

Products for Totally Integrated Automation and Micro Automation

Catalog ST 70 • 2011



SIMATIC

SIMATIC

Answers for industry.

SIEMENS

Related catalogs

Industrial Communication SIMATIC NET IK PI E86060-K6710-A101-B6-7600		SIMATIC TOP connect System Cabling for SIMATIC S7 KT 10.2 PDF (E86060-K2410-A201-A5-7600)	
Industrial Communication SIMATIC NET IK PI N E86060-K6710-A121-A3-7600 (News)		SIMATIC Ident Industrial Identification Systems ID 10 E86060-K8310-A101-A7-7600	
SIMATIC HMI / PC-based Automation Human Machine Interface Systems PC-based Automation ST 80/ST PC E86060-K4680-A101-B7-7600		SITRAIN Training for Automation and Industrial Solutions ITC Only available in German E86060-K6850-A101-C2	
SIMATIC SIMATIC PCS 7 Process Control System ST PCS 7 E86060-K4678-A111-B5-7600		Catalog CA 01 Products for Automation and Drives CA 01 DVD: E86060-D4001-A510-C9-7600	
SITOP Power supply SITOP KT 10.1 E86060-K2410-A111-A7-7600		Industry Mall Information and Ordering Platform in the Internet: www.siemens.com/industrymall	

SIMATIC

Products for Totally Integrated Automation and Micro Automation

Catalog ST 70 · 2011



The products and systems described in this catalog are manufactured/distributed under application of a certified quality management system in accordance with DIN EN ISO 9001 (Certified Registration No. 1323-QM08). The certificate is recognized by all IQNet countries.

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

Refer to the Industry Mall for current updates of this catalog:

www.siemens.com/industrymall

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

Please contact your local Siemens branch

© Siemens AG 2011

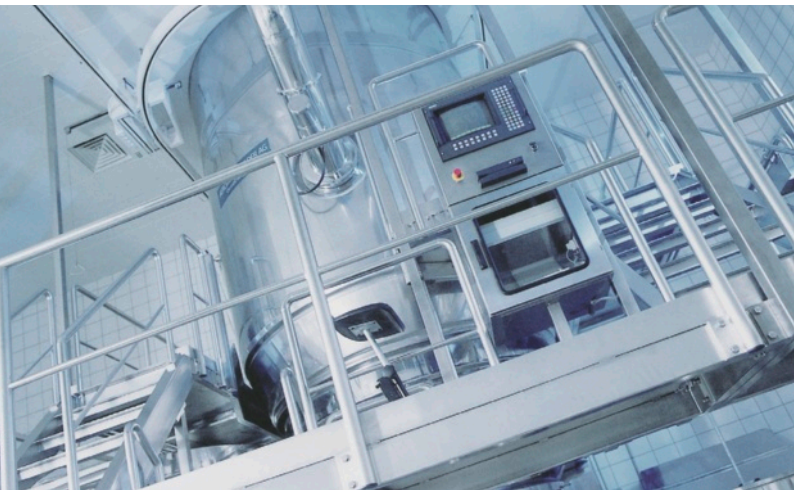


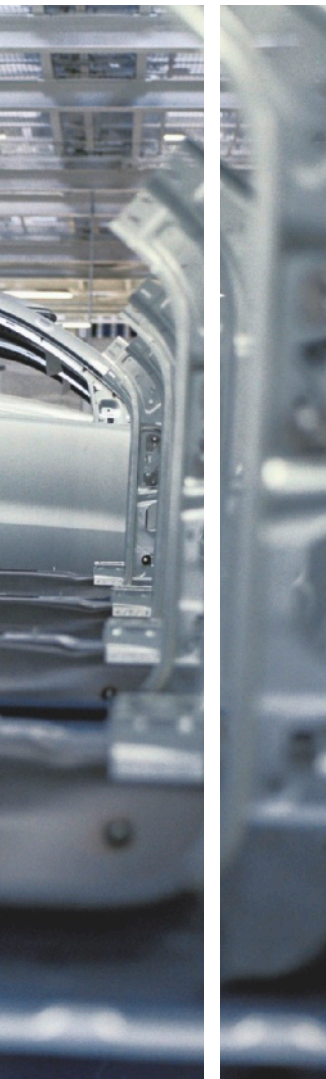
Printed on paper
from sustainably
managed forests and
controlled sources.

PEFC™
PEFC/04-31-0845

www.pefc.org

Introduction	1
LOGO! logic module	2
SIMATIC S7-200	3
SIMATIC S7-1200	4
SIMATIC S7-300	5
SIMATIC S7-400	6
Embedded controller	7
SIMATIC PC-based controller	8
SIMATIC ET 200 distributed I/O	9
SIMATIC control systems	10
SIMATIC industrial software	11
SIMATIC programming devices	12
Overview	13
Supplementary components	14
Appendix	15





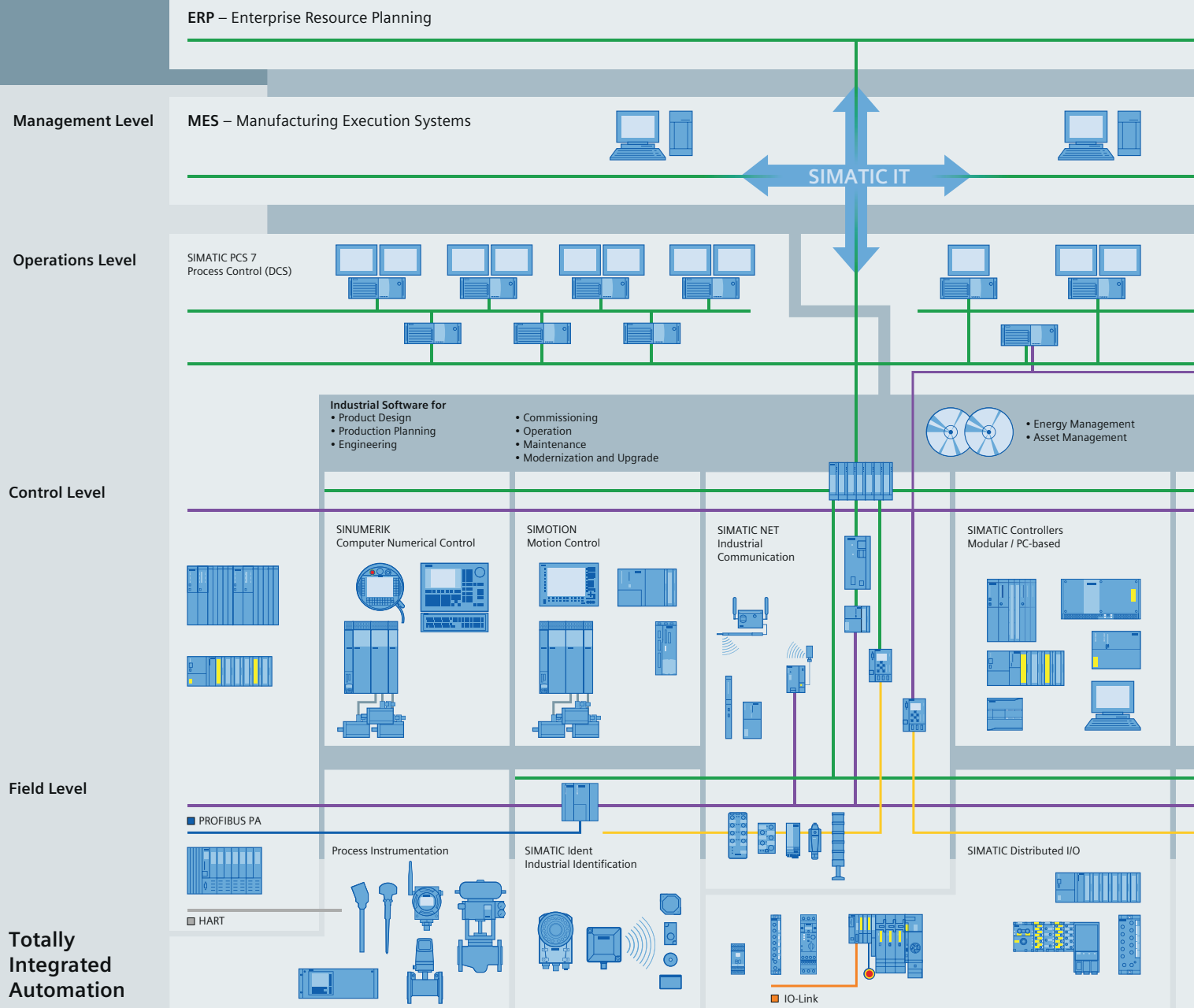
Answers for industry.

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

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

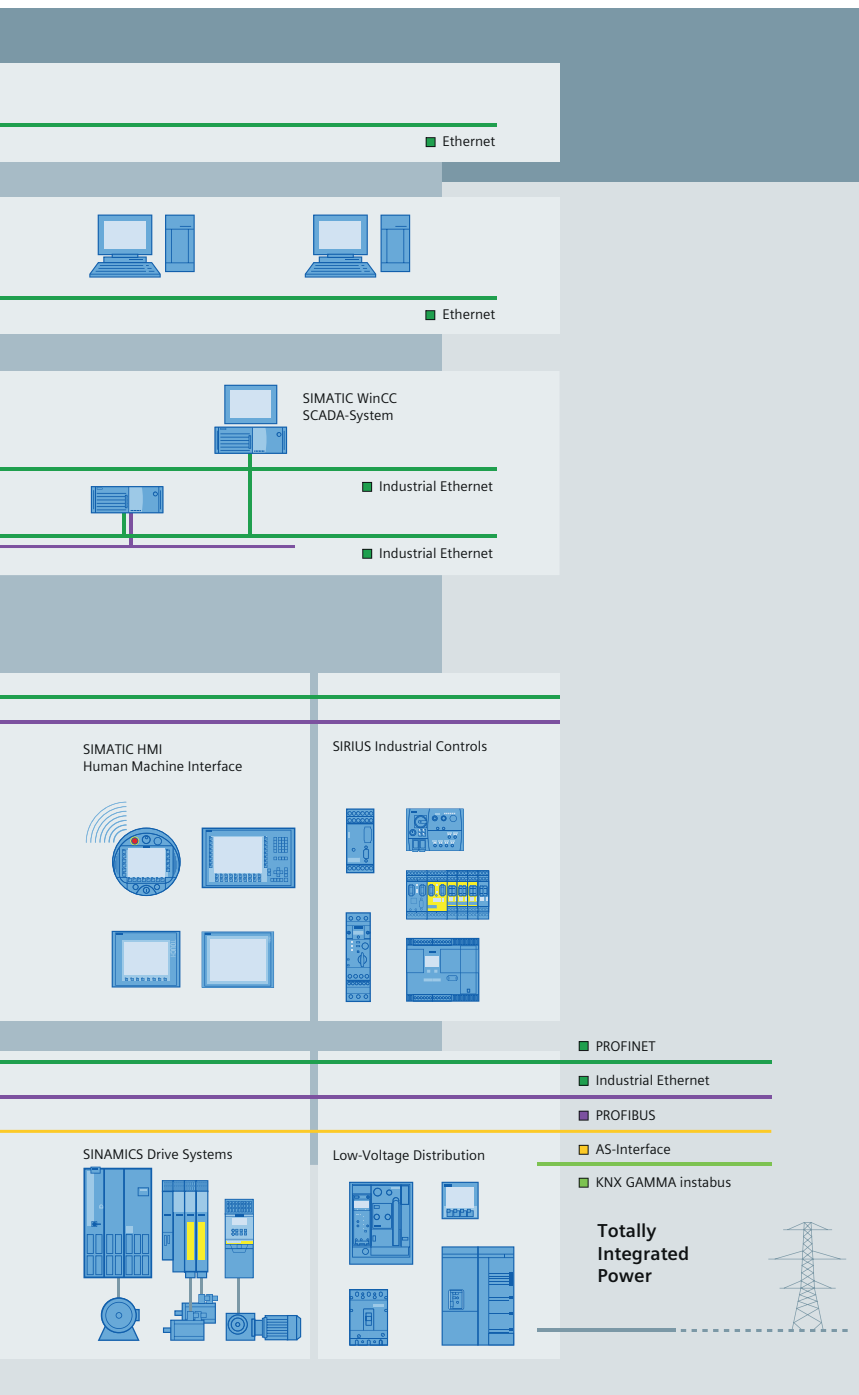
The high quality of our products sets industry-wide benchmarks. High environmental aims are part of our eco-management, and we implement these aims consistently. Right from product design, possible effects on the environment are examined. Hence many of our products and systems are RoHS compliant (Restriction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

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



Setting standards in productivity and competitiveness.

Totally Integrated Automation.



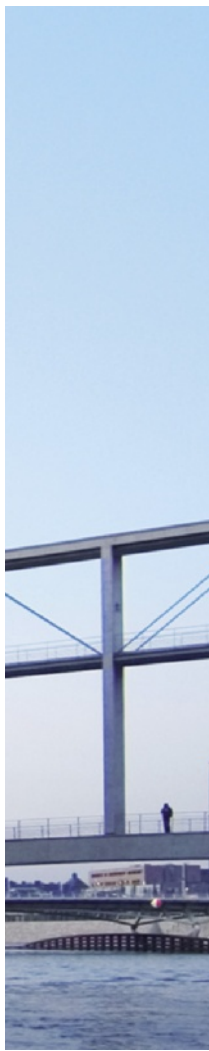
TIA is characterized by its unique continuity.

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.

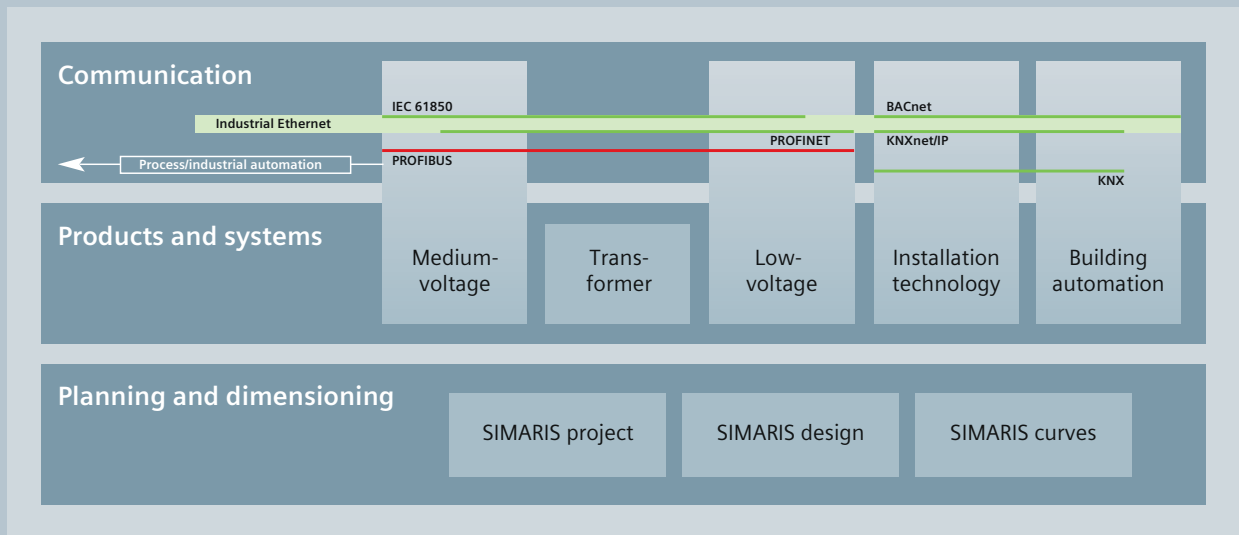
The result: maximum interoperability – covering the controller, HMI, drives, up to the process control system. This reduces the complexity of the automation solution in your plant. You will experience this, for example, in the engineering phase of the automation solution in the form of reduced time requirements 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.



Integrated power distribution from one source.

Totally Integrated Power.



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.



Much more than a catalog. The Industry Mall.

You have a catalog in your hands that will serve you well for selecting and ordering your products. But have you heard of the electronic online catalog (the Industry Mall) and all its benefits? Take a look around it sometime:

www.siemens.com/industrymall



Selecting

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.

Ordering

You can load the products that you have selected in this way into the shopping basket at a click of the mouse. You can create your own templates and you will be informed about the availability of the products in your shopping cart. You can load the completed parts lists directly into Excel or Word.

Delivery status

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!

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 x 90 x 55 mm (4 modular widths)			

— = cannot be used/not available

● = can be used/available

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				

— = cannot be used/not available

● = can be used/available

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

— = cannot be used/not available

● = can be used/available

Introduction

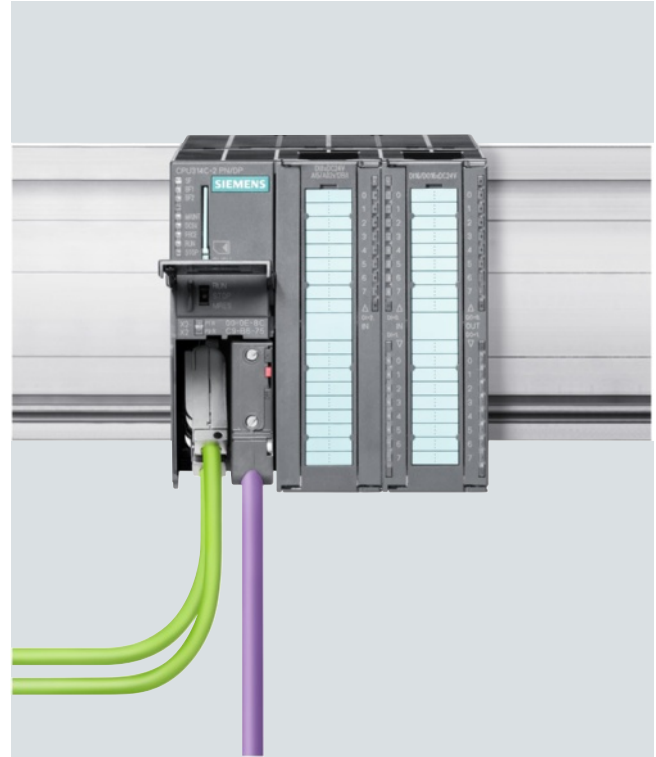
SIMATIC modular controllers

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

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

¹⁾ CPU 314
²⁾ CPU 315-2 PN/DP

³⁾ CPU 317-2 PN/DP
⁴⁾ CPU 317TF-2 PN/DP

- 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

⁶⁾ CPU 314C-2 PN/DP

⁷⁾ CPU 315F-2 PN/DP

⁸⁾ CPU 317F-2 PN/DP

⁹⁾ CPU 319F-3 PN/DP

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

- 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

Introduction

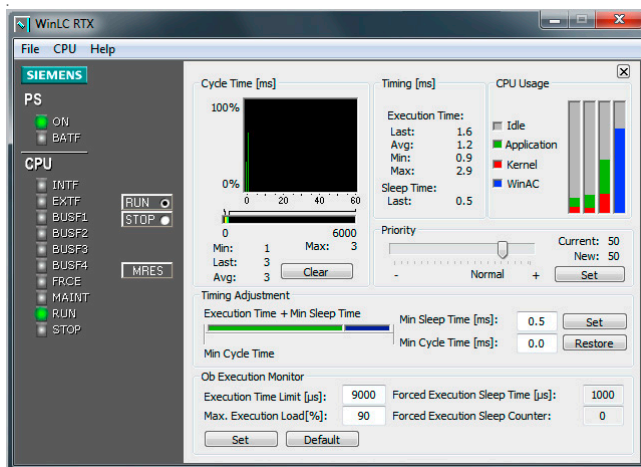
SIMATIC controllers

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>

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>

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.

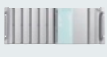
SIMATIC Panel PC

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>

	Rack PC	Box PC	Panel PC	
8xx series High Industrial Maximum expandability Rugged High performance	 IPC847C	 IPC827C		Identical Mainboard basis + Advantages due to identical Mainboard basis + Identical system software and driver due to identical processors and chipsets + Reduced evaluation costs when using different SIMATIC IPCs + Reduced supply of spare parts (e.g. memory, hard disks)
6xx series High Industrial Compact Rugged High performance	 IPC647C	 IPC627C	 HMI IPC677C	
5xx series Industrial High / maximum performance Expandable Cost-effective	 IPC547D		 HMI IPC577C	
4xx series Embedded Ultra-compact Highly rugged Maintenance-free		 IPC427C	 HMI IPC477C	Identical Mainboard basis ⌚ Long-term availability and defined further development ⌚ Mainboards from our own ¹⁾ development and production facilities ⌚ Long-term availability of 3-5 years ⌚ 5 year of repair and spare parts service This results in a total service and support period of 8-10 years.
2xx series Embedded Nano-compact Highly rugged Maintenance-free		 IPC227D	 HMI IPC277D	



Long-term availability and defined further development
 ⌚ Mainboards from our own¹⁾ development and production facilities
 ⌚ Long-term availability of 3-5 years

⌚ 5 year of repair and spare parts service
 This results in a total service and support period of 8-10 years.

¹⁾ The SIMATIC IPC547D is also developed and manufactured in Germany.

G_5780_XY_00459

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>

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.

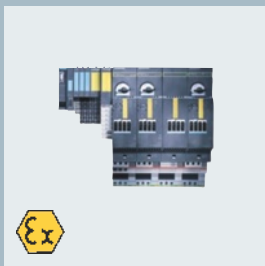
Communication over PROFINET and PROFIBUS, uniform engineering, transparent diagnostics options as well as optimum interfacing to SIMATIC controllers and HMI devices prove the unique integration of Totally Integrated Automation. In addition to the fieldbus systems, the point-to-point connection IO-Link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

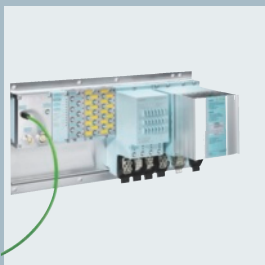
Intrinsically safe version for hazardous area



Without control cabinet (IP65/67)

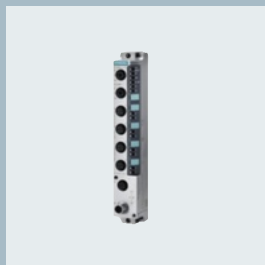
ET 200pro

Modular design and multifunctional



ET 200eco PN

Low-cost, spacesaving block I/Os



ET 200eco

Economical digital block I/Os

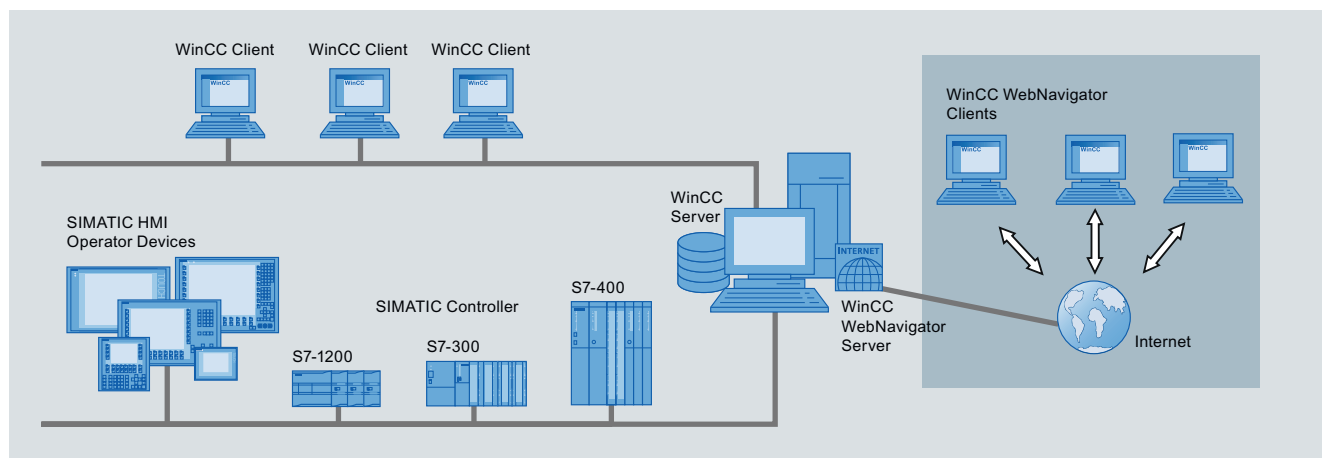


ET 200R

The solution for robots



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.

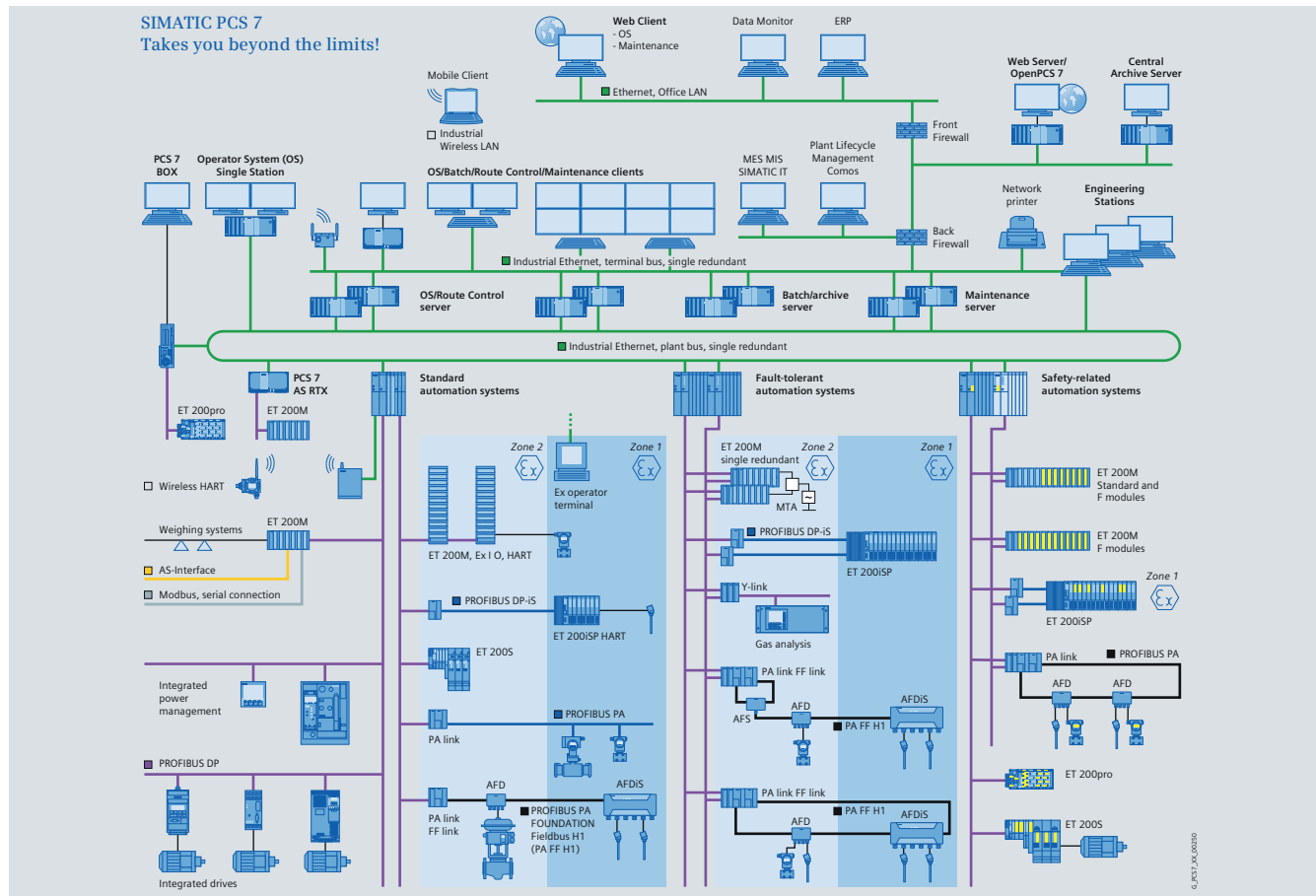
Functional or industry-specific expansions of the runtime software are available in the form of options. Some of the options are already integrated as standard functions in the HMI devices of different performance classes, while others can only be executed together with the corresponding runtime basic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

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:

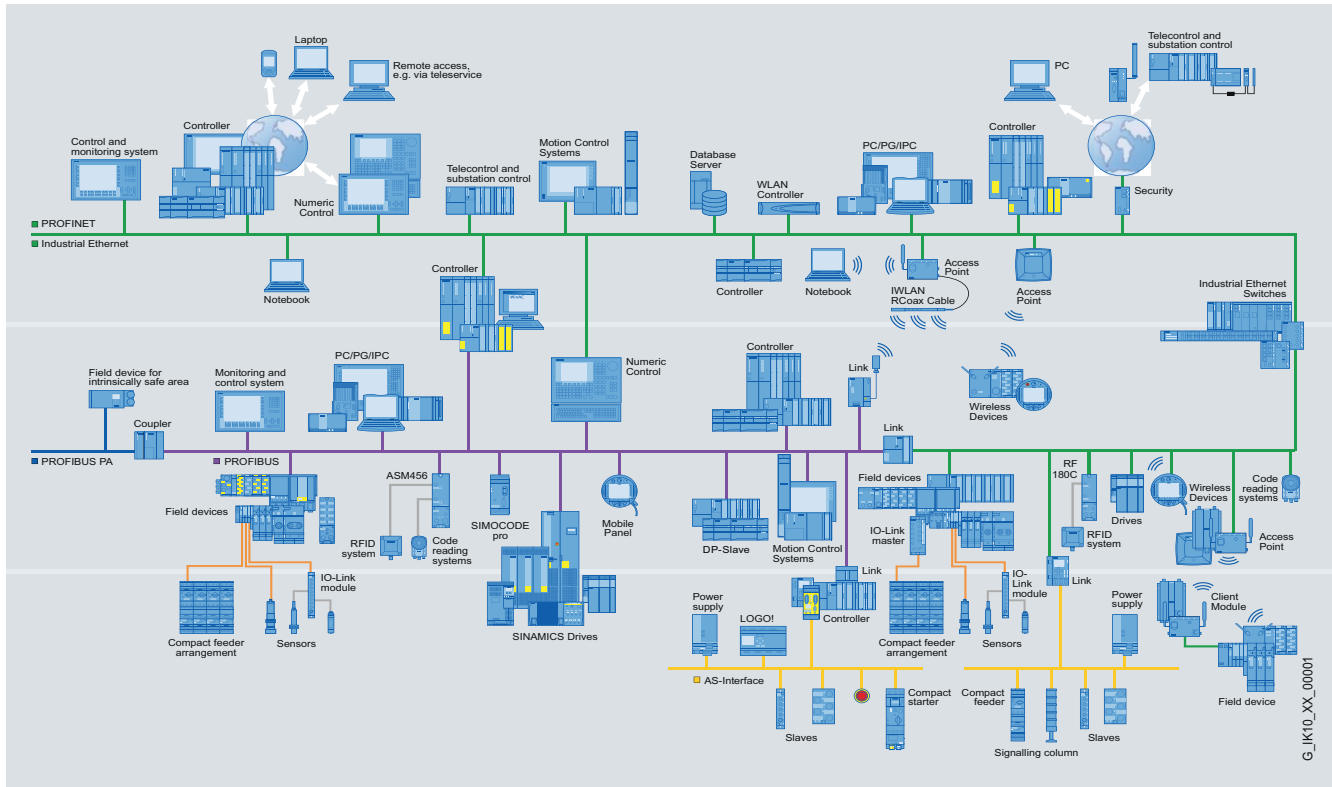
- Reduction of total cost of ownership through integration
- High performance and quality coupled with efficient engineering, reliability, and availability
- Flexibility and scalability – from small laboratory systems to large plant networks
- Protection of investments thanks to step-by-step modernization 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>

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>

LOGO! logic module



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>

LOGO! logic module

Introduction

LOGO! logic module

Overview



LOGO! logic module

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

SIPLUS LOGO!

- The 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:

SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm;
HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm

Limit value (max. 30 min/d):

SO₂ < 17.8 ppm; H₂S < 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!

Overview



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

2

Technical specifications

	6ED1 052-1CC01-0BA6	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

LOGO! logic module

LOGO! modular

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

LOGO! logic module 24C 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	I
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	
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	
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	

Order No.

6ED1 052-1CC01-0BA6
6ED1 052-1MD00-0BA6
6ED1 052-1HB00-0BA6
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 English French Spanish Italian Chinese	6ED1 050-1AA00-0AE7 6ED1 050-1AA00-0BE7 6ED1 050-1AA00-0CE7 6ED1 050-1AA00-0DE7 6ED1 050-1AA00-0EE7 6ED1 050-1AA00-0KE7

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

Ordering data		Order No.	Order No.	
LOGO! Memory Card		6ED1 056-1DA00-0BA0	LOGO! modem cable	6ED1 057-1CA00-0BA0
Program module for copying, with know-how protection			Adapter cable for analog modem communication	
LOGO! battery card		6ED1 056-6XA00-0BA0	Front plate mounting set	
Battery module for backing up the integral real-time clock (not LOGO! 24)			Width 4 modular spacings	6AG1 057-1AA00-0AA0
			Width 4 modular spacings, with keys	6AG1 057-1AA00-0AA3
LOGO! memory/battery card		6ED1 056-7DA00-0BA0	Width 8 modular spacings	6AG1 057-1AA00-0AA1
Combined program and battery module, with know-how protection and for backing up the integral real-time clock (not LOGO! 24)			Width 8 modular spacings, with keys	6AG1 057-1AA00-0AA2
LOGO! PROM	L	6AG1 057-1AA01-0BA6	LOGO! News Box, 12/24 V	
Programming device used to simultaneously reproduce program module contents on up to 8 program modules			Contains LOGO! 12/24RC, LOGO! USB PC cable, LOGO!Soft Comfort V6.0, manual, screwdriver, information material	
LOGO!Soft Comfort V6.0	J	6ED1 058-0BA02-0YA0	German	J 6ED1 057-3BA00-0AA5
For programming on the PC in LAD/FBD; executes on Windows 98 SE and higher, Linux, MAC OSX; on CD-ROM			English	J 6ED1 057-3BA00-0BA5
LOGO!Soft Comfort V6.0 upgrade	J	6ED1 058-0CA02-0YE0	LOGO! News Box, 230 V	
Upgrade from V1.0 to V6.0			Contains LOGO! 230RC, LOGO! USB PC cable, LOGO!Soft Comfort V6.0, manual, screwdriver, information material	
LOGO! PC cable		6ED1 057-1AA00-0BA0	German	J 6ED1 057-3AA02-0AA0
For program transfer between LOGO! and the PC			English	J 6ED1 057-3AA02-0BA0
LOGO! USB PC cable	J	6ED1 057-1AA01-0BA0	LOGO! TD News Box, 12/24 V	
For transferring the program between LOGO! and PC, including driver on CD-ROM			Contains LOGO! 12/24RC, 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: 91999 and ECCN: N

LOGO! logic module

LOGO! modular

SIPLUS LOGO! modular basic versions

Overview

2



- 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:

SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm

Limit value (max. 30 min/d):

SO₂ < 17.8 ppm; H₂S < 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.	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	Accessories	
			SIPLUS Upmister upstream device	L 6AG1 053-1AA00-2AA0
			for reliable operation at the battery of combustion engines	
			Additional accessories	See LOGO! modular basic versions
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		

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

L: Subject to export regulations AL: 91999 and ECCN: N

LOGO! logic module

LOGO! modular

LOGO! modular pure versions

Overview

2



- 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

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.****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

LOGO! logic module

LOGO! modular

LOGO! modular pure versions

2

Ordering data	Order No.	Order No.
Accessories		LOGO! memory/battery card
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	6ED1 056-7DA00-0BA0 Combined program and battery module, with know-how protection and for backing up the integral real-time clock (not LOGO! 240)
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! PROM L 6AG1 057-1AA01-0BA6 Programming device used to simultaneously reproduce program module contents on up to 8 program modules
LOGO! manual German English French Spanish Italian Chinese	6ED1 050-1AA00-0AE7 6ED1 050-1AA00-0BE7 6ED1 050-1AA00-0CE7 6ED1 050-1AA00-0DE7 6ED1 050-1AA00-0EE7 6ED1 050-1AA00-0KE7	LOGO!Soft Comfort V6.0 J 6ED1 058-0BA02-0YA0 For programming on the PC in LAD/FBD; executes on Windows 98 SE and higher, Linux, MAC OSX; on CD-ROM
LOGO! Memory Card Program module for copying, with know-how protection	6ED1 056-1DA00-0BA0	LOGO!Soft Comfort V6.0 upgrade J 6ED1 058-0CA02-0YE0 Upgrade from V1.0 to V6.0
LOGO! battery card Battery module for backing up the integral real-time clock (not LOGO! 24)	6ED1 056-6XA00-0BA0	LOGO! PC cable 6ED1 057-1AA00-0BA0 For program transfer between LOGO! and the PC
		LOGO! USB PC cable J 6ED1 057-1AA01-0BA0 For transferring the program between LOGO! and PC, including driver on CD-ROM
		LOGO! modem cable 6ED1 057-1CA00-0BA0 Adapter cable for analog modem communication

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

L: Subject to export regulations AL: 91999 and ECCN: N

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:

SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm

Limit value (max. 30 min/d):

SO₂ < 17.8 ppm; H₂S < 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

LOGO! logic module

LOGO! modular

SIPLUS LOGO! modular pure versions

2

Ordering data	Order No.	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	6AG1 052-2CC01-2BA6	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 2/10
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	

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

L: Subject to export regulations AL: 91999 and ECCN: N

Overview



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

2

Technical specifications

	6ED1 055-1CB00-0BA0	6ED1 055-1HB00-0BA0	6ED1 055-1MB00-0BA1	6ED1 055-1FB00-0BA1
Supply voltages				
Rated value				
• 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

LOGO! logic module

LOGO! modular

LOGO! modular expansion modules

2

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	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

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. • with inductive load, max. • mechanical, max.	10 Hz 0.5 Hz	2 Hz 0.5 Hz 10 Hz	2 Hz 0.5 Hz 10 Hz
Relay outputs			
Switching capacity of contacts • with inductive load, max. • with resistive load, max. • thermal continuous current, max.	0.3 A	3 A 5 A	3 A 5 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. • Max.	0 °C 55 °C	0 °C 55 °C	0 °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 • Width • Height • Depth	on 35 mm DIN rail, 4 spacing units wide 72 mm; 4 DU 90 mm 53 mm	on 35 mm DIN rail, 4 spacing units wide 72 mm; 4 DU 90 mm 53 mm	on DIN rail 25 mm, 4 module spaces wide 72 mm; 4 DU 90 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

LOGO! logic module

LOGO! modular

LOGO! modular expansion modules

2

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

Ordering data	Order No.	Accessories	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! Manual German English French Spanish Italian Chinese	6ED1 050-1AA00-0AE7 6ED1 050-1AA00-0BE7 6ED1 050-1AA00-0CE7 6ED1 050-1AA00-0DE7 6ED1 050-1AA00-0EE7 6ED1 050-1AA00-0KE7
LOGO! 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! memory card for copying, with know-how protection	6ED1 056-1DA00-0BA0
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!Soft Comfort V6.0 J For programming on the PC in LAD/FBD; executes on Windows 98 SE and higher, Linux, MAC OSX; on CD-ROM	6ED1 058-0BA02-0YA0
LOGO! DM8 24R Supply voltage 24 V AC/DC, 4 digital inputs 24 V AC/DC, 4 relay outputs 5 A	6ED1 055-1HB00-0BA0	LOGO!Soft Comfort V6.0 J upgrade Upgrade from V1.0 to V6.0	6ED1 058-0CA02-0YE0
LOGO! DM16 24R Supply voltage 24 V DC, 8 digital inputs 24 V DC, 8 relay outputs 5 A	6ED1 055-1NB10-0BA0	LOGO! PC cable For program transfer between LOGO! and PC	6ED1 057-1AA00-0BA0
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 I Supply voltage 12/24 V DC, 2 analog inputs Pt100, temper- ature range -50 °C ... 200 °C	6ED1 055-1MD00-0BA1		
LOGO! AM2 AQ I Supply voltage 24 V DC, 2 analog outputs 0 to 10 V, 0/4 to 20 mA	6ED1 055-1MM00-0BA1		

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

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

LOGO! logic module

LOGO! modular

SIPLUS LOGO! modular expansion modules

Overview

2



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

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 No.	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.	

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: SO₂ < 4.8 ppm;
H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm;
NH₃ < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm;
Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH₃ < 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

LOGO! logic module

LOGO! modular

SIPLUS LOGO! modular expansion modules

2

Ordering data	Order No.		Order No.
SIPLUS LOGO! DM8 24 (extended temperature range and medial exposure) 24 V DC power supply, four 24 V DC digital inputs, four 24 V DC digital outputs, 0.3 A Temperature range -25 ... +70 °C H Temperature range -40 ... +70 °C L	6AG1 055-1CB00-2XB0 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 Temperature range -40 ... +70 °C L	6AG1 055-1PB00-2XB0 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 Temperature range -40 ... +70 °C L	6AG1 055-1HB00-2XB0 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 Temperature range -40 ... +70 °C L	6AG1 055-1MB00-2XB1 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 Temperature range -40 ... +70 °C L	6AG1 055-1FB00-2XB1 6AG1 055-1FB00-2BY1		
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 Temperature range -40 ... +70 °C L	6AG1 055-1MA00-2XB0 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 for reliable operation at the battery of combustion engines	6AG1 053-1AA00-2AA0		
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

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) x 90 x 55

Ordering data

Order No.

