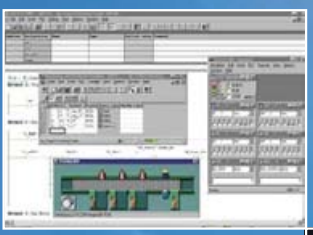
Catalog ST 70 · 2003











simatic

Products for
Totally Integrated Automation
and Micro Automation

SIEMENS

SIMATIC Catalogs

SIMATIC ST 50
SIMATIC S5/PC/505
Automation systems

PDF No.:
E86060-K4650-A111-A8-7600



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



SIMATIC HMI ST 80
Human Machine Interface

Order No.:
E86060-K4680-A101-A9-7600



Industrial Communication IK PI
Industrial Communication and Field Devices

Order No.:
E86060-K6710-A101-B2-7600



Information and Training ITC
for Automation and
Drives Technology
Order No.:
E86060-K6850-A101-B3
CD-ROM: E86060-D6850-A100-B7-7400



Components for Automation CA 01

Order No.:
E86060-D4001-A110-B8-7600



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For further information about SIMATIC, see our Internet site:

www.siemens.com/simatic

Products for Totally Integrated Automation and Micro Automation

Catalog ST 70 · 2003



Supersedes:
Catalog ST 70 · 2001

The products listed in this catalog are also available in Catalog CA 01 on CD-ROM (insert).

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The products and systems described in this catalog are manufactured under application of a quality management system certified by DQS in accordance with DIN EN ISO 9001 (Certificate registration No.: 1323-05). The DQS Certificate is recognized in all EQ Net countries (Reg. No. 1323).

SIEMENS

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Totally Integrated Automation SIMATIC and Micro Automation

In the past, SIMATIC® was often regarded as a synonym for programmable controllers. In addition to this, Siemens offers Totally Integrated Automation®, a wide and completely integrated range of products..
Micro Automation additionally offers automation components for the low-end and bottom performance ranges.

Totally Integrated Automation stands for a revolutionary new way of combining the worlds of production and process technology. All hardware and software components are integrated in a single system.

Such complete continuity is made possible through three-fold integration:

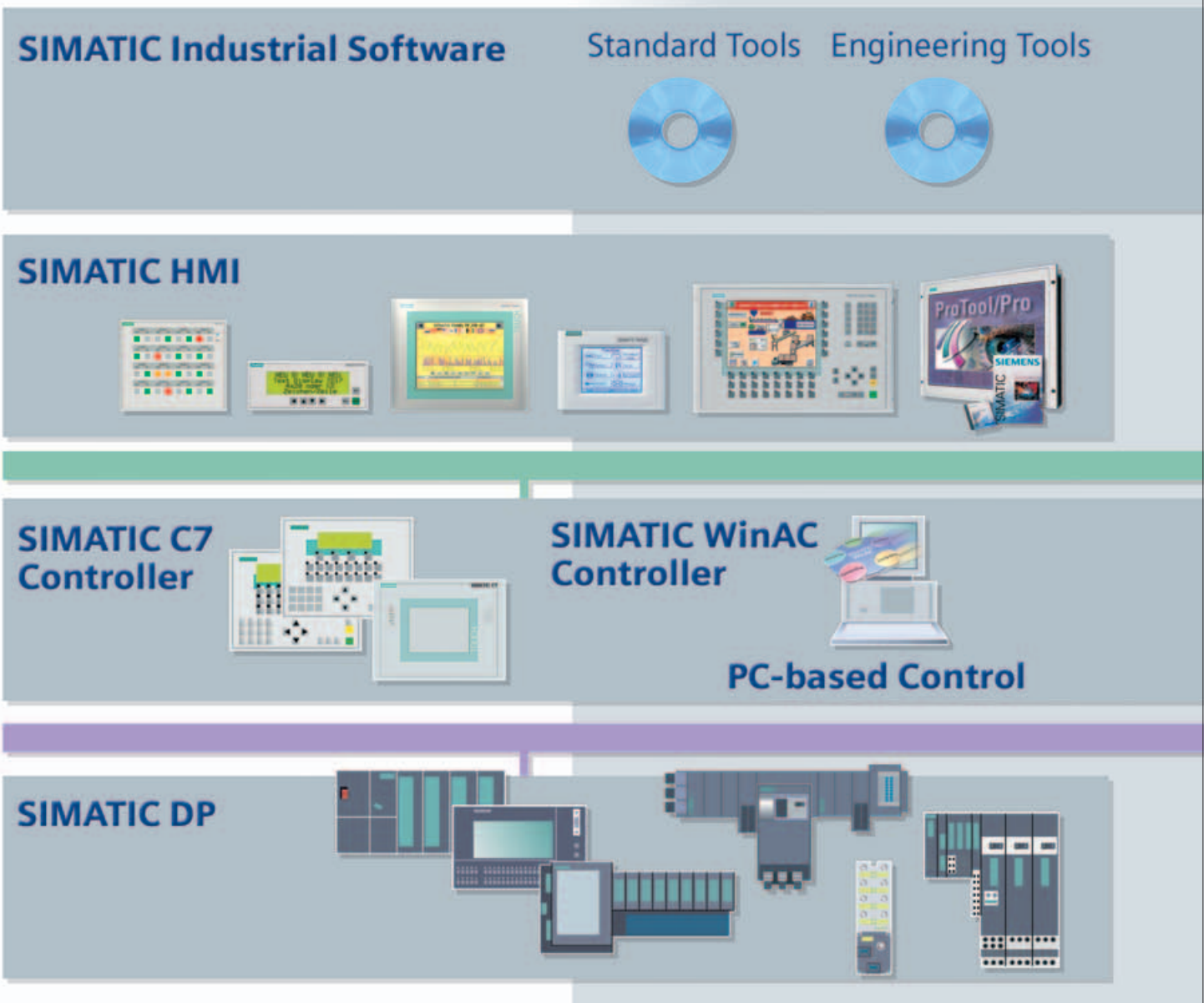
- In data management; data are only entered once, and are then available factory-wide. Transfer errors and inconsistencies are thus a thing of the past.
- In configuring and programming; all components and systems that are part of a given solution are configured, programmed, tested and monitored with a single, fully integrated yet modular software building block system. Under a single operator interface, and with the perfect tool for the job.
- In communication; "who with whom" is simply entered in a series of connection tables, and can be changed at any time, anywhere. The various networks can be easily and uniformly configured.

Overview of Totally Integrated Automation:

- SIMATIC Controller
  SIMATIC S7, SIMATIC C7
- SIMATIC DP
  Distributed I/O
- SIMATIC Industrial Software
- SIMATIC PG
  Programming tools
- SIMATIC PC
  Industrial PC
- SIMATIC PC-based Control
- SIMATIC HMI®
  Human Machine Interface
- SIMATIC NET®
  High-performance communication
- SIMATIC PCS 7
  SIMATIC process control system

Overview of Micro Automation:

- LOGO!
  Logic module
- SIMATIC S7-200®
  PLC for low-end performance range



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Products and systems

Micro Automation

The LOGO! logic module is the compact, convenient and low-cost solution for simple open-loop control tasks.

SIMATIC S7-200 is the economic micro system for the bottom performance range – as a stand-alone solution or in a bus network

SIMATIC Controller

With its upgraded line of modules, the SIMATIC S7-300® is suitable for universal use with focus on the production industry.

The SIMATIC S7-400® is the most powerful PLC, and allows system solutions for production and process engineering.

SIMATIC S7-300 and S7-400 are also available as fail-safe PLCs for processing safety-oriented data.

SIMATIC Industrial software

Everything is executed using a common user interface, and is completely uniform. Furthermore, SIMATIC software supports the complete workflow in a company. This aspect is of increasing importance since total productivity not only depends on effective engineering tools, but also on their integration into a complete workflow. The clear structures and open interfaces of the SIMATIC software facilitate their combination with other tools.

New features:

S7-GRAPH V5.1 is the only sequence programmer on the market with the PLCopen Base Level certificate. STEP® 7 Lite is appropriate as the simple, low-cost introduction to SIMATIC..

SIMATIC PG/PC

We have integrated the very latest processor and memory technologies in the rugged industrial SIMATIC PGs and PCs, thus guaranteeing high-performance program development and processing. After all, engineering systems and operator stations require an appropriately powerful hardware basis.

SIMATIC PC-based Control

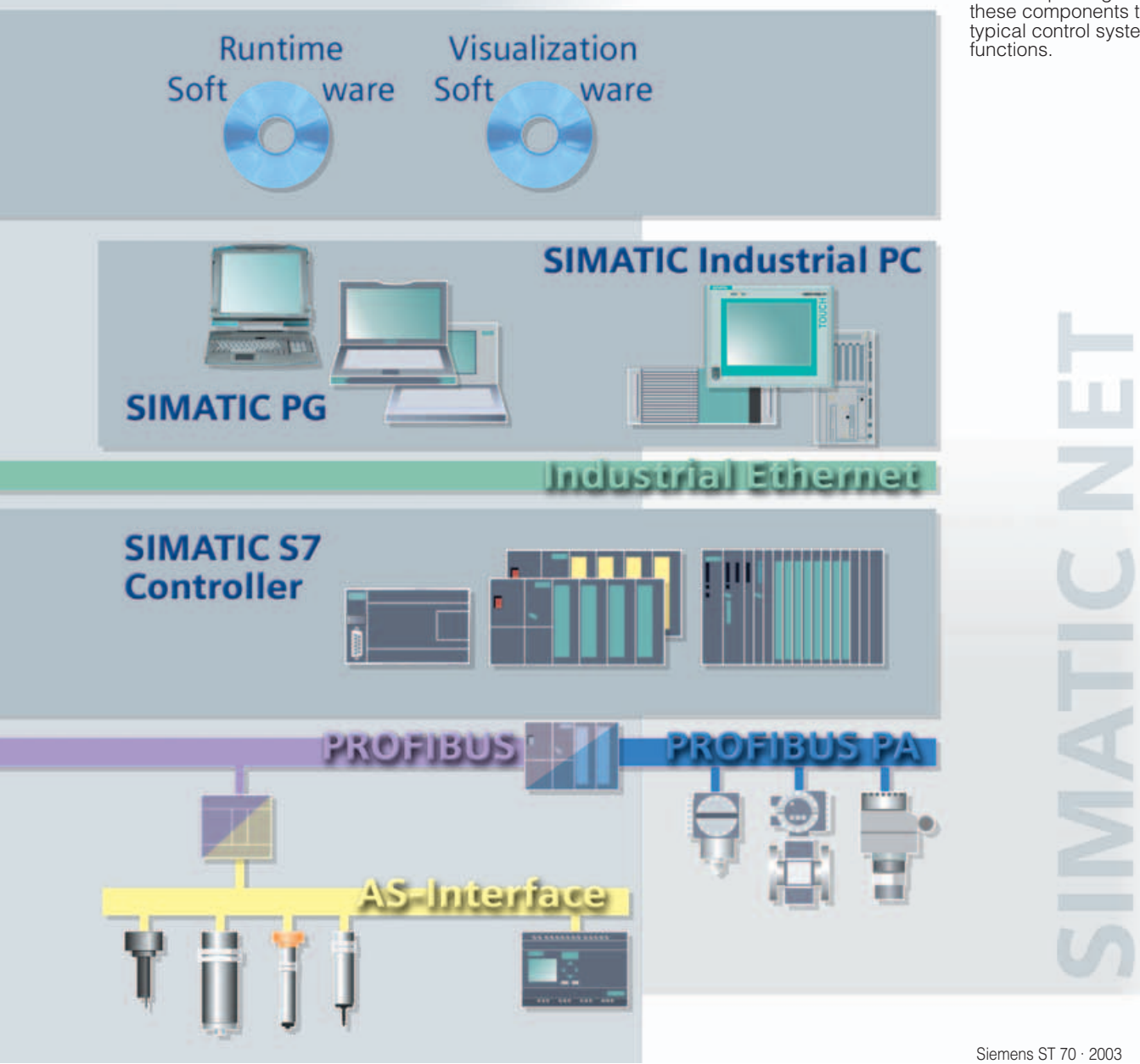
SIMATIC WinAC® supplements the SIMATIC S7 controllers with PC based controllers (software PLC and slot PLC). The new WinAC Embedded Control range provides, for the first time, a software PLC under Windows CE on the multi-functional MP370® platform.

SIMATIC HMI / SIMATIC NET

The products for operator control and visualization (SIMATIC HMI) and communication (SIMATIC net) are totally integrated in the SIMATIC system, thus also ensuring three-fold integration.

SIMATIC PCS 7

SIMATIC PCS 7 is a process control system based on SIMATIC standard components. Supplementary software packages expand these components to include typical control system functions.



Introduction
Micro Automation

Logic module LOGO!

The compact, convenient and low-cost solution for simpler open-loop control tasks.

Universally applicable for industry, functional or private buildings.

Replaces wiring by the connection of functions.

Operates similar to a programmable controller, but without mathematical functions.

With integral control and display unit for direct input on the device and for display of message texts/variables.

Simple operation:
- Linking of functions by mouse click on PC or pressing of key on device

Minimum time requirements:
- Wiring only of inputs and outputs
- Production of circuit diagrams and assebly of control cabinet in parallel

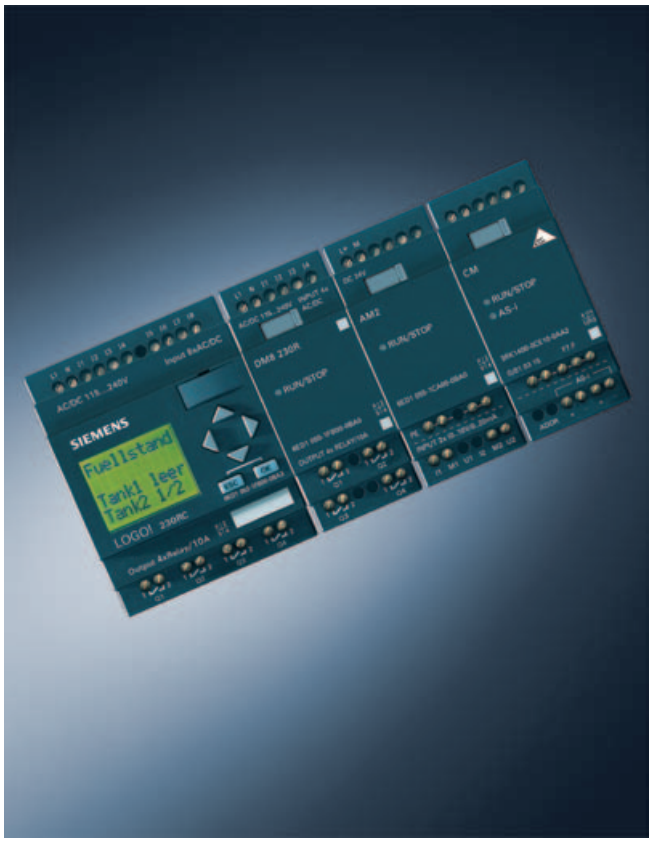
Reduced costs:
- Numerous integral functions of switchgear technology

High flexibility:
- Simple modification of functions with a keystroke
- Versions for different operating voltages
- Modular design, therefore expandable at any time

Additional information can be obtained at:



http://www.siemens.de/logo



LOGO!:
Technology with a future provides great support

LOGO!	24 24o	12/24RC 12/24RCo	24RC 24RCo	230RC 230RCo
Supply voltage	24 V DC	12/24 V DC	24 V AC/DC	115/230 V AC/DC
Inputs	8 (2 of which can be used in analog mode)	8 (2 of which can be used in analog mode)	8	8
Outputs	4, transistors	4, relays		
Continuous current	0.3 A	10 A (with resistive load); 3 A (with inductive load)		
Short-circuit protection	electrical (1 A)	External fusiing required		
Integrated time switches/ power reserve	—	8/typically 80 h		
Ambient temperature	0 to +55 °C			
RI suppression	According to EN 50 011 (limit class B)			
Degree of protection	IP 20			
Certification	According to VDE 0631, IEC 1131, UL, FM, CSA, marine approvals			
Assembly	On 35 mm DIN rail, 4 width units			
Dimensions	72 (4 width units) × 90 × 55			

■ = Usable/present
— = Not usable/present

SIMATIC S7-200

The compact, low-cost solution for automation tasks in the bottom performance range as a replacement for contactors and timing relays.

Optimized for applications with a low degree of networking and system integration, e.g. series machine construction, various types of equipment.

Enables fast, cost-effective solutions, is of compact design and easy to program.

Graduated range of CPUs with a high degree of basic PLC functionality.

Modular expandability for individual adaptation to a specific problem solution.

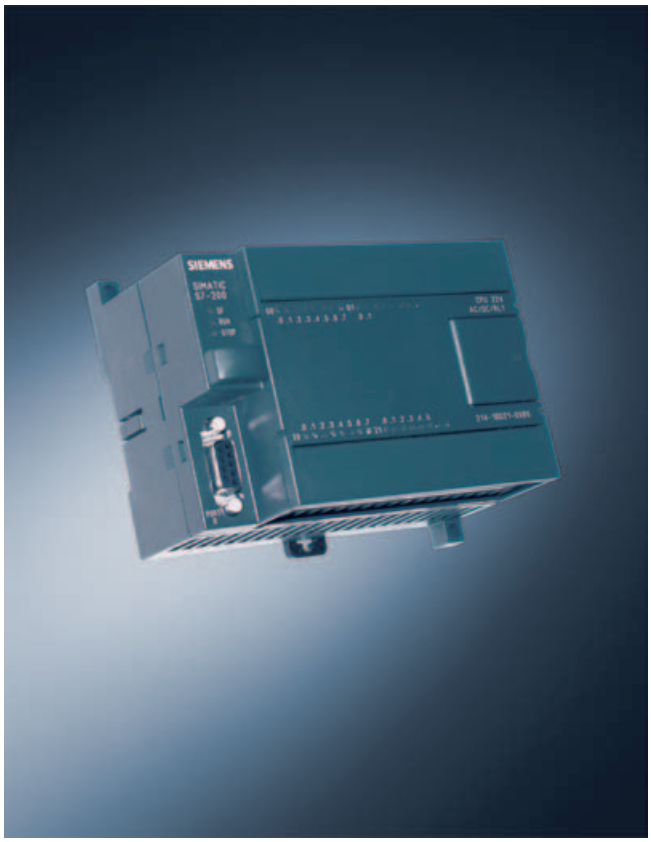
Simple networking via point-to-point interface (PPI) with programming, communication and HMI functions.

Programming with STEP 7-Micro/WIN, software optimized for S7-200 functionality.

Wizards for exceptionally easy, user-friendly operator control.

Additional information can be obtained at:

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



SIMATIC S7-200:
The powerful, modularly expandable microsystem

SIMATIC S7-200	CPU 221	CPU 222	CPU 224	CPU 226	CPU 226 XM
Program memory /	4 Kbyte / 2 Kbyte	4 Kbyte / 2 Kbyte	8 Kbyte / 5 Kbyte	8 Kbyte / 5 Kbyte	16 Kbyte / 10 Kbyte
Data memory					
Execution time per 1 K binary statements	0.37 ms	0.37 ms	0.37 ms	0.37 ms	0.37 ms
Bit memory	256	256	256	256	256
Counters	256	256	256	256	256
Timers	256	256	256	256	256
Digital inputs/outputs	Max. 10; 10 integrated	Max. 40 / 38; 14 integrated	Max. 94 / 74; 24 iintegrated	Max. 128 / 120; 40 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	Max. 28/7 or 0/14
HMI devices	■	■	■	■	■
Communications interface	PPI (point-to-point)	PPI (point-to-point)	PPI (point-to-point)	PPI (point-to-point)	PPI (point-to-point)
Networking	—	AS-Interface PROFIBUS DP	AS-Interface PROFIBUS DP	AS-Interface PROFIBUS DP	AS-Interface PROFIBUS DP
Real-time clock	Optional	Optional	Integrated	Integrated	Integrated

■ = Usable/present
— = Not usable/present

SIMATIC S7-300

Modular expandable PLC for system solutions with focus on production engineering.

Fully integrated in Totally Integrated Automation:

- Configuring and programming with STEP 7
- Networking with MPI and SIMATIC net

Complete family of CPUs from starter CPU up to high-performance CPU; permits short machine cycle times through efficient processing speed.

CPUs with integral I/O, process functions and communications interfaces for specific problem solutions. There are currently 6 new compact CPUs and 3 new standard CPUs:

- Command execution times reduced to 1/3 to 1/4
- Larger quantity breakdowns (e.g. larger main memory)
- Micro memory card (MMC) as data and program memory makes backup battery unnecessary. A complete project including symbols can be saved on the MMC
- Small module width reduces assembly volume

Modular expandability and as many as 3 expansion units.

Building block system with hardware and software components for solving technological functions.

Thanks to the compact design, perfectly suitable for small spaces and distributed structures.

Easy installation with DIN rail and modules with integral bus and no fixed slot assignments.



SIMATIC S7-300:
For system solutions with focus on production engineering

SIMATIC S7-300	CPU 312	CPU 314	CPU 315-2 DP	CPU 315F-2 DP
Main memory	16 Kbyte	48 Kbyte	128 Kbyte	170 Kbyte[1]
Charge memory via MMC	64 Kbyte to 8 Mbyte	64 Kbyte to 8 Mbyte	64 Kbyte to 8 Mbyte	64 Kbyte to 4 Mbyte
Processing times (µs)				
Bit/word/fixed-/floating-point	0.2/1/5/30	0.1/0.5/3.5/15	0.1/0.5/3.5/15	≥ 0.1 ms
Timers/Counters	128/128	256/256	256/256	256/256
Address ranges				
Digital channels	256	1024	1024	2000
Analog channels	64	256	256	372
Interfaces				
MPI	■	■	■	■
PROFIBUS DP	—	—	■	■
PtP communication	—	—	—	—
Integral inputs/outputs				
DI/DO	—	—	—	—
AI/AO	—	—	—	—
Integral functions				
Counters/frequency meters	—	—	—	—
Pulse outputs	—	—	—	—
Control/positioning		—/—	—/—	—/—
Mounting dimensions W x H x D (mm)	40 x 125 x 130	40 x 125 x 130	40 x 125 x 130	120 x 125 x 130

■ = Usable/present
— = Not usable/present

1) Depends on the programming; approx. 34 Kbyte fail-safe instructions possible.

SIMATIC S7-300

Fan-free and maintenance-free operation.

Powerful diagnostics functions for high PLC availability.

Outdoor versions for extreme environmental conditions, such as extended temperature ranges. (see Catalog ST 70, Section 4).

Fail-safe SIMATIC S7-300F for implementation of fail-safe applications.

- Based on standard CPU with special operating system for processing safety-oriented user programs
- Communication via PROFIBUS DP with PROFIsafe profile
- With ET 200®S PROFIsafe fail-safe signal modules
- Complies with IEC/EN 61508 (SIL 1 to SIL 3), EN 954-1 (Cat. 2 to Cat. 4)

Additional information can be obtained at:



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



SIMATIC S7-300	CPU 312C	CPU 313C	CPU 313C-2 PtP	CPU 313C-2 DP	CPU 314C-2 PtP	CPU 314C-2 DP
Main memory	16 Kbyte	32 Kbyte	32 Kbyte	32 Kbyte	48 Kbyte	48 Kbyte
Charge memory via MMC	64 Kbyte to 4 Mbyte	64 Kbyte to 4 Mbyte	64 Kbyte to 4 Mbyte	64 Kbyte to 4 Mbyte	64 Kbyte to 4 Mbyte	64 Kbyte to 4 Mbyte
Processing times (µs)						
Bit/word/fixed-/floating-point	0.2/1/5/30	0.1/0.5/3.5/15	0.1/0.5/3.5/15	0.1/0.5/3.5/15	0.1/0.5/3.5/15	0.1/0.5/3.5/15
Timers/Counters	128/128	256/256	256/256	256/256	256/256	256/256
Address range						
Digital Channels	266	1016	1008	1008	1016	1016
Analog Channels	64	253	248	248	253	253
Interfaces						
MPI	■	■	■	■	■	■
PROFIBUS DP	—	—	—	■	—	■
PtP Communication	—	—	ASCII, 3964R	—	ASCII, 3964R	—
Integral inputs/outputs						
DI/DO	10/6	24/16	16/16	16/16	24/16	24/16
AI/AO	—	4/2	—	—	4/2	4/2
Integral functions						
Counters/frequency meters	2 (10 kHz)	3 (30 kHz)	3 (30 kHz)	3 (30 kHz)	4(60 kHz)	4 (60 kHz)
Pulse outputs	2 (2.5 kHz)	3 (2.5 kHz)	3 (2.5 kHz)	3 (2.5 kHz)	4 (2.5 kHz)	4 (2.5 kHz)
Control/positioning	—/—	■/—	■/—	■/—	■/■	■/■
Mounting dimensions W x H x D (mm)	80 x 125 x 130	120 x 125 x 130	120 x 125 x 130	120 x 125 x 130	120 x 125 x 130	120 x 125 x 130

■ = Usable/present
— = Not usable/present

SIMATIC S7-400

Modularly expandable PLC platform for system solutions in production and process engineering.

Fully incorporated in Totally Integrated Automation:

- Configuring and programming with STEP 7
- Networking via MPI and SIMATIC NET

Extremely high performance with exceptionally short execution times and deterministic response times of less than 0.5 ms.

Wide variety of modules:

- Graduated CPU performance, plus multicomputing
- Function and communications modules for technological tasks, networking and links to the IT world

Hot swapping of signal modules.

Efficient configuring with high-level languages such as SCL and graphical engineering tools.

Powerful graphics functions for higher PLC availability.

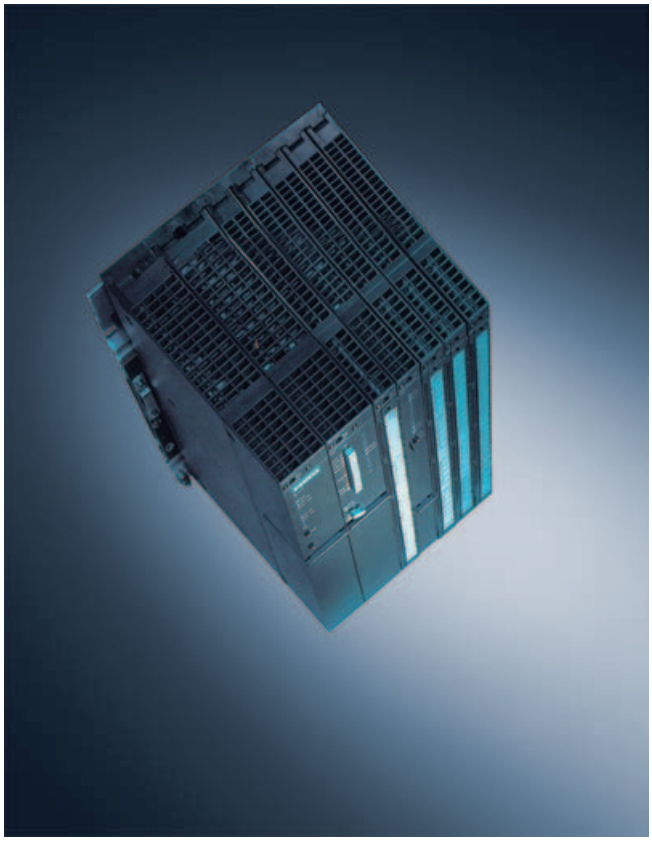
Storing of all project data (e.g. program sources) directly on the CPU to facilitate service calls.

Special versions, based on the standard PLC, for applications requiring a high degree of availability and fail-safety as well as PC-based solutions.

Additional information can be obtained at:



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



SIMATIC S7- 400:
For system solutions in production and process engineering

SIMATIC S7-400 with	CPU 412-1 CPU 412-2	CPU 414-2 CPU 414-3	CPU 416-2 CPU 416-3	CPU 417-4	CPU 414-4H	CPU 417-4H for S7-400H / F/FH
Main memory for program Main memory for data	48 (72[1])) Kyte 48 (72[1])) Kbyte	128 (384[2])) Kbyte 128 (384[2])) Kbyte	0.8 (1.6[3])) Mbyte 0.8 (1.6[3])) Mbyte	2 Mbyte 2 Mbyte	348 Kbyte 348 Kbyte	2 Mbyte 2 Mbyte
Processing times per 1 K binary statements	0.2 ms	0.1 ms	0.08 ms	0.1 ms	0.1 ms	0.1 ms
Bit memory	4096	8192	16384	16384	8192	16384
Counters	256	256	512	512	256	512
Timers	256	256	512	512	256	512
Digital channels of which central	Sufficient Sufficient	Sufficient Sufficient	131072/131072 131072/131072	131072/131072 131072/131072	65536/65536 65536/65536	131072/131072 131072/131072
Analog channels of which central	2048/2048 2048/2048	4096/4096 4096/4096	8192/8192 8192/8192	8192/8192 8192/8192	4096/4096 4096/4096	8192/8192 8192/8192
HMI devices	■	■	■	■	■	■
Communication interface	MPI (multipoint capability) PROFIBUS DP	MPI (multipoint capability) PROFIBUS DP	MPI (multipoint capability) PROFIBUS DP	MPI (multipoint capability) PROFIBUS DP	MPI (multipoint capability) PROFIBUS DP	MPI (multipoint capability) PROFIBUS DP
Networking	PROFIBUS Ind. Ethernet	PROFIBUS Ind. Ethernet	PROFIBUS Ind. Ethernet	PROFIBUS Ind. Ethernet	PROFIBUS Ind. Ethernet	PROFIBUS Ind. Ethernet
Real-time clock	Integrated	Integrated	Integrated	Integrated	Integrated	Integrated
■ = Usable/present — = Not usable/ present	1) CPU 412-2 2) CPU 414-3 3) CPU 416-3					

SIMATIC C7

Complete system for implementation of machine controls, including visualization, in even the smallest spaces, for example in production engineering or simple process engineering applications.

Cost-efficient controller consisting of an S7-300 CPU and a line-oriented or pixel-graphics operator panel, i.e. PLC and OP basic functionality in one unit.

Compact, easy-to-install housing with independent wiring, rugged sealed keyboard, and backlit display.

Low engineering overhead thanks to STEP 7 programming, ProTool configuring, and use of a common database.

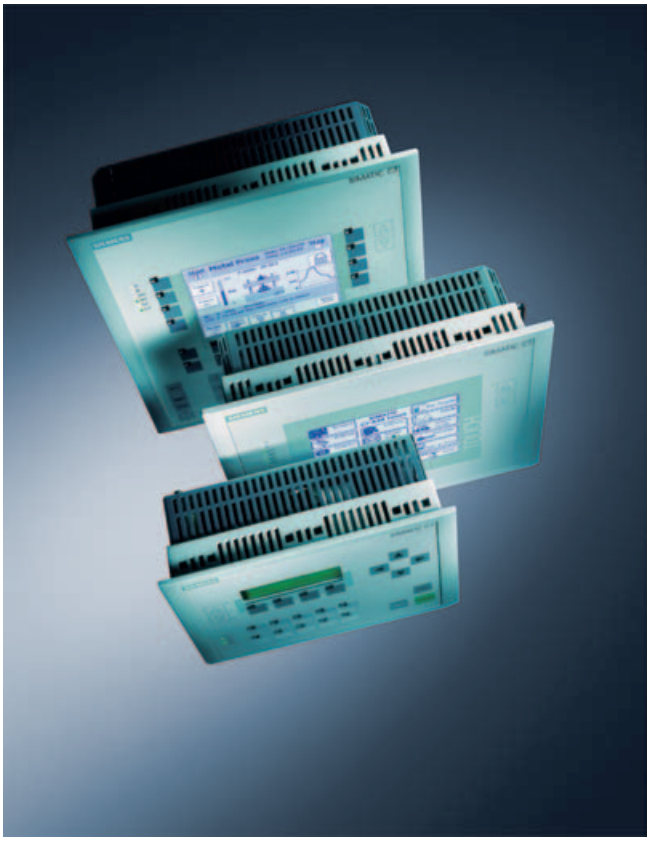
Product versions based on communication interfaces (MPI, DP, AS-I), onboard I/O, and expandability with S7-300 modules, e.g. for technological tasks.

Three new complete systems (C7-613, C7-635 keys and C7-635 touch) with all advantages of the S7-300 compact CPUs.

Additional information can be obtained at:



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



SIMATIC C7: Control system with PLC and OP

SIMATIC C7	C7-613	C7-621 C7-621 ASi	C7-633/P C7-633 DP	C7-634/P C7-634 DP	C7-635 keys C7-635 touch
PLC CPU	CPU 313C	CPU 314	CPU 315[2]/ CPU 315-2 DP[5]	CPU 315[3]/ CPU 315-2 DP[6]	CPU 314C-2 DP
CPU user memory	32 Kbyte	32 Kbyte	48[2]/64[5] Kbyte	48[3]/64[6] Kbyte	64 Kbyte
OP	—	OP3	OP7	OP17	OP170B/ TP170B[7]
No. of lines x characters per line, resolution	4 x 20	2 x 20	4 x 20	4 x 20 or 8 x 40	Pixel/vector graphics 320 x 240
I/O	24 DI 16 DO 4 AI + 1 Pt100 2 AO	16 DI[1] 16 DO[1] 4 AI[1] 1 AO[1]	16 DI[2] 16 DO[2] 4 AI[2] 1 AO[2] 4 Interrupts/counters/ frequency[2]	16 DI[3] 16 DO[3] 4 AI[3] 1 AO[3] 4 Interrupts/counters/ frequency[3]	24 DI 16 DO 4 AI + 1 Pt100 2 AO
Communication interface	MPI	MPI AS Interface[4]	MPI PROFIBUS DP (master/slave)[5]	MPI PROFIBUS DP (master/slave)[6]	MPI PROFIBUS DP (master/slave)
Programming PLC section HMI section	STEP 7 Lite, STEP 7	STEP 7 Lite[1], STEP 7 ProTool Lite®, ProTool, ProTool/Pro®	STEP 7 Lite[2], STEP 7 ProTool Lite, ProTool®, ProTool/Pro	STEP 7 Lite[3], STEP 7 ProTool Lite, ProTool, ProTool/Pro	STEP 7 ProTool Lite, ProTool, ProTool/Pro
■ = Usable/present — = Not usable/ present		1) C7-621 only 4) C7-621 ASi only	2) C7-633/P only 5) C7-633 DP only	3) C7-634/P only 6) C7-634 DP only	7) C7-635 touch

Programming devices

Complete programming tools for SIMATIC controllers and other automation components:

- Ready-to-use programming software
- All necessary interfaces and connecting cables

With the Windows operating system, the PGs also have full PC capabilities for the most widely varied office applications.

Rugged industrial design with a high degree of resistance to shock and vibration as well as electromagnetic compatibility.

SIMATIC Field PG®

Mobile industrial PG in notebook format

Principally designed for commissioning, servicing and maintenance of automation systems.

Optimally suitable where space is limited as result of small dimensions and weight below 4 kg.

Powerful ion battery for many hours of network-independent operation.

SIMATIC Power PG®

Flexible programming workstation with powerful components from the desktop PC sector.

Principally designed for configuring, programming, simulation and testing.

With full PC keyboard for cable-free operation from any desk.

Additional information can be obtained at:

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



SIMATIC PG:
Complete programming tools and full-range PC

SIMATIC PG	Field PG	Power PG
Design	Notebook	Mobile Computer
Processor	Mobile Intel Celeron 900 MHz incl. 128 Kbyte second level cache; optional Mobile Intel Pentium III 1 GHz incl. 256 Kbyte second level cache	Pentium III 1.26 GHz, incl. 512 Kbyte second level cache;
Main memory	128 Mbyte, upgradable to max. 512 Mbyte	128 Mbyte, upgradable to max. 512 Mbyte
Display	14.1" TFT, resolution 1024 x 768	15" TFT, resolution 1024 x 768
PC slots	—	2 x PCI (1 x long, 1 x short)
Keyboard	Notebook keyboard without numericblock	Cable-free, standard keyboard with numeric block
Hard disk	20 Gbyte, optional 40 Gbyte; 2.5"	40 Gbyte; 3.5"
DVD-ROM/CD-ROM	8/24-speed DVD-ROM/CD-ROM drive optional 8/8/24-speed DVD-ROM/CD-RW drive	8/24-speed DVD-ROM/CD-ROM drive optional 8/8/24-speed DVD-ROM/CD-RW drive

SIMATIC PC

Industrial PC for processing machine data and visualization of process sequences as well as ideal basis for PC-based automation with pretested SIMATIC industrial software.

A combination of operational reliability and investment security.

Rugged, industrial design with a high degree of protection and resistance to shock and vibration as well as excellent electromagnetic compatibility.

Integral monitoring functions, continuous operation at 45 °C.

Integral interfaces, state-of-the-art and service-friendly PC technology, vacant slots for expansion modules, and guaranteed spare parts availability.

SIMATIC PCs are available in three versions:

- As **Box PC** for use in production, process and building automation
- As **Rack PC** for installation in control cabinets and consoles
- As **Panel PC** for applications requiring process visualization on site

Additional information can be obtained at:

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



SIMATIC PC: Always the right industrial PC

Box PC	Rack PC	Panel PC
SIMATIC Box PC 620	**SIMATIC Rack PC Industrial Lite 40**	**SIMATIC Panel PC Industrial Lite 70**
Extremely rugged and compact	High performance industrial PC in 19"-rack (4HU)	Low-cost starter solution with standard industrial compability requirements
Maximum processor performance with small space requirements	Low-cost solution for low industrial compability requirements	Standard industrial compability: vibration 0.25 g, shock 1.0 g (during operation)
Intel Celeron and Pentium III processors with FCPGA receptacle from the Intel embeddes line	**SIMATIC Rack PC 840**	High EMC: CE marking for industrial sector
Two slots for PC modules, 2 USB ports, max. 1 Gbyte main memory	Rugged, scaleable industrial PC in 19"-rack (4HU); individual configuration	State of the art PC technology: high innovation rate of components, maximum CPU performance, PCI slots, Ethernet onboard
UXGA graphics controller on the AGP bus with min. 8 Mbyte memory	Particularly suitable for use in harsh industrial environment	12 months guarantee
SIMATIC Box PC 840		**SIMATIC Panel PC 670 and 870**
Maximum processor performance and many possibilities for expansion		Rugged, powerful PC
Intel Celeron and Pentium III processors with FCPGA370 receptacle from the Intel embedded line		High industrial compatibility: vibration 1.0 g, shock 5.0 g (during operation)
Five slots for PC modules, 2 USB ports, max. 512 Mbyte main memory		High EMC: CE marking for industrial sector
SXGA graphics controller on the AGP bus with 8 Mbyte memory		High industrial functionality: PROFIBUS DP/MPI integrated, Ethernet onboard ISA and PCI slots Small mounting depth (Panel PC 670), Maximum possible expansion (Panel PC 870) Optional direct key module Distributed design (option)
		24 month guarantee

Introduction

SIMATIC industrial software

SIMATIC industrial software

SIMATIC industrial software has become the software basis for SIMATIC as a whole. It is a concept which will remain valid well into the future, yet which also integrates the existing know-how gained from SIMATIC S5/505 users.

SIMATIC industrial software provides users with a complete system of tools for every automation task, regardless of which SIMATIC automation systems are in use.

SIMATIC industrial software is uniform:

- Data is stored centrally. It only needs to be entered once, and is available for all software components
- Symbols are maintained in a uniform symbol table, and are available project-wide for all tools
- The user-friendly Manager function handles project management, coordinates all tools, and manages all applications developed by the user

Standard Tools

The core of the SIMATIC industrial software is the STEP 7 standard tool which executes under Windows 98/Windows NT. That means total integration and absolute user-friendliness.

STEP 7 is easy to use:

- Much of what used to be done by hand is now taken care of autonomously, or virtually autonomously, by the software
- STEP 7 builds on STEP 5. As always, users have the statement list, ladder diagram and function block diagram programming languages at their disposal
- STEP 7 is based on the IEC 61131-3 standard, thus considerably reducing training overhead
- The self-explanatory Windows interface makes it much easier to use the system

STEP 7 increases productivity:

- Pretested program sections can be stored in libraries and reused
- A plant can be divided into several projects which can be centrally maintained and processed by different users
- A converter is available for programs generated in STEP 5 or TISOFT



The software basis with a future

Engineering Tools

Engineering tools are task-oriented tools such as high-level languages for programmers (e.g. SCL, C/C++), graphical languages for technologists (e.g. for sequencers, state graphs, technological diagrams), and supplementary software for diagnostics, simulation, teleservice, and plant documentation. Use of these tools noticeably reduces engineering overhead, and makes the entire engineering process more user-friendly.

STEP 7 Professional

More and more frequently, the engineering overhead determines the costs of an automation solution. State-of-the-art engineering tools are one way of effectively reducing costs in this sector.

The combination of user-oriented software and tools guarantees maximum productivity, even when the automation tasks to be solved are complex in nature.
To ensure professional work, we therefore recommend STEP 7 Professional. This combines the LAD, FBD and STL programming languages with three powerful engineering tools:

- S7-GRAPH for graphical sequencer programming
- S7-SCL, the high-level language that makes it possible to master even the most complex tasks, and
- PLCSIM for offline simulation of your automation solution.

Additional information can be obtained at:



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

PC based Control

SIMATIC WinAC supplements SIMATIC S7 with PC based controls. It is used if various tasks such as data processing, communication, visualization and automation are to be integrated on a single PC platform.

SIMATIC WinAC is available in two basically different versions:

- **SIMATIC WinAC Software PLCs** for tasks requiring high flexibility and integration capability
- **SIMATIC WinAC Slot PLCs** slot PLCs where PC-independent operation, availability and high operational reliability are of prime importance

With its open and powerful interfaces, SIMATIC WinAC is the ideal **platform for tailored automation solutions**.

- Execute on standard PCs under Windows NT or Windows 2000
- Code-compatible with SIMATIC S7; programming using the same tools, generated programs can also be used for SIMATIC 7
- Use of standard interfaces for incorporation into the office environment
- Open interfaces for the integration of specific technological hardware and software

SIMATIC WinAC is optimized for the following tasks:

- Data processing, communication, visualization and automation on one PC platform for space and performance reasons
- Close incorporation required into data processing with high performance
- Specific automation tasks in close cooperation with the control functionsn
- Incorporation of special hardware or software modules

1) Not for WinAC MP

WinAC components

SIMATIC WinAC Controlling

- **WinAC Basis** Basis as an economical solution for non-deterministic processes in association with comprehensive PC tasks
- **WinAC PN** is the first SIMATIC CPU which supports the PROFInet communications standard; upwards compatible with WinAC Basis
- **WinAC RTX** additionally with real-time expansion for Windows, guaranteeing a deterministic response for the control unit
- **WinAC Slot 412/416** plug-in cards for the PC; guarantee largely independent operation of PC and its states

SIMATIC WinAC Computing[1)]

WinAC Computing is a component of all WinAC products and offers two important interfaces for integration into data processing:

- The integral **WinAC OPC Server** opens WinAC for access to process data using standard data processing and visualization systems
- **ActiveX components** support the high-performance connection of the production process to application-specific software or office applications.

WinAC Open Development Kit (ODK) and WinAC T-Kit[1)]

The following optional packages are available for linking process functions or PC plug-in cards to the Software or Slot PLC:

- **WinAC Basis ODK and WinAC RTX ODK** for direct linking of C/C++ code into the control program of the WinAC Software PLCs. Access to external hardware and software components is then possible. Thus all operating system functions and system resources are available to the programming engineer for the control task..



Visualization, communication, data processing and control on a common PC platform

- **WinAC Slot T-Kit** for development of applications requiring extremely fast data exchange with WinAC Slot. This ensures close cooperation with process applications on the PC.

Embedded Control

WinAC Embedded Control extends the SIMATIC range by a new class of devices for control and visualization at machine level on one platform.

SIMATIC WinAC MP is the soft PLC under Windows CE, executing on the MP370 multifunction platform. WinAC MP is the economic solution for deterministic processes in conjunction with a rugged hardware platform. At the same time, it is ideal for processing large volumes of data.

The SIMATIC MP370 provides the cost-optimized, rugged HW platform and the visualization software. Just like operator panels and PLCs, it is designed without hard disks or fans, and has real-time and deterministic capabilities.

Additional information can be obtained at:



http://www.PCbasedAutomation.de

Distributed I/O

Distributed structures are highly acceptable as they are more flexible, less complex and in many cases cheaper.

In conjunction with the PROFIBUS fieldbus, an integrated concept has been implemented for SIMATIC which enables maximum system performance.

In addition, PROFIBUS offers state-of-the-art innovations:

- PROFIsafe for the transfer of safety-oriented signals via the fieldbus
- PROFIdrive for motion control makes the fieldbus into a combination of fieldbus and drive bus
- Finally, PROFInet® offers a new concept for modular plant construction with distributed intelligence and Ethernet link.

The system is uniform:
SIMATIC no longer distinguishes between centralized and distributed I/O. One software package is all that is needed for configuring and initializing the hardware, testing, commissioning and documenting all components. Online programming and diagnostics are possible from any location in the plant. Even drives fit perfectly into this concept.

The system is powerful:
The interfaces have been integrated in several of the PLC CPUs, doing away with the execution times needed on the interface module and backplane bus, and saving space and costs without sacrificing performance or speed.

I/Os with distributed intelligence handle local CPU tasks, off-loading the central controller to a considerable degree.

In addition to I/Os with distributed intelligence, drives also communicate as slaves via PROFIBUS DP.

Fully integrated in the SIMATIC Manager, the Drive ES engineering system drive makes it possible to link the drives easily and quickly to the SIMATIC world.

PROFIBUS DP's new functionalities – isochronous operation for the control, synchronization of drives via the bus, and lateral communication between drives and I/O – make it possible to implement motion control tasks on the various hardware platforms (e.g. PC, PLC or drive).

Several different converter series are available for a wide variety of drive tasks:

- MICROMASTER®/ COMBIMASTER®
- SIMODRIVE® 611 universall
- SIMODRIVE POSMO®
- SIMOVERT masterdrives intelligent drives

The system is flexible:
Bus couplers make it possible to connect additional bus systems, for example the binary networking system AS-Interface or the PROFIBUS PA bus system for application in hazardous areas.

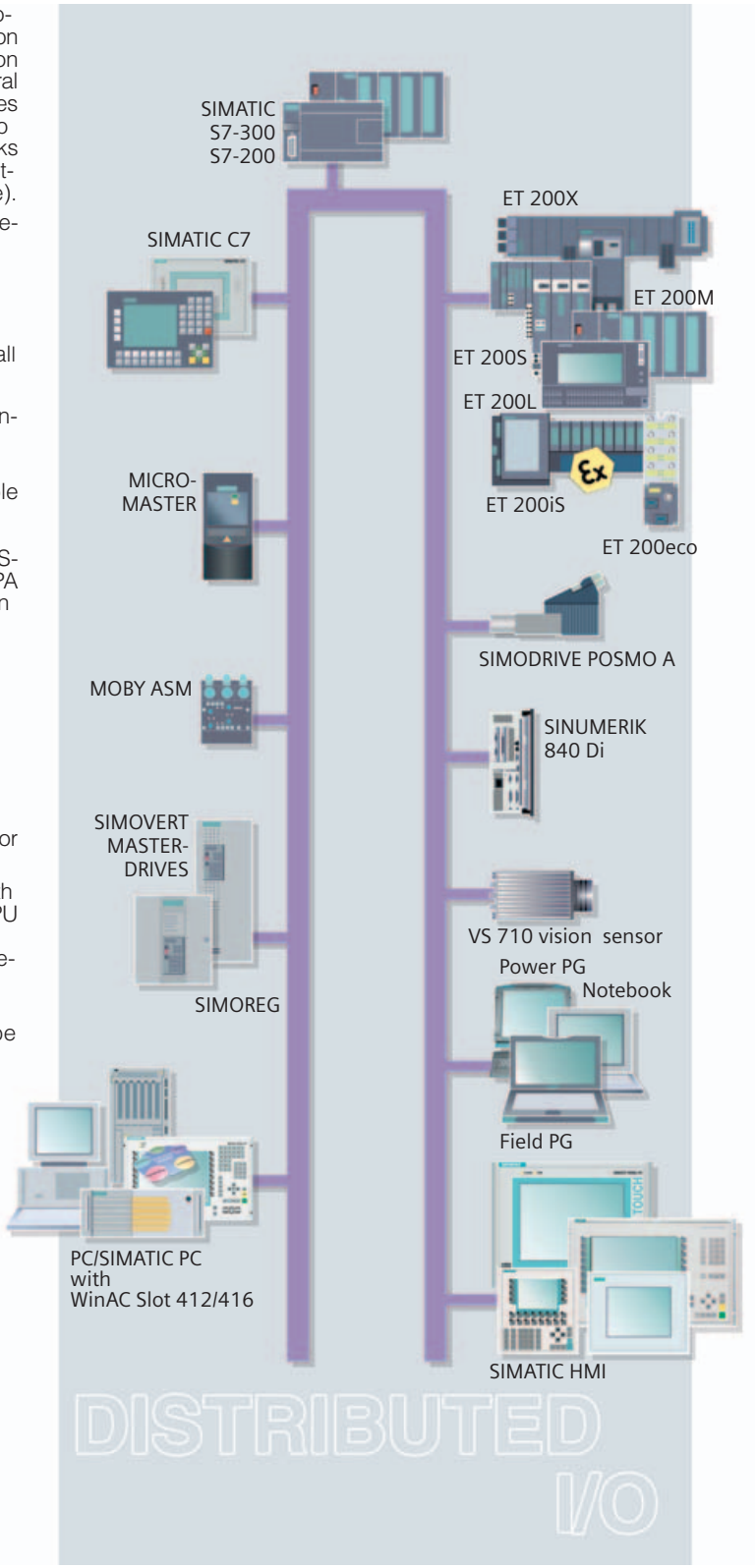
An extensive line of distributed I/O stations is available..

SIMATIC ET 200 offers something for everyone:

- Compact or modular, with IP 20 protection
- High degree of protection or intrinsically-safe
- Cost-effective systems with integral pneumatic link, CPU services, technological functions, motor starter, frequency converter, even safety technology

Additional information can be obtained at:

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



The high-speed fieldbus as system bus

Communication

Communication is playing an increasingly important role, particularly in large plants. SIMATIC has taken this important fact into account:

A suitable communication option is available for every situation, from a simple point-to-point link over integrated interfaces or communications processors to networking using powerful bus systems.

Regardless of what type of communication is used, users only have one user-friendly operator interface to worry about.

SIMATIC NET bus systems:

Industrial Ethernet is the widely accepted, powerful bus system for area and cell networking acc. to international standards (IEEE 802.3/802.3u/802.11b).

It has been specially developed for use in harsh industrial environments, and provides powerful data communication functions. Furthermore, Ethernet provides basic technologies for intranet and Internet, as well as many facilities for integration into worldwide networks. The various facilities already provided nowadays in office environment by intranet, Extranet and Internet can also be used for production and process automation.

PROFIBUS is the bus system for the lower and mid performance ranges, based on the PROFIBUS standard IEC 61158/EN 50170

PROFIBUS is the most successful open fieldbus with a large installed basis, and can be used for a wide range of applications. PROFIBUS defines the technical and functional features of a serial fieldbus with which distributed automation devices in the field can be networked in the lower performance range (sensor/actuator level) to mid performance range (cell level).

AS Interface is a networking system for binary actuators and sensors in the bottom performance range.

All components fit harmoniously into the SIMATIC net landscape, which can be interfaced to AS-Interface, PROFIBUS and Industrial Ethernet using integral interfaces or communications processors.

EIB (EN 50090, ANSI EIA 776) is the internationally standardized building services system and the basis for building services automation.

MPI multipoint interface

The MPI multipoint interface is the successor to SINEC L1. MPI is the most cost-effective choice for simple yet powerful networking of HMI systems, PGs/PCs and other SIMATIC systems.

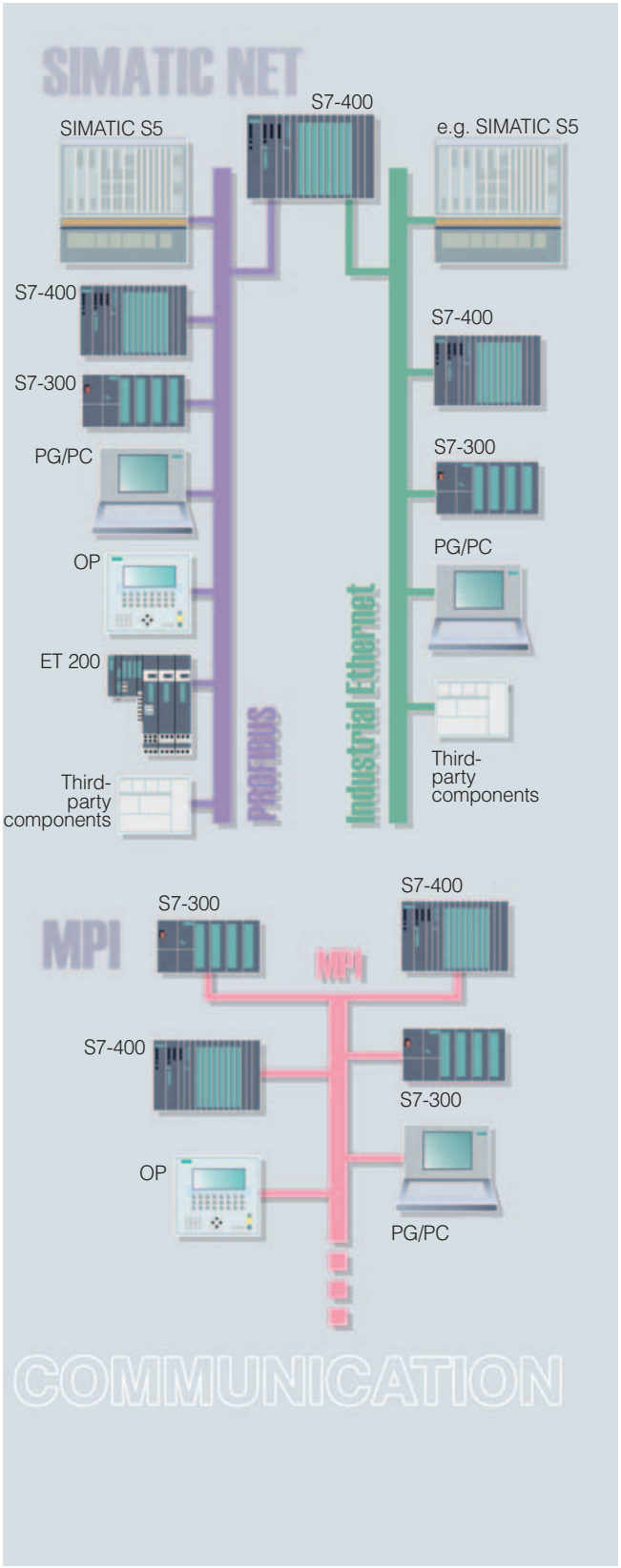
In addition, powerful communications processors are available for point-to-point links.

The PPI point-to-point interface is available for the SIMATIC S7-200. The SIMATIC S7-200 can communicate with a wide variety of peers via this interface.

Additional information can be obtained at:



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



Powerful communication with uniform operator interface

HMI systems

Because they help keep things organized, HMI systems are becoming increasingly important, even in the world of minicontrollers.

SIMATIC works hand in hand with the SIMATIC HMI system family in this area.

The HMI system requests the process data it needs for its configured process displays from the SIMATIC controller. The data are then forwarded to the HMI system automatically, so that forwarding does not need to be taken into account in the user program.

SIMATIC panels are configured using the SIMATIC ProTool configuring software which executes under Windows. The systematic adherence to the principle of "what you see is what you get" (WYSIWYG), easily identifiable icons, and drop down menus have made the software clear and easy to read, considerably reducing assimilation and configuring time. In addition, the integral online help system, the index functions and the find functions also facilitate operation.

SIMATIC ProTool, the PC-based visualization software at machine level, executes under Microsoft Windows 98SE/ME/NT 4.0 and Windows 2000. SIMATIC ProTool/Pro is synonymous with an integrated HMI concept that is understood to include the powerful runtime software as well as the universal SIMATIC ProTool/Pro Configuration software. ProTool/Pro Configuration comprises the proven functionality of ProTool, supplementing it with the PC-based runtime software.

ProTool/Pro Runtime provides the basic functionality for the graphics devices, providing continuity of visualization extending from the existing graphics OPs to the PC-based systems.

SIMATIC WinCC® is the PC-based SIMATIC HMI system.

SIMATIC WinCC can be used as a stand-alone system or, in a networked client/server configuration, as a multi-user system. WinCC is available in a number of different versions and performance levels. Software packages, graduated according to the number of variables, and option packages for different quantity breakdowns and with more or less expanded functionality, allow a high degree of customization.

Both configuring data and archive data are stored in a relational database, and can be read from there using the ODBC (Open Database Connectivity) and SQL (Standard Query Language) standards. Applications that execute in parallel with WinCC, such as ms-Excel, can request process data from WinCC over the DDE interface. WinCC also allows linking of commercial OCXs (OLE Custom Controls).

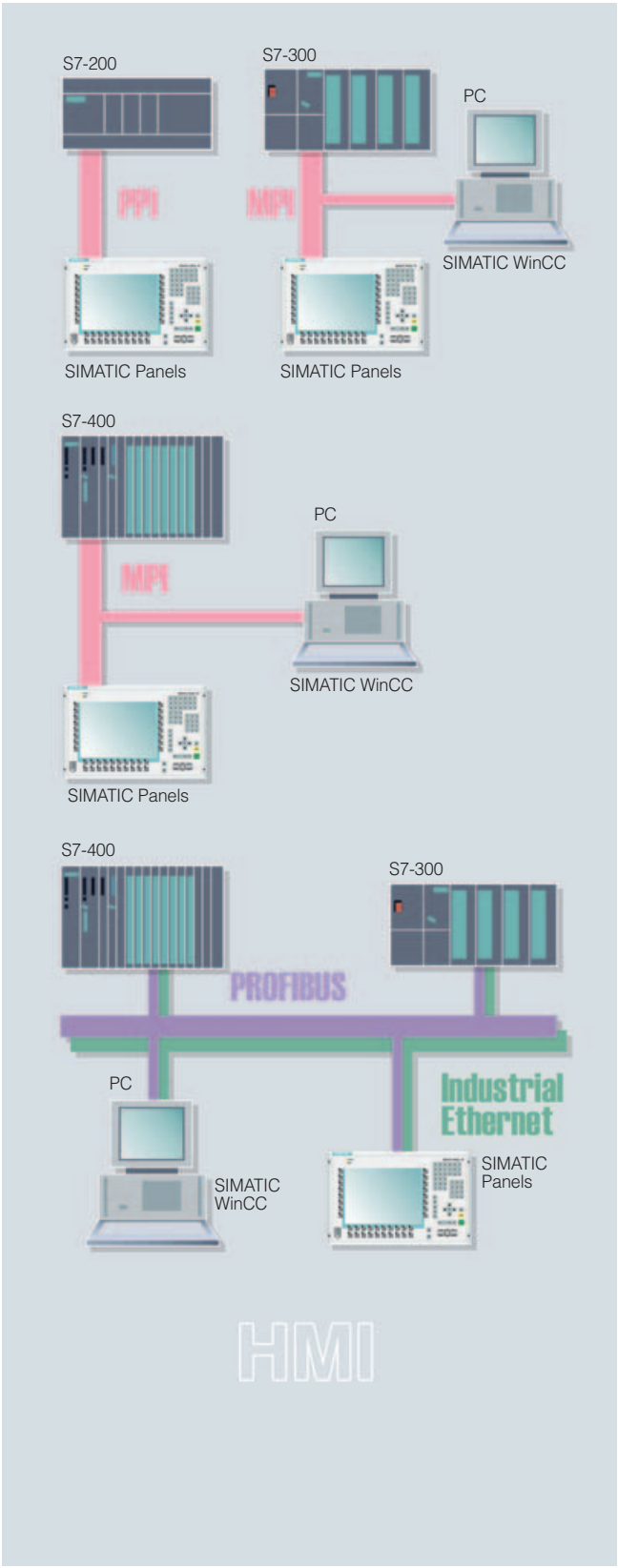
Like all SIMATIC components, the Windows-compatible operator interface permits fast, easy configuration, e.g. the linking of existing standard and user programs. Online configuring permits local modifications without interrupting the process.

WinCC is available for the Windows NT 4.0 and Windows 2000 operating systems.

Additional information can be obtained at:

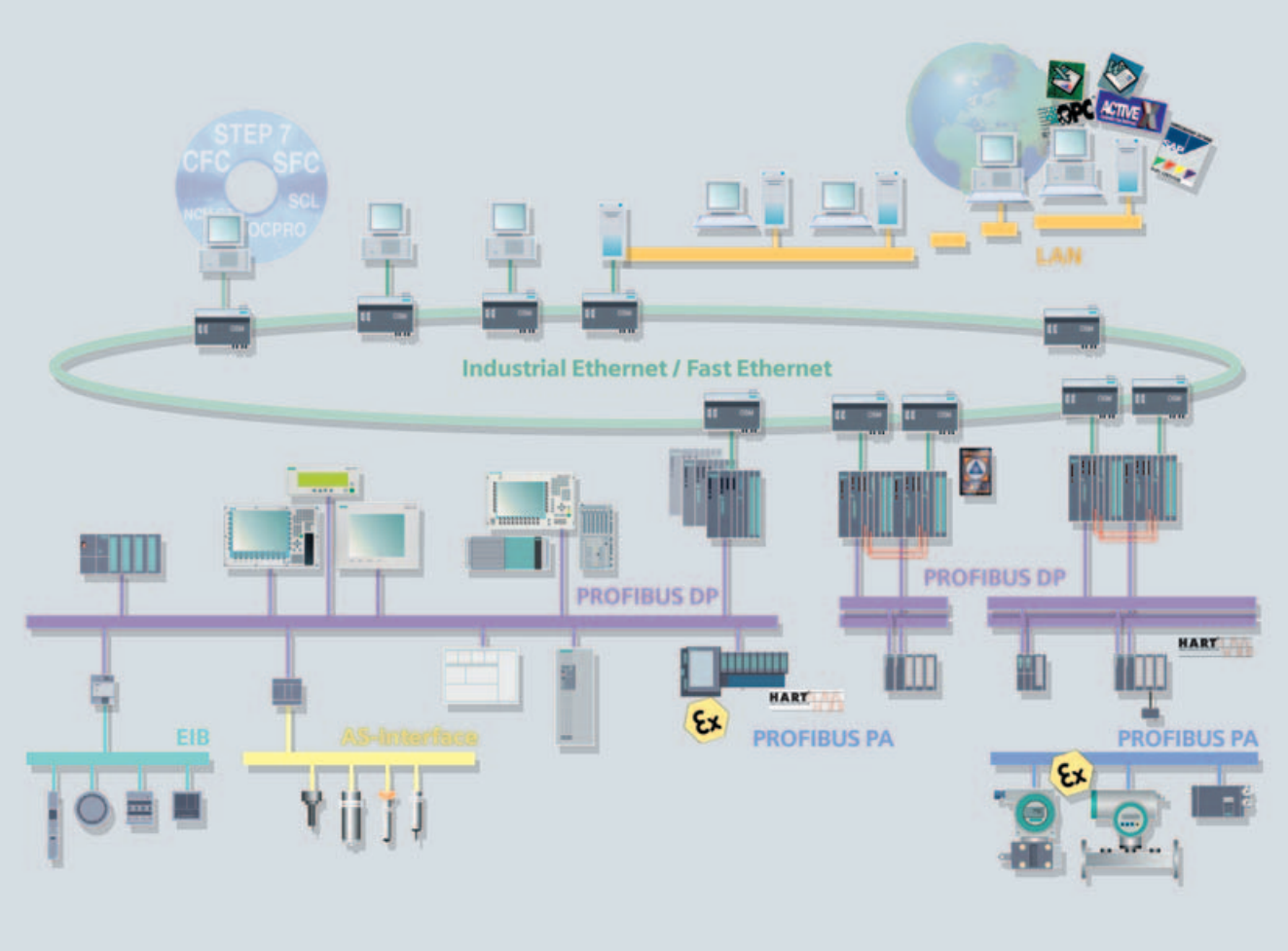


http://www.siemens.de/simatichmi



User friendly overview

Process control system



As a component of totally integrated automation, SIMATIC PCS 7® is a flexible and open standard platform for economical plant solutions in the process engineering field.

Because it is exceptionally user-friendly, PCS 7 fulfills demands for fast, integrated configuring, process control system performance and reliability, not to mention operational safety.

PCS 7 is suitable for everything relating to automation, including both continuous and batch core processes and all mainstream, upstream and downstream processes. In addition, the openness of PCS 7 allows customer-specific expansion and adaptation.

Integrated and homogeneous system

PCS 7 is an integrated system. Its control system characteristics, from engineering to operation, ensure the fulfillment of all demands for future-oriented process engineering:

- Modular and scaleable design
- Fast, integrated, system-wide engineering
- Integrated fieldbus and link to the MES/ERP level

SIMATIC PCS 7 is based on SIMATIC components such as controller, PC etc.
Together with typical control system software, these standard products provide the functionality and performance of a modern process control system.

The SIMATIC net components ensure integrated communication between all system units:

- Office-, Industrial- or Fast-Ethernet
- PROFIBUS DP/PA, as well as PROFISafe
- AS Interface and EIB

PCS 7 ordering units – ES, OS, AS

All required hardware and software components are preinstalled and pretested, and form logical functional units within a PCS 7 system. The following PCS 7 ordering units are available:

- *PCS 7-ES*: engineering station
- *PCS 7-OS*: operator station, from single-user system up to distributed multi-client/server configurations
- *PCS 7-AS*: automation system with different CPUs, including redundant or fail-safe CPUs

A PCS 7 system can be bit-modular and feature integrated redundancy.

Integration of field technology

PCS 7 is particularly suitable for integration of all HART or PROFIBUS DP/PA field devices, even in hazardous areas and where there is redundant communication.

The Process Device Manager (PDM) provides all functions required for this purpose, without regard to the manufacturer.

PCS 7 engineering system

The central PCS 7 engineering system handles the configuring of all system components and automation tasks, such as:

- Continuous function control (CFC), sequential function control (SFC),
- Recipe-driven processes (batch *flexible*),
- Visualization, process control

Additional information can be obtained at:



http://www.siemens.de/simatic-pcs7

and in Catalog ST PCS 7.

Notes

LOGO! logic module

2





2/2	**Introduction**
2/2	**LOGO! modular**
2/2	LOGO! basic versions
2/4	LOGO! pure versions
2/5	LOGO! expansion modules
2/6	LOGO! CM EIB/KNX communication module
2/7	**LOGO!Power**
2/7	LOGO!Power size 72 mm
2/9	LOGO!Power size 126 mm
2/10	**LOGO!Contact**

Overview



- 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
- Up to 29 different functions can be combined at the press of a key; up to a total of 56 times
- Functions simple to change at the press of a key; no more time-consuming rewiring

Introduction LOGO! modular

Overview

- Semi-modular expandable logic modules
- For optimal adaptation to the corresponding task
- Expandable with up to 24 DIs, 16 DOs and 8 AOs
- With communications modules for connection e.g. to an AS-Interface (available soon)

LOGO! basic versions

Overview



- The space-saving basic versions
- With interface for connection of expansion modules

Technical specifications

	LOGO! 24	LOGO! 12/24RC	LOGO! 24RC	LOGO! 230RC
Supply voltage	24 V DC	12/24 V DC	24 V AC/DC	115/230 V AC/DC
Inputs	8 (of which 2 can be used as analog)	8 (of which 2 can be used as analog)	8	8
Outputs	4 transistors	4 relays	4 relays	4 relays
Continuous current	0.3 A	10 A (in case of ohmic load), 3 A (in case of inductive load)	10 A (in case of ohmic load), 3 A (in case of inductive load)	10 A (in case of ohmic load), 3 A (in case of inductive load)
Short-circuit protection	Electrical (1 A)	External fuse protection is required	External fuse protection is required	External fuse protection is required
Integrated time switches/ power reserve	-	8/typ. 80 h	8/typ. 80 h	8/typ. 80 h
Ambient temperature	0 to +55 °C	0 to +55 °C	0 to +55 °C	0 to +55 °C
RI specification	To EN 55 011 (limit class B)	To EN 55 011 (limit class B)	To EN 55 011 (limit class B)	To EN 55 011 (limit class B)
Degree of protection	IP 20	IP 20	IP 20	IP 20
Certification	To VDE 0631, IEC 1131, UL, FM, CSA, ship building authorizations	To VDE 0631, IEC 1131, UL, FM, CSA, ship building authorizations	To VDE 0631, IEC 1131, UL, FM, CSA, ship building authorizations	To VDE 0631, IEC 1131, UL, FM, CSA, ship building authorizations
Mounting	On DIN rail 35 mm, 4 module widths wide	On DIN rail 35 mm, 4 module widths wide	On DIN rail 35 mm, 4 module widths wide	On DIN rail 35 mm, 4 module widths wide
Dimensions (W x H x D) in mm	72 (4 HP) × 90 × 55	72 (4 HP) × 90 × 55	72 (4 HP) × 90 × 55	72 (4 HP) × 90 × 55

Ordering data

	Order No.
LOGO! 24 logic module Power supply 24 V DC, 8 digital inputs 24 V DC, of which 2 can be used in analog mode (0 to 10 V), 4 digital outputs 24 V DC, 0.3 A; 56 functions can be linked	**6ED1 052-1CC00-0BA3**
LOGO! 12/24RC logic module Power supply 12/24 V DC, 8 digital inputs 12/24 V DC, of which 2 can be used in analog mode (0 to 10 V),4 relay outputs 10 A, integral time switch; 56 functions can be linked	**6ED1 052-1MD00-0BA3**
LOGO! 24RC logic module Power supply 24 V AC/DC, 8 digital inputs 24 V AC/DC, 4 relay outputs 10 A, integral time switch; 56 functions can be linked	**6ED1 052-1HB00-0BA3**
LOGO! 230RC logic module Power supply 115/230 V AC/DC, 8 digital inputs 115/230 V AC/DC, 4 relay outputs 10 A, integral time switch; 56 functions can be linked	**6ED1 052-1FB00-0BA3**
Accessories	
LOGO! manual	
German	**6ED1 050-1AA00-0AE4**
English	**6ED1 050-1AA00-0BE4**
French	**6ED1 050-1AA00-0CE4**
Spanish	**6ED1 050-1AA00-0DE4**
Italian	**6ED1 050-1AA00-0EE4**
Portuguese	**6ED1 050-1AA00-0GE4**

	Order No.
LOGO! program module yellow ► for copying	**6ED1 056-1BA00-0AA0**
LOGO! program module red with know-how protection	**6ED1 056-4BA00-0AA0**
LOGO! Soft Comfort V3.1 for programming on the PC in LAD/FBD; executes with Windows 95 onwards, Linux, MAC OSX; on CD-ROM	**6ED1 058-0BA00-0YC3**
LOGO! Soft Comfort upgrade from V1.0 or V2.0 to V3.1	**6ED1 058-0CA00-0YC2**
LOGO! PC cable for program transmission between LOGO! and PC	**6ED1 057-1AA00-0BA0**
LOGO! News Box, 12/24 V contains LOGO! 12/24RC, LOGO! PC cable, LOGO!Soft Comfort, Tips&Tricks manual, screwdriver, info material	
German	**6ED1 057-3BA00-0AA2**
English	**6ED1 057-3BA00-0BA2**
LOGO! News Box, 230 V contains LOGO! 230RC, LOGO! PC cable, LOGO!Soft Comfort, Tips&Tricks manual, screwdriver, info material	
German	**6ED1 057-3AA00-0AA7**
English	**6ED1 057-3AA00-0BA7**

2

LOGO! pure versions

Overview



- Basic versions optimized for costs
- With integrated interface for the connection of expansion modules

Technical specifications

	LOGO! 24o	LOGO! 12/24RCo	LOGO! 24RCo	LOGO! 230RCo
Supply voltage	24 V DC	12/24 V DC	24 V AC/DC	115/230 V AC/DC
Inputs	8 (of which 2 can be used as analog)	8 (of which 2 can be used as analog)	8	8
Outputs	4 transistors	4 relays	4 relays	4 relays
Continuous current	0.3 A	10 A (in case of ohmic load), 3 A (in case of inductive load)	10 A (in case of ohmic load), 3 A (in case of inductive load)	10 A (in case of ohmic load), 3 A (in case of inductive load)
Short-circuit protection	Electrical (1 A)	External fuse protection is required	External fuse protection is required	External fuse protection is required
Integrated time switches/ power reserve	-	8/typ. 80 h	8/typ. 80 h	8/typ. 80 h
Ambient temperature	0 to +55 °C	0 to +55 °C	0 to +55 °C	0 to +55 °C
RI specification	To EN 55 011 (limit class B)	To EN 55 011 (limit class B)	To EN 55 011 (limit class B)	To EN 55 011 (limit class B)
Degree of protection	IP 20	IP 20	IP 20	IP 20
Certification	To VDE 0631, IEC 1131, UL, FM, CSA, ship building authorizations	To VDE 0631, IEC 1131, UL, FM, CSA, ship building authorizations	To VDE 0631, IEC 1131, UL, FM, CSA, ship building authorizations	To VDE 0631, IEC 1131, UL, FM, CSA, ship building authorizations
Mounting	On DIN rail 35 mm, 4 module widths wide	On DIN rail 35 mm, 4 module widths wide	On DIN rail 35 mm, 4 module widths wide	On DIN rail 35 mm, 4 module widths wide
Dimensions (W x H x D) in mm	72 (4 HP) × 90 × 55	72 (4 HP) × 90 × 55	72 (4 HP) × 90 × 55	72 (4 HP) × 90 × 55

Ordering data

	Order No.
LOGO! 24o logic module Power supply 24 V DC, 8 digital inputs 24 V DC, of which 2 can be used in analog mode (0 to 10 V), 4 digital outputs 24 V DC, 0.3 A; without display and keyboard; 56 functions can be linked	**6ED1 052-2CC00-0BA3**
LOGO! 12/24RCo logic module Power supply 12/24 V DC, 8 digital inputs 12/24 V DC, of which 2 can be used in analog mode (0 to 10 V),4 relay outputs 10 A, integral time switch; without display and keyboard; 56 functions can be linked	**6ED1 052-2MD00-0BA3**

	Order No.
LOGO! 24RCo logic module Power supply 24 V AC/DC, 8 digital inputs 24 V AC/DC, 4 relay outputs 10 A, integral time switch; without display and keyboard; 56 functions can be linked	**6ED1 052-2HB00-0BA3**
LOGO! 230RCo logic module Power supply 115/230 V AC/DC, 8 digital inputs 115/230 V AC/DC, 4 relay outputs 10 A, integral time switch; without display and keyboard; 56 functions can be linked	**6ED1 052-2FB00-0BA3**
Accessories	See page 2/3

Overview



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

Technical specifications

	LOGO! DM8 24	LOGO! DM8 12/24R	LOGO! DM8 24R	LOGO! DM8 230R	LOGO! AM2	LOGO! AM2 PT100
Supply voltage	24 V DC	12/24 V DC	24 V AC/DC	115/230 V AC/DC	12/24 V DC	12/24 V DC
Inputs	4 DIs	4 DIs	4 DIs	4 DIs	2 AIs	2 x PT100 2-wire or 3-wire
Outputs	4 DOs	4 DOs relays	4 DOs relays	4 DOs relays	-	-
Continuous current	0.3 A	5 A (in case of ohmic load), 3 A (in case of inductive load)	5 A (in case of ohmic load), 3 A (in case of inductive load)	5 A (in case of ohmic load), 3 A (in case of inductive load)	-	-
Short-circuit protection	Electrical (1 A)	External fuse protection is required	External fuse protection is required	External fuse protection is required	External fuse protection is required	External fuse protection is required
Ambient temperature	0 to +55 °C	0 to +55 °C	0 to +55 °C	0 to +55 °C	0 to +55 °C	0 to +55 °C
RI specification	To EN 55 011 (limit class B)	To EN 55 011 (limit class B)	To EN 55 011 (limit class B)	To EN 55 011 (limit class B)	To EN 55 011 (limit class B)	To EN 55 011 (limit class B)
Degree of protection	IP 20	IP 20	IP 20	IP 20	IP 20	IP 20
Certification	To VDE 0631, IEC 1131, UL, FM, CSA, ship building authorizations	To VDE 0631, IEC 1131, UL, FM, CSA, ship building authorizations	To VDE 0631, IEC 1131, UL, FM, CSA, ship building authorizations	To VDE 0631, IEC 1131, UL, FM, CSA, ship building authorizations	To VDE 0631, IEC 1131, UL, FM, CSA, ship building authorizations	To VDE 0631, IEC 1131, UL, FM, CSA, ship building authorizations
Mounting	On DIN rail 35 mm, 2 module widths wide	On DIN rail 35 mm, 2 module widths wide	On DIN rail 35 mm, 2 module widths wide	On DIN rail 35 mm, 2 module widths wide	On DIN rail 35 mm, 2 module widths wide	On DIN rail 35 mm, 2 module widths wide
Dimensions (W x H x D) in mm	36 (2 HP) × 90 × 55	36 (2 HP) × 90 × 55	36 (2 HP) × 90 × 55	36 (2 HP) × 90 × 55	36 (2 HP) × 90 × 55	36 (2 HP) × 90 × 55

Ordering data

	Order No.
LOGO! DM8 24 Power supply 24 V DC, 4 digital inputs 24 V DC, 4 digital outputs 24 V DC, 0.3 A	**6ED1 055-1CB00-0BA0**
LOGO! DM8 12/24R Power supply 12/24 V DC, 4 digital inputs 12/24 V DC, 4 relay outputs 5 A	**6ED1 055-1MB00-0BA1**
LOGO! DM8 24R Power supply 24 V AC/DC, 4 digital inputs 24 V AC/DC, 4 relay outputs 5 A	**6ED1 055-1HB00-0BA0**

	Order No.
LOGO! DM8 230R Power supply 115/230 V AC/DC, 4 digital inputs 115/230 V AC/DC, 4 relay outputs 5 A	**6ED1 055-1FB00-0BA1**
LOGO! AM2 Power supply 12/24 V DC, 2 analog inputs 0 to 10 V or 0 to 20 mA, resolution 10 bit	**6ED1 055-1MA00-0BA0**
LOGO! AM2 PT 100 Power supply 12/24 V DC, 2 Pt100 analog inputs, temp. range -50 °C to 200 °C	**6ED1 055-1MD00-0BA0**
Accessories	See page 2/3

LOGO! CM EIB/KNX communication module

Overview



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

Technical specifications

Power supply	24 V AC/DC
Inputs	16 DE/12DA/8AE
Outputs	16 digital
Continuous current	25 mA
Short-circuit protection	Protection by external fuse necessary
Ambient temperature	0 to +55 °C
Integrated time switches/reserve power	-

RI suppression	Conforms to EN 55 011 (limit class B)
Degree of protection	IP 20
Certification	According to VDE 0631, IEC61131-2, cULus, FM
Mounting	DIN rail, 35 mm, 2 width modules
Dimensions (W × H × D) in mm	36 (2 MW) × 90 × 55

Ordering data

	Order No.
LOGO! CM EIB KNX communication module for connection to *EIB*, power supply 24 V DC,	**6BK1 700-0BA00-0AA0**

Overview



LOGO!power supplies of size 72 mm are available in the following versions:

- 12 V/1.9 A
- 24 V/1.3 A

Technical specifications

Type	12 V/1.9 A	24 V/1.3 A
Order No.	6EP1 321-1SH01	6EP1 331-1SH01
Input	Single-phase AC	
Rated voltage $V_{in\ rated}$	**120 - 230 V AC** Wide-range input	
Voltage range	85 to 264 V AC	
Surge strength	2.3 x $V_{in\ rated}$/1.3 ms	
Mains buffering at $I_{out\ rated}$	> 40 ms at V_{in} =187 V	
Rated line frequency/range	50/60 Hz; 47 to 63 Hz	
Rated current $I_{out\ rated}$	0.34 - 0.18 A	0.48 - 0.3 A
Inrush current limitation (+25 °C)	< 15 A	
I^2t	< 0.8 A^2s	
Integral input fuse	Internal	
Recommended circuit-breaker (IEC 898) in the supply cable	From 10 A, Characteristic C or from 6 A, Characteristic D	
Output	Regulated, floating direct voltage	
Rated voltage $V_{out\ rated}$	12 V DC	24 V DC
Stat. total tolerance	± 3%	
• Steady-state line compensation	Approx. 0.2%	Approx. 0.1%
• Stat. load compensation	Approx. 1.5%	
Residual ripple (switching frequency approx. 90 kHz)	< 200 mV_{pp}	< 200 mV_{pp}
Spikes (bandwidth approx. 20 MHz)	< 300 mV_{pp}	< 300 mV_{pp}
Setting range	11.1 to 12.9 V	22.2 to 25.8 V
Status indicator	-	
Turn-on/off response	No overshoot of V_{out} (soft starting)	
Starting delay/voltage rise	< 0.5 s/typ. 15 ms	
Rated current $I_{out\ rated}$	1.9 A	1.3 A
Current range up to +55 °C	0 to 1.9 A	0 to 1.3 A
Parallel connection for increased output	Yes, 2 units	

Type	12 V/1.9 A	24 V/1.3 A
Efficiency		
Efficiency at $V_{out\ rated}$ $I_{out\ rated}$	> 80%	> 80%
Power loss at $V_{out\ rated}$, $I_{out\ rated}$	< 6 W	< 8 W
Regulation		
Dyn. mains compensation ($V_{in\ rated}$ ± 15 %)	< 0.2% V_{out}	
Dyn. load compensation (I_{out}:10/90/10 %)	± 3 % V_{out}	± 1.5 % V_{out}
Correction time load step		
• 10 to 90 %	Typ. 20 ms	
• 90 to 10 %	Typ. 20 ms	
Protection and monitoring		
Output overvoltage protection	-	
Current limitation	Typ. 2.4 A	Typ. 1.6 A
Short circuit protection	Electronic shutdown, auto. restart	
RMS sustained short-circuit current	< 4 A	< 4 A
Overload/short-circuit indicator	-	
Safety		
Electrical isolation primary/secondary	Yes, SELV output voltage V_{out} to EN 60 950	
Protection class (IEC 536)	Class II	
Discharge current	< 3.5 mA (typ. 0.28 mA)	
CE marking	Yes	
UL/CSA approval	Yes, UL/CSA listed (UL 508, CSA 22.2)	
FM approval	Yes, Class I Div. 2, Group A, B, C, D T4	
Marine approval	Yes, acc. to GL, LR, ABS and DNV	
Degree of protection (EN 60 529)	IP 20	
EMC		
Interference emission	EN 50 081-1, EN 55 022 Class B	
Line harmonics limitation	Not applicable	
Interference immunity	EN 50 082-2, EN 61 000-4-2, -3, -4, -5, -6	

Logo!Power size 72 mm

Technical specifications (continued)

Type	12 V/1.9 A	24 V/1.3 A
Operating specifications		
Ambient temperature range	-20 to +55 °C with natural convection	
Transport and storage temperature range	-40 to +70 °C	
Humidity class	Humidity class to DIN 40 040: rel. humidity to 75 % mean value, 95 % on 30 days /year; no dewing	

Type	12 V/1.9 A	24 V/1.3 A
Mechanical specifications		
Mains input L1, N	One screw terminal each for 0.5 to 2.5 mm2 solid/stranded	
• Terminals		
• Output +	2 screw terminals for 0.5 to 2.5 mm^2	
• Output -	2 screw terminals for 0.5 to 2.5 mm^2	
Dimensions (W x H x D) in mm	72 x 90 x 55	
Weight	0.2 kg	
Installation	Snap-mounting on DIN rail to DIN EN 50 022- 35 x 15/7.5	

Ordering data

	Order No.
LOGO! Power 12 V/1.3 A Input voltage 120/230 V AC; output voltage 12 V DC/1.3 A	**6EP1 321-1SH01**
LOGO! Power 24 V/1.9 A Input voltage 120/230 V AC; output voltage 24 V DC/1.9 A	**6EP1 331-1SH01**

Overview



LOGO!Power supplies of size 126 mm are available in the following versions:

- 12 V/4.5 A
- 24 V/2.5 A

Technical specifications

Type	12 V/ 4.5 A	24 V/ 2.5 A
Order No.	6EP1 322-1SH01	6EP1 332-1SH41
Input	Single-phase AC	
Rated voltage $V_{in\ rated}$	120 - 230 V AC Wide-range input	
Voltage range	85 to 264 V AC	
Overvoltage protection	2.3 x $V_{in\ rated}$/1.3 ms	
Mains buffering at $I_{out\ rated}$	> 40 ms at V_{in} =187 V	
Rated line frequency/range	50/60 Hz; 47 to 63 Hz	
Rated current $I_{in\ rated}$	0.73 - 0.43 A	0.85 - 0.5 A
Inrush current limitation (+25 °C)	< 30 A	
I^2t	< 3 A^2s	
Integral line-side fuse	Internal	
Required circuit-breaker (IEC 898) in mains supply cable	From 10 A, Characteristic C or from 6 A, Characteristic D	
Output	Regulated, floating direct voltage	
Rated voltage $V_{out\ rated}$	12 V DC	24 V DC
Stat. total tolerance	± 3%	
• Stat. mains compensation	Approx. 0.1%	
• Stat. load compensation	Approx. 1.5%	
Residual ripple (switching frequency approx. 90 kHz)	< 200 mV_{pp}	
Spikes (bandwidth approx. 20 MHz)	< 300 mV_{pp}	
Setting	11.1 to 12.9 V	22.2 to 25.8 V
Operation indicator	-	
Power on/off behaviour	No overshoot of V_{out} (soft starting)	
Starting delay/voltage rise	< 0.5 s/typ. 15 ms	
Rated current $I_{in\ rated}$	4.5 A	2.5 A
Current range up to +55 °C	0 to 4.5 A	0 to 2.5 A
Parallel connection for increased output	Yes, 2 units	

Type	12 V/ 4.5 A	24 V/ 2.5 A
Efficiency		
Efficiency at $V_{out\ rated}$ $I_{out\ rated}$	> 80%	
Power loss at $V_{out\ rated}$, $I_{out\ rated}$	< 14 W	< 15 W
Regulation		
Dyn. mains compensation ($V_{in\ rated}$ ± 15 %)	< 0.2% V_{out}	
Dyn. load compensation (I_{out}:10/90/10 %)	± 4.2 % V_{out}	± 1.5 % V_{out}
Correction time load step		
• 10 to 90 %	Typ. 20 ms	
• 90 to 10 %	Typ. 20 ms	
Protection and monitoring		
Output overvoltage protection	-	
Current limitation	Typ. 5.4 A	Typ. 3.1 A
Short circuit protection	Electronic shutdown, auto. restart	
RMS sustained short-circuit current	< 8 A	< 8 A
Overload/short-circuit indicator	-	
Safety		
Electrical isolation primary/secondary	Yes, SELV output voltage V_{out} to EN 60 950	
Protection class (IEC 536)	Class II	
Discharge current	< 3.5 mA	
CE marking	Yes	
UL/CSA approval	Yes, UL/CSA listed (UL 508, CSA 22.2)	
FM approval	Yes, Class I Div. 2 Group A, B, C, D T4	
Marine approval	Yes, acc. to GL, LR, ABS and DNV	
Degree of protection (EN 60 529)	IP 20	
EMC		
Interference emission	EN 50 081-1, EN 55 022 Class B	
Line harmonics limitation	Not applicable	
Interference immunity	EN 50 082-2, EN 61 000-4-2, -3, -4, -5, -6	

LOGO!Power size 126 mm

Technical specifications (continued)

Type	12 V/ 4.5 A	24 V/ 2.5 A
Operating specifications		
Ambient temperature range	-20 to +55 °C with natural convection	
Transport and storage temperature range	-40 to +70 °C	
Humidity class	Humidity class to DIN 40 040: rel. humidity to 75 % mean value, 95 % on 30 days /year; no dewing	

Type	12 V/ 4.5 A	24 V/ 2.5 A
Mechanical specifications		
Terminals		
• Mains input L1, N	One screw terminal each for 0.5 to 2.5 mm2 solid/stranded	
• Output +	2 screw terminals for 0.5 to 2.5 mm^2	
• Output -	2 screw terminals for 0.5 to 2.5 mm^2	
Dimensions (W x H x D) in mm	126 x 90 x 55	
Weight	0.4 kg	
Installation	Snap-mounting on DIN rail to DIN EN 50 022- 35 x 15/7.5	

Ordering data

	Order No.
LOGO! Power 12 V/4.5 A Input voltage 120/230 V AC; output voltage 12 V DC/4.5 A	**6EP1 322-1SH01**
LOGO! Power 24 V/2.5 A Input voltage 120/230 V AC; output voltage 24 V DC/2.5 A	**6EP1 332-1SH41**

LOGO!Contact

Overview



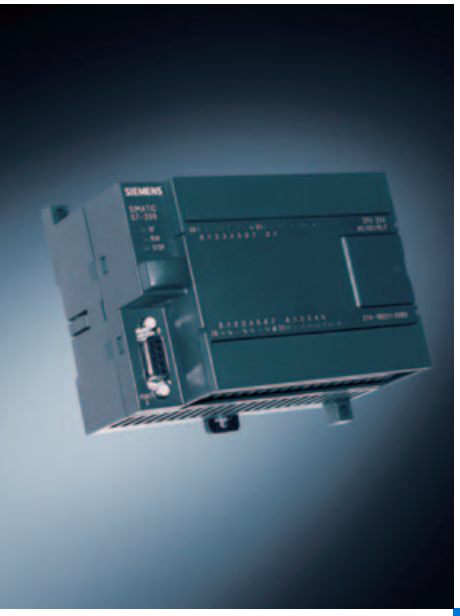
- Switching module for the direct switching of resistive loads up to 20 A and motors up to 4kW

Ordering data

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

SIMATIC S7-200

3



3/2	General
3/3	Central processing units
3/16	Digital expansion modules
3/20	Analog expansion modules
3/24	Function modules
3/25	Communication
3/29	Power supplies
3/31	Human Machine Interface
3/33	Software



3

Overview



- 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 viable in the past
- With outstanding real-time performance and powerful communications (PPI, PROFIBUS-DP, AS-Interface)

- American Bureau of Shipping (ABS)
- Bureau Veritas (BV)
- Des Norske Veritas (DNV)
- Germanischer Lloyd (GL)
- Lloyds Register of Shipping (LRS)
- Registro Italiano Navale (RINA)
- Nippon Kaiji Kyokai (NK)

General technical specifications

Degree of protection	IP 20 acc. to IEC 529
Ambient temperature	
• Operation (95% air humidity)	
- with horizontal mounting	0 to 55 °C
- with vertical mounting	0 to 45 °C
• Storage and transport	-40 to +70 °C
- for 95% air humidity	25 to 55 °C
Isolation	
• 5/24 V DC circuits	Test voltage 500 V AC
• 115/230 V AC circuits to earth	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 the EMC Guideline
• Interference immunity to EN 50082-2	Tested acc. 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 acc. to : EN 55011, Class A, Group 1 and EN 55011, Class B, Group 1
Mechanical stress	
• Vibrations, tested according to / tested with	IEC 68, Part 2-6: 10 to 57 Hz; constant amplitude 0.3 mm; 58 to 150 Hz; constant acceleration 1 g (for standard rail mounting) or 2 g (for control panel mounting); Type of vibration: Frequency progressions changing at 1 octave per minute; Duration of vibration: 10 frequency progressions per axis in each direction of the three mutually perpendicular axes
• Shock, tested acc. to / tested with	IEC 68, Part 2-27/semisinusoidal: Shock strength 15 g (peak value), duration 11 ms, 6 shocks on each of the mutually perpendicular axes

Overview
CPU 221



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

Overview
CPU 222



- The superior compact solution
- With 14 inputs/outputs on board
- Expansion capability for max. 2 expansion units

Overview
CPU 224



- The compact high-performance CPU
- With 24 inputs/outputs on board
- Expansion capability for max. 7 expansion units

CPU 221, 222, 224, 226, 226 XM

Overview
CPU 226



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

Overview
CPU 226 XM



- The high-performance package for large-scale technical tasks
- With an additional PPI connection for increased flexibility and communication options
- 40 on-board inputs/outputs
- Expansion capability for max. 7 expansion units
- Enhanced program and data memory

Technical specifications CPU 221

Program memory	4 KB
Data memory	2 KB
Memory cartridge (optional)	1 memory module; contents identical to integrated EEPROM
Program backup	Entire program maintenance-free in the integrated EEPROM, programmable using CPU
Data backup	Entire DB 1 loaded from PG/PC in integral EEPROM; maintenance-free Current value of DI 1 in RAM, retentive bit memories, timers, counters, etc. maintenance-free over high-performance capacitor; Battery for long-term buffering, optional
Backup time typ.	50 h (min. 8 h at 40 °C); 200 days (typ.) with optional battery module
Programming language	Ladder logic, FBD and STL
Program organization	1 OB, 1 DB, 1 SDB subroutines with/without parameter passing
Program execution	Free cycle (OB 1) • interrupt-controlled • time controlled (1 to 255 ms)
No. of subroutines, max.	64
User program protection	3-level password protection
Instruction set	Bit (logic) instructions, comparison instructions, timer instructions, counter instructions, clock instructions, fixed-point arithmetic, floating-point arithmetic, numeric functions, transfer instructions, table instructions, binary logic instructions, shift and rotate instructions, conversion instructions, program control instructions, system interrupt and communications instructions, stack instructions
Execution times for bit operations	0.37 µs
Cycle time monitoring	At 300 ms, can be retriggered
Bit memories	256
• Of these retentive	0 to 112 in EEPROM, adjustable; 0 to 256, over high-performance capacitor or battery, selectable
Counter	256
• Of these retentive	256, using high-performance capacitor or battery, selectable
• Counting range	0 to 32767
Timers	256
• Of these retentive	64, using high-performance capacitor or battery, selectable
• Range	4 timers, 1 ms to 30 s 16 timers, 10 ms to 5 min 236 timers, 100 ms to 54 min
Integrated high-speed functions	
• Interrupt inputs	4 (4 positive-going edges and/or 4 negative-going edges)
• Counter	4 quick counters (each 30 kHz), 32-bit (incl. sign), usable as up/down counter or to connect 2 incremental encoders with 2 pulse trains offset at a 90° angle (max. 20 kHz (A/B counter); configurable enable and reset input; interrupt possibilities (incl. call to a subprogram with desired content) when the setpoint value is reached; Counter direction change, etc.
• Pulse outputs	2 quick outputs, 20 kHz, with interrupt possibility; pulse width and frequency can be modulated
Interfaces	1 RS 485 communications interface, optionally: As PPI interface with PPI protocol for programming functions, HMI functions (TD 200, OP), S7-200 internal CPU/CPU communication; baud rates 9.6/19.2/187.5 kbit/s • Or as MPI slave for data exchange with MPI masters (S7-300/S7-400 CPUs, OPs, TDs, push button panels); S7-200 internal CPU/CPU communication is possible but limited in the MPI network; baud rates 19.2/187.5 kbit/s • Or as freely programmable interface with interrupt possibility for serial data exchange with third-party devices with ASCII protocol baud rates: 0.3/0.6/1.2/2.4/4.8/9.6/19.2/38.4 kbit/s; At rates ranging from 1.2 to 38.4 kbit/s the PC/PPI cable can be used as RS232/RS485 converter
Connectable programming units/PCs	SIMATIC PG/PC, standard PC
Onboard I/Os	
• Plug-in I/O terminals	No
• Digital inputs	6
• Digital outputs	4
• Analog potentiometers	1 analog potentiometer; resolution 8 bits
Max. number of inputs/outputs	
• Digital inputs/outputs	Max. 6 inputs and 4 outputs (integrated I/Os); expansion not possible
• Analog inputs/outputs	-
• AS-Interface inputs/outputs, max.	-
Expansion, max.	-
Degree of protection	IP 20 in accordance with IEC 529
Ambient temperature	
• With horizontal installation	0 to 55°C
• When mounted vertically	0 to 45 °C
Relative humidity	5 to 95 % (RH severity level 2 in accordance with IEC 1131-2)
Atmospheric pressure	860 to 1080 hPa
Other environmental conditions	See "S7-200 Programmable Controller System Manual"

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Technical specifications CPU 221 (continued)

Power supply:	24 V DC	100 to 230 V AC
Inputs:	**24 V DC**	**24 V DC**
Outputs:	**24 V DC**	**Relay**
Supply voltage C L+/L1		
• Rated value	24 V DC	100 C 230 V AC
• Permitted range	20.4 to 28.8 V	85 to 264 V AC (47 to 63 Hz)
Input current		
• Max. incl. load	10 A at 28.8 V	20 A at 264 V
• Power consumption max.	80 to 900 mA	15 to 60 mA (240 V) 30 to 120 mA (120 V)
Output voltage for sensors		
• Rated value	L+ (24 V DC)	24 V DC
• Permitted range	15.4 to 28.8 V	20.4 to 28.8 V
Output current for sensors (24 V DC)		
• Rated value	180 mA	180 mA
• Short-circuit protection	Electronic at 600 mA	Electronic at 600 mA
Integrated inputs	**6**	**6**
• Type	Current sinking or sourcing	Current sinking or sourcing
Input voltage		
• Rated value	24 V DC	24 V DC
• At “1” signal , min.	15 V	15 V
• At "0" signal	0 to 5 V	0 to 5 V
Electrical isolation	Optocoupler	Optocoupler
• In groups of	2 and 4	2 and 4
Input current		
• Nominal value at “1” signal	4 mA	4 mA
Input delay (at rated value of the input voltage)		
• For standard inputs, max.	Every 0.2 to 12.8 ms, settable	Every 0.2 to 12.8 ms, settable
• For interrupt inputs, typ./ max.	(E0.0 to E0.3) -	(E0.0 to E0.3) -
• For fast counters, typ./max.	(E0.0 to E0.5) 30 kHz	(E0.0 to E0.5) 30 kHz
Connection of 2-wire BERO®		
• Permissible quiescent current, max.	1 mA	1 mA
Cable lengths		
• Unshielded (not for high-speed signals)	300 m	300 m
• Shielded		
- standard input	500 m	500 m
- high-speed counters	50 m	50 m
On-board outputs	**4 (transistors)** Can be switched in parallel for high output currents	**4 (relays)**
Rated load voltage L+/L1	24 V DC	24 V DC/ 24 to 230 V AC
• Permitted range	20.4 to 28.8 V DC	5 to 30 V DC/ 5 to 250 V AC

Power supply:	24 V DC	100 to 230 V AC
Inputs:	**24 V DC**	**24 V DC**
Outputs:	**24 V DC**	**Relay**
Output voltage		
• At "1" signal, min.	20 V DC	L+/L1
Output current, max.		
• At "1" signal		
- rated value at 40°C	0.75 A	2 A
- rated value at 55°C	0.75 A	2 A
- min. current	-	-
• At "0" signal	0.1 mA	0 mA
Sum of all output currents		
• At 40°C, max.	3.0 A	6.0 A
• At 55°C, max. (horizontal installation)	3.0 A	6.0 A
ON delay		
• Of the standard outputs, max.	(A0.2 to A0.3) 15 µs	All outputs 10 ms
• Of the pulse outputs, max.	(A0.0 to A0.1) 2 µs	-
OFF delay		
• Of the standard outputs, max.	(A0.2 to A0.3) 100 µs	All outputs 10 ms
• Of the pulse outputs, max.	(A0.0 to A0.1) 10 µs	-
Operating frequency of pulse outputs	(A0.0 to A0.1)	(A0.0 to A0.1)
• For resistive load	20 kHz	-
Switching capacity of the outputs		
• For resistive load	0.75 A	2 A
• For a lamp load	5 W	30 W DC 200 W AC
Service life of the contacts (number of switching cycles to VDE 0660, Part 200)		
• Mechanical	-	10 Mio.
• At rated voltage	-	100,000
Limitation of voltage induced on circuit interruption, max.	1 W	-
Short-circuit protection	Provide externally	Provide externally
Cable lengths		
• Unshielded	150 m	150 m
• Shielded	500 m	500 m
Isolation		
• Between 24 V DC and 5 V DC	500 V DC	500 V DC
• Between 24 V DC and 230 V AC	-	1500 V AC
Dimensions (W x H x D) in mm	90 x 80 x 62	90 x 80 x 62
Weight, approx.	270 g	310 g

Technical specifications CPU 222

Program memory	4 KB
Data memory	2 KB
Memory cartridge (optional)	1 pluggable memory cartridge; content identical to the integrated EEPROM
Program backup	Entire program maintenance-free in the integrated EEPROM
Data backup	Entire DB 1 loaded from programming device/PC in integral EEPROM; maintenance-free Current DB 1 values in RAM, retentive flags, timers, counters etc. maintenance-free through super capacitor; optional battery for long-term backup
Backup time typ.	50 hr (minimum 8 hr at 40°C); 200 days (typ.) with optional battery module
Programming language	LAD, FBD and STL
Program organization	1 OB, 1 DB, 1 SDB subroutines with/without parameter passing
Program execution	free cycle (OB 1) • Interrupt-controlled • Time controlled (1 to 255 ms)
Subroutine levels	64
User program protection	3-level password protection
Operation set	Bit (logic) instructions, comparison instructions, timer instructions, counter instructions, clock instructions, fixed-point arithmetic, floating-point arithmetic, numeric functions, transfer instructions, table instructions, binary logic instructions, shift and rotate instructions, conversion instructions, program control instructions, system interrupt and communication instructions, stack instructions
Execution times for bit operations	0.37 µs
Cycle time monitoring	300 ms (retriggerable)
Bit memories	256
• Of these retentive	0 to 112 in EEPROM, selectable 0 to 256, using super capacitor or battery, selectable
Counter	256
• Of these retentive	256, using super capacitor or battery, selectable
• Counting range	0 to 32767
Timers	256
• Of these retentive	64, using super capacitor or battery, selectable
• Range	4 timers, 1 ms to 30 s 16 timers, 10 ms to 5 min 236 timers, 100 ms to 54 min
Integrated high-speed functions	
• Interrupt inputs	4 (4 positive-going edges and/or 4 negative-going edges)
Counter	4 fast counters (each with 30 kHz), 32 bits (incl. sign), can be used as up/down counters or for connecting 2 incremental encoders with 2 pulse trains offset by 90° (max. 20 kHz (A/B counters)); with parameterizable enable and reset inputs; interrupt capability (incl. calling a subroutine with random contents) on reaching a setpoint; reversal of direction of counting etc.
• Pulse outputs	2 high-speed outputs, 20 kHz with interrupt option; pulse width and frequency modulation possible
Interfaces	1 RS 485 communication interface, optionally: As PPI interface with PPI protocol for programming functions, HMI functions (TD 200, OP), S7-200 internal CPU/CPU communication; transmission rates 9.6, 19.2, 187.5 kbit/s • Or as MPI slave for data exchange with MPI masters (S7-300/S7-400 CPUs, OPs, TDs, push-button panels); S7-200-internal CPU/CPU communication is possible to a limited extent on the MPI network; transmission rates 19.2/187.5 kbit/s • or as user-programmable interface with interrupt capability for serial data exchange with non-Siemens devices at ASCII protocol transmission rates: 0.3, 0.6, 1.2, 2.4, 4.8, 9.6, 19.2, 38.4 kbit/s; at 1.2 to 38.4 kbit/s the PC/PPI cable can be used as an RS232/RS458 adapter Expansion bus • Connection of expansion modules (EM)[1] Only series S7-22x EMs can be used.
Connectable programming units/PC	SIMATIC PG/PC, Standard-PC
Onboard I/Os	
• Plug-in I/O terminals	No
• Digital inputs	8
• Digital outputs	6
• Analog potentiometer	1 analog potentiometer; 8 bit resolution
Max. number of inputs /outputs	
• Digital inputs/outputs	Max. 40 inputs and 38 outputs (CPU and EM)
• Analog inputs/outputs	Max. 8 inputs and 2 outputs (EM) or max. 0 inputs and 4 outputs (EM)
• AS-Interface inputs/outputs, max.	Max. 31 AS-Interface slaves (CP 243-2)
Expansion, max.	2 expansion boards[1]. Only expansion modules from the S7-22x series may be used
Degree of protection	IP 20 in accordance with IEC 529

1) Because of the limited output current, the use of expansion modules can be subject to restrictions.

