop-through plug (see page 9/319)
⑧ Power connection cable (see page 9/319)
⑨ Power connection cable for isolator modules (see page 9/319)
⑩ Motor cable (see page 9/320)

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Ordering data

	Version		Order No.
ET 200pro accessories			
	① **Power feeder plugs** Connector set for energy supply, e.g. for connecting to T terminal connectors, comprising a coupling enclosure, straight outgoing feeder (with bracket), pin insert for HAN Q4/2, incl. gland		
	• 5 male contacts 2.5 mm²		**3RK1 911-2BS60**
	• 5 male contacts 4 mm²		**3RK1 911-2BS20**
	• 5 male contacts 6 mm²		**3RK1 911-2BS40**
	② **Power connection plugs** Connector set for energy supply for connection to ET 200pro motor starters/ET 200pro isolator modules, comprising a cable-end connector hood, angled outgoing feeder,female insert for HAN Q4/2, incl. gland		
	• 5 female contacts 2.5 mm²		**3RK1 911-2BE50**
	• 5 female contacts 4 mm²		**3RK1 911-2BE10**
	• 5 female contacts 6 mm²		**3RK1 911-2BE30**
	③ **Power jumper plugs**		**3RK1 922-2BQ00**
	④ **Motor connection plugs** Connector set for motor cable for connection to ET 200pro motor starters, comprising a cable-end connector hood, angular outgoing feeder, pin insert for HAN Q8/0, incl. gland		
	• 8 male contacts 1.5 mm²	F	**3RK1 902-0CE00**
	• 6 male contacts 2.5 mm²	F	**3RK1 902-0CC00**
	⑤ **Motor plugs** Connector set for motor cable for connection to motors, comprising a cable-end connector hood, straight outgoing feeder, female insert for HAN 10e, incl. star jumper, incl. gland		
	• 7 female contacts 1.5 mm²		**3RK1 911-2BM21**
	• 7 female contacts 2.5 mm²		**3RK1 911-2BM22**
	⑥ **Motor plugs with EMC suppressor circuit** Connector set for motor cable for connection to motors, comprising a cable-end connector hood, straight outgoing feeder, female insert for HAN 10e with EMC suppressor circuit, incl. star jumper, incl. gland		
	• 7 female contacts 1.5 mm²		**3RK1 911-2BL21**
	• 7 female contacts 2.5 mm²		**3RK1 911-2BL22**
	⑦ **Power loop-through plugs** Connector set for power loop-through for connection to ET 200pro motor starters/ET 200pro isolator modules, comprising a cable-end connector hood, angled outgoing feeder, pin insert for HAN Q4/2, incl. gland		
	• 4 male contacts 2.5 mm²		**3RK1 911-2BF50**
	• 4 male contacts 4 mm²		**3RK1 911-2BF10**
	⑧ **Power connection cables, assembled at one end** Power connection cable for ET 200pro motor starters, ECOFAST, open at one end, for HAN Q4/2, angled, insert turned at isolator module end, 4 x 4 mm²		
	• Length 1.5 m		**3RK1 911-0DB13**
	• Length 5.0 m		**3RK1 911-0DB33**
	⑨ **Power connection cables for isolator modules, assembled at one end** Power connection cable for ET 200pro isolator modules, open at one end, for HAN Q4/2, angled, insert turned at isolator module end, 4 x 4 mm²		
	• Length 1.5 m		**3RK1 911-0DF13**
	• Length 5.0 m		**3RK1 911-0DF33**

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

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Accessories for ET 200pro motor starters

Version	Order No.
⑩ **Motor cables, assembled at one end** Open at one end, HAN Q8, angled, length 5 m	
• Motor cable for motor without brake, for ET 200pro, ET 200X, AS-i Compact, 4 x 1.5 mm^2	**3RK1 911-0EB31**
• Motor cable for motor with brake, for ET 200pro, 6 x 1.5mm^2	**3RK1 911-0ED31**

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Version	Order No.
Module racks, wide[1] • Length 500 mm • Length 1000 mm • Length 2000 mm	 **6ES7 194-4GB00-0AA0** **6ES7 194-4GB60-0AA0** **6ES7 194-4GB20-0AA0**
Module racks, wide, compact[1] • Length 500 mm • Length 1000 mm • Length 2000 mm	 **6ES7 194-4GD00-0AA0** **6ES7 194-4GD10-0AA0** **6ES7 194-4GD20-0AA0**
Backplane bus modules 110 mm^2[2]	**3RK1 922-2BA00**
Backplane bus modules for Safety local isolator modules	**3RK1 922-2BA01**
RS 232 interface cables	**3RK1 922-2BP00**
Hand-held devices for ET 200pro motor starter, (also for ET 200S High-Feature and ECOFAST), for local operation. A serial interface cable must be ordered separately.	**3RK1 922-3BA00**
Sealing caps (for power supply) (1 pack contains 10 units)	**3RK1 902-0CJ00**
Dismantling tools for HAN Q4/2	**3RK1 902-0AB00**
Crimping tools for pins/sockets 4 mm^2 and 6 mm^2	**3RK1 902-0CW00**
Crimping tools for male contacts and sockets up to 4.0 mm^2 (HAN Q8/0)	**3RK1 902-0CT00**
Dismantling tools for male contacts and sockets (HAN Q8/0)	**3RK1 902-0AJ00**
M12 sealing caps For sealing unused input and output sockets (one set contains ten sealing caps)	**3RX9 802-0AA00**



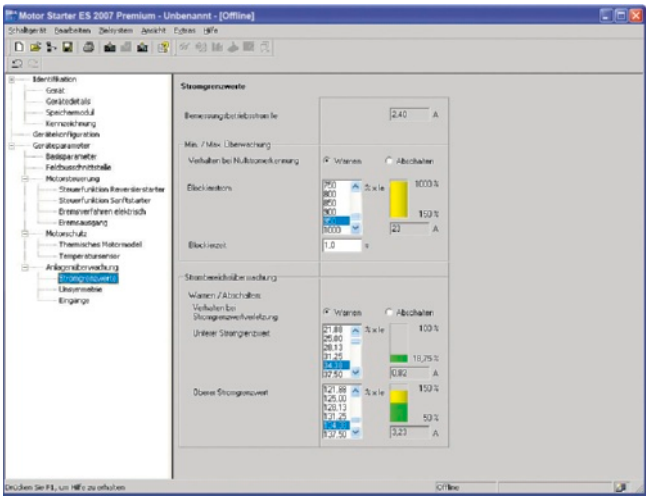
3RK1 922-3BA00

1) The wide module rack can accommodate all ET 200pro motor starters and any optional modules (isolator module, Safety local isolator module and 400 V disconnecting module).

2) The backplane bus module is a prerequisite for operation of the motor starter ET 200pro and the optional module.

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Overview



Motor starter ES for parameterization, monitoring, diagnostics and testing of motor starters

Motor starter ES is used for start-up, parameterization, diagnostics, documentation and the preventative maintenance of the motor starters in the SIMATIC ET 200pro, SIMATIC ET 200S, ECOFAST and SIRIUS M200D product families.

Note:

For further information see page 9/180.

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ET 200eco PN

Overview



- Compact block I/O for processing digital, analog and IO-Link signals for connection to the PROFINET bus system
- Cabinet-free design with degree of protection IP65/66/67 with M12 connections
- Very rugged and resistant metal enclosure and encapsulated
- Compact module in two types of enclosures:
  - 30 mm x 200 mm x 37 mm (W x H x D, long and narrow enclosure), with 4 x M12 for digital signals
  - 60 mm x 175 mm x 37 mm (W x H x D, short and wide enclosure), with 8 x M12 for digital signals and IO-Link
  - 60 mm x 175 mm x 37 mm (W x H x D, short and wide enclosure) with 4 x M12 or 8 x M12 for analog signals
- PROFINET connection: 2 x M12 and automatic PROFINET address assignment
- Data transmission rate 100 Mbit/s
- LLDP proximity detection without PG and Fast Startup (boot up within approx 0.5 seconds)
- Supply and load voltage connection: 2 x M12
- Module variance:
  - 8 DI
  - 16 DI
  - 8 DO (2 A)
  - 8 DO (1.3 A)
  - 8 DO (0.5 A)
  - 16 DO (1.3 A)
  - 8 DI/DO (1.3 A),
  - 8 AI (U, I, TC, RTD)
  - 4 AO (U, I)
  - 4 IO-Link + 8 DI + 4 DO (1.3 A)
- Channel-specific diagnostics

Technical specifications

	6ES7 141-6BF00-0AB0	6ES7 141-6BG00-0AB0	6ES7 141-6BH00-0AB0
General information			
Vendor identification (VendorID)	002AH	002AH	002AH
Device identifier (DeviceID)	0306H	0306H	0306H
• 24 V DC	Yes	Yes	Yes
• permissible range, lower limit (DC)	20.4 V	20.4 V	20.4 V
• permissible range, upper limit (DC)	28.8 V	28.8 V	28.8 V
• reverse polarity protection	Yes	Yes	Yes
Current consumption, typ.	100 mA	100 mA	100 mA
Encoder supply			
Number of outputs	4	8	8
Output current, rated value	100 mA; per output	100 mA; per output	100 mA; per output
24 V encoder supply			
• Short-circuit protection	Yes	Yes	Yes
Power losses			
Power loss, typ.	5.5 W	4.5 W	6.5 W
Digital inputs			
Number of digital inputs	8	8	16
• in groups of	2	1	2
Number of simultaneously controllable inputs			
• all mounting positions			
- Concurrently controllable inputs, up to 60 °C	8	8	16
Input characteristic curve acc. to IEC 1131, Type 3	Yes	Yes	Yes
Input voltage			
• Rated value, DC	24 V	24 V	24 V
• for signal "0"	-3 to +5 V	-3 to +5 V	-3 to +5 V
• for signal "1"	11 to 30 V	11 to 30 V	11 to 30 V

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Technical specifications (continued)

	6ES7 141-6BF00-0AB0	6ES7 141-6BG00-0AB0	6ES7 141-6BH00-0AB0
Input current			
• for signal "0", max. (permissible quiescent current)	1.5 mA	1.5 mA	1.5 mA
• for signal "1", typ.	7 mA	7 mA	7 mA
Input delay (for rated value of input voltage)			
• for standard inputs			
- at "0" to "1", max.	Typ. 3 ms	Typ. 3 ms	Typ. 3 ms
- at "1" to "0", max.	Typ. 3 ms	Typ. 3 ms	Typ. 3 ms
Cable length			
• Cable length unshielded, max.	30 m	30 m	30 m
Interfaces			
Transmission procedure	100BASE-TX	100BASE-TX	100BASE-TX
Transmission rate, max.	100 Mbit/s	100 Mbit/s	100 Mbit/s
• Number of PROFINET interfaces	2	2	2
• Autocrossing	Yes	Yes	Yes
• Automatic detection of transmission speed	Yes	Yes	Yes
• Integrated switch	Yes	Yes	Yes
• PROFINET IO device			
- IRT with the option "high flexibility" supported	Yes	Yes	Yes
- Prioritized startup supported	Yes	Yes	Yes
Protocols			
PROFINET IO	Yes	Yes	Yes
Protocols (Ethernet)			
• SNMP	Yes	Yes	Yes
• DCP	Yes	Yes	Yes
• LLDP	Yes	Yes	Yes
• ping	Yes	Yes	Yes
• arp	Yes	Yes	Yes
Alarms/diagnostics/status information			
Status indicator	Yes; green LED	Yes; green LED	Yes; green LED
Alarms			
• Diagnostic alarm	Yes	Yes	Yes
Diagnosetics			
• Diagnostic functions	Yes	Yes	Yes
• Diagnostic information readable	Yes	Yes	Yes
• Monitoring the supply voltage to the electronics	Yes; green "ON" LED	Yes; green "ON" LED	Yes; green "ON" LED
• Wire break in signal transmitter cable	Yes	Yes	Yes
• Short circuit encoder supply	Yes; per channel group	Yes; per channel group	Yes; per channel group
• Group error	Yes; red/yellow "SF/MT" LED	Yes; red/yellow "SF/MT" LED	Yes; red/yellow "SF/MT" LED
Galvanic isolation			
between the load voltages	Yes	Yes	Yes
between load voltage and all other switching components	No	No	No
between Ethernet and electronics	Yes	Yes	Yes
Galvanic isolation digital inputs			
• between the channels	No	No	No
Permissible potential difference			
between different circuits	75 V DC/60 V AC	75 V DC/60 V AC	75 V DC/60 V AC

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Technical specifications (continued)

	6ES7 141-6BF00-0AB0	6ES7 141-6BG00-0AB0	6ES7 141-6BH00-0AB0
Isolation			
tested with			
• 24 V DC circuits	500 V	500 V	500 V
• Interface	1 500 V; according to IEEE 802.3	1 500 V; according to IEEE 802.3	1 500 V; according to IEEE 802.3
IP65	Yes	Yes	Yes
IP66	Yes	Yes	Yes
IP67	Yes	Yes	Yes
Connection method			
M12	Yes	Yes	Yes
Dimensions and weight			
Dimensions			
• Width	30 mm	60 mm	60 mm
• Height	200 mm	175 mm	175 mm
• Depth	49 mm	49 mm	49 mm
Weight			
• Weight	550 g	910 g	910 g

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Technical specifications (continued)

	6ES7 142-6BF50-0AB0	6ES7 142-6BF00-0AB0	6ES7 142-6BG00-0AB0	6ES7 142-6BR00-0AB0	6ES7 142-6BH00-0AB0
General information					
Vendor identification (VendorID)	002AH	002AH	002AH	002AH	002AH
Device identifier (DeviceID)	0306H	0306H	0306H	0306H	0306H
Load voltage 1L+					
• Rated value (DC)	24 V	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	20.4 V
• Permissible range, upper limit (DC)	28.8 V	28.8 V	28.8 V	28.8 V	28.8 V
• Reverse polarity protection	Yes	Yes	Yes	Yes	Yes
Load voltage 2L+					
• Rated value (DC)	24 V	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	20.4 V
• Permissible range, upper limit (DC)	28.8 V	28.8 V	28.8 V	28.8 V	28.8 V
• Reverse polarity protection	Yes	Yes	Yes	Yes	Yes
from load voltage 1L+ (unswitched voltage)	100 mA	4 A	4 A	4 A	4 A
from load voltage 2L+, max.	4 A	4 A	4 A	4 A	4 A
Power losses					
Power loss, typ.	3 W	5.5 W	5.5 W	5 W	5.5 W
Digital outputs					
Number of digital outputs	8	8	8	8	16
• in groups of	8	4	4	4	8
Short-circuit protection	Yes; electronic	Yes; electronic	Yes; electronic	Yes; electronic	Yes; electronic
• Response threshold, typ.	0.7 A	1.8 A	1.8 A	2.8 A	1.8 A
Limitation of inductive shutdown voltage to	Typ. (L1+, L2+) -47 V	Typ. (L1+, L2+) -47 V	Typ. (L1+, L2+) -47 V	Typ. (L1+, L2+) -47 V	Typ. (L1+, L2+) -47 V
Switching capacity of the outputs					
• on lamp load, max.	5 W	5 W	5 W	10 W	5 W
Controlling a digital input	Yes	Yes	Yes	Yes	Yes
Output current					
• for signal "1" rated value	0.5 A	1.3 A; maximum	1.3 A; maximum	2 A	1.3 A; maximum
• for signal "0" residual current, max.	1.5 mA	1.5 mA	1.5 mA	1.5 mA	1.5 mA
Parallel switching of 2 outputs					
• for increased power	No	No	No	No	No
• for redundant control of a load	Yes	Yes	Yes	Yes	Yes
Switching frequency					
• with resistive load, max.	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
• on lamp load, max.	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz
Aggregate current of outputs (per group)					
• up to 55 °C, max.		3.9 A			
• up to 60 °C, max.	4 A	2.6 A	3.9 A	3.9 A	3.9 A
Cable length					
• Cable length unshielded, max.	30 m	30 m	30 m	30 m	30 m

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Technical specifications (continued)

	6ES7 142-6BF50-0AB0	6ES7 142-6BF00-0AB0	6ES7 142-6BG00-0AB0	6ES7 142-6BR00-0AB0	6ES7 142-6BH00-0AB0
Interfaces					
Transmission procedure	100BASE-TX	100BASE-TX	100BASE-TX	100BASE-TX	100BASE-TX
Transmission rate, max.	100 Mbit/s	100 Mbit/s	100 Mbit/s	100 Mbit/s	100 Mbit/s
• Number of PROFINET interfaces	2	2	2	2	2
• Autocrossing	Yes	Yes	Yes	Yes	Yes
• Automatic detection of transmission speed	Yes	Yes	Yes	Yes	Yes
• Integrated switch	Yes	Yes	Yes	Yes	Yes
• PROFINET IO device					
- IRT with the option "high flexibility" supported	Yes	Yes	Yes	Yes	Yes
- Prioritized startup supported	Yes	Yes	Yes	Yes	Yes
Protocols					
PROFINET IO	Yes	Yes	Yes	Yes	Yes
Protocols (Ethernet)					
• SNMP	Yes	Yes	Yes	Yes	Yes
• DCP	Yes	Yes	Yes	Yes	Yes
• LLDP	Yes	Yes	Yes	Yes	Yes
• ping	Yes	Yes	Yes	Yes	Yes
• arp	Yes	Yes	Yes	Yes	Yes
Alarms/diagnostics/ status information					
Status indicator	Yes; green LED	Yes; green LED	Yes; green LED	Yes; green LED	Yes; green LED
Alarms					
• Diagnostic alarm	Yes	Yes	Yes	Yes	Yes
Diagnostics					
• Diagnostic functions	Yes	Yes	Yes	Yes	Yes
• Diagnostic information readable	Yes	Yes	Yes	Yes	Yes
• Monitoring the supply voltage to the electronics	Yes; green "ON" LED	Yes; green "ON" LED	Yes; green "ON" LED	Yes; green "ON" LED	Yes; green "ON" LED
• Wire break in actuator cable	Yes	Yes	Yes	Yes	Yes
• Short circuit	Yes	Yes	Yes	Yes	Yes
• Group error	Yes; red/yellow "SF/ MT" LED	Yes; red/yellow "SF/ MT" LED	Yes; red/yellow "SF/ MT" LED	Yes; red/yellow "SF/ MT" LED	Yes; red/yellow "SF/ MT" LED
Galvanic isolation					
between the load voltages	Yes	Yes	Yes	Yes	Yes
between load voltage and all other switching components	No	No	No	No	No
between Ethernet and electronics	Yes	Yes	Yes	Yes	Yes
Galvanic isolation digital outputs					
• between the channels	No	No	No	No	No
Permissible potential difference					
between different circuits	75 V DC/60 V AC	75 V DC/60 V AC	75 V DC/60 V AC	75 V DC/60 V AC	75 V DC/60 V AC

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Technical specifications (continued)

	6ES7 142-6BF50-0AB0	6ES7 142-6BF00-0AB0	6ES7 142-6BG00-0AB0	6ES7 142-6BR00-0AB0	6ES7 142-6BH00-0AB0
Isolation					
tested with					
• 24 V DC circuits	500 V	500 V	500 V	500 V	500 V
• Interface	1 500 V; according to IEEE 802.3	1 500 V; according to IEEE 802.3	1 500 V; according to IEEE 802.3	1 500 V; according to IEEE 802.3	1 500 V; according to IEEE 802.3
IP65	Yes	Yes	Yes	Yes	Yes
IP66	Yes	Yes	Yes	Yes	Yes
IP67	Yes	Yes	Yes	Yes	Yes
Connection method					
M12	Yes	Yes	Yes	Yes	Yes
Dimensions and weight					
Dimensions					
• Width	30 mm	30 mm	60 mm	60 mm	60 mm
• Height	200 mm	200 mm	175 mm	175 mm	175 mm
• Depth	49 mm	49 mm	49 mm	49 mm	49 mm
Weight					
• Weight	550 g	550 g	910 g	910 g	910 g

	6ES7 147-6BG00-0AB0
General information	
Vendor identification (VendorID)	002AH
Device identifier (DeviceID)	0306H
• 24 V DC	Yes
• Permissible range, lower limit (DC)	20.4 V
• Permissible range, upper limit (DC)	28.8 V
• Reverse polarity protection	Yes
Load voltage 2L+	
• Rated value (DC)	24 V
• Permissible range, lower limit (DC)	20.4 V
• Permissible range, upper limit (DC)	28.8 V
• Reverse polarity protection	Yes
from load voltage 1L+ (unswitched voltage)	4 A
from load voltage 2L+, max.	4 A
Encoder supply	
Number of outputs	8
Output current, rated value	100 mA; Per output
24 V encoder supply	
• Short-circuit protection	Yes

	6ES7 147-6BG00-0AB0
Power losses	
Power loss, typ.	6.5 W
Digital inputs	
Number of digital inputs	8
• in groups of	4
Number of simultaneously controllable inputs	
• all mounting positions	
- Concurrently controllable inputs, up to 60 °C	8
Input characteristic curve acc. to IEC 1131, Type 3	Yes
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)	1.5 mA
• for signal "1", typ.	7 mA
Input delay (for rated value of input voltage)	
• for standard inputs	
- at "0" to "1", max.	Typ. 3 ms
- at "1" to "0", max.	Typ. 3 ms
Cable length	
• Cable length unshielded, max.	30 m

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Technical specifications (continued)

	6ES7 147-6BG00-0AB0
Digital outputs	
Number of digital outputs	8
• in groups of	4
Short-circuit protection	Yes; Electronic
• Response threshold, typ.	1.8 A
Limitation of inductive shutdown voltage to	Typ. (L1+, L2+) -47 V
Switching capacity of the outputs	
• on lamp load, max.	5 W
Controlling a digital input	Yes
Output current	
• for signal "1" rated value	1.3 A; maximum
• for signal "0" residual current, max.	1.5 mA
Parallel switching of 2 outputs	
• for increased power	No
• for redundant control of a load	Yes
Switching frequency	
• with resistive load, max.	100 Hz
• with inductive load, max.	0.5 Hz
• on lamp load, max.	1 Hz
Aggregate current of outputs (per group)	
• up to 60 °C, max.	3.9 A
Cable length	
• Cable length unshielded, max.	30 m
Interfaces	
Transmission procedure	100BASE-TX
Transmission rate, max.	100 Mbit/s
• Number of PROFINET interfaces	2
• Autocrossing	Yes
• Automatic detection of transmission speed	Yes
• Integrated switch	Yes
• PROFINET IO device	
- IRT with the option "high flexibility" supported	Yes
- Prioritized startup supported	Yes
Protocols	
PROFINET IO	Yes
Protocols (Ethernet)	
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
• ping	Yes
• arp	Yes

	6ES7 147-6BG00-0AB0
Alarms/diagnostics/status information	
Status indicator	Yes; Green LED
Alarms	
• Diagnostic alarm	Yes
Diagnostics	
• Diagnostic functions	Yes
• Diagnostic information readable	Yes
• Monitoring the supply voltage to the electronics	Yes; Green "ON" LED
• Wire break in actuator cable	Yes
• Wire break in signal transmitter cable	Yes
• Short circuit	Yes
• Short circuit encoder supply	Yes
• Group error	Yes; Red/yellow "SF/MT" LED
Galvanic isolation	
between the load voltages	Yes
between load voltage and all other switching components	No
between Ethernet and electronics	Yes
Galvanic isolation digital inputs	
• between the channels	No
Galvanic isolation digital outputs	
• between the channels	No
Permissible potential difference	
between different circuits	75 V DC / 60 V AC
Isolation	
tested with	
• 24 V DC circuits	500 V
• Interface	1 500 V; According to IEEE 802.3
IP65	Yes
IP66	Yes
IP67	Yes
Connection method	
M12	Yes
Dimensions and weight	
Dimensions	
• Width	60 mm
• Height	175 mm
• Depth	49 mm
Weight	
• Weight	910 g

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Technical specifications (continued)

	6ES7 144-6KD00-0AB0
General information	
Vendor identification (VendorID)	002AH
Device identifier (DeviceID)	0306H
• 24 V DC	Yes
• Permissible range, lower limit (DC)	20.4 V
• Permissible range, upper limit (DC)	28.8 V
• Reverse polarity protection	Yes
Current consumption, typ.	110 mA
Encoder supply	
Number of outputs	4
24 V encoder supply	
• Short-circuit protection	Yes; electronic at 1.4 A
• Output current, max.	1 A
Power losses	
Power loss, typ.	2.8 W
Analog inputs	
Number of analog inputs	8
Number of analog inputs for voltage/current measurement	4
Number of analog inputs for resistance/temperature measurement	4
Cable length, shielded, max.	30 m
Permissible input voltage for voltage input (destruction limit), max.	28.8 V permanent, 35 V for max. 500 ms
Input ranges (rated values), voltages	
• 0 to +10 V	Yes
• 1 to 5 V	Yes
• -10 V to +10 V	Yes
• -80 mV to +80 mV	Yes
Input ranges (rated values), currents	
• 0 to 20 mA	Yes
• -20 to +20 mA	Yes
• 4 to 20 mA	Yes
Input ranges (rated values), thermoelements	
• Type E	Yes
• Type J	Yes
• Type K	Yes
• Type N	Yes
Input ranges (rated values), resistance thermometers	
• Ni 100	Yes
• Ni 1000	Yes
• Ni 120	Yes
• Ni 200	Yes
• Ni 500	Yes
• Pt 100	Yes
• Pt 1000	Yes
• Pt 200	Yes
• Pt 500	Yes
Input ranges (rated values), resistors	
• 0 to 150 Ohm	Yes
• 0 to 300 Ohm	Yes
• 0 to 600 Ohm	Yes
• 0 to 3000 Ohm	Yes

	6ES7 144-6KD00-0AB0
Temperature compensation	
• Temperature compensation parameterizable	Yes
• Internal temperature compensation	Yes
• External temperature compensation with compensations socket	Yes
Analog value creation	
Analog value display	SIMATIC S7 format
Measurement principle	Integrating
Integrations and conversion time/ resolution per channel	
• Resolution (incl. overrange)	15 bit + sign
• Integration time, parameterizable	Yes
• Integration time, ms	2/16.67/20/100 ms
• Interference voltage suppression for interference frequency f1 in Hz	500/50/60/10 Hz
• Conversion time (per channel)	4/19/22/102 ms
Smoothing of measured values	
• parameterizable	Yes
• Step: None	Yes; 1 x cycle time
• Step: Low	Yes; 4 x cycle time
• Step: Medium	Yes; 16 x cycle time
• Step: High	Yes; 64 x cycle time
Encoder	
Number of connectable encoders, max.	8
Connection of signal encoders	
• for voltage measurement	Yes
• for current measurement as 2-wire transducer	Yes
• 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	
Linearity error (relative to input area)	+/- 0.01 %
Temperature error (relative to input area)	U: 0.0035%/°C; I:0.006%/°C; RTD: 0.0005%/°C; TC: 0.0035%/°C
Crosstalk between the inputs, min.	85 dB
Repeat accuracy in settled status at 25 °C (relative to input area)	+/- 0.008 %
Interference voltage suppression for f = n x (fl +/- 1%), fl = interference frequency	
• Series mode interference (peak value of interference < rated value of input range), min.	46 dB
• Common mode interference, min.	70 dB

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Technical specifications (continued)

	6ES7 144-6KD00-0AB0
Interfaces	
Transmission procedure	100BASE-TX
Transmission rate, max.	100 Mbit/s
• Number of PROFINET interfaces	2
• Autocrossing	Yes
• Automatic detection of transmission speed	Yes
• Integrated switch	Yes
• PROFINET IO device	
- IRT with the option "high flexibility" supported	Yes
- Prioritized startup supported	Yes
Protocols	
PROFINET IO	Yes
Protocols (Ethernet)	
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
• ping	Yes
• arp	Yes
Alarms/diagnostics/status information	
Alarms	
• Diagnostic alarm	Yes
Diagnostics	
• Diagnostic functions	Yes
• Diagnostic information readable	Yes
• Monitoring the supply voltage to the electronics	Yes; Green "ON" LED
• Short circuit encoder supply	Yes; Per module
• Group error	Yes; Red/yellow "SF/MT" LED
• Overflow/underflow	Yes

	6ES7 144-6KD00-0AB0
Galvanic isolation	
between the load voltages	Yes
between load voltage and all other switching components	No
between Ethernet and electronics	Yes
Galvanic isolation analog inputs	
• between the channels	No
Permissible potential difference	
between inputs and MANA (UCM)	10 Vpp AC
Isolation	
tested with	
• 24 V DC circuits	500 V
• Interface	1 500 V; According to IEEE 802.3
IP65	Yes
IP66	Yes
IP67	Yes
Connection method	
M12	Yes
Dimensions and weight	
Dimensions	
• Width	60 mm
• Height	175 mm
• Depth	49 mm
Weight	
• Weight	930 g

	6ES7 145-6HD00-0AB0
General information	
Vendor identification (VendorID)	002AH
Device identifier (DeviceID)	0306H
• 24 V DC	Yes
• Permissible range, lower limit (DC)	20.4 V
• Permissible range, upper limit (DC)	28.8 V
• Reverse polarity protection	Yes
Current consumption, typ.	280 mA
Encoder supply	
Number of outputs	4
24 V encoder supply	
• Short-circuit protection	Yes; Electronic at 1.4 A
• Output current, max.	1 A
Power losses	
Power loss, typ.	5.5 W
Analog outputs	
Number of analog outputs	4
Cable length, shielded, max.	30 m
Voltage output, short-circuit protection	Yes
Voltage output, short-circuit current, max.	30 mA

	6ES7 145-6HD00-0AB0
Current output, no-load voltage, max.	20 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
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.	600 Ω
• with current outputs, inductive load, max.	1 mH
Destruction limits against externally applied voltages and currents	
• Voltages at the outputs towards MANA	28.8 V permanent, 35 V for max. 500 ms

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Technical specifications (continued)

	6ES7 145-6HD00-0AB0
Analog value creation	
Analog value display	SIMATIC S7 format
Measurement principle	Resistor network
Integrations and conversion time/ resolution per channel	
• Resolution (incl. overrange)	15 bit + sign
• Conversion time (per channel)	1 ms
Settling time	
• for resistive load	2 ms
• for capacitive load	1.8 ms
• for inductive load	2 ms
Errors/accuracies	
Output ripple (based on output area, bandwidth 0 to 50 kHz)	U: ±0.6 mVrms; I: ±0.4 nArms
Linearity error (relative to output area)	+/- 0.02 %
Temperature error (relative to output area)	U: 0.001%/°C; I: 0.0025%/°C
Crosstalk between the outputs, min.	70 dB
Repeat accuracy in settled status at 25 °C (relative to output area)	+/- 0.008 %
Interfaces	
Transmission procedure	100BASE-TX
Transmission rate, max.	100 Mbit/s
• Number of PROFINET interfaces	2
• Autocrossing	Yes
• Automatic detection of transmission speed	Yes
• Integrated switch	Yes
• PROFINET IO device	
- IRT with the option "high flexibility" supported	Yes
- Prioritized startup supported	Yes
Protocols	
PROFINET IO	Yes
Protocols (Ethernet)	
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
• ping	Yes
• arp	Yes

	6ES7 145-6HD00-0AB0
Alarms/diagnostics/status information	
Status indicator	Yes
Substitute values connectable	Yes
Alarms	
• Diagnostic alarm	Yes
Diagnostics	
• Diagnostic functions	Yes
• Diagnostic information readable	Yes
• Monitoring the supply voltage to the electronics	Yes; Green "ON" LED
• Wire break	Yes; Channel-by-channel with current output
• Short circuit	Yes; Channel-by-channel with voltage output
• Group error	Yes; Red/yellow "SF/MT" LED
Galvanic isolation	
between the load voltages	Yes
between load voltage and all other switching components	No
between Ethernet and electronics	Yes
Galvanic isolation analog outputs	
• between the channels	No
Permissible potential difference	
between M internally and the outputs	10 Vpp AC
IP65	Yes
IP66	Yes
IP67	Yes
Connection method	
M12	Yes
Dimensions and weight	
Dimensions	
• Width	60 mm
• Height	175 mm
• Depth	49 mm
Weight	
• Weight	930 g

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Technical specifications (continued)

	6ES7 148-6JA00-0AB0
General information	
Vendor identification (VendorID)	002AH
Device identifier (DeviceID)	0306H
• 24 V DC	Yes
• Permissible range, lower limit (DC)	20.4 V
• Permissible range, upper limit (DC)	28.8 V
• Reverse polarity protection	Yes
Load voltage 2L+	
• Rated value (DC)	24 V
• Permissible range, lower limit (DC)	20.4 V
• Permissible range, upper limit (DC)	28.8 V
• Reverse polarity protection	Yes
from load voltage 1L+ (unswitched voltage)	4 A
from load voltage 2L+, max.	4 A
Encoder supply	
Number of outputs	6
Output current, rated value	200 mA; 100 mA per output to X5-X6
24 V encoder supply	
• Short-circuit protection	Yes
Power losses	
Power loss, typ.	8 W
Digital inputs	
Number of digital inputs	8
Number of simultaneously controllable inputs	
• all mounting positions	
- Concurrently controllable inputs, up to 60 °C	8
Input characteristic curve acc. to IEC 1131, Type 3	Yes
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)	1.5 mA
• for signal "1", typ.	7 mA
Input delay (for rated value of input voltage)	
• for standard inputs	
- at "0" to "1", max.	Typ. 3 ms
- at "1" to "0", max.	Typ. 3 ms
Cable length	
• Cable length unshielded, max.	30 m

	6ES7 148-6JA00-0AB0
Digital outputs	
Number of digital outputs	4
Short-circuit protection	Yes; Electronic
• Response threshold, typ.	1.8 A
Limitation of inductive shutdown voltage to	Typ. (L1+, L2+) -47 V
Switching capacity of the outputs	
• on lamp load, max.	5 W
Controlling a digital input	Yes
Output current	
• for signal "1" rated value	1.3 A; maximum
• for signal "0" residual current, max.	1.5 mA
Parallel switching of 2 outputs	
• for increased power	No
• for redundant control of a load	Yes
Switching frequency	
• with resistive load, max.	100 Hz
• with inductive load, max.	0.5 Hz
• on lamp load, max.	1 Hz
Aggregate current of outputs (per group)	
• up to 60 °C, max.	3.9 A
Cable length	
• Cable length unshielded, max.	30 m
Interfaces	
Transmission procedure	100BASE-TX
Transmission rate, max.	100 Mbit/s
• Number of PROFINET interfaces	2
• Autocrossing	Yes
• Automatic detection of transmission speed	Yes
• Integrated switch	Yes
• PROFINET IO device	
- IRT with the option "high flexibility" supported	Yes
Protocols	
PROFINET IO	Yes
Protocols (Ethernet)	
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
• ping	Yes
• arp	Yes

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Technical specifications (continued)

	6ES7 148-6JA00-0AB0
Alarms/diagnostics/status information	
Status indicator	Yes; Green LED
Alarms	
• Diagnostic alarm	Yes
Diagnostics	
• Diagnostic functions	Yes
• Diagnostic information readable	Yes
• Monitoring the supply voltage to the electronics	Yes; Green "ON" LED
• Wire break in actuator cable	Yes
• Wire break in signal transmitter cable	Yes
• Short circuit	Yes
• Short circuit encoder supply	Yes
• Group error	Yes; Red/yellow "SF/MT" LED
Galvanic isolation	
between the load voltages	Yes
between load voltage and all other switching components	No
between Ethernet and electronics	Yes
Galvanic isolation digital inputs	
• between the channels	No
Galvanic isolation digital outputs	
• between the channels	No

	6ES7 148-6JA00-0AB0
Permissible potential difference	
between different circuits	75 V DC / 60 V AC
Isolation	
tested with	
• 24 V DC circuits	500 V
• Interface	1 500 V; According to IEEE 802.3
IP65	Yes
IP66	Yes
IP67	Yes
Connection method	
M12	Yes
Dimensions and weight	
Dimensions	
• Width	60 mm
• Height	175 mm
• Depth	49 mm
Weight	
• Weight	910 g

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ET 200eco PN

Ordering data

		Order No.
ET 200eco PN digital input module		
• 8 DI 24 V DC; 4 x M12, dual assignment, degree of protection IP67	I	**6ES7 141-6BF00-0AB0**
• 8 DI 24 V DC; 8 x M12, degree of protection IP67	I	**6ES7 141-6BG00-0AB0**
• 16 DI 24 V DC; 8 x M12, dual assignment, degree of protection IP67	I	**6ES7 141-6BH00-0AB0**
ET 200eco PN digital output module		
• 8 DO 24 V DC/0.5 A; 4 x M12, dual assignment, 1 load voltage supply DO; degree of protection IP67	I	**6ES7 142-6BF50-0AB0**
• 8 DO 24 V DC/1.3 A; 4 x M12, dual assignment, degree of protection IP67	I	**6ES7 142-6BF00-0AB0**
• 8 DO 24 V DC/1.3 A; 8 x M12, degree of protection IP67	I	**6ES7 142-6BG00-0AB0**
• 8 DO 24 V DC/2 A; 8 x M12, degree of protection IP67	I	**6ES7 142-6BR00-0AB0**
• 16 DO 24 V DC/1.3 A; 8 x M12, dual assignment, degree of protection IP67	I	**6ES7 142-6BH00-0AB0**
ET 200eco PN digital input/ output modules		
• 8 DI/DO 24 V DC/1.3 A; 8 x M12, degree of protection IP67	I	**6ES7 147-6BG00-0AB0**
ET 200eco PN analog input modules		
• 8 AI 4 U/I + 4 RTD/TC; 8 x M12, degree of protection IP67	I	**6ES7 144-6KD00-0AB0**
ET 200eco PN analog output modules		
• 4 AO U/I; 4 x M12, degree of protection IP67	I	**6ES7 145-6HD00-0AB0**
ET 200eco PN IO-Link master module		
• 4 IO-L + 8 DI + 4 DO 24 V DC/ 1.3 A; 8 x M12, degree of protection IP67	I	**6ES7 148-6JA00-0AB0**
Accessories		
• PD voltage distributor, 24 V DC; 1 X 7/8", 4 X M12	I	**6ES7 148-6CB00-0AA0**
• Terminal block for ET 200eco PN, 10 A insulation piercing connecting devices	I	**6ES7 194-6CA00-0AA0**
• Spare fuses for terminal block, 10 units		**6ES7 194-6HB00-0AA0**
• Mounting rail 0.5 m		**6ES7 194-6GA00-0AA0**
• Profile screw for mounting rail, 50 units		**6ES7 194-6MA00-0AA0**
• Cap M12 for modules IP67, 10 units		**3RX9 802-0AA00**
• Labels 10 × 7 mm, pastel turquoise, 816 units		**3RT1 900-1SB10**

	Order No.
PROFINET M12 connector, can be assembled	
IE FC M12 connector PRO, can be assembled	
• 1 unit I	**6GK1 901-0DB20-6AA0**
• 8 units I	**6GK1 901-0DB20-6AA8**
PROFINET M12 connecting cables	
Pre-assembled connecting cable with 2 M12 connectors (D-coded) in various lengths:	
0.3 m	**6XV1 870-8AE30**
0.5 m	**6XV1 870-8AE50**
1.0 m	**6XV1 870-8AH10**
1.5 m	**6XV1 870-8AH15**
2.0 m	**6XV1 870-8AH20**
3.0 m	**6XV1 870-8AH30**
5.0 m	**6XV1 870-8AH50**
10.0 m	**6XV1 870-8AN10**
15.0 m	**6XV1 870-8AN15**
M12 connector for load supply 24 V DC	
Connection socket for infeed of 24 V DC; 4-pin, A-coded, 3 units	**6GK1 907-0DC10-6AA3**
Connector for passing on the 24 V DC; 4-pin, A-coded, 3 units	**6GK1 907-0DB10-6AA3**
M12 power connection cables	
Pre-assembled power connection cables on both sides with M12 socket and connector 4 x 0.75 mm^2, in various lengths:	
0.3 m	**6XV1 801-5DE30**
0.5 m	**6XV1 801-5DE50**
1.0 m	**6XV1 801-5DH10**
1.5 m	**6XV1 801-5DH15**
2.0 m	**6XV1 801-5DH20**
3.0 m	**6XV1 801-5DH30**
5.0 m	**6XV1 801-5DH50**
10.0 m	**6XV1 801-5DN10**
15.0 m	**6XV1 801-5DN15**
M12 coupler plug	
Can be assembled, for connecting actuators or sensors, 5-pin	**3RK1 902-4BA00-5AA0**
Y cable M12	
For double connection of I/O by means of single cable to ET 200, 5-pin	**6ES7 194-6KA00-0XA0**

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

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Overview



The IO-Link master module ET200eco PN is part of the compact block I/O range ET 200eco PN.
It is characterized by:

- Compact block I/O for processing digital and IO-Link signals for connection to the PROFINET bus system
- Cabinet-free installation to the IP67 degree of protection with M12 connection system
- Extremely rugged and resistant metal housing and casting
- Compact module in housing size 60 mm x 175 mm x 37 mm (W x H x D, short and wide) with 8 x M12 for digital signals and IO-Link
- PROFINET connection: 2 x M12 and automatic PROFINET address assignment
- 100 Mbit/s data transmission rate
- LLDP neighbor detection without the need for a programming device
- Supply and load voltage connection: 2 x M12
- Channel-specific diagnostics

Technical specifications

	6ES7 148-6JA00-0AB0
General information	
Vendor identification (VendorID)	002AH
Device identifier (DeviceID)	0306H
• 24 V DC	Yes
• Permissible range, lower limit (DC)	20.4 V
• Permissible range, upper limit (DC)	28.8 V
• Reverse polarity protection	Yes
Load voltage 2L+	
• Rated value (DC)	24 V
• Permissible range, lower limit (DC)	20.4 V
• Permissible range, upper limit (DC)	28.8 V
• Reverse polarity protection	Yes
from load voltage 1L+ (unswitched voltage)	4 A
from load voltage 2L+, max.	4 A
Encoder supply	
Number of outputs	6
Output current, rated value	200 mA; 100 mA per output to X5-X6
24 V encoder supply	
• Short-circuit protection	Yes
Power losses	
Power loss, typ.	8 W

	6ES7 148-6JA00-0AB0
Digital inputs	
Number of digital inputs	8
Number of simultaneously controllable inputs	
• all mounting positions	
- Concurrently controllable inputs, up to 60 °C	8
Input characteristic curve acc. to IEC 1131, Type 3	Yes
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)	1.5 mA
• for signal "1", typ.	7 mA
Input delay (for rated value of input voltage)	
• for standard inputs	
- at "0" to "1", max.	Typ. 3 ms
- at "1" to "0", max.	Typ. 3 ms
Cable length	
• Cable length unshielded, max.	30 m

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Technical specifications (continued)

	6ES7 148-6JA00-0AB0
Digital outputs	
Number of digital outputs	4
Short-circuit protection	Yes; electronic
• Response threshold, typ.	1.8 A
Limitation of inductive shutdown voltage to	Typ. (L1+, L2+) -47 V
Switching capacity of the outputs	
• on lamp load, max.	5 W
Controlling a digital input	Yes
Output current	
• for signal "1" rated value	1.3 A; maximum
• for signal "0" residual current, max.	1.5 mA
Parallel switching of 2 outputs	
• for increased power	No
• for redundant control of a load	Yes
Switching frequency	
• with resistive load, max.	100 Hz
• with inductive load, max.	0.5 Hz
• on lamp load, max.	1 Hz
Aggregate current of outputs (per group)	
• up to 60 °C, max.	3.9 A
Cable length	
• Cable length unshielded, max.	30 m
Interfaces	
Transmission procedure	100BASE-TX
Transmission rate, max.	100 Mbit/s
• Number of PROFINET interfaces	2
• Autocrossing	Yes
• Automatic detection of transmission speed	Yes
• Integrated switch	Yes
• PROFINET IO Device	
- IRT with the option "high flexibility" supported	Yes
Protocols	
PROFINET IO	Yes
Protocols (Ethernet)	
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
• ping	Yes
• arp	Yes

	6ES7 148-6JA00-0AB0
Alarms/diagnostics/status information	
Status indicator	Yes; green LED
Alarms	
• Diagnostic alarm	Yes
Diagnostics	
• Diagnostic functions	Yes
• Diagnostic information readable	Yes
• Monitoring the supply voltage to the electronics	Yes; green "ON" LED
• Wire break in actuator cable	Yes
• Wire break in signal transmitter cable	Yes
• Short circuit	Yes
• Short circuit encoder supply	Yes
• Group error	Yes; red/yellow "SF/MT" LED
Galvanic isolation	
between the load voltages	Yes
between load voltage and all other switching components	No
between Ethernet and electronics	Yes
Galvanic isolation digital inputs	
• between the channels	No
Galvanic isolation digital outputs	
• between the channels	No
Permissible potential difference	
between different circuits	75 V DC / 60 V AC
Isolation	
tested with	
• 24 V DC circuits	500 V
• Interface	1 500 V; according to IEEE 802.3
IP65	Yes
IP66	Yes
IP67	Yes
Connection method	
M12	Yes
Dimensions and weight	
Dimensions	
• Width	60 mm
• Height	175 mm
• Depth	49 mm
Weight	
• Weight	910 g

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Ordering data		Order No.
IO-Link Master ET 200eco PN		
• 4 IO-L + 8 DE + 4 DA DC 24 V/ 1.3 A; 8 X M12, IP67 degree of protection	I	**6ES7 148-6JA00-0AB0**
Accessories		
• Voltage divider PD 24 V DC; 1 X 7/8", 4 X M12	I	**6ES7 148-6CB00-0AA0**
• Terminal block for ET 200eco PN, 10 A insulation-piercing	I	**6ES7 194-6CA00-0AA0**
• Spare fuses for terminal block, 10 units		**6ES7 194-6HB00-0AA0**
• Mounting rail 0.5 m		**6ES7 194-6GA00-0AA0**
• Shaped screw for mounting rail, 50 units		**6ES7 194-6MA00-0AA0**
• Sealing cap M12 for IP67 modules, 10 units		**3RK1 901-1KA00**
• Labels 10 x 7 mm, pale turquoise, 816 units per pack		**3RT1 900-1SB10**
PROFINET M12 cable connector, for user assembly		
IE FC M12 connector PRO, for user assembly		
• 1 unit	I	**6GK1 901-0DB20-6AA0**
• 8 units	I	**6GK1 901-0DB20-6AA8**
PROFINET M12 connecting cables		
Preassembled connecting cables with 2 M12 connectors (D-coded), in various lengths:		
0.3 m		**6XV1 870-8AE30**
0.5 m		**6XV1 870-8AE50**
1.0 m		**6XV1 870-8AH10**
1.5 m		**6XV1 870-8AH15**
2.0 m		**6XV1 870-8AH20**
3.0 m		**6XV1 870-8AH30**
5.0 m		**6XV1 870-8AH50**
10.0 m		**6XV1 870-8AN10**
15.0 m		**6XV1 870-8AN15**
M12 connector for 24 V DC load power supply		
Socket for 24 V DC incoming supply; 4-pole A-coded, 3 units		**6GK1 907-0DC10-6AA3**
Cable connector for loop-through of 24 V DC; 4-pole A-coded, 3 units		**6GK1 907-0DB10-6AA3**

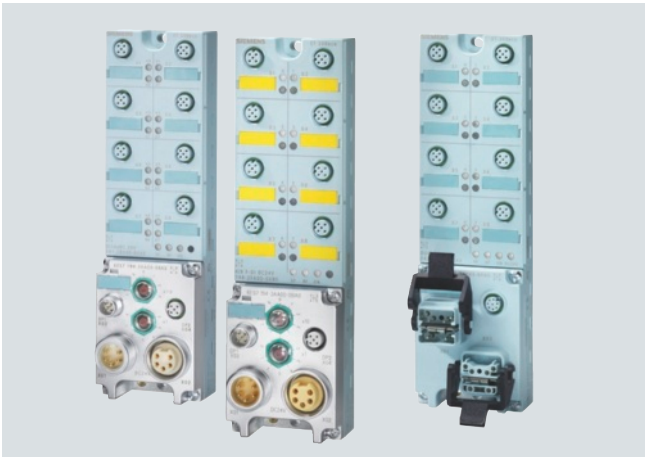
	Order No.
M12 plug-in power cables	
Pre-assembled plug-in power cables, fitted at each end with M12 socket and plug 4 x 0.75 mm^2, in various lengths:	
0.3 m	**6XV1 801-5DE30**
0.5 m	**6XV1 801-5DE50**
1.0 m	**6XV1 801-5DH10**
1.5 m	**6XV1 801-5DH15**
2.0 m	**6XV1 801-5DH20**
3.0 m	**6XV1 801-5DH30**
5.0 m	**6XV1 801-5DH50**
10.0 m	**6XV1 801-5DN10**
15.0 m	**6XV1 801-5DN15**
M12 coupler plug	
Pre-assembled	
• For connecting actuators or sensors, 4-pole	**3RX8 000-0CD40**
• For connecting actuators or sensors, 5-pole	**3RX8 000-0CD55**
M12 angular coupler plug	
For user assembly; for connecting actuators or sensors, 5-pole	**3RX8 000-0CE55**
M12 Y cable	
For double connection of I/O by means of a single-cable on ET200, 5-pole	**6ES7 194-6KA00-0XA0**
M12 connecting cables (PUR casing)	
Preassembled plug-in cables for connecting digital sensors and actuators	
Fitted at each end with M12 socket and plug 3 x 0.34 mm^2, in various lengths:	
0.6 m	**3RX8 000-0GF32-1AA6**
1.0 m	**3RX8 000-0GF32-1AB0**
1.5 m	**3RX8 000-0GF32-1AB5**
Fitted at each end with M12 socket and plug 4 x 0.34 mm^2, in various lengths:	
0.6 m	**3RX8 000-0GF42-1AA6**
1.0 m	**3RX8 000-0GF42-1AB0**
1.5 m	**3RX8 000-0GF42-1AB5**