LOGO! CM EIB KNX communication module for connection to <i>EIB</i> , 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

LOGO! logic module

LOGO! modular

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

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		
Rated voltage $U_{in \text{ rated}}$	1-phase AC or DC 100-240 V AC Wide-range input	1-phase AC or DC 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	$2.3 \times U_{in \text{ rated}}$, 1.3 ms	$2.3 \times U_{in \text{ rated}}$, 1.3 ms
Mains buffering at $I_{out \text{ rated}}$	> 40 ms at $U_{in} = 187 \text{ V}$	> 40 ms at $U_{in} = 187 \text{ V}$
Rated line frequency, rated line frequency range	50/60 Hz; 47 ... 63 Hz	50/60 Hz; 47 ... 63 Hz
Rated current $I_{in \text{ rated}}$	0.36-0.22 A	0.71-0.37 A
Switch-on current limitation (+25 °C)	< 26 A	< 50 A
β_t	< 0.8 A ² s	< 3 A ² s
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		
Rated voltage $U_{out \text{ rated}}$	Controlled, isolated DC voltage 5 V DC	Controlled, isolated DC voltage 5 V DC
Total tolerance, static	±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 $I_{out \text{ rated}}$	3 A	6.3 A
Current range up to +55 °C	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

LOGO! logic module

LOGO!Power

LOGO!Power

2

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 ($U_{in rated} \pm 15\%$)	< 0.2 % U_{out}	< 0.2 % U_{out}
Dynamic load compensation (I_{out} : 10/90/10 %)	Typ. $\pm 3\%$ U_{out}	Typ. $\pm 3\%$ 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 2 screw terminals each for 0.5 ... 2.5 mm ²	Solid/finely-stranded per screw-type terminal for 0.5 mm ... 2.5 mm ² 2 screw terminals each for 0.5 ... 2.5 mm ²
Connections		
• Output +		
• Output -		
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

Technical specifications LOGO!Power 12 V

Power supply, type Order No.	12 V/1.9 A 6EP1 321-1SH03	12 V/4.5 A 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	$2.3 \times U_{in rated}$, 1.3 ms	$2.3 \times U_{in rated}$, 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
β_t	< 0.8 A ² s	< 3 A ² s
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	±3 %	±3 %
• Static mains compensation	Approx. 0.2 %	Approx. 0.1 %
• Static load smoothing	Approx. 1.5 %	Approx. 1.5 %
Residual ripple	< 200 mV _{pp} (typ. 10 mV _{pp})	< 200 mV _{pp} (typ. 10 mV _{pp})
Spikes (bandwidth approx. 20 MHz)	< 300 mV _{pp} (typ. 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	0 ... 1.9 A	0 ... 4.5 A
• Derating	0 ... 1.3 A (up to +70 °C)	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 ($U_{in rated} \pm 15$ %)	< 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 %	Approx. 1 ms	Approx. 1 ms
• 90 to 10 %	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

LOGO! logic module

LOGO!Power

LOGO!Power

2

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	2 screw terminals each for 0.5 ... 2.5 mm ²	2 screw terminals each for 0.5 ... 2.5 mm ²
• Output +		
• Output -		
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		
Rated voltage value $U_{in rated}$	1-phase AC or DC 100-240 V AC Wide-range input	1-phase AC or DC 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	$2.3 \times U_{in rated}$, 1.3 ms	$2.3 \times U_{in rated}$, 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
ρ_t	< 0.8 A ² s	< 3 A ² s
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		
Rated voltage $U_{out rated}$	Controlled, isolated DC voltage 15 V DC	Controlled, isolated DC voltage 15 V DC
Total tolerance, static	±3 %	±3 %
• Static mains compensation	Approx. 0.1 %	Approx. 0.1 %
• Static load smoothing	Approx. 1.5 %	Approx. 1.5 %
Residual ripple	< 200 mV _{pp} (typ. 10 mV _{pp})	< 200 mV _{pp} (typ. 10 mV _{pp})

Technical specifications LOGO!Power 15 V (continued)

Power supply, type Order No.	15 V/1.9 A 6EP1 351-1SH03	15 V/4 A 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 ($U_{in rated} \pm 15\%$)	< 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

LOGO! logic module

LOGO!Power

LOGO!Power

2

Technical specifications LOGO!Power 15 V (continued)

Power supply, type Order No.	15 V/1.9 A 6EP1 351-1SH03	15 V/4 A 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 2 screw terminals each for 0.5 ... 2.5 mm ²	1 screw terminal each for 0.5 mm ... 2.5 mm ² single-core/finely stranded 2 screw terminals each for 0.5 ... 2.5 mm ²
Connections		
• Output +		
• Output -		
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 Order No.	24 V/1.3 A 6EP1 331-1SH03	Power supply, type Order No.	24 V/1.3 A 6EP1 331-1SH03
Input	1-phase AC or DC	Closed-loop control	
Rated voltage $U_{in rated}$	100-240 V AC Wide-range input	Dyn. mains compensation ($U_{in rated} \pm 15\%$)	$< 0,2\% U_{out}$
Voltage range	85 ... 264 V AC 110 ... 300 V DC	Dynamic load smoothing (I_{out} : 50/100/50 %)	Typ. $\pm 1\% U_{out}$ (I_{out} : 10/90/10 %)
Overvoltage strength	$2.3 \times U_{in rated}$, 1.3 ms	Load step settling time	
Mains buffering at $I_{out rated}$	> 40 ms at $U_{in} = 187$ V	• 50 to 100%	Typ. 1 ms (10 to 90%)
Rated line frequency, rated line-frequency range	50/60 Hz; 47 ... 63 Hz	• 100 to 50%	Typ. 1 ms (90 to 10%)
Rated current $I_{in rated}$	0.7-0.35 A	Protection and monitoring	
Switch-on current limitation (+25 °C)	< 30 A	Output overvoltage protection	Yes, according to EN 60950
ρ_t	< 0.8 A ² s	Current limitation	Typ. 1.7 A
Built-in incoming fuse	Internal	Short-circuit protection	Constant current character- istic
Recommended miniature circuit breaker (IEC 898) in the mains power input	16 A or higher, Character- istic B or 10 A or higher, Characteristic C	Sustained short-circuit current rms value	< 4 A
Output	Controlled, isolated DC voltage	Overload/short-circuit indicator	-
Rated voltage $U_{out rated}$	24 V DC	Safety	
Total tolerance	$\pm 3\%$	Primary/secondary isolation	Yes, safety extra low output voltage U_{out} according to EN 60950-1 and EN 50178
• Static mains compensation	Approx. 0.1%	Safety class	Class II (without protective conductor)
• Static load smoothing	Approx. 1.5%	Leakage current	-
Residual ripple	< 200 mV _{pp} (typ. 10 mV _{pp})	Safety test	Yes; CB scheme
Spikes (bandwidth approx. 20 MHz)	< 300 mV _{pp} (typ. 20 mV _{pp})	CE marking	Yes
Adjustment range	22.2 ... 26.4 V	UL/cUL (CSA) approval	cULus-listed (UL 508, CSA C22.2 No. 107.1), cURus- recognized (UL 60950, CSA C22.2 No. 60950)
Status indicator	24 V OK = green LED	Protection against explosion	ATEX EX II 3G Ex nA IIC T3
On/Off behavior	No overshoot of U_{out} (soft start)	FM approval	Class I Div. 2, Group A, B, C, D T4
Startup delay / voltage rise	< 0.5 s/typ. 15 ms	Marine approval	GL, ABS
Rated current $I_{out rated}$	1.3 A	Degree of protection (EN 60529)	IP20
Current range		EMC	
• Current range up to +60 °C	0 ... 1.3 A (up to +55°C)	Emitted interference	EN 55022 Class B
• Derating	0 ... 0.9 A (up to +70°C)	Supply harmonics limitation	Not applicable
Parallel switching for enhanced perfor- mance	Yes, 2 units	Noise immunity	EN 61000-6-2
Efficiency			
Efficiency at $U_{out rated}$, $I_{out rated}$	Approx. 83%		
Power loss at $U_{out rated}$, $I_{out rated}$	Approx. 6.3 W		

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

Power supply, type Order No.	24 V/1.3 A 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 Order No.	24 V/1.3 A 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 Order No	24 V/2.5 A 6EP1 332-1SH43
Input	
Rated voltage $U_{in rated}$	1-phase AC or DC 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
ρ_t	< 3 A ² s
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	
Rated voltage $U_{out rated}$	Controlled, isolated DC voltage 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	
On/Off behavior	24 V OK = green LED 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 Order No	24 V/2.5 A 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 ($U_{in rated} \pm 15\%$)	< 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

LOGO! logic module

LOGO!Power

LOGO!Power

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

Power supply, type Order No	24 V/2.5 A 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 Order No	24 V/2.5 A 6EP1 332-1SH43
Mechanics	
Connections	- Supply input L, N, PE - DC input: L+1, M1, PE
• 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 Order No.	24 V/4 A 6EP1 332-1SH52
Input	
Rated voltage $U_{in rated}$	1-phase AC or DC 100-240 V AC Wide-range input
Voltage range	85 ... 264 V AC 110 ... 300 V DC
Overvoltage strength	$2.3 \times U_{in rated}$, 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
ρ_t	< 2.5 A ² s
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	
Rated voltage $U_{out rated}$	Controlled, isolated DC voltage 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	
On/Off behavior	24 V OK = green LED No overshoot of U_{out} (soft start)
Startup delay / voltage rise	< 0.5 s/typ. 15 ms

Power supply, type Order No.	24 V/4 A 6EP1 332-1SH52
Rated current $I_{out rated}$	4 A
Current range	0 ... 4 A (up to +55°C) 0 ... 2.8 A (up to +70°C)
• Current range up to +60 °C	
• Derating	
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 ($U_{in rated} \pm 15\%$)	< 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)

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

Power supply, type Order No.	24 V/4 A 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 Order No.	24 V/4 A 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	-

LOGO! logic module

LOGO!Power

LOGO!Power

2

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

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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm

Threshold / limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 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

Technical specifications

Power supply, type	24 V/1.3 A
Order number	6EP1 331-1SH02
Input	1-phase AC
Rated voltage $U_{in \text{ rated}}$	100 ... 240 V AC Wide-range input
Voltage range	85 ... 264 V AC
Overvoltage strength	$2.3 \times U_{in \text{ rated}}$, 1.3 ms
Mains buffering at $I_{out \text{ rated}}$	> 40 ms at $U_{in} = 187 \text{ V}$
Rated line frequency, rated line frequency range	50/60 Hz; 47 ... 63 Hz
Rated current $I_{in \text{ rated}}$	0.7-0.35 A
Switch-on current limitation (+25 °C)	< 35 A
P_t	< 0.8 A ² s
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 $U_{out \text{ rated}}$	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 $I_{out \text{ rated}}$	1.3 A
Current range	0 ... 1.3 A (up to 55 °C)
• Current range up to +60 °C	-
• Derating	Yes, 2 units
Parallel switching for enhanced performance	
Efficiency	
Efficiency at $U_{out \text{ rated}}$, $I_{out \text{ rated}}$	Approx. 82%
Heat loss at $U_{out \text{ rated}}$, $I_{out \text{ rated}}$	Approx. 7 W
Closed-loop control	
Dyn. mains compensation ($U_{in \text{ rated}} \pm 15\%$)	< 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	Typ. 20 ms (10 to 90%) Typ. 20 ms (90 to 10%)
• 50 to 100%	
• 100 to 50%	
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	-

LOGO! logic module

LOGO!Power

SIPLUS LOGO!Power

2

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 6AG1 931-1SH02-2AA0

(extended temperature range and medial exposure)

 Input 100 ... 240 V AC
 Output 24 V DC, 1.3 A

L: Subject to export regulations AL: 91999 and ECCN: N

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

LOGO!Contact	Order No.
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

LOGO! logic module

LOGO! software

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

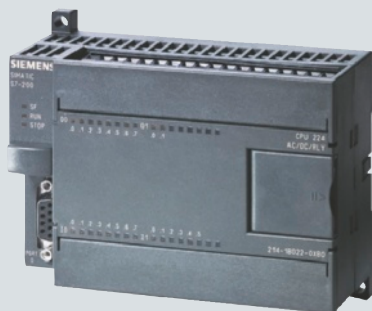
LOGO!Soft Comfort V6.0 upgrade

Upgrade from V1.0 to V6.0

J 6ED1 058-0CA02-0YE0

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

SIMATIC S7-200

**3/2 Introduction****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
- 3/28 SIPLUS CPU 226

3/30 Digital modules

- 3/30 EM 221
- 3/30 EM 222
- 3/30 EM 223

3/38 SIPLUS digital modules

- 3/38 SIPLUS EM 221
- 3/38 SIPLUS EM 222
- 3/38 SIPLUS EM 223

3/42 Analog modules

- 3/42 EM 231
- 3/42 EM 232
- 3/42 EM 235
- 3/47 EM 231 thermocouple module
- 3/49 EM 231 RTD module

3/51 SIPLUS analog modules

- 3/51 SIPLUS EM 231
- 3/51 SIPLUS EM 232
- 3/51 SIPLUS EM 235
- 3/55 SIPLUS EM 231 RTD module

3/57 Function modules

- 3/57 EM 253 positioning module
- 3/59 SIWAREX MS
- 3/61 SIPLUS DCF 77 radio clock module

3/62 Communication

- 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

3/86 SIPLUS operator control and monitoring

- 3/86 SIPLUS S7-200 TD 200
- 3/87 SIPLUS S7-200 TD 400C

3/88 Software

- 3/88 Software
- 3/89 S7-200 PC Access

3/90 Accessories

- 3/90 PPI cable

3/91 SIPLUS accessories

- 3/91 SIPLUS cables 901

Brochures

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

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

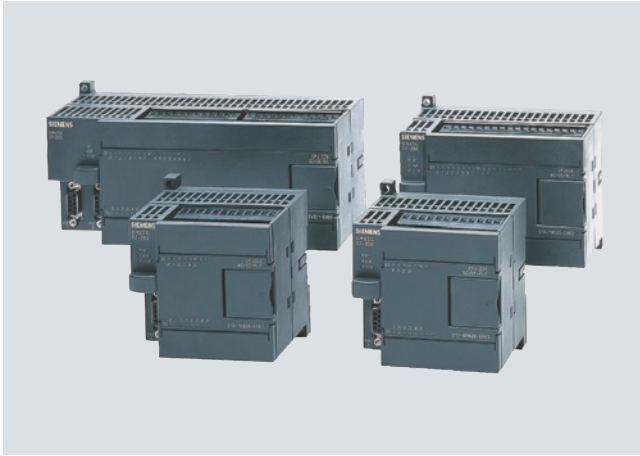
SIMATIC S7-200

Introduction

S7-200

Overview

3



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

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 compo- nents
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: SO₂ < 4.8 ppm;
H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm;
NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 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!
- 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

SIMATIC S7-200

Central processing units

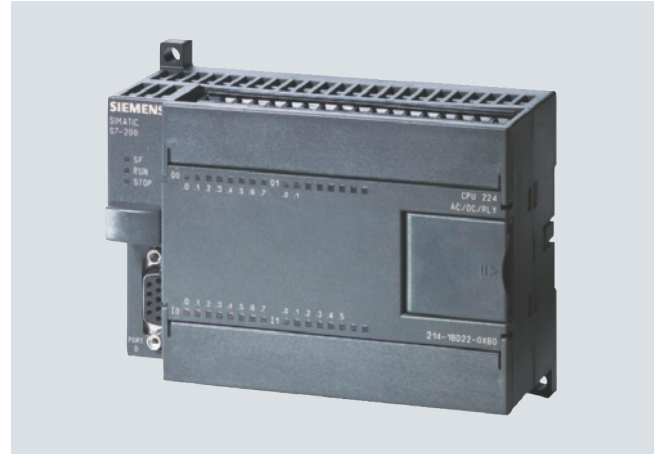
CPU 221, CPU 222, CPU 224, CPU 224 XP,
CPU 224 XPSi, CPU 226

Overview CPU 221



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

Overview CPU 224



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

Overview CPU 222



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

Overview CPU 224 XP/224 XPSi



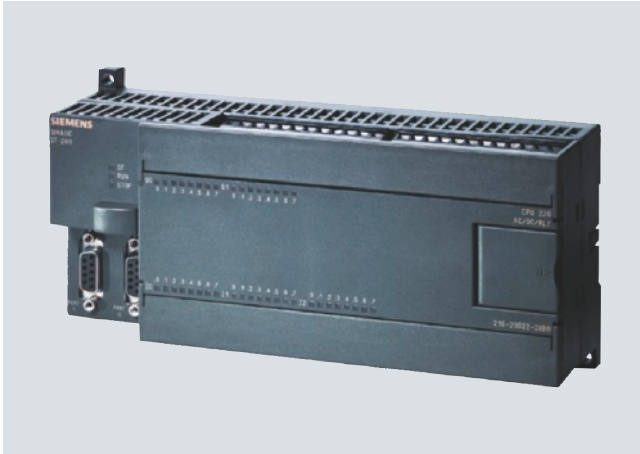
- The power CPU
- With 24 digital and 3 analog inputs/outputs onboard
- Expandable with up to 7 expansion modules

SIMATIC S7-200

Central processing units

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

Overview CPU 226



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

3

Technical specifications

	6ES7 211-0AA23-0XB0	6ES7 211-0BA23-0XB0	6ES7 212-1AB23-0XB0	6ES7 212-1BB23-0XB0
Supply voltages				
Rated value				
• 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

SIMATIC S7-200

Central processing units

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

Technical specifications (continued)

	6ES7 211-0AA23-0XB0	6ES7 211-0BA23-0XB0	6ES7 212-1AB23-0XB0	6ES7 212-1BB23-0XB0
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

SIMATIC S7-200

Central processing units

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

Technical specifications (continued)

	6ES7 211-0AA23-0XB0	6ES7 211-0BA23-0XB0	6ES7 212-1AB23-0XB0	6ES7 212-1BB23-0XB0
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, standard PC
Expansion devices, max.			2; Only expansion modules of the S7-22x series can be used. Due to the limited output current, the use of expansion modules may be limited.	2; Only expansion modules of the S7-22x series can be used. Due to the limited output current, the use of expansion modules may be limited.
Extension of distributed I/O				
• Analog inputs/outputs, max.			10; max. 8 inputs and 2 outputs (EM) or max. 0 inputs and 4 outputs (EM)	10; max. 8 inputs and 2 outputs (EM) or max. 0 inputs and 4 outputs (EM)
• Digital inputs/outputs, max.			78; max. 40 inputs and 38 outputs (CPU + EM)	78; max. 40 inputs and 38 outputs (CPU + EM)
• AS-Interface inputs/outputs max.			62; AS-Interface A/B slaves (CP 243-2)	62; AS-Interface A/B slaves (CP 243-2)
Connection 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

SIMATIC S7-200

Central processing units

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

Technical specifications (continued)

	6ES7 211-0AA23-0XB0	6ES7 211-0BA23-0XB0	6ES7 212-1AB23-0XB0	6ES7 212-1BB23-0XB0
• 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

SIMATIC S7-200

Central processing units

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

Technical specifications (continued)

	6ES7 211-0AA23-0XB0	6ES7 211-0BA23-0XB0	6ES7 212-1AB23-0XB0	6ES7 212-1BB23-0XB0
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

SIMATIC S7-200

Central processing units

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

Technical specifications (continued)

	6ES7 211-0AA23-0XB0	6ES7 211-0BA23-0XB0	6ES7 212-1AB23-0XB0	6ES7 212-1BB23-0XB0
Encoder				
Connectable encoders				
• 2-wire BEROs	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 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
• 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

SIMATIC S7-200

Central processing units

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

Technical specifications (continued)

	6ES7 211-0AA23-0XB0	6ES7 211-0BA23-0XB0	6ES7 212-1AB23-0XB0	6ES7 212-1BB23-0XB0
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	

SIMATIC S7-200

Central processing units

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

Technical specifications (continued)

	6ES7 214-1AD23-0XB0	6ES7 214-1BD23-0XB0	6ES7 214-2AD23-0XB0	6ES7 214-2BD23-0XB0	6ES7 214-2AS23-0XB0	6ES7 216-2AD23-0XB0	6ES7 216-2BD23-0XB0
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, program-mable 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, program-mable 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, program-mable 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, program-mable 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, program-mable 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, program-mable 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, program-mable 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

SIMATIC S7-200

Central processing units

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

Technical specifications (continued)

	6ES7 214-1AD23-0XB0	6ES7 214-1BD23-0XB0	6ES7 214-2AD23-0XB0	6ES7 214-2BD23-0XB0	6ES7 214-2AS23-0XB0	6ES7 216-2AD23-0XB0	6ES7 216-2BD23-0XB0
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

SIMATIC S7-200

Central processing units

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

Technical specifications (continued)

	6ES7 214-1AD23-0XB0	6ES7 214-1BD23-0XB0	6ES7 214-2AD23-0XB0	6ES7 214-2BD23-0XB0	6ES7 214-2AS23-0XB0	6ES7 216-2AD23-0XB0	6ES7 216-2BD23-0XB0
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

SIMATIC S7-200

Central processing units

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

Technical specifications (continued)

	6ES7 214-1AD23-0XB0	6ES7 214-1BD23-0XB0	6ES7 214-2AD23-0XB0	6ES7 214-2BD23-0XB0	6ES7 214-2AS23-0XB0	6ES7 216-2AD23-0XB0	6ES7 216-2BD23-0XB0
• 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

SIMATIC S7-200

Central processing units

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

Technical specifications (continued)

	6ES7 214-1AD23-0XB0	6ES7 214-1BD23-0XB0	6ES7 214-2AD23-0XB0	6ES7 214-2BD23-0XB0	6ES7 214-2AS23-0XB0	6ES7 216-2AD23-0XB0	6ES7 216-2BD23-0XB0
• 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

SIMATIC S7-200

Central processing units

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

Technical specifications (continued)

	6ES7 214-1AD23-0XB0	6ES7 214-1BD23-0XB0	6ES7 214-2AD23-0XB0	6ES7 214-2BD23-0XB0	6ES7 214-2AS23-0XB0	6ES7 216-2AD23-0XB0	6ES7 216-2BD23-0XB0
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 I 0.3 to I 0.5	2.5 mA; 8 mA for I 0.3 to I 0.5	2.5 mA; 8 mA for I 0.3 to I 0.5	2.5 mA	2.5 mA
Input delay (for rated value of input voltage)							
• for standard inputs							
- 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

SIMATIC S7-200

Central processing units

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

Technical specifications (continued)

	6ES7 214-1AD23-0XB0	6ES7 214-1BD23-0XB0	6ES7 214-2AD23-0XB0	6ES7 214-2BD23-0XB0	6ES7 214-2AS23-0XB0	6ES7 216-2AD23-0XB0	6ES7 216-2BD23-0XB0
Digital outputs							
Number of digital outputs	10; Transistor	10; Relay	10; Transistor	10; Relay	10; Transistor current sinking	16; Transistor	16; Relay
Short-circuit protection	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

SIMATIC S7-200

Central processing units

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

Technical specifications (continued)

	6ES7 214-1AD23-0XB0	6ES7 214-1BD23-0XB0	6ES7 214-2AD23-0XB0	6ES7 214-2BD23-0XB0	6ES7 214-2AS23-0XB0	6ES7 216-2AD23-0XB0	6ES7 216-2BD23-0XB0
Relay outputs							
Number of operating cycles		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.

SIMATIC S7-200

Central processing units

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

Technical specifications (continued)

	6ES7 214-1AD23-0XB0	6ES7 214-1BD23-0XB0	6ES7 214-2AD23-0XB0	6ES7 214-2BD23-0XB0	6ES7 214-2AS23-0XB0	6ES7 216-2AD23-0XB0	6ES7 216-2BD23-0XB0
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 13 and 11
• between the channels, in groups of	6 and 8	6 and 8	6 and 8	6 and 8	6 and 8	13 and 11	
Galvanic isolation digital outputs							
• between the channels	Yes; Optocoupler 5	Yes; Relay 3 and 4	Yes; Optocoupler 5	Yes; Relay 3 and 4	Yes; Optocoupler 10	Yes; Optocoupler 8 and 8	Yes; Relay 4, 5 and 7
• between the channels, in groups of							
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

SIMATIC S7-200

Central processing units

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

Technical specifications (continued)

	6ES7 214-1AD23-0XB0	6ES7 214-1BD23-0XB0	6ES7 214-2AD23-0XB0	6ES7 214-2BD23-0XB0	6ES7 214-2AS23-0XB0	6ES7 216-2AD23-0XB0	6ES7 216-2BD23-0XB0
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

SIMATIC S7-200

Central processing units

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

3

Ordering data	Order No.	Order No.
CPU 221 Compact CPU, work memory 4 KB, power supply 24 V DC, 6 DI/4 DO integrated Compact CPU, work memory 4 KB, power supply 100 V to 230 V AC, 6 DI/4 DO integrated, relay outputs	6ES7 211-0AA23-0XB0 6ES7 211-0BA23-0XB0	S7-200 True Power Box Complete package, comprising CPU 222, STEP 7 Micro/WIN V4, simulator, intelligent USB/PPI multi-master cable, manual; delivered in a practical box German J 6ES7 298-0AA20-0AA3 English J 6ES7 298-0AA20-0BA3
CPU 222 Compact CPU, expandable, work memory 4 KB, power supply 24 V DC, 8 DI/6 DO integrated Compact CPU, expandable, work memory 4 KB, power supply 100 V to 230 V AC, 8 DI/6 DO integrated, relay outputs	6ES7 212-1AB23-0XB0 6ES7 212-1BB23-0XB0	MC 291 memory module, EEPROM for CPU 221/222//224/224 XP/226 64 KB 6ES7 291-8GF23-0XA0 256 KB 6ES7 291-8GH23-0XA0
CPU 224 Compact CPU, expandable, work memory 8/12 KB program, 8 KB data, power supply 24 V DC, 14 DI/10 DO integrated 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 214-1AD23-0XB0 6ES7 214-1BD23-0XB0	Ground terminal 10 units 6ES5 728-8MA11 Front flap set contains various cover flaps for CPUs and EMs; spare part 6ES7 291-3AX20-0XA0
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 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 214-2AD23-0XB0 6ES7 214-2BD23-0XB0	SIM 274 simulator (optional) with 8 terminals for CPU 221/222 6ES7 274-1XF00-0XA0 with 14 terminals for CPU 224/224 XP 6ES7 274-1XH00-0XA0 with 24 terminals for CPU 226 6ES7 274-1XK00-0XA0
CPU 224 XPsi 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	6ES7 214-2AS23-0XB0	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
CPU 226 Compact CPU, expandable, work memory 16/24 KB program, 10 KB data, power supply 24 V DC, 24 DI/16 DO integrated 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 216-2AD23-0XB0 6ES7 216-2BD23-0XB0	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 5 m; for connecting the S7-200 to MPI 6ES7 901-0BF00-0AA0 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

SIMATIC S7-200

Central processing units

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

3

Ordering data	Order No.	Order No.
Optional battery module	6ES7 291-8BA20-0XA0	
Optional combined clock and battery module	6ES7 297-1AA23-0XA0	
only for CPU 221/222		
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 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		
		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

SIMATIC S7-200

SIPLUS central processing units

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

Overview SIPLUS CPU 221



- The clever compact solution
- With 10 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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH₃ < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH₃ < 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

SIMATIC S7-200

SIPLUS central processing units

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

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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 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

SIMATIC S7-200

SIPLUS central processing units

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

Overview SIPLUS CPU 224



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

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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 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

SIMATIC S7-200

SIPLUS central processing units

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

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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH₃ < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH₃ < 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

SIMATIC S7-200

SIPLUS central processing units

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

Overview SIPLUS CPU 226



- The power 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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 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

SIMATIC S7-200

SIPLUS central processing units

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

3

Ordering data	Order No.			Order No.	
SIPLUS CPU 221 (extended temperature and media exposure) Compact-CPU, work memory 4 KByte, power supply DC 24 V, 6 DI/4 DO integrated Compact-CPU, work memory 4 KByte, power supply AC 100 to 230 V, 6 DI/4 DO integrated, relay outputs	H	6AG1 211-0AA23-2XB0		SIPLUS CPU 224 XP (extended temperature range and media 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 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	L
SIPLUS CPU 222 (extended temperature range and media exposure) Compact CPU, expandable, 4 KB work memory, 24 V DC supply voltage, 8 DI/6 DO integrated	H	6AG1 212-1AB23-2XB0 6AG1 212-1BB23-2XB0		SIPLUS CPU 226 (extended temperature range and media 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 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	L
SIPLUS CPU 224 (extended temperature range and media 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 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 214-1AD23-2XB0 6AG1 214-1BD23-2XB0		Accessories SIPLUS Upmiller upstream device for reliable operation at the battery of combustion engines Additional accessories	L

H: Subject to export regulations AL: 91999 and ECCN: EAR99H

L: Subject to export regulations AL: 91999 and ECCN: N

SIMATIC S7-200

Digital modules

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 • Rated value, DC • for signal "0" • for signal "1"	24 V 0 to 5 V 15 to 30 V	24 V 0 to 5 V 15 to 30 V	230 V; 220/230 V AC (47 to 63 Hz) up to 20 V AC 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. • Cable length unshielded, max.	500 m 300 m	500 m 300 m	500 m 300 m
Encoder Connectable encoders • 2-wire BEROs - permissible quiescent current (2-wire BEROs), max.	Yes 1 mA	Yes 1 mA	Yes 1 mA

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 • between the channels, in groups of	Yes; Optocoupler 4	Yes; Optocoupler 4	Yes; Optocoupler 1; (8 groups)
Dimensions and weight Dimensions • Width • Height • Depth	71.2 mm 80 mm 62 mm	46 mm 80 mm 62 mm	71.2 mm 80 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) • permissible range, lower limit (DC) • permissible range, upper limit (DC)	24 V 20.4 V 28.8 V	24 V 20.4 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. • for signal "0" residual current, max.	5 A 30 µA	750 mA 10 µA
Parallel switching of 2 outputs • for increased power		Yes
Aggregate current of outputs (per group) • horizontal installation - up to 55 °C, max. • up to 40 °C, max. • maximum current per conductor/ group	20 A 20 A 5 A	3 A 3 A 3 A
Cable length • Cable length, shielded, max. • Cable length unshielded, max.	500 m 150 m	500 m 150 m

SIMATIC S7-200

Digital modules

EM 221, EM 222, EM 223

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)

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

SIMATIC S7-200

Digital modules

EM 221, EM 222, EM 223

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

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 L+/L1	0.1 V; with 10 kOhm load L+/L1	0.1 V; with 10 kOhm load L+/L1	0.1 V; with 10 kOhm load L+/L1
• for signal "1", min.				
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

SIMATIC S7-200

Digital modules

EM 221, EM 222, EM 223

Technical specifications EM 223 (continued)

	6ES7 223-1HF22-0XA0	6ES7 223-1PH22-0XA0	6ES7 223-1PL22-0XA0	6ES7 223-1PM22-0XA0
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

Ordering data	Order No.	Order No.
Digital input module EM 221 for CPU 221/222/224/224 XP/226 • 8 inputs, 24 V DC, isolated, current sourcing/sinking • 16 inputs, 24 V DC, isolated, current sourcing/sinking • 8 inputs, 120/230 V AC, isolated, current sourcing/sinking	6ES7 221-1BF22-0XA0 6ES7 221-1BH22-0XA0 6ES7 221-1EF22-0XA0	Front flap set contains various cover flaps for CPUs and EMs; spare part 6ES7 291-3AX20-0XA0
Digital output module EM 222 for CPU 221/222/224/224 XP/226 • 4 outputs, 24 V DC; 5 A, isolated • 8 outputs, 24 V DC; 0.75 A, isolated • 4 outputs, 24 V DC, 24 to 230 V AC; 10 A, isolated, relay outputs • 8 outputs, 24 V DC, 24 to 230 V AC; 2 A, isolated, relay outputs • 8 outputs, 120/230 V AC; 0.5 A, isolated	6ES7 222-1BD22-0XA0 6ES7 222-1BF22-0XA0 6ES7 222-1HD22-0XA0 6ES7 222-1HF22-0XA0 6ES7 222-1EF22-0XA0	Pluggable terminal block (spare part) • With 7 terminals (for EM 221/222) • With 12 terminals (for EM 223) 6ES7 292-1AD20-0AA0 6ES7 292-1AE20-0AA0
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 • 8 inputs, 24 V DC, 8 outputs 24 V DC; 0.75 A, isolated • 16 inputs, 24 V DC, 16 outputs 24 V DC; 0.75 A, isolated • 32 inputs, 24 V DC, 32 outputs 24 V DC; 0.75 A, isolated • 4 inputs, 24 V DC; 4 outputs, relays • 8 inputs, 24 V DC; 8 outputs, relays • 16 inputs, 24 V DC; 16 outputs, relays • 32 inputs, 24 V DC; 32 outputs, relays	6ES7 223-1BF22-0XA0 6ES7 223-1BH22-0XA0 6ES7 223-1BL22-0XA0 6ES7 223-1BM22-0XA0 6ES7 223-1HF22-0XA0 6ES7 223-1PH22-0XA0 6ES7 223-1PL22-0XA0 6ES7 223-1PM22-0XA0	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 English French Spanish Italian Chinese
		6ES7 298-8FA24-8AH0 6ES7 298-8FA24-8BH0 6ES7 298-8FA24-8CH0 6ES7 298-8FA24-8DH0 6ES7 298-8FA24-8EH0 6ES7 298-8FA24-8FH0

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

SIMATIC S7-200

SIPLUS digital modules

SIPLUS EM 221, EM 222, EM 223

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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 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

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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 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

SIMATIC S7-200

SIPLUS digital modules

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		

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: SO₂ < 4.8 ppm;
H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm;
NH₃ < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm;
Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH₃ < 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.	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 • 16 inputs, 24 V DC, isolated, current sourcing/sinking H	6AG1 221-1BF22-2XB0 6AG1 221-1BH22-2XA0	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 • 8 inputs, 24 V DC, 8 outputs, 24 V DC; 0.75 A, isolated H • 16 inputs, 24 V DC, 16 outputs, 24 V DC; 0.75 A, isolated H • 4 inputs, 24 V DC, 4 outputs, relay H • 8 inputs, 24 V DC, 8 outputs, relay H • 16 inputs, 24 V DC, 16 outputs, 24 V DC; 0.75 A, relay H	6AG1 223-1BF22-2XB0 6AG1 223-1BH22-2XB0 6AG1 223-1BL22-2XB0 6AG1 223-1HF22-2XB0 6AG1 223-1PH22-2XB0 6AG1 223-1PL22-2XB0
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 • 8 outputs, 24 V DC / 24 to 230 V AC, 2 A, electrically isolated, relay outputs H	6AG1 222-1BF22-2XB0 6AG1 222-1HF22-2XB0	Accessories See SIMATIC S7-200 EM 221 digital input modules, page 3/37	

H: Subject to export regulations AL: 91999 and ECCN: EAR99H

SIMATIC S7-200

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

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 f_1 in Hz	40 dB, DC to 60 V for interference frequency 50 / 60 Hz	40 dB, DC up to 60 V for interference frequency
• Conversion time (per channel)	250 μ s	250 μ s
Displayable conversion value range		
• bipolar signals	-32000 to +32000	-32000 to +32000
• unipolar signals	0 to 32000	0 to 32000
Errors/accuracies		
Interference voltage suppression for $f = n \times (f_1 \pm 1\%)$, f_1 = interference frequency		
• common mode voltage, max.	12 V	12 V
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

SIMATIC S7-200

Analog modules

EM 231, EM 232, EM 235

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

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 (f1 +/- 1%), f1 = 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

SIMATIC S7-200

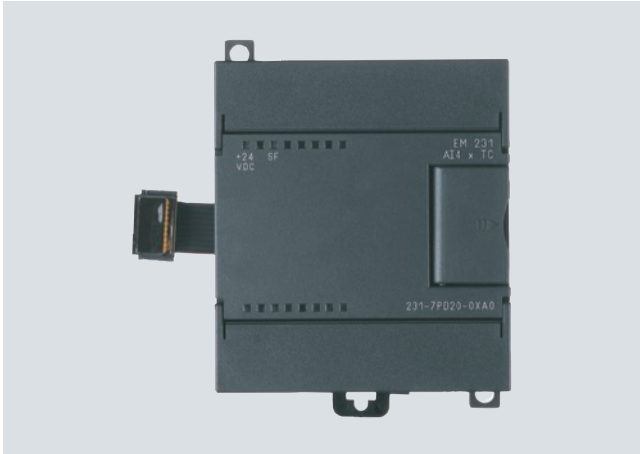
Analog modules

EM 231, EM 232, EM 235

3

Ordering data	Order No.		Order No.
EM 231 analog input module for CPU 221/222/224/224 XP/226 4 inputs, 0 to 10 V, 12 bit resolution 8 inputs, 0 to 10 V, of which max. 2 inputs also 0 to 20 mA, 11/12 bit resolution	6ES7 231-0HC22-0XA0 6ES7 231-0HF22-0XA0	Ground terminal 10 units	6ES5 728-8MA11
EM 232 analog output module for CPU 221/222/224/224 XP/226 2 outputs, ± 10 V, 12 bit resolution 4 outputs, ± 10 V, 12-bit resolution	6ES7 232-0HB22-0XA0 6ES7 232-0HD22-0XA0	Front flap set contains various cover flaps for CPUs and EMs; spare part	6ES7 291-3AX20-0XA0
EM 235 analog input/output module for CPU 222/224/224 XP/226; 4 inputs, 1 output, ± 10 V DC, 12 bit resolution	6ES7 235-0KD22-0XA0	S7-200 programmable controller, system manual for CPU 221/222/224/224 XP/226 and STEP 7 Micro/Win V4 German English French Spanish Italian Chinese	6ES7 298-8FA24-8AH0 6ES7 298-8FA24-8BH0 6ES7 298-8FA24-8CH0 6ES7 298-8FA24-8DH0 6ES7 298-8FA24-8EH0 6ES7 298-8FA24-8FH0

Overview



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

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

	6ES7 231-7PD22-0XA0	6ES7 231-7PF22-0XA0
• 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

SIMATIC S7-200

Analog modules

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

6ES7 290-6AA20-0XA0

for connecting two rows of
modules with double-tier configu-
ration, for CPU 222/224/224 XP/
226

**S7-200 programmable
controller, system manual**

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

German

6ES7 298-8FA24-8AH0

English

6ES7 298-8FA24-8BH0

French

6ES7 298-8FA24-8CH0

Spanish

6ES7 298-8FA24-8DH0

Italian

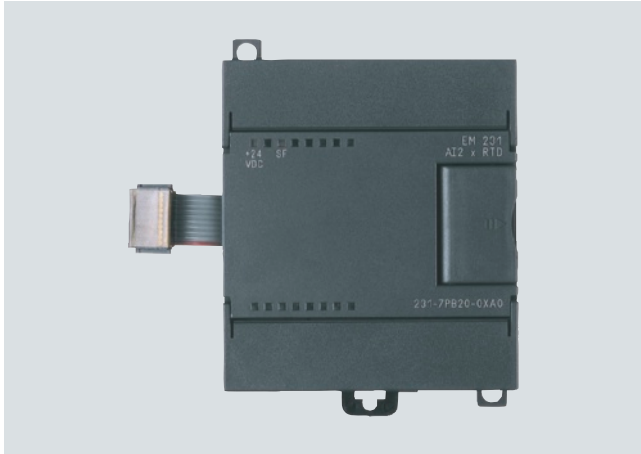
6ES7 298-8FA24-8EH0

Chinese

6ES7 298-8FA24-8FH0

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

Overview



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

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 (f1 +/- 1%), f1 = 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

SIMATIC S7-200

Analog modules

EM 231 RTD module

3

Ordering data	Order No.		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 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 231-7PB22-0XA0 6ES7 231-7PC22-0XA0	S7-200 programmable controller, system manual for CPU 221/222/224/224 XP/226 and STEP 7 Micro/Win V4 German English French Spanish Italian Chinese	6ES7 298-8FA24-8AH0 6ES7 298-8FA24-8BH0 6ES7 298-8FA24-8CH0 6ES7 298-8FA24-8DH0 6ES7 298-8FA24-8EH0 6ES7 298-8FA24-8FH0
Ground terminal 10 units	6ES5 728-8MA11		
Backplane bus expansion cable for connecting two rows of modules with double-tier configuration, for CPU 222/224/224 XP/226	6ES7 290-6AA20-0XA0		

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

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	
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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 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

SIMATIC S7-200

SIPLUS analog modules

SIPLUS EM 231, EM 232, EM 235

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	
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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 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

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	
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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 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

SIMATIC S7-200

SIPLUS analog modules

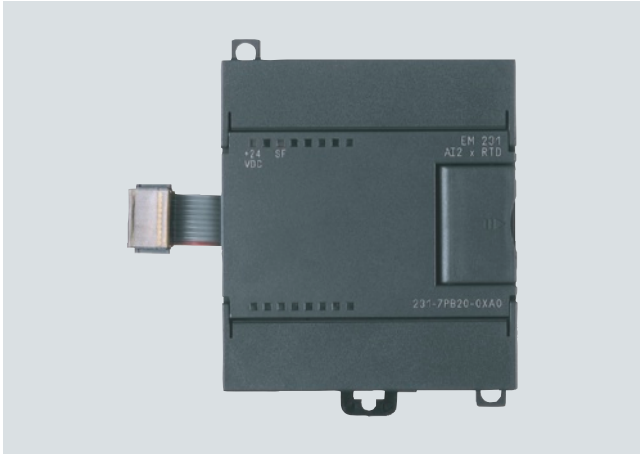
SIPLUS EM 231, EM 232, EM 235

3

Ordering data	Order No.	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	6AG1 231-0HC22-2XB0	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
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	6AG1 232-0HB22-2XB0	Accessories See SIMATIC S7-200 EM 231 analog output modules, page 3/46

H: Subject to export regulations AL: 91999 and ECCN: EAR99H

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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH₃ < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH₃ < 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

Overview



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

3

Technical specifications

6ES7 253-1AA22-0XA0	
Supply voltages	
Rated value	
• permissible range, lower limit (DC)	11 V
• permissible range, upper limit (DC)	30 V
Current consumption	
from backplane bus 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

SIMATIC S7-200

Function modules

EM 253 positioning module

3

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**

for connecting two rows of modules with double-tier configuration, for CPU 221/222/224/224 XP/226

6ES7 290-6AA20-0XA0**S7-200 programmable controller, system manual**

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

German

English

French

Spanish

Italian

Chinese

Order No.