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Technical specifications CPU 222 (continued)

Ambient temperature		
• With horizontal installation	0 to 55 °C	
• When mounted vertically	0 to 45 °C	
Relative humidity	5 to 95% (RH severity level 2 in accordance with IEC 1131-2)	
Atmospheric pressure	860 to 1080 hPa	
Other environmental conditions	See "S7-200 Programmable Controller System Manual"	
Power supply:	**24 V DC**	**100 to 230 V AC**
Inputs:	**24 V DC**	**24 V DC**
Outputs:	**24 V DC**	**Relay**
Supply voltage L+/L1		
• Rated value	24 V DC	100 to 230 V AC
• Permitted range	20.4 to 28.8 V	85 to 264 V AC (47 to 63 Hz)
Input current		
• Max. incl. load	10 A at 28.8 V	20 A at 264 V
• Power consumption max.	85 to 500 mA	20 to 70 mA (24 V) 40 to 140 mA (120 V)
Output voltage for sensors		
• Rated value	L+ (24 V DC)	24 V DC
• Permitted range	25.4 to 28.8 V	20.4 to 28.8 V
Output current for sensors (24 V DC)		
• Rated value	180 mA	180 mA
• Short-circuit protection	Electronic at 600 mA	Electronic at 600 mA
Output current for expansion modules (5 V DC)	340 mA	340 mA
Integrated inputs	**8**	**8**
• Type	Current sinking or sourcing	Current sinking or sourcing
Input voltage		
• Rated value	24 V DC	24 V DC
• At "1" signal	15 V	15 V
• At "0" signal	0 to 5 V	0 to 5 V
Electrical isolation	Optocoupler	Optocoupler
• In groups of	4	4
Input current		
• Nominal value at "1" signal	4 mA	4 mA
Input delay (at rated value of the input voltage)		
• For standard inputs	Every 0.2 to 12.8 ms (settable)	Every 0.2 to 12.8 ms (settable)
• For interrupt inputs	(I0.0 to I0.3) -	(E0.0 to E0.3) -
• For fast counters, max.	(I0.0 to I0.5) 30 kHz	(E0.0 to E0.5) 30 kHz
Connection of 2-wire BERO		
• Permissible quiescent current, max.	1 mA	1 mA

Power supply:	**24 VDC**	**100 to 230 V AC**
Inputs:	**24 V DC**	**24 V DC**
Outputs:	**24 V DC**	**Relay**
Cable lengths		
• Unshielded (not for high-speed signals)	300 m	300 m
• Shielded		
- standard input	500 m	500 m
- high-speed counters	50 m	50 m
On-board outputs	**6 (transistors)** Can be switched in parallel for high output currents	**6 (relays)**
Rated load voltage L+/L1	24 V DC	24 V DC/ 24 to 230 V AC
• Permitted range	20.4 to 28.8 V DC	5 to 30 V DC / 5 to 250 V AC
Output voltage		
• At "1" signal , min.	20 V DC	L+/L1
Electrical isolation	Optocoupler	Relay
• In groups of	6	3
Output current, max.		
• At "1" signal		
- rated value at 40°C	0.75 A	2 A
- rated value at 55°C	0.75 A	2 A
- min. current	-	-
• At "0" signal	10 µA	0 mA
Sum of all output currents per common		
• At 40°C, max.	4.5 A	6.0 A
• At 55°C, max. (horizontal installation)	4.5 A	6.0 A
ON delay		
• Of the standard outputs, max.	(A0.2 to A0.5) 15 µs	(all outputs) 10 ms
• Of the pulse outputs, max.	(A0.0 to A0.1) 2 µs	-
OFF delay		
• Of the standard outputs, max.	(A0.2 to A0.5) 100 µs	(all outputs) 10 ms
• Of the pulse outputs, max.	(A0.0 to A0.1) 10 µs	-
Operating frequency of pulse outputs	(A0.0 to A0.1)	(A0.0 to A0.1)
• For resistive load	20 kHz	-
Switching capacity of the outputs		
• For resistive load	0.75 A	2 A
• For a lamp load	5 W	30 W for 200 W DC for AC
Service life of the contacts (number of switching cycles to VDE 0660, Part 200)		
• Mechanical	-	10 million
• At rated voltage	-	100,000
Limitation of voltage induced on circuit interruption, max.	1 W	-
Short-circuit protection	Provide externally	Provide externally

Technical specifications CPU 222 (continued)

Power supply:	24 V DC	100 to 230 V AC
Inputs:	**24 V DC**	**24 V DC**
Outputs:	**24 V DC**	**Relay**
Cable lengths		
• Unshielded	150 m	150 m
• Shielded	150 m	500 m
Isolation		
• Between 24 V DC and 5 V DC	500 V DC	500 V DC
• Between 24 V DC and 230 V AC	-	1500 V AC

Power supply:	24 V DC	100 to 230 V AC
Inputs:	**24 V DC**	**24 V DC**
Outputs:	**24 V DC**	**Relay**
Dimensions (W x H x D) in mm	90 x 80 x 62	90 x 80 x 62
Weight, approx.	270 g	310 g

Technical specifications CPU 224

Program memory	8 KB
Data memory	5 KB
Memory cartridge (optional)	1 pluggable memory cartridge; content identical to the integrated EEPROM
Program backup	Entire program maintenance-free in the integrated EEPROM
Data backup	Entire DB 1 loaded from programming device/PC in integral EEPROM; maintenance-free
	Current DB 1 values in RAM, retentive flags, timers, counters etc. maintenance-free through super capacitor; optional battery for long-term backup
Backup time typ.	190 hr (minimum 120 hr at 40°C); 200 days (typ.) with optional battery module
Programming language	LAD, FBD and STL
Program organization	1 OB, 1 DB, 1 SDB subroutines with/without parameter passing
Program execution	Free cycle (OB 1) • Interrupt-controlled • Time controlled (1 to 255 ms)
Subroutine levels	64
User program protection	3-level password protection
Operation set	Bit (logic) instructions, comparison instructions, timer instructions, counter instructions, clock instructions, fixed-point arithmetic, floating-point arithmetic, numeric functions, transfer instructions, table instructions, binary logic instructions, shift and rotate instructions, conversion instructions, program control instructions, system interrupt and communication instructions, stack instructions
Execution times for bit operations	0.37 µs
Cycle time monitoring	300 ms (retriggerable)

Bit memories	256
• Of these retentive	0 to 112 in EEPROM, selectable 0 to 256, using super capacitor or battery, selectable
Counter	256
• Of these retentive	256, using super capacitor or battery, selectable
• Counting range	0 to 32767
Timers	256
• Of these retentive	64, using super capacitor or battery, selectable
• Range	4 timers, 1 ms to 30 s 16 timers, 10 ms to 5 min 236 timers, 100 ms to 54 min
Integrated high-speed functions	
• Interrupt inputs	4 (4 positive-going edges and/or 4 negative-going edges)
• Counter	6 fast counters (each with 30 kHz), 32 bits (incl. sign), can be used as up/down counters or for connecting 2 incremental encoders with 2 pulse trains offset by 90° (max. 20 kHz (A/B counters)); with parameterizable enable and reset inputs; interrupt capability (incl. calling a subroutine with random contents) on reaching a setpoint; reversal of direction of counting etc.
• Pulse outputs	2 high-speed outputs, 20 kHz with interrupt option; pulse width and frequency modulation possible

3

Technical specifications CPU 224 (continued)

Interfaces	1 RS 485 communication interface, optionally: As PPI interface with PPI protocol for programming functions, HMI functions (TD 200, OP), S7-200 internal CPU/CPU communication; transmission rates 19.2/187.5 kbit/s • Or as MPI slave for data exchange with MPI masters (S7-300/S7-400 CPUs, OPs, TDs, push-button panels); S7-200-internal CPU/CPU communication is possible to a limited extent on the MPI network; transmission rates 19.2/187.5 kbit/s • Or as user-programmable interface with interrupt capability for serial data exchange with non-Siemens devices at ASCII protocol transmission rates 0.3/0.6/1.2/2.4/4.8/9.6/19.2/38.4 kbit/s; at 1.2 to 38.4 kbit/s the PC/PPI cable can be used as an RS232/RS458 adapter Expansion bus • Connection of expansion modules (EM) [1] Only series S7-22x EMs can be used
Connectable programming units/PC	SIMATIC PG/PC, Standard-PC
Onboard I/Os	
• Plug-in I/O terminals	Yes
• Digital inputs	14
• Digital outputs	10
• Analog potentiometers	2 analog potentiometers; 8 bit resolution
Max. number of inputs / outputs	
• Digital inputs/outputs	94 inputs and 74 outputs
• Analog inputs/outputs	28 Inputs and 7 outputs or 0 inputs and 14 outputs
• AS-Interface inputs/outputs, max.	Max. 31 AS-Interface slaves (CP 243-2)
Expansion, max.	7 expansion boards[1]. Only expansion modules from the S7-22x series may be used
Degree of protection	IP 20 in acc. with IEC 529
Ambient temperature	
• With horizontal installation	0 to 55 °C
• When mounted vertically	0 to 45 °C
Relative humidity	5 to 95% (RH severity level 2 in accordance with IEC 1131-2)
Atmospheric pressure	860 to 1080 hPa
Other environmental conditions	See "S7-200 Programmable Controller System Manual"

1) Because of the limited output current, the use of expansion modules can be subject to restrictions.

Power supply:	**24 V DC**	**100 to 230 V AC**
Inputs:	**24 V DC**	**24 V DC**
Outputs:	**24 V DC**	**Relay**
Supply voltage L+/L1		
• Rated value	24 V DC	100 to 230 V AC
• Permitted range	20.4 to 28.8 V	85 AC to 264 V (47 to 63 Hz)
Input current, typ.	-	-
• Max. incl. load	10 A at 28.8 V	20 A at 264 V
• Power consumption max.	110 to 700 mA	30 to 100 mA (240 V) 60 to 200 mA (120 V)
Output voltage for sensors		
• Rated value	L+ (24 V DC)	24 V DC
• Permitted range	15.4 to 28.8 V	20.4 to 28.8 V
Output current for sensors (24 V DC)		
• Rated value	280 mA	280 mA
• Short-circuit protection	Elektronic at 600 mA	Electronic at 600 mA
Output current for expansion modules (5 V DC)	660 mA	660 mA
Integrated inputs	**14**	**14**
• Type	Current sinking or sourcing	Current sinking or sourcing
Input voltage		
• Rated value	24 V DC	24 V DC
• At signal “1”, min.	15 V	15 V
• At "0" signal	0 to 5 V	0 to 5 V
Electrical isolation	Optocoupler	Optocoupler
• In groups of	6 and 8	6 and 8
Input current		
• At "1" signal	4 mA	4 mA
Input delay (at rated value of the input voltage)		
• For standard inputs	Every 0.2 to 12.8 ms (settable)	Every 0.2 to 12.8 ms (settable)
• For interrupt inputs	(I0.0 to I0.3) -	(I0.0 to I0.3) -
• For fast counters, max.	(I0.0 to I1.5) 30 kHz	(I0.0 to I1.5) 30 kHz
Connection of 2-wire BERO		
• Permissible quiescent current, max.	1 mA	1 mA
Cable lengths		
• Unshielded (not for high-speed signals)	300 m	300 m
• Shielded		
- standard input	500 m	500 m
- high-speed counters	50 m	50 m

Technical specifications CPU 224 (continued)

Power supply:	24 V DC	100 to 230 V AC
Inputs:	**24 V DC**	**24 V DC**
Outputs:	**24 V DC**	**Relay**
On-board outputs	**10 (transistors)** Can be switched in parallel for high output currents	**10 (relays)**
Rated load voltage L+/L1	24 V DC	24 V DC/ 24 to 230 V AC
• Permitted range	20.4 to 28.8 V DC	5 to 30 V DC / 5 to 250 V AC
Output voltage		
• At "1" signal , min.	20 V DC	L+/L1
Electrical isolation	Optocoupler	Relay
• In groups of	5 and 5	3, 3 and 4
Output current, max.		
• At "1" signal		
- rated value at 40°C	0.75 A	2 A
- rated value at 55°C	0.75 A	2 A
- min. current	-	-
• At "0" signal	10 µA	0 mA
Sum of all output currents (horizontal mounting)		
• At 40 °C, max.	3.75 A	8.0 A
• At 55 °C, max.	3.75 A	8.0 A
ON delay		
• Of the standard outputs, max.	(A0.2 to A1.1) 15 µs	(all outputs) 10 ms
• Of the pulse outputs, max.	(A0.0 to A0.1) 2 µs	-

Power supply:	24 V DC	100 to 230 V AC
Inputs:	**24 V DC**	**24 V DC**
Outputs:	**24 V DC**	**Relay**
OFF delay		
• Of the standard outputs, max.	(Q0.2 to Q1.1) 100 µs	(all outputs) 10 ms
• Of the pulse outputs, max.	(Q0.0 to Q0.1) 10 µs	-
Operating frequency of pulse outputs	(Q0.0 to Q0.1)	(A0.0 to A0.1)
• For resistive load	20 kHz	-
Switching capacity of the outputs		
• For resistive load	0.75 A	2 A
• For a lamp load	5 W	30 W for DC 200 W for AC
Service life of the contacts (number of switching cycles to VDE 0660, Part 200)		
• Mechanical	-	10 million
• At rated voltage	-	100,000
Limitation of voltage induced on circuit interruption, max.	1 W	-
Short-circuit protection	Provide externally	Provide externally
Cable lengths		
• Unshielded	150 m	150 m
• Shielded	500 m	500 m
Isolation		
• Between 24 V DC and 5 V DC	500 V DC	1500 V AC
• Between 24 V DC and 230 V AC	-	1500 V AC
Dimensions (W x H x D) in mm	120.5 x 80 x 62	120.5 x 80 x 62
Weight, approx.	360 g	410 g

Technical specifications CPU 226, CPU 226 XM

Program memory	
• CPU 226	8 KB
• CPU 226 XM	16 KB
Data memory	
• CPU 226	5 KB
• CPU 226 XM	10 KB
Memory cartridge (optional)	1 plug-in memory module; contents identical to integrated EEPROM
Program backup	Entire program maintenance-free in integral EEPROM, programmable using CPU
Data backup	Entire DB 1 loaded from PG/PC in integral EEPROM; maintenance-free
	Current values of DB 1 in RAM, retentive bit memories, timers, counters, etc. maintenance-free using power capacitor; Battery for long-term backup optional
Backup time	190 h (at least 120 h at 40°C); 200 days (typically) with optional battery module

Programming language	LAD, FBD and STL
Program organization	1 OB, 1 DB, 1 SDB subroutines with/without parameter passing
Program execution	Free cycle (OB 1) • Interrupt-controlled • Time-controlled (1 to 255 ms)
No. of subroutines, max.	64
User program protection	3-level password protection
Operation set	Bit (logic) instructions, comparison instructions, timer instructions, counter instructions, clock instructions, fixed-point arithmetic, floating-point arithmetic, numeric functions, transfer instructions, table instructions, binary logic instructions, shift and rotate instructions, conversion instructions, program control instructions, system interrupt and communication instructions, stack instructions

Technical specifications CPU 226, 226 XM (continued)

Execution times for bit operations	0.37 µs
Scan time monitoring	At 300 ms, can be retriggered
Bit memories	256
• Of these retentive	0 to 112 in EEPROM, adjustable; 0 to 256, using high-performance capacitor or battery, selectable
Counters	256
• Of these retentive	256, using high-performance capacitor or battery, selectable
• Counting range	0 to 32767
Timers	256
• Of these retentive	64, using super capacitor or battery, selectable
• Range	4 timers, 1 ms to 30 s 16 timers, 10 ms to 5 min 236 timers, 100 ms to 54 min
Integrated high-speed functions	
• Interrupt inputs	4 (4 positive-going edges and/or 4 negative-going edges)
• Counters	6 high-speed counters (each 30 kHz), 32 bit (incl. sign), suitable for use as up/down-counter or for connection of 2 incremental encoder with 2 pulse trains offset at 90° (up to 20 kHz (A/B counter)); parameterizable enable and reset input; Interrupt features (including calling of subroutine of random contents) upon reaching the setpoint; reversal of count direction, etc.
• Pulse outputs	2 high-speed outputs, 20 kHz, with interrupt feature; pulse width and frequency modulation supported
Interfaces	Two RS 485 communications interfaces, optionally:
	As PPI interface with PPI protocol for PG functions, HMI functions (TD 200, OP), S7-200-internal CPU/CPU communication; Transmission speeds 9.6/19.2/187.5 kbit/s • Alternatively as MPI slave for data exchange with MPI masters (S7-300/S7-400-CPUs, OPs, TDs, push button panels); S7-200-internal CPU/CPU communication is possible to a limited extent in MPI network; Transmission speeds 19.2/187.5 kbit/s • Alternatively as freely programmable interface with interrupt feature for serial data exchange with non-Siemens devices having ASCII protocol baud rates: 0.3, 0.6, 1.2, 2.4, 4.8, 9.6, 19.2, 38.4 kbit/s; At 1.2 to 38.4 kbit/s, the PC/PPI cable can be used as a RS232/RS485 adapter

1) Because of the limited output current, the use of expansion modules can be subject to restrictions.

Interfaces (continued)	Expansion bus - connection of expansion modules (EMs)[1]. Only EMs of the S7-22x series can be used	
Connectable programming units/PC	SIMATIC PG/PC, standard-PC	
Onboard I/Os		
• Plug-in I/O terminals	Yes	
• Digital inputs	24	
• Digital outputs	16	
• Analog potentiometers	2 analog potentiometers; 8 bit resolution	
Max. number of inputs /outputs		
• Digital inputs/outputs	128 inputs and 120 outputs	
• Analog inputs/outputs	28 Inputs and 7 outputs or 0 inputs and 14 outputs	
• AS-Interface inputs/outputs, max.	Max. 31 AS-Interface slaves (CP 243-2)	
Expansion, max.	7 expansion modules[1]. Only expansion modules of the S7-22x series can be used	
Degree of protection	IP 20 in accordance with IEC 529	
Ambient temperature		
• With horizontal mounting	0 to 55°C	
• When mounted vertically	0 to 45°C	
Relative humidity	5 to 95% (RH severity level 2 in accordance with IEC 1131-2)	
Atmospheric pressure	860 to 1080 hPa	
Other environmental conditions	See "S7-200 Programmable Controller System Manual"	
Power supply:	**24 V DC**	**100 to 230 V AC**
Inputs:	**24 V DC**	**24 V DC**
Outputs:	**24 V DC**	**Relay**
Supply voltage L+/L1		
• Rated value	24 V DC	100 to 230 V AC
• Permissible range	20.4 to 28.8 V	85 to 264 V AC (47 to 63 Hz)
Input current, typically	-	-
• Max. incl. load	10 A at 28.8 V	20 A at 264 V
• Power consumption max.	150 to 1050 mA	40 to 160 mA (240 V) 80 to 320 mA (120 V)
Output voltage for sensors		
• Rated value	L+ (24 V DC)	24 V DC
• Permissible range	25.4 to 28.8 V	20.4 to 28.8 V
Output current for sensors (24 V DC)		
• Rated value	400 mA	400 mA
• Short-circuit protection	Electronic at approx. 1.5 A	Electronic at approx. 1.5 A
Output current for expansion modules	1000 mA	1000 mA

Technical specifications CPU 226, 226 XM (continued)

Power supply:	24 V DC	100 to 230 V AC
Inputs:	**24 V DC**	**24 V DC**
Outputs:	**24 V DC**	**Relay**
Integrated inputs	**24**	**24**
• Type	Current sinking or sourcing	Current sinking or sourcing
Input voltage		
• Rated value	24 V DC	24 V DC
• At “1” signal, min.	15 V	15 V
• At "0" signal	0 to 5 V	0 to 5 V
Electrical isolation	Optocoupler	Optocoupler
• In groups of	13 and 11	13 and 11
Input current		
• Nominal value at “1” signal	4 mA	4 mA
Input delay (at rated value of the input voltage)		
• For standard inputs	Every 0.2 to 12.8 ms (settable)	Every 0.2 to 12.8 ms (settable)
• For interrupt inputs	(I0.0 to I0.3) -	(I0.0 to I0.3) -
• For fast counters, max.	(I0.0 to I1.5) 30 kHz	(I0.0 to I1.5) 30 kHz
Connection of 2-wire BERO		
• Permissible quiescent current, max.	1 mA	1 mA
Cable lengths		
• Unshielded (not for high-speed signals)	300 m	300 m
• Shielded		
- Standard input	500 m	500 m
- High-speed counters	50 m	50 m
Integrated outputs	**16 (transistors)** Parallel circuit is possible for high output currents	**16 (relays)**
Rated load voltage L+/L1	24 V DC	24 V DC/24 to 230 V AC
• Permissible range	20.4 to 28.8 V DC	5 to 30 V DC/ 5 to 250 V AC
Output voltage		
• At “1" signal, min.	20 V DC	L+/L1
Electrical isolation	Optocoupler	Relay
• In groups of	8 and 8	4, 5 and 7
Output current, max.		
• At "1" signal		
- rated value at 40°C	0.75 A	2 A
- rated value at 55°C	0.75 A	2 A
- min. current	-	-
• At "0" signal	10 µA	0 mA

Power supply:	24 V DC	100 to 230 V AC
Inputs:	**24 V DC**	**24 V DC**
Outputs:	**24 V DC**	**Relay**
Sum of all output currents (horizontal mounting)		
• At 40°C, max.	6.0 A	10.0 A
• At 55°C, max.	6.0 A	10.0 A
ON delay		
• Of the standard outputs, max.	(Q0.2 to Q1.1) 15 µs	(all outputs) 10 ms
• Of the pulse outputs, max.	(Q0.0 to Q0.1) 2 µs	-
OFF delay		
• Of the standard outputs, max.	(Q0.2 to Q1.1) 100 µs	(all outputs) 10 ms
• Of the pulse outputs, max.	(Q0.0 to Q0.1) 10 µs	-
Operating frequency of pulse outputs	(Q0.0 to Q0.1)	(Q0.0 to Q0.1)
• For resistive load	20 kHz	-
Switching capacity of the outputs		
• For resistive load	0.75 A	2 A
• For lamp load	5 W	30 W for DC 200 W for AC
Service life of the contacts (number of switching cycles to VDE 0660, Part 200)		
• Mechanical	-	10 million
• At rated voltage	-	100,000
Limitation of voltage induced on circuit interruption, max.	1 W	-
Short-circuit protection	Provide externally	Provide externally
Cable lengths		
• Unshielded	150 m	150 m
• Shielded	500 m	500 m
Isolation		
• Between 24 V DC and 5 V DC	500 V DC	500 V DC
• Between 24 V DC and 230 V AC	--	1500 V AC
Dimensions (W x H x D) in mm	196 x 80 x 62	196 x 80 x 62
Weight, approx.	550 g	660 g

CPU 221, 222, 224, 226, 226 XM

Ordering data	Order No.
CPU 221	
Compact CPU, main memory 4 Kbyte, power supply 24 V DC, 6 DI/4 DO integrated	**6ES7 211-0AA22-0XB0**
Compact CPU, main memory 4 Kbyte, power supply 100 to 230 V AC, 6 DI/ 4 DO integrated, relay outputs	**6ES7 211-0BA22-0XB0**
CPU 222	
Compact CPU, expandable, main memory 4 Kbyte, power supply 24 V DC, 8 DI/6 DO integrated	**6ES7 212-1AB22-0XB0**
Compact CPU, expandable, main memory 4 Kbyte, power supply 100 to 230 V AC, 8 DI/6 DO integrated, relay outputs	**6ES7 212-1BB22-0XB0**
CPU 224	
Compact CPU, expandable, main memory 8 Kbyte, power supply 24 V DC, 14 DI/ 10 DO integrated	**6ES7 214-1AD22-0XB0**
Compact CPU, expandable, main memory 8 Kbyte, power supply 100 to 230 V AC, 14 DI/ 10 DO integrated, relay outputs	**6ES7 214-1BD22-0XB0**
CPU 226	
Compact CPU, expandable, main memory 8 Kbyte, power supply 24 V DC, 24 DI/ 16 DO integrated	**6ES7 216-2AD22-0XB0**
Compact CPU, expandable, main memory 8 Kbyte, power supply 100 to 230 V AC, 24 DI/ 16 DO integrated, relay outputs	**6ES7 216-2BD22-0XB0**
CPU 226 XM	
Compact CPU, expandable, main memory 16 Kbyte, power supply 24 V DC, 24 DI/ 16 DO integrated	**6ES7 216-2AF22-0XB0**
Compact CPU, expandable, main memory 16 Kbyte, power supply 100 to 230 V AC, 24 DI/ 16 DO integrated, relay outputs	**6ES7 216-2BF22-0XB0**
MC 291 memory cartridge, EEPROM	
for CPU 221/222//224/226	**6ES7 291-8GE20-0XA0**
Grounding terminal	
10 units	**6ES5 728-8MA11**
Front flap set	
contains various cover flaps for CPUs and EMs; spare part	**6ES7 291-3AX20-0XA0**
SIM 274 simulator (optional)	
with 8 terminals for CPU 221/222	**6ES7 274-1XF00-0XA0**
with 14 terminals for CPU 224	**6ES7 274-1XH00-0XA0**

	Order No.
SIM 274 simulator (optional)	
with 24 terminals for CPU 226/226 XM	**6ES7 274-1XK00-0XA0**
Terminal block for field-level wiring (optional)	
12-pin, for CPU 221/222, 10 units	**6ES7 290-2AA00-0XA0**
for CPU 224, 10 units	**6ES7 290-2BA00-0XA0**
Pluggable terminal block (spare part)	
with 12 interfaces (for CPU 22x)	**6ES7 292-1AE20-0AA0**
with 14 interfaces (for CPU 226/ 226 XM)	**6ES7 292-1AF20-0AA0**
with 18 interfaces (for CPU 224)	**6ES7 292-1AG20-0AA0**
PC to PPI cable	**6ES7 901-3BF21-0XA0**
5 m; with integral RS 232C/RS 485 adapter, between S7-200 and PC or data terminal equipment such as printers, bar-code readers; Electrical isolation by optocouplers	
MPI cable	**6ES7 901-0BF00-0AA0**
5 m; for connecting the S7-200 to MPI	
Bus backplane extension cable	**6ES7 290-6AA20-0XA0**
for interconnection of the two rows of devices with double-row configuration, for CPU 222/224/ 226/226 XM	
Optional battery module	**6ES7 291-8BA20-0XA0**
Optional combined clock and battery module	**6ES7 297-1AA20-0XA0**
only for CPU 221/222	
S7-200 programmable controller, system manual	
for CPU 221/222/224/226 and STEP 7-Micro/Win32 V3.2	
German	**6ES7 298-8FA22-8AH0**
English	**6ES7 298-8FA22-8BH0**
French	**6ES7 298-8FA22-8CH0**
Spanish	**6ES7 298-8FA22-8DH0**
Italian	**6ES7 298-8FA22-8EH0**
SIMATIC Manual Collection	**6ES7 998-8XC01-8YE0**
Electronic manuals on CD-ROM, in 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	
SIMATIC Manual Collection updating service for 1 year	**6ES7 998-8XC01-8YE2**
Current Manual Collection CD as well as the three following updates	
Programming software STEP 7-Micro/WIN32 V3.1	See Section 8

Ordering data	Order No.
PROFIBUS IP 20 bus connector with 90° cable outlet	
• Without PG interface	**6ES7 972-0BA12-0XA0**
• With PG interface	**6ES7 972-0BB12-0XA0**
PROFIBUS IP 20 bus connector with 35° cable outlet	
• Without PG interface	**6ES7 972-0BA41-0XA0**
• With PG interface	**6ES7 972-0BB41-0XA0**

	Order No.
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 972-0AA01-0XA0**

EM 221, EM 222, EM 223

Overview



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

Technical specifications EM 221

	DC	AC
6ES7 221-	1BF22-0XA0	1EF22-0XA0
Plug-in I/O terminals	CPU 22x	CPU 22x
Number of inputs	Yes	Yes
Type	8	8
Input voltage	Choice of sink input or source input per group	IEC type 1
• Rated value		
• At "1" signal	24 V DC	220/230 V AC (47 to 63 Hz)
• At "0" signal	15 to 30 V	79 V AC (at 2.5 mA min.)
Electrical isolation	0 to 5 V	20 V AC or 1 mA AC max.
• In groups of	Optocoupler	Optocoupler
Input current	4	1 (8 groups)
• At "1" signal		
Plug-in I/O terminals	4 mA	Min. 2.5 mA

	DC	AC
6ES7 221-	1BF22-0XA0	1EF22-0XA0
Input delay		
• For rated value of the input voltage	4.5 ms	15 ms
Connection of 2-wire BERO		
• Permissible quiescent current	1 mA	1 mA
Line length		
• Unshielded	300 m	300 m
• Shielded	500 m	500 m
Current consumption		
• From backplane bus	30 mA	30 mA
• From 24 V DC		
Power loss typ.	2 W	3 W
Dimensions (W x H x D) in mm	46 x 80 x 62	71.2 x 80 x 62
Weight	150 g	160 g

Technical specifications EM 222

	DC	Relay	AC
6ES7 222-	1BF22-0XA0	1HF22-0XA0	1EF22-0XA0
For connection to	S7-22x series	S7-22x series	S7-22x series
Plug-in I/O terminals	Yes	Yes	Yes
Number of outputs	8	8	8
Rated load voltage L+/L1	24 V DC	24 V DC, 24 to 230 V AC	220/230 V AC(47 to 63 Hz)
• Permitted range	20.4 to 28.8 V DC	5 to 30 V DC, 5 to 250 V AC	65 to 264 V AC
Output voltage			
• At "1" signal, min.	20 V	-	L_1 - 0.9 V
Electrical isolation	Optocoupler	Relay	Optocoupler
• In groups of	4	4	1 (8 Groups)
Output current, max.			
• At "1" signal			
- rated value at 40 °C	0.75 A	2.0 A	0.5 A (AC)
- rated value at 55 °C	0.75 A	2.0 A	0.5 A (AC)
- min. current	-	-	0.05 A
• At "0" signal	10 µA	0 mA	1.8 mA at 264 V AC

Technical specifications EM 222 (continued)

	DC	Relay	AC
6ES7 222-	**1BF22-0XA0**	**1HF22-0XA0**	**1EF22-0XA0**
Sum of all output currents			
• At 40 °C	3.0 A	8.0 A	0.5 A/group
• At 55°C (mounted horizontally)	3.0 A	8.0 A	0.5 A/group
Maximum current per conductor/group (mounted horizontally and vertically)	3 A Parallel circuit is possible for high output currents	8 A	0.5 A
Switching capacity of outputs (1 output to 40 °C)			
• For resistive load	0.75 A	2 A	0,5 A
• For inductive load	0.75 A	2 A	0,5 A
• For lamp load	5 W	30/200 W (DC/AC)	60 W
Service life of the contacts			
• Mechanical	-	10×10^6	-
• At rated voltage	-	100,000	-
Voltage induced on circuit interruption limited to (internally)	L+ - 48 V	Provide externally (see manual "Configuring an S7-200")	Provide externally (see manual "Configuring an S7-200")
Short-circuit protection	Provide externally (see manual "Configuring an S7-200")	Provide externally	Provide externally
Line length			
• Unshielded	150 m	150 m	150 m
• Shielded	500 m	500 m	500 m
Current consumption			
• From backplane bus	50 mA	40 mA	110 mA
• From L+/L1	-	72 mA (9 mA per connected output)	-
Power loss typ.	2 W	2 W	4 W
Dimensions (W x H x D) in mm	45 x 80 x 62	45 x 80 x 62	71.2 x 80 x 62
Weight	150 g	170 g	170 g

Technical specifications EM 223

	4 I/4 O	8 I/8 O	16 I/16 O	4 I/4 O	8 I/8 O	16 I/16 O
6ES7 223-	**1BF22-0XA0**	**1BH22-0XA0**	**1BL22-0XA0**	**1HF22-0XA0**	**1PH22-0XA0**	**1PL22-0XA0**
Inputs:	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC
Outputs:	24 V DC	24 V DC	24 V DC	Relay	Relay	Relay
For connection to	S7-22x series	S7-22x series	S7-22x series	S7-22x series	S7-22x series	S7-22x series
Plug-in I/O terminals	Yes	Yes	Yes	Yes	Yes	Yes
Inputs	**4**	**8**	**16**	**4**	**8**	**16**
Input voltage						
• Rated value	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC
• At "1" signal	15 to 30 V DC	15 to 30 V DC	15 to 30 V DC	15 to 30 V DC	15 to 30 V DC	15 to 30 V DC
• At "0" signal	0 to 5 V	0 to 5 V	0 to 5 V	0 to 5 V	0 to 5 V	0 to 5 V
Isolation	Optocoupler	Optocoupler	Optocoupler	Optocoupler	Optocoupler	Optocoupler
• In groups of	4	4	4	4	4	8
• Tested for	500 V AC	500 V AC	500 V AC	500 V AC	500 V AC	500 V AC
Input current						
• At "1" signal	4 mA	4 mA	4 mA	4 mA	4 mA	4 mA
Input delay						
• For rated value of the input voltage	4.5 ms	4.5 ms	4.5 ms	Max. 4.5 ms	Max. 4.5 ms	Max. 4.5 ms

Technical specifications EM 223 (continued)

	4 I/4 O	8 I/8 O	16 I/16 O	4 I/4 O	8 I/8 O	16 I/16 O
6ES7 223-	**1BF22-0XA0**	**1BH22-0XA0**	**1BL22-0XA0**	**1HF22-0XA0**	**1PH22-0XA0**	**1PL22-0XA0**
Connection of two-wire BEROs						
• Permissible quiescent current	1 mA	1 mA	1 mA	1 mA	1 mA	1 mA
Outputs	**4**	**8**	**16**	**4**	**8**	**16**
Rated load voltage L+/L1	24 V DC	24 V DC	24 V DC	24 V DC/24 to 230 V AC	24 V DC/24 to 230 V AC	24 V DC/24 to 230 V AC
• Permissible range	20.4 to 28.8 V DC	20.4 to 28.8 V DC	20.4 to 28.8 V DC	5 to 30 V DC/ 5 to 250 V AC	5 to 30 V DC/ 5 to 250 V AC	5 to 30 V DC/ 5 to 250 V AC
Output voltage						
• At "1" signal, min.	20 V	20 V	20 V	L+/L1	L+/L1	L+/L1
• At "0" signal, max. (with 10 kΩ load)	0.1 V DC	0.1 V DC	0.1 V DC	0.1 V DC	0.1 V DC	0.1 V DC
Isolation	Optocoupler	Optocoupler	Optocoupler	Relay	Relay	Relay
• In groups of	4	4	4/4/8	4	4	4
Output current, max.						
• At "1" signal	0.75 A	0.75 A	0.75 A	2 A	2 A	2 A
- minimum current	-	-	-	-	-	-
Max. current per conductor/group	3 A	3 A	3/3/6 A	8 A	8 A	8 A
Contact rating[1]						
• For resistive load	0.75 A per output	0.75 A per output	0.75 A per output	0.75 A per output	0.75 A per output	0.75 A per output
• For inductive load	0.75 A per output[2]	0.75 A per output[2]	0.75 A per output[2]	0.75 A per output[2]	0.75 A per output[2]	0.75 A per output[2]
• For lamp load	5 W	5 W	5 W	30/200 W (DC/AC)	30/200 W (DC/AC)	30/200 W (DC/AC)
Life of the contacts (no. of switching operations) to VDE 0660, Part 200						
• Mechanical	-	-	-	10 million	10 million	10 million
• For rated load voltage	-	-	-	100,000	100,000	100,000
Voltage induced on circuit interruption limited to (internally)	L+ - 48 V	L+ - 48 V	L+ - 48 V	-	-	-
General						
Short circuit protection	Provide externally	Provide externally	Provide externally	Provide externally	Provide externally	Provide externally
Line length						
• Unshielded	150 m	150 m	150 m	150 m	150 m	150 m
• Shielded	500 m	500 m	500 m	500 m	500 m	500 m
Current consumption						
• From backplane bus	40 mA	80 mA	160 mA	40 mA	80 mA	150 mA
• From sensor supply or external power supply (24 V DC)	-	-	-	72 mA	72 mA	72 mA
• From (24 V DC) coil current	-	-	-	9 mA per output at "1" signal	9 mA per output at "1" signal	9 mA per output at "1" signal
Power loss typically	2 W	3 W	6 W	2 W	3 W	6 W
Dimensions (W x H x D) in mm	46 x 80 x 62	71.2 x 80 x 62	137.5 x 80 x 62	46 x 80 x 62	71.2 x 80 x 62	137.5 x 80 x 62
Weight approx.	160 g	200 g	360 g	160 g	300 g	400 g

1) 1 output up to 40°C; request details of several outputs and higher temperatures
2) $0.5 \times F \times L \times I^2 < 1$ W (F: Frequency; L: Inductance; I: Current)

Ordering data	Order No.
EM 221 digital input module	
for CPU 222/224/226/226 XM	
• 8 inputs, 24 V DC, electrically isolated, sink input and source input	**6ES7 221-1BF22-0XA0**
• 8 inputs, 120/230 V AC, electrically isolated, sink input and source input	**6ES7 221-1EF22-0XA0**
EM 222 digital output module	
for CPU 222/224/226/226 XM	
• 8 outputs, 24 V DC; 0.75 A, electrically isolated	**6ES7 222-1BF22-0XA0**
• 8 outputs, 24 V DC / 24 to 230 V AC; 2 A, electrically isolated, relay outputs	**6ES7 222-1HF22-0XA0**
• 8 outputs, 120/230 V AC; 0.5 A, electrically isolated	**6ES7 222-1EF22-0XA0**
EM 223 digital input/output module	
for CPU 222/224/226/226 XM	
• 4 inputs, 24 V DC, 4 outputs, 24 V DC; 0.75 A, electrically isolated	**6ES7 223-1BF22-0XA0**
• 8 inputs, 24 V DC, 8 outputs, 24 V DC; 0.75 A, electrically isolated	**6ES7 223-1BH22-0XA0**
• 16 inputs, 24 V DC, 16 outputs, 24 V DC; 0.75 A, electrically isolated	**6ES7 223-1BL22-0XA0**

	Order No.
EM 223 digital input/output module (continued)	
• 4 inputs, 24 V DC, 4 outputs, relay	**6ES7 223-1HF22-0XA0**
• 8 inputs, 24 V DC, 8 outputs, relay	**6ES7 223-1PH22-0XA0**
• 16 inputs, 24 V DC, 16 outputs, relay	**6ES7 223-1PL22-0XA0**
Front flap set	
contains various cover flaps for CPUs and EMs; spare part	**6ES7 291-3AX20-0XA0**
Pluggable terminal block (spare part)	
• with 7 terminals (for EM 221/222)	**6ES7 292-1AD20-0AA0**
• with 12 terminals (for EM 223)	**6ES7 292-1AE20-0AA0**
SIM 274 simulator (optional)	
with 8 terminals for EM 221 and EM 223	**6ES7 274-1XF00-0XA0**
S7-200 programmable system manual	
for CPU 221/222/224/226 and STEP 7-Micro/Win32 V3.2	
German	**6ES7 298-8FA22-8AH0**
English	**6ES7 298-8FA22-8BH0**
French	**6ES7 298-8FA22-8CH0**
Spanish	**6ES7 298-8FA22-8DH0**
Italian	**6ES7 298-8FA22-8EH0**

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
For connection to	S7-22x series
Plug-in I/O terminals	No
Number of inputs	4, differential
Polarity reversal protection	No
Input ranges/input resistance	0 to 5 V/10 MΩ 0 to 10 V/10 MΩ ±2.5 V/10 MΩ ±5 V/10 MΩ 0 to 20 mA/10 MΩ
Acceptable input voltage for voltage input, max.	30 V
Acceptable input current for current input, max.	32 mA
Isolation	No
Analog-to-digital conversion time	250 µs
Converter	12 bit
Resolution	Refer to manual

6ES7 231-	0HC22-0XA0
Noise voltage suppression	40 dB, DC to 60 V
For interference frequency	50/60 Hz
Common mode voltage, max.	12 V
Representable conversion range	
Unipolar signals	0 to 32,000
Bipolar signals	-32,000 to +32,000
Characteristic linearization	No
Temperature compensation	No
Diagnostics	LED, EXTF
Current consumption	
From backplane bus (5 V DC)	20 mA
From sensor supply or external power supply (24 V DC)	60 mA
Power loss typically	2 W
Dimensions (W x H x D) in mm	71.2 x 80 x 62
Weight	183 g

Technical specifications EM 232

6ES7 232-	0HB22-0XA0
For connection to	S7-22x series
Plug-in I/O terminals	No
Outputs	**2**
Output ranges	
• Voltage outputs	-10 to +10 V
• Current outputs	4 to 20 mA
Load resistor	
• Voltage outputs min.	5 kΩ
• Current outputs max.	0.5 kΩ
Electrical isolation	No
Resolution	
• For voltage output	12 bit
• For current output	11 bit
Transient recovery time	
• For voltage output	100 µs
• For current output	2 ms

6ES7 232-	0HB22-0XA0
Representable conversion range	
• Unipolar signals	0 to 32,000
• Bipolar signals	-32,000 to +32,000
Operating error limit (0 to 60°C, referred to the output range)	
• Voltage	2.0%
• Current	2.0%
Basic error threshold (operating error threshold at 25°C, with reference to output range)	
• Voltage	0.5%
• Current	0.5%
General	
Current consumption	
• From backplane bus (5 V DC)	20 mA
• From sensor supply or external power supply (24 V DC)	70 mA

Technical specifications EM 232 (continued)

6ES7 232-	0HB22-0XA0
Power loss typ.	2.0 W
Dimensions (W x H x D) in mm	46 x 80 x 62
Weight	148 g

Technical specifications EM 235

6ES7 235-	0KD22-0XA0
For connection to	S7-22x series
Plug-in I/O terminals	No
Inputs	**4, differential**
Polarity reversal protection	-
Input ranges/input resistance	0 to 50 mV 0 to 100 mV 0 to 500 mV 0 to 1 V 0 to 5 V 0 to 10 V 0 to 20 mA ± 25 mV ± 50 mV ± 100 mV ± 250 mV ± 500 mV ± 1 V ± 2,5 V ± 5 V ± 10 V
Acceptable input voltage for voltage input, max.	30 V
Acceptable input current for current input, max.	32 mA
Isolation	No
Converter	12 bit
Analog-to-digital conversion time	< 250 µs
Resolution	Refer to manual
Noise voltage suppression	40 dB, DC to 60 Hz
• For interference frequency	None
Common mode voltage, max.	12 V
Representable conversion range	
• Unipolar signals	0 to 32,000
• Bipolar signals	-32,000 to + 32,000
Characteristic linearization	No
Temperature compensation	No
Diagnostics	LED, EXTF

6ES7 235-	0KD22-0XA0
Outputs	**1**
Output ranges	
• Voltage outputs	-10 to +10 V
• Current outputs	0 to 20 mA
Load resistor	
• Voltage outputs min.	5 kΩ
• Current outputs max.	0.5 kΩ
Isolation	No
Resolution	
• For voltage output	12 bit
• For current output	11 bit
Transient recovery time	
• For voltage output	100 µs
• For current output	2 ms
Representable conversion range	
• Unipolar signals	0 to 32,000
• Bipolar signals	-32,000 to +32,000
Operating error limit (0 to 60°C, referred to the output range)	
• Voltage	± 2%
• Current	± 2%
Basic error limits (basic error limit at 25°C, referred to output range)	
• Voltage	± 0.5%
• Current	± 0.5%
General	
Current consumption	
• From backplane bus (5 V DC)	30 mA
• From sensor power supply or external power supply (24 V DC)	60 mA
Power loss typically	2.0 W
Dimensions (W x H x D) in mm	71.2 x 80 x 62
Weight	186 g

Ordering data

	Order No.
EM 231 analog input module for CPU 222/224/226; 4 inputs, 0-10 V, resolution 12 bit	**6ES7 231-0HC22-0XA0**
EM 232 analog output module for CPU 222/224/226; 2 outputs, ± 10 V, resolution 12 bit	**6ES7 232-0HB22-0XA0**
EM 235 analog input/output module for CPU 222/224/226; 4 inputs, 1 output, ±10 V DC, resolution 12 bit	**6ES7 235-0KD22-0XA0**

	Order No.
Grounding terminal 10 units	**6ES5 728-8MA11**
Front flap set contains various cover flaps for CPUs and EMs; spare part	**6ES7 291-3AX20-0XA0**
S7-200 programmable controller, system manual	See page 3/14

EM 231 thermocouple module

3

Overview



- For user-friendly acquisition of temperatures with high precision
- 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

Suitable for connection to	S7-222/224/226
Plug-in I/O terminals	No
Number of inputs	**4, analog**
Input ranges/ input impedance	TC types: S, T, R, E, N, K, J/ > 1 MΩ, Voltage range ± 80 mV/ > 1 MΩ
Acceptable input voltage for voltage input, max.	30 V DC
Electrical isolation	Yes
• Field side to logic	500 V AC
• Field side to 24 V DC	500 V AC
• 24 V DC to logic	500 V AC
Update time	405 ms (all channels)
Principle of measurement	SIGMA-DELTA
Resolution	15 bit + sign
• Temperature	0.1 °C/0.1 °F
• Voltage	15 bit + sign
Noise suppression for noise frequency	85 dB
• For noise frequency	50/60/400 Hz

Common-mode voltage	120 V AC
Common-mode rejection, min.	120 dB at 120 V AC
Displayable conversion value range	
• Bipolar signals	-27,648 to +27,648
Basic error	0.1% FS (voltage)
Repeatability	0.05% FS
Cold junction error	±1.5 °C
Diagnostics	LED: EXTF, SF
Cable length, max.	100 m to sensor
Cable loop resistance, max.	100 Ω
Current consumption	
• From backplane bus (5 V DC)	87 mA
• From L+	60 mA
Power loss	1.8 W
Dimensions (W x H x D) in mm	71.2 x 80 x 62
Weight	210 g

Ordering data

	Order No.
EM 231 thermocouple module 4 inputs +/- 80 mV, resolution 15 bit + sign, thermocouple elements type J, K, S, T, R, E, N	**6ES7 231-7PD22-0XA0**
Grounding terminal 10 units	**6ES5 728-8MA11**

	Order No.
Bus backplane extension cable for interconnection of the two rows of devices with double-row configuration, for CPU 222/224/226/226 XM	**6ES7 290-6AA20-0XA0**
S7-200 programmable controller, system manual for CPU 221/222/224/226 and STEP 7-Micro/Win32 V3.2	
German	**6ES7 298-8FA22-8AH0**
English	**6ES7 298-8FA22-8BH0**
French	**6ES7 298-8FA22-8CH0**
Spanish	**6ES7 298-8FA22-8DH0**
Italian	**6ES7 298-8FA22-8EH0**

Overview



- For user-friendly acquisition of temperatures with high precision
- Supports 31 standard resistance temperature sensors
- Easy to install in an existing system

Technical specifications

Suitable for connection to	S7-222/224/226
Plug-in I/O terminals	No
Number of inputs	**2, analog**
Input ranges/ input impedance	RTD types: • Pt 100 Ω, 200 Ω, 500 Ω, 1000 Ω (α = 3850 ppm, 3920 ppm, 3850,55 ppm, 3916 ppm, 3902 ppm) • Pt 10000 Ω (α = 3850 ppm) • Cu 9.035 Ω (α = 4270 ppm) • Ni 10 Ω, 120 Ω, 1000 Ω (α = 6720 ppm, 6178 ppm) • R 150 Ω, 300 Ω, 600 Ω FS
Input resistance	min. 10 MΩ
Acceptable input voltage for voltage input, max.	30 V DC (sensor) 5 V DC (source)
Electrical isolation	Yes
• Field side to logic	500 V AC
• Field side to 24 V DC	500 V AC
• 24 V DC to logic	500 V AC
Update time	405 ms (all channels) (700 ms for Pt 10000)
Principle of measurement	SIGMA-DELTA

Resolution	15 bit + sign
• Temperature	0.1°C/0.1°F
• Resistance	15 bit + sign
Noise suppression for noise frequency	85 dB
• For noise frequency	50/60/400 Hz
Common-mode voltage	0
Common-mode rejection, min.	120 dB at 120 V AC
Displayable conversion value range	
• Bipolar signals	-27.648 to +27.648
Basic error	0.1% FS (voltage)
Repeatability	0.05% FS
Diagnostics	LED: EXTF, SF
Cable length, max.	100 m to sensor
Cable loop resistance	20 Ω (max. 2.7 Ω for copper)
Current consumption	
• From backplane bus (5 V DC)	87 mA
• From L+	60 mA
Power loss	1.8 W
• Sensor, max.	1 mW
Dimensions (W x H x D) in mm	71.2 x 80 x 62
Weight	210 g

Ordering data

	Order No.
EM 231 RTD module 2 inputs for resistance temperature sensors Pt100/200/500/1000/10000, Ni100/120/1000, Cu10; resistance 150/300/600 Ohm, resolution 15 bit + sign	**6ES7 231-7PB22-0XA0**
Grounding terminal 10 units	**6ES5 728-8MA11**

	Order No.
Bus backplane extension cable for interconnection of the two rows of devices with double-row configuration, for CPU 222/224/226/226 XM	**6ES7 290-6AA20-0XA0**
S7-200 programmable controller, system manual for CPU 221/222/224/226 and STEP 7-Micro/Win32 V3.2	
German	**6ES7 298-8FA22-8AH0**
English	**6ES7 298-8FA22-8BH0**
French	**6ES7 298-8FA22-8CH0**
Spanish	**6ES7 298-8FA22-8DH0**
Italian	**6ES7 298-8FA22-8EH0**

EM 253 positioning module

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 start-up

Technical specifications

General specifications	
Number of modules that can be used (limited by current input from the backplane bus)	
• With CPU 222, max.	1
• With CPU 224, max.	3
• With CPU 226/226XM, max.	5
Supply voltage	11 to 30 V DC
Current consumption	
• From backplane bus	190 mA
• From 12/24 V DC, max.	12V DC: 300mA/24V DC: 130mA
Isolation	
• L+ to the logic	500 V AC
• I+ to the inputs	500 V AC
• L+ to the outputs	-
Dimensions (W x H x D) in mm	71.2 x 80 x 62
Weight, approx.	190 g
Drive interface	
Signal outputs	
Number of inputs	4
Type	RS422/RS485 or 5 V DC
Output signals	
• RS422	P0+, P0-, P1+, P1-
• 5 V DC	P0, P1, DIS, CLR
Electrical isolation	Yes
Switching frequency, max.	200 kHz (P0+,P0-,P1+,P1-,P0,P1)
Line length	
• Unshielded	1 m
• Shielded	10 m
RS422	
Differential output voltage, min.	2.8 V (R_L = 200 Ω)
DC 5 V	
Output voltage, max.	30 V DC
Output current, max.	50 mA
Output delay (DIS, CLR), max.	30 µs
Digital inputs	
Number of inputs	5
Type	According to IEC Type 1, sink
Functions	• Stop (STP) • Reference point switch (RPS) • Upper limit (LMT+) • Lower limit (LMT-) • Zero point (ZP)
Electrical isolation	Yes
• In groups of	1 (STP, RPS, ZP)/2 (LMT-, LMT+)
Input delay	
• STP, RPS, LMT+, LMT-	0.2 to 12.8 ms (parameterizable)
• ZP	Min. 2 µs
Input voltage	
• Rated value	24 V DC
• At "0" signal, max.	
- STP, RPS, LMT+, LMT-	5 V DC
- ZP	1 V DC
• At "1" signal, min.	
- STP, RPS, LMT+, LMT-	15 V DC
- ZP	3 V DC
Input current, min.	
Connection of two-wire BEROs	Yes
• Leakage current, max.	1 mA
Line length	
• Unshielded	
- STP, RPS, LMT+, LMT-	30 m
- ZP	Not recommended
• Shielded	
- STP, RPS, LMT+, LMT-	100 m
- ZP	10 m

Ordering data

	Order No.
EM 253 positioning module for control of stepper motors or servo drives	**6ES7 253-1AA22-0XA0**
Grounding terminal 10 units	**6ES5 728-8MA11**
Bus backplane extension cable	**6ES7 290-6AA20-0XA0**
S7-200 programmable controller, system manual	See page 3/14

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 to the communications interface of the CPU
- Easy to retrofit

Technical specifications

Outputs (process image)	8, for internal modem functions
Rated load voltage L+/L1	24 V DC
• Permitted range	20.4 to 28.8 V DC
Telephone connection	RJ11 (4 wires, 6 contacts)
Dialling mode	Pulse dialling mode Tone dialling mode
Communication protocols	PPI, Modbus
Modem standards	Bell 103, Bell 212, V. 21, V. 22, V. 22 to, V. 23c, V. 32, V. 32 to, V. 34 (preset)

Isolation	
• Telephone cable to logic or field side	1500 V AC
• Field side to logic	500 V AC
Current consumption	
• From expansion bus	80 mA
• From L+/L1	70 mA
Power losses, typically	2.1 W
Dimensions (W x H x D) in mm	71.2 x 80 x 62
Weight	190 g

Ordering data

	Order No.
EM 241 modem Analog modem for remote maintenance/diagnostics; CPU-CPU/PC communication, transmission of SMS/pager messages	**6ES7 241-1AA22-0XA0**
Grounding terminal 10 units	**6ES5 728-8MA11**

	Order No.
Bus backplane extension cable for interconnection of the two rows of devices with double-row configuration, for CPU 222/224/226/226 XM	**6ES7 290-6AA20-0XA0**
S7-200 programmable controller, system manual for CPU 221/222/224/226 and STEP 7-Micro/Win32 V3.2	
German	**6ES7 298-8FA22-8AH0**
English	**6ES7 298-8FA22-8BH0**
French	**6ES7 298-8FA22-8CH0**
Spanish	**6ES7 298-8FA22-8DH0**
Italian	**6ES7 298-8FA22-8EH0**

EM 277 PROFIBUS-DP module

Overview



- For connection of the S7-22x to PROFIBUS-DP (as slave) and MPI
- Can be simultaneously operated as MPI slave and DP slave
- Transmission rate max. 12 Mbit/s
- Can be used with CPU from version 6ES7 22x-xxx**21**-xxxx

Technical specifications

Suitable for connection to	CPU 22x
• Plug-in I/O terminals	No
• Number of outputs	1
Type	RS 485
Isolation	
• Between external signal and control circuits	500 V AC (electrical)
Signal and diagnostic displays (LEDs)	• CPU fault • Power supply • DP fault • DX mode
Power supply using communications port	
• 5 V DC	
- output current	90 mA
- isolation between output and module and between output and 24 V DC power supply	500 V AC (max. 1 min.)
• 24 V DC	
- voltage range	20.4 to 28.8 V
- output current	120 mA
- overcurrent protection	0.7 to 2.4 A
- isolation	No; same circuit as for 24 V DC power supply
Protocols	• PROFIBUS DP (slave) • MPI (slave)

Current consumption	
• Over backplane bus (5 V DC)	150 mA
• External supply using sensor power supply (24 V DC)	30 to 180 mA
Power loss	2.5 W
Dimensions (W x H x D) in mm	71 x 80 x 62
Weight	175 g
Communication	
PROFIBUS DP transmission rates (self-setting)	9.6/19.2/45.45/93.75/187.5/500/1000/1500/3000/6000/ 12000 kbit/s
Cable lengths	100 to 1200 m, depending on transmission rate
DP station address	0 to 99, programmable
Number of stations per segment, max.	32
Number of stations in the network, max.	126, max. 99 of which EM 277
MPI connections, max.	6; 1 each reserved for programming device and OP
Connectable nodes	• TD 200 Version 2.0 or higher • OP • TP • Programming device/PC • S7-300/-400 • PROFIBUS DP master

Ordering data

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

Overview



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

- Connection of up to 62 AS-Interface slaves and integrated analog value transmission (according to expanded AS-Interface Specification V2.1)
- Supports all AS-Interface master functions according to expanded AS-Interface Specification V2.1
- Display of operating status and operational readiness of the connected slaves through LEDs in the frontplate
- Display errors (e.g. AS-Interface voltage errors, configuration errors) using LEDs in the frontplate
- Compact housing in the design of the innovative SIMATIC S7-200 generation

Technical specifications

AS-Interface Specification	V2.1
Interfaces	
• Address space used in the PLC	Corresponding to 2 I/O modules (8 DI/8 DO and 8 AI/8 AO)
• AS-Interface connection	Terminal
Current consumption	
• Through AS-Interface	Max. 100 mA
• Through backplane bus	Typ. 220 mA at DC 5V
Power loss	Approx. 2 W

Permissible ambient conditions	
• Operating temperature	
- horizontal installation	0 °C to +55 °C
- vertical installation	0 °C to +45 °C
• Transport/storage temperature	- 40 °C to +70 °C
• Relative humidity	Max. 95% at +25 °C
Design	
• Module format	S7-22x expansion module
• Dimensions (W x H x D) in mm	71.2 x 80 x 62 (H+16 mm with holes for fixing to the wall)
• Weight	Approx. 250 g
• Space required	1 slot

Ordering data

	Order No.
CP 243-2 communications processor for connecting SIMATIC S7-200 to AS-Interface	**6GK7 243-2AX01-0XA0**

	Order No.
CP 243-3 manual incl. AS-Interface basics and diskette with example programs	
German	**6GK7 243-2AX00-8AA0**
English	**6GK7 243-2AX00-8BA0**
French	**6GK7 243-2AX00-8CA0**
Spanish	**6GK7 243-2AX00-8DA0**
Italian	**6GK7 243-2AX00-8EA0**

CP 243-1

Overview



- For connecting to Industrial Ethernet with
  - 10/100 Mbit/s
  - Half/Full Duplex
  - RJ45 socket connector
  - TCP/IP
- Configuring, remote programming and service with STEP 7-Micro/WIN using Industrial Ethernet possible (programm up-/download, status)
- CPU/CPU communication possible with Industrial Ethernet (client + server, 8 connections)
- Further processing of PLC data in PC applications by linnking into S7-OPC possible
- Exchange of modules possible without PG

Technical specifications

Transmission rate	10/100 Mbit/s
Interfaces	
• connection toIndustrial Ethernet	RJ45
Versorgungsspannung	24 V DC
Current consumption	
• From backplane bus	55 mA
• From 24 V DC external	60 mA
Power loss at 24 V DC	1.75 W
Permissible ambient conditions	
• Operating temperature	
- horizontal installation	0 °C to +55 °C
- vertical installation	0 °C to +45 °C

Permissible ambient conditions (continued)	
• Transport/storage temperature	- 40 °C to +70 °C
• Relative humidity	95% at +25 °C
Design	
• Dimensions (W x H x D) in mm	71.2 x 80 x 62
• Weight	150 g
Performance data	
S7 communication/ PG communication	
• Number of operational connections	8
Configuring	with STEP 7-Micro/WIN

Ordering data

	Order No.
CP 243-1 communications processor for connecting SIMATIC S7-200 to Industrial Ethernet; for S7 communication, PG communication	**6GK7 243-1EX00-0XE0**

	Order No.

Overview



The regulated load power supply for the SIMATIC S7-200.

- Coordinated design and functionality, allowing simple integration in the PLC network.
- For reliably powering the controller, encoders and sensors with 24 V DC, 3.5 A
- Flexible implementation, either in industry or in the domestic supply system

Technical specifications

Type	**3.5 A**
Order No.	**6EP1 332-1SH31**
Input	Single-phase AC
Rated voltage $V_{in\ rated}$	**120/230 V AC** selected by wire jumper
Voltage range	93 to 132 V/187 to 264 V AC
Surge strength	2.3 U_{in} rated, 1.3 ms
Mains buffering at $I_{out\ rated}$	> 20 ms at V_{in} = 187 V
Rated line frequency, range	50/60 Hz, 47 to 63 Hz
Rated current $I_{in\ rated}$	1.65/0.95 A
Inrush current limiting (+25 °C)	< 33 A, < 3 ms (V_{in} = 230 V)
I^2t	< 1.0 A^2s
Integral input fuse	T 2.5 A/250 V (not accessible)
Recommended circuit-breaker (IEC 898) in the supply cable	Two-pole circuit-breaker, from 10 A, Characteristic C or from 6 A Characteristic D
Output	Regulated, floating direct voltage
Rated voltage $V_{out\ rated}$	**24 V DC**
Total tolerance	± 5 % (typ. ± 2 %)
• Steady-state line compensation	± 0.1 %
• Steady-state load compensation	± 0.2 %
Residual ripple (switching frequency: approx. 50 kHz)	< 150 mV_{pp} (typ. 30 mV_{pp})
Spikes (bandwidth: 20 MHz)	< 240 mV_{pp} (typ. 110 mV_{pp})
Setting range	-
Status indicator	-
Turn-on/off response	No overshoot of V_{out} (soft starting)
Starting delay/voltage rise	< 1 s/typ.80 ms
Rated current $I_{out\ rated}$	**3.5 A**
Current range	
• Up to +45 °C	0-3.5 A
• Up to +60 °C	0-3.5 A

Dynamic V/I for	
• Starting into short-circuit	Typ. 5 A for 100 ms
• Short-circuit in operation	Typ. 5 A for 100 ms
Parallel connection to increase power	Yes, up to 5 units
Efficiency	
Efficiency at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 84 %
Power loss at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 16 W
Regulation	
Dynamic line compensation ($V_{in\ rated}$ ±15 %)	± 0.3 % V_{out}
Dynamic load compensation (I_{out}: 50/100/50 %)	< ± 10 % V_{out} (typ. ± 2.1 % V_{out})
Correction time	
• Load step 50 to 100 %	< 5 ms
• Load step 100 to 50 %	< 5 ms
Protection and monitoring	
Output overvoltage protection	
Current limiting typ.	3.8 A
Short-circuit protection	Constant current characteristic up to typ. 14 V; electronic shutdown at less than that value, auto. restart
Continuous short-circuit RMS current	< 4 A
Overload/short-circuit indicator	-
Safety	
Isolation primary/secondary	Yes, SELV output voltage V_{out} to EN 60 950
Protection class (IEC 536; VDE 0106 T1)	Class I
Leakage current	< 3.5 mA
Technical Inspectorate type testing	Yes
CE marking	Yes
UL/cUL (CSA) approval	Yes, UL/cUL-Listed (UL 508, CSA 22.2), File E143289
FM approval	-
Shipbuilding approval	-
Degree of protection (EN 60 529; VDE 0470 T1)	IP 20

S7-200 type

3

Technical specifications (continued)

EMC	
Emitted interference	EN 50 081-1, EN 55 022 Class B
Line harmonic limiting	-
Interference immunity	EN 50 082-2, IEC 801-2, -3, -4, -5
Operating specifications	
Ambient temperature range	0 to +60 °C with natural convection
Non-operating temperature range	-25 to +85 °C
Humidity class	Humidity class to DIN 40 040: relative humidity up to 75 % mean value, 95 % on 30 days/year, no condensation

Mechanical specifications	
Terminals	
• Supply input L, N, PE	One screw terminal each for 0.5 to 1 mm^2 stranded, 0.5 to 1.5 mm^2 solid
• Output L+	1 screw terminal for 0.5 to 1 mm^2
• Output M	1 screw terminal for 0.5 to 1 mm^2
Dimensions (W x H x D) in m	160 x 80 x 62
Approx. weight	0.5 kg
Installation	Snap-mounting on DIN rail to DIN EN 50 022-35 x 15/7.5
Accessories	Mounting bracket

Ordering data

	Order-No.
SITOP® power 3.5 A regulated load power supply 120/230 V AC, 24 V DC/3.5 A	**6EP1 332-1SH31**

	Order-No.
Mounting bracket for space-saving assembly of power supply on rear wall of control cabinet (the power supply is connected together with the side panel to the rear wall); for control cabinets with depth of 240 mm or more	**6EP1 971-1AA01**

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 the cable supplied, or integration into the network (likewise using EM 277)
- No separate power supply required
- No separate parameterization software required
- On request with customized front design
- Addressing and contrast adjustment by means of supplied menu

Technical specifications

Display	LCD backlit, 2-line, 20 characters/line (ASCII, Cyrillic), 10 characters/line (Chinese), 5 mm character height
Interfaces	1 PPI (RS 485) max.to set up a network with max. 126 stations (S7-200, OP, TP, TBP, PG/PC); Transmission speeds 9.6, 19.2, 187.5 kbit/s
Power supply	24 V DC, 120 mA; Powered from S7-200 communication interface or optional external power pack. Sensor power supply (24 V DC) of CPU is not affected

Ambient temperature	0 to 60 °C
Transport/storage temperature	-40 to +70 °C
Degree of protection	IP 65 front
Dimensions (W x H x D) in mm	148 x 76 x 27
Installation opening (standard cut-out) in mm	138 x 68
Cabinet/control panel thickness in mm	0.3 to 4
Weight	250 g

Ordering data

	Order-No.
TD 200 text display for connection to SIMATIC S7-200	**6ES7 272-0AA20-0YA0**
TD 200 manual	
German	**6ES7 272-0AA20-8AA0**
English	**6ES7 272-0AA20-8BA0**
French	**6ES7 272-0AA20-8CA0**
Spanish	**6ES7 272-0AA20-8DA0**
Italian	**6ES7 272-0AA20-8EA0**

	Order-No.
PROFIBUS IP 20 bus connector with 90° cable outlet	
• Without PG interface	**6ES7 972-0BA12-0XA0**
• With PG interface	**6ES7 972-0BB12-0XA0**
PROFIBUS IP 20 bus connector with 35° cable outlet	
• Without PG interface	**6ES7 972-0BA41-0XA0**
• With PG interface	**6ES7 972-0BB41-0XA0**
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**

SIMATIC TP 070

Overview



- Touch device specially designed for the SIMATIC S7-200 (point-to-point connection)
- Human machine interface for small machines and plants
- Connection using MPI or PROFIBUS DP cable
- Configuration with the STEP 7-Micro/Win V3.1 and STEP 7-Micro/Win Toolbox configuring software
- Configuration download through PPI adaptor
- Future-proof through the innovative Windows CE standard operating system

Technical specifications

Display	STN Liquid Crystal Display (LCD)
• Size	5.7"
• Resolution (pixels)	320 x 240
• Colors	4 blue levels
• MTBF of display and background lighting (at 25 °C)	Approx. 50,000 hours
Control elements	Touch screen
• Numeric/alphanumeric input	Yes/-
Processor	RISC 66 MHz
Operating system	Win CE
Memory	
• Type	Flash / RAM
• Memory available for user data	128 KB
Interfaces	1 x RS485
Printer	No
Interface with PLC	S7-200
Supply voltage	24 V DC
• Rated voltage	24 V
• Permitted range	+18 to +30 V DC
• Current input, typ.	0.24 A
Backup battery	No
Clock	Software clock
Degree of protection	
• Front	IP 65 (when mounted)
• Rear	IP 20
Certification	FM, UL, CSA, CE

Dimensions	
• Front w x h (mm)	212 x 156
• Mounting cutout/depth w x h x d (mm)	198 x 142 x 45
Weight (kg)	0.7
Ambient conditions	
• Mounting position	
- max. permissible angle of inclination without assisted ventilation	35°
• Temperature	
- operation (vertical installation)	0 to +50 °C
- operation (max. inclination)	0 to +40 °C
- transport, storage	-20 to +60 °C
• Relative humidity	85%
Functions	
Process diagrams	20
• Text objects	200 text elements
• Variables per diagram	10
• Graphics objects	Bitmaps, icons, background images
• Dynamic objects	Bars
Variables	50
Online languages	1
• Standard languages	English, French, German, Italian, Spanish
Character set	Tahoma, freely scalable
Configuration tool	MicroWin TP-Designer from version 3.1, executable under Windows 98/SE/ME/NT/2000 (must be ordered separately)
• Configuration transfer	Serial

Ordering data

	Order-No.
SIMATIC TP 070 with 5.7" STN display, resistive analog touch panel, numerical system keyboard, RS 485 interface	**6AV6 545-0AA15-2AX0**
TP 070 equipment manual	
German	**6AV6 591-1DC01-0AA0**
English	**6AV6 591-1DC01-0AB0**
French	**6AV6 591-1DC01-0AC0**
Italian	**6AV6 591-1DC01-0AD0**
Spanish	**6AV6 591-1DC01-0AE0**
Configuration software STEP 7-Micro/Win, TP-Designer for TP 070	See Section 8
TP 070 protective plastic cover (10 units)	**6AV6 574-1AD00-4AX0**
TP 070 protective hood (2 units)	**6AV6 574-1AE00-4AX0**

	Order-No.
TP 070 service pack comprising gaskets, clamps, 2-pin connector (power supply)	**6AV6 574-1AA00-4AX0**
PC/PPI cable 5 m long	**6ES7 901-3BF20-0XA0**
MPI cable 3 m long	**6XV1 830-1CH30**
PROFIBUS bus cables, accessories	See page 3/14

Software

Overview

- Software for the SIMATIC S7-200
- Functions for all phases of an automation project:
  - Planning, engineering, configuring, and parameter assignment of hardware and communications
  - Creation of user program
  - Documentation
  - Test, startup, service
  - Process control
  - Archiving

Available are:

- STEP 7-Micro/WIn
- STEP 7-Micro/WIn command library
- TP-Designer for TP 070
- SIMATIC MicroComputing

For further information see Section 8.

SIMATIC S7-300

4





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4

Overview

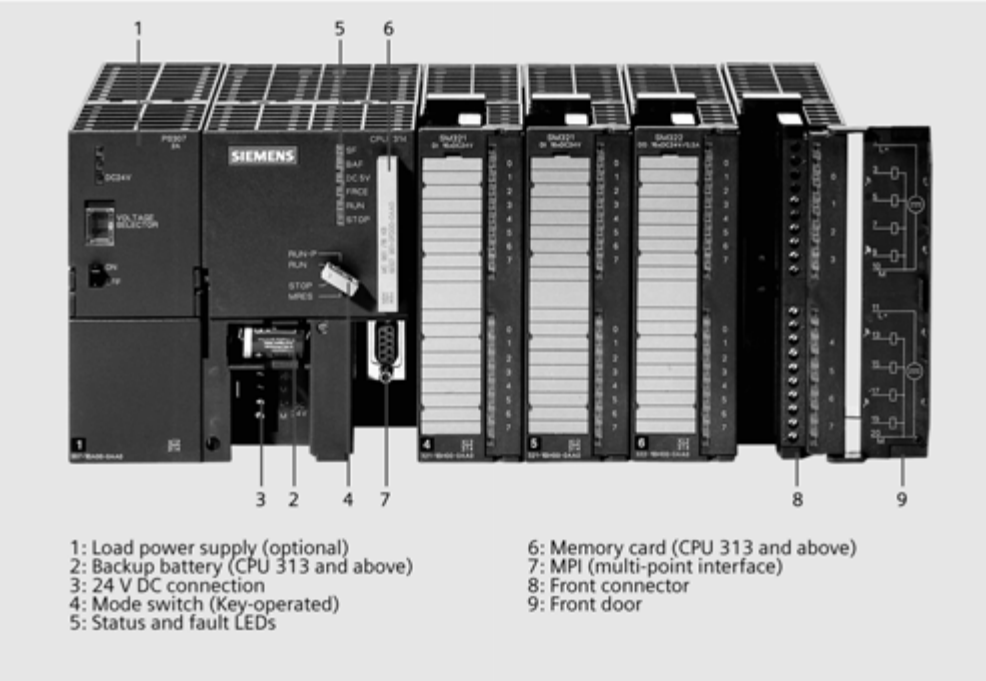


Fig. 4/1 Automation system SIMATIC S7-300

SIMATIC S7-300

- The modular mini PLC system for the low-end and mid performance ranges
- With a comprehensive range of modules for optimum adaptation to the automation task
- Flexible usage through the easy implementation of distributed structures and versatile networking capability
- User-friendly handling and uncomplicated, fan-free design
- Trouble-free expansion when your task grows
- Powerful thanks to a large number of integrated functions

SIMATIC S7-300F

- Failsafe automation system for installations in manufacturing with increased safety requirements
- Complies with safety requirements up to SIL 3 to IEC 61508, AK6 to DIN V 19250 and Cat. 4 acc. to EN 954-1
- Based on S7-300 with failsafe modules
- Standard modules for non-safety-related applications can also be used in the automation system

SIMATIC S7-300 Outdoor®

- The PLC for use in the harshest environmental conditions
- With extended temperature range from -25 to +60°C (+70°C in development)
- Occasional short-term condensation and increased mechanical loading permissible
- With the proven PLC technology of the S7-300
- Convenient handling, programming, maintenance and service
- Ideal for use in the automotive industry, environmental technology, mining, chemical plants, production technology, food industry etc.
- The alternative to expensive custom solutions

Technical specifications

General technical specifications S7-300, S7-300F	
Degree of protection	IP 20 to IEC 529
Ambient temperature	
• At horizontal installation	0 to 60 °C
• At vertical installation	0 to 40 °C
Relative humidity	5 to 95%, no condensation (RH degree of severity 2 to IEC 1131-2)
Atmospheric pressure	795 to 1080 hPa
Insulation	
• 24 V DC circuit	500 V DC test voltage
• 230 V AC circuit	1460 V AC test voltage
Electromagnetis compability	Complies with EMC requirements; Noise suppression to EN 50082-2, tested to: IEC 801-2, ENV 50140, IEC 801-4, ENV 50141, IEC 801-5; Noise emission to EN 50081-2, tested to EN 55011, Class A, Group 1
Mechanical load	
• Vibration, tests acc. to/tested with	IEC 68, Part 2-6/10 to 58 Hz; constant amplitude 0.075 mm; 58 to 150 Hz; constant acceleration 1 g; period of vibration: 10 frequency sweeps per axis in each of the three mutually perpendicular axes
• Shock, tests acc. to/tested with	IEC 68, Part 2-27/half-sine: Shock strength: 15 g (peak value), duration 11 ms

General technical specifications S7-300 Outdoor	
Climatic operating conditions	
Temperature	Horizontal installation: -25°C to 60°C (70°C under development) Vertical installation: -25°C to 40°C
Relative humidity	5 to 95%; short-term moisture condensation allowed, corresponds to relative humidity (RH) degree of severity 2 at IEC 1131-2 and IEC 721 3-3 Class 3K5
Temporary icing	-25°C to 0°C IEC 721 3-3 Class 3K5
Atmospheric pressure	1080 to 795 hPa Corresponds to a height of –1000 to 2000 m
Pollutant concentrations	SO_2: < 0.5 ppm; relative humidity <60% Test: 10 ppm, 4 days H_2S: < 0.1 ppm; relative humidity <60% Test: 1 ppm, 4 days (to IEC 721 3-3; class 3C3)
Mechanical operating conditions	
Vibration	Type of vibration: frequency sweeps with a change rate of 1 octave per minute. 2 Hz ≤ f ≤ 9 Hz, constant amplitude 3.0 mm 9 Hz ≤ f ≤ 150 Hz, constant acceleration 1 g period of vibration: 10 frequency sweeps per axis in each of the three mutually perpendicular axes; Vibration tests according to IEC 68 part 2-6 (sinusoidal) and IEC 721 3-3, class 3M4
Shock	Type of shock: half-sine Shock strength: 15 g peak value, 11 ms duration Shock direction: 3 shocks each in +/- direction in each of the three mutually perpendicular axes Shock test according to IEC 68 part 2-27

4

Overview

- 20 different CPUs:
  - 6 compact CPUs (with integrated technology functions and I/O)
  - 3 redesigned standard CPUs (CPU 312, CPU 314, CPU 315-2 DP)
  - 5 standard CPUs (CPU 313, CPU 314, CPU 315, CPU 315-2 DP, CPU 316-2 DP); superseded in the medium-term by redesigned standard CPUs
  - CPU 315F-2 DP
  - 4 SIMATIC S7-300 Outdoor CPUs (CPU 312 IFM, CPU 314 IFM, CPU 315-2 DP)
  - CPU 318-2 DP
- Graded performance spectrum for a wide range of different applications

Overview
CPU 312C



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

Micro memory card required to operate the CPU

Overview
CPU 313C



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

Micro memory card required to operate the CPU

Overview
CPU 313C-2 PtP



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

Micro memory card required to operate the CPU

Overview
CPU 313C-2 DP



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

Micro memory card required to operate the CPU

Overview
CPU 314C-2 PtP



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

Micro memory card required to operate the CPU

Overview
CPU 314C-2 DP



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

Micro memory card required to operate the CPU

4

Overview
CPU 312 new



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

Micro memory card required to operate the CPU

Overview
CPU 314 new



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

Micro memory card required to operate the CPU

Overview
CPU 315-2 DP new



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

Micro memory card required to operate the CPU

Overview
CPU 313



- The low-cost CPU with extended program memory
- For small applications requiring high-speed processing

Overview
CPU 314



- The CPU for demanding tasks requiring high-speed processing and medium-sized I/O configurations
- Used in installations requiring medium-sized programs and mid-range instruction execution speeds

Overview
CPU 315



- The CPU with a mid-sized to large program memory
- For extensive I/O configurations

Overview
CPU 315-2 DP



- The CPU with medium to large program memory and PROFIBUS DP master/slave interface
- For extensive I/O configurations
- For setting up distributed I/O structures

4

Overview
CPU 316-2 DP



- The CPU 316-2 DP with lots of program memory
- For extensive I/O configurations
- With PROFIBUS DP master/slave interface
- Is used in plants that contain both distributed and centralized I/O configurations

Overview
CPU 312 IFM Outdoor



- The compact CPU with integral digital I/O
- For small systems
- With special functions and special inputs for specific functions
- Can also be used under the harshest environmental conditions

Overview
CPU 314 IFM Outdoor



- The compact CPU with integral digital inputs/outputs and extended special functions
- For systems with high requirements in respect of response time and special functions
- With additional special functions and special inputs for more specific functions
- Can also be used under harsh environmental conditions

Overview
CPU 314 Outdoor



- The CPU for demanding tasks requiring high-speed processing and medium-sized I/O configurations
- Used in installations requiring medium-sized programs and mid-range instruction execution speeds
- Can also be used under harsh environmental conditions

Overview

CPU 318-2 DP



- The CPU with large program memory and PROFIBUS DP master/slave interface
- For extensive I/O configurations
- For setting up distributed I/O structures

Overview

CPU 315F



- The first S7-315F CPU based on the S7-300C devices with a PROFIBUS DP master/slave interface
- For configuring a failsafe automation system for installations with increased safety requirements
- Complies with safety requirements up to SIL 3 to IEC 61508, AK6 to DIN V 19250 and Cat. 4 acc. to EN 954-1
- Without additional wiring of the fail-safe I/O
- Safety-related communication using PROFIBUS DP with *PROFI*safe profile for distributed I/O stations
- ET 200M and ET 200S can be connected with failsafe digital modules
- Standard modules for non-safety-related applications can also be operated in the automation system

Micro memory card required to operate the CPU

Technical specifications compact CPUs

	CPU 312C	CPU 313C	CPU 313C-2 PtP	CPU 313C-2 DP	CPU 314C-2 PtP	CPU 314C-2 DP
Memory						
RAM						
• Integrated	16 KB for program and data	32 KB for program and data	32 KB for program and data	32 KB for program and data	48 KB for program and data	48 KB for program and data
• Expandable	No	No	No	No	No	No
Load memory						
• Integrated	-	-	-	-	-	-
• Upgradable FEPROM	With micro memory card (MMC) up to 4 MB	With micro memory card (MMC) up to 4 MB	With micro memory card (MMC) up to 4 MB	With micro memory card (MMC) up to 4 MB	With micro memory card (MMC) up to 4 MB	With micro memory card (MMC) up to 4 MB
Backup	Performed by MMC (maintenance free)	Performed by MMC (maintenance free)	Performed by MMC (maintenance free)	Performed by MMC (maintenance free)	Performed by MMC (maintenance free)	Performed by MMC (maintenance free)
• With battery	-	-	-	-	-	-
• Without battery	Program and data	Program and data	Program and data	Program and data	Program and data	Program and data
Execution times						
Processing times for						
• Bit operations, min.	0.2 µs to 0.4 µs	0.1 µs to 0.2 µs	0.1 µs to 0.2 µs	0.1 µs to 0.2 µs	0.1 µs to 0.2 µs	0.1 µs to 0.2 µs
• Word operations, min.	1 µs	0.5 µs	0.5 µs	0.5 µs	0.5 µs	0.5 µs
• Fixed-point addition, min.	2 µs	1 µs	1 µs	1 µs	1 µs	1 µs
• Floating-point addition, min.	30 µs	15 µs	15 µs	15 µs	15 µs	15 µs

Technical specifications compact CPUs (continued)

	CPU 312C	CPU 313C	CPU 313C-2 PtP	CPU 313C-2 DP	CPU 314C-2 PtP	CPU 314C-2 DP
Timers/counters and their retentivity						
S7 counters	128	256	256	256	256	256
• Retentivity selectable	From Z 0 to Z 128	From Z 0 to Z 256	From Z 0 to Z 256	From Z 0 to Z 256	From Z 0 to Z 256	From Z 0 to Z 256
• Counting range	1 to 999	1 to 999	1 to 999	1 to 999	1 to 999	1 to 999
IEC counters	Yes	Yes	Yes	Yes	Yes	Yes
• Type	SFB	SFB	SFB	SFB	SFB	SFB
S7 timers	128	256	256	256	256	256
• Retentivity selectable	From T 0 to T 128	From T 0 to T 256	From T 0 to T 256	From T 0 to T 256	From T 0 to T 256	From T 0 to T 256
• Range	10 ms to 9990 s	10 ms to 9990 s	10 ms to 9990 s	10 ms to 9990 s	10 ms to 9990 s	10 ms to 9990 s
IEC timers	Yes	Yes	Yes	Yes	Yes	Yes
• Type	SFB	SFB	SFB	SFB	SFB	SFB
Data ranges and their retentivity						
Bit memories	1024	2048	2048	2048	2048	2048
• Retentivity selectable	From MB 0 to MB 1024	From MB 0 to MB 2048	From MB 0 to MB 2048	From MB 0 to MB 2048	From MB 0 to MB 2048	From MB 0 to MB 2048
Blocks						
Max. block size	16 KB	16 KB	16 KB	16 KB	16 KB	16 KB
Number of						
• Watchdog interrupts	1	1	1	1	1	1
• Process alarms	1	1	1	1	1	1
• Time-of-day interrupts	1	1	1	1	1	1
• Delay interrupts	1	1	1	1	1	1
Nesting depth						
• Per priority class	8	8	8	8	8	8
• Additional within an error OB	4	4	4	4	4	4
FBs, max.	64	128	128	128	128	128
FCs, max.	64	128	128	128	128	128
Data blocks, max.	63 (DB 0 reserved)	127 (DB 0 reserved)	127 (DB 0 reserved)	127 (DB 0 reserved)	127 DB 0 reserved)	127 (DB 0 reserved)
Programming						
Programming language	STEP 7 V5.1 SP2 (LAD, FBD, STL); SCL, GRAPH, HiGraph	STEP 7 V5.1 SP2 (LAD, FBD, STL); SCL, GRAPH, HiGraph	STEP 7 V5.1 SP2 (LAD, FBD, STL); SCL, GRAPH, HiGraph	STEP 7 V5.1 SP2 (LAD, FBD, STL); SCL, GRAPH, HiGraph	STEP 7 V5.1 SP2 (LAD, FBD, STL); SCL, CFC, GRAPH, HiGraph	STEP 7 V5.1 SP2 (LAD, FBD, STL); SCL, CFC, GRAPH, HiGraph
Nesting levels	8	8	8	8	8	8
User program protection	Password protection	Password protection	Password protection	Password protection	Password protection	Password protection
Address areas (inputs/outputs)						
Total I/O address area	1024 / 1024 byte (freely adressable)	1024 / 1024 byte (freely adressable)	1024 / 1024 byte (freely adressable)	1024 / 1024 byte (freely adressable)	1024 / 1024 byte (freely adressable)	1024 / 1024 byte (freely adressable)
Process image	128 / 128 byte	128 / 128 byte	128 / 128 byte	128 / 128 byte	128 / 128 byte	128 / 128 byte
Digital channels	256 / 256 max.	Max. 992 / 992	Max. 992 / 992	Max. 992 / 992	Max. 992 / 992	Max. 992 / 992
Analog channels	64 / 32 max.	Max. 248 / 124	Max. 248 / 124	Max. 248 / 124	Max. 248 / 124	Max. 248 / 124

Technical specifications compact CPUs (continued)

	CPU 312C	CPU 313C	CPU 313C-2 PtP	CPU 313C-2 DP	CPU 314C-2 PtP	CPU 314C-2 DP
Design						
Central controllers/ expansion units, max.	1 / 0	1 / 3	1 / 3	1 / 3	1 / 3	1 / 3
Number of modules per system	8	31	31	31	31	31
Number of DP masters						
• Integrated	-	-	-	1	-	1
• Via CP	1	1	1	1	1	1
Suitable modules (recommendation)						
• FMs	4	8	8	8	8	8
• CPs, point-to-point	2	4	4	4	4	4
• CPs, LAN	1	2	2	2	2	2
Time-of-day						
Clock	Yes	Yes	Yes	Yes	Yes	Yes
• Backed up	No	Yes	Yes	Yes	Yes	Yes
Hours counter	1	1	1	1	1	1
Time-of-day synchronization	Yes	Yes	Yes	Yes	Yes	Yes
Communication functions						
Total number of connections usable for	6	8	8	8	12	12
• Programming devic communications	Yes	Yes	Yes	Yes	Yes	Yes
- reserved	1	1	1	1	1	1
- adjustable	1 to 5	1 to 7	1 to 7	1 to 7	1 to 11	1 to 11
• OP communications	Yes	Yes	Yes	Yes	Yes	Yes
- reserved	1	1	1	1	1	1
- adjustable	1 to 5	1 to 7	1 to 7	1 to 7	1 to 11	1 to 11
• S7 standard communication	Yes	Yes	Yes	Yes	Yes	Yes
- reserved	2	4	4	4	8	8
- adjustable	0 to 2	0 to 4	0 to 4	0 to 4	0 to 8	0 to 8
• Routing	-	-	-	4	-	4
S7 message functions						
Number of stations that can be defined for message functions (e.g. OS)	3	5	5	5	7	7
Interfaces						
1st interface						
Functionality						
• MPI	Yes	Yes	Yes	Yes	Yes	Yes
• DP master	No	No	No	No	No	No
• DP slave	No	No	No	No	No	No
• Point-to-point link	No	No	Yes	No	Yes	No