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ET 200eco

Overview



- Compact, cost-effective I/O devices for processing digital signals
- Design without control cabinet with degree of protection IP65/67 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 connection with identification plug for setting the PROFIBUS address
  - M12: 2 x M12 and 2 x 7/8" with 2 rotary coding switches for assigning the PROFIBUS address
- Connection block contains T-functionality for bus and power supply so that during commissioning and service, the modules can be disconnected from and reconnected to the PROFIBUS without interruption
- Module variance: 8DI, 16DI, 8DI/8DO (1.3 A), 8DI/8DO (2.0 A), 8DO (2.0 A), 16DO (0.5 A)
- Transmission rates up to 12 Mbit/s
- Fail-safe DI modules 4/8 F-DI with safety-related signal processing according to PROFIsafe

Technical specifications

	6ES7 141-3BF00-0XA0	6ES7 141-3BH00-0XA0	6ES7 148-3FA00-0XB0
Supply voltages			
Supply voltage of electronics 1L+			
• Rated value (DC)	24 V	24 V	24 V
• Reverse polarity protection	Yes	Yes	No
Current consumption			
from supply voltage 1L+, max.	70 mA; typically	70 mA; typically	100 mA
Power losses			
Power loss, typ.	2.4 W	3.6 W	3 W
FH technology			
Module for fail-safe applications			Yes
Protocols			
PROFIBUS DP protocol	Yes	Yes	Yes
PROFIBUS DP			
Transmission rate, max.	12 Mbit/s; 9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 Kbit/s; 1.5 / 3 / 6 / 12 Mbit/s	12 Mbit/s; 9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 Kbit/s; 1.5 / 3 / 6 / 12 Mbit/s	12 Mbit/s
Digital inputs			
Number of digital inputs	8	16	8; 8 single channel, 4 two-channel
Number of simultaneously controllable inputs	8; all mounting positions up to 55 °C	16; all mounting positions up to 55 °C	8; 8 single channel, 4 two-channel
Input characteristic curve acc. to IEC 1131, Type 1	Yes	Yes	Yes
Input voltage			
• Rated value, DC	24 V	24 V	24 V
• for signal "0"	-3 to +5 V	-3 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	3.7 mA
Input delay (for rated value of input voltage)			
• for standard inputs			
- at "0" to "1", max.	3 ms; typ.	3 ms; typ.	
- at "1" to "0", max.	3 ms; typically	3 ms; typically	
Cable length			
• Cable length unshielded, max.	30 m	30 m	30 m

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Technical specifications (continued)

	6ES7 141-3BF00-0XA0	6ES7 141-3BH00-0XA0	6ES7 148-3FA00-0XB0
Encoder supply			
Number of outputs	8	8	2
Output voltage	24 V DC	24 V DC	min. L+ (-1.5 V)
Output current, rated value	1 A; aggregate current up to 55 °C	1 A; aggregate current up to 55 °C	300 mA
Short-circuit protection	Yes; electronic	Yes; electronic	Yes
Encoder			
Connectable encoders			
• 2-wire BEROS	Yes	Yes	No
- permissible quiescent current (2-wire BEROS), max.	1.5 mA	1.5 mA	
Alarms/diagnostics/status information			
Status indicator	Yes	Yes	
Alarms			
• Alarms	No	No	
Diagnostics			
• Diagnostics	Yes; diagnostic information readable	Yes; diagnostic information readable	
Diagnostic indication LED			
• Group error SF (red)	Yes	Yes	Yes
• Status indicator digital input (green)	Yes	Yes	Yes
• Channel error indicator F (red)	No	No	No
Isolation			
Isolation checked with	500 V DC	500 V DC	500 V AC for 1 min.
Galvanic isolation			
between PROFIBUS DP and all other circuit components	Yes	Yes	Yes
Galvanic isolation digital inputs			
• between the channels	No	No	No
Permissible potential difference			
between different circuits	75 V DC / 60 V AC	75 V DC / 60 V AC	75 V DC / 60 V AC
Standards, approvals, certificates			
Highest safety class achievable in safety mode			
• acc. to EN 954			Cat. 3 (single-channel), Cat. 4 (two-channel)
• acc. to IEC 61508			SIL 2 (single-channel), SIL 3 (two-channel)
General information			
Vendor identification (VendorID)	80DBh	80DAh	
Dimensions and weight			
Dimensions			
• Width	60 mm	60 mm	60 mm
• Height	210 mm	210 mm	210 mm
• Depth	28 mm	28 mm	28 mm
Weight			
• Weight, approx.	210 g	210 g	220 g

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Technical specifications (continued)

	6ES7 142-3BF00-0XA0	6ES7 142-3BH00-0XA0
Supply voltages		
Supply voltage of electronics 1L+		
• Rated value (DC)	24 V	24 V
• Reverse polarity protection	Yes	Yes
Load voltage 2L+		
• Rated value (DC)	24 V	24 V
• Reverse polarity protection	Yes	Yes
Current consumption		
from load voltage 2L+ (without load), max.	60 mA; typically	80 mA; typically
from supply voltage 1L+, max.	70 mA; typically	70 mA; typically
Power losses		
Power loss, typ.	4 W	4 W
Protocols		
PROFIBUS DP protocol	Yes	Yes
PROFIBUS DP		
Transmission rate, max.	12 Mbit/s; 9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 Kbit/s; 1.5 / 3 / 6 / 12 Mbit/s	12 Mbit/s; 9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 Kbit/s; 1.5 / 3 / 6 / 12 Mbit/s
Digital outputs		
Number of digital outputs	8	16
Short-circuit protection	Yes; electronic	Yes; electronic
• Response threshold, typ.	4 A per channel	1.4 A (per channel)
Limitation of inductive shutdown voltage to	2L+ (-44 V)	2L+ (-47 V)
Lamp load, max.	10 W	5 W
Controlling a digital input	Yes	Yes
Output voltage		
• for signal "1", min.	2L+ (-0.8 V)	2L+ (-0.8 V)
Output current		
• for signal "1" rated value	2 A	0.5 A
• for signal "1" permissible range for 0 to 55 °C, min.	5 mA	5 mA
• for signal "1" permissible range for 0 to 55 °C, max.	2.4 A	1 A
• for signal "0" residual current, max.	0.5 mA	0.1 mA
Parallel switching of 2 outputs		
• for increased power	No	No
• for redundant control of a load	Yes	Yes
Switching frequency		
• with resistive load, max.	100 Hz	100 Hz
• with inductive load, max.	0.5 Hz; to IEC 947-5-1, DC13	0.5 Hz; to IEC 947-5-1, DC13
• on lamp load, max.	1 Hz	1 Hz
Aggregate current of outputs (per group)		
• up to 55 °C, max.	4 A; 4 A each for sockets X1, X3, X5, X7 and 4 A each for sockets X2, X4, X6, X8; note the current carrying capacity of the cable	4 A; Please note the current carrying capacity of the cable!
Load resistance range		
• lower limit	12 Ω	12 Ω
• upper limit	4 kΩ	4 kΩ
Cable length		
• Cable length unshielded, max.	30 m	30 m
Alarms/diagnostics/status information		
Status indicator	Yes	Yes
Alarms		
• Alarms	No	No
Diagnostics		
• Diagnostics	Yes; diagnostic information readable	Yes; diagnostic information readable

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Technical specifications (continued)

	6ES7 142-3BF00-0XA0	6ES7 142-3BH00-0XA0
Diagnostics indication LED		
• Group error SF (red)	Yes	Yes
• Status indicator digital output (green)	Yes	Yes
• Channel error indicator F (red)	No	No
Isolation		
Isolation checked with	500 V DC	500 V DC
Galvanic isolation		
between PROFIBUS DP and all other circuit components	Yes	Yes
Galvanic isolation digital outputs		
• between the channels	No	No
Permissible potential difference		
between different circuits	75 V DC / 60 V AC	75 V DC / 60 V AC
General information		
Vendor identification (VendorID)	80DDh	80FBh
Dimensions and weight		
Dimensions		
• Width	60 mm	60 mm
• Height	210 mm	210 mm
• Depth	28 mm	28 mm
Weight		
• Weight, approx.	210 g	210 g

	6ES7 143-3BH00-0XA0	6ES7 143-3BH10-0XA0
Supply voltages		
Supply voltage of electronics 1L+		
• Rated value (DC)	24 V	24 V
• Reverse polarity protection	No	Yes
Load voltage 2L+		
• Rated value (DC)	24 V	24 V
• Reverse polarity protection	No	Yes
Current consumption		
from load voltage 2L+ (without load), max.	60 mA; typically	60 mA; typically
from supply voltage 1L+, max.	70 mA; typically	70 mA; typically
Power losses		
Power loss, typ.	5 W	5 W
Protocols		
PROFIBUS DP protocol	Yes	Yes
PROFIBUS DP		
Transmission rate, max.	12 Mbit/s; 9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 Kbit/s; 1.5 / 3 / 6 / 12 Mbit/s	12 Mbit/s; 9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 Kbit/s; 1.5 / 3 / 6 / 12 Mbit/s
Digital inputs		
Number of digital inputs	8	8
Number of simultaneously controllable inputs	8; all mounting positions up to 55 °C	8; all mounting positions up to 55 °C
Input characteristic curve acc. to IEC 1131, Type 1	Yes	Yes
Input voltage		
• Rated value, DC	24 V	24 V
• for signal "0"	-3 to +5 V	-3 to +5 V
• for signal "1"	13 to 30 V	13 to 30 V
Input current		
• for signal "1", typ.	7 mA	7 mA
Input delay (for rated value of input voltage)		
• for standard inputs		
- at "0" to "1", max.	3 ms; typ.	3 ms; typ.
- at "1" to "0", max.	3 ms; typically	3 ms; typically

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Technical specifications (continued)

	6ES7 143-3BH00-0XA0	6ES7 143-3BH10-0XA0
Digital outputs		
Number of digital outputs	8	8
Short-circuit protection	Yes; electronic	Yes; electronic
• Response threshold, typ.	4 A per channel	4 A per channel
Limitation of inductive shutdown voltage to	2L+ (-44 V)	2L+ (-44 V)
Lamp load, max.	10 W	10 W
Controlling a digital input	Yes	Yes
Output voltage		
• for signal "1", min.	2L+ (-0.8 V)	2L+ (-1.2 V)
Output current		
• for signal "1" rated value	2 A	1.3 A
• for signal "1" permissible range for 0 to 55 °C, min.	5 mA	5 mA
• for signal "1" permissible range for 0 to 55 °C, max.	2.4 A	1.8 A
• for signal "0" residual current, max.	0.5 mA	0.5 mA
Parallel switching of 2 outputs		
• for increased power	No	No
• for redundant control of a load	Yes	Yes
Switching frequency		
• with resistive load, max.	100 Hz	100 Hz
• with inductive load, max.	0.5 Hz; to IEC 947-5-1, DC13	0.5 Hz; to IEC 947-5-1, DC13
• on lamp load, max.	1 Hz	1 Hz
Aggregate current of outputs (per group)		
• up to 55 °C, max.	4 A; 4 A each for sockets X1, X3, X5, X7 and 4 A each for sockets X2, X4, X6, X8; note the current carrying capacity of the cable	5.2 A; please note the current carrying capacity of the cable!
Load resistance range		
• lower limit	12 Ω	12 Ω
• upper limit	4 kΩ	4 kΩ
Cable length		
• Cable length unshielded, max.	30 m	30 m
Encoder supply		
Number of outputs	8	8
Output voltage	24 V DC	
Output current, rated value	0.75 A; up to 55°C max. 0.75 A (summation current)	1 A; up to 55°C max. 1 A (summation current)
Short-circuit protection	Yes; electronic	Yes; electronic
Encoder		
Connectable encoders		
• 2-wire BEROS	Yes	Yes
- permissible quiescent current (2-wire BEROS), max.	1.5 mA	1.5 mA
Alarms/diagnostics/status information		
Status indicator	Yes	Yes
Alarms		
• Alarms	No	No
Diagnostics		
• Diagnostics	Yes; diagnostic information readable	Yes; diagnostic information readable
Diagnostics indication LED		
• Group error SF (red)	Yes	Yes
• Status indicator digital output (green)	Yes	Yes
• Status indicator digital input (green)	Yes	Yes
• Channel error indicator F (red)	No	No

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Technical specifications (continued)

	6ES7 143-3BH00-0XA0	6ES7 143-3BH10-0XA0
Isolation		
Isolation checked with	500 V DC	500 V DC
Galvanic isolation		
between PROFIBUS DP and all other circuit components	Yes	Yes
Galvanic isolation digital inputs		
• between the channels	No	No
Galvanic isolation digital outputs		
• between the channels	No	No
Permissible potential difference		
between different circuits	75 V DC / 60 V AC	75 V DC / 60 V AC
General information		
Vendor identification (VendorID)	80DCh	80FCh
Dimensions and weight		
Dimensions		
• Width	60 mm	60 mm
• Height	210 mm	210 mm
• Depth	28 mm	28 mm
Weight		
• Weight, approx.	210 g	210 g

	6ES7 194-3AA00-0AA0	6ES7 194-3AA00-0BA0
Power losses		
Power loss, typ.	2 W; The power loss depends on the current that you loop through via the connection block.	2 W; The power loss depends on the current that you loop through via the connection block.
Dimensions and weight		
Dimensions		
• Width	79 mm	79 mm
• Height	60 mm	60 mm
• Depth	30 mm	29 mm
Weight		
• Weight, approx.	313 g	392 g

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ET 200eco

Ordering data		Order No.
BM 141 ET 200eco basic modules		
• 8 DI 24 V DC 8 x M12, individual assignment, IP65/67 connection block 6ES7194-3AA00-0.A0 to be ordered separately		**6ES7 141-3BF00-0XA0**
• 16 DI 24 V DC 8 x M12, double assignment, IP65/67 connection block 6ES7194-3AA00-0.A0 to be ordered separately		**6ES7 141-3BH00-0XA0**
BM 142 ET 200eco basic module		
• 8 DO 24 V DC/1.2 A 8 x M12, individual assignment, IP65/67 connection block 6ES7194-3AA00-0.A0 to be ordered separately		**6ES7 142-3BF00-0XA0**
• 16 DO 24 V DC/0.5 A 8 x M12, double assignment, IP65/67; connection block 6ES7 194-3AA00-0.A0 to be ordered separately		**6ES7 142-3BH00-0XA0**
BM 143 ET 200eco basic modules		
• 8 DI/8 DO, 2 A 8 x M12, IP65/67 connection block 6ES7194-3AA00-0.A0 to be ordered separately		**6ES7 143-3BH00-0XA0**
• 8 DI/8 DO, 1.3 A 8 x M12, double assignment, IP65/67 connection block 6ES7 194-3AA00-0.A0 to be ordered separately		**6ES7 143-3BH10-0XA0**
BM 148 ET 200eco basic modules		
• 4/8 F-DI, 8 x M12, connection block 6ES7194-3AA00-0.A0 to be ordered separately		**6ES7 148-3FA00-0XB0**
ECOFAST connection block	I	**6ES7 194-3AA00-0AA0**
for ET 200eco, 2 x ECOFAST connection RS485 identification connector for PROFIBUS DP, address setting		
M12 connection block, 7/8"		**6ES7 194-3AA00-0BA0**
for ET 200eco, 2 x M12 and 2 x 7/8" 2 rotary coding switch for PROFIBUS DP, address setting		
Accessories for ECOFAST connection block		
PROFIBUS ECOFAST hybrid plug		
• Female contact insert, straight		**6GK1 905-0CB00**
• Female contact insert, angled		**6GK1 905-0CD00**
• Male contact insert, straight		**6GK1 905-0CA00**
• Male contact insert, angled		**6GK1 905-0CC00**
PROFIBUS ECOFAST terminating plug ECOFAST terminating resistor for PROFIBUS DP		
• 1 pack = 1 unit		**6GK1 905-0DA10**
• 1 pack = 5 units		**6GK1 905-0DA00**
PROFIBUS ECOFAST Hybrid cable – Cu		See ECOFAST bus cables

		Order No.
Accessories for M12 connection block, 7/8"		
PROFIBUS M12 cable connector		
1 pack = 5 units		
• Male insert		**6GK1 905-0EA00**
• Female insert		**6GK1 905-0EB00**
PROFIBUS M12 connecting cable		
for PROFIBUS DP, 1 pack = 5 units		
• Male insert		**6GK1 905-0EC00**
PROFIBUS M12 connecting cable		
Pre-assembled 2-wire (inverse coded) with M12 connectors (straight) in various lengths:		
• 0.3 m	I	**6XV1 830-3DE30**
• 0.5 m		**6XV1 830-3DE50**
• 1.0 m		**6XV1 830-3DH10**
• 1.5 m		**6XV1 830-3DH15**
• 2.0 m		**6XV1 830-3DH20**
• 3.0 m		**6XV1 830-3DH30**
• 5.0 m		**6XV1 830-3DH50**
• 10.0 m		**6XV1 830-3DN10**
• 15.0 m		**6XV1 830-3DN15**
• Other special lengths with 90° or 180° cable outlet		see http://support.automation.siemens.com/WW/view/en/26999294
7/8" connector		
1 pack = 5 units		
• Male contact insert, straight		**6GK1 905-0FA00**
• Male contact insert, angled	F	**3RK1 902-3BA00**
• Female contact insert, straight		**6GK1 905-0FB00**
• Female contact insert, angled	F	**3RK1 902-3DA00**
7/8" covering caps		**6ES7 194-3JA00-0AA0**
1 pack = 10 units		
SIMATIC NET energy cable		
5-wire energy cable, stranded 5 x 1.5 mm^2, trailing-type		
• Sold by the meter, minimum order quantity = 20 m		**6XV1 830-8AH10**
7/8" connecting cable to power supply		
Pre-assembled 5-wire cable with 7/8" connectors (straight) in various lengths:		
• 0.3 m	I	**6XV1 822-5BE30**
• 0.5 m		**6XV1 822-5BE50**
• 1.0 m		**6XV1 822-5BH10**
• 1.5 m		**6XV1 822-5BH15**
• 2.0 m		**6XV1 822-5BH20**
• 3.0 m		**6XV1 822-5BH30**
• 5.0 m		**6XV1 822-5BH50**
• 10.0 m		**6XV1 822-5BN10**
• 15.0 m		**6XV1 822-5BN15**

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Ordering data

		Order No.
7/8" connecting cable to power supply		
Pre-assembled 5-wire cable with 7/8" connectors (straight) in various lengths:		
• 3.0 m	F	**3RK1 902-3NB30**
• 5.0 m	F	**3RK1 902-3NB50**
• 10.0 m	F	**3RK1 902-3NC10**
• Other special lengths with 90° or 180° cable outlet		see http://support.automation.siemens.com/WW/view/en/26999294
Other accessories		
Identification plug		**6ES7 194-1KB00-0XA0**
for setting of the PROFIBUS node address		
M12 Y circular connector		**6ES7 194-1KA01-0XA0**
For double connection of sensors via a single cable, 5-pole; cannot be used for F DI 4/8		
M12 Y cable		**6ES7 194-6KA00-0XA0**
For double connection of sensors via a single cable, 5-pole; cannot be used for F DI 4/8		
M12 coupler plug		**3RK1 902-4BA00-5AA0**
for connecting actuators or sensors, 5-pole		
M12 covering caps		**3RX9 802-0AA00**
for sealing of unused I/O sockets		
Labels		**3RT1 900-1SB20**
Module description "Distributed I/O device ET 200eco" excluding F-DI		
• paper version, German		**6ES7 198-8GA00-8AA0**
• paper version, English		**6ES7 198-8GA00-8BA0**
• paper version, French		**6ES7 198-8GA00-8CA0**

		Order No.
"Distributed Safety" V5.4 F programming tool		**6ES7 833-1FC02-0YA5**
Floating License for 1 user, with documentation, 3 languages (German, English, French), on CD, runs on STEP 7 V5.3 SP3 or higher		
"Distributed Safety" F programming tool		**6ES7 833-1FC02-0YE5**
Upgrade from V5.x to V5.4		
"Distributed Safety" F programming tool		**6ES7 833-1FC00-0YX2**
Software Update Service for 1 year, with automatic extension; latest software version required		
S7 Manual Collection	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multi-language: S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication)		
S7 Manual Collection update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates		

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ET 200R

Overview



- Distributed I/O to the degree of protection IP65
- Die-cast aluminum housing
- Integrated repeater
- Parameterizable inputs/ outputs: 8 DI/8 DO up to 16 DI
- Terminal strip at rear for connecting up analog signals for welding transformers
- Connection through hybrid line to 17-pin M23 connector

Technical specifications

	6ES7 143-2BH00-0AB0	6ES7 143-2BH50-0AB0
Supply voltages		
Rated value		
• 24 V DC	Yes; -15 / +20 %	Yes; -15 / +20 %
• 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; also electronic protection	Yes; also electronic protection
Connection method		
Bus cables	Bus and voltage: X01/X02: 2x M23 (17-pin)	Bus and voltage: X01/X02: 2x M23 (17-pin)
Inputs/outputs	8x 5-pin M12x1 circular connector	8x 5-pin M12x1 circular connector
Protocols		
PROFIBUS DP protocol	Yes; ramp-up time at 12 Mbit/s: approx. 80 ms	Yes
PROFIBUS DP		
Cable length, max.	30 m; per line, shielded	30 m; per line, shielded
Digital inputs		
Number of digital inputs	8; 16 process channels, 8 DI fixed, 8 DI/DO can be set in parameters	8; 16 process channels, 8 DI fixed, 8 DI/DO can be set in parameters
Input characteristic curve acc. to IEC 1131, Type 2	Yes	Yes
Input voltage		
• for signal "0"	-3 to +5 V	-3 to +5 V
• for signal "1"	15 to 30 V	15 to 30 V
Input current		
• for signal "1", typ.	7 mA	7 mA
Input delay (for rated value of input voltage)		
• for standard inputs		
- at "0" to "1", max.	3 ms; typ.	3 ms; typ.
Cable length		
• Cable length unshielded, max.	10 m; for signal lines	10 m; for signal lines

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Technical specifications (continued)

	6ES7 143-2BH00-0AB0	6ES7 143-2BH50-0AB0
Digital outputs		
Number of digital outputs	8; 16 process channels, 8 DI fixed, 8 DI/DO can be set in parameters	8; 16 process channels, 8 DI fixed, 8 DI/DO can be set in parameters
Short-circuit protection	Yes; electronic	Yes; electronic
Output current		
• for signal "1" permissible range for 0 to 55 °C, max.	0.5 A	0.5 A
Switching frequency		
• with resistive load, max.	100 Hz	100 Hz
Aggregate current of outputs (per group)		
• up to 55 °C, max.	2 A	2 A
Cable length		
• Cable length unshielded, max.	10 m	10 m
Encoder supply		
Number of outputs	8	8
Output current, rated value	0.5 A; 8 channels each	0.5 A; 8 channels each
Encoder		
Connectable encoders		
• 2-wire BEROS	Yes	Yes
Alarms/diagnostics/status information		
Diagnostics		
• Diagnostic functions	Yes; diagnostic frames	Yes; diagnostic frames
• Short circuit	Yes; (digital outputs) per group; X0 to X1 or X2 to X3	Yes; (digital outputs) per group; X0 to X1 or X2 to X3
• Short circuit encoder supply	Yes; per group X0 to X3 or X4 to X7	Yes; per group X0 to X3 or X4 to X7
• Missing load voltage	Yes	Yes
Diagnostic indication LED		
• Description	Channel 01, Channel 02	Channel 01, Channel 02
• Bus fault BF (red)	Yes	Yes
• Rated load voltage PWR (green)	Yes; 24 V DC (load voltage) US2	Yes; 24 V DC (load voltage) US2
• Group error SF (red)	Yes	Yes
• Status indicator digital output (green)	Yes	Yes
• Status indicator digital input (green)	Yes	Yes
• Monitoring 24 V voltage supply ON (green)	Yes; (logic circuits/encoder voltage) US1	Yes; (logic circuits/encoder voltage) US1
Environmental requirements		
Operating temperature		
• max.	55 °C	55 °C
Degree of protection		
IP65	Yes	Yes
Standards, approvals, certificates		
CE mark	Yes	Yes
CSA approval	Yes; ES 02 or higher	Yes
UL approval	Yes; ES 02 or higher	Yes
General information		
Housing	Die-cast aluminum	Die-cast aluminum
Dimensions and weight		
Dimensions		
• Width	54 mm	54 mm
• Height	55 mm; 64 mm incl. overall plug height	55 mm; 64 mm incl. overall plug height
• Depth	150 mm	150 mm
• Length	150 mm	150 mm
Weight		
• Weight, approx.	780 g	780 g

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ET 200R

Ordering data

		Order No.
ET 200R handling module IP65	I	**6ES7 143-2BH00-0AB0**
Metal casing 8 DI + 8 DI/DO, configurable; 24 V DC, 5-pole, 8 x M12, 2 x M23 (DP, PS, analog)		
ET 200R welding module IP65	I	**6ES7 143-2BH50-0AB0**
Metal casing 8 DI + 8 DI/DO, configurable; 24 V DC, 5-pole, 8 x M12, 2 x M23 (DP, PS, analog)		
Accessories		
Cables ELOCAB		Order from: ELOCAB Sonderkabel Obere Lerch 34 D-91166 Georgensmünd Tel.: (+49 91 72) 69 80-0 Fax: (+49 91 72) 20 29
M23 Connector Interconnectron		Order from: Hypertac GmbH Auwiesenstr. 5, Postfach 14 65 D-94454 Deggendorf

		Order No.
S7 Manual Collection	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multi-language: S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication)		
S7 Manual Collection update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates		

D: Subject to export regulations AL: N and ECCN: 5D992
I: Subject to export regulations AL: N and ECCN: EAR99H
J: Subject to export regulations AL: N and ECCN: EAR99S

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Overview



- The device for low-cost PROFIBUS DP transfer over contact conductors and slip rings to degree of protection IP20
- Permissible baud rates from 9600 bit/s to 500 kbit/s, self-optimizing
- Permissible busbar length:
  From 25 m at 500 kbit/s to 1200 m at 9600 bit/s
- Configuring with PRB Checker software
- Up to 125 nodes per segment
- Transparent for data communication:
  The power rail booster does not reserve DP addresses
- Easy to install due to connection without terminating resistor and filter element
- Diagnostics LED for power supply, bus activity and group errors
- Isolated electronic changeover contact for external group error display or diagnostic alarm
- Uninterruptible communication beyond segment limits using the "PRB segment controller"

Technical specifications

Degree of protection	IP20
Dimensions (W x H x D, with connector) in mm	90 x 132 x 75
Supply voltage	24 V DC
Power consumption	max. 20 W
Data transmission rate, max.	500 kbit/s, self-adjusting
Cable length (depends on baud rate), max.	1200 m
Shock-hazard protected voltage	Yes, to EN 61131-2
Stations per PRB segment, max.	125
Operation without terminating resistance	Yes
Operation without filter	Yes
Wiring options: Line / star	Yes / Yes

Ordering data

		Order No.
Power Rail Booster Signal amplifier for PROFIBUS DP transmission over contact cables, max. 500 kbit/s	I	**6ES7 972-4AA02-0XA0**
PRB segment controller Automatic change-over switch between PRB segments	I	**6ES7 972-4AA50-0XA0**

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Diagnostic repeater for PROFIBUS DP

Overview



- RS 485 repeater with online line diagnostics for PROFIBUS DP
- DP standard PROFIBUS slave (DP-V1)
- Automatic determination of fault types and locations
- Data transmission rate 9.6 kbit/s to 12 Mbit/s
- Connection through FastConnect using the insulation displacement method

Technical specifications

	6ES7 972-0AB01-0XA0
Supply voltages	
Rated value	
• 24 V DC	Yes
• permissible range, lower limit (DC)	20.4 V
• permissible range, upper limit (DC)	28.8 V
Connection method	
Bus cables	FastConnect insulation displacement, 10 clamping cycles possible
Power supply	Terminal block
PROFIBUS DP	
Transmission rate, max.	12 Mbit/s; 9.6 Kbit/s to 12 Mbit/s
Environmental requirements	
Operating temperature	
• Min.	0 °C
• Max.	60 °C
Storage/transport temperature	
• Min.	-40 °C
• Max.	70 °C
Relative humidity	
• Operation, max.	95 %; at 25 °C
Degree of protection	
IP20	Yes
Dimensions and weight	
Dimensions	
• Width	80 mm
• Height	125 mm
• Depth	67.5 mm
Weight	
• Weight, approx.	300 g

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Ordering data	Order No.
RS 485 diagnostic repeater For connection of 1 or 2 segments to PROFIBUS DP; with online diagnostic functions for monitoring the bus cables	**6ES7 972-0AB01-0XA0**
Accessories	
RS 485 bus connector with 90° cable outlet With screw terminals Max. transfer rate 12 Mbit/s	
• Without PG interface	**6ES7 972-0BA12-0XA0**
• With PG interface	**6ES7 972-0BB12-0XA0**
PROFIBUS FastConnect bus connector RS 485 with 90° cable outlet With insulation displacement terminals, max. data transfer rate 12 Mbit/s Without PG interface	
• 1 unit	**6ES7 972-0BA52-0XA0**
• 100 units	**6ES7 972-0BA52-0XB0**
With PG interface	
• 1 unit	**6ES7 972-0BB52-0XA0**
• 100 units	**6ES7 972-0BB52-0XB0**
RS 485 bus connector with angled cable outlet (35°) With screw terminals, max. transfer rate 12 Mbit/s	
• Without PG interface	**6ES7 972-0BA42-0XA0**
• With PG interface	**6ES7 972-0BB42-0XA0**
PROFIBUS FastConnect RS 485 bus connector with angular cable outlet (35°) With insulation displacement terminals, max. transfer rate 12 Mbit/s	
• Without PG interface	**6ES7 972-0BA60-0XA0**
• With PG interface	**6ES7 972-0BB60-0XA0**

		Order No.
PROFIBUS FastConnect Stripping Tool Preadjusted stripping tool for fast stripping of PROFIBUS FastConnect bus cables		**6GK1 905-6AA00**
PROFIBUS FC Standard 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**
S7 Manual Collection Electronic manuals on DVD, multi-language: S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication)	J	**6ES7 998-8XC01-8YE0**
S7 Manual Collection update service for 1 year Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates	D	**6ES7 998-8XC01-8YE2**
Manual for PROFIBUS networks [1] Network architecture, configuration, network components, installation		
German		**6GK1 970-5CA20-0AA0**
BT 200 Hardware Tester with point-to-point cable for station testing, with test connector for wiring test, without charging unit, with operating instructions in German/English/French		**6ES7 181-0AA01-0AA0**
Connecting cable for PROFIBUS 12 Mbit/s, for PG connection to PROFIBUS DP, preassembled with 2 x 9-pin sub D connector, 3.0 m		**6ES7 901-4BD00-0XA0**

[1] Further language variants and manuals can be found for the respective products at: www.siemens.com/automation/csi/net

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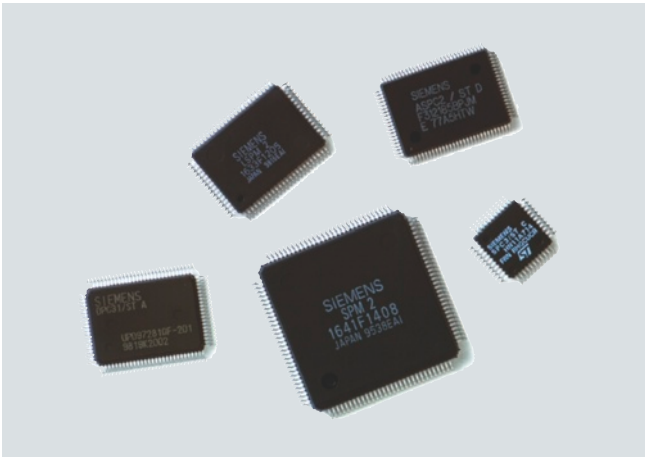
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PROFIBUS DP ASICs

Overview



- Easy connection of field devices to PROFIBUS
- Integrated low power management
- Different ASICs for the different functional requirements and application areas

Technical specifications

	LSPM 2	SPC 3	SPC 3LV	DPC 31
Protocol	PROFIBUS DP	PROFIBUS DP	PROFIBUS DP	PROFIBUS DP, PROFIBUS PA
Application range	simple slave application	intelligent slave application	intelligent slave application	intelligent slave application
Transmission rate, max.	12 Mbit/s	12 Mbit/s	12 Mbit/s	12 Mbit/s
Bus access	in ASIC	in ASIC	in ASIC	in ASIC
Automatic determination of transmission rate	yes	yes	yes	yes
Microprocessor required	no	yes	yes	integrated
Scope of firmware	not required	6 to 24 KB	6 to 24 KB	approx. 38 KB
Message buffer	-	1.5 KB	1.5 KB	6 KB
Power supply	5 V DC	5 V DC	3.3 V DC	3.3 V DC
Power loss, max.	0.35 W	0.5 W	<0.5 W	0.2 W
Permissible ambient temperature	-40 °C … +75 °C	-40 °C … +85 °C	-40 °C … +85 °C	-40 °C … +85 °C
Housing	MQFP, 80-pin	PQFP, 44-pin	PQFP, 44-pin	PQFP, 100-pin
Frame size	4 cm^2	2 cm^2	2 cm^2	4 cm^2
Delivery quantities (pcs.)	6/66/330/4950	6/96/750/960/4800	5/160/800/1000/4800	STEP B: 6/60/300/5100 STEP C1: 6/66/660/4620

	SPC 4-2	ASPC 2	SIM 1-2	FOCSI
Protocol	PROFIBUS DP PROFIBUS FMS PROFIBUS PA	PROFIBUS DP PROFIBUS FMS PROFIBUS PA	PROFIBUS PA	-
Application range	Intelligent slave application	Master application	Medium Attachment	Medium Management Unit
Transmission rate, max.	12 Mbit/s	12 Mbit/s	31.25 kbit/s	12 Mbit/s
Bus access	in ASIC	in ASIC	-	-
Automatic determination of transmission rate	yes	yes	-	-
Microprocessor required	yes	yes	-	-

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Technical specifications (continued)

	SPC 4-2	ASPC 2	SIM 1-2	FOCSI
Scope of firmware	3 … 30 KB	80 KB	not required	not required
Message buffer	3 KB	1 MB (external)	-	-
Voltage supply	5 V DC, 3.3 V	5 V DC	via bus	3.3 V DC
Power loss, max.	0.6 W at 5V 0.01 W at 3.3 V	0.9 W	0.05 W	0.75 W
Permissible ambient temperature	-40 °C … +85 °C	-40 °C … +85 °C	-40 °C … +85 °C	-40 °C … +85 °C
Housing	TQFP, 44-pin	P-MQFP, 100-pin	MLPQ, 40-pin	TQFP, 44-pin
Frame size	2 cm^2	4 cm^2	36 mm^2	2 cm^2
Delivery quantities (pcs.)	5/160	6/66/660/4620	30/60/1000	40

Ordering data

		Order No.
ASIC ASPC 2		
For constructing master interfaces (quantity discount)		
• 6 units (lead-free)	I	**6ES7 195-0AA05-0XA0**
• 66 units (lead-free)	I	**6ES7 195-0AA15-0XA0**
• 660 units (lead-free)	I	**6ES7 195-0AA25-0XA0**
• 4620 units (lead-free)	I	**6ES7 195-0AA35-0XA0**
ASIC LSPM 2		
For constructing simple slave interfaces (quantity discount)		
• 6 units (lead-free)	I	**6ES7 195-0BA02-0XA0**
• 66 units (lead-free)	I	**6ES7 195-0BA12-0XA0**
• 330 units (lead-free)	I	**6ES7 195-0BA22-0XA0**
• 4950 units (lead-free)	I	**6ES7 195-0BA32-0XA0**
ASIC SPC 3		
For constructing intelligent DP slave interfaces (quantity discounts)		
• 6 units (lead-free)	I	**6ES7 195-0BD04-0XA0**
• 96 units (lead-free)	I	**6ES7 195-0BD14-0XA0**
• 960 units (lead-free)	I	**6ES7 195-0BD24-0XA0**
• 4800 units (lead-free)	I	**6ES7 195-0BD34-0XA0**
• 750 units (lead-free) T&R	I	**6ES7 195-0BD44-0XA0**
ASIC SPC 3LV		
For constructing intelligent DP slave interfaces (quantity discounts)		
• 5 units (lead-free)		**6ES7 195-0BG00-0XA0**
• 160 units (lead-free)		**6ES7 195-0BG10-0XA0**
• 800 units (lead-free)		**6ES7 195-0BG20-0XA0**
• 4800 units (lead-free)	I	**6ES7 195-0BG30-0XA0**
• 1000 units (lead-free) T&R		**6ES7 195-0BG40-0XA0**
ASIC FOCSI		
Fiber Optic Controller from Siemens for conditioning signals for the optical PROFIBUS		
• 40 units (lead-free)	I	**6ES7 195-0EA20-0XA0**

		Order No.
ASIC DPC 31 STEP B		
For constructing intelligent DP slave interfaces (quantity discounts)		
• 6 units (lead-free)	I	**6ES7 195-0BE02-0XA0**
• 60 units (lead-free)	I	**6ES7 195-0BE12-0XA0**
• 300 units (lead-free)	I	**6ES7 195-0BE22-0XA0**
• 5100 units (lead-free)	I	**6ES7 195-0BE32-0XA0**
ASIC DPC 31 STEP C1		
For constructing intelligent DP slave interfaces (quantity discounts)		
• 6 units (lead-free)	I	**6ES7 195-0BF02-0XA0**
• 66 units (lead-free)	I	**6ES7 195-0BF12-0XA0**
• 660 units (lead-free)	I	**6ES7 195-0BF22-0XA0**
• 4620 units (lead-free)	I	**6ES7 195-0BF32-0XA0**
ASIC SPC 4-2		
For constructing intelligent DP slave interfaces (quantity discounts)		
• 5 units for laboratory development (lead-free)		**6GK1 588-3AA00**
• 160 units (lead-free, 1 tray)		**6GK1 588-3AA15**
ASIC SIM 1-2		
For connection according to IEC H1 for PROFIBUS PA with a transmission rate of 31.25 kbit/s		
• 60 units (in tube)	I	**6GK1 588-3BB02**
• 1000 units (tape & reel)	I	**6GK1 588-3BB21**
Accessories		
Firmware for Siemens ASIC SPC 3		
• DP firmware		**6ES7 195-2BA00-0XA0**
• DPV1 firmware		**6ES7 195-2BA01-0XA0**
• DPV1 firmware upgrade		**6ES7 195-2BA02-0XA0**
Firmware for Siemens ASIC DPC 31		
• DPV1 firmware		**6ES7 195-2BB00-0XA0**

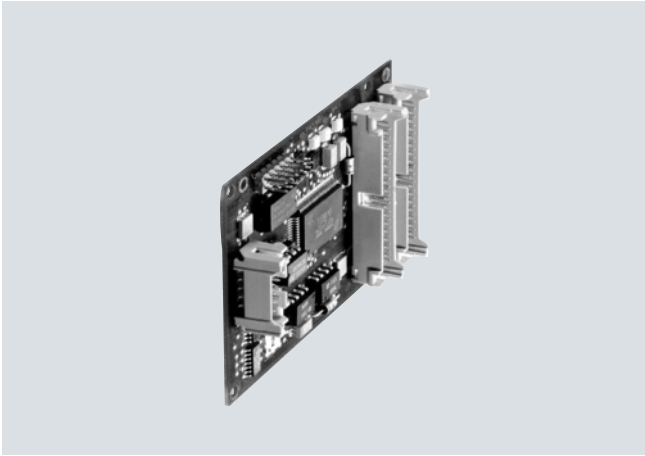
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Connections/interfaces

Overview



- PC slave board IM 182-1 for the connection of AT-compatible PCs as DP slaves

Technical specifications

	6ES7 182-0AA01-0XA0
Supply voltages	
Rated value	
• 5 V DC	Yes
Current consumption	
Current consumption, typ.	250 mA
Protocols	
PROFIBUS DP protocol	Yes
PROFIBUS DP	
Transmission rate, max.	12 Mbit/s
Hardware components/ modules/ ASIC	
ASIC	SPC 3
Scope of firmware	4 to 24 KB (incl. test program)
Programming devices	
Microprocessor type	Processor of the PG/PC
Environmental requirements	
Operating temperature	
• Min.	0 °C
• Max.	60 °C
General information	
Application area	Slave applications
Dimensions	
PCB size, width	168 mm
PCB size, height	105 mm

Ordering data

	Order No.
SIMATIC S5/S7 IM 182-1 PC slave board I	**6ES7 182-0AA01-0XA0**
For PROFIBUS DP, max. 12 Mbit/s	
Accessories	
Windows NT driver for IM 180 and IM 182	**6ES7 195-2AC00-0XA0**
Firmware for Siemens ASIC SPC 3 and IM 182-1	
• DP firmware	**6ES7 195-2BA00-0XA0**
• DPV1 firmware	**6ES7 195-2BA01-0XA0**
• DPV1 firmware upgrade	**6ES7 195-2BA02-0XA0**

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Overview

Development kit

Using the development kits, PROFIBUS hardware and software applications can be developed and tested using the PROFIBUS ASICs DPC31.

The comprehensive, perfectly interacting hardware and software components considerably reduce the development costs for a PROFIBUS device.

The kits provide a fully functional hardware development environment which development engineers can build on with their special requirements for hardware and software. The kit documentation is supplied on CD in English and German.

The kits make our PROFIBUS know-how accessible to other users. The development team is available to provide advice to new users even with their own developments - this consultancy service is also a component part of the development kit.

Following completion of a development, devices can be certified by our experts in the PROFIBUS interface centers – we can help new users here, too.

PROFIBUS DP/PA development kit

The kit facilitates set up of PROFIBUS slaves with a variety of PROFIBUS standards:

- PROFIBUS DP-V1 (RS485)
- PROFIBUS PA (IEC 1158) and
- PROFIBUS based on fiber-optic cables.

The development environment shows applications implemented using PROFIBUS-ASICs DPC 31.

Hardware included:

- DPC 31 development board; for developing/testing proprietary applications
- CP 5613; serves as master interface for the PC (PCI card)
- Optical bus terminal; for conversion of copper cables to FOCs
- Pre-assembled PROFIBUS cables

Software included:

- Testing and simulation software under WinNT for use on the PC in connection with the CP 5613 master module
- Sample program for the DPC 31 board
- DPC 31 DPV1 original firmware, including developer license
- Parameterization software for CP 5613 "COM PROFIBUS“ for DP operation

When developing PROFIBUS PA applications, order a PROFIBUS DP/PA coupler (6ES7 157-0AC80-0XA0) separately. The DP/PA coupler converts the PROFIBUS DP physical specifications into those of PROFIBUS PA physical. This module is not included in the development kit!

PROFIsafe starter kit V3.4

The PROFIsafe starter kit V3.4 is compatible with version 2.4 of the PROFIsafe profile, as specified in IEC 61784-3-3. It meets a series of user requirements such as multi-instance capability and variable process data length at runtime.

Along with all of the PI specifications required for development, the PROFIsafe starter kit contains the source files for the PROFIsafe driver software (PSD) and a comprehensive implementation manual in English and German. In addition, it includes various CRC calculation tools and tools for creating GSD files with security-related parameters.

Examples of adaptation of the PSD (PROFIsafe Driver) to current PROFIBUS and PROFINET stack interfaces provide assistance for adaptations that may be necessary. Special "slow motion monitors" allow the PROFIsafe protocol processes to be monitored in slow motion. A new feature is support for the iPar server and the TCI interface.

Example applications are provided on the CD-ROM for both PROFIBUS and PROFINET. The hardware components supplied in the development kits offer the user access to the PROFIsafe world, step-by-step.

The PROFIsafe starter kit consists of the following components:

- Current PROFIsafe specifications with current PROFIsafe certificate
- PROFIsafe driver software (as core component of the development package)
- Example GSD file for STEP7 (for PROFIBUS DP/PA development package and DK-ERTEC 200 PN IO)
- Example project for S7-319F (for PROFIBUS DP/PA development package and DK-ERTEC 200 PN IO)
- GSD tools (e.g. GSD editor and CRC calculation tool)
- iPar server software and instructions (FB24)
- Tool calling interface example and instructions
- F programming guidelines
- Layer stacks (V1SL and PN IO)
- Example firmware (for PROFIBUS DP/PA development package and DK-ERTEC 200 PN IO)
- Project for development environment example (for PROFIBUS DP/PA development package and DK-ERTEC 200 PN IO)
- Slow motion monitor (for PROFIBUS: PG-PC and CP5613, for PROFINET: PG-CP1616)
- Comprehensive documentation

Ordering data

		Order No.
DP/PA development kit For PROFIBUS ASIC DPC 31 and SIM1, English/German	I	**6ES7 195-3BA10-0YA0**
PROFIsafe starter kit V3.4	J	**6ES7 195-3BF02-0YA0**

I: Subject to export regulations AL: N and ECCN: EAR99H
J: Subject to export regulations AL: N and ECCN: EAR99S

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SIPLUS diagnostic repeater for PROFIBUS

Overview



- RS-485 repeater with online line diagnostics for PROFIBUS DP
- PROFIBUS DP standard slaves (DP-V1)
- Automatic determination of fault type and location
- Transmission rate from 9.6 kbit/s to 12 Mbit/s
- Connection via Fast Connect IDC

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS diagnostic repeater for PROFIBUS DP	
Order No.	**6AG1 972-0AB01-4XA0**
Order No. based on	**6ES7 972-0AB01-0AA0**
Ambient temperature range	0 °C to +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions.
Ambient conditions	
Relative humidity	5 … 100 % condensation permitted
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080...795 hPa (-1000 ... +2000 m) See ambient temperature range 795...658 hPa (+2000 ... +3500 m) Derating 10 K 658...540 hPa (+3500 ... +5000m) Derating 20K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 <4.8 ppm; H_2S <9.9 ppm; Cl <0.2 ppm; HCl <0.66 ppm; HF <0.12 ppm; NH <49 ppm; O_3 <0.1 ppm; NOX <5.2 ppm Threshold / limit value (max. 30 min/d): SO_2 <17.8 ppm; H_2S <49.7 ppm; Cl <1.0 ppm; HCl <3.3 ppm; HF <2.4 ppm; NH <247 ppm; O_3 <1.0 ppm; NOX <10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

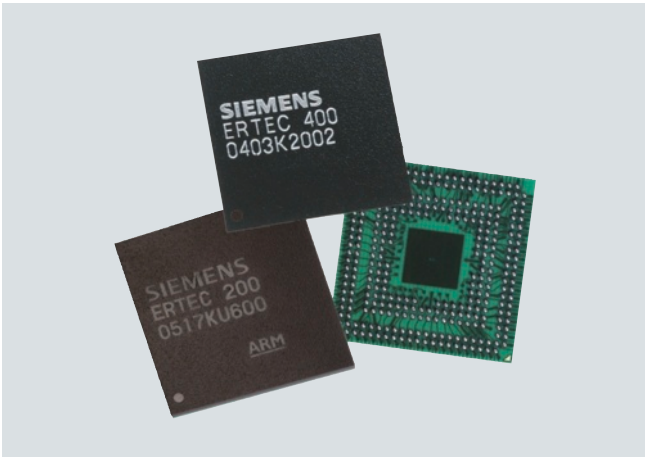
Ordering data

		Order No.
SIPLUS RS 485 diagnostic repeater (medial exposure) to connect up to 2 segments to PROFIBUS DP, with on-line diagnostic functions to monitor the bus lines	H	**6AG1 972-0AB01-4XA0**
Accessories		See SIMATIC RS 485 diagnostic repeater, page 9/351

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H

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Overview



With the Industrial Ethernet ASICs of the ERTEC family (Enhanced Real-Time Ethernet Controller), devices and systems can be connected to PROFINET without great effort. The high-performance Ethernet controllers with 32-bit microprocessor as well as integral real-time switch for Real Time Ethernet have been specially developed for industrial use.