6ES7 298-8FA24-8AH0**6ES7 298-8FA24-8BH0****6ES7 298-8FA24-8CH0****6ES7 298-8FA24-8DH0****6ES7 298-8FA24-8EH0****6ES7 298-8FA24-8FH0**

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

Overview

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

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

Technical specifications

SIWAREX MS	
Integration in S7-200 automation systems	- CPU 222 (6ES7212-1*B23-0XB0) - CPU 224 (6ES7214-1*D23-0XB0) - CPU 224XP (6ES7214-2*D23-0XB0) - 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	24 V DC
- Max. current consumption	30 mA
• Rated voltage (from CPU)	5 V DC
- Max. current consumption	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

SIMATIC S7-200

Function modules

SIWAREX MS

3

Ordering data	Order No.		Order No.
SIWAREX MS Weighing electronics for scales in SIMATIC S7-200 for applications without obligation of verification	7MH4 930-0AA01	SIWAREX JB junction box, stainless steel housing for connecting up to 4 load cells in parallel	7MH4 710-1EA
SIWAREX MS manual available in a range of languages Free download on the Internet at: www.siemens.com/weighing-technology		Ex interface, type SIWAREX Pi With UL and FM approvals, but without ATEX approval for intrinsically safe connection of load cells, suitable for weighing modules SIWAREX U, CS, MS, FTA, FTC and M. Not approved for use in the EU.	7MH4 710-5AA
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	Manual for Ex interface type SIWAREX Pi	C71000-T5974-C29
SIWAREX MS "Getting started" Sample software show beginners how to program the scales. Free download on the Internet at: www.siemens.com/weighing-technology		Ex interface, type SIWAREX IS With ATEX approval, but without UL and FM approvals for intrinsically-safe connection of load cells, including manual, suitable for the SIWAREX U, CS, MS, FTA, FTC, M and CF weighing modules. Approved for use in the EU. • With short-circuit current < 199 mA DC • With short-circuit current < 137 mA DC	7MH4 710-5BA 7MH4 710-5CA
SIWATOOL cable from SIWAREX M, FTA, FTC, MS with serial PC interface, for 9-pin PC interfaces (RS 232) • 2 m long • 5 m long	7MH4 702-8CA 7MH4 702-8CB	Cable (optional) Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, orange sheath to connect SIWAREX U, CS, MS, FTA, FTC, M and CF to the junction box (JB), extension box (EB) or Ex interface (Ex-I) or between two JBs, for fixed laying, occasional bending permitted, 10.8 mm outer diameter, for ambient temperature -40 ... +80 °C	7MH4 702-8AG
Shield clamps for shield termination Pack of 10; 1 unit required for each shielded cable	6ES5 728-8MA11	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
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.		Cable LiYCY 4 x 2 x 0.25 mm² for TTY (connect 2 pairs of conductors in parallel), for connection of a remote display	7MH4 407-8BD0
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		

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

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

H

6AG1 057-1AA03-0AA0

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

H: Subject to export regulations AL: 91999 and ECCN: EAR99H

SIMATIC S7-200

Communication

EM 241 modem

Overview



- Modem expansion module for SIMATIC S7-200
- The Plug&Play solution for all classical modem tasks in the PLC field
- Used for remote maintenance/remote diagnostics, CPU-to-CPU/PC communication or SMS/pager messaging
- Minimal engineering outlay required
- Replaces external modems connected via the 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	6ES7 241-1AA22-0XA0
Analog modem for remote maintenance/diagnostics; CPU-CPU/PC communication, SMS/pager message transmission	
Grounding terminal	6ES5 728-8MA11
10 units	
Front door set	6ES7 291-3AX20-0XA0
contains different cover flaps for CPU and EM; spare part	
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

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

EM 277 PROFIBUS DP module

Overview



- For connecting S7-22x to PROFIBUS DP (as a slave) and MPI
- Simultaneous operation as MPI slave and DP slave is possible
- Transmission rate max. 12 Mbit/s
- Version 6ES7 2xx-xxx21-xxxx and higher can be used with CPU

Technical specifications

6ES7 277-0AA22-0XA0	
Supply voltages	
Load voltage L+	
• Rated value (DC)	24 V
• permissible range, lower limit (DC)	20.4 V
• permissible range, upper limit (DC)	28.8 V
Current consumption	
from backplane bus 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

6ES7 277-0AA22-0XA0	
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

SIMATIC S7-200

Communication

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

6GK7 243-2AX01-0XA0

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)

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	-

SIMATIC S7-200

Communication

CP 243-1

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	
<u>Performance data S7 communication</u>	
Maximum number of possible connections for S7 communication	8
Number of possible connections for S7 communication - Note	-
<u>Performance data IT functions</u>	
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

Ordering data	Order No.		Order No.
CP 243-1 communication processor for connection of SIMATIC S7-200 to Industrial Ethernet; for S7 communication, PG communication, E-mail and WWW server; with electronic manual on CD-ROM German, English, French, Italian, Spanish	6GK7 243-1EX01-0XE0	SOFTNET S7 Lean Edition 2008 for Industrial Ethernet up to 8 connections • Single license for 1 installation • 1-year Software Update Service, with automatic extension; requirement: Current software version • Upgrade from Edition 2006 to V8.0 • Upgrade from V6.0, V6.1, V6.2 or V6.3 to V8.0	6GK1 704-1LW71-3AA0 6GK1 704-1LW00-3AL0 6GK1 704-1LW00-3AE0 6GK1 704-1LW00-3AE1
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	STEP 7-Micro/WIN V4 programming software <i>Target system:</i> All CPUs of the SIMATIC S7-200 <i>Requirements:</i> Windows 2000/XP on PG or PC, <i>Type of delivery:</i> German, English, French, Spanish, Italian, Chinese; with online documentation • Single license J • Upgrade Single license ¹⁾ J	6ES7 810-2CC03-0YX0 6ES7 810-2CC03-0YX3
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 • 1-year Software Update Service, with automatic extension; requirement: Current software version • Upgrade from Edition 2006 to V8.0 • Upgrade from V6.0, V6.1, V6.2 or V6.3 to V8.0	6GK1 704-1CW71-3AA0 6GK1 704-1CW00-3AL0 6GK1 704-1CW00-3AE0 6GK1 704-1CW00-3AE1	IE TP Cord RJ45/RJ45 TP cable 4 x 2 with 2 RJ45 connectors • 0.5 m • 1 m • 2 m • 6 m	6XV1 870-3QE50 6XV1 870-3QH10 6XV1 870-3QH20 6XV1 870-3QH60
SOFTNET S7 Lean Edition V8 for Industrial Ethernet up to 8 connections • Single license for 1 installation	6GK1 704-1LW80-3AA0	SCALANCE X005 Industrial Ethernet Switch for 10/100 Mbit/s; with five 10/100 Mbit/s RJ45 ports for configuring small star and line structures	6GK5 005-0BA00-1AA3

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

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

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

SIMATIC S7-200

Communication

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 • GSM data calls • GPRS - Up to 2 uplinks - Up to 4 downlinks	300 bit/s to 57,600 bit/s CSD 9,600 bit/s 13.4 Kbit/s to 27 Kbit/s gross upload (modem to Internet); net approx. 30 % lower 40 Kbit/s to 54 Kbit/s gross download (Internet to modem); net is approx. 30 % lower
Interfaces	
• RS232 • Antenna connection	1 x 9-pin Sub-D socket 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 • at 24 V	430 mA 140 mA
Receive mode	
• at 12 V • at 24 V	90 mA 50 mA
Supply voltage	
12 ... 30 V DC	
Power loss	
typ. 5 W max. 6.2 W	
Permissible ambient conditions	
• Operating temperature • Transport/storage temperature • Relative humidity	- 20 °C ... +60 °C - 25 °C ... +85 °C Max. 95 % at +25 °C
Design	
• Dimensions (W x H x D) in mm • Weight • Assembly	22.5 x 99 x 114 Approx. 150 g 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	

Ordering data	Order No.		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	ANT794-4MR antenna Quad band antenna, omnidirectional with 5 m cable	6NH9 860-1AA00
Accessories 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 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 J Connection management for eight SIMATIC S7-1200 or S7-200 stations • Telecontrol Server Basic 64 J Connection management for 64 SIMATIC S7-1200 or S7-200 stations • Telecontrol Server Basic 256 J Connection management for 256 SIMATIC S7-1200 or S7-200 stations • Telecontrol Server Basic 1000 J Connection management for 1000 SIMATIC S7-1200 or S7-200 stations • Telecontrol Server Basic 5000 J Connection management for 5000 SIMATIC S7-1200 or S7-200 stations		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
		6NH9 910-0AA20-0AA0	
	6NH9 910-0AA20-0AB0		
	6NH9 910-0AA20-0AC0		
	6NH9 910-0AA20-0AD0		
	6NH9 910-0AA20-0AE0		

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

SIMATIC S7-200

Communication

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-Traversal; 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

Ordering data	Order No.	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	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 B 6GK5 612-0BA00-2AA3 uses the Stateful Inspection Firewall to protect network segments against unauthorized access; protects up to 32 devices up to 64 VPN tunnels simultaneously • SCALANCE S613 B 6GK5 613-0BA00-2AA3 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)
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 • 1 pack = 10 units • 1 pack = 50 units	6GK1 901-1BB10-2AA0 6GK1 901-1BB10-2AB0 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	IE TP Cord RJ45/RJ45 TP cable 4 x 2 with 2 RJ45 connectors • 0.5 m • 1 m • 2 m • 6 m • 10 m 6XV1 870-3QE50 6XV1 870-3QH10 6XV1 870-3QH20 6XV1 870-3QH60 6XV1 870-3QN10

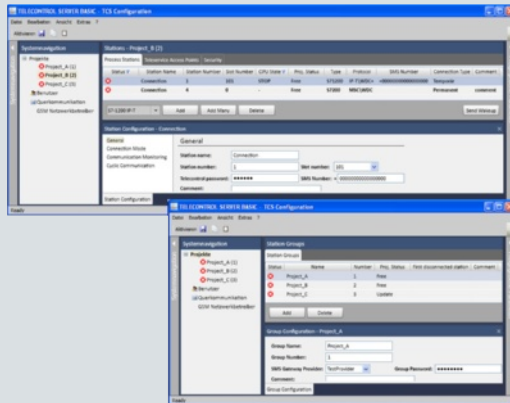
B: Subject to export regulations AL: 5A002A1A2 and ECCN: 5A002ENCU

SIMATIC S7-200

Communication

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

SIMATIC S7-200

Communication

Telecontrol Server Basic

Ordering data	Order No.	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 J Connection management for eight SIMATIC S7-1200 or S7-200 stations	6NH9 910-0AA20-0AA0	Accessories CP 1242-7 communication processor Communication processor for connecting SIMATIC S7-1200 to GSM/GPRS mobile wireless network 6GK7 242-7KX30-0XE0
• Telecontrol Server Basic 64 J Connection management for 64 SIMATIC S7-1200 or S7-200 stations	6NH9 910-0AA20-0AB0	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
• Telecontrol Server Basic 256 J Connection management for 256 SIMATIC S7-1200 or S7-200 stations	6NH9 910-0AA20-0AC0	ANT794-4MR antenna Quad band antenna, omnidirectional with 5 m cable 6NH9 860-1AA00
• Telecontrol Server Basic 1000 J Connection management for 1000 SIMATIC S7-1200 or S7-200 stations	6NH9 910-0AA20-0AD0	ANT794-3M antenna Triband flat antenna, in enclosure with 1.2 m cable 6NH9 870-1AA00
• Telecontrol Server Basic 5000 J Connection management for 5000 SIMATIC S7-1200 or S7-200 stations	6NH9 910-0AA20-0AE0	

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

SIMATIC S7-200

SIPLUS communication

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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH₃ < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH₃ < 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 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

SIPLUS 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 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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 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 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

SIMATIC S7-200

SIPLUS communication

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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH₃ < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH₃ < 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 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

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 $U_{in \text{ rated}}$	120/230 V AC Set via wire jumper
Voltage range	93 ... 132 V/187 ... 264 V
Overvoltage strength	$2.3 \times U_{in \text{ rated}}$, 1.3 ms
Mains buffering at $I_{out \text{ rated}}$	> 20 ms at $U_{in} = 187 \text{ V}$
Rated line frequency; rated line frequency range	50/60 Hz, 47 ... 63 Hz
Rated current $I_{in \text{ rated}}$	1.65/0.95 A
Switch-on current limitation (+25 °C) $\hat{I}_t$	< 33 A, < 3 ms ($U_{in} = 230 \text{ V}$) < 1.0 A ² s
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 $U_{out \text{ rated}}$	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 $I_{out \text{ rated}}$	3.5 A

Power supplies, type	3.5 A
Order No.	6EP1 332-1SH31 ¹⁾
Current range	0 ... 3.5 A
• Up to +60°C	-
• 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 $U_{out \text{ rated}}$, $I_{out \text{ rated}}$	Approx. 84%
Power loss at $U_{out \text{ rated}}$, $I_{out \text{ rated}}$	Approx. 16 W
Closed-loop control	
Dyn. line compensation ($U_{in \text{ rated}} \pm 15\%$)	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	-

SIMATIC S7-200

Power supplies

The S7-200 version

Technical specifications (continued)

Power supplies, type	3.5 A
Order No.	6EP1 332-1SH31¹⁾
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

H

6AG1203-1SH31-2AA0

-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

SITOP power 3.5

6EP1332-1SH31

Universal Line stabilized power supply
Input: 120/230 V AC,
Output: 24 V DC/3.5 A
S7-200 design

Accessories

SITOP power mounting bracket

6EP1971-1AA01

90 degree 35 mm DIN rail,
M5 fixing screws,
for Special Line flat

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

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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH₃ < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH₃ < 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 PS 203 stabilized load current supply (extended temperature range and medial exposure) 120/230 V AC, 24 V DC/3.5 A	6AG1 203-1SH31-2AA0
Accessories	
	See SIMATIC S7-200 power supplies, page 3/78

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

SIMATIC S7-200

Operator control and monitoring

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	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
• Rated value	
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

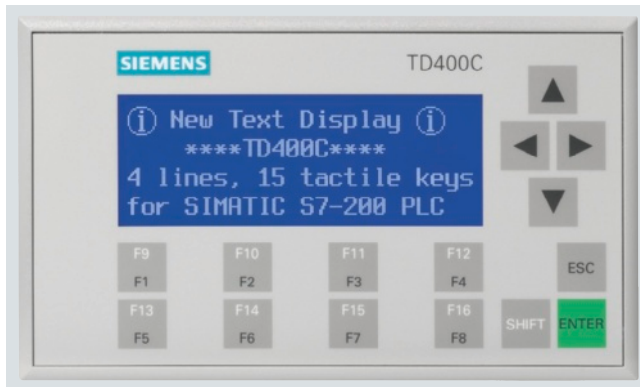
See Catalog ST 80/ST PC

SIMATIC S7-200

Operator control and monitoring

TD 400C text display

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

	6AV6 640-0AA00-0AX1
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	I 6AV6 640-0AA00-0AX1
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	
Promotion package	J 6ES7 298-1AA20-0YA3
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	
Connecting cables	6ES7 901-3EB10-0XA0
for connecting TD 100C/TD 200C or TD 400C to S7-200	
Blank foils	6AV6 671-0AP00-0AX0
for printing customized keyboard layouts; 2 perforated films per sheet; 10 sheets per pack	
Accessories	
Accessories for supplementary ordering	See Catalog ST 80/ST PC

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

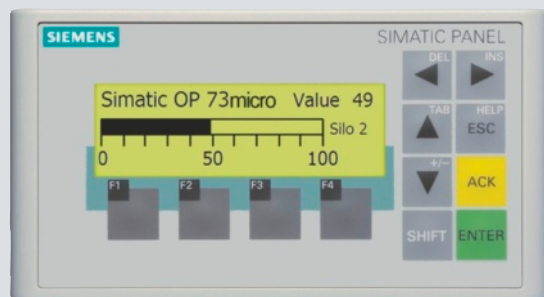
J: Subject to export regulations AL: N and ECCN: EAR99S

SIMATIC S7-200

Operator control and monitoring

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

	6AV6 640-0BA11-0AX0
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

SIMATIC S7-200

Operator control and monitoring

SIMATIC OP 73micro

3

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**

Operator panel for connection to the SIMATIC S7-200, with 3" display, monochrome incl. mounting accessories

6AV6 640-0BA11-0AX0**OP 73micro starter package** C

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)

6AV6 650-0BA01-0AA0**Configuration**

with SIMATIC WinCC flexible

Documentation (to be ordered separately)**OP 73micro/TP 177micro operating instructions**

- German
- English
- French
- Italian
- Spanish

6AV6 691-1DF01-0AA0
6AV6 691-1DF01-0AB0
6AV6 691-1DF01-0AC0
6AV6 691-1DF01-0AD0
6AV6 691-1DF01-0AE0

Order No.**WinCC flexible Micro user manual**

- German
- English
- French
- Italian
- Spanish

6AV6 691-1AA01-3AA0
6AV6 691-1AA01-3AB0
6AV6 691-1AA01-3AC0
6AV6 691-1AA01-3AD0
6AV6 691-1AA01-3AE0

SIMATIC HMI manual collection J

Electronic documentation, on DVD

5 languages (English, French, German, Italian and Spanish); contains: all currently available user manuals, manuals and communication manuals for SIMATIC HMI

6AV6 691-1SA01-0AX0**Accessories****Accessories for supplementary ordering**

see catalog ST 80/ST PC

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

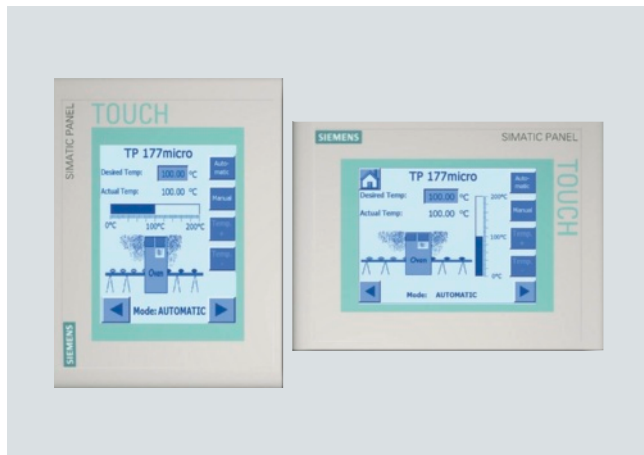
J: Subject to export regulations AL: N and ECCN: EAR99S

SIMATIC S7-200

Operator control and monitoring

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

6AV6 640-0CA11-0AX1	
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

SIMATIC S7-200

Operator control and monitoring

SIMATIC TP 177micro

3

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

SIMATIC S7-200

SIPLUS operator control and monitoring

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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 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!

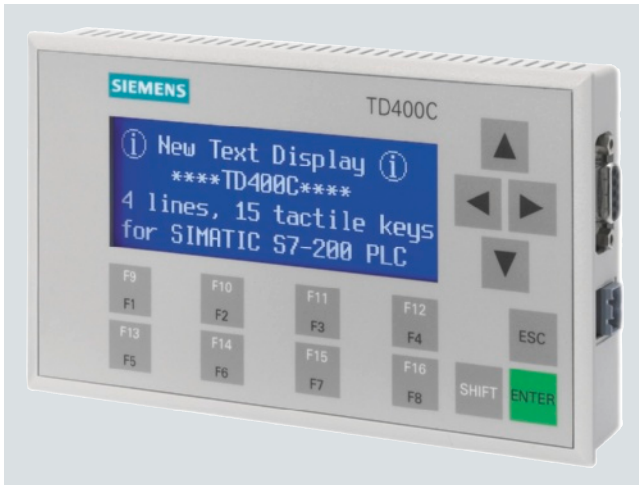
The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

Ordering data	Order No.
SIPLUS S7-200 TD 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	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

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:
 SO₂ < 4.8 ppm; H₂S < 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): SO₂ < 17.8 ppm;
 H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm;
 NH < 247 ppm; O₃ < 1.0 ppm; NO_x < 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 (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	H 6AG1 640-0AA00-2AX1
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: 91999 and ECCN: EAR99H

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.

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

SIMATIC S7-200

Accessories

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; Freepoint	
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

6ES7 901-3CB30-0XA0

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

Intelligent USB/PPI multi-master cable

6ES7 901-3DB30-0XA0

For connecting devices with a USB interface to SIMATIC S7-200 or PPI network; Master in multi-master PPI network

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

L 6AG1 901-3CB30-2XA0

(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: Subject to export regulations AL: 91999 and ECCN: N

SIMATIC S7-200



3

SIMATIC S7-1200

**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

4/122 Software**Brochures**

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

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

SIMATIC S7-1200

Introduction

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 - vertical installation • Transportation and storage - with 95% humidity	0 ... 55 °C 0 ... 45 °C -40 ... +70 °C 25 ... 55 °C
Insulation • 5/24 V DC circuits • 115/230 V AC circuits to ground • 115/230 V AC circuits to 115/230 V AC circuits • 230 V AC circuits to 5/24 V DC circuits • 115 V AC circuits to 5/24 V DC circuits	500 V AC test voltage 1500 V AC test voltage 1500 V AC test voltage 1500 V AC test voltage 1500 V AC test voltage
Electromagnetic compatibility • Noise immunity acc. to EN 50082-2 • Emitted interference acc. to EN 50081-1 and EN 50081-2	Requirements of the EMC directive Test acc. to: IEC 801-2, IEC 801-3, IEC 801-4, EN 50141, EN 50204, IEC 801-5, VDE 0160 Test according to EN 55011, Class A, Group 1
Mechanical strength • Vibrations, test acc. to / tested with • Shocks, 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 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

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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
limit value (max 30 min): SO₂ < 17.8 ppm; H₂S < 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!

SIMATIC S7-1200

Central processing units

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

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

SIMATIC S7-1200

Central processing units

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

Technical specifications (continued)

	6ES7 211-1BD30-0XB0	6ES7 211-1HD30-0XB0	6ES7 211-1AD30-0XB0
Digital inputs			
Number of digital inputs • of which, inputs usable for technological functions	6; Integrated 3; HSC (High Speed Counting)	6; Integrated 3; HSC (High Speed Counting)	6; Integrated 3; HSC (High Speed Counting)
m/p-reading	Yes	Yes	Yes
Input voltage • Rated value, DC • for signal "0" • for signal "1"	24 V	24 V	24 V 5 V DC at 1 mA 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 - at "0" to "1", min. - at "0" to "1", max. • for interrupt inputs - parameterizable • for counter/technological functions - parameterizable	0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in 4 groups 0.2 ms 12.8 ms Yes Single phase : 3 at 100 kHz, differential: 3 at 80 kHz	0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in 4 groups 0.2 ms 12.8 ms Yes Single phase : 3 at 100 kHz, differential: 3 at 80 kHz	0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four 0.2 ms 12.8 ms Yes Single phase : 3 at 100 kHz, differential: 3 at 80 kHz
Cable length • Cable length, shielded, max. • Cable length unshielded, max.	500 m; 50 m for technological functions 300 m; For technological functions: No	500 m; 50 m for technological functions 300 m; For technological functions: No	500 m; 50 m for technological functions 300 m; For technological functions: No
Digital outputs			
Number of digital outputs • of which high-speed outputs	4	4	4 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. • on lamp load, max.	2 A 30 W DC; 200 W AC	2 A 30 W DC; 200 W AC	0.5 A 5 W
Output voltage • for signal "0" (DC), max. • for signal "1", min.			0.1 V; with 10 kOhm load 20 V
Output current • for signal "1" rated value • for signal "0" residual current, max.			0.5 A 0.1 mA
Output delay with resistive load • 0 to "1", max. • 1 to "0", max.	10 ms; max. 10 ms; max.	10 ms; max. 10 ms; max.	1 µs; 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. • Cable length unshielded, max.	500 m 150 m	500 m 150 m	500 m 150 m

SIMATIC S7-1200

Central processing units

CPU 1211C

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

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%

SIMATIC S7-1200

Central processing units

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 5° C to 55°, 3° C/minute	0°C to 55°C horizontal mounting, 0°C to 45°C vertical mounting 5°C to 55°C, 3°C / minute	0°C to 55°C horizontal mounting, 0°C to 45°C vertical mounting 5°C to 55°C, 3°C / minute
- Permissible temperature change			
• 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	SO ₂ : < 0.5 ppm; H ₂ S: < 0.1 ppm; RH < 60% condensation-free	SO ₂ : < 0.5 ppm; H ₂ S: < 0.1 ppm; RH < 60% condensation-free	SO ₂ : < 0.5 ppm; H ₂ S: < 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

Ordering data	Order No.		Order No.
CPU 1211C		SB 1223 signal board	
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	6ES7 211-1BD30-0XB0	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	6ES7 223-0BD30-0XB0
		2 inputs, 5 V DC, 200 kHz 2 outputs 5 V DC, 0.1 A, 200 kHz	6ES7 223-3AD30-0XB0
		2 inputs, 24 V DC, 200 kHz 2 outputs 24 V DC, 0.1 A, 200 kHz	6ES7 223-3BD30-0XB0
		SB 1231 signal board	6ES7 231-4HA30-0XB0
		1 analog input, ±10 V with 12 bit or 0 ... 20 mA with 11 bit	
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	6ES7 211-1AD30-0XB0	SB 1231 thermocouple signal board	6ES7 231-5QA30-0XB0
		1 input +/- 80 mV, resolution 15 bit + sign, thermocouples type J, K	
		SB 1231 RTD signal board	6ES7 231-5PA30-0XB0
		1 input for resistance temperature sensors Pt 100, Pt 200, Pt 500, Pt 1000, resolution 15 bit + sign	
		SB 1232 signal board	6ES7 232-4HA30-0XB0
		1 analog output, ±10 V with 12 bit or 0 to 20 mA with 11 bit	
		CB 1241 RS485 communication board	6ES7 241-1CH30-1XB0
		for point-to-point connection, with 1 RS485 interface	
		Simulator (optional)	
		8 input switches, for CPU 1211C / CPU 1212C	6ES7 274-1XF30-0XA0
		SIMATIC memory card (optional)	
		2 MB	6ES7 954-8LB01-0AA0
		24 MB	6ES7 954-8LF01-0AA0
		Terminal block (spare part)	
		for CPU 1211C/1212C	
		For DI, with 14 screws, tin-plated; 4 units	6ES7 292-1AH30-0XA0
		For DO, with 8 screws, tin-plated; 4 units	6ES7 292-1AP30-0XA0
		For AI, with 3 screws, tin-plated; 4 units	6ES7 292-1BC30-0XA0
SB 1221 signal board			
4 inputs, 5 V DC, 200 kHz	6ES7 221-3AD30-0XB0		
4 inputs, 24 V DC, 200 kHz	6ES7 221-3BD30-0XB0		
SB 1222 signal board			
4 outputs, 5 V DC, 0.1 A, 200 kHz	6ES7 222-1AD30-0XB0		
4 outputs, 24 V DC, 0.1 A, 200 kHz	6ES7 222-1BD30-0XB0		

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

SIMATIC S7-1200

Central processing units

CPU 1211C

4

Ordering data		Order No.		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	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 Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license STEP 7 Basic V11, trial license STEP 7 Basic Software Update Service, 1 year	
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		6ES7 822-0AA01-0YA0
English	K	6ES7 298-8FA30-8BQ0		6ES7 822-0AA01-0YE0
French	K	6ES7 298-8FA30-8CQ0		6ES7 822-1AA01-0YC5
Spanish	K	6ES7 298-8FA30-8DQ0		
Italian	K	6ES7 298-8FA30-8EQ0		6ES7 822-0AA01-0YA7
Chinese	K	6ES7 298-8FA30-8KQ0		6ES7 822-0AA00-0YL0

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

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

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 • Permissible range, lower limit (DC) • Permissible range, upper limit (DC) • 120 V AC • 230 V AC • Permissible range, lower limit (AC) • Permissible range, upper limit (AC) • Permissible frequency range, lower limit • Permissible frequency range, upper limit	Yes 20.4 V 28.8 V Yes Yes 85 V 264 V 47 Hz 63 Hz	Yes 20.4 V 28.8 V	Yes 20.4 V 28.8 V
Load voltage L+ • Rated value (DC) • Permissible range, lower limit (DC) • Permissible range, upper limit (DC)	24 V 5 V 250 V	24 V 20.4 V 28.8 V	24 V 5 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

SIMATIC S7-1200

Central processing units

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

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

SIMATIC S7-1200

Central processing units

CPU 1212C

Technical specifications (continued)

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

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

SIMATIC S7-1200

Central processing units

CPU 1212C

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	SO ₂ : < 0.5 ppm; H ₂ S: < 0.1 ppm; RH < 60% condensation-free	SO ₂ : < 0.5 ppm; H ₂ S: < 0.1 ppm; RH < 60% condensation-free	SO ₂ : < 0.5 ppm; H ₂ S: < 0.1 ppm; RH < 60% condensation-free

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

SIMATIC S7-1200

Central processing units

CPU 1212C

4

Ordering data	Order No.		Order No.
CPU 1212C		SB 1223 signal board	
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	6ES7 212-1BD30-0XB0	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	6ES7 223-0BD30-0XB0
		2 inputs, 5 V DC, 200 kHz 2 outputs 5 V DC, 0.1 A, 200 kHz	6ES7 223-3AD30-0XB0
		2 inputs, 24 V DC, 200 kHz 2 outputs 24 V DC, 0.1 A, 200 kHz	6ES7 223-3BD30-0XB0
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	6ES7 212-1AD30-0XB0	SB 1231 signal board	6ES7 231-4HA30-0XB0
		1 analog input, ±10 V with 12 bit or 0 ... 20 mA with 11 bit	
		SB 1231 thermocouple signal board	6ES7 231-5QA30-0XB0
		1 input +/- 80 mV, resolution 15 bit + sign, thermocouples type J, K	
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	6ES7 212-1HD30-0XB0	SB 1231 RTD signal board	6ES7 231-5PA30-0XB0
		1 input for resistance temperature sensors Pt 100, Pt 200, Pt 500, Pt 1000, resolution 15 bit + sign	
SB 1221 signal board		SB 1232 signal board	6ES7 232-4HA30-0XB0
4 inputs, 5 V DC, 200 kHz	6ES7 221-3AD30-0XB0	1 analog output, ±10 V with 12 bit or 0 to 20 mA with 11 bit	
4 inputs, 24 V DC, 200 kHz	6ES7 221-3BD30-0XB0	CB 1241 RS485 communication board	6ES7 241-1CH30-1XB0
SB 1222 signal board		for point-to-point connection, with 1 RS485 interface	
4 outputs, 5 V DC, 0.1 A, 200 kHz	6ES7 222-1AD30-0XB0	Simulator (optional)	6ES7 274-1XF30-0XA0
4 outputs, 24 V DC, 0.1 A, 200 kHz	6ES7 222-1BD30-0XB0	8 input switches, for CPU 1211C / CPU 1212C	
		SIMATIC Memory Card (optional)	
		2 MB	6ES7 954 -8LB01-0AA0
		24 MB	6ES7 954 -8LF01-0AA0
		Extension cable for two-tier configuration	6ES7 290-6AA30-0XA0
		for connecting digital/analog signal modules; length 2 m	
		Starter box CPU 1212C AC/DC/ relay	6ES7 212-1BD30-4YB0
		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: Subject to export regulations AL: N and ECCN: 5D992

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

SIMATIC S7-1200

Central processing units

CPU 1212C

4

Ordering data		Order No.	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	
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

SIMATIC S7-1200

Central processing units

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)

4

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

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

SIMATIC S7-1200

Central processing units

CPU 1214C

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

Technical specifications (continued)

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

SIMATIC S7-1200

Central processing units

CPU 1214C

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

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%

SIMATIC S7-1200

Central processing units

CPU 1214C

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 - Permissible temperature change - Air pressure acc. to IEC 60068-2-13 - Permissible air pressure - Permissible operating height - Pollutant concentrations - SO₂ at RH < 60% without condensation			
	0°C to 55°C horizontal mounting, 0°C to 45°C vertical mounting 5° C to 55°, 3° C/minute	5°C to 55°C, 3°C / minute	0°C to 55°C horizontal mounting, 0°C to 45°C vertical mounting 5°C to 55°C, 3°C / minute
	1080 to 795 hPa -1000 to 2000 m	1080 to 795 hPa -1000 to 2000 m	1080 to 795 hPa -1000 to 2000 m
	SO ₂ : < 0.5 ppm; H ₂ S: < 0.1 ppm; RH < 60% condensation-free	SO ₂ : < 0.5 ppm; H ₂ S: < 0.1 ppm; RH < 60% condensation-free	SO ₂ : < 0.5 ppm; H ₂ S: < 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

Ordering data	Order No.	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	6ES7 214-1BE30-0XB0	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 2 inputs, 5 V DC, 200 kHz 2 outputs 5 V DC, 0.1 A, 200 kHz 2 inputs, 24 V DC, 200 kHz 2 outputs 24 V DC, 0.1 A, 200 kHz
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	6ES7 214-1AE30-0XB0	6ES7 223-0BD30-0XB0 6ES7 223-3AD30-0XB0 6ES7 223-3BD30-0XB0
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	6ES7 214-1HE30-0XB0	SB 1231 signal board 1 analog input, ±10 V with 12 bit or 0 ... 20 mA with 11 bit SB 1231 thermocouple signal board 1 input +/- 80 mV, resolution 15 bit + sign, thermocouples type J, K SB 1231 RTD signal board 1 input for resistance temperature sensors Pt 100, Pt 200, Pt 500, Pt 1000, resolution 15 bit + sign
SB 1221 signal board 4 inputs, 5 V DC, 200 kHz 4 inputs, 24 V DC, 200 kHz	6ES7 221-3AD30-0XB0 6ES7 221-3BD30-0XB0	6ES7 231-4HA30-0XB0 6ES7 231-5QA30-0XB0 6ES7 231-5PA30-0XB0
SB 1222 signal board 4 outputs, 5 V DC, 0.1 A, 200 kHz 4 outputs, 24 V DC, 0.1 A, 200 kHz	6ES7 222-1AD30-0XB0 6ES7 222-1BD30-0XB0	SB 1232 signal board 1 analog output, ±10 V with 12 bit or 0 to 20 mA with 11 bit CB 1241 RS485 communication board for point-to-point connection, with 1 RS485 interface Simulator (optional) 14 input switches, for CPU 1214C SIMATIC memory card (optional) 2 MB 24 MB Extension cable for two-tier configuration for connecting digital/analog signal modules; length 2 m Terminal block (spare part) for CPU 1214C For DI, with 20 screws, tin-plated; 4 units For DO, with 12 screws, tin-plated; 4 units For AI, with 3 screws, tin-plated; 4 units
		6ES7 241-1CH30-1XB0 6ES7 274-1XH30-0XA0 6ES7 954-8LB01-0AA0 6ES7 954-8LF01-0AA0 6ES7 290-6AA30-0XA0 6ES7 292-1AV30-0XA0 6ES7 292-1AM30-0XA0 6ES7 292-1BC30-0XA0

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

SIMATIC S7-1200

Central processing units

CPU 1214C

4

Ordering data		Order No.	Order No.	
Front flap set (spare part) for CPU 1214C		6ES7 291-1AB30-0XA0	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 Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license STEP 7 Basic V11, trial license STEP 7 Basic Software Update Service, 1 year	
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		

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

SIMATIC S7-1200

SIPLUS central processing units

SIPLUS CPU 1211C

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.

4

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

SIMATIC S7-1200

SIPLUS central processing units

SIPLUS CPU 1211C

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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 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 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
- Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +55 °C; without restrictions; SB module can be used I
- 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 212-1BD30-4XB0

6AG1 212-1BD30-5XB0

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
- Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +55 °C; without restrictions; SB module can be used I
- 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 212-1AD30-4XB0

6AG1 212-1AD30-5XB0

6AG1 212-1AD30-2XB0

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

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

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

H: Subject to export regulations AL: 91999 and ECCN: EAR99H

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

SIMATIC S7-1200

SIPLUS central processing units

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

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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 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!

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

Ordering data**Order No.****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
- Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +55 °C; without restrictions; SB module can be used I
- 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 212-1BD30-4XB0**6AG1 212-1BD30-5XB0****6AG1 212-1BD30-2XB0****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
- Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +55 °C; without restrictions; SB module can be used I
- 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 212-1AD30-4XB0**6AG1 212-1AD30-5XB0****6AG1 212-1AD30-2XB0**

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

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

SIMATIC S7-1200

SIPLUS central processing units

SIPLUS CPU 1212C

4

Ordering data

Order No.

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 extra-
ordinary medial exposure (conformal coating) H
- Suitable for areas with extra-
ordinary medial exposure (conformal coating);
ambient temperature
-25 ... +55 °C;
without restrictions; SB module
can be used I
- Suitable for areas with extra-
ordinary 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 212-1HD30-4XB0

6AG1 212-1HD30-5XB0

6AG1 212-1HD30-2XB0

Accessories

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

SIMATIC S7-1200

SIPLUS central processing units

SIPLUS CPU 1214C

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.

4

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

SIMATIC S7-1200

SIPLUS central processing units

SIPLUS CPU 1214C

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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 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 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
- Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +55 °C; without restrictions; SB module can be used I
- 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 214-1BE30-4XB0

6AG1 214-1BE30-5XB0

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
- Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +55 °C; without restrictions; SB module can be used I
- 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 214-1AE30-4XB0

6AG1 214-1AE30-5XB0

6AG1 214-1AE30-2XB0

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

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

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

H: Subject to export regulations AL: 91999 and ECCN: EAR99H
I: Subject to export regulations AL: N and ECCN: EAR99H

SIMATIC S7-1200

Digital modules

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

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

SIMATIC S7-1200

Digital modules

SM 1221 digital input module

4

Ordering data		Order No.			Order No.
SM 1221 digital input signal module			S7-1200 automation system, Easy Book		
8 inputs, 24 V DC, isolated, current sourcing/sinking	I	6ES7 221-1BF30-0XB0	Brief instructions		
16 inputs, 24 V DC, isolated, current sourcing/sinking	I	6ES7 221-1BH30-0XB0	German	K	6ES7 298-8FA30-8AQ0
Extension cable for two-tier configuration	I	6ES7 290-6AA30-0XA0	English	K	6ES7 298-8FA30-8BQ0
for connecting digital/analog signal modules; length 2 m			French	K	6ES7 298-8FA30-8CQ0
Terminal block (spare part)			Spanish	K	6ES7 298-8FA30-8DQ0
for 8/16-channel digital signal modules			Italian	K	6ES7 298-8FA30-8EQ0
with 7 screws, zinc-plated; 4 units	I	6ES7 292-1AG30-0XA0	Chinese	K	6ES7 298-8FA30-8KQ0
Front flap set (spare part)			STEP 7 Basic V11 engineering software		
for 8/16-channel signal modules		6ES7 291-1BA30-0XA0	Target system: SIMATIC S7-1200 controllers and the associated I/O.		
S7-1200 automation system, system manual			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)		
For SIMATIC S7-1200 and STEP 7 Basic			Type of delivery: German, English, Chinese, Italian, French, Spanish		
German	K	6ES7 298-8FA30-8AH0	Single license		6ES7 822-0AA01-0YA0
English	K	6ES7 298-8FA30-8BH0	Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license		6ES7 822-0AA01-0YE0
French	K	6ES7 298-8FA30-8CH0	Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license		6ES7 822-1AA01-0YC5
Spanish	K	6ES7 298-8FA30-8DH0	STEP 7 Basic V11, trial license		6ES7 822-0AA01-0YA7
Italian	K	6ES7 298-8FA30-8EH0	STEP 7 Basic Software Update Service, 1 year	D	6ES7 822-0AA00-0YL0
Chinese	K	6ES7 298-8FA30-8KH0			

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

Overview



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

4

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

SIMATIC S7-1200

Digital modules

SB 1221 digital input module

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

Ordering data	Order No.	Order No.
SB 1221 signal board digital input modules		STEP 7 Basic V11 engineering software
4 inputs, 5 V DC, 200 kHz	I 6ES7 221-3AD30-0XB0	Target system: SIMATIC S7-1200 controllers and the associated I/O.
4 inputs, 24 V DC, 200 kHz	I 6ES7 221-3BD30-0XB0	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)
Terminal block (spare part)		Type of delivery: German, English, Chinese, Italian, French, Spanish
for Signal Board		Single license
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	6ES7 822-0AA01-0YA0
English	K 6ES7 298-8FA30-8BH0	6ES7 822-0AA01-0YE0
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	6ES7 822-1AA01-0YC5
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	
		Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license
		STEP 7 Basic V11, trial license
		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

SIMATIC S7-1200

Digital modules

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		

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	2 A	2 A
• for signal "1" permissible range, max.				
• 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

SIMATIC S7-1200

Digital modules

SM 1222 digital output module

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 • 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 - permissible temperature change 5°C to 55°C, 3°C / minute				
Degree of protection IP20				
Standards, approvals, certificates CE mark				
C-TICK				
FM approval				
Mechanics/material Type of housing (front) • Plastic				
Dimensions and weight Dimensions • Width 45 mm • Height 100 mm • Depth 75 mm				
Weight • Weight, approx. 180 g				

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

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

SIMATIC S7-1200

Digital modules

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

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) • Temperature - Permissible temperature range • Air pressure acc. to IEC 60068-2-13 - Permissible air pressure • Relative humidity - Permissible range (without condensation) at 25 °C	0.3 m; Five times, in dispatch package -40 °C to +70 °C 1080 to 660 hPa 95%	0.3 m; Five times, in dispatch package -40 °C to +70 °C 1080 to 660 hPa 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 • Height • Depth Weight • Weight, approx.	38 mm 62 mm 21 mm 40 g	38 mm 62 mm 21 mm 40 g

SIMATIC S7-1200

Digital modules

SB 1222 digital output module

4

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

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

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

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

SIMATIC S7-1200

Digital modules

SM 1223 digital input/output module

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 - Rated value, DC - for signal "0" - for signal "1"	24 V 5 V DC at 1 mA 15 V DC at 2.5 mA	24 V 5 V DC at 1 mA 15 V DC at 2.5 mA	24 V 5 V DC at 1 mA 15 V DC at 2.5 mA	24 V 5 V DC at 1 mA 15 V DC at 2.5 mA	230 V 20 V AC at 1 mA 79 V AC at 2.5 mA
Input current - for signal "0", max. (permissible quiescent current) - for signal "1", min. - for signal "1", typ.	1 mA 2.5 mA 4 mA; typical	1 mA 2.5 mA 4 mA; typical	1 mA 2.5 mA 4 mA; typical	1 mA 2.5 mA 4 mA; typical	1 mA 2.5 mA 9 mA; typical
Input delay (for rated value of input voltage) - for standard inputs - parameterizable - for interrupt 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	Yes; 0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four Yes	Yes; 0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four Yes	Yes; 0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four Yes	Yes; 0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four Yes
Cable length - Cable length, shielded, max. - Cable length unshielded, max.	500 m 300 m	500 m 300 m	500 m 300 m	500 m 300 m	500 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. - on lamp load, max.	0.5 A 5 W	0.5 A 5 W	2 A 30 W DC ; 200 W AC	2 A 30 W DC ; 200 W AC	2 A 30 W DC ; 200 W AC
Output voltage - Rated value (AC) - Rated value (DC) - for signal "0" (DC), max. - for signal "1", min.	24 V 0.1 V; with 10 kOhm load 20 V DC	24 V 0.1 V; with 10 kOhm load 20 V DC	5 to 250 V AC 5 to 30 V AC	5 to 250 V AC 5 to 30 V AC	5 to 250 V AC 5 to 30 V DC
Output current - for signal "1" permissible range, max. - for signal "0" residual current, max.	0.5 A 10 µA	0.5 A 10 µA	2 A	2 A	2 A
Output delay with resistive load 0 to "1", max. 1 to "0", max.	50 µs 200 µs	50 µs 200 µs	10 ms 10 ms	10 ms 10 ms	10 ms 10 ms

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 2	Relays 4	Relays 2
• between the channels, in groups of	1	1			
• 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

SIMATIC S7-1200

Digital modules

SM 1223 digital input/output module

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) • Temperature - Permissible temperature range • Air pressure acc. to IEC 60068-2-13 - Permissible air pressure • Relative humidity - Permissible range (without condensation) at 25 °C	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
	-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
	1080 to 660 hPa	1080 to 660 hPa	1080 to 660 hPa	1080 to 660 hPa	1080 to 660 hPa
	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 • Height • Depth	45 mm 100 mm 75 mm	70 mm 100 mm 75 mm	45 mm 100 mm 75 mm	70 mm 100 mm 75 mm	45 mm 100 mm 75 mm
Weight • Weight, approx.	210 g	310 g	230 g	350 g	230 g

Ordering data	Order No.	Order No.
SM 1223 digital input/output signal module		S7-1200 automation system, Easy Book
8 inputs, 24 V DC, IEC type 1 current sinking; 8 24 V DC transistor outputs, 0.5 A, 5 W	6ES7 223-1BH30-0XB0	Brief instructions
16 inputs, 24 V DC, IEC type 1 current sinking; 16 24 V DC transistor outputs, 0.5 A, 5 W	6ES7 223-1BL30-0XB0	German K 6ES7 298-8FA30-8AQ0
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	6ES7 223-1PH30-0XB0	English K 6ES7 298-8FA30-8BQ0
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	6ES7 223-1PL30-0XB0	French K 6ES7 298-8FA30-8CQ0
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	6ES7 223-1QH30-0XB0	Spanish K 6ES7 298-8FA30-8DQ0
Extension cable for two-tier configuration	6ES7 290-6AA30-0XA0	Italian K 6ES7 298-8FA30-8EQ0
for connecting digital/analog signal modules; length 2 m		Chinese K 6ES7 298-8FA30-8KQ0
Terminal block (spare part)		STEP 7 Basic V11 engineering software
for 8/16-channel digital signal modules		Target system: SIMATIC S7-1200 controllers and the associated I/O.
with 7 screws, zinc-plated; 4 units	6ES7 292-1AG30-0XA0	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)
Terminal block (spare part)		Type of delivery: German, English, Chinese, Italian, French, Spanish
for 8/16-channel signal modules	6ES7 291-1BA30-0XA0	Single license 6ES7 822-0AA01-0YA0
for 32-channel signal modules	6ES7 291-1BB30-0XA0	Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license 6ES7 822-0AA01-0YE0
S7-1200 automation system, system manual		Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license 6ES7 822-1AA01-0YC5
For SIMATIC S7-1200 and STEP 7 Basic		STEP 7 Basic V11, trial license 6ES7 822-0AA01-0YA7
German K 6ES7 298-8FA30-8AH0		STEP 7 Basic D 6ES7 822-0AA00-0YL0
English K 6ES7 298-8FA30-8BH0		Software Update Service, 1 year
French K 6ES7 298-8FA30-8CH0		
Spanish K 6ES7 298-8FA30-8DH0		
Italian K 6ES7 298-8FA30-8EH0		
Chinese K 6ES7 298-8FA30-8KH0		

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

SIMATIC S7-1200

Digital modules

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, DO 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 control- lable 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

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

SIMATIC S7-1200

Digital modules

SB 1223 digital input/output module

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) • Temperature - Permissible temperature range • Air pressure acc. to IEC 60068-2-13 - Permissible air pressure • Relative humidity - Permissible range (without condensation) at 25 °C	0.3 m; Five times, in dispatch package -40 °C to +70 °C 1080 to 660 hPa 95%	0.3 m; Five times, in dispatch package -40 °C to +70 °C 1080 to 660 hPa 95%	0.3 m; Five times, in dispatch package -40 °C to +70 °C 1080 to 660 hPa 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 • Height • Depth	38 mm 62 mm 21 mm	38 mm 62 mm 21 mm	38 mm 62 mm 21 mm
Weight • Weight, approx.	40 g	40 g	40 g

Ordering data	Order No.	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 2 inputs, 5 V DC, 200 kHz 2 outputs 5 V DC, 0.1 A, 200 kHz 2 inputs, 24 V DC, 200 kHz 2 outputs 24 V DC, 0.1 A, 200 kHz	6ES7 223-0BD30-0XB0 6ES7 223-3AD30-0XB0 6ES7 223-3BD30-0XB0	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
Terminal block (spare part) for signal board with 6 screws, gold-plated; 4 units	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		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

SIMATIC S7-1200

SIPLUS digital modules

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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 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.