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Technical specifications compact CPUs (continued)

	CPU 312C	CPU 313C	CPU 313C-2 PtP	CPU 313C-2 DP	CPU 314C-2 PtP	CPU 314C-2 DP
MPI						
Cable length (without repeater)	50 m	50 m	50 m	50 m	50 m	50 m
Transmission rates	Up to 187.5 kbit/s	Up to 187.5 kbit/s	Up to 187.5 kbit/s	Up to 187.5 kbit/s	Up to 187.5 kbit/s	Up to 187.5 kbit/s
Number of connections	6	8	8	8	12	12
Services						
• Programming device/ OP communications	Yes	Yes	Yes	Yes	Yes	Yes
• Global data communication	Yes	Yes	Yes	Yes	Yes	Yes
• Number of GD circuits						
- sender, max.	4	4	4	4	4	4
- receiver, max.	4	4	4	4	4	4
• Size of the GD packets, max.	22 byte	22 byte	22 byte	22 byte	22 byte	22 byte
S7 standard communication	Yes	Yes	Yes	Yes	Yes	Yes
• User data per job, max.	76 byte	76 byte	76 byte	76 byte	76 byte	76 byte
S7 Communication						
• As server	Yes	Yes	Yes	Yes	Yes	Yes
• As client	No	No	No	No	No	No
• User data per job, max.	64 KB	64 KB	64 KB	64 KB	64 KB	64 KB
2nd interface	-	-				
Functionality	-	-				
• MPI	-	-	No	No	No	No
• DP master	-	-	No	Yes	No	Yes
• DP slave	-	-	No	Yes	No	Yes
• Point-to-point link	-	-	Yes	No	Yes	No
• Electrical isolation	-	-	Yes	Yes	Yes	Yes
Point-to-point	-	-				
Transfer media	-	-	RS422 / RS485 (X.27)	-	RS422 / RS485 (X.27)	-
Transmission rate	-	-	19.2 kbit/s	-	19.2 kbit/s	-
Line length	-	-	1,200 m	-	1,200 m	-
Implemented protocols	-	-	ASCII, 3964 (R)	-	ASCII, 3964 (R), RK 512	-
DP-Master	-	-	-		-	
Number of connections	-	-	-	8 for PG/OP communication	-	12 for PG/OP communication
- Of these reserved	-	-	-	1 for PG, 1 for OP	-	1 for PG, 1 for OP
Services	-	-				
• Programming device/ OP communications	-	-	-	Yes	-	Yes
• Support for internode communications	-	-	-	Yes	-	Yes
• Equidistance	-	-	-	Yes	-	Yes
• SYNC/FREEZE	-	-	-	Yes	-	Yes

Technical specifications compact CPUs (continued)

	CPU 312C	CPU 313C	CPU 313C-2 PtP	CPU 313C-2 DP	CPU 314C-2 PtP	CPU 314C-2 DP
Services	-	-				
• Global data communication	-	-	-	No	-	No
• S7 basic communication	-	-	-	No	-	No
• S7 communication	-	-	-		-	
- as server	-	-	-	No	-	No
- as client	-	-	-	No	-	No
Transmission rates	-	-	-	Up to 12 Mbit/s	-	Up to 12 Mbit/s
Number of DP slaves, max.	-	-	-	32	-	32
Address range max. (I/O)	-	-	-	1024 / 1024 byte	-	1024 / 1024 byte
User data per DP slave, max. (I/O)	-	-	-	244 / 244 byte	-	244 / 244 byte
Voltages, currents						
Supply voltage						
Rated value	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC
Permissible range	20.4 to 28.8 V	20.4 to 28.8 V	20.4 to 28.8 V	20.4 to 28.8 V	20.4 to 28.8 V	20.4 to 28.8 V
Current consumption typ.	0.5 A	0.7 A	0.9 A	0.9 A	0.8 A	1.0 A
Starting current, typ.	11 A	11 A	11 A	11 A	11 A	11 A
Power losses, typically	6 W incl. integrated I/Os	14 W	10 W	10 W	14 W	14 W
Dimensions						
Installation dimensions (W x H x D) in mm	80 x 125 x 130	120 x 125 x 130	120 x 125 x 130	120 x 125 x 130	120 x 125 x 130	120 x 125 x 130
Weight, approx.	410 g	660 g	570 g	570 g	680 g	680 g
Integrated digital inputs						
Number of inputs	10	24	16	16	24	24
Input voltage						
• Rated value	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC
• For "1" signal	15 to 30 V	15 to 30 V	15 to 30 V	15 to 30 V	15 to 30 V	15 to 30 V
• For "0" signal	-3 to +5 V	-3 to +5 V	-3 to +5 V	-3 to +5 V	-3 to +5 V	-3 to +5 V
Electrical isolation	Yes	Yes	Yes	Yes	Yes	Yes
• In groups of	10	16 and 8	16	16	16	16
Input current						
• For "1" signal, min./typ.	8 mA	-/8 mA	2 mA / 8 mA	2 mA / 8 mA	-/8 mA	-/8 mA
Input delay (at rated value of the input voltage)						
• For standard inputs, typ./max.	0.1/0.3/3/15 ms	0.1 /0.3 /3 / 15 ms	0.1/0.3/3/15 ms	0.1/0.3/3/15 ms	0.1/0.3/3/15 ms	0.1/0.3/3/15 ms
• For process-related functions	50 µs	16 µs	8 µs	8 µs	8 µs	8 µs
Connection of 2-wire BERO						
• Acceptable quiescent current	1.5 mA	1.5 mA	1.5 mA	1.5 mA	1.5 mA	1.5 mA
Cable lengths						
• Unshielded	600 m	600 m	600 m	600 m	600 m	600 m
• Shielded	1000 m (100 m for process-related functions)	1000 m (100 m for process-related functions)	1000 m (100 m for process-related functions)	1000 m (100 m for process-related functions)	1000 m (100 m for process-related functions)	1000 m (100 m for process-related functions)

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Technical specifications compact CPUs (continued)

	CPU 312C	CPU 313C	CPU 313C-2 PtP	CPU 313C-2 DP	CPU 314C-2 PtP	CPU 314C-2 DP
Integrated digital outputs						
Number of inputs	6	16	16	16	16	16
Rated load voltage L+/L1	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC
• Permitted range	20.4 to 28.8 V	20.4 to 28.8 V	20.4 to 28.8 V	20.4 to 28.8 V	20.4 to 28.8 V	20.4 to 28.8 V
Output voltage						
• At "1" signal, max.	L+ - 0.8 V	L+ - 0.8 V	L+ - 0.8 V	L+ - 0.8 V	L+ - 0.8 V	L+ - 0.8 V
Electrical isolation	Yes	Yes	Yes	Yes	Yes	Yes
• In groups of	6	8	8	8	8	8
Maximum output current						
• At "1" signal						
- rated value at 40 °C	0.5 A	0.5 A	0.5 A	0.5 A	0.5 A	0.5 A
- rated value at 60 °C	0.5 A	0.5 A	0.5 A	0.5 A	0.5 A	0.5 A
- min. current	5 mA	5 mA	5 mA	5 mA	5 mA	5 mA
• For "0" signal, max.	0.5 mA	0.5 mA	0.5 mA	0.5 mA	0.5 mA	0.5 mA
Total load capability						
• At 40 °C	100 %	100 %	100 %	100 %	100 %	100 %
• At 60 °C	50 %	50 %	50 %	50 %	50 %	50 %
Switching frequency of outputs						
• For resistive load	100 Hz	100 Hz	100 Hz	100 Hz	100 Hz	100 Hz
• For inductive load	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz
Voltage induced on circuit interruption limited to	Type (L+) –48V	Type (L+) –48V	Type (L+) –48V	Type (L+) –48V	Type (L+) –48V	Type (L+) –48V
Short-circuit protection	Electronic, clocked	Electronic, clocked	Electronic, clocked	Electronic, clocked	Electronic, clocked	Electronic, clocked
Cable lengths						
• Unshielded	600 m	600 m	600 m	600 m	600 m	600 m
• Shielded	1000 m	1000 m	1000 m	1000 m	1000 m	1000 m
Integrated analog inputs (for resistance / temperature)	-		-	-		
• Number of inputs	-	4	-	-	4	4
• Resistance	-	±10 V, 0 to 10 V	-	-	±10 V, 0 to 10 V	±10 V, 0 to 10 V
Electrical isolation	-	±20 mA, 0/4 to 20 mA	-	-	±20 mA, 0/4 to 20 mA	±20 mA, 0/4 to 20 mA
Bipolar resolution	-	Common for analog I/O	-	-	Common for analog I/O	Common for analog I/O
Integration time (adjustable)	-	11 bit + sign	-	-	11 bit + sign	11 bit + sign
• Per channel	-		-	-		
• Integrated analog inputs (for resistance / temperature)	-	2.5 / 16.6 / 20ms	-	-	2.5 / 16.6 / 20ms	2.5 / 16.6 / 20ms
Basic error (operational limit at 25 °C, referred to output range), max.	-	±0.7%	-	-	±0.7%	±0.7%

Technical specifications compact CPUs (continued)

	CPU 312C	CPU 313C	CPU 313C-2 PtP	CPU 313C-2 DP	CPU 314C-2 PtP	CPU 314C-2 DP
Integrated analog inputs (for resistance / temperature)	-		-	-		
Number of inputs	-	1	-	-	1	1
Resistance	-	0 to 600 Ohm, Pt 100	-	-	0 to 600 Ohm, Pt 100	0 to 600 Ohm, Pt 100
Electrical isolation	-	Common for analog I/O	-	-	Common for analog I/O	Common for analog I/O
Bipolar resolution	-	11 bit + sign	-	-	11 bit + sign	11 bit + sign
Integration time (adjustable)	-		-	-		
• Per channel	-	2.5 / 16.6 / 20ms	-	-	2.5 / 16.6 / 20ms	2.5 / 16.6 / 20ms
Basic error threshold (operating error threshold at 25°C, referred to input range)	-	±3%	-	-	±3%	±3%
Integrated analog outputs	-		-	-		
Number of outputs	-	2	-	-	2	2
Output ranges (rated values)	-		-	-		
• Voltage	-	±10 V, 0 to 10 V	-	-	±10 V, 0 to 10 V	±10 V, 0 to 10 V
• Current	-	±20 mA, 0/4 to 20 mA	-	-	±20 mA, 0/4 to 20 mA	±20 mA, 0/4 to 20 mA
Electrical isolation	-	Common for analog I/O	-	-	Common for analog I/O	Common for analog I/O
Conversion time per channel	-	1ms	-	-	1ms	1ms
Basic error (operational limit at 25 °C, referred to output range), max.	-	±0.7%	-	-	±0.7%	±0.7%
• Required front connector	1 x 40-pin	2 x 40-pin	1 x 40-pin	1 x 40-pin	2 x 40-pin	2 x 40-pin
• Integrated functions						
• Counter	2	3	3	3	4	4
• Counting speed max.	10 kHz	30 kHz	30 kHz	30 kHz	60 kHz	60 kHz
• Pulse outputs	2	3	3	3	4	4
• Switching frequency max.	2.5 kHz	2.5 kHz	2.5 kHz	2.5 kHz	2.5 kHz	2.5 kHz
• Frequency measurement	Yes	Yes	Yes	Yes	Yes	Yes
• Open-loop positioning	-	-	-	-	Yes	Yes
• Integrated “Closed loop control” function blocks	-	PID	PID	PID	PID	PID

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Technical specifications innovated standard CPUs

	CPU 312 new	CPU 314 new	CPU 315-2 DP new
MLFB	6ES7312-1AD10-0AB0	6ES7314-1AF10-0AB0	6ES7315-2AG10-0AB0
Associated programming package	STEP7 from V 5.1 + SP 4 and higher	STEP 7 from V 5.1 + SP 4 **Optional:** • S7-SCL • S7-GRAPH	STEP 7 from V 5.1 + SP 4 **Optional:** • S7-SCL • S7-GRAPH • S7-HiGraph
Memory			
RAM			
• Integrated	16 KB	48 KB	128 KB
• Expandable	No	No	No
Load memory	Plug-in using MMC (4 MB max.)	Plug-in using MMC (8 MB max.)	Plug-in using MMC (8 MB max.)
Backup	Performed by MMC (maintenance free)	Performed by MMC (maintenance free)	Performed by MMC (maintenance free)
Execution times			
Processing times for			
• Bit operation, min.	0.2 µs	0.1 µs	0.1 µs
• Word operation, min.	0.4 µs	0.2 µs	0.2 µs
• Fixed-point addition, min.	5 µs	2.0 µs	2.0 µs
• Floating-point addition, min.	6 µs	6 µs	6 µs
Timers/counters and their retentivity			
S7 counters		256	256
• Retentivity	Variable	Variable	Variable
• Default	From Z 0 to Z 7	From Z 0 to Z 7	From Z 0 to Z 7
• Counting range	0 to 999	0 to 999	0 to 999
IEC counters	Yes	Yes	Yes
• Type	SFB	SFB	SFB
• Number of inputs	Unlimited (only restricted by working memory)	Unlimited (only restricted by working memory)	Unlimited (only restricted by working memory)
S7 timers	128	256	256
• Retentivity	Variable	Variable	Variable
• Default	No retentivity	No retentivity	No retentivity
• Range	10 ms to 9990 s	10 ms to 9990 s	10 ms to 9990 s
IEC timers	Yes	Yes	Yes
• Type	SFB	SFB	SFB
• Number of inputs	Unlimited (only restricted by working memory)	Unlimited (only restricted by working memory)	Unlimited (only restricted by working memory)
Data ranges and their retentivity			
Total retentive data storage (incl. bit memories; timers; counters)	All	All	All
Bit memories	128 byte	256 byte	2048 byte
• Retentivity	Yes	Yes	Yes
• Preset retentivity	From MB 0 to MB 15	MB 0 to MB15	MB 0 to MB15
Clock bit memory	8 (1 flag byte)	8 (1 flag byte)	8 (1 flag byte)

Technical specifications innovated standard CPUs (continued)

	CPU 312 new	CPU 314 new	CPU 315-2 DP new
Data blocks			
• Number	511	511	1023
• Size	16 KB	16 KB	16 KB
Local data per priority class, max.	256 byte	512 byte	1024 byte
Blocks			
Total	1024 (DBs, FCs, FBs)	1024 (DBs, FCs, FBs)	1024 (DBs, FCs, FBs)
OBs	See operation list	See operation list	See operation list
• Size, max.	16 KB	16 KB	16 KB
Nesting depth			
• Per priority class	8	8	8
• Additional within an error OB	4	4	4
FBs, max.		See operation list	See operation list
• Number	512	512	2048
• Size, max.	16 KB	16 KB	16 KB
FCs, max.		See operation list	See operation list
• Number	512	512	2048
• Size, max.	16 KB	16 KB	16 KB
Address areas (inputs/outputs)			
Total I/O address area	1024 / 1024 byte (freely addressable)	1024 /1024 byte (freely addressable)	2048 /2048 byte (freely addressable)
• Of these decentrally, max.	-	-	2000
Process image I/O	128 byte/ 128 byte	128 byte/128 byte	128 byte/128 byte
Digital channels, max.	256	1024	16384
• Of these centrally, max.	256	1024	1024
Analog channels, max.	64	256	1024
• Of these centrally, max.	64	256	256
Design			
Rack, max.	1	4	4
Modules per rack, max.	8	8	8
Number of DP masters			
• Integrated	None	None	1
• Using CP	1	1	1
Supported function modules and communications processors			
• FM, max.	8	8	8
• CP (point-to-point) , max.	8	8	8
• CP (LAN) , max.	4	10	10

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Technical specifications innovated standard CPUs (continued)

	CPU 312 new	CPU 314 new	CPU 315-2 DP new
Time-of-day			
Clock	Yes (SW clock)	Yes (HW clock)	Yes (HW clock)
• Backed up	No	Yes	Yes
• Accuracy		Typ. 6 weeks (at 40°C ambient temperature)	Typ. 6 weeks (at 40°C ambient temperature)
Hour counter	Deviation per day: < 15 s	Deviation per day: < 10 s	Deviation per day: < 10 S
• Number	1	1	1
• Range of values	0	0	0
• Selectivity	2^{31} (when using SFC 101)	2^{31} hours (when using SFC 101)	2^{31} hours (when using SFC 101)
• Retentive control relays	1 hour	1 hour	1 hour
Time-of-day synchronization	Yes; must be restarted on every restart	Yes; must be restarted on every restart	Yes; must be restarted on every restart
• In AS	Yes	Yes	Yes
• On MPI	Master	Master/ slave	Master
S7 message functions	Master/ slave	Slave	Master/ slave
Time-of-day			
Number of stations that can be defined for message functions (e.g. OS)	6 (depending on the links configured for PG/OP and S7 basic communication)	12 (depending on the links configured for PG/OP and S7 basic communication)	16 (depending on the links configured for PG/OP and S7 basic communication)
Process diagnostics messages	Yes	Yes	Yes
• Simultaneously active alarm S blocks, max.	20	40	40
Test and startup function			
Status/force variable	Yes	Yes	Yes
• Variable	Inputs, outputs, flags, DBs, timers, counters	Inputs, outputs, flags, DBs, timers, counters	Inputs, outputs, flags, DBs, timers, counters
• Number of variables	30	30	30
- of which status variables	30	30	30
- of which force variables	14	14	14
Force	Yes	Yes	
• Variable	Inputs, outputs	Inputs, outputs	Inputs, outputs
• Number of variables, max.	10	10	10
Status block	Yes	Yes	Yes
Single step	Yes	Yes	Yes
Breakpoint	2		2
Diagnostic buffer	Yes	Yes	Yes
• Number of entries (not adjustable), max.	100	100	100
Communication functions			
PG/OP communication	Yes	Yes	Yes
Global data communication	Yes	Yes	Yes
• Number of GD pakkets, max.	4	4	8
- sender, max.	4	4	8
- receiver, max.	4	4	8
• Size of the GD pakkets, max.	22 byte	22 byte	22 byte
- of which consistent	22 byte	22 byte	22 byte

Technical specifications innovated standard CPUs (continued)

	CPU 312 new	CPU 314 new	CPU 315-2 DP new
S7 basic communication	Yes	Yes	Yes
• Useful data per request, max.	76 byte	76 byte	76 byte
- of these consistent	76 byte (for X_SEND or X_RCV) 64 byte (for X_PUT or X_GET as server)	76 byte (for X_SEND or X_RCV) 64 byte (for X_PUT or X_GET as server)	76 byte (for X_SEND or X_RCV) 64 byte (for X_PUT or X_GET as server)
S7 communication		Yes	Yes
• As server	Yes	Yes	Yes
• As client		Yes (using CP and reloadable FC)	Yes (using CP and reloadable FC)
• Useful data per request, max.	180 byte (for PUT/GET)	180 byte (for PUT/GET)	180 byte (for PUT/GET)
- of these consistent	64 byte	64 byte	64 byte (as server)
S5-compatible communications	Yes (using CP and reloadable FC)	Yes (using CP and reloadable FC)	Yes (using CP and reloadable FC)
Number of connections, max.	6	12	16
Usable for			
• PG communication, max.	5		
- reserved (default)	1	1	1
- variable	From 1 to 5	From1 to 11	From1 to 15
• OP communication, max.	5		
- reserved (default)	1	1	1
- variable	From 1 to 5	From1 to 11	From1 to 15
• S7 standard communication			Yes
- reserved (default)	2	8	12
- variable	From 0 to 2	From 0 to 8	From 0 to 12
Routing	No	No	Yes
Interfaces			
1st interface			
Type of interface	Integrated RS 485 interface	Integrated RS 485 interface	Integrated RS 485 interface
Physical design	RS 485	RS 485	RS 485
Electrical isolation	No	No	No
Power supply at interface (15 to 30 V DC)	Max. 200 mA	200 mA	200 mA
Functionality			
MPI	Yes	Yes	Yes
PROFIBUS DP	No	No	No
Point-to-point link	No	No	No
MPI			
Number of connections	6	12	16
Services			
• PG/OP communication	Yes	Yes	Yes
• Routing	No	No	Yes
• Global data communication	Yes	Yes	Yes
• S7 basic communication	Yes	Yes	Yes
• S7 Communication		Yes	Yes
- as server	Yes	Yes	Yes
- as client	No	Yes (using CP and reloadable FB)	Yes (using CP and reloadable FB)
• Transmission rates	187.5 kbaud	187.5 kbaud	187.5 kbaud

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Technical specifications innovated standard CPUs (continued)

	CPU 312 new	CPU 314 new	CPU 315-2 DP new
2nd interface	-	-	
Type of interface	-	-	Integrated RS 485 interface
Physical design	-	-	RS 485
Electrical isolation	-	-	Yes
Type of interface	-	-	Integrated RS 485 interface
Power supply at interface (15 to 30 V DC), max.	-	-	200 mA
Number of connections	-	-	16
Functionality			
MPI	-	-	No
PROFIBUS DP	-	-	Yes
Point-to-point link	-	-	No
DP master			
Number of connections	-	-	16
Services			
• PG/OP communication	-	-	Yes
• Routing	-	-	Yes
• Global data communication	-	-	No
• S7 basic communication	-	-	No
• S7 communication	-	-	No
• Clock synchronism	-	-	Yes
• SYNC/FREEZE	-	-	Yes
• DPV1	-	-	Yes
Data transmission rate	-	-	Up to 12 Mbaud
Number of DP slaves per station	-	-	125
Address range, max.	-	-	244 KB
DP slave			
Number of connections	-	-	16
Services			
• PG/OP communication	-	-	Yes
• Routing	-	-	Yes (only when interface is active)
• Global data communication	-	-	No
• S7 basic communication	-	-	No
• S7 communication	-	-	No
• Direct data transfer	-	-	Yes
• Transmission rates	-	-	Up to 12 Mbaud
• Transfer memory	-	-	244 byte I/244 byte O
• Address areas, max.	-	-	32 with max. 32 byte each
• DPV1	-	-	No
GSD file	-	-	The latest GSD file is available at http://www.ad.siemens.com/support under Product Support
Programming			
Programming language	LAD/FBD/STL	LAD/FBD/STL	LAD/FBD/STL
Operation set	See operation list	See operation list	See operation list
Nesting levels	8	8	8

Technical specifications innovated standard CPUs (continued)

	CPU 312 new	CPU 314 new	CPU 315-2 DP new
System functions (SFCs)	See operation list	See operation list	See operation list
System function blocks (SFB)	See operation list	See operation list	See operation list
User program protection	Yes	Yes	Yes
Dimensions			
Mounting dimensions W x H x D (mm)	40 x 125 x 130	40 x 125 x 130	40 x 125 x 130
Weight	270 g	280 g	290 g
Voltages, currents			
Supply voltage (rated value)	24 V DC	24 V DC	24 V DC
• Permissible range	20.4 V to 28.8 V	20.4 V to 28.8 V	20.4 V to 28.8 V
Current input (no load)	60 mA	60 mA	60 mA
Inrush	2.5 A	2.5 A	2.5 A
I^2t	0.5 A^2s	0.5 A^2s	0.5 A^2s
External fuse protection for supply cables (recommended)	2 A	2 A	2 A
Power loss	2.5 W	2.5 W	2.5 W

Technical specifications standard CPUs

	CPU 313	CPU 314	CPU 315	CPU 315-2 DP	CPU 316-2 DP
RAM (1 statement corresponds to an average of 3 byte)	12 KB / 4 K statement RAM (built-in)	24 KB / 8K statement RAM (built-in)	48 KB / 16K statement RAM (built-in)	64 KB / 21K statement RAM (built-in)	128 KB / 42K statement RAM (built-in)
Load memory					
• Integrated	20 KB RAM	40 KB RAM	80 KB RAM	96 KB RAM	192 KB RAM
• Plug-in, as MC	4 MB flash EPROM	4 MB flash EPROM	4 MB flash EPROM	4 MB flash EPROM	4 MB Flash-EPROM
Backup					
• Without battery	72 byte	4 KB; Bit memories, counters, timers and data	4 KB; Bit memories, counters, timers and data	4 KB; Bit memories, counters, timers and data	4 KB; Bit memories, counters, timers and data
• With battery	All blocks	All blocks	All blocks	All blocks	All blocks
Real-time clock	-	Yes	Yes	Yes	Yes
Programming language	STEP® 7 V5.0	STEP 7 V5.0 Optional: S7-SCL S7-GRAPH	STEP 7 V5.0 **Optional:** • S7-SCL • S7-GRAPH • S7-HiGraph	**6ES7 315-2AF03-0AB0**: STEP 7 V5.0 **6ES7 315-2AF83-0AB0**[1]: STEP 7 V5.0 SP1 **Optional:** • S7-SCL • S7-GRAPH • S7-HiGraph	STEP 7 V5.0 **Optional:** • S7-SCL • S7-GRAPH • S7-HiGraph • CFC
Program organization	Linear, structured	Linear, structured	Linear, structured	Linear, structured	Linear, structured
Types of blocks	• Organization blocks (OBs) • Function blocks (FBs) • Functions (FC) • Data blocks (DBs) • System functions (SFBs, SFCs)	• Organization blocks (OBs) • Function blocks (FBs) • Functions (FC) • Data blocks (DBs) • System functions (SFBs, SFCs)	• Organization blocks (OBs) • Function blocks (FBs) • Functions (FC) • Data blocks (DBs) • System functions (SFBs, SFCs)	• Organization blocks (OBs) • Function blocks (FBs) • Functions (FC) • Data blocks (DBs) • System functions (SFBs, SFCs)	• Organization blocks (OBs) • Function blocks (FBs) • Functions (FC) • Data blocks (DBs) • System functions (SFBs, SFCs)

1) SIMATIC Outdoor with expanded temperature range

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Technical specifications standard CPUs (continued)

	CPU 313	CPU 314	CPU 315	CPU 315-2 DP	CPU 316-2 DP
Number/size of data blocks					
• OB	See operation list / max. 8 KBs	See operation list / max. 8 KBs	See operation list / max. 16 KBs	See operation list / max. 16 KBs	See operation list / max. 16 KBs
• FB	128 / max. 8 KBs	128 / max. 8 KBs	192 / max. 16 KBs	192 / max. 16 KBs	256 / max. 16 KBs
• FC	128 / max. 8 KBs	128 / max. 8 KBs	192 / max. 16 KBs	192 / max. 16 KBs	256 / max. 16 KBs
• DB	127 / max. 8 KBs	127 / max. 8 KBs	255 / max. 16 KBs	255 / max. 16 KBs	511 / max. 16 KBs
Program execution	• Free cycle (OB 1) • Time-driven (OB 35) • Real-time controlled (OB 10) • Interrupt-driven (OB 40) • Start (OB 100)	• Free cycle (OB 1) • Time-driven (OB 35) • Real-time controlled (OB 10) • Interrupt-driven (OB 40) • Start (OB 100)	• Free cycle (OB 1) • Time-driven (OB 35) • Real-time controlled (OB 10) • Interrupt-driven (OB 40) • Start (OB 100)	• Free cycle (OB 1) • Time-driven (OB 35) • Real-time controlled (OB 10) • Interrupt-driven (OB 40) • Start (OB 100)	• Free cycle (OB 1) • Time-driven (OB 35) • Real-time controlled (OB 10) • Interrupt-driven (OB 40) • Start (OB 100)
Block nesting depth	8 for each program execution level	8 for each program execution level	8 for each program execution level	8 for each program execution level	8 for each program execution level
Nesting levels	8	8	8	8	8
Operation set	Binary logic, parenthesis commands, result assignment, save, count, load, transfer, compare, shift, rotate, generate complement, call up blocks, fixed-point and floating point arithmetic functions, jump functions	Binary logic, parenthesis commands, result assignment, save, count, load, transfer, compare, shift, rotate, generate complement, call up blocks, fixed-point and floating point arithmetic functions, jump functions	Binary logic, parenthesis commands, result assignment, save, count, load, transfer, compare, shift, rotate, generate complement, call up blocks, fixed-point and floating point arithmetic functions, jump functions	Binary logic, parenthesis commands, result assignment, save, count, load, transfer, compare, shift, rotate, generate complement, call up blocks, fixed-point and floating point arithmetic functions, jump functions	Binary logic, parenthesis commands, result assignment, save, count, load, transfer, compare, shift, rotate, generate complement, call up blocks, fixed-point and floating point arithmetic functions, jump functions
User program protection	Password protection	Password protection	Password protection	Password protection	Password protection
System functions (SFCs)	Interrupt and error/ fault handling, data copying, real-time clock functions, diagnostic functions, module parameter assignment, operating mode transitions Operating state transitions	Interrupt and error/ fault handling, data copying, real-time clock functions, diagnostic functions, module parameter assignment, operating mode transitions Operating state transitions	Interrupt and error/ fault handling, data copying, real-time clock functions, diagnostic functions, module parameter assignment, operating mode transitions Operating state transitions	Interrupt and error/ fault handling, data copying, real-time clock functions, diagnostic functions, module parameter assignment, operating mode transitions Operating state transitions	Interrupt and error/ fault handling, data copying, real-time clock functions, diagnostic functions, module parameter assignment, operating mode transitions Operating state transitions
Execution times					
• Bit operations	0.6 µs to 1.2 µs	0.3 to 0.6 µs	0.3 to 0.6 µs	0.3 to 0.6 µs	0.3 to 0.6 µs
• Word operations, approx.	2 µs	1 µs	1 µs	1 µs	1 µs
• Timer-/counter operations	15 µs	12 µs	12 µs	12 µs	12 µs
• Fixed-point addition	3 µs	2 µs	2 µs	2 µs	2 µs
• Floating-point addition	60 µs	50 µs	50 µs	50 µs	50 µs
Cycle time monitoring	150 ms (preset), programmable 1 to 6000 ms	150 ms (preset), programmable 1 to 600 ms	150 ms (preset), programmable 1 to 6000 ms	150 ms (preset), programmable 1 to 6000 ms	150 ms (preset), programmable 1 to 6000 ms
Bit memories	2048	2048	2048	2048	2048
• Of these retentive with battery	0 to 576 (M 0.0 to M 71.7, selectable)	0 to 2048 (M 0.0 to M 255.7, selectable)	0 to 2048 (M 0.0 to M 255.7, selectable)	0 to 2048 (M 0.0 to M 255.7, selectable)	0 to 2048 (M 0.0 to M 255.7, selectable)
• Of these retentive without battery	0 to 576 (M 0.0 to M 71.7, selectable)	0 to 2048 (M 0.0 to M 255.7, selectable)	0 to 2048 (M 0.0 to M 255.7, selectable)	0 to 2048 (M 0.0 to M 255.7, selectable)	0 to 2048 (M 0.0 to M 255.7, selectable)
Counter	64	64	64	64	64
• Of these retentive with battery	0 to 35, selectable	0 to 63, selectable	0 to 63, selectable	0 to 63, selectable	0 to 63, selectable
• Of these retentive without battery	0 to 35, selectable	0 to 63, selectable	0 to 63, selectable	0 to 63, selectable	0 to 63, selectable
• Counting range	1 to 999	1 to 999	1 to 999	1 to 999	1 to 999

Technical specifications standard CPUs (continued)

	CPU 313	CPU 314	CPU 315	CPU 315-2 DP	CPU 316-2 DP
Timers	128	128	128	128	128
• Of these retentive with battery	0 to 35, adjustable	0 to 127, adjustable	0 to 127, adjustable	0 to 127, adjustable	0 to 127, adjustable
• Of these retentive without battery	-	0 to 127, adjustable	0 to 127, adjustable	0 to 127, adjustable	0 to 127, adjustable
• Range	10 ms to 9990 s	10 ms to 9990 s	10 ms to 9990 s	10 ms to 9990 s	10 ms to 9990 s
Integral functions	-	-	-	-	-
MPI interface					
• No. of stations, max.	32 stations on the MPI bus; PG/PC, OP, additional S7-300®/ S7-400®, C7; for each CPU, max. 4 static and 4 dynamic connections	32 stations on the MPI bus; PG/PC, OP, additional S7-300®/ S7-400®, C7; for each CPU, max. 4 static and 8 dynamic connections	32 stations on the MPI bus; PG/PC, OP, additional S7-300®/ S7-400®, C7; for each CPU, max. 4 static and 8 dynamic connections	32 stations on the MPI bus; PG/PC, OP, additional S7-300®/ S7-400®, C7; for each CPU, max. 4 static and 8 dynamic connections	32 stations on the MPI bus; PG/PC, OP, additional S7-300®/ S7-400®, C7; for each CPU, max. 4 static and 8 dynamic connections
• Communication functions	• Programming device/OP communications • Global data communications • S7 basic communication • S7 communication (server)	• Programming device/OP communications • Global data communications • S7 basic communication • S7 communication (server)	• Programming device/OP communications • Global data communications • S7 basic communication • S7 communication (server)	• Programming device/OP communications • Global data communications • S7 basic communication • S7 communication (server)	• Programming device/OP communications • Global data communications • S7 basic communication • S7 communication (server)
• Data transmission rate	187.5 kbit/s	187.5 kbit/s	187.5 kbit/s	187.5 kbit/s	19.2 kbit/s and 187.5 kbit/s
• Distance between 2 adjacent stations, max.	Without repeaters: 50 m With 2 repeaters: 1100 m With 10 repeaters in series: 9100 m Over fiber-optic cables: 23.8 km (with 16 star couplers or OLMs)	Without repeaters: 50 m With 2 repeaters: 1100 m With 10 repeaters in series: 9100 m Over fiber-optic cables: 23.8 km (with 16 star couplers or OLMs)	Without repeaters: 50 m With 2 repeaters: 1100 m With 10 repeaters in series: 9100 m Over fiber-optic cables: 23.8 km (with 16 star couplers or OLMs)	Without repeaters: 50 m With 2 repeaters: 1100 m With 10 repeaters in series: 9100 m Over fiber-optic cables: 23.8 km (with 16 star couplers or OLMs)	Without repeaters: 50 m With 2 repeaters: 1100 m With 10 repeaters in series: 9100 m Over fiber-optic cables: 23.8 km (with 16 star couplers or OLMs)
• PG/PCs with STEP® 7	Can be connedted using MPI interface	Can be connedted using MPI interface	Can be connedted using MPI interface	Can be connedted using MPI interface	Can be connedted using MPI interface
Onboard I/Os	-	-	-	-	-
Total address areas I/O	128/128 byte	512/512 byte	256/256 byte	1/1 KB	2/2 KB
Process image I/O	32/32 byte	128/128 byte	128/128 byte	128/128 byte	128/128 byte
Total no. of digital channels	Max. 256	Max. 1024	Max. 1024	Max. 8192	Max. 16384
• Of these central	Max. 64 I and 32 O		Max. 1024	Max. 1024	Max. 1024
Total no. of analog channels	8	Max. 256 E or 128 A	Max. 256	Max. 512	Max. 1024
• Of these central	1/0		Max. 256 E or Max. 128 A	Max. 256 E or max. 128 A	Max. 256 E or max. 128 A
No. of modules per system	-/1	32	32	32	32
No. of CCs/EUs	-/8	1/3	1/3	1/3	1/3
No. of DP lines per CPU (integral interface/CP 342-5)	64 byte	-/1	-/1	1/1	1/1
DP stations per master CPU (integral interface/CP 342-5)	8	-/16	-/32	64/64	124/64
Address area per DP station	64 byte	122 byte	122 byte	244 byte	244 byte
Modules per ET 200®M	8	8	4/8		
DP connection (master/slave)		1 (CP 342®-5)	1 (CP 342-5)	1 (CP 342-5)	1 (CP 342-5)

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Technical specifications standard CPUs (continued)

	CPU 313	CPU 314	CPU 315	CPU 315-2 DP	CPU 316-2 DP
Internode communication support				Yes; sender and receiver	Yes; sender and receiver
Support for clock synchronism				Yes	Yes
Activation/ deactivation of DP slaves				Yes	Yes
Communication functions using CPs					
• Programming device/OP communications	Yes	Yes	Yes	Yes	Yes
• Extended communications	Yes (server)	Yes (server)	Yes (server)	Yes	Yes (server)
• S5 compatible communi-cations	-	Yes (using reloadable blocks)	Yes (using reloadable blocks)	Yes (using reloadable blocks)	Yes (using reloadable blocks)
• Standard communication	-	Yes (using reloadable blocks)	Yes (using reloadable blocks)	Yes (using reloadable blocks)	Yes (using reloadable blocks)
No. of connections, static/dynamic	4/4	4/8	4/8	4/8	4/8
Supply voltage					
• Rated value	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC
• Permitted range	20.4 to 28.8 V	20.4 to 28.8 V	20.4 to 28.8 V	20.4 to 28.8 V	20.4 to 28.8 V
Current consumption typ.	1 A	1 A	1 A	1 A	1 A
Starting current, typ.	8 A	8 A	8 A	8 A	8 A
Power losses, typ.	8 W	8 W	8 W	8 W	8 W
Dimensions (W x H x D) in mm	80 x 125 x 130	80 x 125 x 130	80 x 125 x 130	80 x 125 x 130	80 x 125 x 130
Weight					
• CPU	530 g	530 g	530 g	530 g	530 g
• Memory card	16 g	16 g	16 g	16 g	16 g
Suitable modules (recommendation)					
• FM		4	8	8	8
• CP, point-to-point		2	4	4	4
• CP, LAN, (C bus)		1	2	2	2
Suitable software					
• Software controllers		Dependent on required storage space and resulting runtime	Dependent on required storage space and resulting runtime	Dependent on required storage space and resulting runtime	Dependent on required storage space and resulting runtime
• Process diagnostics		Yes	Yes	Yes	Yes
• S7-GRAPH		-	Yes	Yes	Yes
• S7-HiGraph®		-	Yes	Yes	Yes
• S7-SCL		Yes	Yes	Yes	Yes
• CFC		-	Yes	Yes	Yes

Technical specifications outdoor CPUs

	CPU 312 IFM Outdoor	CPU 314 IFM Outdoor	CPU 314 Outdoor
Memory (1 statement corresponds to an average of 3 byte)	6 KB 2 K-statement RAM (built-in)	32 KB/10 K statements RAM (integrated)	24 KB / 8K statements RAM (integrated)
Load memory			
• Integrated	20 KB RAM / 20 KB FEPROM	48 KB RAM	40 KB RAM
• Plug-in, as MC	-	-	4 MB flash EPROM
Backup			
• Without battery	72 byte; Bit memories, counters, timers and data	144 byte; bit memories, counters, timers and data	4 KB; bit memories, counters, timers and data
• With battery	-	All blocks	All blocks
Real-time clock	-	Yes	Yes

Technical specifications Outdoor-CPUs (continued)

	CPU 312 IFM Outdoor	CPU 314 IFM Outdoor	CPU 314 Outdoor
Programming language	STEP 7 V5.0 SP1	STEP 7 V5.0 SP1 **Optional:** • S7-SCL • S7-GRAPH	STEP 7 V5.0 Optional: S7-SCL S7-GRAPH
Program organization	Linear, structured	Linear, structured	Linear, structured
Types of blocks	• Organization blocks (OBs) • Function blocks (FBs) • Functions (FC) • Data blocks (DBs) • System functions (SFBs, SFCs)	• Organization blocks (OBs) • Function blocks (FBs) • Functions (FC) • Data blocks (DBs) • System functions (SFBs, SFCs)	• Organization blocks (OBs) • Function blocks (FBs) • Functions (FC) • Data blocks (DBs) • System functions (SFBs, SFCs)
Number/size of data blocks			
• OB	See operation list / max. 6 KB	See operation list / max. 8 KBs	See operation list / max. 8 KBs
• FB	32 / max. 6 KBs	128 / max. 8 KBs	128 / max. 8 KBs
• FC	32 / max. 6 KBs	128 / max. 8 KBs	128 / max. 8 KBs
• DB	63 / max. 6 KBs	127 / max. 8 KBs	127 / max. 8 KBs
Program execution	• Free cycle (OB 1) • Interrupt-driven (OB 40) • Restart (OB 100)	• Free cycle (OB 1) • Time-driven (OB 35) • Real-time controlled (OB 10) • Interrupt-driven (OB 40) • Restart (OB 100)	• Free cycle (OB 1) • Time-driven (OB 35) • Real-time controlled (OB 10) • Interrupt-driven (OB 40) • Restart (OB 100)
Block nesting depth	8 for each program execution level	8 for each program execution level	8 for each program execution level
Nesting levels	8	8	8
Instruction set	Binary logic, parenthesis commands, result assignment, save, count, load, transfer, compare, shift, rotate, generate complement, call up blocks, fixed-point and floating point arithmetic functions, jump functions	Binary logic, parenthesis commands, result assignment, save, count, load, transfer, compare, shift, rotate, generate complement, call up blocks, fixed-point and floating point arithmetic functions, jump functions	Binary logic, parenthesis commands, result assignment, save, count, load, transfer, compare, shift, rotate, generate complement, call up blocks, fixed-point and floating point arithmetic functions, jump functions
User program protection	Password protection	Password protection	Password protection
System functions (SFCs)	Interrupt and error processing, copying data, clock functions, diagnostic functions, module initialization, status transitions	Interrupt and error processing, copying data, clock functions, diagnostic functions, module initialization, status transitions	Interrupt and error processing, copying data, clock functions, diagnostic functions, module initialization, status transitions
Processing times for			
• Bit operations	0,6 µs to 1,2 µs	0.3 to 0.6 µs	0.3 to 0.6 µs
• Word operations, approx.	2 µs	1 µs	1 µs
• Timer-/counter operations	15 µs	12 µs	12 µs
• Fixed-point addition	3 µs	2 µs	2 µs
• Floating-point addition	60 µs	50 µs	50 µs
Cycle time monitoring	150 ms (preset), selectable from 1 to 6000 ms	150 ms (preset), selectable from 1 to 6000 ms	150 ms (preset), selectable from 1 to 6000 ms
Bit memories	1024	2048	2048
• Of these retentive with battery	-	0 to 2048 (M 0.0 to M 255.7, selectable)	0 to 2048 (M 0.0 to M 255.7, selectable)
• Of these retentive without battery	0 to 576 (M 0.0 to M 71.7, selectable)	0 to 1152 (M 0.0 to M 143.7, selectable)	0 to 2048 (M 0.0 to M 255.7, selectable)
Counter	32	64	64
• Of these retentive with battery	-	0 to 63, programmable	0 to 63, programmable
• Of these retentive without battery	0 to 31, programmable	0 to 63, programmable	0 to 63, programmable
• Counting range	1to 999	1 to 999	1 to 999

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Technical specifications Outdoor-CPUs (continued)

	CPU 312 IFM Outdoor	CPU 314 IFM Outdoor	CPU 314 Outdoor
Timers	64	128	128
• Of these retentive with battery	-	0 to 71, selectable	0 to 127, selectable
• Of these retentive without battery	-	0 to 71, selectable	0 to 127, selectable
• Range	10 ms to 9990 s	10 ms to 9990 s	10 ms to 9990 s
Integral functions			-
• Counter	1 counter with 4 inputs, counter frequency 10 kHz; 32 bit (incl. sign); 2 direction-dependent comparators	1 counter with 4 inputs or 2 counters with 2 inputs and 2 direction-dependent comparators for each counter; counter frequency 10 kHz; 32-bit (incl. sign)	-
• Frequency measurement	1 channel to max. 10 kHz; sample times 0.1 s, 1 s, 10 s; measuring procedure: Calculation of pulse number per sample time	1 channel to max. 10 kHz; sample times 0.1 s, 1 s, 10 s; measuring procedure: Calculation of pulse number per sample time	-
• Open-loop positioning	-	1 channel; position detection using a 24 V asymmetric incremental encoder; 3 digital inputs are occupied by the encoder (track A, track B, reference point); single interpretation of count pulses (10 kHz)	-
• Integral "Closed loop control" function blocks	-	PID control function blocks • Continuous-action manipulated variable outputs • Binary manipulated variable outputs • Automatic/manual mode • Manipulated variable limitation	-
MPI interface			
• No. of stations, max.	32 bus nodes on the MPI bus; PG/PC, OP, other S7-300®/400®, C7; per CPU max. 4 static and 2 dynamic connections	32 bus nodes on the MPI bus; PG/PC, OP, other S7-300®/400®, C7; per CPU max. 4 static and 8 dynamic connections	32 bus nodes on the MPI bus; PG/PC, OP, other S7-300®/400®, C7; per CPU max. 4 static and 8 dynamic connections
• Communication functions	• PG/OP communication • Global data communication • S7 basic communication • S7 communication	• PG/OP communication • Global data communication • S7 basic communication • S7 communication	• PG/OP communication • Global data communication • S7 basic communication • S7 communication
• Data transmission rate	187.5 kbit/s	187.5 kbit/s	187.5 kbit/s
• Distance between 2 adjacent stations, max.	With 10 repeaters in row: 9100 m, using fiber-optic cables: 23.8 km (with 16 hubs or OLM)	Without repeaters: 50 m with 2 repeaters: 1100 m with 10 repeaters in row: 9100 m using fiber-optic cables: 23.8 km (with 16 hubs or OLM)	Without repeaters: 50 m with 2 repeaters: 1100 m with 10 repeaters in row: 9100 m using fiber-optic cables: 23.8 km (with 16 hubs or OLM)
PG/PCs with STEP® 7	Can be connected using MPI interface	Can be connected using MPI interface	Can be connected using MPI interface
Onboard I/Os			-
• Digital inputs	10; 24 V DC of which, 4 channels can be used for process interrupts or integrated functions	20; 24 V DC of which, 4 channels can be used for process interrupts or integrated functions	-
• Digital outputs	6; 24 V DC; 0.5 A	16; 24 V DC; 0.5 A	-
• Analog inputs; resolution (bit)	-	4; ±10 V, ±20 mA / 11 + sign	-
• Analog outputs; resolution (bit)	-	1; ±10 V, ±20 mA / 11 + sign	-
Real-time clock		Yes	
Total address areas I/O	128/128 byte	512/512 byte	512/512 byte
Process image I/O	32/32 byte	128/128 byte	128/128 byte
Total no. of digital channels	Max. 256	Max. 992	Max. 1024
Total no. of analog channels	Max. 64 inputs or 32 outputs	Max. 248 inputs or 124 outputs	Max. 256 inputs or 128 outputs

Technical specifications Outdoor CPUs (continued)

	CPU 312 IFM Outdoor	CPU 314 IFM Outdoor	CPU 314 Outdoor
No. of modules per system	8	31	32
No. of CCs/EUs	1/0	1/3	1/3
No. of DP lines per CPU (integral interface/CP 342-5)	-/1	-/1	-/1
DP stations per master CPU (integrated interface/ CP 342-5)	-/8	-/16	-/16
Address area per DP station	64 byte	122 byte	122 byte
Modules per ET 200M	8	8	8
DP connection (master/slave)	1 (CP 342-5)	1 (CP 342-5)	1 (CP 342-5)
Communications functions using CPs			
• Programming device/OP communications	Yes	Yes	Yes
• Extended communications	Yes (server)	Yes (server)	Yes (server)
• S5-compatible communi-cations	-	Yes (using reloadable blocks)	Yes (using reloadable blocks)
• Standard communication	-	Yes (using reloadable blocks)	Yes (using reloadable blocks)
Number of connections, static/dynamic	4/4	4/8	4/8
Supply voltage			
• Rated value	24 V DC	24 V DC	24 V DC
• Permissible range	20.4 to 28.8 V	20.4 to 28.8 V	20.4 to 28.8 V
Current consumption typ.	0.8 A + 0.5 A per fully loaded output	1 A	1 A
Starting current, typ.	8 A	8 A	8 A
Power losses, typ.	9 W incl. integral inputs/outputs	16 W	8 W
Required front connector	1 x 20-pin	2 x 40-pin	-
Dimensions (W x H x D) in mm	80 x 125 x 130	160 x 125 x 130	80 x 125 x 130
Weight	450 g		
• CPU		900 g	530 g
• Memory card		-	16 g
Suitable modules (recommendation)			
• FM		4	4
• CP, point-to-point		2	2
• CP, LAN, (C bus)		1	1
Suitable software			
• Software controllers		Dependent on required storage space and resulting runtime	Dependent on required storage space and resulting runtime
• Process diagnostics		Yes	Yes
• S7-GRAPH		-	-
• S7-HiGraph		-	-
• S7-SCL		Yes	Yes
• CFC		-	-
On-board digital inputs	**10**	**20**	-
Input voltage			
• Rated value	24 V DC	24 V DC	-
• At "1" signal	15 to 30 V	15 to 30 V	-
• At "0" signal	-3 to +5 V	-3 to +5 V	-
Electrical isolation	No		-
• Special inputs/in groups of	No/10	No / 4	-
• Inputs / in groups of		Yes / 16	-

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Technical specifications Outdoor CPUs (continued)

	CPU 312 IFM Outdoor	CPU 314 IFM Outdoor	CPU 314 Outdoor
Input current			
• At "1" signal, min./typ.	2 mA/7 mA	2 mA / 7 mA	-
Input delay (at rated value of the input voltage)			
• For standard inputs, typ./ max.	3 ms/5 ms	3 ms/5 ms	-
• For interrupt inputs, max.	50 µs	50 µs	-
• For counter, max.	50 µs	50 µs	-
Connection of 2-wire BERO			
• Acceptable quiescent current	1.5 mA	1,5 mA	-
Cable lengths			
• Unshielded	600 m	600 m	-
• Shielded	1000 m (100 m for interrupt and counter inputs)	1000 m (100 m for interrupt and counter inputs)	-
Integrated digital outputs	**6**	**16**	**-**
Rated load voltage L+/L1	24 V DC	24 V DC	-
• Permitted range	20.4 to 28.8 V	20.4 to 28.8 V	-
Output voltage			
• For "1" signal, max.	L+ - 0,8 V	L+ - 0.8 V	-
Electrical isolation	No/6	Yes / 8	-
Maximum output current			
• At "1" signal			
- Rated value at 40 °C	0.5 A	0.5 A	-
- Rated value at 60 °C	0.5 A	0.5 A	-
- Min. current	5 mA	5 mA	-
• At "0" signal , max.	0.5 mA	0.5 mA	-
Total load capability			
• At 40 °C	100%	50%	-
• At 60 °C	100%	25%	-
Switching frequency of outputs			
• For resistive load	100 Hz	100 Hz	-
• For inductive load	0.5 Hz	0.5 Hz	-
Voltage induced on circuit interruption limited to	30 V	30 V	-
Short-circuit protection	Electronic, clocked	Electronic, clocked	-
Cable lengths			
• Unshielded	600 m	600 m	-
• Shielded	1000 m	1000 m	-
Integrated analog inputs	-	**4**	-
Input ranges (rated values)/ input resistance			
• Voltage	-	±10 V/50 kΩ	-
• Current	-	±20 mA/105,5 kΩ	-
Electrical isolation / in grp-ups of	-	Ja / 4	-
Bipolar resolution	-	11 bit + sign	-
Conversion time			
• Per channel	-	100 µs	-
• Per module	-	400 µs	-

Technical specifications CPU 318-2 DP (continued)

	CPU 312 IFM Outdoor	CPU 314 IFM Outdoor	CPU 314 Outdoor
Basic error threshold (operating error threshold at 25°C, referred to input range)	-	±0.9%	-
Integrated analog outputs	-	**1**	-
Output ranges (rated values)			
• Voltage	-	±10 V	-
• Current	-	±20 mA	-
Isolation / in groups of		Yes / 1	
Conversion time per channel	-	40 µs	-
Basic error (operational limit at 25 °C, referred to output range), max.	-	±0.9%	-

Technical specifications CPU 318-2 DP (continued)

Memory (1 statement corresponds to an average of 3 byte)	512 KB of which max. 256 KB are code and max. 256 KB are data
Load memory	
• Integrated	64 KB RAM
• Plug-in as MC, max.	4 MB Flash-EPROM/RAM
Backup	
• Without battery	8 KB; bit memories, counters, timers and data
• With battery	All blocks
Real-time clock	Yes
Programming language	STEP 7 V5.0 **Optional:** • S7-SCL • S7-GRAPH • S7-HiGraph • CFC
Program organization	Linear, structured
Types of blocks	• Organization blocks (OBs) • Function blocks (FBs) • Functions (FC) • Data blocks (DBs) • System functions (SFBs, SFCs)
Number/size of data blocks	
• OB	See operation list / max. 64 KBs
• FB	1024 / max. 64 KBs
• FC	1024 / max. 64 KBs
• DB	2047 / max. 64 KBs

Program execution	• TOD interrupts (OB 10, 11) • Delay interrupts (OB 20, 21) • Time interrupts (OB 32, 35) • Process alarms (OB 40, 41) • Background OB (OB 90) • Restart (OB 100) • Asynchronous errors (OB 80, 81, 82, 84 to 87) • Synchronous errors (OB 121, 122)
Block nesting depth	20 for each program execution level (except synchronization error OB); 1 additional synchronization error OB
Nesting levels	8
Instruction set	Binary logic, parenthesis commands, result assignment, save, count, load, transfer, compare, shift, rotate, generate complement, call up blocks, fixed-point and floating point arithmetic functions, jump functions
User program protection	Password protection
System functions (SFCs)	Interrupt and error processing, copying data, clock functions, diagnostic functions, module initialization, status transitions
Execution times	
• Bit operations	0.1 µs
• Word operations, approx.	0.1 µs
• Timer-/counter operations	0.1 µs
• Fixed-point addition	0.1 µs
• Floating-point addition	0.6 µs

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Technical specifications CPU 318-2 DP (continued)

Cycle time monitoring	150 ms (preset), selectable from 1 to 6000 ms
Bit memories	8192
• Of which retentive with battery	0 to 8191 (M 0.0 to M 1023.7, programmable)
• Of these, retentive without battery bakkup	0 to 8191 (M 0.0 to M 1023.7, programmable)
Counter	512
• Of these retentive with battery	0 to 511, programmable
• Of these, retentive without battery bakkup	0 to 511, programmable
• Counting range	1 to 999
Timers	512
• Of these retentive with battery	0 to 511, programmable
• Of these, retentive without battery bakkup	0 to 511, programmable
• Range	10 ms to 9990 s
Integral functions	-
MPI interface	
• No. of stations, max.	32 bus nodes on the MPI bus; PG/PC, OP, other S7-300®/400®, C7; each CPU 32 connections max.
• Communication functions	• Programming device/OP communications • Global data communication • S7 basic communication • S7 communication
• Transmission rate, max.	12 Mbit/s
• Max. distance between 2 adjacent nodes at 12 Mbit/s	Without repeaters: 100 m; with 2 repeaters: 1100 m with 10 repeaters in series: 9100 m using fiber-optic cables: 23.8 km (with 16 hubs or OLM)
PG/PCs with STEP® 7	Can be connected using MPI interface
Onboard I/Os	-
Total address areas I/O	8/8 KB
Process image I/O	256/256 byte, expandable to 2048
Total no. of digital channels	Max. 65536
• Of these, central	Max. 1024
Total no. of analog channels	Max. 4096
• Of these, central	Max. 256 I or 128 O

No. of modules per system	32
No. of CCs/EUs	1/3
No. of DP lines per CPU (integrated interface/CP 342-5)	2/2
DP master stations per CPU (integrated interface/CP 342-5)	32 (MPI interface), 125 (DP interface)/64
Address area per DP station	244 byte
DP connection (Master/Slave)	1 (CP 342-5); 2 (integrated, master/slave)
Internode communication support	Yes; sender and receiver
Support for clock synchronism	Yes
Communications functions using CPs	
• Programming device/OP communications	Yes
• Extended communications	Yes (server)
• S5-compatible communications	Yes (using reloadable blocks)
• Standard communication	Yes (using reloadable blocks)
Number of connections	32
Supply voltage	
• Rated value	24 V DC
• Permitted range	20.4 to 28.8 V
Current consumption typ.	1.2 A
Starting current, typ.	12 A
Power loss	12 W
Dimensions (W x H x D) in mm	160 x 125 x 130
Weight	
• CPU	900 g
• Memory card	16 g
Suitable modules	
• FMs	16
• CP, point-to-point	8
• CP, LAN, (C bus)	2
Suitable software	
• Software controllers	Dependent on required storage space and resulting runtime
• Process diagnostics	Yes
• S7-GRAPH	Yes
• S7-HiGraph	Yes
• S7-SCL	Yes
• CFC	Yes

Technical specifications CPU 315F-2 DP

Main memory, integrated	128 KB[1)]
Load memory, plug-in	64 KB to 4 MB
Command runtime	≥ 0.1 µs
Alarm response time	400 µs
Flags/timers/counters	2048, 256, 256
Total address areas I/O	1024 byte each

Number of digital I/O	1000/1000
Number of analog I/O	248/124
MPI interface	187,5 kbit/s, 32 nodes max.
PROFIBUS DP interface	12 Mbits/s, 32 stations max., master/slave changeover
Dimensions (W x H x D) in mm	120 x 125 x 130

1) The number of F instructions in contrast to a standard program is limited due to the F-specific overhead; depending on the type of programming, approximately 24 K F statements are possible.

Ordering data	Order No.
CPU 312C Compact CPU, main memory 16 KB, power supply 24 V DC, 10 DI/6 DO integrated, integrated functions, MPI; including slot number labels and 2 keys; MMC required	**6ES7 312-5BD00-0AB0**
CPU 313C Compact CPU, main memory 32 KB, power supply 24 V DC, 24 DI/16 DO, 4 AI/2 AO integrated, integrated functions, MPI; MMC required	**6ES7 313-5BE00-0AB0**
CPU 313C-2 PtP Compact CPU, main memory 32 KB, power supply 24 V DC, 16 DI/16 DO integrated, integrated functions, MPI, RS 422/485 interface; MMC required	**6ES7 313-6BE00-0AB0**
CPU 313C-2 DP Compact CPU, main memory 32 KB, power supply 24 V DC, 16 DI/16 DO integrated, integrated functions, MPI, PROFIBUS DP master/slave interface; MMC required	**6ES7 313-6CE00-0AB0**
CPU 314C-2 PtP Compact CPU, main memory 48 KB, power supply 24 V DC, 24DI/16DO/4AI/2AO integrated, integrated functions, MPI, RS 422/485 interface; MMC required	**6ES7 314-6BF00-0AB0**
CPU 314C-2 DP Compact CPU, main memory 48 KB, power supply 24 V DC, 24DI/16DO/4AI/2AO integrated, integrated functions, MPI, PROFIBUS DP master/slave interface; MMC required	**6ES7 314-6CF00-0AB0**
CPU 312 new Main memory 16 KB, power supply 24 V DC, MPI; MMC required	**6ES7 312-1AD10-0AB0**
CPU 314 new Main memory 48 KB, power supply 24 V DC, MPI; MMC required	**6ES7 314-1AF10-0AB0**
CPU 315-2 DP new Main memory 128 KB, power supply 24 V DC, MPI, PROFIBUS DP master/slave interface; MMC required	**6ES7 315-2AG10-0AB0**
CPU 313 Main memory 12 KB, power supply 24 V DC, MPI, slot for memory card, compartment for backup battery, including slot number labels and 2 keys	**6ES7 313-1AD03-0AB0**

	Order No.
CPU 314 Main memory 24 KB, power supply 24 V DC, MPI, slot for memory card, compartment for backup battery; including slot number labels and 2 keys	**6ES7 314-1AE04-0AB0**
CPU 315 Main memory 48 KB, power supply 24 V DC, MPI, slot for memory card, compartment for backup battery; including slot number labels and 2 keys	**6ES7 315-1AF03-0AB0**
CPU 315-2 DP Main memory 64 KB, power supply 24 V DC, PROFIBUS DP master/slave interface, MPI, slot for memory card, compartment for backup battery; including slot number labels and 2 keys	
• Standard temperature range	**6ES7 315-2AF03-0AB0**
• Outdoor version	**6ES7 315-2AF83-0AB0**
CPU 316-2 DP Main memory 128 KB, power supply 24 V DC, PROFIBUS DP master/slave interface, MPI, slot for memory card, compartment for backup battery; including slot number labels and 2 keys	**6ES7 316-2AG00-0AB0**
CPU 312 IFM Outdoor Compact CPU for extended temperature range; main memory 6 KB, power supply 24 V DC, 10 DI/6 DO integrated, integrated functions, MPI; including slot number labels and 2 keys	**6ES7 312-5AC82-0AB0**
CPU 314 IFM Outdoor Compact CPU for extended temperature range; main memory 32 KB, power supply 24 V DC, 20DI/16DO/4AI/1AO integrated, integrated functions, MPI; including slot number labels and 2 keys	**6ES7 314-5AE83-0AB0**
CPU 314 Outdoor CPU for extended temperature range; main memory 24 KB, power supply 24 V DC, MPI, slot for memory card, compartment for backup battery; including slot number labels and 2 keys	**6ES7 314-1AE84-0AB0**

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Ordering data (continued)

	Order No.
CPU 318-2 DP Main memory 512 KB, power supply 24 V DC, PROFIBUS DP master/slave interface, MPI, slot for memory card, compartment for backup battery; including slot number labels and 2 keys	**6ES7 318-2AJ00-0AB0**
CPU 315F-2 DP CPU for SIMATIC S7-300F; main memory 128 KB, power supply 24 V DC, PROFIBUS DP master/slave interface, MPI; including slot number labels and 2 keys; MMC required	**6ES7 315-6FF00-0AB0**
S7 F Distributed Safety option package for generating fail-safe programs for S7-300F	**6ES7 833-1FC00-0YX0**
FEPROM memory card For standard and outdoor CPUs as well as CPU 318-2 DP	
16 KB	**6ES7 951-0KD00-0AA0**
32 KB	**6ES7 951-0KE00-0AA0**
64 KB	**6ES7 951-0KF00-0AA0**
128 KB	**6ES7 951-0KG00-0AA0**
256 KB	**6ES7 951-1KH00-0AA0**
512 KB	**6ES7 951-0KJ00-0AA0**
1 MB	**6ES7 951-1KK00-0AA0**
2 MB	**6ES7 951-1KL00-0AA0**
4 MB	**6ES7 951-1KM00-0AA0**
For outdoor CPUs	
16 KB, ext. temperature range	**6ES7 951-0KD80-0AA0**
32 KB, ext. temperature range	**6ES7 951-0KE80-0AA0**
64 KB, ext. temperature range	**6ES7 951-0KF80-0AA0**
RAM memory card for CPU 318-2 DP	
128 KB	**6ES7 951-0AG00-0AA0**
256 KB	**6ES7 951-1AH00-0AA0**
512 KB	**6ES7 951-1AJ00-0AA0**
1 MB	**6ES7 951-1AK00-0AA0**
2 MB	**6ES7 951-1AL00-0AA0**
Micro memory card for compact CPUs, innovated standard CPUs and CPU 315F-2 DP	
64 KB	**6ES7 953-8LF00-0AA0**
128 KB	**6ES7 953-8LG00-0AA0**
512 KB	**6ES7 953-8LJ00-0AA0**
2 MB	**6ES7 953-8LL00-0AA0**
4 MB	**6ES7 953-8LM00-0AA0**
8 MB	**6ES7 953-8LP10-0AA0**
Programming adapter for micro memory cards for PG 720 and PG 740	**6ES7 798-0BA00-0XA0**
MPI cable for connecting SIMATIC S7 and PG using MPI; 5 m long	**6ES7 901-0BF00-0AA0**

	Order No.
Point-to-point connecting cable for connection to CPU 31xC-2 PtP; 5 m long	
5 m	**6ES7 902-3AB00-0AA0**
10 m	**6ES7 902-3AC00-0AA0**
50 m	**6ES7 902-3AG00-0AA0**
Sub-D connector for connection to the 2nd serial interface of the CPU 31xC-2 PtP 15-pin, male	**6ES5 750-2AA21**
Backup battery for standard CPUs, outdoor CPUs and CPU 318-2 DP; 3.6 V, 850 mA	**6ES7 971-1AA00-0AA0**
Front connector (1 unit) For CPU 312 IFM 20-pin, with screw-type terminals	
• 1 unit	**6ES7 392-1AJ00-0AA0**
• 100 units	**6ES7 392-1AJ00-1AB0**
20-pin, with spring-loaded terminals	**6ES7 392-1BJ00-0AA0**
For compact CPUs, CPU 314 IFM (2 units required here) and CPU 315F-2 DP 40-pin, with screw-type terminals	
• 1 unit	**6ES7 392-1AM00-0AA0**
• 100 units	**6ES7 392-1AM00-1AB0**
40-pin, with spring-loaded terminals	**6ES7 392-1BM01-0AA0**
Spare keys for CPU 2 units (spare part)	**6ES7 911-0AA00-0AA0**
Slot number labels	**6ES7 912-0AA00-0AA0**
S7-300 manual Design, CPU data, module data, instruction list	
German	**6ES7 398-8FA10-8AA0**
English	**6ES7 398-8FA10-8BA0**
French	**6ES7 398-8FA10-8CA0**
Spanish	**6ES7 398-8FA10-8DA0**
Italian	**6ES7 398-8FA10-8EA0**
Documentation for S7-300F System description, configuring and programming, PROFIsafe fail-safe modules	
German	**6ES7 988-8FB10-8AA0**
English	**6ES7 988-8FB10-8BA0**
French	**6ES7 988-8FB10-8CA0**
Manual: integrated functions for CPUs 312 IFM, 314 IFM	
German	**6ES7 398-8CA00-8AA0**
English	**6ES7 398-8CA00-8BA0**
French	**6ES7 398-8CA00-8CA0**
Spanish	**6ES7 398-8CA00-8DA0**
Italian	**6ES7 398-8CA00-8EA0**
Instruction list for standard and outdoor CPUs as well as CPU 318-2 DP	
German	**6ES7 398-8AA03-8AN0**
English	**6ES7 398-8AA03-8BN0**
French	**6ES7 398-8AA03-8CN0**
Spanish	**6ES7 398-8AA03-8DN0**
Italian	**6ES7 398-8AA03-8EN0**

Ordering data (continued)	Order No.
Operation list	
for compact CPUs, innovated standard CPUs and CPU 315F-2 DP	
German	**6ES7 398-8AA10-8AN0**
English	**6ES7 398-8AA10-8BN0**
French	**6ES7 398-8AA10-8CN0**
Spanish	**6ES7 398-8AA10-8DN0**
Italian	**6ES7 398-8AA10-8EN0**
SIMATIC Manual Collection	**6ES7 998-8XC01-8YE0**
Electronic manuals on CD-ROM, in 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	
SIMATIC Manual Collection updating service for 1 year	**6ES7 998-8XC01-8YE2**
Current Manual Collection CD as well as the three following updates	
Technical overview "S7-300 programmable controller - design and application"	
German	**6ES7 031-0AA00-8AB0**
English	**6ES7 031-0AA00-8BB0**
French	**6ES7 031-0AA00-8CB0**
Spanish	**6ES7 031-0AA00-8DB0**
Italian	**6ES7 031-0AA00-8EB0**
Technical overview "From SIMATIC S5 to SIMATIC S7"	
German	**6ES7 398-8AA01-8AB0**
English	**6ES7 398-8AA01-8BB0**
French	**6ES7 398-8AA01-8CB0**
Spanish	**6ES7 398-8AA01-8DB0**
Italian	**6ES7 398-8AA01-8EB0**
Manual "Communication for SIMATIC S7-300/-400"	
German	**6ES7 398-8EA00-8AA0**
English	**6ES7 398-8EA00-8BA0**
French	**6ES7 398-8EA00-8CA0**
Spanish	**6ES7 398-8EA00-8DA0**
Italian	**6ES7 398-8EA00-8EA0**
SIMATIC S7 demonstration pack	**6ES7 910-3AA00-0XA0**
with components for mounting S7-200 and S7-300	
Rechargeable battery for real-time clock	**6ES7 971-5BB00-0AA0**
for backup of real-time clock in CPU 314 or better	
Power supply plug	**6ES7 391-1AA00-0AA0**
for compact CPUs, innovated standard CPUs and CPU 315F-2 DP (10 units, spare part)	

	Order No.
Labelling strips	
For compact CPUs, innovated standard CPUs, CPU 312 IFM Outdoor, CPU 314 IFM Outdoor and CPU 315F-2 DP (10 units, spare part)	**6ES7 392-2XX00-0AA0**
For CPU 314 IFM Outdoor (10 units, spare part)	**6ES7 392-2XX10-0AA0**
Labelling cover	**6ES7 392-2XY00-0AA0**
For compact CPUs, innovated standard CPUs, CPU 312 IFM Outdoor, CPU 314 IFM Outdoor and CPU 315F-2 DP (10 units, spare part)	
For CPU 314 IFM Outdoor (10 units, spare part)	**6ES7 392-2XY10-0AA0**
S7-SmartLabel	**2XV9 450-1SL00-0YX0**
Software for machine labelling of modules directly from the STEP 7 project	
Labelling sheets for machine labelling	See page 4/123
PROFIBUS DP RS 485 bus connector	
• With 90° outgoing feeder cable, max. transmission rate 12 Mbit/s	
- Without PG interface	**6ES7 972-0BA12-0XA0**
- With PG interface	**6ES7 972-0BB12-0XA0**
• With 90° outgoing feeder cable for FastConnect system, max. transmission rate 12 Mbit/s	
- Without PG interface	**6ES7 972-0BA50-0XA0**
- With PG interface	**6ES7 972-0BB50-0XA0**
• With axial outgoing feeder cable for SIMATIC OP, for connecting to PPI, MPI, PROFIBUS	**6GK1 500-0EA02**
PROFIBUS FastConnect bus cable	**6XV1 830-0EH10**
Standard type with special design for fast mounting, 2-core, shielded, sold by the meter; max. delivery unit 1000 m, minimum ordering length 20 m	
RS 485 repeater for PROFIBUS	**6ES7 972-0AA01-0XA0**
Max. transmission rate 12 Mbit/s; 24 V DC; housing IP 20	
PROFIBUS bus components	See Catalogs IK PI, CA 01
for configuring MPI/PROFIBUS communication	

SM 321 digital input modules

Overview



- Digital I/O for the SIMATIC® S7-300®
- For connecting switches and 2-wire proximity switches (BERO)

Technical specifications

6ES7 321-	1BH02-0AA0 1BH82-0AA0 [1]	1BH50-0AA0	1BL00-0AA0 1BL80-0AA0 [1]	1CH00-0AA0	1CH80-0AA0 [1)2)]
Number of inputs	16	16; source input	32	16	16
Interrupts	-	-	-	-	-
Diagnostics	-	-	-	-	-
Rated load voltage L+/L1					
• Rated value	24 V DC	24 V DC	24 V DC	24 to 48 V AC/DC	48 to 125 V DC
• Permitted range	20.4 V to 28.8 V			-	-
Input voltage					
• Rated value	24 V DC	24 V DC	24 V DC	24 to 48 V DC 24 to 48 V AC	48 to 125 V DC
• At "1" signal	13 to 30 V	-13 to -30 V	13 to 30 V	14 to 60 V AC	30 to 146 V DC
• At signal "0"	-30 to +5 V	-5 to +30 V	-30 to +5 V	-5 to 5 V AC	-30 to 15 V DC
• Frequency	-	-	-	0 to 63 Hz	-
Isolation (to backplane bus)	Optocoupler			Optocoupler	Optocoupler
• In groups of	16	16	16	1	8
Input current					
• At "1" signal, typ.	9.0 mA	7.0 mA	7.0 mA	8 mA	2.6 mA
Input delay					
• Configurable	-	-	-	-	-
• At rated input voltage	1.2 to 4.8 ms	1.2 to 4.8 ms	1.2 to 4.8 ms	Max. 15 ms	1 to 3 ms
No. of simultaneously controllable inputs					
• Up to 40 °C	16	16	32	16 (horizontal and vertical mounting)	16 (at 120 V DC)
• Up to 60 °C	16	16	16	16 (vertical mounting)	16 (at 60 V DC) or 10 (at 140 V DC)
• Up to 70 °C	-	-	-	-	16 (at 60 V DC) or 6 (at 140 V DC)
Connection of 2-wire BERO	Possible	Possible	Possible	Possible	Possible
• Permissible quiescent current, max.	1.5 mA	1.5 mA	1.5 mA	1.0 mA	1.0 mA
Line length					
• Unshielded	600 m	600 m	600 m	600 m	600 m
• Shielded	1000 m	1000 m	1000 m	1000 m	1000 m

1) SIMATIC Outdoor with expanded temperature range -25 to +60 °C
2) Available exclusively with expanded temperature range

Technical specifications (continued)

6ES7 321-	1BH02-0AA0 1BH82-0AA0 [1]	1BH50-0AA0	1BL00-0AA0 1BL80-0AA0 [1]	1CH00-0AA0	1CH80-0AA0 [1][3]
Current consumption					
From backplane bus, max.	10 mA	10 mA	15 mA	100 mA	40 mA
• From L+, max.	25 mA	-	-	-	-
Power losses, typ.	3.5 W	3.5 W	6.5 W	1.5 W at 24 V 2.8 W at 48 V	4.3 W
Isolation tested at	500 V DC	500 V DC	500 V DC	2500 V DC	1500 V DC
Dimensions (W x H x D) in mm	40 x 125 x 120			40 x 125 x 120 mm	40 x 125 x 120
Required front connector	20-pin	20-pin	40-pin	20-pin	20-pin
Weight, approx.	200 g	200 g	260 g	260g	200 g

Technical specifications (continued)

6ES7 321-	7BH00-0AB0 7BH80-0AB0[1]	1FH00-0AA0	1EL00-0AA0	1FF01-0AA0 1FF81-0AA0[1]	1FF10-0AA0
Number of inputs	16	16	32	8	8
Interrupts	Process interrupt diagnostic alarm		-	-	-
Diagnostics	internal/external error		-	-	-
Rated load voltage L+/L1					
• Rated value	24 V DC	-	-	-	-
• Permitted range	20.4 V at 28.8 V	-	-	-	-
Input voltage					
• Rated value	24 V DC	120/230 V AC	120 V AC	120 / 230V AC	120 / 230V AC
• For "1" signal	13 to 30 V	79 to 264 V	74 to 132 V	79 to 264 V	79 to 264 V
• For signal "0"	-30 to +5 V	0 to 40 V	0 to 20 V	0 to 40 V	0 to 40 V
• Frequency	-	47 to 63 Hz	47 to 63 Hz	47 to 63 Hz	47 to 63 Hz
Isolation (to backplane bus)	Optocoupler		Optocoupler	Optocoupler	Optocoupler
• In groups of	16	4	8	2	1
• Input current at "1" signal, typ.	7.0 mA	17.3 mA at AC 264 V	21 mA	6.5 mA (120 V); 11mA (230V)	7.5 mA (120V) 17.3 mA (230V)
Input delay					
• Configurable	Yes	-	-	-	-
• At rated input voltage	0.1/0.5/3/15/20 ms[2]	25 ms	25 ms	25 ms	25 ms
No. of simultaneously controllable inputs					
• Up to 40 °C	16	16	32	8	8
• Up to 60 °C	16	16	24	8	8
Connection of 2-wire BERO	Possible	Possible	Possible	Possible	Possible
• Permissible quiescent current, max.	1.5 mA	2 mA	4 mA	2 mA	2 mA
Line length					
• Unshielded	600 m	600 m	600 m	600 m	600 m
• Shielded	1000 m	1000 m	1000 m	1000 m	1000 m
Current consumption					
• From backplane bus, max.	55 mA	43 mA	16 mA	29 mA	100 mA
• From L+, max.	40 mA	-	-	-	-
Power losses, typ.	4 W	4.1 W	4.0 W	4.9 W	4.9 W
Isolation tested at	500 V DC	1500 V AC	1500 V AC	1500 V AC	1500 V AC
Dimensions (W x H x D) in mm	40 x 125 x 120	40 x 125 x 120	40 x 125 x 120	40 x 125 x 120	40 x 125 x 120
Required front connector	20-pin	20-pin	40-pin	20-pin	20-pin
Weight, approx.	200 g	275 g	300 g	240 g	240 g

1) SIMATIC Outdoor with expanded temperature range -25 to +60 °C
2) In addition, a regeneration time of 0.25 ms must be added before the signal can be forwarded on the backplane bus
3) Available exclusively with expanded temperature range

SM 321 digital input modules

4

Ordering data	Order No.
SM 321 digital input modules	
including labelling strips, bus connector	
16 inputs, 24 V DC	**6ES7 321-1BH02-0AA0**
16 inputs, 24 V DC, extended temperature range	**6ES7 321-1BH82-0AA0**
16 inputs, 24 V DC, source input	**6ES7 321-1BH50-0AA0**
32 inputs, 24 V DC	**6ES7 321-1BL00-0AA0**
32 inputs, 24 V DC, extended temperature range	**6ES7 321-1BL80-0AA0**
16 inputs, 24 to 48 V DC	**6ES7 321-1CH00-0AA0**
16 inputs, 48 to 120 V DC, extended temperature range	**6ES7 321-1CH80-0AA0**
16 inputs, 24 V DC, diagnostics capability	**6ES7 321-7BH00-0AB0**
16 inputs, 24 V DC, diagnostics capability, extended temperature range	**6ES7 321-7BH80-0AB0**
32 inputs, 120 V AC	**6ES7 321-1EL00-0AA0**
8 inputs, 120/230 V AC	**6ES7 321-1FF01-0AA0**
8 inputs, 120/230 V AC, extended temperature range	**6ES7 321-1FF81-0AA0**
8 inputs, 120/230 V AC, common reference potential	**6ES7 321-1FF10-0AA0**
16 inputs, 120/230 V AC	**6ES7 321-1FH00-0AA0**
Front connector	
20-pin, with screw-type terminals	
• 1 unit	**6ES7 392-1AJ00-0AA0**
• 100 units	**6ES7 392-1AJ00-1AB0**
20-pin, with spring-loaded terminals	**6ES7 392-1BJ00-0AA0**
40-pin, with screw-type terminals	
• 1 unit	**6ES7 392-1AM00-0AA0**
• 100 units	**6ES7 392-1AM00-1AB0**
40-pin, with spring-loaded terminals	**6ES7 392-1BM01-0AA0**
Front door, improved version	**6ES7 328-0AA00-7AA0**
e.g. for 32-channel modules; permits connection of 1.3 mm^2/ 16 AWG conductors	
SIMATIC TOP connect	See page 4/114
Bus connector	**6ES7 390-0AA00-0AA0**
1 unit (spare part)	

	Order No.
Labelling strips	
10 units (spare part)	
For signal modules (except 32-channel), function modules, CPU 312 IFM and CPU 314 IFM	**6ES7 392-2XX00-0AA0**
For 32-channel signal modules	**6ES7 392-2XX10-0AA0**
Labelling cover	
10 units (spare part)	
For signal modules (except 32-channel), function modules, CPU 312 IFM and CPU 314 IFM	**6ES7 392-2XY00-0AA0**
For 32-channel signal modules	**6ES7 392-2XY10-0AA0**
S7-SmartLabel	**2XV9 450-1SL00-0YX0**
Software for machine labelling of modules directly from the STEP 7 project	
Labelling sheets for machine labelling	See page 4/123
SIMATIC Manual Collection	**6ES7 998-8XC01-8YE0**
Electronic manuals on CD-ROM, multi-language: S7-200, TD 200, S7-300, C7, S7-400, STEP 7, engineering tools, runtime software, SIMATIC DP (distributed I/O), SIMATIC HMI (human machine interface), SIMATIC NET (industrial communication)	
SIMATIC Manual Collection updating service for 1 year	**6ES7 998-8XC01-8YE2**
Current S7 Manual Collection CD as well as the three following updates	
S7-300 manual	
Design, CPU data, module data, instruction list	
German	**6ES7 398-8FA10-8AA0**
English	**6ES7 398-8FA10-8BA0**
French	**6ES7 398-8FA10-8CA0**
Spanish	**6ES7 398-8FA10-8DA0**
Italian	**6ES7 398-8FA10-8EA0**

Overview



- Digital outputs for the SIMATIC® S7-300®
- For connection of solenoid valves, contactors, low-power motors, lamps and motor starters

Technical specifications

6ES7 322-	1BH01-0AA0 1BH81-0AA0 [1]	1BL00-0AA0	8BF00-0AB0 [2] 8BF80-0AB0 [1]	5GH00-0AB0	1CF80-0AA0 [1][3]	1BF01-0AA0
Number of outputs	16	32	8	16	8	**8**
Interrupts	-	-	Yes	-	-	-
Diagnostics	-	-	Configurable: diagnostic alarm channel-wise, short-circuit, wire break, missing load voltage	Parameters can be assigned	-	-
Load voltage L+/L1	24 V DC	24 V DC	24 V DC	24/48 V DC	48 to 125 V DC	24 V DC
• Permitted range	20.4 to 28.8V	20.4 to 28.8V	20.4 to 28.8 V	-	40 to 140 V DC	20.4 to 28.8V
Output voltage						
• At "1" signal	L+ -0.8 V	L+ -0.8 V	L+ -0.8 to -1.6 V	L+ (-0.25 V)	L-1.1 V	L+ -0.8 V
Electrical isolation to backplane bus	Optocoupler	Optocoupler	Optocoupler	Optocoupler	Optocoupler	Optocoupler
• In groups of	8	8	8	1	4	4
Output current						
• At "1" signal						
- rated value at 40 °C	-	-	-	-	1.5 A	
- rated value at 60 °C	0.5 A	0.5 A	0.5 A	0.5 A	-	2 A
- minimum current	5 mA	5 mA	10 mA		10 mA	5 mA
- permitted range				1.5 A (for 50 ms) 1 A^2s (einmalig)	10 mA	
• At "0" signal	0.5 mA	0.5 mA	0.5 mA	10 µA	10 mA	0.5 mA
Total current of the outputs (per group)						
• Up to 40 °C	4 A	4 A	2 A		4.0 A	
• Up to 60 °C (horiz. mounting)	3 A	3 A	2 A	0.5 A	4.0 A	4 A
Lamp load, max.	5 W	5 W	5 W	5 W	15 W (48 V) or 40 W (120 V)	10 W
Switching frequency of outputs						
• Resistive load, max.	100 Hz	100 Hz	100 Hz	0.5 Hz	20 Hz	100 Hz
• Inductive loads, max.	0.5 Hz	0.5 Hz	2 Hz	-	0.5 Hz	0.5 Hz
• Lamp load, max.	100 Hz	100 Hz	100 Hz	-	10 Hz	100 Hz
• Mechanical, max.	-	-	-	-	-	-
Switching capacity of contacts						
• Resistive load, max.	-	-	-	-	-	-
• Inductive loads, max.	-	-		-	-	-
• Lamp load, max.	-	-	-	-	-	-

1) SIMATIC Outdoor with expanded temperature range -25 to +60 °C
2) The module can hold the last value at CPU stop or switch off a substitute value on the output. Diagnostics using CPU analysis and red LED per channel.
3) Available as SIMATIC Outdoor module with extended temperature range only

SM 322 digital output modules

Technical specifications (continued)

6ES7 322-	1BH01-0AA0 1BH81-0AA0 [1]	1BL00-0AA0	8BF00-0AB0 [2] 8BF80-0AB0 [1]	5GH00-0AB0	1CF80-0AA0 [1][3]	1BF01-0AA0
Service life of contacts to VDE 0660, Part 200						
• AC 15	-	-	-	-	-	-
• DC 13	-	-	-	-	-	-
Voltage induced on current interruption limited to	L+ - 48 V	L+ - 48 V	L+ - 45 V	-	-	L+ - 48 V
Short-circuit protection	Electronic	Electronic	Electronic	Provide externally	Electronic	Electronic
Line length						
• Unshielded	600 m	600 m	600 m	600 m	600 m	600 m
• Shielded	1000 m	1000 m	1000 m	1000 m	1000 m	1000 m
Current consumption						
• From backplane bus, max.	80 mA	110 mA	70 mA	100 mA	100 mA	40 mA
• From L+/L1, max. (without load)	120 mA	200 mA	90 mA	200 mA	40 mA	60 mA
Supply voltage L+/ current consumption of relays	-	-	-	-	-	-
Power losses, typ.	4,9 W	5 W	5 W	2.8 W	6.5 W	6.8 W
Isolation tested at	500 V DC	500 V DC	500 V DC		1500 V DC	500 V DC
Dimensions (W x H x D) in mm	40x125x120	40x125x120	40x125x120	40x125x120	40x125x120	40x125x120
Required front connector	20-pin	40-pin	20-pin	40-pin	20-pin	20-pin
Weight, approx.	190 g	210 g	210 g	260 g	250 g	190 g

1) SIMATIC Outdoor with expanded temperature range -25 to +60 °C
2) The module can hold the last value at CPU stop or switch off a substitute value on the output. Diagnostics using CPU analysis and red LED per channel.
3) Available as SIMATIC Outdoor module with extended temperature range only

Technical specifications (continued)

6ES7 322-	1FF01-0AA0	5FF00-0AB0	1FH00-0AA0	1EL00-0AA0	1HF01-0AA0
Number of outputs	8	8	16	32	8 (relay)
Interrupts	-	-	-	-	-
Diagnostics	Red LED for fuse or missing L1/N	Off, last value/ substitute value	Red LED for fuse	Red LED for fuse	-
Load voltage L+/L1	120 V/230 V AC	120/230 V AC	120/230 V AC	120 V AC	Up to 230 V AC 24 V DC
• Permitted range	93 to 132 V/187 to 264 V	79 to 264 V	79 to 264 V	93 to 132 V	-
Output voltage					
• At "1" signal	L1 - 1.5 V	-	-	L1 - 1.5 V	-
Electrical isolation to backplane bus	Optocoupler	Optocoupler	Optocoupler	Optocoupler	Optocoupler
• In groups of	4	1	8	8	2
Output current					
• At "1" signal					
- rated value at 40 °C					
- rated value at 60 °C	1 A	1 A	1 A	1 A	-
- minimum current	10 mA	10 mA	10 mA	10 mA	-
- max. permissible range					
• At "0" signal	2 mA	3 mA at 264 V	3 mA at 264 V	3 mA	-
Total current of the outputs (per group)					
• Up to 40 °C					
• Up to 60 °C (horiz. mounting)	2 A	1 A	2 A	3 A	-

Technical specifications (continued)

6ES7 322-	1FF01-0AA0	5FF00-0AB0	1FH00-0AA0	1EL00-0AA0	1HF01-0AA0
Lamp load, max.	50 W	50 W	25 W	25 W	-
Switching capacity of contacts					
• Resistive load, max.	10 Hz	10 Hz	10 Hz	10 Hz	2 Hz
• Inductive loads, max.	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz
• Lamp load, max.	1 Hz	1 Hz	1 Hz	1 Hz	2 Hz
• mechanisch, max.	-	-	-	-	10 Hz
Switching capacity of contacts					
• Resisitive load, max.	-	-	-	-	2 A (230 V AC), 2 A (24 V DC)
• Inductive loads, max.	-	-	-	-	2 A (230 V AC), 2 A (24 V DC)
• Lamp load, max.	-	-	-	-	-
Service life of contacts to VDE 0660, Part 200					
• AC 15	-				
• DC 13	-				
Life of the contacts to IEC 947-5-1 DC 13/AC 15					
• 24 V DC		-	-	-	At 2 A: 0.3×10^6
• 120 V AC		-	-	-	At 2 A: 0.2×10^6
• 230 V AC		-	-	-	At 2 A: 0.1×10^6
Voltage induced on current interruption limited to	-	-	-	-	-
Short-circuit protection	Fuse	Provide externally	Back-up in groups to 8	Fuse	-
Line length					
• Unshielded	600 m	600 m	600 m	600 m	600 m
• Shielded	1000 m	1000 m	1000 m	1000 m	1000 m
Current consumption					
• From backplane bus, max.	100 mA	100 mA	184 mA	100 mA	40 mA
• From L+/L1, max. (without load)	2 mA	3 mA	3 mA	275 mA	110 mA
Supply voltage L+/ current consumption of relays	-	-	-	-	24 V DC/110 mA
Power losses, typ.	8.6 W	8.6 W	8.6 W	25 W	2.2 W
Isolation tested at	1500 V AC		1500 V AC	1500 V AC	1500 V AC
Dimensions (W x H x D) in mm	40x125x120	40 x 125 x 120	40 x 125 x 120	80x125x120	40x125x120
Required front connector	20-pin	40-pin	20-pin	20-pin	20-pin
Weight, approx.	275 g	275 g	275 g	500 g	190 g

SM 322 digital output modules

Technical specifications (continued)

6ES7 322-	1HF10-0AA0 1HF80-0AA0 [1]	5HF00-0AB0	1HH01-0AA0
Number of outputs	8 (relays)	8 (relays)	16 (relays
Interrupts	-		-
Diagnostics	-	Off, last value/substitute value	-
Load voltage L+/L1	24 to 230 V AC 24 to 120 V DC	24 to 230 V AC 24 to 120 V DC	24 to 230 V AC 24 to 120 V DC
• Permitted range	-	-	-
Output voltage			
• At "1" signal	-	-	-
Electrical isolation to backplane bus	Optocoupler	Optocoupler	Optocoupler
• In groups of	1	1	8
Total current of the outputs (per group)			
• Up to 60 °C (horiz. mounting)	Max. 5 A	5 A	Max. 8 A
Lamp load, max.	-	1500 W AC 230 V)	-
Switching frequency of outputs			
• For resisitve load, max.	2 Hz	2 Hz	1 Hz
• For inductive loads, max.	0.5 Hz	0.5 Hz	0.5 Hz
• For lamp load, max.	2 Hz	2 Hz	1 Hz
• Mechanical, max.	10 Hz	10 Hz	10 Hz
Switching capacity of contacts			
• For resisitive load, max.	8 A (230 V AC), 5 A(24 V DC)	5 A	2 A (230 V AC), 2 A (24 V DC)
• For inductive load	3 A (230 V AC), 2 A(24 V DC)	5 A	2 A (230 V AC), 2 A (24 V DC)
• For lamp load, max.	-	-	-
Life of the contacts to IEC 947-5-1 DC 13/AC 15			
• 24 V DC	At 2 A: 0.3 x 10^6	At 5 A[2]: 0.1 x 10^6	At 2 A: 0.05 x 10^6
• 120 V AC	At 3 A: 0.2 x 10^6	-	At 2 A: 0.7 x 10^6
• 230 V AC	At 3 A: 0.1 x 10^6	At 5 A[2]: 0.1 x 10^6	At 2 A 0.1 x 10^6
Voltage induced on current interruption limited to	-		-
Short-circuit protection	-	Provide externally	-
Line length			
• Unshielded	600 m	600 m	600 m
• Shielded	1000 m	1000 m	1000 m
Current consumption			
• From backplane bus, max.	40 mA	100 mA	100 mA
• From L+/L1, max. (without load)	125 mA	160 mA	250 mA
Supply voltage L+/ current consumption of relays	-	-	-
Power losses, typ.	4.2 W	3.5 W	4.5 W
Isolation tested at	2000 V AC	1500 V AC	1500 V AC
Dimensions (W x H x D) in mm	40x125x120	40 x 125 x 120	40x125x120
Required front connector	40-pin	40-pin	20-pin
Weight, approx.	320 g	320 g	250 g

1) SIMATIC Outdoor with expanded temperature range -25 to +60 °C
2) Increased life of the contacts with selected RC attenuation network

Ordering data	Order No.
SM 322 digital output modules	
including labelling strips, bus connector	
8 outputs, 24 V DC, 2 A	**6ES7 322-1BF01-0AA0**
16 outputs, 24 V DC, 0.5 A	**6ES7 322-1BH01-0AA0**
16 outputs, 24 V DC, 0.5 A, extended temperature range	**6ES7 322-1BH81-0AA0**
32 outputs, 24 V DC, 0.5 A	**6ES7 322-1BL00-0AA0**
8 outputs, 24 V DC, 0.5 A, diagnostics capability	**6ES7 322-8BF00-0AB0**
8 outputs, 24 V DC, 0.5 A, diagnostics capability, extended temperature range	**6ES7 322-8BF80-0AB0**
16 outputs, 24/48 V DC, 0.5 A	**6ES7 322-5GH00-0AB0**
8 outputs, 48 to 125 V DC, 1.5 A, only available with extended temperature range	**6ES7 322-1CF80-0AA0**
8 outputs, 120/230 V AC, 1 A	**6ES7 322-1FF01-0AA0**
8 outputs, 120/230 V AC, 2 A	**6ES7 322-5FF00-0AB0**
16 outputs, 120/230 V AC, 0.5 A	**6ES7 322-1FH00-0AA0**
32 outputs, 120 V AC, 1 A	**6ES7 322-1EL00-0AA0**
8 outputs, relay contacts, 2 A	**6ES7 322-1HF01-0AA0**
8 outputs, relay contacts, 5 A	**6ES7 322-1HF10-0AA0**
8 outputs, relay contacts, 5 A, extended temperature range	**6ES7 322-1HF80-0AA0**
8 outputs, relay contacts, 5 A, with RC filter for overvoltage protection	**6ES7 322-5HF00-0AB0**
16 outputs, relay contacts, 8 A	**6ES7 322-1HH01-0AA0**
Front connector	
20-pin, with screw-type terminals	
• 1 unit	**6ES7 392-1AJ00-0AA0**
• 100 units	**6ES7 392-1AJ00-1AB0**
20-pin, with spring-loaded terminals	**6ES7 392-1BJ00-0AA0**
40-pin, with screw-type terminals	
• 1 unit	**6ES7 392-1AM00-0AA0**
• 100 units	**6ES7 392-1AM00-1AB0**
40-pin, with spring-loaded terminals	**6ES7 392-1BM01-0AA0**
Front door, improved version	**6ES7 328-0AA00-7AA0**
e.g. for 32-channel modules; permits connection of 1.3 mm^2/16 AWG conductors	

	Order No.
SIMATIC TOP connect	See page 4/114
Bus connector	**6ES7 390-0AA00-0AA0**
1 unit (spare part)	
Labelling strips	
10 units (spare part)	
For signal modules (except 32-channel), function modules and CPU 312 IFM	**6ES7 392-2XX00-0AA0**
For 32-channel signal modules	**6ES7 392-2XX10-0AA0**
Labelling cover	
10 units (spare part)	
For signal modules (except 32-channel), function modules and CPU 312 IFM	**6ES7 392-2XY00-0AA0**
For 32-channel signal modules	**6ES7 392-2XY10-0AA0**
S7-SmartLabel	**2XV9 450-1SL00-0YX0**
Software for machine labelling of modules directly from the STEP 7 project	
Labelling sheets for machine labelling	See page 4/123
Fuse for SM 322	**6ES7 973-1HD00-0AA0**
10 fuses, 8 A fast-action, 2 fuse holders	
SIMATIC Manual Collection	**6ES7 998-8XC01-8YE0**
Electronic manuals on CD-ROM, multi-language: S7-200, TD 200, S7-300, C7, S7-400, STEP 7, engineering tools, runtime software, SIMATIC DP (distributed I/O), SIMATIC HMI (human machine interface), SIMATIC NET (industrial communication)	
SIMATIC Manual Collection updating service for 1 year	**6ES7 998-8XC01-8YE2**
Current S7 Manual Collection CD as well as the three following updates	
S7-300 manual	
Design, CPU data, module data, instruction list	
German	**6ES7 398-8FA10-8AA0**
English	**6ES7 398-8FA10-8BA0**
French	**6ES7 398-8FA10-8CA0**
Spanish	**6ES7 398-8FA10-8DA0**
Italian	**6ES7 398-8FA10-8EA0**

SM 323 digital I/O modules

Overview



- Digital I/O for the SIMATIC® S7-300®
- For connecting switches, 2-wire BERO proximity switches, solenoid valves, contactors, small motors, lamps and motor starters

Technical specifications

6ES7 323-	1BH01-0AA0 1BH81-0AA0 [1]	1BL00-0AA0
Inputs		
• Number of inputs	8	16
Interrupts	-	-
Diagnostics	-	-
Rated load voltage		
• Rated value	24 V DC	24 V DC
• Permitted range	20.4 to 28.8 V	20.4 to 28.8 V
Input voltage		
• Rated value	24 V DC	24 V DC
• At “1” signal	13 to 30 V	13 to 30 V
• At “0” signal	-30 to + 5 V	-30 to + 5 V
• Frequency	-	-
Isolation to backplane bus	Optocoupler	Optocoupler
• In groups of	8	16
Input current		
• At "1" signal, typ.	7 mA	7 mA
Input delay		
• Configurable	-	-
• At rated input voltage, typ.	1.2 to 4.8 ms	1.2 to 4.8 ms
No. of simultaneously controllable inputs		
• Up to 40°C	8	16
• Up to 60 °C	8	8
Connection of 2-wire BERO	Possible	Possible
• Permissible quiescent current, max.	2 mA	1.5 mA
Outputs		
• Number of inputs	8	16
Interrupts	-	-
Diagnostics	-	-
Rated load voltage L+/L1	24 V DC	24 V DC
• Permitted range	20.4 to 28.8 V	20.4 to 28.8 V

6ES7 323-	1BH01-0AA0 1BH81-0AA0 [1]	1BL00-0AA0
Output voltage		
• At "1" signal	L+ - 0.8 V	L+ - 0.8 V
Electrical isolation	Optocoupler	Optocoupler
• In groups of	8	8
Maximum output current		
• At "1" signal		
- rated value at 60 °C	0.5 A	0.5 A
- minimum current	5 mA	5 mA
• At signal “0”, max.	0.5 mA	0.5 mA
Total current of the outputs (per group)		
• Up to 40°C	4 A	4 A
• Up to 60°C (horizontal installation)	4 A	3 A
Lamp load, max.	5 W	5 W
Switching frequency of outputs		
• For resistive load, max.	100 Hz	100 Hz
• For inductive loads, max.	0.5 Hz	0.5 Hz
• For a lamp load	100 Hz	100 Hz
Voltage induced on circuit interruption limited to	L+ - 48 V	L+ - 48 V
Short-circuit protection	Electronic	Electronic
General		
Line length		
• Unshielded	600 m	600 m
• Shielded	1000 m	1000 m
Current consumption		
• From backplane bus, max.	40 mA	80 mA
• From L+/L1 (without load)	20 mA	100 mA
Power losses, typically	4.5 W	6.5 W
Isolation tested at	500 V DC	600 V DC
Dimensions (W x H x D) in mm	40 x 125 x 120	40 x 125 x 120
Required front connector	20-pin	40-pin
Weight, approx.	220 g	260 g

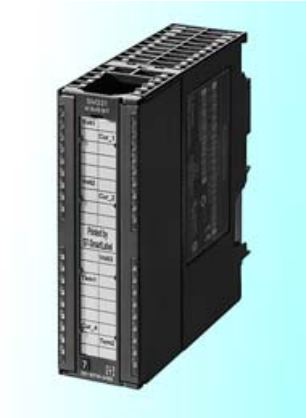
1) SIMATIC Outdoor with expanded temperature range -25 to +60 °C

Ordering data	Order No.
SM 323 digital input/output modules	
including labelling strips, bus connector	
8 inputs, 8 outputs	**6ES7 323-1BH01-0AA0**
8 inputs, 8 outputs, extended temperature range	**6ES7 323-1BH81-0AA0**
16 inputs, 16 outputs	**6ES7 323-1BL00-0AA0**
Front connector	
20-pin, with screw-type terminals	
• 1 unit	**6ES7 392-1AJ00-0AA0**
• 100 units	**6ES7 392-1AJ00-1AB0**
20-pin, with spring-loaded terminals	**6ES7 392-1BJ00-0AA0**
40-pin, with screw-type terminals (for SM 323-1BL)	
• 1 unit	**6ES7 392-1AM00-0AA0**
• 100 units	**6ES7 392-1AM00-1AB0**
40-pin, with spring-loaded terminals (for SM 323-1BL)	**6ES7 392-1BM01-0AA0**
Front door, improved version	**6ES7 328-0AA00-7AA0**
e.g. for 32-channel modules; permits connection of 1.3 mm^2/16 AWG conductors	
SIMATIC TOP connect	See page 4/114
Bus connector	**6ES7 390-0AA00-0AA0**
1 unit (spare part)	
Labelling strips	
10 units (spare part)	
For signal modules (except 32-channel), function modules and CPU 312 IFM	**6ES7 392-2XX00-0AA0**
For 32-channel signal modules	**6ES7 392-2XX10-0AA0**

	Order No.
Labelling cover	
10 units (spare part)	
For signal modules (except 32-channel), function modules and CPU 312 IFM	**6ES7 392-2XY00-0AA0**
For 32-channel signal modules	**6ES7 392-2XY10-0AA0**
S7-SmartLabel	**2XV9 450-1SL00-0YX0**
Software for machine labelling of modules directly from the STEP 7 project	
Labelling sheets for machine labelling	See page 4/123
SIMATIC Manual Collection	**6ES7 998-8XC01-8YE0**
Electronic manuals on CD-ROM, multi-language: S7-200, TD 200, S7-300, C7, S7-400, STEP 7, engineering tools, runtime software, SIMATIC DP (distributed I/O), SIMATIC HMI (human machine interface), SIMATIC NET (industrial communication)	
SIMATIC Manual Collection updating service for 1 year	**6ES7 998-8XC01-8YE2**
Current S7 Manual Collection CD as well as the three following updates	
S7-300 manual	
Design, CPU data, module data, instruction list	
German	**6ES7 398-8FA10-8AA0**
English	**6ES7 398-8FA10-8BA0**
French	**6ES7 398-8FA10-8CA0**
Spanish	**6ES7 398-8FA10-8DA0**
Italian	**6ES7 398-8FA10-8EA0**

SM 331 analog input modules

Overview



- Analog inputs for the SIMATIC® S7-300®
- For the connection of voltage and current sensors, thermocouples, resistors and resistance thermometers

Technical specifications

6ES7 331-	7KF02-0AB0	1KF00-0AB0	7KB02-0AB0 7KB82-0AB0 1)
Number of inputs	8	8	2
• For resistance measurement	4	8	1
Interrupts			
• Limit value interrupt	Configurable	No	Configurable
• Diagnostics interrupt	Configurable channels 0 and 2	No	Configurable channels 0
Diagnostics	Red LED for indicating group errors; diagnostic info can be read out	No	Red LED for indicating group errors; diagnostic info can be read out
Rated load voltage L+	24 V DC	-	24 V DC
• Polarity reversal protection	Yes	-	Yes
Input resistance/ input ranges			
• Voltage	+/- 80 mV /10 MΩ, +/- 250 mV/10 MΩ +/- 500 mV/10 MΩ +/- 1 V/10 MΩ +/- 2,5 V/100 kΩ +/- 5 V/100 kΩ 1 to 5 V/ 100 kΩ +/- 10 V/100 kΩ	+/- 50 mV /10 MΩ +/- 500 mV /10 MΩ +/- 1 V /10 MΩ +/- 5 V /100 kΩ 1 to 5 V /100 kΩ +/- 10 V /100 kΩ 0 to 10 V /100 kΩ	+/- 80 mV /10 MΩ, +/- 250 mV/10 MΩ +/- 500 mV/10 MΩ +/- 1 V/10 MΩ +/- 2,5 V/100 kΩ +/- 5 V/100 kΩ 1 to 5 V/ 100 kΩ +/- 10 V/100 kΩ
• Current	+/- 10 mA/25 Ω +/- 3,2 mA/25 Ω +/- 20 mA/25 Ω 0 to 20 mA/25 Ω 4 to 20 mA/25 Ω	+/- 20 mA /50 Ω 0 to 20 mA /50 Ω 4 to 20 mA /50 Ω	+/- 10 mA/25 Ω +/- 3,2 mA/25 Ω +/- 20 mA/25 Ω 0 to 20 mA/25 Ω 4 to 20 mA/25 Ω
• Resistance	150 Ω /10 MΩ 300 Ω /10 MΩ 600 Ω /10 MΩ	0 to 6kΩ /10 MΩ 0 to 600Ω /10 MΩ	150 Ω /10 MΩ 300 Ω /10 MΩ 600 Ω /10 MΩ
• Thermocouples	Type E, N, J, K/10 MΩ	-	Type E, N, J, K/10 MΩ
• Resistance thermometer	Pt 100 standard/10 MΩ Ni 100 standard	Pt 100-Standard /10 MΩ Pt 100 climate /10 MΩ	Pt 100 standard/ 10 MΩ Ni 100 standard
Permissible input voltage for voltage input, max.	20 V	30 V	20 V
Permissible input current for current input, max.	40 mA	40 mA Delete protection available	40 mA
Connection of signal sen sors			
• For current measurement			
- as 2-wire transmitter	Yes	Yes, with external supply	Yes
- as 4-wire transmitter	Yes	Yes	Yes

1) SIMATIC Outdoor with expanded temperature range -25 to +60 °C

Technical specifications (continued)

6ES7 331-	7KF02-0AB0	1KF00-0AB0	7KB02-0AB0 7KB82-0AB0 [1]
Connection of signal sen sors			
• For impedance measure ment			
- with 2 conductor connections	Yes	Yes	Yes
- with 3 conductor connections	Yes	Yes, With 3-line compensation	Yes
- with 4 conductor connections	Yes	Yes	Yes
Isolation to backplane bus	Yes	Yes	Yes
Characteristic linearization			
• For thermocouples	Type N, E, J, K	-	Type N, E, J, K
• For resistance thermometers	Pt 100 (standard range) Ni 100 (standard range)	PT 100 standard PT 100 climate	PT 100 (standard range) NI 100 (standard range)
Temperature ompensa tion	Configurable	No	Configurable
• Internal	Possible	-	Possible
• External with compensation socket	Possible	-	Possible
• External with Pt 100	-	-	-
Conversion time[2]/ reso lution (per channel)			
• Integration time	2.5/16 $^2/_3$/20/100 ms	16 $^2/_3$ / 20 ms	2.5/16 $^2/_3$/20/100 ms
• Resolution			
- unipolar	9/12/12/14 bit	13 / 13 bit	9/12/12/14 bit
- bipolar	9+sign/12+sign/12+sign/ 14+sign bit	12+sign / 12+sign	9+sign/12+sign/12+sign/ 14+sign bit
• Interference voltage suppression for interference frequency	400/60/50/10 Hz	60 / 50 Hz	400/60/50/10 Hz
Operational limit (in entire temperature range, referred to input range), max.	+/-1%	+/-0.6%, +/-1.2K	+/-1%
Basic error (operational limits at 25°C, referred to input range), max.	+/-0.6%	+/-0.4%, +/-1K	+/-0.6%
Cable length (shielded), max.	200 m (50 m at 80 mV)	200 m (50 m at 50 mV)	200 m (50 m at 80 mV)
Current consumption			
• From backplane bus, max.	50 mA	90 mA	50 mA
• From L+, max.	200 mA	-	80 mA
Power losses, typically	1.3 W	0.4 W	1.3 W
Isolation tested at	600 V DC	600 V DC	500 V DC
Dimensions (W x H x D) in mm	40 x 125 x 120	40 x 125 x 120	40 x 125 x 120
Required front connector	20-pin	40-pin	20-pin
Weight	250 g	250 g	250 g

1) SIMATIC Outdoor with expanded temperature range -25 to +60 °C
2) Other details have to be heeded to calculate the scan time. These can be found in the manual "Configuring a "S7-300® ".