These Ethernet controllers handle all the data transmission for PROFINET IO in real time (RT) and isochronous real time (IRT) and thus offload the application processor. Thanks to the integral 2-port switch (ERTEC 200) or 4-port switch (ERTEC 400), there are no costs for external switches. Flexible topologies such as star, tree and linear topologies can be implemented without any other external network components.

- ERTEC 200
  with an integral 2-port switch for developing simple or modular PROFINET field devices. It also contains integral PHYs for linking the Ethernet controllers to the physical communication network.
- ERTEC 400
  with 4 integral ports and one integral PCI interface for developing controllers and network components.

The DK-ERTEC 200 PN IO and DK-ERTEC 400 PN IO Development Kits enable the uncomplicated development of PROFINET field devices thanks to fast and simple integration of the PROFINET IO functionalities based on the ERTEC. The ERTEC 200 PN IO Starter Kit is especially suitable for low-cost introduction to PROFINET field device development.

Technical specifications

	ERTEC 400	ERTEC 200
Transmission rate	10/100 Mbit/s	10/100 Mbit/s
Interfaces		
• Ethernet / PHY interface	4 x PHY interface	2 x Ethernet interface (PHY integrated) or alternatively 2 x PHY interface (for connection of optical PHYs)
	• Half/full duplex	• Half/full duplex
	• Broadcast filter	• Broadcast filter
	• IEEE 802.1 p Traffic Management	• IEEE 802.1 p Traffic Management
	• IEEE 802.1 q VLAN Tagging and Identification	• IEEE 802.1 q VLAN Tagging and Identification
	• IEEE 1588	• IEEE 1588
- In connection with the corresponding PHY types:	Support for copper and fiber-optic cables; autosensing; autocrossover	Support for copper and fiber-optic cables (PHY for copper integrated); autosensing; autocrossover
• Local Bus Unit (LBU)	Local bus master interface for connecting an external host with access to internal areas of the ERTEC; 16 bit data bit width	Local bus master interface for connecting an external host with access to internal areas of the ERTEC; 16 bit data bit width
• PCI interface	32 bit, 33/66 MHz	–
	• Host functionality	–
	• 2 PCI interrupt outputs INTA_N and SERR_N	–
	• Power Management V1.1	–
	• 3.3 V (5 V tolerance)	–
	• PCI master/target interface	–
	• PCI Core compatible PCI spec. 2.2	–
• External memory interface (EMIF)		
- SDRAM controller	128 MB/16 bit or 256 MB/32 bit	64 MB/16 bit or 128 MB/32 bit
- SRAM controller	4 x 16 MB for asynchronous blocks (SRAM, flash, I/O 8/16/32 bit)	4 x 16 MB for asynchronous blocks (SRAM, flash, I/O 8/16/32 bit)
- Chip-select support	yes	yes
• IO interfaces	32 parameterizable I/O (GPIO); multifunctional outputs	45 parameterizable I/O (GPIO) multifunctional outputs

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Technical specifications (continued)

	ERTEC 400	ERTEC 200
Function units		
• Real-time Ethernet switch	Integral 4-port Fast Ethernet/Real-Time Ethernet switch; 10/100 Mbit Ethernet full duplex	Integral 2-port Fast Ethernet/Real-Time Ethernet switch; 10/100 Mbit Ethernet full duplex
- Communication RAM (SRAM on chip for message frame buffering)	192 KB	64 KB
- Intelligent switching and PROFINET IRT prioritization/timing	yes	yes
• Integral ARM946 processor	32-bit ARM system	32-bit ARM system
- Adjustable operating frequency	50/100/150 MHz	50/100/150 MHz
- Data cache	4 KB	4 KB
- Instruction cache	8 KB	8 KB
- D-TCM	4 KB	4 KB
- Memory Protection Unit (MPU)	yes	yes
- Trace functionality	Debug capability due to embedded ICE (JTAG)	Debug capability due to embedded ICE (JTAG)
- Interrupt controller	For 16xIRQ/ 8xFIQ	For 16xIRQ/ 8xFIQ
• Processor I/O	2 UART similar to the standard UART 16C550	1 UART similar to the standard UART 16C550
- SPI master interface	yes	yes
- Timer 32 bit down-counter	2	3
- F timer 32 bit down-counter	yes	yes
- Watchdog functions	2	3
- External interrupt inputs	yes	yes
• Internal bus structure	32 bit (multi-layer AHB) with 50 MHz clock frequency; multi-layer architecture with parallel access structure of several multimasters to multislave	32 bit (multi-layer AHB) with 50 MHz clock frequency; multi-layer architecture with parallel access structure of several multimasters to multislave
• SRAM-integral work memory on AHB		
- Size	8 KB	–
- Program/data memory	ARM 946	–
- Multiport RAM	For ARM946, IRT and PCI	–
• Clock cycle generation	Internal through PLL for ARM 946ES, AHB, APB and IRT	Internal through PLL for ARM 946ES, AHB, APB and IRT
• Boot ROM	With opcode for software download from different download sources	With opcode for software download from different download sources
• Test functions	Boundary scan	Boundary scan
Supply voltage		
• Core (VDD Core)	1.5 V +/- 10 %	1.5 V +/- 10 %
• I/Os (VDD IO)	3.3 V +/- 10 %	3.3 V +/- 10 %
Current input		
• IDD core	Typ. 270 mA	Typ. 535 mA
• IDD IO	Typ. 150 mA	Typ. 175 mA
Power loss		
• PDD core	Typ. 0.4 W	Typ. 0.8 W
• PDD IO	Typ. 0.5 W	Typ. 0.57 W
Perm. ambient conditions		
• Operating temperature	-40 °C to +85 °C	-40 °C to +85 °C
• Transport/storage temperature	-40 °C to +85 °C	-40 °C to +85 °C
• Relative humidity	Max. 95 % at +25 °C	Max. 95 % at +25 °C
Constructional design		
• Housing	Plastic FBGA 304 Pin	Plastic FBGA 304 Pin
• Pinning Ball Pitch	0.8 mm	0.8 mm
Dimensions (W x H x D) in mm - ERTEC	19 x 1 x 19	19 x 1 x 19
Supported communication protocols		
• General Ethernet protocols	In accordance with the respective software implementation that uses the ERTEC as Ethernet controller	In accordance with the respective software implementation that uses the ERTEC as Ethernet controller
• PROFINET in combination with a PROFINET Software Stack	Real-Time communication (RT); Isochronous Real-Time communication (IRT)	Real-Time communication (RT); Isochronous Real-Time communication (IRT)

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Ordering data

		Order No.
ERTEC 400 (lead-free)		
ASIC ERTEC 400 for connection to switched Ethernet 10/100 Mbit/s, Ethernet controller with integrated 4-port switch, ARM 946 RISC and PCI interface (V2.2), data preparation for real-time and isochrone real-time for PROFINET IO		
• 70 units (individual tray),		**6GK1 184-0BB01-0AA1**
• 350 units (drypack, 5 trays),		**6GK1 184-0BB01-0AA2**
DK-ERTEC 400 PN IO Development kit	D	**6GK1 953-0CA00**

		Order No.
ERTEC 200 (lead-free)		
ASIC ERTEC 200 for connection to switched Ethernet 10/100 Mbit/s, Ethernet controller with integrated 2-port switch, ARM 946 processor and integrated PHYs real-time for PROFINET IO		
• 70 units (individual tray)		**6GK1 182-0BB01-0AA1**
• 350 units (drypack, 5 trays)		**6GK1 182-0BB01-0AA2**
DK-ERTEC 200 PN IO Development kit	D	**6GK1 953-0BA00**
ERTEC 200 PN IO Starter kit	D	**6ES7 195-3BD00-0YA0**

D: Subject to export regulations AL: N and ECCN: 5D992

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Development kit for ERTEC

Overview



With the help of the development kits for the Enhanced Real-Time Ethernet Controller ERTEC, compact or modular PROFINET IO field devices can be developed in a short time and without great effort.

The DK-ERTEC 200 PN IO and DK-ERTEC 400 PN IO development kits enable comprehensive implementation of the PROFINET IO functionality. The low-cost starter kit is suitable as an introduction to PROFINET technology and can later be upgraded to a full DK-ERTEC 200 PN IO.

New: Since Version 3.2, the innovative functions Shared Device, MRP and PROFIenergy have been included in the development packages and can be integrated into PROFINET IO field devices at no additional expense.

Ordering data

		Order No.
ERTEC development kits		
DK-ERTEC 200 PN IO Development kit	D	**6GK1 953-0BA00**
DK-ERTEC 400 PN IO Development kit	D	**6GK1 953-0CA00**
ERTEC 200 PN IO Starter Kit	D	**6ES7 195-3BD00-0YA0**
PROFIsafe starter kit V3.4	J	**6ES7 195-3BF02-0YA0**
ERTEC ASICs		
ERTEC 200		
ASIC ERTEC 200 for connection to switched Ethernet 10/100 Mbit/s, Ethernet controller with integrated 2-port switch, ARM 946 processor and integrated PHYs real-time for PROFINET IO		
• 70 units (individual trays),		**6GK1 182-0BB01-0AA1**
• 350 units (drypack, 5 trays),		**6GK1 182-0BB01-0AA2**
ERTEC 400		
ASIC ERTEC 400 for connection to switched Ethernet 10/100 Mbit/s, Ethernet controller with integrated 4-port switch, ARM 946 RISC and PCI (V2.2), data preparation for real-time and isochronous real-time for PROFINET IO		
• 70 units (individual trays),		**6GK1 184-0BB01-0AA1**
• 350 units (drypack, 5 trays),		**6GK1 184-0BB01-0AA2**
Accessories		
PROFINET IO product line license for one product line		**6ES7 195-3BC10-0YA0**

D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

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Development kit for Standard Ethernet Controllers

Overview



With the help of the development kit for Standard Ethernet Controllers, PROFINET IO devices can be developed on the basis of a Standard Ethernet Controller.

Ordering data

		Order No.
Development kit for Standard Ethernet Controller for Ethernet processor	J	**6ES7 195-3BC00-0YA0**
Accessories		
PROFINET IO product line license for one product line		**6ES7 195-3BC10-0YA0**

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

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RS 485 repeater for PROFIBUS

Overview



- Automatic data transmission rate search
- Data transmission rate of 45.45 Kbit/s possible
- 24 V DC voltage display
- Display bus activity segment 1 and 2
- Isolation of segment 1 and 2 possible by switch
- Isolation of the right segment part when terminating resistor is inserted
- Decoupling of segment 1 and segment 2 in the event of static interference.

Designed for Industry

- To increase the number of stations and the expansion
- Galvanic isolation of segments
- Startup assistance
  - switch for disconnecting segments
  - display of bus activity
  - isolation of segment with incorrectly inserted terminating resistor

Please also have a look at the diagnostic repeater which in addition to the normal repeater functionality also has comprehensive diagnostic functions for physical line diagnostics.
It is described on page 9/350.

Technical specifications

	6ES7 972-0AA01-0XA0
Supply voltages	
Rated value	
• 24 V DC	Yes
• permissible range, lower limit (DC)	20.4 V
• permissible range, upper limit (DC)	28.8 V
Current consumption	
Current consumption, max.	200 mA; (200 mA without loads at PG/OP socket; 230 mA load at PG/OP socket (5 V/90 mA); 300 mA load at PG/OP socket (24 V/90 mA))
Connection method	
Bus cables	2 terminal blocks
Power supply	Terminal block
PROFIBUS DP	
Transmission rate, max.	12 Mbit/s; 9.6 Kbit/s to 12 Mbit/s
Environmental requirements	
Operating temperature	
• Min.	0 °C
• Max.	60 °C
Storage/transport temperature	
• Min.	-40 °C
• Max.	70 °C
Relative humidity	
• Operation, max.	95 %; at 25 °C
Degree of protection	
IP20	Yes
Dimensions and weight	
Dimensions	
• Width	45 mm
• Height	128 mm
• Depth	67 mm
Weight	
• Weight, approx.	350 g

Ordering data

	Order No.
RS 485 Repeater for PROFIBUS	**6ES7 972-0AA02-0XA0**
Data transmission rate up to 12 Mbit/s 24 V DC, housing to IP20	

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Overview



- Terminates bus segments at data transmission rates of 9.6 kbit/s to 12 Mbit/s
- Power supply independent of bus stations.

Designed for Industry

- Terminal-independent bus termination through onboard power supply

Technical specifications

	6ES7 972-0DA00-0AA0
Supply voltages	
Rated value	
• 24 V DC	Yes
• permissible range, lower limit (DC)	20.4 V
• permissible range, upper limit (DC)	28.8 V
Current consumption	
Current consumption, typ.	30 mA
Connection method	
Bus cables	Screw terminal block
Power supply	Screw terminal block
PROFIBUS DP	
Transmission rate, max.	12 Mbit/s; 9.6 Kbit/s to 12 Mbit/s
Environmental requirements	
Operating temperature	
• Min.	0 °C
• max.	60 °C
Storage/transport temperature	
• Min.	-40 °C
• max.	70 °C
Relative humidity	
• Operation, max.	95 %; at +25 °C
Degree of protection	
IP20	Yes
Dimensions and weight	
Dimensions	
• Width	60 mm
• Height	70 mm
• Depth	43 mm
Weight	
• Weight, approx.	95 g

Ordering data

	Order No.
Active RS 485 terminating element for PROFIBUS For terminating bus segments for data transmission rates of 9.6 kbit/s to 12 Mbit/s	**6ES7 972-0DA00-0AA0**

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SIPLUS RS 485 repeater

Overview



- Automatically detects transmission rate
- 45.45 kbit/s transmission rate is possible
- 24 V DC voltage display
- Bus activity segment 1 and 2 display
- The separation of segment 1 and segment 2 on switch is possible
- Separation of the right segment with an inserted terminator
- Decoupling of segment 1 and segment 2 with static interference

Designed for Industry

- To increase the number of participants and the extension
- Segment electric isolation
- Commissioning support
  - Segment separation switch
  - Bus activity display
  - Segment separation with an incorrectly inserted terminator

Please also note in this context the diagnostic repeater that provides extensive diagnostic functions for physical line diagnostics in addition to the normal repeater functionality. This is described on page 9/350.

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS Repeater RS-485 for PROFIBUS		
Order No.	**6AG1 972-0AA01-4XA0**	**6AG1 972-0AA01-7XA0**
Order No. based on	**6ES7 972-0AA01-0XA0**	**6ES7 972-0AA01-0XA0**
Ambient temperature range	0 °C to +60 °C	-25 °C to +70 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	
Ambient conditions		
Relative humidity	5 … 100 % condensation permitted	
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)	
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)]	
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]	
Air pressure (depending on the highest positive temperature range specified)	1080...795 hPa (-1000 ... +2000 m) See ambient temperature range 795...658 hPa (+2000 ... +3500 m) Derating 10 K 658...540 hPa (+3500 ... +5000m) Derating 20K	

1) ISA-S71.04 severity level GX: Long-term load: SO_2 <4.8 ppm; H_2S <9.9 ppm; Cl <0.2 ppm; HCl <0.66 ppm; HF <0.12 ppm; NH <49 ppm; O_3 <0.1 ppm; NOX <5.2 ppm Threshold / limit value (max. 30 min/d): SO_2 <17.8 ppm; H_2S <49.7 ppm; Cl <1.0 ppm; HCl <3.3 ppm; HF <2.4 ppm; NH <247 ppm; O_3 <1.0 ppm; NOX <10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

Ordering data		**Order No.**
SIPLUS RS 485 repeater for PROFIBUS		
(medial exposure)		
Transfer rate up to max. 12 Mbit/s, 24 V DC, housing IP20	L	**6AG1 972-0AA01-4XA0**
Additionally with extended ambient temperature range -25 °C … +70 °C	L	**6AG1 972-0AA01-7XA0**

L: Subject to export regulations AL: 9I999 and ECCN: N

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SIPLUS DP active RS485 terminating element

Overview



- Used to complete bus segments at rates of 9.6 kbit/s to 12 Mbit/s
- Power supply independent of the bus participants.

Designed for Industry

- End-device independent bus termination due to own power supply

Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

SIPLUS active RS-485 terminating element	
Order No.	**6AG1 972-0DA00-2AA0**
Order No. based on	**6ES7 972-0DA00-0AA0**
Ambient temperature range	-25 °C to +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions.
Ambient conditions	
Relative humidity	5 … 100 % condensation permitted
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA –S71.04 severity level G1; G2; G3; GX [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust 2)
Air pressure (depending on the highest positive temperature range specified)	1080...795 hPa (-1000 ... +2000 m) See ambient temperature range 795...658 hPa (+2000 ... +3500 m) Derating 10 K 658...540 hPa (+3500 ... +5000m) Derating 20K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 <4.8 ppm; H_2S <9.9 ppm; Cl <0.2 ppm; HCl <0.66 ppm; HF <0.12 ppm; NH <49 ppm; O_3 <0.1 ppm; NOX <5.2 ppm Threshold / limit value (max. 30 min/d): SO_2 <17.8 ppm; H_2S <49.7 ppm; Cl <1.0 ppm; HCl <3.3 ppm; HF <2.4 ppm; NH <247 ppm; O_3 <1.0 ppm; NOX <10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

Ordering data

	Order No.
SIPLUS DP active RS 485 terminating element for PROFIBUS L (extended temperature range and medial exposure) to complete bus segments for transmission rates of 9.6 kbit/s to 12 Mbit/s	**6AG1 972-0DA00-2AA0**

L: Subject to export regulations AL: 9I999 and ECCN: N

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PN/PN coupler

Overview



- Data exchange of max. 256-byte input data and 256-byte output data between two PROFINET networks
- Maximum of 16 input/output ranges for the exchange of data
- Electrical isolation between the two PROFINET IO subnets
- Redundant power supply
- Supported Ethernet services
  - ping
  - arp
  - network diagnostics (SNMP/MIB-2)
- Diagnostic interrupts
- ReturnOf Submodule interrupts

Ordering data

Ordering data	Order No.
PN/PN coupler for connecting two PROFINET networks	**6ES7158-3AD01-0XA0**
Power supply connector Spare part; for connecting the 24 V DC supply voltage	
• with push-in terminals	**6ES7 193-4JB00-0AA0**
• with screw-type terminals	**6ES7 193-4JB50-0AA0**

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Overview



- Interconnecting two PROFIBUS DP networks
- The interchange of data between both DP networks takes place by internal copying in the coupler.

Technical specifications

DP/DP transceiver	
PROFIBUS transmission rate	max. 12 Mbit/s
Interfaces	
• PROFIBUS DP	9-pin Sub-D connector
Supply voltage	24 V DC
Current consumption typ.	150 mA
Mounting	Upright (DIP switches above)
Perm. ambient conditions	
• Operating temperature	
- horizontal mounting	0°C … +60°C
- all other mounting positions	0°C … +40°C
• Transport/storage temperature	-40 °C … +70 °C
• Relative humidity	10-95 % at +25 °C
Design	
• Dimensions (W x H x D) in mm	40 x 127 x 117
• Weight	approx. 250 g
Degree of protection	IP20

Ordering data

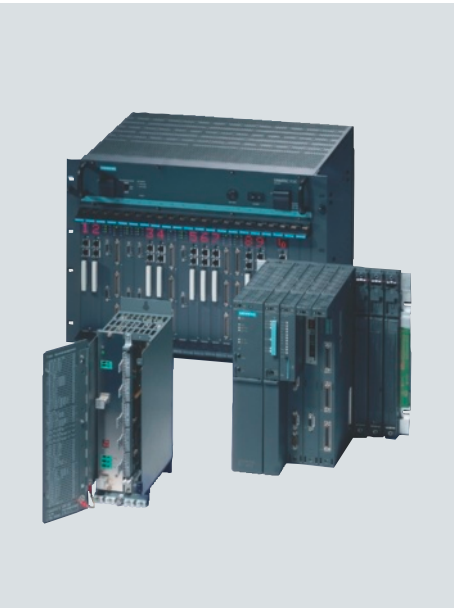
	Order No.
DP/DP coupler	**6ES7 158-0AD01-0XA0**

Note:
The manual is available on the Internet free of charge.

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SIMATIC control systems



10/2 T400 technology module

10/2 T400 technology module

10/4 SRT400 technology box

10/5 Standard software packages: Axial winders with T400 - SPW420

10/5 Standard software packages: Angular-locked synchronism control with T400 - SPA440

10/5 Standard software packages: Cross cutters with T400 - SPS450

10/6 SIMATIC TDC multi processor control system

10/6 UR5213 rack

10/7 CPU551 processor module

10/8 MC5xx program memory module

10/8 CP50M1 communication module

10/9 CP51M1 communication module

10/9 CP53M0 communications module

10/10 SM500 I/O module

10/12 GlobalDataMemory

10/13 Accessories for SIMATIC TDC

Brochures

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

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

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T400 technology module

Overview



The T400 technology module (Drive Based) implements technological tasks direct in the drive:

- The T400 technology module is plugged into the SIMOVERT MASTERDRIVES frequency converter or in the SIMOREG DC-Master converter
- The T400 can also be used as stand-alone solution for other drives in combination with the SRT400 technology box

Technical specifications

T400 technology module	
Processor	32-bit RISC with FPU
Program memory (PC card)	2 MB Flash
Loading the program code	Via serial interface from PC (no plug-in memory module required)
Work memory (program/data)	4 MB DRAM
Cache (program/data)	4 KB each
Permanent modification memory	32 KB NOVRAM
Data backup in the event of a power failure	NOVRAM for 30 configurable (real) values
Sampling time, strictly cyclic, for a closed control loop	
• Shortest • Typical	0.1 ms 0.8 … 1.6 ms
Typical computing times (REAL)	
• MUL, multiplier • PIC, PI controller • RGE, ramp generator	5.5 µs 14.3 µs 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
Galvanic isolation of inputs/outputs	No
Operating state indicators	3 LEDs
Space requirements	1 slot
Dimensions (W x H x D) in mm	14 x 267 x 140
Weight	0.3 kg
Analog outputs	
Number	2
Output range	±10 V
Short-circuit protection	Yes

T400 technology module	
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 corner frequency: 25 kHz
Resolution	12 bit (4.88 mV)
Absolute precision	± 3 bit
Linearity error	< 1 bit
Digital outputs	
Number	2 + max. 4 (bidirectional)
External power supply • Rated value • Permitted range • Current consumption	 24 V DC 15 … 33 V DC 20 mA + output currents
Output voltage • for "0" signal • for "1" signal	 max. 0.1 V External power supply - 0.3 V
Output current	max. 50 mA/output
Overload protection	Yes (limited to 220 mA)
Switching frequency • Resistive load	 5 kHz
max. switching delay (0 … 24 V)	70 µs

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Technical specifications (continued)

T400 technology module	
Digital inputs and reference cams:	
Number	8 + max. 4 (bidirectional) + max. 2 (reference cams)
Input voltage	
• Rated voltage	24 V DC
• with 0 signal	-1 … +6 V or open input
• with 1 signal	+13 … +33 V
Input current	
• with 0 signal	0 mA
• with 1 signal	Typ. 3 mA, max. 5 mA
Delay time	150 µs
Incremental encoder 1	
Connection of sensor signals	Converter module (CUx) or T400/terminals 81-83
Signal voltage for connection to T400 (HTL, unipolar)	
• for "0" signal	< 5 V
• for "1" signal	> 8 V
Signal voltage for connection to converter	As converter (see there); 5 V encoder also possible
Input current	8 mA (max.)
Max. pulse frequency	400 kHz (depending on cable length)
Input filter	Can be configured on function block (NAV)
Incremental encoder 2	
Connection of sensor signals	T400/terminals 62-64, 86-88
Signal voltages (rated value)	5 V (TTL) or 15 V (HTL), unipolar or bipolar

T400 technology module	
Signal voltage for RS 422, bipolar:	
• for "0" signal	< -0.2 V
• for "1" signal	> 0.2 V
Signal voltage for TTL, unipolar (untyp.):	
• for "0" signal	< 0.8 V
• for "1" signal	> 2.3 V
Signal voltage at 15 V (HTL, bipolar):	
• for "0" signal	- 30 … 4 V
• for "1" signal	8 … 30 V
Signal voltage at 15 V (HTL, unipolar):	
• for "0" signal	< 4 V
• for "1" signal	> 8 V
Input current	2 mA (max.)
Max. pulse frequency	1.5 MHz (depending on cable length)
Input filter	Can be configured on function block (NAV)
Absolute encoder	
Number	Max. 2
Connectable encoders	Single turn or multiturn encoder with SSI (synchronous-serial) or EnDat interface
Signal voltage	5 V to RS 422
Data transmission rate	100 kHz to 2 MHz
Data representation	Dual code, gray code, gray excess code

Ordering data

		Order No.
T400 technology module (incl. T400 short description)	I	**6DD1 606-0AD1**
SC400 commissioning cable for PC - connection to T400		**6DD1 684-0GF0**
LBA local bus adapter for MASTERDRIVES and SIMOREG DC Master		**6SE7 090-0XX84-4HA0**
ADB adapter module	I	**6SE7 090-0XX84-0KA0**
CBP2 communication module for PROFIBUS DP and USS	I	**6SE7 090-0XX84-0FF5**
CBC communication module for CAN	I	**6SE7 090-0XX84-0FG0**

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SRT400 technology box

Overview



Compact rack for technology-oriented open-loop and closed-loop control tasks, e.g. for highly dynamic control of two to four drives.

The SRT400 is comparable to the electronics box of SIMOVERT MASTERDRIVES.

The following can be plugged into the SRT400 technology box:

- Up to two T400 technology modules, or
- one T400 and one MASTERDRIVES communication module (e.g. CBx, ADB subrack module for CBP2 (PROFIBUS DP) and CBC submodules).

Technical specifications

Input	
Input voltage	
• Nominal value	115 V/230 V AC
• Permissible range	± 15 %
Line supply frequency	
• Nominal value	50/60 Hz
• Permissible range	± 2.5 Hz
Line supply failure buffering	10 ms
Input current (nominal value)	
• At 120 V AC	190 mA
• At 230 V AC	140 mA to 320 mA (when the 24 V DC output is loaded)
Output	
Output voltages	
• +5 V	5.05 to 5.15 V
• +15 V	14.25 to 15.75 V
• -15 V	-14.25 to –15.75 V
• +24 V	20 to 30 V
Output currents	
• +5 V	3.0 A
• +15 V	0.5 A
• -15 V	0.5 A
• +24 V	0.6 A
Short-circuit protection	Yes
Electrical isolation	Yes
Power drain for two T400 and max. 24V load	43 W at 115 V 54 W at 230 V
Power loss, typical (without modules)	7 W at 115 V 16 W at 230 V
Dimensions (W x H x D) in mm	90 x 291 x 175
Weight	2 kg

Ordering Data

	Order No.
SRT400 technological box Compact rack with power supply, 115/230 V AC, 2 free slots	**6DD1 682-0CG0**

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Standard software packages: Axial winders with T400 - SPW420

Overview

This standard software package SPW420 is suitable for use in the following drive units:

- MASTERDRIVES VC/MC
- SIMOREG DC master

Ordering data

	Order No.
Axial winders with T400 - SPW420 Standard software package with documentation German/English	**6DD1 842-0AA1**
Axial winder software on CD, German and English, executable under Win 95/98/ME, NT, 2000, in connection to STEP 7	**6DD1 843-0AA0**

Standard software packages: Angular-locked synchr. control with T400 - SPA440

Overview

The standard software package SPA440 is suitable for use in the following drive units:

- MASTERDRIVES MC/SC/VC
- SIMOREG DC master

Ordering data

	Order No.
Angular-locked synchronism control with T400 - SPA440 Standard software package with documentation German/English	**6DD1 842-0AB1**
Angular-locked synchronism control software on CD, German and English, executable under Win 95/98/ME, NT, 2000, in connection to STEP 7	**6DD1 843-0AB0**

Standard software packages: Cross cutters 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 short description and documentation CD	**6DD1 842-0AD1**

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UR5213 rack

Overview



The UR5213 rack is the basis for SIMATIC TDC. System power supply and system fans are integrated. A high-performance 64-bit backplane bus supports high-speed data exchange between the inserted modules.

SR51 slot cover

The slot cover SR51 is used for covering any slots that are not used in the rack. It is required to ensure the EMC properties and ventilation of the system.



SR51 slot cover

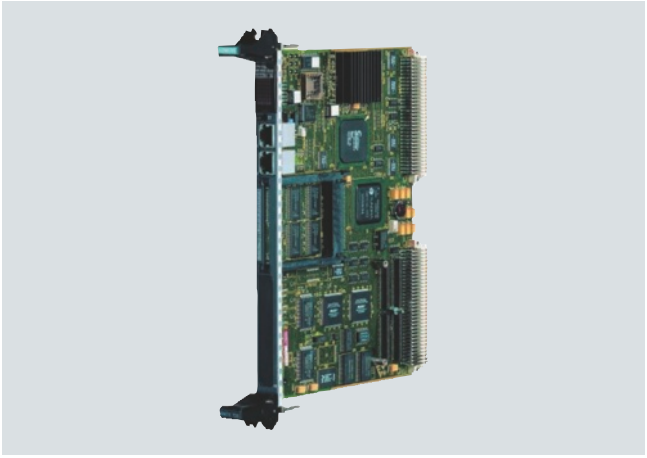
Technical specifications

Input voltage range	85 V - 264 V AC, 47 - 63 Hz 198 V - 253 V DC
Mains buffering	Min. 20 ms
Dimensions (W x H x D) in mm	482.6 x 354.9 x 343
Weight	Approx. 20 kg
Degree of protection	IP20
Rated input current	At 120 V AC: 4.45 A At 230 V AC: 2.3 A At 220 V DC: 2.38 A
Max. inrush current	<40 A
Output voltages	+3.3 V 44 A + 5 V 36 A + 12 V 4.6 A – 12 V 4 A
Operating temperature range	0 °C to +60 °C
Storage temperature range	-40 °C to +70 °C

Ordering data	Order No.
UR5213 rack, spare-part compatible successor of 6DD1 682-0CH0	**6DD1 682-0CH2**
Accessories	
SR51 slot cover for covering any slots that are not used in the rack	**6DD1 682-0DA1**
Spare parts	
Backup battery	**6ES7 971-0BA00**

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Overview



High-performance CPU module for open and closed-loop control and arithmetic tasks.

Technical specifications

CPU551	
Required space / width	1 slot
Weight	0.6 kg
Display	5x7 LED
Local service interface	Serial RS232 interface
Sampling intervals	from 100 µs
SDRAM	128 MB
Synchronous cache	8 MB
Clock frequency	500 MHz
CPU	64 bit RISC CPU with floating point unit
SRAM	512 KB, battery buffered
Power supply	
Voltage / Power supply (at 250°C)	+3.3 V, 2.0 A typical +5 V, 1.5 A typical +12 V, 0.04 A typical –12 V, 0.04 A typical
Buffer battery	3.0 V, 3 µA typical
Power loss, typical	15 W
Digital inputs	
Number	8 inputs, 4 with alarm capability
Galvanic isolation	Only through optional interface modules
Input voltage • Rated voltage • For 0-signal • For 1-signal	 24 V -1 V ... +6 V +13.5 V ... +33 V
Input power • At 0-signal • At 1-signal	 0 mA 3 mA
Delay time	100 µs
Real-time clock, resolution	0.1 ms

Ordering data

	Order No.
CPU551 processor module	**6DD1 600-0BA2**
Accessories	
MC500 memory module 4 Mbyte	**6DD1 610-0AH4**
MC510 memory module I 8 Mbyte	**6DD1 610-0AH6**
MC521 memory module I 2 Mbyte	**6DD1 610-0AH3**
SB10 interface module for connecting 8 digital I/O to FM 458-1 DP	**6DD1 681-0AE2**
SB60 interface module for connecting 8 digital I/O to FM 458-1 DP, input voltage 115/230 V AC/DC	**6DD1 681-0AF4**
SB61 interface module for connecting 8 digital I/O to FM 458-1 DP, input voltage 24/48 V DC	**6DD1 681-0EB3**
SU12 interface module for connecting 10 signals to 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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MC5xx program memory module

Overview

Program memory module for the program designed with CFC.

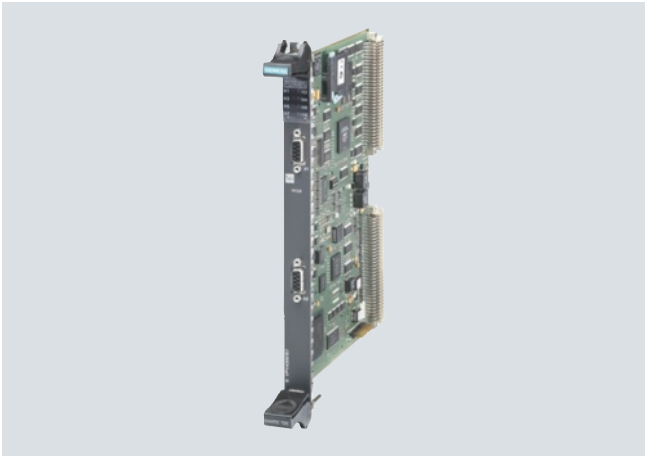
Ordering data

		Order No.
MC500 memory module (4 MByte)		**6DD1 610-0AH4**
MC510 memory module (8 MByte)	I	**6DD1 610-0AH6**
MC521 memory module (2 MByte)	I	**6DD1 610-0AH3**

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CP50M1 communication module

Overview



The CP50M1 communication module provides two PROFIBUS DP/MPI interfaces and an 8 MB interprocessor memory for inter-CPU communication. The interfaces can be used as PROFIBUS DP master, slave, as master and slave simultaneously or as MPI node.

Technical specifications

Power supply	
Voltage / Power supply	+5 V, 1.0 A typical
Power loss, typical	5 W
Required space / width	1 slot
Weight	0.34 kg

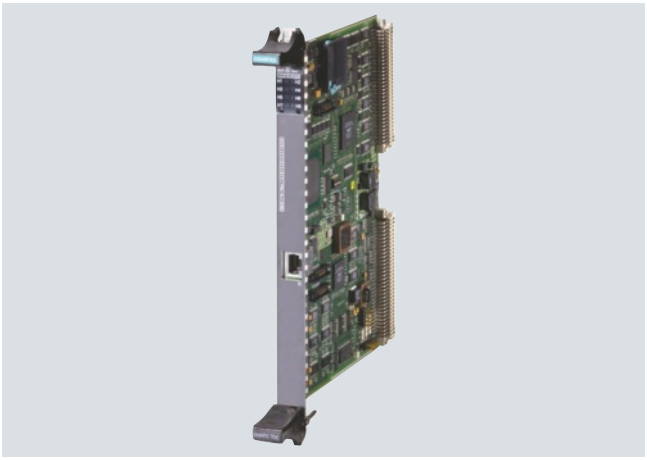
Ordering data

	Order No.
CP50M1 communication module with 8 MB interprocessor memory, with up to 1 MPI interface and up to 2 PROFIBUS DP interfaces	**6DD1 661-0AD1**

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CP51M1 communication module

Overview



The CP51M1 communication module is an Industrial Ethernet connection for the SIMATIC TDC automation system.

Technical specifications[1)]

Required space / width	**1 slot**
Connection for Industrial Ethernet	RJ45
Protocols	TCP/IP and/or UDP
Message frame lengths	also larger than 2 KB
Modes of transfer	Refresh, Handshake, Multiple and Select
Autosensing	for 10 Mbit or 100 Mbit network
Default router	adjustable

1) Up-to-date technical specifications can be taken from the user documentation provided at the start of delivery

Ordering data

	Order No.
CP51M1 communication module	**6DD1 661-0AE1**

CP53M0 communications module

Overview



The CP53M0 communication module allows coupling of a SIMATIC TDC system to a SIMADYN D system for fast data exchange, e.g. when expanding existing SIMADYN D systems.

Technical specifications

CP53M0 communications module	
Memory	
Communication memory	SRAM, 128 KB
Communications buffer	SDRAM, 8 MB
FOC interface	
Number	2 (master mode) 1 (slave mode)
Data transfer rate	96 Mbit/s
Coding	5B/6B
Voltage, currents	
Voltages / currents	+5 V / 0.3 A 3.3 V / 0.5 A
Power loss	
Power loss, typical	3.1 W
Dimensions	
Number of slots required in rack	1
Dimensions W x H x D (in mm)	20 x 233 x 160
Weight	0.6 kg

Ordering data

	Order No.
CP53M0 communications module For connection of a SIMATIC TDC system to a SIMADYN D system or to two additional SIMATIC TDC racks	**6DD1 660-0BJ0**

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SM500 I/O module

Overview



The SM500 I/O module provides analog and digital inputs/ outputs as well as incremental and absolute value encoder connections.

Technical specifications

Power supply	
Voltage/current supply (at 25°C)	+5 V typ. 1.0 A +3.3 V typ. 0.05 A +12 V typ. 0.3 A –12 V typ. 0.3 A
Typical power loss	12.5 W
Space requirement/width	1 slot
Weight	0.7 kg
Analog outputs	
Number	8
Version	Output with associated ground
Electrical isolation	No
Output voltage range	–10 V to +10 V
Output current	± 10 mA
Resolution	12 bit
Typ. conversion time per channel	4 µs
Accuracy • Max. differential linearity error • Max. gain error • Max. offset error	 ±1 LSB (monotony maintained) ±- 0.3 % ±- 24 LSB
Slewrate	Approx. 3.5 V/µs
Voltage output • Short-circuit protection to ground • Short-circuit current	 Yes 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

Power supply	
Accuracy • Max. differential linearity error • Max. gain error • Max. offset error	 ± 1 LSB (no missing code) ± 0.3 % ± 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 bit for a 4 ms integration time
Max. integration time per channel	Can be configured
Accuracy • Max. differential linearity error • Max. gain error • Max. offset error	 0.05 % 1 % ± 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
External power supply voltage • Rated value • Permissible range • Briefly • Max. current consumption (without load)	 24 V 20 to 30 35 V, for max. 0,5 s 40 mA
Output voltage range • For a 0-signal, max. • For a 1-signal, min.	 3 V Ext. power supply voltage. - 2.5 V
Output current • For a 0-signal, min. • For a 1-signal - Rated value - Permissible range, max.	 - 20 µA 50 mA 100 mA
Delay time	100 µs
Max. switching frequency of the outputs for an ohmic load	6 kHz
Short-circuit protection to • Ground • Ext. power supply	 Yes 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

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Technical specifications (continued)

Power supply	
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
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
Min. phase difference of the track signals	200 ns
Max. pulse frequency (track frequency)	1 MHz
Input voltage	
• 15 V encoder	
- Rated value	- 30 V to + 30 V
- For a 0-signal	- 30 V to + 4 V
- For a 1-signal	+ 8 V to +30 V
• 5 V encoder	
- Rated value	- 7 V to + 7 V
- For a 0-signal	- 7 V to - 0,7 V
- For a 1-signal	+1.5 V to + 7 V
Input current	
• For 15 V - encoder (typ.,abs.)	5,0 mA
• For 5 V - encoder (typ.,abs.)	1.5 mA
Monitoring output	Not avaible
Monitoring input	Specification, the same as for digital inputs

Power supply	
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
Signal voltage	5 V, RS485 level
Types which can be connected	Single or multi-turn Encoder
Protocols	SSI, EnDat
Data formats	Gray, binary
Data direction	
• Uni-directional	SSI
• Bi-directional	EnDat
Data bits	SSI: 13+Parity, 25+Parity EnDat: variable
Max. pulse frequency	2 MHz, dependant on the cable length
Input voltage	
• Permissible range	RS 485 signal level

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Ordering data

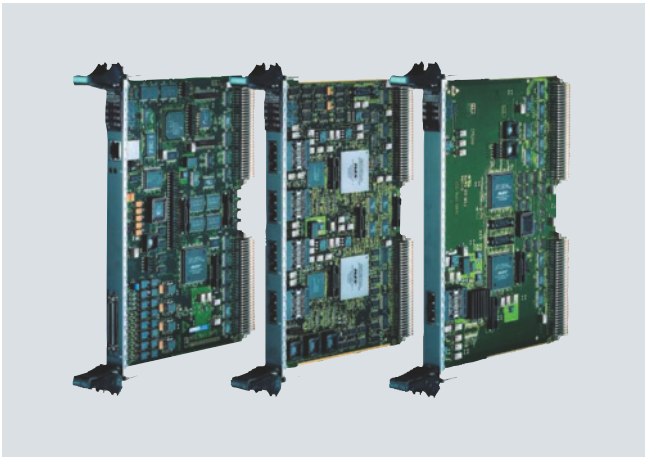
	Order No.
SM500 I/O module	**6DD1 640-0AH0**
SB10 interface module for connecting 8 digital I/O to FM 458-1 DP	**6DD1 681-0AE2**
SB60 interface module for connecting 8 digital I/O to FM 458-1 DP, input voltage 115/230 V AC/DC	**6DD1 681-0AF4**
SB61 interface module for connecting 8 digital I/O to FM 458-1 DP, input voltage 24/48 V DC	**6DD1 681-0EB3**
SB70 interface module 8 digital outputs with relay	**6DD1 681-0AG2**
SB71 interface module 8 digital outputs with transistors, 24/48 V DC	**6DD1 681-0DH1**

	Order No.
SU12 interface module for connecting 10 signals to FM 458-1 DP	**6DD1 681-0AJ1**
SU13 interface module with screw-plug-in terminal	**6DD1 681-0GK0**
SC62 interface module between rack SM500 or EXM 438-1 and max. 5 SB10, SB60, SB70, SB 61, SB71 and/or SU12 interface modules, 2 m long	**6DD1 684-0GC0**
SC63 interface module between rack SM500 or EXM 438-1 and SU13 interface module, 2 m long	**6DD1 684-0GD0**

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GlobalDataMemory

Overview



GlobalDataMemory

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.

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

CP52M0	
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

Ordering data

	Order No.
CP52M0 memory module with 2 MB SRAM storage	**6DD1 660-0BF0**
CP52IO interface module with 4 interfaces	**6DD1 660-0BG0**
CP52A0 access module for GlobalDataMemory	**6DD1 660-0BH0**

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Overview SB60 interface module



Interface module for connecting 8 digital inputs with 120 V DC/AC to 24 V DC conversion.

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 module and a local configuration / service PC.

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Accessories for SIMATIC TDC

Technical specifications

SB60 interface module	
Number of digital inputs for • Input voltage	8 120 V DC/AC
Insulating voltage	• Safe isolation assured between inputs and outputs • Galvanic isolation assured between input circuits • 1125 V AC test voltage
Connectable conductor cross-section	1.5 mm^2
Dimensions (W x H x D) in mm	45 x 130 x 156
Weight	0.31 kg
SB70 interface module	
Number of digital outputs • Output voltage, max.	8 120 V DC/AC
Relay switching current • at 120 V AC • at 120 V DC	 2 A 0.2 A
Galvanic isolation	via relay
Insulating voltage	• Safe isolation assured between inputs and outputs • Galvanic isolation assured between input circuits • 1125 V AC test voltage
Connectable conductor cross-section	1.5 mm^2
Dimensions (W x H x D) in mm	45 x 130 x 156
Weight	0.32 kg

Ordering data

	Order No.
SB60 interface module 8 digital inputs, 120 V AC	**6DD1 681-0AF4**
SB70 interface module 8 digital outputs with relay	**6DD1 681-0AG2**
SC66 interface cable between the CPU551 and the SB10, SB60, SB61 or SU12 interface module, 2 m long	**6DD1 684-0GG0**
SC67 service cable between CPU551 and PG/PC, 7 m long	**6DD1 684-0GH0**

Note:

For more information about SC62, SC63, SC64 interface cables and SB10, SB61, SB71, SU12 and SU13 interface modules see chapter 6, page 6/136

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Software for SIMATIC controller



11/2 **Introduction**

11/3 **Controller software inside TIA Portal**
11/3 STEP 7 Professional/Basic V11

11/5 **STEP 7 programming software**
11/5 STEP 7
11/8 STEP 7 Professional
11/10 STEP 7 Lite
11/11 STEP 7 Micro/WIN
11/12 STEP 7 Micro/WIN commands library
11/13 S7-SCL
11/15 S7-GRAPH
11/17 S7-PLCSIM

11/18 **Options for programming and design**
11/18 CFC
11/20 Distributed safety software
11/21 S7 F/FH systems
11/22 S7 F systems
11/23 SIMATIC Safety Matrix
11/24 Software redundancy
11/25 SIMATIC iMap
11/27 DOCPRO

11/28 **Options for diagnostics and service**
11/28 S7-PDIAG
11/29 TeleService
11/32 PRODAVE

11/33 **Options for engineering and drive technology**
11/33 Standard PID control
11/35 Modular PID control
11/38 PID Self-Tuner
11/39 Fuzzy Control
11/41 NeuroSystems
11/43 S7-Technology
11/44 Easy Motion Control
11/46 D7-SYS
11/47 Drive ES engineering software

11/48 **Software for joint tasks in the documentation sector**
11/48 Technical product data for CAx applications

11/49 **Software for joint tasks in the maintenance sector**
11/49 SIMATIC Maintenance Station
11/51 SIMATIC PDM process device manager

11/54 **Software for joint tasks in the administration sector**
11/54 Version cross manager
11/55 Version Trail
11/56 ADDM data management

11/57 **Additional software**
11/57 KNX/EIB2S7
11/58 HVAC Lite Library runtime software

Brochures

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

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

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Software for SIMATIC controller

Overview



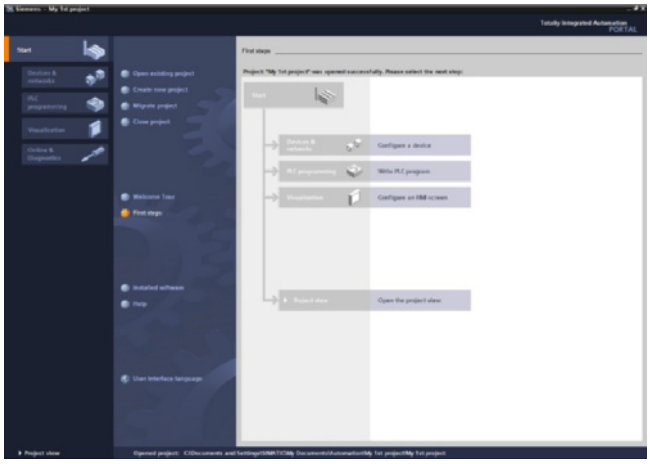
- System of seamlessly interconnected software tools for SIMATIC S7 and SIMATIC WinAC
- With user-friendly functions for all phases of an automation project
- Comprising:
  - Controller software in the TIA Portal
  - STEP 7 programming software
  - Options for programming and design
  - Options for diagnostics and service
  - Options for technology and drive systems

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

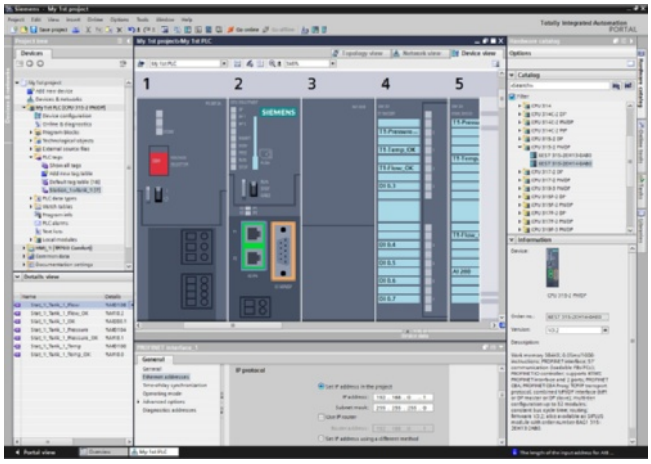
www.siemens.com/simatic/printmaterial

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Overview



STEP 7 V11 (TIA Portal), portal view



STEP 7 V11 (TIA Portal), device view: configuring and parameterizing in photographically realistic representation

Intuitive, efficient and future-oriented - the new engineering software for programming the S7 controllers

SIMATIC STEP 7 Professional V11 is the easy-to-use, integrated engineering system for the current S7-1200, S7-300, S7-400 SIMATIC controllers and WinAC.

SIMATIC STEP 7 Basic V11 is the successor to STEP 7 Basic V10.5 and supports the additional functions of the firmware 2.0 of the S7-1200 controller.

STEP 7 V11 is based on the new central engineering framework Totally Integrated Automation Portal (TIA Portal), which offers the user a uniform, efficient and intuitive solution to all automation tasks. TIA Portal forms the integrated working environment for IA and DT engineering software.

WinCC Basic for configuration of Basic Panels is included in the scope of delivery.