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: 91999 and ECCN: EAR99H

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

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.	

SIMATIC S7-1200

SIPLUS digital modules

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

- ISA-S71.04 severity level GX: Long-term load: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 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
- 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

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
- -25 ... +70 °C, from +60 ... +70°C number of simultaneously controllable inputs and outputs max. 50 % I

6AG1 222-1BF30-4XB0

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
- -25 ... +70 °C, from +60 ... +70°C number of simultaneously controllable inputs and outputs max. 50 % I

6AG1 222-1BH30-4XB0

6AG1 222-1BH30-2XB0

Order No.

Order No.

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
- -25 ... +70 °C, from +60 ... +70°C number of simultaneously controllable inputs and outputs max. 50 % I

6AG1 222-1HF30-4XB0

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
- -25 ... +70 °C, from +60 ... +70°C number of simultaneously controllable inputs and outputs max. 50 % I

6AG1 222-1HH30-4XB0

6AG1 222-1HH30-2XB0

Accessories

See SIMATIC S7-1200 SM 1222 digital output, page 4/49

H: Subject to export regulations AL: 91999 and ECCN: EAR99H

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

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.

4

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.	

SIMATIC S7-1200

SIPLUS digital modules

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: SO₂ < 4.8 ppm;
H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm;
NH₃ < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm;
Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH₃ < 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

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)

- -25 ... +70 °C,
from +60 ... +70 °C number of
simultaneously controllable
inputs and outputs max. 50 %

Order No.

6AG1 223-1BH30-4XB0

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)

- -25 ... +70 °C,
from +60 ... +70 °C number of
simultaneously controllable
inputs and outputs max. 50 %

6AG1 223-1BL30-4XB0

6AG1 223-1BL30-2XB0

Order No.

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)
- -25 ... +70 °C,
from +60 ... +70 °C number of
simultaneously controllable
inputs and outputs max. 50 %

6AG1 223-1PH30-4XB0

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)
- -25 ... +70 °C,
from +60 ... +70 °C number of
simultaneously controllable
inputs and outputs max. 50 %

6AG1 223-1PL30-4XB0

6AG1 223-1PL30-2XB0

Accessories

See SIMATIC S7-1200 SM 1223
digital input/output, page 4/57

H: Subject to export regulations AL: 91999 and ECCN: EAR99H

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

Overview



- Digital inputs and outputs as supplement to the integral I/O of the SIPLUS S7-1200-CPU
- 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.

4

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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 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

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

Ordering data	Order No.	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) • Ambient temperature -25 ... +55 °C	H 6AG1 223-0BD30-4XB0 I 6AG1 223-0BD30-5XB0	Accessories See SIMATIC S7-1200 SB 1223 digital input/output, page 4/61

H: Subject to export regulations AL: 91999 and ECCN: EAR99H
I: Subject to export regulations AL: N and ECCN: EAR99H

SIMATIC S7-1200

Analog modules

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. from backplane bus 5 V DC, typ.	45 mA 80 mA	45 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 • Current • Thermocouple • Resistance thermometer • Resistance	Yes; ±10 V, ±5 V, ±2.5 V Yes; 0 to 20 mA No No No	Yes; ±10 V, ±5 V, ±2.5 V Yes; 0 to 20 mA No No No
Input ranges (rated values), voltages • -10 V to +10 V • Input resistance (-10 V to +10 V) • -2.5 V to +2.5 V • Input resistance (-2.5 V to +2.5 V) • -5 V to +5 V • Input resistance (-5 V to +5 V)	Yes ≥9 MOhm Yes ≥9 MOhm Yes ≥9 MOhm	Yes ≥9 MOhm Yes ≥9 MOhm Yes ≥9 MOhm
Input ranges (rated values), currents • 0 to 20 mA • Input resistance (0 to 20 mA)	Yes ≥ 250 Ohm	Yes ≥ 250 Ohm
Voltage input • permissible input voltage for voltage input (destruction limit), max.	35 V	35 V

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 (f1 +/- 1%), f1 = 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%

SIMATIC S7-1200

Analog modules

SM 1231 analog input module

4

	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	1080 to 795 hPa	1080 to 795 hPa
- Permissible air pressure		
• Pollutant concentrations		
- SO ₂ at RH < 60% without condensation	SO ₂ : < 0.5 ppm; H ₂ S: < 0.1 ppm; RH < 60% condensation-free	SO ₂ : < 0.5 ppm; H ₂ S: < 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.	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	6ES7 231-4HD30-0XB0	
8 analog inputs ±10 V, ±5 V, ±2.5 V, or 0 ... 20 mA 12 bit + sign	6ES7 231-4HF30-0XB0	
Extension cable for two-tier configuration	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	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	
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

SIMATIC S7-1200

Analog modules

SB 1231 analog input module

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

Product type designation	6ES7 231-4HA30-0XB0 SB1231 AI 1x12 BIT
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	SO ₂ : < 0.5 ppm; H ₂ S: < 0.1 ppm; RH < 60% condensation-free

SIMATIC S7-1200

Analog modules

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 • Height • Depth	38 mm 62 mm 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 I or 0 ... 20 mA with 11 bit	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 English K French K Spanish K Italian K Chinese K	6ES7 298-8FA30-8AH0 6ES7 298-8FA30-8BH0 6ES7 298-8FA30-8CH0 6ES7 298-8FA30-8DH0 6ES7 298-8FA30-8EH0 6ES7 298-8FA30-8KH0
S7-1200 automation system, Easy Book Brief instructions German K English K French K Spanish K Italian K Chinese K	6ES7 298-8FA30-8AQ0 6ES7 298-8FA30-8BQ0 6ES7 298-8FA30-8CQ0 6ES7 298-8FA30-8DQ0 6ES7 298-8FA30-8EQ0 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 Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license STEP 7 Basic V11, trial license STEP 7 Basic Software Update Service, 1 year D	6ES7 822-0AA01-0YA0 6ES7 822-0AA01-0YE0 6ES7 822-1AA01-0YC5 6ES7 822-0AA01-0YA7 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

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. from backplane bus 5 V DC, typ.	45 mA 80 mA	45 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 Temperature compensation • Temperature compensation parameterizable	0 No	No
Analog outputs Number of analog outputs Output ranges, voltage • -10 to +10 V Output ranges, current • 0 to 20 mA Load impedance (in rated range of output) • with voltage outputs, min. • with current outputs, max.	2; current or voltage Yes Yes 1 000 Ω 600 Ω	4; current or voltage Yes Yes 1 000 Ω 600 Ω
Analog value creation Measurement principle	Differential	Differential
Integrations and conversion time/ resolution per channel • Resolution (incl. overrange) • Integration time, parameterizable • Interference voltage suppression for interference frequency f1 in Hz	Voltage: 14 bit; Current : 13 bit Yes 40 dB, DC to 60 V for interference frequency 50 / 60 Hz	Voltage: 14 bit; Current : 13 bit Yes 40 dB, DC to 60 V for interference frequency 50 / 60 Hz

SIMATIC S7-1200

Analog modules

SM 1232 analog output module

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 $f = n \times (f_l \pm 1\%)$, f_l = 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	SO ₂ : < 0.5 ppm; H ₂ S: < 0.1 ppm; RH < 60% condensation-free	SO ₂ : < 0.5 ppm; H ₂ S: < 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

SIMATIC S7-1200

Analog modules

SM 1232 analog output module

4

Ordering data		Order No.	Order No.	
SM 1232 analog output signal module			STEP 7 Basic V11 engineering software	
2 analog outputs, ±10 V with 14 bit or 0 ... 20 mA with 13 bit	I	6ES7 232-4HB30-0XB0	Target system: SIMATIC S7-1200 controllers and the associated I/O.	
4 analog outputs, ±10 V with 14 bit or 0 ... 20 mA with 13 bit	I	6ES7 232-4HD30-0XB0	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)	
Extension cable for two-tier configuration	I	6ES7 290-6AA30-0XA0	Type of delivery: German, English, Chinese, Italian, French, Spanish	
for connecting digital/analog signal modules; length 2 m			Single license	6ES7 822-0AA01-0YA0
Terminal block (spare part)			Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license	6ES7 822-0AA01-0YE0
for 8/16-channel analog signal modules			Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license	6ES7 822-1AA01-0YC5
with 7 screws, gold-plated; 4 units	I	6ES7 292-1BG30-0XA0	STEP 7 Basic V11, trial license	6ES7 822-0AA01-0YA7
S7-1200 automation system, system manual			STEP 7 Basic Software Update Service, 1 year	6ES7 822-0AA00-0YL0
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		

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

SIMATIC S7-1200

Analog modules

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 μ S (R), 750 μ S (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 $\pm$ 0.5% bis 55°C $\pm$ 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%

SIMATIC S7-1200

Analog modules

SB 1232 analog output module

4

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	SO ₂ : < 0.5 ppm; H ₂ S: < 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 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

SIMATIC S7-1200

Analog modules

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 AO 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

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. • with current outputs, max.	1 000 Ω 600 Ω
Analog value creation	
Measurement principle	Differential
Integrations and conversion time/ resolution per channel • Resolution (incl. overrange) • Resolution with overrange (bit including sign), max. • Integration time, parameterizable • Interference voltage suppression for interference frequency f1 in Hz	Voltage: 14 bit; Current : 13 bit 12 bit; + sign Yes 40 dB, DC to 60 V for interference frequency 50 / 60 Hz
Smoothing of measured values • Parameterizable • Step: None • Step: Low • Step: Medium • Step: High	Yes Yes Yes Yes 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 • Current, relative to input area • Voltage, relative to output area • Current, relative to output area	+/- 0,1 % +/- 0,1 % +/- 0,3 % +/- 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 • Diagnostic alarm	Yes Yes
Diagnostics • Diagnostic functions • Monitoring the supply voltage to the electronics • Wire break • Short circuit	Yes Yes Yes Yes
Diagnostic indication LED • for status of the inputs • For status of the outputs • for maintenance	Yes Yes Yes

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

SIMATIC S7-1200

Analog modules

SM 1234 analog input/output module

4

Ordering data

Order No.

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

6ES7 234-4HE30-0XB0**Extension cable for two-tier configuration**

for connecting digital/analog signal modules;
length 2 m

6ES7 290-6AA30-0XA0**Terminal block (spare part)**

for 8/16-channel analog signal modules

with 7 screws, gold-plated; 4 units

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**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

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. From backplane bus 5 V DC, typ.	40 mA 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 • Input resistance (-80 mV to $+80$ mV)	Yes $\geq 1\text{M}\Omega$	Yes $\geq 1\text{M}\Omega$
Input ranges (rated values), thermoelements • Type C • Type E • Type J • Type K • Type N • Type R • Type S • Type T • Type TXK/TXK(L) to GOST	Yes Yes Yes Yes Yes Yes Yes Yes Yes	Yes Yes Yes Yes Yes Yes Yes Yes Yes
Thermocouple (TC) • permissible input voltage for voltage input (destruction limit), max.	± 35 V	± 35 V
Temperature compensation • Temperature compensation parameterizable	No	No

SIMATIC S7-1200

Analog modules

SM 1231 thermocouple module

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)		
Smoothering 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	SO ₂ : < 0.5 ppm; H ₂ S: < 0.1 ppm; RH < 60% condensation-free	SO ₂ : < 0.5 ppm; H ₂ S: < 0.1 ppm; RH < 60% condensation-free

SIMATIC S7-1200

Analog modules

SM 1231 thermocouple module

	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

4

Ordering data	Order No.	Order No.
SM 1231 thermocouple module		
4 inputs +/- 80 mV, resolution 15 bit + sign, thermocouple types J, K, S, T, R, E, N	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)	6ES7 231-5QF30-0XB0	
Accessories		
Terminal block (spare part)		
for 8/16-channel analog signal modules		
with 7 screws, gold-plated; 4 units	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	6ES7 822-0AA01-0YA0
English	K 6ES7 298-8FA30-8BH0	6ES7 822-0AA01-0YE0
French	K 6ES7 298-8FA30-8CH0	6ES7 822-1AA01-0YC5
Spanish	K 6ES7 298-8FA30-8DH0	6ES7 822-0AA01-0YA7
Italian	K 6ES7 298-8FA30-8EH0	6ES7 822-0AA00-0YL0
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 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		
Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license		
Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license		
STEP 7 Basic V11, trial license		
STEP 7 Basic 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

SIMATIC S7-1200

Analog modules

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 SB1231 AI 1xTC	
Product type designation	6ES7 231-5QA30-0XB0 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.	± 35 V
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 SB1231 AI 1xTC	
Product type designation	6ES7 231-5QA30-0XB0 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 $\pm 0.1\%$ to 55°C $\pm 0.2\%$ total measurement range
Interference voltage suppression for $f = n \times (f1 \pm 1\%)$, f1 = 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	SO ₂ : < 0.5 ppm; H ₂ S: < 0.1 ppm; RH < 60% condensation-free

SIMATIC S7-1200

Analog modules

SB 1231 thermocouple signal board

4

Technical specifications (continued)

	6ES7 231-5QA30-0XB0
Product type designation	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		6ES7 231-5QA30-0XB0
1 input +/- 80 mV, resolution 15 bit + sign, thermocouples type J, K		
Accessories		
Terminal block (spare part)		
for signal board		
with 6 screws, gold-plated; 4 units		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 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

SIMATIC S7-1200

Analog modules

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; 150 Ω, 300 Ω, 600 Ω	Yes; Resistance-type transmitter: Pt10, Pt50, Pt100, Pt200, Pt500, Pt1000, Ni100, Ni120, Ni200, Ni500, Ni1000, Cu10, Cu50, Cu 100, LG-Ni1000 Yes; 150 Ω, 300 Ω, 600 Ω
Input ranges (rated values), resistance thermometers • Cu 10 • Input resistance (Cu 10) • Ni 100 • Input resistance (Ni 100) • Ni 1000 • Input resistance (Ni 1000) • LG-Ni 1000 • Input resistance (LG-Ni 1000) • Ni 120 • Input resistance (Ni 120) • Ni 200 • Input resistance (Ni 200) • Ni 500 • Input resistance (Ni 500) • Pt 100 • Input resistance (Pt 100) • Pt 1000 • Input resistance (Pt 1000) • Pt 200 • Input resistance (Pt 200) • Pt 500 • Input resistance (Pt 500)	Yes 10 Ω Yes 100 Ω Yes 1 000 Ω Yes 1 000 Ω Yes 120 Ω Yes 200 Ω Yes 500 Ω Yes 100 Ω Yes 1 000 Ω Yes 200 Ω Yes 500 Ω	Yes 10 Ω Yes 100 Ω Yes 1 000 Ω Yes 1 000 Ω Yes 120 Ω Yes 200 Ω Yes 500 Ω Yes 100 Ω Yes 1 000 Ω Yes 200 Ω Yes 500 Ω
Input ranges (rated values), resistors • 0 to 150 Ohm • 0 to 300 Ohm • 0 to 600 Ohm	Yes Yes Yes	Yes Yes Yes
Temperature compensation • Temperature compensation parameterizable	No	No

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 (f1 +/- 1%), f1 = 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	SO ₂ : < 0.5 ppm; H ₂ S: < 0.1 ppm; RH < 60% condensation-free	SO ₂ : < 0.5 ppm; H ₂ S: < 0.1 ppm; RH < 60% condensation-free

SIMATIC S7-1200

Analog modules

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

Ordering data	Order No.	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	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	6ES7 231-5PF30-0XB0	
Accessories		
Terminal block (spare part)		
for 8/16-channel analog signal modules		
with 7 screws, gold-plated; 4 units	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	
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

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 SB1231 AI 1xRTD	
Product type designation	6ES7 231-5PA30-0XB0 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 SB1231 AI 1xRTD	
Product type designation	6ES7 231-5PA30-0XB0 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	SO ₂ : < 0.5 ppm; H ₂ S: < 0.1 ppm; RH < 60% condensation-free

SIMATIC S7-1200

Analog modules

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		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		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 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

SIMATIC S7-1200

SIPLUS analog modules

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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 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 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

SIMATIC S7-1200

SIPLUS analog modules

SIPLUS SB 1232 analog output module

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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 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:

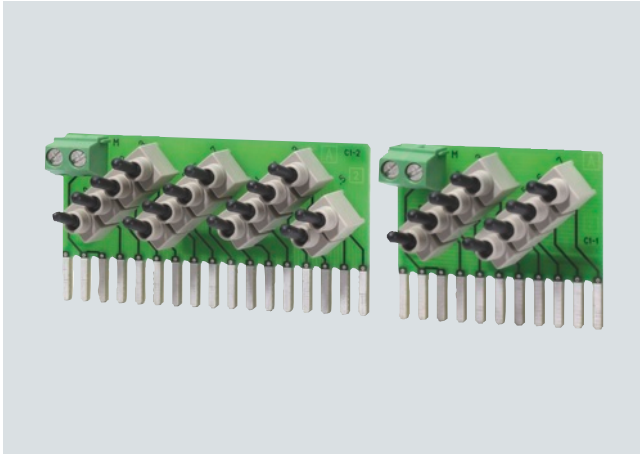
www.siemens.com/siplus-extreme

Ordering data	Order No.
SIPLUS SB 1232 analog output signal board (extended temperature range and medial exposure) <u>Ambient temperature range - 25 ... +55 °C</u> 1 analog output, ±10 V with 12 bit or 0 ... 20 mA with 11 bit <u>Ambient temperature range 0 ... +55 °C</u> 1 analog output, ±10 V with 12 bit or 0 ... 20 mA with 11 bit	6AG1 232-4HA30-5XB0 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

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 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

SIMATIC S7-1200

Communication

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

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.	Order No.
CM 1241 communication module		
Communication module for point-to-point connection, with one RS485 interface	6ES7 241-1CH30-0XB0	
Communication module for point-to-point connection, with one RS232 interface	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	
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		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

SIMATIC S7-1200

Communication

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	SO ₂ : < 0.5 ppm; H ₂ S: < 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.	Order No.	
RS485 CB 1241 communication board		6ES7 241-1CH30-1XB0	STEP 7 Basic V11 engineering software	
for point-to-point connection, with 1 RS485 interface			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	
Accessories				
Terminal block (spare part)				
for signal board				
with 6 screws, gold-plated; 4 units		6ES7 292-1BF30-0XA0		
S7-1200 automation system, system manual				
For SIMATIC S7-1200 and STEP 7 Basic				
German	K	6ES7 298-8FA30-8AH0	Single license	6ES7 822-0AA01-0YA0
English	K	6ES7 298-8FA30-8BH0	Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license	6ES7 822-0AA01-0YE0
French	K	6ES7 298-8FA30-8CH0	Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license	6ES7 822-1AA01-0YC5
Spanish	K	6ES7 298-8FA30-8DH0	STEP 7 Basic V11, trial license	6ES7 822-0AA01-0YA7
Italian	K	6ES7 298-8FA30-8EH0	STEP 7 Basic Software Update Service, 1 year	6ES7 822-0AA00-0YL0
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		

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

SIMATIC S7-1200

Communication

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

Technical specifications (continued)		Ordering data	Order No.
Order No.	6GK7 242-5DX30-0XE0	CM 1242-5 communication module	
Product properties, functions, components in general		Communication module for electrical connection of SIMATIC S7-1200 to PROFIBUS as a DPV1 slave	6GK7 242-5DX30-0XE0
Maximum number of modules per CPU	3	Accessories	
Number of modules - Note	-	RS485 PROFIBUS FastConnect connector	
Performance data		With 90° cable outlet; insulation displacement technology, max. transmission rate 12 Mbit/s	
<u>Performance data open communication</u>		- Without PG interface - With PG interface	6ES7 972-0BA52-0XA0 6ES7 972-0BB52-0XA0
Number of possible connections for open communication by means of SEND/RECEIVE blocks, maximum	-	PROFIBUS FC standard cable	
Data volume as user data per connection for open communication by means of SEND/RECEIVE blocks, maximum	-	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
<u>Performance data PROFIBUS DP</u>		PROFIBUS FastConnect stripping tool	
Service as DP master DPV0	-	Stripping tool for fast stripping of the PROFIBUS FastConnect bus cable	6GK1 905-6AA00
Number of DP slaves that can be operated on DP master	-	12M PROFIBUS bus terminal	
Data volume		Bus terminal for connection of PROFIBUS nodes at up to 12 Mbit/s with connecting cable	6GK1 500-0AA10
- 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		
<u>Performance data S7 communication</u>			
Number of possible connections for S7 communication			
• Maximum	-		
• For PG connections, maximum	-		
• Maximum with PG/OP connections	-		
• Note	-		
<u>Performance data multiprotocol operation</u>			
Number of active connections in multiprotocol mode			
• Maximum without DP	-		
• Maximum with DP	-		
Product functions Management, configuration, programming			
Configuration software required	STEP 7 Basic V11.0 or higher		

SIMATIC S7-1200

Communication

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 storage	-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

Technical specifications (continued)		Ordering data	Order No.
Order No.	6GK7 243-5DX30-0XE0	CM 1243-5 communication module	
Product properties, functions, components in general		Communication module for electrical connection of SIMATIC S7-1200 to PROFIBUS as a DPV1 master	6GK7 243-5DX30-0XE0
Number of modules		Accessories	
• Per CPU, maximum	1	RS485 PROFIBUS FastConnect connector	
• Note	-	With 90° cable outlet; insulation displacement technology, max. transmission rate 12 Mbit/s	
Performance data		• Without PG interface	6ES7 972-0BA52-0XA0
<u>Performance data open communication</u>		• With PG interface	6ES7 972-0BB52-0XA0
Number of possible connections for open communication by means of SEND/RECEIVE blocks, maximum	-	PROFIBUS FC standard cable	
Data volume as user data per connection for open communication by means of SEND/RECEIVE blocks, maximum	-	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
<u>Performance data PROFIBUS DP</u>		PROFIBUS FastConnect stripping tool	
Service as DP master DPV0	-	Stripping tool for fast stripping of the PROFIBUS FastConnect bus cable	6GK1 905-6AA00
Number of DP slaves that can be operated on DP master	16	12M PROFIBUS bus terminal	
Data volume		Bus terminal for connection of PROFIBUS nodes at up to 12 Mbit/s with connecting cable	6GK1 500-0AA10
• 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	-		
<u>Performance data S7 communication</u>			
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		
<u>Performance data multiprotocol operation</u>			
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		

SIMATIC S7-1200

Communication

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	4
• For network components or terminal equipment	
• 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

Technical specifications (continued)		Ordering data	Order No.
Order number	6GK7 277-1AA00-0AA0	CSM 1277 compact switch module	6GK7 277-1AA10-0AA0
Product properties, functions, components in general		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	
Cascading with star topology	-	Accessories	
Product function: switch-managed	No	IE TP Cord RJ45/RJ45	6XV1 870-3QE50 6XV1 870-3QH10 6XV1 870-3QH20 6XV1 870-3QH60 6XV1 870-3QN10
Standards, specifications, approvals		TP cable 4 x 2 with 2 RJ45 connectors	
Standard		• 0.5 m	6GK1 901-1FC00 0AA0
• For EMC from FM	FM3611: Class 1, Division 2, Group A, B, C, D / T.., CL. 1, Zone 2, GP. IIC, T.. Ta	• 1 m	
• For Ex zone	EN 600079-15:2005, EN 600079-0:2006, II 3 G Ex nA II T4, KEMA 08 ATEX 0003 X	• 2 m	
• For CSA and UL safety	UL 508, CSA C22.2 No. 142	• 6 m	
• For Ex zone of CSA and UL	-	• 10 m	
• 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	IE FC Outlet RJ45	
• CE mark	Yes	For connecting Industrial Ethernet FC cables and TP cords; graduated prices for 10 and 50 units or more	
• C-Tick	Yes		

SIMATIC S7-1200

Communication

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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 14.8 ppm; H₂S < 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!

For further technical documentation on SIPLUS, see:

www.siemens.com/siplus-extreme

Ordering data

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

Order No.

6AG1 277-1AA00-4AA0

Order No.

Accessories

See CSM 1277 unmanaged, page 4/105

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

SIMATIC S7-1200

Communication

CP 1242-7

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	
<u>Performance data open communication</u>	
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
<u>Performance data S7 communication</u>	
Number of possible connections for S7 communication	
• Maximum	-
• For PG connections, maximum	-
• For PG/OP connections, maximum	-
• Note	-

Order No.	6GK7 242-7KX30-0XE0
<u>Performance data Telecontrol</u>	
Connection to the control center	Telecontrol Server Basic
• Note	Connection to Scada system by means of OPC interface is supported
• 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
<u>Performance data Teleservice</u>	
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
<u>Accessories</u>	
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

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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 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 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	6AG1 241-1CH30-2XB0
Communication module for point-to-point connection, with one RS232 interface	6AG1 241-1AH30-2XB0
Suitable for areas with extraordinary medial exposure (conformal coating)	
Communication module for point-to-point connection, with one RS485 interface	6AG1 241-1CH30-4XB0
Communication module for point-to-point connection, with one RS232 interface	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

SIMATIC S7-1200

Power supplies

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 $U_{in \text{ rated}}$	120/230 V AC Automatic range switchover
Voltage range	85 ... 132 V/176 ... 264 V
Overvoltage strength	$2.3 \times U_{in \text{ rated}}$, 1.3 ms
Mains buffering at $I_{out \text{ rated}}$	> 20 ms at $U_{in} = 93/187 \text{ V}$
Rated line frequency, rated line-frequency range	50/60 Hz; 47 ... 63 Hz
Rated current $I_{in \text{ rated}}$	1.2/0.67 A
Switch-on current limitation (+25 °C)	< 13 A, < 3 ms ($U_{in} = 230 \text{ V}$)
β_t	< 0.5 A ² s
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	
Rated voltage $U_{out \text{ rated}}$	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 $I_{out \text{ rated}}$	2.5 A

Power supply, type	2.5 A
Order number	6EP1 332-1SH71 ¹⁾
Current range	0 ... 2.5 A
• Up to +60 °C	-
• 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 $U_{out \text{ rated}}, I_{out \text{ rated}}$	Approx. 83%
Power loss at $U_{out \text{ rated}}, I_{out \text{ rated}}$	Approx. 12 W
Closed-loop control	
Dyn. mains compensation ($U_{in \text{ rated}} \pm 15\%$)	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	-

SIMATIC S7-1200

Power supplies

SIMATIC S7-1200 PM 1207

Technical specifications (continued)

Power supply, type	2.5 A
Order number	6EP1 332-1SH71¹⁾
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****6EP1 332-1SH71**

Input 120/230 V AC, output 24 V DC/2.5 A

SIMATIC S7-1200 PM 1207**L 6AG1 332-1SH71-7AA0**

(Extended temperature range and medial exposure, -25 ... +70 °C)

L: Subject to export regulations AL: 91999 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

SIMATIC S7-1200

SIPLUS power supplies

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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 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 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

Ambient temperature
0 ... +60 °C

L **6AG1 332-1SH71- 7AA0**

6AG1 332-1SH71- 4AA0

L: Subject to export regulations AL: 91999 and ECCN: N

SIMATIC S7-1200

Operator control and monitoring

Basic panels - Standard

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

4

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, program-mable	4 function keys	6 function keys	6 function keys	6 function keys
Connection for mouse/ keyboard/barcode reader	- / - / -	- / - / -	- / - / -	- / - / -

SIMATIC S7-1200

Operator control and monitoring

Basic panels - Standard

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

SIMATIC S7-1200

Operator control and monitoring

Basic panels - Standard

4

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

SIMATIC S7-1200

Operator control and monitoring

Basic panels - Standard

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 • Numeric/alphabetical input	analog, resistive Yes (on-screen keyboard) / Yes (on-screen keyboard)	analog, resistive Yes (on-screen keyboard) / Yes (on-screen keyboard)	analog, resistive 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) • Operation (max. tilt angle) • Transport, storage	0 °C to +50 °C 0 °C to +40 °C -20 °C to +60 °C	0 °C to +50 °C 0 °C to +40 °C -20 °C to +60 °C	0 °C to +50 °C 0 °C to +40 °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

SIMATIC S7-1200

Operator control and monitoring

Basic panels - Standard

4

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

SIMATIC S7-1200

Operator control and monitoring

Basic panels - Standard

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

SIMATIC S7-1200

Operator control and monitoring

Basic panels - Standard

4

Ordering data	Order No.	Order No.
SIMATIC HMI KP300 Basic mono PN	I 6AV6 647-0AH11-3AX0	Starter kit SIMATIC S7-1200 + KTP600 Basic D 6AV6 651-7DA01-3AA0 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 Configuration • All device versions: with SIMATIC WinCC V11, configurable 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 • English • French • Italian • Spanish WinCC flexible Communication user manual • German • English • French • Italian • Spanish 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
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	6AV6 691-1AB01-3AA0 6AV6 691-1AB01-3AB0 6AV6 691-1AB01-3AC0 6AV6 691-1AB01-3AD0 6AV6 691-1AB01-3AE0
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	6AV6 691-1CA01-3AA0 6AV6 691-1CA01-3AB0 6AV6 691-1CA01-3AC0 6AV6 691-1CA01-3AD0 6AV6 691-1CA01-3AE0
SIMATIC HMI TP1500 Basic color PN	I 6AV6 647-0AG11-3AX0	
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)		
Starter kit SIMATIC S7-1200 + KTP400 Basic	D 6AV6 651-7AA01-3AA0	
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: 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

SIMATIC S7-1200

SIPLUS operator control and monitoring

SIPLUS basic panels

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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 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.	Order No.	
SIPLUS HMI KTP400 Basic mono PN		6AG1 647-0AA11-2AX0	SIPLUS HMI KTP 1000 Basic Color PN	6AG1 647-0AF11-4AX0
Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -10 ... +60 °C			Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature 0 ... +50 °C	
SIPLUS HMI KTP 600 Basic color PN	H	6AG1 647-0AD11-2AX0	SIPLUS HMI TP 1500 Basic Color PN	6AG1 647-0AG11-4AX0
Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +60 °C			Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature 0 ... +50 °C	
SIPLUS HMI KTP 1000 Basic Color DP	I	6AG1 647-0AE11-4AX0	Accessories	See SIMATIC basic panels, page 4/119
Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature 0 ... +50 °C				

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

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

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.

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>

SIMATIC S7-300

Introduction

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, Test according to: HF irradiation according to IEC 61000-4-3, HF decoupling according to IEC 61000-4-6
• Sinusoidal disturbance variables	Interference emission according to EN 50081-2
• Emission of radio interference	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 $10 \text{ Hz} \leq f \leq 58 \text{ Hz}$ • Continuous: 0.0375 mm amplitude • Occasionally 0.75 mm amplitude Frequency range $58 \text{ Hz} \leq f \leq 150 \text{ Hz}$ • Continuous: 0.5 g constant acceleration • Occasionally 1 g constant acceleration Testing according to IEC 60068-2-6 Tested with: $5 \text{ Hz} \leq f \leq 9 \text{ Hz}$, constant amplitude 3.5 mm; $9 \text{ Hz} \leq f \leq 150 \text{ Hz}$, constant acceleration 1 g; Duration of oscillation: 10 frequency passes per axis in each direction of the 3 mutually perpendicular axes 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 $\pm$ direction in each of the 3 mutually vertical axes
• Shock	

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: SO₂ < 4.8 ppm; H₂S < 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
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O₃ < 1.0 ppm; NO_x < 10.4 ppm

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

SIMATIC S7-300

Central processing units

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.

SIMATIC S7-300

Central processing units

Standard CPUs

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.

SIMATIC S7-300

Central processing units

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.

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 ² t	1 A ² ·s	1 A ² ·s	1 A ² ·s	1 A ² ·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

SIMATIC S7-300

Central processing units

Standard CPUs

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

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

SIMATIC S7-300

Central processing units

Standard CPUs

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

SIMATIC S7-300

Central processing units

Standard CPUs

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

SIMATIC S7-300

Central processing units

Standard CPUs

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 • Data length of all incoming connections master/slave, max. • Data length of all outgoing connections master/slave, max. • Number of device-internal and PROFIBUS interconnections • Data length of device-internal und PROFIBUS interconnections, max. • Data length per connection, max. • Remote interconnections with acyclic transmission - Sampling frequency: Sampling time, min. - Number of incoming interconnections - Number of outgoing interconnections - Data length of all incoming interconnections, max. - Data length of all outgoing interconnections, max. - Data length per connection, max. • Remote interconnections with cyclic transmission - Transmission frequency: Transmission interval, min. - Number of incoming interconnections - Number of outgoing interconnections - Data length of all incoming interconnections, max. - Data length of all outgoing interconnections, max. - Data length per connection, max. • HMI variables via PROFINET (acyclic) - Number of stations that can log on for HMI variables (PN OPC/iMap) - HMI variable updating - Number of HMI variables - Data length of all HMI variables, max. • PROFIBUS proxy functionality - Supported - Number of linked PROFIBUS devices - Data length per connection, max.				1 000 4 000 byte 4 000 byte 500 4 000 byte 1 400 byte 500 ms 100 100 2 000 byte 2 000 byte 1 400 byte 10 ms 200 200 2 000 byte 2 000 byte 450 byte 3; 2x PN OPC/1x iMap 500 ms 200 2 000 byte Yes 16 240 byte; Slave-dependent

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

SIMATIC S7-300

Central processing units

Standard CPUs

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 - Routing - Global data communication - S7 basic communication - S7 communication - S7 communication, as client - S7 communication, as server - Direct data exchange (slave-to-slave communication) - DPV1 - Transmission rate, max. - Transfer memory - Inputs - Outputs - Address area, max. - User data per address area, max.				Yes Yes; Only with active interface No No Yes No Yes; Connection configured on one side only Yes No 12 Mbit/s 244 byte 244 byte 32 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 - Switchover time on line break, typically - Number of stations in the ring, max.				Yes 200 ms; PROFINET MRP 50
Change of IP address at runtime, supported				Yes
Functionality - MPI - DP master - DP slave - PROFINET IO controller - PROFINET IO device - PROFINET CBA - Web server - Number of HTTP clients - Local Operating Network			No Yes Yes No	No No No Yes; Also simultaneously with IO device functionality Yes; Also simultaneously with IO controller functionality Yes Yes 5

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. • Services - PG/OP communication - Routing - Global data communication - S7 basic communication - S7 communication - S7 communication, as client - S7 communication, as server - Equidistance mode support - Isochronous mode - SYNC/FREEZE - Activation/deactivation of DP slaves - Number of DP slaves that can be simultaneously activated/deactivated, max. - DPV1 • Transmission rate, max. • Number of DP slaves, max. • Address area - Inputs, max. - Outputs, max. • User data per DP slave - Inputs, max. - Outputs, max.			16 Yes Yes No Yes; I blocks only Yes No Yes Yes Yes; OB 61 Yes Yes 8 Yes 12 Mbit/s 124; Per station 2 048 byte 2 048 byte 244 byte 244 byte	
DP slave • Number of connections • Services - PG/OP communication - Routing - Global data communication - S7 basic communication - S7 communication, as client - S7 communication, as server - Direct data exchange (slave-to-slave communication) - DPV1 • GSD file • Transmission rate, max. • Automatic baud rate search • Transfer memory - Inputs - Outputs • Address area, max. • User data per address area, max.			16 Yes Yes; Only with active interface No No No Yes Yes No The current GSD file can be obtained from: www.siemens.com/profibus-gsd 12 Mbit/s Yes; only with passive interface 244 byte 244 byte 32 32 byte	

SIMATIC S7-300

Central processing units

Standard CPUs

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 - Routing - S7 communication - Isochronous mode - Open IE communication - Transmission rate, max. - Number of connectable IO devices, max. - Max. number of connectable IO devices for RT - of which in line, max. - Number of IO devices with IRT and the option "high flexibility" - of which in line, max. - Number of IO devices with IRT and the option "high performance", max. - of which in line, max. - IRT, supported - Shared device, supported - Prioritized startup supported - Number of IO devices, max. - Activation/deactivation of IO devices - Number of IO devices that can be simultaneously activated/deactivated, max. - IO devices changing during operation (partner ports), supported - Max. number of IO devices per tool - Device replacement without swap medium - Updating time				Yes Yes Yes; with loadable FBs, max. configurable connections: 14, max. number of instances: 32 Yes; OB61; isochronous mode can only be used alternatively on PROFIBUS DP or PROFINET IO Yes; via TCP/IP, ISO on TCP and UDP 100 Mbit/s 128 128 128 128 61 64 64 Yes Yes Yes 32 Yes 8 Yes 8 Yes 250 µs to 512 ms (depending on the operating mode, see Manual "S7-300 CPU 31xC and CPU 31x, Technical Data" for more details) 2 Kibyte 2 Kibyte 1 024 byte
PROFINET IO device - Services - PG/OP communication - Routing - S7 communication				Yes Yes Yes; With loadable FBs, max. configurable connections: 14, max. number of instances: 32

Technical specifications (continued)

	6ES7 312-1AE14-0AB0	6ES7 314-1AG14-0AB0	6ES7 315-2AH14-0AB0	6ES7 315-2EH14-0AB0
PROFINET IO device - Isochronous mode - Open IE communication - IRT, supported - PROFINergy, supported - Shared device, supported - Number of IO controllers with shared device, max. • Transfer memory - Inputs, max. - Outputs, max. • Submodules - Number, max. - User data per submodule, max.				No Yes; Via TCP/IP, ISO on TCP, UDP Yes Yes; With SFB 73 / 74 prepared for loadable PROFINergy standard FB for I-Device Yes 2 1 440 byte; Per IO controller with shared device 1 440 byte; Per IO controller with shared device 64 1 024 byte
PROFINET CBA • acyclic transmission • cyclic transmission				Yes Yes
Open IE communication • Open IE communication, supported • Number of connections, max. • Local port numbers used at the system end • Keep-alive function, supported				Yes 8 0, 20, 21, 25, 80, 102, 135, 161, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535 Yes
Isochronous mode Isochronous mode			Yes	Yes; Via PROFIBUS DP or PROFINET interface
Programming Programming language • STEP 7 • LAD • FBD • STL • SCL • CFC • GRAPH • HiGraph®	Yes; V5.2 SP1 or higher with HW update Yes Yes Yes Yes Yes Yes Yes	Yes; V5.2 SP1 or higher with HW update Yes Yes Yes Yes Yes Yes Yes	Yes; V5.2 SP1 or higher with HW update Yes Yes Yes Yes Yes Yes Yes	Yes; V5.5 or higher Yes Yes Yes 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 • Block encryption	Yes	Yes	Yes	Yes 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

SIMATIC S7-300

Central processing units

Standard CPUs

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

	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 ·s	1 A ² ·s	1.2 A ² ·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

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

SIMATIC S7-300

Central processing units

Standard CPUs

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

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

SIMATIC S7-300

Central processing units

Standard CPUs

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

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

SIMATIC S7-300

Central processing units

Standard CPUs

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	

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/profinet-gsd		The current GSD file can be obtained from: www.siemens.com/profinet-gsd

SIMATIC S7-300

Central processing units

Standard CPUs

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		Yes	
- PG/OP communication		Yes	
- Routing		Yes; with loadable FBs, max. configurable connections: 16, max. number of instances: 32	
- S7 communication		Yes; OB61; Isochronous mode can only be used alternatively on PROFIBUS DP or PROFINET IO	
- Isochronous mode		Yes; via TCP/IP, ISO on TCP and UDP	
- Open IE communication			
• 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		Yes	
- PG/OP communication		Yes	
- Routing		Yes; With loadable FBs, max. configurable connections: 16, max. number of instances: 32	
- S7 communication		No	
- Isochronous mode		No	

Technical specifications (continued)

	6ES7 317-2AJ10-0AB0	6ES7 317-2EK14-0AB0	6ES7 318-3EL01-0AB0
PROFINET IO device			
- Services - Open IE communication - IRT, supported - PROFINET, supported - Shared device, supported - Number of IO controllers with shared device, max. - Transfer memory - Inputs, max. - Outputs, max. - Submodules - Number, max. - User data per submodule, max.		Yes; Via TCP/IP, ISO on TCP, UDP Yes Yes; With SFB 73 / 74 prepared for loadable PROFINET standard FB for I-Device Yes 2 1 440 byte; Per IO controller with shared device 1 440 byte; Per IO controller with shared device 64 1 024 byte	
PROFINET CBA			
- acyclic transmission - cyclic transmission		Yes Yes	
Open IE communication			
- Open IE communication, supported - Number of connections, max. - Local port numbers used at the system end - Keep-alive function, supported		Yes 16 0, 20, 21, 25, 80, 102, 135, 161, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535 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 - Switchover time on line break, typically - Number of stations in the ring, max.			Yes 200 ms; PROFINET MRP 50
Change of IP address at runtime, supported			Yes
Functionality			
- MPI - DP master - DP slave - PROFINET IO controller - PROFINET IO device - PROFINET CBA - Open IE communication - Web server - Number of HTTP clients			No No No Yes; also simultaneously with I-Device functionality Yes; also simultaneously with IO controller functionality Yes Yes; via TCP/IP, ISO on TCP and UDP Yes 5

SIMATIC S7-300

Central processing units

Standard CPUs

Technical specifications (continued)

	6ES7 317-2AJ10-0AB0	6ES7 317-2EK14-0AB0	6ES7 318-3EL01-0AB0
PROFINET IO controller - Services - Isochronous mode - Max. number of connectable IO devices for RT - of which in line, max. - Number of IO devices with IRT and the option "high flexibility" - of which in line, max. - Number of IO devices with IRT and the option "high performance", max. - of which in line, max. - IRT, supported - Shared device, supported - Prioritized startup supported - Number of IO devices, max. - Activation/deactivation of IO devices - Number of IO devices that can be simultaneously activated/deactivated, max. - IO devices changing during operation (partner ports), supported - Max. number of IO devices per tool - Device replacement without swap medium - Send clock times - Updating time			Yes; OB 61 - isochronous mode is possible either on DP or PROFINET IO (not simultaneously) 256 256 256 61 64 64 Yes Yes Yes 32 Yes 8 Yes 8 Yes 250 µs, 500 µs, 1 ms; 2 ms, 4 ms (not in the case of IRT with "high flexibility" option) 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 - Routing - S7 communication - Isochronous mode - Open IE communication - IRT, supported - PROFInergy, supported - Shared device, supported - Number of IO controllers with shared device, max. - Transfer memory - Inputs, max. - Outputs, max. - Submodules - Number, max. - User data per submodule, max.			Yes Yes Yes; With loadable FBs, max. configurable connections: 16, max. number of instances: 32 No Yes; Via TCP/IP, ISO on TCP, UDP Yes Yes; With SFB 73 / 74 prepared for loadable PROFInergy standard FB for I-Device Yes 2 1 440 byte; Per IO controller with shared device 1 440 byte; Per IO controller with shared device 64 1 024 byte
PROFINET CBA - acyclic transmission - cyclic transmission			Yes Yes

Technical specifications (continued)

	6ES7 317-2AJ10-0AB0	6ES7 317-2EK14-0AB0	6ES7 318-3EL01-0AB0
Open IE communication			Yes
• Open IE communication, supported			32
• Number of connections, max.			0, 20, 21, 23, 25, 80, 102, 135, 161, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535
• Local port numbers used at the system end			Yes
• Keep-alive function, supported			
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

SIMATIC S7-300

Central processing units

Standard CPUs

5

Ordering data	Order No.	Order No.
CPU 312 32 KB work memory, 24 V DC power supply, MPI; MMC required	6ES7 312-1AE14-0AB0	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
CPU 314 128 KB work memory, 24 V DC power supply, MPI; MMC required	6ES7 314-1AG14-0AB0	SIMATIC manual collection update service for 1 year D 6ES7 998-8XC01-8YE2 Current "Manual Collection" DVD and the three subsequent updates
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	Power supply connector 6ES7 391-1AA00-0AA0 10 units, spare part
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	Manual "Communication for SIMATIC S7-300/-400" German 6ES7 398-8EA00-8AA0 English 6ES7 398-8EA00-8BA0 French 6ES7 398-8EA00-8CA0 Spanish 6ES7 398-8EA00-8DA0 Italian 6ES7 398-8EA00-8EA0
CPU 317-2 DP 512 KB work memory, 24 V DC power supply, MPI, PROFIBUS DP master/slave interface, MMC required	6ES7 317-2AJ10-0AB0	SIMATIC S7 training case 6ES7 910-3AA00-0XA0 With mounting components for mounting S7-200 and S7-300
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	PC adapter USB 6ES7 972-0CB20-0XA0 For connecting a PC to SIMATIC S7-200/300/400 via USB; with USB cable (5 m)
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	PROFIBUS bus components
SIMATIC Micro Memory Card 64 KB 128 KB 512 KB 2 MB 4 MB 8 MB	6ES7 953-8LF20-0AA0 6ES7 953-8LG20-0AA0 6ES7 953-8LJ20-0AA0 6ES7 953-8LL20-0AA0 6ES7 953-8LM20-0AA0 6ES7 953-8LP20-0AA0	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
MPI cable For connecting SIMATIC S7 and the PG through MPI; 5 m in length	6ES7 901-0BF00-0AA0	PROFIBUS Fast Connect bus cable 6XV1 830-0EH10 Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m
Slot number plates	6ES7 912-0AA00-0AA0	RS 485 repeater for PROFIBUS 6ES7 972-0AA02-0XA0 Transmission rate up to 12 Mbit/s; 24 V DC; IP20 enclosure
S7-300 manual Design, CPU data, module data, instruction list German English	6ES7 398-8FA10-8AA0 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

SIMATIC S7-300

Central processing units

Standard CPUs

Ordering data	Order No.		Order No.
PROFINET bus components			
IE FC TP standard cable GP 2x2 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug; PROFINET-compatible; with UL approval; sold by the meter	6XV1 840-2AH10	IE FC RJ45 Plugs RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables	
FO standard cable GP (50/125) Standard cable, splittable, UL approval, sold by the meter	6XV1 873-2A	IE FC RJ45 Plug 145 145° cable outlet 1 unit 10 units 50 units	6GK1 901-1BB30-0AA0 6GK1 901-1BB30-0AB0 6GK1 901-1BB30-0AE0
SCALANCE X204-2 Industrial Ethernet Switch Industrial Ethernet Switches with integral SNMP access, Web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbit/s RJ45 ports and two FO ports	6GK5 204-2BB10-2AA3	IE FC RJ45 Plug 180 180° cable outlet 1 unit 10 units 50 units	6GK1 901-1BB10-2AA0 6GK1 901-1BB10-2AB0 6GK1 901-1BB10-2AE0
CSM 377 compact wswitch 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	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

SIMATIC S7-300

Central processing units

SIPLUS Standard CPUs

Overview SIPLUS CPU 314



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

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 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: SO₂ < 4.8 ppm; H₂S < 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
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O₃ < 1.0 ppm; NO_x < 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

Additional conformance with EN 50155

Accessories

6AG1 314-1AG14-7AB0

6AG1 314-1AG14-2AY0

See SIMATIC CPU 314, page 5/30

H: Subject to export regulations AL: 91999 and ECCN: EAR99H

SIMATIC S7-300

Central processing units

SIPLUS Standard CPUs

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.