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Technical specifications (continued)

SM 331 6ES7 331-	7PF00-0AB0	7PF10-0AB0	7NF00-0AB0	7NF10-0AB0
Number of inputs	8	8	8	8
• For resistance measurement	8	-	-	-
Interrupts				
• Limit value interrupt	Configurable	Configurable	Configurable channels 0 and 2	all channels configurable[3]
• Diagnostics interrupt	Configurable per group	Configurable per group	Configurable	Configurable
Diagnostics	Red LED for indicating group errors; diagnostic info can be read out	Red LED for indicating group errors; diagnostic info can be read out	Red LED for indicating group errors; diagnostic info can be read out	Red LED for indicating group errors; diagnostic info can be read out
Rated load voltage L+	24 V DC	24 V DC	-	-
• Polarity reversal protection	Yes	Yes	-	-
Input range				
• Voltage	-	-	± 5 V/2 MΩ 1 to 5 V/2 MΩ ± 10 V/2 MΩ	± 5 V/10 MΩ 1 to 5 V/10 MΩ ± 10 V/10 MΩ
• Current	-	-	±20 mA/250 Ω 0 to 20 mA/ 250 Ω 4 to 20 mA/ 250 Ω	±20 mA/250 Ω 0 to 20 mA/ 250 Ω 4 to 20 mA/ 250 Ω
• Resistance	0 to 150 Ω 0 to 300 Ω 0 to 600 Ω	-	-	-
• Thermocouples	-	Typ B, E, J, K, L, N, R, S. T, U	-	-
• Resistance thermometer	Pt 100, Pt 200, Pt 500, Pt 1000, Ni 100, Ni 120, Ni 200, Ni 500, Ni 1000, Cu 10	-	-	-
Permissible input voltage for voltage input, max.	50 V	50 V	50 V	75 V
Permissible input current for current input, max.	-	-	32 mA	40 mA
Isolation to backplane bus	Yes (4 groups of 2 channels each)	Yes (4 groups of 2 channels each)	Yes	Yes
Connection of signal sensors				
• For current measurement				
- as 2-wire transmitter	-	-	Yes with external transmitter	Yes, with external transducer, power pack
- as 4-wire transmitter	-	-	Yes	Yes
• For impedance measurement				
- with 2 conductor connections	Yes	-	-	-
- with 3 conductor connections	Yes	-	-	-
- with 4 conductor connections	Yes	-	-	-
Characteristic linearization				
• For thermocouples	-	Type B, E, J, K, L, N, R, S. T, U	-	-
• For resistance thermometers	Pt 100, Pt 200, Pt 500, Pt 1000, Ni 100, Ni 120, Ni 200, Ni 500, Ni 1000, Cu 10 (standard and airconditioning applications)	-	-	-
Temperature compensation	Internal	Configurable	-	-
• Internal	-	Possible	-	-
• External with compensation socket	-	Possible	-	-
• External with Pt 100	-	Yes		

3) Clock alarms are also supported in the modules

Technical specifications (continued)

SM 331 6ES7 331-	7PF00-0AB0	7PF10-0AB0	7NF00-0AB0	7NF10-0AB0
Conversion time[2]/ resolution (per channel)				
• Integrationszeit			2.5/16 2/3/20/100 ms	23/72/83/95 ms for all 8 channels of the module. For more information see manual [4]
• Basic conversion time				
- up to 4 channels (1channel per group)	10 ms per module	10 ms per module		
- 5 channels or more (>1channel per group)	190 ms per module	190 ms per module		
• Resolution				
- unipolar			15/15/15/15 bit	15/15/15/15 bit
- bipolar			15+sign/15+sign/15+sign/ 15+sign bit	15+sign/15+sign/15+sign/ 15+sign bit
• Resolution in bit	16, two's complement	16, two's complement		
• Resolution in bit (internal)	24, Sigma-Delta-principle	24, Sigma-Delta-principle		
• Noise suppression for noise frequency	400/60/50 Hz	400/60/50 Hz	400/60/50/10 Hz	400/60/50 Hz, combinations from 400, 60, 50 Hz
Operational limit (in entire temperature range, referred to input range), max.	+/- 0.1% +/-1 K	+/- 0.1% +/-1 K	± 0.1% (voltage) ± 0.3% (current)	± 0.1% (voltage) ± 0.1% (current)
Basic error (operational limits at 25°C, referred to input range), max.	+/-0.05% +/-0.5 K	+/-0.05% +/-0.5 K	± 0.05% (voltage) ± 0.05% (current)	± 0.05% (voltage) ± 0.05% (current)
Cable length (shielded), max.	200 m	200 m	200 m	200 m
Current consumption				
• From backplane bus, max.	100 mA	100 mA	130 mA	100 mA
• From L+, approx.	200 mA	200 mA	-	-
Power losses, typically	4 W	4 W	0.6 W	3.0 W
Isolation tested at	500 V AC	1500 V AC	500 V AC	500 V AC
Dimensions (W x H x D) in mm	40 x 125 x 120	40 x 125 x 120	40 x 125 x 120	40 x 125 x 120
Required front connector	40-pin	40-pin	40-pin	40-pin
Weight, approx.	260 g	270 g	270 g	270 g

2) Other details have to be heeded to calculate the scan time. These can be found in the manual "Configuring a "S7-300® ".
4) In the 4-channel mode the basic execution time for all channels is 10 ms

SM 331 analog input modules

Ordering data	Order No.
SM 331 analog input modules	
incl. labelling strips, bus connector, range cards	
8 inputs, resolution 13 bit	**6ES7 331-1KF00-0AB0**
8 inputs	**6ES7 331-7KF02-0AB0**
2 inputs	**6ES7 331-7KB02-0AB0**
2 inputs, extended temperature range	**6ES7 331-7KB82-0AB0**
8 inputs, enhanced resolution	**6ES7 331-7NF00-0AB0**
8 inputs, enhanced resolution, 4-channel mode	**6ES7 331-7NF10-0AB0**
8 inputs, for thermal resistances	**6ES7 331-7PF00-0AB0**
8 inputs, for thermocouples	**6ES7 331-7PF10-0AB0**
Range card for analog inputs	**6ES7 974-0AA00-0AA0**
1 card for 2 analog inputs; 2 cards (spare part)	
Front connector	
1 unit	
20-pin, with screw-type terminals	
• 1 unit	**6ES7 392-1AJ00-0AA0**
• 100 units	**6ES7 392-1AJ00-1AB0**
20-pin, with spring-loaded terminals	**6ES7 392-1BJ00-0AA0**
40-pin, with screw-type terminals	
• 1 unit	**6ES7 392-1AM00-0AA0**
• 100 units	**6ES7 392-1AM00-1AB0**
40-pin, with spring-loaded terminals	**6ES7 392-1BM01-0AA0**
Front door, improved version	**6ES7 328-0AA00-7AA0**
e.g. for 32-channel modules; permits connection of 1.3 mm^2/16 AWG conductors	
SIMATIC TOP connect	See page 4/114
Bus connector	**6ES7 390-0AA00-0AA0**
1 unit (spare part)	
Shield connecting element	**6ES7 390-5AA00-0AA0**
80 mm wide, with 2 rows for 4 terminal elements each	

	Order No.
Terminal elements	
2 units	
For 2 cables with 2 to 6 mm diameter	**6ES7 390-5AB00-0AA0**
For 1 cable with 3 to 8 mm diameter	**6ES7 390-5BA00-0AA0**
For 1 cable with 4 to 13 mm diameter	**6ES7 390-5CA00-0AA0**
Labelling cover	**6ES7 392-2XY00-0AA0**
10 units for signal modules (except 32-channel), function modules and CPU 312 IFM	
Labelling strips	**6ES7 392-2XX00-0AA0**
10 units for signal modules (except 32-channel), function modules and CPU 312 IFM	
S7-SmartLabel	**2XV9 450-1SL00-0YX0**
Software for machine labelling of modules directly from the STEP 7 project	
Labelling sheets for machine labelling	See page 4/123
SIMATIC Manual Collection	**6ES7 998-8XC01-8YE0**
Electronic manuals on CD-ROM, multi-language: S7-200, TD 200, S7-300, C7, S7-400, STEP 7, engineering tools, runtime software, SIMATIC DP (distributed I/O), SIMATIC HMI (human machine interface), SIMATIC NET (industrial communication)	
SIMATIC Manual Collection updating service for 1 year	**6ES7 998-8XC01-8YE2**
Current S7 Manual Collection CD as well as the three following updates	
S7-300 manual	
Design, CPU data, module data, instruction list	
German	**6ES7 398-8FA10-8AA0**
English	**6ES7 398-8FA10-8BA0**
French	**6ES7 398-8FA10-8CA0**
Spanish	**6ES7 398-8FA10-8DA0**
Italian	**6ES7 398-8FA10-8EA0**

Overview



- Analog outputs for the SIMATIC® S7-300®
- For connecting analog actuators

Technical specifications

6ES7 332-	5HB01-0AB0 5HB81-0AB0 [1]	5HD01-0AB0	5HF00-0AB0	7ND00-0AB0
Number of outputs	2	4	8	4
Interrupts				
• Diagnostics interrupt	Yes	Yes	Yes	Yes
Diagnostics	Red LED for indicating group errors; diagnostic info can be read out	Red LED for indicating group errors; diagnostic info can be read out	Red LED for indicating group errors; diagnostic info can be read out	Red LED for indicating group errors; diagnostic info can be read out
Rated load voltage	24 V DC	24 V DC	24 V DC	24 V DC
Output ranges				
• Voltage outputs	0 to 10 V; +/- 10 V; 1 to 5 V	0 to 10 V; +/- 10 V; 1 to 5 V	0 to 10 V; +/- 10 V; 1 to 5 V	0 to 10 V; +/- 10 V; 1 to 5 V
• Current outputs	4 to 20 mA; +/- 20 mA; 0 to 20 mA	4 to 20 mA; +/- 20 mA; 0 to 20 mA	4 to 20 mA; +/- 20 mA; 0 to 20 mA	4 to 20 mA; +/- 20 mA; 0 to 20 mA
Load impedance				
• For voltage outputs, min.	1 kΩ	1 kΩ	1 kΩ	1 kΩ
• For current outputs, max.	500 Ω	500 Ω	500 Ω	500 Ω
• For capacitive load, max.	1 µF	1 µF	1 µF	1 µF
• For inductive loads, max.	10 mH	10 mH	10 mH	1 mH
Voltage output				
• Short-circuit protection	Yes	Yes	Yes	Yes
• Short-circuit current, max.	25 mA	25 mA	25 mA	40 mA
Current output				
• Open-circuit voltage, max.	18 V	18 V	18 V	18 V
Isolation to backplane bus	Yes	Yes	Yes	Yes
Resolution	11 bit + sign (at +/- 10 V; +/- 20mA) 12 bit (at 0 to 10 V; 0 to 20 mA), 4 to 20 mA, 1 to 5 V	11 bit + sign (at +/- 10 V; +/- 20mA) 12 bit (at 0 to 10 V; 0 to 20 mA), 4 to 20 mA, 1 to 5 V	11 bit + sign (at +/- 10 V; +/- 20mA) 12 bit (at 0 to 10 V; 0 to 20 mA), 4 to 20 mA, 1 to 5 V	15 Bit + sign
Conversion time per channel, max.	0.8 ms	0.8 ms	0.8 ms	1.5 ms
Transient recovery time				
• For resistive load	0.2 ms	0.2 ms	0.2 ms	0.2 ms
• For capacitive loads	3.3 ms	3.3 ms	3.3 ms	3.3 ms
• For inductive loads	0.5 ms	0.5 ms	0.5 ms	0.5 ms
Substitute values assignable	Configurable	Configurable	Configurable	Configurable
Operating error limit (0 to 60°C, referred to the output range)				
• Voltage	+/- 0.5%	+/- 0.5%	+/- 0.5%	+/- 0.12%
• Current	+/- 0.6%	+/- 0.6%	+/- 0.6%	+/- 0.18%

1) SIMATIC Outdoor with expanded temperature range -25 to +60 °C

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Technical specifications (continued)

6ES7 332-	5HB01-0AB0 5HB81-0AB0 [1]	5HD01-0AB0	5HF00-0AB0	7ND00-0AB0
Basic error threshold (operating error threshold at 25 °C, with reference to output range)				
• Voltage	+/- 0.4%	+/- 0.4%	+/- 0.4%	+/- 0.01%
• Current	+/- 0.5%	+/- 0.5%	+/- 0.5%	+/- 0.01%
Cable length (shielded), max.	200 m	200 m	200 m	200 m
Current consumption				
• From backplane bus, max.	60 mA	60 mA	100 mA	60 mA
• From L+, max.	240 mA	240 mA	340 mA	240 mA
Power loss typ.	3 W	3 W	6 W	3 W
Isolation tested at	500 V DC	500 V DC	500 V DC	500 V DC
Dimensions (W x H x D) in mm	40 x 125 x 120	40 x 125 x 120	40 x 125 x 120	40 x 125 x 120
Required front connector	20-pin	20-pin	40-pin	20-pin
Weight, approx.	220 g	220 g	272 g	220 g

1) SIMATIC Outdoor with expanded temperature range -25 to +60 °C

Ordering data

	Order No.
SM 332 analog output modules	
incl. labelling strips, bus connector	
4 outputs	**6ES7 332-5HD01-0AB0**
4 outputs, 15 bit	**6ES7 332-7ND00-0AB0**
2 outputs	**6ES7 332-5HB01-0AB0**
2 outputs, extended temperature range	**6ES7 332-5HB81-0AB0**
8 outputs	**6ES7 332-5HF00-0AB0**
Front connector	See page 4/48
Front door, improved version	**6ES7 328-0AA00-7AA0**
e.g. for 32-channel modules; permits connection of 1.3 mm^2/16 AWG conductors	
SIMATIC TOP connect	See page 4/114
Bus connector	**6ES7 390-0AA00-0AA0**
1 unit (spare part)	
Shield connecting element	**6ES7 390-5AA00-0AA0**
80 mm wide, with 2 rows for 4 terminal elements each	
Terminal elements	
2 units	
For 2 cables with 2 to 6 mm diameter	**6ES7 390-5AB00-0AA0**
For 1 cable with 3 to 8 mm diameter	**6ES7 390-5BA00-0AA0**
For 1 cable with 4 to 13 mm diameter	**6ES7 390-5CA00-0AA0**
Labelling cover	**6ES7 392-2XY00-0AA0**
10 units for signal modules (except 32-channel), function modules and CPU 312 IFM	

	Order No.
Labelling strips	**6ES7 392-2XX00-0AA0**
10 units for signal modules (except 32-channel), function modules and CPU 312 IFM	
S7-SmartLabel	**2XV9 450-1SL00-0YX0**
Software for machine labelling of modules directly from the STEP 7 project	
Labelling sheets for machine labelling	See page 4/123
SIMATIC Manual Collection	**6ES7 998-8XC01-8YE0**
Electronic manuals on CD-ROM, multi-language: S7-200, TD 200, S7-300, C7, S7-400, STEP 7, engineering tools, runtime software, SIMATIC DP (distributed I/O), SIMATIC HMI (human machine interface), SIMATIC NET (industrial communication)	
SIMATIC Manual Collection updating service for 1 year	**6ES7 998-8XC01-8YE2**
Current S7 Manual Collection CD as well as the three following updates	
S7-300 manual	
Design, CPU data, module data, instruction list	
German	**6ES7 398-8FA10-8AA0**
English	**6ES7 398-8FA10-8BA0**
French	**6ES7 398-8FA10-8CA0**
Spanish	**6ES7 398-8FA10-8DA0**
Italian	**6ES7 398-8FA10-8EA0**

Overview



- Analog I/O for the SIMATIC® S7-300®
- For connection of analog sensors and actuators

Technical specifications

6ES7 334-	0CE01-0AA0	0KE00-0AB0 0KE80-0AB0 1)
Inputs	**4**	**4**
• For voltage measurement	4	2
• For resistance measurement	-	4
Interrupts		
• Limit value interrupt	-	-
• Diagnostics interrupt	-	-
Diagnostics	-	-
Rated load voltage L+	24 V DC	24 V DC
Input ranges / input resistance	0 to 10 V/ 100 kΩ; 0 to 20 mA/ 50 Ω	0 to 10 V/ 100 kΩ; resistance 10 kΩ; Pt 100 (climatic range only)
Permissible input range for voltage input, max.	20 V	-
Permissible input current for current input, max.	20 mA	-
Connection of signal sensors		
• For current measurement		
- as 2-wire transmitter	-	-
- as 4-wire transmitter	Yes	-
• For impedance measurement		
- with 2-line compensation	-	Yes
- with 3-line compensation	-	Yes
- with 4-line compensation	-	Yes
Isolation to backplane bus	No	Yes
Conversion time/ resolution per channel		
• Integration time (all channels)		85 ms
• Resolution	8 bit	12 bit

SM 334-	0CE01-0AA0	0KE00-0AB0 0KE80-0AB0 1)
Operational limit (in the entire temperature range, referred to input range)		
• Voltage	+/- 0.9%	+/- 0.7%
• Current	+/- 0.8%	-
• 10 kΩ	-	+/- 3.5%
• Pt 100	-	+/- 1.0%
Basic error (operational error at 25 °C, referred to output range)		
• Voltage	+/- 0.7%	+/- 0.5%
• Current	+/- 0.6%	-
• 10 kΩ	-	+/- 2.8%
• Pt 100	-	+/- 0.8%
Outputs	**2**	**2**
Interrupts		
• Diagnostics interrupt	-	-
Diagnostics	-	-
Output ranges		
• Current output	0 to 10 V	0 to 10 V
• Current outputs	0 to 20 mA	-
Load resistor		
• For voltage outputs, min.	5 kΩ	2.5 kΩ
• For current outputs, max.	300 Ω	-
• For capacitive load, max.	1 µF	1 µF
• For inductive loads, max.	1 mH	-
Voltage output		
• Short-circuit protection	Yes	Yes
• Short-circuit current, max.	11 mA	10 mA
Current output		
• Open-circuit voltage, max.	15 V	-
Isolation to backplane bus	No	Yes
Resolution	8 bit	12 bit

1) SIMATIC Outdoor with expanded temperature range -25 to +60 °C

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Technical specifications (continued)

6ES7 334-	0CE01-0AA0	0KE00-0AB0 0KE80-0AB0 [1]
Scan time (all channels/AI + AO)	5 ms	85 ms
Transient recovery time		
• For resistive load, max.	0.3 m	0.8 ms
• For capacitive load, max.	3 ms	0.8 ms
• For inductive load, max.	0.3 ms	-
Substitute values assignable	-	-
Operational limits (referred to output range)		
• Voltage	+/- 0.6%	+/- 1.0%
• Current	+/- 1.0%	-
Basic error (operational error at 25 °C, referred to output range)		
• Voltage	+/- 0.4%	+/- 0.85%
• Current	+/- 0.8%	-

6ES7 334-	0CE01-0AA0	0KE00-0AB0 0KE80-0AB0 [1]
General		
Cable length (shielded), max.	200 m	100 m
Current consumption		
• From backplane bus, max.	55 mA	60 mA
• From L+	110 mA	80 mA
Isolation		500 V DC
Power losses, typically	2.6 W	2 W
Dimensions (W x H x D) in mm	40 x 125 x 120	40 x 125 x 120
Required front connector	20-pin	20-pin
Weight	285 g	200 g

Ordering data

	Order No.
SM 334 analog input/output modules	
incl. labelling strips, bus connector	
4 inputs, 2 outputs	**6ES7 334-0CE01-0AA0**
4 inputs, 2 outputs; resistance measurement, Pt 100	**6ES7 334-0KE00-0AB0**
4 inputs, 2 outputs; resistance measurement, Pt 100; extended temperature range	**6ES7 334-0KE80-0AB0**
Front connector	
1 unit	
20-pin, with screw-type terminals	
• 1 unit	**6ES7 392-1AJ00-0AA0**
• 100 units	**6ES7 392-1AJ00-1AB0**
20-pin, with spring-loaded terminals	**6ES7 392-1BJ00-0AA0**
Front door, improved version	**6ES7 328-0AA00-7AA0**
e.g. for 32-channel modules; permits connection of 1.3 mm^2/16 AWG conductors	
SIMATIC TOP connect	See page 4/114
Bus connector	**6ES7 390-0AA00-0AA0**
1 unit (spare part)	
Shield connecting element	**6ES7 390-5AA00-0AA0**
80 mm wide, with 2 rows for 4 terminal elements each	
Terminal elements	
2 units	
For 2 cables with 2 to 6 mm diameter	**6ES7 390-5AB00-0AA0**
For 1 cable with 3 to 8 mm diameter	**6ES7 390-5BA00-0AA0**
For 1 cable with 4 to 13 mm diameter	**6ES7 390-5CA00-0AA0**

	Order No.
Labelling cover	**6ES7 392-2XY00-0AA0**
10 units for signal modules (except 32-channel), function modules and CPU 312 IFM	
Labelling strips	**6ES7 392-2XX00-0AA0**
10 units for signal modules (except 32-channel), function modules and CPU 312 IFM	
S7-SmartLabel	See page 4/50
Labelling sheets for machine labelling	See page 4/123
SIMATIC Manual Collection	**6ES7 998-8XC01-8YE0**
Electronic manuals on CD-ROM, multi-language: S7-200, TD 200, S7-300, C7, S7-400, STEP 7, engineering tools, runtime software, SIMATIC DP (distributed I/O), SIMATIC HMI (human machine interface), SIMATIC NET (industrial communication)	
SIMATIC Manual Collection updating service for 1 year	**6ES7 998-8XC01-8YE2**
Current S7 Manual Collection CD as well as the three following updates	
S7-300 manual	
Design, CPU data, module data, instruction list	
German	**6ES7 398-8FA10-8AA0**
English	**6ES7 398-8FA10-8BA0**
French	**6ES7 398-8FA10-8CA0**
Spanish	**6ES7 398-8FA10-8DA0**
Italian	**6ES7 398-8FA10-8EA0**

Highlights



- High-speed analog inputs and outputs for the SIMATIC S7-300
- For the connection of analog sensors and actuators

The SM 335 fast analog input/output module provides:

- 4 fast analog inputs (basic conversion time for 4 channels max. 1 ms)
- 4 fast analog outputs (conversion max. 0.8 ms per channel)
- Encoder power supply 10 V/25 mA
- 1 counter input (24 V/ 500 Hz)

The SM 335 has two special operating modes:

- **Comparator:** In this mode the SM 335 compares a set-point value with an analog value measured at the analog input.
  Application: Very fast comparison of an analog value
- **Measurement only:**
  In the "measurement only" mode, the analog inputs are measured continually without updating the analog outputs.
  Application: very fast measurement of analog values (< 0.5 ms)

Further information can be found in the SM 335 Handbook (free download through Internet under:
http://www.siemens.com/automation/mc/html_00/products/index.htm

4

Technical specifications

Module-specific data	
Number of channels	4
Number of outputs	4
Cable length, shielded	200 m
With wire-break monitoring in range 0 V to 10 V	30 m
Voltages, currents, potentials	
Rated load voltage	24 V DC
Polarity reversal protection	Yes
Electrical isolation	Yes
Permissible potential difference	
• Between inputs (U_{CM})	3 V
• Between input (M terminal) and central grounding point	75 V DC
• Insulation	Tested at 500 V DC
Current consumption	
• From S7-300 backplane bus, max.	75 mA
• From L+, max.	150 mA
Power losses, max.	3.6 W
Status, interrupts, diagnostics	
Interrupts	
• Limit value interrupt	No
• Cycle end interrupt	Yes, parameterizable
• Diagnostics interrupt	Yes, parameterizable
Diagnostic functions	
• Fault display for grouped fault	Yes, red LED
• Diagnostic information can be read out	Yes
Analog value generation for inputs	
Measuring principle	Successive approximation
Conversion time per channel	200 µs
• Basic conversion time for 4 channels, max.	1 ms
Resolution	
• Bipolar	13 bit + sign
• Unipolar	14 bit
Analog inputs	
Interference between inputs	
• At 50 Hz	65 dB
• At 60 Hz	65 dB
Operational limits (over entire temperature range, referred to input range)	
• With voltage measurement	± 0.15 % (with 14-bit resolution)
• With current measurement	0.25 %
Basic error limit (operational limits at 25 °C, referred to input range)	0.13 % (with 14-bit resolution)
Temperature error (referred to input range)	± 0.1 % (with 14-bit resolution)
Linearity error (referred to input range)	± 0.015 %
Repeatability (under steady-state conditions, at 25 °C, referred to input range)	± 0.05 %
Encoder selection data	
Input range (rated values)/input resistance	
• Voltage	± 1 V; ± 10 V; ± 2,5 V; 0 V to 2 V; 0 V to 10 V: 10 MΩ
• Current	± 10 mA; 0 mA to 20 mA; 4 mA to 20 mA: 100 Ω
Permissible input voltage for voltage input (destruction limit)	± 30 V

SM 335 fast analog I/O module

Technical specifications (continued)

Permissible input current for current input (destruction limit)	25 mA
Connection of signal encoder	
• For voltage measurement	Possible
• For current measurement	
- as 2-wire transducer	Not possible
- as 4-wire transducer	Possible
• For resistance measurement	Not possible
Output for supplying the transducer (short-circuit proof)	10 V/25 mA
Data for encoder supply output	
Rated voltage	10 V
Output current, max.	25 mA
Short-circuit proof	Yes
Operating limits (over entire temperature range)	0.2 %
Temperature error	0.002 %/K
Basic error for rated voltage	0.1 %
Outputs	
Resolution (including overcontrol range)	
• ± 10 V	11 bit + sign
• From 0 V to 10 V	12 bit
Conversion time per channel, max.	800 µs
Settling time	
• For resistive load	< 0.1 ms
• For capacitive load	< 3.3 ms
• For inductive load	< 0.5 ms
Interference between outputs	40 dB

Substitute values can be switched in	Yes
Operational limits (over entire temperature range, referred to output range)	0.5 %
Basic error limit (operational limits at 25 °C, referred to output range)	0.2 %
Linearity error (referred to output range)	± 0.05 %
Repeatability (under steady-state conditions, at 25 °C, referred to output range)	± 0.05 %
Output ripple (referred to output range)	± 0.05 %
Actuator selection data	
Input ranges (rated values)	± 10 V and 0 V to 10 V (switchover)
Load impedance	
• For voltage outputs, min.	3 kΩ
• For capacitive load, max.	1 µF
• For inductive load, max.	1 mH
Voltage output	
• Short-circuit proof	Yes
• Short-circuit current, max.	8 mA
Connection of the actuators for voltage output	
• As 2-wire connection	Possible
• As 4-wire connection	Not possible
Dimensions and weight	
Dimensions (w x h x d)	40 mm x 125 mm x 120 mm
Weight, approx.	300 g

Ordering data

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

	Order No.
Front connector	
20-pin, with screw-type terminals	
• 1 unit	**6ES7 392-1AJ00-0AA0**
• 100 units	**6ES7 392-1AJ00-1AB0**
20-pin, with spring-loaded terminals	**6ES7 392-1BJ00-0AA0**
Shield connecting element 80 mm wide, with 2 rows for 4 terminal elements each	**6ES7 390-5AA00-0AA0**
Terminal elements	
2 units	
For 2 cables with 2 to 6 mm diameter	**6ES7 390-5AB00-0AA0**
For 1 cable with 3 to 8 mm diameter	**6ES7 390-5BA00-0AA0**
For 1 cable with 4 to 13 mm diameter	**6ES7 390-5CA00-0AA0**

SM 326 F digital input - Safety Integrated

Overview



- Digital inputs for the SIMATIC S7-400F/FH and SIMATIC S7-300F
- For connecting:
  - Switches and two-wire proximity switches (BEROs)
  - NAMUR-compliant encoders and wired mechanical contacts even for signals from the area with danger of explosion
- With integrated safety functions for fail-safe operation
- Suitable for use only in the ET 200M distributed I/O or in S7-300F modules
- Suitable for use in standard operation in the same way as S7-300® module

Technical specifications

6ES7 326-	1RF00-0AB0	1BK00-0AB0
Number of inputs	8 (single-channel) 4 (two-channel)	24
Interrupts	Diagnostic interrupt	Diagnostic interrupt
Diagnostics	Group error display, fail-safe operation indication; Diagnostic information selectable	Group error display, fail-safe operation indication; Diagnostic information selectable
Maximum achievable safety class during safety operation		
• According to IEC 61508	SIL 2 (single-chanel) SIL 3 (two-channel)	SIL 3
• According to DIN VDE 0801	AK 4 (single-channel) AK 5 and 6 (two-channel)	AK 6
• According to EN 954	Cat. 3 (single-chanel) Cat. 4 (two-channel)	Cat. 4
Type of protection	II(2)G [EEx ib] IIC acc. to EN 50020	-
Test number KEMA	99 ATEX 2671 X	-
Nominal supply voltage of electronics and sensors 1L+/2L+	24 V DC	24 V DC
Input voltage	Acc. to DIN 19234 or NAMUR	
• Rated value		24 V DC
• At "1" signal		11 to 30 V
• Or signal "0"		-30 to +5 V
• Frequency		-
Electrical isolation		
• To backplane bus		Yes
- in groups of		12
- input current for "1" signal, typ.		10 mA
• Between channels and backplane bus	Yes	Yes
• Between channels and Spannungsversorgung der Elektronik	Yes	
• Between channels	Yes	75 V DC, 60 V AC
Input current		
• At "1" signal, min.	2.1 mA to 7 mA	10 mA
• At "0" signal , max..	0.35 to 1.2 mA	2 mA

6ES7 326-	1RF00-0AB0	1BK00-0AB0
Input delay		
• For "0" to "1", typ.	1.2 to 3 ms	3 ms
• For "1" to "0", typ.	1.2 to 3 ms	3 ms
No. of simultaneously controllable inputs		
• Horizontal arrangement		
- up to 40 °C		24
- up to 60 °C	8	24 (at 24 V) 18 (at 28.8 V)
• Vertical arrangement		
- up to 40 °C	9	24
Connection type of the sensors	Two-wire connection	
Highest values of input circuits (per channel)	(per circuit)	(per circuit)
• U0, max.	10.0 V	-
• I0, max.	13.9 mA	-
• P0, max.	33.1 mW	-
• Permissible external inductance L0, max.	80 mH	-
• Permissible external capacitance C0, max.	3 µF	-
• Fault voltage Um, max.	60 V DC 30 V AC	-
• Permissible ambient temperature Ta, max.	60 °C	60 °C
Connection of 2-wire BERO		Possible
• Permissible quiescent current, max.		2 mA
Encoder supply	8.2 V DC	400 mA
• Number of outputs	8	4, isolated
Cable length		
• Unshielded	200 m	100 m
• Shielded	100 m	200 m
Current consumption		
• From backplane bus, typ.	Max. 90 mA	90 mA
• From 1L+, 2L+ (no load), typ.	Max. 160 mA	350 mA
Power losses, typ.	4.5 W	9.0 W

SM 326 F digital input - Safety Integrated

Technical specifications (continued)

6ES7 326-	1RF00-0AB0	1BK00-0AB0
Isolation tested at		75 V DC
• Channels to backplane bus and load voltage L+	1500 V AC	-
• Load voltage L+ against backplane bus	500 V DC or 350 V AC	-
• Channels horizontally	1500 V AC	-

6ES7 326-	1RF00-0AB0	1BK00-0AB0
Dimensions (W x H x D) in mm	80 X 125 x 120	80 x 125 x 120
Required front connector	40-pin	40-pin
Weight	482 g	442 g

Ordering data

	Order No.
SM 326 fail-safe digital input modules	
24 inputs, 24 V DC	**6ES7 326-1BK00-0AB0**
8 inputs, 24 V DC, NAMUR	**6ES7 326-1RF00-0AB0**
Labelling sheet with strips for 10 electronics blocks for	
• 16-channel electronics blocks incl. supplementary terminals	**6ES7 193-1BH00-0XA0**
• 32-channel electronics blocks incl. supplementary terminals	**6ES7 193-1BL00-0XA0**
Connecting cable for PROFIBUS 12 Mbit/s, for PG connection to PROFIBUS DP, preassembled with 2x9-pin Sub-D plug, 3 m long	**6ES7 901-4BD00-0XA0**
Bus connector for PROFIBUS	
• 90° outgoing feeder cable, terminating resistor with isolating function, without PG socket, up to 12 Mbit/s	**6ES7 972-0BA12-0XA0**
• Slanting outgoing feeder cable, barrel contacts, without bus terminating resistor, without PG socket, up to 1.5 Mbit/s	**6ES7 972-0BA30-0XA0**
• 90° outgoing feeder cable, terminating resistor with isolating function, with PG socket, up to 12 Mbit/s	**6ES7 972-0BB12-0XA0**
DIN rail for active bus modules for max. 5 active bus modules for hot swapping function	
• 483 mm long	**6ES7 195-1GA00-0XA0**
• 530 mm long	**6ES7 195-1GF30-0XA0**
• 620 mm long	**6ES7 195-1GG30-0XA0**
• 2000 mm long	**6ES7 195-1GC00-0XA0**
Active bus module BM 1 x 80 for one 80-mm wide module	**6ES7 195-7HC00-0XA0**
SITOP power supply module for ET 200M 120/230 V AC, 24 V DC, 5 A Type PS 307-1E	**6ES7 307-1EA00-0AA0**
Front connector 40-pin, with screw-type terminals	
• 1 unit ▶	**6ES7 392-1AM00-0AA0**
• 100 units ▶	**6ES7 392-1AM00-1AB0**

	Order No.
Labelling strips for fail-safe modules (spare part) 10 units	**6ES7 392-2XX20-0AA0**
Labelling cover for fail-safe modules (spare part) 10 units	**6ES7 392-2XY20-0AA0**
LK 393 cable duct for fail-safe modules; L+ and M connections 5 units	**6ES7 393-4AA10-0AA0**
S7-300 manual Design, CPU data, module data, instruction list	
German	**6ES7 398-8FA10-8AA0**
English	**6ES7 398-8FA10-8BA0**
French	**6ES7 398-8FA10-8CA0**
Spanish	**6ES7 398-8FA10-8DA0**
Italian	**6ES7 398-8FA10-8EA0**
Documentation for S7-300F System description, configuring and programming, PROFIsafe fail-safe modules	
German	**6ES7 988-8FB10-8AA0**
English	**6ES7 988-8FB10-8BA0**
French	**6ES7 988-8FB10-8CA0**
Manual S7-400F/FH programmable controller Paper version	
German	**6ES7 988-8FA10-8AA0**
English	**6ES7 988-8FA10-8BA0**
SIMATIC Manual Collection Electronic manuals on CD-ROM, multi-language: S7-200, TD 200, S7-300, C7, S7-400, STEP 7, engineering tools, runtime software, SIMATIC DP (distributed I/O), SIMATIC HMI (human machine interface), SIMATIC NET (industrial communication)	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection updating service for 1 year Current S7 Manual Collection CD as well as the three following updates	**6ES7 998-8XC01-8YE2**

Overview



- Digital outputs for the SIMATIC S7-400F/FH or SIMATIC S7-400F/FH
- For connection of solenoid valves, DC contactors and indicator lights
- With integrated safety functions for fail-safe operation
- Suitable for use in S7-300 F modules or in the ET 200M distributed I/O
- Suitable for use in standard operation in the same way as S7-300 modules

Technical specifications

Number of outputs	**10**
Interrupts	Diagnostic interrupt
Diagnostics	Group error display, fail-safe operation indication; diagnostic information selectable
Maximum achievable safety class during safety operation	
• According to IEC 61508	SIL 3
• According to DIN VDE 0801	AK 5 and 6
• According to EN 954	Cat. 4
Load voltage 1L+, 2L+, 3L+	24 V DC
Output voltage	
• At "1" signal	
- without series diode, min.	L+ -1.0 V
- with series diode, min.	L+ -1.8 V
Electrical isolation	
• Between channels and backplane bus	Yes
• Between channels and power supply of the electronics	Yes
• Between channels	Yes
• In groups of	5
Output current	
• At "1" signal	
- rated value	2 A
- permissible range up to 40°C, horizontal arrangement	7 mA to 2 A
- permissible range up to 40°C, vertical arrangement	7 mA to 1 A
- permissible range to 60 °C, horizontal arrangement	7 mA to 1 A
• At "0" signal, max.	0.5 mA
Total current of the outputs (per group)	
• Horizontal arrangement	
- up to 40°C, max.	7.5 A (without series diode) 5 A (with series diode)
- up to 60 °C	5 A (without series diode) 4 A (with series diode)

Total current of the outputs (per group)	
• Vertical arrangement	
- Up to 40 °C	5 A (without series diodes) 4 A (with series diodes)
Lamp load, max.	5 W
Switching frequency of outputs	
• For resistive load, max.	100 Hz
• For inductive load, max.	0.5 Hz
• For lamp load, max.	100 Hz
• Mechanical, max.	-
Switching capacity of contacts	
• For resistive load, max.	30 Hz
• For inductive load, max.	2 Hz
• For lamp load, max.	10 Hz
Limitation of voltage induced on circuit interruption to typically.	L+ - 53 V (without series diodes) L+ - 33 V (with series diodes)
Short-circuit protection	Electronic
Cable length	
• Unshielded, max.	600 m
• Shielded, max.	1000 m
• At SIL 3, AK 5 and 6, Cat. 4, max.	200 m
Current consumption	
• From backplane bus, max.	100 mA
• From 1L+, max.	70 mA
• From 2L+, 3L+, max. (no load)	100 mA
Power losses, typ.	12 W
Isolation tested at	75 V DC
Dimensions (W x H x D) in mm	80 x 125 x 120
Front connector required	40-pin
Weight, approx.	465 g

SM 326 F digital output - Safety Integrated

Ordering data	Order No.
SM 326 fail-safe digital output module	
10 inputs, 24 V DC, 2 A	**6ES7 326-2BF00-0AB0**
Labelling sheet with strips for 10 electronics blocks for	
• 16-channel electronics blocks incl. supplementary terminals	**6ES7 193-1BH00-0XA0**
• 32-channel electronics blocks incl. supplementary terminals	**6ES7 193-1BL00-0XA0**
Connecting cable for PROFIBUS	**6ES7 901-4BD00-0XA0**
12 Mbit/s, for PG connection to PROFIBUS DP, preassembled with 2x9-pin Sub-D plug, 3 m long	
Bus connector for PROFIBUS	
• 90° outgoing feeder cable, terminating resistor with isolating function, without PG socket, up to 12 Mbit/s	**6ES7 972-0BA12-0XA0**
• Slanting outgoing feeder cable, barrel contacts, without bus terminating resistor, without PG socket, up to 1.5 Mbit/s	**6ES7 972-0BA30-0XA0**
• 90° outgoing feeder cable, terminating resistor with isolating function, with PG socket, up to 12 Mbit/s	**6ES7 972-0BB12-0XA0**
DIN rail for active bus modules	
for max. 5 active bus modules for hot swapping function	
• 483 mm long	**6ES7 195-1GA00-0XA0**
• 530 mm long	**6ES7 195-1GF30-0XA0**
• 620 mm long	**6ES7 195-1GG30-0XA0**
• 2000 mm long	**6ES7 195-1GC00-0XA0**
Active bus module	**6ES7 195-7HC00-0XA0**
BM 1 x 80 for one 80-mm wide module	
SITOP power supply module	**6ES7 307-1EA00-0AA0**
for ET 200M 120/230 V AC, 24 V DC, 5 A Type PS 307-1E	
Front connector	
40-pin, with screw-type terminals	
• 1 unit	**6ES7 392-1AM00-0AA0**
• 100 units	**6ES7 392-1AM00-1AB0**

	Order No.
Labelling strips	**6ES7 392-2XX20-0AA0**
for fail-safe modules (spare part) 10 units	
Labelling cover	**6ES7 392-2XY20-0AA0**
for fail-safe modules (spare part) 10 units	
LK 393 cable duct	**6ES7 393-4AA10-0AA0**
for fail-safe modules; L+ and M connections 5 units	
S7-300 manual	
Design, CPU data, module data, instruction list	
German	**6ES7 398-8FA10-8AA0**
English	**6ES7 398-8FA10-8BA0**
French	**6ES7 398-8FA10-8CA0**
Spanish	**6ES7 398-8FA10-8DA0**
Italian	**6ES7 398-8FA10-8EA0**
Documentation for S7-300F	
System description, configuring and programming, PROFIsafe fail-safe modules	
German	**6ES7 988-8FB10-8AA0**
English	**6ES7 988-8FB10-8BA0**
French	**6ES7 988-8FB10-8CA0**
Manual S7-400F/FH programmable controller	
Paper version	
German	**6ES7 988-8FA10-8AA0**
English	**6ES7 988-8FA10-8BA0**
SIMATIC Manual Collection	**6ES7 998-8XC01-8YE0**
Electronic manuals on CD-ROM, multi-language: S7-200, TD 200, S7-300, C7, S7-400, STEP 7, engineering tools, runtime software, SIMATIC DP (distributed I/O), SIMATIC HMI (human machine interface), SIMATIC NET (industrial communication)	
SIMATIC Manual Collection updating service for 1 year	**6ES7 998-8XC01-8YE2**
Current S7 Manual Collection CD as well as the three following updates	

Overview



- Analog input modules for the SIMATIC® S7-400®F/FH or SIMATIC S7-400F/FH
- For connection of analog sensors with voltage and current signals
- With integrated safety functions for fail-safe operation
- Suitable for use in S7-300F module or in the ET 200M distributed I/O
- Suitable for use in standard operation in the same way as S7-300® modules

Technical specifications

Number of inputs	6
• For voltage measurement, max.	4
Interrupts	
• Diagnostic interrupt	Programmable
Diagnostics	Green LED for indicating fail-safe operation, green LED for monitoring sensor power supply, red LED for group error display; diagnostic information selectable
Maximum achievable safety class during safety operation	
• According to IEC 61508	Max. SIL 3
• According to IEC 19250	Max. AK 6
• According to EN 954-1	Max. Kat. 4
Rated load voltage L+	24 V DC
• Polarity reversal protection	Yes
Input impedance/ input ranges in standard operation	
• Voltage	0 to 10 V/59 kΩ
• Current	0 to 20 mA/107 Ω 4 to 20 mA/107 Ω
Input impedance/ input ranges in safety operation	
• Current	4 to 20 mA/107 Ω
Permissible input voltage for voltage input, max.	30 V
Permissible input current for current input, max.	40 mA
Connection of signal sensors	
• For current measurement	
- as 2-wire transmitter	Yes
- as 4-wire transducer	Yes

Electrical isolation	
• Between channels and backplane bus	Yes
• Between channels and power supply of the electronics	Yes (only with external supply of sensors)
• Between channels	No
Conversion time[1]/resolution (per channel)	
• Integration time	20 ms (at 50 Hz) 16.66 ms (at 60 Hz)
• Resolution	13 bit + sign
• Noise suppression, min.	38 dB
Operational limit (in the entire temperature range, referred to input range), max.	
• Current input	±0.45%
• Voltage input	±0.45%
Basic error (operational limits at 25 °C, referred to input range), max.	
• Current input	±0.35%
• Voltage input	±0.35%
Cable length (shielded), max.	200 m
Current consumption	
• From backplane bus, max.	90 mA
• From L+, typ.	160 mA
Power losses, typ.	4.25 W
Isolation tested at	600 V DC
Dimensions (W x H x D) in mm	80 x 125 x 120
Required front connector	40-pin
Weight	480 g

1)Other details have to be heeded to calculate the scan time. These can be found in the manual "Configuring a "S7-300® ".

SM 336 F analog input - Safety Integrated

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Ordering data	Order No.
SM 326 fail-safe analog input module	
6 inputs, 14 bit	**6ES7 336-1HE00-0AB0**
Labelling sheet with strips for 10 electronics blocks for	
• 16-channel electronics blocks incl. supplementary terminals	**6ES7 193-1BH00-0XA0**
• 32-channel electronics blocks incl. supplementary terminals	**6ES7 193-1BL00-0XA0**
Connecting cable for PROFIBUS	**6ES7 901-4BD00-0XA0**
12 Mbit/s, for PG connection to PROFIBUS DP, preassembled with 2x9-pin Sub-D plug, 3 m long	
Bus connector for PROFIBUS	
• 90° outgoing feeder cable, terminating resistor with isolating function, without PG socket, up to 12 Mbit/s	**6ES7 972-0BA12-0XA0**
• Slanting outgoing feeder cable, barrel contacts, without bus terminating resistor, without PG socket, up to 1.5 Mbit/s	**6ES7 972-0BA30-0XA0**
• 90° outgoing feeder cable, terminating resistor with isolating function, with PG socket, up to 12 Mbit/s	**6ES7 972-0BB12-0XA0**
DIN rail for active bus modules	
for max. 5 active bus modules for hot swapping function	
• 483 mm long	**6ES7 195-1GA00-0XA0**
• 530 mm long	**6ES7 195-1GF30-0XA0**
• 620 mm long	**6ES7 195-1GG30-0XA0**
• 2000 mm long	**6ES7 195-1GC00-0XA0**
Active bus module	**6ES7 195-7HC00-0XA0**
BM 1 x 80 for one 80-mm wide module	
SITOP power supply module	**6ES7 307-1EA00-0AA0**
for ET 200M 120/230 V AC, 24 V DC, 5 A Type PS 307-1E	
Front connector	
40-pin, with screw-type terminals	
• 1 unit	**6ES7 392-1AM00-0AA0**
• 100 units	**6ES7 392-1AM00-1AB0**

	Order No.
Labelling strips	**6ES7 392-2XX20-0AA0**
for fail-safe modules (spare part) 10 units	
Labelling cover	**6ES7 392-2XY20-0AA0**
for fail-safe modules (spare part) 10 units	
LK 393 cable duct	**6ES7 393-4AA10-0AA0**
for fail-safe modules; L+ and M connections 5 units	
S7-300 manual	
Design, CPU data, module data, instruction list	
German	**6ES7 398-8FA10-8AA0**
English	**6ES7 398-8FA10-8BA0**
French	**6ES7 398-8FA10-8CA0**
Spanish	**6ES7 398-8FA10-8DA0**
Italian	**6ES7 398-8FA10-8EA0**
Documentation for S7-300F	
System description, configuring and programming, PROFIsafe fail-safe modules	
German	**6ES7 988-8FB10-8AA0**
English	**6ES7 988-8FB10-8BA0**
French	**6ES7 988-8FB10-8CA0**
Manual S7-400F/FH programmable controller	
Paper version	
German	**6ES7 988-8FA10-8AA0**
English	**6ES7 988-8FA10-8BA0**
SIMATIC Manual Collection	**6ES7 998-8XC01-8YE0**
Electronic manuals on CD-ROM, multi-language: S7-200, TD 200, S7-300, C7, S7-400, STEP 7, engineering tools, runtime software, SIMATIC DP (distributed I/O), SIMATIC HMI (human machine interface), SIMATIC NET (industrial communication)	
SIMATIC Manual Collection updating service for 1 year	**6ES7 998-8XC01-8YE2**
Current S7 Manual Collection CD as well as the three following updates	

Overview



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

Technical specifications

Ex digital input	6ES7 321-7RD00-0AB0
Number of inputs	4 (NAMUR)
Electrical isolation	Yes
in groups of	1
Load voltage	24 V DC
Input voltage	
• Rated value	8.2 V DC (from internal circuit supply)
Input current	
• At signal “1”, min.	2.1 mA to 7 mA
• At signal “0”, max.	0.35 to 1.2 mA
• On short-circuit, min.	8.5 mA
• At wirebreak, max.	0.1 mA
Delay time	
• At “0” following “1”, typ.	0.1/0.5/3/15/20 ms (configurable, plus 0.25 ms conditioning time)
Input frequency, max.	2 kHz
Connection type for signal encoders	Two-wire connection
Cable length (unshielded), max.	200 m
Encoder supply	Via the inputs
Fault message ”Short-circuit”	Red LED (group error indicator), red LED per channel

Ex digital input	6ES7 321-7RD00-0AB0
Type of protection	[EEx ib] IIC
PTB no.	Ex-96.D.2094X
FMs	CL.2, DIV 2, GP A,B,C,D T4
Input circuit maximum values	(per circuits)
• U_0	10.0 V
• I_K	14.1 mA
• P	33.7 mW
• Permissible ext. inductance L_a, max.	100 mH
• Permissible ext. capacitance C_a, max.	3 µF
Ambient temperature, max.	60 °C
Current consumption	
• Internal (backplane bus), max.	80 mA
• External (load voltage), max.	50 mA
Power loss	1.1 W
Required front connector	20-pin
Weight, approx.	230 g

Ex digital I/O modules

Technical specifications

Ex digital outputs 6ES7 322-	5SD00-0AB0	5RD00-0AB0
Number of inputs	4	4
Electrical isolation	Yes	Yes
• In groups of	1	1
Supply voltage U_P (for load)		
• Rated value	24 V DC	15 V DC
Output current		
• At signal "1", max.	10 mA +/- 10%	20 mA +/- 10%
• On short-circuit, min.	10 mA + 10%	20.5 mA + 10%
Short-circuit protection	Electronic	Electronic
Fault diagnostics	Yes	Yes
Switching frequency, max.	100 Hz	100 Hz
Load	390 Ω	200 Ω
Connection type for load	Two-wire connection	Two-wire connection
Cable length (unshielded), max.	200 m	200 m
Fault message "Short-circuit" (group fault message, additionally per channel)	Red LED, CPU message	Red LED, CPU message
Type of protection	[EEx ib] IIC	[EEx ib] IIC
PTB no.	Ex-96.D.2093X	Ex-96.D.2102X

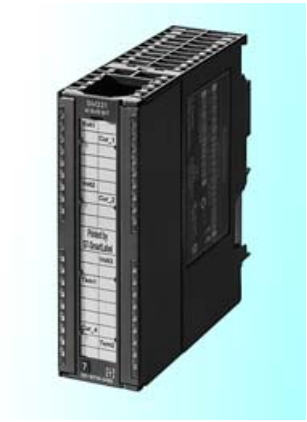
Ex digital outputs 6ES7 322-	5SD00-0AB0	5RD00-0AB0
FMs	CL I, DIV 2, GP A,B,C,D T4	AIS CL.1, DIV 1, GP A,B,C,D CL.I, DIV 2, GP A,B,C,D T4
Highest values of the output circuits	(per circuits)	
• U_0	25.2 V	15.75 V
• I_K	70 mA	85 mA
• P	440 mW	335 mW
• Permissible ext. Induktivität L_a, max.	6.7 mH	5 mH
• Permissible ext. Kapazität C_a, max.	90 nF	500 nF
Ambient temperature, max.	60 °C	60 °C
Current consumption		
• Internal (backplane bus), max.	70 mA	70 mA
• External (load voltage), max.	160 mA	160 mA
Power losses, typ.	3 W	3 W
Required front connector	20-pin	20-pin
Weight, approx.	230 g	230 g

Ordering data

	Order No.
Ex digital input module	
4 inputs, electrically isolated, NAMUR	**6ES7 321-7RD00-0AB0**
Ex digital output modules	
4 outputs, electrically isolated, 24 V DC, 10 mA	**6ES7 322-5SD00-0AB0**
4 outputs, electrically isolated, 15 V DC, 20 mA	**6ES7 322-5RD00-0AB0**
Front connector	
20-pin, with screw-type terminals	
• 1 unit	**6ES7 392-1AJ00-0AA0**
• 100 units	**6ES7 392-1AJ00-1AB0**
Front door, improved version	**6ES7 328-0AA00-7AA0**
e.g. for 32-channel modules; permits connection of 1.3 mm^2/ 16 AWG conductors	
LK 393 cable duct	**6ES7 393-4AA00-0AA0**
Mandatory requirement for Ex operation	

	Order No.
Labelling strips	**6ES7 392-2XX00-0AA0**
10 units (spare part) for signal modules (except 32-channel), function modules, CPU 312 IFM and CPU 314 IFM	
Labelling cover	**6ES7 392-2XY00-0AA0**
10 units for signal modules (except 32-channel), function modules and CPU 312 IFM	
S7-SmartLabel	**2XV9 450-1SL00-0YX0**
Software for machine labelling of modules directly from the STEP 7 project	
Labelling sheets for machine labelling	See page 4/123
SIMATIC Manual Collection	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection updating service for 1 year	**6ES7 998-8XC01-8YE2**
Reference manual: S7-300 Ex I/O modules, ET 200M	
German	**6ES7 398-8RA00-8AA0**
English	**6ES7 398-8RA00-8BA0**

Overview



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

Technical specifications

Ex analog input	6ES7 331-7RD00-0AB0	6ES7 331-7SF00-0AB0
Input range	0 to 20 mA 4 to 20 mA	8 x thermocouples, 4 x RTD resistance thermometers.
Number of inputs	**4**	**8/4**
Electrical isolation	Yes	Yes
Input resistance	50 Ω	10 MΩ
Connection of signal sensors	2-wire	2-wire
	4-wire	4-core; thermocouples type T, U, E, J, L, K, N, R, S, B; resistance thermometers Pt 100, Pt 200, Ni 100
Digital representation of the input signal	10 to 15 bit + sign	10 to 15 bit + sign
Principle of measurement	SIGMA-DELTA	SIGMA-DELTA
Integration time (adjustable for optimum noise voltage suppression)	2.5 to 100 ms	2.5 to 100 ms
Permissible voltage		
• Between the inputs, max.	60 V DC	60 V DC
• Inputs to grounding point, (destruction limit), max.	60 V DC	30 V DC
Permissible input current, max. (destruction limit)	40 mA	-
Fault indication	Message, red LED	Message, red LED
Fault message at		
• Overflow	Message, red LED	Message, red LED
• Wirebreak on the signal encoder line	Message	Message
• Short-circuit of the signal encoder line	Message	Message
Noise suppression for noise frequency	10 to 400 Hz	10 to 400 Hz
• Common-mode noise, min.	130 dB	130 dB
• Series-mode noise, min. (peak value of the noise < rated value of the range)	60 dB	60 dB

Ex analog input	6ES7 331-7RD00-0AB0	6ES7 331-7SF00-0AB0
Basic error limits, bei 25 °C	+/- 0.1%	0.1%
Operating error limits	+/- 0.45%	0.09 to 0.04%; temperature error: 0.001 to 0.02%/K
Type of protection	[EEx ib] IIC	[EEx ib] IIC
PTB no.	Ex-96.D.2092X	Ex-96.D.2108X
FMs	CL.I, DIV 2, GP A,B,C,D T4	CL.I, DIV 2, GP A,B,C,D T4
Input circuit maximum values	(per circuits)	
• U_0	25.2 V	5.9 V
• I_K	68.5 mA	28.8 mA
• P	431 mW	41.4 mW
• R_i	50 Ω	
• Permissible ext. inductance L_a, max.	7.5 mH	40 mH
• Permissible ext. capacitance C_a, max.	90 nF	60 µF
Ambient temperature, max.	60 °C	60 °C
Cable length (shielded), max.	200 m	200 m, HTC:50 m
Supply voltage from module (for 2-wire transducer)		
• No-load voltage	25.2 V DC	-
• rRted value	13 V at 22 mA	-
Current consumption		
• Internal (backplane bus), max.	60 mA	120 mA
• External (24 V DC), max.	150 mA	
Power losses, typ.	3 W	0.6 W
Required front connector	20-pin	20-pin
Weight, approx.	290 g	210 g

Ex analog I/O modules

4

Technical specifications

Ex analog output	6ES7 332-5RD00-0AB0
Output range (nominal value)	0/4 to 20 mA
Number of outputs	**4**
Electrical isolation	Yes
Load resistance, min.	500 MΩ
Connection of signal sensors	Two-wire connection
Digital representation of output signal	15 bit
Conversion time	2.5 ms
Short-circuit protection	Yes
Short-circuit current, e.g.	70 mA
Idle voltage, approx.	14 V
Permissible voltage	
• Between the outputs, max.	30 V AC/60 V DC
• Outputs to grounding point, max.	30 V AC/60 V DC
Basic error limits at 25 °C	± 0.2 %
Operating error limits (0° C to 60 °C)	± 0.55 %
Cable length (shielded), max.	200 m
Fault message "Short-circuit"	Group fault message, additionally per channel

Ex analog output	6ES7 332-5RD00-0AB0
Fault message at	
• Wirebreak on the actuator line	Yes
• Overflow	Yes
Type of protection	[EEx ib] IIC
PTB no.	Ex-96.D.2026X
FMs	CL.I, DIV 2, GP A,B,C,D T4
Highest values of the input circuits (per channel)	
• U_0, max.	14 V
• I_K	70 mA
• P	440 mW
• Permissible ext. inductance L_a, max.	6.6 mH
• Permissible ext. capacitance C_a, max.	850 nF
Ambient temperature, max.	60 °C
Current consumption	
• Internal (backplane bus), max.	80 mA
• External, max.	180 mA
Power losses, typ.	4 W
Required front connector	20-pin
Weight, approx.	280 g

Ordering data

	Order No.
Ex analog input modules	
4 inputs, electrically isolated, 0/4 to 20 mA, 15 bit	**6ES7 331-7RD00-0AB0**
8/4 inputs, electrically isolated, for thermocouples and Pt 100, Pt 200, Ni 100	**6ES7 331-7SF00-0AB0**
Ex analog output module	
4 outputs, electrically isolated, 0/4 to 20 mA	**6ES7 332-5RD00-0AB0**
Front connector	
20-pin, with screw-type terminals	
• 1 unit	**6ES7 392-1AJ00-0AA0**
• 100 units	**6ES7 392-1AJ00-1AB0**
Front door, improved version	**6ES7 328-0AA00-7AA0**
e.g. for 32-channel modules; permits connection of 1.3 mm²/16 AWG conductors	
LK 393 cable duct	**6ES7 393-4AA00-0AA0**
Mandatory requirement for Ex operation	

	Order No.
Labelling strips	**6ES7 392-2XX00-0AA0**
10 units (spare part) for signal modules (except 32-channel), function modules, CPU 312 IFM and CPU 314 IFM	
Labelling cover	**6ES7 392-2XY00-0AA0**
10 units for signal modules (except 32-channel), function modules and CPU 312 IFM	
S7-SmartLabel	**2XV9 450-1SL00-0YX0**
Software for machine labelling of modules directly from the STEP 7 project	
Labelling sheets for machine labelling	See page 4/123
SIMATIC Manual Collection	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection updating service for 1 year	**6ES7 998-8XC01-8YE2**
Reference manual: S7-300 Ex I/O modules, ET 200M	
German	**6ES7 398-8RA00-8AA0**
English	**6ES7 398-8RA00-8BA0**

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:
We offer incremental encoders and preassembled connecting cables for counting and positioning functions under SIMODRIVE Sensors or Motion Connect 500 (see also www.siemens.de/simatic-technologie).

Technical specifications

Number of counters	1
Counting range	32 bit or +/- 31 bit
Connectable incremental encoders:	• 5-V RS422, symmetrical with two 90°-offset pulse trains; • 24 V asymmetric • 24-V direction sensor (1 pulse train, 1 direction level); • 24 V initiator
Counting frequency if selected with	
• 5-V RS422, max.	500 kHz
• 24-V encoder, max.	200 kHz
Digital inputs	1 for gate start
	1 for gate stop
	1 to set counter
Digital outputs	2
Electrical isolation	
• Between digital inputs, outputs and S7 bus	Yes (optocoupler)
• Between digital inputs, outputs and counter inputs	Yes (optocoupler)
Permissible potential difference	75 V DC, 60 V AC
Supply voltage for encoders	
• At 5.2 V, max.	5.2 V +/- 2%
• At 24 V, max.	$1L_+$ -3 V
• Output current for encoders	
• At 5.2 V, max.	300 mA
• At 24 V, max.	300 mA
Auxiliary voltage $1L_+$, load voltage 2 L_+	
• Rated value	24 V DC
• Permissible range (including ripple)	
- static	20.4 to 28.8 V
- dynamic	18.5 to 30.2 V

Auxiliary voltage $1L_+$, load voltage 2 L_+	
• Non-periodic skip	
- value	35 V
- duration	500 ms
- recovery time	50 s
• Current consumption	40 mA
5 V DC counter inputs	According to RS422
Terminating resistor, approx.	220 Ω
Differential input voltage, min.	0.5 V
24 V DC counter inputs, digital inputs	
• Low level	-28.8 to +5 V
• High level	+11 to +28.8 V
• Input current, typ.	9 mA
• Minimum pulse width/interpulse period	2.5 µs or 25 µs
Output voltage	
• At "0" signal, max.	3 V
• At "1" signal , min.	$2L_+$ - 1.5 V
Output current at "1" signal	
• Rated value	0.5 A
• Range	5 mA to 0.6 A
Switching time, max.	300 µs
Circuit interruption voltage	Limited to $2L_+$ - 39 V
Short-circuit protection	Yes (electronic, clocked)
Current consumption	
• From S7-300® bus, typ.	160 mA
Power losses, typically	4.5 W
Isolation tested at	500 V
Allocated binary addresses	16 byte
Required front connector	1 x 20-pin
Dimensions (W x H x D) in mm	40 x 125 x 120
Weight, approx.	250 g

FM 350-1 counter module

Technical specifications (continued)

Standard function block	FC CNT_CTRL (FC 0)	FC DIAG_INF (FC 1)
• Memory requirements		
• FB length in memory	522 byte	262 byte
• DB length in the memory	67 byte	67 byte
Runtimes in S7-300/C7	With CPU 314 approx. 0.85 ms	With CPU 314 approx. 2.50 ms
Runtimes in S7-400	On request	On request
Target system	S7-300 (CPU 314 and higher), SIMATIC S7-400, SIMATIC C7	S7-300 (CPU 314 and higher), SIMATIC S7-400, SIMATIC C7

Ordering data

	Order No.
FM 350-1 counter module with 1 channel, max. 500 kHz; for incremental encoders	**6ES7 350-1AH02-0AE0**
Coding connector - range card for analog inputs Spare part	**6ES7 974-0AA00-0AA0**
Front connector 20-pin, with screw-type terminals	
• 1 unit	**6ES7 392-1AJ00-0AA0**
• 100 units	**6ES7 392-1AJ00-1AB0**
20-pin, with spring-loaded terminals	**6ES7 392-1BJ00-0AA0**
Bus connector 1 unit (spare part)	**6ES7 390-0AA00-0AA0**
Labelling strips 10 units (spare part)	**6ES7 392-2XX00-0AA0**
S7-SmartLabel Software for machine labelling of modules directly from the STEP 7 project	**2XV9 450-1SL00-0YX0**
Labelling sheets for machine labelling	See "Accessories"

	Order No.
Slot number label Spare part	**6ES7 912-0AA00-0AA0**
Shield connecting element 80 mm wide, with 2 rows for 4 terminal elements each	**6ES7 390-5AA00-0AA0**
Terminal elements 2 units	
For 2 cables with 2 to 6 mm diameter	**6ES7 390-5AB00-0AA0**
For 1 cable with 3 to 8 mm diameter	**6ES7 390-5BA00-0AA0**
For 1 cable with 4 to 13 mm diameter	**6ES7 390-5CA00-0AA0**
FM 350-1 manual	
German	**6ES7 350-1AH00-8AG0**
English	**6ES7 350-1AH00-8BG0**
French	**6ES7 350-1AH00-8CG0**
Italian	**6ES7 350-1AH00-8EG0**
Suitable incremental encoders 6FX2 001-2...	Refer to A&D Mall under SIMODRIVE Sensor or Motion Connect 500 (see also) www.siemens.de/simatic-technologie)

Overview



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

Note:
We offer incremental encoders and preassembled connecting cables for counting and positioning functions under SIMODRIVE Sensors or Motion Connect 500 (see also www.siemens.de/simatic-technologie).

Technical specifications

Number of counters	8
Counting range	32 bit or +/- 31 bit
Counting frequency if selected with	
• 24 V incremental position encoder, max.	10 kHz
• 24 V direction sensing element, max.	20 kHz
• 24 V initiator, max.	20 kHz
• NAMUR sensor, max.	20 kHz
Counting inputs	**8**
Input voltage	
• At "1" signal	11 to 30.2 V
• At "0" signal	-3 to +5 V
Input current	
• At "1" signal, typ.	9 mA
• At "0" signal, max.	2 mA
Input delay, max.	50 µs
Electrical isolation	Against backplane bus and shield
Connection of 2-wire initiators	Possible
Cable length, shielded	100 m
NAMUR inputs	**8**
Level	According to DIN 19 234
Input current	
• At "1" signal, min.	2.1 mA
• At "0" signal, max.	0.5 mA
Input delay, max.	50 µs
Electrical isolation	Against backplane bus and shield
Cable length, shielded	100 m
Digital inputs	**8**
Digital inputs	1 each for gate start / gate stop
Input voltage	
• At signal "1"	11 to 30.2 V
• At "0" signal	-3 to +5 V
Input current	
• At "1" signal, typ.	9 mA
• At "0" signal, max.	2 mA
Input delay, max.	50 µs
Electrical isolation	Against backplane bus and shield
Connection of two-wire BEROs	Possible
Cable length, shielded	100 m
Digital outputs	**8**
Output voltage	
• At signal "1"	L+ - 0.8 V
Output current for sensor	
• At signal "1"	0.5 A
• At "0" signal	0.5 mA
Aggregate current for outputs	
• Horizontal installation	
- up to 40°C	4 A
- up to 60 °C	2 A
• Vertical installation	
- up to 40°C	2 A
Switching frequency of outputs	
• For resistive load, max.	500 Hz
• For inductive loads, max.	0.5 Hz
Restriction of the voltage induced on circuit interruption to, typ.	L+ - 40 V
Short-circuit protection	Yes
Electrical isolation	Against backplane bus and shield
Output delay, typ.	300 µs
Line length	
• Unshielded	100 m
• Shielded	600 m
General	
Interrupts	
• Process interrupt	Configurable
• Diagnostics interrupt	Configurable
Diagnostics	Red LED for indicating group errors; diagnostic info can be read out

FM 350-2 counter module

Technical specifications (continued)

Auxiliary supply 1L+, load voltage 2L+	
• Rated value	24 V DC
• Permitted range	20.4 to 28.8 V
NAMUR sensor supply	
• Output voltage	8.2 V ±2%
• Output current, max.	200 mA, short-circuit-proof

Current consumption	
• From S7-300® bus, approx.	100 mA
• From L+ (without load), approx.	150 mA
Power loss, approx.	10 W
Required front connector	1 x 40-pin
Dimensions (W x H x D) in mm	80 x 125 x 120
Weight, approx.	460 g

Technical specifications (continued)

Standard function blocks	FC CNT2_CTR (FC 2)	FC CNT2_WR (FC 3)	FC CNT2_RD (FC 4)	FC DIAG_RD (FC 5)
Memory requirements				
• FB length in memory	320 byte	992 byte	496 byte	278 byte
• DB length in the memory	On request	On request	On request	On request
Runtimes in S7-300®/C7	0.5 to 0.6 ms	0.3 to 3.0 ms	0.2 to 3.0 ms	2.0 to 2.7 ms
Runtimes in S7-400®	On request	On request	On request	On request
Target system	SIMATIC® S7-300® (CPU 314 upwards), SIMATIC® S7-400®, SIMATIC® C7			

Ordering data

	Order No.
FM 350-2 counter module with 8 channels, max. 20 kHz; for 24-V incremental encoders and NAMUR encoders	**6ES7 350-2AH00-0AE0**
Front connector 40-pin, with screw-type terminals	
• 1 unit	**6ES7 392-1AM00-0AA0**
• 100 units	**6ES7 392-1AM00-1AB0**
40-pin, with spring-loaded terminals	**6ES7 392-1BM01-0AA0**
Bus connector 1 unit (spare part)	**6ES7 390-0AA00-0AA0**
Labelling strips 10 units (spare part)	**6ES7 392-2XX00-0AA0**
S7-SmartLabel Software for machine labelling of modules directly from the STEP 7 project	**2XV9 450-1SL00-0YX0**
Labelling sheets for machine labelling	See "Accessories"

	Order No.
Slot number label Spare part	**6ES7 912-0AA00-0AA0**
Shield connecting element 80 mm wide, with 2 rows for 4 terminal elements each	**6ES7 390-5AA00-0AA0**
Terminal elements 2 units	
For 2 cables with 2 to 6 mm diameter	**6ES7 390-5AB00-0AA0**
For 1 cable with 3 to 8 mm diameter	**6ES7 390-5BA00-0AA0**
For 1 cable with 4 to 13 mm diameter	**6ES7 390-5CA00-0AA0**
FM 350-2 manual	
German	**6ES7 350-2AH00-8AG0**
English	**6ES7 350-2AH00-8BG0**
French	**6ES7 350-2AH00-8CG0**
Italian	**6ES7 350-2AH00-8EG0**

Overview



- 8-channel intelligent counter module for universal metering and measurement tasks, as well as for simple positioning tasks (max. 4 axes).
- 8 counter inputs (optionally for 5 V or 24 V signal level)
- 8 integrated digital outputs for fast output of module reactions
  Provided that the outputs are not occupied by the set operating mode, they can be used freely as a process I/O by the user program.

Technical specifications

Voltages/Currents	
Power supply	5 V (through S7-bus)
Current consumption, typ.	150 mA
Connection	1 x 25-pin Sub-D connector 1 x 15-pin Sub-D connector
Pulse counter	
Number of inputs	8
Counting frequency, max.	10 kHz per channel
Counting modes	Up or down
Set/read counter	All channels can be set/read separately
Zero cont or counter value query	Interrupt generation for “0“ or count value
Period duration measurement	
Number of inputs	8
Internal reference frequency	Max. 100 kHz per channel, configurable for periods, e. g.:

Periods	**Meas. frequency**
100 kHz	1.6 Hz to 1 kHz
50 kHz	0.8 Hz to 500 Hz
25 kHz	0.4 Hz to 250 Hz

Time generator	
Number of inputs	8
Times	10 ms to 278 min
Simple positioning	
Number of inputs	4
Outputs per channel	2 (forward / backward)
Inputs per channel	2 (sensor track A / sensor track B)
Setpoint, max.	2^{31} inkrements
Scanning	1 x / 2 x / 4 x
Frequency, max.	2 kHz
Digital outputs	
Rated value	+ 24 V source output
Output current, max.	500 mA, short-circuit proof
Switching frequency	100 Hz resistive load 0,5 Hz inductive load 8 Hz lamp load
Cable length, shielded, max.	100 m
Digital inputs	

	24 V DC	**5 V DC**
Rated input voltage		
• At signal “1“	15 V to 30 V	2,4 V to 6 V
• At signal “0“	-3 V to 5 V	-0.6 V to 0.8 V
Rated input current, typ.	4.7 mA (at 24 V)	10 mA (at 5 V)
Cable length, shielded, max.	25 m	5 m

Miscellaneous	
UL/CSA/FM	No
Configuraton with active bus modules	Not supported
Dimensions (B x H x T)	40 mm x 125 mm x 120 mm
Weight, approx.	350 g

Ordering data

	Order No.
CM 35 counter module with 8 pulse inputs and 8 digital outputs, for universal counting and measuring tasks as well as simple positioning tasks	**6AT1 735-0AA01-0AA0**
Configuring package for CM 35, incl. manual and example program; on CD-ROM	**6AT1 735-0DA01-0YA0**

	Order No.
Sub-D connector	
15-pin, male	**6ES5 750-2AA21**
25-pin, male	**6ES5 750-2AA31**
Shield connecting element	See page 4/68
Terminal elements	See page 4/68

FM 351 positioning module

Overview



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

Note:
We offer position sensing systems and preassembled connecting cables for counting and positioning functions under SIMODRIVE Sensors or Motion Connect 500 (see also www.siemens.de/simatic-technologie).

Technical specifications

General specifications		
Supply voltage	24 V DC	
Current consumption	350 mA	
Supply current for position encoders	max. 350 mA	
Supply voltage for position encoder	5 V and 24 V	
Protection to DIN 40050	IP 20	
Permissible humidity to DIN 40040	Humidity class F	
Permissible ambient temperature		
• Storage and transport	-40 to + 70 °C	
• Operation	0 to + 60 °C	
Required front connector	1 x 20-pin	
Dimensions (W x H x D) in mm	80 x 125 x 120 mm	
Weight, approx.	550 g	
Position detection, incremental		
Accepts encoder types	**Encoders with TTL quadrature signal**	**Encoders with asymmetrical inputs**
Track signals	A; not A; B; not B	A, B
Zero mark signal	N; not N	N
Input signal	5 V differential signal (phys. RS 422)	-
• Differential input voltage	1 to 10 V	-
• Input frequency, max.	0.5 MHz	-
Input voltage	-	24 V
Input frequency, max.	-	50 kHz at 25 m cable length, 25 kHz at 100 m cable length
Cable length		
• 5-V encoder supply, max.	32 m	
• 24 V encoder supply, max.	100 m	

Synchronous-serial position detection	
Accepts encoder types	Single or multi-turn encoders with SSI (GRAY encoding)
Data signal	DATA; not DATA
Clock signal	CL; not CL
Frame length	13 or 25 bit serial
Input signal	5-V differential signal (phys. RS 422)
• Differential input voltage	1 to 10 V
Transmission rate max.	1 MHz
Encoder supply	24 V DC, max. 400 mA per channel
Cable length, max.	300 m (at max. 125 kHz)
Digital inputs	
Number of inputs	8
Functions	Reference cam, reversing cam,
	Set actual value on-the-fly,
	Start/stop positioning run
Electrical isolation	Yes
Input voltage	
• Rated value	24 V DC
• At "0" signal	-3 to +5 V
• At "1" signal	11 to 30 V
Input current for 2-wire BEROs	
At "0" signal, max.	2 mA
At "1" signal, max.	6 mA
Digital outputs	
Number of outputs	8
Functions	Rapid traverse, creep speed,clockwise, counter-clockwise
Electrical isolation	Yes
Output voltage	
• Rated value	24 V DC
• At signal "0"	Residual current max. 0.5 mA
• At signal "1"	UP - 0.8 V
Output current	5 mA to 0.6 A at UP_{max} (short-circuit proof)

Ordering data	Order No.
FM 351 positioning module	**6ES7 351-1AH01-0AE0**
for rapid traverse and creep-speed drives	
FM 351 manual	
German	**6ES7 351-1AH00-8AG0**
English	**6ES7 351-1AH00-8BG0**
French	**6ES7 351-1AH00-8CG0**
Italian	**6ES7 351-1AH00-8EG0**
703 connecting cable	
to connect FM 351, FM 352, FM 354 to:	
• Siemens incremental position encoder 6FX2 001-...	
5 m, outgoing feeder cable downwards	**6ES5 703-1BF00**
10 m, outgoing feeder cable, up	**6ES5 703-1CB01**
20 m, outgoing feeder cable, up	**6ES5 703-1CC01**
• Incremental position encoder for 5-V signals (RS 422), supply voltage 5 V, 1 end open	
5 m, outgoing feeder cable, up	**6ES5 703-2BF01**
10 m	**6ES5 703-2CB0** ■
• Incremental position encoder for 24-V signals (RS 422), supply voltage 24 V, 1 end open	
10 m	**6ES5 703-4CB0 0**
32 m	**6ES5 703-4CD20**
• Absolute SSI position encoder, supply volt. 24 V, 1 end open	
20 m	**6ES5 703-5CC0** ■
50 m	**6ES5 703-5CF0** ■
Outgoing feeder cable	
Downwards	**0**
Upwards	**1**

	Order No.
Sub-D connector	**6ES5 750-2AA21**
15-pin, male	
Front connector	
20-pin, with screw-type terminals	
• 1 unit	**6ES7 392-1AJ00-0AA0**
• 100 units	**6ES7 392-1AJ00-1AB0**
20-pin, with spring-loaded terminals	**6ES7 392-1BJ00-0AA0**
Bus connector	**6ES7 390-0AA00-0AA0**
1 unit (spare part)	
Labelling strips	**6ES7 392-2XX00-0AA0**
10 units (spare part)	
Slot number label	**6ES7 912-0AA00-0AA0**
S7-SmartLabel	**2XV9 450-1SL00-0YX0**
Software for machine labelling of modules directly from the STEP 7 project	
Labelling sheets for machine labelling	See "Accessories"
Spare part	
Shield connecting element	**6ES7 390-5AA00-0AA0**
80 mm wide, with 2 rows for 4 terminal elements each	
Terminal elements	
2 units	
For 2 cables with 2 to 6 mm diameter	**6ES7 390-5AB00-0AA0**
For 1 cable with 3 to 8 mm diameter	**6ES7 390-5BA00-0AA0**
For 1 cable with 4 to 13 mm diameter	**6ES7 390-5CA00-0AA0**

FM 352 electronic cam controller

Overview



- Extremely fast electronic cam control
- Low-cost alternative to mechanical cam controllers
- 32 cam tracks, 13 on-board digital outputs for direct output of actions
- Incremental or synchro-serial position decoding

Note:
We offer position sensing systems and preassembled connecting cables for counting and positioning functions under SIMODRIVE Sensors or Motion Connect 500 (see also www.siemens.de/simatic-technologie).

Technical specifications

General specifications	
Supply voltage	24 V DC
Current consumption	
• L+ (without load)	200 mA
• From backplane bus	100 mA
Supply current for position encoders	Max. 300 mA
Supply voltage for position encoder	5 V or 24 V
Protection to DIN 40050	IP 20
Permissible humidity to DIN 40040	Humidity class F
Permissible ambient temperature	
• Storage and transport	-40 to +70 °C
• Operation	0 to +60 °C
Necessary front connectors	1 x 20-pin
Dimensions (W x H x D) in mm	80 x 125 x 120 mm
Weight, approx.	550 g

Position detection, incremental		
Accepts encoder types	**Encoders with TTL quadrature signal**	**Encoders with asymmetrical inputs**
Track signals	A; not A; B; not B	A, B
Zero mark signal	N; not N	N
Input signal	5-V differential signal (phys. RS 422)	-
• Differential input voltage	1 to 10 V	-
• Input frequency, max.	1 MHz	-
Input voltage	-	24 V
Input frequency, max.	-	50 kHz at 25 m cable length, 25 kHz at 100 m cable length
Cable length		
• 5-V encoder supply, max.	32 m	
• 24 V encoder supply, max.	100 m	

Synchronous-serial position detection	
Accepts encoder types	Single or multi-turn encoders with SSI (Gray encoding)
Data signal	DATA; not DATA
Clock signal	CL; not CL
Frame length	13 or 25 bit
Input signal	5-V differential signal (phys. RS 422)
• Differential input voltage	1 to 10 V
Transmission rate max.	1 MHz
Encoder supply	24 V, max. 300 mA
Cable length, max.	320 m (at max. 125 kHz)
Digital inputs	
Number of inputs	4
Functions	Reference point switch,
	Set actual value/measure lengths on-the-fly, brake enable, enable
	Track output no. 3
Electrical isolation	No
Input voltage	
• Rated value	24 V DC
• At "0" signal	-3 to +5 V
• At "1" signal	11 to 30 V
Input current for 2-wire BEROs	
At "0" signal, max.	2 mA
At "1" signal, max.	9 mA
Digital outputs	
Number of outputs	13
Functions	Cam track
Electrical isolation	No
Output voltage	
• Rated value	24 V DC
• For signal "0"	Residual current max. 0.5 mA
• For signal "1"	UP - 0.8 V
Output current	5 mA to 0.6 A at UP_{max} (short-circuit proof)

Ordering data	Order No.
FM 352 electronic cam controller	**6ES7 352-1AH01-0AE0**
FM 352 manual	
German	**6ES7 352-1AH00-8AG0**
English	**6ES7 352-1AH00-8BG0**
French	**6ES7 352-1AH00-8CG0**
Italian	**6ES7 352-1AH00-8EG0**
703 connecting cable	See FM 351
Sub-D connector	**6ES5 750-2AA21**
15-pin, male; for encoder cable	
Front connector	
20-pin, with screw-type terminals	
• 1 unit	**6ES7 392-1AJ00-0AA0**
• 100 units	**6ES7 392-1AJ00-1AB0**
20-pin, with spring-loaded terminals	**6ES7 392-1BJ00-0AA0**
Bus connector	**6ES7 390-0AA00-0AA0**
1 unit (spare part)	

	Order No.
Labelling strips	**6ES7 392-2XX00-0AA0**
10 units (spare part)	
S7-SmartLabel	**2XV9 450-1SL00-0YX0**
Software for machine labelling of modules directly from the STEP 7 project	
Labelling sheets for machine labelling	See "Accessories"
Slot number label	**6ES7 912-0AA00-0AA0**
Spare part	
Shield connecting element	**6ES7 390-5AA00-0AA0**
80 mm wide, with 2 rows for 4 terminal elements each	
Terminal elements	
2 units	
For 2 cables with 2 to 6 mm diameter	**6ES7 390-5AB00-0AA0**
For 1 cable with 3 to 8 mm diameter	**6ES7 390-5BA00-0AA0**
For 1 cable with 4 to 13 mm diameter	**6ES7 390-5CA00-0AA0**

FM 352-5 High-Speed Boolean Processor

Overview



- The high-speed Boolean processor FM352-5 offers an extremely fast binary control and some of the quickest switching procedures ever possible (cycle duration: 1 µs)
- Programming with LAD or FBD is possible
- The accompanying instruction set includes: bit instructions (parts instructions set for STEP 7), time generator, counter, frequency divider, frequency generator, shift register
- 12 integrated DI/8 integrated DO
- 1 channel for connecting a 24-V incremental encoder, a 5-V increment encoder (RS422) or a serial interface absolute value encoder

Micro Memory Card is required for operation of the FM 352-5

Note:
We offer position sensing systems and preassembled connecting cables for counting and positioning functions under SIMODRIVE Sensors or Motion Connect 500 (see also www.siemens.de/simatic-technologie).