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STEP 7 Professional/Basic V11

Technical specifications

	STEP 7 Professional / Basic V11 (TIA Portal)		
Type of license	Single License (Basic) / Floating License (Professional)		
Software class	A		
Current version	V11		
Target system	SIMATIC S7-1200, S7-300, S7-400, WinAC		
Operating system	Microsoft Windows XP Home SP3 (STEP 7 Basic only) Windows XP Professional SP3 (32 bit) Microsoft Windows 7 Home Premium (STEP 7 Basic only) Microsoft Windows 7 Professional (32 bit) Microsoft Windows 7 Enterprise (32 bit) Microsoft Windows 7 Ultimate (32 bit) Microsoft Server 2003 R2 Std. SP2 (32 bit) Microsoft Server 2008 Std. SP2 (32 bit)		
Minimum PG/PC hardware	Processor: Pentium 4, 1.7 GHz or comparable	RAM: 1 GB	Graphics: 1024x768
Recommended PG/PC hardware	Processor: Core Duo, 2 GHz or comparable	RAM: 2 GB	Graphics: 1280x1024
Note	Includes the IEC programming languages SCL, LAD, FBD, STL, GRAPH		

Compatibility with other SIMATIC products

STEP 7 Professional / Basic V11 (incl. WinCC Basic V11) can be installed on a PC in parallel with other versions of STEP 7 (V5.4/ V5.5), STEP 7 Micro/WIN, WinCC flexible (from 2008) and WinCC (V7.0 SP2).

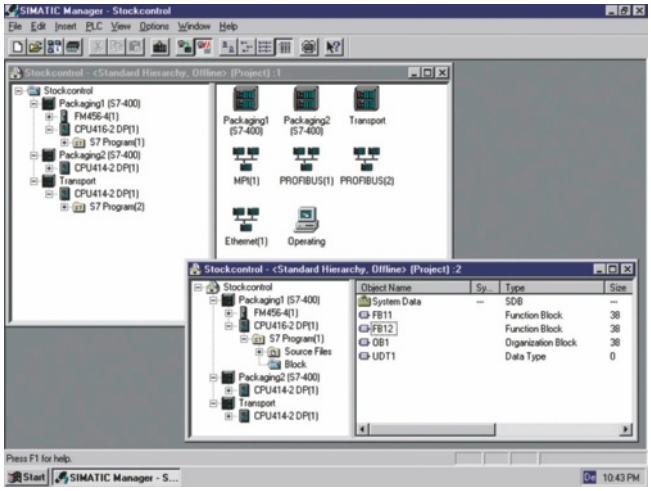
Ordering data

	Order No.
STEP 7 Professional / Basic V11	
Target system: SIMATIC S7-1200, S7-300, S7-400, WinAC Requirements: Windows XP Home SP3 (STEP 7 Basic only), Windows XP Professional SP3 (32 bit), Windows 7 Home Premium (STEP 7 Basic only), Windows 7Professional (32 bit), Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit), Microsoft Server 2008 Std. SP2 (32 bit) Type of delivery: German, English, Chinese, Italian, French, Spanish	
STEP 7 Professional V11, floating license	**6ES7 822-1AA01-0YA5**
STEP 7 Prof. V11, trial license	**6ES7 822-1AA01-0YA7**
Upgrade STEP 7 Prof. 2006/2010 to STEP 7 Prof. V11, floating license	**6ES7 822-1AA01-0XE5**
PowerPack & Upgrade STEP 7 V5.4/V5.5 to STEP 7 Prof. V11, floating license	**6ES7 822-1AA01-0XC5**
Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license	**6ES7 822-1AA01-0YC5**
STEP 7 Professional V11, Software Update Service, 1 year; requires current software version	**6ES7 822-1AA00-0YL5**
STEP 7 Professional V11, Software Update Service Compact, 1 year; requires current software version	**6ES7 822-1AA00-0YM5**
STEP 7 Professional Software Update Service; 1 year; for STEP 7 Professional and STEP 7 Professional inside TIA Portal, requires current software version	**6ES7 810-5CC04-0YE2**
STEP 7 Professional Software Update Service Compact; 1 year; for STEP 7 Professional and STEP 7 Professional inside TIA Portal, requires current software version	**6ES7 810-5CC00-0YM2**
STEP 7 Basic V11, single license	**6ES7 822-0AA01-0YA0**
STEP 7 Basic V11, trial license	**6ES7 822-0AA01-0YA7**
Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license	**6ES7 822-0AA01-0YE0**
STEP 7 Basic, Software Update Service, 1 year; requires current software version D	**6ES7 822-0AA00-0YL0**
STEP 7 Basic, Software Update Service Compact, 1 year; requires current software version D	**6ES7 822-0AA00-0YM0**

D: Subject to export regulations AL: N and ECCN: 5D992

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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, diagnostic 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 PGs/ 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 PGs/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 PGs/ 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 PGs/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 more information about the online connection of PCs and SIMATIC S7/C7 controllers under "SIMATIC NET Communication Systems".

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Technical specifications

	STEP 7
Type of license	Floating license
Software class	A
Current version	V 5.5
Target system	SIMATIC S7-300 SIMATIC S7-400
Operating system	Windows XP Professional Windows 7 Professional, Windows 7 Ultimate
Main memory expansion in PG / PC, min.	Depends on Microsoft Windows operating system used. Recommendation: 1 to 2 GB
Hard drive requirement in PG / PC	Depending on scope of installation, 650 to 900 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)
Comment	-

PC adapter USB	6ES7 972-0CB20-0XA0
Supply voltages	
Rated value	
• 24 V DC	Yes
Current consumption	
Current consumption, typ.	100 mA
Power consumption, typ.	max. 2.5 W
EMC	
Interference immunity against discharge of static electricity	
• Interference immunity against discharge of static electricity acc. to IEC 61000-4-2	Yes; 6 kV, contact discharge (acc. to IEC 61000-4-2); 8 kV, air discharge (to IEC 61000-4-2)
Interference immunity to cable-borne interference	
• on the supply lines acc. to IEC 61000-4-4	Yes; 2 kV (to IEC 61000-4-4, Burst)
• Interference immunity on signal lines acc. to IEC 61000-4-4	Yes; 1 kV (acc. to IEC 61000-4-4; burst; length < 3 m); 2 kV (acc. to IEC 61000-4-4; burst; length > 3 m)
Surge immunity	
• on the supply lines acc. to IEC 61000-4-5	Yes; 1 kV (to IEC 61000-4-5; surge symm.); 2 kV (acc. to IEC 61000-4-5; surge asymm.)
Immunity against high-frequency electromagnetic fields	
• Interference immunity against high-frequency radiation acc. to IEC 61000-4-3	Yes; 10 V/m, 80 to 1000 MHz (acc. to IEC 61000-4-3); 10 V/m, 900 MHz, 1.89 GHz, 50% ED (acc. to IEC 61000-4-3)

PC adapter USB	6ES7 972-0CB20-0XA0
Immunity against conducted interference induced by high-frequency fields	
• Interference immunity against high frequency current feed acc. to IEC 61000-4-6	Yes; 10 V, 9 kHz to 80 MHz (acc. to IEC 61000-4-6)
Immunity to magnetic field interference	
• Interference immunity to magnetic fields at 50 Hz	30 A/m; acc. to IEC 61000-4-8
Emission of radio interference acc. to EN 55 022	
• Interference emission acc. to EN 55022, class B	Yes
Environmental requirements	
Operating temperature	
• Min.	5 °C
• Max.	40 °C
• Permissible temperature change	10 °C/h; Operation: 10 K/h; storage/transport: 20 K/h
Storage/transport temperature	
• Min.	-20 °C
• Max.	60 °C
Relative humidity	
• Operation, min.	5 %
• Operation, max.	80 %; at 25 °C (no condensation)
• Storage/transport, min.	5 %
• Storage/transport, max.	95 %; at 25 °C (no condensation)
Vibrations	
• 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
• Transport, checked according 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
Shock test	
• Shock test	Tested to 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
Dimensions and weight	
Dimensions	
• Width	105 mm
• Height	58 mm
• Depth	26 mm
Weight	
• Weight, approx.	100 g

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Ordering data	Order No.
STEP 7 Version 5.5	
Target system: SIMATIC S7-300/400, SIMATIC C7, SIMATIC WinAC Requirements: Windows XP Prof., Windows 7 Professional / Ultimate Type of delivery: German, English, French, Spanish, Italian; incl. license key on USB stick, with electronic documentation	
Floating license on DVD	**6ES7 810-4CC10-0YA5**
Rental license for 50 hours	**6ES7 810-4CC10-0YA6**
Software Update Service on DVD (requires current software version)	**6ES7 810-4BC01-0YX2**
Upgrade Floating License 3.x/4.x/5.x to V5.4; on DVD	**6ES7 810-4CC10-0YE5**
Trial License STEP 7 V5.4; on DVD, runs for 14 days	**6ES7 810-4CC10-0YA7**
STEP 7 Version 5.4 Japanese	
Target system: SIMATIC S7-300/400, SIMATIC C7, SIMATIC WinAC Requirements: Windows XP Professional Japanese Type of delivery: English, Japanese; incl. license key on USB stick, with electronic documentation	
Floating License Japanese on DVD	**6ES7 810-4CC08-0JA5**
Upgrade Floating License Japanese 3.x/4.x/5.x to V5.4; on DVD	**6ES7 810-4CC08-0JE5**
STEP 7 Version 5.5, Chinese	
Target system: SIMATIC S7-300/400, SIMATIC C7, SIMATIC WinAC Requirements: Windows XP Professional Chinese Type of delivery: English, Chinese; incl. license key on USB stick, with electronic documentation	
Floating License Chinese on DVD	**6ES7 810-4CC10-0KA5**
Upgrade Floating License Chinese 3.x/4.x/5.x to V5.5; on DVD	**6ES7 810-4CC10-0KE5**
Documentation package STEP 7 basic information	
Comprising Getting Started, hardware configuration manual, programming manual, migration manual	
German	**6ES7 810-4CA10-8AW0**
English	**6ES7 810-4CA10-8BW0**
French	**6ES7 810-4CA10-8CW0**
Spanish	**6ES7 810-4CA10-8DW0**
Italian	**6ES7 810-4CA10-8EW0**

	Order No.
STEP 7 reference manuals	
Consisting of STL, LAD and FBD manuals as well as a reference manual for standard and system functions for SIMATIC S7-300/400	
German	**6ES7 810-4CA10-8AW1**
English	**6ES7 810-4CA10-8BW1**
French	**6ES7 810-4CA10-8CW1**
Spanish	**6ES7 810-4CA10-8DW1**
Italian	**6ES7 810-4CA10-8EW1**
SIMATIC manual collection J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	
SIMATIC manual collection update service for 1 year D	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates	
EPROM programming device, USB prommer	**6ES7 792-0AA00-0XA0**
For programming SIMATIC memory cards and EPROM modules	
MPI cable	**6ES7 901-0BF00-0AA0**
For linking SIMATIC S7 and PG through MPI (5 m)	
Components for connecting a PC to MPI and PROFIBUS	
For PCs with a free PCI slot:	
CP 5611	**6GK1 561-1AA01**
CP 5611 MPI I	**6GK1 561-1AM01**
incl. MPI cable (5 m)	
For PCs with a free PCMCIA slot:	
CP 5512	**6GK1 551-2AA00**
For Windows XP Professional	
For PCs without a free PCI slot:	
PC adapter USB	**6ES7 972-0CB20-0XA0**
For connecting a PC to S7-300/-400/C7 through a USB interface; with USB cable (5 m)	
Components for connecting the PC to Industrial Ethernet	
For PCs with a free PCI slot:	
Layer 2 Ethernet cards	
• For PCs with a free PCMCIA slot:	
SOFTNET-PG Edition 2006	**6GK1 704-1PW64-3AA0**

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

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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.

Technical specifications

	STEP 7 Professional
Type of license	Floating license
Software class	A
Current version	Edition 2010
Target system	SIMATIC S7-300 SIMATIC S7-400 SIMATIC C7
Operating system	Windows XP Professional Windows 7 Professional, Windows 7 Ultimate
Main memory expansion in PG / PC, min.	Depends on Microsoft Windows operating system used. Recommendation: 1 to 2 GB
Hard drive requirement in PG / PC	Depending on scope of installation, 700 to 1000 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)
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

Ordering data

	Order No.
STEP 7 Professional 2010	
Target system: SIMATIC S7-300/400, SIMATIC C7, SIMATIC WinAC Requirements: Windows XP Prof., Windows 7 Professional / Ultimate Type of delivery: German, English, French, Spanish, Italian; license key on USB stick, with electronic documentation	
Floating license on DVD	**6ES7 810-5CC11-0YA5**
Rental license for 50 hours	**6ES7 810-5CC11-0YA6**
STEP 7 Professional Software Update Service; 1 year; for STEP 7 Professional and STEP 7 Professional inside TIA Portal, requires current software version	**6ES7 810-5CC04-0YE2**
STEP 7 Professional Software Update Service Compact; 1 year; for STEP 7 Professional and STEP 7 Professional inside TIA Portal, requires current software version	**6ES7 810-5CC00-0YM2**
Upgrade of Floating License to Edition 2010; on DVD	**6ES7 810-5CC11-0YE5**
Powerpack Floating License for upgrading from STEP 7 to STEP 7 Professional	**6ES7 810-5CC11-0YC5**
Trial License STEP 7 Professional 2010; on DVD, runs for 14 days	**6ES7 810-5CC11-0YA7**
Documentation package STEP 7 basic information	
Comprising Getting Started, hardware configuration manual, programming manual, migration manual	
German	**6ES7 810-4CA10-8AW0**
English	**6ES7 810-4CA10-8BW0**
French	**6ES7 810-4CA10-8CW0**
Spanish	**6ES7 810-4CA10-8DW0**
Italian	**6ES7 810-4CA10-8EW0**
STEP 7 reference manuals	
Comprising STL, LAD and FBD manuals as well as a reference manual for standard and system functions for SIMATIC S7-300/400	
German	**6ES7 810-4CA10-8AW1**
English	**6ES7 810-4CA10-8BW1**
French	**6ES7 810-4CA10-8CW1**
Spanish	**6ES7 810-4CA10-8DW1**
Italian	**6ES7 810-4CA10-8EW1**

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Ordering data		Order No.
SIMATIC manual collection Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	J	**6ES7 998-8XC01-8YE0**
SIMATIC manual collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	D	**6ES7 998-8XC01-8YE2**
EPROM programming device, USB prommer For programming SIMATIC memory cards and EPROM modules		**6ES7 792-0AA00-0XA0**
MPI cable For linking SIMATIC S7 and PG through MPI (5 m)		**6ES7 901-0BF00-0AA0**

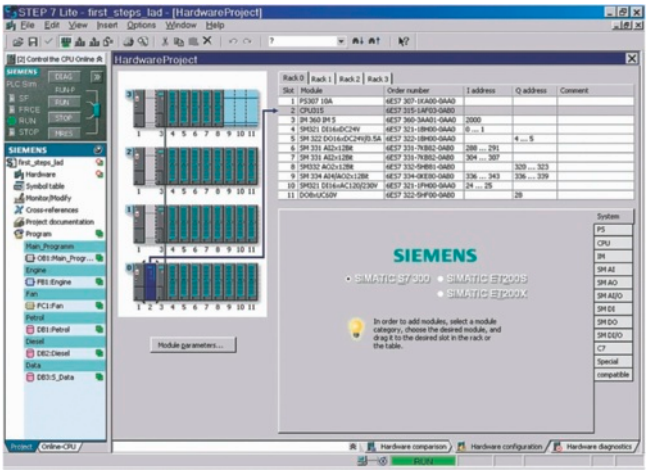
		Order No.
Components for connecting a PC to MPI and PROFIBUS *For PCs with a free PCI slot:*		
CP 5611		**6GK1 561-1AA01**
CP 5611 MPI incl. MPI cable (5 m)	I	**6GK1 561-1AM01**
For PCs with a free PCMCIA slot:		
CP 5512 For Windows XP Professional		**6GK1 551-2AA00**
For PCs without a free PCI slot:		
PC adapter USB For connecting a PC to S7-300/-400/C7 through a USB interface; with USB cable (5 m)		**6ES7 972-0CB20-0XA0**
Components for connecting the PC to Industrial Ethernet *For PCs with a free PCI slot:*		
Layer 2 Ethernet cards • For PCs with a free PCMCIA slot:		
SOFTNET-PG Edition 2006		**6GK1 704-1PW64-3AA0**

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

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STEP 7 Lite

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 exclusively available for free downloading. Further information is available in the Internet under:

http://support.automation.siemens.com/WW/view/com/39599210

Technical specifications

	STEP 7 Lite
Type of license	Floating license
Software class	A
Current version	V 3.0
Target system	SIMATIC S7-300 SIMATIC C7
Operating system	Windows XP Home Windows 2000 Professional Windows XP Professional
Main memory expansion in PG / PC, min.	Depends on Microsoft Windows operating system used. Recommendation: 128 MB
Hard drive requirement in PG / PC	Depending on scope of installation, 90 to 250 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)
Comment	For stand-alone applications with centralized I/O.

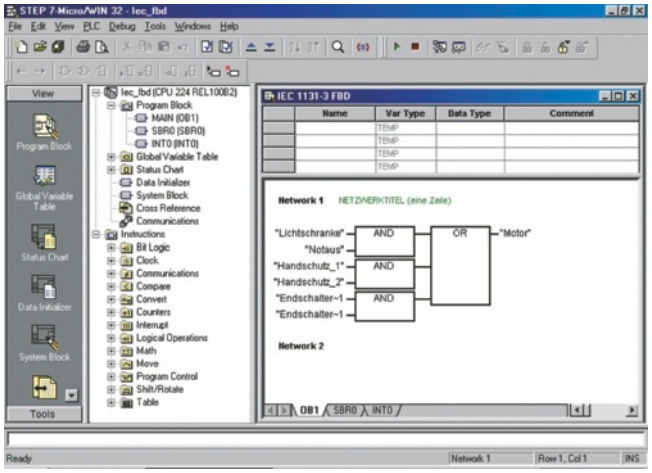
Ordering data

		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. Type of delivery: German, English, French, Spanish, Italian; incl. 3.5" authorization diskette Downloading free-of-charge from the Internet at: http://support.automation.siemens.com/WW/view/com/22764848		
SIMATIC manual collection Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	J	**6ES7 998-8XC01-8YE0**
SIMATIC manual collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	D	**6ES7 998-8XC01-8YE2**
EPROM programming device, USB prommer For programming SIMATIC memory cards and EPROM modules		**6ES7 792-0AA00-0XA0**
MPI cable For linking SIMATIC S7 and PG through MPI (5 m) With Engineering Software for use with STEP 7 Lite		**6ES7 901-0BF00-0AA0**
S7-PLCSIM		see page 11/17
TeleService		see page 11/29
Components for connecting a PC to MPI and PROFIBUS *For PCs with a free PCI slot:*		
CP 5611		**6GK1 561-1AA01**
CP 5611 MPI incl. MPI cable (5 m)	I	**6GK1 561-1AM01**
For PCs with a free PCMCIA slot:		
CP 5512 for Windows XP Professional		**6GK1 551-2AA00**
For PCs without a free PCI slot:		
PC adapter USB For connecting a PC to S7-300/-400/C7 through a USB interface; with USB cable (5 m)		**6ES7 972-0CB20-0XA0**

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

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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

Technical specifications

Standard tool	STEP 7 Micro/WIN
Type of license	Single license
Software class	A
Current version	V 4.0
Target system	SIMATIC S7-200
Operating system	Windows 2000 Windows XP
Main memory expansion in PG / PC, min.	32 MB
Hard drive requirement in PG / PC	50 MB
Size of user program in the CPU	Approx. factor 1.0 compared with STEP 5 for STL, LAD

Ordering Data

		Order No.
STEP 7 Micro/WIN V4 programming software Target system: All CPUs of the SIMATIC S7-200 Requirements: Windows 2000/XP on PG or PC Type of delivery: German, English, French, Spanish, Italian, Chinese; with online documentation		
Single license	J	**6ES7 810-2CC03-0YX0**
Upgrade Single License[1]	J	**6ES7 810-2CC03-0YX3**
To be ordered separately:		
Intelligent RS 232/PPI multi-master cable For connecting devices with an RS 232 interface to SIMATIC S7-200 or the PPI network; master in the multi-master PPI network		**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**
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 incl. MPI cable (5 m)	I	**6GK1 561-1AM01**
For PCs with a free PCMCIA slot:		
CP 5512 for Windows XP Professional		**6GK1 551-2AA00**
For PCs without a free PCI slot:		
PC adapter USB For connecting a PC to S7-300/ S7-400/C7 through a USB interface; with USB cable (5 m)		**6ES7 972-0CB20-0XA0**

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

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

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STEP 7 Micro/WIN commands 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 commands 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**

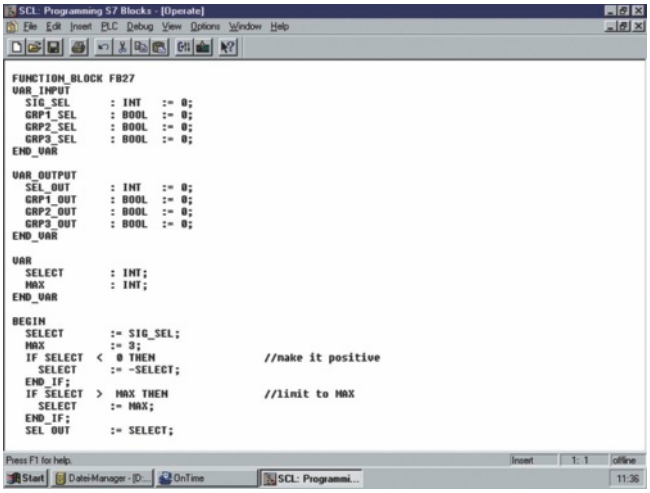
Selection guide STEP 7

Overview

	STEP 7 Lite	STEP 7	STEP 7 Professional
Configuration			
Target systems	S7-300/C7	S7-300/S7-400/C7/WinAC	
Modules	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-GRAPH (sequencer)/ S7-SCL (textual high-language)
Structured/symbolic programming	Yes/yes	Yes/yes	
Checking/establishing program consistently	Yes/yes	Yes/yes	
Standard/user libraries	Yes/no	Yes/yes	
Online functions			
Online access	MPI	MPI, PROFIBUS, option: Industrial Ethernet	
Test functions	Monitoring, control, forcing	Monitoring, control, forcing, single step (debugging)	
Offline/online comparison functions	Program, HW configuration	Program	
Diagnostics	System diagnostics	System diagnostics, signaling of system faults, integrated process fault diagnostics with S7-GRAPH	
Option packages			
Optional programming languages	None	S7-GRAPH, S7-SCL, S7-HiGraph, CFC	S7-HiGraph, CFC
Options for simulation, documentation, diagnostics and remote maintenance	S7-PLCSIM, S7-Teleservice	S7-PLCSIM, S7-DOCPRO, TeleService, S7-PDiag	DOCPRO, TeleService, S7-PDiag (S7-PLCSIM included in scope of delivery)

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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



Technical specifications

Engineering Tool	S7-SCL
Current version	V5.3
Software class	A
Application areas	
Can be used for	Text-based high-level language programming of simple and complex calculations, CASE, loop, jump, and comparison functions
Marketing message	Programming of algorithms and calculations made easy!
Advantages	• Clear and easy-to-read programs • Functional, module-based programming • CASE instruction replaces a large number of jump and comparison functions • Easily understood by PLC programmers, as the programming philosophy of LAD/FBD/STL is retained • Easy switchover to PLC programming for PC programmers • Exchangeability (porting) of subroutines in accordance with IEC 61131-3 • Less time required for engineering compared to LAD/FBD/STL: Up to 20% for simple programs; at least 50% for demanding program structures
Sectors	• Labeling machines • Chemical plants (e.g. oxygen extraction, evaluation of measured values) • Rubber and plastics machines • Woodworking machines • Storage and logistics systems • Paper and printing machinery • Punching and cutting machines • Water industry • Coilers
Target systems	
Can be used in	S7-300 (CPU 313 or higher and CPU 312C or higher recommended) S7-400 C7 (C7-626 or higher recommended) WinAC
System requirements	
Operating system	Windows 2000 Professional Windows XP Professional
Required hard drive memory in the PG/PC	8 MB
Required software	STEP 7 V5.3

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S7-SCL

Technical specifications (continued)

Engineering Tool	S7-SCL
Properties	
Monitoring tags	Yes
Controlling tags	Yes
Single-step processing	Yes
Integration in CFC	Yes
Program runtimes	
with S7-300 (typical)	Similar to LAD/FBD/STL
with S7-400 (typical)	Similar to LAD/FBD/STL
Diagnostics	
Integration of diagnostic data in ProAgent	-
Integration of diagnostic data in ProTool/Pro	-
Integration of diagnostic data in WinCC	-
Supported standards	
IEC 61131-3	PLCopen certification • Base level ST available • Conformity and reusability level ST (available soon)
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 guide • Examples Authorization diskette Certificate of License Product information
Upgrade (floating license)	CD-ROM with • Tool • Electronic manual • Getting Started guide • Examples Authorization diskette Certificate of License Product information
Software Update Service (SUS)	
Also a component part of	
STEP 7 Professional	Yes
S7 Trainer Package	Yes
PCS 7	Yes
D7-SYS	-

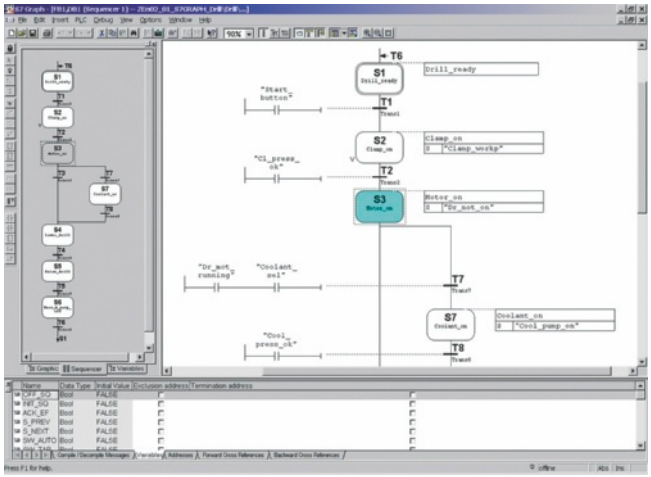
Ordering data

		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 Requirements: STEP 7 V5.3 and higher Type of delivery: on CD; German, English, French, Spanish, Italian; incl. authorization diskette, with electronic documentation		
Floating License		**6ES7 811-1CC05-0YA5**
Software Update Service (requires current software version)		**6ES7 811-1CA01-0YX2**
Upgrade floating to V5.3		**6ES7 811-1CC05-0YE5**
SIMATIC manual collection Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	J	**6ES7 998-8XC01-8YE0**
SIMATIC manual collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	D	**6ES7 998-8XC01-8YE2**

D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

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Overview



- For configuring and programming sequential processes using sequencers
- Standardized representation to EN 1131-3
- Clearly comprehensible program thanks to structuring of the process into separate steps
- With extensive diagnostic 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

Technical specifications

Engineering Tool	S7-GRAPH
Current version	V5.3
Software class	A
Application areas	
Can be used for	Graphical programming of sequential controllers and sequencers
Marketing message	Fast, elegant way to program sequential processes easily and transparently!
Advantages	• Can be used to optimum effect even during the design phase • Less configuration effort thanks to graphical structuring and programming • Quick and easy familiarization • Precise fault localization thanks to integrated diagnostics in combination with ProAgent for ProTool/Pro and WinCC • Less time required for engineering compared to LAD/FBD/STL: approx. 40 to 70%
Sectors	• Automotive industry (e.g. body-in-white, final assembly) • Electrical equipment manufacture • Rubber and plastics machines • Pick-and-place machines • Woodworking machines • Metalworking machines • Paper and printing machinery • Testing machines • Rolling mills • Coilers • Leisure and entertainment facilities
Target systems	
Can be used in	S7-300 (CPU 314 or higher and CPU 312C or higher recommended) S7-400 C7 (C7-626 or higher recommended) WinAC
System requirements	
Operating system	Windows 2000 Professional Windows XP Professional
Required hard drive memory in the PG/PC	15 MB
Required software	STEP 7 V5.3

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S7-GRAPH

Technical specifications (continued)

Engineering Tool	S7-GRAPH
Properties	
Monitoring tags	Yes
Controlling tags	Yes
Single-step processing	Yes
Integration in CFC	-
Program runtimes	
with S7-300 (typical)	3 ms per block + 1 ms per active step
with S7-400 (typical)	0.4 ms per block + 0.06 ms per active step
Diagnostics	
Integration of diagnostic data in ProAgent	Yes
Integration of diagnostic data in ProTool/Pro	Via ProAgent
Integration of diagnostic data in WinCC	Via ProAgent
Supported standards	
IEC 61131-3	PLCopen certification • Base Level SFC available
Status of PLCopen activities	-
Available versions/licenses	
Floating license	CD-ROM with • Tool • Electronic manual • Getting Started guide • Examples Authorization diskette Certificate of License Product information
Upgrade (floating license)	CD-ROM with • Tool • Electronic manual • Getting Started guide • Examples Authorization diskette Certificate of License Product information
Software Update Service (SUS)	
Also a component part of	
STEP 7 Professional	Yes
S7 Trainer Package	Yes
PCS 7	-
D7-SYS	-

Ordering data

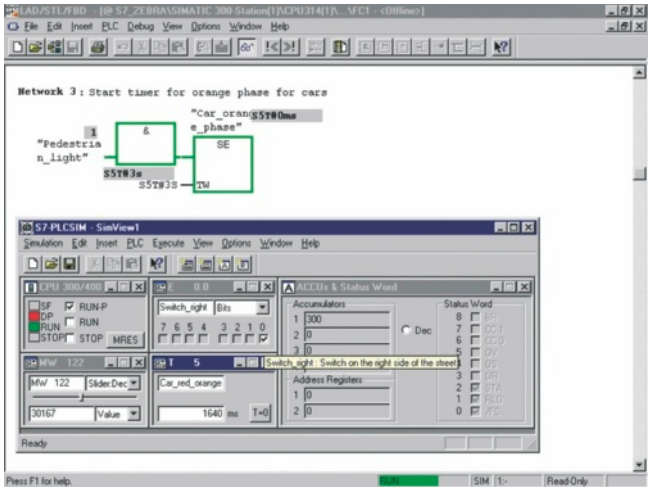
		Order No.
SIMATIC S7 GRAPH, Version 5.3 Task: Configuration and programming of sequences Target system: SIMATIC S7-300, SIMATIC S7-400, SIMATIC C7, SIMATIC WinAC Requirements: STEP 7 V5.3 and higher Type of delivery: on CD; German, English, French, Spanish, Italian; incl. authorization diskette, with 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 Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	J	**6ES7 998-8XC01-8YE0**
SIMATIC manual collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	D	**6ES7 998-8XC01-8YE2**

D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

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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)

Technical specifications

Engineering Tool	S7-PLCSIM
Type of license	Floating license
Software class	A
Current version	V5.4
Target system (recommended)	SIMATIC S7-300 SIMATIC S7-400 SIMATIC C7
Operating system	Windows 2000 Professional Windows XP Professional
Required software packages	STEP 7 V5.4 SP1 or higher
Disk space required in PG/PC	5 MB

Ordering data

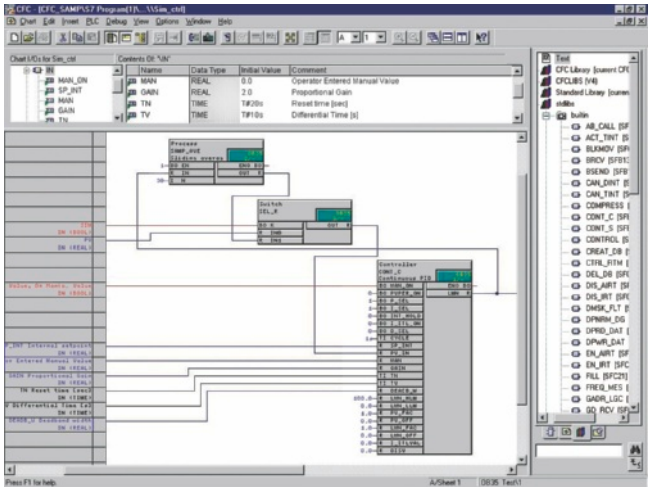
		Order No.
S7-PLCSIM, Version 5.4 Task: Function testing of SIMATIC S7 application blocks on PG/PC Target system: SIMATIC S7-300, SIMATIC S7-400, SIMATIC C7 Requirements: From STEP 7 V5. 4 incl. SP1, SP2 or SP3 Type of delivery: on CD; English, German, French, Spanish, Italian; license key on USB stick, with electronic documentation		
Floating License		**6ES7 841-0CC05-0YA5**
Software Update Service (requires current software version)		**6ES7 841-0CA01-0YX2**
Floating license upgrade to V5.4		**6ES7 841-0CC05-0YE5**
SIMATIC manual collection Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	J	**6ES7 998-8XC01-8YE0**
SIMATIC manual collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	D	**6ES7 998-8XC01-8YE2**

D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

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CFC

Overview



- For creating automation programs by drawing a function chart
- With extensive libraries of prefabricated function blocks to which function blocks created by the user can be added
- Reduced costs and fewer mistakes by simply interconnecting read-to-use function blocks
- Optimized integration in the world of automation, for example, through guaranteed compatibility with all STEP 7 tools
- Can be used for SIMATIC S7-300 (recommended for CPU 316 or CPU 314C or higher), SIMATIC S7-400, SIMATIC WinAC and D7-SYS

Technical specifications

Engineering Tool	CFC
Current version	V7.1
Software class	A
Application areas	
Can be used for	Graphical creation, interconnection and parameterization of (preconfigured) blocks and functions
Marketing message	Simply interconnect and configure instead of programming!
Advantages	• Can be used to optimum effect even during the design phase • Reduced configuration effort thanks to graphical interconnection • High degree of reusability of diagrams that have already been created • Quick and easy familiarization • Quick and transparent interconnection of ready-made functions • Technological creation of the program as a whole • Clear representation of control loop structures • Short commissioning time • High plant availability • Less time required for engineering compared to LAD/FBD/STL: up to 50%
Sectors	• Automotive industry (e.g. thermostats, tire production processes) • Chemicals • Power engineering and supply • Rubber and plastics machines • Metalworking machines • Food and beverage machines • Petrochemicals • Rolling mills • Water industry • Coilers
Target systems	
Can be used in	S7-300 S7-400 F/H systems WinAC
System requirements	
Operating system	Windows 2000 Professional SP4, Windows Server 2003 R2 SP2, Windows XP Professional SP3, Windows Vista SP2 32 bit, Windows 7 32 bit
Required hard drive memory in the PG/PC	approx. 60 MB
Required software	STEP 7 V5.3 or higher

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Technical specifications (continued)

Engineering Tool	CFC
Properties	
Monitoring tags	Yes
Controlling tags	Yes
Single-step processing	-
Integration in CFC	Yes
Program runtimes	
with S7-300 (typical)	Depending on the interconnected blocks
with S7-400 (typical)	Depending on the interconnected blocks
Diagnostics	
Integration of diagnostic data in ProAgent	-
Integration of diagnostic data in ProTool/Pro	-
Integration of diagnostic data in WinCC	-
Supported standards	
IEC 61131-3	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 guide • Examples License Key Disk Terms and Conditions Certificate of License
Floating license (S7-HiGraph) or single license (CFC)	CD-ROM with • Tool • Electronic manual • Getting Started guide • Examples License Key Disk Emergency Key Disk Certificate of License Terms and Conditions Product information
Software Update Service (SUS)	
Also a component part of	
STEP 7 Professional	-
S7 Trainer Package	-
PCS 7	Yes
D7-SYS	Yes

Ordering data

		Order No.
SIMATIC CFC, Version 7.1 Task: Graphic configuring and programming of automation applications in the form of technology-oriented diagrams Target system: SIMATIC S7-300/400, SIMATIC WinAC, D7-SYS Requirements: STEP 7 V5.3 and higher Type of delivery: Engineering software and electronic documentation on CD-ROM, License Key on USB stick, Certificate of License		
Floating License		**6ES7 658-1EX17-2YA5**
Floating license upgrade from V7.0 to V7.1		**6ES7 658-1EX17-2YE5**
Software Update Service (requires current software version)		**6ES7 658-1EX00-2YL8**
SIMATIC manual collection Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	J	**6ES7 998-8XC01-8YE0**
SIMATIC manual collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	D	**6ES7 998-8XC01-8YE2**

D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

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Distributed safety software

Overview

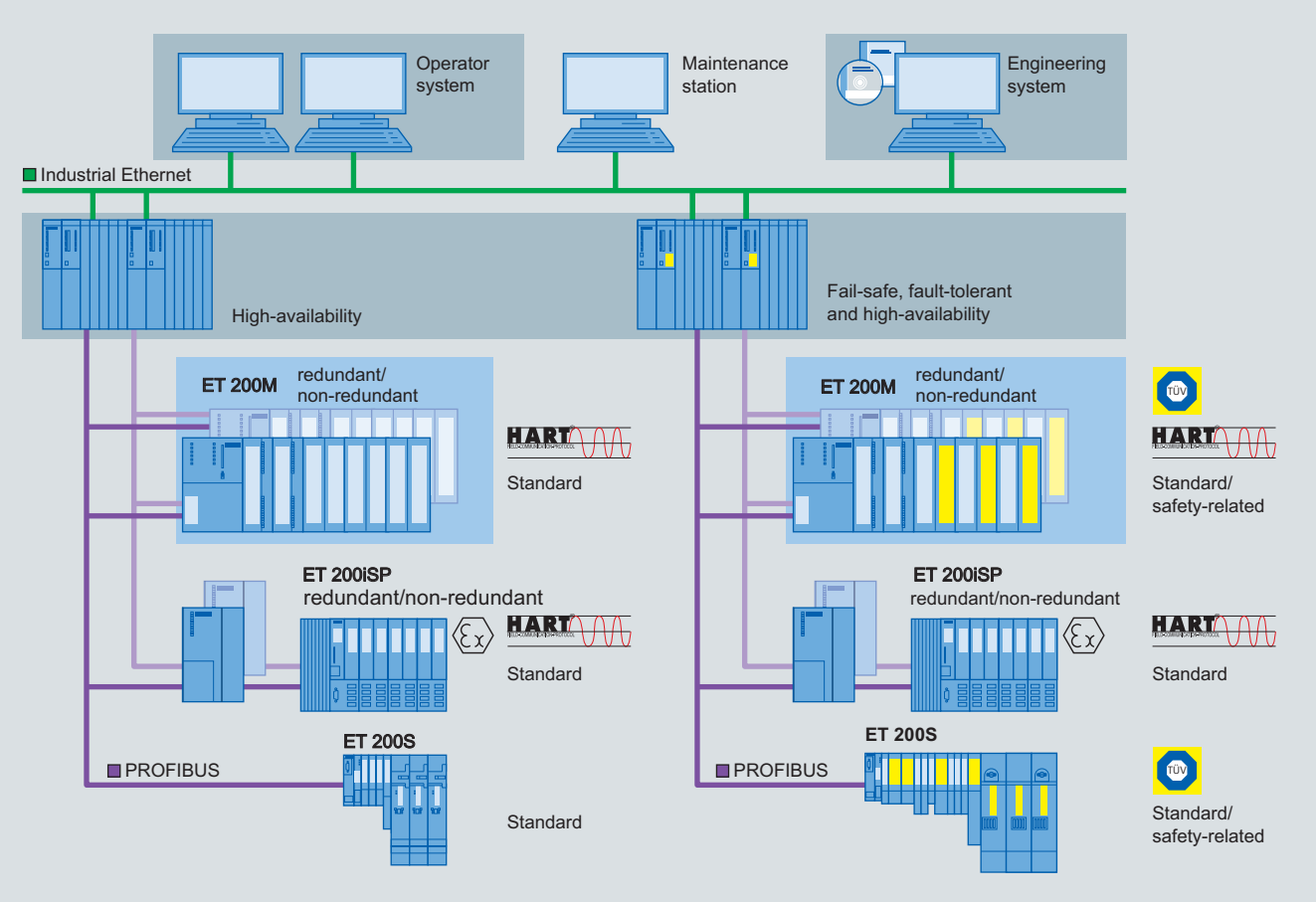
- For creating safety-oriented automation applications with SIMATIC S7 in LAD or FBD (STEP 7 required)
- Implementation of safety functions by making simple connections between function blocks
- With preconfigured function block library
- User-defined blocks can be created
- Optimum embedding in the 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

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 Requirements: STEP 7 V5.3 SP3 and higher	
Floating license	**6ES7 833-1FC02-0YA5**
Software Update Service (requires current software version)	**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**

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Overview



Common engineering system for basic process control system and safety instrumented system

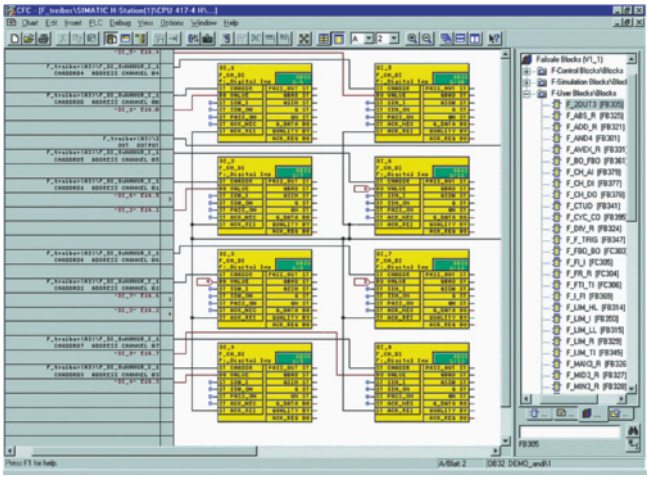
The process industry frequently features complex technological sequences with high safety demands, and faults and failures in the process automation could have fatal consequences for personnel, machines, plants and the environment. Therefore, process safety is of particular significance. The safety technology 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 PROFIsafe
- Safe communication also via PROFIBUS PA with PROFIsafe
- 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 versions:
  - Single-channel (with one CPU, safety-related)
  - High-availability (with redundant CPUs, safety-related and fault-tolerant)

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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.

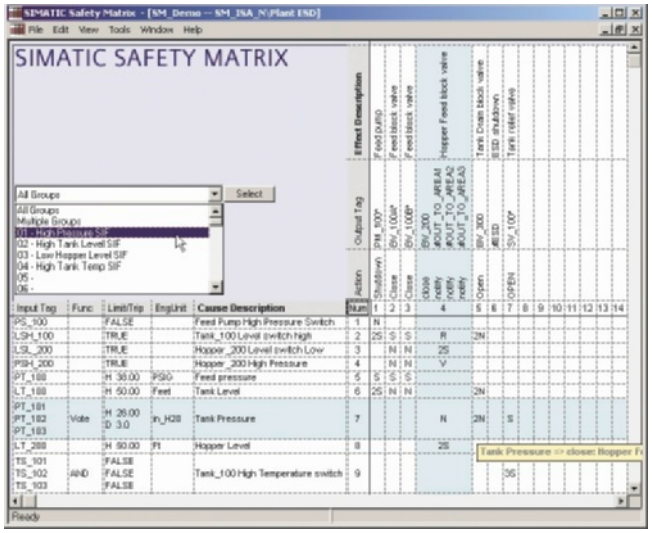
Ordering data

Ordering data	Order No.
S7 F systems RT license For processing safety-related application programs, for one AS 412F/FH, AS 414F/FH or AS 417F/FH	**6ES7 833-1CC00-6YX0**
S7 F systems V6.1 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/SP3, Windows Server 2003 SP2 2 languages (German, English) Type of delivery: Certificate of license as well as software and electronic documentation on CD	**6ES7 833-1CC02-0YA5**
S7 F systems upgrade from V5.x/V6.0 to V6.1 2 languages (German, English), floating license for 1 user Type of delivery: Certificate of license as well as software and electronic documentation on CD	**6ES7 833-1CC02-0YE5**

Note:
In the case of an S7 F Systems Upgrade from V5.x to V6.1, the type of S7 F Systems license changes from single license to floating license.