5

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: SO₂ < 4.8 ppm; H₂S < 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
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O₃ < 1.0 ppm; NO_x < 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.	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 Additional conformance with EN 50155	6AG1 315-2AH14-7AB0 6AG1 315-2AH14-2AY0	Accessories See SIMATIC CPU 315-2 DP, page 5/30

H: Subject to export regulations AL: 91999 and ECCN: EAR99H

SIMATIC S7-300

Central processing units

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: SO₂ < 4.8 ppm; H₂S < 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
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O₃ < 1.0 ppm; NO_x < 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 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

Additional conformance with EN 50155

Order No.

6AG1 315-2EH14-7AB0

6AG1 315-2EH14-2AY0

Accessories

Order No.

See SIMATIC CPU 315-2 PN/DP, page 5/30

SIMATIC S7-300

Central processing units

SIPLUS Standard CPUs

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: SO₂ < 4.8 ppm; H₂S < 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
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O₃ < 1.0 ppm; NO_x < 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

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

Additional conformance with EN 50155

Order No.

6AG1 317-2EK13-2AB0

6AG1 317-2EK13-2AY0

Accessories

Order No.

See SIMATIC CPU 317-2 PN/DP, page 5/30

H: Subject to export regulations AL: 91999 and ECCN: EAR99H

L: Subject to export regulations AL: 91999 and ECCN: N

SIMATIC S7-300

Central processing units

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.

SIMATIC S7-300

Central processing units

Compact CPUs

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.

SIMATIC S7-300

Central processing units

Compact CPUs

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 ·s	0.7 A ² ·s	0.7 A ² ·s	0.7 A ² ·s
from supply voltage L+, max.	500 mA	700 mA	700 mA	900 mA
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

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

SIMATIC S7-300

Central processing units

Compact CPUs

Technical specifications (continued)

	6ES7 312-5BE03-0AB0	6ES7 313-5BF03-0AB0	6ES7 313-6BF03-0AB0	6ES7 313-6CF03-0AB0
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

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	

SIMATIC S7-300

Central processing units

Compact CPUs

Technical specifications (continued)

	6ES7 312-5BE03-0AB0	6ES7 313-5BF03-0AB0	6ES7 313-6BF03-0AB0	6ES7 313-6CF03-0AB0
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

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. • Number of connections (of which reserved), max. • Services - PG/OP communication - Routing - Global data communication - S7 basic communication - S7 communication - S7 communication, as client - S7 communication, as server - Equidistance mode support - Isochronous mode - SYNC/FREEZE - Activation/deactivation of DP slaves - Direct data exchange (slave-to-slave communication) - DPV1 • Transmission rate, max. • Number of DP slaves, max. • Address area - Inputs, max. - Outputs, max. • User data per DP slave - Inputs, max. - Outputs, max.				8; for PG / OP communication 1 for PG, 1 for OP Yes Yes No Yes; I blocks only Yes No Yes Yes Yes Yes Yes 12 Mbit/s 32 1 Kibyte 1 Kibyte 244 byte 244 byte
DP slave • Number of connections • Services - PG/OP communication - Routing - Global data communication - S7 basic communication - S7 communication, as client - S7 communication, as server - Direct data exchange (slave-to-slave communication) - DPV1 • GSD file • Transmission rate, max. • Automatic baud rate search • Transfer memory - Inputs - Outputs • Address area, max. • User data per address area, max.				8 Yes Yes; Only with active interface No No No Yes Yes No The current GSD file can be obtained from: www.siemens.com/profibus-gsd 12 Mbit/s Yes; only with passive interface 244 byte 244 byte 32 32 byte

SIMATIC S7-300

Central processing units

Compact CPUs

Technical specifications (continued)

	6ES7 312-5BE03-0AB0	6ES7 313-5BF03-0AB0	6ES7 313-6BF03-0AB0	6ES7 313-6CF03-0AB0
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

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

SIMATIC S7-300

Central processing units

Compact CPUs

Technical specifications (continued)

	6ES7 312-5BE03-0AB0	6ES7 313-5BF03-0AB0	6ES7 313-6BF03-0AB0	6ES7 313-6CF03-0AB0
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		

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 k Ω		
• with voltage outputs, capacitive load, max.		0.1 μ F		
• 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		

SIMATIC S7-300

Central processing units

Compact CPUs

Technical specifications (continued)

	6ES7 312-5BE03-0AB0	6ES7 313-5BF03-0AB0	6ES7 313-6BF03-0AB0	6ES7 313-6CF03-0AB0
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 %		

Technical specifications (continued)

	6ES7 312-5BE03-0AB0	6ES7 313-5BF03-0AB0	6ES7 313-6BF03-0AB0	6ES7 313-6CF03-0AB0
Interference voltage suppression for $f = n \times$ (fl +/- 1%), fl = interference frequency		30 dB		
• Series mode interference (peak value of interference < rated value of input range), min.		40 dB		
• Common mode interference, min.				
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

SIMATIC S7-300

Central processing units

Compact CPUs

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 ² t	0.7 A ² ·s	0.7 A ² ·s	0.7 A ² ·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

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

SIMATIC S7-300

Central processing units

Compact CPUs

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

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

SIMATIC S7-300

Central processing units

Compact CPUs

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			
- Number of connections, max.			Yes; via integrated PROFINET interface and loadable FBs
- Several passive connections per port, supported			8
• ISO-on-TCP (RFC1006)			Yes
- Number of connections, max.			Yes; via integrated PROFINET interface and loadable FBs
- Data length, max.			8
• UDP			32 768 byte
- Number of connections, max.			Yes; via integrated PROFINET interface and loadable FBs
- Data length, max.			8
			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

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 • Number of remote interconnection partners • Number of functions, master/slave • Total of all Master/Slave connections • Data length of all incoming connections master/slave, max. • Data length of all outgoing connections master/slave, max. • Number of device-internal and PROFIBUS interconnections • Data length of device-internal und PROFIBUS interconnections, max. • Data length per connection, max. • Remote interconnections with acyclic transmission - Sampling frequency: Sampling time, min. - Number of incoming interconnections - Number of outgoing interconnections - Data length of all incoming interconnections, max. - Data length of all outgoing interconnections, max. - Data length per connection, max. • Remote interconnections with cyclic transmission - Transmission frequency: Transmission interval, min. - Number of incoming interconnections - Number of outgoing interconnections - Data length of all incoming interconnections, max. - Data length of all outgoing interconnections, max. - Data length per connection, max. • HMI variables via PROFINET (acyclic) - Number of stations that can log on for HMI variables (PN OPC/iMap) - HMI variable updating - Number of HMI variables - Data length of all HMI variables, max. • PROFIBUS proxy functionality - supported - Number of linked PROFIBUS devices - Data length per connection, max.			50 % 32 30 1 000 4 000 byte 4 000 byte 500 4 000 byte 1 400 byte 500 ms 100 100 2 000 byte 2 000 byte 1 400 byte 10 ms 200 200 2 000 byte 2 000 byte 450 byte 3; 2x PN OPC/1x iMap 500 ms 200 2 000 byte Yes 16 240 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	

SIMATIC S7-300

Central processing units

Compact CPUs

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

Technical specifications (continued)

	6ES7 314-6BG03-0AB0	6ES7 314-6CG03-0AB0	6ES7 314-6EH04-0AB0
DP slave			
• Services			Yes
- PG/OP communication			Yes; Only with active interface
- Routing			No
- Global data communication			No
- S7 basic communication			Yes
- S7 communication			No
- S7 communication, as client			Yes; Connection configured on one side only
- S7 communication, as server			Yes
- Direct data exchange (slave-to-slave communication)			No
- DPV1			12 Mbit/s
• Transmission rate, max.			244 byte
• Transfer memory			244 byte
- Inputs			32
- Outputs			32 byte
• Address area, max.			
• User data per address area, max.			
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	

SIMATIC S7-300

Central processing units

Compact CPUs

Technical specifications (continued)

	6ES7 314-6BG03-0AB0	6ES7 314-6CG03-0AB0	6ES7 314-6EH04-0AB0
DP master • Number of connections, max. • Number of connections (of which reserved), max. • Services - PG/OP communication - Routing - Global data communication - S7 basic communication - S7 communication - S7 communication, as client - S7 communication, as server - Equidistance mode support - Isochronous mode - SYNC/FREEZE - Activation/deactivation of DP slaves - Direct data exchange (slave-to-slave communication) - DPV1 • Transmission rate, max. • Number of DP slaves, max. • Address area - Inputs, max. - Outputs, max. • User data per DP slave - Inputs, max. - Outputs, max.		12; for PG / OP communication 1 for PG, 1 for OP Yes Yes No Yes; I blocks only Yes No Yes Yes No Yes Yes Yes Yes 12 Mbit/s 32 1 Kibyte 1 Kibyte 244 byte 244 byte	
DP slave • Number of connections • Services - PG/OP communication - Routing - Global data communication - S7 basic communication - S7 communication, as client - S7 communication, as server - Direct data exchange (slave-to-slave communication) - DPV1 • GSD file • Transmission rate, max. • Automatic baud rate search • Transfer memory - Inputs - Outputs • Address area, max. • User data per address area, max.		12 Yes Yes; Only with active interface No No No Yes Yes No The current GSD file can be obtained from: www.siemens.com/profibus-gsd 12 Mbit/s Yes; only with passive interface 244 byte 244 byte 32 32 byte	

Technical specifications (continued)

	6ES7 314-6BG03-0AB0	6ES7 314-6CG03-0AB0	6ES7 314-6EH04-0AB0
PROFINET IO controller - Services - PG/OP communication - Routing - S7 communication - Isochronous mode - Open IE communication - Transmission rate, max. - Number of connectable IO devices, max. - Max. number of connectable IO devices for RT - of which in line, max. - Number of IO devices with IRT and the option "high flexibility" - of which in line, max. - Number of IO devices with IRT and the option "high performance", max. - of which in line, max. - IRT, supported - Shared device, supported - Prioritized startup supported - Number of IO devices, max. - Activation/deactivation of IO devices - Number of IO devices that can be simultaneously activated/deactivated, max. - IO devices changing during operation (partner ports), supported - Max. number of IO devices per tool - Device replacement without swap medium - Updating time			Yes Yes Yes; With loadable FBs, max. configurable connections: 10, max. number of instances: 32 Yes; OB 61 Yes; via TCP/IP, ISO on TCP and UDP 100 Mbit/s 128 128 128 128 61 64 64 Yes Yes Yes 32 Yes 8 Yes 8 Yes 250 µs to 512 ms (depending on the operating mode, see Manual "S7-300 CPU 31xC and CPU 31x, Technical Data" for more details) 2 Kibyte 2 Kibyte 1 024 byte
PROFINET IO device - Services - PG/OP communication - Routing - S7 communication - Isochronous mode - Open IE communication - IRT, supported - PROFIenergy, supported - Shared device, supported - Number of IO controllers with shared device, max. - Transfer memory - Inputs, max. - Outputs, max. - Submodules - Number, max. - User data per submodule, max.			Yes Yes Yes; With loadable FBs, max. configurable connections: 10, max. number of instances: 32 No Yes; Via TCP/IP, ISO on TCP, UDP Yes Yes; With SFB 73 / 74 prepared for loadable PROFIenergy standard FB for I-Device Yes 2 1 440 byte; Per IO controller with shared device 1 440 byte; Per IO controller with shared device 64 1 024 byte

SIMATIC S7-300

Central processing units

Compact CPUs

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 not allowed
- unshielded, max.	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

Technical specifications (continued)

	6ES7 314-6BG03-0AB0	6ES7 314-6CG03-0AB0	6ES7 314-6EH04-0AB0
Input voltage • Rated value, DC • for signal "0" • for signal "1"	24 V -3 to +5 V 15 to 30 V	24 V -3 to +5 V 15 to 30 V	24 V -3 to +5 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 - Rated value • for counter/technological functions - at "0" to "1", max.	Yes; 0.1 / 0.3 / 3 / 15 ms 3 ms 8 µs	Yes; 0.1 / 0.3 / 3 / 15 ms 3 ms 8 µs	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.) 3 ms 8 µs; Minimum pulse width/ minimum pause between pulses at maximum counting frequency
Cable length • Cable length, shielded, max. • Cable length unshielded, max.	1 000 m; 50 m for technological functions 600 m; For technological functions: No	1 000 m; 50 m for technological functions 600 m; For technological functions: No	1 000 m; 50 m for technological functions 600 m; For technological functions: No
Digital outputs Number of digital outputs • of which high-speed outputs	16 4	16 4	16 4; Notice: You cannot connect the fast outputs of your CPU in parallel
Short-circuit protection • Response threshold, typ.	Yes; Clocked electronically 1 A	Yes; Clocked electronically 1 A	Yes; Clocked electronically 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 • for signal "1" permissible range, min. • for signal "1" permissible range, max. • for signal "1" minimum load current • for signal "0" residual current, max.	500 mA 5 mA 0.6 A 5 mA 0.5 mA	500 mA 5 mA 0.6 A 5 mA 0.5 mA	500 mA 5 mA 0.6 A 5 mA 0.5 mA
Parallel switching of 2 outputs • for increased power • for redundant control of a load	No Yes	No Yes	No Yes
Switching frequency • with resistive load, max. • with inductive load, max. • on lamp load, max. • of the pulse outputs, with resistive load, max.	100 Hz 0.5 Hz 100 Hz 2.5 kHz	100 Hz 0.5 Hz 100 Hz 2.5 kHz	100 Hz 0.5 Hz 100 Hz 2.5 kHz

SIMATIC S7-300

Central processing units

Compact CPUs

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

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 k Ω	1 k Ω	1 k Ω
• with voltage outputs, capacitive load, max.	0.1 μ F	0.1 μ F	0.1 μ F
• with current outputs, max.	300 Ω	300 Ω	300 Ω
• with current outputs, inductive load, max.	0.1 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

SIMATIC S7-300

Central processing units

Compact CPUs

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 $f = n \times (f_l \pm 1\%)$, f_l = interference frequency			
• Series mode interference (peak value of interference < rated value of input range), min.	30 dB	30 dB	30 dB
• Common mode interference, min.	40 dB	40 dB	40 dB

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	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

SIMATIC S7-300

Central processing units

Compact CPUs

5

Ordering data	Order No.		Order No.
CPU 312C 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	6ES7 312-5BE03-0AB0	MPI cable For connecting SIMATIC S7 and the PG through MPI; 5 m in length	6ES7 901-0BF00-0AA0
CPU 313C 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	6ES7 313-5BF03-0AB0	Point-to-point link cable for connection to CPU 31xC-2 PtP 5 m 10 m 50 m	6ES7 902-3AB00-0AA0 6ES7 902-3AC00-0AA0 6ES7 902-3AG00-0AA0
CPU 313C-2 PtP Compact CPU, 64 KB, 24 V DC power supply, 16 DI/16 DO integrated, integrated functions, MPI; RS 422/485 interface; MMC is required	6ES7 313-6BF03-0AB0	Front connector (1 unit) For compact CPUs 40-pin, with screw contacts 1 unit 100 units 40-pin, with spring-loaded contacts 1 unit 100 units 40-pin, with FastConnect 1 unit	6ES7 392-1AM00-0AA0 6ES7 392-1AM00-1AB0 6ES7 392-1BM01-0AA0 6ES7 392-1BM01-1AB0 6ES7 392-1CM00-0AA0
CPU 313C-2 DP 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	6ES7 313-6CF03-0AB0	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
CPU 314C-2 PtP 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	6ES7 314-6BG03-0AB0	Slot number plates	6ES7 912-0AA00-0AA0
CPU 314C-2 DP 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	6ES7 314-6CG03-0AB0	S7-300 manual Design, CPU data, module data, instruction list German English	6ES7 398-8FA10-8AA0 6ES7 398-8FA10-8BA0
CPU 314C-2 PN/DP 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	6ES7 314-6EH04-0AB0	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	6ES7 998-8XC01-8YE0
Starter kit 2009 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	6ES7 313-5BF03-4YB0	SIMATIC manual collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	6ES7 998-8XC01-8YE2
SIMATIC Micro Memory Card 64 KB 128 KB 512 KB 2 MB 4 MB 8 MB	6ES7 953-8LF20-0AA0 6ES7 953-8LG20-0AA0 6ES7 953-8LJ20-0AA0 6ES7 953-8LL20-0AA0 6ES7 953-8LM20-0AA0 6ES7 953-8LP20-0AA0	Power supply connector 10 units, spare part Labeling strips 10 units, spare part Label cover 10 units, spare part	6ES7 391-1AA00-0AA0 6ES7 392-2XX00-0AA0 6ES7 392-2XY00-0AA0

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

SIMATIC S7-300

Central processing units

Compact CPUs

Ordering data	Order No.	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 For connecting a PC to SIMATIC S7-200/300/400 via USB; with USB cable (5 m) 6ES7 972-0CB20-0XA0		
		RS 485 PROFIBUS DP bus connector • With 90° cable outlet, max. transmission rate 12 Mbit/s - Without PG interface - With PG interface • With 90° cable outlet for FastConnect connection system, max. transmission rate 12 Mbit/s - Without PG interface, 1 unit - Without PG interface, 100 units - With PG interface, 1 unit - With PG interface, 100 units • With axial cable outlet for SIMATIC OP, for connecting to PPI, MPI, PROFIBUS 6ES7 972-0BA12-0XA0 6ES7 972-0BB12-0XA0 6ES7 972-0BA52-0XA0 6ES7 972-0BA52-0XB0 6ES7 972-0BB52-0XA0 6ES7 972-0BB52-0XB0 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
		PROFIBUS bus components For establishing MPI/PROFIBUS communication see catalogs IK PI, CA 01

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

SIMATIC S7-300

Central processing units

SIPLUS compact CPUs

Overview SIPLUS CPU 312C



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

Micro Memory Card required for operation of CPU.

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 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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOx < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 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.	Accessories	Order No.
SIPLUS CPU 312C (extended temperature range and medial exposure)			See SIMATIC CPU 312C, page 5/66
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		

H: Subject to export regulations AL: 91999 and ECCN: EAR99H

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: SO₂ < 4.8 ppm; H₂S < 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
 Limit value (max. 30 min): SO₂ < 17.8 ppm; H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O₃ < 1.0 ppm; NO_x < 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.	Order No.
SIPLUS CPU 313C (extended temperature range and medial exposure)		Accessories See SIMATIC CPU 313C, page 5/66
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	

H: Subject to export regulations AL: 91999 and ECCN: EAR99H

SIMATIC S7-300

Central processing units

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.

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: SO₂ < 4.8 ppm; H₂S < 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
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O₃ < 1.0 ppm; NO_x < 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.	Order No.
SIPLUS CPU 313C-2 DP (extended temperature range and medial exposure)		Accessories
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	See SIMATIC CPU 313C-2 DP, page 5/66
Additional conformance with EN 50155	L 6AG1 313-6CF03-2AY0	

H: Subject to export regulations AL: 91999 and ECCN: EAR99H

L: Subject to export regulations AL: 91999 and ECCN: N

SIMATIC S7-300

Central processing units

SIPLUS compact CPUs

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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOx < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 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 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

Accessories

See SIMATIC CPU 314C-2 PtP, page 5/66

L: Subject to export regulations AL: 91999 and ECCN: N

SIMATIC S7-300

Central processing units

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.

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: SO₂ < 4.8 ppm; H₂S < 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
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O₃ < 1.0 ppm; NO_x < 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.	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	See SIMATIC CPU 314C-2 DP, page 5/66
Additional conformance with EN 50155	H 6AG1 314-6CG03-2AY0	
Accessories		

H: Subject to export regulations AL: 91999 and ECCN: EAR99H

SIMATIC S7-300

Central processing units

Fail-safe CPUs

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.

SIMATIC S7-300

Central processing units

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 requirements.
- 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.

SIMATIC S7-300

Central processing units

Fail-safe CPUs

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 ² t	1 A ² ·s	1 A ² ·s	1 A ² ·s	1 A ² ·s	1.2 A ² ·s
from supply voltage L+, max.	900 mA				
Power losses					
Power loss, typ.	4.5 W		4 W		14 W
Memory					
Work memory • integrated • expandable • Size of retentive memory for retentive data blocks	384 Kibyte No 128 Kibyte	512 Kibyte No 128 Kibyte	1 024 Kibyte No	1.5 Mbyte No 256 Kibyte	2 560 Kibyte No 700 Kibyte
Load memory • pluggable (MMC) • pluggable (MMC), max. • Data management on MMC (after last programming), min.	Yes 8 Mbyte 10 a	Yes 8 Mbyte 10 a	Yes 8 Mbyte 10 a	Yes 8 Mbyte 10 a	Yes 8 Mbyte 10 a
Backup • present • without battery	Yes; guaranteed by MMC (maintenance-free) Yes; Program and data	Yes; guaranteed by MMC (maintenance-free) Yes; Program and data	Yes; guaranteed by MMC (maintenance-free) Yes; Program and data	Yes; guaranteed by MMC (maintenance-free) Yes; Program and data	Yes 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. • Size, max.	1 024 64 Kibyte	1 024; Number range: 1 to 16000 64 Kibyte	2 047; Number band: 1 to 2047 64 Kibyte	2 048 64 Kibyte	4 096 64 Kibyte

5

SIMATIC S7-300

Central processing units

Fail-safe CPUs

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

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	Yes; via non-retain property on DB yes	Yes; via non-retain property on DB yes	Yes; via non-retain property on DB yes	Yes; via non-retain property on DB yes
• 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

SIMATIC S7-300

Central processing units

Fail-safe CPUs

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

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

SIMATIC S7-300

Central processing units

Fail-safe CPUs

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 - Equidistance mode support - Isochronous mode - SYNC/FREEZE - Activation/deactivation of DP slaves - Number of DP slaves that can be simultaneously activated/deactivated, max. - Direct data exchange (slave-to-slave communication) - DPV1 - Transmission rate, max. - Number of DP slaves, max. - Address area - Inputs, max. - Outputs, max. - User data per DP slave - Inputs, max. - Outputs, max.		Yes Yes Yes; OB 61 Yes Yes 8 Yes 12 Mbit/s 124 2 Kibyte 2 Kibyte 244 byte 244 byte	Yes Yes No Yes Yes Yes Yes 12 Mbit/s 124 244 byte 244 byte	Yes Yes Yes; OB 61 Yes Yes 8 Yes 12 Mbit/s 124 8 Kibyte 8 Kibyte 244 byte 244 byte	Yes Yes No Yes Yes 8 Yes; As subscriber Yes 12 Mbit/s 124 8 Kibyte 8 Kibyte 244 byte 244 byte
DP slave - Services - PG/OP communication - Global data communication - S7 basic communication - S7 communication - S7 communication, as client - S7 communication, as server - Direct data exchange (slave-to-slave communication) - DPV1 - Transmission rate, max. - Automatic baud rate search - Transfer memory - Inputs - Outputs - Address area, max. - User data per address area, max.		Yes No No Yes No Yes; Connection configured on one side only Yes No 12 Mbit/s Yes; only with passive interface 244 byte 244 byte 32 32 byte	No Yes No No Yes Yes No 12 Mbit/s Yes; only with passive interface 244 byte 244 byte 32 32 byte	Yes No No Yes No Yes; Connection configured on one side only Yes No 12 Mbit/s Yes; only with passive interface 244 byte 244 byte 32 32 byte	Yes No No Yes No Yes; Connection configured on one side only Yes No 12 Mbit/s Yes; only with passive interface 244 byte 244 byte 32 32 byte

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

SIMATIC S7-300

Central processing units

Fail-safe CPUs

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

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		Yes		Yes	
- PG/OP communication					
- 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	

SIMATIC S7-300

Central processing units

Fail-safe CPUs

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. - Outputs, max. - User data per address area, max. - User data consistency, max.		2 Kibyte 2 Kibyte 254 byte		8 Kibyte 8 Kibyte 254 byte	
Open IE communication					
- Open IE communication, supported - Number of connections, max. - Local port numbers used at the system end		Yes 8 0, 20, 21, 25, 80, 102, 135, 161, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535		Yes 8 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 - Switchover time on line break, typically - Number of stations in the ring, max.					Yes 200 ms; PROFINET MRP 50
Change of IP address at runtime, supported					Yes

SIMATIC S7-300

Central processing units

Fail-safe CPUs

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 • DP master • DP slave • PROFINET IO controller • PROFINET IO device • PROFINET CBA					No No No Yes; also simultaneously with I device functionality No; also simultaneously with IO controller functionality Yes
PROFINET IO controller • Services - PG/OP communication - S7 communication - Isochronous mode - Open IE communication • Transmission rate, max. • Number of connectable IO devices, max. • Max. number of connectable IO devices for RT - of which in line, max. • Number of IO devices with IRT and the option "high flexibility" - of which in line, max. • Number of IO devices with IRT and the option "high performance", max. - of which in line, max. • IRT, supported • Shared device, supported • Prioritized startup supported - Number of IO devices, max.					Yes Yes; With loadable FBs, max. configurable connections: 16, max. number of instances: 32 Yes; OB 61 - isochronous mode is possible either on DP or PROFINET IO (not simultaneously) Yes; via TCP/IP, ISO on TCP, UDP 100 Mbit/s 256 256 256 256 61 64 64 Yes Yes Yes 32

5

SIMATIC S7-300

Central processing units

Fail-safe CPUs

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 - Number of IO devices that can be simultaneously activated/deactivated, max. • IO devices changing during operation (partner ports), supported - Max. number of IO devices per tool • Device replacement without swap medium • Send clock times					Yes 8 Yes 8 Yes 250 µs, 500 µs, 1 ms; 2 ms, 4 ms (not in the case of IRT with "high flexibility" option) 250 µs to 512 ms (depending on the operating mode, see Manual "S7-300 CPU 31xC and CPU 31x, Technical Data" for more details) 8 Kibyte 8 Kibyte 1 024 byte
• Updating time					
• Address area - Inputs, max. - Outputs, max. • User data per address area, max. - User data consistency, max.					
PROFINET IO device • Services - PG/OP communication - Routing - S7 communication - Isochronous mode - Open IE communication - IRT, supported - PROFINergy, supported - Shared device, supported - Number of IO controllers with shared device, max.					Yes Yes Yes; With loadable FBs, max. configurable connections: 16, max. number of instances: 32 No Yes; Via TCP/IP, ISO on TCP, UDP Yes Yes; With SFB 73 / 74 prepared for loadable PROFINergy standard FB for I-Device Yes 2

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					1 440 byte; Per IO controller with shared device
- Inputs, max.					1 440 byte; Per IO controller with shared device
- Outputs, max.					64
• Submodules					1 024 byte
- Number, max.					
- User data per submodule, max.					
Open IE communication					Yes
• Open IE communication, supported					32
• Number of connections, max.					0, 20, 21, 23, 25, 80, 102, 135, 161, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535
• Local port numbers used at the system end					Yes
• Keep-alive function, supported					
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)

SIMATIC S7-300

Central processing units

Fail-safe CPUs

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

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

SIMATIC S7-300

Central processing units

Fail-safe CPUs

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 - 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					
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.

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

SIMATIC S7-300

Central processing units

Fail-safe CPUs

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	6ES7 315-6FF04-0AB0
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	
CPU 315F-2 PN/DP	6ES7 315-2FJ14-0AB0
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	
CPU 317F-2 DP	6ES7 317-6FF03-0AB0
1024 KB work memory, 24 V DC power supply, MPI, PROFIBUS DP master/slave interface, MMC required	
CPU 317F-2 PN/DP	6ES7 317-2FK14-0AB0
Work memory 1.5 MB, 24 V DC power supply, MPI/PROFIBUS DP master/slave interface, Industrial Ethernet/PROFINET interface; MMC required	

Order No.

CPU 319F-3 PN/DP	6ES7 318-3FL01-0AB0
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	
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

SIMATIC S7-300

Central processing units

Fail-safe CPUs

Ordering data	Order No.		Order No.
MPI cable For connecting SIMATIC S7 and the PG through MPI; 5 m in length	6ES7 901-0BF00-0AA0	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 ordering quantity 20 m	6XV1 830-0EH10
Slot number plates	6ES7 912-0AA00-0AA0	PROFINET bus components	
S7-300 manual Design, CPU data, module data, instruction list German English	6ES7 398-8FA10-8AA0 6ES7 398-8FA10-8BA0	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
SIMATIC manual collection J 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	6ES7 998-8XC01-8YE0	FO standard cable GP (50/125) Standard cable, splittable, UL approval, sold by the meter	6XV1 873-2A
SIMATIC manual collection update service for 1 year D Current "Manual Collection" DVD and the three subsequent updates	6ES7 998-8XC01-8YE2	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
Power supply connector 10 units, spare part	6ES7 391-1AA00-0AA0	CSM 377 compact switch 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
Manual "Communication for SIMATIC S7-300/-400" German English French Spanish Italian	6ES7 398-8EA00-8AA0 6ES7 398-8EA00-8BA0 6ES7 398-8EA00-8CA0 6ES7 398-8EA00-8DA0 6ES7 398-8EA00-8EA0	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	
PC adapter USB For connecting a PC to SIMATIC S7-200/300/400 via USB; with USB cable (5 m)	6ES7 972-0CB20-0XA0	IE FC RJ45 Plug 145 145° cable outlet 1 unit 10 units 50 units	6GK1 901-1BB30-0AA0 6GK1 901-1BB30-0AB0 6GK1 901-1BB30-0AE0
PROFIBUS bus components		IE FC RJ45 Plug 180 180° cable outlet 1 unit 10 units 50 units	6GK1 901-1BB10-2AA0 6GK1 901-1BB10-2AB0 6GK1 901-1BB10-2AE0
RS 485 PROFIBUS DP bus connector • With 90° cable outlet, max. transmission rate 12 Mbit/s - Without PG interface - With PG interface • With 90° cable outlet for FastConnect connection system, max. transmission rate 12 Mbit/s - Without PG interface, 1 unit - Without PG interface, 100 units - With PG interface, 1 unit - With PG interface, 100 units • With axial cable outlet for SIMATIC OP, for connecting to PPI, MPI, PROFIBUS	6ES7 972-0BA12-0XA0 6ES7 972-0BB12-0XA0 6ES7 972-0BA52-0XA0 6ES7 972-0BA52-0XB0 6ES7 972-0BB52-0XA0 6ES7 972-0BB52-0XB0 6GK1 500-0EA02	PROFIBUS/PROFINET bus components For establishing MPI/PROFIBUS/PROFINET communication	see catalogs IK PI, CA 01
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			

5

SIMATIC S7-300

Central processing units

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: 91999 and ECCN: EAR99H

SIMATIC S7-300

Central processing units

SIPLUS fail-safe CPUs

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.	Accessories	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 Additional conformance with EN 50155	6AG1 315-2FJ14-2AB0 6AG1 315-2FJ14-2AY0		See SIMATIC CPU 315F-2 PN/DP, page 5/92

SIMATIC S7-300

Central processing units

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.	Accessories	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 Additional conformance with EN 50155	6ES7 317-6FF03-2AB0 6AG1 317-6FF03-2AY0		See SIMATIC CPU 317F-2 DP, page 5/92

L: Subject to export regulations AL: 91999 and ECCN: N

SIMATIC S7-300

Central processing units

SIPLUS fail-safe CPUs

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.	Accessories	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 Additional conformance with EN 50155	6AG1 317-2FK14-2AB0 6AG1 317-2FK14-2AY0	Accessories	See SIMATIC CPU 317F-2 PN/DP, page 5/92

SIMATIC S7-300

Central processing units

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.

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.

5

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	STEP 7 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 ·s	1 A ² ·s	1 A ² ·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

SIMATIC S7-300

Central processing units

Technology CPUs

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

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

SIMATIC S7-300

Central processing units

Technology CPUs

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

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

SIMATIC S7-300

Central processing units

Technology CPUs

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	

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 control- lable 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

SIMATIC S7-300

Central processing units

Technology CPUs

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

SIMATIC S7-300

Central processing units

Technology CPUs

Ordering data	Order No.		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	SIMATIC manual collection J 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	6ES7 998-8XC01-8YE0
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	SIMATIC manual collection update service for 1 year D Current "Manual Collection" DVD and the three subsequent updates	6ES7 998-8XC01-8YE2
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	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-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	S7 SmartLabel V3.0 Software for automatic labeling of modules direct from the STEP 7 project Single license J Upgrade single license J	2XV9 450-1SL03-0YX0 2XV9 450-1SL03-0YX4
SIMATIC Micro Memory Card 4 MB 8 MB	6ES7 953-8LM20-0AA0 6ES7 953-8LP20-0AA0	Labeling sheets for machine inscription For 16-channel signal modules, DIN A4, for printing with laser printer; 10 units petrol light-beige yellow red For 32-channel signal modules, DIN A4, for printing with laser printer; 10 units petrol light-beige yellow red	6ES7 392-2AX00-0AA0 6ES7 392-2BX00-0AA0 6ES7 392-2CX00-0AA0 6ES7 392-2DX00-0AA0
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 • 100 units 40-pin, with spring-loaded contacts • 1 unit • 100 units 40-pin, with FastConnect • 1 unit	6ES7 392-1AM00-0AA0 6ES7 392-1AM00-1AB0 6ES7 392-1BM01-0AA0 6ES7 392-1BM01-1AB0 6ES7 392-1CM00-0AA0		6ES7 392-2AX10-0AA0 6ES7 392-2BX10-0AA0 6ES7 392-2CX10-0AA0 6ES7 392-2DX10-0AA0
Slot number plates	6ES7 912-0AA00-0AA0	Manual "Communication for SIMATIC S7-300/-400" German English French Spanish Italian	6ES7 398-8EA00-8AA0 6ES7 398-8EA00-8BA0 6ES7 398-8EA00-8CA0 6ES7 398-8EA00-8DA0 6ES7 398-8EA00-8EA0
S7-300 manual Design, CPU data, module data, instruction list German English	6ES7 398-8FA10-8AA0 6ES7 398-8FA10-8BA0	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

SIMATIC S7-300

Central processing units

Technology CPUs

Ordering data	Order No.	Order No.
RS 485 PROFIBUS DP bus connector - With 90° cable outlet, max. transmission rate 12 Mbit/s - Without PG interface - With PG interface - With 90° cable outlet for FastConnect connection system, max. transmission rate 12 Mbit/s - Without PG interface, 1 unit - Without PG interface, 100 units - With PG interface, 1 unit - With PG interface, 100 units - With axial cable outlet for SIMATIC OP, for connecting to PPI, MPI, PROFIBUS	6ES7 972-0BA12-0XA0 6ES7 972-0BB12-0XA0 6ES7 972-0BA52-0XA0 6ES7 972-0BA52-0XB0 6ES7 972-0BB52-0XA0 6ES7 972-0BB52-0XB0 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 RS 485 repeater for PROFIBUS Transmission rate up to 12 Mbit/s; 24 V DC; IP20 enclosure PROFIBUS bus components For establishing MPI/PROFIBUS communication
		6XV1 830-0EH10 6ES7 972-0AA02-0XA0 see catalogs IK PI, CA 01

Overview



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

5

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

SIMATIC S7-300

Digital modules

SM 321 digital input module

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

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 control- lable 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

SIMATIC S7-300

Digital modules

SM 321 digital input module

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		

	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

SIMATIC S7-300

Digital modules

SM 321 digital input module

5

Ordering data	Order No.	Order No.
SM 321 digital input modules		
incl. labeling strips, bus connector		SIMATIC TOP connect See page 5/290
16 inputs, 24 V DC	6ES7 321-1BH02-0AA0	Bus connectors 6ES7 390-0AA00-0AA0
16 inputs, 24 V DC, active low	6ES7 321-1BH50-0AA0	1 unit (spare part)
32 inputs, 24 V DC	6ES7 321-1BL00-0AA0	Labeling strips
64 inputs, 24 V DC, active high/low	6ES7 321-1BP00-0AA0	10 units (spare part)
Note: 6ES7392-4...0-0AA0 connection cable and 6ES7392-1.N00-0AA0 terminal blocks necessary.		for modules with 20-pin front connector 6ES7 392-2XX00-0AA0
16 inputs, 24 to 48 V DC	6ES7 321-1CH00-0AA0	for modules with 40-pin front connector 6ES7 392-2XX10-0AA0
16 inputs, 48 to 125 V DC	6ES7 321-1CH20-0AA0	Label cover
16 inputs, 24 V DC, for isochronous mode	6ES7 321-1BH10-0AA0	10 units (spare part)
32 inputs, 120 V AC	6ES7 321-1EL00-0AA0	for modules with 20-pin front connector 6ES7 392-2XY00-0AA0
8 inputs, 120/230 V AC	6ES7 321-1FF01-0AA0	for modules with 40-pin front connector 6ES7 392-2XY10-0AA0
8 inputs, 120/230 V AC, single root	6ES7 321-1FF10-0AA0	S7 SmartLabel V3.0
16 inputs, 120/230 V AC	6ES7 321-1FH00-0AA0	Software for automatic labeling of modules direct from the STEP 7 project
16 inputs, 24 V DC, for isochronous mode, diagnostics-capable	6ES7 321-7BH01-0AB0	Single license J 2XV9 450-1SL03-0YX0
Front connectors		Upgrade single license J 2XV9 450-1SL03-0YX4
20-pin, with screw contacts	6ES7 392-1AJ00-0AA0 6ES7 392-1AJ00-1AB0	Labeling sheets for machine inscription
• 1 unit		For 16-channel signal modules, DIN A4, for printing with laser printer; 10 units
• 100 units		petrol 6ES7 392-2AX00-0AA0
20-pin, with spring-loaded contacts	6ES7 392-1BJ00-0AA0 6ES7 392-1BJ00-1AB0	light-beige 6ES7 392-2BX00-0AA0
• 1 unit		yellow 6ES7 392-2CX00-0AA0
• 100 units		red 6ES7 392-2DX00-0AA0
20-pin, with FastConnect	6ES7 392-1CJ00-0AA0	For 32-channel signal modules, DIN A4, for printing with laser printer; 10 units
• 1 unit		petrol 6ES7 392-2AX10-0AA0
40-pin, with screw contacts	6ES7 392-1AM00-0AA0 6ES7 392-1AM00-1AB0	light-beige 6ES7 392-2BX10-0AA0
• 1 unit		yellow 6ES7 392-2CX10-0AA0
• 100 units		red 6ES7 392-2DX10-0AA0
40-pin with spring-loaded contacts	6ES7 392-1BM01-0AA0 6ES7 392-1BM01-1AB0	SIMATIC manual collection J 6ES7 998-8XC01-8YE0
• 1 unit		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
• 100 units		SIMATIC manual collection update service for 1 year D 6ES7 998-8XC01-8YE2
40-pin, with FastConnect	6ES7 392-1CM00-0AA0	Current "Manual Collection" DVD and the three subsequent updates
• 1 unit		S7-300 manual
S7-300 connecting cable		Design, CPU data, module data, instruction list
For 64-channel modules; 2 units	6ES7 392-4BB00-0AA0	German 6ES7 398-8FA10-8AA0
1 m	6ES7 392-4BC50-0AA0	English 6ES7 398-8FA10-8BA0
2.5 m	6ES7 392-4BF00-0AA0	
5 m		
Terminal block		
For 64-channel modules; 2 units	6ES7 392-1AN00-0AA0	
With screw contacts	6ES7 392-1BN00-0AA0	
With spring-loaded contacts		
Front door, elevated design	6ES7 328-0AA00-7AA0	
e.g. for 32-channel modules; for connecting 1.3 mm ² /16 AWG conductors		

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

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

Overview



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

5

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

SIMATIC S7-300

Digital modules

SM 322 digital output module

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. - for signal "1" minimum load current - for signal "0" residual current, max.	0.6 A 5 mA 0.5 mA	0.6 A 5 mA 0.5 mA	0.6 A 5 mA 0.5 mA			0.6 A 10 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

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

SIMATIC S7-300

Digital modules

SM 322 digital output module

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.		3 A	4 A	2 A	4 A	2 A
• vertical installation	0.5 A; (8 A per module)					
- 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; parameter- izable	No	No	No	Yes; parameter- izable	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

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

SIMATIC S7-300

Digital modules

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: 100 000; 120 V AC: 200 000; 24 V DC: 300 000 (at 2 A)	300 000; 300 000 (24 V DC, at 2 A); 200 000 (120 V AC, at 3 A); 100 000 (230 V AC, at 3 A)	100 000; 100 000 (24 V DC, at 5 A), 100 000 (230 V AC, at 5 A)	100 000; 50 000 (24 V DC, at 2 A); 700 000 (120 V AC, at 2 A); 100 000 (230 V AC, at 2 A)
Switching capacity of 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

Ordering data	Order No.	Order No.
SM 322 digital output modules incl. labeling strips, bus connector 8 outputs, 24 V DC, 2 A 16 outputs, 24 V DC, 0.5 A 16 outputs, 24 V DC, 0.5 A, high speed 32 outputs, 24 V DC, 0.5 A 64 outputs, 24 V DC, 0.3 A Note: 6ES7392-4...0-0AA0 connection cable and 6ES7392-1.N00-0AA0 terminal blocks necessary. 64 outputs, 24 V DC, 0.3 A, sink output Note: 6ES7392-4...0-0AA0 connection cable and 6ES7392-1.N00-0AA0 terminal blocks necessary. 8 outputs, 24 V DC, 0.5 A, diagnostics-capable 16 outputs, 24/48 V DC, 0.5 A 8 outputs, 48 to 125 V DC, 1.5 A 8 outputs, 120/230 V AC, 1 A 8 outputs, 120/230 V AC, 2 A 16 outputs, 120/230 V AC, 1 A 32 outputs, 120 V AC, 1 A 8 outputs, relay contacts, 2 A 8 outputs, relay contacts, 5 A 8 outputs, relay contacts, 5 A, with RC filter, overvoltage protection 16 outputs, relay contacts, 8 A Front connectors 20-pin, with screw contacts • 1 unit • 100 units 20-pin, with spring-loaded contacts • 1 unit • 100 units 20-pin, with FastConnect • 1 unit 40-pin, with screw contacts • 1 unit • 100 units 40-pin with spring-loaded contacts • 1 unit • 100 units 40-pin, with FastConnect • 1 unit	6ES7 322-1BF01-0AA0 6ES7 322-1BH01-0AA0 6ES7 322-1BH10-0AA0 6ES7 322-1BL00-0AA0 6ES7 322-1BP00-0AA0 6ES7 322-1BP50-0AA0 6ES7 322-8BF00-0AB0 6ES7 322-5GH00-0AB0 6ES7 322-1CF00-0AA0 6ES7 322-1FF01-0AA0 6ES7 322-5FF00-0AB0 6ES7 322-1FH00-0AA0 6ES7 322-1FL00-0AA0 6ES7 322-1HF01-0AA0 6ES7 322-1HF10-0AA0 6ES7 322-5HF00-0AB0 6ES7 322-1HH01-0AA0 6ES7 392-1AJ00-0AA0 6ES7 392-1AJ00-1AB0 6ES7 392-1BJ00-0AA0 6ES7 392-1BJ00-1AB0 6ES7 392-1CJ00-0AA0 6ES7 392-1AM00-0AA0 6ES7 392-1AM00-1AB0 6ES7 392-1BM01-0AA0 6ES7 392-1BM01-1AB0 6ES7 392-1CM00-0AA0	S7-300 connecting cable For 64-channel modules; 2 units 1 m 2.5 m 5 m Terminal block For 64-channel modules; 2 units With screw contacts With spring-loaded contacts Front door, elevated design e.g. for 32-channel modules; for connecting 1.3 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 10 fuses 6.3 A; for 6ES7 322-1CF00-0AA0 Labeling strips 10 units (spare part) for modules with 20-pin front connector for modules with 40-pin front connector Label cover 10 units (spare part) for modules with 20-pin front connector for modules with 40-pin front connector S7 SmartLabel V3.0 Software for automatic labeling of modules direct from the STEP 7 project Single license J Upgrade single license J 2XV9 450-1SL03-0YX0 2XV9 450-1SL03-0YX4

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

SIMATIC S7-300

Digital modules

SM 322 digital output module

Ordering data

Order No.