Technical specifications

General specifications	
Supply voltage	24 V DC
Power consumption	
1L+ module supply	150 mA (max) 60 mA (type)
2L+ DI / DO supply	200 mA (max) 60 mA (type)
3L+ with encoders	600 mA (max) 80 mA plus encoder power supplt (type)
L3+ without encoder	200 mA (max) 60 mA (typical)
From backplane bus	100 mA (type)
Power pack for position encoder	
5 V output	250 mA max.
24 V output	400 mA max.
Output voltage protection	
5 V output	Electronic overload protection. No protection when applying normal or counter voltage.
24 V output	Overload and overheating protection during overload. Diagnostics when output reaches the temperature limit. No protection when applying normal or counter voltage
Rated load voltage L+	24 V DC
Range	20.4 to 28.8 V
Polarity reversal protection	Yes
Supply voltage for position encoder	5 V or 24 V
Protection according to DIN 40050	IP 20
Permissible ambient temperature	
Storage and transport	-40 to +70 °C
Operation	0 to +60 °C
Required front connector	1 x 40-pin
Dimensions (W x H x D)	80 x 125 x 120 mm
Shipping weight, approx.	500 g (with bus and 1L connection & without I/O connection or MMC)
Module weight, approx.	434 g (with 1L connection & without I/O connection or MMC)

Separation	
Between backplane bus and digital & sensor I/O & 1L & 2L & 3L	Yes (75 V DC, 60 V AC)
Between digital I/O & 2L and sensor I/O & 3L	Yes (75 V DC, 60 V AC)
Between 1L and 2L and 3L	Yes (75 V DC, 60 V AC)
Heat dissipation of electronics module, typ.	6.5 W
Digital inputs	
Number of inputs	8 standard and up to 12 for 24 V DC sensor inputs as digital inputs
Separation	Yes CPU, I/O and sensor units are separated
Digital input	
Rated value	24 V DC
• 0 signal	-30 to 5 V
• 1 signal	11 to 30 V
Input current	
• 0 signal	≤ 1.5 mA (current at 0 signal)
• 1 signal, typ.	3.8 mA
Input frequency	200 kHz max.
Hardware input delay	3 µs max. 1.5 µs typ.
Programmable digital filter delay	None, 5 µs, 10 µs, 15 µs, 20 µs, 50 µs, 1.5 ms
Minimum pulse width for program response	1 µs, 5 µs, 10 µs, 15 µs, 20 µs, 50 µs, 1.6 ms
Cable length, sensor	100 meters unshielded, 600 m shielded, shielded cable recommended when filtering is set in the 1.6 ms grid.
Cable length, HTL incremental encoder, Siemens, type 6FX2001-4	50 kHz, 25 m shielded, max. 25 kHz, 50 m shielded, max.
Minimum pulse width (max. SW counter frequency)	1 µs (200 kHz)
Connection of two-wire BEROs	Possible
Input characteristics	Type 1A for PLC BEROs with less than 1.5 mA cutoff current

Technicals specifications (continued)

Digital output	
Number of inputs	8
Output type	Current sinking
Output voltage	28.8 V max.
• Rated value	24 V DC
• 0 signal	28.8 V DC max.
• 1 signal	≤ 0.5 V DC max.
Output current	
• 0 signal (current at 0 signal)	≤ 1.0 mA
• 1 signal	
• Permissible range	5 mA to 0.6 A
• Rated value	0.5 A at 60°C
Leak current in switched off state	< 1 mA
Parallel outputs	Yes, 2
Loss of voltage/pt @ 500 mA	125 mW
Number of switching actuations	
• For resistive load	20 kHz at 0.5 A 100 kHz at 0.25 A
• For inductive load	2 Hz at 0.5 A with external commutator diodes 0.5 Hz at 0.5 A without external commutator diodes
• For a lamp load	≤ 10 Hz 5 Watt maximum
Output delay (resistive load)	
• ON to OFF	1.7 µs 50 mA / 1.5 µs 0.5 A
• OFF to ON	0.6 µs 50 mA / 1.0 µs 0.5 A
Output protection	
Short circuit	Yes
Threshold value for response	1.7 A to 3.5 A
Overvoltage	Yes
Thermal	Yes
Inductive limitation at kickback from inductive loads	Yes; 2M +45 V type, (40 to 55 V) Note: no protection against inductive kickback > 55 mJ
Digital input control	No
Cable length	
• Unshielded	100 m
• Shielded	600 m
Status, diagnostics	
Module malfunction	SF, red LED
MMC error	MCF, red LED
Module supply	5V DC, green LED
I/O status	IOF, red LED
Run mode	RUN, green LED
Stop mode	STOP, yellow LED
Overload on sensor power supply	5VF, red LED, 24VF, red LED
Status display, digital input module DI	I0 to I11, 12 green LEDs
Status display, digital output module DO	O0 to O7 8 green LEDs

Sensor support	
5 V differential	16-bit or 32-bit counter
24 V single-wire	16-bit or 32-bit counter
Serial interface	13-bit or 25-bit message length
Support for additional 24 V inputs	Yes, at 5 V differential or serial interface sensor inputs or if no sensor is available
Maximum counter input frequency for sensor	
• 5 V DC input	1 MHz
• 24 V DC input	200 kHz
Control at 5 V and 24 V signal	
Sensor gating	Pulse & direction, 1X, 2X, 4X
Reset source	No, HW, SW, HW and SW, HW or SW
Reset value source	Constant 0, min/max value, load value
Reset signal type	Edge, layer
Load value, source	Constant, module application
Hold source	No, HW, SW, HW and SW, HW or SW
Load value	User entry or module application
Counter range, minimum	User entry
Counter range, maximum	User entry
Main counting direction	Count forward/backward
Hardware hold source	Can be set to any input between 0 and 14
Hardware reset source	Can be set to any input between 0 and 14
Count modes	
Continuous	Yes, 16-bit or 32-bit counter
Counter range (16-bit counter):	-32768 to 32767 (user-specific within this range)
Counter range (32-bit counter):	-2,147,483,648 to 2,147,483,647 (user-specific within this range)
Periodic	Yes, 16-bit or 32-bit counter
Counter range (16-bit counter):	-32768 to 32767 (user-specific within this range)
Counter range (32-bit counter):	-2,147,483,648 to 2,147,483,647 (user-specific within this range)
Individual	Yes, 16-bit or 32-bit counter
Counter range (16-bit counter):	-32768 to 32767 (user-specific within this range)
Counter range (32-bit counter):	-2,147,483,648 to 2,147,483,647 (user-specific within this range)
Encoder signals	
Incremental 5 V encoder (RS422)	A, /A, B, /B, and N, /N
Incremental 24 V encoder	A, B and N

FM 352-5 High-Speed Boolean Processor

Technical specifications (continued)

SSI sensor	
Signal types	D, /D, CK and /CK
Master mode	Yes
Listening mode	Yes, up to two stations
Multi-turn	25-bit message frame
Maximum number of sequence steps	16.777.216 sequence step
Delay, configurable (Monoflop timer)	16, 32, 48, or 64 µs.
Shift register, length	13 bit or 25 bit
Clock rate	125 kHz, 250 kHz, 500 kHz, or 1 MHz
Cable length, RS-422 (5 V) incremental sensor, Siemens type 6FX201-2, 5 V supply	500 kHz, 32 meters, shielded, max.
Cable length, RS-422 (5 V) incremental sensor, Siemens type 6FX201-2, 24 V supply	500 kHz, 100 meters, shielded, max.
Cable length, RS-422 serial interface absolute sensor Siemens type 6FX201-5, 24 V supply	125 kHz, 320 meters shielded, max. 250 kHz, 160 meters shielded, max. 500 kHz, 60 meters shielded, max. 1 MHz, 20 meters shielded, max.
Data shifting direction (normalizing)	Left or right
Data shifting distance (normalizing)	0 to 12 bit
5 V level for input logic	Via RS-422
5 V input voltage	330Ω DC / 116Ω AC

Interrupts	
Diagnostics	1L, 2L, 3L missing; MMC error; output overload (8); sensor supply overload; differential wire break; parameter assignment error; serial interface message frame overflow.
Process	8 available; for generation by user program
Program technical specifications	
Program cycle time (scan)	1 µs
Update rate PLC interface	5 ms (2.6 ms typ.)
Input to 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.)
Control signal buffer size	**Partitioned, maximum**
FLIP FLOPS, etc.	
RSFF	1
SRFF	1
NEG	2
POS	2
BISCALE	2
CP_GEN	29
MOVE	17
MOVE_U	0

COUNTERS	
CTD16	36
CTU16	31
CTUD16	47
CTUD32	99
TIMERS	
TOF16	26
TOF32	55
TON16	25
TON32	53
TP16	26
TP32	54
SHIFT REGISTERS	
SHIFT	18
SHIFT2	18
SHIFT4	18
SHIFT8	19
COMPARATORS	
CMP16_EQ	6
CMP16_GE	17
CMP16_GT	8
CMP16_LE	17
CMP16_LT	8
CMP16_NE	6
CMP32_EQ	11
CMP32_GE	33
CMP32_GT	25
CMP32_LE	33
CMP32_LT	25
CMP32_NE	11
TYPE GENERATION	
I_DI	9
I_DI_U	0
LOGICAL OPS	
AND	1
OR	1
XOR	1
SENSOR TYPES	
Serial interface Master - 13-bit	64
Serial interface Master - 25-bit	117
Serial interface Listener - 16-bit	61
Serial interface Listener - 32-bit	100
None	77
Serial interface Master - 13-bit	122
Serial interface Master - 25-bit	0
Memory card	**Required for operation**
Size	128 KB, at least
Type	MMC (Micro Memory Card)
Order No.	6ES7 953-8Lx00-0AA0

Ordering data	Order No.
FM 352-5 high-speed Boolean processor	**6ES7 352-5AH00-0AE0**
Configuring software for FM 352-5 in 5 languages Ge, En, Fr, Sp, It; executes under Windows 98/Me/ NT 4.0 from SP3 onwards/2000 Professional from SP 1 onwards	**6ES7 352-5AH00-7XG0**

	Order No.
Micro memory card	
128 KB	**6ES7 953-8LG00-0AA0**
512 KB	**6ES7 953-8LJ00-0AA0**
2 MB	**6ES7 953-8LL00-0AA0**
Front connector	
40-pin, with screw-type terminals	
• 1 unit	**6ES7 392-1AM00-0AA0**
• 100 units	**6ES7 392-1AM00-1AB0**
40-pin, with spring-loaded terminals	**6ES7 392-1BM01-0AA0**

FM 353 positioning module

Overview



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

Technical specifications

General specifications	
Supply voltage	24 V DC
Current consumption	300 mA
Protection to DIN 40050	IP 20
Permissible humidity to DIN 40040	Humidity class F
Permissible ambient temperature	
• Storage and transport	-40 to +70 °C
• Operation	0 to +55 °C
Required front connector	1 x 20-pin
Dimensions (W x H x D) in mm	80 x 125 x 118 mm
Weight, approx.	500 g
Drive interface	
Signal input	
Function	"Power section Ready"
Signal outputs	
Output signals	5 V difference signal (phys. RS 422) for: • Direction • Enable • Cycle • Power regulation
Differential output voltage, min.	2 V (R_L = 100 Ω)
• "0" signal, max.	1 V (I_0 = 20 mA)
• "1" signal, min.	3.7 V (I_0 = -20 mA)
Cable length	35 m

Digital inputs	
Number of inputs	4
Functions	• Reference cam • Set actual value on-the-fly • Measure on-the-fly • Start/stop positioning run • External block change
Electrical isolation	No
Input voltage	
• Rated value	24 V DC
• "0" signal, max.	-3 to +5 V
• "1" signal, min.	11 to 30 V
Input current, min.	
• "0" signal, max.	2 mA
• "1" signal, min.	6 to 15 mA
Digital outputs	
Number of inputs	4
Functions	• Position reached: stop • Axis traveling forward • Axis traveling in reverse • Change M function M97 • Change M function M98 • Enable start • Direct output using data record
Electrical isolation	No
Output voltage	
• Rated value	24 V DC
• "0" signal, max.	Residual current max. 2 mA
• "1" signal, min.	UP – 3 V
Output current	0.6 A at $UP_{max.}$ (short-circuit proof)

Ordering data	Order No.
FM 353 positioning module for stepper motors; incl. configuration package on CD-ROM, Ge, En, Fr, It, comprising: • FM 353 manual, electronic • Standard function blocks (STEP 7 interface software) • Screen-based configuration software for FM 353 • Standard HMI forms for OP7/OP17	**6ES7 353-1AH01-0AE0**
FM 353 manual	
German	**6ES7 353-1AH01-8AG0**
English	**6ES7 353-1AH01-8BG0**
French	**6ES7 353-1AH01-8CG0**
Italian	**6ES7 353-1AH01-8EG0**
Edit FM Program editor for editing, loading and saving NC programs using standard programming device/PC; German/English, on CD-ROM	**6FC5 263-0AA03-0AB0**
Connecting cable to stepper motor power section	
1 m	**6FX8002-3AC02-1AB0**
2 m	**6FX8002-3AC02-1AC0**
3 m	**6FX8002-3AC02-1AF0**
Connecting cables and encoders	See Catalog NC 60, NC Z, CA 01 or in the A&D Mall
Sub-D connector 15-pin, female	**6ES5 750-2AB21**

	Order No.
Front connector 20-pin, with screw-type terminals	
• 1 unit	**6ES7 392-1AJ00-0AA0**
• 100 units	**6ES7 392-1AJ00-1AB0**
20-pin, with spring-loaded terminals	**6ES7 392-1BJ00-0AA0**
Bus connector 1 unit (spare part)	**6ES7 390-0AA00-0AA0**
Labelling strips 10 units (spare part)	**6ES7 392-2XX00-0AA0**
S7-SmartLabel Software for machine labelling of modules directly from the STEP 7 project	**2XV9 450-1SL00-0YX0**
Labelling sheets for machine labelling	See "Accessories"
Slot number label Spare part	**6ES7 912-0AA00-0AA0**
Shield connecting element 80 mm wide, with 2 rows for 4 terminal elements each	**6ES7 390-5AA00-0AA0**
Terminal elements 2 units	
For 2 cables with 2 to 6 mm diameter	**6ES7 390-5AB00-0AA0**
For 1 cable with 3 to 8 mm diameter	**6ES7 390-5BA00-0AA0**
For 1 cable with 4 to 13 mm diameter	**6ES7 390-5CA00-0AA0**

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:
We offer position sensing systems and preassembled connecting cables for counting and positioning functions under SIMODRIVE Sensors or Motion Connect 500 (see also www.siemens.de/simatic-technologie).

Technical specifications

General specifications	
Supply voltage	24 V DC
Current consumption	350 mA
Supply current for position encoders	Max. 300 mA
Supply voltage for position encoder	5 V or 24 V
Protection to DIN 40050	IP 20
Permissible humidity to DIN 40040	Humidity class F
Permissible ambient temperature	
• Storage and transport	-40 to +70 °C
• Operation	0 to +55 °C
Required front connector	1 x 20-pin
Dimensions (W x H x D) in mm	80 x 125 x 118 mm
Weight, approx.	550 g
Position detection, incremental	
Accepts encoder types	Encoders with TTL quadrature signal
Track signals	A, not A; B, not B
Zero mark signal	N, not N
Input signal	5 V difference signal (phys. RS 422)
• Input frequency, max.	1 MHz
Cable length	
• 5-V encoder supply, max.	35 m at max. 220 mA
• 24-V encoder supply, max.	100 m at max. 300 mA
Synchronous-serial position detection	
Accepts encoder types	Single or multiturn encoders with SSI
Data signal	DATA, not DATA
Clock signal	CL, not CL
Frame length	13, 21 or 25 bit
Input signal	5 V difference signal (phys. RS 422)
Transmission rate max.	1.25 Mbit/s
Encoder supply	24 V DC, max. 300 mA
Cable length, max.	10 m (at 1.25 Mbit/s) 100 m (at up to 125 kbit/s)

Drive interface	
Input closed-loop controller signal	
Function	"Drive ready"
Electrical isolation	Yes (optocoupler)
Input voltage	
• Rated value	24 V DC
• "0" signal	-3 to +5 V
• "1" signal	15 to 30 V
Input current at "1" signal	2 mA to 6 mA
Output closed-loop controller enable (contact)	
Function	Safety disconnection of drives for operation using contact relays
Load, max.	1 A/50 V/30 VA DC
Analog output	
Function	Setpoint output for drive
Output voltage	• -10 to +10 V
Output current	• -3 to +3 mA
Cable length, max.	• 35 m
Digital inputs	
Number of inputs	4
Function (configurable)	• Reference cam
	• Set actual value on-the-fly
	• Measure on-the-fly
	• Start/stop positioning run
	• External block change
Electrical isolation	No
Input voltage	
• Rated value	24 V DC
• "0" signal	-3 to +5 V
• "1" signal	11 to 30 V
Input current, min.	
• "0" signal, max.	2 mA
• "1" signal	6 to 15 mA

Technical specifications (continued)

Digital outputs	
Number of inputs	4
Function	• Position reached: stop • Axis traveling forward • Axis traveling in reverse • Change M function M97 • Change M function M98 • Enable start • Direct output via data record
Electrical isolation	No
Output voltage	
• Rated value	24 V DC
• "0" signal	Residual current max. 2 mA
• "1" signal	UP – 3 V
Output current	0.6 A at $UP_{max.}$ (short-circuit proof)

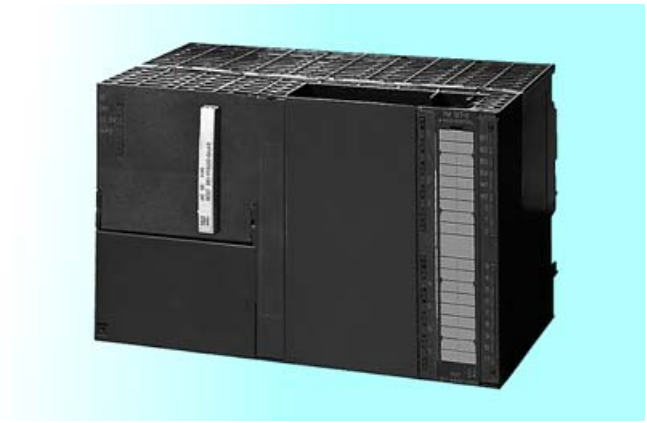
Ordering data

	Order No.
FM 354 positioning module for servo motors; incl. configuration package on CD-ROM, Ge, En, Fr, It, comprising: • FM 354 manual, electronic • Standard function blocks (STEP 7 interface software) • Screen-based configuration software for FM 354 • Standard HMI forms for OP7/OP17	**6ES7 354-1AH01-0AE0**
FM 354 manual	
German	**6ES7 354-1AH01-8AG0**
English	**6ES7 354-1AH01-8BG0**
French	**6ES7 354-1AH01-8CG0**
Italian	**6ES7 354-1AH01-8EG0**
Edit FM Program editor for editing, loading and saving NC programs using standard programming device/PC; German/English, on CD-ROM	**6FC5 263-0AA03-0AB0**
Connecting cables and encoders	See Catalog NC 60, NC Z, CA 01 or in the A&D Mall
703 connecting cable	See FM 351
Sub-D connector	
15-pin, male	**6ES5 750-2AA21**
9-pin, female	**6ES5 750-2AB11**

	Order No.
Front connector	
20-pin, with screw-type terminals	
• 1 unit	**6ES7 392-1AJ00-0AA0**
• 100 units	**6ES7 392-1AJ00-1AB0**
20-pin, with spring-loaded terminals	**6ES7 392-1BJ00-0AA0**
Bus connector 1 unit (spare part)	**6ES7 390-0AA00-0AA0**
Labelling strips 10 units (spare part)	**6ES7 392-2XX00-0AA0**
S7-SmartLabel Software for machine labelling of modules directly from the STEP 7 project	**2XV9 450-1SL00-0YX0**
Labelling sheets for machine labelling	See "Accessories"
Slot number label Spare part	**6ES7 912-0AA00-0AA0**
Shield connecting element 80 mm wide, with 2 rows for 4 terminal elements each	**6ES7 390-5AA00-0AA0**
Terminal elements	
2 units	
For 2 cables with 2 to 6 mm diameter	**6ES7 390-5AB00-0AA0**
For 1 cable with 3 to 8 mm diameter	**6ES7 390-5BA00-0AA0**
For 1 cable with 4 to 13 mm diameter	**6ES7 390-5CA00-0AA0**

FM 357-2 positioning module

Overview



- Continuous path and positioning control for the intelligent motion control of up to 4 axes
- Covers a wide spectrum from independent individual positioning axes through to interpolatory multi-axis continuous-path control
- For the control of stepper motors and controlled servo-drive axes
- User-friendly startup through easy-to-use parameterization tool
- Interface for SIMODRIVE 611U and MASTERDRIVES MC using the isochronous PROFIBUS (not for FM 357-2H in combination with HT6)

Note:
We offer position sensing systems and preassembled connecting cables for counting and positioning functions under SIMODRIVE Sensors or Motion Connect 500 (see also www.siemens.de/simatic-technologie).

Technical specifications

General specifications	
NC program memory, approx.	750 KB
Programmable traversing speed max.	1000 m/min
Supply voltage	24 V DC
Power consumption max.	24 W
Power consumption from backplane bus	100 mA
Protection to DIN 40050	IP 20
Required front connector	1 x 40-pin
Dimensions (W x H x D) in mm	200 x 125 x 118
Weight approx.	1.2 kg
Position detection, incremental	
Accepts encoder types	Encoders with TTL quadrature signal
Track signals	A, not A; B, not B
Zero mark signal	N, not N
Input signal	5 V difference signal (phys. RS 422)
Input frequency, max.	1 MHz
Cable length	
• 5-V encoder supply, max.	35 m at max. 210 mA
• 24 V encoder supply, max.	100 m at max. 300 mA
Synchronous-serial position detection	
Accepts encoder types	Single or multiturn encoders with SSI
Data signal	DATA, not DATA
Clock signal	CL, not CL
Frame length	13, 21 or 25 bit
Input signal	5 V difference signal (phys. RS 422)
Transmission rate max.	1.5 Mbit/s
Encoder supply	24 V DC, max. 300 mA
Cable length, max.	250 m (at max.187.5 kbit/s)

Drive interface for analog drives	
Output closed-loop controller enable (contact)	
Function	Safety disconnection of drives for operation via contact relays
Load, max.	1 A/50 V/30 VA DC
Analog output	
Function	Setpoint output for drive
Output voltage	• -10 to +10 V
Output current	• -3 to +3 mA
Cable length, max.	• 35 m
Drive control interface for stepper motors	
Output signals	5 V difference signal (phys. RS 422) for: • Direction, enable, clock
Differential output voltage, min.	2 V (RL = 100 Ω)
• "0" signal, max.	1 V (I0 = 20 mA)
• "1" signal, min.	3.7 V (I0 = -20 mA)
Sensor frequency for T, max.	750 kHz
Permissible cable length max.	50 m
• In mixed mode with servo axes max.	35 m
Digital drive interface using PROFIBUS DP with MC expansions	See SIMODRIVE 611 Universal, MASTERDRIVES MC
Digital inputs	
Number of inputs	18
Function	• 4 Bero • 2 probe • 12 freely usable
Electrical isolation	Yes

Technical specifications (continued)

Input voltage	
• Rated value	24 V DC
• "0" signal	-3 to +5 V
• Type "1"	11 to 30 V
Input current	
• "0" signal, max.	2 mA
• Type "1"	6 mA to 30 mA
Digital outputs	
Number of inputs	8
Function	• 8 freely usable
Electrical isolation	Yes
Output voltage	
• Rated value	24 V DC
• "0" signal	Residual current max. 2 mA
• "1" signal	UP – 3 V
Output current	0.6 A at UP_{max}
FM-READY output (contact)	
Function	Ready for linking to Emergency Stop
Load, max.	1 A/50 V/30 VA DC

Ordering data

	Order No.
FM 357-2 positioning module Basic device	**6ES7 357-4AH01-0AE0**
System firmware incl. configuring package on CD-ROM, Ge., En., Fr., It., comprising manual (electronic), configuring software (parameterization forms, standard blocks, HMI forms for OP17/OP27)	
FM 357-2L system firmware on memory card	**6ES7 357-4AH03-3AE0**
FM 357-2LX system firmware with additional functions; on memory card	**6ES7 357-4BH03-3AE0**
FM 357-H system firmware with additional functions for handling range; on memory card	**6ES7 357-4CH03-3AE0**

	Order No.
FM 357-2 manual	
German	**6ES7 357-4AH00-8AG0**
English	**6ES7 357-4AH00-8BG0**
French	**6ES7 357-4AH00-8CG0**
Italian	**6ES7 357-4AH00-8EG0**
Edit FM Program editor for editing, loading and saving NC programs using standard programming device/PC; German/English, on CD-ROM	**6FC5 263-0AA03-0AB0**
Connecting cables and encoders	See Catalog NC 60, NC Z, CA 01 or have a look in the A&D Mall
Front connector	
40-pin, with screw-type terminals	
• 1 unit	**6ES7 392-1AM00-0AA0**
• 100 units	**6ES7 392-1AM00-1AB0**
40-pin, with spring-loaded terminals	**6ES7 392-1BM01-0AA0**
Battery	**6ES7 971-1AA00-0AA0**

FM STEPDRIVE power section

Overview



The FM STEPDRIVE power section controls the motion of the stepper motors in the SIMOSTEP 1FL3 series with the utmost precision. In combination with the SINUMERIK 802S control and the FM 353 and FM 357-2 function modules, it performs highly accurate positioning tasks in the lower output range of 600 W.

The FM STEPDRIVE can be used for stepper motors with torques in the 2 Nm (17.702 lb-in) to 15 Nm (132.762 lb-in) range. The FM STEPDRIVE has the same design as the SIMATIC S7-300 family.

Technical specifications

Supply voltage	115 V /230 V AC ± 20% selectable
Max. input current	11 A / 5.5 A
Frequency	47 Hz to 63 Hz
Connection system	Via terminals max. 2.5 mm^2
Supply voltage (signals)	24 V DC (20.4 V to 28.8 V)
Max. input current	1.5 A
DC link voltage	325 V
Pulse interface	5 V signals [1)] 15-pin sub D sokket connector, standard cable
Signal interface	24 V, I/O signals [1)]
Motor connection	3 x 325 V (connected to supply)
Phase current	1.7 A to 6.8 A (adjustable on unit)

1) Enable signal (enabling of power unit) either 5 V via pulse interface or 24 V via signal interface.

Max. cable length	Up to 50 m (164 ft) with 1.5 mm^2 Up to 30 m (98 ft 5 in) with 0.75 mm^2
Terminals	For max. 2.5 mm^2
Number of steps/revolution	Can be set to 500, 1000, 5000, 10000
Degree of protection to DIN EN 60529 (IEC 60529)	IP 20, must be installed in cabinet
Moisture condensation	Not permissible
Permissible ambient temperature	
• Storage and transport	-40 °C to +70 °C (-40 °F to +158 °F)
• Operation	0 °C to +50 °C (+32 °F to +122 °F) with reduction in power, and dependent on mounting position
Weight, approx.	0.85 kg (1 lb 14 oz)
Dimensions (W x H x D)	80 mm x 125 mm x 118 mm (3.15 in x 4.92 in x 4.65 in)

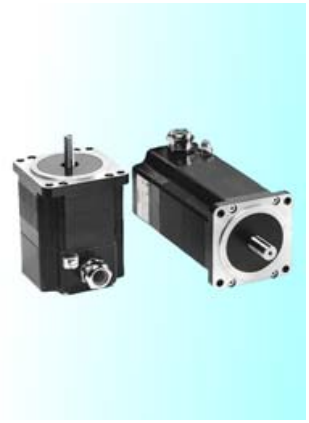
Ordering data

	Order No.
Power section for FM STEPDRIVE stepper motors	**6SN1 227-2ED10-0HA0**
Sub-D connector 15-pin, female (matching connector, pack of 3)	**6FC9 348-7HX**

	Order No.
Motor cable	
EMC tested	
10 m	**6FX5 008-5AA00-1BA0**
20 m	**6FX5 008-5AA00-1CA0**
50 m	**6FX5 008-5AA00-1FA0**
Connecting cables	See Catalog NC Z

4

Overview



Stepper motors for the positioning of axes.

- Simple and favorably priced drive concept for high-precision positioning tasks in the output range up to 600 W
- Applications:
  - Positioning drives in general automation systems
  - Positioning drives in processing plants
  - Positioning in the basic handling area
- Optionally with holding brake for fixing the position after switching off the motor.
- Can be used with the positioning modules FM 353 and FM 357-2 via FM STEPDRIVE

Technical specifications

Motor type	3-phase stepper motor
Motor voltage	325 V
Insulation according to EN 60034-1 (IEC 60034-1)	Temperature class F for a winding temperature of ΔT = 100 K at an ambient temperature of +40 °C (+104°F)
Type according to DIN 42950	IM B5 (IM V1, IM V3)
Degree of protection according to IEC 60529	IP 56; IP 41 on shaft protrusion
Cooling	Natural air cooling
Permissible ambient temperature • Storage and transport • Operation	 -40 °C to +70 °C 0 °C to +40 °C
Max. pulse frequency	5.3 kHz (at 1FL304.)
	4.3 kHz (at 1FL306.)
Number of steps/revolution	500/1000/5000/10000 adjustable via FM STEPDRIVE
Max. speed	6000 rpm
Step angle in degrees	0.72°/0.36°/0.072°/0.036°
Systematic angle tolerance (measured at 1000 steps/revolution)	± 6 per step

Shaft end	Plain shaft with 1FL304. Fitted key with 1FL306.
Permissible dynamic shaft load • Axial, approx. • Radial, approx.	 60 N (on half shaft protrusion, engaged from the motor flange) 100 N (with 1FL3041, 1FL3042) 110 N (with 1FL3043) 300 N (with 1FL3061,1FL3062)
Rotational accuracy, concentricity and axial runout according to DIN 42955 (IEC 60072-1)	Tolerance N (Normal)
Vibration severity according to EN 60034-14 (IEC 60034-14)	Grade N (Normal)
Sound pressure level max. EN 21680 Impact load DIN 40046, T7	• 1FL3041: 65 dB(A) • 1FL3042: 72 dB(A) • 1FL3043: 75 dB(A) • 1FL3061: 69 dB(A) • 1FL3062: 72 dB(A) • 1FL304.: 50 g • 1FL306.: 50 g
Paint finish	Black
Connection	Terminal block

Technical specifications holding brake

Motor type	1FL304.	1FL306.
Rated voltage	24 V	
Minimum holding voltage for released brake	10 V (at the earliest 130 ms after excitation)	
Electrical pickup power	24 W	32 W

Switching times		
• Release brake	35 ms	65 ms
• Engage brake	15 ms	15 ms
Connection	Connector (mating connector in scope of supply)	

Ordering data

	Order No.
SIMOSTEP stepper motors 1FL3	
• 2 Nm, shaft diameter 12 mm	**1FL3 041-0AC31-0BK0**
• 4 Nm, shaft diameter 12 mm	**1FL3 042-0AC31-0BK0**
• 6 Nm	**1FL3 043-0AC31-0BG0**
• 10 Nm	**1FL3 061-0AC31-0BG0**
• 15 Nm	**1FL3 062-0AC31-0BG0**
with holding brake	
• 2 Nm, shaft diameter 12 mm	**1FL3 041-0AC31-0BJ0**
• 4 Nm, shaft diameter 12 mm	**1FL3 042-0AC31-0BJ0**
• 6 Nm	**1FL3 043-0AC31-0BH0**

	Order No.
SIMOSTEP stepper motors 1FL3	
with holding brake (continued)	
• 10 Nm	**1FL3 061-0AC31-0BH0**
• 15 Nm	**1FL3 062-0AC31-0BH0**
Motor cable	
EMC tested, for connecting to FM STEPDRIVE	
• 10 m	**6FX5 008-5AA00-1BA0**
• 20 m	**6FX5 008-5AA00-1CA0**
• 50 m	**6FX5 008-5AA00-1FA0**

FM 355 closed-loop control module

Overview



- 4-channel closed-loop control module for universal closed-loop control tasks
- Used for temperature, pressure, flowrate and fill-level control loops
- User-friendly online self-optimization for temperature controls
- Preprogrammed controller structures
- 2 control algorithms
- 2 versions:
  - FM 355 C as continuous-action controller;
  - FM 355 S as step or pulse controller
- With 4 analog outputs (FM 355 C) or 8 digital outputs (FM 355 S) for direct control of the most common types of actuator
- Continued operation of the control loop is possible even after a CPU stop or failure

Technical specifications

Number of controllers	**4**
General specifications	
Rated load voltage L+	24 V DC
• Permitted range	20.4 to 28.8 V
Electrical isolation	
• To backplane bus	Yes (optocoupler)
• Between channels	No
Permissible potential difference	
• between input (frame terminal and the central grounding point)	75 V DC, 60 V AC
• Between analog inputs and N_{ANA} (U_{CM})	2.5 V DC
• Isolation tested at	500 V DC
Current consumption	
• From backplane bus, typ./max.	50 mA/75 mA
• From L+ (without load)	
- FM 355 C, typ.	260 mA
- FM 355 C, max.	310 mA
- FM 355 S, typ.	220 mA
- FM 355 S, max.	270 mA
Total current of the digital outputs, max.	400 mA
Power loss	
• FM 355 C, typ.	6.5 W
• FM 355 C, max.	7.8 W
• FM 355 S, typ.	5.5 W
• FM 355 S, max.	6.9 W
Required front connector	2 x 20-pin
Dimensions (W x H x D) in mm	80 x 125 x 120
Weight, approx.	470 g
Digital inputs	
• Number of inputs	8
Input voltage	
• Rated value	24 V DC
• At "0" signal	-3 to +5 V
• At "1" signal	13 to 30 V
Input current at "1" signal, typ.	7 mA
Input characteristic	In accordance with ICE 1131, type 2
Connection of two-wire BEROs	Possible
• Permissible quiescent current, max.	1.5 mA
Line length	
• Unshielded	600 m
• Shielded	1000 m
Digital outputs	
• Number	8 (only FM 355S)
Output voltage	
• At "1" signal	L+ (-2.5 V)
Output current	
• At "1" signal	
- rated value	0.1 A
- permitted range	5 to 150 mA
• At "0" signal, residual current, max.	0.5 mA
Load resistance	240 Ω to 4 kΩ
Output power	
• Lamp load, max.	5 W
Switch 2 outputs in parallel	For logic operations
Setting a digital input	Possible
Switching frequency	
• With resistive load/lamp load, max.	100 Hz
• Inductive loads, max.	0.5 Hz
Voltage induced on circuit interruption limited to (internally), typ.	L+(-1.5 V)
Short-circuit protection of output	Yes, electronic
Line length	
• Unshielded	600 m
• Shielded	1000 m
Analog inputs	
Number of inputs	4

Technical specifications (continued)

Number of controllers	
Input range (rated values/ display range/ input resistance)	
• Voltage	+/- 80 mV; -80 to +80 mV/10 MΩ; 0 to 10V/ -1.75 to 11.75V/ 100 kΩ
• Current	0 to 20 mA/-3.5 to 23.5 mA/ 50 Ω 4 to 20 mA/ 0 to 23.5 mA; 50 Ω
• Thermocouple type	B/0 to 13.81 mV/10 MΩ J/-8.1 to 69.54 mV/ 10 MΩ K/-6.54 mV to 54.88/ 10 MΩ R/-0.23 to 21.11 mV/10 MΩ S/-0.24 to 18.7 mV/10 MΩ
• Resistance thermometer	Pt 100/30.82 to 650.46 mV/ 10 MΩ
Principle of measurement	Integrating
Resolution (including overrange)	12 or 14 bit, parameterizable
Conversion time per analog input	
• At 12 bit	16 2/3 ms at 60 Hz 20 ms at 50 Hz
• At 14 bit	100 ms at 50 and 60 Hz
Transient recovery time	
• For resistive load	0.1 ms
• Capacitive loads	3.3 ms
• Inductive loads	0.5 ms
Substitute values injectable	Yes, parameterizable
Permissible input voltage for voltage input (destruction limit)	20 V
Permissible input current for current input (destruction limit)	40 mA
Connection for transducer	For voltage measurement and for current measurement (as 4-wire transducers)
Linearization of characteristic	Yes, parameterizable
• For thermocouples	Type B, J, K, R, S
• For resistance thermometers	Pt 100 (standard range)
Temperature compensation	Yes, parameterizable (internal and external with Pt 100)
Noise voltage suppression for f = n x (fl +/- 1 %), fl = noise frequency	
• Common-mode noise, min. (Vpp < 2.5 V)	70 dB
• Series-mode noise, min. (peak value of fault < rated value of input range)	40 dB
Operational limit (in the entire temperature range, referred to input range)	+/-0.6 to +/-1%
Basic error limit (operating error limit at 25 °C, referred to the input range)	+/-0.4 to +/-0.6%
Temperature error (referred to input range)	+/-0.005%/K
Linearity error (referred to input range)	+/-0.05%
Cable length (shielded)	200 m, 50 m at 80 mV with thermocouples
Analog outputs	
• Number	4 (only FM 355C)
• Output ranges	+/-10 V / 0 to 10 V 0 to 20 mA, 4 to 20 mA
Load resistor	
• Voltage outputs, min.	1 kΩ
- capacitive load, max.	1 µF
• Current outputs, max.	500 Ω
- inductive load, max.	1 mH
Voltage output	
• Short-circuit protection	Yes
• Short-circuit current, max.	25 mA
Current output	
• Idle voltage, max.	18 V
Connection of actuators	
• For voltage output	2-lead connection
• For current output	2-lead connection
Operating error limit (in the entire temperature range of the modules, relative to input range)	
• Voltage	+/- 0.5%
• Current	+/- 0.6%
Basic error threshold (operating error threshold at 25 °C, with reference to output range)	
• Voltage	+/- 0.2%
• Current	+/- 0.3%
Temperature	+/- 0.02%/K
Linearity error	+/- 0.05%
Cable length (shielded)	200 m, 50m at 80 mV with thermocouples

FM 355 closed-loop control module

Technical specifications function blocks

FB	Memory requirements		Runtimes	
	FB length in load memory	DB length in load memory	in S7-300/C7 (for CPU 314, C7-623/624)	in S7-400 (for CPU 414)
PID_FM	1.976 byte	490 byte	0.65 ms	0.077 ms
FUZ_355	464 byte	172 byte	2.1 ms	1.9 ms
FORCE355	790 byte	214 byte	2.2 ms	2.0 ms
READ_355	644 byte	184 byte	2.5 ms	2.2 ms
CH_DIAG	420 byte	178 byte	2.3 ms	2.1 ms
PID_PAR	1.074 byte	410 byte	4.3 ms	3.8 ms
CJ_T_PAR	354 byte	130 byte	1.8 ms	1.6 ms
Target system	SIMATIC S7-300 (from CPU 314), S7-400, C7			

Ordering data

	Order No.
FM 355 C closed-loop control module	**6ES7 355-0VH10-0AE0**
with 8 digital outputs for 4 step or pulse controllers	
FM 355 S closed-loop control module	**6ES7 355-1VH10-0AE0**
with 4 analog outputs for 4 continuous-action controllers	
FM 355 manual	
Manual and Getting Started	
German	**6ES7 355-0VH00-8AA0**
English	**6ES7 355-0VH00-8BA0**
French	**6ES7 355-0VH00-8CA0**
Italian	**6ES7 355-0VH00-8EA0**
Front connector	
20-pin, with screw-type terminals	
• 1 unit	**6ES7 392-1AJ00-0AA0**
• 100 units	**6ES7 392-1AJ00-1AB0**
20-pin, with spring-loaded terminals	**6ES7 392-1BJ00-0AA0**
Bus connector	**6ES7 390-0AA00-0AA0**
1 unit (spare part)	

	Order No.
Labelling strips	**6ES7 392-2XX00-0AA0**
10 units (spare part)	
S7-SmartLabel	**2XV9 450-1SL00-0YX0**
Software for machine labelling of modules directly from the STEP 7 project	
Labelling sheets for machine labelling	See "Accessories"
Slot number label	**6ES7 912-0AA00-0AA0**
Spare part	
Shield connecting element	**6ES7 390-5AA00-0AA0**
80 mm wide, with 2 rows for 4 terminal elements each	
Terminal elements	
2 units	
For 2 cables with 2 to 6 mm diameter	**6ES7 390-5AB00-0AA0**
For 1 cable with 3 to 8 mm diameter	**6ES7 390-5BA00-0AA0**
For 1 cable with 4 to 13 mm diameter	**6ES7 390-5CA00-0AA0**

Overview



- 4-channel closed-loop control module specially for temperature controls
- With convenient, integrated online self-optimization
- Heating and cooling controls as well as combined controls with a heating and active cooling function can be implemented
- Ready-to-use controllers
- 2 versions:
  - FM 355-2 C as a continuous-action controller;
  - FM 355-2 S as a step-action or pulse controller
- With 4 analog outputs (FM 355-2 C) or 8 digital outputs (FM 355-2 S) for direct control of the most commonly used final control elements
- The controller will continue to operate in the event of a CPU Stop or CPU failure

Technical specifications

Number of controllers	**4**
General specifications	
Rated load voltage L+	24 V DC
• Permitted range	20.4 to 28.8 V
Electrical isolation	
• To backplane bus	Yes (optocoupler)
• Between channels	No
Permissible potential difference	
• Between input (frame terminal and the central grounding point)	75 V DC, 60 V AC
• Between analog inputs and N_{ANA} (U_{CM})	2.5 V DC
• Isolation tested at	500 V DC
Current consumption	
• From backplane bus, typ./max.	50 mA/75 mA
• From L+ (without load)	
- FM 355-2 C, typ.	260 mA
- FM 355-2 C, max.	310 mA
- FM 355-2 S, typ.	220 mA
- FM 355-2 S, max.	270 mA
Total current of the digital outputs, max.	400 mA
Power loss	
• FM 355-2 C, typ.	6.5 W
• FM 355-2 C, max.	7.8 W
• FM 355-2 S, typ.	5.5 W
• FM 355-2 S, max.	6.9 W
Required front connector	2 x 20-pin
Dimensions (W x H x D) in mm	80 x 125 x 120
Weight, approx.	470 g
Digital inputs	
• Number	8
Input voltage	
• Rated value	24 V DC
• At "0" signal	-3 to +5 V
• At "1" signal	13 to 30 V
Input current at "1" signal, typ.	7 mA
Input characteristic	In accordance with ICE 1131, Typ 2
Connection of two-wire BEROs	Possible
• Permissible quiescent current, max.	1.5 mA
Line length	
• Unshielded	600 m
• Shielded	1000 m
Digital outputs	
• Number of inputs	8 (only FM 355-2S)
Output voltage	
• At signal "1"	L+ (-2.5 V)
Output current	
• At "1" signal	
- rated value	0.1 A
- permitted range	5 to 150 mA
• At "0" signal, residual current, max.	0.5 mA
Load resistance	240 Ω to 4 kΩ
Output power	
• Lamp load, max.	5 W
Switch 2 outputs in parallel	For logic operations
Setting a digital input	Possible
Switching frequency	
• With resistive load/lamp load, max.	100 Hz
• Inductive loads, max.	0.5 Hz
Voltage induced on circuit interruption limited to (internally), typ.	L+(-1.5 V)
Short-circuit protection of output	Yes, electronic
Line length	
• Unshielded	600 m
• Shielded	1000 m
Analog inputs	
Number of inputs	4
Input range (rated values/ display range/ input resistance)	
• Voltage	0 to 10V/ -1.75 to 11.75V/ 100 kΩ
• Current	0 to 20 mA/ -3.5 to 23.5 mA/50 Ω 4 to 20 mA/ 0 to 23.5 mA; 50 Ω

FM 355-2 closed-loop control module

Technical specifications (continued)

• Thermocouple type	B/0 to 13.81 mV/10 MΩ E/ -9.84 to 76.36mV/ 10 MΩ J/-8.1 to 69.54 mV/10 MΩ K/-6.54 mV to 54.88/10 MΩ R/-0.23 to 21.11 mV/10 MΩ S/-0.24 to 18.7 mV/10 MΩ
• Resistance thermometer	Pt 100/30.82 to 650.46 mV/ 10 MΩ
Principle of measurement	Integrating
Resolution (including overrange)	14-bit
Conversion time per analog input	100 ms at 50 and 60 Hz
Transient recovery time	
• For resistive load	0.1 ms
• Capacitive loads	3.3 ms
• Inductive loads	0.5 ms
Substitute values injectable	Yes, parameterizable
Permissible input voltage for voltage input (destruction limit)	20 V
Permissible input current for current input (destruction limit)	40 mA
Connection for transducer	For voltage measurement and for current measurement (as 4-wire transducers)
Linearization of characteristic	Yes, parameterizable
• For thermocouples	Type B,E, J, K, R, S
• For resistance thermometers	Pt 100 (standard range)
Temperature compensation	Yes, parameterizable, via internal sensor or externally with Pt 100
Noise voltage suppression for f = n x (fl +/- 1 %), fl = noise frequency	
• Common-mode noise, min. (Vpp < 2.5 V)	70 dB
• Series-mode noise, min. (peak value of fault < rated value of input range)	40 dB
Operational limit (in the entire temperature range, referred to input range)	+/-0.06 to +/-0.7%
Basic error limit (operating error limit at 25 °C, referred to the input range)	+/-0.04 to +/-0.5%
Temperature error (referred to input range)	+/-0.005%/K
Linearity error (referred to input range)	+/-0.05%
Cable length (shielded)	200 m, 50m at 80 mV and thermocouples
Analog outputs	
• Number of inputs	4 (only FM 355-2C)
• Output ranges	+/-10 V / 0 to 10 V 0 to 20 mA, 4 to 20 mA
Load resistor	
• Voltage outputs, min.	1 kΩ
- capacitive load, max.	1 µF
• Current outputs, max.	500 Ω
- inductive load, max.	1 mH
Voltage output	
• Short-circuit protection	Yes
• Short-circuit current, max.	25 mA
Current output	
• Idle voltage, max.	18 V
Connection of actuators	
• For voltage output	2-lead connection
• For current output	2-lead connection
Operating error limit (in the entire temperature range of the modules, relative to input range)	
• Voltage	+/- 0.5%
• Current	+/- 0.6%
Basic error threshold (operating error threshold at 25 °C, with reference to output range)	
• Voltage	+/- 0.2%
• Current	+/- 0.3%
Temperature	+/- 0.02%/K
Linearity error	+/- 0.05%
Cable length (shielded)	200 m, 50m at 80 mV and thermocouples

Technical specifications, function blocks

FB	Memory requirements		Runtimes	
	FB length in load memory	DB length in load memory	in S7-300/C7 (for CPU 315-2DP)	in S7-400 (for CPU 416-2DP)
FMT_PID	1.804 byte	490 byte	0.65 … 7.41 ms[1)]	0.04 … 0.82 ms[1)]
FMT_PAR	324 byte	172 byte	1.7 ms	0.19 ms
FMT_CJ_T	410 byte	214 byte	1.8 ms	0.19 ms
FMT_DS1	216 byte	184 byte	1.9 ms	0.19 ms
FMT_TUN	332 byte	178 byte	4.5 ms	0.19 ms
FMT_PV	1108 byte	410 byte	4.3 ms	3.8 ms
READ_PV =TRUE			3.2 ms	0.28 ms
LOAD_PV=TRUE			2.9 ms	0.35 ms
Target system	SIMATIC S7-300 (from CPU 314), S7-400, C7			

1) Dependent on the parameterization of READ_OUT, LOAD_OP and LOAD_PAR (READ_PAR)

Ordering data

	Order No.
FM 355-2 C temperature closed-loop control module with 8 digital outputs for 4 step or pulse controllers	**6ES7 355-2CH00-0AE0**
FM 355-2 S temperature closed-loop control module with 4 analog outputs for 4 continuous-action controllers	**6ES7 355-2SH00-0AE0**
Front connector 20-pin, with screw-type terminals	
• 1 unit	**6ES7 392-1AJ00-0AA0**
• 100 units	**6ES7 392-1AJ00-1AB0**
20-pin, with spring-loaded terminals	**6ES7 392-1BJ00-0AA0**
Bus connector 1 unit (spare part)	**6ES7 390-0AA00-0AA0**
Labelling strips 10 units (spare part)	**6ES7 392-2XX00-0AA0**

	Order No.
S7-SmartLabel Software for machine labelling of modules directly from the STEP 7 project	**2XV9 450-1SL00-0YX0**
Labelling sheets for machine labelling	See "Accessories"
Slot number label Spare part	**6ES7 912-0AA00-0AA0**
Shield connecting element 80 mm wide, with 2 rows for 4 terminal elements each	**6ES7 390-5AA00-0AA0**
Terminal elements 2 units	
For 2 cables with 2 to 6 mm diameter	**6ES7 390-5AB00-0AA0**
For 1 cable with 3 to 8 mm diameter	**6ES7 390-5BA00-0AA0**
For ,1 cable with 4 to 13 mm diameter	**6ES7 390-5CA00-0AA0**

SM 338 ultrasonic position encoder module

Overview



An ultrasonic measuring system comprises:

- SIMATIC S7-300 with CPU and power supply
- The SM 338 ultrasonic position decoding module
- 24 V external supply voltage
- Ultrasonic position sensor(s)

Ultrasonic position sensors with the following characteristics can be used:

- START/STOP interface with RS 422 signals
- One power supply for all sensors that are simultaneously connected to the SM 338 module: +/- 15 V / max. 200 mA floating or +24 V / max. 300 mA floating.

For a sensor length of less than 3 m, the resolution is 0.05 mm. At the maximum sensor length of 6 m, the resolution is 0.1 mm.

With more than one measuring point on a sensor, the sensor-specific minimum spacing must be complied with. This ensures that there is no mutual interference between the measuring points.

Technical specifications

Position sensors	
Number	Up to 4
Max no. of measuring points	8, up to 4 per sensor
Measuring range	3 m and 6 m
Resolution	0.05 mm (up to 3 m measuring range) and 0.1 mm
Programmable measuring cycle	0.5 ms to 16 ms
Supply voltage for sensors	
• With Electrical isolation	
- voltage	± 15 V
- current	200 mA
• Without electrical isolation	
- voltage	24 V
- current, total	300 mA, without electrical isolation
Total power for supplying the sensors max.	7.2 W
Supply voltage for the module	
Current consumption	
• Internal from S7-300 backplane bus	Typ. 80 mA; max. 1000 mA,
• External voltage	20.4 V to 28.8 V
• Without sensors max.	0.1 A
• With sensors max.	0.85 A
Fuse	1.0 A slow-acting

Polarity reversal protection	Yes
Operating conditions	
Ambient temperature	
• Horizontal mounting position	0 °C to 60 °C
• for vertical installation	0 °C to 40 °C
Relative air humidity	5 % to 95 % (without condensation)
Atmospheric pressure	860 hPa to 1080 hPa
Pollutant concentration	
• SO_2 max.	10 ppm
• H_2S max.	1 ppm
Vibration	
• 10 Hz to 57 Hz	0.075 mm amplitude
• 57 Hz to 150 Hz	1 g constant acceleration
Conditions for storage and transport (in original packaging)	
• Free fall (to IEC 1131-2)	< 1 m
• Temperature (to IEC 1131-2)	-40 °C to +70 °C
• Atmospheric pressure	< 700 hPa (3000 m above sea level)
• Relative air humidity	5 % to 95 % (without condensation)
Casing	
Dimensions (W x H x D in mm)	80 x 125 x 120
Weight	500 g
Degree of protection	IP 20

Ordering data

	Order No.
SM 338 ultrasonic position encoder module for position detection with ultrasonic sensors with start/stop interface	**6ES7 338-7UH01-0AC0**
Bus connector 1 unit (spare part)	**6ES7 390-0AA00-0AA0**
Shield connecting element 80 mm wide, with 2 rows for 4 terminal elements each	**6ES7 390-5AA00-0AA0**

	Order No.
SM 388 ultrasonic position encoder module manual	
German	**6ES7 338-7UH00-8AC0**
English	**6ES7 338-7UH00-8BC0**
Configuration package for SM 338 comprising manual, parameterization forms and example programs (German, English)	**6AT1 733-8DA00-0YA0**

Overview



- Interface between a maximum of 3 absolute position encoders (SSI) and the CPU.
- To provide the position encoder values for subsequent processing in the STEP® 7 program
- Enables the programmable controller's direct response to encoder values in moving systems.

Note:
We offer position sensing systems and preassembled connecting cables for counting and positioning functions under SIMODRIVE Sensors or Motion Connect 500 (see also www.siemens.de/simatic-technologie).

Technical specifications

General	
Rated load voltage L+	24 V DC
• Permitted range	20.4 to 28.2 V
Electrical isolation	No
Encoder supply	
• Output voltage	L+ - 0.8 V
• Output current, max.	900 mA
Interrupts	
• Diagnostics interrupt	Configurable
Current consumption	
• From S7-300 ® backplane bus, max.	160 mA
• From L+, max.	10 mA
Power loss	3 W
Dimensions (W x H x D) in mm	40 x 125 x 120
Required front connector	20-pin
Weight	235 g

SSI encoder inputs	
Position encoders	Absolute
Cable length (shielded), max.	320 m at 125 kHz
	160 m at 250 kHz
	60 m at 500 kHz
	20 m at 1 MHz
Digital inputs	
Input voltage	
• At "1" signal	11 to 30,2 V
• At "0" signal	-3 to 5 V
Input current	
• At "1" signal, typ.	9 mA
• At "0" signal, max.	2 mA
Input delay	300 µs
Connection of 2-wire BERO	Yes
Cable length (shielded), max.	600 m

Ordering data

	Order No.
SM 338 POS input module for position detection with ultrasonic sensors with start/stop interface	**6ES7 338-4BC00-0AB0**
Front connector 20-pin, with screw-type terminals	
• 1 unit	**6ES7 392-1AJ00-0AA0**
• 100 units	**6ES7 392-1AJ00-1AB0**
20-pin, with spring-loaded terminals	**6ES7 392-1BJ00-0AA0**
Front door, improved version e.g. for 32-channel modules; permits connection of 1.3 mm^2/16 AWG conductors	**6ES7 328-0AA00-7AA0**

	Order No.
SIMATIC Manual Collection Electronic manuals on CD-ROM, multi-language	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection updating service for 1 year Current S7 Manual Collection CD as well as the three following updates	**6ES7 998-8XC01-8YE2**
S7-300 manual Design, CPU data, module data, instruction list	
German	**6ES7 398-8FA10-8AA0**
English	**6ES7 398-8FA10-8BA0**
French	**6ES7 398-8FA10-8CA0**
Spanish	**6ES7 398-8FA10-8DA0**
Italian	**6ES7 398-8FA10-8EA0**

SIWAREX U

Overview



SIWAREX U is an optimal solution in all areas where sensors (e.g. load cells, force sensors or torque measuring shafts) are used for measurement. The main applications of SIWAREX U include:

- Fill level monitoring of bins and hoppers
- Monitoring of crane loads
- Load measurement of conveyor belts
- Overload protection in industrial elevators and rolling mills
- Scales for potentially explosive areas (can be implemented by using an Ex(i) interface)
- Weight encoders for other types of scales (e.g. conveyor type scales, etc.).

Technical specifications

Main applications	
• Load measurement on cranes	•
• Overload protection	•
• Belt tensioning devices	•
• Platform scales	•
• Fill level measurements (containers/bins)	•
• Proportioning and mixing scales	–
• Scales with verification capacity	–
Intrinsically-safe load cell powering	Optional (Ex-I)
Stand-alone (without SIMATIC)	With IM 153-1
Integration in:	
• S5-90/S5-95U/S5-100U	–
• S5-95U/DP (PROFIBUS master)	Via ET 200M
• S5-115U/ -135U/ -155U	Via ET 200M
• S7-300	Direct integration
• S7-400	Via ET 200M
• PCS 7	Via ET 200M
• M7-300	Direct integration
• M7-400	Via ET 200M
• C7	Via IM bzw. ET 200M
• TELEPERM M (AS 388/488/TM)	–
Communication interfaces	SIMATIC S7 (P-Bus) RS 232
Process interfaces	
• Digital inputs	–
• Digital outputs	–
• Pulse input	–
• Analog output/analog input	–/–
Remote display connection (via serial interface)	• Gross, channel 1, 2 specified value 1, 2
Printer connection	–

Measuring properties	
Class III EU type approval for commercial scales (with verification capability)	–
Accuracy (definition acc. to measuring technology)	0.05%
n_{IND} acc. to EN 45 501 min. measuring signal ΔU_{min} pro d (*) no verification capability	3000 (*) 1.5 µV
Internal resolution	65 535
Data format for weight values	2 byte (fixed point)
No. of measurements/second	50
Filters	Exponent filter: 0.05 to 5 Hz Mean value filter
Scale functions	
• Weight values	Gross weight
• Limit	2 (min/max)
• Scale standstill	–
• Zero setting function	Via command
Proportioning functions	
• Control of coarse/fine flow valves	–
• Tolerance monitoring	–
• Material flow monitoring	–
• Automatic proportioning optimization	–
• Automatic reproportioning	–
• Inching mode	–
Integral display and operator panel	–
Module parameterization	Using SIMATIC S5/S7/M7/C7 or PC parametizaton software SIWATOOL U
UL/CSA/FM approval	•
IP degree of protection to DIN EN 60 529; IEC 60 529	IP 20

• Function included
– Function not included

Technical specifications (continued)

Load cell supply	
• Supply voltage U_s (rated value)	10.3 V DC
• Max. supply current	≤ 240 mA single-channel ≤ 120 mA two-channel
• Permissible load resistance: (per weighing channel)	
- R_{Lmin}	> 41 Ω single-channel > 82 Ω two-channel
- R_{Lmax}	< 4010 Ω with Ex(i) interface
- R_{Lmin}	> 87 Ω
- R_{Lmax}	< 4010 Ω
Permissible load cell characteristic	Up to 4 mV/V
Perm. range of measurement signal (with largest characteristic value set)	-1.5 to +42.5 mV
Max. distance of load cells	1000 m (300 m in Ex area[1])
Voltage supply DC 24 V	
• Rated voltage	24 V DC
• Max. current consumption	220 mA
Voltage supply from backplane bus	Typ. 100 mA
Serial interface 1	RS 232:
• Transmission rate	9600 bps
• Parity	Even/odd/without
• No. of data bit / stop bit	8/1
• Signal level	In acc. with EIA-RS 232C
• Protocols	SIWAREX protocol

Serial interface 2	TTY:
• Transmission rate	9600 bps
• Parity	Even/odd/without
• No. of data bit / stop bit	8/1
• Signal level	Passive, floating
• Protocols	Remote display protocol for digital remote displays
Binary inputs	–
Binary outputs	–
Analog output	
• Output range	–
• Total error at 25 °C	–
• Update rate	–
• Resolution	–
• Burden including line resistance	–
Climatic requirements $T_{min(IND)}$ to $T_{max(IND)}$ (operating temperature)	vertical installation: 0 to +60 °C horizontal installation: 0 to +40 °C
EMC requirements in accordants with	NAMUR NE21, Part 1 89/386/EEC
MTBF (SN 29500)	>350,000 h

∞ Function included
– Function not included
1) Up to 1000 m, depending on the gas group.

Ordering data

	Order No.
SIWAREX U weighing module	
Single-channel version for connection of one balance	**7MH4 601-1AA01**
Two-channel version for connection of two balance	**7MH4 601-1BA01**
Configuring package incl. SIWATOOL parameterization software, manual on CD-ROM and example programs	**7MH4 683-3AA63**
SIWAREX U manual	
German	**7MH4 693-3AA11**
English	**7MH4 693-3AA21**
Junction box JB for connecting together max. 4 load cells	**7MH4 710-1BA**
9-conductor cable to connect SIWAREX U to 9-pin PC interface (RS 232C)	**7MH4 607-8CA**

	Order No.
Cable LI2Y (ST) to connect SIWAREX U to junction boxes	**7MH4 702-8AB**
Front connector	
20-pin, with screw-type terminals	
• 1 unit	**6ES7 392-1AJ00-0AA0**
• 100 units	**6ES7 392-1AJ00-1AB0**
20-pin, with spring-loaded terminals	**6ES7 392-1BJ00-0AA0**
Labelling strips 10 units (spare part)	**6ES7 392-2XX00-0AA0**
Shield connecting element 80 mm wide, with 2 rows for 4 terminal elements each	**6ES7 390-5AA00-0AA0**
Terminal elements	
2 units	
For 1 cable with 4 to 13 mm diameter	**6ES7 390-5CA00-0AA0**

SIWAREX M

Overview



SIWAREX M is a weighing and proportioning system with verification capability for maximum accuracy requirements. The main applications of SIWAREX M include:

- Fill level scales with verification capability
- Platform scales and vehicle scales with verification capability
- Single component scales
- Multi-component scales
- Proportioning scales with verification capability
- Scales for potentially explosive areas (can be implemented by using an Ex(i) interface)
- Weight encoders for other types of scales (e.g. differential proportioning scales, etc.)

Technical specifications

Main applications	
• Load measurement on cranes	–
• Overload protection	–
• Belt tensioning devices	–
• Platform scales	•
• Fill level measurement (container/bins)	•
• Proportioning and mixing scales	•
• Scales with verification capacity	•
Intrinsically safe load cell powering	Optional (Ex-I)
Stand-alone (without SIMATIC)	•
Integration in:	
• S5-90/S5-95U/S5-100U	Via RS 232/TTY + CP
• S5-95U/DP (PROFIBUS master)	Via RS 232/TTY + CP
• S5-115U/S5-135U/S5-155U	Via ET 200M
• S7-300	Direct integration
• S7-400	via ET 200M
• PCS 7	via ET 200M
• M7-300	–
• M7-400	–
• C7	Via IM or ET 200M
• TELEPERM M (AS 388/488/TM)	Via ET 200M
Communication interfaces	SIMATIC S7 (P bus) RS 232, TTY
Process interfaces	
• Digital inputs	3 (assignable)
• Digital outputs	4 (assignable)
• Pulse input	–
• Analog output/analog input	•/–
Remote display connection (via serial interface)	• (with verification capability) gross/net/setpoint remote display with operator control
Printer connection	• (verification capability)

Measuring properties	
Class III EU type approval for commercial scales (with verification capability)	6000 d
Accuracy (definition acc. to measuring technology)	0.01%
n_{IND} acc. to EN 45 501 min. measuring signal Δu_{min} pro d (*) no verification capability	6000 0.5 µV
Internal resolution	± 524,288
Data format for weight values	4 byte (fixed point)
No. of measurements/second	50
Filters	Exponent filter: 0.05 to 5 Hz Mean value filter
Scale functions	
• Weight values	Gross/net/tare
• Limit	4 (min/max/empty/overfill)
• Scale standstill	•
• Zero setting function	Via command and automatically
Proportioning functions	
• Control of coarse/fine flow valves	•
• Tolerance monitoring	•
• Material flow monitoring	•
• Automatic proportioning optimization	•
• Automatic reproportioning	•
• Inching mode	•
Integral display and operator panel	–
Module parameterization	Via SIMATIC S5/S7/C7 or SIWATOOL M PC parameterization software
UL/CSA/FM approval	Yes
IP degree of protection to DIN EN 60 529; IEC 60 529	In S7 frame: IP 20 Stand-alone: IP 10

• Function included
– Function not included

Technical specifications (continued)

• Load cell supply	
• Supply voltage U_s (rated value)	10.2 V DC
• Max. supply current	≤ 180 mA
• Permissible load resistance:	
- R_{Lmin}	> 60 Ω single-channel
- R_{Lmax}	< 4010 Ω
	with Ex(i) interface:
- R_{Lmin}	> 87 Ω
- R_{Lmax}	< 4010 Ω
Permissible load cell characteristics	Up to 4 m V/V
Perm. range of measurement signal (with largest characteristic value set)	-41.5 to 41.5 mV
Max. distance of load cells	1000 m 300 m in Ex area [1]
Voltage supply DC 24 V	
• Rated voltage	24 V DC
• Max. current consumption	300 mA
Voltage supply from backplane bus	Typ. 50 mA
Serial interface 1	RS 232:
• Transmission rate	2400/9600 bps
• Parity	Even/odd
• No. of data bit / stop bit	8/1
• Signal level	In acc. with EIA-RS 232
• Protocols	SIWAREX-Protokoll 3964R, XON/XOFF (printer) [2]
Serial interface 2	TTY:
• Transmission rate	9600 bps
• Parity	Even
• No. of data bit / stop bit	8/1

Serial interface 2	TTY:
• Signal level	Active/passive (floating)
• Protocols	Remote display protocol SIWAREX protocol 3964R
Binary inputs	Number:3 rated voltage: 24 V switching frequency: 10 Hz
Binary outputs	Number: 4 (digital) rated voltage: 24 V rated current: 0.5 A total max.: 1 A isolation: 500 V
Analog output	
• Output range	0/4 to 20 mA
• Total error at 25 °C	0.15%
• Update rate	Approx. 350 ms
• Resolution	16 bit (0-20 mA)
• Burden including line resistance	≤ 600 Ω
Climatic requirements $T_{min(IND)}$ to $T_{max(IND)}$ (opperating temperature)	Vertical installation: -10 to +60 °C horizontal installation/with verification-capability: -10 to +40 °C
EMC requirements in accordance with	NAMUR NE21, Part 1 90/384/EWG 89/386/EWG
MTBF (SN 29500)	172 000 h at +40°C

1) Up to 1000 m, depending on the gas group.
2) Serial printer, ANSI-, EPSON-, IBM-compatible

Ordering data

	Order No.
SIWAREX M weighing module with verification capability	**7MH4 553-1AA41**
Configuring package incl. SIWATOOL parameterization software, manual on CD-ROM and example programs	**7MH4 583-3FA63**
SIWAREX M manual	
German	**7MH4 593-3AA11**
English	**7MH4 593-3AA21**
Junction box JB for connecting max. 4 load cells	**7MH4 710-1BA**
9-conductor cable to connect SIWAREX M to 9-pin PC interface (RS 232C)	
2 m	**7MH4 702-8CA**
5 m	**7MH4 702-8CB**

	Order No.
Cable LI2Y (ST) to connect SIWAREX M to junction boxes	**7MH4 702-8AB**
Front connector 20-pin, with screw-type terminals	
• 1 unit	**6ES7 392-1AJ00-0AA0**
• 100 units	**6ES7 392-1AJ00-1AB0**
20-pin, with spring-loaded terminals	**6ES7 392-1BJ00-0AA0**
Labelling strips 10 units (spare part)	**6ES7 392-2XX00-0AA0**
Shield connecting element 80 mm wide, with 2 rows for 4 terminal elements each	**6ES7 390-5AA00-0AA0**
Terminal elements 2 units	
For 1 cable with 4 to 13 mm diameter	**6ES7 390-5CA00-0AA0**

SIWAREX A

Overview



SIWAREX A is a weighing and proportioning system with verification capability for maximum accuracy requirements and fast processes. The main applications of SIWAREX A include:

- Filling plants
- Bagging scales
- Single component scales
- Multi-component scales
- Filling scales with verification capability
- Scales for potentially explosive areas (can be implemented by using an Ex(i) interface).

Technical specifications

Main applications	
• Load measurement on cranes	–
• Overload protection	–
• Belt tensioning devices	–
• Platform scales	–
• Fill level measurement (containers/bins)	•
• Propoortioning and mixing scales	•
• Scales with verification capability	•
Intrinsically-safe load cell powering	Optional (Ex-I)
Stand-alone (without SIMATIC)	•
Integration in	
• S5-90/-95U/-100U	–
• S5-95U/DP (PROFIBUS-master)	–
• S5-115U/-135U/-155U	–
• S7-300	Direct integration
• S7-400	Via ET 200M
• PCS 7	–
• M7-300	–
• M7-400	–
• C7	Via IM or ET 200M
• TELEPERM M (AS 388/488/TM)	–
Communication interfaces	SIMATIC S7 (P-Bus) RS 232, TTY
Process interfaces	
• Digital input	3
• Digital output	4
• Pulse input	–
• Analog output/analog input	•/–
Remote display connection (via serial interface)	• (verification capability) Gross/net
Printer connection	• (verification capability)
Measuring properties	
Class III EU type approval for commercial scales (with verification capability)	6000 d (2 x 6000 d)

Accuracy (definition in acc. with measuring technology)	0.01%
n_{IND} in acc. with EN 45 501	6000
Min. measuring signal u_{min} pro d (*) no verification capability	0.5 µV
Internal resolution	1,048,576
Data format for weight values	4 byte (fixed point)
No. of measurements/second	50
Filters	Mean value filter, 4 stages
Scale functions	
• Weight values	Gross/net
• Limits	–
• Scales standstill	•
• Zero setting function	Via command or automatically
Proportioning functions	
• Control of coarse/fine flow valves	•
• Tolerance monitoring	•
• Material flow monitoring	•
• Autom. proportioning optimization	•
• Automatic reproportioning	•
• Inching mode	•
Integral display and operator panel	–
Module parameterization	Via SIMATIC S7 or SIWATOOL A PC-parameterization software
UL/CSA/FM approval	–
IP degree of protection to DIN EN 60 529; IEC 60 529	In S7 frame: IP 20 Stand-alone: IP 10
Load cell supply	
• Supply voltage U_s (rated value)	10.2 V DC
• Max. supply current	≤ 180 mA
Permiss. load resistance:	
- R_{Lmin}	> 60 Ω
- R_{Lmax}	< 4010 Ω
	With Ex(i) interface:
- R_{Lmin}	> 87 Ω
- R_{Lmax}	< 4010 Ω

• Function included
– Function not included

Technical specifications (continued)

Main application	
Perm. load cell characteristic	Up to 4 mV/V
Perm. range of measurement signal (with largest characteristic value set)	-1.5 to +41.5 mV
Max. distance of load cells	1000 m 300 m in Ex area[1)]
Voltage supply 24 V DC	
• Rated voltage	24 V DC
• Max. current consumption	300 mA
Voltage supply from backplane bus	Typ. 50 mA
Serial interface 1	RS 232:
• Transmission rate	2400/9600 Baud
• Parity	Even/odd
• No. of data bit / stop bit	8/1
• Signal level	In acc. with EIA-RS 232
• Protocol	SIWAREX protocol XON/XOFF (printer)[2)]
Serial interface 2	TTY:
• Transmission rate	9600 bps
• Parity	Even
• No. of data bit / stop bit	8/1
• Signal level	Active/passive (floating)
• Protocol	Remote display protocol SIWAREX protocol

Binary inputs	Number:3 Rated voltage: 24 V Switching frequency: 10 Hz
Binary outputs	Number: 4 (digital) Rated voltage: 24 V Rated current: 0.5 A Total max.: 1 A Isolation: 500 V
Analog output	
• Output range	0/4-20 mA
• Total error at 25 °C	0.15%
• Update rate	Approx. 350 ms
• Resolution	16 bit (0-20 mA)
• Burden including line resistance	≤ 600 Ω
Climatic requirements $T_{min(IND)}$ to $T_{max(IND)}$ **(operating temperature)**	vertical installation: -10 to +60 °C horizontal installation/ with verification capability: -10 to +40 °C
EMC requirements in accordance with	NAMUR NE21, Part 1 90/384/EWG 89/386/EWG
MTBF (SN 29500)	> 172 000 h at +40°C

1) Up to 1000 m, depending on the gas group.
2) Serial printer, ANSI-, EPSON-, IBM-compatible

Ordering data

	Order No.
SIWAREX A weighing module with verification capability, for maximum accuracy and fast processes	**7MH4 421-1AA01**
Configuring package incl. SIWATOOL parameterization software, manual on CD-ROM and example programs	**7MH4 483-3DA63**
SIWAREX M manual	
German	**7MH4 593-3AA11**
English	**7MH4 593-3AA21**
Junction box JB for connecting together max. 4 load cells	**7MH4 710-1BA**
9-conductor cable to connect SIWAREX A to 9-pin PC interface (RS 232C)	
2 m	**7MH4 702-8CA**
5 m	**7MH4 702-8CB**

	Order No.
Cable LI2Y (ST) to connect SIWAREX M to junction boxes	**7MH4 702-8AB**
Front connector 20-pin, with screw-type terminals	
• 1 unit	**6ES7 392-1AJ00-0AA0**
• 100 units	**6ES7 392-1AJ00-1AB0**
20-pin, with spring-loaded terminals	**6ES7 392-1BJ00-0AA0**
Labelling strips 10 units (spare part)	**6ES7 392-2XX00-0AA0**
Shield connecting element 80 mm wide, with 2 rows for 4 terminal elements each	**6ES7 390-5AA00-0AA0**
Terminal elements 2 units	
For 1 cable with 4 to 13 mm diameter	**6ES7 390-5CA00-0AA0**

4

SM 374 simulator

Overview



- Simulator module for testing programs during startup and operation
- For simulation of sensor signals using switches
- For indicating signal statuses at the outputs using LEDs

Technical specifications

Inputs	16 switches
Outputs	16 LEDs
Electrical isolation	No
Power consumption max.	80 mA
Power losses, typ.	0.35 W
Dimensions (W x H x D) in mm	40 x 125 x 120
Weight, approx.	190 g

Ordering data

	Order-No.
SM 374 simulator module incl. bus connector and labelling strips	**6ES7 374-2XH01-0AA0**
Bus connector 1 unit (spare part)	**6ES7 390-0AA00-0AA0**

	Order No.
Labelling strips 10 units (spare part)	**6ES7 392-2XX00-0AA0**
S7-SmartLabel	See page 4/91
Labelling cover 10 units (spare part)	**6ES7 392-2XY00-0AA0**

DM 370 dummy module

Overview



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

Technical specifications

Current consumption	
• From backplane bus, max.	5 mA
Power losses, typ.	0.03 W
Dimensions (W x H x D) in mm	40 x 125 x 120
Weight	180 g

Ordering data

	Order No.
DM 370 dummy module incl. bus connector and labelling strips	**6ES7 370-0AA01-0AA0**
Bus connector	See above

	Order No.
Labelling strips	See above
S7-SmartLabel	See page 4/91
Labelling cover	See above

Overview



- The economical complete solution for serial communications via point-to-point links.
- 3 versions with different physical properties:
  - RS 232C (V.24)
  - 20 mA (TTY)
  - RS 422/RS 485 (X.27)
- Implemented protocols:
  - ASCII, 3964 (R) and
  - Printer driver
- Simple parameterization by means of a parameterization tool integrated inSTEP®7

Technical specifications

CP 340 Version	RS 232 (V.24)	20 mA (TTY)	RS 422/485 (X.27)
Interfaces			
• Number of inputs	1, electrical isolation		
• Transmission rate max.	19.2 kbit/s	9.6 kbit/s	19.2 kbit/s
• Transmission rate min.	2.4 kbit/s	2.4 kbit/s	2.4 kbit/s
• Cable length, max.	15 m	100 m /1000 m (act./passive)	1200 m
ASCII:			
• Max. frame length	1024 byte		
• Transmission rate, max.	9.6 kbit/s		
3964 (R):			
• Max. frame length	1024 byte		
• Transmission rate, max..	19.2 kbit/s		
Printer driver:			
• Transmission rate, max.	9.6 kbit/s		
• Supported printers	HP-Deskjet, HP-Laserjet, IBM-Proprinter, user-defined		
• Memory requirements of the handling blocks, approx.	2700 byte (data communications, sending and receiving)		
Current consumption typ.	165 mA	220 mA	165 mA
Power loss	0.85 W		
Dimensions (W x H x D) in mm	40 x 125 x 120		
Weight, approx.	300 g		

Ordering data

	Order No.
CP 340 communications processor with one RS 232 C (V.24) interface	**6ES7 340-1AH01-0AE0**
RS 232 connecting cable for linking to SIMATIC S7	
5 m	**6ES7 902-1AB00-0AA0**
10 m	**6ES7 902-1AC00-0AA0**
15 m	**6ES7 902-1AD00-0AA0**
CP 340 communications processor with one 20 mA (TTY) interface	**6ES7 340-1BH00-0AE0**
20 mA (TTY) connecting cable for linking to SIMATIC S7	
5 m	**6ES7 902-2AB00-0AA0**
10 m	**6ES7 902-2AC00-0AA0**
50 m	**6ES7 902-2AG00-0AA0**

	Order No.
CP 340 communications processor with one RS 422/485 (X.27) interface	**6ES7 340-1CH00-0AE0**
RS 422/485 connecting cable for linking to SIMATIC S7	
5 m	**6ES7 902-3AB00-0AA0**
10 m	**6ES7 902-3AC00-0AA0**
50 m	**6ES7 902-3AG00-0AA0**

CP 341

Overview



- For powerful, high-speed serial communications via point-to-point links
- 3 versions with different physical properties:
  - RS 232C (V.24),
  - 20 mA (TTY),
  - RS 422/RS 485 (X.27)
- Implemented protocols: ASCII, 3964 (R), RK 512, customer-specific protocols (reloadable)
- Simple parameterization via a parameterization tool integrated in STEP® 7

Technical specifications

Version	RS 232C (V.24)	20 mA (TTY)	RS 422/485 (X.27)
Interfaces			
• Number of inputs	1, electrical isolation		
• Transmission rate			
- Max.	76.8 kbit/s	19.2 kbit/s	76.8 kbit/s
- Min.	0.3 kbit/s	0.3 kbit/s	0.3 kbit/s
• Cable length, max.	15 m	1000 m	1200 m
• Connection technique	9-pin Sub-D male	9-pin Sub-D female	15-pin Sub-D socket connector
Implemented protocol driver	ASCII; 3964 (R) (not with RS 485); RK 512 (not with RS 485); customized driver can be loaded		
ASCII			
• Max. frame length	1024 byte		
• Transmission rate, max.	76.8 kbit/s (half-duplex) / 38.4 kbit/s (full-duplex)		
3964 (R)			
• Max. frame length	1024 byte		
• Transmission rate, max.	76.8 kbit/s		
RK 512			
• Max. frame length	1024 byte		
• Transmission rate, max.	76.8 kbit/s		
Memory requirements of the function blocks, approx.	5500 byte (data communication, sending and receiving)		
External voltage supply	24 V DC (3 screw-type terminals: L+, M, GND)		
Current consumption typ.	200 mA	200 mA	240 mA
• From backplane bus, max.	70 mA	70 mA	70 mA
Power loss	4.8 W	4.8 W	5.8 W
Dimensions (W x H x D) in mm	40 x 125 x 120		
Weight, approx.	300 g		

Technical specifications available drivers

MODBUS Master	
	• MODBUS protocol with RTU format • Master/slave coupling: SIMATIC S7 is the master • Implemented function codes: 01, 02, 03, 04, 05, 06, 07, 08, 11,12,15,16 • No RS 232 C (V.24) control and signaling lines • CRC polynomial: X16 + x15 + x2 +1 • Interfaces: TTY (20 mA); V.24 (RS 232 C); X.27 (RS 422, 2-wire or 4-wire/RS 485, 2-wire) • Receive location specified at BRCV • Character delay time 3.5 characters or multiples thereof • Broadcast message possible
Parameters to be set	• Transmission rate 300 bit/s up to 76800 bit/s; (TTY up to 19200 bit/s) • Character frame • With/without RS 485 mode for 2-wire connections • With/without modem operation (ignore scratch characters) • Response monitoring time 100 ms to 25.5 s in 100 ms steps • Factor for character delay time 1-10 • Reservation of the receive line when using the X.27 interface module
MODBUS Slave	
	• MODBUS protocol with RTU format • Master/slave coupling: SIMATIC S7 is the slave • Implemented function codes: 01, 02, 03, 04, 05, 06, 08, 15, 16 • No V.24 control and signaling line • CRC polynomial X16 + x15 + x2 + 1 • Interfaces: TTY (20 mA), V.24 (RS 232C X.27 (RS 422, 2-wire or 4-wire/RS 485, 2-wire) • Communication FB 180, instance DB 180 (using a multi-instance)

MODBUS Slave	
	• Conversion of the MODBUS data address to S7 data areas. Data areas that can be edited: DB, flags, outputs, inputs, timers, counters • Character delay time 3.5 characters or multiples thereof
Parameters to be set	• Transmission rate 300 bit/s to 76800 bit/s; (TTY up to 19200 bit/s) • Character frame • Slave address of the CP (1 to 255) • With/without RS 485 mode for 2-wire connection • With/without modem operation (ignore scratch characters) • Factor for character delay time 1-10 • Number of the work DB (for FB processing) • Enabling of memory areas that can be written by the master • Reservation of the receive line when using the RS 422 (X.27) interface module • Conversion of the MODBUS addresses to S7 data areas
Data Highway	
	• Data Highway Full Duplex (DF1) protocol • Interfaces: TTY (20 mA), V.24 (RS 232C), RS 422 (4-wire) • No "embedded responses"
Parameters to be set	• Transmission rate 300 bit/s to 76800 bit/s; (TTY up to 19200 bit/s) • Character frame: 7/8 bit; 1/2 Stop bit; even/odd/no parity • Receiving location DB and data word • Timeout for acknowledge character: 30 ms to 10 s • Number of repeats for NAK: 0 to 5 • Number of ENQ requests: 0 to 5 • Duplicate Message Transmission-Detection: On or Off • Acknowledgement for CP immediately on receipt or only after transfer to the CPU

CP 341

Ordering data	Order No.
CP 341 communications processor	**6ES7 341-1AH01-0AE0**
with one RS 232 C (V.24) interface	
RS 232 connecting cable	
for linking to SIMATIC S7	
5 m	**6ES7 902-1AB00-0AA0**
10 m	**6ES7 902-1AC00-0AA0**
15 m	**6ES7 902-1AD00-0AA0**
CP 341 communications processor	**6ES7 341-1BH01-0AE0**
with one 20 mA (TTY) interface	
20 mA (TTY) connecting cable	
for linking to SIMATIC S7	
5 m	**6ES7 902-2AB00-0AA0**
10 m	**6ES7 902-2AC00-0AA0**
50 m	**6ES7 902-2AG00-0AA0**
CP 341 communications processor	**6ES7 341-1CH01-0AE0**
with one RS 422/485 (X.27) interface	
RS 422/485 connecting cable	
for linking to SIMATIC S7	
5 m	**6ES7 902-3AB00-0AA0**
10 m	**6ES7 902-3AC00-0AA0**
50 m	**6ES7 902-3AG00-0AA0**

	Order No.
CP 341 manual	
German	**6ES7 341-1AH00-8AA0**
English	**6ES7 341-1AH00-8BA0**
French	**6ES7 341-1AH00-8CA0**
Italian	**6ES7 341-1AH00-8EA0**
Loadable drivers for CP 341	
MODBUS Master (RTU format)	
• Single license	**6ES7 870-1AA01-0YA0**
• Single license, without software or documentation	**6ES7 870-1AA01-0YA1**
MODBUS Slave (RTU format)	
• Single license	**6ES7 870-1AB01-0YA0**
• Single license, witout software or documentation	**6ES7 870-1AB01-0YA1**
Data Highway (DF1 protocol)	
• Single license	**6ES7 870-1AE00-0YA0**
• Single license, without software or documentation	**6ES7 870-1AE00-0YA1**

Overview



The CP 343-2 is the AS-Interface master for PLC SIMATIC S7-300 and the distributed I/O device ET 200M. The new communications processor offers the following functions:

- Connection of up to 62 AS-Interface slaves and integrated analog value transmission (according to expanded AS-Interface Specification V2.1)
- Supports all AS-Interface master functions according to expanded AS-Interface Specification V2.1
- Display of operating status and operational readiness of the connected slaves through LEDs in the front-plate
- Display errors (incl. AS-Interface voltage errors, configuration errors) through LEDs in the frontplate
- Compact housing in the design of the SIMATIC S7-300

Technical specifications

AS-Interface specification	V 2.1
Bus cycle time	5 ms for 31 slaves 10 ms for 62 slaves
Interfaces	
• Assignment of analog address space in PLC	16 byte I/O and P-bus S7-300
• AS-Interface connection	S7-300-front connector with terminal
Supply voltage	+5 V DC through backplane bus
Current consumption	
• Through backplane bus	typ. 200 mA at 5 V DC
• Through AS interface from the AS-Interface shaped cables	Max. 100 mA

Power loss	2 W
Permissible ambient conditions	
• Operating temperature	0 °C to +60 °C
• Transport/storage temperature	-40 °C to +70 °C
• Relative humidity	Max. 95% at +25 °C
Design	
• Module format	S7-300 design
• Dimensions (W x H x D) in mm	40 x 125 x 120
• Weight	Approx. 190 g
• Space required	1 slot

Ordering data

	Order No.
CP 343-2 communications processor for connection of SIMATIC S7-300 and ET 200M to AS-Interface according to extended AS-Interface; without front connector	**6GK7 343-2AH00-0XA0**
Front connector 20-pin, with screw-type terminals	
• 1 unit	**6ES7 392-1AJ00-0AA0**
• 100 units	**6ES7 392-1AJ00-1AB0**

	Order No.
CP 343-2 manual including software (FC) and examples	
German	**6GK7 343-2AH00-8AA0**
English	**6GK7 343-2AH00-8BA0**
French	**6GK7 343-2AH00-8CA0**
Spanish	**6GK7 343-2AH00-8DA0**
Italian	**6GK7 343-2AH00-8EA0**
Electronic manuals Communications systems, protocols, products; on CD-ROM, German/English	**6GK1 975-1AA00-3AA0**

CP 342-5

Overview



- PROFIBUS DP master or slave with electrical interface to connect the SIMATIC S7-300 and the SIMATIC C7 to PROFIBUS up to 12 Mbit/s (including 45.45 kbit/s)
- Direct connection to the optical PROFIBUS-Network through FOC interface for plastic and PCF FO cables.
- Communication services:
  - PROFIBUS DP
  - PG/OP communication
  - S7 communication (Client, Server, Multiplexing)
  - S5-compatible communication (SEND/RECEIVE)
- Simple configuration and programming using PROFIBUS
- PG/OP communication between networks through S7 routing.
- Module changeover without PG

Technical specifications

Data transmission rate	9.6 to 12 Mbit/s (exception: 3 and 6 Mbit/s)
Interfaces	
• Connection to PROFIBUS	9-pin Sub-D socket
• Supply voltage	4-pole terminal block
Supply voltage	24 V DC
Current consumption	
• From backplane bus	150 mA
• From 24 V DC	250 mA
Power loss	6.75 W
Permissible ambient conditions	
• Operating temperature	0 °C to +60 °C
• Transport/storage temperature	-40 °C to +70 °C
• Relative humidity	Max. 95% at +25°C
Design	
• Module format	Compact assembly
• Dimensions (W x H x D) in mm	40 x 125 x 120
• Weight	Approx. 300 g
Number of CPs per S7-300	4
Performance data S7 communication	
• Number of usable connections	Max. 16
S5-compatible interface (SEND/RECEIVE)	
• Number of usable connections	Max. 16
• Useful data/connections	Max. 240 byte (SEND and RECEIVE)

Multi-protocol operation	
• Number of usable connections	Max. 32 (without DP); max. 28 (with DP)
• Size of DP diagnostics data per connected slave	Max. 240 byte
DP master function	
• DP Master	DP-VO
• Number of DP slaves	124
• Total size of DP data ranges	
- DP input range	2160 byte
- DP output range	2160 byte
• Size of DP data ranges per connected slave	
- DP input range	244 byte
- DP output range	244 byte
DP slave function	
• DP slave	DP-VO
Size of DP data ranges	
• DP input range	240 byte
• DP output range	240 byte
PG/OP communication	
• Number of operable OP connections (acyclic services)	16

Ordering data	Order No.
CP 342-5 communications processor for connection of SIMATIC S7-300 to PROFIBUS up to 12 Mbit/s; with electronic manual on CD-ROM	**6GK7 342-5DA02-0XE0**
NCM S7 configuration software for PROFIBUS	Delivered with STEP 7 V5 onwards
NCM S7 manual for PROFIBUS Paper version, for V5.x (STEP 7 V5.x)	
German	**6GK7 080-5AA04-8AA0**
English	**6GK7 080-5AA04-8BA0**
French	**6GK7 080-5AA04-8CA0**
Spanish	**6GK7 080-5AA04-8DA0**
Italian	**6GK7 080-5AA04-8EA0**
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**

	Order No.
PROFIBUS bus connector IP 20 for connection to PPI, MPI, PROFIBUS	
Without PG interface	**6ES7 972-0BA12-0XA0**
With PG interface	**6ES7 972-0BB12-0XA0**
PROFIBUS FastConnect bus connector RS 485 with 90° outgoing feeder cable; with insulation displacement system, max. transmission rate 12 Mbit/s	
Without PG interface	**6ES7 972-0BA50-0XA0**
With PG interface	**6ES7 972-0BB50-0XA0**
PROFIBUS 12M bus terminal Bus terminal for connection of PROFIBUS stations up to 12 Mbit/s; with connecting cable	**6GK1 500-0AA10**
DM 370 dummy module	**6ES7 370-0AA01-0AA0**

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 up to 12 Mbit/s (including 45.45 kbit/s)
- Direct connection to the optical PROFIBUS network through integrated fiber-optic cable interface for plastic and PCF fiber optics
- Communication services:
  - PROFIBUS-DP
  - PG/OP communication
  - S7 communication (client, server, multiplexing)
  - S5-compatible communication (SEND/RECEIVE))
- Simple configuration and programming using PROFIBUS
- PG/OP communication between networks through S7 routing.
- Module changeover without PG.

Technical specifications

Data transmission rates	9.6 kbit/s to 12 Mbit/s (exception: 3 and 6 Mbit/s)
Interfaces	
• Connection to PROFIBUS	2 x duplex socket
• Supply voltage	4-pin terminal block
Supply voltage	24 V DC
Current consumption	
• From backplane bus	150 mA
• From 24 V DC	250 mA
Power loss	6.75 W
Maximum distance between 2 adjacent network stations	
• Plastic FOC	Max. 50 m
• PCF FOC	Max. 300 m
Perm. ambient conditions	
• Operating temperature	0 °C to +60 °C
• Transport/storage temperature	-40 °C to +70 °C
• Relative humidity	Max. 95% at +25°C
• Operating altitude	
Design	Compact assembly
• Module format	40 x 125 x 120
• Dimensions (W x H x D) in mm	Approx. 300 g
• Weight	4
Performance data	
S7 communication	
• No. of usable connections	Max. 16

DP master function	
• DP master	DP-V0
• Number of operational DP slaves	124
• Size of the DP data ranges in total	
- DP input range	2160 byte
- DP output range	2160 byte
• Size of the DP data ranges per connected slave	
- DP input range	244 byte
- DP output range	244 byte
• Size of the DP diagnostic data per connected slave	Max. 240 byte
DP slave function	
• Size of DP data storage areas	
- DP input range	240 byte
- DP output range	240 byte
PG/OP communication	
• Number of operable OP connections (acyclic services)	16
S5-compatible interface (SEND/RECEIVE)	
• No. of usable connections	Max. 16
• Useful data/connections	Max. 240 byte (send and receive)
Multi-protocol operation	
• No. of usable connections	32 (without DP); max. 28 (with DP)

Ordering data	Order No.
CP 342-5 FO communications processor for optical connection of SIMATIC S7-300 to PROFIBUS up to 12 Mbit/s; with electronic manual on CD-ROM	**6GK7 342-5DF00-0XE0**
NCM S7 configuration software for PROFIBUS	Delivered with STEP 7 V5 onwards
NCM S7 manual for PROFIBUS Paper version, for V5.x (STEP 7 V5.x)	
German	**6GK7 080-5AA04-8AA0**
English	**6GK7 080-5AA04-8BA0**
French	**6GK7 080-5AA04-8CA0**
Spanish	**6GK7 080-5AA04-8DA0**
Italian	**6GK7 080-5AA04-8EA0**

	Order No.
Manual for PROFIBUS networks Paper version Network architecture, components (OLM (V3), OBT, ILM), configuration and assembly	
German	**6GK1 970-5CA20-0AA0**
English	**6GK1 970-5CA20-0AA1**
PROFIBUS Plastic Fiber Optic, simplex plug/polishing kit 100 simplex plugs and 5 polishing sets for assembling PROFIBUS plastic fiber-optic cables for the optical PROFIBUS DP	**6GK1 901-0FB00-0AA0**
PROFIBUS Plastic Fiber Optic, stripping tool set Tools for removing the outer casing and core casing	**6GK1 905-6PA10**
Plug adapter for installing plastic simplex plugs; 50 units	**6ES7 195-1BE00-0XA0**

CP 343-5

Overview



Master connection of SIMATIC S7-300 and SIMATIC C7 to PROFIBUS to 12 Mbit/s (incl. 45.45 kbit/s)

- Communication services:
  - PG/OP communication
  - S7 communication
  - S5-compatible communication (SEND/RECEIVE)
  - PROFIBUS-FMS
- Simple to configure and program using PROFIBUS
- Easily integrated into the S7-300 system
- PG/OP communication between networks due to S7 routing.
- Module changeover without PG.

Technical specifications

Data transmission rate	9.6 to 12 Mbit/s
Interfaces	
• Connection to PROFIBUS	9-pin Sub-D socket
• Supply voltage	4-pin terminal block
Supply voltage	24 V DC
Current consumption	
• From backplane bus	150 mA
• From 24 V DC	250 mA
Power loss	6.75 W
Perm. ambient conditions	
• Operating temperature	0 °C to +60 °C
• Transport/storage temperature	-40 °C to +70 °C
• Relative humidity	Max. 95% at +25°C
Design	
• Module format	Compact assembly
• Dimensions (W x H x D) in mm	40 x 125 x 120
• Weight	Approx. 300 g
Number of CPs per S7-300	4

1) Depending on the CPU used

S7 communication performance data	
• Number of usable connections	Max. 16 [1]
S5-compatible interface performance data (SEND/RECEIVE)	
• Number of usable connections	Max. 16
• Useful data/connection	Max. 240 byte (SEND and RECEIVE)
Performance data FMS function	
• Number of usable connections	max. 16
• Variable length for READ	237 byte
• Variable length for WRITE and REPORT	233 byte
• No. of configurable server variables	256
• No. of variables which can be loaded from partner	256
Multi-protocol operation	
• Number of operable connections	Max. 48

Ordering data

	Order-No.
CP 343-5 communications processor for connecting SIMATIC S7-300 to PROFIBUS	**6GK7 343-5FA01-0XE0**
NCM S7 configuration software for PROFIBUS	Delivered with STEP 7 V5 onwards
NCM S7 manual for PROFIBUS	See CP 342-5
Manual "Communication for SIMATIC S7-300/-400"	See CP 342-5
PROFIBUS bus connector IP 20	See CP 342-5
PROFIBUS FastConnect bus connector RS 485	See CP 342-5
PROFIBUS 12M bus terminal	See CP 342-5
DM 370 dummy module	See CP 342-5

Overview



- Connection of SIMATIC S7-300 to Industrial Ethernet
  - 10/100 Mbit/s full/half duplex connection with autosensing for automatic switching
  - Universal connection options for ITP, RJ45 and AUI
  - Multiprotocol mode with ISO and TCP transport protocol
  - Adjustable Keep Alive function
- Communication services:
  - ISO and TCP/IP transport protocols
  - PG/OP communication
  - S7 communication (client, server, multiplexing)
  - S5-compatible communication
- Multicast at UDP
- Remote programming and commissioning through the network
- Configuration of the CP 343-1 with the option package NCM S7 for Industrial Ethernet (integrated in STEP 7)
- With S7 routing, PG/OP communication can be used across the whole network.