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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

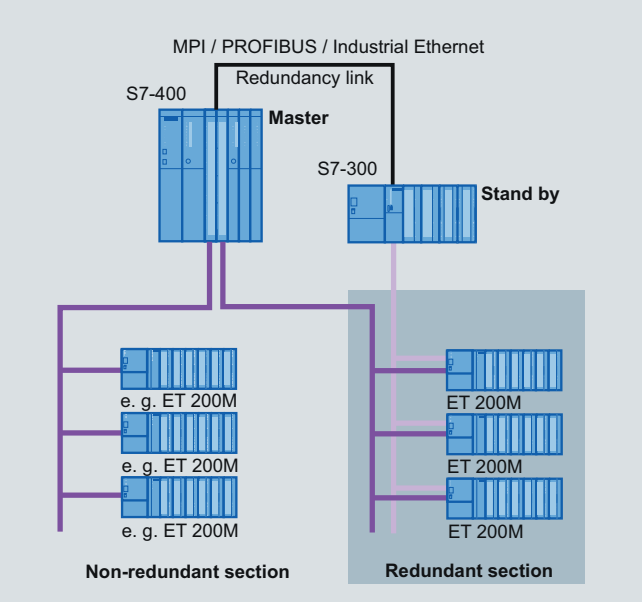
		Order No.
SIMATIC Safety Matrix Tool V6.2 Creation, configuration, compilation, loading and online monitoring of the Safety Matrix in a SIMATIC PCS 7 environment Including SIMATIC Safety Matrix Viewer for SIMATIC PCS 7, for operation and monitoring of the Safety Matrix in a SIMATIC PCS 7 environment with several operator control levels 1 language (English), executes with Windows XP Professional, Type of supply: Certificate of License and authorization diskette for Safety Matrix Tool and Safety Matrix Viewer; software and electronic documentation on CD		
Floating License for 1 installation	J	**6ES7 833-1SM02-0YA5**
Floating License upgrade from V5.x/V6.x to V6.2	J	**6ES7 833-1SM02-0YE5**
SIMATIC Safety Matrix Editor V6.2 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 delivery: Certificate of License and authorization diskette; software and electronic documentation on CD	J	**6ES7 833-1SM42-0YA5**
SIMATIC Safety Matrix Viewer V6.2 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 delivery: Certificate of License and authorization diskette; software and electronic documentation on CD		
Floating License for 1 installation	J	**6ES7 833-1SM62-0YA5**
Floating License upgrade from V6.x to V6.2	J	**6ES7 833-1SM62-0YE5**

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

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Software redundancy

Overview



- Software package for assembling fault-tolerant control systems based on software
- Designed for control systems with single-channel distributed I/O
- For use in applications with low demands on changeover speed, such as the control of hydroelectric power plants, cooling circuits, traffic flows, level control, measured data acquisition
- Inexpensive thanks to the use of standard S7-300 and S7-400 components
- I/O linking with PROFIBUS DP in redundant configuration
- Optional control via WinCC operator station

Technical specifications

Hardware requirements	
CPU	S7-300: CPU 313C-2 DP, 314C-2 DP, 315-2 DP, 316-2 DP, 318-2 DP S7-400: all CPUs
Redundancy link of the CPUs	MPI, PROFIBUS, Industrial Ethernet; existing connections can also be used.
Suitable modules for ET 200M	IM 153-2; all DI/O, AI/O for ET 200M; FM 350-1 counter module CP 341
Software requirements	
Configuring/programming	STEP 7 V4.0
Communication configuration for redundant PROFIBUS DP	NCM S7 for PROFIBUS

Ordering data

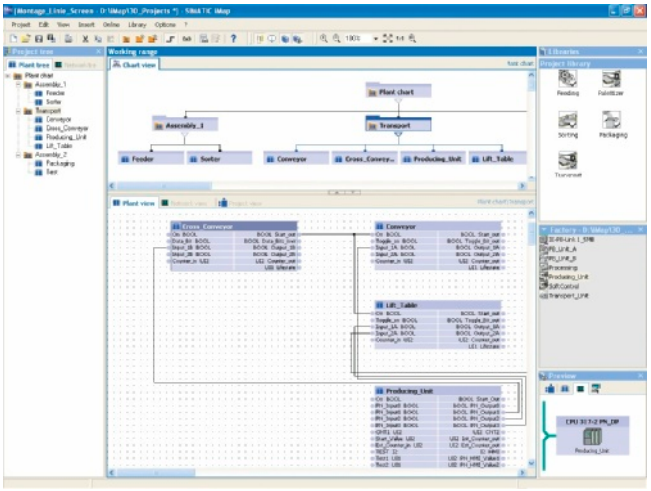
		Order No.
Program package software redundancy V1.2 Task: Configuring a redundant control. Target system: SIMATIC S7-300, S7-400 Requirements: STEP 7 V5.2, NCM S7 for PROFIBUS Type of delivery: incl. electronic documentation (English, German, French, Spanish, Italian), 4 application examples and faceplate 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 Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	J	**6ES7 998-8XC01-8YE0**
SIMATIC manual collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	D	**6ES7 998-8XC01-8YE2**

D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

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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 • Diagnostics of communication in the diagnostics window
Sectors	• Automotive industry (especially in assembly, conveyor systems and in the paint shop) • More 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)

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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
Type of delivery	
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

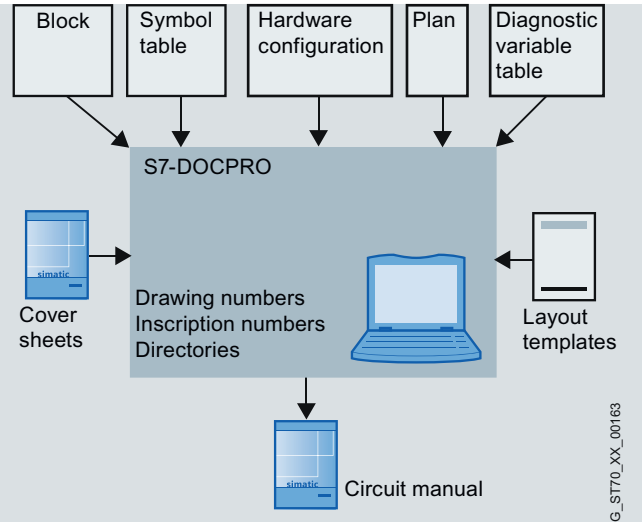
Ordering data

		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 higher or Windows XP Prof. with Service Pack 1 or higher or Windows 2003 Server with Service Pack 1 or higher; on PG or PC with Pentium processor, min. 1 GHz; STEP 7 V5.3 or higher with Service Pack 3, PN OPC Server V6.3 or higher Type of delivery: German, English, with electronic documentation		
Floating License	D	**6ES7 820-0CC04-0YA5**
Software Update Service (requires current software version)	D	**6ES7 820-0CC01-0YX2**
Upgrade to V3.0, floating license	D	**6ES7 820-0CC04-0YE5**

D: Subject to export regulations AL: N and ECCN: 5D992

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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

Technical specifications

Engineering Tool	DOCPRO
Type of license	Floating license
Software class	A
Current version	V5.4
Target system (recommended)	SIMATIC S7-300/400 SIMATIC C7
Operating system	Windows 2000 Professional Windows XP Professional Windows Vista Business/Ultimate
Required software packages	STEP 7 V5.4 or higher under Windows Vista V5.4 SP3 or higher
Disk space required in PG/PC	5 MB

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 Requirements: from STEP 7 V5.4 Type of delivery: 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**
Floating license upgrade to V5.4		**6ES7 803-0CC03-0YE5**
SIMATIC manual collection Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	J	**6ES7 998-8XC01-8YE0**
SIMATIC manual collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	D	**6ES7 998-8XC01-8YE2**

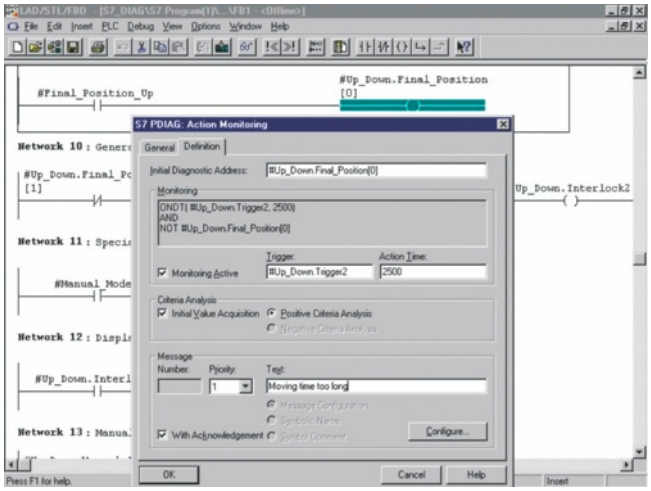
D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

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S7-PDIAG

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

Technical specifications

Engineering tool	S7-PDIAG
Type of license	Floating license
Software class	A
Current version	V5.3
Target system (recommended)	SIMATIC S7-300 (CPU 314 or higher) SIMATIC S7-400
Operating system	Windows 2000 Professional Windows XP Professional
Required software packages	STEP 7 V5.3 SP3 or higher
Disk space required in PG/PC	6 MB

Ordering data

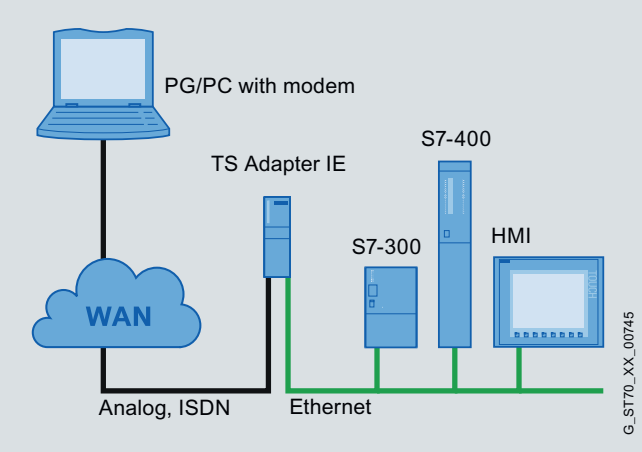
		Order No.
S7-PDIAG, Version 5.3 Task: Configuring of process diagnostics for LAD/FBD/STL Target system: SIMATIC S7-300 (CPU 314 and higher); SIMATIC S7-400 Requirements: STEP 7 V5.3 SP3 and higher Type of delivery: on CD; German, English, French, Spanish, Italian; incl. authorization diskette, with electronic 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 Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	J	**6ES7 998-8XC01-8YE0**
SIMATIC manual collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	D	**6ES7 998-8XC01-8YE2**

D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

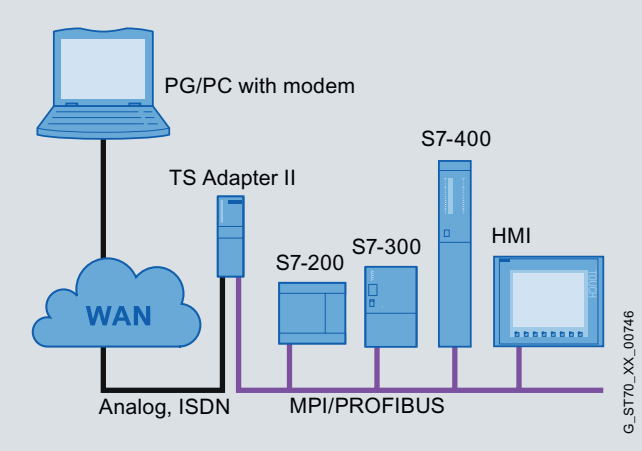
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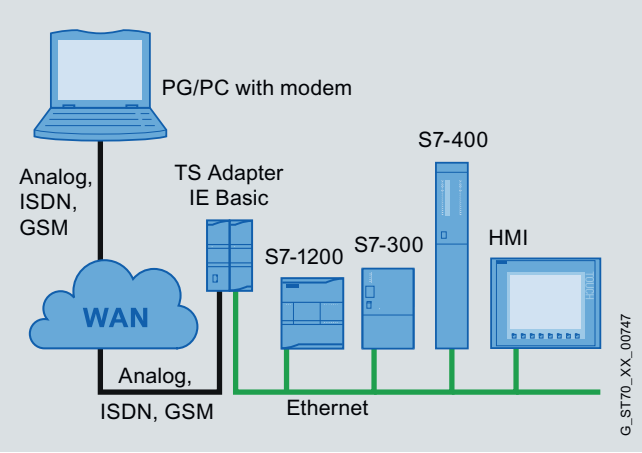
Overview



Teleservice with TS Adapter IE



Teleservice with TS Adapter II



Teleservice with TS Adapter IE Basic

- 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 or TS adapter IE Basic 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.

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TeleService

Technical specifications

Engineering tool	DOCPRO
Type of license	Floating license
Software class	A
Current version	V5.4
Target system (recommended)	SIMATIC S7-300/400 SIMATIC C7
Operating system	Windows 2000 Professional Windows XP Professional Windows Vista Business/Ultimate
Required software packages	STEP 7 V5.4 or higher under Windows Vista V5.4 SP3 or higher
Disk space required in PG/PC	5 MB

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 to +60 °C
• Storage/transport	-40 °C to +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 to +60 °C
• Storage/transport	-40 °C to +70 °C

TS adapter IE Basic (basic unit)	
Dimensions (W x H x D) in mm	30 x 100 x 75
Weight, approx.	100 g
Interfaces	
• Ethernet	RJ45 (10/100 MBit/s)
• to TS module	Proprietary (can only be used for TS modules
Supply voltage external	24 V DC
Current consumption	
• with TS module Modem	typ. 50 mA, max. 80 mA
• with TS module ISDN	typ. 50 mA, max. 80 mA
• with TS module RS232	typ. 40 mA, max. 60 mA
• with TS module GSM	typ. 100 mA, max. 180 mA
Switch-on current, max.	240 mA
Degree of protection	IP20
Temperature	
• Operation	± 0 °C to +60 °C (horizontal mounting) ± 0 °C to +40 °C (vertical mounting)
• Storage	40 °C to +70 °C

TS module modem	
Dimensions (W x H x D) in mm, approx.	30 x 100 x 75
Weight, approx.	98 g
ITU transmission standards	• V.21, V.22, V.22bis, V.23, V.32, V.32bis, V.34, V.34x, K56flex, V.90, V.92
Additional features	• Error correction and data compressing • a/b interface • Hayes (AT) command set • All data formats • Dialing multifrequency (MFV), impulse (IWV)

TS module ISDN	
Dimensions (W x H x D) in mm	30 x 100 x 75
Weight, approx.	92 g
Protocols	
• D-channel protocols	DSS1 (Euro-ISDN), 1TR6
• B-channel protocols	V.110 (9600 bit/s, 19200 bit/s, 38400 bit/s) V.120 (64 Kbit/s) X.75 (64 Kbit/s)
Additional features	• Multiple Subscriber Numbers (MSN) • AT command interpreter

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Technical specifications (continued)

TS module RS232	
Dimensions (W x H x D) in mm	30 x 100 x 75
Weight, approx.	100 g
Operating mode	Full duplex, asynchronous
Signals	TXD, RXD, DSR, CTS, RTS, DTR, DCD
Data transmission rate	2 400 ... 115 200 bit/s
Frame	8 data bits (LSB first), no parity bit, 1 stop bit
Control	according to RS232 standard
Plug-in	D sub 9-pin, male

TS module GSM	
Dimensions (W x H x D) in mm	30 x 100 x 75
Weight, approx.	118 g
Transmission rate	
• GPRS Multislot Class 10	
- up to 2 uplinks	13.4 Kbit/s … 27 Kbit/s upload gross
- up to 4 downlinks	40 Kbit/s … 54 Kbit/s download gross
Interfaces	
• SIM interface	3 V/1.8 V
• Antenna connection	1 x SMA antenna socket (50 Ohm)
Frequency ranges	Quad band: 850, 900, 1800, 1900 MHz
Transmitted output power	2 W at 850 MHz, 900 MHz 1 W at 1800 MHz, 1900 MHz

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 Requirements: TS Adapter (STEP 7 not required) Type of delivery: on CD, German, English, French, Spanish, Italian; with electronic documentation		
Floating License	J	**6ES7 842-0CE00-0YE0**
Floating License Upgrade (from each previous version)	J	**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**

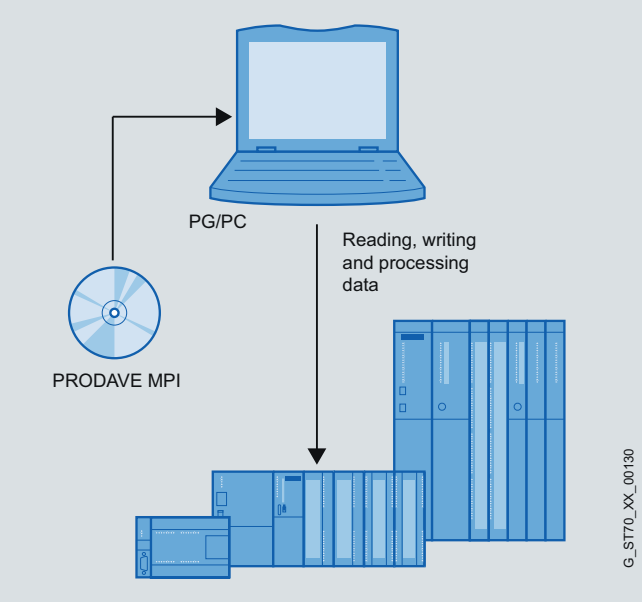
		Order No.
USB cable for parameterizing the TS adapter II, it can also be used for programming the connected devices. 5 m long		**6ES7 901-0AE00-0XA0**
TS adapter IE Basic Basic unit	I	**6ES7 972-0EB00-0XA0**
TS module modem	I	**6ES7 972-0MM00-0XA0**
TS module ISDN	I	**6ES7 972-0MD00-0XA0**
TS module RS232	I	**6ES7 972-0MS00-0XA0**
TS module GSM	I	**6GK7 972-0MG00-0XA0**
S7 mounting rail adapter For mounting on TS adapter IE Basic on S7-300 mounting rail, width 60 mm		**6ES7 972-0SE00-7AA0**
SIMATIC manual collection Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	J	**6ES7 998-8XC01-8YE0**
SIMATIC manual collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	D	**6ES7 998-8XC01-8YE2**

D: Subject to export regulations AL: N and ECCN: 5D992
I: Subject to export regulations AL: N and ECCN: EAR99H
J: Subject to export regulations AL: N and ECCN: EAR99S

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PRODAVE

Overview



- The toolbox for exchange of process data between SIMATIC S7, SIMATIC C7 and a PG/PC
- For autonomous handling of data traffic over MPI/PPI, PROFIBUS and Industrial Ethernet

Technical specifications

Runtime software	
Parameterization software	**PRODAVE**
Type of license	Simple license, copy license
Software class	A
Current version	V6.1
Target system	SIMATIC S7-200 SIMATIC S7-300 SIMATIC S7-400 SIMATIC C7
Operating system	Windows 2000 Prof./XP, Vista 32 Ultimate
Required software packages	-
Main memory configuration in target system	8 MB on PG/PC
Disk space required in PG/PC	2 MB
Standard FBs	
Required libraries	-

Ordering data

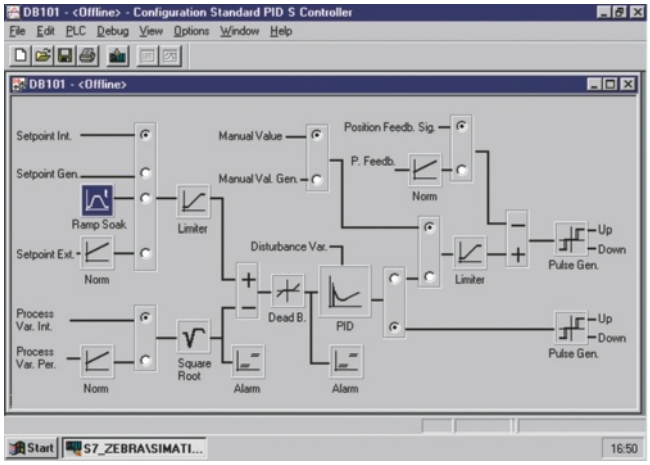
		Order No.
PRODAVE MPI/IE V6.1 for Windows 95/98/ME/NT 4.0/ 2000 Prof./XP Prof. Task: Data link between PG/PC and SIMATIC S7/C7 via MPI (S7-200 via PPI) or Industrial Ethernet Requirements: Windows 2000 Prof./XP Prof./ Vista 32 Ultimate; CP 5611, integrated MPI or PC adapter Type of delivery: CD incl. electr. documentation (German, English)		
Single license	J	**6ES7 807-4BA02-0YA0**
Copy license, without software and documentation	J	**6ES7 807-4BA02-0YA1**
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 Type of delivery: CD incl. electr. documentation (German, English)		
Single license	J	**6ES7 807-3BA01-0YA0**
Copy license, without software and documentation	J	**6ES7 807-3BA01-0YA1**
SIMATIC manual collection Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	J	**6ES7 998-8XC01-8YE0**
SIMATIC manual collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	D	**6ES7 998-8XC01-8YE2**

D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

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Overview



- For integrating continuous PID controllers, pulse controllers and step controllers in the application program
- Reduces engineering costs thanks to time-saving parameterization and optimization of the controller
- For use in SIMATIC S7-300 (CPU 313 or higher), S7-400 and WinAC

Technical specifications

Parameterization software	**Standard PID control**					
Type of license	Single license					
Software class	A					
Current version	V 5.2					
Target system	SIMATIC S7-300 (CPU 313 or higher) SIMATIC S7-400 SIMATIC C7					
Required software packages	STEP 7 V5.3 SP2 or higher					
Main memory configuration in PG/PC	16 MB					
Disk space required in PG/PC	1.85 MB					
Standard function blocks	**PID_CP (FB 1)**		**PID_ES (FB 2)**		**LP_SCHED (FC 1)**	
Storage space requirements • FB length in the memory • DB length in the memory	Load memory 8956 byte 1168 byte	Work memory 7796 byte 510 byte	Load memory 9104 byte 1124 byte	Work memory 7982 byte 484 byte	Load memory 1064 byte 184 byte[2)]	Work memory 976 byte 100 byte[2)]
Runtimes • In S7-300[1)] • In S7-400[1)]	 0.18 - 4.4 ms 0.13 - 0.35 ms		 0.2 - 5.1 ms 0.16 - 0.35 ms		 0.03 - 0.3 ms 0.03 - 0.08 ms	
Required libraries	Standard PID control FBs					
Licensing forms	Simple license and 1 runtime license; 1 runtime license					
Software class	A					
Current version	V 5.2					
Target system	SIMATIC S7-300 (CPU 313 or higher) SIMATIC S7-400 SIMATIC C7					
Required software packages	STEP 7 V5.3 SP2 or higher					
Main memory configuration in PG/PC	16 MB					
Disk space required in PG/PC	1.85 MB					

[1)] Depending on the CPU
[2)] With 5 control loops

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Standard PID control

Ordering data

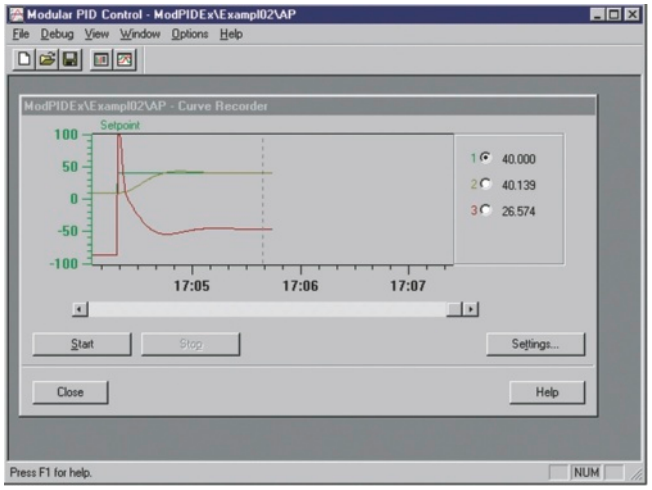
	Order No.
Standard PID control parameterization tool, V5.2	
Task: Parameterization tool for standard closed-loop controls Requirements: STEP 7, V5.3 SP2 or higher Type of delivery: With electronic manual/Getting Started English, German; incl. authorization diskette	
Floating license	**6ES7 830-2AA22-0YX0**
Software Update Service (requires current software version)	**6ES7 830-2AA00-0YX2**
Upgrade License from V5.x to V5.2	**6ES7 830-2AA22-0YX4**
Standard function blocks for standard PID control, V5.2	
Task: Standard FBs for standard closed-loop controls Target system: SIMATIC S7-300 (CPU 313 or higher), S7-400 Type of delivery: With electronic manual/Getting Started English, German	
Single license	**6ES7 860-2AA21-0YX0**
Single license without software and documentation	**6ES7 860-2AA21-0YX1**

		Order No.
SIMATIC manual collection	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC		
SIMATIC manual collection update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		

D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

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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 higher), S7-400 and WinAC

Technical specifications

Parameterization software	Modular PID control
Type of license	Single license
Software class	A
Current version	V 5.1
Target system	SIMATIC S7-300 (CPU 313 or higher) SIMATIC S7-400 SIMATIC C7
Required software packages	STEP 7 V5.3 SP2 or higher
Main memory configuration in PG/PC	16 MB
Disk space required in PG/PC	1.85 MB
Processor, at least	486
Windows swap area, approx.	20 MB (max. possible)

Standard function blocks	A_DEAD_B		CRP_IN		CPR_OUT	
Storage space requirements	Load memory	Work memory	Load memory	Work memory	Load memory	Work memory
• FB length in the memory	898 byte	692 byte	182 byte	70 byte	206 byte	96 byte
• DB length in the memory	186 byte	44 byte	122 byte	20 byte	114 byte	14 byte
Runtimes in S7-300	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 (CPU 313 and higher), S7-400, WinAC		SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC		SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC	

Standard function blocks	DEAD_T		DEAD_BAND		DIF	
Storage space requirements	Load memory	Work memory	Load memory	Work memory	Load memory	Work memory
• FB length in the memory	532 byte	394 byte	232 byte	120 byte	410 byte	268 byte
• DB length in the memory	142 byte	22 byte	114 byte	16 byte	158 byte	30 byte
Runtimes in S7-300	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 (CPU 313 and higher), S7-400, WinAC		SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC		SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC	

Standard function blocks	ERR_MON		INTEG		LAG1ST	
Storage space requirements	Load memory	Work memory	Load memory	Work memory	Load memory	Work memory
• FB length in the memory	558 byte	360 byte	488 byte	314 byte	534 byte	368 byte
• DB length in the memory	206 byte	52 byte	168 byte	36 byte	156 byte	30 byte
Runtimes in S7-300	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 (CPU 313 and higher), S7-400, WinAC		SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC		SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC	

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Technical specifications (continued)

Standard function blocks	LAG2ND		LIMALARM		LIMITER	
Storage space requirements	Load memory	Work memory	Load memory	Work memory	Load memory	Work memory
• FB length in the memory	690 byte	516 byte	390 byte	240 byte	262 byte	140 byte
• DB length in the memory	190 byte	46 byte	152 byte	28 byte	124 byte	20 byte
Runtimes in S7-300	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 (CPU 313 and higher), S7-400, WinAC		SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC		SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC	

Standard function blocks	LMNGEN_C		LMNGEN_S		NONLIN	
Storage space requirements	Load memory	Work memory	Load memory	Work memory	Load memory	Work memory
• FB length in the memory	1576 byte	1280 byte	2578 byte	2152 byte	826 byte	672 byte
• DB length in the memory	276 byte	80 byte	360 byte	110 byte	138 byte	18 byte
Runtimes in S7-300	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 (CPU 313 and higher), S7-400, WinAC		SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC		SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC	

Standard function blocks	NORM		OVERRIDE		PARA_CTL	
Storage space requirements	Load memory	Work memory	Load memory	Work memory	Load memory	Work memory
• FB length in the memory	234 byte	122 byte	362 byte	214 byte	406 byte	232 byte
• DB length in the memory	130 byte	24 byte	146 byte	28 byte	234 byte	82 byte
Runtimes in S7-300	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 (CPU 313 and higher), S7-400, WinAC		SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC		SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC	

Standard function blocks	PID		PULSEGEN		RMP_SOAK	
Storage space requirements	Load memory	Work memory	Load memory	Work memory	Load memory	Work memory
• FB length in the memory	1560 byte	1242 byte	1110 byte	872 byte	1706 byte	1500 byte
• DB length in the memory	340 byte	98 byte	190 byte	34 byte	212 byte	62 byte
Runtimes in S7-300	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 (CPU 313 and higher), S7-400, WinAC		SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC		SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC	

Standard function blocks	ROC_LIM		SCALE		SP_GEN	
Storage space requirements	Load memory	Work memory	Load memory	Work memory	Load memory	Work memory
• FB length in the memory	1242 byte	980 byte	136 byte	32 byte	658 byte	484 byte
• DB length in the memory	222 byte	50 byte	114 byte	16 byte	164 byte	40 byte
Runtimes in S7-300	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 (CPU 313 and higher), S7-400, WinAC		SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC		SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC	

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Technical specifications (continued)

Standard function blocks	SPLT_RAN		SWITCH		LP_SCHED	
Storage space requirements	Load memory	Work memory	Load memory	Work memory	Load memory	Work memory
• FB length in the memory	304 byte	180 byte	238 byte	116 byte	1104 byte	972 byte[1)]
• DB length in the memory	138 byte	28 byte	118 byte	18 byte	234 byte	64 byte[1)]
Runtimes in S7-300	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 (CPU 313 and higher), S7-400, WinAC		SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC		SIMATIC S7-300 (CPU 313 and higher), S7-400, WinAC	

1) With 5 control loops

Standard FBs in general	
Required libraries	Modular PID control FBs
Licensing forms	Simple license and 1 runtime license; 1 runtime license
Software class	A

Current version	V 5.1
Required software packages	STEP 7 V5.3 SP2 or higher
Main memory configuration in PG/PC	16 MB
Disk space required in PG/PC	1.85 MB

Ordering data

	Order No.
Modular PID control commissioning tool, V5.1 for SIMATIC S7 and WinAC Task: Start-up tool for modular PID controllers Requirements: STEP 7, V5.3 SP2 or higher Type of delivery: With electronic manual, English, German; incl. authorization diskette	
Floating license	**6ES7 830-1AA11-0YX0**
Software Update Service (requires current software version)	**6ES7 830-1AA00-0YX2**
Upgrade License from V5.0 to V5.1	**6ES7 830-1AA11-0YX4**
Standard function blocks for modular PID control, V5.1 Task: Standard FBs for modular PID controllers Target system: SIMATIC S7-300 (CPU 313 or higher), S7-400, WinAC Type of delivery: English, German; with electronic manual	
Single license	**6ES7 860-1AA10-0YX0**
Single license, without software and documentation	**6ES7 860-1AA10-0YX1**

		Order No.
SIMATIC manual collection Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	J	**6ES7 998-8XC01-8YE0**
SIMATIC manual collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	D	**6ES7 998-8XC01-8YE2**

D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

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PID Self-Tuner

Overview

- PID Self-Tuner: For expanding existing PID controllers to create self-tuning 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
- Ideally applicable to temperature controllers, but also suitable for level and flow controllers
- Can be used with SIMATIC S7-300 (CPU 313 or higher), SIMATIC S7-400 and WinAC; 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

Parameterization software	**PID Self-Tuner**			
Type of license	-			
Software class	-			
Current version	-			
Target system	-			
Operating system	-			
Required software packages	-			
Main memory configuration in PG/PC	-			
Disk space required in PG/PC	-			
Standard FBs	**-**			
PID Self-Tuner	**TUN_EC**		**TUN_ES**	
Storage space requirements • FB length in the memory • DB length in the memory	Load memory approx. 6542 byte 644 byte	Work memory approx. 5956 byte 294 byte	Load memory 6332 byte 638 byte	Work memory 5714 byte 288 byte
Runtimes • In S7-300 • In S7-400	 1.0 ms to 1.5 ms [1] 0.06 ms to 0.19 ms [1]		 1.0 ms to 1.5 ms [1] 0.06 ms to 0.19 ms [1]	
Required libraries	PID Self-Tuner FBs V5.0			
Licensing forms	-			
Software class	A			
Current version	V5.0			
Target system	SIMATIC S7-300 (CPU 313 or higher) SIMATIC S7-400 SIMATIC C7-620			
Required software packages	STEP 7 V3.2 or higher			
Main memory configuration in PG/PC	-			
Disk space required in PG/PC	-			

[1] Depending on the CPU selected

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Ordering data

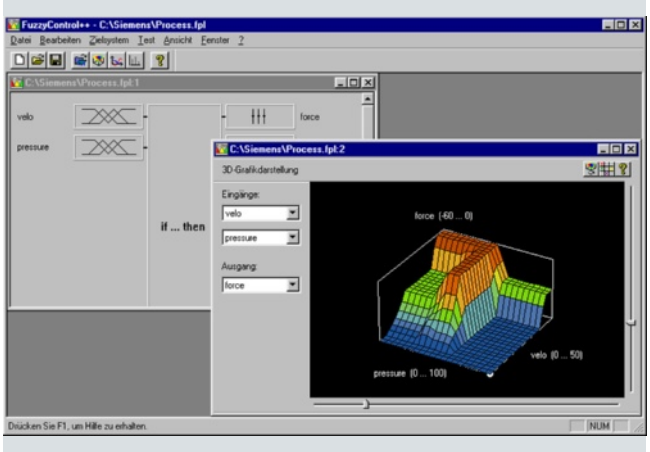
	Order No.
PID Self-Tuner V5.1 Task: Online optimization for PID controller Target system: SIMATIC S7-300 (CPU 313 or higher), S7-400, WinAC Type of delivery: Standard function blocks, electronic manual and Getting Started (German/English);	
Single license	**6ES7 860-4AA01-0YX0**
Single license, without software and documentation	**6ES7 860-4AA01-0YX1**

		Order No.
SIMATIC manual collection Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	J	**6ES7 998-8XC01-8YE0**
SIMATIC manual collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	D	**6ES7 998-8XC01-8YE2**

D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

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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 data for configuration tool	
Parameterization software	**Fuzzy Control++**
Type of license	Single license
Software class	
Current version	
Target system	SIMATIC S7-300 (CPU 314 or higher), SIMATIC S7-400

Technical data for configuration tool	
Processor	PC or PG with 80486 processor (or higher)
Main memory, min.	16 MB work memory (RAM)
Hard disk, min.	5 MB free memory on the hard disk
Operating system	Windows 95 or Windows NT 4.0

Technical data for standard function blocks			
	FUZZY_4K (FB 30)	**FUZZY_20K (FB 31)**	**FUZZY_WinCC**
Target system	SIMATIC S7-300 (CPU 314 or higher), 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 rules, inputs and outputs: 13 up to 180 ms (S7-300), 1.8 up to 22 ms (S7-400)	Depending on the number of rules, inputs and outputs: 1.8 up to 150 ms (S7-400)	Not measurable
Memory requirements • FB • DB	 1524 byte 4228 byte	 1524 byte 20612 byte	 Not measurable
Number of inputs	8 with max. 7 association functions each	8 with max. 7 association functions each	8 with max. 7 association functions each
Number of outputs	4 with max. 9 association functions each	4 with max. 9 association functions each	4 with max. 9 association functions each
Number of rules, max.	200	2000	2000
Required libraries	Fuzzy Control++ FBs		
Licensing forms	Single license		
Software class	A		
Current version	V 4.0		
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		

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Fuzzy Control

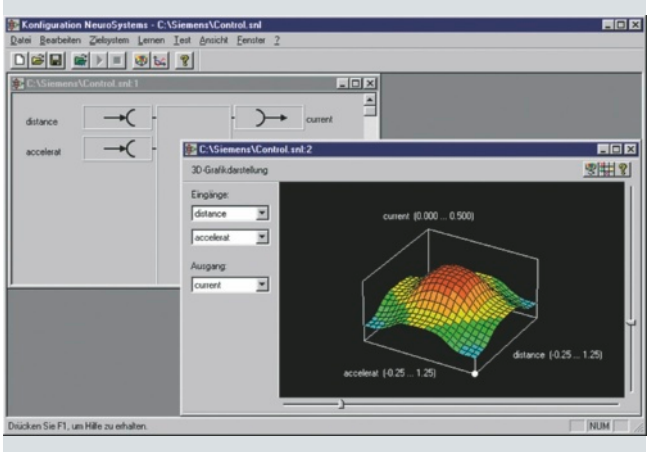
Ordering Data		Order No.
Fuzzy Control++ configuration tool		
Function blocks for S7-300/400 CPU 314 and higher incl. SmartObject for SIMATIC WinCC, manual; single license		
Basic license	J	**2XV9 450-1WC10-0AA1**
Copy license	J	**2XV9450-1WC11-4XA0**

		Order No.
SIMATIC manual collection	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC		
SIMATIC manual collection update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		

D: Subject to export regulations AL: N and ECCN: 5D992
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Overview



- For creating and teaching of 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

Technical data for configuration tool	
Parameterization software	**Neuro systems**
Type of license	Single license
Software class	
Current version	
Target system	SIMATIC S7-300 (CPU 314 or higher), SIMATIC S7-400

Technical data for configuration tool	
Processor	PC or PG with 80486 processor (or higher)
Main memory, min.	16 MB work memory (RAM)
Hard disk, min.	5 MB free memory on the hard disk
Operating system	Windows 95 or Windows NT 4.0

Technical data for standard function blocks			
	NEURO_4K (FB 100)	**NEURO_20K (FB 101)**	**NEURO_WinCC**
Target system	SIMATIC S7-300 (CPU 314 or higher), 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 up to 270 ms (S7-300) 3.3 up to 140 ms (S7-400)	Depending on the number of inputs, outputs and neurons: 3.3 up to 260 ms (S7-400)	Not measurable
Memory requirements • FB • DB	 2246 byte 4278 byte	 2210 byte 20612 byte	 Not measurable
Number of inputs, max.	4	100	10
Number of outputs, max.	4	10	10
Line supply types	MLP, RBF, neuro-fuzzy	MLP, RBF, neuro-fuzzy	MLP, RBF, neuro-fuzzy
Required libraries	Neuro systems FBs		
Licensing forms	Single license		
Software class			
Current version			
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		

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NeuroSystems

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	J	**2XV9 450-1WC15-0AA0**
Copy license	J	**2XV9 450-1WC16-4XA0**

		Order No.
SIMATIC manual collection	J	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC		
SIMATIC manual collection update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		

D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

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Overview

- Option package for creating motion control tasks for CPU 31xT-2 DP and CPU 317TF-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

Ordering data	Order No.
S7-Technology V4.2	
Task: Option package for configuring and programming technology tasks with SIMATIC S7 CPU 31xT-2 DP and the SIMATIC S7 CPU 317TF-2 DP Requirements: STEP 7 V5.4 SP5 or higher Type of delivery: on DVD; incl. documentation for CPU 31xT-2 DP, CPU 317TF-2 DP (included on DVD)	
Floating license	**6ES7 864-1CC42-0YA5**
Upgrade to V4.2	**6ES7 864-1CC42-0YE5**

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Easy Motion Control

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

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Technical specifications (continued)

Runtime load

Typical runtimes of the blocks in µs				
Block	CPU 416-2 DP 6ES7 416-2XK02-0AB0	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. More information can be found in the manual.

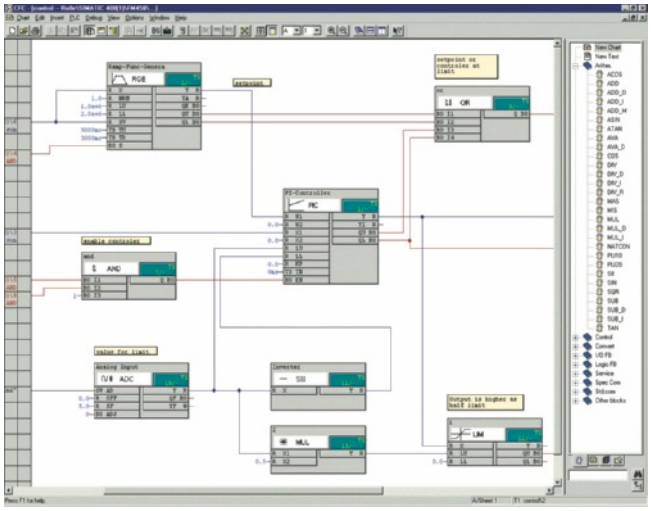
Ordering data

	Order No.
Easy Motion Control V2.1	
Task: Controlled positioning with standard drives with variable speed Requirements: STEP 7 V5.3 SP2 Type of delivery: incl. documentation (German, English),	
Single license	**6ES7 864-0AC01-0YX0**
Single license, without software and documentation	**6ES7 864-0AF01-0YX0**

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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

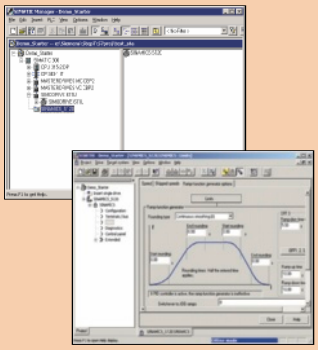
Ordering data

		Order No.
SIMATIC D7-SYS V7.1 Task: Function block library for configuring closed-loop control and automation tasks Target system: SIMATIC S7-400/FM 458/ SIMATIC TDC/T400/SIMADYN Requirements: Windows 2000/XP Type of delivery: on CD, German, English, with electronic documentation		
Floating license		**6ES7 852-0CC02-0YA5**
Upgrade License V5.x and higher		**6ES7 852-0CC02-0YE5**
Software Update Service		**6ES7 852-0CC01-0YL5**
SIMATIC D7 FB Gen V2.1 Function block generator	J	**6DD1 805-5DA0**
SIMATIC manual collection Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	J	**6ES7 998-8XC01-8YE0**
SIMATIC manual collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	D	**6ES7 998-8XC01-8YE2**

D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

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Overview

SIMATIC Programs	Configuration / Commissioning
Drive ES PCS 7 	Drive ES Basic 
Drive ES SIMATIC 	

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 user 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 SIMATIC - to simply parameterize the STEP 7 communication program instead of programming.
- Drive ES PCS 7 - integrates drives with PROFIBUS interface into the SIMATIC PCS 7 process control system.

Ordering data

	Order No.
Drive ES Basic V5.5 SPx *)	
Configuration software for the integration of drives into Totally Integrated Automation	
Requirements: STEP 7, V5.3 and higher, SP3	
Type of delivery: on CD-ROM Ger., Eng., Fr., Sp., It. with electronic documentation	
• Floating license, 1 user	**6SW1 700-5JA00-5AA0**
• Floating license (copy license), 60 users	**6SW1 700-5JA00-5AA1**
• Update service for single-user license	**6SW1 700-0JA00-0AB2**
• Update service for copy license, 60 users	**6SW1 700-0JA00-1AB2**
• Upgrade from V5.x to V5.5 SPx *)	**6SW1 700-5JA00-5AA4**

Ordering data

	Order No.
Drive ES SIMATIC V5.5 SPx *)	
Function block library for SIMATIC for the parameterization of communication with the drives	
Requirements: STEP 7, V5.3 and higher, SP3	
Type of delivery: on CD-ROM Ger., Eng., Fr., Sp., It. with electronic documentation	
• Single-user license incl. 1 runtime license	**6SW1 700-5JC00-5AA0**
• Runtime license (without data carrier)	**6SW1 700-5JC00-1AC0**
• Upgrade from V5.x to V5.5 SPx *)	**6SW1 700-5JC00-5AA4**
Drive ES PCS 7 V6.1 SPx *)	
Block library for PCS 7 for the integration of drives	
Requirements: PCS 7, V6.1 and higher	
Type of delivery: on CD-ROM Ger., Eng., Fr., Sp., It. with electronic documentation	
• Single-user license incl. 1 runtime license	**6SW1 700-6JD00-1AA0**
• Runtime license (without data carrier)	**6SW1 700-5JD00-1AC0**
• Update service for single-user license	**6SW1 700-0JD00-0AB2**
Drive ES PCS 7 V7.0 SPx *)	
Block library for PCS 7 for the integration of drives	
Requirements: PCS 7, V7.0 and higher	
Type of delivery: on CD-ROM Ger., Eng., Fr., Sp., It. with electronic documentation	
• Single-user license incl. 1 runtime license	**6SW1 700-7JD00-0AA0**
• Runtime license (without data carrier)	**6SW1 700-5JD00-1AC0**
• Update service for single-user license	**6SW1 700-0JD00-0AB2**
Upgrade from V5.x to V7.0 SPx *)	**6SW1 700-7JD00-0AA4**
Drive ES PCS 7 V7.1 SPx *)	
Block library for PCS 7 for the integration of drives	
Requirements: PCS 7, V7.1 and higher	
Type of delivery: on CD-ROM Ger., Eng., Fr., Sp., It. with electronic documentation	
• Single-user license incl. 1x runtime license	**6SW1 700-7JD00-1AA0**
• Runtime license (without data carrier)	**6SW1 700-5JD00-1AC0**
• Update service for single-user license	**6SW1 700-0JD00-0AB2**
• Upgrade from V6.x to V7.1 SPx *)	**6SW1 700-7JD00-1AA4**

*) Orders are always automatically supplied with the latest SP.

Further information is available on the Internet under:

www.siemens.com/drivesolutions

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Software for joint tasks in the documentation sector

Technical product data for CAx applications

Overview

The DVD "Technical Product Data for CAx Applications – Industrial Automation System" contains technical product data for approx. 1,400 products from the following product families:

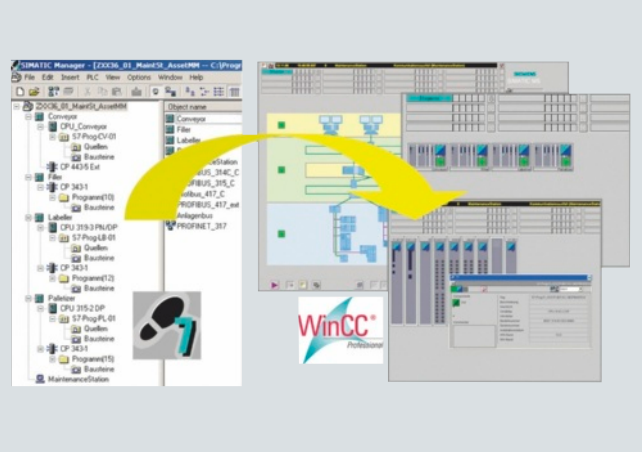
- S7-300 / S7-400
- C7
- Bus components
- ET 200M / S / iS / iSP / X / eco / ecoPN / pro / L
- Communication / Networks

Ordering data

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**

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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
Engineering station "ES"	Windows XP Professional SP2 Windows Server 2003 SP1
Maintenance Station Stand-alone / WinCC-Station "Single-user Workstation"	Windows XP Professional SP2 Windows Server 2003 SP1
ES with Maintenance Station Stand-alone	Windows XP Professional SP2 Windows Server 2003 SP1
Maintenance Station Server / WinCC Server	Windows Server 2003 SP1
Maintenance Station Client / WinCC Client	Windows XP Professional SP2 Windows Server 2003 SP1

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Technical specifications (continued)

Requirements for the integration of devices

Type	Integration	Comment
SIMATIC S7 controllers / I/O		
• S7-300 [1]	Yes	
• S7-400	Yes	
• WinAC	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
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

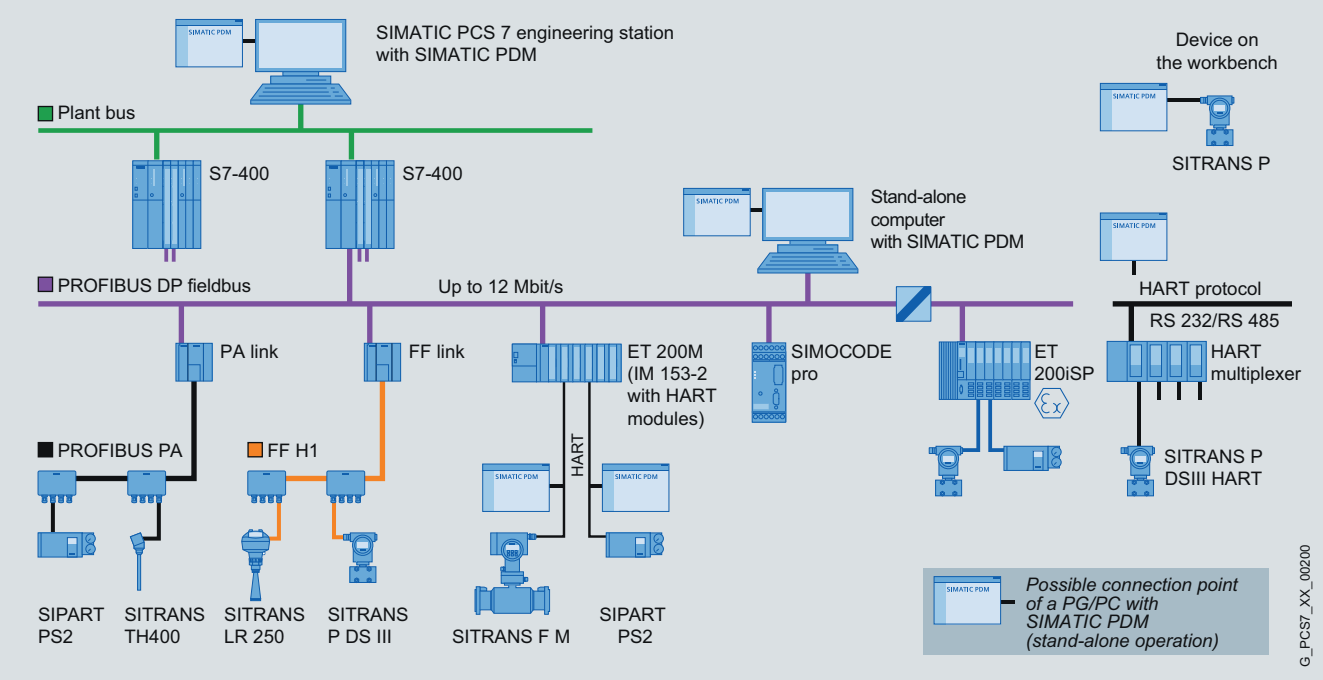
		Order No.
SIMATIC Maintenance Station 2007		
Software for implementation of a plant-oriented asset management system		
Can be used with STEP 7 V5.4 or higher and WinCC V6.2		
• Basic package with engineering software (Floating License) and Runtime License for 100 devices	D	**6ES7 840-0WD00-0YA0**
• Powerpack 100 Runtime License for 100 additional devices	D	**6ES7 840-0WD10-0YD0**
• Powerpack 500 Runtime License for 500 additional devices	D	**6ES7 840-0WD20-0YD0**
• Powerpack 1000 Runtime License for 1000 additional devices	D	**6ES7 840-0WD30-0YD0**
• Basic demo package 2007	D	**6ES7 840-0WD00-0YA7**

		Order No.
SIMATIC Maintenance Station 2009		
Can be used with STEP 7 V5.4 or higher and WinCC V7		
• Basic package with engineering software (Floating License) and Runtime License for 100 devices	D	**6ES7 840-0WD01-0YA0**
• Powerpack 100 Runtime License for 100 additional devices	D	**6ES7 840-0WD11-0YD0**
• Powerpack 500 Runtime License for 500 additional devices	D	**6ES7 840-0WD21-0YD0**
• Powerpack 1000 Runtime License for 1000 additional devices	D	**6ES7 840-0WD31-0YD0**
• Basic demo package 2009	D	**6ES7 840-0WD01-0YA7**
• Upgrade from SIMATIC Maintenance Station 2007 to SIMATIC Maintenance Station 2009	D	**6ES7 840-0WD01-0YE0**

D: Subject to export regulations AL: N and ECCN: 5D992

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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 2000 devices from Siemens and over 200 vendors worldwide on *one* homogeneous user interface.

The user interface satisfies the requirements of the VDI/VDE GMA 2187 and IEC 65/349/CD directives. Parameters and functions for all supported devices are displayed in a consistent and uniform fashion independent of their communications interface. Even complex devices with several hundred parameters can be represented clearly and processed quickly. Using SIMATIC PDM it is very easy to navigate in highly complex stations such as remote I/Os and even connected field devices.

From the viewpoint of device integration, SIMATIC PDM is the most powerful open 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 follow-up costs.

SIMATIC PDM supports the operative system management in particular through:

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

When used in SIMATIC PCS 7, SIMATIC PDM is integrated in the asset management of the process control system. You can change directly to the SIMATIC PDM views from the diagnostics faceplates in the Maintenance Station.