Order No.

Labeling sheets for machine inscription

For 16-channel signal modules, DIN A4, for printing with laser printer; 10 units

petrol

light-beige

yellow

red

For 32-channel signal modules, DIN A4, for printing with laser printer; 10 units

petrol

light-beige

yellow

red

6ES7 392-2AX00-0AA0

6ES7 392-2BX00-0AA0

6ES7 392-2CX00-0AA0

6ES7 392-2DX00-0AA0

6ES7 392-2AX10-0AA0

6ES7 392-2BX10-0AA0

6ES7 392-2CX10-0AA0

6ES7 392-2DX10-0AA0

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

SIMATIC manual collection update service for 1 year

Current "Manual Collection" DVD and the three subsequent updates

S7-300 manual

Design, CPU data, module data, instruction list

German

English

6ES7 998-8XC01-8YE0

6ES7 998-8XC01-8YE2

6ES7 398-8FA10-8AA0

6ES7 398-8FA10-8BA0

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

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

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

SIMATIC S7-300

Digital modules

SM 323/SM 327 digital input/output module

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

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

SIMATIC S7-300

Digital modules

SM 323/SM 327 digital input/output module

5

Ordering data	Order No.	Order No.
SM 323 digital input/output modules incl. labeling strips, bus connector 8 inputs, 8 outputs 16 inputs, 16 outputs	6ES7 323-1BH01-0AA0 6ES7 323-1BL00-0AA0	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
SM 327 digital input/output modules incl. labeling strips, bus connector 8 inputs, 8 inputs or outputs (parametrizable)	6ES7 327-1BH00-0AB0	Labeling sheets for machine inscription For 16-channel signal modules, DIN A4, for printing with laser printer; 10 units petrol 6ES7 392-2AX00-0AA0 light-beige 6ES7 392-2BX00-0AA0 yellow 6ES7 392-2CX00-0AA0 red 6ES7 392-2DX00-0AA0 For 32-channel signal modules, DIN A4, for printing with laser printer; 10 units petrol 6ES7 392-2AX10-0AA0 light-beige 6ES7 392-2BX10-0AA0 yellow 6ES7 392-2CX10-0AA0 red 6ES7 392-2DX10-0AA0
Front connectors 20-pin, with screw contacts • 1 unit • 100 units 20-pin, with spring-loaded contacts • 1 unit • 100 units 20-pin, with FastConnect • 1 unit 40-pin, with screw contacts • 1 unit • 100 units 40-pin with spring-loaded contacts • 1 unit • 100 units 40-pin, with FastConnect • 1 unit	6ES7 392-1AJ00-0AA0 6ES7 392-1AJ00-1AB0 6ES7 392-1BJ00-0AA0 6ES7 392-1BJ00-1AB0 6ES7 392-1CJ00-0AA0 6ES7 392-1AM00-0AA0 6ES7 392-1AM00-1AB0 6ES7 392-1BM01-0AA0 6ES7 392-1BM01-1AB0 6ES7 392-1CM00-0AA0	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
Front door, elevated design e.g. for 32 channel modules; enables connection of 1.3 mm ² /16 AWG wires	6ES7 328-0AA00-7AA0	SIMATIC manual collection update service for 1 year D 6ES7 998-8XC01-8YE2 Current "Manual Collection" DVD and the three subsequent updates
SIMATIC TOP connect	see page 5/290	
Bus connectors 1 unit (spare part)	6ES7 390-0AA00-0AA0	
Labeling strips 10 units (spare part) for modules with 20-pin front connector for modules with 40-pin front connector	6ES7 392-2XX00-0AA0 6ES7 392-2XX10-0AA0	
Label cover 10 units (spare part) for modules with 20-pin front connector for modules with 40-pin front connector	6ES7 392-2XY00-0AA0 6ES7 392-2XY10-0AA0	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

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.	

SIMATIC S7-300

SIPLUS digital modules

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: SO₂ < 4.8 ppm;
H₂S < 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
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm;
Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm;
O₃ < 1.0 ppm; NO_x < 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

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.

5

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.		

SIMATIC S7-300

SIPLUS digital modules

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.		

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: SO₂ < 4.8 ppm;
H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm;
NH₃ < 49 ppm; O₃ < 0.1 ppm; NO_x < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm;
Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH₃ < 247 ppm;
O₃ < 1.0 ppm; NO_x < 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: 91999 and ECCN: EAR99H

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

L: Subject to export regulations AL: 91999 and ECCN: N

SIMATIC S7-300

SIPLUS digital modules

SIPLUS SM 323 digital input/output module

Overview



- Digital inputs and outputs
- For connection of switches, 2-wire proximity switches (BERO), solenoid valves, contactors, small-power motors, lamps and motor starters

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: SO₂ < 4.8 ppm; H₂S < 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
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O₃ < 1.0 ppm; NO_x < 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

SIMATIC S7-300

Analog modules

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

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

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)

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

SIMATIC S7-300

Analog modules

SM 331 analog input module

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

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)				

SIMATIC S7-300

Analog modules

SM 331 analog input module

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 • internal temperature compensation • external temperature compensation with compensations socket • external temperature compensation with Pt100		Yes	Yes		
		Yes	Yes		
		Yes	Yes		
		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				

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

SIMATIC S7-300

Analog modules

SM 331 analog input module

5

Ordering Data	Order No.	Order No.
SM 331 analog input modules Including labeling strips, bus connector, measuring range modules 8 inputs, 13-bit resolution 8 inputs, resolution 9/12/14 bit 2 inputs, resolution 9/12/14 bit 8 inputs, enhanced resolution 16 bits 8 inputs, enhanced resolution 16 bits, 4-channel mode 8 inputs, resolution 14 bit, for isochronous mode 6 inputs, for thermal resistors, resolution 16 bits 8 inputs, for thermal resistors 8 inputs, for thermoelements	6ES7 331-1KF02-0AB0 6ES7 331-7KF02-0AB0 6ES7 331-7KB02-0AB0 6ES7 331-7NF00-0AB0 6ES7 331-7NF10-0AB0 6ES7 331-7HF01-0AB0 6ES7 331-7PE10-0AB0 6ES7 331-7PF01-0AB0 6ES7 331-7PF11-0AB0	Label cover 10 units (spare part), for modules with 20-pin front connector 6ES7 392-2XY00-0AA0 Labeling strips 10 units (spare part), for modules with 20-pin front connector 6ES7 392-2XX00-0AA0
Measuring range module for analog inputs 1 module for 2 analog inputs; 2 units (spare part)	6ES7 974-0AA00-0AA0	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
Front connectors 20-pin, with screw contacts • 1 unit • 100 units 20-pin, with spring-loaded contacts • 1 unit • 100 units 20-pin, with FastConnect • 1 unit 40-pin, with screw contacts • 1 unit • 100 units 40-pin with spring-loaded contacts • 1 unit • 100 units 40-pin, with FastConnect • 1 unit	6ES7 392-1AJ00-0AA0 6ES7 392-1AJ00-1AB0 6ES7 392-1BJ00-0AA0 6ES7 392-1BJ00-1AB0 6ES7 392-1CJ00-0AA0 6ES7 392-1AM00-0AA0 6ES7 392-1AM00-1AB0 6ES7 392-1BM01-0AA0 6ES7 392-1BM01-1AB0 6ES7 392-1CM00-0AA0	Labeling sheets for machine 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
Front door, elevated design e.g. for 32-channel modules; for connecting 1.3 mm ² /16 AWG wires	6ES7 328-0AA00-7AA0	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 TOP connect	see page 5/290	SIMATIC manual collection update service for 1 year D 6ES7 998-8XC01-8YE2 Current "Manual Collection" DVD and the three subsequent updates
Bus connectors 1 unit (spare part)	6ES7 390-0AA00-0AA0	S7-300 manual Design, CPU data, module data, instruction list German 6ES7 398-8FA10-8AA0 English 6ES7 398-8FA10-8BA0
Shield connecting element 80 mm wide, with 2 rows for 4 terminal elements each	6ES7 390-5AA00-0AA0	
Terminal elements 2 units For 2 cables with 2 mm to 6 mm diameter For 1 cable with 3 mm to 8 mm diameter For 1 cable with 4 mm to 13 mm diameter	6ES7 390-5AB00-0AA0 6ES7 390-5BA00-0AA0 6ES7 390-5CA00-0AA0	

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

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 k Ω	1 k Ω	1 k Ω	1 k Ω
• with voltage outputs, capacitive load, max.	1 μ F	1 μ F	1 μ F	1 μ F
• with current outputs, max.	500 Ω	500 Ω	500 Ω	500 Ω
• with current outputs, inductive load, max.	10 mH	10 mH	10 mH	1 mH

SIMATIC S7-300

Analog modules

SM 332 analog output module

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

SIMATIC S7-300

Analog modules

SM 332 analog output module

Ordering data	Order No.	Order No.
SM 332 analog output modules incl. labeling strips, bus connector 4 outputs, 11/12 bit 4 outputs, 16 bit 2 outputs, 11/12 bit 8 outputs, 11/12 bit	6ES7 332-5HD01-0AB0 6ES7 332-7ND02-0AB0 6ES7 332-5HB01-0AB0 6ES7 332-5HF00-0AB0	Label cover 10 units (spare part), for modules with 20-pin front connector Labeling strips 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
Front connectors 20-pin, with screw contacts • 1 unit • 100 units 20-pin, with spring-loaded contacts • 1 unit • 100 units 20-pin, with FastConnect • 1 unit 40-pin, with screw contacts • 1 unit • 100 units 40-pin with spring-loaded contacts • 1 unit • 100 units 40-pin, with FastConnect • 1 unit	6ES7 392-1AJ00-0AA0 6ES7 392-1AJ00-1AB0 6ES7 392-1BJ00-0AA0 6ES7 392-1BJ00-1AB0 6ES7 392-1CJ00-0AA0 6ES7 392-1AM00-0AA0 6ES7 392-1AM00-1AB0 6ES7 392-1BM01-0AA0 6ES7 392-1BM01-1AB0 6ES7 392-1CM00-0AA0	Labeling sheets for machine 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
Front door, elevated design e.g. for 32-channel modules; for connecting 1.3 mm ² /16 AWG wires	6ES7 328-0AA00-7AA0	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 TOP connect	see page 5/290	SIMATIC manual collection update service for 1 year D 6ES7 998-8XC01-8YE2 Current "Manual Collection" DVD and the three subsequent updates
Bus connectors 1 unit (spare part)	6ES7 390-0AA00-0AA0	S7-300 manual Design, CPU data, module data, instruction list German 6ES7 398-8FA10-8AA0 English 6ES7 398-8FA10-8BA0
Shield connecting element 80 mm wide, with 2 rows for 4 terminal elements each	6ES7 390-5AA00-0AA0	
Terminal elements 2 units For 2 cables with 2 mm to 6 mm diameter For 1 cable with 3 mm to 8 mm diameter For 1 cable with 4 mm to 13 mm diameter	6ES7 390-5AB00-0AA0 6ES7 390-5BA00-0AA0 6ES7 390-5CA00-0AA0	

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

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

SIMATIC S7-300

Analog modules

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 thermometers		
• 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	

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. • with voltage outputs, capacitive load, max. • with current outputs, max. • with current outputs, inductive load, max.	5 kΩ 1 μF 300 Ω 1 mH	2.5 kΩ 1 μF
Analog value creation Integrations and conversion time/ resolution per channel • Resolution with overrange (bit including sign), max. • Integration time, ms	8 bit	12 bit 16.67/20 ms
Settling time • for resistive load • for capacitive load • for inductive load	0.3 ms 3 ms 0.3 ms	0.8 ms 0.8 ms
Encoder Connection of signal encoders • for current measurement as 4-wire transducer • for resistance measurement with 2-conductor connection • for resistance measurement with 3-conductor connection • for resistance measurement with 4-conductor connection	Yes	Yes Yes Yes
Errors/accuracies Operational limit in overall temperature range • Voltage, relative to input area • Current, relative to input area • Impedance, relative to input area • Resist.-type thermometer, relative to input area • Voltage, relative to output area • Current, relative to output area	+/- 0,9 % +/- 0,8 % +/- 0,6 % +/- 1 %	+/- 0,7 %; 0 to 10 V +/- 3,5 %; 10 kΩm +/- 1 % +/- 1 %
Basic error limit (operational limit at 25 °C) • Voltage, relative to input area • Current, relative to input area • Impedance, relative to input area • Resist.-type thermometer, relative to input area • Voltage, relative to output area • Current, relative to output area	+/- 0,7 % +/- 0,6 % +/- 0,5 % +/- 0,5 %	+/- 0,5 %; 0 to 10 V +/- 2,8 %; 10 kΩm +/- 0,8 % +/- 0,85 %
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 • Height • Depth	40 mm 125 mm 120 mm	40 mm 125 mm 120 mm
Weight • Weight, approx.	285 g	200 g

SIMATIC S7-300

Analog modules

SM 334 analog input/output module

5

Ordering data	Order No.	Order No.
SM 334 analog input/output modules incl. labeling strips, bus connector 4 inputs, 2 outputs 4 inputs, 2 outputs, resistance measurement, Pt 100	6ES7 334-0CE01-0AA0 6ES7 334-0KE00-0AB0	Labeling strips 10 units (spare part), for modules with 20-pin front connector 6ES7 392-2XX00-0AA0
Front connectors 20-pin, with screw contacts • 1 unit • 100 units 20-pin, with spring-loaded terminals • 1 unit • 100 units 20-pin, with FastConnect • 1 unit	6ES7 392-1AJ00-0AA0 6ES7 392-1AJ00-1AB0 6ES7 392-1BJ00-0AA0 6ES7 392-1BJ00-1AB0 6ES7 392-1CJ00-0AA0	S7 SmartLabel V3.0 Software for automatic labeling of modules direct from the STEP 7 project Single license J 2XV9 450-1SL03-0YX0 Upgrade single license J 2XV9 450-1SL03-0YX4
Front door, elevated design e.g. for 32-channel modules; for connecting 1.3 mm ² /16 AWG wires	6ES7 328-0AA00-7AA0	Labeling sheets for machine labeling For 16-channel signal modules, DIN A4, for printing with laser printer; 10 units petrol 6ES7 392-2AX00-0AA0 light-beige 6ES7 392-2BX00-0AA0 yellow 6ES7 392-2CX00-0AA0 red 6ES7 392-2DX00-0AA0
SIMATIC TOP connect	see page 5/290	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
Bus connectors 1 unit (spare part)	6ES7 390-0AA00-0AA0	SIMATIC manual collection update service for 1 year D 6ES7 998-8XC01-8YE2 Current "Manual Collection" DVD and the three subsequent updates
Shield connecting element 80 mm wide, with 2 rows for 4 terminal elements each	6ES7 390-5AA00-0AA0	S7-300 manual Design, CPU data, module data, instruction list German 6ES7 398-8FA10-8AA0 English 6ES7 398-8FA10-8BA0
Terminal elements 2 units For 2 cables with 2 mm to 6 mm diameter 6ES7 390-5AB00-0AA0 For 1 cable with 3 mm to 8 mm diameter 6ES7 390-5BA00-0AA0 For 1 cable with 4 mm to 13 mm diameter 6ES7 390-5CA00-0AA0		
Label cover 10 units (spare part), for modules with 20-pin front connector	6ES7 392-2XY00-0AA0	

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

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

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.	

SIMATIC S7-300

SIPLUS analog modules

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: SO₂ < 4.8 ppm;
H₂S < 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
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm;
Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm;
O₃ < 1.0 ppm; NO_x < 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: 91999 and ECCN: EAR99H

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

L: Subject to export regulations AL: 91999 and ECCN: N

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.	

SIMATIC S7-300

SIPLUS analog modules

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: SO₂ < 4.8 ppm;
H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm;
NH₃ < 49 ppm; O₃ < 0.1 ppm; NO_x < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm;
Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH₃ < 247 ppm;
O₃ < 1.0 ppm; NO_x < 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: 91999 and ECCN: EAR99H
I: Subject to export regulations AL: N and ECCN: EAR99H
L: Subject to export regulations AL: 91999 and ECCN: N

SIMATIC S7-300

SIPLUS analog modules

SIPLUS SM 334 analog input/output module

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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOx < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 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 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

SIMATIC S7-300

F digital / analog modules

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

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

SIMATIC S7-300

F digital / analog modules

SM 326 F digital input module - Safety Integrated

5

Ordering Data	Order No.	Order No.
F digital input module SM 326 24 inputs, 24 V DC 8 inputs, 24 V DC, NAMUR	6ES7 326-1BK02-0AB0 6ES7 326-1RF00-0AB0	Active bus module BM 1 x 80 for 1 module with 80 mm width 6ES7 195-7HC00-0XA0
Distributed Safety V5.4 programming tool Task: Software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, ET 200S Requirements: STEP 7 V5.3 SP3 and higher Floating License Software Update Service	6ES7 833-1FC02-0YA5 6ES7 833-1FC00-0YX2	SITOP power supply module for ET 200M; 120/230 V AC, 24 V DC, 5 A; Type PS 307-1E 6ES7 307-1EA01-0AA0
Distributed Safety Upgrade From V5.x to V5.4; Floating license for 1 user	6ES7 833-1FC02-0YE5	Front connectors 40-pin, with screw contacts • 1 unit • 100 units 6ES7 392-1AM00-0AA0 6ES7 392-1AM00-1AB0 40-pin with spring-loaded contacts • 1 unit • 100 units 6ES7 392-1BM01-0AA0 6ES7 392-1BM01-1AB0 40-pin, with FastConnect • 1 unit 6ES7 392-1CM00-0AA0
Labeling sheet with strips for 10 electronic blocks • For 16-channel electronic blocks incl. add-on terminals • For 32-channel electronic blocks incl. add-on terminals	6ES7 193-1BH00-0XA0 6ES7 193-1BL00-0XA0	Labeling strips For fail-safe modules (spare part); 10 units 6ES7 392-2XX20-0AA0
Connecting cable for PROFIBUS 12 Mbit/s, for connecting PG to PROFIBUS DP, pre-assembled with 2 x 9-pin Sub-D connector, 3 m	6ES7 901-4BD00-0XA0	Label cover For fail-safe modules (spare part); 10 units 6ES7 392-2XY20-0AA0
PROFIBUS bus connector • 90° cable outlet, terminating resistor with isolating function, without PG socket, up to 12 Mbit/s • 90° cable outlet, terminating resistor with isolating function, without PG socket, up to 12 Mbit/s • 90° cable outlet, FastConnect terminating resistor with isolating function, without PG socket, up to 12 Mbit/s; 1 unit - 1 unit - 100 units • 90° cable outlet, FastConnect terminating resistor with isolating function, with PG socket, up to 12 Mbit/s; 1 unit - 1 unit - 100 units	6ES7 972-0BA12-0XA0 6ES7 972-0BB12-0XA0 6ES7 972-0BA52-0XA0 6ES7 972-0BA52-0XB0 6ES7 972-0BB52-0XA0 6ES7 972-0BB52-0XB0	LK 393 cable guide For F modules; L+ and M connections; 5 units 6ES7 393-4AA10-0AA0
DIN rail for active bus modules for max. 5 active bus modules for hot swapping function • 483 mm (19") long • 530 mm long • 620 mm long • 2000 mm long	6ES7 195-1GA00-0XA0 6ES7 195-1GF30-0XA0 6ES7 195-1GG30-0XA0 6ES7 195-1GC00-0XA0	S7-300 manual Design, CPU data, module data, instruction list German English 6ES7 398-8FA10-8AA0 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

SIMATIC S7-300

F digital / analog modules

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

5

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 voltage 1L+, 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	

SIMATIC S7-300

F digital / analog modules

SM 326 F digital output module - Safety Integrated

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

SIMATIC S7-300

F digital / analog modules

SM 326 F digital output module - Safety Integrated

Ordering data	Order No.	Order No.
F digital output module SM 326 10 outputs, 24 V DC, 2 A PP; width 40 mm 8 outputs, 24 V DC, 2 A PM; width 80 mm	6ES7 326-2BF10-0AB0 6ES7 326-2BF41-0AB0	Active bus modules BM 2 x 40 for accepting 2 IO modules each 40 mm wide BM 1 x 80 for accepting 1 IO module 80 mm wide SITOP power supply module for ET 200M; 120/230 V AC, 24 V DC, 5 A; Type PS 307-1E Front connectors 40-pin, with screw contacts • 1 unit • 100 units 40-pin with spring-loaded contacts • 1 unit • 100 units 40-pin, with FastConnect • 1 unit Labeling strips For fail-safe modules (spare part), 10 units Label cover For fail-safe modules (spare part), 10 units LK 393 cable guide For F modules; L+ and M connections, 5 units
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 Software Update Service	6ES7 833-1FC02-0YA5 6ES7 833-1FC00-0YX2	6ES7 195-7HB00-0XA0 6ES7 195-7HC00-0XA0 6ES7 307-1EA01-0AA0 6ES7 392-1AM00-0AA0 6ES7 392-1AM00-1AB0 6ES7 392-1BM01-0AA0 6ES7 392-1BM01-1AB0 6ES7 392-1CM00-0AA0 6ES7 392-2XX20-0AA0
Distributed Safety Upgrade From V5.x to V5.4; Floating license for 1 user	6ES7 833-1FC02-0YE5	
Labeling sheet with strips for 10 electronic blocks • For 16-channel electronic blocks incl. add-on terminals • For 32-channel electronic blocks incl. add-on terminals	6ES7 193-1BH00-0XA0 6ES7 193-1BL00-0XA0	
Connecting cable for PROFIBUS 12 Mbit/s, for connecting PG to PROFIBUS DP, pre-assembled with 2 x 9-pin Sub-D connector, 3 m	6ES7 901-4BD00-0XA0	
PROFIBUS bus connector • 90° cable outlet, terminating resistor with isolating function, without PG socket, up to 12 Mbit/s • 90° cable outlet, terminating resistor with isolating function, without PG socket, up to 12 Mbit/s • 90° cable outlet, FastConnect terminating resistor with isolating function, without PG socket, up to 12 Mbit/s; 1 unit - 1 unit - 100 units • 90° cable outlet, FastConnect terminating resistor with isolating function, with PG socket, up to 12 Mbit/s; 1 unit - 1 unit - 100 units	6ES7 972-0BA12-0XA0 6ES7 972-0BB12-0XA0 6ES7 972-0BA52-0XA0 6ES7 972-0BA52-0XB0 6ES7 972-0BB52-0XA0 6ES7 972-0BB52-0XB0	S7-300 manual Design, CPU data, module data, instruction list German English SIMATIC manual collection J 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 Current "Manual Collection" DVD and the three subsequent updates
DIN rail for active bus modules for max. 5 active bus modules, for function "Insertion and removal" • 483 mm (19") long • 530 mm long • 620 mm long • 2000 mm long	6ES7 195-1GA00-0XA0 6ES7 195-1GF30-0XA0 6ES7 195-1GG30-0XA0 6ES7 195-1GC00-0XA0	6ES7 398-8FA10-8AA0 6ES7 398-8FA10-8BA0 6ES7 998-8XC01-8YE0 6ES7 998-8XC01-8YE2

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

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

SIMATIC S7-300

F digital / analog modules

SM 336 F analog input module - Safety Integrated

Overview



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

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

SIMATIC S7-300

F digital / analog modules

SM 336 F analog input module - Safety Integrated

Ordering Data	Order No.	Order No.
F analog input module SM 336 6 inputs, 15 bit, 0/4 - 20 mA HART	6ES7 336-4GE00-0AB0	SITOP power supply module for ET 200M; 120/230 V AC, 24 V DC, 5 A; Type PS 307-1E 6ES7 307-1EA01-0AA0
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 Software Update Service	6ES7 833-1FC02-0YA5 6ES7 833-1FC00-0YX2	Front connectors 20-pin, with screw contacts • 1 unit • 100 units 20-pin, with spring-loaded contacts • 1 unit • 100 units 20-pin, with FastConnect • 1 unit Labeling strips For fail-safe modules (spare part), 10 units Label cover For fail-safe modules (spare part), 10 units
Distributed Safety Upgrade From V5.x to V5.4; Floating license for 1 user	6ES7 833-1FC02-0YE5	6ES7 392-1AJ00-0AA0 6ES7 392-1AJ00-1AB0 6ES7 392-1BJ00-0AA0 6ES7 392-1BJ00-1AB0 6ES7 392-1CJ00-0AA0 6ES7 392-2XX20-0AA0
Labeling sheet with strips for 10 electronic blocks • For 16-channel electronic blocks incl. add-on terminals • For 32-channel electronic blocks incl. add-on terminals	6ES7 193-1BH00-0XA0 6ES7 193-1BL00-0XA0	6ES7 392-2XY20-0AA0
Connecting cable for PROFIBUS 12 Mbit/s, for connecting PG to PROFIBUS DP, pre-assembled with 2 x 9-pin Sub-D connector, 3 m	6ES7 901-4BD00-0XA0	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
PROFIBUS bus connector • 90° cable outlet, terminating resistor with isolating function, without PG socket, up to 12 Mbit/s • 90° cable outlet, terminating resistor with isolating function, without PG socket, up to 12 Mbit/s • 90° cable outlet, FastConnect terminating resistor with isolating function, without PG socket, up to 12 Mbit/s; 1 unit - 1 unit - 100 units • 90° cable outlet, FastConnect terminating resistor with isolating function, with PG socket, up to 12 Mbit/s; 1 unit - 1 unit - 100 units	6ES7 972-0BA12-0XA0 6ES7 972-0BB12-0XA0 6ES7 972-0BA52-0XA0 6ES7 972-0BA52-0XB0 6ES7 972-0BB52-0XA0 6ES7 972-0BB52-0XB0	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
DIN rail for active bus modules for max. 5 active bus modules for hot swapping function • 483 mm long • 530 mm long • 620 mm long • 2000 mm long	6ES7 195-1GA00-0XA0 6ES7 195-1GF30-0XA0 6ES7 195-1GG30-0XA0 6ES7 195-1GC00-0XA0	LK 393 cable guide 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
Active bus module BM 2x40 Bus module for accepting 2 IO modules each 40 mm wide	6ES7 195-7HB00-0XA0	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

SIMATIC S7-300

F digital / analog modules

Isolation module

Overview



- Supports mixed operation of fail-safe signal modules in safety mode and S7-300 standard modules in an ET 200M when Cat. 4 or SIL 3 has to be achieved.
- The isolation module is not required if the safety class or safety category to be achieved is less than SIL 3 or Cat. 4, respectively.

When Cat. 4/SIL 3 is required, the isolation module must be implemented in the following situations:

Application	Isolation module must be used
Central use after CPU 31xF-2 DP or CPU 31xF-2 PN/DP • Only fail-safe modules in the tier • Standard and fail-safe modules in the tier	Yes, behind the CPU Yes, after the last standard module and before the first fail-safe module
Central use after CPU 31xF-2 DP or CPU 31xF-2 PN/DP in an expansion rack • Only fail-safe modules in the tier • Standard and fail-safe modules in the tier	Yes, after the IM 36x Yes, after the last standard module and before the first fail-safe module
Distributed behind the IM 153-2 with copper connection • Only fail-safe modules in the station • Standard and fail-safe modules in the station	Yes, after the IM 153-2 Yes, after the last standard module and before the first fail-safe module
Distributed behind the IM 153-2 with fiber-optic connection • Only fail-safe modules in the station • Standard and fail-safe modules in the station	No Yes, after the last standard module and before the first fail-safe module

Technical specifications

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

Ordering data

	Order No.
Isolation module	6ES7 195-7KF00-0XA0
for simultaneous operation of fail-safe and standard modules in an ET 200M	
Isolation bus module	6ES7 195-7HG00-0XA0
for accommodating the isolating module in an ET 200M	

SIMATIC S7-300

SIPLUS F digital/analog modules

SIPLUS SM 326 F digital input module -
Safety Integrated

Overview



- Digital inputs for the fail-safe 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: 91999 and ECCN: EAR99H

L: Subject to export regulations AL: 91999 and ECCN: N

SIMATIC S7-300

SIPLUS F digital/analog modules

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 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

SIMATIC S7-300

SIPLUS F digital/analog modules

SIPLUS SM 336 F analog input module - Safety Integrated

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

SIMATIC S7-300

SIPLUS F digital/analog modules

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	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 5/160

H: Subject to export regulations AL: 91999 and ECCN: EAR99H

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

5

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)	[EEEx 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

SIMATIC S7-300

Ex digital modules

Ex digital input modules

Ordering data

Ex digital input module

4 inputs, isolated, NAMUR

Order No.

6ES7 321-7RD00-0AB0

Front connectors

20-pin, with screw contacts

- 1 unit
- 100 units

6ES7 392-1AJ00-0AA0
6ES7 392-1AJ00-1AB0

Front door, elevated design

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

6ES7 328-0AA00-7AA0

LK 393 cable guide

Mandatory for operation in Ex-hazard areas

6ES7 393-4AA00-0AA0

Labeling strips

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

6ES7 392-2XX00-0AA0

Label cover

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

6ES7 392-2XY00-0AA0

S7 SmartLabel V3.0

Software for automatic labeling of modules 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

SIMATIC manual collection

J

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

6ES7 998-8XC01-8YE0

SIMATIC manual collection update service for 1 year

D

Current "Manual Collection" DVD and the three subsequent updates

6ES7 998-8XC01-8YE2

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

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

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

5

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

SIMATIC S7-300

Ex digital modules

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

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	
Mandatory for operation in Ex-hazard areas	6ES7 393-4AA00-0AA0
Labeling strips	
10 units (spare part), for modules with 20-pin front connector	6ES7 392-2XX00-0AA0
Label cover	
10 units (spare part), for modules with 20-pin front connector	6ES7 392-2XY00-0AA0
S7 SmartLabel V3.0	
Software for automatic labeling of modules 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 D update service for 1 year	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

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)

5

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	

SIMATIC S7-300

Ex analog modules

Ex analog input modules

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 %	0.09 to 0.04%
• Resistance-type thermometer, relative to input area		
Basic error limit (operational limit at 25 °C)		
• Current, relative to input area	+/- 0,1 %	+/- 0,1 %
• Resistance-type thermometer, relative to input area		
Interference voltage suppression for $f = n \times (f1 \pm 1\%)$, $f1$ = 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

SIMATIC S7-300

Ex analog modules

Ex analog input modules

Ordering data	Order No.	Order No.
Ex analog input modules 4 inputs, isolated, 0/4 to 20 mA, 15 bit 8/4 inputs, isolated, for thermo-couples and Pt100, Pt200, Ni100	6ES7 331-7RD00-0AB0 6ES7 331-7SF00-0AB0	
Front connectors 20-pin, with screw contacts • 1 unit • 100 units	6ES7 392-1AJ00-0AA0 6ES7 392-1AJ00-1AB0	
Front door, elevated design e.g. for 32 channel modules; enables connection of 1.3 mm ² /16 AWG wires	6ES7 328-0AA00-7AA0	
LK 393 cable guide Mandatory for operation in Ex-hazard areas	6ES7 393-4AA00-0AA0	
Labeling strips 10 units (spare part), for modules with 20-pin front connector	6ES7 392-2XX00-0AA0	
Label cover 10 units (spare part), for modules with 20-pin front connector	6ES7 392-2XY00-0AA0	
S7 SmartLabel V3.0 Software for automatic labeling of modules direct from the STEP 7 project Single license J Upgrade single license J	2XV9 450-1SL03-0YX0 2XV9 450-1SL03-0YX4	
		Labeling sheets for machine inscription For 16-channel signal modules, DIN A4, for printing with laser printer; 10 units petrol light-beige yellow red 6ES7 392-2AX00-0AA0 6ES7 392-2BX00-0AA0 6ES7 392-2CX00-0AA0 6ES7 392-2DX00-0AA0
		SIMATIC manual collection J 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 6ES7 998-8XC01-8YE0
		SIMATIC manual collection update service for 1 year D Current "Manual Collection" DVD and the three subsequent updates 6ES7 998-8XC01-8YE2

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

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

SIMATIC S7-300

Ex analog modules

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)	[Ex 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

SIMATIC S7-300

Ex analog modules

Ex analog output modules

Ordering data	Order No.	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 • 100 units	6ES7 392-1AJ00-0AA0 6ES7 392-1AJ00-1AB0	
Front door, elevated design e.g. for 32 channel modules; enables connection of 1.3 mm ² /16 AWG wires	6ES7 328-0AA00-7AA0	
LK 393 cable guide Mandatory for operation in Ex-hazard areas	6ES7 393-4AA00-0AA0	
Labeling strips 10 units (spare part), for modules with 20-pin front connector	6ES7 392-2XX00-0AA0	
Label cover 10 units (spare part), for modules with 20-pin front connector	6ES7 392-2XY00-0AA0	
S7 SmartLabel V3.0 Software for automatic labeling of modules direct from the STEP 7 project Single license J Upgrade single license J	2XV9 450-1SL03-0YX0 2XV9 450-1SL03-0YX4	
	Labeling sheets for machine inscription For 16-channel signal modules, DIN A4, for printing with laser printer; 10 units petrol light-beige yellow red SIMATIC manual collection J 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 D update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	6ES7 392-2AX00-0AA0 6ES7 392-2BX00-0AA0 6ES7 392-2CX00-0AA0 6ES7 392-2DX00-0AA0 6ES7 998-8XC01-8YE0 6ES7 998-8XC01-8YE2

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

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

SIMATIC S7-300

Function modules

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

SIMATIC S7-300

Function modules

FM 350-1 counter module

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	
Length code:	
0 m	6FX5 002-2CA12- 0
100 m	1
200 m	2
0 m	3
10 m	A
20 m	B
30 m	C
40 m	D
50 m	E
60 m	F
70 m	G
80 m	H
90 m	J
0 m	K
1 m	A
2 m	B
3 m	C
4 m	D
5 m	E
6 m	F
7 m	G
8 m	H
9 m	J
	K

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

SIMATIC S7-300

Function modules

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

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

Order No.	
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

SIMATIC S7-300

Function modules

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

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

Technical specifications (continued)

6ES7 351-1AH02-0AE0		6ES7 351-1AH02-0AE0	
Encoder		Encoder signals, absolute encoder (SSI)	
Connectable encoders		• Input signal	5 V difference signal (phys. RS 422)
• Incremental encoder (symmetrical)	Yes	• Data signal	DATA, notDATA
• Incremental encoder (asymmetrical)	Yes	• Clock signal	CL, notCL
• Absolute encoder (SSI)	Yes	• Telegram length	13 or 25 bit
• 2-wire BEROs	Yes	• Clock frequency, max.	1.5 MHz
- permissible quiescent current (2-wire BEROs), max.	2 mA; on signal "0", max. 2 mA; on signal "1", max. 6 mA	• Gray code	Yes
		• Cable length, shielded, max.	200 m; At max. 188 kHz
Encoder signals, incremental encoder (symmetrical)		Galvanic isolation	
• Trace mark signals	A, notA, B, notB	Galvanic isolation digital inputs	
• Zero mark signal	N, notN	• Galvanic isolation digital inputs	Yes
• Input signal	5 V difference signal (phys. RS 422)	Galvanic isolation digital outputs	
	0.5 MHz	• Galvanic isolation digital outputs	Yes
• Input frequency, max.		Dimensions and weight	
Encoder signals, incremental encoder (asymmetrical)		Dimensions	
• Trace mark signals	A, B	• Width	80 mm
• Zero mark signal	N	• Height	125 mm
• Input voltage	24 V	• Depth	120 mm
• Input frequency, max.	50 kHz; 50 kHz for 25 m cable length; 25 kHz for 100 m cable length	Weight	
		• Weight, approx.	550 g

SIMATIC S7-300

Function modules

FM 351 positioning module

Ordering data

FM 351 positioning module

for rapid traverse and creep speed drives

Front connectors

20-pin, with screw contacts

- 1 unit
- 100 units

20-pin, with spring-loaded contacts

- 1 unit
- 100 units

20-pin, with FastConnect

- 1 unit

Bus connectors

1 unit (spare part)

Labeling strips

10 units (spare part)

Slot number label

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

Spare part

See "Accessories", page 5/308

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

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

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

Overview



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

Note:

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

www.siemens.com/simatic-technology

5

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 BERO	Yes
- permissible quiescent current (2-wire BERO), 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

SIMATIC S7-300

Function modules

FM 352 cam controller

Technical specifications (continued)

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

Ordering data	Order No.		Order No.
FM 352 electronic cam controller	6ES7 352-1AH02-0AE0	Slot number label	6ES7 912-0AA00-0AA0
Sub-D connector	6ES5 750-2AA21	Spare part	
15-pin, male		Shield connection element	6ES7 390-5AA00-0AA0
Front connector		80 mm wide, with 2 rows for 4 terminals each	
20-pin, with screw contacts	6ES7 392-1AJ00-0AA0 6ES7 392-1AJ00-1AB0	Terminal elements	
• 1 unit		2 units	
• 100 units		For 2 cables with 2 mm to 6 mm diameter	6ES7 390-5AB00-0AA0
20-pin, with spring-loaded contacts	6ES7 392-1BJ00-0AA0 6ES7 392-1BJ00-1AB0	For 1 cable with 3 mm to 8 mm diameter	6ES7 390-5BA00-0AA0
• 1 unit		For 1 cable with 4 mm to 13 mm diameter	6ES7 390-5CA00-0AA0
• 100 units		Signal cable	
20-pin, with FastConnect	6ES7 392-1CJ00-0AA0	Pre-assembled for HTL encoder, UL/DESINA	6FX5 0 2-2AL00-■ ■ ■ ■
• 1 unit		Pre-assembled for SSI absolute encoder, UL/DESINA	6FX5 0 2-2CC11-■ ■ ■ ■
Bus connectors	6ES7 390-0AA00-0AA0	Pre-assembled for TTL encoder 6FX2001-1, UL/DESINA	6FX5 0 2-2CD01-■ ■ ■ ■
1 unit (spare part)		Pre-assembled for TTL encoder 24 V, UL/DESINA	6FX5 0 2-2CD24-■ ■ ■ ■
Labeling strips	6ES7 392-2XX00-0AA0	Length code:	See FM 351, page 5/180
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		