Technical specifications

Data transmission rate	10 Mbit/s und 100 Mbit/s
Interfaces	
• Connection to Industrial Ethernet (10/100 Mbit/s)	15-pin Sub-D socket (automatic switching between AUI and industrial twisted pair)
• 10BaseT, 100BaseTX	RJ45
• Supply voltage	4-pin terminal block
Supply voltage	+5 V DC (±5%) and +24 V DC (±5%)
Current consumption	
• From backplane bus	70 mA
• From external 24 V DC	Typ. 400 mA max. 580 mA (depending on the interface used)
Power loss	8.3 W
Perm. ambient conditions	
• Operating temperature	0 °C to +60 °C
• Transport/storage temperature	-40 °C to +70 °C
• Relative humidity	Max. 95% at +25 °C
Design	
• Module format	Compact S7-300 module double width

Design	
• Dimensions (W x H x D) in mm	80 x 125 x 120
• Weight	Approx. 600 g
Configuration software	NCM S7 for Industrial Ethernet (supplied with STEP 7 V5.x)
Performance data	
S5-compatible communication (SEND/RECEIVE)	
Sum of all simultaneously operable ISO/TCP/UDP connections	Max. 16
• No. of useful data	Max. 8 KB
- ISO or TCP	Max. 8 KB
- UDP	Max. 2 KB
S7 communication	
• Number of connections	Max. 16
PG/OP communication	
• Number of operable OP connections (acyclic services)	16
Multi-protocol operation	
• Sum of all simultaneously operable connections	Max. 32

Ordering data

	Order No.
CP 343-1 communications processor for connecting SIMATIC S7-300 to Industrial Ethernet using ISO, TCP/IP and UDP	**6GK7 343-1EX11-0XE0**
NCM S7 configuration software for Industrial Ethernet	Delivered with STEP 7 V5 onwards
NCM S7 manual for Industrial Ethernet Paper version, for V5.x (STEP 7 V5.0)	
German	**6GK7 080-1AA03-8AA0**
English	**6GK7 080-1AA03-8BA0**
French	**6GK7 080-1AA03-8CA0**
Spanish	**6GK7 080-1AA03-8DA0**
Italian	**6GK7 080-1AA03-8EA0**

	Order No.
Manual "Communication for SIMATIC S7-300/-400"	See CP 342-5
SIMATIC NET electronic manuals German, English; on CD-ROM	**6GK1 975-1AA00-3AA0**

CP 343-1 IT

Overview



- Connection of SIMATIC S7-300 to Industrial Ethernet
  - 10/100 Mbit/s full/half duplex connection with autosensing for automatic switching
  - Universal connection options for ITP, RJ45 and AUI
  - Multi-protocol operation for ISO, TCP/IP and UDP
  - Adjustable Keep Alive function
- Communication services:
  - ISO, TCP/IP and UDP transport protocol
  - PG/OP communication
  - S7 communication
  - S5-compatible communication
  - IT communication
- Web function for accessing process data through Web browser
- E-mail function for sending electronic mail from the S7-300
- FTP server and client function for communication with data
- Multicast at UDP
- PG/OP communication between networks through S7 routing.
- Remote programming and commissioning through the network

Technical specifications

Data transmission rate	**10 Mbit/s or 100 Mbit/s**
Interfaces	
• Connection to Industrial Ethernet (10/100 Mbit/s)	15-pin Sub-D socket (automatic switching betw. AUI and industrial and twisted pair)
• 10BaseT, 100BaseTX	RJ45
• Supply voltage	4-pin terminal block
Supply voltage	+5 V DC (±5%) and +24 V DC (±5%)
Current consumption	
• From backplane bus	70 mA
• From external 24 V DC	Typ. 400 mA max. 580 mA (depending on the interface used)
Power loss	8.3 W
Perm. ambient conditions	
• Operating temperature	0 °C to +60 °C
• Transport/storage temperature	–40 °C to +70 °C
• Relative humidity	Max. 95% at +25 °C
Design	
• Module format	Compact module S7-300 double width
• Dimensions (B x H x T) in mm	80 x 125 x 120
• Weight	Approx. 600 g

Design	
Configuration software	NCM S7 for Industrial Ethernet (supplied with STEP 7 V5.x)
Performance data	
IT communications	
Number of connections to an e-mail server	Max. 1
Memory capacity of the file system	10 MB
S5-compatible communication	
(SEND/RECEIVE)	
• Sum of all simultaneously operable ISO/TCP/UDP connections	Max. 16
• Number of useful data	
- ISO or TCP	Max. 8 KB
- UDP	Max. 2 KB
S7 communication	
• Number of connections [1]	Max. 16
PG/OP communication	
• Number of usable OP connections (acyclic utilities)	Max. 16
Multi protocol operation	
• Sum of all simultaneously operable connections	Max. 32

1) Depends on the S7 CPU being used

Ordering data

	Order No.
CP 343-1 IT communications processor® for connecting SIMATIC S7-300 to Industrial Ethernet for S5-compatible communication, S7 communication, e-mail and www server, 10/100 Mbit/s, with electronic manual on CD-ROM	**6GK7 343-1GX11-0XE0**

	Order No.
NCM S7 configuration software for Industrial Ethernet	Delivered with STEP 7 V5 upwards
NCM S7 manual for Industrial Ethernet	See CP 343-1

Overview



- The CP 343-1 PN enables connection of SIMATIC S7-300 to Industrial Ethernet
  - 10/100 Mbit/s full/half duplex connection with autosensing for automatic switching
  - Universal connection options for ITP, RJ45 and AUI
  - Adjustable Keep Alive function
  - TCP/UDP transport protocol
- PROFInet communications standards. PROFInet defines an engineering model or distributed automation solutions and a model for system-wide communication through PROFIBUS and Industrial Ethernet with IT standards
- Additional communications services:
  - PG/OP communication
  - S7 communication
  - S5 compatible communication
- Multicast at UDP
- Remote programming and commissioning through the network
- Or S5-compatible communication

4

Technical specifications

Data transmission rate	10 Mbit/s and 100 Mbit/s autosensing
Interfaces	
• Connection to Industrial Ethernet AUI/industrial twisted pair	15-pin Sub-D socket with slide catch (automatic switchover between AUI and twisted pair)
• Twisted pair (10Base/100BaseT)	RJ45 socket
• Connection for power supply	4-pin terminal block
Supply voltage	+5 V DC (±5%) and +24 V DC (±5%)
Current consumption	
• From backplane bus	70 mA
• From external 24 V DC	Typ. 400 mA max. 580 mA (depends on the interface being used)
Power loss, approx.	10 W
Perm. ambient conditions	
• Operating temperature	0 °C to +60 °C
• Transport/storage temperature	-40 °C to +70 °C
• Relative humidity	Max. 95% at +25 °C
Design	
• Module format	Compact module S7-300, double width

Design	
• Dimensions (W x H x D) in mm	80 x 125 x 120
• Weight	Approx. 600 g
Degree of protection	IP 20
Configuration	
• Configuration software for PROFInet	Option package SIMATIC iMap
• Configuration software for additional services	NCM S7 for Industrial Ethernet (supplied with STEP 7 v.5.x)
Performance data	
PROFInet Communication	
• Number of communication partners	Max. 64
S5 compatible communication (SEND/RECEIVE)	
• Sum of all simultaneously operable TCP/UDP connections	Max. 16
• Number of useful data,	
- TCP	Max. 8 KB
- UDP	Max. 2 KB
S7 and PG/OP communication	
• Number of connections[1)]	Max. 16
• Multi-protocol operation	
• Sum of all simultaneously operable connections	Max. 32

1) Depends on the S7 CPU being used

Ordering data

	Order No.
CP 343-1 PN communications processor for connecting SIMATIC S7-300 to Industrial Ethernet with PROFInet function, TCP/IP, S7 communication, FETCH/WRITE, SEND/RECEIVE, with/without RFC 1006, 10/100 Mbit/s, with electronic manual on CD-ROM	**6GK7 343-1HX00-0XE0**

	Order No.
NCM S7 configuration software for Industrial Ethernet	Delivered with STEP 7 V5 onwards
NCM S7 manual for Industrial Ethernet	See CP 343-1
SIMATIC iMap V1.1 Linking editor for configuring of communication with Component based Automation	
Single license	**6ES7 820-0CC01-0YX0**
Software update service	**6ES7 820-0CC01-0YX0**

Front connector

Overview



- For simple and user-friendly connection of sensors and actuators
- For retaining the wiring when replacing modules
- With coding to avoid mistakes when replacing modules

Ordering data

	Order No.
Front connector	
20-pin, with screw-type terminals	
• 1 unit	**6ES7 392-1AJ00-0AA0**
• 100 units	**6ES7 392-1AJ00-1AB0**
20-pin, with spring-loaded terminals; 1 unit	**6ES7 392-1BJ00-0AA0**

	Order No.
Front connector	
40-pin, with screw-type terminals	
• 1 unit	**6ES7 392-1AM00-0AA0**
• 100 units	**6ES7 392-1AM00-1AB0**
40-pin, with spring-loaded terminals; 1 unit	**6ES7 392-1BM01-0AA0**

SIMATIC TOP connect; fully modular connection

Overview



- The standard connection for SIMATIC S7-300
- For fast and error-free connection of sensors and actuators for distances of up to 3 m
- For clear and understandable wiring in the switching cabinet
- Comprising front connector module, connecting cable and terminal block
- All components are easy to plug in and can be replaced individually

For further information:

- Internet: http://www.siemens.de/simatic_tc
- Catalog KT 10.2

Technical specifications

Front connector module	
Rated operating voltage	**24 V DC**
Max. permissible operating voltage	**60 V DC**
Max. permissible continuous current • Per connector pin	1 A
Max. permissible continuous current	4 A/byte
Permissible ambient temperature	0 to + 60 °C
Test voltage	0.5 kV, 50 Hz, 60 s
Clearances and creepage distances	IEC 664 (1980), IEC 664 A (1981), to DIN VDE 0110 (01.89), overvoltage class II, pollution severity 2

Front connector module 16-core and 2 x 16-core twisted ribbon cable from SIMATIC S7 to terminal block	
Operating voltage	**60 V DC**
Continuous current per signal conductor	1 A
Max. total current	4 A/byte
Operating temperature	0 to + 60 °C
Outer diameter in mm 16-core/ 2 x 16-core	Approx. 9.5/11.5

Technical specifications (continued)

Terminal blocks for single-wire connection and 3-wire sensors	
Operating voltage, max.	60 V DC
Continuous current per signal	1 A
Total current, max. (supply)	4 A/byte
Operating temperature	0 to + 60 °C
Installation orientation	Any
Clearances and creepage distances	IEC Report 664, IEC 664 A, IEC 1131 T2, CSA C22.2 No 142 UL 508, VDE 0160 (12.90), overvoltage class II, pollution severity 3
Dimensions (W x H x D in mm)	
• 1-wire connection 6ES7924-0AA00-_A_0	Approx. 51 x 41 x 55
• For 3-wire sensors 6ES7924-0CA00-_A_0	Approx. 60 x 41 x 70
Terminal blocks with 8S relays	
Excitation side	
Inductor operating voltage	**24 V DC**
Connected to input	No
Contact side	
Number of relay outputs	8 (NO contacts)
Contact design	Single contact, 1 NO
Switching capacity (resistive load)	Max. 2 A/250 V AC, max. 2 A/ 30 V DC, max. 0,2 A/60 V DC Recommended minimum load ≥ 100 mA
Switching frequency	6 cycles/minute
Service life	
• Mechanical	10 x 10^6 make-break operations
• Electrical	600 x 10^3 make-break operations at 230 V AC/2 A/ cos φ = 1
Operating temperature	0 to +60 °C
Installation position	Horizontal, vents running vertically. A space of at least 30 mm must be maintained above and below the relay terminal block for heat dissipation

Terminal blocks with 8S relays (continued)	
Clearances and creepage distances	IEC 1131-2 (1992), EN 50 178 (4/98) overvoltage class III pollution severity 2 Between control circuit and relay contacts: 5.5 mm Between contact groups K0-K3 and K4-K7: 5.5 mm within a contact group: 3.2 mm UL and CSA pending
Connection blocks can be released for permanent wiring	
• For 24 V infeed for supplying the digital modules	4-pin connection block
• For relay outputs	Two 8-pin connection blocks
Dimensions (W x H x D) in mm	Approx. 60 x 68 x 78
Terminal blocks for 2 A module for SIMATIC S7	
Operating voltage, max.	**60 V DC**
Continuous current per signal line	2 A
Operating temperature	0 to + 60 °C
Installation orientation	Any
Clearances and creepage distances	IEC Report 664, IEC 664 A, IEC 1131 T2, CSA C22.2 No 142 UL 508, VDE 0160 (12.90), overvoltage class II, pollution severity 3
Dimensions (W x H x D in mm)	Approx. 60 x 41 x 70
Terminal blocks for SIMATIC S7 analog modules	
Operating voltage, max.	60 V DC
Continuous current per signal line	1 A
Operating temperature	0 to + 60 °C
Installation orientation	Any
Clearances and creepage distances	IEC Report 664, IEC 664 A, IEC 1131 T2, CSA C22.2 No 142 UL 508, VDE 0160 (12.90), overvoltage class II, pollution severity 3
Dimensions (W x H x D in mm)	Approx. 60 x 41 x 70

Ordering data

	Order No.
Front connector module (2 x 8 I/O)	
Power supplied by means of	
• spring-loaded terminals	**6ES7 921-3AA00-0AA0**
• screw-type terminals	**6ES7 921-3AB00-0AA0**
Front connector module (4 x 8 I/O)	
Power supplied by means of	
• spring-loaded terminals	**6ES7 921-3AA20-0AA0**
• screw-type terminals	**6ES7 921-3AB20-0AA0**

	Order-No.
Front connector module (1 x 8 I/O) for 2 A modules	
Power supplied by means of	
• spring-loaded terminals	**6ES7 921-3AC00-0AA0**
• screw-type terminals	**6ES7 921-3AD00-0AA0**
Front connector module for analog signal modules	
Power supplied by means of	
• spring-loaded terminals	**6ES7 921-3AF00-0AA0**
• screw-type terminals	**6ES7 921-3AG00-0AA0**

► Available ex works

SIMATIC TOP connect; fully modular connection

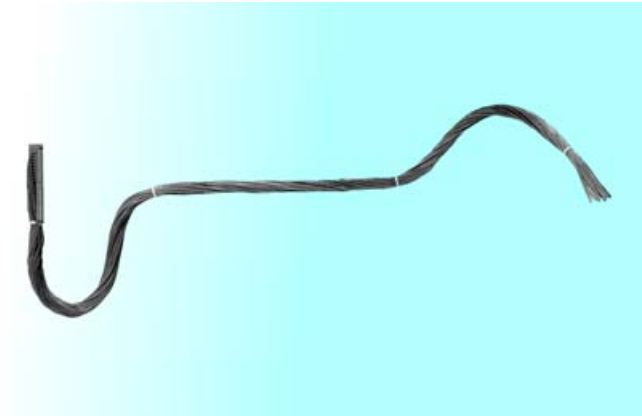
Ordering data (continued)

	Order No.
Connecting cable	
Round-sheath ribbon cable, 16-wire, sold by the meter, unshielded	
• 30 m	**6ES7 923-0CD00-0AA0**
• 60 m	**6ES7 923-0CG00-0AA0**
Shielded	
• 30 m	**6ES7 923-0CD00-0BA0**
• 60 m	**6ES7 923-0CG00-0BA0**
Round-sheath ribbon cable, 2 x 16-wire, sold by the meter, unshielded	
• 30 m	**6ES7 923-2CD00-0AA0**
• 60 m	**6ES7 923-2CG00-0AA0**
Connectors (female ribbon cable connectors)	**6ES7 921-3BE10-0AA0**
8 connectors, 8 cable grips	
Crimping tool	**6ES7 928-0AA00-0AA0**
to attach connectors	
Terminal block for 1-wire connection	
1 unit	
• Spring-loaded terminals	**6ES7 924-0AA00-0AB0**
• Screw-type terminals	**6ES7 924-0AA00-0AA0**
10 units	
• Spring-loaded terminals	**6ES7 924-0AA00-1AB0**
• Screw-type terminals	**6ES7 924-0AA00-1AA0**
Terminal block for 2 A modules	
1 unit	
• Spring-loaded terminals	**6ES7 924-0BB00-0AB0**
• Screw-type terminals	**6ES7 924-0BB00-0AA0**
10 units	
• Spring-loaded terminals	**6ES7 924-0BB00-1AB0**
• Screw-type terminals	**6ES7 924-0BB00-1AA0**

	Order No.
Terminal block for 3-wire initiators	
1 unit	
• Spring-loaded terminals	**6ES7 924-0CA00-0AB0**
• Screw-type terminals	**6ES7 924-0CA00-0AA0**
10 units	
• Spring-loaded terminals	**6ES7 924-0CA00-1AB0**
• Screw-type terminals	**6ES7 924-0CA00-1AA0**
Terminal block with relays	
1 unit	
• Spring-loaded terminals	**6ES7 924-0CD00-0AB0**
• Screw-type terminals	**6ES7 924-0CD00-0AA0**
Terminal block for analog modules	
1 unit	
• Spring-loaded terminals	**6ES7 924-0CC00-0AB0**
• Screw-type terminals	**6ES7 924-0CC00-0AA0**
10 units	
• Spring-loaded terminals	**6ES7 924-0CC00-1AB0**
• Screw-type terminals	**6ES7 924-0CC00-1AA0**
Shield plate for analog terminal block	**6ES7 928-1BA00-0AA0**
4 units	
Terminal elements	
2 units	
For 2 cables with 2 to 6 mm diameter	**6ES7 390-5AB00-0AA0**
For 1 cable with 3 to 8 mm diameter	**6ES7 390-5BA00-0AA0**
For 1 cable with 4 to 13 mm diameter	**6ES7 390-5CA00-0AA0**

► Available ex works

Overview



- For fast, direct connections to individual elements in the control cabinet
- Comprises front connector with individual cores attached
- Core type H05V-K or UL/CSA
- 0.5 mm² wire cross section also allows higher currents

For further information:

- Internet: http://www.ad.siemens.de/simatic_tc
- Catalog KT 10.2

Technical specifications

Front connector with single cores, 16 channels	
Rated operating voltage	24 V DC
Max. permissible continuous current with simultaneous loading of all cores	1.5 A
Permissible ambient temperature	0 to +60 °C
Cores types	H05V-K single cores or UL-Style 1007/1569 CSA-AWM TR64
Cross-section	0.5 mm², copper
Bunch diameter in mm	Approx. 15
Core color	Blue, numbered 1 to 20 (adapter contact = core number)
Contact type	Screw contacts

Front connector with single cores, 32 channels	
Rated operating voltage	24 V DC
Max. permissible continuous current with simultaneous loading of all cores	1.5 A
Permissible ambient temperature	0 to +60 °C
Number of cores	40 H05V-K- or UL/CSA-Adern
Cross-section	0.5 mm², copper
Bunch diameter in mm	Approx. 17
Core color	Blue, numbered 1 to 40 (adapter contact = core number)
Contact type	Screw contacts

Ordering data

	Order No.
Front connector with single wires 20 x 0.5 mm², screw connection	
for SIMATIC S7-300 (16 I/O); 1 unit	
• H05V-K wires	
2.5 m	**6ES7 922-3BC50-0AB0**
3.2 m	**6ES7 922-3BD20-0AB0**
5.0 m	**6ES7 922-3BF00-0AB0**
Special lengths	On request
• UL/CSA wires	
3.2 m	**6ES7 922-3BD20-0UB0**
5.0 m	**6ES7 922-3BF00-0UB0**
Front connector with single wires 40 x 0.5 mm², screw connection	
for SIMATIC S7-300 (32 I/O); 1 unit	
• H05V-K wires	
2.5 m	**6ES7 922-3BC50-0AC0**
3.2 m	**6ES7 922-3BD20-0AC0**
5.0 m	**6ES7 922-3BF00-0AC0**
Special lengths	On request
• UL/CSA wires	
3.2 m	**6ES7 922-3BD20-0UC0**
5.0 m	**6ES7 922-3BF00-0UC0**

	Order No.
Front connector with single wires 20 x 0.5 mm², screw connection	
for SIMATIC S7-300 (16 I/O); pack of 5	
• H05V-K wires	
2.5 m	**6ES7 922-3BC50-5AB0**
3.2 m	**6ES7 922-3BD20-5AB0**
5.0 m	**6ES7 922-3BF00-5AB0**
Front connector with single wires 40 x 0.5 mm², screw connection	
for SIMATIC S7-300 (32 I/O); pack of 5	
• H05V-K wires	
2.5 m	**6ES7 922-3BC50-5AC0**
3.2 m	**6ES7 922-3BD20-5AC0**
5.0 m	**6ES7 922-3BF00-5AC0**

► Available ex works

SIMATIC TOP connect; flexible connection

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Ordering data (continued)

	Order No.
Front connector with single wires 20 x 0.5 mm², crimp connection	
for SIMATIC S7-300 (16 I/O); 1 unit	
• H05V-K wires	
2.5 m	**6ES7 922-3BC50-0AF0**
3.2 m	**6ES7 922-3BD20-0AF0**
5.0 m	**6ES7 922-3BF00-0AF0**

	Order No.
Front connector with single wires 40 x 0.5 mm², crimp connection	
for SIMATIC S7-300 (32 I/O); 1 unit	
• H05V-K wires	
2.5 m	**6ES7 922-3BC50-0AG0**
3.2 m	**6ES7 922-3BD20-0AG0**
5.0 m	**6ES7 922-3BF00-0AG0**

Overview



- For connecting the racks in multi-tier configurations of the SIMATIC S7-300
- IM 365:
  For configuring a central controller and no more than one expansion rack
- IM 360/IM 361:
  For configuring a central controller and up to four expansion racks

Technical specifications

Interface modules	IM 365	IM 360	IM 361
Max. interface modules per CPU	1 pair	1	3
Supply voltage (external)	-	-	24V DC
Current consumption			
• From 24 V DC line	-	-	0.5 A
• From internal bus (5 V)	100 mA	350 mA	-
Power loss typ.	0.5 W	2 W	5 W
Dimensions (W x H x D) in mm	40 x 125 x 120 per module	40 x 125 x 120	80 x 125 x 120
Weight, approx.	580g (total)	225 g	505 g

Ordering data

	Order No.
IM 360 interface module to expand the S7-300 by max. 3 EUs; can be plugged into central controller	**6ES7 360-3AA01-0AA0**
IM 361 interface module to expand the S7-300 by max. 3 EUs; can be plugged into expansion unit	**6ES7 361-3CA01-0AA0**
Connecting cable between IM 360 and IM 361 or IM 361 and IM 361	
1 m	**6ES7 368-3BB01-0AA0**
2.5 m	**6ES7 368-3BC51-0AA0**
5 m	**6ES7 368-3BF01-0AA0**
10 m	**6ES7 368-3CB01-0AA0**

	Order-No.
IM 365 interface module to expand the S7-300 by max. 1 EU; 2 modules with fixed connecting cable (1 m)	
Standard temperature range	**6ES7 365-0BA01-0AA0**
Extended temperature range	**6ES7 365-0BA81-0AA0**
SIMATIC Manual Collection	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection updating service for 1 year	**6ES7 998-8XC01-8YE2**
S7-300 manual Design, CPU data, module data, instruction list	
German	**6ES7 398-8FA10-8AA0**
English	**6ES7 398-8FA10-8BA0**
French	**6ES7 398-8FA10-8CA0**
Spanish	**6ES7 398-8FA10-8DA0**
Italian	**6ES7 398-8FA10-8EA0**

► Available ex works

PS 307 power supply modules

Overview



- Load power supplies for S7-300/ET 200M
- For conversion of the line voltage to the required operating voltage of 24 V DC
- Output current of 2 A, 5 A or 10 A

Technical specifications

Power supply, type	2 A	2 A	5 A	5 A	10 A
Order No. [1]	**6ES7 307-1BA00-0AA0**	**6ES7 305-1BA80-0AA0**	**6ES7 307-1EA00-0AA0**	**6ES7 307-1EA80-0AA0**	**6ES7 307-1KA01-0AA0**
Input	Single-phase AC	Direct voltage	Single-phase AC	Single-phase AC	Single-phase AC
Rated voltage $V_{in\ rated}$	**120/230 V AC** set with selector switch on the unit	**24 to 110 V DC** Wide-range input	**120/230 V AC** set with selector switch on the unit	**120/230 V AC** set with selector switch on the unit	**120/230 V AC** set with selector switch on the unit
Voltage range	85 to 132 V/ 170 to 264 V AC	16.8 to 138 V DC	85 to 132 V/170 to 264 V AC	93 to 132 V/187 to 264 V AC	85 to 132 V/170 to 264 V AC
Surge strength	2.3 x Vin $_{rated}$, 1.3 ms	154 V; 0.1 s	2.3 x $V_{in\ rated}$,1.3 ms	2.3 x $V_{in\ rated}$, 1.3 ms	2.3 x Vin $_{rated}$, 1.3 ms
Mains buffering at $I_{out\ rated}$	> 20 ms at V_{in} = 93/187 V	> 10 ms at $V_{in\ rated}$	> 20 ms at V_{in} = 93/187 V	> 20 ms at V_{in} = 93/187 V	> 20 ms at V_{in} = 93/187 V
Rated line frequency, range	50/60 Hz, 47 to 63 Hz	-	50/60 Hz, 47 to 63 Hz	50/60 Hz, 47 to 63 Hz	50/60 Hz, 47 to 63 Hz
Rated current $I_{in\ rated}$	0.9/0.6 A	2.7-0.6 A (4-0.9 A)	2,1/1, 3 A	2.1/1.2 A	4.1/1.8 A
Inrush current limiting (+25 °C)	< 20 A, < 3 ms	< 20 A, < 10 ms	< 45 A, < 3 ms	< 45 A, < 3 ms	< 55 A, < 3 ms
I^2t	< 1.0 A^2s	< 5 A^2s	< 1.2 A^2s	< 1.8 A^2s (typ. 1.2 A^2s)	< 3.3 A^2s
Integral input fuse	T 1.6 A/250 V (not accessible)	T 6.3 A/250 V (not accessible)	F 4 A/250 V (not accessible)	T 3.15 A/250 V (not accessible)	T 6.3 A/250 V (not accessible)
Recommended circuit-breaker (IEC 898) in the supply cable	From 3 A, characteristic C	From 10 A, characteristic C, suitable for DC	From 6 A, characteristic C	From 10 A, characteristic C or from 6 A, characteristic D	From 10 A, characteristic
Output	Regulated, floating direct voltage	Regulated, floating direct voltage	Regulated, floating direct voltage	Regulated, floating direct voltage	Regulated, floating direct voltage
Rated voltage $V_{out\ rated}$	**24 V DC**	**24 V DC**	**24 V DC**	**24 V DC**	**24 V DC**
Total tolerance	± 3 %	± 3 %	± 3 %	± 3 %	± 3 %
• Steady-state line compensation	• Approx. 0.1 %	Approx. 0.2 %	Approx. 0.1 %	± 0.2 %	Approx. 0.1 %
• Steady-state load compensation	• Approx. 0.2 %	Approx. 0.4 %	Approx. 0.2 %	± 0.4 %	Approx. 0.5 %
Residual ripple (switching frequency: approx. 50 kHz)	< 150 mV_{pp} (typ. < 20 mV_{pp})	< 150 mV_{pp} (typ. < 30 mV_{pp})	< 150 mV_{pp} (typ. 40 mV_{pp})	< 150 mV_{pp} (typ. 40 mV_{pp})	< 150 mV_{pp} (typ. 40 mV_{pp})
Spikes (bandwidth: 20 MHz)	< 240 mV_{pp} (typ. < 150 mV_{pp})	< 240 mV_{pp} (typ. < 150 mV_{pp})	< 240 mV_{pp} (typ. 90 mV_{pp})	< 240 mV_{pp} (typ. 90 mV_{pp})	< 240 mV_{pp} (typ. 100 mV_{pp})
Setting range	-	-	-	-	-
Status indicator	Green LED for 24 V O.K.	Green LED for 24 V O.K.	Green LED for 24 V O.K.	Green LED for 24 V O.K.	Green LED for 24 V O.K.
Turn-on/off response	No overshoot of V_{out} (soft starting)	No overshoot of V_{out} (soft starting)	No overshoot of V_{out} (soft starting)	No overshoot of V_{out} (soft starting)	No overshoot of V_{out} (soft starting)
Starting delay/voltage rise	< 3 s/typ. 60 ms	< 3 s (typ.7 ms)/typ. 5 ms	< 2 s/typ.60 ms	< 3 s/typ.100 ms	< 1.5 s/typ. 80 ms

1) For mounting on a standard rail (35 mm x 15 mm), versions are available with an integrated mounting adapter: Order No. 6EP1331-1SL11

Technical specifications (continued)

Power supply, type	**2 A**	**2 A**	**5 A**	**5 A**	**10 A**
Rated current $I_{out\ rated}$	**2 A**	**2 A (3 A for U_e > 24 V)**	**5 A**	**5 A**	**10 A**
Current range					
• Up to +45 °C	• 0 to 2 A	0 to 2 A (3A)	0 to 5 A	0 to 5 A	0 to 10 A
• Up to +60 °C	• 0 to 2 A	0 to 2 A (3A)	0 to 5 A	0 to 5 A	0 to 10 A
Dynamic V/I for					
• Starting into short-circuit	• Typ. 10 A for 90 ms	Typ. 9 A for 270 ms	Typ. 20 A for 75 ms	20 A for 180 ms	Typ. 35 A for 80 ms
• Short-circuit in operation	• Typ. 10 A for 90 ms	Typ. 9 A for 270 ms	Typ. 20 A for 75 ms	20 A for 80 ms	Typ. 35 A for 150 ms
Parallel connection to increase power	Not permissible	Yes, 2 units	Not permissible	Not permissible	Not permissible
Efficiency					
Efficiency at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 83%	Approx. 75%	Approx. 87%	Approx. 84%	Approx. 87%
Power loss at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 10 W	Approx. 16 W (24 W)	Approx. 18 W	Approx. 23 W	Approx. 34 W
Regulation					
Dynamic line compensation ($V_{in\ rated}$ ±15 %)	± 0.3% V_{out}	± 0.3 % V_{out}	± 0.3% V_{out}	± 0.3% V_{out}	± 0.3% V_{out}
Dynamic load compensation (I_{out}: 50/100/50 %)	± 0.8% V_{out}	± 2.5 % V_{out}	± 2.5% V_{out}	± 3% V_{out}	± 2.5% V_{out}
Correction time					
• Load step 50 to 100 %	• < 5 ms (typ. 2.5 ms)	< 5 ms (typ. 2.5 ms)	Typ. 0.1 ms	< 5 ms (typ. 0.2 ms)	< 5 ms
• Load step 100 to 50 %	• < 5 ms (typ. 2.5 ms)	< 5 ms (typ. 2.5 ms)	Typ. 0.1 ms	< 5 ms (typ. 0.2 ms)	< 5 ms
Protection and monitoring					
Output overvoltage protection	Additional control circuit, shutdown at approx. 30 V, auto. restart	Additional control circuit, shutdown at approx. 30 V, auto. restart	Additional control circuit, shutdown at approx. 30 V, auto. restart	Additional control circuit, shutdown at approx. 30 V, auto. restart	Additional control circuit, shutdown at approx. 30 V, auto. restart
Current limiting	2.2 to 2.6 A	3.3 to 3.9 A	5.5 to 6.5 A	5.5 to 6.5 A	11 to 12 A
Short-circuit protection	Electronic shutdown, auto restart	Electronic shutdown, auto. restart	Electronic shutdown, auto. restart	Electronic shutdown, auto. restart	Electronic shutdown, auto. restart
Continuous short-circuit RMS current	< 4 A	< 2 A	< 9 A	< 5 A	< 10 A
Overload/short-circuit indicator	-	-	-	-	-
Safety					
Isolation primary/secondary	Yes, SELV output voltage V_{out} acc. to EN 60 950 and EN 50 178	Yes, SELV output voltage V_{out} to EN 60 950 and EN 50 178, clearances and creepage distances > 5 mm	Yes, SELV output voltage V_{out} acc. to EN 60 950 and EN 50 178	Yes, SELV output voltage V_{out} to EN 60 950 and EN 50 178, clearances and creepage distances > 8 mm	Yes, SELV output voltage V_{out} acc. to EN 60 950 and EN 50 178
Protective class	Class I	Class I	Class I	Class I	Class I
Discharge current	< 3.5 mA (typ. 0.7 mA)	< 3.5 mA (typ. 0.7 mA)	< 3.5 mA (typ. 0.3 mA)	< 3.5 mA (typ. 0.3 mA)	< 3.5 mA (typ. 0.5 mA)
Technical Inspectorate type testing	Yes	Yes	Yes	Yes	Yes
CE marking	Yes	Yes	Yes	Yes	Yes
UL/cUL (CSA) approval	Yes, UL/CSA-listed (UL 508, CSA 22.2), File E143289	Yes, UL/CSA-listed (UL 508, CSA 22.2), File E143289	Yes, UL/CSA-listed (UL 508, CSA 22.2), File E143289	Yes, UL/CSA-listed (UL 508, CSA 22.2), File E143289	Yes, UL/CSA-listed (UL 508, CSA 22.2), File E143289
FM approval	Yes, Class I Div. 2 Group A, B, C, D T4	-	Yes, Class I Div. 2 Group A, B, C, D, T 4	-	Yes, Class I Div. 2, A, B, C, D, T4
Shipbuilding approval	In S7-300 range	Yes, GL, ABS, DNV, LRS	In S7-300 range	Yes, GL, ABS, DNV, LRS	In S7-300 range
Degree of protection (EN 60 529; VDE 0470 T1)	IP 20	IP 20	IP 20	IP 20	IP 20

PS 307 power supply modules

Technical specifications (continued)

Power supply, type	2 A	2 A	5 A	5 A	10 A
EMC					
Emitted interference	EN 50 081-1, EN 55 022 Class B	EN 50 081-1, EN 55 011 Class A	EN 50 081-1, EN 55 022 Class B	EN 55 011 Class A EN 50 081-2,	EN 50 081-1, EN 55 022 Class B
Line harmonic limiting	Not applicable	Not applicable	EN 61 000-3-2	-	-
Interference immunity	EN 61 000-6-2, EN 61 000-4-2, -3, -4, -5,-6,-11	EN 50 082-2, IEC 801-2, -3, -4, -5, prEN 50 121-3, -2	EN 61 000-4-2, -3, -4, -5, -6, -11	EN 50 082-2, IEC 801-2, -3, -4, -5	EN 61 000-6-2, EN 61 000-4-2, -3, -4,-5, -6, -11
Operating specifications					
Ambient temperature range	0 to +60 °C with natural convection	-25 to +70 °C with natural convection	0 to +60 °C with natural convection	- 25 to + 70 °C with natural convection	0 to +60 °C with natural convection
Non-operating temperature range	-40 to +85 °C	- 25 to + 85 °C	-40 to +85 °C	- 25 to + 85 °C	-40 to +85 °C
Humidity class	Climate class 3K3 to EN 60 721	Climate class 3K5 acc. to EN 60 721, brief condensation permissible	Climate class 3K3 to EN 60 721	Relative humidity up to 75 % average value, 95 % on 30 days/year, brief condensation permissible	Climate class 3K3 to EN 60 721
Mechanical specifications					
Terminals					
• Supply input L, N, PE (DC input: L+1, M1, PE)	• One screw terminal each for 0.5 to 2.5 mm^2 solid/stranded	One screw terminal each for 0.5 to 2.5 mm^2 solid/stranded	One screw terminal each for 0.5 to 2.5 mm^2 solid / stranded	One screw terminal each for 0.5 to 2.5 mm^2 solid / stranded	One screw terminal each for 0.5 to 2.5 mm^2 solid / stranded
• Output L+	• 2 screw terminals for 0.5 to 2.5 mm^2	3 screw terminals for 0.5 to 2.5 mm^2	3 screw terminals for 0.5 to 2.5 mm^2	3 screw terminals for 0.5 to 2.5 mm^2	4 screw terminals for 0.5 to 2.5 mm^2
• Output M	• 2 screw terminals for 0.5 to 2.5 mm^2	3 screw terminals for 0.5 to 2.5 mm^2	3 screw terminals for 0.5 to 2.5 mm^2	3 screw terminals for 0.5 to 2.5 mm^2	4 screw terminals for 0.5 to 2.5 mm^2
Dimensions in (W x H x D) in mm	50 x 125 x 120	80 x 125 x 120	80 x 125 x 120	80 x 125 x 120	120 x 125 x 120
Approx. weight	0.42 kg	0.75 kg	0.74 kg	0.57 kg	1.1 kg
Mounting [1]	Snap-mounting on S7 rails[1]	Snap-mounting on S7 rail	Snap-mounting on S7 rail[1]	Snap-mounting on S7 rail	Snap-mounting on S7 rail[3]
Accessories [1]	Mounting adapter for standard rail and PS-CPU connector[1]	Mounting adapter for standard rail and PS-CPU connector	Mounting adapter for standard rail and PS-CPU connector[1]	Mounting adapter for standard rail and PS-CPU connector	Mounting adapter for standard rail and PS-CPU connector[3]

1) For mounting on a standard rail (35 mm x 15 mm), versions are available with an integrated mounting adapter: Order No. 6EP1331-1SL11
2) Delivery planned for December 2002; Successor type for 6ES7 307-1KA00-0AA0.
3) For mounting on a standard rail (35 mm x 15 mm), versions are available with an integrated mounting adapter: Order No. 6EP1334-1SL12

Ordering data

	Order No.
PS 307 load power supply module	
including power connector; 120/230 V AC; 24 V DC	
2 A	**6ES7 307-1BA00-0AA0**
2 A, extended temperature range	**6ES7 305-1BA80-0AA0**
5 A	**6ES7 307-1EA00-0AA0**
5 A, extended temperature range	**6ES7 307-1EA80-0AA0**
10 A (PS 307-1K)	**6ES7 307-1KA01-0AA0**

	Order No.
Mounting adapter	**6ES7 390-6BA00-0AA0**
for snapping PS 307 to the 35 mm DIN rail (EN 50 022)	
PS-CPU power connector	**6ES7 390-7BA00-0AA0**
Spare part	
S7 Manual Collection, S7-300 manual	See SM 321

► Available ex works

DIN rail

Overview



- The mechanical mounting rack of the SIMATIC S7-300
- For accommodating the modules
- Can be screwed onto the wall

Ordering data

	Order No.
DIN rail	
160 mm	**6ES7 390-1AB60-0AA0**
482 mm	**6ES7 390-1AE80-0AA0**
530 mm	**6ES7 390-1AF30-0AA0**
830 mm	**6ES7 390-1AJ30-0AA0**
2000 mm	**6ES7 390-1BC00-0AA0**

Labeling sheets

Overview

Labeling sheets

- Film sheets for application-specific labeling of I/O modules of the SIMATIC S7-300 with commercial laser printers
- Single-color films, tear-resistant, dirt-resistant
- Easy handling:
  - pre-perforated labeling sheets in DIN A4 format to allow easy separation of the labeling strips
  - the separated strips can be inserted directly into the I/O modules
- Different colors for distinction between module types or preferred areas of application: The labeling sheets are available in the colors teal, light beige, red and yellow. Yellow is reserved for fail-safe systems

Additional information is available in the internet under:
http://www.s7-smartlabel.de.

Technical specifications

Dimensions	DIN A4
Labeling strips per sheet, pre-perforated	10
Weight, approx.	0.1 kg

Ordering data

	Order No.
Labelling sheets	
for 16-channel signal modules, DIN A4, for printing using laser printer; 10 units	
Petrol	**6ES7 392-2AX00-0AA0**
Light beige	**6ES7 392-2BX00-0AA0**
Yellow	**6ES7 392-2CX00-0AA0**
Red	**6ES7 392-2DX00-0AA0**
Labelling sheets	
for 32-channel signal modules, DIN A4, for printing using 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**

► Available ex works

Labeling strips

Overview

- Teal-colored writable plastic strips
- For insertion in the front connector
- Spare part, 10 units

Ordering data

	Order No.		Order No.
Labelling strips for signal modules (except 32-channel), function modules and CPU 312 IFM	**6ES7 392-2XX00-0AA0**	**Labelling strips** for 32-channel signal modules	**6ES7 392-2XX10-0AA0**

Labelling cover

Overview

- Teal-colored film
- To cover and hold user-made labeling strips on normal paper
- Accessories, 10 units

Ordering data

	Order No.		Order No.
Labelling cover for signal modules (except 32-channel), function modules and CPU 312 IFM	**6ES7 392-2XY00-0AA0**	**Labelling cover** for 32-channel signal modules	**6ES7 392-2XY10-0AA0**

SIMATIC S7-400

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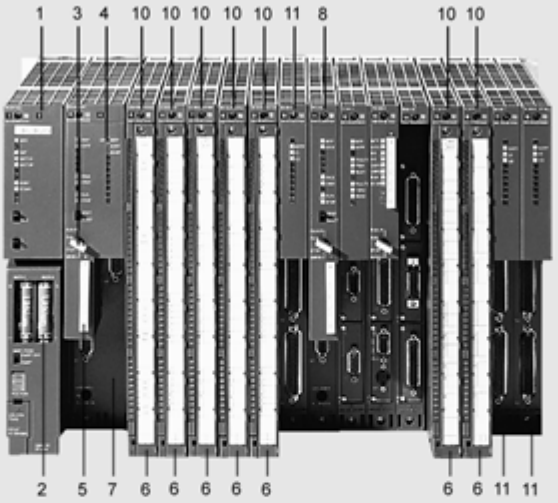




5/2	**Introduction**
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5/31	**Function modules**
5/31	FM 450-1 counter module
5/33	FM 451 positioning module
5/35	FM 452 electronic cam controller
5/36	FM 453 positioning module
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5/50	**SIMATIC S5 intelligent I/O modules**
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S7-400/S7-400H/S7-400F/FH

Overview



1: Power supply module
2: Buffer batteries
3: Mode switch (key-operated)
4: Status and fault LEDs
5: Memory card
6: Front connector with labelling field
7: CPU 1
8: CPU 2
10: I/O modules
11: IM interface modules

Fig. 5/1 Automation system SIMATIC S7-400

- The power PLC for the mid to high-end performance ranges
- The solution for even the most demanding tasks
- With a comprehensive range of modules and performance-graded CPUs for optimal adaptation to the automation task
- Flexible in use through simple implementation of distributed structures and extensive communications capabilities
- User-friendly handling and uncomplicated, fan-free design
- Trouble-free expansion when your task grows

SIMATIC S7-400H

Overview



- Fault-tolerant automation system with redundant design
- For applications with high fail-safety requirements
- Redundant central functions
- Increases availability of I/O: switched-I/O configuration
- Also possible to use standard-availability I/Os:single-sided configuration
- Hot standby: automatic reaction-free switching to the standby unit in the event of a fault
- Configuration with 2 separate or one divided central rack
- Connection of switched I/O via redundant PROFIBUS DP

SIMATIC S7-400H/FH

Overview



- Fail-safe automation system to satisfy high safety requirements
- If required, also fault-tolerant due to redundant design
- Without additional wiring of the fail-safe I/O; fail-safe communication over PROFIBUS-DP with PROFISafe profile
- Based on S7-400H and ET 200M with fail-safe modules
- Standard modules also for suitable use on the automation system for non-fail-safe applications

General technical specifications

Degree of protection	IP 20
Ambient temperature	0 to 60 °C
Relative humidity	5 to 95%, no condensation
Atmospheric pressure	860 to 1080 hPa
Electromagnetic compatibility	EG Directive 89/336/EWG;
	• Per EN 50082-2 (noise immunity), testing per : IEC 61000-4-2, IEC 61000-4-4, IEC 61000-4-3, IEC 61000-4-6, IEC 61000-4-5;
	Emitted interference to EN 50081-2, limit values accoridng to EN 55011, Class A, Group 1

Mechanical tolerance	
• Vibration, tested per/with	IEC 68, Part 2-6/10 to 58 Hz; constant amplitude 0.075 mm;
	58 to 150 Hz; constant acceleration 1 g;
	Duration of vibrations: 10 frequency cycles per axis in the direction of each of the three mutually normal axes
• Impact, tested per/with	IEC 68, Part 2-27/semi-sinusoidal:
	Impact 15 g (peak value), duration 11 ms

CPU 412-1 to CPU 417-4

Overview

CPU 412-1, CPU 412,2



- Economical entry into the medium performance range
- Suitable for use in small and medium-sized systems with medium-range performance requirements

CPU 412-1 to CPU 417-4

Overview
CPU 414-2, CPU 414-3



- The CPUs for more demanding requirements in the mid performance renge
- For installations with high requirements of programming size and insruction processing speeds.

Overview
CPU 416-2, CPU 416-3



- The powerful CPUs for the high-end performance range
- For installations with the demanding requirements of the high-end performance range

Overview
CPU 417-4



- The most powerful SIMATIC S7-400 CPU
- Can be used in the most sophisticated installations in the upper performance range
- With integrated PROFIBUS DP master interface
- Has 2 slots for IF modules (for serial interfaces)

Technical specifications

	CPU 412-1	CPU 412-2	CPU 414-2	CPU 414-3
Memory				
User memory, integrated				
• Integrated	48 KB for program 48 KB for data	72 KB for program 72 KB for data	128 KB for program 128 KBfor data	384 KB for program 384 KB for data
• Expandable	No	No	No	No
Load memory				
• Integrated	256 KB RAM	256 KB RAM	256 KB RAM	256 KB RAM
• Upgradable FEPROM	With memory card (FEPROM) up to 64 MB	With memory card (FEPROM) up to 64 MB	With memory card (FEPROM) up to 64 MB	With memory card (FEPROM) up to 64 MB
• Expandable RAM	With memory card (RAM) up to 64 MB	With memory card (RAM) up to 64 MB	With memory card (RAM) up to 64 MB	With memory card (RAM) up to 64 MB
Backup	Yes	Yes	Yes	Yes
• With battery	All data	All data	All data	All data
• Without battery	None	None	None	None
Execution times				
Processing times for				
• Bit operations, min.	0.2 µs	0.2 µs	0.1 µs	0.1 µs
• Word operations, min.	0.2 µs	0.2 µs	0.1 µs	0.1 µs
• Fixed-point addition, min.	0.2 µs	0.2 µs	0.1 µs	0.1 µs
• Floating-point addition, min.	0.6 µs	0.6 µs	0.6 µs	0.6 µs
Timers/counters and their retentivity				
S7 counters	256	256	256	256
• Retentivity selectable	From C 0 to C 255	From C 0 to C 255	From C 0 to C 255	From C 0 to C 255
• Default	From C 0 to C 7	From C 0 to C 7	From C 0 to C 7	From C 0 to C 7
• Counting range	1 to 999	1 to 999	1 to 999	1 to 999
IEC counters	Yes	Yes	Yes	Yes
• Type	SFB	SFB	SFB	SFB
S7 timers	256	256	256	256
• Retentivity selectable	From T 0 to T 255	From T 0 to T 255	From T 0 to T 255	From T 0 to T 255
• Default	No timer retentivity	No timer retentivity	No timer retentivity	No timer retentivity
• Range	10 ms to 9990 s	10 ms to 9990 s	10 ms to 9990 s	10 ms to 9990 s
IEC timers	Yes	Yes	Yes	Yes
• Type	SFB	SFB	SFB	SFB
Data ranges and their retentivity				
Bit memories	4 KB	4 KB	8 KB	8 KB
• Retentivity selectable	From MB 0 to MB 4095	From MB 0 to MB 4095	From MB 0 to MB 8191	From MB 0 to MB 8191
Clock bit memory	8 (1 flag byte)	8 (1 flag byte)	8 (1 flag byte)	8 (1 flag byte)
Blocks				
Max. block size	48 KB	64 KB	64 KB	64 KB
Number of				
• Watchdog interrupts	2	2	4	4
• Process alarms	2	2	4	4
• Time-of-day interrupts	2	2	4	4
• Delay interrupts	2	2	4	4
Nesting depth				
• Per priority class	24	24	24	24
• Additional within an error OB	2	2	2	2
FBs, max.	256	256	2048	2048
• Size, max.	48 KB	64 KB	64 KB	64 KB

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Technical specifications (continued)

	CPU 412-1	CPU 412-2	CPU 414-2	CPU 414-3
FCs, max.	256	256	2048	2048
• Size, max.	48 KB	64 KB	64 KB	64 KB
Data blocks, max.	512 (DB 0 reserved)	512 (DB 0 reserved)	4095 (DB 0 reserved)	4095 (DB 0 reserved)
Programming				
Programming language	STEP 7 V5.0 SP2 (LAD, FBD, STL); SCL, CFC, GRAPH, HiGraph	STEP 7 V5.0 SP2 (LAD, FBD, STL); SCL, CFC, GRAPH, HiGraph	STEP 7 V5.0 SP2 (LAD, FBD, STL); SCL, CFC, GRAPH, HiGraph	STEP 7 V5.0 SP2 (LAD, FBD, STL); SCL, CFC, GRAPH, HiGraph
Nesting levels	8	8	8	8
User program protection	Password protection	Password protection	Password protection	Password protection
Address areas (inputs/outputs)				
Total I/O address area	4 KB/4 KB	4 KB/4 KB	8 KB/8 KB	8 KB/8 KB
• Of which distributed	2 KB/2 KB	2 KB/2 KB		
- MPI/DP interface			2 KB/2 KB	2 KB/2 KB
- DP interface			6 KB/6 KB	6 KB/6 KB
- DP interface module			-	6 KB/6 KB
Process I/O image (adjustable to loads of the code range of RAM)	4 KB/4 KB	4 KB/4 KB	8 KB/8 KB	8 KB/8 KB
• Default	128 byte/128 byte	128 byte/128 byte	256 byte/256 byte	256 byte/256 byte
• No. of subprocess images, max.	8	8	8	8
Digital channels	Adequate	Adequate	Adequate	Adequate
• Of these, central	Adequate	Adequate	Adequate	Adequate
Analog channels	2048/2048	2048/2048	4096/4096	4096/4096
• Of these, central	2048/2048	2048/2048	4096/4096	4096/4096
Design				
Central controllers/expansion units, max.	1/21, of which 6 ER with k-bus	1/21, of which 6 ER with k-bus	1/21, of which 6 ER with k-bus	1/21, of which 6 ER with k-bus
Multicomputing	Max. 4 CPUs (with UR1 or UR2)	Max. 4 CPUs (with UR1 or UR2)	Max. 4 CPUs (with UR1 or UR2)	Max. 4 CPUs (with UR1 or UR2)
Number of IMs connectable (total), max.	6	6	6	6
• IM 460, max.	6	6	6	6
• IM 463, max.	6	6	6	6
Number of DP masters				
• Integrated	1	2	2	2
• Using interface submodule	None	None	None	1
• Using IM 467	4	4	4	4
• Using CP	10	10	10	10
• Using mixed operation IM+CP	-	-	No	No
Number of S5 modules connectable (using adapter casing, in the central controller), max.	6	6	6	6
Supported function modules and communications processors				
• FMs	Restricted by number of slots and number of connections	Restricted by number of slots and number of connections	Restricted by number of slots and number of connections	Restricted by number of slots and number of connections

Technical specifications (continued)

	CPU 412-1	CPU 412-2	CPU 414-2	CPU 414-3
Supported function modules and communications processors				
• CPs, point-to-point	Restricted by number of slots and number of connections	Restricted by number of slots and number of connections	Restricted by number of slots and number of connections	Restricted by number of slots and number of connections
• CPs, LAN	Restricted by number of slots and number of connections; up to 4 with S5-compatible communication	Restricted by number of slots and number of connections; up to 4 with S5-compatible communication	Restricted by number of slots and number of connections; up to 4 with S5-compatible communication	Restricted by number of slots and number of connections; up to 4 with S5-compatible communication
Time-of-day				
Clock	Yes	Yes	Yes	Yes
• Backed up	Yes	Yes	Yes	Yes
Hours counter	8	8	8	8
Time-of-day synchronization	Yes	Yes	Yes	Yes
• In AS	Master/slave	Master/slave	Master/slave	Master/slave
• On MPI	Master/slave	Master/slave	Master/slave	Master/slave
S7 signaling functions				
Number of loggable stations for message functions (e.g. OS)	8	8	8	8
Process diagnostics messages	Yes	Yes	Yes	Yes
Test and startup function				
Status/force variable	Yes	Yes	Yes	Yes
Force	Yes	Yes	Yes	Yes
Status chip	Yes	Yes	Yes	Yes
Single step	Yes	Yes	Yes	Yes
Diagnostic buffer	Yes	Yes	Yes	Yes
• Number of entries, max.	200 (adjustable)	400 (adjustable)	400 (adjustable)	3200 (adjustable)
Communication functions				
Total connections	16	16	32	32
• Of these OS connections, max.	8	8	8	8
Programming device/OP communications	Yes	Yes	Yes	Yes
Global data communication	Yes	Yes	Yes	Yes
S7 basic communication	Yes	Yes	Yes	Yes
S7 Communication	Yes	Yes		
• As server	Yes	Yes	Yes	Yes
• As client	Yes	Yes	Yes	Yes
Number of total connections	16	16	32	32
Usable for				
• PG communication				
- reserved	1	1	1	1
- adjustable	No	No	No	No
• OP communication				
- reserved	1	1	1	1
- adjustable	No	No	No	No

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Technical specifications (continued)

	CPU 412-1	CPU 412-2	CPU 414-2	CPU 414-3
Usable for				
• S7 basic communication				
- reserved	No	No	No	No
- adjustable	No	No	No	No
• Routing (assigned 2 connections!)				
- reserved	No	No	No	No
- adjustable	No	No	No	No
Interfaces				
1st interface				
Functionality				
• MPI	Yes	Yes	Yes	Yes
• DP master	Yes	Yes	Yes	Yes
• DP slave	No	No	No	No
• Default setting	MPI	MPI	MPI	MPI
• Electrical isolation	Yes	Yes	Yes	Yes
MPI				
Number of connections	16	16	32	32
Programming device/OP communications	Yes	Yes	Yes	Yes
Routing	Yes	Yes	Yes	Yes
Global data communication	Yes	Yes	Yes	Yes
• Number of GD packets				
- sender, max.	8	8	8	8
- receiver, max.	16	16	16	16
• Size of the GD packets, max.	64 byte	64 byte	64 byte	64 byte
S7 standard communication	Yes	Yes	Yes	Yes
• User data per job, max.	76 byte	76 byte	76 byte	76 byte
S7 communication	Yes	Yes		
• As server	Yes	Yes	Yes	Yes
• As client	Yes	Yes	Yes	Yes
• User data per job, max.	64 KB	64 KB	64 KB	64 KB
S5-compatible communications	Yes (using CP and reloadable FC)	Yes (using CP and reloadable FC)	Yes (using CP and reloadable FC)	Yes (using CP and reloadable FC)
• User data per job, max.	8 KB	8 KB	8 KB	8 KB
Standard communications	Yes (using CP and reloadable FC)	Yes (using CP and reloadable FC)	Yes (using CP and reloadable FC)	Yes (using CP and reloadable FC)
Transmission rates	Up to 12 Mbit/s	Up to 12 Mbit/s	Up to 12 Mbit/s	Up to 12 Mbit/s
DP master	Yes	Yes		
Number of connections	16 for PG/OP communication	16 for PG/OP communication	16 for PG/OP communication	16 for PG/OP communication
• Of these reserved	1 for PG, 1 for OP	1 for PG, 1 for OP	1 for PG, 1 for OP	1 for PG, 1 for OP
Services				
• Programming device/OP communications	Yes	Yes	Yes	Yes
• Support for internode communications	Yes	Yes	Yes	Yes
• Isochronicity	Yes	Yes	Yes	Yes
• SYNC/FREEZE	Yes	Yes	Yes	Yes
• Global data communication	No	No	Yes	Yes

Technical specifications (continued)

	CPU 412-1	CPU 412-2	CPU 414-2	CPU 414-3
Services				
• S7 basic communication	No	No	Yes	Yes
• S7 Communication				
- as server	No	No	Yes	Yes
- as client	No	No	Yes	Yes
Transmission rates	Up to 12 bit/s	Up to 12 Mbit/s	Up to 12 Mbit/s	Up to 12 Mbit/s
Number of DP slaves, max.	32	32	32	32
Number of slots, max.	512	512	512	512
Address range, max.	2 KB	2 KB	2 KB	2 KB
User data per DP slave, max.	244 byte I/244 byte O	244 byte I/244 byte O	244 byte I/244 byte O	244 byte I/244 byte O
2nd interface				
Functionality				
• DP master	-	Yes	Yes	Yes
• DP slave	-	No	No	No
• Point-to-point connection	-	No	No	No
• Default setting	-	DP master	DP master	DP master
• Electrical isolation	-	Yes	Yes	Yes
DP master				
Number of connections	-	16 for PG/OP communication	32 for PG/OP communication	32 for PG/OP communication
• Of which reserved	-	1 for PG, 1 for OP	1 for PG, 1 for OP	1 for PG, 1 for OP
Services				
• Programming device/OP communications	-	Yes	Yes	Yes
• Support for internode communications	-	Yes	Yes	Yes
• Isochronicity	-	Yes	Yes	Yes
• SYNC/FREEZE	-	Yes	Yes	Yes
• Global data communication	No	No	No	No
• S7 basic communication	No	No	No	No
• S7 communication				
- as server	No	No	No	No
- as client	No	No	No	No
Transmission rates	-	Up to 12 Mbit/s	Up to 12 Mbit/s	Up to 12 Mbit/s
Number of DP slaves, max.	-	64	96	96
Number of slots, max.	-	1024	1536	1536
Address range, max.	-	2 KB	6 KB	6 KB
User data per DP slave, max.	-	244 byte I/244 byte O	244 byte I/244 byte O	244 byte I/244 byte O
3rd interface	-	-	Technical specifications as 2nd interface	
Connectable interface module	-	-	-	IF 964-DP as DP master
Voltages, currents				
Supply voltage	Rated value 24 V DC	Rated value 24 V DC	Rated value 24 V DC	Rated value 24 V DC
Current consumption from S7-400® bus (5 V DC)	Typ. 1.5 A, max. 1.6 A	Typ. 1.5 A, max. 1.6 A	Typ. 1.5 A, max. 1.6 A	Typ. 1.5 A, max. 1.6 A
Current consumption from S7-400® bus (24 V DC)	Max. 0.15 A	Max. 0.3 A	Max. 0.3 A	Max. 0.3 A
Backup current	Typ. 40 µA, max. 300 µA	Typ. 40 µA, max. 320 µA	Typ. 40 µA, max. 380 µA	Typ. 40 µA, max. 420 µA

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Technical specifications (continued)

	CPU 412-1	CPU 412-2	CPU 414-2	CPU 414-3
Supply of external backup voltage to CPU	5 to 15 V DC	5 to 15 V DC	5 to 15 V DC	5 to 15 V DC
PG supply on MPI (15 to 30 V DC)	Max. 150 mA	Max. 300 mA	Max. 300 mA	Max. 300 mA
Power loss	Typ. 8 W	Typ. 8 W	Typ. 8 W	Typ. 8 W
Dimensions				
Installation dimensions (W x H x D) in mm	25 x 290 x 219	25 x 290 x 219	25 x 290 x 219	50 x 290 x 219
Required slots	1	1	1	2
Weight, approx.	720 g	720 g	720 g	1070 g

Technical specifications (continued)

	CPU 416-2	CPU 416-3	CPU 417-4
Memory			
User memory, integrated			
• Integrated	0.8 MB for program 0.8 MB for data	1.6 MB for program 1.6 MB for data	2 MB for program 2 MB for data
• Expandable	No	No	Up to 8 MB for program Up to 8 MB for data
Load memory			
• Integrated	256 KB RAM	256 KB RAM	256 KB RAM
• Upgradable FEPROM	With memory card (FEPROM) up to 64 MB	With memory card (FEPROM) up to 64 MB	With memory card (FEPROM) up to 64 MB
• Expandable RAM	With memory card (FEPROM) up to 64 MB	With memory card (FEPROM) up to 64 MB	With memory card (FEPROM) up to 64 MB
Backup	Yes	Yes	Yes
• With battery	All data	All data	All data
• Without battery	None	None	None
Execution times			
Processing times for			
• Bit operations, min.	0.08 µs	0.08 µs	0.1 µs
• Word operations, min.	0.08 µs	0.08 µs	0.1 µs
• Fixed-point addition, min.	0.08 µs	0.08 µs	0.1 µs
• Floating-point addition, min.	0.48 µs	0.48 µs	0.6 µs
Timers/counters and their retentivity			
S7 counters	512	512	512
• Retentivity selectable	From C 0 to Z 511	From C 0 to Z 511	From C 0 to Z 511
• Default	From C 0 to Z 7	From C 0 to Z 7	From C 0 to Z 7
• Counting range	1 to 999	1 to 999	1 to 999
IEC counters	Yes	Yes	Yes
• Type	SFB	SFB	SFB
S7 timers	512	512	512
• Retentivity selectable	From T 0 to T 511	From T 0 to T 511	From T 0 to T 511
• Default	No timer retentivity	No timer retentivity	No timer retentivity
• Range	10 ms to 9990 s	10 ms to 9990 s	10 ms to 9990 s
IEC timers	Yes	Yes	Yes
• Type	SFB	SFB	SFB
Data ranges and their retentivity			
Bit memories	16 KB	16 KB	16 KB
• Retentivity selectable	From MB 0 to MB 16383	From MB 0 to MB 16383	From MB 0 to MB 16383
Clock bit memory	8 (1 flag byte)	8 (1 flag byte)	8 (1 flag byte)

Technical specifications (continued)

	CPU 416-2	CPU 416-3	CPU 417-4
Blocks			
Max. block size	64 KB	64 KB	64 KB
Number of			
• Watchdog interrupts	9	9	9
• Process alarms	8	8	8
• Time-of-day interrupts	8	8	8
• Delay interrupts	4	4	4
Nesting depth			
• Per priority class	24	24	24
• Additional within an error OB	2	2	2
FBs, max.	2048	2048	6144
• Size, max.	64 KB	64 KB	64 KB
FCs, max.	2048	2048	6144
• Size, max.	64 KB	64 KB	64 KB
Data blocks, max.	4096 (DB 0 reserved)	4096 (DB 0 reserved)	8192 (DB 0 reserved)
Programming			
Programming language	STEP 7 V5.0 SP2 (LAD, FBD, STL); SCL, CFC, GRAPH, HiGraph	STEP 7 V5.0 SP2 (LAD, FBD, STL); SCL, CFC, GRAPH, HiGraph	STEP 7 V5.0 SP2 (LAD, FBD, STL); SCL, CFC, GRAPH, HiGraph
Nesting levels	8	8	8
User program protection	Password protection	Password protection	Password protection
Address areas (inputs/outputs)			
Total I/O address area	16 KB/16 KB	16 KB/16 KB	16 KB/16 KB
• Of which distributed	2 KB/2 KB	2 KB/2 KB	2 KB/2 KB
- MPI/DP interface	8 KB/8 KB	8 KB/8 KB	8 KB/8 KB
- DP interface	-	8 KB/8 KB	8 KB/8 KB
- 1. DP interface module		8 KB/8 KB	8 KB/8 KB
- 2. DP interface module	-	-	8 KB/8 KB
Process I/O image (adjustable to loads of the code range of RAM)	16 KB/16 KB	16 KB/16 KB	16 KB/16 KB
• Default	512 byte/512 byte	512 byte/512 byte	1024 byte/1024 byte
• No. of subprocess images, max.	8	8	8
Digital channels	131072/131072	131072/131072	131072/131072
• Of these, central	131072/131072	131072/131072	131072/131072
Analog channels	8192/8192	8192/8192	8192/8192
• Of these, central	8192/8192	8192/8192	8192/8192
Design			
Central controllers/expansion units, max.	1/21, of which 6 ER with k-bus	1/21, of which 6 ER with k-bus	1/21, of which 6 ER with k-bus
Multicomputing	Max. 4 CPUs (with UR1 or UR2)	Max. 4 CPUs (with UR1 or UR2)	Max. 4 CPUs (with UR1 or UR2)
Number of IMs connectable (total), max.	6	6	6
• IM 460, max.	6	6	6
• IM 463, max.	6	6	6

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Technical specifications (continued)

	CPU 416-2	CPU 416-3	CPU 417-4
Number of DP masters			
• Integrated	2	2	2
• Using interface submodule	None	1	2
• Using IM 467	4	4	4
• Using CP	10	10	10
• Using mixed operation IM + CP	No	No	No
Number of connectable S5 modules (via adapter casing, in the central controller), max.	6	6	6
Supported function modules and communications processors			
• FMs	Restricted by number of slots and number of connections	Restricted by number of slots and number of connections	Restricted by number of slots and number of connections
• CPs, point-to-point	Restricted by number of slots and number of connections	Restricted by number of slots and number of connections	Restricted by number of slots and number of connections
• CPs, LAN	Restricted by number of slots and number of connections; up to 4 with S5-compatible communication	Restricted by number of slots and number of connections; up to 4 with S5-compatible communication	Restricted by number of slots and number of connections; up to 4 with S5-compatible communication
Time-of-day			
Clock	Yes	Yes	Yes
• Backed up	Yes	Yes	Yes
Hours counter	8	8	8
Time-of-day synchronization	Yes	Yes	Yes
• In AS	Master/slave	Yes	Master/slave
• On MPI	Master/slave	Yes	Master/slave
S7 signaling functions			
Number of loggable stations for message functions (e.g., OS)	12	12	16
Process diagnostics messages	Yes	Yes	Yes
Test and startup function			
Status/force variable	Yes	Yes	Yes
Force	Yes	Yes	Yes
Status chip	Yes	Yes	Yes
Single step	Yes	Yes	Yes
Diagnostic buffer	Yes	Yes	Yes
• Number of entries, max.	3200 (adjustable)	3200 (adjustable)	3200 (adjustable)
Communication functions			
Total connections	64	64	64
• Of which OS connections, max.	12	12	16
Programming device/OP communications	Yes	Yes	Yes
Global data communication	Yes	Yes	Yes
S7 basic communication	Yes	Yes	Yes
S7 communication			
• As server	Yes	Yes	Yes
• As client	Yes	Yes	Yes

Technical specifications (continued)

	CPU 416-2	CPU 416-3	CPU 417-4
Number of total connections	64	64	64
Usable for			
• PG communication			
- reserved	1	1	1
- adjustable	No	No	No
• OP communication			
- reserved	1	1	1
- adjustable	No	No	No
• S7 basic communication			
- reserved	No	No	No
- adjustable	No	No	No
• Routing (assigned 2 connections!)			
- reserved	No	No	No
- adjustable	No	No	No
Interfaces			
1st interface			
Functionality			
• MPI	Yes	Yes	Yes
• DP master	Yes	Yes	Yes
• DP slave	No	No	No
• Default setting	MPI	MPI	MPI
• Electrical isolation	Yes	Yes	Yes
MPI			
Number of connections	44	44	44
Programming device/OP communications	Yes	Yes	Yes
Routing	Yes	Yes	Yes
Global data communication	Yes	Yes	Yes
• Number of GD packets			
- sender, max.	16	16	16
- receiver, max.	32	32	32
• Size of the GD packets, max.	64 byte	64 byte	64 byte
S7 standard communication	Yes	YesYes	Yes
• User data per job, max.	76 byte	76 byte	76 byte
S7 communication			
• As server	Yes	Yes	Yes
• As client	Yes	Yes	Yes
• User data per job, max.	64 KB	64 KB	64 KB
S5-compatible communications	Yes (via CP and reloadable FC)	Yes (via CP and reloadable FC)	Yes (via CP and reloadable FC)
• User data per job, max.	8 KB	8 KB	8 KB
Standard communication	Yes (via CP and reloadable FC)	Yes (via CP and reloadable FC)	Yes (via CP and reloadable FC)
Transmission rates	Up to 12 Mbit/s	Up to 12 Mbit/s	Up to 12 MBit/s
DP master			
Number of connections	32 for PG/OP communication	32 for PG/OP communication	32 for PG/OP communication
• Of these reserved	1 for PG, 1 for OP	1 for PG, 1 for OP	1 for PG, 1 for OP

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Technical specifications (continued)

	CPU 416-2	CPU 416-3	CPU 417-4
Services			
• Programming device/OP communications	Yes	Yes	Yes
• Support for internode communications	Yes	Yes	Yes
• Isochronicity	Yes	Yes	Yes
• SYNC/FREEZE	Yes	Yes	Yes
• Global data communication	Yes	Yes	No
• S7 basic communication	No	No	No
• S7 communication			
- as server	No	No	No
- as client	No	No	No
Transmission rates	Up to 12 Mbit/s	Up to 12 Mbit/s	Up to 12 Mbit/s
Number of DP slaves, max.	32	32	32
Number of slots, max.	512	512	512
Address range, max.	2 KB	2 KB	2 KB
User data per DP slave, max.	244 byte I/244 byte O	244 byte I/244 byte O	244 byte I/244 byte O
2nd interface			
Functionality			
• DP master	Yes	Yes	Yes
• DP slave	No	No	No
• Point-to-point connection	No	No	No
• Default setting	DP master	DP master	DP master
• Electrical isolation	Yes	Yes	Yes
DP master			
Number of connections	32 for PG/OP communication	32 for PG/OP communication	32 for PG/OP communication
- of these reserved	1 for PG, 1 for OP	1 for PG, 1 for OP	1 for PG, 1 for OP
Services			
• Programming device/ OP communications	Yes	Yes	Yes
• Support for internode communications	Yes	Yes	Yes
• Isochronicity	Yes	Yes	Yes
• SYNC/FREEZE	Yes	Yes	Yes
• Global data communication	No	No	No
• S7 basic communication	No	No	No
• S7 communication			
- as server	No	No	No
- as client	No	No	No
Transmission rates	Up to 12 Mbit/s	Up to 12 Mbit/s	Up to 12 Mbit/s
Number of DP slaves, max.	96	125	125
Number of slots, max.	1536	2048	2048
Address range, max.	6 KB	8 KB	8 KB
User data per DP slave, max.	244 byte I/244 byte O	244 byte I/244 byte O	244 byte I/244 byte O
3rd interface	Technical specifications see 2nd interface	Technical specifications see 2nd interface	Technical specifications see 2nd interface
Suitable interface submodules	-	IF 964-DP as DP master	IF 964-DP as DP master

Technical specifications (continued)

	CPU 416-2	CPU 416-3	CPU 417-4
4th interface	-	-	Technical specifications see 2nd interface
Suitable interface submodules			IF 964-DP as DP master
Voltages, currents			
Supply voltage	Rated value 24 V DC	Rated value 24 V DC	Rated value 24 V DC
Current consumption from S7-400 bus (5 V DC)	Typ. 1.5 A, max. 1.6 A	Typ. 1.5 A, max. 1.8 A	Typ. 1.8 A, max. 2.0 A
Current consumption from S7-400 bus (24 V DC)	Max. 0.3 A	Max. 0.3 A	Max. 0.3 A
Backup current	Typ. 40 µA, max. 380 µA	Typ. 50 µA, max. 460 µA	Typ. 75 µA, max. 860 µA
Supply of external backup voltage to CPU	5 to 15 V DC	5 to 15 V DC	5 to 15 V DC
PG supply on MPI (15 to 30 V DC)	Max. 300 mA	Max. 150 mA	Max. 150 mA
Power loss	Typ. 8 W	Typ. 8 W	Typ. 10 W
Dimensions			
Installation dimensions (W x H x D) in mm	25 x 290 x 219	50 x 290 x 219	50 x 290 x 219
Required slots	1	2	2
Weight, approx.	720 g	1070 g	1070 g

Ordering data

	Order No.
CPU 412-1 Main memory 96 KB, power supply 24 V DC, MPI/ PROFIBUS DP master interface, slot for memory card, incl. slot number labels, 2 keys	**6ES7 412-1XF03-0AB0**
CPU 412-2 Main memory 144 KB, power supply 24 V DC, MPI/ PROFIBUS DP master interface, slot for memory card, incl. slot number labels, 2 keys	**6ES7 412-2XG00-0AB0**
CPU 414-2 Main memory 256 KB, power supply 24 V DC, MPI/ PROFIBUS DP master interface, slot for memory card, incl. slot number labels, 2 keys	**6ES7 414-2XG03-0AB0**
CPU 414-3 Main memory 768 KB, power supply 24 V DC, MPI/PROFIBUS DP master interface, PROFIBUS DP master interface, slot for memory card, slot for IF module, incl. slot number labels, 2 keys	**6ES7 414-3XJ00-0AB0**
CPU 416-2 Main memory 1.6 MB, power supply 24 V DC, MPI/ PROFIBUS DP master interface, PROFIBUS DP master interface, slot for memory card, incl. slot number labels, 2 keys	**6ES7 416-2XK02-0AB0**

	Order No.
CPU 416-3 Main memory 3.2 KB, power supply 24 V DC, MPI/PROFIBUS DP master interface, PROFIBUS DP master interface, slot for memory card, slot for IF module, incl. slot number labels, 2 keys	**6ES7 416-3XL00-0AB0**
CPU 417-4 Main memory 4 MB, power supply 24 V DC, MPI/ PROFIBUS DP master interface, PROFIBUS DP master interface, 2 slots for IF modules, slot for memory card, incl. slot number labels, 2 keys	**6ES7 417-4XL00-0AB0**
RAM (main memory)	
for CPU 417-4	
2x2 MB	**6ES7 955-2AL00-0AA0**
2x4 MB	**6ES7 955-2AM00-0AA0**
RAM memory card	
64 KB	**6ES7 952-0AF00-0AA0**
256 KB	**6ES7 952-1AH00-0AA0**
1 MB	**6ES7 952-1AK00-0AA0**
2 MB	**6ES7 952-1AL00-0AA0**
4 MB	**6ES7 952-1AM00-0AA0**
8 MB	**6ES7 952-1AP00-0AA0**
16 MB	**6ES7 952-1AS00-0AA0**

CPU 412-1 to CPU 417-4

Ordering data (continued)	Order No.
FEPROM memory card	
64 KB	**6ES7 952-0KF00-0AA0**
256 KB	**6ES7 952-0KH00-0AA0**
1 MB	**6ES7 952-1KK00-0AA0**
2 MB	**6ES7 952-1KL00-0AA0**
4 MB	**6ES7 952-1KM00-0AA0**
8 MB	**6ES7 952-1KP00-0AA0**
16 MB	**6ES7 952-1KS00-0AA0**
32 MB[A)]	**6ES7 952-1KT00-0AA0**
64 MB[A)]	**6ES7 952-1KY00-0AA0**
MPI cable	**6ES7 901-0BF00-0AA0**
for connecting SIMATIC S7 and PG via MPI; 5 m long	
IF 964-DP interface module	**6ES7 964-2AA01-0AB0**
to connect an additional DP line	
Spare keys for CPU	**6ES7 911-0AA00-0AA0**
2 units (spare part)	
Slot number labels	**6ES7 912-0AA00-0AA0**
1 set (spare part)	
Manual "SIMATIC S7-400 programmable controller"	
incl. operation list	
German	**6ES7 498-8AA03-8AA0**
English	**6ES7 498-8AA03-8BA0**
French	**6ES7 498-8AA03-8CA0**
Spanish	**6ES7 498-8AA03-8DA0**
Italian	**6ES7 498-8AA03-8EA0**
S7-400 operation list	
German	**6ES7 498-8AA03-8AN0**
English	**6ES7 498-8AA03-8BN0**
French	**6ES7 498-8AA03-8CN0**
Spanish	**6ES7 498-8AA03-8DN0**
Italian	**6ES7 498-8AA03-8EN0**
Manual "Communication for SIMATIC S7-300/-400"	
German	**6ES7 398-8EA00-8AA0**
English	**6ES7 398-8EA00-8BA0**
French	**6ES7 398-8EA00-8CA0**
Spanish	**6ES7 398-8EA00-8DA0**
Italian	**6ES7 398-8EA00-8EA0**

	Order No.
SIMATIC Manual Collection	**6ES7 998-8XC01-8YE0**
Electronic manuals on CD-ROM, in 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	
SIMATIC Manual Collection updating service for 1 year	**6ES7 998-8XC01-8YE2**
Current Manual Collection CD as well as the three following updates	
Technical overview "S7-400 programmable controller - design and application"	
German	**6ES7 498-8AA00-8AB0**
English	**6ES7 498-8AA00-8BB0**
French	**6ES7 498-8AA00-8CB0**
Spanish	**6ES7 498-8AA00-8DB0**
Italian	**6ES7 498-8AA00-8EB0**
Technical overview "From SIMATIC S5 to SIMATIC S7"	
German	**6ES7 398-8AA01-8AB0**
English	**6ES7 398-8AA01-8BB0**
French	**6ES7 398-8AA01-8CB0**
Spanish	**6ES7 398-8AA01-8DB0**
Italian	**6ES7 398-8AA01-8EB0**
RS 485 bus connector with 90° outgoing feeder cable	
Max. transmission rate 12 Mbit/s	
Without PG interface	**6ES7 972-0BA12-0XA0**
With PG interface	**6ES7 972-0BB12-0XA0**
RS 485 bus connector with slanting outgoing feeder cable	
Max. transmission rate 12 Mbit/s	
Without PG interface	**6ES7 972-0BA41-0XA0**
With PG interface	**6ES7 972-0BB41-0XA0**
RS 485 bus connector with 90° outgoing feeder cable for Fast Connect system	
Max. transmission rate 12 Mbit/s	
Without PG interface	**6ES7 972-0BA50-0XA0**
With PG interface	**6ES7 972-0BB50-0XA0**
RS 485 bus connector with axial outgoing feeder cable	
for SIMATIC OP, for connection to PPI, MPI, PROFIBUS	**6GK1 500-0EA02**
PROFIBUS FastConnect bus cable	
Standard type with special design for fast mounting, 2-core, shielded, sold by the meter; max. delivery unit 1000 m, minimum ordering length 20 m	**6XV1 830-0EH10**

CPU 414-4H, 417-4H for S7-400H / F/FH

Overview
CPU 414-4H



- CPU for the SIMATIC S7-400 H and S7-400 F/FH
- Can be used in high availability S7-400 H systems
- With F-runtime license and F-compatible CPU for use in safety-related S7-400 F/FH systems
- With integrated PROFIBUS DP master interface
- With 2 slots for Sync modules

Overview
CPU 417-4H



- The CPU for the SIMATIC S7-400 H and S7-400 F/FH
- Can be used in high availability S7-400 H systems
- Can be used with F runtime license as F-compatible CPU in safety-oriented systems S7-400 F/FH
- With integrated PROFIBUS DP master interface
- With 2 slots for sync modules

Technical specifications

	CPU 417-4H	CPU 414-4H
Memory		
User memory, integrated		
• Integrated	2 MB for program 2 MB for data	384 KB for program 384 KB for data
• Expandable	Up to 10 MB for program Up to 10 MB for data	No
Load memory		
• Integrated	256 KB RAM	256 KB RAM
• Upgradable FEPROM	With memory card (FEPROM) up to 64 MB	With memory card (FEPROM) up to 64 MB
• Expandable RAM	With memory card (FEPROM) up to 64 MB	With memory card (FEPROM) up to 64 MB
Backup	Yes	Yes
• With battery	All data	All data
• Without battery	None	None
Execution times		
Processing times for		
• Bit operations, min.	0.1 µs	0.1 µs

	CPU 417-4H	CPU 414-4H
Processing times for		
• Word operations, min.	0.1 µs	0.1 µs
• Fixed-point addition, min.	0.1 µs	0.1 µs
• Floating-point addition, min.	0.6 µs	0.6 µs
Timers/counters and their retentivity		
S7 counters	512	256
• Retentivity selectable	From C 0 up to C 511	From C 0 up to C 255
• Counting range	1 to 999	1 to 999
IEC counters	Yes	Yes
• Type	SFB	SFB
S7 timers	512	256
• Range	10 ms to 9990 s	10 ms to 9990 s
IEC timers	Yes	Yes
• Type	SFB	SFB
Data areas		
Bit memories	16 KB	8192
• Retentivity selectable	From MB 0 to MB 16383	From MB 0 to MB 8191

CPU 414-4H, 417-4H for S7-400H / F/FH

Technical specifications (continued)

	CPU 417-4H	CPU 414-4H
Blocks		
Max. block size	64 KB	64 KB
FBs, max.	6144	2048
FCs, max.	6144	2048
Data blocks, max.	8192 (DB 0 reserved)	4095
Address areas (inputs/outputs)		
Total I/O address area	16 KB/16 KB	8 KB/8 KB
• Of which distributed		
- MPI/DP interface	2 KB/2 KB	2 KB/2 KB
- DP interface	8 KB/8 KB	6 KB/6 KB
Process I/O image (adjustable to loads of the code range of RAM)	16 KB/16 KB	8 KB/8 KB
• Default	1024 byte/1024 byte	1024 byte/1024 byte
• No. of subprocess images, max.	8	8
Digital channels	131072/131072	65536/65536
• Of these, central	131072/131072	65536/65536
Analog channels	8192/8192	4096/4096
• Of these, central	8192/8192	4096/4096
Design		
Central controllers/expansion units, max.	1/21	1/20
Multicomputing	No	No
Number of IMs connectable (total), max.	6	6
• IM 460, max.	6	6
• IM 463, max.	6	6
Number of DP masters		
• Integrated	2	2
• Using interface submodule	None	None
• Via IM 467	None	None
• Via CP	10	10
• In mixed operation IM+CP	No	No
Supported function modules and communications processors		
• FMs	Restricted by number of slots and number of connections	Restricted by number of slots and number of connections
• CPs, point-to-point	Restricted by number of slots and number of connections	Restricted by number of slots and number of connections
• CPs, LAN	Restricted by number of slots and number of connections	Restricted by number of slots and number of connections
Time-of-day		
Clock	Yes	Yes
• Backed up	Yes	Yes
Hours counter	8	8

	CPU 417-4H	CPU 414-4H
Time-of-day synchronization	Yes	Yes
S7 message functions		
• Number of stations that can be defined for message functions (e.g. OS) max.	16	16
Communication functions		
Total connections	64	32
Programming device/ OP communications	Yes	Yes
Global data communication	No	No
S7 basic communication	No	No
• User data per job, max.	-	
S7 communication		
• As server	Yes	Yes
• As client	Yes	Yes
• User data per job, max.	64 KB	64 KB
S5-compatible communications	Yes (using CP and reloadable FC)	Yes (using CP and reloadable FC)
• User data per job, max.	8 KB	8 KB
Standard communications	Yes (using CP and reloadable FC)	Yes (using CP and reloadable FC)
• User data per job	Dependent on the CP	Dependent on the CP
Total number of connections	64	64
Usable for		
• Programming device communications		
- reserved	1	1
- adjustable	No	No
• OP communications		
- reserved	1	1
- adjustable	No	No
• S7 standard communication		
- reserved	No	No
- adjustable	No	No
• Routing (assigned 2 connections!)		
- reserved	No	No
- adjustable	No	No
Interfaces		
1st interface		
Functionality		
• MPI	Yes	Yes
• DP master	Yes	Yes
• DP slave	No	No
• Default setting	MPI	MPI
• Electrical isolation	Yes	Yes
MPI		
Number of connections	44	32

Technical specifications (continued)

	CPU 417-4H	CPU 414-4H
Services		
• Programming device/ OP communications	Yes	Yes
• Global data communication	No	No
• S7 basic communication	No	No
• S7 Communication		
- as server	Yes	Yes
- as client	Yes	Yes
Transmission rates	Up to 12 Mbit/s	Up to 12 Mbit/s
DP master		
Number of connections	32 for PG/OP communication	32
• Of these reserved	1 for PG, 1 for OP	1 for PG, 1 for OP
Services		
• Programming device/ OP communications	Yes	Yes
• Support for internode traffic	No	No
• Isochronicity	No	No
• SYNC/FREEZE	No	No
• Global data communication	No	No
• S7 standard communication	No	No
• S7 Communication		
- as server	No	No
- as client	No	No
Transmission rates	Up to 12 Mbit/s	Up to 12 Mbit/s
Number of DP slaves, max.	32	32
Number of slots, max.	512	512
Address range, max.	2 KB	2 KB
User data per DP slave, max.	244 byte E/244 byte A	244 byte E/244 byte A
2nd interface		
Functionality		
• DP master	Yes	Yes
• DP slave	No	No
• Point-to-point link	No	No
• Default setting	DP master	DP master
• Electrical isolation	Yes	Yes
DP master		
Number of connections	16 for PG/OP communication	16
• Of which reserved	1 for PG, 1 for OP	1 for PG, 1 for OP

	CPU 417-4H	CPU 414-4H
Services		
• Programming device/ OP communications	Yes	Yes
• Support for internode traffic	No	No
• Isochronicity	No	No
• SYNC/FREEZE	No	No
• Global data communication	No	No
• S7 basic communication	No	No
• S7 communication		
- as server	No	No
- as client	No	No
Transmission rates	Up to 12 Mbit/s	Up to 12 Mbit/s
Number of DP slaves, max.	125	96
Number of slots, max.	2048	1536
Address range, max.	8 KB	8 KB
User data per DP slave, max.	244 byte E/244 byte A	244 byte E/244 byte A
Programming		
Programming language	STEP 7 V5.0 SP2 (LAD, FBD, STL); SCL, CFC, GRAPH, HiGraph	STEP 7 V5.0 SP2 (LAD, FBD, STL); SCL, CFC, GRAPH, HiGraph
User program protection	Password protection	Password protection
Voltages, currents		
Supply voltage	Rated value 24 V DC	Rated value 24 V DC
Current consumption from S7-400® bus (5 V DC)	Typ. 1.8 A, max. 2.0 A	Typ. 1.8 A, max. 2.0 A
Current consumption from S7-400® bus (24 V DC)	Max. 0.3 A	Max. 0.3 A
Backup current	Typ. 75 µA, max. 860 µA	Typ. 75 µA, max. 860 µA
Supply of external backup voltage to CPU	5 DC to 15 V	5 DC to 15 V
PG supply on MPI (15 to 30 V DC)	Max. 150 mA	Max. 150 mA
Power loss	Typ. 10 W	Typ. 10 W
Dimensions		
Installation dimensions (W x H x D) in mm	50 x 290 x 219	50 x 290 x 219
Required slots	2	2
Weight, approx.	1070 g	1070 g

Ordering data

	Order No.
CPU 414-4H Main memory 768 KB, power supply 24 V DC, MPI/ PROFIBUS DP master interface, 2 slots for sync modules, slot for memory card, incl. slot number labels, 2 keys	**6ES7 414-4HJ00-0AB0**

	Order No.
CPU 417-4H Main memory 4 MB, power supply 24 V DC, MPI/ PROFIBUS DP master interface, 2 slots for sync modules, slot for memory card, incl. slot number labels, 2 keys	**6ES7 417-4HL01-0AB0**

CPU 414-4H, 417-4H for S7-400H / F/FH

Ordering data (continued)

	Order No.
RAM (main memory)	
2x2 MB	**6ES7 955-2AL00-0AA0**
2x4 MB	**6ES7 955-2AM00-0AA0**
RAM memory card	
1 MB	**6ES7 952-1AK00-0AA0**
2 MB	**6ES7 952-1AL00-0AA0**
4 MB	**6ES7 952-1AM00-0AA0**
8 MB	**6ES7 952-1AP00-0AA0**
16 MB	**6ES7 952-1AS00-0AA0**
FEPROM memory card	
1 MB	**6ES7 952-1KK00-0AA0**
2 MB	**6ES7 952-1KL00-0AA0**
4 MB	**6ES7 952-1KM00-0AA0**
8 MB	**6ES7 952-1KP00-0AA0**
16 MB	**6ES7 952-1KS00-0AA0**
32 MB	**6ES7 952-1KT00-0AA0**
64 MB	**6ES7 952-1KY00-0AA0**
MPI cable	**6ES7 901-0BF00-0AA0**
for connecting SIMATIC S7 and PG via MPI; 5 m long	
Spare keys for CPU	**6ES7 911-0AA00-0AA0**
2 cards (spare part)	
Slot number labels	**6ES7 912-0AA00-0AA0**
1 set (spare part)	
S7 H Systems optional package	**6ES7 833-2AC00-2YX0**
for configuring an S7-400H system, 5 languages, without documentation	
S7 F Systems optional package	**6ES7 833-1CC00-0YX0**
to program fail-safe user programs, with F block library	
F runtime license	**6ES7 833-1CC00-6YX0**
for use of fail-safe programs in the CPU 417-4H; 1 license required for each S7-400F/FH system	
Manual "SIMATIC S7-400H programmable controller"	
German	**6ES7 988-8HA10-8AA0**
English	**6ES7 988-8HA10-8BA0**
French	**6ES7 988-8HA10-8CA0**
Spanish	**6ES7 988-8HA10-8DA0**
Italian	**6ES7 988-8HA10-8EA0**
Manual "SIMATIC S7-400F/FH programmable controller"	
German	**6ES7 988-8FA10-8AA0**
English	**6ES7 988-8FA10-8BA0**

	Order No.
Manual "Communication for SIMATIC S7-300/-400"	
German	**6ES7 398-8EA00-8AA0**
English	**6ES7 398-8EA00-8BA0**
French	**6ES7 398-8EA00-8CA0**
Spanish	**6ES7 398-8EA00-8DA0**
Italian	**6ES7 398-8EA00-8EA0**
SIMATIC Manual Collection	**6ES7 998-8XC01-8YE0**
Electronic manuals on CD-ROM, in 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	
SIMATIC Manual Collection updating service for 1 year	**6ES7 998-8XC01-8YE2**
Current Manual Collection CD as well as the three following updates	
Technical overview "SIMATIC S7-400 programmable controller - design and application"	
German	**6ES7 498-8AA00-8AB0**
English	**6ES7 498-8AA00-8BB0**
French	**6ES7 498-8AA00-8CB0**
Spanish	**6ES7 498-8AA00-8DB0**
Italian	**6ES7 498-8AA00-8EB0**
RS 485 bus connector with 90° outgoing feeder cable	
Max. transmission rate 12 Mbit/s	
Without PG interface	**6ES7 972-0BA12-0XA0**
With PG interface	**6ES7 972-0BB12-0XA0**
RS 485 bus connector with slanting outgoing feeder cable	
Max. transmission rate 12 Mbit/s	
Without PG interface	**6ES7 972-0BA41-0XA0**
With PG interface	**6ES7 972-0BB41-0XA0**
RS 485 bus connector with 90° outgoing feeder cable for FastConnect system	
Max. transmission rate 12 Mbit/s	
Without PG interface	**6ES7 972-0BA50-0XA0**
With PG interface	**6ES7 972-0BB50-0XA0**
RS 485 bus connector with axial outgoing feeder cable	
for SIMATIC OP, for connection to PPI, MPI, PROFIBUS	**6GK1 500-0EA02**
PROFIBUS FastConnect bus cable	
Standard type with special design for fast mounting, 2-core, shielded, sold by the meter; max. delivery unit 1000 m, minimum ordering length 20 m	**6XV1 830-0EH10**

Sync module for linking CPU 41x-4H

Overview



- For connecting the two CPUs 414-4H/417-4H in the subunits of the S7-400 H
- Suitable for direct plugging into the CPU

Technical specifications

Current consumption from 5 V DC (from CPU), max.	0.5 A
Power loss	2.5 W
Weight	0.06 kg

Ordering data

	Order-No.
Sync module	**6ES7 960-1AA00-0XA0**
for connecting the two CPU 414-4H/417-4H in the S7-400H/F/FH; 2 modules required per CPU	

	Order-No.
Fiber-optic connecting cable	
1 m	**6ES7 960-1AA00-5AA0**
2 m	**6ES7 960-1AA00-5BA0**
10 m	**6ES7 960-1AA00-5KA0**
Other lengths	On request

IF-964 DP PROFIBUS module

Overview



- For connection to PROFIBUS DP as master
- 9.6 kbit/s to 12 Mbit/s
- Connection by means of 9-pin Sub-D socket
- 1 or 2 PROFIBUS modules can be plugged into each S7-400 CPU:
  - CPU 414-3/416-3: 1 module
  - CPU 417-4: 2 modules

Technical specifications

Can be used for	• S7-400, CPU 414-3/416-3 (1 interface module) • S7-400, CPU 417-4 (2 interface module)
Functionality	
• DP master	Yes
• DP slave	No
• Point-to-point link	No
• Default setting	DP master
• Electrical isolation	Yes
DP master	
• Services	
- PG-OP communication	Yes
- support for internode traffic	Yes
- equidistance	Yes
- SYNC/FREEZE	Yes
• Transmission rates	Up to 12 Mbit/s
• Number of connections	Device-dependent
- of these reserved	1 for PG, 1 for OP
• Number of DP slaves, max.	125
• Number of slots, max.	Device-dependent
• Address range, max.	Device-dependent
• User data per DP slave, max.	244 byte inputs/ 244 byte outputs

Line length	
• At 9.6 kbit/s, max.	1200 m
• At 12 Mbit/s, max.	100 m
Cache (Dual Port RAM)	256 KB
Interface	RS 485
Supply voltage	Through the module where the submodule is plugged in
Current consumption	
• In S7-400	0.45 A
Load rating of the floating 5 V ($P5_{ext}$), max.	20 mA
Power loss	2 W
Dimensions (W x H x D) in mm	18.2 x 67 x 97
Weight, approx.	65 g

Ordering data

	Order No.
IF-964 DP interface module Interface module with integral PROFIBUS DP master interface	**6ES7 964-2AA01-0AB0**

	Order No.