The Process Device Manager provides more detailed information for all devices described by means of an Electronic Device Description (EDD), e.g.:

- Detailed diagnostics information (manufacturer information, information on error diagnostics and troubleshooting, further documentation)
- Information on changes (audit trail report)
- Parameter information

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SIMATIC PDM process device manager

Technical specifications

	SIMATIC PDM V6.0	SIMATIC PDM V7.0
Hardware	• PG/PC/notebook with processor corresponding to operating system requirements	• PG/PC/notebook with processor corresponding to operating system requirements
Operating systems (alternative)	• Microsoft Windows 2000 Professional SP3/SP4 • Microsoft Windows XP Professional SP2/SP3 • Microsoft Windows Server 2003 SP2 (only for operation on a SIMATIC PCS 7 Engineering Station)	• Microsoft Windows XP Professional SP3 with Internet Explorer 7 • Microsoft Windows Server 2003 SP2/R2 with Internet Explorer 7
Integration in STEP 7 / PCS 7	• STEP 7 V5.2 + SP1 • STEP 7 V5.3 + SP3 • STEP 7 V5.4 + SP3/SP4/SP5 • SIMATIC PCS 7 V6.1 + SP2/SP3/SP4 • SIMATIC PCS 7 V7.0 + SP1/SP2/SP3 • SIMATIC PCS 7 V7.1/V7.1 + SP1/SP2	• SIMATIC PCS 7 V7.1 + SP2

Ordering data

Selection and ordering data for TIA applications

	Order No.
Product packages	
Minimum configuration	
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, Italian, Spanish, Chinese), software class A, executes with Windows 2000 Professional or Windows XP Professional, floating license for 1 user Type of delivery: License key disk, certificate of license including terms and conditions; software SIMATIC PDM V6.0 and device library on CD/DVD	**6ES7 658-3HX06-0YA5**
Basic configuration for individual product packages	
SIMATIC PDM Basic V6.0 Product package 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, Italian, Spanish, Chinese), software class A, executes with Windows 2000 Professional or Windows XP professional Type of delivery: License key disk, certificate of license including terms and conditions; software SIMATIC PDM V6.0 and device library on CD/DVD	
• Floating license for 1 user	**6ES7 658-3AX06-0YA5**
• Rental license for 50 hours	**6ES7 658-3AX06-0YA6**
Application-specific configurations	
SIMATIC PDM Service V6.0 Product package for stand-alone users for servicing, with • SIMATIC PDM Basic V6.0 • 128 TAGs 6 languages (German, English, French, Italian, Spanish, Chinese), software class A, executes with Windows 2000 Professional or Windows XP Professional, floating license for 1 user Type of delivery: License key disk, certificate of license including terms and conditions; software SIMATIC PDM V6.0 and device library on CD/DVD	**6ES7 658-3JX06-0YA5**
SIMATIC PDM S7 V6.0 Product package for use in a SIMATIC S7 configuration environment, with • SIMATIC PDM Basic V6.0 • Integration in STEP 7 / PCS 7 • 128 TAGs 6 languages (German, English, French, Italian, Spanish, Chinese), software class A, executes with Windows 2000 Professional or Windows XP Professional, floating license for 1 user Type of delivery: License key disk, certificate of license including terms and conditions; software SIMATIC PDM V6.0 and device library on CD/DVD	**6ES7 658-3KX06-0YA5**

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Ordering data	Order No.
Optional product components for SIMATIC PDM V6.0	
Integration in STEP 7 / SIMATIC PCS 7 only required for integration of SIMATIC PDM into HW Config 6 languages (German, English, French, Italian, Spanish, Chinese), software class A, executes with Windows 2000 Professional or Windows XP Professional, floating license for 1 user Type of delivery: License key disk, certificate of license including terms and conditions	**6ES7 658-3BX06-2YB5**
Routing via S7-400 6 languages (German, English, French, Italian, Spanish, Chinese), software class A, executes with Windows 2000 Professional or Windows XP Professional, floating license for 1 user Type of delivery: License key disk, certificate of license including terms and conditions	**6ES7 658-3CX06-2YB5**
Communication via standard HART multiplexer 6 languages (German, English, French, Italian, Spanish, Chinese), software class A, executes with Windows 2000 Professional or Windows XP Professional, floating license for 1 user Type of delivery: License key disk, certificate of license including terms and conditions	**6ES7 658-3EX06-2YB5**

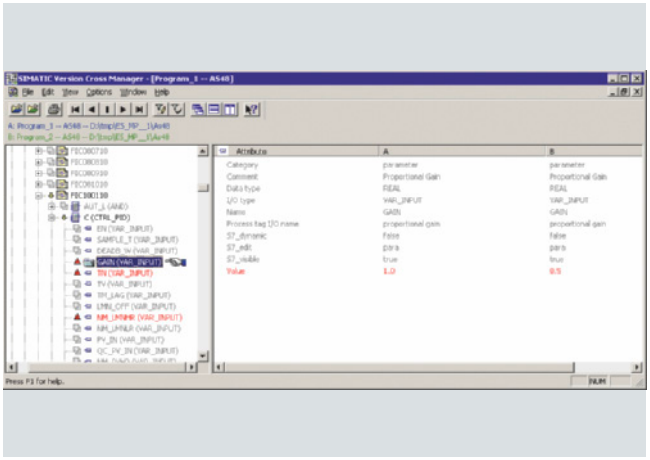
	Order No.
TAG options/PowerPacks for SIMATIC PDM V6.0	
SIMATIC PDM TAG option for TAG expansion, additive to SIMATIC PDM Basic V6.0 6 languages (German, English, French, Italian, Spanish, Chinese), software class A, executes with Windows 2000 Professional or Windows XP Professional, floating license for 1 user Type of delivery: License key disk, certificate of license including terms and conditions	
• Up to 128 TAGs	**6ES7 658-3XA06-2YB5**
• Up to 512 TAGs	**6ES7 658-3XB06-2YB5**
• Up to 1 024 TAGs	**6ES7 658-3XC06-2YB5**
• Up to 2 048 TAGs	**6ES7 658-3XD06-2YB5**
SIMATIC PDM PowerPack for TAG expansion, for any SIMATIC PDM V6.0 product packages 6 languages (German, English, French, Italian, Spanish, Chinese), software class A, executes with Windows 2000 Professional or Windows XP Professional, floating license for 1 user Type of delivery: License key disk, certificate of license including terms and conditions	
• From 128 TAGs to 512 TAGs	**6ES7 658-3XB06-2YD5**
• From 512 TAGs to 1 024 TAGs	**6ES7 658-3XC06-2YD5**
• From 1 024 TAGs to 2 048 TAGs	**6ES7 658-3XD06-2YD5**
• From 2 048 TAGs to unlimited number of TAGs	**6ES7 658-3XH06-2YD5**
Demonstration software	
SIMATIC PDM Demo V6.0 without online communication and storage functionality 6 languages (German, English, French, Italian, Spanish, Chinese), software class A, executes with Windows 2000 Professional or Windows XP professional Type of delivery: SIMATIC PDM V6.0 software and device library on CD/DVD	**6ES7 658-3GX06-0YC8**

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Software for joint tasks in the administration sector

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:

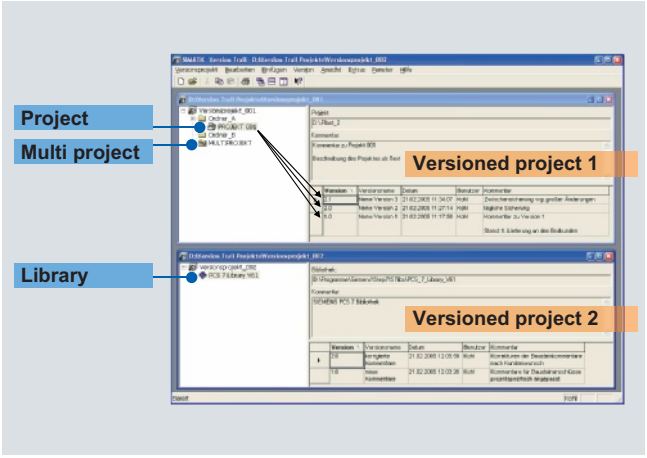
- Tracing missing, additional or differing objects by comparing hardware configuration, communication, technological hierarchy, CFC/SFC charts, SFC details, block types, alarms, global variables, signals and run sequences
- Graphic display of comparison results in a combination of tree and tabular formats
- Clear hierarchical structuring according to the technological hierarchy of the plant
- Color-coded identification of the differences

Ordering data

	Order No.
SIMATIC Version Cross Manager V7.1 6 languages (German, English, French, Italian, Spanish, Chinese), software class A, executes with Windows 2000 Professional SP4, Windows XP Professional SP3, Windows Server 2003 R2 SP2, Windows Vista SP2 32 bit, Windows 7 32 bit; floating license for 1 user Type of delivery: License key memory stick, certificate of license including terms and conditions as well as TIA Engineering Toolset CDs V7.1	**6ES7 658-1CX17-2YA5**

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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.

Ordering data

Ordering data	Order No.
SIMATIC Version Trail V7.1 6 languages (German, English, French, Italian, Spanish, Chinese), software class A, executes with Windows 2000 Professional SP4, Windows XP Professional SP3, Windows Server 2003 R2 SP2, Windows Vista SP2 32 bit, Windows 7 32 bit; floating license for 1 user Type of delivery: License key memory stick, certificate of license including terms and conditions as well as TIA Engineering Toolset CDs V7.1	**6ES7 658-1FX17-2YA5**

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Software for joint tasks in the administration sector

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		
For PC/PG with Windows XP		
• Single license with CD-ROM of current software version		**6BQ3 030-1AA30-3AD0**
• Trial license with CD-ROM of current software version		**6BQ3 030-1AA70-3AD0**
• Single user upgrade		**6BQ3 030-1AB13-3AD0**
ADDM Client		
For PC/PG with Windows XP		
• Single license without data carrier	D	**6BQ3 030-1AA20-1AC0**
• Single license with CD-ROM of current software version		**6BQ3 030-1AA10-0AD0**
• Client upgrade from V5.x to V6.2 with CD-ROM		**6BQ3 030-1AB11-3AD0**
ADDM Server		
For server PC with Windows XP and Windows 2003 Server		
• Single license with CD-ROM of current software version		**6BQ3 030-1AA00-3AD0**
• Server upgrade from V5.x to V6.2 with CD-ROM		**6BQ3 030-1AB10-3AD0**
ADDM Agent		
For SINUMERIK PCU with HMI-Advanced		
• Single license without data carrier	D	**6BQ3 030-1AA00-1AB0**
• Single license with CD-ROM of current software version		**6BQ3 030-4AA00-0AD0**
• Agent upgrade from V1.x to V1.3 with CD-ROM		**6BQ3 030-1AB12-3AD0**

D: Subject to export regulations AL: N and ECCN: 5D992

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Overview



- Software for SIMATIC S7 communication with components of a building automation unit
- For use of industry automation components in building automation
- Allows the integration of actuators/sensors on a KNX/EIB bus in automation solutions with SIMATIC S7
- For the use of information from building automation for the automation of a production plant

Ordering data

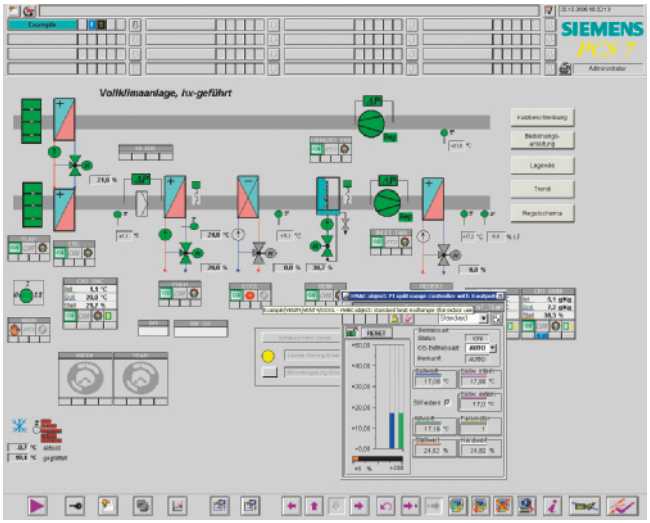
		Order No.
KNX/EIB2S7 program package Task: Software for connecting KNX/EIB building technology components to SIMATIC S7; Type of delivery: Editor, function blocks for SIMATIC S7, samples, documentation on C; license for editor on USB flash memory	J	**6AV6 643-7AC10-0AA1**

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

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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 processing units with Micro Memory Card (CPU 313 or higher)
- 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:

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
Operator control and monitoring	
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 systems	
• 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 to unlimited data points	**6FL4 214-4ND44-0AD0**
• Powerpack for 1 SIMATIC-CPU; 40 to unlimited data points	**6FL4 214-4ND45-0AD0**

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SIMATIC programming devices

12



12/2 **Programming devices**
12/2 Field PG M3

12/6 **Accessories**
12/6 External prommer

12/7 **Communication software**
12/7 SOFTNET for PROFIBUS
12/9 SOFTNET for Industrial Ethernet
12/11 SOFTNET PN IO
12/13 OPC server for Industrial Ethernet
12/15 SNMP OPC server

Brochures

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

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

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Field PG M3

Overview



- The mobile, industry-compatible programming device with powerful Intel Core i processor technology.
- Optimal for commissioning, service and maintenance of automation systems.
- Industrial notebook with wireless technology, large 15.6" widescreen display, long battery service life, high-speed RAM, and integral data backup concept.
- With all commonly used interfaces for industrial applications.

Technical specifications

	SIMATIC Field PG M3
General features	
Design	Notebook
Processor	• Intel P4500 Processor (1.86 GHz, 2 MB Cache) • Intel CORE i5-520M processor (2.40 GHz, 3 MB cache)
RAM	Expandable up to 8 GB DDR3 SODIMM
Free slots for expansions	• 1 x PC Card (Type I, Type II) • 1 x Express Card (34 and 54 mm)
Graphics	Intel HD Graphics with Dual View (e.g. desktop across 2 screens)
Display	15.6" widescreen display, 16:9 format • 1366 x 768 (HD ready) • 1920 x 1080 (full HD)
Speakers	Built-in stereo speakers
Pointing device	Touchpad with 2 mouse buttons
Operating system	Windows XP Prof. SP3 Engl. MUI (Eng, Ger, Fr, Sp, It; additional languages can be installed later)
Power supply	Wide-range power supply unit 100-240 V AC, 50-60 Hz, high-power lithium-ion battery 71 Wh (running time up to 3 hours)
Warranty conditions	24 months for hardware components (6 months for battery[1])
Drives	
Hard disk	2.5" serial ATA with 250 GB or 500 GB; easily replaceable
Optical drive	Multistandard DVD+-R/+-RW

	SIMATIC Field PG M3
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; TTY as optional version); over supplied adapter on 9-pin sub-D male connector
SIMATIC Memory Card	Programming interface for SIMATIC Memory Card and S5 memory module (S5 EPROM module as optional equipment version)
SIMATIC Micro Memory Card	Interface for SIMATIC Micro Memory Card
Media Card Reader	Interface for SMC (SIMATIC Memory Card) SD/SHC xD-Picture Card MS Pro
Ethernet	2 x Gigabit Ethernet (RJ45)
USB 2.0	5 interfaces for high-speed universal serial bus. Max. 2 high current (500 mA); for each interface block, only 1 interface can be used for high current
PC Card (PCMCIA)/ Express Card/54	• 1 x PC Card (Type I, Type II) • 1 x Express Card (34 and 54 mm)
DVI-I	1 interface for external monitor (VGA monitors can be operated with a DVI/VGA adapter)
WLAN[2]	Integrated IEEE802.11 a, b, g, n
Modem	Analog, V.92 compatible
Headphones/microphone	Connection in each case for 3.5 mm stereo jack

[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.

[2] Integral WLAN with antennas specially designed for the Field PG M3. The integral wireless LAN is approved for operation in Europe (CE), USA (FCC), Canada (IC) and China (CCC). For operation outside these countries, the relevant national regulations must be observed.

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Technical specifications (continued)

	SIMATIC Field PG M3
Ambient conditions	
Degree of protection in accordance with IEC 60529	Front IP30 when covers closed
Vibrations	Tested in accordance with 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
Resistance to 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)	
• Radiated interference	EN 61000-6-3:2007, EN 61000-3-2 Class D and EN 61000-3-3
• Immunity to conducted interference on the supply lines	± 2 kV; (according to IEC 61000-4-4; burst) ± 1 kV; (according to IEC 61000-4-5; surge sym./line to line) ± 2 kV; (according to IEC 61000-4-5; surge sym./line to ground)
• Noise immunity on signal lines	± 1 kV; (according to IEC 61000-4-4; burst; length < 30 m) ± 2 kV; (according to IEC 61000-4-4; burst; length > 30 m) ± 2 kV; (according to IEC 61000-4-5; surge sym./line to ground; length > 30 m)
• Immunity to static discharge	± 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 radio frequency interference	10 V (with modem operation max. 3 V), with 80% amplitude modulation with 1 kHz, 10 kHz ... 80 MHz (in accordance with IEC 61000-4-6) 10 V/m (with modem operation max. 3 V/m), with 80% amplitude modulation with 1 kHz, 80 MHz ... 1000 MHz and 1.4 GHz ... 2 GHz (in accordance with IEC 61000-4-3) 1 V/m, with 80% amplitude modulation with 1 kHz, 2.0 GHz ... 2.7 GHz 1 V/m (in accordance with IEC 61000-4-3)
• Immunity to magnetic fields	100 A/m; 50/60 Hz (in accordance with IEC 61000-4-8)

	SIMATIC Field PG M3
Temperature	Tested in accordance with IEC 60068-2-1, IEC 60068-2-2
• Operation[3)]	+ 5 °C ... + 40 °C max. 10°C/h (no condensation)
• Storage/transport	- 20 °C ... + 60 °C max. 20°C/h (no condensation)
Relative humidity	Tested according to IEC 60068-2-78, IEC 60068-2-30, IEC 60068-2-14
• Operation	5 % ... 80% at 25°C/h (no condensation)
• Storage/transport	5 % ... 95% at 25°C/h (no condensation)
Safety	
Safety class	Safety class II according to IEC 61140
Safety regulations	• According to VDE 0805 in conformance with IEC 60950-1:2006 • IEC 60950-1:2005 • EN 60950-1:2006 with change EN 60950-1:2006/A11:2009 • EN 60950-1 (VDE 0805-1):2006-11 with change EN 60950-1/A11 (VDE0805-1/A11):2009-11 • UL 60950-1 Second Edition • CAN/CSA-C22.2 No. 60950-1-07 Second Edition
Dimensions and weights	
Dimensions (W x H x D) in mm	385 x 53 x 275
Weight, approx.	Without battery approx. 3 kg With battery approx. 3.4 kg

3) Battery charging and CD/DVD writing is only possible at temperatures up to 35 °C

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Field PG M3

Ordering Data

		Order No.
Field PG M3 programming device		
Field PG M3 standard: Intel P4500 processor, 1.86 GHz, DL multistandard DVD RW drive, 250 GB S-ATA hard disk, 1x 2 GB DDR3 RAM; no S5 interface/S5 PROMMER	D	**6ES7 715-0AA ■■ - 0 ■■ 1**
Field PG M3 Premium: Intel Core i5 processor, 2.4 GHz, DL Multistandard DVD RW drive, 500 GB S-ATA hard disk, 3 GB DDR3 RAM (1x 1 GB, 1x 2 GB); no S5 interface/S5 PROMMER	D	**6ES7 715-1BB ■■ - 0 ■■ 1**
Field PG M3 Premium/S5: Intel Core i5 processor, 2.4 GHz, DL Multistandard DVD RW drive, 500 GB S-ATA hard disk, 3 GB DDR3 RAM (1x 1 GB, 1x 2 GB); with S5 online interface/ S5 EPROMMER, incl. S5 PLC cable and S5 EPROM adapter	D	**6ES7 715-1CC ■■ - 0 ■■ 1**
Display		
• 15.6" display, HD ready (1366 x 768)		**0**
• 15.6" display, full HD (1920 x 1080)		**2**
Keyboard and power cable (absolutely necessary)		
• Keyboard: QWERTY (& German); power plug: EC, Switzerland, without UK; approvals for Europe (CE)		**0**
• Keyboard: QWERTY (& German); power plug: United Kingdom; approvals for Europe (CE)		**1**
• Keyboard: QWERTY (& German); power plug: USA, Canada; approvals for USA and Canada (FCC, IC)		**2**
• Keyboard: QWERTY (& German); power plug: China; approvals for China (CCC)		**3**
• Keyboard: AZERTY; power plug: EC, Switzerland, without UK approvals for Europe (CE)		**4**
Operating system		
• Windows XP Professional SP3 English MUI (Fr., Span., Ital., Ger.; image stored on HD, other language packages available for downloading)		**A**
• Windows 7 Ultimate, 32-bit (Eng, Ger., Fr., Sp., It. selectable); STEP 5 and STEP 7-Micro/Win are not pre-installed and do not run under Windows 7		**B**

		Order No.
Field PG M3 programming device		
Field PG M3 Standard	D	**6ES7 715-0AA ■■ - 0 ■■ 1**
Field PG M3 Premium	D	**6ES7 715-1BB ■■ - 0 ■■ 1**
Field PG M3 Premium /S5	D	**6ES7 715-1CC ■■ - 0 ■■ 1**
Licenses for the SIMATIC software		
• Trial license for STEP 7 Professional, WinCC flexible Advanced; without MPI cable		**A**
• Upgrade license STEP 7 Professional, STEP 5, WinCC flexible Advanced (requires license for STEP 7 Prof./STEP 5 (at least V3.0)); incl. MPI cable		**B**
• Powerpack license STEP 7 Professional, upgrade license STEP 5 and WinCC flexible Advanced (requires license for STEP 7/ STEP 5 (at least V3.0)); incl. MPI cable		**C**
• License for STEP 7 Professional, STEP 7 Basic, STEP 5, STEP 7-Micro/WIN, WinCC flexible Advanced; incl. MPI cable		**D**
• License for STEP 7 Professional, STEP 7 Basic, STEP 7 Micro/ WIN, WinCC flexible Advanced; incl. MPI cable		**E**
Accessories		
Memory expansion		
1 GB DDR3 RAM 1066 MHz	I	**6ES7 648-2AH40-0KA0**
2 GB DDR3 RAM 1066 MHz	I	**6ES7 648-2AH50-0KA0**
USB mouse (PS/2-compatible)	I	**6ES7 790-0AA01-0XA0**
AC/DC external power supply unit	I	**6ES7 798-0GA02-0XA0**
For Field PG M3 only		
Power cable (length 3 m)		
For Field PG M3 only		
For EC, Switzerland, without UK		**6ES7 900-5AA01-0XA0**
For Great Britain		**6ES7 900-5BA01-0XA0**
For the USA and Canada		**6ES7 900-5DA01-0XA0**
For China		**6ES7 900-5FA01-0XA0**
Spare battery (lithium ion, 6.6 Ah)[1)]	I	**6ES7 798-0AA06-0XA0**
For Field PG M3 only		
MPI cable		**6ES7 901-0BF00-0AA0**
for connecting a PG and SIMATIC S7 via MPI; 5 m		

D: Subject to export regulations AL: N and ECCN: 5D992

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

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.

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Ordering data

		Order No.
S5 EPROM programming adapter for SIMATIC S5 EPROM programming using the Field PG		**6ES7 798-0CA00-0XA0**
S5 PLC cable For connecting programming devices to SIMATIC S5 PLCs, 5 m		**6ES5 734-2BF00**
Hard disk kit Replaceable hard disk 500 GB serial ATA; with protective pocket and Torx screwdriver; for Field PG M3 only	G	**6ES7 791-2BA01-0AA0**
Adapter serial ATA to USB For using the replaceable hard disk of the hard disk kit as an external hard disk (for Field PG M/M2 or M3 only)	I	**6ES7 790-1AA00-0AA0**
Backpack for Field PG M3		**6ES7 798-0DA01-0XA0**

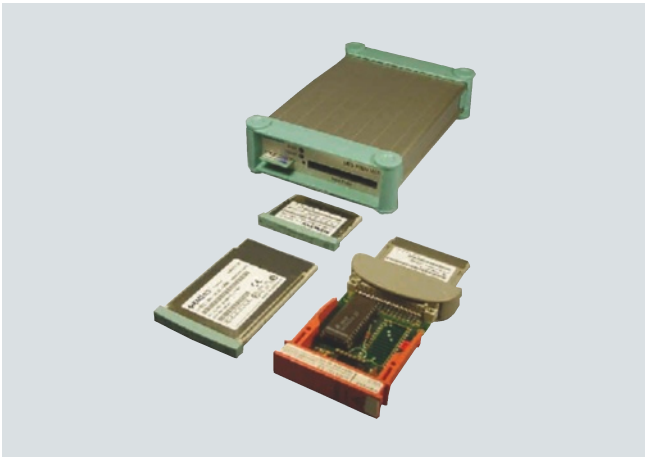
G: Subject to export regulations AL: N and ECCN: EAR99APP
I: Subject to export regulations AL: N and ECCN: EAR99H

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Accessories

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

Technical specifications

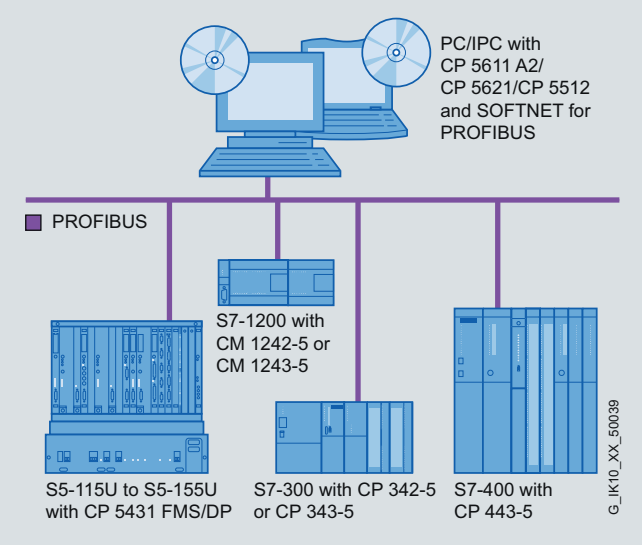
	6ES7 792-0AA00-0XA0
Power supply	
Description	90 to 264 V; 47 to 63 Hz; wide range power supply unit
Operator control and monitoring	
Display	
• Design of display	without
Environmental requirements	
Operating temperature	
• Min.	5 °C
• Max.	40 °C
Storage/transport temperature	
• Min.	-20 °C
• Max.	60 °C
Dimensions and weight	
Dimensions	
• Width	172 mm
• Height	40 mm
• Depth	121 mm
Weight	
• Weight, approx.	400 g

Ordering data

	Order No.
EPROM programming device USB prommer for programming SIMATIC memory cards and EPROM modules	**6ES7 792-0AA00-0XA0**

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Overview



DP-M	DP-S	FMS	OPC	PG/OP	S7/S5
●	●		●	●	●

- Software for coupling PGs/PCs 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 delivery of the respective communication software

Technical specifications

Performance data	CP 5611 A2/CP 5711/CP 5621/ CP 5512
Mono protocol mode	
Number of connectable DP slaves	max. 60
Number of FDL tasks waiting	max. 50
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

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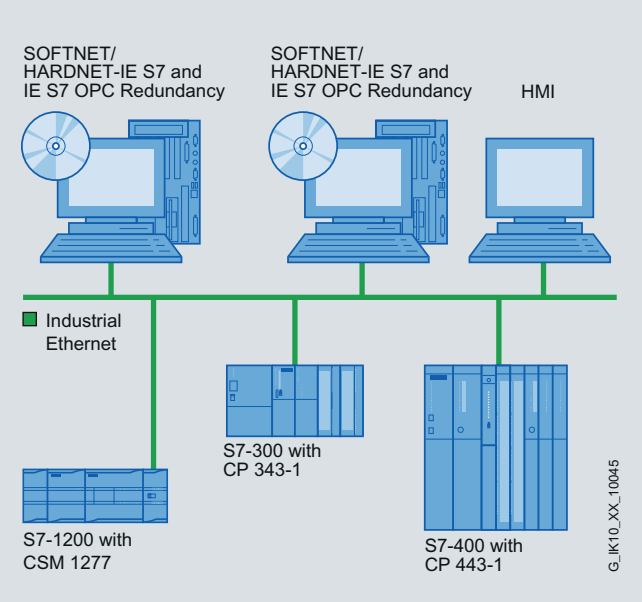
SOFTNET for PROFIBUS

Ordering data		Order No.
SOFTNET-PB S7		
Software for S7 communication, incl. FDL protocol with OPC server and NCM-PC, runtime software, software and electronic manual on CD-ROM, license key on USB flash drive, Class A; for CP 5611 A2, CP 5711, CP 5621;		
SOFTNET-PB S7 V8.1		
for 32/64 bit: Windows 7 Professional/Ultimate; for 64 bit: Windows 2008 Server R2; English/German		
• Single license for 1 installation		**6GK1 704-5CW80-3AA0**
SOFTNET-S7 Edition 2008		
for 32 bit Windows XP Professional SP2/3; Windows 2003 Server R2, SP2; Windows Vista Business/ Ultimate SP1; Windows 2008 Server; English/German		
• Single license for 1 installation	D	**6GK1 704-5DW08-1AA0**
Software Update		
• Software Update Service for 1 year, with automatic extension; requirement: Current software version		**6GK1 704-5CW00-3AL0**
• Upgrade SOFTNET-S7, Edition 2006 or higher, to SOFTNET-S7 Edition 2008/V8.1		**6GK1 704-5CW00-3AE0**
• Upgrade SOFTNET-S7 from V6.0, V6.1, V6.2 or V6.3 to SOFTNET-S7 Edition 2008/V8.1		**6GK1 704-5CW00-3AE1**
SOFTNET-PB DP		
Software for DP protocol (master class 1 and 2), incl. FDL protocol with OPC server and NCM PC, runtime software, software and electronic manual on CD-ROM, license key on USB flash drive; for CP 5611 A2, CP 5711, CP 5621;		
SOFTNET-PB DP V8.1		
for 32/64 bit: Windows 7 Professional/Ultimate; for 64 Bit; Windows 2008 Server R2; English/German		
• Single license for 1 installation	D	**6GK1 704-5DW08-1AA0**
SOFTNET-DP Edition 2008		
for Windows XP Professional SP2/ 3; Windows 2003 Server R2, SP2; Windows Vista Business/Ultimate SP1; Windows 2008 Server; English/German		
• Single license for 1 installation		**6GK1 704-5DW71-3AA0**
Software Update		
• Software Update Service for 1 year, with automatic extension; requirement: Current software version		**6GK1 704-5DW00-3AL0**
• Upgrade SOFTNET-DP, Edition 2006 or higher, to SOFTNET-DP Edition 2008/V8.1		**6GK1 704-5DW00-3AE0**
• Upgrade SOFTNET-DP from V6.0, V6.1, V6.2 or V6.3 to SOFTNET-DP Edition 2008/V8.1		**6GK1 704-5DW00-3AE1**
SOFTNET-PB DP slave		
Software for DP slave, with DP OPC server and NCM PC, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on USB flash drive, Class A; for CP 5611 A2, CP 5711, CP 5621;		
SOFTNET-DP Slave V8.1		
for 32/64 bit: Windows 7 Professional/Ultimate; for 64 bit: Windows 2008 Server R2 English/German		
• Single license for 1 installation	D	**6GK1 704-5SW08-1AA0**
SOFTNET-DP Slave Edition 2008		
for 32 bit Windows XP Professional SP2/3; Windows 2003 Server R2, SP2; Windows Vista Business/ Ultimate SP1; Windows 2008 Server; English/German		
• Single license for 1 installation		**6GK1 704-5SW71-3AA0**
Software Update		
• Software Update Service for 1 year, with automatic extension; requirement: Current software version		**6GK1 704-5SW00-3AL0**
• Upgrade SOFTNET-DP Slave, Edition 2006 or higher, to SOFTNET-DP Slave Edition 2008/ V8.1		**6GK1 704-5SW00-3AE0**
• Upgrade SOFTNET-DP Slave from V6.0, V6.1, V6.2 or V6.3 to SOFTNET-DP Slave Edition 2008/ V8.1		**6GK1 704-5SW00-3AE1**

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Overview



System configuration SOFTNET for Industrial Ethernet

ISO	TCP/ UDP	PN	MRP	OPC	PG/OP	S7/S5	IT
●	●			●	●	●	

- For coupling PGs/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/PCIe)
  - Integrated Industrial Ethernet interface, e.g. CP 1612 A2
  - 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 delivery of the respective communication software

Technical specifications

Performance data	
S7 and PG/OP communication (number of operable connections)	
• SOFTNET-S7	max. 64
• SOFTNET-S7 Lean	max. 8

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SOFTNET for Industrial Ethernet

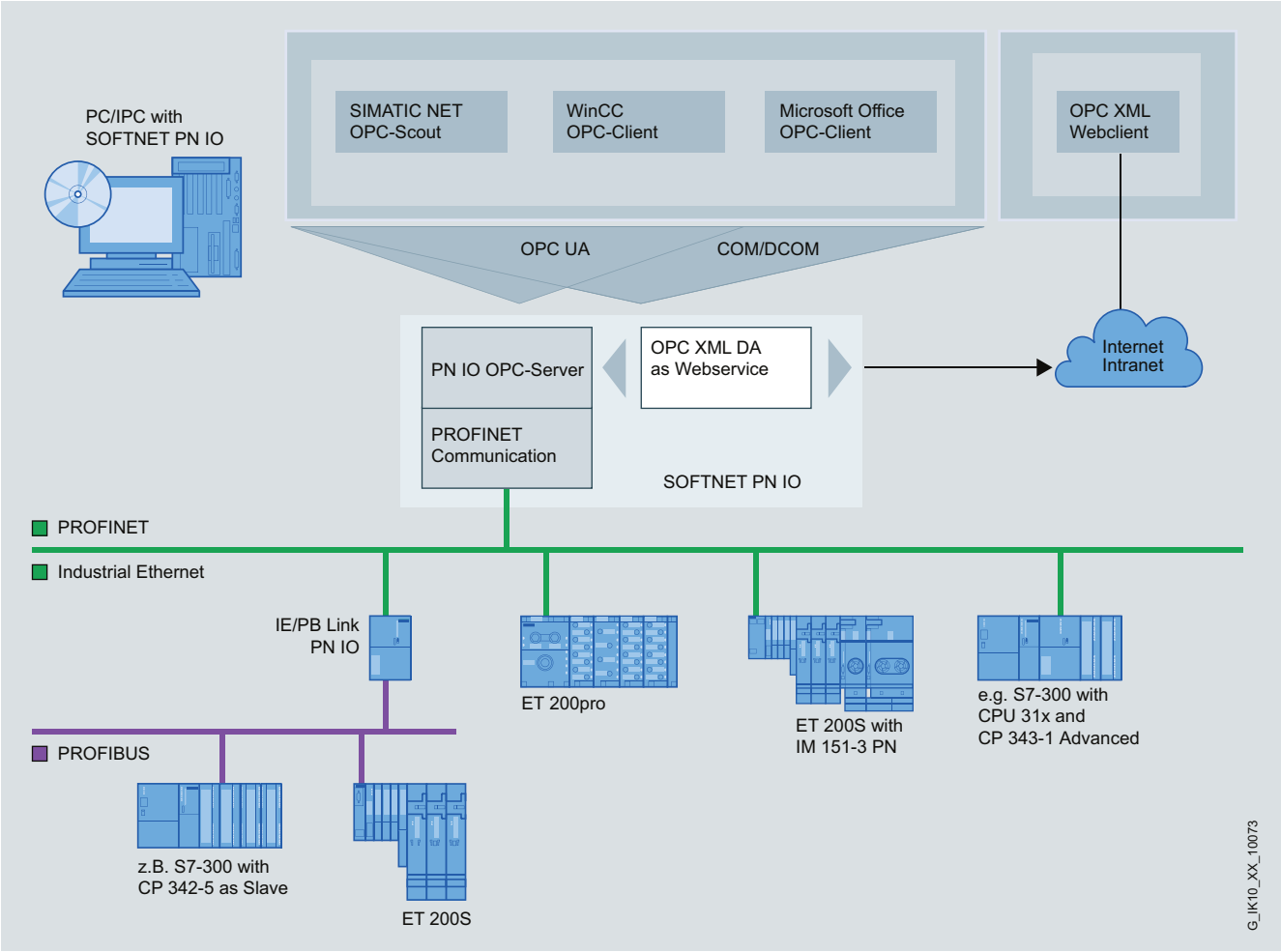
Ordering data		Order No.
SOFTNET S7 for Industrial Ethernet		
Software for S7 and open communication, incl. OPC server, PG/OP communication, and NCM PC, runtime software, software and electronic manual on CD-ROM, license key on USB flash drive, Class A		
SOFTNET-IE S7 V8.1		
for 32/64 bit: Windows 7 Professional/Ultimate; for 64 bit: Windows 2008 server R2; English/German		
up to 64 connections		
• Single license for 1 installation	D	**6GK1 704-1CW08-1AA0**
SOFTNET Edition 2008 for Industrial Ethernet		
for 32 bit Windows XP Professional SP2/3; Windows 2003 Server R2, SP2; Windows Vista Business/Ultimate SP1; Windows 2008 Server; English/German		
up to 64 connections		
• Single license for 1 installation		**6GK1 704-1CW71-3AA0**
Software Update		
• Software Update Service for 1 year, with automatic extension; requirements: Current software version		**6GK1 704-1CW00-3AL0**
• Upgrade from Edition 2006 and higher to Edition 2008 or V8.1		**6GK1 704-1CW00-3AE0**
• Upgrade from V6.0, V6.1, V6.2 or V6.3 to Edition 2008 or V8.1		**6GK1 704-1CW00-3AE1**
SOFTNET-IE S7 Lean V8.1		
up to 8 connections		
• Single license for 1 installation	D	**6GK1 704-1LW08-1AA0**
SOFTNET-S7 Lean Edition 2008 for Industrial Ethernet		
up to 8 connections		
• Single license for 1 installation		**6GK1 704-1LW71-3AA0**
Software Update		
• Software Update Service for 1 year, with automatic extension; requirements: current software version		**6GK1 704-1LW00-3AL0**
• Upgrade from Edition 2006 and higher to Edition 2008 or V8.1		**6GK1 704-1LW00-3AE0**
• Upgrade from V6.0, V6.1, V6.2 or V6.3 to Edition 2008 or V8.1		**6GK1 704-1LW00-3AE1**

		Order No.
SOFTNET-PG for Industrial Ethernet		
Software for PG/OP communication, runtime software, software and electronic manual on CD-ROM, license key on USB flash drive, Class A		
SOFTNET-IE PG V8.1		
for 32/64 bit: Windows 7 Professional/Ultimate; for 64 bit: Windows 2008 Server R2; English/German		
• Single license for 1 installation	D	**6GK1 704-1PW08-1AA0**
SOFTNET-PG Edition 2008 for Industrial Ethernet		
for 32 bit Windows XP Professional SP2/3; Windows 2003 Server R2, SP2; Windows Vista Business/Ultimate SP1; Windows 2008 Server; English/German		
• Single license for 1 installation		**6GK1 704-1PW71-3AA0**
Software Update		
• Software Update Service for 1 year, with automatic extension; requirement: Current software version		**6GK1 704-1PW00-3AL0**
• Upgrade from Edition 2006 and higher to Edition 2008 or V8.1		**6GK1 704-1PW00-3AE0**
• Upgrade from V6.0, V6.1, V6.2 or V6.3 to Edition 2008 or V8.1		**6GK1 704-1PW00-3AE1**
IE S7 OPC Redundancy		
Software for redundant OPC server in the field of industrial ethernet software S7 products, runtime software, software and electronic manual on CD-ROM, license key on USB flash drive, class A		
IE S7 OPC Redundancy V8.1		
for 64 bit: Windows 2008 Server R2; English/German		
• Single license for 1 installation	D	**6GK1 706-1CW08-1AA0**
Software Update		
• Software update service for 1 year, with automatic extension; requirements: current software version		**6GK1 706-1CW00-3AL0**

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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 delivery

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SOFTNET PN IO

Technical specifications

	SOFTNET PN IO
Performance data	
• Number of operable IO devices	max. 64
• Number of external IO-lines in one central rack	max. 1
• Size of IO data areas overall	
- I/O input area	max. 2 KB
- 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

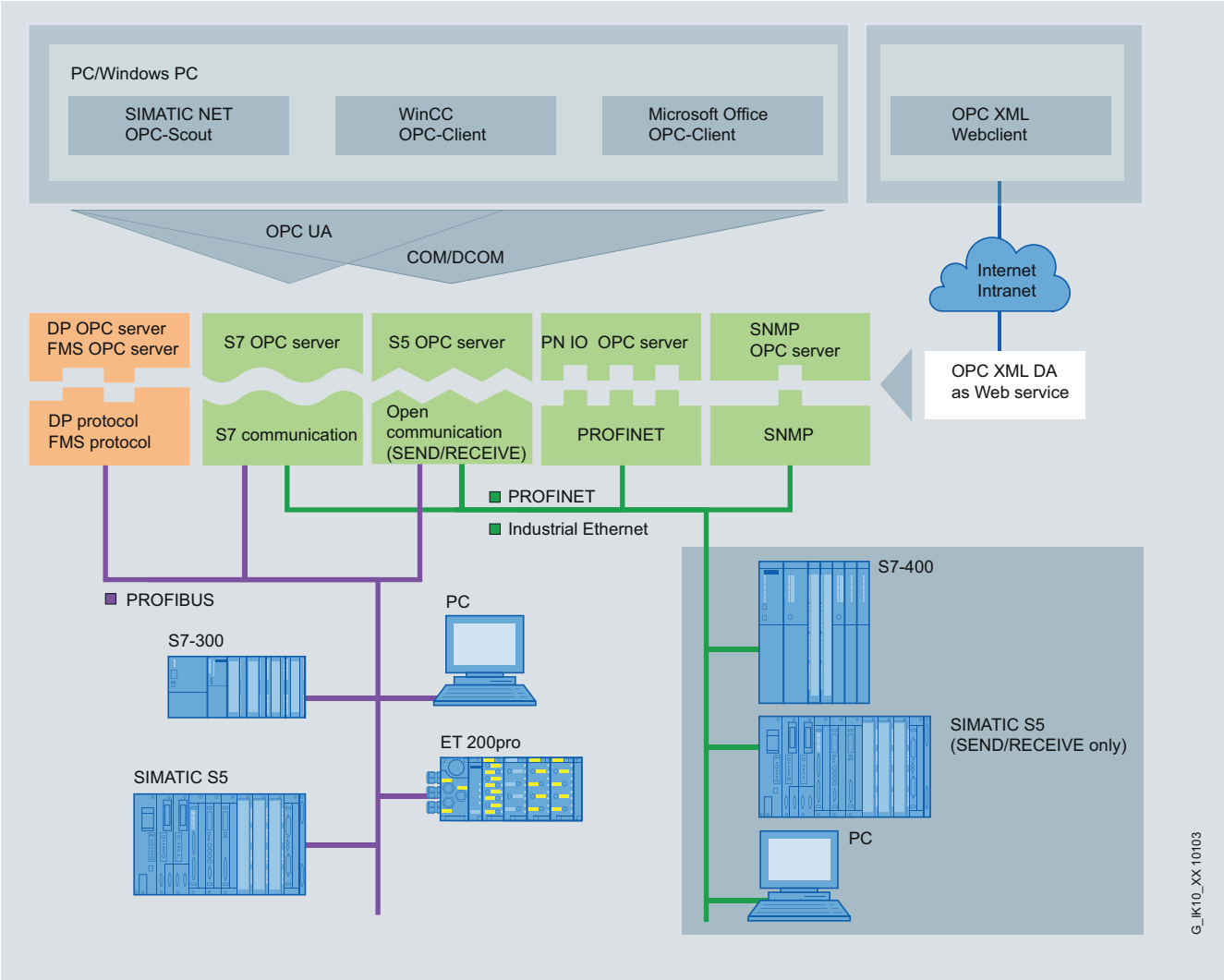
Ordering data

	Order No.
SOFTNET PN IO	
Software for PROFINET IO Controller with OPC server and NCM PC, runtime software, software and electronic manual on CD-ROM, license key on USB flash drive, Class A,	
SOFTNET-IE PN IO V8.1	
for 32/64 bit: Windows 7 Professional/Ultimate; for 64 bit: Windows 2008 server R2; English/German	
• Single License for 1 installation D	**6GK1 704-1HW08-1AA0**
SOFTNET PN IO Edition 2008	
for 32 bit Windows XP Professional SP 2/3; Windows 2003 Server R2, SP2; Windows Vista Business/ Ultimate SP1; Windows 2008 Server; English/German	
• Single license for one installation	**6GK1 704-1HW71-3AA0**
Software Update	
• Software Update Service for 1 year, with automatic extension; requirements: current software version	**6GK1 704-1HW00-3AL0**
• Upgrade SOFTNET PN IO Edition 2006 or higher to SOFTNET PN IO Edition 2008 or V8.1	**6GK1 704-1HW00-3AE0**
• Upgrade SOFTNET PN IO from V6.0, V6.1, V6.2 or V6.3 to SOFTNET PN IO Edition 2008 or V8.1	**6GK1 704-1HW00-3AE1**

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Overview



System integration with OPC server

OPC (Openness, Productivity & Collaboration) is a standardized, open, and multi-vendor interface and is widely used in automation engineering.

Currently it is differentiated between classic OPC and its consistent further development, OPC UA (Unified Architecture). A smooth migration to the new standard OPC UA, which provides added value such as security, is possible without problems. The SIMATIC NET OPC servers offer (currently for S7 and PROFINET) both interfaces, OPC UA and classic OPC.