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

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.

www.siemens.com/simatic-technology

5

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 voltage 1L+, max.	150 mA; typ. 60 mA	150 mA; typ. 60 mA
from load voltage 2L+ (without load), max.	200 mA; typ. 60 mA, DI/DO supply	200 mA; typ. 60 mA, DI/DO supply
from load voltage 3L+ (with encoder), max.	600 mA; typ. 80 mA plus encoder supply	600 mA; typ. 80 mA plus encoder supply
from load voltage 3L+ (without encoder), max.	200 mA; typ. 80 mA	200 mA; typ. 80 mA
from backplane bus 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

SIMATIC S7-300

Function modules

FM 352-5 high-speed Boolean processor

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 - for signal "0" - for signal "1"	24 V -30 to +5 V 11 to 30 V	24 V -30 to +5 V 11 to 30 V
Input current - for signal "0", max. (permissible quiescent current) - for signal "1", typ.	1.5 mA 3.8 mA	1.5 mA 3.8 mA
Input delay (for rated value of input voltage) - Input frequency (with a time delay of 0.1 ms), max. - Programmable digital filter delay - Minimum pulse width for program reactions - for standard inputs - at "0" to "1", max.	200 kHz None, 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 3 µs; typ. 1.5 µs	200 kHz None, 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 3 µs; typ. 1.5 µs
Cable length - Cable length, shielded, max. - Cable length unshielded, max.	600 m 100 m; Shielded cable recommended if filtering delay is set to less than 1.6 ms	600 m 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 Response threshold, typ.	Yes; Overvoltage protection, thermal protection 1.7 to 3.5 A	Yes; Overvoltage protection, thermal protection 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) - for signal "0" (DC), max. - for signal "1" (DC), max.	24 V 28.8 V 0.5 V	24 V 28.8 V 0.5 V
Output current - for signal "1" rated value - for signal "1" permissible range for 0 to 60 °C, min. - for signal "1" permissible range for 0 to 60 °C, max. - for signal "0" residual current, max.	0.5 A; At 60 °C 5 mA 600 mA 1 mA	0.5 A; At 60 °C 5 mA 600 mA 1 mA
Output delay with resistive load 0 to "1", max. 1 to "0", max.	1 µs; 0.6 µs 50 mA / 1.0 µs 0.5 A 1.5 µs; 1.7 µs 50 mA / 1.5 µs 0.5 A	1 µs; 0.6 µs 50 mA / 1.0 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. - with inductive load, max. - on lamp load, max.	100 kHz; 20 kHz at 0.5 A; 100 kHz at 0.25 A 2 Hz; 2 Hz at 0.5 A with external commutator diodes; 0.5 Hz at 0.5 A without external commutator diodes 10 Hz	100 kHz; 20 kHz at 0.5 A; 100 kHz at 0.25 A 2 Hz; 2 Hz at 0.5 A with external commutator diodes; 0.5 Hz at 0.5 A without external commutator diodes 10 Hz
Cable length - Cable length, shielded, max. - Cable length unshielded, max.	600 m 100 m	600 m 100 m

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

SIMATIC S7-300

Function modules

FM 352-5 high-speed Boolean processor

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)

FM 352-5 high-speed Boolean processor

Ordering data	Order No.	Order No.
FM 352-5 high-speed Boolean processor with current sinking digital outputs with current sourcing digital outputs	6ES7 352-5AH01-0AE0 6ES7 352-5AH11-0AE0	6ES7 352-5AH01-0AE0 6ES7 352-5AH11-0AE0
Micro Memory Card 128 KB 512 KB 2 MB	6ES7 953-8LG20-0AA0 6ES7 953-8LJ20-0AA0 6ES7 953-8LL20-0AA0	6ES7 953-8LG20-0AA0 6ES7 953-8LJ20-0AA0 6ES7 953-8LL20-0AA0
Front connectors 40-pin, with screw contacts • 1 unit • 100 units 40-pin with spring-loaded contacts • 1 unit • 100 units 40-pin, with FastConnect • 1 unit	6ES7 392-1AM00-0AA0 6ES7 392-1AM00-1AB0 6ES7 392-1BM01-0AA0 6ES7 392-1BM01-1AB0 6ES7 392-1CM00-0AA0	6ES7 392-1AM00-0AA0 6ES7 392-1AM00-1AB0 6ES7 392-1BM01-0AA0 6ES7 392-1BM01-1AB0 6ES7 392-1CM00-0AA0

Signal cables

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

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

Length code:

6FX5 002-2CA12-■■■■0

6FX5 002-2CC12-■■■■■

See FM 351, page 5/180

SIMATIC S7-300

Function modules

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

SIMATIC S7-300

Function modules

FM 353 positioning module

Ordering data	Order No.	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	Bus connectors 1 unit (spare part) 6ES7 390-0AA00-0AA0
FM 353 manual German English French Italian	6ES7 353-1AH01-8AG0 6ES7 353-1AH01-8BG0 6ES7 353-1AH01-8CG0 6ES7 353-1AH01-8EG0	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
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	Labeling sheets for machine inscription see "Accessories", page 5/308
Connecting cables To stepper motor power section	6FX8 0 2-3AC02-■ ■ ■ ■	Slot number label Spare part 6ES7 912-0AA00-0AA0
Length code:	See FM 351, page 5/180	Shield connection element 80 mm wide, with 2 rows for 4 terminals each 6ES7 390-5AA00-0AA0
Connecting cables and encoders See Catalog NC 60, CA 01 or in the Industry Mall		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
Sub-D connector 15-pin, socket	6ES5 750-2AB21	
Front connector 20-pin, with screw contacts • 1 unit • 100 units 20-pin, with spring-loaded contacts • 1 unit • 100 units 20-pin, with FastConnect • 1 unit	6ES7 392-1AJ00-0AA0 6ES7 392-1AJ00-1AB0 6ES7 392-1BJ00-0AA0 6ES7 392-1BJ00-1AB0 6ES7 392-1CJ00-0AA0	

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

SIMATIC S7-300

Function modules

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

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

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

SIMATIC S7-300

Function modules

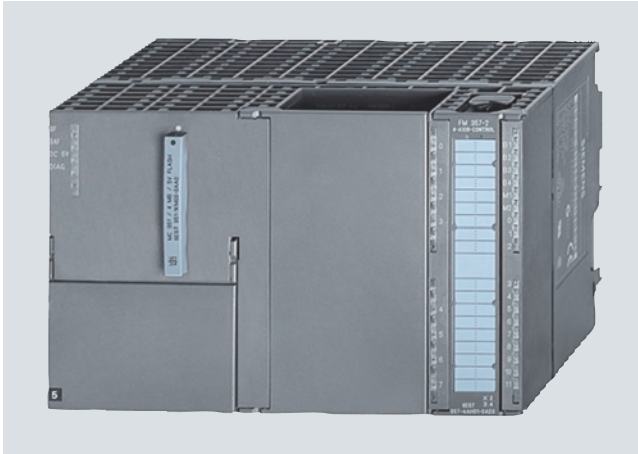
FM 354 positioning module

Ordering data	Order No.	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	Encoders see Catalogs NC 60, CA 01 or in the Industry Mall
FM 354 manual German English French Italian	6ES7 354-1AH01-8AG0 6ES7 354-1AH01-8BG0 6ES7 354-1AH01-8CG0 6ES7 354-1AH01-8EG0	Front connector 20-pin, with screw contacts • 1 unit • 100 units 20-pin, with spring-loaded contacts • 1 unit • 100 units 20-pin, with FastConnect • 1 unit
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	Bus connectors 1 unit (spare part)
Connecting cables To SSI absolute encoders 6FX2 001-5, preassembled To incremental encoders 6FX2 001-1, preassembled For 24 V incremental encoders, preassembled To SIMODRIVE 611A, preassembled To SIMODRIVE 611U, preassembled To SSI absolute encoders 6FX2 001-5, preassembled, without Sub-D connector To SSI absolute encoders 6FX2 001-5, preassembled, suitable for trailing To incremental encoders 6FX2 001-2, preassembled, suitable for trailing To SIMODRIVE 611A, preassembled, suitable for trailing To SIMODRIVE 611U, preassembled, suitable for trailing, 1 free end To SIMODRIVE 611A, preassembled, suitable for trailing, free ends	6FX5 0 2-2CC11-■■■■■ 6FX5 0 2-2CD01-■■■■■ 6FX5 0 2-2CD24-■■■■■ 6FX5 0 2-2CJ00-■■■■■ 6FX5 0 2-2CJ10-■■■■■ 6FX5 002-2CC12-■■■■■ 6FX8 0 2-2CC11-■■■■■ 6FX8 0 2-2CD01-■■■■■ 6FX8 0 2-2CJ00-■■■■■ 6FX8 0 2-2CJ10-■■■■■ 6FX8 0 2-3AB01-■■■■■	Labeling strips 10 units (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 see "Accessories", page 5/308 Slot number label Spare part Shield connection element 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
Length code:	see FM 351, page 5/180	

G: Subject to export regulations AL: N and ECCN: EAR99APP

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

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

5

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

SIMATIC S7-300

Function modules

FM 357-2 positioning module

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

Ordering data	Order No.	Order No.
FM 357-2 positioning module G	6ES7 357-4AH01-0AE0	
Basic unit		
System firmware		
incl. configuration package on CD-ROM, German, English, French, Italian, consisting of equipment manual (electronic), configuring software (parameter- ization screenforms, standard blocks, operator control and monitoring screenforms for OP17/OP27)		
FM 357-2L system firmware	6ES7 357-4AH03-3AE0	
On memory card		
FM 357-2LX system firmware	6ES7 357-4BH03-3AE0	
With additional functions; on memory card		
FM 357-H system firmware	6ES7 357-4CH03-3AE0	
With additional functions for the handling sector; on memory card		
FM 357-2 manual		
German	6ES7 357-4AH00-8AG0	
English	6ES7 357-4AH00-8BG0	
French	6ES7 357-4AH00-8CG0	
Italian	6ES7 357-4AH00-8EG0	
Edit FM	6FC5 263-0AA03-0AB0	
Program editor for editing, loading and saving NC programs with the standard programming device/PC; German/English, on CD-ROM		
Connecting cables and encoders		See 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		6ES7 971-1AA00-0AA0
Li-Ion, 3.6 V/0.95 Ah		
Signal cable		
Pre-assembled for SSI absolute encoder, UL/DESINA		6FX5 0 2-2CC11-■■■■
Pre-assembled for TTL encoder 6FX2001-1, UL/DESINA		6FX5 0 2-2CD01-■■■■
Pre-assembled for TTL encoder 24 V, UL/DESINA		6FX5 0 2-2CD24-■■■■
Length code:		see FM 351, page 5/180

G: Subject to export regulations AL: N and ECCN: EAR99APP

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

5

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)

SIMATIC S7-300

Function modules

FM 355 controller module

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

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 %	

SIMATIC S7-300

Function modules

FM 355 controller module

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 $f = n \times$ (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

SIMATIC S7-300

Function modules

FM 355 controller module

Ordering data	Order No.		Order No.
FM 355 C controller module with 4 analog outputs for 4 continuous controllers	6ES7 355-0VH10-0AE0	S7 SmartLabel V3.0 Software for automatic labeling of modules based on data of the STEP 7 project	
FM 355 S controller module with 8 digital outputs for 4 step or pulse controllers	6ES7 355-1VH10-0AE0	Single license J 2XV9 450-1SL03-0YX0	
		Upgrade single license J 2XV9 450-1SL03-0YX4	
Front connector 20-pin, with screw contacts • 1 unit • 100 units	6ES7 392-1AJ00-0AA0 6ES7 392-1AJ00-1AB0	Labeling sheets for machine inscription	See "Accessories", page 5/308
20-pin, with spring-loaded contacts • 1 unit • 100 units	6ES7 392-1BJ00-0AA0 6ES7 392-1BJ00-1AB0	Slot number label	6ES7 912-0AA00-0AA0
20-pin, with FastConnect • 1 unit	6ES7 392-1CJ00-0AA0	Spare part	
Bus connectors	6ES7 390-0AA00-0AA0	Shield connection element	6ES7 390-5AA00-0AA0
1 unit (spare part)		80 mm wide, with 2 rows for 4 terminals each	
Labeling strips	6ES7 392-2XX00-0AA0	Terminal elements	
10 units (spare part)		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

SIMATIC S7-300

Function modules

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

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)

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	

SIMATIC S7-300

Function modules

FM 355-2 temperature controller module

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 %	

Technical specifications (continued)

	6ES7 355-2CH00-0AE0	6ES7 355-2SH00-0AE0
Interference voltage suppression for $f = n \times (f_l \pm 1\%)$, f_l = interference frequency		
• Series mode interference (peak value of interference < rated value of input range), min.	40 dB	40 dB
• common mode voltage (USS < 2.5 V), min.	70 dB	70 dB
Control technology		
Number of closed-loop controllers	4	4
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.		Order No.
FM 355-2 C temperature controller module	6ES7 355-2CH00-0AE0	S7 SmartLabel V3.0	
with 4 analog outputs for 4 continuous controllers		Software for automatic labeling of modules based on data of the STEP 7 project	
FM 355-2 S temperature controller module	6ES7 355-2SH00-0AE0	Single license J	2XV9 450-1SL03-0YX0
with 8 digital outputs for 4 step or pulse controllers		Upgrade single license J	2XV9 450-1SL03-0YX4
Front connector		Labeling sheets for machine inscription	See "Accessories", page 5/308
20-pin, with screw contacts		Slot number label	6ES7 912-0AA00-0AA0
• 1 unit	6ES7 392-1AJ00-0AA0	Spare part	
• 100 units	6ES7 392-1AJ00-1AB0	Shield connection element	6ES7 390-5AA00-0AA0
20-pin, with spring-loaded contacts		80 mm wide, with 2 rows for 4 terminals each	
• 1 unit	6ES7 392-1BJ00-0AA0	Terminal elements	
• 100 units	6ES7 392-1BJ00-1AB0	2 units	
20-pin, with FastConnect		For 2 cables with 2 mm to 6 mm diameter	6ES7 390-5AB00-0AA0
1 unit	6ES7 392-1CJ00-0AA0	For 1 cable with 3 mm to 8 mm diameter	6ES7 390-5BA00-0AA0
Bus connectors	6ES7 390-0AA00-0AA0	For 1 cable with 4 mm to 13 mm diameter	6ES7 390-5CA00-0AA0
1 unit (spare part)			
Labeling strips	6ES7 392-2XX00-0AA0		
10 units (spare part)			

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

SIMATIC S7-300

Function modules

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

SIMATIC S7-300

Function modules

SM 338 POS input module

Ordering data	Order No.		Order No.
SM 338 POS input module For position sensing with 3 SSI encoders	6ES7 338-4BC01-0AB0	SIMATIC manual collection update service for 1 year D	6ES7 998-8XC01-8YE2
Front connectors 20-pin, with screw contacts • 1 unit • 100 units 20-pin, with spring-loaded contacts • 1 unit • 100 units 20-pin, with FastConnect • 1 unit	6ES7 392-1AJ00-0AA0 6ES7 392-1AJ00-1AB0 6ES7 392-1BJ00-0AA0 6ES7 392-1BJ00-1AB0 6ES7 392-1CJ00-0AA0	S7-300 manual Design, CPU data, module data, instruction list German English French Spanish Italian	 6ES7 398-8FA10-8AA0 6ES7 398-8FA10-8BA0 6ES7 398-8FA10-8CA0 6ES7 398-8FA10-8DA0 6ES7 398-8FA10-8EA0
Front door, elevated design e.g. for 32-channel modules; for connecting 1.3 mm ² /16 AWG conductors	6ES7 328-0AA00-7AA0	Signal cable Pre-assembled for SSI absolute encoder 6FX2001-5, without Sub-D connector, UL/DESINA	6FX5 002-2CC12-■■■■
SIMATIC manual collection J 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	6ES7 998-8XC01-8YE0	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

SIMATIC S7-300

Function modules

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

6ES7 174-0AA10-0AA0	
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

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)
	1 MHz
• Input frequency, max.	35 m; 35 m at max. 500 kHz;
• Cable length, shielded, max.	10 m at max. 1 MHz
Encoder signals, absolute encoder (SSI)	
• Input signal	5 V difference signal (phys. RS 422)
	DATA, notDATA
• Data signal	CL, notCL
• Clock signal	13, 21, 24 bit
• Telegram length	187.5 KHz 1.5 MHz (parameterizable)
• Clock frequency, max.	1
	1
• Binary code	250 m; 250 m at 187.5 kHz,
• Gray code	10 m at 1.5 MHz
• Cable length, shielded, max.	
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	2
- Number of relay contacts	
• Differential output voltage, min.	30 V
- Switching voltage, max.	
• Differential output voltage for signal "0", max.	1 A
- Switching current, max.	
• Differential output voltage, for signal "1", min.	30 V-A
- Switching capacity, max.	at 30 V DC, 1 A
- Number of switching cycles, min.	
• 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;
• Differential output voltage for signal "0", max.	4.5 V at I = -100 µA,
	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	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

SIMATIC S7-300

Function modules

SIWAREX U

Overview



SIWAREX U weighing electronics

SIWAREX U is a versatile weighing module for all simple weighing and force measuring tasks. The compact module is easy to install in all SIMATIC automation systems. Complete data access is then possible via the SIMATIC.

Technical specifications

SIWAREX U

Integration in automation systems:

S7-300	Direct integration
S7-400 (H)	Via ET 200M
PCS 7 (H)	Via ET 200M
C7	Via IM or ET 200M
Automation systems from other vendors	Via ET 200M
Stand-alone (without SIMATIC CPU)	Possible with IM 153-1

Communication interfaces

- SIMATIC S7 (P bus)
- RS 232
- TTY

Connection of remote displays (through TTY serial interface)

Gross, channel 1, 2 or default value 1, 2

Adjustment of scales settings

over SIMATIC (P bus) or PC using SIWATOOL U (RS 232)

Measuring properties

Error limit to DIN 1319-1 of full-scale value at 20 °C ± 10 K	0.05 %
Internal resolution ADC	65535
Data format of weight values	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
• R_{Lmin}	With Ex(i) interface: > 87 Ω per channel
• R_{Lmax}	< 4010 Ω

Permissible load cell characteristic

Up to 4 mV/V

Max. distance of load cells

500 m ²⁾
150/500 m for gas group IIC
500 m ²⁾ for gas group IIB
(see SIWAREX IS Manual)

Intrinsically-safe load cell powering

Optional (Ex interface) with SIWAREX IS

Supply voltage 24 V DC

Rated voltage	24 V DC
Max. current consumption	150 mA (single-channel) / 240 mA (two-channel)

Voltage supply from backplane bus

≤ 100 mA

Certification

ATEX 95, FM, cUL_{US} Haz. Loc.

IP degree of protection to DIN EN 60529; IEC 60529

IP20

Climatic requirements

T_{min} (IND) to T_{max} (IND) (operating temperature)	
Vertical installation	0 ... +60 °C
Horizontal installation	0 ... +40 °C

EMC requirements according to

NAMUR NE21, Part 1
EN 61326

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).

Ordering data	Order No.		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 - Two-channel version ^{2) D)} for connecting two scales	7MH4 950-1AA01 7MH4 950-2AA01	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
SIWAREX U manual available in a range of languages Free download on the Internet at: www.siemens.com/weighing-technology		S7 DIN rail 160 mm 480 mm 530 mm 830 mm 2000 mm	6ES7 390-1AB60-0AA0 6ES7 390-1AE80-0AA0 6ES7 390-1AF30-0AA0 6ES7 390-1AJ30-0AA0 6ES7 390-1BC00-0AA0
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	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 PS 307-1E; 5 A PS 307-1K; 10 A	6ES7 307-1BA00-0AA0 6ES7 307-1EA00-0AA0 6ES7 307-1KA00-0AA0
SIWAREX U configuration package for PCS 7, version 6.x suitable for 7MH4601-1*AA01 and 7MH4950-*AA01 In German and English on CD-ROM, module for the CFC and faceplate	7MH4 683-3BA64	Labeling strips (10 units, spare part) 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.	6ES7 392-2XX00-0AA0
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 of SIWAREX U/CS with serial PC interface, for 9-pin PC interfaces (RS 232), length 3 m Installation material (mandatory)	7MH4 607-8CA	SIWAREX JB junction box, aluminium housing for connecting up to 4 load cells in parallel, and for connecting several junction boxes	7MH4 710-1BA
20-pin front plug with screw contacts (required for each SIWAREX module)		SIWAREX JB junction box, stainless steel housing for connecting up to 4 load cells in parallel	7MH4 710-1EA
Shield contact element Sufficient for two SIWAREX U modules	6ES7 392-1AJ00-0AA0	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

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

SIMATIC S7-300

Function modules

SIWAREX U

Ordering data

Order No.

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
- With short-circuit current < 137 mA DC

7MH4 710-5BA**7MH4 710-5CA**

Cable (optional)

Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, orange sheath

to connect SIWAREX U, CS, MS, FTA, FTC, M and CF to the junction box (JB), extension box (EB) or Ex interface (Ex-I) or between two JBs, for fixed laying, occasional bending permitted, 10.8 mm outer diameter, for ambient temperature -40 to +80 °C

7MH4 702-8AG**Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, blue sheath**

to connect the junction box (JB) or extension box (EB) in a potentially explosive 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**

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.

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

Overview



SIWAREX FTA weighing module

The SIWAREX FTA (Flexible Technology, Automatic Weighing Instrument) is a versatile and flexible weighing module for industrial use. It can be used for automatic and non-automatic weighing, e.g. for the production of mixtures, filling, loading, monitoring and bagging.

It has been assigned appropriate scale approvals and is also suitable for calibration plants.

The SIWAREX FTA function module is integrated in SIMATIC S7/PCS7, and uses the features of this modern automation system, such as integral communication, diagnostics and configuration tools.

5

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	$3 \times 6000 \text{ d} \geq 0.5 \text{ } \mu\text{V/e}$
Internal resolution	16 million parts
Internal/external updating rate	400/100 Hz
Several parameterizable digital filters	
	Critically damped, Bessel, Butterworth (0.05 ... 20 Hz), mean-value filter
Weighing functions	
Non-automatic weighing machine	OIML R76
Automatic weighing machine	OIML R51, R61, R107
Load cells	
	Strain gages in 4-wire or 6-wire system
3 characteristic value ranges	1, 2 or 4 mV/V
Load cell powering	
Supply voltage U_S (rated value)	10.3 V DC
Max. supply current	184 mA
Permissible load cell resistance	
• R_{Lmin}	$> 56 \text{ } \Omega$
	$> 87 \text{ } \Omega$ with Ex interface
• R_{Lmax}	$\leq 4010 \text{ } \Omega$

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

SIMATIC S7-300

Function modules

SIWAREX FTA

5

Ordering data	Order No.		Order No.
SIWAREX FTA Legal-for-trade weighing electronics for automatic scales for S7-300 and ET 200M. EU type approval 3 x 6000 d Applications: proportioning, filling, bagging, loading. Note: Observe approval conditions for applications with obligation of verification. We recommend using our calibration set and contacting our SIWAREX hotline.	7MH4 900-2AA01	SIWAREX 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 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 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
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	SIWATOOL connecting cable from SIWAREX FTA with serial PC interface, for 9-pin PC interfaces (RS 232) • 2 m long • 5 m long	7MH4 702-8CA 7MH4 702-8CB
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	40-pin front plug with screw contacts (required for each SIWAREX module), alternatively with spring-loaded contacts	6ES7 392-1AM00-0AA0
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	40-pin front plug with spring-loaded contacts (required for each SIWAREX module), alternatively with screw contacts	6ES7 392-1BM01-0AA0
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	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 • 480 mm • 530 mm • 830 mm • 2000 mm	6ES7 390-1AB60-0AA0 6ES7 390-1AE80-0AA0 6ES7 390-1AF30-0AA0 6ES7 390-1AJ30-0AA0 6ES7 390-1BC00-0AA0
		PS 307 load power supply (only required if 24 V DC is not available) 120/230 V AC; 24 V DC • PS 307-1B; 2 A • PS 307-1E; 5 A • PS 307-1K; 10 A	6ES7 307-1BA00-0AA0 6ES7 307-1EA00-0AA0 6ES7 307-1KA00-0AA0
		MMC memory for data recording up to 16 MB	7MH4 900-2AY20

Ordering data	Order No.	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 • With short-circuit current < 137 mA DC	7MH4 710-5BA 7MH4 710-5CA	
		Cable (optional) Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, orange sheath to connect SIWAREX U, CS, MS, FTA, FTC, M and CF to the junction box (JB), extension box (EB) or Ex interface (Ex-I) or between two JBs, for fixed laying, occasional bending permitted, 10.8 mm outer diameter, for ambient temperature -40 to +80 °C
		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
		Cable LiYCY 4 x 2 x 0.25 mm² for TTY (connect 2 pairs of conductors in parallel), for connection of a remote display
		7MH4 702-8AG 7MH4 702-8AF 7MH4 407-8BD0

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

SIMATIC S7-300

Function modules

SIWAREX FTC

Overview



SIWAREX FTC weighing module

The SIWAREX FTC (Flexible Technology for Continuous Weighing) is a versatile and flexible weighing module for conveyor scales, loss-in-weigh scales and bulk flow meters. It can also be used to record weights and measure force. The SIWAREX FTC function module is integrated in SIMATIC S7/PCS7, and uses the features of this modern automation system, such as integral communication, diagnostics and configuration tools.

Technical specifications

SIWAREX FTC	
Use in automation systems	
S7-300	Directly or via ET 200M
S7-400 (H)	Via ET 200M
PCS 7 (H)	Via ET 200M
Communication interfaces	
S7	Through backplane bus
RS 232	For SIWATOOL or printer connection
RS 485	For remote display or digital load cell
Module parameterization	
	Using SIMATIC S7
	Using SIWATOOL FTC software (RS 232)
Measuring properties	
Accuracy to EN 45501	$3 \times 6000 \text{ d} \geq 0.5 \mu\text{V/e}$
Internal resolution	+/- 8 million parts
Internal/external updating rate	400/100 Hz
Several parameterizable digital filters	
	Critically damped, Bessel, Butterworth (0.05 ... 20 Hz), mean-value filter

SIWAREX FTC	
Weighing functions	
	• Non-automatic weighing machine, force measurement • Conveyor scale • Differential proportioning weigher • Bulk flow meter
Load cells	
3 characteristic value ranges	Strain gages in 4-wire or 6-wire system 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}	$> 56 \Omega$
• R_{Lmax}	$> 87 \Omega$ with Ex interface $\leq 4010 \Omega$
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	
$T_{min}(\text{IND}) \dots T_{max}(\text{IND})$ (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

Ordering data	Order No.		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_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 Manual for belt scales • Available in a range of languages Free download from the Internet at: www.siemens.com/weighing-technology		SIWAREX FTC_B configuration package for PCS 7 V6.x on CD-ROM (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_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_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 "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_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
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_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	
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_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	
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	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

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.

5

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.

SIMATIC S7-300

Function modules

SIFLOW FC070

Technical specifications (continued)

Power		Approvals	
Supply	24 V DC nominal	SIFLOW FC070 Standard	CE, C-UL, ATEX II 3G EEx nA IIC
Tolerance	20.4 V DC ... 28.8 V DC	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
Consumption	Max. 6 W		
Fuse	T1 A/125 V, not replaceable by operator	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
Ambient conditions		NAMUR	Within the limits according to "General requirements" with error criteria A in accordance with NE21
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)	Programming tools	
Enclosure		SIMATIC S7	Configuration trough backplane P-BUS and PLC program
Material	Noryl, color: anthracite	SIMATIC PCS7	Configuration trough backplane P-BUS and PLC/WinCC faceplates
Rating	IP20/NEMA 2 according to IEC 60529	SIMATIC PDM	Through Modbus port RS 232C and RS 485
Mechanical load	According to SIMATIC standards (S7-300 devices)		

SIMATIC S7-300

Function modules

SIFLOW FC070

Ordering data	Order No.	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	
		SIMATIC S7-300 rail The mechanical mounting rack of the SIMATIC S7-300
		• 160 mm (6.3")
		• 482 mm (18.9")
		• 530 mm (20.8")
		• 830 mm (32.7")
		• 2000 mm (78.7")
		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 390-1AB60-0AA0
		6ES7 390-1AE80-0AA0
		6ES7 390-1AF30-0AA0
		6ES7 390-1AJ30-0AA0
		6ES7 390-1BC00-0AA0
		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

SIMATIC S7-300

SIPLUS function modules

SIPLUS FM 350-1 counter module

Overview



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

Note:

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	
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: SO₂ <4.8 ppm; H₂S <9.9 ppm; Cl <0.2 ppm; HCl <0.66 ppm; HF <0.12 ppm; NH <49 ppm; O₃ <0.1 ppm; NOx <5.2 ppm
Threshold/ limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 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 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

SIMATIC S7-300

SIPLUS function modules

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: SO₂ <4.8 ppm; H₂S <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): SO₂ <17.8 ppm; H₂S <49.7 ppm; Cl <1.0 ppm; HCl <3.3 ppm; HF <2.4 ppm; NH <247 ppm; O₃ <1.0 ppm; NO_x <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

H

6AG1 350-2AH01-4AE0

(medial exposure)

With 8 channels, max. 20 kHz; for 24 V incremental encoders and NAMUR encoders; incl. configuration package and electronic documentation on CD

Accessories

See SIMATIC FM 350-2 counter module, page 5/177

H: Subject to export regulations AL: 91999 and ECCN: EAR99H

SIMATIC S7-300

SIPLUS function modules

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	6AG1 950-2AA01-4AA0

(media exposure)

Electronic weighing system
for SIMATIC S7 and ET 200M,
incl. bus connector

Accessories

see SIWAREX U, page 5/209

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

SIMATIC S7-300

SIPLUS function modules

SIPLUS DCF 77 radio clock module

Overview



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

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

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

H

6AG1 057-1AA03-0AA0

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

H: Subject to export regulations AL: 91999 and ECCN: EAR99H

SIMATIC S7-300

Special modules

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 • Height • Depth	40 mm 125 mm 120 mm
Weight • Weight, approx.	190 g

Ordering data

	Order No.
SM 374 simulator module incl. bus connectors, labeling strips	6ES7 374-2XH01-0AA0
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 light-beige yellow red	
	6ES7 392-2AX00-0AA0
	6ES7 392-2BX00-0AA0
	6ES7 392-2CX00-0AA0
	6ES7 392-2DX00-0AA0

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

Overview



- Dummy module for reserving slots for non-parameterized signal modules
- Structure and address allocation is retained when replaced with a signal module

5

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

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

SIMATIC S7-300

Communication

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

5

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-Proprietary, user-defined	HP-Deskjet, HP-Laserjet, IBM-Proprietary, user-defined	HP-Deskjet, HP-Laserjet, IBM-Proprietary, 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

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. • with ASCII protocol, max. • with printer driver, max.,		19.2 kbit/s 9.6 kbit/s 9.6 kbit/s	
Transmission speed, RS 422/485 • with 3964 (R) protocol, max. • with ASCII protocol, max. • with printer driver, max.,			19.2 kbit/s 9.6 kbit/s 9.6 kbit/s
Transmission speed, RS232 • with 3964 (R) protocol, max. • with ASCII protocol, max. • with printer driver, max.,	19.2 kbit/s 9.6 kbit/s 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 • Height • Depth	40 mm 125 mm 120 mm	40 mm 125 mm 120 mm	40 mm 125 mm 120 mm
Weight • Weight, approx.	300 g	300 g	300 g

Ordering data

Order No.	Order No.
CP 340 communication processor With one RS 232 C (V.24) interface	CP 340 communication processor With one RS 422/485 (X.27) interface
RS 232 connecting cable For linking to SIMATIC S7	RS 422/485 connecting cable For linking to SIMATIC S7
5 m	5 m
10 m	10 m
15 m	50 m
CP 340 communication processor With one 20 mA (TTY) interface	
20 mA (TTY) connecting cable For linking to SIMATIC S7	
5 m	
10 m	
50 m	

SIMATIC S7-300

Communication

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

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. • with ASCII protocol, max. • with printer driver, max., • with RK 512 protocol, max.		19.2 kbit/s 19.2 kbit/s 19.2 kbit/s 19.2 kbit/s	
Transmission speed, RS 422/485 • with 3964 (R) protocol, max. • with ASCII protocol, max. • with printer driver, max., • with RK 512 protocol, max.			115.2 kbit/s 115.2 kbit/s 115.2 kbit/s 115.2 kbit/s
Transmission speed, RS232 • with 3964 (R) protocol, max. • with ASCII protocol, max. • with printer driver, max., • with RK 512 protocol, max.	115.2 kbit/s 115.2 kbit/s 115.2 kbit/s 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 • Height • Depth	40 mm 125 mm 120 mm	40 mm 125 mm 120 mm	40 mm 125 mm 120 mm
Weight • Weight, approx.	300 g	300 g	300 g

Ordering data	Order No.	Order No.
CP 341 communication processor With one RS 232 C (V.24) interface	6ES7 341-1AH02-0AE0	6ES7 341-1CH02-0AE0
RS 232 connecting cable For linking to SIMATIC S7 5 m 10 m 15 m	6ES7 902-1AB00-0AA0 6ES7 902-1AC00-0AA0 6ES7 902-1AD00-0AA0	
CP 341 communication processor With one 20 mA (TTY) interface	6ES7 341-1BH02-0AE0	
20 mA (TTY) connecting cable For linking to SIMATIC S7 5 m 10 m 50 m	6ES7 902-2AB00-0AA0 6ES7 902-2AC00-0AA0 6ES7 902-2AG00-0AA0	
		RS 422/485 connecting cable For linking to SIMATIC S7 5 m 10 m 50 m
		Loadable drivers for CP 341 Modbus master (RTU format) • Single license • Single license, without software or documentation Modbus slave (RTU format) • Single license • Single license, without software or documentation
		6ES7 870-1AA01-0YA0 6ES7 870-1AA01-0YA1 6ES7 870-1AB01-0YA0 6ES7 870-1AB01-0YA1

SIMATIC S7-300

Communication

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

SIMATIC S7-300

Communication

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.

Technical specifications		Ordering data	Order No.
Order No.	6GK7 343-2AH11-0XA0	CP 343-2 P communication processor	6GK7 343-2AH11-0XA0
Product type description	CP 343-2 P	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	
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. • from AS-Interface cable, max.		
	200 mA 100 mA		
Effective power loss	Effective power loss		
	2 W		
Permitted ambient conditions	Ambient temperature • during operation • during storage • during transport Maximum relative humidity at 25 °C during operation		
	0 ... 60 °C -40 ... +70 °C -40 ... +70 °C 95 %	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
Design, dimensions and weight	Module format Width Height Depth Net weight Number of slots required	Front connector, 20-pin with screw contacts Front connector, 20-pin with spring terminal	6ES7 392-1AJ00-0AA0 6ES7 392-1BJ00-0AA0
	S7-300 design 40 mm 125 mm 120 mm 190 g 1		
Standards and specifications	Version of the AS-Interface specification Bus cycle time of the AS-Interface • with 31 slaves • with 62 slaves		
	V 3.0 5 ms 10 ms		
Performance data	Data volume • of the address area of the inputs as allocation in the PLC • of the address area of the outputs as allocation in the PLC		
	16 byte 16 byte		
Configuration	Configuration software included in scope of delivery of STEP 7 V5.2 or higher		
	Yes		

SIMATIC S7-300

Communication

CP 342-5

Overview



- PROFIBUS DP master or slave with electrical interface for connecting the SIMATIC S7-300 and the SIMATIC C7 to PROFIBUS at up to 12 Mbit/s (including 45.45 kbit/s)
- Communication services:
 - PROFIBUS DP
 - PG/OP communication (OP multiplexing)
 - S7 communication (client, server)
 - Open communication (SEND/RECEIVE)
- Easy configuration and programming over PROFIBUS
- Cross-network programming device communication through S7 routing
- Modules can be replaced without the need for a PG

DP-M	DP-S	FMS	PG/OP	S7/S5	
●	●		●	●	

Technical specifications

Order No.	6GK7 342-5DA02-0XE0
Product type 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	-

Technical specifications (continued)

Order No.	6GK7 342-5DA02-0XE0
Product type designation	CP 342-5
Performance data	
<u>Performance data Open communication</u>	
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
<u>Performance data PROFIBUS DP</u>	
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
<u>Performance data S7 communication</u>	
Maximum number of possible connections for S7 communication	16
Number of possible connections for S7 communication - Note	-
<u>Performance data Multiprotocol operation</u>	
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	6GK7 342-5DA02-0XE0
Communication processor for electrical connection of SIMATIC S7-300 to PROFIBUS at up to 12 Mbit/s, with electronic manual on CD-ROM	
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	6GK1 500-0AA10
Bus terminal for connection of PROFIBUS nodes at up to 12 Mbit/s with connecting cable	
SIMATIC S7-300 DM 370	6ES7 370-0AA01-0AA0
Dummy module; used for module replacement	

SIMATIC S7-300

Communication

CP 342-5 FO

Overview



- PROFIBUS DP master or slave with optical interface for connecting the SIMATIC S7-300 and the SIMATIC C7 to PROFIBUS at up to 12 Mbit/s (including 45.45 kbit/s)
- Direct connection to the optical PROFIBUS network over the integrated fiber-optic interface for plastic and PCF fiber-optic cables
- Communication services:
 - PROFIBUS DP-V0
 - PG/OP communication (OP multiplexing)
 - S7 communication (client, server)
 - Open communication (SEND/RECEIVE)
- Easy configuration and programming over PROFIBUS
- Cross-network programming device communication through S7 routing
- Modules can be replaced without the need for a PG

DP-M	DP-S	FMS	PG/OP	S7/S5	
●	●		●	●	

Technical specifications

Order No.	6GK7 342-5DF00-0XE0
Product type 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 clad fiber cable, maximum	300 m
• With plastic optical fiber cable, maximum	50 m

Technical specifications (continued)

Order No.	6GK7 342-5DF00-0XE0
Product type designation	CP 342-5 FO
Performance data	
<u>Performance data Open communication</u>	
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
<u>Performance data PROFIBUS DP</u>	
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
<u>Performance data S7 communication</u>	
Maximum number of possible connections for S7 communication	16
Number of possible connections for S7 communication - Note	-
<u>Performance data Multiprotocol operation</u>	
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	6GK7 342-5DF00-0XE0
Communication processor for optical connection of SIMATIC S7-300 to PROFIBUS to 12 Mbit/s with electronic manual on CD-ROM	
STEP 7 Version 5.4	
<u>Target system:</u> SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC <u>Requirements:</u> Windows 2000 Prof./XP Prof. <u>Type of delivery:</u> German, English, French, Spanish, Italian; incl. 3.5" authorization diskette, without documentation • Floating license on CD • Rental license for 50 hours • Software Update Service on CD (requires current software version) • Upgrade Floating License 3.x/4.x/5.x to V5.4; on CD • Trial License STEP 7 V5.4; on CD, runs for 14 days	6ES7 810-4CC08-0YA5 6ES7 810-4CC08-0YA6 6ES7 810-4BC01-0YX2 6ES7 810-4CC08-0YE5 6ES7 810-4CC08-0YA7
Manual for PROFIBUS networks	
Paper version Network architecture, components (OLM (V3), OBT, ILM), configuring and installation • German • English	6GK1 970-5CA20-0AA0 6GK1 970-5CA20-0AA1
PROFIBUS Plastic Fiber Optic, Simplex connector/polishing set	6GK1 901-0FB00-0AA0
100 simplex connectors and 5 polishing sets for assembling PROFIBUS plastic fiber optic cables for the optical PROFIBUS DP	
PROFIBUS Plastic Fiber Optic, stripping tool set	6GK1 905-6PA10
Tools for removing the outer sheath or core sheath of Plastic Fiber Optic cables	
Plug-in adapter	6ES7 195-1BE00-0XA0
For assembling the plastic Simplex connector in combination with CP 342-5 FO, IM 467 FO, IM 153-2 FO and IM 151 FO	
50 units	

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

SIMATIC S7-300

Communication

CP 343-5

Overview



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

DP-M	DP-S	FMS	PG/OP	S7/S5	
		●	●	●	

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	-

Technical specifications (continued)		Ordering data	Order No.
Order No.	6GK7 343-5FA01-0XE0	CP 343-5 communication processor	6GK7 343-5FA01-0XE0
Product type designation	CP 343-5	Communication processor for connection of S7-300 to PROFIBUS, FMS, open communication, PG/OP and S7 communication; with electronic manual on CD-ROM	
Performance data		STEP 7 Version 5.4	
<u>Performance data Open communication</u>		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	
Number of possible connections for open communication by means of SEND/RECEIVE blocks, maximum	16	• Floating license on CD	6ES7 810-4CC08-0YA5
Data volume as user data per connection for open communication by means of SEND/RECEIVE blocks, maximum	240 byte	• Rental license for 50 hours	6ES7 810-4CC08-0YA6
<u>Performance data FMS functions</u>		• Software Update Service on CD (requires current software version)	6ES7 810-4BC01-0YX2
Number of possible connections with FMS connection, maximum	16	• Upgrade Floating License 3.x/4.x/5.x to V5.4; on CD	6ES7 810-4CC08-0YE5
Data volume of variables		• Trial License STEP 7 V5.4; on CD, runs for 14 days	6ES7 810-4CC08-0YA7
• 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		
<u>Performance data S7 communication</u>		RS485 PROFIBUS FastConnect bus connector	
Maximum number of possible connections for S7 communication	16	With 90° cable outlet; insulation displacement technology, max. transmission rate 12 Mbit/s	
Number of possible connections for S7 communication - Note	-	• Without PG interface	6ES7 972-0BA50-0XA0
<u>Performance data Multiprotocol operation</u>		• With PG interface	6ES7 972-0BB50-0XA0
Number of active connections in multiprotocol mode	48	PROFIBUS bus connector IP20	
Product functions Management, configuration, programming		With connection to PPI, MPI, PROFIBUS	
Configuration software required	STEP 7 V5.1 SP3 and higher and NCM S7 for 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	
		SIMATIC S7-300 DM 370	6ES7 370-0AA01-0AA0
		Dummy module; used for module replacement	

SIMATIC S7-300

Communication

CP 343-1 Lean

Overview



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.