Overview



- Digital inputs for the SIMATIC S7-400
- For the connection of switches and 2-wire BERO proximity switches

Technical specifications

6ES7 421-	7BH00-0AB0	1BL01-0AA0	1EL00-0AA0	1FH20- 0AA0	7DH00- 0AB0	5EH00- 0AA0
Number of inputs	16	32	32	16	16	16
Interrupts	Process interrupt, diagnostic interrupt	-	-	-	Process interrupt, diagnostic interrupt	-
Diagnostics	int./ext. fault	-	-	-	Int./ext. fault	-
Rated load voltage L+/L1						
• Rated value	24 V DC	-	-	-	-	120 V AC
• Permitted range	20.4 to 28.8 V	-	-	-	-	74 to 132 V AC
Input voltage						
• Rated value	24 V DC	24 V DC	120 V AC/DC	120/230 V AC/DC	24 to 60 V AC/DC	120 V AC
• At "1" signal	11 to 30 V DC	11 to 30 V DC	79 to 132 V AC 80 to 132 V DC	79 to 264 V AC 80 to 264 V DC	15 to 72 V DC 15 to 60 V AC	74 to 132 V AC
• At "0" signal	-30 to +5 V DC	-30 to +5 V DC	0 to 20 V	0 to 40 V	-6 to +6 V DC 0 to 5 V AC	0 to 20 V AC
• Frequency	-	-	47 to 63 Hz	47 to 63 Hz	47 to 63 Hz	47 to 63 Hz
Electrical isolation	Yes	Yes	Yes	Yes	Yes	Yes
• In groups of	8	32	8	4	1	1
Input current						
• At "1" signal, typ.	6 to 8 mA	7 mA	2 to 5 mA	At 120 V: AC 10 mA, DC 1.8 mA at 230 V: AC 14 mA, DC 2 mA	4 to 10 mA	6 to 20 mA
• At "0" signal, typ.	-	< 1.3 mA	-	0 to 6 mA AC 0 to 2 mA DC	-	0 to 4 mA
Input delay, rated value	0.1/0.5/3 ms	3 ms	10/20 ms	25 ms	0.5; 3; 10/20 ms	Min. 2ms
• Configurable	Yes	-	-	-	Yes	Max. 15 ms
No. of simultaneously controllable inputs						
• At 40 °C	16	32	32	16	16	16
• At 60 °C	16	32	32	16	16	16
Connection of 2-wire BEROs	Possible	Possible	Possible	Possible	Possible	Possible
• Quiescent current "0" signal, max.	3 mA	1.5 mA	1 mA	5 mA	2 mA	4 mA
Cable length; nominal						
• Unshielded	600 m/3 ms 50 m/0.5 ms 20 m/0.1 ms	600 m	600 m	600 m	100 m (input delay 0.5 ms)	600 m
• Shielded	1000 m/3 ms 70 m/0.5 ms 30 m/0.1 ms	1000 m	1000 m	1000 m	1000 m	1000 m

SM 421 digital input module

Technical specifications (continued)

6ES7 421-	7BH00-0AB0	1BL01-0AA0	1EL00-0AA0	1FH20- 0AA0	7DH00- 0AB0	5EH00- 0AA0
Current consumption						
• From S7-400 backplane bus (5 V DC), max.	130 mA	20 mA	200 mA	80 mA	150 mA	100 mA
• From L+, max.	120 mA	-	-	-	--	-
Power loss	Typ. 5 W	Max. 6 W	Max. 16 W	Typ. 12 W	3.5 W (24 V DC); 6.5 W (48 V DC); 8.0 W (60 V DC)	20 W
Isolation tested at	500 V DC	500 V DC	1500 V AC	1500 V AC	1500 V AC	1500 V AC
Dimensions (W x H x D) in mm	25 x 290 x 210	25 x 290 x 210	25 x 290 x 210	25 x 290 x 210	25 x 290 x 210	25 x 290 x 210
Weight, approx.	600 g	600 g	600 g	650 g	600 g	650 g

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Ordering data

	Order No.
SM 421 digital input modules	
16 inputs, 24 V DC, with process/diagnostics interrupt	**6ES7 421-7BH00-0AB0**
32 inputs, 24 V DC	**6ES7 421-1BL01-0AA0**
32 inputs, 120 V AC/DC	**6ES7 421-1EL00-0AA0**
16 inputs, 120/230 V AC/DC, inputs to IEC 1131-2 Type 2	**6ES7 421-1FH20-0AA0**
16 inputs, 24 to 60 V AC/DC, with process/diagnostics interrupt	**6ES7 421-7DH00-0AB0**
16 inputs, 120 V AC	**6ES7 421-5EH00-0AA0**
Front connector	
1 unit	
• With screw-type terminals	**6ES7 492-1AL00-0AA0**
• With spring-loaded terminals	**6ES7 492-1BL00-0AA0**
• With crimp contacts	**6ES7 492-1CL00-0AA0**
SIMATIC TOP connect	See page 5/66
Cover film for labelling strips	**6ES7 492-2XX00-0AA0**
Spare part	
S7-SmartLabel	**2XV9 450-1SL00-0YX0**
Software for machine labelling of modules directly from the STEP 7 project	

	Order No.
Labelling sheets for machine labelling	See page 5/82
SIMATIC Manual Collection	**6ES7 998-8XC01-8YE0**
Electronic manuals on CD-ROM, in 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	
SIMATIC Manual Collection updating service for 1 year	**6ES7 998-8XC01-8YE2**
Current Manual Collection CD as well as the three following updates	
Manual "SIMATIC S7-400 programmable controller"	
incl. operation list	
German	**6ES7 498-8AA03-8AA0**
English	**6ES7 498-8AA03-8BA0**
French	**6ES7 498-8AA03-8CA0**
Spanish	**6ES7 498-8AA03-8DA0**
Italian	**6ES7 498-8AA03-8EA0**

SM 422 digital output module

Overview



- Digital outputs for the SIMATIC S7-400
- For the connection of solenoid valves, contactors, small motors, lamps and motor starters

Technical specifications

6ES7 422-	1FH00- 0AA0	1HH00- 0AA0	5EH00- 0AB0	1BH11 0AA0	5EH10- 0AB0	1BL00- 0AA0	7BL00- 0AB0
Number of outputs	16	16 (Relay)	16	16	16	32	32
Interrupts	-	-	-	-	Diagnostic interrupt	-	-
Diagnostics	-	-	-	-	Internal/ external fault	-	Internal/ external fault
Rated load voltage L+/L1	120/230 V AC	230 V AC/ 60 V DC	20 to 120 V AC	24 V DC	20 to 125 V DC	24 V DC	24 V DC
• Permitted range	79 to 264 V AC	5 to 264 V AC/ 1 to 60 V DC	20 to 132 V AC	20.4 to 28.8 V DC	20 to 138 V DC	20.4 to 28.8 V DC	20.4 to 28.8 V DC
Output voltage							
• At "1" signal, min.	L - 18.1 V	-	20 to 132 V AC	L+ -0.5 V	L+ -1 V	L+ -0.3 V	L+ -0.8 V
Electrical isolation	Yes	Yes	Yes	Yes	Yes	Yes	Yes
• In groups of	4	2	1	8	8	32	8
Output current, max.							
• At "1" signal							
- rated value	2 A	-	2 A	2 A	1.5 A	0.5 A	0.5 A
- permitted range	10 mA minimum current	-	-	5 mA to 2.4 A	5 mA to 1.5 A	5 mA to 0.6 A	5 mA to 0.6 A
• At "0" signal, max.	2.6 mA	-	-	0.5 mA	10 mA	0.3 mA	0.5 mA
Aggregate current for outputs							
• Up to 60 °C	2 A (per 4 adjacent outputs)	-	7 A	2 A (per 2 adjacent outputs)	8 A	2 A (per 2 adjacent outputs)	2 A/group
Lamp load, max.	25 W	-	-	10 W	8 W	5 W	5 W
Switching frequency of outputs							
• For resistive load, max.	10 Hz	-		100 Hz	100 Hz	100 Hz	100 Hz
• For inductive loads, max.	0.5 Hz	-	-	0.1 Hz	0.1 Hz	0.5 Hz	2 Hz
• For lamp load, max.							
Switching frequency of contacts							
• For resistive load, max.	-	5 A (30 DC/ 240 V AC)	-	-	-	-	-
• For inductive loads, max.	-	1.2 A (60 V DC) 5A (30 V DC/ 240 V AC)	-	-	-	-	-

SM 422 digital output module

Technical specifications (continued)

6ES7 422-	1FH00- 0AA0	1HH00- 0AA0	5EH00- 0AB0	1BH11 0AA0	5EH10- 0AB0	1BL00- 0AA0	7BL00- 0AB0
Service life to DIN VDE 0660, Part 2							
• AC 15	-	10^5 switching cycles	-	-	-	-	-
• DC 13	-	10^5 switching cycles	-	-	-	-	-
• Mechanical	-	3 10^6 switching cycles	-	-	-	-	-
Voltage induced on current interruption limited (internally) to, max.	-	-	-	-30 V	-30 V	-27 V	L+ -45 V
Short-circuit protection	Fuse	-	-	Electronic, clocked	Electronic, clocked	Electronic, clocked	Electronic, clocked
Cable lengths; guideline							
• Unshielded	600 m (input delay 0.5 ms)	-	-	600 m	600 m	600 m	600 m
• Shielded	1000 m	-	-	1000 m	1000 m	1000 m	1000 m
Current consumption							
• From S7-400 backplane bus (5 V DC), max.	400 mA	1 A	600 mA	160 mA	700 mA	200 mA	200 mA
• From L+/L1 (without load), max.	6 mA	-	-	30 mA	30 mA	30 mA	120 mA
Power loss, max.	16 W	25 W	16 W	7 W	10 W	4 W	8 W
Isolation tested at	1500 V AC	1500 V AC	1500 V AC	500 V DC	500 V DC	500 V DC	500 V DC
Dimensions (W x H x D) in mm	25 x 290 x 210	25 x 290 x 210	25 x 290 x 210	25 x 290 x 210	25 x 290 x 210	25 x 290 x 210	25 x 290 x 210
Weight, approx.	802 g	700 g	850 g	600 g	800 g	600 g	600 g

Ordering data

	Order No.
SM 422 digital output modules	
16 outputs, 24 V DC; 2 A	**6ES7 422-1BH11-0AA0**
16 outputs, 20 to 132 V DC; 1.5 A; with diagnostics capability	**6ES7 422-5EH10-0AB0**
32 outputs, 24 V DC; 0.5 A	**6ES7 422-1BL00-0AA0**
32 outputs, 24 V DC; 0.5 A; with diagnostics capability	**6ES7 422-7BL00-0AB0**
16 outputs, 120/230 V AC; 2 A	**6ES7 422-1FH00-0AA0**
16 outputs, relay contacts	**6ES7 422-1HH00-0AA0**
16 outputs, 20 to 120 V AC; 2 A	**6ES7 422-5EH00-0AB0**
Front connector	
1 unit	
• With screw-type terminals	**6ES7 492-1AL00-0AA0**
• With spring-loaded terminals	**6ES7 492-1BL00-0AA0**
• With crimp contacts	**6ES7 492-1CL00-0AA0**
SIMATIC TOP connect	See page 5/66
Cover film for labelling strips	**6ES7 492-2XX00-0AA0**
Spare part	
Fuse cover	**6ES7 422-0XX00-7AA0**
Spare part, 4 units	

	Order No.
S7-SmartLabel	**2XV9 450-1SL00-0YX0**
Software for machine labelling of modules directly from the STEP 7 project	
Labelling sheets for machine labelling	See page 5/82
SIMATIC Manual Collection	**6ES7 998-8XC01-8YE0**
Electronic manuals on CD-ROM, in 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	
SIMATIC Manual Collection updating service for 1 year	**6ES7 998-8XC01-8YE2**
Current Manual Collection CD as well as the three following updates	
Manual "SIMATIC S7-400 programmable controller"	
incl. operation list	
German	**6ES7 498-8AA03-8AA0**
English	**6ES7 498-8AA03-8BA0**
French	**6ES7 498-8AA03-8CA0**
Spanish	**6ES7 498-8AA03-8DA0**
Italian	**6ES7 498-8AA03-8EA0**

Overview



- Analog inputs for the SIMATIC S7-400
- For connection of voltage and current sensors, thermocouples, resistors and resistance thermometers
- Resolution from 13 to 16 bit

Technical specifications

6ES7 431-	0HH00- 0AB0	1KF00- 0AB0	1KF10- 0AB0	1KF20- 0AB0	7QH00- 0AB0	7KF00- 0AB0	7KF10- 0AB0
Number of inputs							
• For voltage/ current measurement	16	8	8	8	16	8	-
• For resistance measurement	-	4	4	4	8	-	8
Interrupts							
• Limit value interrupt	-	-	-	-	Configurable	Yes	Yes
• Diagnostic interrupt	-	-	-	-	Configurable	Yes	Yes
Diagnostics	-	-	-	-	Configurable	Yes	Yes
Rated load voltage L+	24 V DC	-	24 V DC	24 V DC	24 V DC	-	-
• Polarity reversal protection	Yes	-	Yes	Yes	Yes	-	-
Input resistance/ input ranges	± 1 V/10 MΩ ±10 V/ 100 kΩ ± 1 to 5V/ 100 kΩ 4 to 20 mA/ 50 Ω ± 20 mA/ 50 Ω	± 1 V/200 kΩ ± 10 V/200 kΩ 1 to 5 V/200 kΩ ± 20 mA/80 Ω 4 to 20 mA/80 Ω 0 to 600 Ω	± 80 mV/>1 MΩ ± 250 mV/ >1 MΩ ± 500 mV/>1 MΩ ± 1 V/>1 MΩ ± 2.5 V/>1 MΩ ± 5 V/>1 MΩ ± 10 V/>1 MΩ 1 to 5 V/>1 MΩ 0 to 20 mA/>50 Ω 4 to 20 mA/ >50 Ω 0 to 48 Ω 0 to 150 Ω 0 to 300 Ω 0 to 600 Ω 0 to 6000 Ω (for use up to 5000 Ω)	± 1 V/10 MΩ 1 to 5 V/10 MΩ ± 10 V/100 kΩ ± 20 mA/50 Ω 4 to 20 mA/50 Ω 0 to 600 Ω	± 25 mV/>1 MΩ ± 50 mV/ >1 MΩ ± 80 mV/>1 MΩ ± 250 mV/>1 MΩ ± 500 mV/ >1 MΩ ± 1 V/ >1 MΩ ± 2.5 V/>1 MΩ ± 5 V/>1 MΩ 1 to 5 V/>1 MΩ ± 10 mV/>1 MΩ 0 to 20 mA/50 Ω ± 5 mA/50 Ω ± 10 mA/50 Ω ± 20 mA/50 Ω 4 to 20 mA/ >50 Ω 0 to 48 Ω 0 to 150 Ω 0 to 300 Ω 0 to 600 Ω 0 to 6000 Ω (for use up to 5000 Ω)	± 20 mV/± 50 mV ± 80 mV/± 100 mV ± 250 mV ± 500 mV/ ± 1 V ± 2.5 V/± 5 V ± 10 V/1 b. 5 V ± 5 mA/± 10 mA ± 20 mA/± 3.2 mA 0 to 20 mA 4 to 20 mA	-
Permissible input voltage for voltage input (destruction limit), max.	20 V	50 V	18 V	18 V	18 V	200 V AC	+/- 30 V
Permissible input current for current input (destruction limit), max.	40 mA	50 mA	40 mA	54 mA	40 mA	-	-

SM 431 analog input module

Technical specifications (continued)

6ES7 431-	0HH00- 0AB0	1KF00- 0AB0	1KF10- 0AB0	1KF20- 0AB0	7QH00- 0AB0	7KF00- 0AB0	7KF10- 0AB0
Connection of signal sensors							
• For current measurement							
- as 2-wire transmitter	Yes	Yes, with ext. transmitter	Yes	Yes	Yes	-	-
- as 4-wire transmitter	Yes	Yes	Yes	Yes	Yes	Yes	-
• For resistance measurement							
- with 2-lead connection	-	Yes	Yes	Yes	Yes	-	-
- with 3-lead connection	-	-	Yes	Yes	Yes	-	Yes
- with 4-lead connection	-	Yes	Yes	Yes	Yes	Yes	Yes
Electrical isolation							
Internal/external	No	Yes	Yes	Yes	Yes	Yes	Yes
by channel	No	No	No	No	No	Yes	No
Characteristic linearization							
• For thermocouples	-	-	Types B, R, S, T, E, J, K, N, U, L	-	Types B, R, S, T, E, J, K, N, U, L	Types B, N, E, R, S, J, L, T, K, U	-
• For resistance thermometers	-	-	Pt 100, Pt 200, Pt 500, Pt 1000; Ni 100	-	Pt 100, Pt 200, Pt 500, Pt 1000; Ni 100, Ni 1000	-	Pt 100, Pt 200, Pt 500, Pt 1000; Ni 100, Ni 1000 different characteristics selectable (Europe/US)
Temp.- compensation							
• Internal	-	-	-	-	-	Yes	-
• External with compensation sokket	-	-	Possible	-	Possible	Yes	-
• External with Pt 100	-	-	Possible	-	Possible	-	-
• Dynamic reference temperature value	-	-	Possible	-	Possible	Yes	-
Integration- /conversion time/ resolution (per channel)							
• Integration time (ms)	16.7 or 20	16.7 or 20	16.7/20	-	2.5/16.7/20	At 50 Hz: 20 ms (entire module)	At 50 Hz: 20 ms (entire module incl. wire break)
• Basic conversion time (ms, configurable)	55 or 65	23 or 25	20.1/23.5	52 µs	6/21.1/23.5	-	-
• Additional conversion time (ms) for resistance measurement	-	-	40.2/47	-	12/40.2/47	-	-
• Additional conversion time for wire break monitoring	-	-	4.3 ms	-	4.3 ms	-	-
• Additional conversion time for wire break monitoring and resistance measurement	-	-	5.5 ms	-	5.5 ms	1 ms (entire module)	None
• Resolution	12 bit +sign/ 13 bit	13 bit	14 bit	14 bit	16 bit	15 bit+sign/ 16 bit	15 bit+sign/ 16 bit
• Interference frequency suppression	60/50 Hz	60/50 Hz	60/50 Hz	400/60/50 Hz	400/60/50 Hz	400/60/50 Hz	60/50 Hz
Operational error limit (in entire temperature range, referred to input range), max.	±0.65 %, 1.0% at 1 to 5 V	±1.25 %	±0.5 %	±0.9 %	±0.4 %	On request	±1 °C
Basic error (operational limits at 25 °C, referred to output range), max.	+/- 0.25 %, 0.5 at 1 b.5 V	+/-0.8 %	+/-0.3 %	+/-0.75 %	+/-0.3 %	On request	+/- 0.2 °C

Technical specifications (continued)

6ES7 431-	0HH00- 0AB0	1KF00- 0AB0	1KF10- 0AB0	1KF20- 0AB0	7QH00- 0AB0	7KF00- 0AB0	7KF10- 0AB0
Common-mode test voltage (inputs against each other)	8 V AC	30 V AC	120 V AC	8 V AC	120 V AC		None
Cable length (shielded), max.	200 m	200 m	200 m 50 m with thermocouples and input ranges ≤ 80 mV	200 m	200 m 50 m with thermocouples and input ranges ≤ 80 mV	200 m 50 m with thermocouples and input ranges ≤ 80 mV	200 m 50 m with thermocouples and input ranges ≤ 80 mV
Current consumption							
• From S7-400® backplane bus (5 V DC), max.	100 mA	350 mA	600 mA	1000 mA	700 mA	1200 mA	650 mA
• From L+, max.	400 mA	-	200 mA	200 mA	400 mA	400 mA	400 mA
Power losses, typ.	2 W	1.8 W	3.5 W	4.9 W	4.5 W	5 W	5 W
Isolation between bus and analog section, tested at	1500 V AC	1500 V AC	1500 V AC	1500 V AC	1500 V AC	1500 V AC	1500 V AC
Slot requirement	1	1	1	1	1	1	1
Dimensions (W x H x D) in mm	25 x 290 x 210	25 x 290 x 210	25 x 290 x 210	25 x 290 x 210	25 x 290 x 210	25 x 290 x 210	25 x 290 x 210
Weight, approx.	500 g	480 g	500 g	500 g	650 g	650 g	650 g

Ordering data

	Order No.
SM 431 analog input modules	
16 inputs, non-floating, 13 bit	**6ES7 431-0HH00-0AB0**
8 inputs, floating, 13 bit	**6ES7 431-1KF00-0AB0**
8 inputs, floating, 14 bit, with linearization	**6ES7 431-1KF10-0AB0**
8 inputs, floating, 14 bit	**6ES7 431-1KF20-0AB0**
16 inputs, floating, 16 bit, process interrupt capability	**6ES7 431-7QH00-0AB0**
8 inputs, floating, 16 bit, process interrupt capability, for thermocouples (current, voltage)	**6ES7 431-7KF00-0AB0**
8 inputs, floating, 16 bit, process interrupt capability, for thermal resistors	**6ES7 431-7KF10-0AB0**
Front connector	
1 unit	
• With screw-type terminals	**6ES7 492-1AL00-0AA0**
• With spring-loaded terminals	**6ES7 492-1BL00-0AA0**
• With crimp contacts	**6ES7 492-1CL00-0AA0**
1 unit; for 6ES7 431-7KF00-0AB0; spare part, included in scope of delivery of module	**6ES7 431-7KF00-6AA0**
SIMATIC TOP connect	See page 5/66
Range card for analog inputs	**6ES7 974-0AA00-0AA0**
1 card for 2 inputs (spare part)	

	Order No.
Cover film for labelling strips	**6ES7 492-2XX00-0AA0**
Spare part	
S7-SmartLabel	**2XV9 450-1SL00-0YX0**
Software for machine labelling of modules directly from the STEP 7 project	
Labelling sheets for machine labelling	See page 5/82
SIMATIC Manual Collection	**6ES7 998-8XC01-8YE0**
Electronic manuals on CD-ROM, in 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	
SIMATIC Manual Collection updating service for 1 year	**6ES7 998-8XC01-8YE2**
Current Manual Collection CD as well as the three following updates	
Manual "SIMATIC S7-400 programmable controller"	
incl. operation list	
German	**6ES7 498-8AA03-8AA0**
English	**6ES7 498-8AA03-8BA0**
French	**6ES7 498-8AA03-8CA0**
Spanish	**6ES7 498-8AA03-8DA0**
Italian	**6ES7 498-8AA03-8EA0**

SM 432 analog output module

Overview



- Analog outputs for the SIMATIC S7-400
- For connecting analog actuators

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Technical specifications

Number of outputs	8
Interrupts	
• Diagnostics interrupt	-
Diagnostics	-
Rated load voltage L+	24 V DC
Output ranges	
• Voltage outputs	± 10 V, 0 to 10 V, 1 to 5 V
• Current outputs	± 20 mA, 0 to 20 mA, 4 to 20 mA
Load resistor	
• Voltage outputs, min.	1 kΩ
• Current outputs, max.	500 Ω, max. 600 Ω with reduced common-mode voltage at <1 V
• For capacitive load, max.	1 µF
Voltage output	
• Short-circuit protection	Yes
• Short-circuit current, e.g.	25 mA
Current output	
• Open-circuit voltage, max.	18 V
Isolation (between analog section, bus and shield)	Yes
Resolution	13 bit
Conversion time per channel, max.	420 µs

Transient recovery time	
• For resistive load	0.1 ms
• For capacitive loads	3.5 ms
• For inductive loads	0.5 ms
Substitute values injectable	No
Operating error limit (0 to 60°C, referred to the output range)	
• Voltage	+/- 0.5 %
• Current	+/- 1 %
Basic error (at 25 °C, referred to output range)	
• Voltage	+/- 0.2 %
• Current	+/- 0.3 %
Cable length (shielded), max.	200 m
Current consumption	
• From S7-400 backplane bus (5 V DC), max.	150 mA
• From L+, max.	400 mA
Power loss, max.	9 W
Isolation between bus and analog section, tested at	1500 V AC
Slot requirement	1
Dimensions (W x H x D) in mm	25 x 290 x 210
Weight	650 g

Ordering data

	Order No.
SM 432 analog output modules	
8 outputs, floating, 13 bit	**6ES7 432-1HF00-0AB0**
Front connector	
1 unit	
• With screw-type terminals	**6ES7 492-1AL00-0AA0**
• With spring-loaded terminals	**6ES7 492-1BL00-0AA0**
• With crimp contacts	**6ES7 492-1CL00-0AA0**
SIMATIC TOP connect	See page 5/66

	Order-No.
Cover film for labelling strips Spare part	**6ES7 492-2XX00-0AA0**
S7-SmartLabel	**2XV9 450-1SL00-0YX0**
Labelling sheets for machine labelling	See page 5/82
SIMATIC Manual Collection	See page 5/29
SIMATIC Manual Collection updating service for 1 year	See page 5/29
Manual "SIMATIC S7-400 programmable controller"	See page 5/29

Overview



- Two-channel intelligent counter module for simple counting tasks
- For direct connection of incremental encoders
- Comparison function with 2 specifiable comparison values
- Integrated digital outputs for outputting the response when the comparison values are reached

Note:
We offer incremental encoders and preassembled connecting cables for counting and positioning functions under SIMODRIVE Sensors or Motion Connect 500 (see also www.siemens.de/simatic-technologie).

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Technical specifications

Number of counters	2
Counting range	32 bit or ±31 bit
Connectable incremental encoders:	• 5 V RS422, symmetric with 2 pulse trains displaced by 90 ° • 24 V asymmetric • 24 V direction sensor (1 pulse train, 1 direction level) • 24 V initiator
Counting frequency if selected with	
• 5 V RS422	Max. 500 kHz
• 24 V encoder	Max. 200 kHz
Digital inputs, number per channel	1 for gate start
	1 for gate stop
	1 to set counter
Digital outputs, number per channel	2
Electrical isolation	Yes
• Between digital inputs, outputs and S7 bus	Yes (optocoupler)
• Between digital inputs, outputs and counter inputs	Yes (optocoupler)
Permissible potential difference	75 V DC, 60 V AC
Supply voltage for encoders	
• At 5.2 V, max.	300 mA
• At 24 V, max.	300 mA
Auxiliary voltage $1L_+$, load voltage 2 L_+	
• Rated value	24 V DC
• Permissible range (incl. ripple), static, dynamic	20.4 to 28.8 V,18.5 to 30.2 V
• Current consumption	40 mA
• Non-periodic skip	
- value	35 V
- duration	500 ms
- recovery time	50 s

5 V DC counter inputs	to RS 422
Terminating resistor, approx.	220 Ω
Differential input voltage, min.	0.5 V
24 V DC counter inputs, digital inputs	
• Low level	-28.8 to + 5 V
• High level	+ 11 to + 28.8 V
• Input current, typ.	9 mA
• Minimum pulse width/interpulse period	2.5 ms or 25 ms
Output voltage	
• At "0" signal, max.	3 V
• At "1" signal, min.	2 L+ - 1.5 V
Output current at "1" signal	
• Rated value	0.5 A
• Range	5 mA to 0.6 A
Switching time, max.	300 ms
Circuit interruption voltage	Limited to 2L + - 39 V
Short-circuit protection	Yes (electronic, clocked)
Current consumption	
• From S7-400® bus (5 V), typ.	450 mA
Power loss	Typ. 9 W
Isolation tested at	500 V
Allocated binary addresses I/O	64/64 byte
Required front connector	1 x 48-pin
Dimensions (W x H x D) in mm	25 x 290 x 210
Weight, approx.	650 g

Standard function block	**FC CNT_CTRL (FC 0)**	**FC DIAG_INF (FC 1)**
• Memory requirements		
• FB length in memory	522 byte	262 byte
• DB length in the memory	On request	On request
Runtimes in S7-400	On request	On request
Target system	SIMATIC S7-400	SIMATIC S7-400

FM 450-1 counter module

Ordering data	Order No.
FM 450-1 counter module	**6ES7 450-1AP00-0AE0**
with 2 channels, max. 500 kHz; for incremental encoders	
FM 450-1 manual	
German	**6ES7 450-1AP00-8AG0**
English	**6ES7 450-1AP00-8BG0**
French	**6ES7 450-1AP00-8CG0**
Italian	**6ES7 450-1AP00-8EG0**

	Order No.
Front connector	
1 unit	
• With screw-type terminals	**6ES7 492-1AL00-0AA0**
• With spring-loaded terminals	**6ES7 492-1BL00-0AA0**
• With crimp contacts	**6ES7 492-1CL00-0AA0**
Front covers for CPU and function modules	**6ES7 492-1XL00-0AA0**
Spare part	

Overview



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

Note:
We offer position sensing systems and preassembled connecting cables for counting and positioning functions under SIMODRIVE Sensors or Motion Connect 500 (see also www.siemens.de/simatic-technologie).

Technical specifications

General specifications		
Supply voltage	24 V DC	
Current consumption	550 mA	
Supply current for position encoders	Max. 300 mA	
Supply voltage for position encoder	5 V or 24 V	
Protection to DIN 40050	IP 20	
Permissible humidity to DIN 40040	Humidity class F	
Permissible ambient temperature		
• Storage and transport	-40 to +70 °C	
• Operation	0 to +55 °C	
Required front connector	1 x 48-pin	
Dimensions (W x H x D) in mm	50 x 290 x 210	
Weight, approx.	1.3 kg	
Position detection, incremental		
Accepts encoder types	Encoders with TTL quadrature signal	Encoders with asymmetrical inputs
Track signals	A, NOT A, B, NOT B	A, B
Zero mark signal	N, NOT N	N
Input signal	5-V differential signal (phys. RS 422)	-
• Differential input voltage	1 to 10 V	-
• Input frequency, max.	1 MHz	-
Input voltage	-	24 V
Input frequency, max.	-	50 kHz for 25 m cable length, 25 kHz for 100 m cable length
Cable length		
5-V encoder supply, max.	35 m at max. 210 mA	
24 V encoder supply , max.	100 m at max. 300 mA	

Synchronous-serial position detection	
Accepts encoder types	Single or multiturn encoders with SSI (Gray code)
Data signal	DATA, NOT DATA
Clock signal	CL, NOT CL
Frame length	13 or 25 bit serial
Input signal	5 V differential signal (phys. RS 422)
Differential input voltage	1 to 10 V
Transmission rate max.	1.25 Mbit/s
Encoder supply	24 V DC, max. 300 mA
Cable length, max.	300 m (at max.156 kbit/s)
Digital inputs	
Number	12 (4 per axis)
Function	Reference cams, reversing cams, flying setting of actual value, start/stop positioning run
Electrical isolation	Yes
Input voltage	
Rated value	24 V DC
At "0" signal	-3 to +5 V
At "1" signal	11 to 30 V
Input current, min.	6 mA
(for 2-wire BERO), max.	30 mA
Digital outputs	
Number	12 (4 per axis)
Function	Rapid traverse, creep speed, clockwise, counter-clockwise
Electrical isolation	Yes
Output voltage	
Rated value	24 V DC
At "0" signal	Residual current max. 0.5 mA
At "1" signal	UP - 3 V
Output current	0.6 A at UP_{max} (short-circuit-proof)

FM 451 positioning module

Ordering data	Order No.
FM 451 positioning module	**6ES7 451-3AL00-0AE0**
for rapid traverse and creep-speed drives	
FM 451 manual	
German	**6ES7 451-3AL00-8AG0**
English	**6ES7 451-3AL00-8BG0**
French	**6ES7 451-3AL00-8CG0**
Italian	**6ES7 451-3AL00-8EG0**
703 connecting cable	
to connect FM 351, FM 352, FM 354 to:	
• Siemens incremental position encoder 6FC9 320-3...	
10 m, outgoing feeder cable upwards	**6ES5 703-1CB01**
20 m, outgoing feeder cable upwards	**6ES5 703-1CC01**
• Incremental position encoder for 5-V signals (RS 422), supply voltage 5 V, 1 end open	
5 m, outgoing feeder cable upwards	**6ES5 703-2BF01**
10 m, outgoing feeder cable upwards	**6ES5 703-2CB01**
to connect FM 351, FM 352, FM 354 to:	
• Incremental position encoder for 24-V signals (RS 422), supply voltage 24 V, 1 end open	
10 m, outgoing feeder cable downwards	**6ES5 703-4CB00**
32 m, outgoing feeder cable downwards	**6ES5 703-4CD20**

	Order-No.
703 connecting cable	
• Absolute SSI position encoder, supply voltage 24 V, 1 end open	
20 m, outgoing feeder cable downwards	**6ES5 703-5CC00**
20 m, outgoing feeder cable upwards	**6ES5 703-5CC01**
50 m, outgoing feeder cable downwards	**6ES5 703-5CF00**
50 m, outgoing feeder cable upwards	**6ES5 703-5CF01**
Sub-D connector	**6ES5 750-2AA21**
15-pin, male	
Front connector	
1 unit	
• With screw-type terminals	**6ES7 492-1AL00-0AA0**
• With spring-loaded terminals	**6ES7 492-1BL00-0AA0**
• With crimp contacts	**6ES7 492-1CL00-0AA0**
Front covers for CPU and function modules	**6ES7 492-1XL00-0AA0**
Spare part	

Overview



- Extremely fast electronic cam control
- Low-cost alternative to mechanical cam controllers
- 32 cam tracks, 16 on-board digital outputs for direct output of actions
- Incremental or synchro-serial position decoding

Note:
We offer position sensing systems and preassembled connecting cables for counting and positioning functions under SIMODRIVE Sensors or Motion Connect 500 (see also www.siemens.de/simatic-technologie).

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Technical specifications

General		
Supply voltage	24 V DC	
Current consumption	500 mA	
Supply current for position encoders	Max. 300 mA	
Supply voltage for position encoder	5 V or 24 V	
Protection to DIN 40050	IP 20	
Permissible humidity to DIN 40040	Humidity class F	
Permissible ambient temperature • Storage and transport • Operation	 -40 to +70 °C 0 to +55 °C	
Required front connector	1 x 48-pin	
Dimensions (W x H x D) in mm	25 x 290 x 210	
Weight, approx.	650 g	
Position detection, incremental		
Accepts encoder types	Encoders with TTL quadrature signal	Encoders with asymmetrical inputs
Track signals	A, NOT A,B, NOT B	A, B
Zero mark signal	N, NOT N	N
Input signal • Differential input voltage • Input frequency, max.	5 V differential signal (phys. RS 422) 1 to 10 V 1 MHz	- - -
Input voltage	-	24 V
Input frequency, max.	-	50 kHz at 25 m cable length, 25 kHz at 100 m cable length
Cable length • 5-V encoder supply • 24 V encoder supply	 Max. 32 m Max. 100 m	

Synchronous-serial position detection	
Accepts encoder types	Single or multiturn encoders with SSI
Data signal	DATA, NOT DATA
Clock signal	CL, NOT CL
Frame length	13 or 25 bit serial (Gray Code)
Input signal • Differential input voltage	5 V differential signal (phys. RS 422) 1 to 10 V
Transmission rate max.	1 MHz
Encoder supply	24 V DC, max. 300 mA
Cable length, max.	300 m (at max.125 kHz)
Digital inputs	
Number of inputs	11
Function	Reference point switch, on-the-fly actual value setting/length measurement, brake enable, enable track output No. 3-10
Electrical isolation	No
Input voltage • Rated value • At "0" signal • At "1" signal	 24 V DC -3 to +5 V 11 to 30 V
Input current , min. (for 2-wire BERO), max.	2 mA 9 mA
Digital outputs	
Number	16
Function	Cam tracks
Electrical isolation	No
Output voltage • Rated value • At "0" signal • At "1" signal	 24 V DC Residual current max. 0,5 mA UP - 3 V
Output current	0.6 A at UP_{max} (short-circuit-proof)

Ordering data

	Order No.
FM 452 electronic cam controller	**6ES7 452-1AH00-0AE0**
Front covers for CPU and function modules Spare part	**6ES7 492-1XL00-0AA0**

	Order No.
FM 452 manual	
German	**6ES7 452-1AH00-8AG0**
English	**6ES7 452-1AH00-8BG0**
French	**6ES7 452-1AH00-8CG0**
Italian	**6ES7 452-1AH00-8EG0**
Front connector	See FM 451

FM 453 positioning module

Overview



- Positioning module for servo and/or stepper motors in machines with high clock pulse rates
- Can be used for point-to-point positioning tasks and for complex traversing patterns
- Up to 3 independent motors can be controlled

Note:
We offer position sensing systems and preassembled connecting cables for counting and positioning functions under SIMODRIVE Sensors or Motion Connect 500 (see also www.siemens.de/simatic-technologie).

Technical specifications

General specifications	
Power consumption max. (5 V, from backplane bus)	1.6 A (rated current)
Power loss	8 W
Auxiliary voltage 1L+ to 4L+	24 V DC
• Dynamic range	18.5 to 30.2 V
• Static range	20.4 to 28.8 V
Current consumption 1L at, max.	1.0 A with 24 V position encoders
Rated voltage (position encoder supply voltage generated from 1L+)	1.0 A with 5 V position encoders
Current consumption 2L+ to 4L+, max. (digital outputs channel 1 to 3)	2 A per channel
Protection to DIN 40050	IP 20
Permissible humidity to DIN 40040	Humidity class F
Permissible ambient temperature	
• Storage and transport	-40 to +70 °C
• Operation	0 to +55 °C
Required front connector	1 x 48-pin
Dimensions (W x H x D) in mm	50 x 290 x 210
Weight, approx.	1620 g
Servo drive interface	
Output controller enable (contact)	
Function	Safety disconnection of drives for operation via contact relays
Load, max.	1 A/50 V/30 VA DC
Analog output	
• Function	Setpoint output for drive
• Output voltage	-10 to +10 V
• Output current	-3 to +3 mA
• Cable length, max.	30 m
Stepper drive interface	
Signal input "Ready 1"	
Function	"Power section ready" for Ui < 1 V, Ii = 2 mA
Signal outputs	
• Output signals (for clock pulse, direction, enable, current regulation)	5 V (in acc. with RS 422)
Signal outputs	
• At "0" signal , typ.	1.1 V (I_0 = 30 mA)
• At "1" signal , typ.	3.7 V (I_0 = -30 mA)
• Load resistance, min.	55 Ω
• Pulse frequency, max.	200 kHz (500 kHz available soon)
• Cable length, max.	35 m for symm. transmission, 10 m for non-symm. transmission
Position detection, incremental	
Accepts encoder types	TTL rectangular signal
Signal voltage	Inputs 5 V in acc. with RS 422
Supply voltage	5 V/300 mA, 24 V/300 mA
Input frequency, max.	1 MHz for 10 m cable length, 0.5 MHz for 35 m cable length
Cable length	
• 5-V encoder supply, max.	25 m at max. 300 mA, 35 m at max. 210 mA
• 24 V encoder supply, max.	100 m at max. 300 mA
Synchronous-serial position detection	
Accepts encoder types	Single or multiturn encoders with SSI
Signal voltage	Inputs 5 V in acc. with RS 422
Supply voltage	5 V/300 mA, 24 V/300 mA
Data transfer rate, max.	1.25 Mbit/s with 10 m cable length, (2.5 Mbit/s available soon)
Cable length, max.	250 m at max. 156 kbit/s
Digital inputs	
Number of inputs	6 per channel/axis
Function	Configurable
Electrical isolation	Yes (optocoupler)
Input voltage	
• Rated value	24 V DC
• At "0" signal	-3 to +5 V (max. 3 mA)
• At "1" signal	11 to 30 V (max. 7 mA)
Input delay	
• Over input voltage range, max.	45 ms (high-low), 15 ms (low-high)
• At 24 V DC, max.	8 ms (low-high)

Technical specifications (continued)

Digital outputs	
Number of inputs	4 per channel /axis
Function	Configurable
Electrical isolation	Yes (optocoupler)
Output voltage	
• Rated value	24 V DC
• At "0" signal	Residual current max. 2 mA
• At "1" signal	UP - 0.3 V
Output curent at "1" signal	
• At 40 °C	
- rated value	0.5 A
- permitted range	5 mA to 0,6 A for L+ between 20.4 and 28.8 V)

Output curent at "1" signal	
- rated value	0.1 A
- permitted range	5 mA to 0,12 A (for L+ between 20,4 and 28,8 V)
Residual current at "0" signal , max.	2 mA
• Switching frequency	
- resistive load	100 Hz
- inductive load	0.25 Hz
Short circuit/overvoltage protection	Yes

Ordering data

	Order No.
FM 453 positioning module with 3 channels/axes	**6ES7 453-3AH00-0AE0**
Setpoint connecting cable[1] for 3 servo motors	**6FX2 002-3AD01-□□□□**
FM 453 manual	
German	**6ES7 453-3AH00-8AG0**
English	**6ES7 453-3AH00-8BG0**
French	**6ES7 453-3AH00-8CG0**
Italian	**6ES7 453-3AH00-8EG0**

1) Price per meter. Please state length

	Order No.
Front connector 1 unit	
• With screw-type terminals	**6ES7 492-1AL00-0AA0**
• With spring-loaded terminals	**6ES7 492-1BL00-0AA0**
• With crimp contacts	**6ES7 492-1CL00-0AA0**
Front covers for CPU and function modules Spare part	**6ES7 492-1XL00-0AA0**

FM 455 closed-loop control module

Overview



- 16-channel closed-loop control module for universal closed-loop control tasks
- Suitable for temperature, pressure, and flow control systems
- User-friendly online self-optimization for temperature controls
- Pre-programmed controller structures
- 2 control algorithms
- 2 versions:
  - FM 455 C as continuous-action controller;
  - FM 455 S as step controller or pulse controller
- With 16 analog outputs (FM 455 C) or 32 digital outputs (FM 455 S) for final controlling elements

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Technical specifications

Number of controllers	16 with thermocouples or 2-wire connection, 8 with Pt100 or 4-wire connection
General specifications	
Rated load voltage L+	24 V DC
• Permitted range	20.4 to 28.8 V
Electrical isolation	
• To backplane bus	Yes (optocoupler)
• Between the channels	No
Permissible potential difference	
• Between input (frame terminal and the central grounding point)	75 V DC, 60 V AC
• Between analog inputs and N_{ANA} (U_{CM})	2,5 V DC
• Isolation tested at	500 V DC
Current consumption	
• From backplane bus	-
• From L+ (without load)	
- FM 455 C, typ.	370 mA
- FM 455 C, max.	440 mA
- FM 455 S, typ.	330 mA
- FM 455 S, max.	400 mA
Total current of the digital outputs, max.	1.6 A
• Power loss	
- FM 455 C, typ.	12 W
- FM 455 C, max.	17.3 W
- FM 455 S, typ.	10.7 W
- FM 455 S, max.	16.2 W
Necessary front connectors	2 x 48-pin
Dimensions (W x H x D) in mm	50 x 290 x 210
Weight, approx.	1.4 kg
Digital inputs	
Number	16
Input voltage	
• Rated value	24 V DC
• At "0" signal	-3 to +5 V
• At "1" signal	13 to 30 V
Input current at "1" signal , typ.	7 mA
Input characteristic	Acc. to IEC 1131, Type 2
Connection of two-wire BEROs	Possible
Permissible quiescent current, max.	1.5 mA
Line length	
• Unshielded	600 m
• Shielded	1000 m
Digital outputs	
Number	32 (FM 455 S only)
Output voltage	
• For signal "1"	L+ (-2.5 V)
Output current	
• At "1" signal	
- rated value	0.1 A
- permitted range	5 to 150 mA
• At "0" signal , residual current, max.	0.5 mA
Load resistance	240 Ω to 4 kΩ
Output power	
• Lamp load, max.	5 W
Switch 2 outputs in parallel	For logic operations
Setting a digital input	Possible
Switching frequency	
• With resistive load/lamp load, max.	100 Hz
• With inductive load; max.	0.5 Hz
Voltage induced on circuit interruption limited to (internally), typ.	L+ (-1.5 V)
Short-circuit protection of output	Yes, electronic
Line length	
• Unshielded	600 m
• Shielded	1000 m
Analog inputs	
Number of inputs	16 with thermocouples or 2-wire connection 8 with Pt100 or 4-wire connection

Technical specifications (continued)

Input range (rated values/ display range/ input resistance)	
• Voltage	+/- 80 mV/-80 to+80 mV/10 MΩ 0 to 10 V/-1.75 to +11.75 V/ 100 kΩ
• Current	0 to 20 mA/-3.5 to 23.5 mA/50 Ω 4 to 20 mA/0 to 23.5 mA/50 Ω
• Thermocouple type	B /0 to 13.81 mV/10 M Ω J /-8.1 to 69.54 mV/10 M Ω K /-6.54 to 54.88 mV/10 M Ω R /-0.23 to 21.11 mV/10 M Ω S /-0.24 to 18.7 mV/10 M Ω
• Resistance thermometer	Pt 100/30.82 to 650.46 mV/ 10 MΩ
Principle of measurement	Integrating
Resolution (including overrange)	12 or 14 bit, parameterizable
Conversion time per analog input	
• At 12 bit	162/3 ms at 60 Hz 20 ms at 50 Hz
• At 14 bit	100 ms at 50 und 60 Hz
Transient recovery time	
• For resistive load	0.1 ms
• For capacitive loads	3.3 ms
• For inductive loads	0.5 ms
Substitute values injectable	Yes, parameterizable
Permissible input voltage for voltage input (destruction limit)	20 V
Permissible input current for current input (destruction limit)	40 mA
Connection for transducer	For voltage measurement and for current measurement (as 4-wire transducers)
Linearization of characteristic	Yes, parameterizable
• For thermocouples	Typ B, J, K, R, S
• For resistance thermometers	Pt 100 (standard range)
Temperature compensation	Yes, parameterizable (internal and external with Pt 100)
Noise voltage suppression for f = n x (fl +/- 1 %), fl = noise frequency	
• Common-mode noise (USS < 2.5 V), min.	70 dB
• Series-mode noise, min. (peak value of the noise < rated value of the input range), min.	40 dB
Operational limit (in the entire temperature range, referred to input range)	+/- 0.6 to +/- 1%
Basic error limit (operating error limit at 25 °C, referred to the input range)	+/-0.4 to +/-0.6%
Analog outputs	
Temperature error (referred to input range)	+/-0.005 %/K
Linearity error (referred to input range)	+/-0.05 %
Cable length (shielded)	200 m, 50 m at 80 mV and thermocouples
Number	16 (FM 455 C only)
Output ranges (rated values)	+/-10 V/0 to 10 V +/- 20 mA/ 0 to 20 mA, 4 to 20 mA
Load resistor	
• With voltage outputs; min.	1 kΩ
- capacitive load, max.	1 mF
• Current outputs, max.	500 Ω
- inductive load, max.	1 mH
Voltage output	
• Short-circuit protection	Yes
• Short-circuit current max.	25 mA
Current output	
• Open-circuit voltage, max.	18 V
Connection of actuators	
• For voltage output	2-wire connection
• For current output	2-wire connection
Operating error limit (in the entire temperature range of the modules, relative to input range)	
• Voltage	+/-0.5 %
• Current	+/-0.6 %
Basic error threshold (operating error threshold at 25 °C, with reference to output range)	
• Voltage	+/- 0.2 %
• Current	+/- 0.3 %
Temperature error (referred to output range)	+/-0.02 %/K
Linearity error (referred to output range)	+/-0.05 %
Cable length (shielded)	200 m, 50 m at 80 mV and thermocouples

FM 455 closed-loop control module

Technical specifications function blocks

FB	Memory requirements		Runtimes	
	FB length in load memory	DB length in load memory	in S7-300/C7 (for CPU 314, C7-623/624)	in S7-400 (for CPU 414)
PID_FM	1.976 byte	490 byte	0.65 ms	0.077 ms
FUZ_355	464 byte	172 byte	2.1 ms	1.9 ms
FORCE355	790 byte	214 byte	2.2 ms	2.0 ms
READ_355	644 byte	184 byte	2.5 ms	2.2 ms
CH_DIAG	420 byte	178 byte	2.3 ms	2.1 ms
PID_PAR	1.074 byte	410 byte	4.3 ms	3.8 ms
CJ_T_PAR	354 byte	130 byte	1.8 ms	1.6 ms
Target system	SIMATIC S7-300 (from CPU 314), S7-400, C7			

Ordering data

	Order No.
FM 455 C closed-loop control module with 16 analog outputs for 16 continuous-action controllers	**6ES7 455-0VS00-0AE0**
FM 455 S closed-loop control module with 32 digital outputs for 16 step or pulse controllers	**6ES7 455-1VS00-0AE0**
FM 455 manual	
German	**6ES7 455-0VS00-8AA0**
English	**6ES7 455-0VS00-8BA0**
French	**6ES7 455-0VS00-8CA0**
Italian	**6ES7 455-0VS00-8EA0**

	Order No.
Front connector	
1 unit	
• With screw-type terminals	**6ES7 492-1AL00-0AA0**
• With spring-loaded terminals	**6ES7 492-1BL00-0AA0**
• With crimp contacts	**6ES7 492-1CL00-0AA0**

FM 458-1 DP application module

Overview



SIMATIC FM 458-1 DP integrated into SIMATIC S7-400:

- Designed for high-performance and freely configurable closed-loop control tasks in SIMATIC S7-400
- Can be adapted as required to individual requirements, such as:
  Open-loop control, closed-loop control and Motion Control; therefore sufficiently flexible for an extensive range of applications
- Comprehensive library containing about 300 function blocks,
  e.g. simple functions such as AND, ADD and OR through to complex GMC (General Motion Control) blocks such as virtual master and gearing functions
- User-friendly graphical configuration with the SIMATIC Engineering Tool CFC (Continuous Function Chart); optimized code generation with compilers, so SCL is not required.
- PROFIBUS DP interface onboard

SIMATIC FM 458-1 DP is the result of more than 15 years of experience of high-performance closed-loop control systems and combines this knowledge with the advantages of SIMATIC – the market-leading automation system worldwide for decades. In contrast to other function modules with static structures and functions, the FM 458-1 DP application module can be flexibly adapted to individual requirements.

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FM 458-1 DP base module

Overview



- Basic module for performing calculation, open-loop control and closed-loop control tasks
- PROFIBUS DP interface for connecting to distributed I/O and drive systems
- Modular expansion by means of expansion modules for I/O and communication

Technical specifications

Supply voltage/current (rated values)	+5 V: 2.3 A
Back-up battery (for the SIMATIC power supply)	3.4 V: 10 µA
PROFIBUS DP interface (connector X3)	• Equidistant with linking to interrupt tasks • Internode communication capability • Configuration with HWKonfig
Digital inputs (connector X2)	
Number	8 inputs with interrupt capability
Electrical isolation	No, using optional interface modules only

Input voltage	
Rated value	24 V DC
• At "0" signal	-1 to +6 V or open input
• At "1" signal	+13 to +33 V
Input current	
• At "0" signal	0 mA
• At "1" signal , typ.	3 mA at 24 V
Delay time	20 µs
Realtime clock, resolution	0.1 ms
Space requirements/width	1 SIMATIC slot
Weight	Approx. 0.8 kg

FM 458-1 DP basic module

Ordering data	Order No.
FM 458-1 DP application module Basic module for importing arithmetic and control tasks; with PROFIBUS DP interface	**6DD1 607-0AA1**
Micro memory card for FM 458-1 DP basic module	
512 KB	**6ES7 953-8LJ00-0AA0**
2 MB	**6ES7 953-8LL00-0AA0**
4 MB	**6ES7 953-8LM00-0AA0**
SC 57 interface cable for connection of FM 458-1 to SBxx or SU12 interface module	**6DD1 684-0FH0**
SC 64 interface cable for connection of FM 458-1 to the serial port of a PG/PC	**6DD1 684-0GE0**
SB10 interface module for connection of 8 binary I/Os to FM 458-1 DP	**6DD1 681-0AE2**
SB60 interface module for connection of 8 binary I/Os to FM 458-1 DP, input voltage 115/230 V AC/DC	**6DD1 681-0AF4**
SB61 interface module for connection of 8 binary I/Os to FM 458-1 DP, input voltage 24/48 V DC	**6DD1 681-0EB3**

	Order No.
SU12 interface module for connection of 10 signals to FM 458-1 DP	**6DD1 681-0AJ1**
RS 485 bus connector with 90° outgoing feeder cable	
Max. transmission rate 12 Mbit/s	
Without PG interface	**6ES7 972-0BA12-0XA0**
With PG interface	**6ES7 972-0BB12-0XA0**
RS 485 bus connector with slanting outgoing feeder cable	
Max. transmission rate 12 Mbit/s	
Without PG interface	**6ES7 972-0BA41-0XA0**
With PG interface	**6ES7 972-0BB41-0XA0**
RS 485 bus connector with 90° outgoing feeder cable for Fast-Connect system	
Max. transmission rate 12 Mbit/s	
Without PG interface	**6ES7 972-0BA50-0XA0**
With PG interface	**6ES7 972-0BB50-0XA0**
PROFIBUS FastConnect bus cable Standard type with special design for fast mounting, 2-core, shielded, sold by the meter; max. delivery unit 1000 m, minimum ordering length 20 m	**6XV1 830-0EH10**
Preferred lengths:	
20 m	**6XV1 830-0EN20**
50 m	**6XV1 830-0EN50**
100 m	**6XV1 830-0ET10**

EXM 438-1- I/O expansion module for FM 458-1 DP

Overview



- Optional plug-in expansion modules for the FM 458-1 DP basic module
- For reading and outputting time-critical signals
- With digital and analog inputs/outputs
- Incremental and absolute encoders can be connected
- 4 high-resolution analog outputs
- Fan-free operation up to 40 °C

Technical specifications

Power supply	
Rated voltage	+5 V 24 V (supplied externally)
• Minimum	+4.75 V
• Maximum	+5.25 V
Current consumption, typ.	1.5 A
Space requirements	1 slot
Weight	1 kg
Analog outputs, 12-bit	
Number	4
Electrical isolation	No
Output voltage range	-10 V to +10 V
Output current, max.	±10 mA
Resolution	12 bit
Conversion time per channel, typ.	4 µs
Accuracy	
• Integral linearity error, max.	± 1 LSB
• Gain error, max.	± 0.3 %
• Offset error, max.	± 24 mV
Slewrate	Approx. 3.5 V/µs
Voltage output	
• Short-circuit protection	Yes (relative to frame)
• Short-circuit current	Approx. 100 mA
Analog outputs, 16-bit	
Number	4
Electrical isolation	No
Output voltage range	-10 V to +10 V
Output current, max.	±10 mA
Resolution	16 bit
Conversion time per channel, typ.	2 µs
Accuracy	
• Integral linearity error, max.	±1 LSB
• Gain error, max.	±0.1 %
• Offset error, max.	±1 mV
Slewrate	Approx. 0.7 V/µs

Voltage output	
• Short-circuit protection	Yes (relative to frame)
• Short-circuit current	Approx. 27 mA per channel
Analog inputs	
Number	5
Design	Differential inputs, non-floating
Input voltage range	-10 V +/- 4 LSB to +10 V +/- 4 LSB (1 LSB = 4.88 mV)
Input impedance	470 kOhm
Input filter	3 dB cut-off frequency: 1.5 kHz
Resolution	12 bit
Absolute accuracy	Typ. 11 bit over complete temperature range
Max. conversion time	45 µs
Digital outputs	
Number	8, non-floating
Supply voltage	From external supply
• Rated value	24 V
• Permissible range (including ripple)	+20 to +30 V
• Temporarily	+35 V, max. 0.5 s
Output current at "1" signal	
• Rated current	50 mA
• Permissible range	Up to 100 mA
Short-circuit protection	Electronic/thermal for approx. 250 mA
Voltage induced on current interruption limited to	Supply voltage + 1 V
Overall loading	80 % at 50°C all outputs 50 mA
Residual current at "0" signal	20 µA
Signal level of outputs	
• At "0" signal	Max. 3 V
• At "1" signal	Supply voltage - 2,5 V
• ON delay	Max. 15 µs

EXM 438-1- I/O expansion module for FM 458-1 DP

Technical specifications (continued)

Digital inputs	
Number	16, non-floating
Input voltage	
• Rated voltage	+24 V
• At "0" signal	-1 to +6 V or open input
• At "1" signal	+13 to +33 V
Input current	
• At "0" signal	0 mA
• At "1" signal	3 mA typ
Delay time	Max. 200 µs
15 V incremental encoder (HTL)	
Number of encoders	Max. 8 (incl. 5 V encoder)
Design	Differential input, with electrical isolation
Internal current limiting	Approx. 15 mA (electronic)
Track signals	Tracks A and B (phase offset 90 degrees) also with marker pulse N
Monitoring track	One monitoring track per encoder; same specification as digital inputs
Pulse frequency	Max. 1 MHz (track frequency)
Phase difference for track signals	Independently of the pulse frequency, at least 200 ns
Input voltage	
• At "0" signal	-30 V to +4 V (at 15 mA loading)
• At "1" signal	+8 V to + 30 V (at 15 mA loading)
Permissible input voltage range	Differential voltage -30 V to +30 V
Fault pulse suppression	Configured on speed actual value function block: 0 – 16 µs (62.5 kHz)
5 V incremental encoder (TTL)	
Number of encoders	Max. 8 (incl. 15 V encoder)
Design	Differential input, with electrical isolation
Track signals	1.) For tracks A and B (90° phase offset), also with marker pulse N 2.) For separate forwards and backwards tracks
Pulse frequency	Max. 2.5 MHz
Permissible input voltage range	Differential voltage -5 V to +5 V
Max. input current	15 mA (caution, not limited on module!)
Input voltage	
• At "0" signal	-5 V to 0 V
• At "1" signal	+3 V to +5 V
Input impedance	
• Static	180 Ohm
• Dynamic	100 Ohm (corresponds to the ripple resistance of a twisted-pair cable)
Fault pulse suppression	Configured on speed actual value function block: 0 or 125 ms
Supply voltage connection for pulse encoder	
Design	Non-floating, electronic short-circuit and overload protection
Output voltage	Approx. 14 V
Output current, max.	100 mA
Absolute encoder	
Number	4
Connectable types	Single or multiturn encoder with SSI (synchronous serial) or EnDat interface
Signal voltage	5 V according to RS 422
Data transfer rate	100 kHz to 2 MHz (dependent on the cable length)
Data formats	Dual, Gray, Gray Excess code

Ordering data

	Order No.
EXM 438-1 input/output expansion for direct exchange of digital and analog signals between FM 458-1 DP and the plant	**6DD1 607-0CA1**
SB10 interface module for connection of 8 binary inputs or output to FM 458-1 DP	**6DD1 681-0AE2**
SB60 interface module for connection of 8 binary inputs to FM 458-1 DP, input voltage 115/230 V AC/DC	**6DD1 681-0AF4**
SB61 interface module for connection of 8 binary inputs to FM 458-1 DP, input voltage 24/48 V DC	**6DD1 681-0EB3**
SB70 interface module for connection of 8 binary outputs to FM 458-1 DP; output voltage 230 V AC/DC	**6DD1 681-0AG2**
SB71 interface module for connection of 8 binary outputs to FM 458-1 DP; output voltage 24/48 V DC	**6DD1 681-0DH1**
SU13 interface module for connection of 50 signals to FM 458-1 DP	**6DD1 681-0GK0**

EXM 448/448-1 universal communications expansion module for FM 458-1 DP

Overview



- Optional plug-in expansion modules for the FM 458-1 DP basic module
- For high-speed communication using PROFIBUS DP or SIMOLINK
- EXM 448: With a spare slot for one MASTERDRIVES option module
- EXM 448-1: With an installed MASTERDRIVES option module, SLB, for establishing a SIMOLINK fiber-optic cable connection

Technical specifications

Rated voltage/current input	+5 V/approx. 0.8 A	Weight	0.8 kg
Space requirements	1 slot		

Ordering data

	Order No.		Order No.
EXM 448 universal communications expansion module for fast communication, e.g. with drives; with vacant slot for MASTERDRIVES option module	**6DD1 607-0EA0**	**COM PROFIBUS V5.1 parameterization software** for parameterization of PROFIBUS networks for Windows 95/98/NT/2000/Me on CD-ROM, in 5 languages, incl. documentation	**6ES5 895-6SE03**
EXM 448-1 universal communications expansion module for fast communication, e.g. with drives; with MASTERDRIVES option module SLB to design a SIMOLINK fiber-optic connection	**6DD1 607-0EA1**		

Accessories for FM 458-1 DP

Overview
Interface cable SC57, SC64



SC64 interface cable

- Connects the FM 458 to SBxx or SU12 interface modules
- Enables the digital inputs of the FM 458, which have interrupt capability, to be used

SC57 service cable

- Connects the FM 458 to the serial interface of a PC/PG
- Enables access with CFC Online or for program downloads

Overview
Interface cable SC62



- Connects the EXM 438-1 I/O module to up to 5 SBxx or SU12 interface modules in order to use the digital inputs/outputs
- Shielded circular cable
- 5x connector 10-pin
- 50-pin connector (on the module side)
- Length 2.0 m

Overview
Interface cable SC63



- Connects the EXM 438-1 I/O module to an SU13 interface module
- Shielded circular cable
- 2x50-pin connector
- Length 2.0 m

Overview
Interface module SB10



- Interface module to connect 8 digital inputs or outputs. The signals are transferred through; there is no electrical conversion.
- In combination with SC62
- 2 x 8 Screw terminals to connect 8 binary signals
- No electrical isolation
- The statuses of the digital signals are displayed using a LED for each binary signal.
- The 24 V DC supply status is displayed using LEDs

Overview
Interface module SB60



- 8 digital inputs with conversion from 115/230 V DC/AC to 24 V DC.
- In combination with SC62
- 3 x 8 screw terminals to connect 8 digital inputs

- Electrical isolation (optocouplers)
- Signal voltage is either 115 V DC/AC or 230 V AC
- Status display of the binary signals each with an LED

Overview
Interface module SB61



- 8 digital inputs with conversion from 24/48 V DC to 24 V DC.
- In combination with SC62
- 3 x 8 screw terminals to connect 8 digital signals

- Electrical isolation (optocouplers)
- Reference potentials can be separately set for the digital inputs
- Status display of the binary signals each with an LED

Overview
Interface module SB70



- 8 digital outputs, the module-side 24 V DC is converted on the plant-side to max. 230 V DC/AC using **relays**.
- In combination with SC62

- 3 x 8 screw terminals to connect 8 binary inputs; each connected in the interface module with central, break and make contacts of changeover contact elemments (relays)

Overview
Interface module SB71



- 8 binary outputs with conversion of 24 V DC on the module side to max. 24/48 V DC on the plant side using transistors
- In combination with SC62
- 2 x 8 screw terminals to connect 8 binary inputs;

- 40 mA max. output currrent, short-circuit-proof
- Electric isolation (optocoupler)
- Status display of the binary signals each with an LED

Accessories for FM 458-1 DP

Overview
Interface module SU12



- Connection of 50 signals, no electronic conversion
- In combination with SC62
- 1:1 connection
- 10 screw terminals to connect 10 signals
- Max. 60 V, 0.5 A per signal
- No electrical isolation

Overview
Interface module SU13



- Connection of 50 signals, no electronic conversion
- In combination with SC63
- 1:1 connection
- 50 screw terminals to connect 50 signals
- Max. 60 V, 0.5 A per signal
- No electrical isolation

Overview
Porgram memory modules



- The program designed with CFC is stored on the program memory module. The module is then inserted into the slot on a CPU module, which then runs the program.
- 2, 4 or 8 MB program memory (Flash)
- 8 KB changing data memory (EEPROM)
- Weight: 30 g

Technical specifications

Interface module SB10	
Function	8 binary inputs or outputs
Dimensions (W x H x D) in mm	45 x 130 x 156
Weight	0.3 kg
Interface module SB60	
Function	8 binary inputs for 115/230 V DC/AC
Dimensions (W x H x D) in mm	45 x 130 x 156
Weight	0.31 kg
Interface module SB61	
Function	8 binary inputs for 24/48 V DC
Dimensions (W x H x D) in mm	45 x 130 x 156
Weight	0,32 kg
Interface module SB70	
Function	8 binary inputs for 230 V AC
Dimensions (W x H x D) in mm	45 x 130 x 156
Weight	0.32 kg

Interface module SB71	
Function	8 binary outputs for 24/48 V DC
Dimensions (W x H x D) in mm	45 x 130 x 156
Weight	0.32 kg
Interface module SU12	
Function	Connection of 10 signals
Dimensions (W x H x D) in mm	45 x 130 x 156
Weight	0.28 kg
Interface module SU13	
Function	Connection of 50 signals
Dimensions (W x H x D) in mm	45 x 130 x 156
Weight	0.3 kg

Ordering data

	Order No.
SC 57 interface cable for connection of FM 458-1 to SBxx or SU12 interface module	**6DD1 684-0FH0**
SC 64 interface cable for connection of FM 458-1 to the serial port of a PG/PC	**6DD1 684-0GE0**
SC 62 interface cable for connection of EXM 438-1 to up to 5 SBxx or SU12	**6DD1 684-0GC0**
SC 63 interface cable for connection of EXM 438-1 to an SU13	**6DD1 684-0GD0**
SB10 interface module for connection of 8 binary I/Os to FM 458-1 DP	**6DD1 681-0AE2**
SB60 interface module for connection of 8 binary I/Os to FM 458-1 DP, input voltage 115/230 V AC/DC	**6DD1 681-0AF4**

	Order No.
SB61 interface module for connection of 8 binary I/Os to FM 458-1 DP, input voltage 24/48 V DC	**6DD1 681-0EB3**
SB70 interface module for connection of 8 binary outputs to FM 458-1 DP; output voltage 230 V AC/DC	**6DD1 681-0AG2**
SB71 interface module for connection of 8 binary outputs to FM 458-1 DP; output voltage 24/48 V DC	**6DD1 681-0DH1**
SU12 interface module for connection of 10 signals to FM 458-1 DP	**6DD1 681-0AJ1**
SU13 interface module for connection of 50 signals to FM 458-1 DP	**6DD1 681-0GK0**

IP 242B counter module

Overview

- For acquiring and processing count pulses up to a frequency of 500 kHz
- Used for counting pulses, generating frequencies, splitting frequencies as well as measuring frequency, time and velocity.
- For applications in which the count has to be processed extremely quickly.

For further information and ordering data, please refer to Catalog ST 50, CA 01 or the A&D Mall.

Ordering data

	Order No.
IP 242B counter module	**6ES7 470-1AB00-0AA0**
including S7 adapter casing	
To be ordered separately:	
IP 242B configuration package in S7 adapter casing	
consisting of manual and standard function blocks	
German	**6ES5 242-5AB11**
English	**6ES5 242-5AB21**
French	**6ES5 242-5AB31**
Italian	**6ES5 242-5AB51**

	Order No.
Terminal connector	**6ES5 983-2AB11**
4 units	
Converter	**6ES5 242-1AU11**
for 24 V asymmetric incremental encoders to 5 V (RS 422) symmetric incremental encoders	
705 connecting cable	**6ES5 705-2CC00**
for Siemens position encoders (RS 422)	

IP 244 thermostat module

Overview

- For controlling and monitoring temperatures and for acquiring and monitoring analog measured values

For further information and ordering data, please refer to Catalog ST 50, CA 01 or the A&D Mall.

Ordering data

	Order No.
IP 244 thermostat module	**6ES7 470-1AD00-0AA0**
including S7 adapter casing	
To be ordered separately:	
IP 244 configuration package in S7 adapter casing	
consisting of manual and standard function blocks	
German	**6ES5 244-5AA11**
English	**6ES5 244-5AA21**
French	**6ES5 244-5AA31**
Italian	**6ES5 244-5AA51**

	Order No.
721-4 connecting cable	
between IP 244 and binary inputs or outputs	
2.5 m	**6ES5 721-4BC50**
5 m	**6ES5 721-4BF00**
10 m	**6ES5 721-4CB00**
721-5 connecting cable	
between IP 244 and analog inputs or outputs	
2.5 m	**6ES5 721-5BC50**
5 m	**6ES5 721-5BF00**
32 m	**6ES5 721-5CD20**

WF 705 position decoder module

Overview

- For acquiring and processing the signals from up to 12 synchro-serial absolute value encoders (SSI)

For further information and ordering data, please refer to Catalog ST 50, CA 01 or the A&D Mall.

Ordering data

	Order No.
WF 705 position encoder	**6FM1 705-3AA70**
including S7 adapter casing	
WF 705 standard software	
for actual-value acquisition on 3.5" diskette	
MS-DOS single license	**6FM1 705-7UA30-1AA0**
Updating service	**6FM1 705-7UA30-1AA2**
Master license for 50 applications	**6FM1 705-7UA30-1AA5**
To be ordered separately:	
WF 705 technical description	
German	**6ZB5 440-0AA01-0BA5**
English	**6ZB5 440-0AA02-0BA5**
French	**6ZB5 440-0AA03-0BA2**
EMC guidelines for WF modules	
German	**6ZB5 440-0QX01-0BA4**
English	**6ZB5 440-0QX02-0BA4**
French	**6ZB5 440-0QX03-0BA3**
Italian	**6ZB5 440-0QX05-0BA3**

	Order No.
Absolute encoders	
24 bit, SSI, with synchro flange	**6FX2 001-5FS24**
24 bit, SSI, with terminal flange	**6FX2 001-5QS24**
590 connecting cable	
between actual-value distributor and SSI position encoder	
2 m	**6FM1 590-2EA00**
5 m	**6FM1 590-2EB00**
10 m	**6FM1 590-2EC00**
18 m	**6FM1 590-2ED00**
25 m	**6FM1 590-2EE00**
35 m	**6FM1 590-2EF00**
50 m	**6FM1 590-2EG00**
60 m	**6FM1 590-2EH00**
790 connecting cable	
to actual-value distributors	
2 m	**6FM1 790-1HA00**
5 m	**6FM1 790-1HB00**

WF 706 C positioning, position measuring, counter module

Overview

- For positioning axes via limit points, for position encoding and for counting
- Additional axes can be positioned using an analog submodule available as an option

For further information and ordering data, please refer to Catalog ST 50, CA 01 or the A&D Mall.

Ordering data

	Order No.
WF 706 C positioning module	
including S7 adapter casing	
with 3 channels	**6FM1 706-3AA70**
with 6 channels	**6FM1 706-3AB70**
Analog module	**6FM1 706-4AA00**
To be ordered separately:	
WF 706 C description	
German	**6ZB5 440-0KR01-0BB0**
English	**6ZB5 440-0KR02-0BB0**
French	**6ZB5 440-0KR03-0BA7**
Italian	**6ZB5 440-0KR05-0BB0**
EMC guidelines for WF modules	See WF 705

	Order No.
Incremental encoder with RS 422 interface (TTL)	
Synchro flange and 5 V power supply, 1 m cable with axial connector	
1000 pulses/revolution	**6FX2 001-2CB00**
2000 pulses/revolution	**6FX2 001-2CC00**
2500 pulses/revolution	**6FX2 001-2CC50**
Absolute encoders	
12 bit, SSI, with synchro flange	**6FX2 001-5FS12**
12 bit, SSI, with terminal flange	**6FX2 001-5QS12**
24 bit, SSI, with synchro flange	**6FX2 001-5FS24**
24 bit, SSI, with terminal flange	**6FX2 001-5QS24**

WF 706 C positioning, position measuring, counter module

Ordering data (continued)

	Order No.
790 connecting cable	
between WF 706 and:	
Heidenhain position encoder ROD 320	
5 m	**6FM1 790-1BB00**
10 m	**6FM1 790-1BC00**
18 m	**6FM1 790-1BD00**

	Order-No.
790 connecting cable	
between WF 706 and:	
Siemens position encoder 6FX2 001-2...	
2 m	**6FM1 790-1CA00**
5 m	**6FM1 790-1CB00**
18 m	**6FM1 790-1CD00**

5

WF 707 cam controller

Overview

- For the output of path-dependent switching fuctions for drives with linear and rotary axes
- Mainly for small and high-speed machines.

For further information and ordering data, please refer to Catalog ST 50, CA 01 or the A&D Mall.

Ordering data

	Order No.
WF 707 cam controller	**6FM1 707-3AA70**
including S7 adapter casing	
To be ordered separately:	
WF 707 description	
German	**6ZB5 440-0ST01-0BA5**
English	**6ZB5 440-0ST02-0BA5**
French	**6ZB5 440-0ST03-0BA1**
Italian	**6ZB5 440-0ST05-0BA1**
EMC guidelines for WF modules	
German	**6ZB5 440-0QX01-0BA4**
English	**6ZB5 440-0QX02-0BA4**
French	**6ZB5 440-0QX03-0BA3**
Italian	**6ZB5 440-0QX05-0BA3**
Incremental encoder with RS 422 interface (TTL)	
Synchro flange and 5 V power supply, 1 m cable with axial connector	
1000 pulses/revolution	**6FX2 001-2CB00**
2000 pulses/revolution	**6FX2 001-2CC00**
2500 pulses/revolution	**6FX2 001-2CC50**

	Order No.
Absolute encoders	
12 bit, SSI, with synchro flange	**6FX2 001-5FS12**
12 bit, SSI, with terminal flange	**6FX2 001-5QS12**
24 bit, SSI, with synchro flange	**6FX2 001-5FS24**
24 bit, SSI, with terminal flange	**6FX2 001-5QS24**
790 connecting cable	
between WF 707 and:	
Heidenhain position encoder ROD 320	
5 m	**6FM1 790-1BB00**
10 m	**6FM1 790-1BC00**
18 m	**6FM1 790-1BD00**
Siemens position encoder 6FX2 001-2...	
2 m	**6FM1 790-1CA00**
5 m	**6FM1 790-1CB00**
18 m	**6FM1 790-1CD00**
WF 706/707 or modules without SSI signal processing	
0.5 m	**6FM1 790-1JS00**
2 m	**6FM1 790-1JA00**

Overview

- WF 721:
  For positioning and closed-loop position control of one axis with a variable-speed drive.
- WF 723A/B/C:
  For control of up to three axes with variable-speed drives.

For further information and ordering data, see Catalog ST 50, CA01 have a look in the A&D Mall.

Ordering data

	Order No.
WF 721 positioning module	**6FM1 721-3AA70**
including S7 adapter casing	
Firmware upgrade for WF 721 positioning module	**6FM1 721-4AA00**
WF 723 A positioning module	**6FM1 723-3AA70**
including S7 adapter casing	
Firmware upgrade for WF 723 A positioning module	**6FM1 723-4AA00**
WF 723 B positioning module	**6FM1 723-3BA70**
including S7 adapter casing	
WF 723 C positioning module	**6FM1 723-3CA70**
including S7 adapter casing	
Firmware upgrade for WF 723 C positioning module	**6FM1 723-4CA00**
Software packages	
Standard A	
to connect SIMATIC S7 to WF 721/723 A/B/C; on 3.5" diskettes (MS-DOS)	
Single license	**6FM1 700-7UA31-1AA0**
Copy license for 50 applications	**6FM1 700-7UA31-1AA5**
Standard B-OP	
Operation and programming package for operation of WF 721/723 A/B/C together with OP25/27/35/37; on 3.5" diskettes (MS-DOS)	
Single license	**6FM1 025-8AA30-1MA0**
Copy license	**6FM1 025-8AA30-1MA1**
Standard operator guide for OP25/35/37	
on 3.5" diskettes (MS-DOS)	
Single license	**6FM1 025-8BA30-1MA0**
COM 723 software for PC controls	
for WF 721, 723 x, for SIMATIC S7; single license	
German	**6FM1 723-6UA70-1AA0**
English	**6FM1 723-6UA70-1BA0**
French	**6FM1 723-6UA70-1CA0**
To be ordered separately:	
WF 721, WF 723 A complete manual	
German	**6ZB5 440-0VK01-0BA2**
English	**6ZB5 440-0VK02-0BA2**

	Order No.
WF 723 B complete manual	
German	**6ZB5 440-0VM01-0BA1**
English	**6ZB5 440-0VM02-0BA1**
WF 723 C complete manual	
German	**6ZB5 440-0VY01-0BA1**
English	**6ZB5 440-0VY02-0BA1**
WF 721, WF 723 A/B/C module-independent manual	
German	**6ZB5 440-0WC01-0BA0**
English	**6ZB5 440-0WC02-0BA0**
French	**6ZB5 440-0WC03-0BA0**
Italian	**6ZB5 440-0WC05-0BA0**
WF 721, WF 723 A module-specific manual	
German	**6ZB5 440-0WN01-0BA0**
English	**6ZB5 440-0WN02-0BA0**
French	**6ZB5 440-0WN03-0BA0**
Italian	**6ZB5 440-0WN05-0BA0**
WF 723 B module-specific manual	
German	**6ZB5 440-0WQ01-0BA0**
English	**6ZB5 440-0WQ02-0BA0**
French	**6ZB5 440-0WQ03-0BA0**
Italian	**6ZB5 440-0WQ05-0BA0**
WF 723 C module-specific manual	
German	**6ZB5 440-0WU01-0BA0**
English	**6ZB5 440-0WU02-0BA0**
Italian	**6ZB5 440-0WU05-0BA0**
Incremental encoder with RS 422 interface (TTL)	
Synchro flange and 5 V power supply, 1 m cable with axial connector	
1000 pulses/revolution	**6FX2 001-2CB00**
2000 pulses/revolution	**6FX2 001-2CC00**
2500 pulses/revolution	**6FX2 001-2CC50**
Absolute encoders	
12 bit, SSI, with synchro flange	**6FX2 001-5FS12**
12 bit, SSI, with terminal flange	**6FX2 001-5QS12**
24 bit, SSI, with synchro flange	**6FX2 001-5FS24**
24 bit, SSI, with terminal flange	**6FX2 001-5QS24**

Ordering data (continued)

	Order No.
790 connecting cable	
between WF 721 and:	
static converter	
2 m	**6FM1 790-2BA00**
5 m	**6FM1 790-2BB00**
10 m	**6FM1 790-2BC00**
between WF 723 and:	
static converter	
2 m	**6FM1 790-2CA00**
5 m	**6FM1 790-2CB00**
10 m	**6FM1 790-2CC00**

	Order No.
790 connecting cable	
between WF 72x and:	
Heidenhain position encoder ROD 320	
5 m	**6FM1 790-1BB00**
10 m	**6FM1 790-1BC00**
18 m	**6FM1 790-1BD00**
Siemens position encoder 6FX2 001-2...	
2 m	**6FM1 790-1CA00**
5 m	**6FM1 790-1CB00**
18 m	**6FM1 790-1CD00**

Overview



- For high-performance transmission of messages using point-to-point connections (high message rate)
- Physical interface: RS 422/ RS 485 (X.27)
- Up to 32 nodes
- Protocol implemented: ASCII, 3964 (R)
- Simple parameterization using a parameterization tool integrated in STEP 7

Technical specifications

Interfaces	
• Number of inputs	1
• Transmission method	RS 422/485 (X.27) max. 115.2 kbit/s)
Transmission protocols	
• Integrated standard protocols	3964 (R); ASCII
Transmission rate, max.	115.2 kbit/s
Transmission distance, max.	RS 422/485 (X.27): 1200 m
Parameterization	using STEP 7: has its own parameterization screen forms

Memory requirement per interface (in memory card of S7 CPU)	1 to 5 KB for parameters 0 to 55 KB for message texts
Communication functions	
• S7 expanded communication	Yes
• Max. number of operable connections per interface	31
Supply voltage	5 V DC/24 V DC
Current consumption from 5 V DC, max.	0.7 A interface: max. 300 mA
Dimensions (W x H x D) in mm	25 x 290 x 210
Weight	720 g

Ordering data

	Order No.
CP 440 communications processor	**6ES7 440-1CS00-0YE0**
with one RS 422/485 (X.27) interface	

	Order No.
RS 422/485 connecting cable	
for linking to SIMATIC S7	
5 m	**6ES7 902-3AB00-0AA0**
10 m	**6ES7 902-3AC00-0AA0**
50 m	**6ES7 902-3AG00-0AA0**

CP 441-1, CP 441-2

Overview



- For powerful, high-speed serial communications via point-to-point links
- 2 versions: CP 441-1 with 1 variable interface for simple point-to-point links; CP 441-2 with 2 variable interfaces for powerful point-to-point links
- Plug-in interface modules for different transmission interfaces:RS 232C (V.24) , 20 mA (TTY) or RS 422/RS 485 (X.27)
- Implemented protocols: ASCII, 3964 (R), printer driversCP 441-2 additionally has RK 512 and customized protocols (retrofittable)
- Simple parameterization via a parameterization tool integrated in STEP® 7

Technical specifications

	CP 441-1	CP 441-2
Interfaces		
• Number of inputs	1, variable	2, variable
• Transmission method	20mA (TTY) (max. 19.2 kbit/s), RS 232C (V.24) (max. 38.4 kbit/s), RS 422/485 (X.27) (max. 38.4 kbit/s)	20mA (TTY) (max. 19.2 kbit/s), RS 232C (V.24) (max. 115.2 kbit/s), RS 422/485 (X.27) (max. 115.2 kbit/s)
Transmission protocols		
• Integrated standard protocols	3964 (R); ASCII; Printers	3964 (R); ASCII; RK 512; Printers loading of non-Siemens protocols;
• Supported printers	HP Deskjet HP Laserjet IBM Proprinter user-defined	HP Deskjet HP Laserjet IBM Proprinter user-defined
Transmission rate, max.	38.4 kbit/s	115.2 kbit/s, distributed over both interfaces
Transmission distance, max.	RS 232C (V.24): 10 m 20mA (TTY): 1000 m RS 422/485 (X.27): 1200 m	
Parameterization	Via STEP 7: own parameterization screen forms	

	CP 441-1	CP 441-2
Memory requirement per interface (in memory card of S7-CPU)	1 bis 5 KB for parameters 0 to 55 KB for alarm texts 0 to 64 KB for loadable drivers (CP 441 -2 only)	
Communication functions		
• S7 expanded communication	Yes	
• Max. number of operable connections per interface	8	
Current consumption from 5 V DC, max.	0.7 A (without interface module)	
Dimensions (W x H x D) in mm	25 x 290 x 210	
Weight	720 g	
Interface modules		
• RS232C (V.24) current consumption from 5 V, max.	300 mA	
- weight	100 g	
• 20 mA (TTY) current consumption from 5V/24V, max.	300/45 mA	
- weight	100 g	
• RS 422/485 (X.27) current consumption from 5 V, max.	300 mA	
- weight	100 g	

Technical specifications, available driver for CP 441-2

MODBUS master	
	• MODBUS protocol with RTU format • Master/slave coupling: SIMATIC S7 is the master • Implemented function codes: 01, 02, 03, 04, 05, 06, 07, 08, 11,12,15,16 • No V.24 control and signalling lines • CRC polynomial: X16 + x15 + x2 +1 • Interfaces: TTY (20 mA); V.24 (RS 232 C); X.27 (RS 422/485) 2-wire or 4-wire

MODBUS Master	
	• Receive location specified at BRCV • Character delay time 3.5 characters or multiples thereof • Broadcast message possible
Parameters to be set	• Transmission rate 300 bit/s up to 76800 bit/s; (TTY up to 19200 bit/s) • Character frame • With/without RS 485 mode for 2-wire connections • With/without modem operation (ignore scratch characters) • Response monitoring time 100 ms to 25.5 s in 100 ms steps

Technical specifications, available driver for CP 441-2 (continued)

MODBUS Master	
	• Factor for character delay time 1-10 • Reservation of the receive line when using the X.27 interface module
MODBUS Slave	
	• MODBUS protocol with RTU format • Master/slave coupling: SIMATIC S7 is the slave • Implemented function codes: 01, 02, 03, 04, 05, 06, 08, 15, 16 • No V.24 control and signalling line • CRC polynomial X16 + x15 + x2 + 1 • Interfaces: TTY (20 mA), V.24 (RS 232C), X.27 (RS 422/485) 2-wire or 4-wire • Communication FB 180, instance DB 180 (using a multi-instance) • Conversion of the MODBUS data address to S7 data areas. Data areas that can be edited: DB, flags, outputs, inputs, timers, counters • Character delay time 3.5 characters or multiples thereof
Parameters to be set	• Transmission rate 300 bit/s to 76800 bit/s; (TTY up to 19200 bit/s) • Character frame • Slave address of the CP (1 to 255) • With/without RS 485 mode for 2-wire connection • With/without modem operation (ignore scratch characters)

MODBUS Slave	
	• Factor for character delay time 1-10 • Number of the work DB (for FB processing) • Enabling of memory areas that can be written by the master • Reservation of the receive line when using the X.27 interface module • Conversion of the MODBUS addresses to S7 data areas
Data Highway	
	• Data Highway Full Duplex (DF1) protocol • Interfaces: TTY (20 mA), V.24 (RS 232C), RS 422/485 (4-wire) • No "embedded responses"
Parameters to be set	• Transmission rate 300 bit/s to 76800 bit/s; (TTY up to 19200 bit/s) • Character frame: 7/8 bit; 1/2 Stop bit; even/odd/no parity • Receiving location DB and data word • Timeout for acknowledge character: 30 ms to 10 s • Number of repeats for NAK: 0 to 5 • Number of ENQ requests: 0 to 5 • Duplicate Message Transmission-Detection: On or Off • Acknowledgement for CP immediately on receipt or only after transfer to the CPU

Ordering data

	Order No.
CP 441-1 communications processor with one variable interface for interface submodules	**6ES7 441-1AA03-0AE0**
CP 441-2 communications processor with two variable interfaces for interface submodules	**6ES7 441-2AA03-0AE0**
Interface submodules	
RS 232C (V.24)	**6ES7 963-1AA00-0AA0**
20 mA (TTY)	**6ES7 963-2AA00-0AA0**
RS 422/485 (X.27)	**6ES7 963-3AA00-0AA0**
RS 232 connecting cable	
5 m	**6ES7 902-1AB00-0AA0**
10 m	**6ES7 902-1AC00-0AA0**
TTY connecting cable	
5 m	**6ES7 902-2AB00-0AA0**
10 m	**6ES7 902-2AC00-0AA0**
50 m	**6ES7 902-2AG00-0AA0**
RS 422/485 connecting cable	
5 m	**6ES7 902-3AB00-0AA0**
10 m	**6ES7 902-3AC00-0AA0**
50 m	**6ES7 902-3AG00-0AA0**

	Order No.
CP 441-1, CP 441-2 manual	
German	**6ES7 441-2AA00-8AA0**
English	**6ES7 441-2AA00-8BA0**
French	**6ES7 441-2AA00-8CA0**
Italian	**6ES7 441-2AA00-8EA0**
Loadable drivers (CP 441-2)	
MODBUS master, single license	**6ES7 870-1AA01-0YA0**
MODBUS master, single license; only license without software	**6ES7 870-1AA01-0YA1**
Loadable drivers for CP 441-1	
MODBUS Master (RTU format)	
• Single license	**6ES7 870-1AA01-0YA0**
• Single license, without software or documentation	**6ES7 870-1AA01-0YA1**
MODBUS Slave (RTU format)	
• Single license	**6ES7 870-1AB01-0YA0**
• Single license, without software or documentation	**6ES7 870-1AB01-0YA1**
Data Highway (DF1 protocol)	
• Single license	**6ES7 870-1AE00-0YA0**
• Single license, without software or documentation	**6ES7 870-1AE00-0YA1**

CP 443-5 Basic

Overview



- Master connection of the S7-400 to PROFIBUS
- Communication services:
  - PG/OP communication
  - S7 communication
  - S5-compatible communication (SEND/RECEIVE)
  - PROFIBUS-FMS
- Time-of-day synchronization
- Simple programming and configuration through PROFIBUS
- PG/OP communication between networks due to S7 routing.
- Easy to integrate into the SIMATIC S7-400 system
- Module changeover without PG.
- Operation in the SIMATIC H system for redundant S7 communication

Technical specifications

Data transmission rate	9,6 kbit/s to 12 Mbit/s
Interfaces	
• Transmission technology	RS 485
• Connections	9-pin Sub-D socket
Supply voltage	5 V DC±5%
Power consumption from 5 V	1.2 A
Power loss	6.5 W
Perm. ambient conditions	
• Operating temperature	0 °C to +60 °C
• Transportation/storage temperature	-40 °C to +70 °C
• Relative humidity	Max. 95% at +25°C
Design	
• Dimensions (W x H x D) in mm	25 x 290 x 210
• Weight	Approx. 700 g
S7 communication performance data	
• Number of usable connections	Approx. 48[1)]

1) Depending on CPU type

S5-compatible communication performance data (SEND/ RECEIVE)	
• Number of usable connections	Max. 32
• Useful data/connections	Max. 240 byte
	(SEND and RECEIVE)
FMS function performance data	
• Number of usable connections	Max. 48
• READ variable length	Max. 237 byte
• WRITE variable length	Max. 233 byte
• No. of configurable server variables	512
• No. of variables which can be loaded from partner	2640
Multi-protocol operation	
• Number of usable connections (2 of which are reserved for PG/OP communication)	Max. 59

Ordering data

	Order No.
CP 443-5 Basic communications processor for connecting SIMATIC S7-400 to PROFIBUS; basic version for PROFIBUS-FMS with electronic manual, on CD-ROM	**6GK7 443-5FX01-0XE0**
NCM S7 configuration software for PROFIBUS Configuration software for PROFIBUS CPs for SIMATIC S7; V5.x, executes under STEP 7 V5.x; with electronic manual, on CD-ROM Ge, En, Fr, Sp, It	Delivered with STEP 7 Version 5.x
NCM S7 manual for PROFIBUS Paper version for V5.x (STEP7 V5.x)	
German	**6GK7 080-5AA04-8AA0**
English	**6GK7 080-5AA04-8BA0**
French	**6GK7 080-5AA04-8CA0**
Spanish	**6GK7 080-5AA04-8DA0**
Italian	**6GK7 080-5AA04-8EA0**

	Order No.
RS 485 bus connector with 90° outgoing feeder cable for Fast-Connect system	
Without PG interface	**6ES7 972-0BA50-0XA0**
With PG interface	**6ES7 972-0BB50-0XA0**
RS 485 bus connector with 90° outgoing feeder cable	
Without PG interface	**6ES7 972-0BA12-0XA0**
With PG interface	**6ES7 972-0BB12-0XA0**
PROFIBUS 12M bus terminal Bus terminal for connecting PROFIBUS stations; up to 12 Mbit/s, with connecting cable	**6GK1 500-0AA10**
PROFIBUS 12M bus terminal	**6GK1 500-0AA10**
Manual "Communication for SIMATIC S7-300/-400"	See page 5/16

Overview



- DP-V1 master connection of S7-400 to PROFIBUS
- For configuring additional PROFIBUS DP lines.
- Communication services:
  - PROFIBUS-DP
  - PG/OP communication
  - S7 communication
  - S5-compatible communication (SEND/RECEIVE)
- Time-of-day synchronization
- Simple programming and configuration through PROFIBUS
- PG/OP communication between networks through S7 routing.
- Easy to integrate into the SIMATIC S7-400 system
- Module replacement without the need for a programming device.
- Operation in the SIMATIC H system for redundant S7 communication or DP master communication
- Data record routing (PROFIBUS DP)

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Technical specifications

Data transmission rate	9.6 kbit/s to 12 Mbit/s
Interfaces	
• Transmission technology	RS 485
• Connections	9-pin Sub-D socket
Supply voltage	5 V DC ± 5% 24 V DC ±5%
Power consumption from 5 V	1.3 A
Power loss	6.5 W
Perm. ambient conditions	
• Operating temperature	0 °C to +60 °C
• Transport/storage temperature	-40 °C to +70 °C
• Relative humidity	Max. 95% at +25°C
Design	
• Dimensions (W x H x D) in mm	25 x 290 x 210
• Weight	Approx. 700 g
Number of external DP chains in a central rack	10
DP master function performance data	
• DP master	DP-VO, DP-V1
• Number of operable DP slaves	Max. 125
• Total size of DP data areas	
- DP input range	Max. 4 KB
- DP output range	Max. 4 KB

DP master function performance data	
• Size of DP data areas per connected DP slave	
- DP input range	Max. 244 byte
- DP output range	Max. 244 byte
S7 communication performance data	
• No. of operable connections	Approx. 48[1)]
S5-compatible communication performance data (SEND/ RECEIVE)	
• Number of usable connections	Max. 32
• Useful data/connections	Max. 240 byte (SEND and RECEIVE)
Multi-protocol operation	
• Number of usable connections (2 of which are reserved for PG/OP communication)	
- without DP	Max. 59
- with DP	Max. 55

1) Depending on CPU type

Ordering data

	Order No.
CP 443-5 Extended communications processor for connecting SIMATIC S7-400 to PROFIBUS; Extended version for PROFIBUS DP, with electronic manual, on CD-ROM	**6GK7 443-5DX03-0XE0**
NCM S7 configuration software for PROFIBUS	See CP 443-5 Basic
NCM S7 manual for PROFIBUS	See CP 443-5 Basic

	Order No.
RS 485 bus connector with 90° outgoing feeder cable for Fast-Connect system	See CP 443-5 Basic
RS 485 bus connector with 90° outgoing feeder cable	See CP 443-5 Basic
PROFIBUS 12M bus terminal	See CP 443-5 Basic
Manual "Communication for SIMATIC S7-300/-400"	See page 5/16

CP 443-1

Overview



- Connection of SIMATIC S7-400 to Industrial Ethernet
  - 10/100 Mbit/s full/half duplex connection with autosensing for automatic switching
  - Universal connection options for ITP, RJ45 and AUI
  - Multiprotocol mode with ISO and TCP/IP transport protocol
  - Keep Alive function
- Communication services:
  - ISO and TCP/IP transport protocols
  - PG/OP communication
  - S7 communication
  - S5-compatible communication
- Multicast at UDP
- PG/OP communication between networks through S7 routing.
- Remote programming and commissioning through the network

Technical specifications

Data transmission rate	10/100 Mbit/s
Interfaces	
• Connection to Industrial Ethernet (10/100 Mbit/s)	15-pin Sub-D sokket (automatic switching between AUI and ITP)
• Connection to 10BaseT, 100BaseTX	RJ45
Current consumption	
• From +5 V DC	Approx. 1,4 A
• From 24 V DC	Typ. 220 mA, max. 340 mA (depending on the interface used)
Power loss	8.6 W
Perm. ambient conditions	
• Operating temperature	0 °C to +60 °C
• Transport/storage temperature	-40 °C to +70 °C
• Relative humidity	Max. 95% at +25 °C

1) Depends on performance of used S7-CPU/FM

Design	
• Module format	S7-400 compact module, single-width
• Dimensions (W x H x D) in mm	25 x 290 x 210
• Weight	Approx 700 g
Configuration software	NCM S7 for Industrial Ethernet (included in delivery of STEP 7 V5.x)
Performance data	
S5-compatible communication (SEND/RECEIVE, FETCH/WRITE)	
• Sum of all simultaneously operable ISO/TCP/UDP connections	Max. 64
• Number of useful data (ISO or TCP/IP)	Max. 8 KB
S7 communication	
• Number of connections[1)]	Max. 62
Multi-protocol operation	
• Sum of all simultaneously operable connections	Max. 64

Ordering data

	Order No.
CP 443-1 communications processor for connecting SIMATIC S7-400 to Industrial Ethernet using TCP/IP, ISO and UDP; for S7 communication, S5-compatible communication (SEND/RECEIVE) with FETCH/WRITE with or without RFC 1006, 10/100 Mbit/s, with electronic manual, on CD-ROM	**6GK7 443-1EX11-0XE0**
NCM S7 configuration software for Industrial Ethernet	Included in scope of delivery of STEP 7 V5.x

	Order No.
NCM S7 manual for Industrial Ethernet	
Paper version for V5.x (STEP7 V5.0)	
German	**6GK7 080-1AA03-8AA0**
English	**6GK7 080-1AA03-8BA0**
French	**6GK7 080-1AA03-8CA0**
Spanish	**6GK7 080-1AA03-8DA0**
Italian	**6GK7 080-1AA03-8EA0**
SIMATIC NET electronic manuals German, English; on CD-ROM	**6GK1 975-1AA00-3AA0**

Overview



- Connection of SIMATIC S7-400 to Industrial Ethernet
  - 10/100 Mbit/s full/half duplex connection with autosensing for automatic switching
  - Universal connection options for ITP, RJ45 and AUI
  - Multi-protocol operation for ISO, TCP/IP and UDP
  - Adjustable Keep Alive function
- Communication services:
  - PG/OP communication
  - S7 communication
  - S5-compatible communication
  - IT communications.
- Web function for accessing process data through Web browser
- E-mail function for sending electronic mail from the S7-400
- FTP server and client function for communication with data
- Multicast at UDP
- PG/OP communication between networks through S7 routing.
- Remote programming and commissioning through the network

5

Technical specifications

Data transmission rate	10/100 Mbit/s
Interfaces	
• Connection to AUI/ITP	15-pin Sub-D socket
• Connection to TP	8-pin RJ45 socket
Current consumption	
• From +5 V DC	Approx. 1.5 A
• From 24 V DC	Typ. 220 mA max. 340 mA
Power loss	9.1 W
Perm. ambient conditions	
• Operating temperature	0 °C to +60 °C
• Transportation/storage temperature	-40 °C to +70 °C
• Relative humidity	Max. 95% at +25 °C
Design	
• Module format	Compact module S7-400, single width
• Dimensions (W x H x D) in mm	25 x 290 x 210
• Weight	Approx. 700 g
Configuration software	NCM S7 for Industrial Ethernet from V5 (supplied with STEP 7 V5.x)

Performance data	
IT communications	
Number of connections to an e-mail server	Max. 1
Memory capacity of the file system	10 MB
S5-compatible communication (SEND/RECEIVE)	
• Sum of all simultaneously operable ISO/TCP/UDP connections	Max. 64
• No. of useful data	
- ISO or TCP/IP	Max. 8 KB
- UDP	Max. 2 KB
S7 and PG/OP communication	
• Number of connections [1]	Max. 48
IT communications.	
• Number of connections to an e-mail server	Max. 1
• Memory capacity of the file system	16 MB
Multi-protocol operation	
• Sum of all simultaneously operable connections	Max. 64

1) Depends on performance of used S7-CPU/FM

Ordering data

	Order No.
CP 443-1 IT communications processor for connecting SIMATIC S7-400 to Industrial Ethernet; for S7 communication, S5-compatible communication (SEND/RECEIVE), e-mail and www server, with electronic manual, on CD-ROM	**6GK7 443-1GX11-0XE0**
NCM S7 configuration software for Industrial Ethernet	Included in scope of delivery of STEP 7 V5.x

	Order No.
NCM S7 manual for Industrial Ethernet	
Paper version for V5.x (STEP7 V5.0)	
German	**6GK7 080-1AA03-8AA0**
English	**6GK7 080-1AA03-8BA0**
French	**6GK7 080-1AA03-8CA0**
Spanish	**6GK7 080-1AA03-8DA0**
Italian	**6GK7 080-1AA03-8EA0**
SIMATIC NET electronic manuals German, English; on CD-ROM	**6GK1 975-1AA00-3AA0**

CP 444

Overview



- The link to Industrial Ethernet in conjunction with MMS services as per MAP 3.0
- To off-load the CPU from communications tasks and to implement additional links
- MMS services:
  - Environment Management;
  - VMD Support Services;
  - Variable Access Services

Technical specifications

Data transmission speed	10 Mbit/s
Transmission protocol	MAP 3.0 based on transport protocol to ISO 8073 class 4
Connection	15-pin D subminiature socket connector (automatic switching between AUI and Industrial Twisted Pair)
Communication functions	
• S7 expanded communication	Yes
• No. of operable connections	Max. 1
Permissible ambient conditions	
• Operating temperature	0 to 40°C

Permissible ambient conditions	
• Operating temperature with forced ventilation	0 to 55 °C
• Transport/storage temperature	- 20 to + 60 °C
• Relative humidity max.	8 to 80% at +25°C, no condensation
• Vibration	
- 10 to 58 Hz	0.0035 mm, constant amplitude
- 58 to 500 Hz	0.5 g, constant acceleration
Power consumption max.	3.1 A
Power loss, typ.	15.6 W
Dimensions (W x H x D) in mm	50 x 290 x 210
Weight, approx.	2080 g

Ordering data

	Order No.
CP 444 communications processor for connecting SIMATIC S7-400 to Industrial Ethernet using MMS services to MAP 3.0	**6ES7 444-1MX00-0XE0**

	Order No.
CP 444 manual	
German	**6ES7 444-2AA00-8AA0**
English	**6ES7 444-2AA00-8BA0**

Network components

Overview

PROFIBUS and Industrial Ethernet offer a wide range of network components for the electrical and optical transmission technology.