- The appropriate OPC servers are included in the scope of delivery 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.
- Increased availability due to additional option packages such as OPC server redundancy
- OPC Scout with browser functionality as an OPC client and OCX Data Control/.NET Data Control for simple OPC client creation

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OPC server for Industrial Ethernet

Technical specifications

Programming	• Synchronous and asynchronous reading and writing of variables • Monitoring of variables using the OPC server with a signal to the client when a change occurs • Use of quantity operations; so a large amount of data can be processed in a short time.
Interfaces	• Custom Interface (C++, NET) for high OPC performance • Automation Interface (VB, Excel, Access, Delphi, ...) for ease-of-use • Graphics with OCX or .NET Data Control; for configuring instead of programming • OPC XML-Interface for Data Access

Products	include OPC servers for:
Industrial Ethernet	
• S7-1613, SOFTNET-S7 for Industrial Ethernet, SOFTNET-S7 Lean	S7-OPC server for S7 communication, XML-DA S5-OPC server for open communication[1] communication, XML-DA SNMP OPC server for SNMP protocol access; XML-DA
• IE S7 OPC Redundancy	Redundant S7-OPC server for S7 communication
PROFINET	
• SOFTNET PN IO	PN IO OPC server for PROFINET IO communication; XML-DA
• PN CBA OPC server	PN CBA OPC server for access to CBA components; XML-DA
PROFIBUS	
• DP-5613, SOFTNET-DP, SOFTNET-DP slave	DP-OPC server for PROFIBUS DP communication; XML-DA
• FMS-5613	FMS-OPC server for PROFIBUS FMS communication; XML-DA
• DP-5613 SOFTNET-PB S7	S7-OPC server for S7 communication, XML-DA
• PB S7 OPC Redundancy	Redundant S7-OPC server for S7 communication

[1] also S5-compatible communication

Ordering data

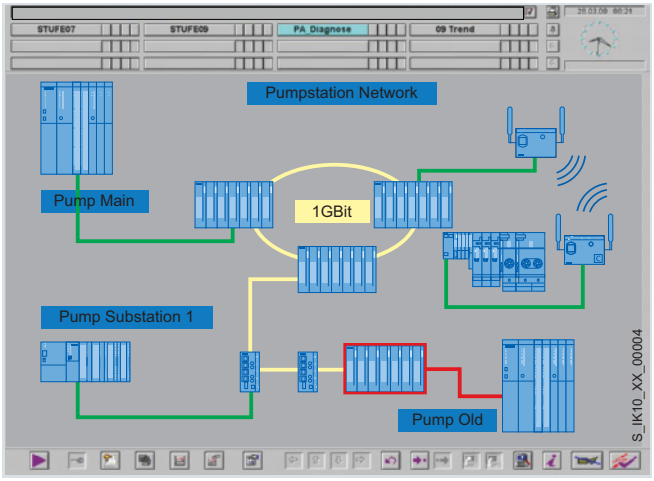
		Order No.
PN CBA OPC Server Edition 2008		
PROFINET OPC server for CBA; runtime software, software and electronic manual on CD-ROM, license key on USB flash drive, Class A, for 32-bit Windows XP Professional SP 2/3; Windows 2003 Server R2, SP2; German/English		
• Single license for 1 installation		**6GK1 706-0HB71-3AA0**
Software update		
• Software update service for 1 year, with automatic extension; requirement: current software version		**6GK1 706-0HB00-3AL0**
• Upgrade from Edition 2006 and higher to Edition 2008, single license		**6GK1 706-0HB00-3AE0**
• Upgrade from V6.0 to Edition 2008, single license		**6GK1 706-0HB00-3AE1**
S7 OPC Redundancy		
Software for redundant OPC server in the field of industrial ethernet software S7 products, runtime software, software and electronic manual on CD-ROM, license key on USB flash drive, class A		
IE S7 OPC Redundancy V8.1		
for 64 bit: Windows 2008 Server R2; English/German		
• Single license for 1 installation	D	**6GK1 706-1CW08-1AA0**
Software update		
• Software update service for 1 year, with automatic extension; requirements: current software version		**6GK1 706-1CW00-3AL0**

D: Subject to export regulations AL: N and ECCN: 5D992

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Overview



- Status monitoring 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
- Configuring with STEP 7 or NCM PC
  - Ready-to-use SNMP diagnostics profiles for SIEMENS devices, e.g. SCALANCE X/W
  - Generation of any SNMP diagnostics profiles by means of the integrated MIB-Compiler
  - Easy setup of the monitored devices using an Autodiscovery function

Ordering Data

		Order No.
SNMP OPC server		
Including MIB compiler; single license for 1 installation of runtime software; software and electronic manual on CD-ROM; license key on USB flash drive, Class A;		
SNMP OPC server Basic		
Administration of up to 20 IP addresses		
• **Basic V8.1** for 32/64 bit: Windows 7 Professional/ Ultimate; for 64 bit: Windows 2008 server R2; Single license for 1 installation	D	**6GK1 706-1NW08-1AA0**
• **Basic 2008** for 32 bit: Windows XP Professional SP2/3; Windows 2003 Server R2, SP2; Windows Vista Business/ Ultimate SP1; Windows 2008 Server; Single license for 1 installation		**6GK1 706-1NW71-3AA0**
Software update		
• Software update service for 1 year, with automatic extension; requirements: current software version		**6GK1 706-1NW00-3AL0**
• Upgrade of SNMP OPC Server Basic, Edition 2006 or higher, to SNMP OPC Server Basic V8.0		**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 V8.0		**6GK1 706-1NW00-3AE1**

		Order No.
SNMP OPC server Extended		
Administration of up to 200 IP addresses		
• **Extended V8.1** for 32/64 bit: Windows 7 Professional/ Ultimate; for 64 bit: Windows 2008 server R2; Single license for 1 installation	D	**6GK1 706-1NX08-1AA0**
• **Extended 2008** for 32 bit: Windows XP Professional SP2/3; Windows 2003 Server R2, SP2; Windows Vista Business/ Ultimate SP1; Windows 2008 Server; Single license for 1 installation		**6GK1 706-1NX71-3AA0**
Software update		
• Software update service for 1 year, with automatic extension; requirement: current software version		**6GK1 706-1NX00-3AL0**
• Upgrade of SNMP OPC Server Extended, Edition 2006 or higher, to SNMP OPC Server Extended Edition 2008		**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 V8.0		**6GK1 706-1NX00-3AE1**
Power Pack		
For upgrade from SNM OPC Server Basic to SNM OPC Server Extended		
• **Power Pack V8.1**		**6GK1 706-1NX08-1AC0**
• **Power Pack Edition 2008**		**6GK1 706-1NX71-3AC0**

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Overviews

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13/2 SIMATIC PCS 7

13/5 SIMATIC HMI

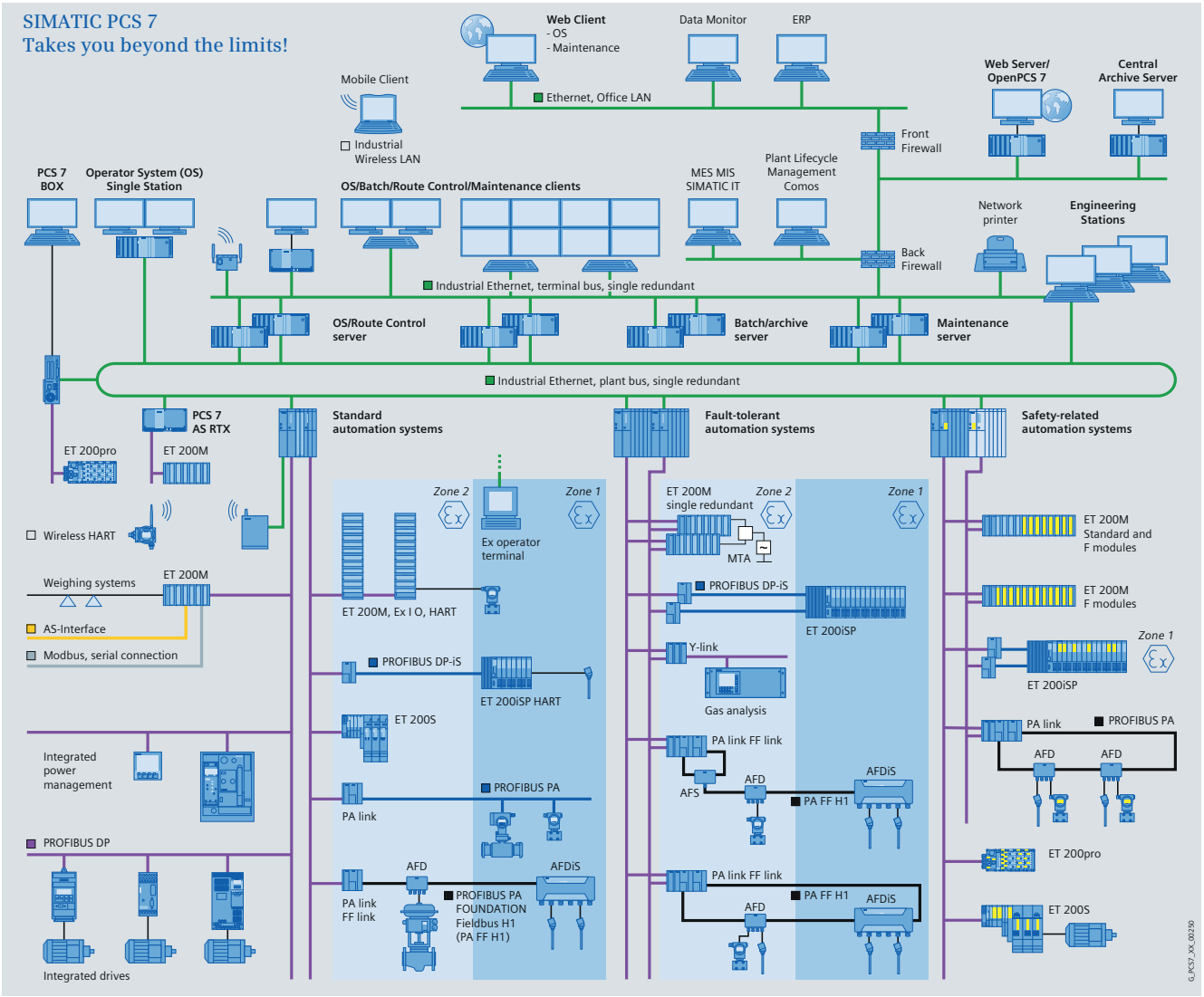
13/10 SIMATIC NET

13/11 SIMATIC Ident

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Introduction

Overview



SIMATIC PCS 7 system architecture

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 platform is suitable for optimization of all the 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.

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

Integrated in a holistic automation solution for the production site, automation of the primary processes is the main 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 manifest during installation and commissioning, everyday operation as well as maintenance, repairs and modernization.

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Overview (continued)

Integrated data management

Integrated 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 ensured even if several persons are working simultaneously on a project. Parameters defined in the engineering system can be transferred beyond network boundaries down to sensors, actuators or drives in the field.

Integrated communication

Uniform communication from the corporate management level down to the field level is based on internationally recognized standards such as Industrial Ethernet, PROFIBUS or FOUNDATION Fieldbus, 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.

Integrated configuration

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.

The SIMATIC PCS 7 Advanced Engineering System expands the functionality for plant configuration. It acts as a link between the standard engineering tools of the engineering system and the tools used for basic and detailed planning, e.g. EPlan, ELCAD or SmartPlant.

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 and 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 due to:

- 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

Essential system properties and functions

In order to survive on a global market which is characterized by fierce competition and pricing pressures, competitors are required to constantly increase their productivity and flexibility. This simultaneously places high demands on the automation technology, which in turn lead to an increasing fusion with information technology.

Bearing in mind these requirements, the advantages of modern process control systems, such as SIMATIC PCS 7 which provides a horizontally and vertically uniform system platform as well as a secure future and can also be expanded flexibly in the context of TIA, become clear.

SIMATIC PCS 7 combines high performance with exceptional system properties and functions such as:

- 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
- Versatility and scalability
- Redundancy at all levels, flexible and modular
- Extensive fieldbus integration
- Remote I/O systems for different demand profiles
- Process device management and diagnostics with comprehensive device support
- Asset management of the process-related plant, in particular the control technology (diagnostics, preventive maintenance, and repairs)
- Flexible solutions for batch processes
- Efficient control of material transport
- Homogenous, integrated safety technology
- Advanced Process Control for process optimization
- Telecontrol center can be integrated for remote plant sections
- Energy management
- Advanced IT security concept for safeguarding the I&C system
- OPC-based evaluation and management of process data
- Direct interfacing to IT systems

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Function (continued)

All these are ideal requirements for cost-effective implementation and economic operation of process control plants.

Versatility and scalability

The architecture of the SIMATIC PCS 7 Process Control System is designed in such a way that instrumentation and control can be configured in accordance with customer requirements and optimally matched to the dimensions of the plant. SIMATIC PCS 7 instrumentation and control can be subsequently expanded or reconfigured with ease if there is an increase in capacity or a technological modification. Provision of expensive reserve capacity is unnecessary.

Various versions of the SIMATIC PCS 7 BOX compact system are suitable as low-cost starter solutions in the lower performance range, and are available as all-in-one systems equipped with functionalities for automation, HMI, and engineering.

With approximately 60 tags, these systems represent the lower end of the scale. Scalability extends up to the distributed multi-user system in client/server architecture with up to 60 000 tags for automation of a very large production facility, or of a plant network at one production location. This corresponds approximately to a scale ranging from 100 to 120 000 I/Os.

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 lifecycles.

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, to mention just a few.

Openness with SIMATIC PCS 7 covers all levels, and equally applies to automation systems and process I/Os as well as industrial communications networks, operator systems or engineering systems.

It comprises not only system architecture and communication, but also the programming and data exchange interfaces for user programs and planning systems. SIMATIC PCS 7 can therefore also be combined with components from other vendors, and integrated in existing infrastructures.

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Overview

Gain transparency and lower costs:

SIMATIC HMI operator control and monitoring systems

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 and productivity.

Everything from a single source

With SIMATIC HMI, Siemens Automation and Drives offers a complete range of innovative and low-cost products and systems for the multi-faceted tasks of operator control and monitoring: Ranging from operator panels and visualization software for operator control and monitoring at the machine through to SCADA systems for widely differing requirements in process visualization. For special requirements, optimally adapted products are offered such as especially rugged HMI devices with all-round protection for mounting on support arms/pedestals, or operator panels with stainless steel front for use in the food and beverages industry. Of course, individual, customer-specific requirements can also be implemented.

Perfectly equipped for integration in the world of automation

With their open, standardized interfaces in hardware and software, SIMATIC HMI products can be integrated at any time in the production and automation level as well as in the corporate management level. Connectability to almost every controller on the market as well as multiple language capability of the configuration and visualization software - including Asian ideographic languages, of course - facilitate operation worldwide.

Increased production transparency through Plant Intelligence

Plant Intelligence is based on the rational use of information to improve processes within the company. It is designed to lower plant costs, consolidate and improve quality, avoid wastage, utilize production facilities better and ultimately ensure greater efficiency and cost effectiveness within the company. WinCC provides the best requirements for achieving this since WinCC features an integrated Historian for acquiring important production data. Using intelligent functions and tools, these process data can be edited into information necessary for making decisions and can be made available throughout the company whenever and wherever it is required – for operators as well as production managers or anyone else within the company. Even the WinCC basic system provides a wealth of display and evaluation functions, such as the statistics functions for the message and measured value logs. WinCC options for IT & business integration make additional 'smart' tools available for optimizing production using Plant Intelligence.

Integrated into the World Wide Web

SIMATIC HMI transforms the Internet into a control desk - within a plant as well as in the worldwide network. Using the WinCC/Web Navigator, you can monitor and operate plants over the Internet or over the internal corporate intranet. Thin Client solutions can be used to integrate rugged, local devices which simultaneously establish the connection between the automation level and the control center. And over a wireless LAN or cell phone connection, you can use mobile Thin Clients such as laptop computers, PDAs (personal digital assistants) or WebPads. In this way, process, service or management information can be made individually available to users. At the machine level, many control units support remote operation, e.g. as a link between the automation level and the control room through to service and diagnostics over the Internet.

With WinCC flexible, concepts with so-called Sm@rtClients and servers facilitate plant-wide access to variables and images, distributed operator stations as well as remote operation and diagnostics via the Internet – also in conjunction with SIMATIC Panels.

Traceability and simple validation

WinCC flexible and WinCC with 'FDA options' provide a high degree of support to machine and plant manufacturers who must fulfill demanding quality requirements, both with respect to the products to be manufactured as well as to the manufacturing processes themselves. These options simplify plant validation enormously and thus provide the most convincing and comprehensive solution for the requirements of these sectors. They support the user in fulfilling high quality requirements asp specified by the FDA (Food and Drug Administration) 21 CFR Part 11 for the food & beverages and pharmaceutical industries.

Increased plant availability

All operator panels and Panel PCs are designed for harsh industrial use. Redundant WinCC process visualization systems ensure a high degree of plant availability during normal operation. The ProAgent process diagnostics of SIMATIC HMI support you effectively with error locating and elimination and significantly reduce downtimes.

Distributed operator control concepts

SIMATIC HMI offers different solutions for various requirements for operator control of large machines and plants spread over extensive areas.

Thus, the Sm@rtAccess option of the SIMATIC WinCC flexible visualization software, for example, allows HMI devices such as panels, Thin Clients and PCs plant-wide access via PROFINET/Ethernet to current process values and the local screen images of all involved stations.

The Sm@rtService option is used for diagnostics, maintenance and remote control of local operator stations over the Internet.

As remote operator stations, SIMATIC Thin Clients make the functionality of machine-level panels available in the control room or in the office, thanks to their connection to PROFINET/Ethernet, and in the other direction, they bring SIMATIC WinCC, office or IT functionality straight to the machine.

In PC-based applications, the computing unit and the operating unit of a Panel PC 677B can be separated from each other by up to 30 m. When using PCs such as the SIMATIC Rack or Box PC, a SIMATIC Flat Panel monitor can also assume the function of the operating unit at a distance of up to 30 m.

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Introduction

Overview (continued)

More than just operator control and monitoring

The Multi Panels under Windows CE combine the advantages of two worlds: On the one hand, the ruggedness of an operator panel and on the other hand the flexibility typical of a PC. Apart from classical operator control and monitoring, other automation functions such as control functions can execute simultaneously. And for PC-based automation, the SIMATIC Panel PCs are available as a compact automation platform - the embedded versions being especially compact and rugged, as well as maintenance-free.

All the advantages of Totally Integrated Automation

With Totally Integrated Automation (TIA), Siemens is the only supplier who offers a system-wide, integrated product and system range for automating the entire production workflow. The distinguishing feature of TIA is that it is completely integrated. The reduced number of interfaces results in very clear structures. This lowers time and costs required for engineering the automation solution and increases the availability of the plant.

SIMATIC WinCC flexible, the system-wide engineering tool for the SIMATIC HMI operator panels, is part of TIA and uses the same database as STEP 7, the programming software for the SIMATIC Controllers. This saves input overhead and ensures data consistency at all times.

In conjunction with other SIMATIC components, SIMATIC HMI also supports system diagnostics and process diagnostics during normal operation. You can start STEP 7 diagnostics directly from WinCC for comprehensive error diagnostics, from the circuit diagram through to the PLC program. The SIMATIC Maintenance Station visualizes the maintenance information for the automation technology of a system – from the controller and network components to switchgear, protective equipment and control devices and the drives. This gives a clear overview of the status of the automation sysem at any time.

A competent partner for automation solutions

With SIMATIC HMI, you not only get excellent products to suit your requirements, we will also support you with selecting a partner for your automation solution. In our worldwide network of Siemens Automation Solution Partners, you will find competent contact partners in your area who are always up-to-date with the latest SIMATIC HMI technology. The Siemens-internal WinCC Competence Centers implement technology-specific products as well as customer and sector-specific solutions on the basis of WinCC. WinCC specialists are external system integrators who combine their WinCC expertise with their sector and technology know-how to create tailor-made, cost-effective solutions. Numerous products from our partners that perfectly interact with WinCC are available as WinCC Add-ons.

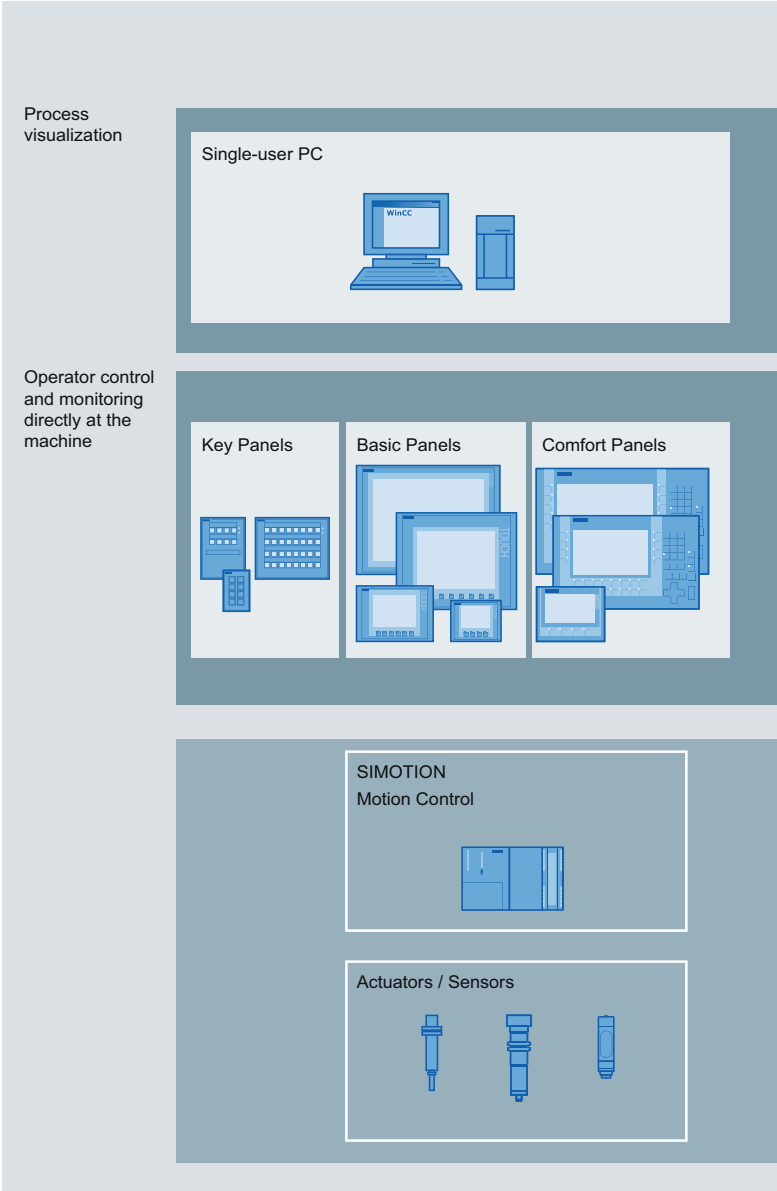
Investment protection included

Our many years of experience in the automation engineering sector are to your advantage. The same applies to our global service network with its expert support. Further services, such as a software update service, training and ordering over the Internet round off what we have to offer.

SIMATIC HMI - The Human Machine Interface

SIMATIC® HMI®

A whole world of operator control and monitoring

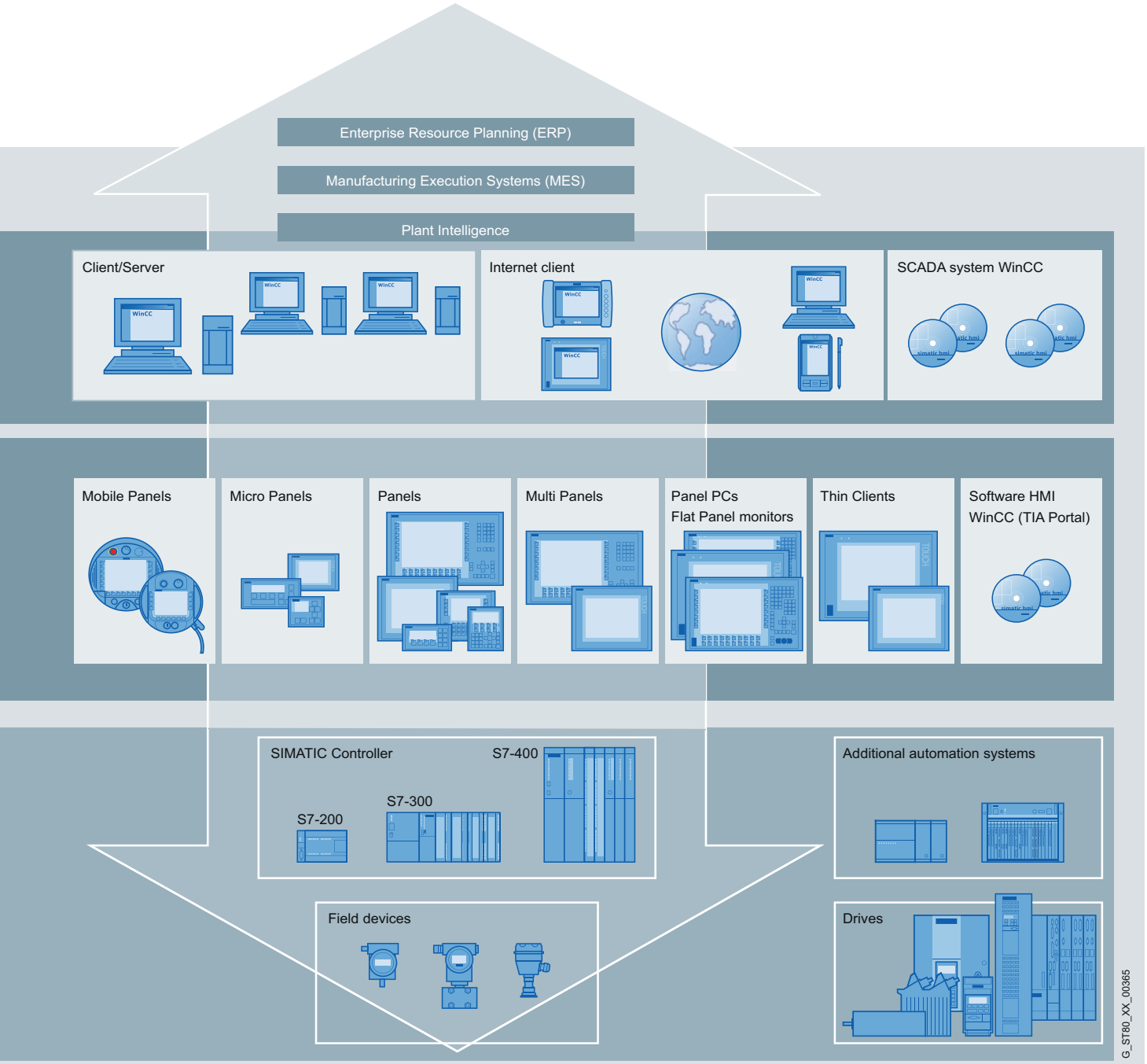


Process visualization

SIMATIC WinCC
The SCADA system for scalable process visualization to suit any requirement – from single-user through to redundant multi-user systems, as well as for plant operation and monitoring over the Internet. WinCC is also the ideal information hub for IT and business integration, with Plant Intelligence ensuring more transparency in the production process.

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Overview (continued)



Operator control and monitoring directly at the machine

Operator panels

SIMATIC Key Panels

Operator panels with bus capability for easy and direct operation of machines.

SIMATIC Basic Panels

Operator panels with basic functionality for small machines and plants.

SIMATIC Comfort Panels

Operator panels with high-end functionality for demanding applications.

SIMATIC Mobile Panels

Mobile operator panels with or without cables for direct operator control of the plant and machine from any location.

SIMATIC Micro Panels

Operator panels for small machines and specially designed for SIMATIC S7-200.

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Overview (continued)

SIMATIC Panels

Compact and rugged operator panels for use directly at the machine – finely graded in performance and convenience and available as operator panels and Touch Panels.

SIMATIC Multi Panels

Multifunctional platforms that, in addition to visualization, also perform other automation tasks such as controlling.

SIMATIC WinAC MP

The software PLC can be used on the Multi Panels of the 170/270 and 370 series and is suitable for complex processes in which control and visualization tasks are to be solved with one and the same device.

SIMATIC HMI devices with all-round protection

The SIMATIC HMI devices with all-round protection (MP 377 PRO, Thin Client PRO, Flat Panel PRO, and HMI IPC477C PRO) are specially designed for mounting on a support arm/stand. Thanks to their extremely rugged design, the devices are ideal for industrial applications in harsh environments.

Devices with stainless steel fronts

Panels and Panel PCs with touch screens and stainless steel fronts have been designed for use in the food & beverages industry for operator control and monitoring directly on food processing machines.

HMI devices for hazardous areas

Die SIMATIC HMI Ex devices are intrinsically safe Panel PCs and Thin Clients that have been specially designed for the 'Zone 1' and 'Zone 2' hazardous areas. Further SIMATIC HMI devices are also available for the hazardous area 'Zone 2' and can be found in Catalog ST 80/ST PC, Chapter 2 'Operator panels'.

HMI software

Flexibility in any HMI application – from Basic Panel up to process visualization

SIMATIC WinCC in the Totally Integrated Automation Portal (TIA Portal) is part of a new, integrated engineering framework which offers a uniform engineering environment for programming and configuration of control, visualization and drive solutions.

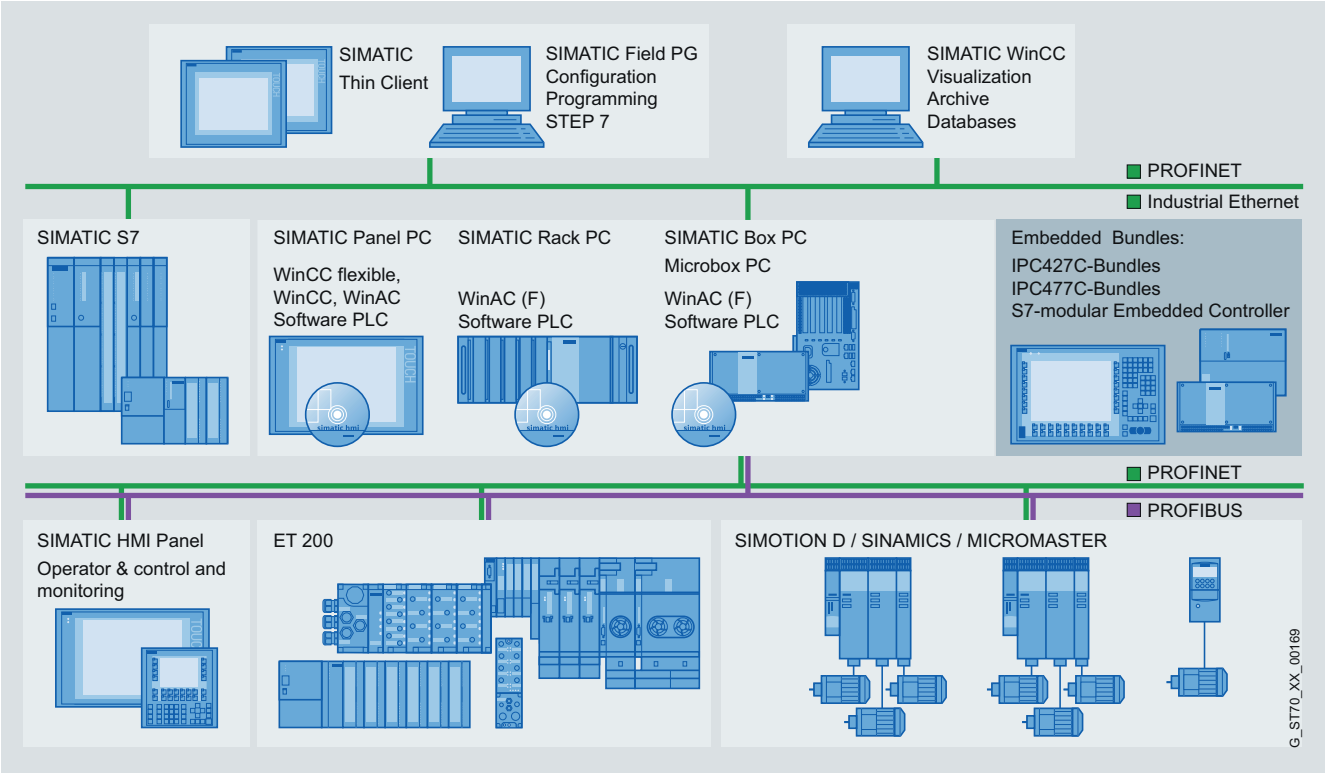
With WinCC in the TIA Portal it is possible to configure HMI applications ranging from the simplest operating solutions with Basic Panels and Comfort Panels up to SCADA applications on PC-based multi-user systems. The possible range of solutions is thus greatly extended compared to the predecessor product SIMATIC WinCC flexible.

SIMATIC WinCC V7 is still available for highly-complex applications with Plant Intelligence solutions, integral archive servers or redundant architectures, whereas WinCC Open Architecture is available for applications with high customer-specific adaptation requirements, even for non-Windows platforms.

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Overview (continued)

SIMATIC PC-based Automation



Industrial PC

The optimum PC hardware platforms for PC-based Automation from Siemens are our reliable and innovative industrial PCs.

PC-based Controllers

Siemens has developed a wide range of coordinated hardware and software components for PC-based Automation. Focal point: SIMATIC PC-based Control with SIMATIC WinAC, the open, flexible and reliable controller for your PC-based automation solution.

Embedded controllers

SIMATIC S7-mEC is a modular controller in S7-300 design with the latest embedded PC technology. It comprises the EC31 (CPU) and optional expansion modules.

Embedded bundles

Embedded bundles based on the embedded industrial PCs are extremely compact, powerful and rugged systems for use at machine level. The functions of PC-based Control (also fail-safe) and/or visualization are already pre-installed and ready to use.

Software packages for SIMATIC IPC

For a number of SIMATIC IPCs, low-cost software packages with the SIMATIC WinCC and WinCC flexible visualization software or the SIMATIC WinAC RTX (F) software controller are offered. An industrial PC must be purchased at the same time as the software package to take advantage of these offers.

Industrial monitors and Thin Clients

Flexible operating concepts can be implemented via Flat Panel monitors and Thin Clients. These can be industry-standard LCD monitors with high-luminance displays that can be placed up to 30 m away from the PC, or low-cost, rugged Thin Clients that offer HMI functionality over the network in large-scale, widely distributed plants.

Further information:

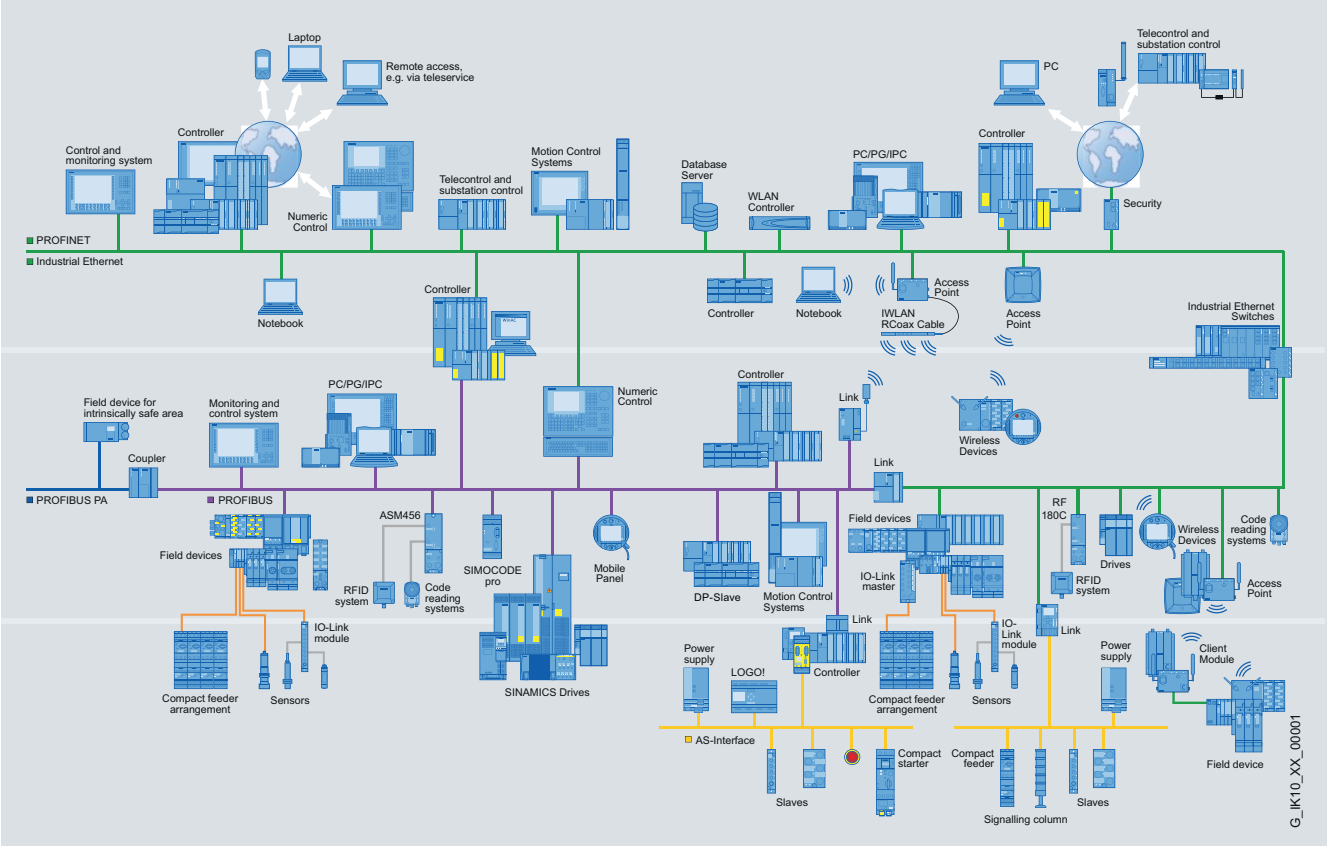
- Catalog ST 80/ST PC

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Introduction

Overview

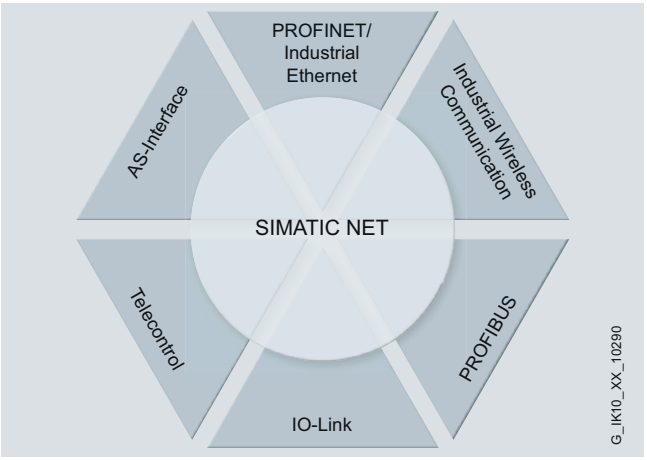
SIMATIC NET
Industrial communication – the backbone of automation



Powerful and open communication systems ensure trouble-free communication for automation systems, covering

- data communication or
- process or field communication.

Openness and flexibility of the individual communication systems in different topologies enable linking of a wide variety of systems and their subsequent expansions. By using standardized communication systems, it is possible to connect standardized components from different suppliers without any problems. This guarantees maximum protection of investment, as existing networks can be extended without any adverse effects.



SIMATIC NET provides components for an integrated overall solution beyond network boundaries.

These include:

- Passive network components, e.g. FastConnect cabling systems
- Active network components, e.g. SCALANCE X Industrial Ethernet switches
- Interfaces for connecting automation devices to the communication systems:
  - Integrated interfaces
  - Communications processors
- Components for wireless networks, e.g. IWLAN
- Components for industrial security
- Gateways, e.g. IE/PB Link PN IO
- Software for configuration, monitoring and diagnostics of the network, e.g. SINEMA E/SINEMA Server

Further information:

- Catalog IK PI
- Catalog CA 01 on DVD

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Overview

SIMATIC Ident – for more cost-effective production and logistic processes

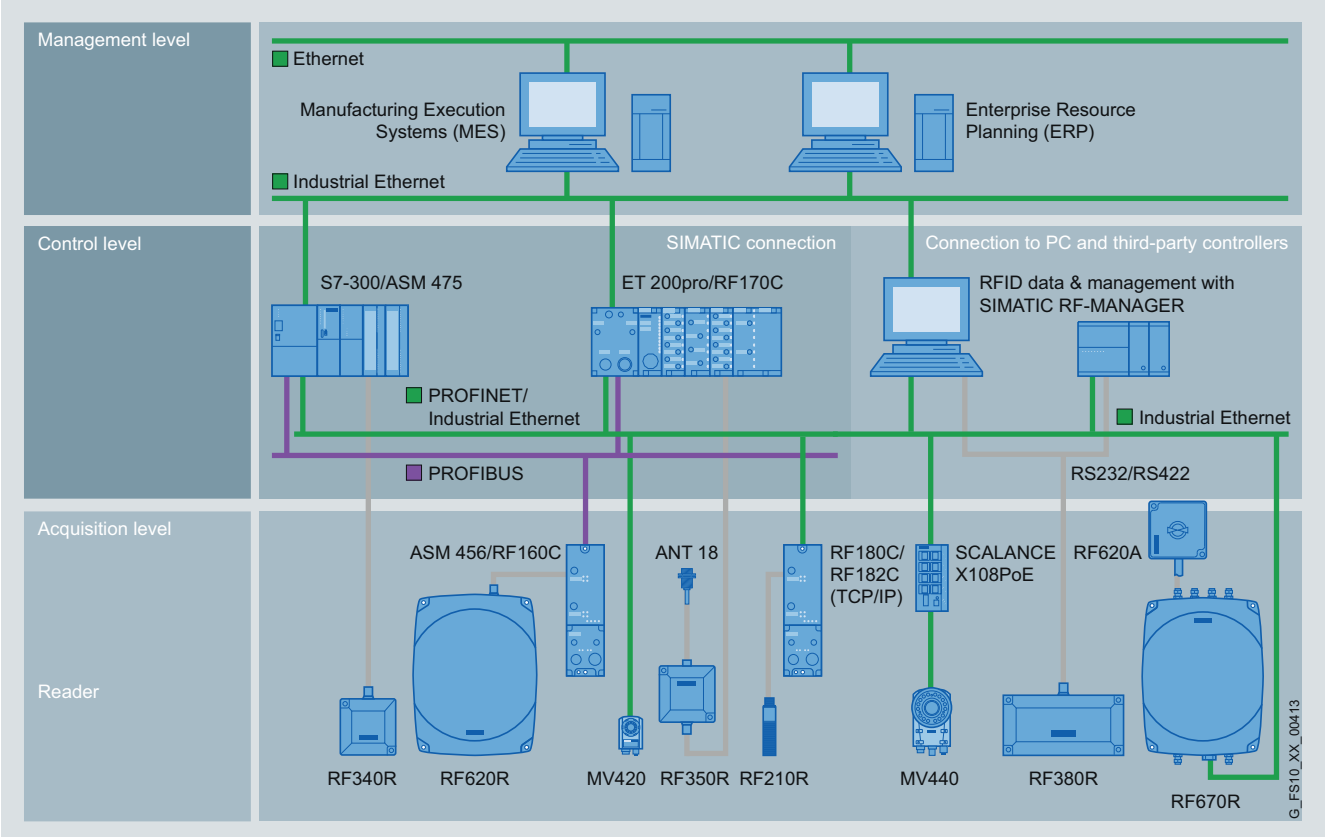
Fiercer competition, stricter standards and legal regulations, shorter product lifecycles, more individual customer requirements, and the increasing globalization of the added value: in order to survive in ever more dynamic markets, companies must increase the efficiency of their value chain. And this applies to production control, asset management, tracking & tracing as well as supply chain management. Through the use of innovative identification technology, companies can gain an important competitive edge.

But should RFID or optical code reading systems be used? Which technology is the right one for the respective application? Is an alternative or joint application appropriate, and how flexibly can you react to changing requirements? Siemens can help you to make the right decision. We offer SIMATIC Ident, a unique portfolio for industrial identification which can provide the perfect solution for your requirements while keeping you flexible for the future.

The two technologies constitute a single system

The appropriate identification technology depends on factors such as recording distance, light conditions, single or repeated identification, and environmental influences such as temperature and contamination. Depending on the application, optical and RFID systems can also be used together as a hybrid solution in the same production line, e.g. DMC for direct marking on the product and RFID for pallets or workpiece holders.

In this case, seamless connection of the two technologies is essential. Our SIMATIC Ident portfolios can offer you the appropriate solution: using joint communication modules or function blocks, connection of optical and RFID systems to the SIMATIC PLC is simple. This ensures that you have a uniform software architecture, and significantly saves effort and costs for engineering, commissioning and maintenance.



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Introduction

Overview (continued)

Identification systems: RFID and optical codes

Whether barcode, DMC, RFID or OCR: every technology has its specific strengths. For example, OCR is used where information also has to be read by people, for example a freshness date. The high level of data security of 2D codes and RFID is impressive and they have proven their worth even in harsh industrial environments.

The decisive criterion for an identification system: your individual application.

Verification, identification: code reading systems



If an increased performance is required, 2D codes are recommendable as an alternative to a barcode since they offer a higher storage capacity and a better read rate. They are also inexpensive to attach, e.g. together with dispatch labels. Furthermore, they permit direct part marking (DPM) by means of lasers, printers or needles, which makes them particularly resistant to external influences. 2D codes can be recorded absolutely reliably even from an oblique angle or under difficult lighting conditions.

Our SIMATIC code reading systems provide the ideal solution for reading and verification of 1D and 2D codes and for optical character recognition (OCR), ensuring reliable traceability of production batches beyond the production plant.

Identification, mobile data storage:



If a line of sight does not exist between the recording unit and the code, if large data quantities or long distances are necessary, or if saved information has to be changed, these are fields for RFID. In this case the product or object is provided with a memory chip which can be programmed and read by radio. RFID is ideally suitable for the most diverse applications through the use of low-cost Smart Labels for logistics, rugged data memories for assembly lines, and transponders with a wide operating range.

Our intelligent SIMATIC RF range offers seamless transparency. This makes data available at all times along the complete production and distribution route - thus allowing perfect control and optimization of material flows and logistics.

Further information:

- Catalog ID 10
- Catalog CA 01 on DVD

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Supplementary components

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14/2 Drive systems
14/2 SINAMICS
14/5 SIMODRIVE

14/5 Overvoltage protection
14/5 SICROWBAR AC overvoltage protection
14/6 SICROWBAR DC overvoltage protection

14/6 Time-delay, coupling and monitoring relays
14/6 SIRIUS relays

14/7 Measuring systems
14/7 SIMODRIVE sensors

14/8 Automation systems
14/8 SIMOTION motion control system
14/9 SINUMERIK CNC automation systems

14/11 Time synchronization systems
14/11 SICLOCK

14/12 System cabling
14/12 MOTION-CONNECT connection system

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Overview



The SINAMICS family

- Uniform range of drives for every application and sector.
- Wide output range from 0.12 kW up to 120 MW.
- Wide range of functions from simple V/f control up to highly dynamic servo control.
- Designed for trouble-free interaction with other automation components from Siemens.
- Joint platform concept with uniform functionality, configuration, commissioning and operation as well as a standardized diagnostics concept and consistent communication mechanisms.

SINAMICS G110 – The versatile drive for low outputs

- For variable-speed applications (V/f) in 200 to 240 V networks.
- Output range from 0.12 to 3 kW.
- Delivered ready for connection – makes for fast installation.
- Simple commissioning through ready-to-connect delivery.
- Available with integrated filter.
- Versions with increased flexibility and various types of communication.
- Can be used in a wide range of applications in industry and trade.

Further information:

- Catalog D 11.1
- Internet: www.siemens.com/sinamics-g110

SINAMICS G120 – The modular single drive for low to medium outputs

- For variable-speed applications (V/f and vector regulation with/without encoder) in 380 to 480 V networks.
- Output range from 0.37 to 250 kW
- Modular system for increased 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 trade.
- Innovative cooling concept and increased ruggedness thanks to external heat sinks.
- Available with integrated line filter and energy recovery

Further information:

- Catalog D 11.1
- Internet: www.siemens.com/sinamics-g120

SINAMICS G120P – The specialist for pumps, fans, and compressors

- For variable-speed applications (V/f and vector regulation without encoder) in 380 to 480 V networks
- Output range from 0.37 to 90 kW
- Communication over RS 485 (USS, Modbus/RTU, BACnet MS/TP), PROFIBUS DP and CANopen
- Integrated technology functions specially for pump, fan, and compressor applications
- Available with integrated filter A or B
- Can be used in building services, water industry, and process industry

Further information:

- Catalog News D 11.1N, October 2010
- Internet: www.siemens.com/sinamics-g120p

SINAMICS G110D – The distributed, compact single drive with high degree of protection for simple applications

- For variable-speed applications (V/f) in 380 to 500 V networks
- Output range from 0.75 to 7.5 kW.
- Communication via AS-Interface
- Main focus is conveying technology, in particular distribution logistics and airports
- Low profile design with standard drilling dimensions in IP65 degree of protection.
- With integrated line filter and brake control
- Version with repair switch

Further information:

- Catalog D 11.1
- Internet: www.siemens.com/sinamics-g110d

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Overview (continued)

SINAMICS G120D –
The distributed, modular single drive with high degree of protection for first-rate design

- For variable-speed applications (V/f and vector regulation with/without encoder) in 380 to 480 V networks.
- Output range from 0.75 to 7.5 kW.
- Modular system for increased flexibility: various types of communication (PROFINET and PROFIBUS DP) and Safety Integrated with fail-safe control units.
- Can be used in a wide range of applications in industry, main focus on automotive industry.
- Low profile design with standard drilling dimensions in IP65 degree of protection.
- With integrated line filter and energy recovery.

Further information:

- Catalog D 11.1
- Internet: www.siemens.com/sinamics-g120d

SINAMICS G130/G150 –
The universal drive solution for single drives in the medium and top performance ranges

- For variable-speed standard applications in the medium and top performance ranges.
- Ready-to-connect standard SINAMICS G150 cabinet, SINAMICS G130 rack-mounted units for plant-specific design.
- Output range from 75 to 2700 kW.
- Equipped as standard with PROFIBUS interface for connection to higher-level controls.
- Particularly suitable for economical use of pumps, fans, extruders, mixers etc.

Further information:

- Catalog D 11
- Internet: www.siemens.com/sinamics-g130 www.siemens.com/sinamics-g150

SINAMICS S110 –
The compact single-axis servo drive for simple positioning with integrated safety functions

- Specially for single-axis positioning tasks in all sectors of machine and plant construction.
- Servo control.
- Output range from 0.12 to 90 kW.
- For synchronous servo motors with encoder.
- For asynchronous servo motors with or without encoder.
- Supports practically all types of encoder used in practice for positioning tasks.
- Integrated safety functions.
- Basic positioner (Epos).
- Free blocks (FFB).
- Pulse direction input.
- PID controller.
- Brake control.

Further information:

- Catalog PM 22
- Internet: www.siemens.com/sinamics-s110

SINAMICS S120 –
The flexible, modular drive system for demanding single-axis and multi-axis applications from the lower to top performance ranges

- Specially for motion control and vector-regulated single-axis and multi-axis applications in all sectors of machine and plant construction.
- Servo/vector regulation, V/f.
- Output range from 0.12 to 1200 kW, as cabinet modules up to 4500 kW
- Various designs with different focal applications.
- Highly flexible, e.g. as result of modular system architecture, different types of cooling, support for a wide range of motors/encoders, simple expandability.
- High degree of scalability with regard to performance, number of axes, functionality.
- Integrated safety functions.
- Comprehensive motion control functionality.
- High availability and efficiency even in unstable networks.
- Automatic parameterization and simple drive commissioning/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

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Overview (continued)

SINAMICS S150 –
The sophisticated drive solution for single drives in the medium to top performance ranges

- For applications with maximum demands on precision and dynamic response in the medium to top performance ranges such as test rig drives, elevator and crane systems, cross-cutters and shears, conveyor belts, presses, cable winders and centrifuges.
- Ready-to-use control cabinet.
- Output range from 75 to 1200 kW.
- High availability and efficiency even in unstable networks.
- Efficient operation through standard energy recovery.
- Reactive power compensation possible.
- Equipped as standard with PROFIBUS interface for connection to higher-level controls.