ISO	TCP/UDP	PN	MRP	IT	IP-R	PG/OP	S7/S5
	●	●	●			●	●

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	
<u>Performance data</u> <u>Open communication</u>	
Number of possible connections for open communication by means of SEND/RECEIVE blocks, maximum	8

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
<u>Performance data S7 communication</u>	
Maximum number of possible connections for S7 communication	4
Number of possible connections for S7 communication - Note	-
<u>Performance data Multiprotocol operation</u>	
Number of active connections in multiprotocol mode	12
<u>Performance data PROFINET communication as PN IO device</u>	
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

SIMATIC S7-300

Communication

CP 343-1 Lean

5

Ordering data	Order No.		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	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 • 1-year Software Update Service, with automatic extension; requirement: Current software version • Upgrade from Edition 2006 to V8.0 • Upgrade from V6.0, V6.1, V6.2 or V6.3 to V8.0	6GK1 704-1CW71-3AA0 6GK1 704-1CW00-3AL0 6GK1 704-1CW00-3AE0 6GK1 704-1CW00-3AE1
IE FC TP standard cable GP 2x2 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug; PROFINET-compatible; with UL approval; sold by the meter	6XV1 840-2AH10	SOFTNET S7 Lean Edition V8 for Industrial Ethernet up to 8 connections • Single license for 1 installation	6GK1 704-1LW80-3AA0
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	SOFTNET S7 Lean Edition 2008 for Industrial Ethernet up to 8 connections • Single license for 1 installation • 1-year Software Update Service, with automatic extension; requirement: Current software version • Upgrade from Edition 2006 to V8.0 • Upgrade from V6.0, V6.1, V6.2 or V6.3 to V8.0	6GK1 704-1LW71-3AA0 6GK1 704-1LW00-3AL0 6GK1 704-1LW00-3AE0 6GK1 704-1LW00-3AE1
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 • 1 pack = 10 units • 1 pack = 50 units	6GK1 901-1BB30-0AA0 6GK1 901-1BB30-0AB0 6GK1 901-1BB30-0AE0	STEP 7 Version 5.4 <u>Target system:</u> SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC <u>Requirements:</u> Windows XP Professional, Vista Ultimate, Vista Business <u>Type of delivery:</u> German, English, French, Spanish, Italian, including license key on USB flash drive, with electronic documentation • Floating license on DVD • Rental license for 50 hours • Software Update Service on DVD (requires current software version) • Floating license upgrade 3.x/4.x/5.x to V5.4; on DVD • Trial license STEP 7 V5.4; on DVD, operational for 14 days	6ES7 810-4CC08-0YA5 6ES7 810-4CC08-0YA6 6ES7 810-4BC01-0YX2 6ES7 810-4CC08-0YE5 6ES7 810-4CC08-0YA7
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		

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.

Overview



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.

ISO	TCP/UDP	PN	MRP	IT	IP-R	PG/OP	S7/S5
●	●	●	●			●	●

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

SIMATIC S7-300

Communication

CP 343-1

Technical specifications (continued)

Order No.	6GK7 343-1EX30-0XE0
	CP 343-1
Performance data	
<u>Performance data Open communication</u>	
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
<u>Performance data S7 communication</u>	
Maximum number of possible connections for S7 communication	16
Number of possible connections for S7 communication - Note	-
<u>Performance data Multiprotocol operation</u>	
Number of active connections in multiprotocol mode	32
<u>Performance data PROFINET communication as PN IO Controller</u>	
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
<u>Performance data PROFINET communication as PN IO device</u>	
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

Ordering data	Order No.		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 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 • 1 pack = 10 units • 1 pack = 50 units <i>SOFTNET S7 for Industrial Ethernet</i> 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	6GK1 901-1BB30-0AA0 6GK1 901-1BB30-0AB0 6GK1 901-1BB30-0AE0
IE FC TP standard cable GP 2x2 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug; PROFINET-compatible; with UL approval; sold by the meter	6XV1 840-2AH10	SOFTNET 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
FO standard cable GP (50/125) Standard cable, splittable, UL approval, sold by the meter	6XV1 873-2A	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 • 1-year Software Update Service, with automatic extension; requirement: Current software version • Upgrade from Edition 2006 to V8.0 • Upgrade from V6.0, V6.1, V6.2 or V6.3 to V8.0	6GK1 704-1CW71-3AA0 6GK1 704-1CW00-3AL0 6GK1 704-1CW00-3AE0 6GK1 704-1CW00-3AE1
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 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	SOFTNET S7 Lean Edition V8 for Industrial Ethernet up to 8 connections • Single license for 1 installation SOFTNET S7 Lean Edition 2008 for Industrial Ethernet up to 8 connections • Single license for 1 installation • 1-year Software Update Service, with automatic extension; requirement: Current software version • Upgrade from Edition 2006 to V8.0 • Upgrade from V6.0, V6.1, V6.2 or V6.3 to V8.0	6GK1 704-1LW80-3AA0 6GK1 704-1LW71-3AA0 6GK1 704-1LW00-3AL0 6GK1 704-1LW00-3AE0 6GK1 704-1LW00-3AE1

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

SIMATIC S7-300

Communication

CP 343-1

Ordering data

Order No.

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
- 1-year Software Update Service, with automatic extension; requirement: Current software version
- Upgrade S7-1613, Edition 2006 or higher, to S7-1613 Edition 2008
- Upgrade S7-1613 from V6.0, V6.1, V6.2 or V6.3 to S7-1613 V8.0

6GK1 716-1CB71-3AA0**6GK1 716-1CB00-3AL0****6GK1 716-1CB00-3AE0****6GK1 716-1CB00-3AE1****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 delivery:

German, English, French,
Spanish, Italian, including license key on USB flash drive, with electronic documentation

- Floating license on DVD
- Rental license for 50 hours
- Software Update Service on DVD (requires current software version)
- Floating license upgrade 3.x/4.x/5.x to V5.4; on DVD
- Trial license STEP 7 V5.4; on DVD, operational for 14 days

6ES7 810-4CC08-0YA5**6ES7 810-4CC08-0YA6****6ES7 810-4BC01-0YX2****6ES7 810-4CC08-0YE5****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.

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.

5

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	
<u>Performance data</u> <u>Open communication</u>	
Number of possible connections for open communication by means of SEND/RECEIVE blocks, maximum	16

SIMATIC S7-300

Communication

CP 343-1 Advanced

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
<u>Performance data S7 communication</u>	
Maximum number of possible connections for S7 communication	16
Number of possible connections for S7 communication - Note	-
<u>Performance data Multiprotocol operation</u>	
Number of active connections in multiprotocol mode	48
<u>Performance data IT functions</u>	
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
<u>Performance data PROFINET communication as PN IO controller</u>	
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
<u>Performance data PROFINET communication as PN IO device</u>	
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
<u>Performance data PROFINET CBA</u>	
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
<u>Performance data PROFINET CBA remote connection with acyclic transmission</u>	
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

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
<u>Performance data PROFINET CBA remote connection with cyclic transmission</u>	
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
<u>Performance data PROFINET CBA HMI variables via PROFINET, acyclic</u>	
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
<u>Performance data PROFINET CBA device-internal connections</u>	
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
<u>Performance data PROFINET CBA PROFIBUS proxy functionality</u>	
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

SIMATIC S7-300

Communication

CP 343-1 Advanced

5

Ordering data	Order No.	Order No.	
CP 343-1 Advanced communication processor For the connection of SIMATIC S7-300 to Industrial Ethernet; PROFINET IO controller and IO device with RT and IRT, MRP, PROFINET CBA, TCP/IP and UDP, S7 communication, open communication (SEND/RECEIVE), FETCH/ WRITE, with and without RFC 1006, 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 Lean Edition 2008 for Industrial Ethernet up to 8 connections • Single license for 1 installation • 1-year Software Update Service, with automatic extension; requirement: Current software version • Upgrade from Edition 2006 to V8.0 • Upgrade from V6.0, V6.1, V6.2 or V6.3 to V8.0	6GK1 704-1LW71-3AA0 6GK1 704-1LW00-3AL0 6GK1 704-1LW00-3AE0 6GK1 704-1LW00-3AE1
SOFTNET S7 for Industrial Ethernet		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
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		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 • AWG 24, for connection to IE FC RJ45 Plug 4 x 2	6XV1 870-2E 6XV1 878-2A
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	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/CPU's with Industrial Ethernet interface • 1 pack = 1 unit • 1 pack = 10 units • 1 pack = 50 units	6GK1 901-1BB10-2AA0 6GK1 901-1BB10-2AB0 6GK1 901-1BB10-2AE0
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 • 1-year Software Update Service, with automatic extension; requirement: Current software version • Upgrade from Edition 2006 to V8.0 • Upgrade from V6.0, V6.1, V6.2 or V6.3 to V8.0	6GK1 704-1CW71-3AA0 6GK1 704-1CW00-3AL0 6GK1 704-1CW00-3AE0 6GK1 704-1CW00-3AE1	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/CPU's with Industrial Ethernet interface • 1 pack = 1 unit • 1 pack = 10 units • 1 pack = 50 units	6GK1 901-1BB11-2AA0 6GK1 901-1BB11-2AB0 6GK1 901-1BB11-2AE0
SOFTNET S7 Lean Edition V8 for Industrial Ethernet up to 8 connections • Single license for 1 installation	6GK1 704-1LW80-3AA0		

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

Ordering data	Order No.	Order No.
IE FC stripping tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	6GK1 901-1GA00	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
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 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	6GK5 308-2FL00-2AA3	

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

SIMATIC S7-300

Communication

CP 343-1 ERPC

Overview



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.

ISO	TCP/UDP	PN	MRP	IT	IP-R	PG/OP	S7/S5
	●					●	●

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

Technical specifications (continued)

Order No.	6GK7 343-1FX00-0XE0
Product type designation	CP 343-1 ERPC
Performance data	
<u>Performance data Open communication</u>	
Number of possible connections for open communication by means of SEND/RECEIVE blocks, maximum	8
<u>Data volume</u>	
• 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
<u>Performance data S7 communication</u>	
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
<u>Performance data Multiprotocol operation</u>	
Number of active connections in multiprotocol mode	32
<u>Performance data IT functions</u>	
Number of possible write cycles of flash memory cells	100 000
<u>Performance data ERPC functions</u>	
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

SIMATIC S7-300

Communication

CP 343-1 ERPC

5

Ordering data

Order No.

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
- 1-year Software Update Service, with automatic extension; requirement: Current software version
- Upgrade from Edition 2006 to V8.0
- Upgrade from V6.0, V6.1, V6.2 or V6.3 to V8.0

6GK1 704-1CW71-3AA0
6GK1 704-1CW00-3AL0

6GK1 704-1CW00-3AE0

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
- 1-year Software Update Service, with automatic extension; requirement: Current software version
- Upgrade from Edition 2006 to V8.0
- Upgrade from V6.0, V6.1, V6.2 or V6.3 to V8.0

6GK1 704-1LW71-3AA0
6GK1 704-1LW00-3AL0

6GK1 704-1LW00-3AE0

6GK1 704-1LW00-3AE1

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

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
- AWG 24, for connection to IE FC RJ-45 Plug 4 x 2

6GK5 308-2FL00-2AA3

6XV1 870-2E

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 CPUs/CPUs with Industrial Ethernet interface

- 1 pack = 1 unit
- 1 pack = 10 units
- 1 pack = 50 units

6GK1 901-1BB11-2AA0
6GK1 901-1BB11-2AB0
6GK1 901-1BB11-2AE0

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
- Rental license for 50 hours
- Software Update Service on DVD (requires current software version)
- Floating license upgrade 3.x/4.x/5.x to V5.4; on DVD
- Trial license STEP 7 V5.4; on DVD, operational for 14 days

6ES7 810-4CC08-0YA5
6ES7 810-4CC08-0YA6
6ES7 810-4BC01-0YX2

6ES7 810-4CC08-0YE5

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

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

5

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	4
• for network components or terminal equipment	-
• for signaling contact	1
• for power supply	
Design of electrical connection	RJ45 port
• for network components or terminal equipment	-
• 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

SIMATIC S7-300

Communication

CSM 377 unmanaged

Ordering data

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

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

Order No.

6GK7 377-1AA00-0AA0

6XV1 840-2AH10

Order No.

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/CPU's with Industrial Ethernet interface

- 1 pack = 1 unit
- 1 pack = 10 units
- 1 pack = 50 units

IE FC stripping tool

Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables

6GK1 901-1BB10-2AA0
6GK1 901-1BB10-2AB0
6GK1 901-1BB10-2AE0

6GK1 901-1GA00

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

5

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	
<u>Performance data S7 communication</u>	
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

SIMATIC S7-300

Communication

TIM 3V-IE for WAN and Ethernet

Technical specifications (continued)

Order No.	6NH7 800-3BA00
Product type designation	TIM 3V-IE
<u>Performance data Multiprotocol operation</u>	
Number of active connections in multiprotocol mode	12
<u>Performance data Telecontrol</u>	
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

Ordering data		Order No.	Order No.	
TIM 3V-IE communication module		6NH7 800-3BA00	IE FC Stripping Tool	6GK1 901-1GA00
With an RS232 interface for SINAUT communication via a conventional WAN or an IP-based network (WAN or LAN)			Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	
SINAUT ST7 engineering software, V5.1	J	6NH7 997-0CA51-0AA0	Connecting cable	6NH7 701-4AL
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			For connecting a TIM (RS232) with a SINAUT ST7 MD2, MD3 or MD4 (RS232) modem; cable length 1.5 m	
SINAUT ST7 Engineering Software Edition 09/2009 (Upgrade)	J	6NH7 997-0CA50-0GA0	Connecting cable	6NH7 701-5AN
for STEP 7 V5.4 SP4, for owners of older versions of SINAUT ST7 engineering software			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	
Accessories			Connecting cable	6NH7 701-4BN
IE FC TP standard cable GP 2 x 2 (Type A)		6XV1 840-2AH10	with one end open for connecting a TIM (RS232) to a third-party modem or radio unit (RS232); cable length 2.5 m	
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			Connecting cable	6NH7 701-0AR
IE FC RJ45 Plug 180			For connecting two TIM modules via their RS232 interface without modems ("null modem"); cable length 6 m	
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 CPUs/CPUs with Industrial Ethernet interface • 1 pack = 1 unit • 1 pack = 10 units • 1 pack = 50 units		6GK1 901-1BB10-2AA0 6GK1 901-1BB10-2AB0 6GK1 901-1BB10-2AE0		

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

SIMATIC S7-300

Communication

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	
<u>Performance data S7 communication</u>	
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	-

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
<u>Performance data Multiprotocol operation</u>	
Number of active connections in multiprotocol mode	24
<u>Performance data Telecontrol</u>	
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

Order-No.	6NH7 800-3CA00
Product type designation	TIM 3V-IE Advanced
• With dial-up network - With SINAUT ST1 protocol - With SINAUT ST7 protocol	Spontaneous 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

SIMATIC S7-300

Communication

TIM 3V-IE Advanced

Ordering data

Order No.

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

J

6NH7 997-0CA51-0AA0

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

SINAUT ST7 engineering software Edition 09/2009 (Upgrade)

J

6NH7 997-0CA50-0GA0

for STEP 7 V5.4 SP4, for owners of older versions of SINAUT ST7 engineering software

Accessories

IE FC TP standard cable GP 2 x 2 (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 by the meter; max. length 1000 m, minimum order quantity 20 m

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 CPUs/CPUs with Industrial Ethernet interface

- 1 pack = 1 unit
- 1 pack = 10 units
- 1 pack = 50 units

6GK1 901-1BB10-2AA0
6GK1 901-1BB10-2AB0
6GK1 901-1BB10-2AE0

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

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

5

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	Yes
C-Plug	
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	
<u>Performance data S7 communication</u>	
Number of possible connections for S7 communication	
• Maximum	64
• Maximum with PG connections	2
• For OP connections, maximum	62

SIMATIC S7-300

Communication

TIM 4R-IE for WAN and Ethernet

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 - With SINAUT ST7 protocol	Spontaneous 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

Ordering data	Order No.		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	IE FC stripping tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	6GK1 901-1GA00
SINAUT ST7 engineering software V5.1 J 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	6NH7 997-0CA51-0AA0	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
SINAUT ST7 engineering software Edition 09/2009 (Upgrade) J for STEP 7 V5.4 SP4, for owners of older versions of SINAUT ST7 engineering software	6NH7 997-0CA50-0GA0	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
Accessories		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
Backup battery 3.6 V/2.3 Ah for TIM 4R-IE	6ES7 971-0BA00	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
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	Connecting cable For connecting two TIM modules via their RS232 interface without modems ("null modem"); cable length 6 m	6NH7 701-0AR
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 CPUs/CPUs with Industrial Ethernet interface • 1 pack = 1 unit • 1 pack = 10 units • 1 pack = 50 units	6GK1 901-1BB10-2AA0 6GK1 901-1BB10-2AB0 6GK1 901-1BB10-2AE0	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

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

SIMATIC S7-300

Communication

TIM 3V-IE DNP3

Overview



In an S7 station, the communication module TIM 3V-IE DNP3 (Telecontrol Interface Module) processes the data traffic for the S7-CPU to the assigned master system SIMATIC PCS7 TeleControl V7.1 SP2 using the open protocol DNP3 (Distributed Network Protocol).

- 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	
<u>Performance data S7 communication</u>	
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

Technical specifications (continued)

Order-No.	6NH7 803-3BA00-0AA0
Product type designation	TIM 3V-IE DNP3
<u>Performance data multiprotocol operation</u>	
Number of active connections in multiprotocol mode	-
<u>Performance data Telecontrol</u>	
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
<u>Data transfer format</u>	
• 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	-
<u>Operating mode for scanning of data transmission</u>	
• 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	-
<u>Hamming distance</u>	
• 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

SIMATIC S7-300

Communication

TIM 3V-IE DNP3

5

Ordering data	Order No.		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)	6NH7 803-3BA00-0AA0	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 CPUs/ CPUs with Industrial Ethernet interface • 1 pack = 1 unit • 1 pack = 10 units • 1 pack = 50 units	6GK1 901-1BB10-2AA0 6GK1 901-1BB10-2AB0 6GK1 901-1BB10-2AE0
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	6NH7 997-0CA51-0AA0	IE FC stripping tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	6GK1 901-1GA00
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	6NH7 997-0CA50-0GA0	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
Accessories		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
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	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

Overview



In an S7 station, the communication module TIM 4R-IE DNP3 (Telecontrol Interface Module) processes the data traffic for the S7-CPU to the assigned master system SIMATIC PCS7 TeleControl V7.1 SP2 using the open protocol DNP3 (Distributed Network Protocol).

- 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

5

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	
<u>Performance data S7 communication</u>	
Number of possible connections for S7 communication	
• Maximum	5
• For PG connections, maximum	2
• For OP connections, maximum	1

SIMATIC S7-300

Communication

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
<u>Performance data multiprotocol operation</u>	
Number of active connections in multiprotocol mode	-
<u>Performance data Telecontrol</u>	
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

Ordering data	Order No.		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)	6NH7 803-4BA00-0AA0		IE FC stripping tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	6GK1 901-1GA00
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	6NH7 997-0CA51-0AA0		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
SINAUT ST7 engineering software V5.1 Update from Version V5.0 to V5.1	Software download		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
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	6NH7 997-0CA50-0GA0		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
Accessories			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
Backup battery 3.6 V/2.3 Ah for TIM 4R-IE DNP3			Connecting cable For connecting two TIM modules via their RS232 interface without modems ('Null modem'). Cable length 6 m	6NH7 701-0AR
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		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
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 CPUs/ CPUs with Industrial Ethernet interface • 1 pack = 1 unit • 1 pack = 10 units • 1 pack = 50 units	6GK1 901-1BB10-2AA0 6GK1 901-1BB10-2AB0 6GK1 901-1BB10-2AE0		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

SIMATIC S7-300

Communication

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.

5

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	24 V DC	
• Permissible range	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	0 ... +60 °C	
• Vertical configuration of SIMATIC	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	

Ordering data	Order No.	Order No.
MOBY ASM 475 communication module For SIMATIC S7-300 and ET 200M, parameterizable Accessories	6GT2 002-0GA10	
Front connector (1 x per ASM 475) - with screw terminals - with spring-loaded terminals	6ES7 392-1AJ00-0AA0 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 5 m 10 m 20 m 50 m pre-assembled, between ASM 475 and reader, straight connector, PUR material, in the following lengths: 2 m 5 m 10 m 50 m	6GT2 091-4EH20 6GT2 091-4EH50 6GT2 091-4EN10 6GT2 091-4EN20 6GT2 091-4EN50 6GT2 091-6EH20 6GT2 091-6EH50 6GT2 091-6EN10 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 20 m 50 m	6GT2 491-4EH50 6GT2 491-4EN20 6GT2 491-4EN50	
		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 5 m 6GT2 891-4EH20 6GT2 891-4EH50
		Extension cable SIMATIC RF200 / RF300 / RF600 / MV400, PUR material, CMG approval, suitable for cable carriers, straight connector 2 m 5 m 10 m 20 m 50 m 6GT2 891-4FH20 6GT2 891-4FH50 6GT2 891-4FN10 6GT2 891-4FN20 6GT2 891-4FN50
		DVD "RFID Systems Software & Documentation" 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

SIMATIC S7-300

SIPLUS communication

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.

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: SO₂ < 4.8 ppm; H₂S < 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): SO₂ < 17.8 ppm; H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O₃ < 1.0 ppm; NO_x < 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.	Order No.
SIPLUS CP 340 communication processor (extended temperature range and medial exposure)		Accessories
with one RS 232C interface (V.24) L	6AG1 340-1AH02-2AE0	See SIMATIC CP 340. page 5/227
with one RS 232C interface (V.24); I compliant with EN 50155	6AG1 340-1AH02-2AY0	
with one RS 422/485 interface (X.27) L	6AG1 340-1CH02-2AE0	

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

L: Subject to export regulations AL: 91999 and ECCN: N

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.

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: SO₂ <4.8 ppm; H₂S <9.9 ppm; Cl <0.2 ppm; HCl <0.66 ppm; HF <0.12 ppm; NH <49 ppm; O₃ <0.1 ppm; NOx <5.2 ppm
Threshold/ limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 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.	Order No.
SIPLUS CP 341 communication processor (extended temperature range and medial exposure)		Accessories
with RS 232C interface (V.24)	6AG1 341-1AH02-7AE0	See SIMATIC CP 341, page 5/229
with RS 422/485 (X.27) interface	6AG1 341-1CH02-7AE0	

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

SIMATIC S7-300

SIPLUS communication

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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOx < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 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 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: 91999 and ECCN: N

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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOx < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 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 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 Ambient temperature -25 ... +60 °C	
Accessories	See SIMATIC CP 343-1 Lean communication processor, page 5/242

SIMATIC S7-300

SIPLUS communication

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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOx < 5.2 ppm

Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 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.	Accessories	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 Ambient temperature -25 ... +70 °C	6AG1 343-1EX30-4XE0 6AG1 343-1EX30-7XE0		See SIMATIC CP 343-1 communication processor, page 5/245

SIMATIC S7-300

SIPLUS communication

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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH₃ < 49 ppm; O₃ < 0.1 ppm; NO_x < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH₃ < 247 ppm; O₃ < 1.0 ppm; NO_x < 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.		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	See SIMATIC CP 343-1 Advanced communication processor, page 5/250

L: Subject to export regulations AL: 91999 and ECCN: N

SIMATIC S7-300

SIPLUS communication

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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOx < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 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 TIM 3V-IE communication module

With an RS232 interface for SINAUT communication via a conventional WAN or an IP-based network (WAN or LAN)

Accessories

6AG1 800-3BA00-7AA0

see TIM 3V-IE for WAN and Ethernet, page 5/259

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

SIPLUS TIM 4R-IE for WAN and Ethernet

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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOx < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 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 TIM 4R-IE communication module	6AG1 800-4BA00-7AA0
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)	
Accessories	see TIM 4R-IE for WAN and Ethernet, page 5/265

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

SIMATIC S7-300

Connection methods

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

5

Ordering data	Order No.		Order No.
Front connectors			
20-pin, with screw contacts		40-pin, with spring-loaded contacts	
• 1 unit	6ES7 392-1AJ00-0AA0	• 1 unit	6ES7 392-1BM01-0AA0
• 100 units	6ES7 392-1AJ00-1AB0	• 100 units	6ES7 392-1BM01-1AB0
20-pin, with spring-loaded contacts		40-pin, with FastConnect	
• 1 unit	6ES7 392-1BJ00-0AA0	• 1 unit	6ES7 392-1CM00-0AA0
• 100 units	6ES7 392-1BJ00-1AB0		
20-pin, with FastConnect		Front door, elevated design	6ES7 328-0AA00-7AA0
• 1 unit	6ES7 392-1CJ00-0AA0	e.g. for 32 channel modules; enables connection of 1.3 mm ² / 16 AWG wires	
40-pin, with screw contacts			
• 1 unit	6ES7 392-1AM00-0AA0		
• 100 units	6ES7 392-1AM00-1AB0		

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.

SIMATIC S7-300

Connection methods

SIMATIC TOP connect for SIMATIC S7 Fully modular connection

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.

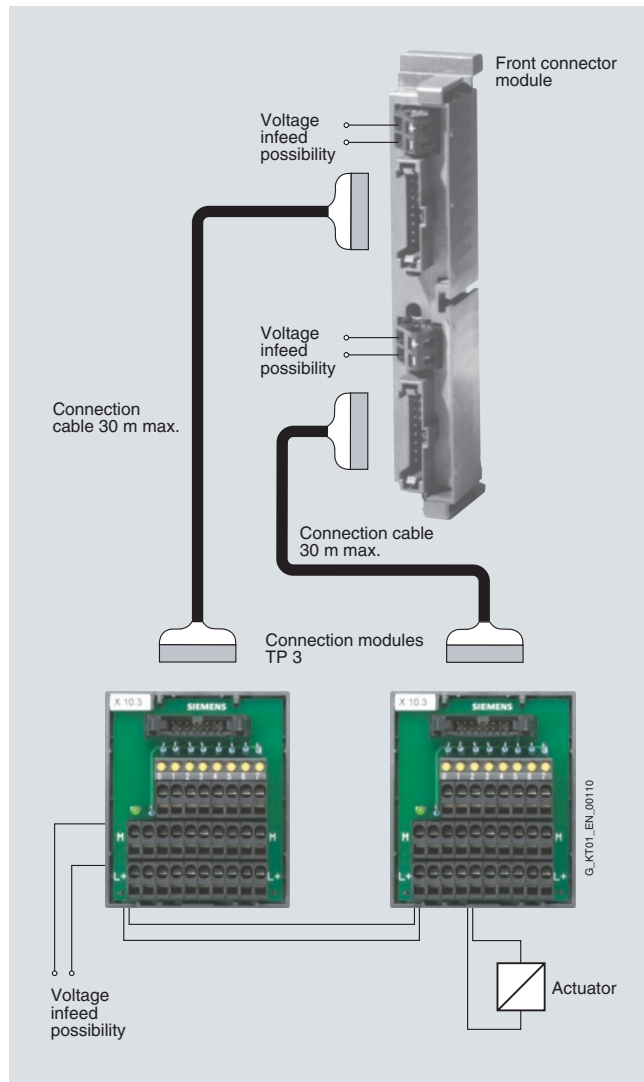
Use with optocouplers for the TPRo relay modules

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.

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	1 A
• per connector pin	
Max. permissible summation current	4 A/byte
Permissible ambient temperature	0 to + 60°C
Test voltage	0.5 kV, 50 Hz, 60 sec.
Air gaps and creepage distances	IEC 664 (1980), IEC 664 A (1981), in accordance with DIN VDE 0110 (01.89), overvoltage class II, pollution degree 2

Wiring rules for front connector modules

Front connector module SIMATIC TOP connect, connection for potential infeed

	Spring connection	Screw connection
Modules up to 4 connections		
Connectable cable cross-sections	No	
• solid cables	0,25 to 1.5 mm ²	
• flexible cables with/without wire end ferrule		
Number of wires per connection	1 or a combination of 2 conductors up to 1.5 mm ² (total) in a common wire end ferrule	
Max. diameter of the cable insulation	3.1 mm	
Stripping length of the cables		
• without insulating collar	6 mm	
• with insulating collar	-	
Wire-end ferrules in acc. with DIN 46228		
• without insulating collar	Form A; 5 to 7 mm long	
• with insulating collar 0.25 to 1.0 mm ²	-	
• with insulating collar 1.5 mm ²	-	
Blade width of the screw-driver	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	No	
• solid cables	0.25 to 0.75 mm ²	
• flexible cables with/without wire end ferrule		
Number of cables per connection	1 or a combination of 2 wires up to 0.75 mm ² (total) in a common wire end ferrule	
Max. diameter of the cable insulation	2.0 mm	
Stripping length of the cables		
• without insulating collar	6 mm	
• with insulating collar	-	
Wire-end ferrules in acc. with DIN 46228		
• without insulating collar	Form A; 5 to 7 mm long	
• with insulating collar 0.25 to 1.0 mm ²	-	
• with insulating collar 1.5 mm ²	-	
Blade width of the screw-driver	3.5 mm (cylindrical shape)	
Tightening torque for connecting the cables	-	0.4 to 0.7 Nm

SIMATIC S7-300

Connection methods

SIMATIC TOP connect for SIMATIC S7 Fully modular connection

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

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

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 • for 3-wire initiators 6ES7 924-0CA10-0A_0 • for 2 x 8 signals 6ES7 924-1AA10-0A_0	Approx. 55 x 43.2 x 63 Approx. 68 x 43.2 x 80 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

Wiring rules for the connection modules

TPA, TP1, TP2, TP3, TPK connection module

	Spring connection	Screw connection
Connectable cable cross-sections	• solid cables • flexible cables without wire end ferrule • flexible cables with wire end ferrule in accordance with DIN 46228/1 • flexible cables with wire end ferrule and plastic collar in accordance with DIN 46228/4	
	No 0.5 to 2.5 mm² 0.5 to 1.5 mm² 0.5 to 1.5 mm²	0.5 to 2.5 mm² (2.5 mm² with a crimp in accordance with EN 60947-1)
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 • for 3-wire initiators with LED 6ES7 924-0CA10-0B_0 • for 2 x 8 signals with LED 6ES7 924-1AA10-0B_0	Approx. 55 x 43.2 x 63 Approx. 68 x 43.2 x 80 Approx. 100 x 43.2 x 80

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 screw-driver	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 γ = 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 μ s/250 μ s 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 $I_{out} \geq 0.9$ 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.

SIMATIC S7-300

Connection methods

SIMATIC TOP connect for SIMATIC S7
Fully modular connection

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
- Wire break at the switching output
- Short-circuit at the switching output

typ. $U_B = 2\text{ V}$
Approx. 0 V0 V to U_B , clockedCurrent 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 $\geq 5\text{ mA}$
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 $\gamma = 1$
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	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

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

Ordering data Connect. cable	Order No.	Ordering data Basic module	Order No.
Pre-assembled round cable		TP1 connection module	
<u>16-pole, 0.14 mm²</u>		for 1-wire initiators	
Unshielded		Packaging unit (1 unit)	
0.5 m	6ES7 923-0BA50-0CB0	• Spring terminals	6ES7 924-0AA10-0AB0
1.0 m	6ES7 923-0BB00-0CB0	• Screw terminals	6ES7 924-0AA10-0AA0
1.5 m	6ES7 923-0BB50-0CB0	TP3 connection module	
2.0 m	6ES7 923-0BC00-0CB0	for 3-wire initiators	
2.5 m	6ES7 923-0BC50-0CB0	Packaging unit (1 unit)	
3.0 m	6ES7 923-0BD00-0CB0	• Spring terminals	6ES7 924-0CA10-0AB0
4.0 m	6ES7 923-0BE00-0CB0	• Screw terminals	6ES7 924-0CA10-0AA0
5.0 m	6ES7 923-0BF00-0CB0	TPK connection module	
Shielded		for 2 x 8 signals	
1.0 m	6ES7 923-0BB00-0DB0	Packaging unit (1 unit)	
2.0 m	6ES7 923-0BC00-0DB0	• Spring terminals	6ES7 924-1AA10-0AB0
2.5 m	6ES7 923-0BC50-0DB0	• Screw terminals	6ES7 924-1AA10-0AA0
3.0 m	6ES7 923-0BD00-0DB0	TP2 connection module	
4.0 m	6ES7 923-0BE00-0DB0	for 2 A modules	
5.0 m	6ES7 923-0BF00-0DB0	for 2-wire initiators	
Round-sheath ribbon cable		Packaging unit (1 unit)	
<u>16-pole, 0.14 mm²</u>		• Spring terminals	6ES7 924-0BB10-0AB0
Unshielded		• Screw terminals	6ES7 924-0BB10-0AA0
30 m	6ES7 923-0CD00-0AA0	TPA connection module	
60 m	6ES7 923-0CG00-0AA0	for analog signals	
Shielded		Packaging unit (1 unit)	
30 m	6ES7 923-0CD00-0BA0	• Spring terminals	6ES7 924-0CC10-0AB0
60 m	6ES7 923-0CG00-0BA0	• Screw terminals	6ES7 924-0CC10-0AA0
Round-sheath ribbon cable		Accessories	
<u>2 x 16-pole, 0.14 mm²</u>		Labeling plates	
Unshielded		for connection modules	
30 m	6ES7 923-2CD00-0AA0	Insertable labeling plate	6ES7 928-2AB00-0AA0
60 m	6ES7 923-2CG00-0AA0	PU = 200 units	
Connector	6ES7 921-3BE10-0AA0	Self-adhesive labeling plate	6ES7 928-2BB00-0AA0
(female ribbon connector)		PU = 200 units	
16-pole, insulation displacement system, with strain relief devices; packing unit: 8 connectors and 8 cable grips		Shield plate	6ES7 928-1BA00-0AA0
Accessories		for analog connection module (4 units)	
Manual pliers	6ES7 928-0AA00-0AA0	Shield connection terminal	
For preparing the connectors (female ribbon connector)		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

SIMATIC S7-300

Connection methods

SIMATIC TOP connect for SIMATIC S7
Fully modular connection

5

Ordering data Signal module Order No.

TP1 connection module with LED

for 1-wire initiators

Packaging unit (1 unit)

- Spring terminals
- Screw terminals

6ES7 924-0AA10-0BB0
6ES7 924-0AA10-0BA0

TP3 connection module with LED

for 3-wire initiators

Packaging unit (1 unit)

- Spring terminals
- Screw terminals

6ES7 924-0CA10-0BB0
6ES7 924-0CA10-0BA0

TPK connection module with LED

for 2 x 8 signals

Packaging unit (1 unit)

- Spring terminals
- Screw terminals

6ES7 924-1AA10-0BB0
6ES7 924-1AA10-0BA0

TP2 connection module with LED

for 2 A modules

for 2-wire initiators

Packaging unit (1 unit)

- Spring terminals
- Screw terminals

6ES7 924-0BB10-0BB0
6ES7 924-0BB10-0BA0

Accessories**Labeling plates** for connection modules**Insertable labeling plate**

PU = 200 units

6ES7 928-2AB00-0AA0**Self-adhesive labeling plate**

PU = 200 units

6ES7 928-2BB00-0AA0

Ordering data Function module Order No.

TPRo connection module for output signals

for 2-wire connection

Packaging unit 1 unit

- Spring-loaded terminals
- Screw-type terminals

6ES7 924-0BD10-0BB0
6ES7 924-0BD10-0BA0

Connection module optocoupler

Packaging unit 1 unit

- Spring-loaded terminals
- Screw-type terminals

6ES7 924-0BF10-0BB0
6ES7 924-0BF10-0BA0

TPRi connection module for input signals

for 2-wire connection

Packaging unit 1 unit

- Spring-loaded terminals
- Screw-type terminals

6ES7 924-0BE10-0BB0
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

Overview



The flexible connection guarantees a fast and direct connection from the input/output modules of the SIMATIC S7-300/400 to the individual elements in the cabinet.

Already attached single cores reduce the wiring effort.

The core cross-sections of 0.5 mm² also allow higher currents.

Technical specifications

Front connector with single cores 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

SIMATIC S7-300

Connection methods

SIMATIC TOP connect for SIMATIC S7
Flexible connection

5

Ordering data	Order No.	Ordering data	Order No.
Front connector with single cores for 16-channel digital modules SIMATIC S7-300, 20 x 0.5 mm²		Front connector with single cores for 32-channel digital modules SIMATIC S7-300, 40 x 0.5 mm²	
Core type H05V-K <u>Screw-type version</u> Packaging unit: 1 unit Length: • 2.5 m • 3.2 m • 5 m • Custom lengths Packaging unit: 5 units Length: • 2.5 m • 3.2 m • 5.0 m <u>Crimp version</u> Packaging unit: 1 unit Length: • 2.5 m • 3.2 m • 5.0 m • Custom lengths	6ES7922-3BC50-0AB0 6ES7922-3BD20-0AB0 6ES7922-3BF00-0AB0 On request 6ES7922-3BC50-5AB0 6ES7922-3BD20-5AB0 6ES7922-3BF00-5AB0 6ES7922-3BC50-0AF0 6ES7922-3BD20-0AF0 6ES7922-3BF00-0AF0 On request	Core type H05V-K <u>Screw-type version</u> Packaging unit: 1 unit Length: • 2.5 m • 3.2 m • 5.0 m • Custom lengths Packaging unit: 5 units Length: • 2.5 m • 3.2 m • 5.0 m <u>Crimp version</u> Packaging unit: 1 unit Length: • 2.5 m • 3.2 m • 5.0 m • Custom lengths	6ES7922-3BC50-0AC0 6ES7922-3BD20-0AC0 6ES7922-3BF00-0AC0 On request 6ES7922-3BC50-5AC0 6ES7922-3BD20-5AC0 6ES7922-3BF00-5AC0 6ES7922-3BC50-0AG0 6ES7922-3BD20-0AG0 6ES7922-3BF00-0AG0 On request
Core type UL/CSA-certified <u>Screw-type version</u> Packaging unit: 1 unit Length: • 3.2 m • 5.0 m	6ES7922-3BD20-0UB0 6ES7922-3BF00-0UB0	Core type UL/CSA-certified <u>Screw version</u> Packaging unit: 1 unit Length: • 3.2 m • 5.0 m	6ES7922-3BD20-0UC0 6ES7922-3BF00-0UC0

SIMATIC S7-300

Interface modules

IM 360/361/365 interface modules

Overview



- For connecting mounting racks in multi-tier SIMATIC S7-300 configurations
- IM 365: For design of central controller and max. 1 expansion unit. Limited use of modules in the expansion unit (e.g. no CPs or FMs)
- IM 360/IM 361: For design of central controller and max. 3 expansion units. No limitation in selection of modules in the expansion unit

5

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.		Order No.
IM 360 interface module for expanding the S7-300 with max. 3 EUs; can be plugged into CC	6ES7 360-3AA01-0AA0	SIMATIC manual collection J	6ES7 998-8XC01-8YE0
IM 361 interface module for expanding the S7-300 with max. 3 EUs; can be plugged into EU	6ES7 361-3CA01-0AA0	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	
Connecting cable between IM 360 and IM 361 or IM 361 and IM 361		SIMATIC manual collection update service for 1 year D	6ES7 998-8XC01-8YE2
1 m	6ES7 368-3BB01-0AA0	Current "Manual Collection" DVD and the three subsequent updates	
2.5 m	6ES7 368-3BC51-0AA0	S7-300 manual	
5 m	6ES7 368-3BF01-0AA0	Design, CPU data, module data, instruction list	
10 m	6ES7 368-3CB01-0AA0	German	6ES7 398-8FA10-8AA0
IM 365 interface module for expanding the S7-300 with max. 1 EU; 2 modules with permanent connecting cable (1 m)	6ES7 365-0BA01-0AA0	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

SIMATIC S7-300

SIPLUS interface modules

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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH₃ < 49 ppm; O₃ < 0.1 ppm; NO_x < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH₃ < 247 ppm; O₃ < 1.0 ppm; NO_x < 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: 91999 and ECCN: N

Application area



The proven power supply in SIMATIC S7-300 design; with PS-CPU connecting comb and mounting direct on the S7 rail.

5

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 $V_{in \text{ rated}}$	120/230 V AC Automatic range switchover
Voltage range	85 ... 132 V/170 ... 264 V
Overvoltage strength	$2.3 \times U_{in \text{ rated}}$, 1.3 ms
Mains buffering at $I_{out \text{ rated}}$	> 20 ms at $U_{in} = 93/187 \text{ V}$
Rated line frequency; rated line frequency range	50/60 Hz, 47 ... 63 Hz
Rated current $I_{in \text{ rated}}$	0.9/0.5 A
Making current limitation (+25°C)	< 22 A, < 3 ms
I^2t	< 1.0 A ² s
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 $V_{out \text{ rated}}$	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 $I_{out \text{ rated}}$	2 A
Current range	0 ... 2 A
• Up to +60°C	-
• Derating	-
Dynamic overcurrent on	Typ. 9 A for 90 ms
• 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 $V_{out \text{ rated}}$, $I_{out \text{ rated}}$	Approx. 84%
Power loss at $V_{out \text{ rated}}$, $I_{out \text{ rated}}$	Approx. 9 W
Closed-loop control	
Dynamic line compensation ($V_{in \text{ rated}} \pm 15\%$)	Typ. $\pm 0.1\% U_{out}$
Dynamic load compensation (I_{out} : 50/100/50%)	Typ. $\pm 0.8\% U_{out}$
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	-

SIMATIC S7-300

Power supplies

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
ρ_t	< 1.2 A ² s
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 ($U_{in rated} \pm 15\%$)	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

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
$\hat{P}_t$	< 3.3 A ² s
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

SIMATIC S7-300

Power supplies

The S7-300 version

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 ($V_{in rated} \pm 15\%$)	Typ. $\pm 0.1\% U_{out}$
Dynamic load compensation (I_{out} : 50/100/50%)	Typ. $\pm 2\% U_{out}$
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
β_t	< 1.8 A ² s (typ. 1.2 A ² s)

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	
Rated voltage $U_{out rated}$	Controlled, isolated DC voltage 24 V DC
Total tolerance	$\pm 3\%$
• Static line compensation	Approx. $\pm 0.2\%$
• Static load compensation	Approx. $\pm 0.4\%$
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).

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	0 ... 5 A
• Up to +60°C	0 ... 5 A (up to +70°C)
• Derating	
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 ($U_{in rated} \pm 15\%$)	Typ. $\pm 0.3\% U_{out}$
Dynamic load compensation (I_{out} : 50/100/50 %)	Typ. $\pm 3\% U_{out}$
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)

SIMATIC S7-300

Power supplies

The S7-300 version

Ordering data	Order No.		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) Output current 5 A (dimensions 60 x 125 x 120) Output current 10 A (dimensions 80 x 125 x 120)	6ES7 307-1BA01-0AA0 6ES7 307-1EA01-0AA0 6ES7 307-1KA02-0AA0		SIMATIC S7-300 Outdoor Stabilized power supply PS 307 Input: 120/230 V AC Output: 24 V DC/5 A
Accessories		SIPLUS S7-300 PS 307 L	6AG1 307-1EA80-2AA0
Mounting adapter for snap mounting of the new PS 307 onto 35 mm DIN rails (EN 50022) Spare part	6EP1 971-1BA00	Accessories	SIMATIC S7-300 mounting adapter for snap mounting of the PS 307 onto 35 mm DIN rails
			6ES7 390-6BA00-0AA0

L: Subject to export regulations AL: 91999 and ECCN: N

SIMATIC S7-300

SIPLUS power supplies

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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH₃ < 49 ppm; O₃ < 0.1 ppm; NO_x < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH₃ < 247 ppm; O₃ < 1.0 ppm; NO_x < 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

6AG1 305-1BA80-2AA0

L: Subject to export regulations AL: 91999 and ECCN: N

SIMATIC S7-300

SIPLUS power supplies

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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH₃ < 49 ppm; O₃ < 0.1 ppm; NO_x < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 14.8 ppm; H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH₃ < 247 ppm; O₃ < 1.0 ppm; NO_x < 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

SIMATIC S7-300

SIPLUS power supplies

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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOx < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 14.8 ppm; H₂S < 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!

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: 91999 and ECCN: N

SIMATIC S7-300

SIPLUS power supplies

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: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH₃ < 49 ppm; O₃ < 0.1 ppm; NO_x < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 14.8 ppm; H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH₃ < 247 ppm; O₃ < 1.0 ppm; NO_x < 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

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

SIMATIC S7-300

Accessories

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