Further information:

- Catalog D 21.3
- Internet: www.siemens.com/sinamics-s150

SINAMICS GM150 –
The universal drive solution for single drives in the medium-voltage range

- Single drive for applications with quadratic and constant load characteristic without regeneration.
- Space-saving, quick and easy commissioning.
- Ready-to-connect cabinet unit.
- Particularly suitable for economical use of pumps, fans, extruders, mixers etc.
- Power unit with HV-IGBT technology for outputs up to 13 MVA, output voltage 2.3 to 4.16 kV, alternatively with air or water cooling.
- Power unit with IGCT technology for outputs from 10 MVA to 21 MVA, output voltage 3.3 kV, water cooling.
- Optimum interaction with SIMATIC.

Further information:

- Catalog D 12
- Internet: www.siemens.com/sinamics-gm150

SINAMICS SM150 –
The sophisticated drive solution for single and multi-motor drives in the medium-voltage range

- Single or multi-motor drives for regenerative, highly dynamic applications.
- Roller drives (cold, warm), hoisting drives, test rigs, belt systems.
- Power unit with HV-IGBT technology for outputs from 3.4 to 5.8 MVA, output voltage 3.3 and 4.16 kV, alternatively with air or water cooling.
- Power unit with IGCT technology for outputs from approx. 5 to 31.5 MVA, output voltage 3.3 kV, water cooling.
- Ideal for direct power exchange over the common DC bus with multi-monitor drives with regenerative and motorized operation.
- Optimum interaction with SIMATIC.

Further information:

- Catalog D 12
- Internet: www.siemens.com/sinamics-sm150

SINAMICS DCM –
The scalable drive system for basic and sophisticated DC drive applications

- In the output range from 6 kW to 30 MW for industrial machines and plants (steel/aluminum, plastics, printing, paper, lifting gear, mining, oil & gas, excitation systems) in new plants and for retrofitting.
- PROFIBUS as standard, PROFINET optional.
- Control unit variance.
- Field power supply in line with requirements.
- Electronics supply for connection to 24 V DC.
- Power unit isolated with respect to ground (floating voltage detection).
- Free function blocks and Drive Control Chart (DCC).
- Expandable functionality using SINAMICS components.
- Single-phase operation possible.
- Coated modules and nickel-plated copper busbars.
- Wide temperature range.

Further information:

- Catalog D 23.1
- Internet: www.siemens.com/sinamics-DCM

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SIMODRIVE

Overview



- Converter system for connection to machine tools, robots, special machines, manipulators, and production machines.
- Consists of the SIMODRIVE 611 digital/universal converter system as well as closed-loop control modules with analog or digital interface for operation of three-phase motors, e.g. synchronous or asynchronous motors.
- SIMODRIVE POSMO A with PROFIBUS DP connection enables simple interfacing to the SIMATIC using the STEP 7 programming software.
  - SIMODRIVE POSMO A is an intelligent positioner motor with integrated converter power unit, motor controller, positioning controller, and program memory.

Drive ES engineering system:
See Catalog Section 11, Engineering Tools, page 11/47.

Further information:

- Catalog NC 60/DA 65.4
- Catalog CA 01
- Internet:
  www.siemens.com/drivesolutions
  www.siemens.com/industrymall

SICROWBAR overvoltage protection

Overview

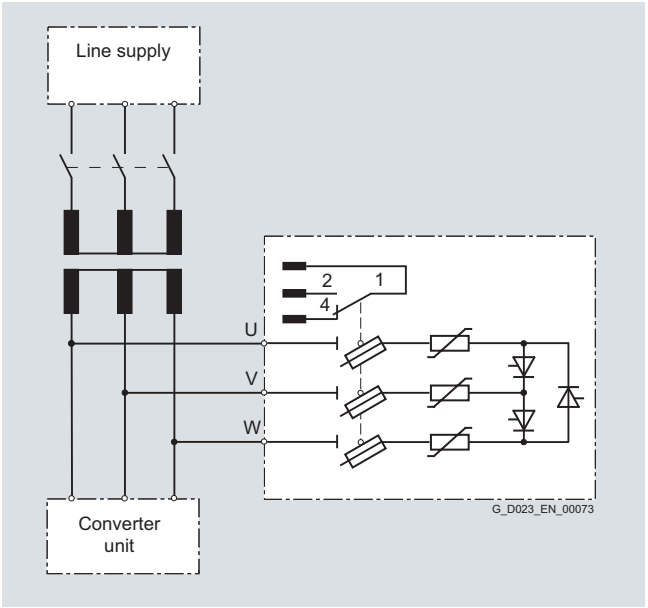
SICROWBAR AC overvoltage protection



SICROWBAR AC overvoltage protection is used to protect power semiconductors in converters (thyristors and diodes) against overvoltages that occur between the phases of a three-phase line supply. The range of applications is not restricted to protecting DC drive converters, but also comprises infeed/regenerative feedback units of the AC drive technology that are equipped with thyristors.

Overvoltages that occur on the AC side of converters are mainly caused by switching operations when disconnecting from the line supply at the transformer primary. This applies both to operational switching operations (shutdown at no-load) as well as in the case of a fault (shutdown under load).

The overvoltage protection is mainly used in the following configuration:



Further information:

- Catalog D 23.1
- Internet:
  www.siemens.com/sinamics-dcm

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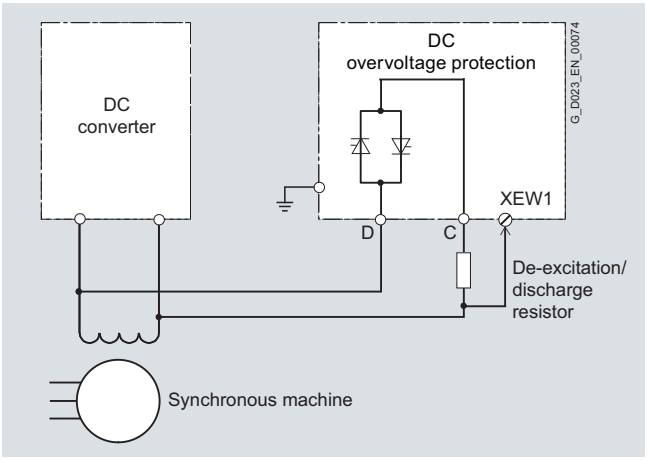
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SICROWBAR overvoltage protection

Overview (continued)

SICROWBAR DC overvoltage protection





SICROWBAR DCovervoltage protection protects coils and converters against overvoltage conditions when they are used to supply large inductances, for instance the excitation coils of synchronous machine motors, DC machine motors or hoisting solenoids.

As an option it is additionally possible to initiate high-speed de-excitation, triggered by a superimposed signal. A corresponding de-excitation/discharge resistor must be provided.

Further information:

- Catalog D 23.1
- Internet:
  www.siemens.com/sinamics-dcm

SIRIUS relays

Overview



Analog interface converters/isolating amplifiers/ transducers 3RS17

The conversion of one signal into another is required if e.g. a voltage signal has to be converted into a current signal for transmission over a longer distance, or if the output of a sensor and the input of the controller do not match.

Analog interface converters are particularly suitable for electrical isolation or for conversion of analog signals, and for EMC and overvoltage protection.

- Microprocessor-controlled and calibrated interface converters with an overall width of 6.2 mm or more.
- Extremely simple commissioning using DIP switches and integrated setpoint generators.
- All terminals are protected against reverse polarity and are short-circuit and surge-proof up to 30 V.

Interface relays 3TX70 and plug-in relay connectors LZS

Interface relays 3TX7 with an overall width of 6.2 mm:

- Can be used for contact multiplication, adaptation of potential, or for EMC and overvoltage protection.
- Semiconductor versions for applications with high switching rate or for switching capacitive loads.

Plug-in relay connectors 3TX701 with an overall width of 6.2 mm:

- Plug-in relays: At the end of its service life, a relay can be replaced without loosening the wiring.
- Wire inlet and connection screw are clearly accessible from the front.

Plug-in relay connectors LZS:

- Can be used for contact multiplication, adaptation of potential, or for switching small loads.
- Max. 4 changeover contacts in one device:
  - Wide-voltage versions with or without hard gold-plated contacts.
  - With screw-type or push-in spring-loaded terminals

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SIRIUS relays

Overview (continued)

Monitoring relays 3RS10/11, 3UG, 3RN1

Temperature monitoring relays 3RS10/11 operate autonomously or in parallel with a closed temperature control loop, and serve to monitor a defined limit temperature in solid, liquid or gaseous media.

- Simple operation without complicated menus or supplementary software.

Monitoring relays 3UG are used to monitor electric and non-electric variables which cannot (or should not) be directly recorded by an automation system.

- Monitoring of networks for overvoltage or undervoltage, direction of rotation, or asymmetry.
- Monitoring of loads using Cos-phi or current measurement.
- Monitoring of levels or speeds of rotation.

Thermistor motor protection devices 3RN1 monitor the winding temperature of motors fitted with a PTC sensor.

- Compliance with the ATEX directive 94/9/EC through conformity with EN 60079-14 and EN 60947-8 standards.
- Fast fault diagnostics through display of open-circuit and short-circuit.
- Electronics-compatible output due to hard gold-plated contacts.

Time-delay relays 3RP15 and 3RP20

Time-delay relays 3RP15 and 3RP20 are used for all time-delayed switching operations in open-loop control, starting, protection and closed-loop control circuits. They guarantee high functionality and good repeatability of the set time. They are used, for example, in critical real-time operations such as the star-delta changeover of motors.

- Wide-voltage and multifunction versions.
- Electronics-compatible, hard gold-plated contacts.

Further information:

- Catalog IC 10 Chapters 3 and 8
- Product documentation for SIRIUS relays
- Internet:
  www.siemens.com/relays

SIMODRIVE sensors

Overview



- SIMODRIVE sensors are measuring systems for recording distances, angles of rotation, and velocities.
- Can be used on machines in various sectors, e.g. production machines, manipulators, machine tools, and special machines.
- Can be connected to SIMATIC, SINAMICS, SINUMERIK, SIMOTION, SIMOVERT MASTERDRIVES and SIMODRIVE.
- Accessories available for SIMODRIVE sensors: couplings, mounting material, connectors, and completely pre-assembled signal cables.
- SIMODRIVE sensors are available as built-on incremental or absolute-value 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-value encoders:
  - All absolute-value encoders are available in single-turn and multiturn versions.
  - Interface SSI (synchronous serial interface) or connection for EnDat, PROFIBUS DP, PROFINET IO with RT/IRT and DRIVE-CLiQ.
  - Encoders with PROFIBUS DP support Class 1 ... 3 profiles as well as isochronous mode, internode communication, and application-specific supplementary functions. They are parameterizable.
  - Encoders with PROFINET IO support Class 1 ... 4 profiles.
- All measuring systems are available in synchro flange and supported flange joint versions.

Further information:

- Catalogs NC 60, NC 61, NC 82, PM 21
- Catalog CA 01
- Internet:
  www.siemens.com/sensor-systems
  www.siemens.com/industrymall

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SIMOTION motion control system

Overview



SIMOTION system

- The SIMOTION system is primarily used for machines in which motion control with servo or hydraulic axes has priority. Main fields of application include packaging, printing and plastics machines, as well as the automation of machines in the textile, converter technology, timber, glass, ceramic, and stone industries.
- The system approach: amalgamation of motion control with logic and technology functions. In this case, all movements, logic functions at motion level, and technology functions such as temperature and hydraulic controls or cams, are executed in the same system.
- Advantages:
  - No time-critical interfaces between the components.
  - No programming requirements for these interfaces.
  - Uniform and transparent programming and diagnostics, as already known from PLC systems.
  - Free selection of hardware platform: Controller, PC or directly integrated in the drive.
  - Simple, graphic sequential programming using Motion Control Chart.
  - Integrated PLC functionality.
- Components of the SIMOTION system:
  - SCOUT engineering system:
    The engineering system for complete automation of machines, including:
    MCC (Motion Control Chart) for simple, graphic sequential programming;
    LAD and FBD for programming of PLC tasks;
    ST as text language for simple creation of functions and comprehensive calculations.
  - Runtime software modules:
    Various motion control and technology functions for implementing simple axis positioning by means of synchronous operation and cam disks up to 3D path interpolation with transformations for various handling kinematics. Specific selection allows flexible adaptation of the system to the machine.
  - Hardware platforms:
    Different platforms allow adaptation to the respective machine. Available for selection are the compact version direct in the drive, the modular version in S7-300 design, and the open version as a pure software solution on an industrial PC.

SIMOTION D – Compact and integrated in the drive

- The complete automation of machines with drive control, PLC, motion control, and technology functionalities in a compact unit in SINAMICS S120 design.
- Particularly fast response.
- Versatile networking via PROFIBUS, PROFINET or Ethernet.
- Scalable with several performance versions.
- Available in two designs:
  - SIMOTION D410 is a compact control unit for single-axis applications and is snapped on to blocksize format SINAMICS S120 PM340 power modules.
  - SIMOTION D4x5/D4x5-2 are control units for multi-axis applications in SINAMICS S120 booksize format and are offered in 4 performance versions.
- Ideally suited for:
  - Compact machines
  - Distributed automation concepts, e.g. for machines with multiple axes
  - Modular machines
  - Time-critical demands on axis couplings

SIMOTION C – Modularity and flexibility

- Controller in S7-300 design.
- Two versions, optionally with integrated drive interfaces for analog and stepper drives or with PROFINET interface.
- Onboard inputs/outputs expandable by I/O and function modules of the SIMATIC S7-300.
- With integrated isochronous PROFIBUS interfaces for distributed connection of drives or for communication with operator panels and higher-level controls.
- Ideally suited for:
  - Largest possible freedom in the choice of drives
  - Wide range of process signals
  - Retrofit applications through integral analog interfaces.

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SIMOTION motion control system

Overview (continued)

SIMOTION P – Open for other tasks

- PC-based, open motion control system available in two versions:
  - SIMOTION P320-3 for embedded PC solutions with the Windows Embedded Standard 2009 operating system
  - SIMOTION P350-3 for high-performance applications with the Windows XP operating system.
- Control, motion control, and HMI functions are executed together with standard PC applications on the same platform. User advantages:
  Through utilization of the PC platform and the Microsoft Windows operating system – with a real-time expansion for SIMOTION – SIMOTION P combines the advantages of two worlds:
- The openness of the Windows operating system
- The real-time capability of the SIMOTION operating system
- Ideally suited for:
  - Applications requiring an open PC environment.
  - Applications with particularly high-performance demands, e.g. hydraulic applications.
  - Applications requiring control and visualization on one hardware platform.
  - Comprehensive data storage, evaluation, and logging.

Further information:

- Catalog PM 21
- Catalog CA 01
- Internet:
  www.siemens.com/simotion
  www.siemens.com/automation/mall

SINUMERIK CNC automation systems

Overview



SINUMERIK 802

- CNC range for simple applications
- Mainly for turning and milling applications; solutions in other technologies also possible.
- SINUMERIK 802S base line together with the SINAMICS V60 servo converter and 1FL5 servo motors is the appropriate solution for economical and simple implementation of control tasks for machine tools with up to three feed axes.
- SINUMERIK 802C base line with analog drives for increased dynamic response and performance. Perfect for retrofitting. Standard drives ±10 V, universal use, simple operation, and proven technology.

SINUMERIK 840D with SIMODRIVE 611 digital

- The digital system for the toughest demands.
- For use in mold making and tool manufacture, for complex industrial scale manufacturing in the job shop, and for almost all technologies.
- With up to 10 CNC channels and 31 axes per NCU module. Thus also appropriate for use in the rotary indexing and cyclic machines sector (e.g. presses, packaging and printing machines).
- Scalable NCU software with 2/6/12/31 axes for several different NCU modules and correspondingly high CNC functionality.
- Coupling facility for up to 8 NCUs with max. 248 axes via NC link.
- Special technology functions (e.g. laser machining, handling) available using reloadable compile cycles. Optimum adaptation to the machines and the equipping of uniform machine series is thus possible.
- 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/industrymall

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Overview (continued)

SINUMERIK 802D sl

The SINUMERIK 802D sl is an operator panel control which combines all the components of a CNC control and drive control in one unit. Six digital drives can be connected via a DRIVE-CLiQ link.

- CNC for every application
- Turning/milling or nibbling/grinding
- Simple and rugged installation with minimal wiring.
- Execution of programs over the network or from CF card

SINUMERIK 828D BASIC T/BASIC M with SINAMICS S120 Combi



Compact, strong, straightforward – simply ingenious

The compact, operator-panel based SINUMERIK 828D BASIC T/BASIC M CNC controls offer a maximum of ruggedness and easy maintainability.

Powerful CNC functions coupled with a unique 80 bit NANO^{FP} accuracy result in maximum workpiece precision and minimum machining time. Thanks to a flexible CNC programming language and the exceptional ShopTurn/ShopMill machining step programming, both mass produced components and individual workpieces can be programmed and machined with the maximum possible efficiency. Pre-configured technology-specific system software and unique servicing functions reduce the costs for commissioning and servicing to an absolute minimum.

Tailored for standard turning machines ...

The SINUMERIK 828D BASIC T CNC control is perfectly tailored to the requirements of modern standard turning machines. With powerful kinematic transformers and a comprehensive selection of technology cycles, the SINUMERIK 828D BASIC T is also well-equipped for sophisticated machining with rotating tools.

Perfectly tailored and pre-configured for:

- Up to 5 axes/spindles in one machining channel.
- Front side machining with rotating tools.
- Lateral surface machining with rotating tools

... and standard milling machines.

The SINUMERIK 828D BASIC M CNC control is perfectly tailored to the requirements of modern standard milling machines. With the integrated SINUMERIK MDynamics technology package including the new intelligent motion and velocity control Advanced Surface, the SINUMERIK 828D BASIC M is also well-equipped for the machining of mold making workpieces.

Perfectly tailored and pre-configured for:

- Up to 5 axes/spindles in one machining channel.
- Lateral surface machining with A axis.
- Machining and use in mold making

Further information:

- Catalog NC 82
- Catalog CA 01
- Internet:
  www.siemens.com/sinumerik
  www.siemens.com/industrymall

SINUMERIK 840D sl



SINUMERIK 840D sl offers modularity, openness, flexibility and a uniform structure for operation, programming, and visualization. It provides a system platform with innovative functions for almost all technologies.

The new SINUMERIK Operate GUI is clear and intuitive. It combines the familiar HMI-Advanced, ShopMill and ShopTurn under a uniform and intuitive operation and programming GUI for efficient machine operation.

- **Open** for uniform integration of your specific know-how from operation down to the NCKs.
- **Flexible** for medium to complex multi-axis systems using scalable hardware and software and optimum integration in networks.
- **Strong** for maximum dynamics and precision thanks to innovative functions.

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SINUMERIK CNC automation systems

Overview (continued)

Integrated and certified SINUMERIK Safety Integrated functions are available with the SINUMERIK 840D sl. It is then possible to provide highly effective protection of personnel and machinery in a simple, economical and practice-oriented manner.

Functions

- Integrated in the SINAMICS S120 drive system.
- Up to 31 axes/spindles, plus up to 19 PLC axes.
- 10 machining channels.
- 80-bit NANO^{FP} accuracy.
- 7.5"/10"/12"/15" TFT operator panel fronts.
- Operating and programming with animated graphics.
- programGUIDE programming support.
- ShopMill/ShopTurn machining step programming.
- programSYNC multichannel programming.
- Strong NC functions.
- Powerful and uniform S7 PLCs.
- SINUMERIK Safety Integrated functions.

Used for turning, drilling, milling, grinding, laser machining, nibbling, punching, in tool and mold making, for high-speed cutting applications, for timber and glass processing, for handling operations, in transfer lines and rotary indexing machines, for mass production and job-shop production.

Further information:

- Catalog NC 61
- Catalog CA 01
- Internet:
  www.siemens.com/sinumerik
  www.siemens.com/industrymall

SICLOCK

Overview



SICLOCK TC400



SICLOCK TC100

- Modular time systems for process synchronization, including radio receivers for GPS and DCF77.
- Can be used for synchronization from single PCs up to large systems with multiple redundancy.
- Can be connected to SIMATIC S7, S5, PCS 7, PC, computer etc. over Ethernet (SIMATIC NET or NTP).
- Individual connections with asynchronous data transmission, pulses, and fiber-optic connections.
- Consists of the SICLOCK TC400, SICLOCK TC100 or SICLOCK TS central system clocks, radio synchronization devices, pulse converters, and driver software for message frame reception.

SICLOCK TC400, SICLOCK TC100 and SICLOCK TS

- Central system clocks for process synchronization.
- Simple and fast adaptation to the process through parameterization of interfaces and message frame contents using LCD on the device (TS) and convenient Web interface (TC400 and TC100).
- Radio synchronization using GPS, DCF77, IRIG B.
- Process synchronization over Ethernet or point-to-point connections, e.g. with DCF77, minutes pulse, IRIG B, IRIG A message frames.

Note:
SICLOCK TS will be discontinued at the end of 2011.

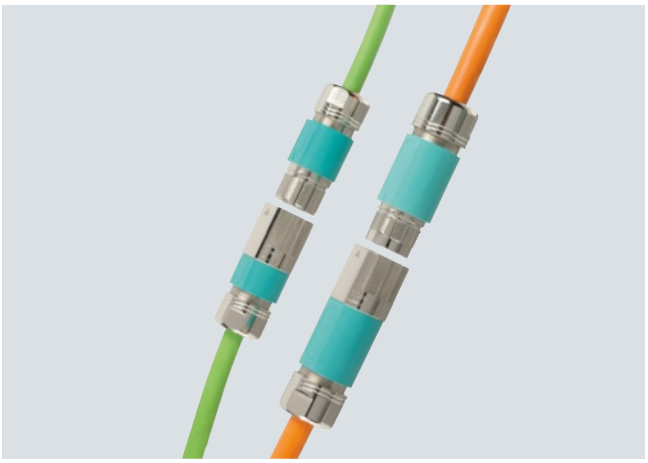
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- Internet:
  www.siemens.com/siclock
  www.siemens.com/industrymall

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MOTION-CONNECT connection system

Overview



MOTION-CONNECT cables are suitable for use with many different types of machine tools and production machinery.

The power cables and signal cables can be supplied by the meter or pre-assembled.

The following MOTION-CONNECT cable designs are available:

- MOTION-CONNECT 500 is the solution for mainly fixed routing.
- MOTION-CONNECT 700 is the ideal complement to linear motors and machines with high dynamic requirements. The cables are resistant to cutting oils.

MOTION-CONNECT 800 meets all the high mechanical requirements for use in cable carriers for machine tools and production machinery. The cables are resistant to cutting oils.

Benefits

SPEED-CONNECT

The new, pre-assembled cables with SPEED-CONNECT connectors permit fast, stable and reliable connections. By rotating briefly up to the stop, the union nut of the connector secures the lock and thus the connection.

The cables with SPEED-CONNECT connectors supplement the previous offering of MOTION-CONNECT cables with fully-threaded connectors.

Use of pre-assembled MOTION-CONNECT cables provides high quality and perfect, system-tested functionality.

Applications

The degree of protection of the pre-assembled power and signal cables and their extension cables is IP67 in the closed, inserted state.

Further information:

- Catalogs NC 60, NC 61, NC 82, PM 21
- Catalog CA 01
- Internet: www.siemens.com/industrymall

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Appendix

15



15/2 Training

15/3 Additional documentation
15/3 Specialist books for automation engineering
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15/30 Export regulations

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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:

http://www.siemens.com/sitrain

or let us advise you personally.

SITRAIN Customer Support Germany:

Phone: +49 (0) 911 / 895 7575

Fax: +49 (0) 911 / 895 7576

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 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 Industry products as well as interaction of the products in systems.

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.



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Overview

Siemens specialist books provide you with a profound knowledge of the various fields of automation engineering. They help readers at various levels, from beginners to experts, to familiarize themselves with individual topics, to consolidate their knowledge and they act as reference manuals.

Ordering data	Order No.
Milestones in automation	
Easy to read and cleverly organized, the book offers technicians, engineers and managers a profound look into the development history and application possibilities of a technology which has shaped all types of industrial processes and technical systems like no other.	
German	**6ZB3 500-0AQ01-0AA0**
English	**6ZB3 500-0AQ02-0AA0**
Automation with SIMATIC	
The book is perfectly suited for all those will little advance experience and who wish to familiarize themselves quickly with the field of programmable controllers.	
German	**6ZB3 500-0AE01-0AA0**
English	**6ZB3 500-0AE02-0AA0**
Automating with SIMATIC S7-1200	
The book introduces the new hardware components of the S7-1200 automation system and describes its configuration and parameterization. A sound introduction to STEP 7 Basic illustrates the fundamentals of programming and troubleshooting. Beginners learn the fundamentals of automation engineering with SIMATIC S7-1200, and those changing from S7-200 and S7-300 can find the knowledge required for this.	
German	**6ZB3 500-0BK01-0AA0**
English	**6ZB3 500-0BL01-0AA0**
LOGO! - Practical Training	
This practical book describes program creation and hardware selection clearly. As well as explaining standard control tasks in the form of a guide, it also contains a host of practical examples. Beginning with the quick start of the program simulation, the reader obtains comprehensive training in the different LOGO! versions.	
English, 1 unit	**6ZB3 500-0BH01-0AA0**
English, 10 units	**6ZB3 500-0BJ01-0AA0**

	Order No.
Automation with STEP 7 in STL and SCL	
Now in its sixth edition, this book presents the most recent service pack version of the STEP 7 programming software. It explains elements and applications of the text-oriented programming languages STL (Statement List) and SCL (Structured Control Language) for both SIMATIC S7-300 and SIMATIC S7-400, including new products for distributed I/O and for applications with PROFINET.	
German	**6ZB3 500-0AA01-0AA0**
English	**6ZB3 500-0AA02-0AA0**
Automation with STEP 7 in LAD and FBD	
The book describes elements and applications of LAD and FBD both for SIMATIC S7-300 and for SIMATIC S7-400. PROFINET IO, SFC 109 Protect and function blocks for I/O access are outlined as special functions.	
German	**6ZB3 500-0AB01-0AA0**
English	**6ZB3 500-0AB02-0AA0**
Controlling with SIMATIC	
This book describes control engineering in practical terms as a subset of open-loop control and automation engineering based on the SIMATIC S7 control system or the SIMATIC PCS 7 process control system within the scope of Totally Integrated Automation (TIA).	
German	**6ZB3 500-0AD01-0AA0**
English	**6ZB3 500-0AD02-0AA0**
Distributed configurations with PROFIBUS DP/DPV1	
Due to its practical nature, the book is especially suited for PROFIBUS planners, project engineers, and programmers. However, students and instructors will also find the basic and comprehensive illustration useful.	
German	**6ZB3 500-0AC01-0AA0**

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Specialist books for automation engineering

Ordering data	Order No.
Automating with PROFINET This book provides an introduction to the new PROFINET technology. Decision-makers, system designers and students get a compact overview of the concept, fundamentals, and current devices. Project engineers, start-up engineers and technicians obtain extensive knowledge that enables them to plan and solve their own PROFINET-based automation applications.	
German	**6ZB3 500-0AP01-0AA0**
English	**6ZB3 500-0AP02-0AA0**
Electrical drive technology This book deals with all aspects of modern electrical drive systems from a user viewpoint. It is aimed on the one hand at industrial users who want to understand, plan, use and maintain electrical drives and on the other hand at skilled operators, technicians, engineers and students who would like to acquire a comprehensive overview of electrical drive technology.	
German	**6ZB3 500-0BD01-0AA0**
Electrical feed drives in automation engineering 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	**6ZB3 500-0AF01-0AA0**
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**
Optimizing processes with RFID and Auto-ID Apart from the fundamentals of RFID/Auto-ID technology, this book also presents applications that are already being put to the test in various real-world situations. They demonstrate the approach, the process and the selection of RFID and Auto-ID systems for solving a variety of problems.	
German	**6ZB3 500-0BE01-0AA0**
English	**6ZB3 500-0BF01-0AA0**

Ordering data	Order No.
Industrial Ethernet in industrial automation This book provides plant planners and operators, programmers and commissioning engineers with the fundamental information and terminology for using Ethernet LAN technologies in industrial automation with SIMATIC.	
German	**6ZB3 500-0AM01-0AA0**
Dictionary of drive systems and mechatronics The dictionary contains a comprehensive collection of terms related to drives and automation engineering, mechatronics and related technical areas, including fieldbus technologies and electrical machines.	
German/English	**6ZB3 500-0AG01-0AA0**
German/English, on CD-ROM	**6ZB3 500-0AH02-0AA0**
Dictionary of electrical engineering, power engineering and automation This dictionary is a standard reference work for translators, engineers and technical writers who need a comprehensive and reliable collection of technical terms from the areas of power generation, transmission and distribution as well as drive and automation engineering, electrical installation engineering, power electronics, and measuring and test engineering.	
German-English	**6ZB3 500-0AJ01-0AA0**
English-German	**6ZB3 500-0AJ02-0AA0**
German-English/English-German, on CD-ROM	**6ZB3 500-0AJ03-0AA0**

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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!
- SIMADYN
- SIMATIC bus components
- SIMATIC C7
- SIMATIC Distributed I/O
- SIMATIC HMI
- SIMATIC Sensors
- SIMATIC NET
- SIMATIC PC Based Automation
- SIMATIC PCS 7
- SIMATIC PG/PC
- SIMATIC S7
- SIMATIC Software
- SIMATIC TDC

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 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	J	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year Current Manual Collection DVD as well as the three following updates	D	**6ES7 998-8XC01-8YE2**

D: Subject to export regulations AL: N and ECCN: 5D992
J: Subject to export regulations AL: N and ECCN: EAR99S

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CE marking

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/EWG “Electromagnetic Compatibility” (EMC guideline).
- 73/23/EWG “Electrical Equipment for Use Within Specific Voltage Limits” (low voltage guideline).

We have declarations of conformity available for the responsible authorities.

The SIMATIC products are designed for operation in industrial environments and comply with the following requirements:

Noise emissions: EN 50081-2: 1993
Noise immunity: EN 50082-2: 1995

The products can also be used in the domestic environment (household, business and trade area, small plants) with individual approval:

Emitted interference: Individual approval
Immunity: EN 50082-1: 1992

For household use an individual approval from the respective national authority or testing body is required as far as emitted-interference is concerned. In Germany this approval is issued by the Federal Post and Telecommunications Office and its subsidaries.

For the installation and operation of the products described in this catalog, the installation guidelines described in the manuals and the important notes concerning installation in cabinets and concerning the use of shielded cable must be complied with.

Notes for machine manufacturers

The SIMATIC automation system is not a machine within the context of the EU machine guidelines. 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

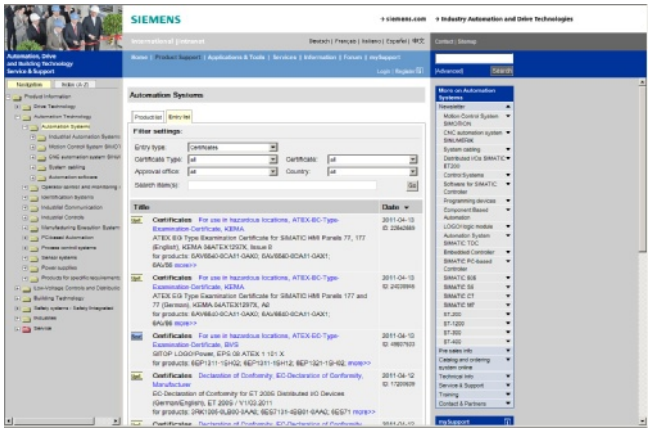
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Certificates, authorizations, approbations, declarations of conformity

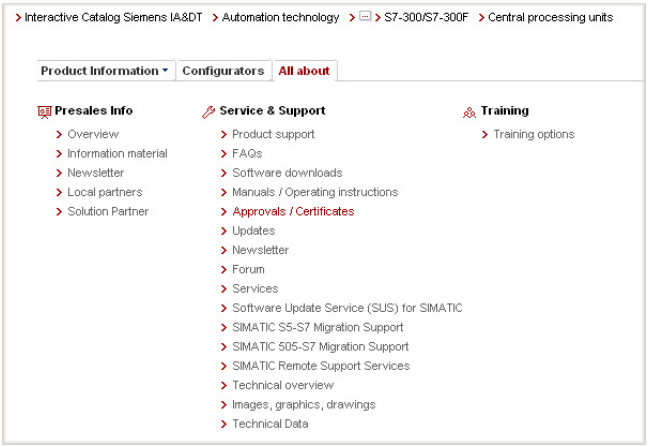
An overview of the certificates available for SIMATIC products (CE, UL, CSA, FM, shipping authorizations) can be found in the internet at

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

The lists are continously updated. The data for products which have not yet been included in the overview is continously collected and prepared for the subsequent edition.



You can also find certificates, approbations, verification certificates or characteristic curves by going directly to the Link Box:



Quality management

The quality management system of the Industry Sector, Industry Automation Division, complies with the international standard ISO 9001.

The products and systems described in this catalog are sold 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 Registered Certificate Nos.:

Siemens AG

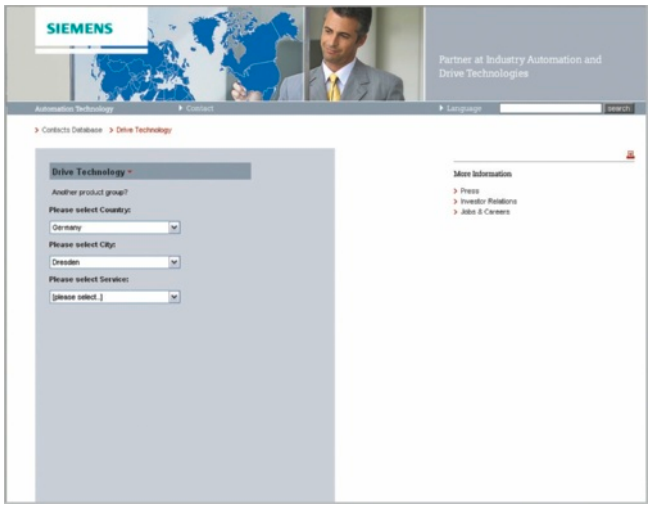
- I IA AS Industrial Automation Systems
  Reg. No.: 001323 QM08

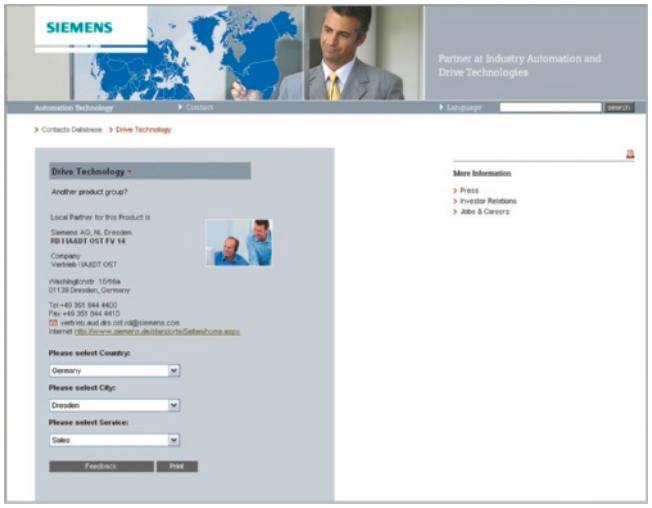
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Siemens contacts worldwide

Overview







At Siemens Industry Automation and Drive Technologies, more than 85 000 people are resolutely pursuing the same goal: long-term improvement of your competitive ability. We are committed to this goal. Thanks to our commitment, we continue to set new standards in automation and drive technology. In all industries – worldwide.

At your service locally, around the globe for consulting, sales, training, service, support, spare parts ... on the entire Industry Automation and Drive Technologies range.

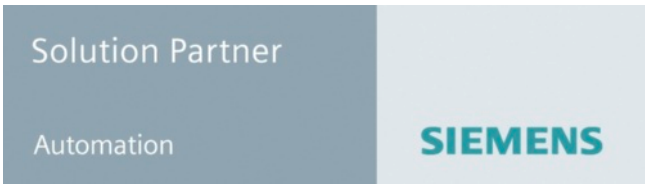
Your personal contact can be found in our Contacts Database at:
www.siemens.com/automation/partner

You start by selecting a

- Product group,
- Country,
- City,
- Service.

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Overview



Siemens Solution Partner Automation

The products and systems from Siemens Industry Automation and Drive Technologies offer the ideal platform for all automation applications.

Under the name of Siemens Solution Partners, selected system integrators around the world act as uniformly qualified solution providers for the Siemens range of products and services in the fields of automation and drives. Day after day, they utilize their qualified product and system know-how as well as their excellent industry expertise to your advantage – for all requirements.

The partner emblem is the guarantee and indicator of proven quality. The basis for this are defined quality features that identify Solution Partners as reliable and competent solution providers:

- Solution quality:
  Numerous reference reports offer you an insight into the solutions expertise of our Solution Partners.
- Expert quality:
  The Solution Partners are trained in specially planned workshops and are thus able to assess the potential of new technologies and implement innovative solutions.
- Project quality:
  Our Solution Partners obtain individual support from us in every industry, so that you can benefit from the highest project quality, greater safety and the comprehensive manufacturing expertise of Siemens.
- Product range quality:
  The Solution Partners offer a comprehensive service portfolio, ranging from consultation and implementation through to servicing.

Solution Partner Finder

The Siemens Solution Partner Program helps you to find the optimum partner for your specific requirements. Support is provided by the Solution Partner Finder, a comprehensive online database that showcases the profiles of all our solution partners. You can convince yourself of the competence of the respective Solution Partner by means of the references provided.

The following search criteria are possible:

- Country
- Technology
- Sector
- Company
- Zip code

Once you have located a partner, you are only one small step from contacting them.

You can locate the Solution Partner Finder as follows:

http://www.siemens.com/automation/partnerfinder

Additional information on the Siemens Solution Partner Program is available online at:

http://www.siemens.com/automation/solutionpartner

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Information and Ordering in the Internet and on DVD

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

www.siemens.com/industry

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

Product Selection Using the Offline Mall of Industry



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 Industry Automation and Drive Technologies 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.

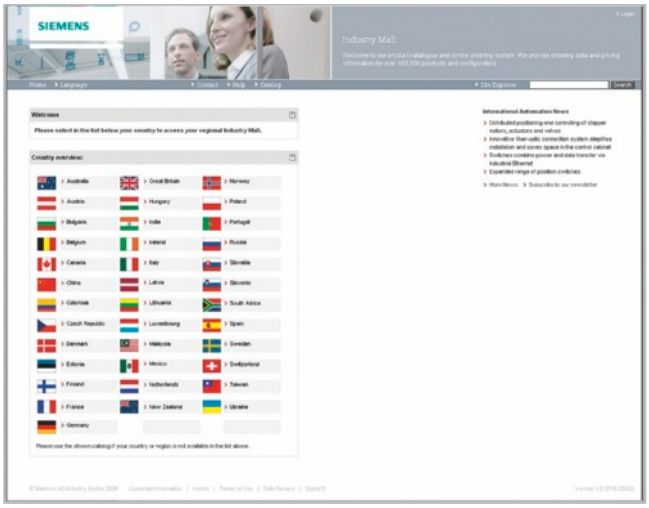
After selecting the product of your choice you can order at the press of a button, by fax or by online link.

Information on the Offline Mall CA 01 can be found in the Internet under

www.siemens.com/automation/ca01

or on DVD.

Easy Shopping with the Industry Mall



The Industry 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.

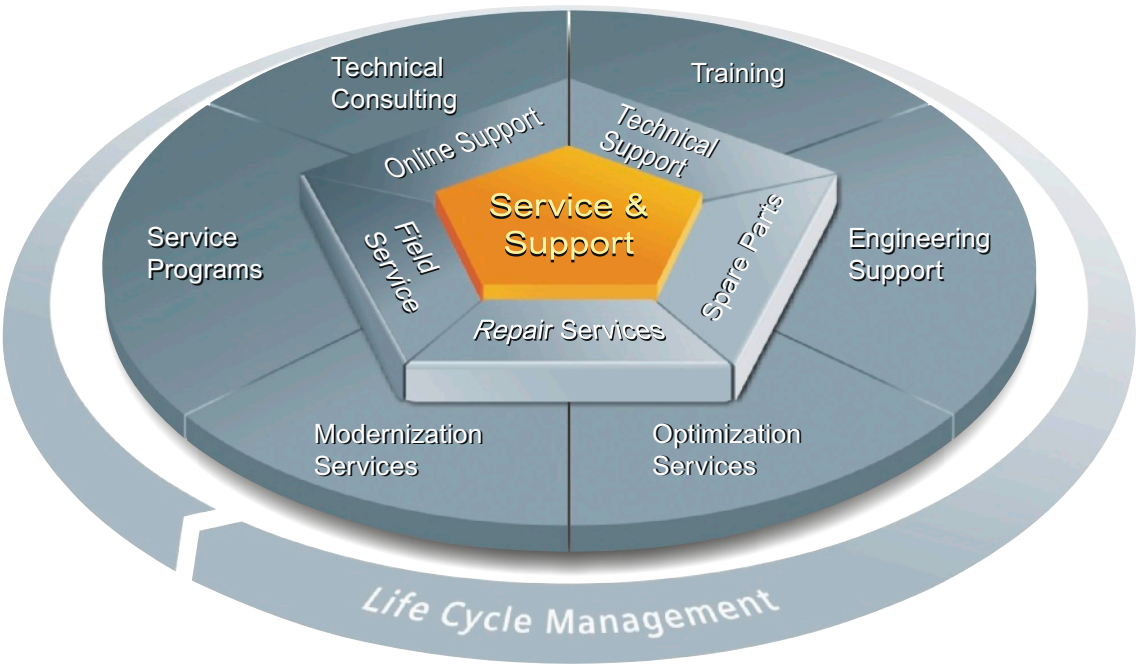
For example, powerful search functions make it easy to find the required products, which can be immediately checked for availability. Customer-specific discounts and preparation of quotes can be carried out online as well as order tracking and tracing.

Please visit the Industry Mall on the Internet under:

www.siemens.com/industrymall

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The unmatched complete service for the entire life cycle



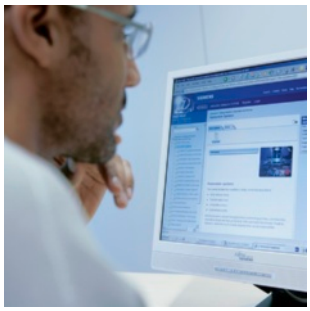
For machine constructors, solution providers and plant operators: The service offering from Siemens Industry, Automation and Drive Technologies includes comprehensive services for a wide range of different users in all sectors of the manufacturing and process industry

To accompany our products and systems, we offer integrated and structured services that provide valuable support in every phase of the life cycle of your machine or plant - from planning and implementation through commissioning as far as maintenance and modernization.

Our Service & Support accompanies you worldwide in all matters concerning automation and drives from Siemens. We provide direct on-site support in more than 100 countries through all phases of the life cycle of your machines and plants.

You have an experienced team of specialists at your side to provide active support and bundled know-how. Regular training courses and intensive contact among our employees - even across continents - ensure reliable service in the most diverse areas.

Online Support



The comprehensive online information platform supports you in all aspects of our Service & Support at any time and from any location in the world.

www.siemens.com/automation/service&support

Technical Consulting



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

Technical Support



Expert advice on technical questions with a wide range of demand-optimized services for all our products and systems.

www.siemens.com/automation/support-request

Training



Extend your competitive edge - through practical know-how directly from the manufacturer.

www.siemens.com/sitrain

Contact information is available in the Internet at:
www.siemens.com/automation/partner

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The unmatched complete service for the entire life cycle

Engineering Support



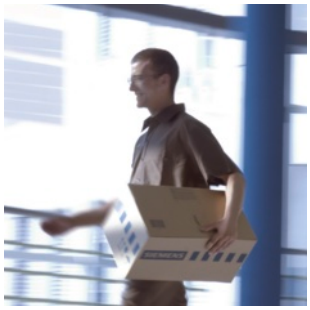
Support during project engineering and development with services fine-tuned to your requirements, from configuration through to implementation of an automation project.

Field Service



Our Field Service offers you services for commissioning and maintenance - to ensure that your machines and plants are always available.

Spare parts



In every sector worldwide, plants and systems are required to operate with constantly increasing reliability. We will provide you with the support you need to prevent a standstill from occurring in the first place: with a worldwide network and optimum logistics chains.

Repairs



Downtimes cause problems in the plant as well as unnecessary costs. We can help you to reduce both to a minimum - with our worldwide repair facilities.

Optimization



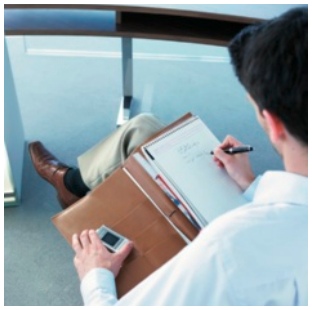
During the service life of machines and plants, there is often a great potential for increasing productivity or reducing costs. To help you achieve this potential, we are offering a complete range of optimization services.

Modernization



You can also rely on our support when it comes to modernization - with comprehensive services from the planning phase all the way to commissioning.

Service programs



Our service programs are selected service packages for an automation and drives system or product group. The individual services are coordinated with each over to ensure smooth coverage of the entire life cycle and support optimum use of your products and systems.

The services of a Service Program can be flexibly adapted at any time and used separately.

Examples of service programs:

- Service contracts
- Plant IT Security Services
- Life Cycle Services for Drive Engineering
- SIMATIC PCS 7 Life Cycle Services
- SINUMERIK Manufacturing Excellence
- SIMATIC Remote Support Servicess

Advantages at a glance:

- Reduced downtimes for increased productivity
- Optimized maintenance costs due to a tailored scope of services
- Costs that can be calculated and therefore planned
- Service reliability due to guaranteed response times and spare part delivery times
- Customer service personnel will be supported and relieved of additional tasks
- Comprehensive service from a single source, fewer interfaces and greater expertise

Contact information is available in the Internet at:
www.siemens.com/automation/partner

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Knowledge Base on DVD



For locations without online connections to the Internet there are excerpts of the free part of the information sources available on DVD (Service & Support Knowledge Base). This DVD contains all the latest product information at the time of production (FAQs, Downloads, Tips and Tricks, Updates) as well as general information on Service & Support.

The DVD also includes a full-text search and our Knowledge Manager for targeted searches for solutions. The DVD will be updated every 4 months.

Just the same as our online offer in the Internet, the Service & Support Knowledge Base on DVD comes complete in 5 languages (German, English, French, Italian, Spanish).

You can order the **Service & Support Knowledge Base** DVD from your Siemens contact.

Order no. **6ZB5310-0EP30-0BA2**

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 something on our Online portal, 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.

Order your Automation and Value Card easily and comfortably like a product with your sales contact.

Automation Value Card order numbers	
Credits	Order no.
200	**6ES7 997-0BA00-0XA0**
500	**6ES7 997-0BB00-0XA0**
1 000	**6ES7 997-0BC00-0XA0**
10 000	**6ES7 997-0BG00-0XA0**

Detailed information on the services offered is available on our Internet site at:

www.siemens.com/automation/service&support

Service & Support à la Card: Examples

Technical Support	
"Priority"	Priority processing for urgent cases
"24 h"	Availability round the clock
"Extended"	Technical consulting for complex questions
"Mature Products"	Consulting service for products that are not available any more
Support Tools in the Support Shop	
	Tools that can be used directly for configuration, analysis and testing

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Overview

Software types

Software requiring a license is categorized into types.
The following software types have been defined:

- Engineering software
- Runtime software

Engineering software

This includes all software products for creating (engineering) user software, e.g. for configuring, programming, parameterizing, testing, commissioning or servicing.

Data generated with engineering software and executable programs can be duplicated for your own use or for use by third-parties free-of-charge.

Runtime software

This includes all software products required for plant/machine operation, e.g. operating system, basic system, system expansions, drivers, etc.

The duplication of the runtime software and executable programs created with the runtime software for your own use or for use by third-parties is subject to a charge.

You can find information about license fees according to use in the ordering data (e.g. in the catalog). Examples of categories of use include per CPU, per installation, per channel, per instance, per axis, per control loop, per variable, etc.

Information about extended rights of use for parameterization/configuration tools supplied as integral components of the scope of delivery can be found in the readme file supplied with the relevant product(s).

License types

Siemens Industry Automation & Drive Technologies offers various types of software license:

- Floating license
- Single license
- Rental license
- 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 Industry Automation & Drive Technologies supplies software products with and without license keys.

The license key serves as an electronic license stamp and is also the "switch" for activating the software (floating license, rental license, etc.).

The complete installation of software products requiring license keys includes the program to be licensed (the software) and the license key (which represents the license).

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Catalog improvement suggestions

Fax form

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