For further information and ordering data, please refer to Catalog ST IK PI, CA01 or the A&D Mall.

Overview

- Transceiver for the transition from a redundant PROFIBUS DP master system to a single-channel PROFIBUS DP master system
- To connect devices with a single PROFIBUS DP interface to the redundant PROFIBUS DP master system of the SIMATIC S7-400H

The Y-link consists of:

- 2 IM 157 interface modules
- 1 Y-coupler
- 1 bus module BM IM157
- 1 bus module BM Y-coupler

Technical specifications

IM 157	
Weights and dimensions	
Dimensions (W x H x D) in mm	40 x 125 x 130
Weight, approx.	165 g
Module-specific data	
Transmission speed of redundant DP master system	9.6; 19.2; 45.45; 93.75; 187.5; 500 kbit/s 1.5; 3; 6; 12 Mbit/s
Bus driver	PROFIBUS-DP
I/O data message frame length, max.	244 byte
Configuration message length, max.	244 byte
Diagnostic message frame length	188 byte
Parameter assignment frame length	18 byte
Voltages, currents, potentials	
Rated supply voltage Y-link	24 V DC
• Polarity reversal protection	Yes
• Power failure stored energy time	5 ms
Isolation	
• From redundant DP master system	Yes
• From Y-coupler	No
Isolation tested at	500 V DC
Current consumption (24 V DC), max.	250 mA
Power losses of the module, typ	4 W
Status, interrupts, diagnostics	
Status indicator	No
Interrupts	Yes, diagnostic interrupts
Diagnostics functions	Yes
• Group error	Red LED "SF"
• Bus error on redundant DP master system	Red LED "BF1"
• Bus error on subordinate local bus system	Red LED "BF2"
• IM has active port	Yellow LED "ACT"
• Monitoring of 24 V voltage supply	Green LED "ON"

Y-coupler	
Weights and dimensions	
Dimensions (W x H x D) in mm	40 x 125 130
Weight, approx.	200 g
Module-specific data	
Transmission speed of subordinate DP master system	187.5; 500 kbit/s 1.5 Mbit/s
Bus driver	PROFIBUS-DP
Parameter assignment frame length, max.	244 byte
Voltages, currents, potentials	From bus module
Power supply	
Electrical isolation from subordinate DP master system	Yes
Status, interrupts, diagnostics	
Status indicator	No
Interrupts	None
Diagnostics functions	No
Characteristics of subordinate DP master system	
Maximum number of DP slaves	31
Termination of subordinate DP master system	Active terminating resistor (bus terminator)
Use of RS 485 repeaters, max.	8
Use of OLM/OBT	Yes

Ordering data

	Order No.
Y coupler to connect single-channel DP slaves to SIMATIC S7-400H	**6ES7 197-1LA01-0XA0**
IM 157 interface module to establish a Y link together with the Y coupler; 2 interface modules required	**6ES7 157-0AA81-0XA0**

IM 153-2 FO

Overview



- For connecting the ET 200M as a slave to the optical PROFIBUS
- Optical expansion to IM 153-2 (RS 485)
- Integral fiber-optic interface for plastic and PCF cables
- Redundancy capability
- With time stamping functionality and time synchronization

Technical specifications

Data transmission rate	9.6 kbit/s to 12 Mbit/s (not 3 and 6 Mbit/s)
Transmission technology	FOC; Wavelength λ = 660 nm
Internode communication support	Yes, transmitter (from 6ES7 153-2AB0**1**-0XB0)
Interfaces	
• Connection to optical PROFIBUS	2 x duplex sockets
Supply voltage	24 V DC through screw terminals
• Permissible range (including ripple)	20.4 to 28.8 V
• Current input from 24 V DC, typ.	625 mA
Output voltage	5 V DC

Output current (at 5 V DC), max.	1 A (for backplane bus)
Address capacity	
• Max. input data	128 byte
• Max. output data	128 byte
Configuring software	STEP 7/COM PROFIBUS/third-party tools using GSD file
Degree of protection	IP 20
Ambient temperature	0 to 60 °C
Operational height, max.	3000 m above mean sea level
Dimensions (W x H x D) in mm	40 x 125 x 120
Weight approx.	350 g

Ordering data

	Order No.
IM 153-2 FO interface module Slave interface module to connect an ET 200M to the optical PROFIBUS DP; also for use in redundant systems	**6ES7 153-2AB01-0XB0**
PROFIBUS Plastic Fiber Optic, simplex plug/polishing kit 100 simplex plugs, 5 polishing sets for assembling PROFIBUS fiber-optic cables for the optical PROFIBUS; for 25 modules	**6GK1 901-0FB00-0AA0**
PROFIBUS Plastic Fiber Optic, stripping tool set Tools for removing the outer casing and core casing of plastic fiber-optic cables	**6GK1 905-6PA10**

	Order No.
Plug adapter pack of 50, for use of the simplex plugs with the integral fiber-optic interfaces; for 25 modules	**6ES7 195-1BE00-0XA0**
SIMATIC Manual Collection Electronic manuals on CD-ROM, in 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection updating service for 1 year Current Manual Collection CD as well as the three following updates	**6ES7 998-8XC01-8YE2**

Isolating module

Overview

- Hybrid operation of failsafe signal modules in safety operation and S7-300 standard modules in an ET 200M
- Configuration of PROFIBUS DP lines with Cu bus cables; fiber-optic cables are not necessary
- Any IM 153-x can be used

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

Ordering data

	Order No.
Isolating module for simultaneous operation of failsafe and standard modules in an ET 200M	**6ES7 195-7KF00-0XA0**
Isolating bus assembly to accommodate the isolating module in an ET 200M	**6ES7 195-7HG00-0XA0**

Fail-safe input/output modules

Overview

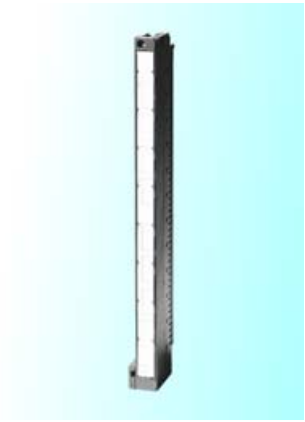


- Fail-safe input/output modules for use with the SIMATIC S7-400F/FH
- With integrated safety functions
- With integrated safety functions
- Achievable safety classes in safety operation: SIL 2, SIL 3 to IEC 61508, AK 4, AK 6 to DIN V 19250, Category 3, 4 to EN 954-1
- Use in standard mode with high diagnostics requirements
- Also suitable for redundant operation

For addtional information, see Section 4.

Front connector

Overview



- For simple and user-friendly connection of sensors and actuators
- For retaining the wiring when replacing modules
- With coding to avoid mistakes when replacing modules

Ordering data

	Order No.
Front connector 48-pin, for signal modules, function modules; 1 unit	
• With screw-type terminals	**6ES7 492-1AL00-0AA0**
• With spring-loaded terminals	**6ES7 492-1BL00-0AA0**
• With crimp contacts	**6ES7 492-1CL00-0AA0**
For 6ES7 431-7KF00-0AB0; spare part, included in scope of delivery of module; 1 unit	**6ES7 431-7KF00-6AA0**
Extracting tool for crimp contacts	**6ES5 497-8MA11**
Crimp contacts 250 units	**6XX3 070**
Crimping tool for crimping the contacts	**6XX3 071**
Front cover for front connector 6 units	**6ES7 492-2XL00-0AA0**
Connection terminal for modules 5 units	**6ES7 490-1BA00-0AA0**
SIMATIC S7-400 manual, SIMATIC Manual Collection	See page 5/16

SIMATIC TOP connect; fully modular connection

Overview



- The standard connection for SIMATIC S7-400
- For fast and error-free connection of sensors and actuators for distances of up to 30 m
- For clear and understandable wiring in the switching cabinet
- Comprising front connector module, connecting cable and terminal block
- All components are easy to plug in and can be replaced individually

For additional information:

- Internet: http://www.siemens.de/simatic_tc
- Catalog KT 10.2

Technical specifications

Front connector module	
Rated operating voltage	**24 V DC**
Max. permissible operating voltage	**60 V DC**
Max. permissible continuous current • Per connector pin	1 A
Max. permissible total current	4 A/byte
Permissible ambient temperature	0 to + 60 °C
Test voltage	0.5 kV, 50 Hz, 60 s

Technical specifications of the 16-core twisted ribbon cable and 2 x 16-core from SIMATIC S7 to terminal block	
Clearances and creepage distances	IEC 664 (1980), IEC 664 A (1981), Acc. to DIN VDE 0110 (01.89), Overvoltage class II, Pollution severity 2
Operating voltage, max.	**60 V DC**
Continuous current per signal	1 A
Total current, max.	4 A/byte

Technical specifications (continued)

Technical specifications of the 16-core twisted ribbon cable and 2 x 16-core from SIMATIC S7 to terminal block (continued)	
Operating temperature	0 to + 60 °C
Outer diameter in mm 16-core/2 x 16-core	Approx. 9.5/11.5
Terminal blocks for single-wire connection and 3-wire sensors	
Operating voltage, max.	60 V DC
Continuous current per signal	1 A
Total current, max. (supply)	4 A/byte
Operating temperature	0 to + 60 °C
Installation orientation	Any
Clearances and creepage distances	IEC Report 664, IEC 664 A, IEC 1131 T2, CSA C22.2 No 142 UL 508, VDE 0160 (12.90), overvoltage class II, pollution severity 3
Dimensions (W x H x D) in mm	
• 1-wire connection	Approx. 51 x 41 x 55
• for 3-wire sensors	Approx. 60 x 41 x 70
Terminal blocks with 8S relays	
Excitation side	
Inductor operating voltage	**24 V DC**
Connected to input	None
Contact side	
Number of relay outputs	8 (NO contacts)
Contact design	Single contact, 1 NO
Switching capacity (resistive load)	Max. 2 A/250 V AC, max. 2 A/30 V DC max. 2 A/60 V DC Recommended minimum load ≥ 100 mA
Switching frequency	6 cycles/minute
Service life	
• Mechanical	10 x 10^6 make-break operations
• Electrical	600 x 10^3 make-break operations at 230 V AC/2 A/ cos φ = 1
Operating temperature	0 to +60 °C
Installation position	Horizontal, vents running vertically. A space of at least 30 mm must be maintained above and below the relay terminal block for heat dissipation

Terminal blocks with 8S relays (continued)	
Clearances and creepage distances	IEC 1131-2 (1992), EN 50 178 (4/98) overvoltage class III pollution severity 2 between control circuit and relay contacts: 5.5 mm between contact groups K0-K3 and K4-K7: 5.5 mm within a contact group: 3.2 mm UL and CSA pending
Connection blocks can be released for permanent wiring	
• For 24 V infeed for supplying the digital modules	4-pin connection block
• For relay outputs	Two 8-pin connection blocks
Dimensions (W x H x D) in mm	Approx. 60 x 68 x 78
Terminal blocks for 2 A module for SIMATIC S7	
Operating voltage, max.	**60 V DC**
Continuous current per signal line	2 A
Operating temperature	0 to + 60 °C
Installation orientation	Any
Clearances and creepage distances	IEC Report 664, IEC 664 A, IEC 1131 T2, CSA C22.2 No 142 UL 508, VDE 0160 (12.90), overvoltage class II, pollution severity 3
Dimensions (W x H x D in mm)	Approx. 60 x 41 x 70
Terminal blocks for SIMATIC S7 analog modules	
Operating voltage, max.	60 V DC
Continuous current per signal line	1 A
Operating temperature	0 to + 60 °C
Installation orientation	Any
Clearances and creepage distances	IEC Report 664, IEC 664 A, IEC 1131 T2, CSA C22.2 No 142 UL 508, VDE 0160 (12.90), overvoltage class II, pollution severity 3
Dimensions (W x H x D in mm)	Approx. 60 x 41 x 70

Ordering data

	Order No.
Front connector module for digital signal modules	
Power supplied by means of	
• spring-loaded terminals	**6ES7 921-4AA00-0AA0**
• screw-type terminals	**6ES7 921-4AB00-0AA0**
Front connector module for 2 A modules	
Power supplied by means of	
• spring-loaded terminals	**6ES7 921-4AC00-0AA0**
• screw-type terminals	**6ES7 921-4AD00-0AA0**

	Order No.
Front connector module for analog signal modules	
Power supplied by means of	
• spring-loaded terminals	**6ES7 921-4AF00-0AA0**
• screw-type terminals	**6ES7 921-4AG00-0AA0**
Connecting cable	
Round-sheath ribbon cable, 16-wire, sold by the meter, unshielded	
• 30 m	**6ES7 923-0CD00-0AA0**
• 60 m	**6ES7 923-0CG00-0AA0**
Shielded	
• 30 m	**6ES7 923-0CD00-0BA0**
• 60 m	**6ES7 923-0CG00-0BA0**

SIMATIC TOP connect; fully modular connection

Ordering data	Order No.
Connecting cable	
Round-sheath ribbon cable, 2 x 16-wire, sold by the meter, unshielded	
• 30 m	**6ES7 923-2CD00-0AA0**
• 60 m	**6ES7 923-2CG00-0AA0**
Connectors (female ribbon cable connectors)	**6ES7 921-3BE10-0AA0**
8 connectors, 8 cable grips	
Crimping tool	**6ES7 928-0AA00-0AA0**
to attach connectors	
Terminal block for 1-wire connection	
1 unit	
• Spring-loaded terminals	**6ES7 924-0AA00-0AB0**
• Screw-type terminals	**6ES7 924-0AA00-0AA0**
10 units	
• Spring-loaded terminals	**6ES7 924-0AA00-1AB0**
• Screw-type terminals	**6ES7 924-0AA00-1AA0**
Terminal block for 2 A modules	
1 unit	
• Spring-loaded terminals	**6ES7 924-0BB00-0AB0**
• Screw-type terminals	**6ES7 924-0BB00-0AA0**
10 units	
• Spring-loaded terminals	**6ES7 924-0BB00-1AB0**
• Screw-type terminals	**6ES7 924-0BB00-1AA0**
Terminal block for 3-wire initiators	
1 unit	
• Spring-loaded terminals	**6ES7 924-0CA00-0AB0**
• Screw-type terminals	**6ES7 924-0CA00-0AA0**
10 units	
• Spring-loaded terminals	**6ES7 924-0CA00-1AB0**
• Screw-type terminals	**6ES7 924-0CA00-1AA0**
Terminal block with relays	
1 unit	
• Spring-loaded terminals	**6ES7 924-0CD00-0AB0**
• Screw-type terminals	**6ES7 924-0CD00-0AA0**
Terminal block for analog modules	
1 unit	
• Spring-loaded terminals	**6ES7 924-0CC00-0AB0**
• Screw-type terminals	**6ES7 924-0CC00-0AA0**
10 units	
• Spring-loaded terminals	**6ES7 924-0CC00-1AB0**
• Screw-type terminals	**6ES7 924-0CC00-1AA0**
Shield plate for analog terminal block	**6ES7 928-1BA00-0AA0**
4 units	
Terminal elements	
2 units	
For 2 cables with 2 to 6 mm diameter	**6ES7 390-5AB00-0AA0**
For 1 cable with 3 to 8 mm diameter	**6ES7 390-5BA00-0AA0**
For 1 cable with 4 to 13 mm diameter	**6ES7 390-5CA00-0AA0**

SIMATIC TOP connect; flexible connection

Overview



- For fast, direct connections to individual elements in the control cabinet
- Comprises front connector with individual cores attached
- H05V-K or UL/CSA wire type
- 0,5 mm^2 wire cross section also allows higher currents

For additional information:

- Internet: http://www.ad.siemens.de/simatic_tc
- Catalog KT 10.2

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Technical specifications

Front connector with single cores	
Rated operating voltage	24 V DC
Max. permissible continuous current with simultaneous loading of all cores	1.0 A
Permissible ambient temperature	0 to +60 °C
Number of cores	46 H05V-K or UL/CSA-single cores

Cross-section	0.5 mm^2, Cu
Bunch diameter in mm	Approx. 17
Core color	Blue, numbered 3 to 48 (adapter contact = core number)
Contact type	Screw contacts or crimp contacts

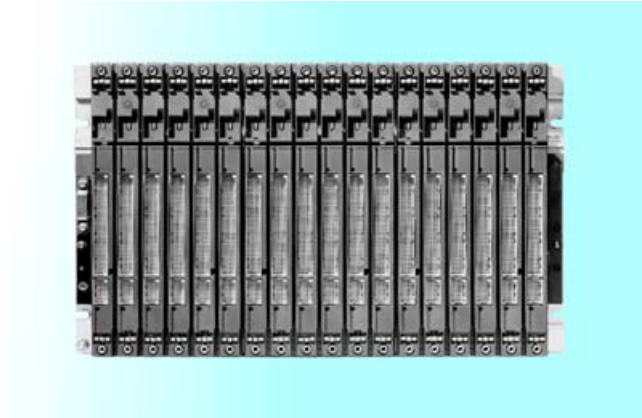
Ordering data

	Order No.
Front connector with single wires 46 x 0.5 mm^2; screw-type terminals	
for SIMATIC S7-400; 1 unit	
• H05V-K wires	
2.5 m	**6ES7 922-4BC50-0AD0**
3.2 m	**6ES7 922-4BD20-0AD0**
5.0 m	**6ES7 922-4BF00-0AD0**
Special lengths	On request
• UL/CSA wires	
3.2 m	**6ES7 922-4BD20-0UD0**
5.0 m	**6ES7 922-4BF00-0UD0**
Front connector w. single wires 46 x 0.5 mm^2; crimp contacts	
for SIMATIC S7-400; 1 unit	
• H05V-K wires	
2.5 m	**6ES7 922-4BC50-0AE0**
3.2 m	**6ES7 922-4BD20-0AE0**
5.0 m	**6ES7 922-4BF00-0AE0**
Spec. l.	On request

	Order No.
Front connector with single wires 46 x 0.5 mm^2; screw-type terminals	
for SIMATIC S7-400; pack of 5	
• H05V-K wires	
2.5 m	**6ES7 922-4BC50-5AD0**
3.2 m	**6ES7 922-4BD20-5AD0**
5.0 m	**6ES7 922-4BF00-5AD0**
Front connector with single wires 46 x 0.5 mm^2; crimp contacts	
for SIMATIC S7-400; pack of 5	
• H05V-K wires	
2.5 m	**6ES7 922-4BC50-5AE0**
3.2 m	**6ES7 922-4BD20-5AE0**
5.0 m	**6ES7 922-4BF00-5AE0**

Racks

Overview



- The basic mechanical framework of the SIMATIC S7-400 /S7-400 H
- For accommodating the modules, supplying them with operating voltage and connecting them via the backplane bus
- Several versions for configuring central controllers and expansion units

UR1 (universal rack)

- For configuring central controllers and expansion units
- For up to 18 modules
- Also suitable for S7-400 H

UR2 (universal rack)

- For configuring central controllers and expansion units
- For up to 9 modules
- Also suitable for S7-400 H

CR2 (central rack)

- For configuring central controllers
- For up to 18 modules
- Segmented racks:
  For operating two independent S7-400 CPUs without S7-400 Multicomputing, but with communication between the CPUs via the backplane bus (K bus);
  Both CPUs can address local, separate I/O modules (segmented P bus)

CR3 (central rack)

- For configuring central controllers
- Optimized for decentralized automation tasks through support of up to 4 modulesUR2-H
- For setting up a complete S7-400 H system in a single mounting rack
- Also suitable for S7-400: operation of 2 separate CPUs with their own I/O (proprietary P and K bus)
- Can also be used as expansion rack
- For up to 18 modules

ER1 (expansion rack)

- For cost-effective configuration of expansion units
- For up to 18 modules with restricted functionality
- Also suitable for S7-400 H

ER2 (expansion rack)

- For cost-effective configuration of expansion units
- For up to 9 modules with restricted functionality
- Also suitable for S7-400 H

Technical specifications

Module racks	UR1	UR2	CR2	CR3	UR2-H	ER1	ER2
Number of single-width slots		9	18; 2 segments with 8 or 10 slots	4	18	18	9
Buses		P, K	P, K	P, K	P, K	P	P
Dimensions (W x H x D) in mm		257.5 x 290 x 27.5	482.5 x 290 x 27.5	130 x 290 x 27.5	482.5x290x 27.5	482.5x290x 27.5	257.5x290x 27.5
Weight, approx.		1.5 kg	3 kg	1.5 kg	3 kg	2.5 kg	1.25 kg

Fan subassembly

Ordering data

	Order No.
UR1 rack for central controllers and expansion units, 18 slots	**6ES7 400-1TA01-0AA0**
UR2 rack for central controllers and expansion units, 9 slots	**6ES7 400-1JA01-0AA0**
CR1 rack for segmented central controllers, 18 slots, 2 local segments	**6ES7 401-2TA01-0AA0**
CR3 rack for central controllers and expansion units, 4 slots optimized for distributed automation solutions	**6ES7 401-1DA01-0AA0**
UR2-H rack for divided central controllers, 18 slots	**6ES7 400-2JA00-0AA0**
ER1 rack for expansion units, P bus only, 18 slots	**6ES7 403-1TA01-0AA0**
ER2 rack for expansion units, P bus only, 9 slots	**6ES7 403-1JA01-0AA0**
Module location cover 10 units (spare part)	**6ES7 490-1AA00-0AA0**

Fan subassembly

Overview



- Fans for the SIMATIC S7-400
- Necessary when using modules that generate an extremely large amount of heat

Technical specifications

Supply voltage	
• Rated value	24 V DC; 120/230 V AC
• Permitted range	19.2 to 30 V DC; 85 to 132 V /170 to 264 V AC
Input current	
• Rated value for 120 V AC	170 mA
• Rated value for 230 V AC	86 mA
• Rated value for 24 V DC	450 mA

Mains frequency	
• Rated value	50/60 Hz
• Permitted range	47 to 63 Hz
Power loss DC/AC	11 W/20 W
Relay contact values	24 V DC / 200 mA
Dimensions (W x H x D) in mm	482.5 x 109.5 x 235
Weight, approx.	1.6 kg

Ordering data

	Order No.
Fan subassembly for all racks; supply voltage	
24 V DC	**6ES7 408-1TA01-0XA0**
120/230 V AC	**6ES7 408-1TB00-0XA0**
Dust filter 10 units	**6ES7 408-1TA00-7AA0**
Replacement fan Spare part	**6ES7 408-1TA00-6AA0**
Cable duct Same design as fan subassembly, but without fans or electronic units	**6ES7 408-0TA00-0AA0**

Expansion units

Overview

- SIMATIC S5 expansion units for distributed expansion of the SIMATIC S7-400
- For connection to existing SIMATIC S5 systems

The following can be connected:

- Expansion units ER 701-2 and ER 701-3 from the SIMATIC S5-115U series
- Expansion units EG 183U and EG 185U from the SIMATIC S5-135U/-155U series.

Suitable SIMATIC® S5 modules

Expansion unit	ER 701-2, ER 701-3	EG 183U, EG 185 U
Digital input modules	6ES5 420-7LA11	6ES5 420-4UA14
	6ES5 430-7LA12	6ES5 430-4UA14
	6ES5 431-7LA11	6ES5 431-4UA12
	6ES5 432-7LA11	6ES5 432-4UA12
	6ES5 434-4UA12	6ES5 434-4UA12
	6ES5 434-7LA12	6ES5 436-4UA12
	6ES5 435-7LA11	
	6ES5 435-7LB11	
	6ES5 435-7LC11	
	6ES5 436-7LA11	
	6ES5 436-7LB11	
	6ES5 436-7LC11	
Digital output modules	6ES5 441-7LA13	6ES5 441-4UA14
	6ES5 451-7LA21	6ES5 451-4UA14
	6ES5 453-7LA11	6ES5 453-4UA12
	6ES5 454-7LA12	6ES5 454-4UA14
	6ES5 454-7LB11	6ES5 455-4UA12
	6ES5 455-7LA11	6ES5 456-4UA12
	6ES5 456-7LA11	6ES5 457-4UA12
	6ES5 456-7LB11	6ES5 458-4UA13
	6ES5 457-7LA11	6ES5 458-4UC11
	6ES5 458-7LA11	
	6ES5 458-7LB11	
	6ES5 458-7LC11	
Digital input/output modules	6ES5 482-7LA11	6ES5 482-4UA20
	6ES5 482-7LF11	
	6ES5 482-7LF21	
	6ES5 482-7LF31	
Analog input modules	6ES5 460-7LA13	6ES5 460-4UA13
	6ES5 463-4UA12	6ES5 463-4UA13
	6ES5 463-4UB12	6ES5 465-4UA13
	6ES5 465-7LA13	6ES5 466-4UA11
	6ES5 466-4UA11	
Analog output modules	6ES5 470-7LA13	6ES5 470-4UA13
	6ES5 470-7LB13	6ES5 470-4UB13
	6ES5 470-7LC13	6ES5 470-4UC13
Interface modules	6ES5 306-7LA11	6ES5 300-3AB11
	6ES5 314-3UA11	6ES5 300-5CA11

For further information and ordering data refer to Catalog ST 50, CA01 or the A&D Mall.

IM 460-0

Overview



- Send interface for central expansion up to 3 m
- Transmission of P and K bus
- Can be plugged into central controller
- Up to 8 expansion racks can be connected
- Can be used exclusively with IM 461-0

Technical specifications

Chain length	Max. 5 m
Power consumption from 5 V	Max. 140 mA
Power loss	Max. 700 mW
Dimensions (W x H x D) in mm	25 x 290 x 217
Weight	600 g

Ordering data

	Order No.
IM 460-0 interface module Send interface module for central connection up to 5 m; with C bus transmission	**6ES7 460-0AA01-0AB0**

	Order No.
468-1 connecting cable between IM 460-0 and IM 461-0; IM 460-3 and IM 461-3	
0.75 m	**6ES7 468-1AH50-0AA0**
1.5 m	**6ES7 468-1BB50-0AA0**
5 m	**6ES7 468-1BF00-0AA0**

IM 461-0

Overview



- Receive interface for central expansion up to 3 m
- Transmission of P and K bus
- Can be plugged into expansion unit
- Can be used exclusively with IM 460-0

Technical specifications

Chain length	Max. 5 m
Power consumption from 5 V	Max. 290 mA
Power loss	Max. 1450 mW
Dimensions (W x H x D) in mm	25 x 290 x 217
Weight	610 g

Ordering data

	Order No.
IM 461-0 interface module Receive interface module for central connection up to 5 m; with C bus transmission	**6ES7 461-0AA01-0AA0**

	Order No.
468-1 connecting cable	See IM 460-0
Terminating connector for IM 461-0	**6ES7 461-0AA00-7AA0**

IM 460-1

Overview



- Send interface for central expansion up to 1.5 m
- Transmission of P bus
- With voltage supply for expansion units
- Can be plugged into central controller
- Up to 2 expansion units can be connected
- Can be used exclusively with IM 461-1

Technical specifications

Chain length, max.	Max. 1.5 m
Power consumption from 5 V	Max. 85 mA
Power loss	Max. 425 mW

Dimensions (W x H x D) in mm	25 x 290 x 217
Weight	600 g

Ordering data

	Order No.
IM 460-1 interface module Send interface module for central connection up to 1.5 m; with 5 V power supply, without C bus transmission	**6ES7 460-1BA01-0AB0**

	Order No.
468-3 connecting cable	
between IM 460-1 and IM 461-1;	
0.75 m	**6ES7 468-3AH50-0AA0**
1.5 m	**6ES7 468-3BB50-0AA0**

IM 461-1

Overview



- Receive interface for central expansion up to 1.5 m
- Transmission of P bus
- With voltage supply for expansion units
- Can be plugged into expansion unit
- Can be used exclusively with IM 460-1

Technical specifications

Chain length, max.	Max. 1.5 m
Power consumption from 5 V	Max. 120 mA
Power loss	Max. 600 mW

Dimensions (W x H x D) in mm	25 x 290 x 217
Weight	610 g

Ordering data

	Order No.
IM 461-1 interface module Receive interface module for central connection up to 1.5 m; with C bus transmission	**6ES7 461-1BA01-0AA0**

	Order No.
468-3 connecting cable	See IM 460-1

IM 460-3

Overview



- Send interface for distributed expansion up to 102 m
- Transmission of K and P bus
- Can be plugged into central controller
- Up to 8 expansion racks can be connected
- Can be used exclusively with IM 461-3

Technical specifications

Chain length, max.	Max. 102 m
Power consumption from 5 V	Max. 1550 mA
Power loss	Max. 7750 mW

Dimensions (W x H x D) in mm	25 x 290 x 217
Weight	630 g

Ordering data

	Order No.
IM 460-3 interface module Send interface module for distributed connection up to 102 m; with C bus transmission	**6ES7 460-3AA01-0AB0**
468-1 connecting cable between IM 460-3 and IM 461-3 0.75m	**6ES7 468-1AH50-0AA0**

	Order No.
468-1 connecting cable (cont.)	
1.5 m	**6ES7 468-1BB50-0AA0**
5 m	**6ES7 468-1BF00-0AA0**
10 m	**6ES7 468-1CB00-0AA0**
25 m	**6ES7 468-1CC50-0AA0**
50 m	**6ES7 468-1CF00-0AA0**
100 m	**6ES7 468-1DB00-0AA0**

IM 461-3

Overview



- Receive interface for distributed expansion up to 102 m
- Transmission of P and K bus
- Can be plugged into expansion unit
- Can be used exclusively with IM 460-3

Technical specifications

Chain length	Max. 102 m
Power consumption from 5 V	Max. 620 mA
Power loss	Max. 3100 mW

Dimensions (W x H x D) in mm	25 x 290 x 217
Weight	620 g

Ordering data

	Order No.
IM 461-3 interface module Receive interface module for distributed connection up to 102 m; with C bus transmission	**6ES7 461-3AA01-0AA0**

	Order No.
468-1 connecting cable	See IM 460-3
Terminating connector for IM 461-3	**6ES7 461-3AA00-7AA0**

IM 460-4

Overview



- Send interface module for distributed expansion to 605 m
- Transmission from P-bus
- Plugs into central controller
- Suitable for connecting up to 8 expansion units
- Suitable for use exclusively with IM 461-4

Technical specifications

Line length	Max. 605 m
Power consumption from 5 V DC	Max. 1550 mA
Power loss	Max. 7750 mW

Dimensions (W x H x D) in mm	25 x 290 x 217
Weight	630 g

Ordering data

	Order No.
IM 460-4 interface module Send interface module for distributed connection up to 605 m; with C bus transmission	**6ES7 460-4AA01-0AB0**

	Order No.
468-1 connecting cable between IM 460-4 and IM 461-4;	
0.75to 100 m	See IM 460-3
250 m	**6ES7 468-1DC50-0AA0**
450 m	**6ES7 468-1DE50-0AA0**
600 m	**6ES7 468-1DG00-0AA0**

IM 461-4

Overview



- Receive interface module for distributed expansion to 605 m
- Transmission from P-bus
- Suitable for plugging into expansion unit
- Suitable for use exclusively with IM 460-4

Technical specifications

Line length	Max. 605 m
Power consumption from 5 V DC	Max. 620 mA
Power loss	Max. 3100 mW

Dimensions (W x H x D) in mm	25 x 290 x 217
Weight	620 g

Ordering data

	Order No.
IM 461-4 interface module Receive interface module for distributed connection up to 605 m; with C bus transmission	**6ES7 461-4AA01-0AA0**

	Order No.
468-1 connecting cable	See IM 460-4
Terminating connector for IM 461-4	**6ES7 461-4AA00-7AA0**

Overview



- Send IM for decentralized expansion with SIMATIC S5 EU to 600 m
- Can be plugged into the central controller
- Up to 8 SIMATIC S5 expansion racks can be connected
- Can be used exclusively with IM 314

Technical specifications

Cable length between IM 463-2 and last IM 314	Max. 600 m
Power consumption from 5 V	Max. 1320 mA
Power loss	Max. 6600 mW

Dimensions (W x H x D) in mm	25 x 290 x 217
Weight	360 g

Ordering data

	Order No.
IM 463-2 interface module Receive interface module for distributed connection of SIMATIC S5-EUs up to 600 m	**6ES7 463-2AA00-0AA0**

	Order No.
721 connecting cable between IM 463-2 and IM 314	
1 m	**6ES5 721-0BB00**
1.6 m	**6ES5 721-0BB60**
2 m	**6ES5 721-0BC00**
2.5 m	**6ES5 721-0BC50**
5 m	**6ES5 721-0BF00**
16 m	**6ES5 721-0CB60**

IM 467, IM 467 FO

Overview



- For the master connections of the S7-400 to PROFIBUS DP
- For configuring additional PROFIBUS-DP chains
- Communication services PROFIBUS DP and PG/OP communication
- Simple programming and configuring via PROFIBUS
- Interfaces:
  RS 485 (IM 467) or integrated fiber-optic interface (IM 467 FO)

Designed for Industry

- Subprocess-oriented configuration of an automation solution through the use of several IMs
- Up to 14 additional DP bus lines can be connected to the S7-400.
- Integration of the fiber-optic interface

Technical specifications

Data transmission rate	9.6 kbit/s to 12 Mbit/s (IM 467 FO not 3 and 6 Mbit/s)
Interfaces	
• Transfer method	IM 467: RS 485 IM 467 FO: LWL/λ = 660 nm
• Connection to PROFIBUS DP	IM 467: 9-pin Sub-D socket IM 467 FO: 2 x Duplex socket
Supply voltage	5 V DC ± 5% 24 V DC ± 5%
Power consumption from 5 V DC	1.3 A via backplane bus
Number of modules operable in SIMATIC S7-400, max.	10 im CR (Depending on CPU type)
Permissible ambient conditions	
• Operating temperature	0 to 60 °C
• Transport/storage temperature	-40 to +70 °C
• Operational height, max.	3000 m above mean sea level
• Relative humidity max.	95% at 25 °C
Design	
• Dimensions (W x H x D) in mm	25 x 290 x 210
• Weight, approx.	700 g

Performance data for PG/OP communication	
• Number of usable connections, approx.	32 (depending on CPU type)
DP master function performance data	
• internode connection support	Yes
• support for equidistance	Yes
Number of operable DP slaves, max.	96
• Total size of the DP data areas	
- DP input range, max.	4 KB
- DP output range, max.	4 KB
• Size of the DP data areas per connected DP slave	
- DP input area, max.	244 byte
- DP output area, max.	244 byte

Ordering data

	Order No.
IM 467 interface module for connection to PROFIBUS DP; RS 485	**6ES7 467-5GJ02-0AB0**
IM 467 FO interface module for connection to PROFIBUS DP; fiber-optic interface	**6ES7 467-5FJ00-0AB0**
RS 485 bus connector with 90° outgoing feeder cable for Fast-Connect system	
Max. transmission rate 12 Mbit/s	
Without PG interface	**6ES7 972-0BA50-0XA0**
With PG interface	**6ES7 972-0BB50-0XA0**

	Order No.
Plug adapter pack of 50, for use of the simplex plugs with the IM 467 FO	**6ES7 195-1BE00-0XA0**
Manual "SIMATIC S7-400 programmable controller"	See S7-400, central modules, page 5/16
Manual "Communication for SIMATIC S7-300/-400"	See S7-400, central modules, page 5/16

Overview



- Power supplies for the SIMATIC S7-400
- For conversion of AC or DC network voltages into the required 5 V and 24 V DC operating voltages
- Output current 4 A, 10 A and 20 A

Technical specifications

DC power supply units	4 A	10 A, wide-range	10 A redundant, wide-range	20 A wide-range
6ES7 405-	**0DA01**	**0KA01**	**0KR00**	**0RA01**
Input				
Input voltage				
• Rated value	24 V DC	24/48/60 V DC	24/48/60 V DC	24/48/60 V DC
• Permissible range	Static: 19.2 to 30 V Dynamic: 18.5 to 30.2 V	Static: 19.2 to 72 V Dynamic: 20.4 to 28.8 V	Static: 19.2 to 72 V Dynamic: 20.4 to 28.8 V	Static: 19.2 to 72 V Dynamic: 18.5 to 75.5 V
Mains buffering	4.5 ms +/- 0.5 ms	≥ 20 ms	≥ 20 ms	≥ 20 ms
Mains buffering time to NAMUR recommendation	No	Yes	Yes	Yes
Input current at rated value				
• 24/48/60 V DC	2/-/- A	4.5/2.1/1.7 A	4.5/2.1/1.7 A	7.3/3.45/2.75 A
Inrush current, max.	Peak value 27 A; half-value width 10 ms	Peak value 18 A; half-value width 20 ms	Peak value 18 A; half-value width 20 ms	Peak value 33 A; half-value width 1.5 ms
Output				
Output voltage				
• Rated values	5.1 V DC / 24 V DC	5.1 V DC / 24 V DC	5.1 V DC / 24 V DC	5.1 V DC / 24 V DC
Output currents				
• Rated values	5 V DC: 4 A (100 mA basic load required); 24 V DC: 0.5 A stable at no-load	5 V DC: 10 A (200 mA basic load required); 24 V DC: 1 A stable at no-load	5 V DC: 10 A (200 mA basic load required); 24 V DC: 1 A stable at no-load	5 V DC: 20 A (200 mA basic load required); 24 V DC: 1 A stable at no-load
Short-circuit protection	Yes	Yes	Yes	Yes
General specifications				
Degree of protection according to IEC 60536	I, with protective ground conductor	I, with protective ground conductor	I, with protective ground conductor	I, with protective ground conductor
Temperature class according to FM approval	Up to 40°C: T4; to 60 °C:T3C	Up to 40 °C: T4;	Up to 40 °C: T4;	Up to 40 °C: T4;
Isolation	Yes	Yes	Yes	Yes
Power consumption, typ.	48 W	104 W	104 W	175 W
Power losses, typ.	16 W	29 W	29 W	51 W
Backup battery (optional)	1 x lithium AA 3.6 V/1.9 Ah	2 x lithium AA 3.6 V/1.9 Ah	2 x lithium AA 3.6 V/1.9 Ah	2 x lithium AA 3.6 V/1.9 Ah
Slots required	1	2	2	3
Dimensions (W x H x D) in mm	25 x 290 x 217	50 x 290 x 217	50 x 290 x 217	75 x 290 x 217
Weight, approx.	800 g	1400 g	1360 g	2200 g
Cable cross-section of the supply cables	3 x 1.5 mm^2; solid or stranded conductor; outer diameter 3 to 9 mm	3x, 3 x 1.5 mm^2; solid or stranded conductor; outer diameter 3 to 9 mm	3x, 3 x 1.5 mm^2; solid or stranded conductor; outer diameter 3 to 9 mm	3x, 3 x 1.5 mm^2; solid or stranded conductor; outer diameter 3 to 9 mm

PS 405/407 power supply modules

Technical specifications (continued)

AC and wide-range power supplies	4 A	10 A	10 A redundant	20 A
6ES7 407-	**0DA01**	**0KA01**	**0KR00**	**0RA01**
Input				
Input voltage				
• Rated value				
- DC	-	110/230 V	110/230 V	110/230 V
- AC	120/230 V	120/230 V	120/230 V	120/230 V
• Permissible range	85 to 132 V AC / 170 to 264 V AC	88 to 300 V DC 85 to 264 V AC	88 to 300 V DC 85 to 264 V AC	88 to 300 V DC 85 to 264 V AC
Mains frequency				
• Rated value	60/50 Hz	60/50 Hz, 0 Hz	60/50 Hz, 0 Hz	60/50 Hz, 0 Hz
• Permissible range	47 to 63 Hz	0 Hz; 47 to 63 Hz	0 Hz; 47 to 63 Hz	0 Hz; 47 to 63 Hz
Mains buffering	4.5 ms +/- 0.5 ms	≥ 20 ms	≥ 20 ms	≥ 20 ms
Mains buffering time to NAMUR recommendation	No	Yes	Yes	Yes
Input current / rated value				
• For 110/230 V DC	-	1.2/0.6 A	1.2/0.6 A	1.5/0.8 A
• At 120/230 V AC	0.55/0.31 A	1.2/0.6 A	1.2/0.6 A	1.5/0.8 A
Inrush current, max.	15 x input current rated value	15 x input current rated value	15 x input current rated value	Maximum value 48 A; half-value width1.5 ms
Output				
Output voltage				
• Rated values	5.1 V DC / 24 V DC	5.1 V DC/ 24 V DC	5.1 V DC/ 24 V DC	5.1 V DC/ 24 V DC
Output currents				
• Rated values	5 V DC: 4 A (100 mA basic load required); 24 V DC: 0,5 A stable at no-load	5 V DC: 10 A (200 mA basic load required); 24 V DC: 1 A stable at no-load	5 V DC: 10 A (200 mA basic load required); 24 V DC: 1 A stable at no-load	5 V DC: 20 A (200 mA basic load required); 24 V DC: 1 A stable at no-load
Short-circuit protection	Yes	Yes	Yes	Yes
General specifications				
Degree of protection to IEC 60536	I, with protective ground conductor	I, with protective ground conductor	I, with protective ground conductor	I, with protective ground conductor
Compliance with standards EN 61000-3-2 and EN 61000-3-3 concerning system perturbations	No	Yes	Yes	Yes
Temperature class to FM approval	Up to 40 °C: T4; Up to 60 °C: T3C	Up to 40 °C: T4;	Up to 40 °C: T4;	Up to 40 °C: T4;
Isolation	Yes	Yes	Yes	Yes
Power consumption, typ.	46.5 W	105 W	97.5 W	168 W
Power losses, typ.	13.9 W	29.7 W	22.4 W	44 W
Backup battery (optional)	1 x lithium AA 3.6 V/1.9 Ah	2 x lithium AA 3.6 V/1.9 Ah	2 x lithium AA 3.6 V/1.9 Ah	2 x lithium AA 3.6 V/1.9 Ah
Slots required	1	2	2	3
Dimensions (W x H x D) in mm	25 x 290 x 217	50 x 290 x 217	50 x 290 x 217	75 x 290 x 217
Weight, approx.	800 g	1360 g	1360 g	2200 g
Cable cross-section of the supply cables	3 x 1.5 mm^2; solid or stranded conductor; outer diameter 3 to 9 mm	3 x 1.5 mm^2; solid or stranded conductor; outer diameter 3 to 9 mm	3 x 1.5 mm^2; solid or stranded conductor; outer diameter 3 to 9 mm	3 x 1.5 mm^2; solid or stranded conductor; outer diameter 3 to 9 mm

Ordering data	Order No.
PS 405 power supply modules	
24 V DC; 5 V DC, 24 V DC	
4 A	**6ES7 405-0DA01-0AA0**
10 A, wide range	**6ES7 405-0KA01-0AA0**
10 A, redundant, wide range	**6ES7 405-0KR00-0AA0**
20 A, wide range	**6ES7 405-0RA01-0AA0**
Power plug for PS 405	**6ES7 490-0AA00-0AA0**
Spare part	
Backup battery	**6ES7 971-0BA00**
Type AA; 1.9 Ah	

	Order No.
PS 407 power supply modules	
120/230 V AC; 5 V DC, 24 V DC	
4 A	**6ES7 407-0DA01-0AA0**
10 A	**6ES7 407-0KA01-0AA0**
10 A, redundant	**6ES7 407-0KR00-0AA0**
20 A	**6ES7 407-0RA01-0AA0**
Power plug for PS 407	**6ES7 490-0AB00-0AA0**
Spare part	
Backup battery	**6ES7 971-0BA00**
Type AA; 1.9 Ah	

Labeling sheets

Overview

Labeling sheets

- Film sheets for application-specific labeling of I/O modules of the SIMATIC S7-400 with commercial laser printers
- Single-color films, tear-resistant, dirt-resistant
- Easy handling:
  - pre-perforated labeling sheets DIN A4 format to allow easy separation of the labeling strips
  - the separated strips can be inserted directly into the I/O modules
- Different colors for distinction between module types or preferred areas of application: The labeling sheets are available in the colors teal, light beige, red and yellow. Yellow is reserved for fail-safe systems

You can find further information in the Internet under:
http://www.s7-smartlabel.de.

Technical specifications

Size	DIN A4	Weight, approx.	0.1 kg
Labeling strip per cover, pre-perforated	4: 4 strips each for wiring diagram and 4 strips for the labelling strip for front connector		

Ordering data

	Order No.		Order No.
Labelling sheets		**Labelling sheets**	
DIN A4, for printing using laser printer; 10 units		DIN A4, for printing using laser printer; 10 units	
Petrol	**6ES7 492-2AX00-0AA0**	Yellow	**6ES7 492-2CX00-0AA0**
Light beige	**6ES7 492-2BX00-0AA0**	Red	**6ES7 492-2DX00-0AA0**

Spare parts

Overview

Cover film for labeling strips

- Petroleum film for covering and fixing user-created labeling strips.
- On normal paper;
- Spare part

Measuring range module for analog input modules

- Plug-in module for selecting the input ranges for analog modules
- 1 module for 2 inputs
- Spare part

Module slot cover

- Cover plates for unassigned slots in module mounting racks
- Spare part, 10 units

Power plug

- Plug for connecting the PS 405 and PS 407 power supply modules to the line supply
- Spare part

Exchangeable fan

- Fan unit for installation in the fan subassembly
- Spare part

Exchangeable monitoring unit

- Electronic monitoring unit for the fan subassembly
- Spare part

Exchangeable power supply unit

- Power supply unit for installation in the fan subassembly
- Spare part

Ordering data

	Order No.		Order No.
Cover film for labeling strips 10 units, spare part	**6ES7 492-2XX00-0AA0**	**Power plug for PS 405** Spare part	**6ES7 490-0AA00-0AA0**
Measuring range module for analog input modules 1 modul for 2 inputs; 2 units, spare part	**6ES7 974-0AA00-0AA0**	**Power plug for PS 407** Spare part	**6ES7 490-0AB00-0AA0**
Module slot cover for module mounting racks; 10 units, spare part	**6ES7 490-1AA00-0AA0**	**Exchangeable fan** Spare part	**6ES7 408-1TA00-6AA0**

SIMATIC C7

6



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6/30 Customized design
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SIMATIC C7

Overview



- Control systems for the low-end performance range
- Combines SIMATIC S7-300 programmable controller and SIMATIC operator panel in one unit
- Ultra-compact complete machine control
- Highly suitable for industrial use
- User-friendly operation, simple fan-free design and reduced installation effort
- Easily adaptable to increasing requirements through the use of the extensive range of S7-300 modules

C7-613

Overview



- The low-cost entry point in the world of SIMATIC C7 control systems
- For all applications which require fast PLC performance and easy to use human-machine interface functionality
- With user-friendly, integrated I/O for space-saving implementation at the machine level
- Integral technology functions for counting, frequency measurement and closed-loop control.

For operation of the C7, a micro memory card and connector set are necessary

Technical specifications

General technical specifications	
Degree of protection	Front: IP 65 to IEC 529 Housing: IP 20 in accordance with IEC 529
Ambient temperature	
• Horizontal mounting position	0 to 40 °C (0 to 45 °C for 45° mounting angle)
• Vertical installation	0 to 50 °C
Relative humidity	5 to 95%, no condensation (RH severity level 2 in accordance with IEC 1131-2)
Atmospheric pressure	795 to 1080 hPa

Ambient conditions	Not suitable for operation outdoors
Isolation	
• 24 V DC circuits	Insulation test voltage 500 V DC
Electromagnetic compatibility	Requirements of German EMC Legislation per EN 50082-2 (noise immunity), testing per : IEC 801-2, ENV 50140, IEC 801-4, ENV 50141, IEC 801-5; Emitted interference acc. to EN 50081-2, Testing acc. to EN 55011, Class A, Group 1

Technical specifications (continued)

Mechanical stress	
• Vibration, tested per/with	IEC 60068-2-6 during operation: 10 to 58 Hz; constant amplitude 0.075 mm; 58 to 500 Hz; constant acceleration 1 g; during storage: 5 to 9 Hz, amplitude 3.5mm 9-500 Hz, acceleration 1 g
• Impact, tested per/with	IEC 60068-2-29 during operation: Half-sine: strength of impact 15 g (peak value), duration 11 ms, 18 shocks during storage: 25 g, 6ms, 1000 shocks
Voltages, currents	
Supply voltage	
• Rated value	24 V DC
• Permissible range	20.4 to 28.8 V
Current consumption typ.	350 mA no-load operation
Inrush current, max.	1.0 A
Power losses, typ.	11 W
Dimensions	
Dimensions (H x W x D) in mm	215 x 165 x 79
Mounting dimensions (W x H) in mm	202 x 152
Weight, approx.	1350 g
CPU	
Memory	
RAM	
• Integrated	32 KB for program and data, but not display data
• Expandable	No
Load memory	
• Integrated	-
• Upgradable FEPROM	With micro memory card (MMC) up to 4 MB
Backup	Performed by MMC (maintenance free)
• With battery	-
• Without battery	Program and data
Execution times	
Processing times for	
• Bit operations, min.	0.1 µs to 0.2 µs
• Word operations, min.	0.5 µs
• Fixed-point addition, min.	1 µs
• Floating-point addition, min.	15 µs
Timers/counters and their retentivity	
S7 counters	256
• Retentivity selectable	From C 0 to C 256
• Counting range	1 to 999
IEC counters	Yes
• Type	SFB

S7 timers	256
• Retentivity selectable	From T 0 to T 256
• Range	10 ms to 9990 s
IEC timers	Yes
• Type	SFB
Data ranges and their retentivity	
Bit memories	2048
• Retentivity selectable	From MB 0 to MB 255
Blocks	
Max. block size	16 KB
Number of	
• Watchdog interrupts	1
• Process alarms	1
• Time-of-day interrupts	1
• Delay interrupts	1
Nesting depth	
• Per priority class	8
• Additional within an error OB	4
FBs, max.	128
FCs, max.	128
Data blocks, max.	127 (DB 0 reserved)
Programming	
Programming language	STEP 7 V5.1 SP3 (KOP, FUP, AWL); STEP 7 Lite, SCL, CFC, S7-GRAPH, HiGraph
Nesting levels	8
User program protection	Password protection
Address areas (inputs/outputs)	
Total I/O address area	1024 / 1024 byte (freely addressable)
Process image	128/128 byte
Digital channels	992 / 992 max.
Analog channels	248 / 124 max.
Design	
Expansion of C7-613	Max. 2 flat Max. 4 deep
No. of modules per system	Max. 4
Number of DP masters	
• Integrated	-
• Using CP	1
Suitable modules (recommendation)	
• FMs	8
• CPs, point-to-point	4
• CPs, LAN	2
Time-of-day	
Clock	Yes
• Backed up	Yes
Hours counter	1
Time-of-day synchronization	Yes

Technical specifications (continued)

Communication functions	
Total number of connections	8
Usable for	
• Programming device communications	Yes
- reserved	1
- variable	1 to 7
• OP communications	Yes
- reserved	1
- variable	1 to 7
• S7 standard communication	Yes
- reserved	4
- variable	0 to 4
• Routing	-
S7 message functions	
Number of stations that can be defined for message functions (e.g. OS)	5
Interfaces	
1st interface	
Functionality	
• MPI	Yes
• DP master	No
• DP slave	No
• Electrical isolation	No
MPI	
Cable length (without repeater)	50 m
Transmission rates	Up to 187.5 kBit/s
Number of connections	8
Services	
• Programming device/OP communication	Yes
• Global data communication	Yes
• Number of GD circuits	
- sender, max.	4
- receiver, max.	4
• Size of the GD packets, max.	22 byte
S7 basic communication	Yes
• User data per job, max.	76 byte
S7 Communication	
• As server	Yes
• As client	No
• User data per job, max.	64 KB
On-board digital inputs	
Number of inputs	24
Input voltage	
• Rated value	24 V DC
• At "1" signal	15 to 30 V
• At "0" signal	-3 to +5 V
Electrical isolation	Yes
• In groups of	16 and 8
Input current	
• At "1" signal, typ.	8 mA
Input delay (at rated value of the input voltage)	
• For standard inputs, typ./max.	0.1/0.3/3/15 ms
• For process-related functions	16 µs
Connection of 2-wire BERO	
• Acceptable quiescent current	1.5 mA
Cable lengths	
• Unshielded	600 m
• Shielded	1000 m (100 m for process-related functions)
Integral digital outputs	
Number of inputs	16
Rated load voltage L+/L1	24 V DC
• Permissible range	20.4 to 28.8 V
Output voltage	
• At "1" signal, max.	L+ - 0.8 V
Electrical isolation	Yes
• In groups of	8
Maximum output current	
• At "1" signal	
- rated value at 40 °C	0.5 A
- rated value at 60 °C	0.5 A
- min. current	5 mA
• At "0" signal, max.	0.5 mA
Total load capability	
• At 40 °C	100%
• At 60 °C	50%
Switching frequency of outputs	
• For resistive load	100 Hz
• For inductive load	0.5 Hz
Voltage induced on circuit interruption limited to	Typ. (L+) –48V
Short-circuit protection	Electronic clocked
Cable lengths	
• Unshielded	600 m
• Shielded	1000 m
Integrated analog inputs (for current / voltage)	
• Number of inputs	4
• Voltage	±10 V, 0 to 10 V
• Current	±20 mA, 0/4 to 20 mA
Electrical isolation	Common for analog I/O
Bipolar resolution	11 bit +sign
Integration time (adjustable)	
• Per channel	2.5 / 16.6 / 20 ms
Basic error threshold (operating error threshold at 25°C, referred to input range)	±0.7%
Integrated analog inputs (for resistance / temperature)	
• Number of inputs	1
• Resistance	0 to 600 Ω, Pt 100

Technical specifications (continued)

Electrical isolation	Common for analog I/O
Bipolar resolution	11 bit +sign
Integration time (adjustable)	
• Per channel	2.5 / 16.6 / 20ms
Basic error threshold (operating error threshold at 25°C, referred to input range)	±3%
Integrated analog outputs	
Number of inputs	2
Output ranges (rated values)	
• Voltage	±10 V, 0 to 10 V
• Current	±20 mA, 0/4 to 20 mA
Electrical isolation	Common for analog I/O
Conversion time per channel	1ms
Basic error (operational limit at 25 °C, referred to output range), max.	±0.7%
Integrated functions	
Counters	3
• Counting speed max.	30 kHz
Pulse outputs	3
• Switching frequency max.	2.5 kHz
Frequency measurement	Yes
Open-loop positioning	-
Integral “Closed loop control” function blocks	PID

Panel	
Display	LCD backlit
• MTBF display and backlighting at 25 °C, approx.	100,000 h
• Lines	4
• Characters	20 characters per line
Keyboard	4 softkeys 10 function keys, can also be used for numerical input
• Make-break operations	1 million
User memory	See RAM for the CPU
Micro memory card	Yes, all data stored on the MMC of the CPU
• Log. connections (also in a network)	1, fixed to integral CPU
Functionality	
• Displays	128
• Variables per display, max.	8
• Alarms	Yes, with buffer
• Graphical objects	Yes
• Info texts	128
• Password protection	Yes
• Online languages	3

C7-613

Ordering data	Order No.
C7-613 control system 32 KB RAM (PLC), 24 DI, 16 DO, 5 AI, 2 AO onboard, backlit LCD (4 lines, 20 characters/line); with mounting accessories and set of connectors	**6ES7 613-1CA00-0AE3**
Micro memory card	
64 KB	**6ES7 953-8LF00-0AA0**
128 KB	**6ES7 953-8LG00-0AA0**
512 KB	**6ES7 953-8LJ00-0AA0**
2 MB	**6ES7 953-8LL00-0AA0**
4 MB	**6ES7 953-8LM00-0AA0**
8 MB	**6ES7 953-8LP10-0AA0**
Connector set for I/O and power supply	
With screw-type terminals	**6ES7 635-0AA00-4AA0**
With spring-loaded terminals	**6ES7 635-0AA00-4BA0**
C7-613 configuration tools Standard function blocks for configuring HMI functions; on CD-ROM	**6ES7 613-0CA00-7AA0**
C7-613 manual package C7-613 manual and S7-300 manual	
German	**6ES7 613-1CA00-8AA0**
English	**6ES7 613-1CA00-8BA0**
French	**6ES7 613-1CA00-8CA0**
Spanish	**6ES7 613-1CA00-8DA0**
Italian	**6ES7 613-1CA00-8EA0**
C7-613 manual	
German	**6ES7 613-1CA00-8AB0**
English	**6ES7 613-1CA00-8BB0**
French	**6ES7 613-1CA00-8CB0**
Spanish	**6ES7 613-1CA00-8DB0**
Italian	**6ES7 613-1CA00-8EB0**

	Order No.
Accessories	
I/O set for expansion of C7-613/C7-635 by max. 4 modules; assembly onto rear of system	
For 2 modules, flat mounting	**6ES7 635-0AA00-6AA0**
For 4 modules, deep mounting	**6ES7 635-0AA00-6BA0**
I/O expansion cable for external expansion of SIMATIC C7-621 by max. 4 modules; 1.5 m long	**6ES7 635-0AA00-6CA0**
Adapter frame for replacement of SIMATIC C7-62x/-633/-634 by C7-613	**6ES7 613-0CA00-1CA0**
SIMATIC Manual Collection Electronic manuals on CD-ROM, multi-language	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection updating service for 1 year Current S7 Manual Collection CD as well as the three following updates	**6ES7 998-8XC01-8YE2**
Spare parts	
Service package 3 seals, 10 clamps, for all SIMATIC C7-613 and C7-635	**6ES7 635-0AA00-3AA0**
Grounding rail with shield terminals for analog I/O	**6ES7 635-0AA00-6EA0**

Overview



- For fast and easy automation tasks that require simple operator control and visualization functions
- C7-621 with integrated analog and digital I/O
- C7-621 ASi with Actuator-Sensor Interface, for use as a master with addressing and diagnostic functions

Technical specifications

General	
Degree of protection	Front: IP 65 acc. to IEC 529
	Housing: IP 20 acc. to IEC 529
Ambient temperature	
• Vertical operation	0 to 50 °C
• With 45° installation	0 to 45 °C, restricted readability with horizontal installation
Relative humidity	5 to 95% (RH severity level 2 in accordance with IEC 1131-2)
Atmospheric pressure	795 to 1080 hPa
Isolation	
• 24 V DC circuit	500 V DC
Electromagnetic compatibility	Radio interference: class B / EN55022; conducted interference: IEC 1000-4-4, IEC 1000-4-5; Noise immunity: IEC 1000-4-2, IEC 1000-4-3, IEC 1000-4-4, IEC 1000-4-6, EN50140
Mechanical rating	
• Vibrations tested with	IEC 68, Part 2-6 10 to 58 Hz; Amplitude 0.075 mm; 58 to 500 Hz: constant acceleration 9.8 m/s^2;
• Shock tested with	IEC 68, Part 2-29 half-sine: 100 m/s^2 (10 g), 16 ms; 100 shocks
Supply voltage	
• Rated value	24 V DC
• Permitted range	20.4 to 30.2 V
Current consumption, typ./ max.	0.3 A/1 A
Power loss, typ.	8 W
Acceptance, certification	EN 61131-2 (IEC 1131-2); UL Listing UL 508; Canadian Standard Association (CSA) to Standard C22.2 Number 142; FM certification, FM standards no. 3611, 3600, 3810 Class I, Div. 2 Group A, B, C, D; DIN/ ISO 9001 certification of manufacturing and development
Dimensions	
• Device (W x H x D) in mm	168 x 120 x 69
• Cutout dimensions (W x H) in mm	158.5 x 110.5
Weight	800 g

PLC	
Memory (1 statement corresponds to an average of 3 byte)	32 KB/10 K statements RAM (integrated)
Load memory	
• Integral (for data)	48 KB RAM 48 KB FEPROM
• Pluggable, max.	–
Data backup	
• With battery	–
• Without battery, max.	144 byte, parameterizable for memory bits, timers, data
Program organization	Linear, structured
Types of blocks	Organization blocks (OB) Function blocks (FB) Functions (FC) Data blocks (DB) System functions (SFC)
Number of blocks, max.	128 FCs, 128 FBs, 127 DBs
Program execution	Start-up (OB 100) Free cycle (OB 1) Interrupt-controlled (OB 40) Error handling (OB 80, 81, 82, 85, 87, 121, 122)
System functions (SFCs)	Interrupt masking, data copying, clock functions, diagnostic functions, fault and error handling, module parameter assignment
Block nesting depth	8 for each program execution level
Nesting levels	8
User program protection	Password protection
Instruction set	Binary logic, parenthesis commands, result assignment, save, count, load, transfer, compare, shift, rotate, generate complement, call up blocks, fixed-point and floating point arithmetic functions, jump functions
Execution times	
• Bit operations	0.3 to 0.6 µs
• Word operations	1 µs
• Timer-/counter operations	12 µs
• Fixed-point addition	2 µs
• Floating-point addition	50 µs

Technical specifications (continued)

Cycle time monitoring	150 ms (default); programmable 1 to 6000 ms
Bit memories	2048
• Of these retentive with battery	-
• Of these retentive without battery	0 to 1023, programmable
Counter	64
• Of these retentive with battery	-
• Of these retentive without battery	0 to 31, programmable
• Counting range	1 to 999
Timers	128
• Of these retentive with battery	-
• Of these retentive without battery	0 to 63, programmable
• Range	1 to 9990 s
Expansion with S7-300 modules	Max. 1-line
S7-300 expansion modules	Max. 4
I/O expansion	
• Digital inputs/outputs, max.	160
• Analog inputs/outputs, max.	37
Onboard interface module	--
Suitable modules	
FMs	4
CP, point-to-point	2
CPs, LAN	1
Total address areas I/O	78/78 byte
Process image I/O	124/124 byte
Communication	
Communication functions	
• Programming device/OP communications	Yes
• Global data communication	Yes
• Basic communication	Yes
• Extended communications	Yes (server)
• S5-compatible communications	-
• Standard communication	-
• Number of connections static/ dynamic	4/4
MPI (multipoint interface)	Yes
• No. of stations, max.	32; PG/PC, OP, C7, S7-300/-400, M7
• Data transmission rate, max.	187.5 kbit/s
Distance between 2 adjacent nodes	Without repeaters 50 m, with 2 repeaters: 1100 m with 10 repeaters in series: 9100 m, via fiber-optic cables: 23.8 km (with star couplers or OLMs)
Suitable programming devices	SIMATIC PG/PC, Standard-PC
PROFIBUS DP interface	-
• Integrated	-
• Transmission procedure	-
• Data transmission rate	-
• Number of DP lines per C7 (integral interface/CP342-5)	-/1
• Number of DP stations per master C7 (integral interface/ CP 342-5)	-/8
• Address area per DP station	64 byte
Number of modules per ET200M	8
• DP connection (Master/ Slave)	1 (CP342-5)

	C7-621	C7-621 ASi
Integrated AS master interface	-	1
Digital inputs	**16**	**-**
Input voltage		-
• Rated value	24 V DC	-
• At "1" signal	15 to 30 V	-
• At "0" signal	-3 to +5 V	-
Electrical isolation	No	-
• In groups of	-	-
Input delay, typ./max.	3/4.8 ms	-
Input current at "1" signal, max.	11.5 mA	-
Connection of two-wire BEROs		
• Permissible quiescent current, max.	2 mA	-
Cable lengths		
• Unshielded	600 m	-
• Shielded	1000 m	-
Digital outputs	**16**	**-**
Rated load voltage	24 V DC	-
• Permitted range	20.4 to 28.8 V	-
Output voltage		
• At "1" signal, max.	L+ > U > L+ - 0.8 V	-
Electrical isolation	No	-
• In groups of	-	-
Output current		-
• At "1" signal		-
• Rated value	0.5 A	-

Technical specifications (continued)

	C7-621	C7-621 ASi
C7-621		-
• At "0" signal , max.	0.5 mA	-
Total current per group of 8		
• At 20 °C	4 A	-
• At 40 °C	2 A	-
Lamp load, max.	5 W	-
Switching frequency		
• For resistive load	100 Hz	-
• For inductive load	0.5 Hz	-
Voltage induced on circuit interruption limited to	48 V	-
Short-circuit protection	Yes, electr. clocked	-
Cable lengths		
• Unshielded	600 m	-
• Shielded	1000 m	-
Universal inputs	**-**	**-**
Electrical isolation	-	-
Input voltage		-
• Rated value	-	-
• At "1" signal	-	-
• At "0" signal	-	-
Input current at "1" signal, typ.	-	-
Cable lengths	-	-
• Unshielded	-	-
• Shielded	-	-
Counter frequency, max.	-	-
Counter	-	
• Principle	-	-
• Counting range	-	-
• Limit value (setpoint) specification	-	-
• Count interrupt up counter	-	-
• Count interrupt down counter	-	-
• Enable	-	-
Period duration counter, max.	-	-
• Principle	-	-
Counting range	-	-
• Period duration, max.	-	-
Frequency counter, max.	-	-
• Principle	-	-
• Counting range	-	-
• Gate width	-	-
Analog inputs	**4**	**-**
Input ranges/input resistance (programmable)	-10 b. 10 V/50 kΩ -20 to 20 mA/ 105.5Ω	-
Permissible input voltage for voltage input, max.	30 V	-
Permissible input current for current input, max.	30 mA	-
Electrical isolation	No	-

	C7-621	C7-621 ASi
Cycle time (all channels)	-	-
Conversion time per channel	100 µs	-
Resolution	12 bits incl. sign	-
Operational limit (in the entire temperature range, referred to input range)		
• Voltage	+/-1.0%	-
• Current	+/-1.0%	-
Basic error limit (operating error limit at 25 °C, referred to the input range)		
• Voltage	+/-0.9%	-
• Current	+/-0.8%	-
Interrupts		
• Limit value interrupt	-	-
• Diagnostics interrupt		-
Alarm cycle		-
Analog outputs	**1**	-
Output ranges		-
• Voltage output	-10 to 10 V	-
• Current output	-20 to 20 mA	-
Load impedance		
• For voltage outputs, min.	2 kΩ	-
• For current outputs, max.	0.5 kΩ	-
• For capacitive load, max.	1 µF	-
• For inductive loads, max.	1 mH	-
Voltage output		
Short-circuit protection	Yes	-
• Short-circuit current	11 mA	-
Current output		
Open-circuit voltage, max.	15 V	-
Electrical isolation	No	-
Cycle time (all channels)	0.5 ms	-
Resolution	12 bit incl. sign	-
Transient recovery time		
• For resistive load, max.	0.6 ms	-
• For capacitive load, max.	3 ms	-
• For inductive load, max.	0.5 ms	-
Substitute values assignable		-
Operating error limit (0 to 60°C, referred to the output range)		
• Voltage	+/-1.0%	-
• Current	+/-1.0%	-
Basic error threshold (operating error threshold at 25 °C, with reference to output range)		
• Voltage	+/-0.8%	-
• Current	+/-0.9%	-
Interrupts		
• Diagnostics interrupt	No	-

Technical specifications (continued)

	C7-621	C7-621 ASi
Cable length, shielded	100 m	-
Programming, planning, configuring		
Programming software	STEP 7, STEP 7-Lite	STEP 7, STEP 7-Lite
Configuring HMI	ProTool/Lite, ProTool, ProTool/ Pro	ProTool/Lite, ProTool, ProTool/ Pro
Suitable software		
Software controllers	8 loops	8 loops
Process diagnostics	Yes (C7-CPU)	Yes (C7-CPU)
S7-GRAPH	-	-
S7-HiGraph	-	-
S7-SCL	Yes	Yes
CFC	-	
Human machine interface		
Display	LC display, LED backlit	LC display, LED backlit
Service life of the back-lighting, approx.	100.000 h (approx. 11 years)	100.000 h (approx. 11 years)
Number of lines x characters per line	2 x 20	2 x 20
Character height	5 mm	5 mm
Resolution	-	-
Active screen surface (W x D) in mm	-	-
Number of soft keys/function keys	5/-	5/-
User memory, permanently integrated	128 KB flash	128 KB flash

	C7-621	C7-621 ASi
RAM (dyn.)	-	-
Operating messages, max.	499	499
Operating message buffer, max.	-	-
Scroll operating messages, max.	50	50
Fault signal buffers, max.	-	-
Max. variables in message text	8	8
Number of pictures	40	40
Entries per picture	20	20
Pixel graphics	-	-
Semi graphics	-	-
Symbol/character sets	1	1
Dynamic objects	Input, output, input/ output fields, date/ time-of-day fields, symbolic input/ output fields	Input, output, input/ output fields, date/ time-of-day fields, symbolic input/ output fields
Recipes, max.	-	-
Recipe data memory	-	-
Data records per recipe, max.	-	-
Entries per data record, max.	-	-
Online languages	3	3
Password levels	9	9
Clock	Software clock	Software clock
Printer interface	-	-

Ordering data

	Order No.
C7-621 control system 32 KB RAM (PLC), 16 DI, 16 DO, 4 AI, 1 AO onboard; 128 KB flash EPROM for HMI data, LED backlit LCD (2 lines, 20 characters/line, 5 mm character height); with mounting accessories and set of connectors	**6ES7 621-1AD02-0AE3**
C7-621 ASi control system 32 KB RAM (PLC), integral AS-Interface (master) 128 KB flash EPROM for HMI data, LED backlit LCD (2 lines, 20 characters/line, 5 mm character height); with mounting accessories and set of connectors	**6ES7 621-6BD02-0AE3**
C7-621, C7-621 ASi manual	
German	**6ES7 621-1AD00-8AA0**
English	**6ES7 621-1AD00-8BA0**
French	**6ES7 621-1AD00-8CA0**
Spanish	**6ES7 621-1AD00-8DA0**
Italian	**6ES7 621-1AD00-8EA0**

	Order No.
Accessories	
SIMATIC C7 simulator for all SIMATIC C7s, with 16 onboard DIs and 16 onboard DOs; with switches and LEDs for simulating 16 DIs and 16 DOs	**6ES7 620-0AA00-4AA0**
IM 621 interface module for expansion of SIMATIC C7-621 by max. 4 modules (1 ER); incl. connecting cable	**6ES7 621-1AD00-6AE3**
Connector set for I/O and power supply	**6ES7 623-1AE01-4AA0**
SIMATIC Manual Collection Electronic manuals on CD-ROM, multi-language	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection updating service for 1 year Current S7 Manual Collection CD as well as the three following updates	**6ES7 998-8XC01-8YE2**
Spare parts	
Service package Seal, 4 clamps, 2 connectors; for all SIMATIC C7s	**6ES7 623-1AE00-3AA0**

Overview



- Cost-effective control systems
- For all applications which require fast PLC performance and easy to use human-machine interface functionality
- Featuring larger user memory for extensive application programs
- Offers the additional benefits of the convenient HMI functions provided by the SIMATIC Operator Panel OP7

Technical specifications

	C7-633 DP	C7-633/P
General		
Degree of protection	Front: IP 65 acc. to IEC 529 Housing: IP 20 acc. to IEC 529	
Ambient temperature		
• Vertical operation	0 to 50 °C	
• At 45° angle of installation	0 to 45 °C	
Relative humidity	5 to 95% at 25 °C (no condensation), tested in accordance with DIN IEC 68-2-3	
Atmospheric pressure	795 to 1080 hPa	
Isolation		
• 24 V DC circuit	500 V DC	
Electromagnetic compatibility	Radio interference Class A / EN55022; conducted interference: IEC 1000-4-4, IEC 1000-4-5; Noise immunity: IEC 1000-4-2, IEC 1000-4-3, IEC 1000-4-4, IEC 1000-4-6, EN50140	
Mechanical rating		
• Vibrations tested with	IEC 68, Part 2-6 10 to 58 Hz; Amplitude 0.075 mm; 58 to 500 Hz: constant acceleration 9.8 m/s2;	
• Shock tested with	IEC 68, Part 2-29 half-sine: 100 m/s2 (10 g), 16 ms; 100 shocks	
Supply voltage		
• Rated value	24 V DC	
• Permitted range	20.4 to 30.2 V	
Current consumption, typ./ max.	550 mA/1 A	
Power losses, typically	12 W	
Acceptance, certification	EN 61131-2 (IEC 1131-2); UL Listing UL 508; Canadian Standard Association (CSA) to Standard C22.2 Number 142; FM permit, FM-Standards No. 3611, 3600, 3810 Class I, Div. 2 Group A, B, C, D; DIN/ISO 9001 certification	
Dimensions		
• Device (W x H x D) in mm	240 x 203.5 x 74.4	240 x 203.5 x 90
• Cutout dimensions (W x H) in mm	231 x 159	231 x 159

	C7-633 DP	C7-633/P
Weight	1600 g	1800 g
PLC		
Memory (1 statement corresponds to an average of 3 byte)	64 KB/ 20 K statements RAM	48 KB/ 16 K statements RAM
Load memory		
• Integral (for data)	96 KB RAM	80 KB RAM
• Pluggable, max.	512 KB	512 KB
Data backup		
• With battery	All data	
• Without battery, max.	4736 byte, byte, parameterizable for bit memories, timers, counters, data	
Real-time clock	Yes	
Program organization	Linear, structured	
Types of blocks	Organization blocks (OBs)	
	Function blocks (FBs)	
	Functions (FCs)	
	Data blocks (DBs)	
	System functions (SFCs)	
Number of blocks, max.	192 FC, 192 FB, 255 DB	
Program execution	Restart (OB 100)	
	Free cycle (OB 1)	
	Real-time controlled (OB 10)	
	Time-driven (OB 35)	
	Interrupt controlled (OB 40)	
	Error handling (OB 80, 81, 82, 85, 86, 87, 121, 122)	
System functions (SFCs)	Interrupt masking, data copying, clock functions, diagnostic functions, fault and error handling, module parameter assignment	
Block nesting depth	8 for each program execution level	
Nesting levels	8	
User protection program	Password protection	

Technical specifications (continued)

	C7-633 DP	C7-633/P
Instruction set	Binary logic, parenthesis commands, result assignment, save, count, load, transfer, compare, shift, rotate, generate complement, call up blocks, fixed-point and floating point arithmetic functions, jump functions	
Processing times for		
• Bit operations	0.3 to 0.6 µs	
• Word operations	1 µs	
• Timer-/counter operations	12 µs	
• Fixed-point addition	2 µs	
• Floating-point addition	50 µs	
Cycle time monitoring	150 ms (default); programmable 1 to 6000 ms	
Bit memories	2048	
• Of these retentive with battery	0 to 2047, adjustable	
• Of these retentive without battery	0 to 2047, adjustable	
Counter	64	
• Of these retentive with battery	0 to 63, settable	
• Of these retentive without battery	0 to 63, settable	
• Counting range	1 to 999	
Timers	128	
• Of these retentive with battery	0 to 127, adjustable	
• Of these retentive without battery	0 to 127, adjustable	
• Range	10 ms to 9990 s	
Expansion with S7-300 modules	Max. 3-line	
Expansion modules S7-300	Max. 24	
I/O expansion		
• Digital inputs/outputs, max.	768	
• Analog inputs/outputs, max.	192	
Interface module onboard	IM 360	
Suitable modules		
• FMs	8	
• CP, point-to-point	4	
• CPs, LAN	2	
Total address areas I/O	1024/1024 byte	
Process image I/O	128/128 byte	
Communication		
Communication functions		
• PG/OP communication	Yes	
• Global data communication.	Yes	
• Basic communication.	Yes	
• Extended communication	Yes (server)	

	C7-633 DP	C7-633/P
Communication functions		
• S5-compatible communication	Yes	
• Standard communication	Yes	
• Number of connections static/dynamic	4/8	
MPI (multipoint interface)	Yes, occupies 2 nodes per unit (1x CPU, 1x OP)	
• Number of nodes, max.	32; PG/PC, OP, C7, S7-300/400, M7;	
• Data transmission rate, max.	187.5 kbit/s	
• Distance between 2 adjacent nodes	Without repeaters 50 m with 2 repeaters: 1000 m with 10 repeaters in series: 9100 m via fiber-optic cables: 23.8 km (with star couplers or OLMs)	
Suitable programming devices	SIMATIC PG/PC, Standard PC	
PROFIBUS DP interface	1	
• Transmission procedure	PROFIBUS DP to DIN 19245 Part 3, DP master, DP slave	
• Data transmission rate	12 Mbit/s	
• Number of DP lines per C7 (integral interface/CP342-5)	1/1	-/1
• Number of DP stations per master C7 (integral interface/CP 342-5)	64/32	-/32
• Address area per DP station	122 byte	122 byte
No. of modules per ET200M	8	8
DP connection (Master/slave)	1 (integral, master/slave) 1 (CP342-5)	1 (CP342-5)
Integrated AS master interface	-	-
Digital inputs	**-**	**16**
Input voltage		
• Rated value	-	24 V DC
• At "1" signal	-	11 to 30 V
• At "0" signal	-	-3 to +5 V
Electrical isolation		Yes, using optocoupler
• In groups of	-	16
Input delay, typ./max.	-	3 / 4.8 ms
Input current at "1" signal, max.	-	11.5 mA
Connection of two-wire BEROs		
• Permissible quiescent current, max.	-	2 mA
Cable lengths		
• Unshielded	-	600 m
• Shielded	-	1000 m

Technical specifications (continued)

	C7-633 DP	C7-633/P
Digital outputs	**-**	**16**
Rated load voltage		24 V DC
• Permitted range	-	20.4 to 28.8 V
Output voltage		
• At "1" signal, max.	-	L+ > U > L+ - 0.8 V
Electrical isolation	-	Yes; via optocouplers
• In groups of	-	2 groups of 8
Output current		
• At "1" signal		
- rated value	-	0.5 A
- minimum current	-	5 mA
• At "0" signal , max.	-	0.5 mA
Total current per group of 8		
• At 20 °C	-	4 A
• At 40 °C	-	2 A
Lamp load, max.	-	5 W
Switching frequency		
• For resistive load	-	100 Hz
• For inductive load	-	0.5 Hz
Voltage induced on circuit interruption limited to	-	48 V
Short-circuit protection	-	Yes; electronic clocked
Cable lengths		
• Unshielded	-	600 m
• Shielded	-	1000 m
Universal inputs		**4**
Can be used as	-	UI1 digital/interrupt input. 24 V DC or up/down counter UI2 digital/interrupt input. 24 V DC or up/down counter UI3 digital/interrupt input 24 V DC or up/down counter or frequency/period duration counter UE4 digital/alarm input 24 V DC
Electrical isolation	-	No
Input voltage		
• Rated value	-	24 V DC
• At "1" signal	-	11 to 30 V
• at "0" signal	-	-3 to +5 V
Input current at "1" signal, typ.	-	11.5 mA
Cable lengths		
• Shielded	-	1000 m
Counter frequency, max.	-	10 kHz

	C7-633 DP	C7-633/P
Counters, max.	-	3 (UE1, UE2, UE3)
• Principle	-	Counting slopes;
• Counting range UI1, UI2	-	Forwards: 0 to 65535, reverse: 65535 to 0
• Counting range UI3	-	Forwards: 0 to 16777215, reverse: 16777215 to 0
• Limit value (setpoint) specification	-	One counter per value
• Count interrupt up counter	-	On reaching the limit value
• Count interrupt down counter	-	On reaching "0"
• Enable	-	In the program
Period duration counter, max.	-	1 (UE3)
• Principle	-	Counting fixed time units between two positive slopes
• Counting range	-	0 to 16777214
• Period duration, max.	-	8.38 s bzw. 0.12 Hz
Frequency counter, max.	-	1 (UE3)
• Principle	-	Counting pulses within a time period
• Counting range	-	0 to 16777215
• Gate width	-	0,1 s; 1 s; 10 s (programmable)
External gate counter		3
• Principle		Counting edges within a gate time using an external pin
• Counting range UI1, UI2		0 to 65535
• Counting range UI3		0 to 16777215
Analog inputs	**-**	**4**
Input ranges/ input resistance (programmable)	-	-10 to 10 V/ 50 kΩ -20 to 20 mA/ 105.5 Ω 4 to 20 mA/ 105.5 Ω
Permissible input voltage for voltage input, max.	-	30 V
Permissible input current for current input, max.	-	30 mA
Electrical isolation	-	Yes, shared with AO
Cycle time (all channels)	-	2 ms
Conversion time per channel	-	0.5 ms
Resolution	-	12 bit incl. sign

Technical specifications (continued)

	C7-633 DP	C7-633/P
Operating error limit (in overall temperature range referred to the input range)	-	
• Voltage	-	+/-0.8%
• Current	-	+/-0.8%
Basic error limit (operating error limit at 25°C, referred to the input range)		
• Voltage	-	+/-0.6%
• Current	-	+/-0.6%
Interrupts		
• Limit value interrupt	-	-
• Diagnostics interrupt	-	Measuring range violation, wire break detection at 4 to 20 mA per software
• Alarm cycle	-	Yes (programmable)
Analog outputs	**-**	**4**
Output ranges		
• Voltage output	-	-10 to 10 V
• Current output	-	-20 to 20 mA, 4 to 20 mA
Load impedance		
• For voltage outputs, min.	-	2 kΩ
• For current outputs, max.	-	0.5 kΩ
• For capacitive load, max.	-	1 µF
• For inductive loads, max.	-	1 mH
Voltage output		
• Short-circuit protection	-	Yes
• Short-circuit current, max.	-	25 mA
Current output		
• Open-circuit voltage, max.	-	+/-16 V
Electrical isolation	-	Yes, shared with AI
Operating cycle time (all channels) typ./max.	-	2/4 ms
Resolution	-	12 bits incl. sign
Transient recovery time		
• For resistive load, max.	-	0.1 ms
• For capacitive load, max.	-	3.3 ms
• For inductive load, max.	-	0.5 ms
Substitute values assignable	-	Yes, parameterizable
Operating error limit (0 to 60°C, referred to the output range)		
• Voltage	-	+/-0.8%
• Current	-	+/-1%

	C7-633 DP	C7-633/P
Basic error limit (operating error limit at 25°C, referred to the output range)		
• Voltage	-	+/-0.5%
• Current	-	+/-0.6%
Interrupts		
• Diagnostics interrupt	-	Yes, programmable for parameter errors
Cable length, shielded	-	200 m
Programming, planning, configuring		
Programming software	STEP 7, STEP 7-Lite	STEP 7, STEP 7-Lite
Configuring HMI	ProTool/Lite, ProTool, ProTool/Pro	ProTool/Lite, ProTool, ProTool/Pro
Suitable software		
Software controllers	16 loops	16 loops
Process diagnostics	Yes (C7-CPU)	Yes (C7-CPU)
S7-GRAPH	Yes	Yes
S7-HiGraph	Yes	Yes
S7-SCL	Yes	Yes
CFC	Yes	Yes
Human machine interface		
Display	LC display, LED backlit	LC display, LED backlit
Service life of the backlighting, approx.	100,000 h (approx. 11 Jahre)	100,000 h (approx. 11 Jahre)
Number of lines x characters per line	4 x 20	4 x 20
Character height	8 mm	8 mm
Resolution	-	-
Active screen surface (W x D) in mm	-	-
Number of soft keys/function keys	4/16	4/16
User memory, permanently integrated	128 KB flash	128 KB flash
RAM (dyn.)	-	-
Operating messages, max.	499	499
Operating message buffer, max.	256 entries	256 entries
Scroll operating messages, max.	256	256
Fault messages, max.	499	499
Fault signal buffers, max.	256 entries	256 entries
Max. variables in message text	8	8
Number of pictures	99	99
Entries per picture	99	99
Pixel graphics	-	-
Semi graphics	Within the bounds of the character set	Within the bounds of the character set

Technical specifications (continued)

	C7-633 DP	C7-633/P
Symbol/character sets	1	1
Dynamic objects	Input, output, input/output fields, date/time-of-day fields, symbolic input/output fields	Input, output, input/output fields, date/time-of-day fields, symbolic input/output fields
Recipes, max.	99	99
Recipe data memory	4 KB	4 KB

	C7-633 DP	C7-633/P
Data records per recipe, max.	99	99
Entries per data record, max.	99	99
Online languages	3	3
Password levels	9	9
Clock	Software clock	Software clock
Printer interface	RS232	RS232

Ordering data

	Order No.
C7-633 DP control system 64 KB RAM (PLC), with PROFIBUS DP interface, without onboard I/O; 128 KB flash EPROM for HMI data, LED backlit LCD (4 lines, 20 characters/line, 8 mm character height); with installation accessories, 24 V DC connector and backup battery	**6ES7 633-2BF02-0AE3**
C7-633/P control system 48 KB RAM (PLC), 16 DI, 16 DO, 4 AI, 4 AO, 4 UI onboard; 128 KB flash EPROM for HMI data, LED backlit LCD (4 lines, 20 characters/line, 8 mm character height); with mounting accessories and backup battery	**6ES7 633-1DF02-0AE3**
C7-633, C7-634 documentation package comprising C7-633, C7-634 manual, S7-300 manual, OP7, OP17 manual	
German	**6ES7 633-1AF01-8AA0**
English	**6ES7 633-1AF01-8BA0**
French	**6ES7 633-1AF01-8CA0**
Spanish	**6ES7 633-1AF01-8DA0**
Italian	**6ES7 633-1AF01-8EA0**
Manual "Communication for SIMATIC S7-300/-400"	**6ES7 398-8EA00-8■A0**
Technical overview "From SIMATIC S5 to SIMATIC S7"	**6ES7 398-8AA01-8■B0**
German	**A**
English	**B**
French	**C**
Spanish	**D**
Italian	**E**
SIMATIC Manual Collection	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection updating service for 1 year	**6ES7 998-8XC01-8YE2**

	Order No.
Accessories	
FEPROM memory card	
16 KB	**6ES7 951-0KD00-0AA0**
32 KB	**6ES7 951-0KE00-0AA0**
64 KB	**6ES7 951-0KF00-0AA0**
128 KB	**6ES7 951-0KG00-0AA0**
512 KB	**6ES7 951-0KJ00-0AA0**
SIMATIC C7 simulator for all SIMATIC C7s, with 16 onboard DIs and 16 onboard DOs; with switches and LEDs for simulating 16 DIs and 16 DOs	**6ES7 620-0AA00-4AA0**
Connector set for I/O and power supply	**6ES7 623-1AE01-4AA0**
Backup battery 3.6 V; 1.5 Ah	**6ES7 623-1AE01-5AA0**
PROFIBUS DP bus connector; PROFIBUS bus components	See page 4/33
Spare parts	
Service package Seal, 4 clamps, 2 connectors; for all SIMATIC C7s	**6ES7 623-1AE00-3AA0**

C7-634

Overview



- Control systems for all applications that require high PLC performance and advanced HMI capabilities
- Expanded user memory for larger application programs and enhanced HMI capability
- Controller section offers performance range of C7-633
- C7-634 additionally offers the convenience of the SIMATIC OP17 Operator Panel

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Technical specifications

	C7-634 DP	C7-634/P
General		
Degree of protection	Front: IP 65 acc. to IEC 529 Housing: IP 20 acc. to IEC 529	
Ambient temperature		
• Vertical operation	0 to 50 °C	
• At 45° angle of installation	0 to 45 °C	
Relative humidity	5 to 95% at 25 °C (no condensation), tested in accordance with DIN IEC 68-2-3	
Atmospheric pressure	795 to 1080 hPa	
Isolation		
• 24 V DC circuit	500 V DC	
Electromagnetic compatibility	Emitted interferance: Class A / EN55022; cableled disturbance: IEC 1000-4-4, IEC 1000-4-5; Noise immunity: IEC 1000-4-2, IEC 1000-4-3, IEC 1000-4-4, IEC 1000-4-6, EN50140	
Mechanical rating		
• Vibrations tested with	IEC 68, Part 2-6 10 to 58 Hz; Amplitude 0.075 mm; 58 to 500 Hz: constant acceleration 9.8 m/s^2;	
• Shock tested with	IEC 68, Part 2-29 half-sine:100 m/s^2 (10g), 16ms; 100 shocks	
Supply voltage		
• Rated value	24 V DC	
• Permitted range	20.4 to 30.2 V	
Current consumption, typ./ max.	550 mA/1 A	
Power losses, typically	12 W	
Acceptance, certification	EN 61131-2 (IEC 1131-2); UL Listing UL 508; Canadian Standard Association (CSA) to Standard C22.2 Number 142; FM permit, FM-Standards No. 3611, 3600, 3810 Class I, Div. 2 Group A, B, C, D; DIN/ISO 9001 Certification	
Dimensions		
• Device (W x H x D) in mm	240 x 203.5 x 74.4	240 x 168 x 89.4
• Cutout dimensions (W x H) in mm	231 x 159	231 x 159
Weight	1700 g	1900 g

	C7-634 DP	C7-634/P
PLC		
Memory (1 statement corresponds to an average of 3 byte)	64 KB/ 20 K statements RAM	48 KB/ 16 K statements RAM
Load memory		
• Integral (for data)	96 KB RAM	80 KB RAM
• Pluggable, max.	512 KB	512 KB
Data backup		
• With battery	All data	
• Without battery, max.	4736 byte, parameterizable for bit memories, timers, counters, data	
Real-time clock	Yes	
Program organization	Linear, structured	
Types of blocks	• Organization blocks (OB) • Function blocks (FB) • Functions (FC) • Data blocks (DB) • System functions (SFC)	
Number of blocks, max.	192 FC, 192 FB, 255 DB	
Program execution	• Restart (OB 100) • Free cycle (OB 1) • Real-time controlled (OB 10) • Time-driven (OB 35) • Interrupt controlled (OB 40) • Error handling (OB 80, 81, 82, 85, 86, 87, 121, 122)	
System functions (SFCs)	Interrupt masking, data copying, clock functions, diagnostic functions, fault and error handling, module parameter assignment	
Block nesting depth	8 for each program execution level	
Nesting levels	8	
User program protection	Password protection	
Instruction set	Binary logic, parenthesis commands, result assignment, save, count, load, transfer, compare, shift, rotate, generate complement, call up blocks, fixed-point and floating point arithmetic functions, jump functions	

Technical specifications (continued)

	C7-634 DP	C7-634/P
Processing times for		
• Bit operations	0.3 to 0.6 µs	
• Word operations	1 µs	
• Timer-/counter operations	12 µs	
• Fixed-point addition	2 µs	
• Floating-point addition	50 µs	
Cycle time monitoring	150 ms (default); programmable 1 to 6000 ms	
Bit memories	2048	
• Of these retentive with battery	0 to 2047, settable	
• Of these retentive without battery	0 to 2047, settable	
Counter	64	
• Of these retentive with battery	0 to 63, settable	
• Of these retentive without battery	0 to 63, settable	
• Counting range	1 to 999	
Timers	128	
• Of these retentive with battery	0 to 127, settable	
• Of these retentive without battery	0 to 127, settable	
• Range	10 ms to 9990 s	
Expansion with S7-300 modules	Max. 3-line	
S7-300 expansion modules	Max. 24	
I/O expansion		
• Digital inputs/outputs, max.	768	
• Analog inputs/outputs, max.	192	
Onboard interface module	IM 360	
Suitable modules		
FMs	8	
CP, point-to-point	4	
CPs, LAN	2	
Total address areas I/O	1024/1024 byte	
Process image I/O	128/128 byte	
Communication		
Communication functions		
• Programming device/ OP communications	Yes	
• Global data communication	Yes	
• Basic communication	Yes	
• Extended communications	Yes (server)	
• S5-compatible communications	Yes	
• Standard communication	Yes	
• Number of connections static/dynamic	4/8	

	C7-634 DP	C7-634/P
MPI (multipoint interface)	Yes, occupies 2 nodes per unit (1x CPU, 1x OP)	
• No. of stations, max.	32; PG/PC, OP, C7, S7-300/400, M7;	
• Data transmission rate, max.	187.5 kbit/s	
• Distance between 2 adjacent nodes	Without repeaters 50 m with 2 repeaters:1100 m with 10 repeaters in series: 9100 m via fiber-optic cables: 23.8 km (with star couplers or OLMs)	
Suitable programming devices	SIMATIC PG/PC, Standard-PC	
PROFIBUS DP interface	1	-
Transmission procedure	PROFIBUS DP to DIN 19245 Part 3, DP master, DP slave	-
Data transmission rate	12 Mbit/s	12 Mbit/s
Number of DP lines per C7 (integral interface/CP342-5)	1/1	-/1
Number of DP stations per master C7 (integral interface/CP 342-5)	64/32	-/32
Address area per DP station	122 byte	122 byte
No. of modules per ET200M	8	8
DP connection (master/ slave)	1 (integral, master/ slave) 1 (CP342-5)	1 (CP342-5)
Integrated AS master interface	-	-
Digital inputs	**-**	**16**
Input voltage		
• Rated value	-	24 V DC
• At "1" signal	-	11 to 30 V
• At "0" signal	-	-3 to +5 V
Electrical isolation	-	Yes, via optocouplers
• In groups of	-	16
Input delay, typ./max.	-	3/4.8 ms
Input current at "1" signal, max.	-	11.5 mA
Connection of two-wire BEROs		
• Permissible quiescent current, max.	-	2 mA
Cable lengths		
• Unshielded	-	600 m
• Shielded	-	1000 m
Digital outputs	**-**	**16**
Rated load voltage	-	24 V DC
• Permitted range	-	20.4 to 28.8 V
Output voltage		
• At "1" signal, max.	-	L+ > U > L+ - 0.8V

Technical specifications (continued)

	C7-634 DP	C7-634/P
Electrical isolation	-	Yes; via optocouplers
• In groups of	-	2 groups of 8
Output current		
• At "1" signal		
Rated value	-	0,5 A
Min. current	-	5 mA
• At "0" signal, max.	-	0.5 mA
Total current per group of 8		
• At 20 °C	-	4 A
• At 40 °C	-	2 A
Lamp load, max.	-	5 W
Switching frequency		
• For resistive load	-	100 Hz
• For inductive load	-	0.5 Hz
Voltage induced on circuit interruption limited to	-	48 V
Short-circuit protection	-	Yes; electronic clocked
Cable lengths		
• Unshielded	-	600 m
• Shielded	-	1000 m
Universal inputs		**4**
Can be used as	-	UI1 digital/interrupt input 24 V DC or up/down counter UI2 digital/interrupt input 24 V DC or up/down counter UI3 digital/interrupt input 24 V DC or up/down counter or frequency/period duration counter UI4 digital interrupt input 24 V DC
Electrical isolation	-	No
Input voltage		
• Rated value	-	24 V DC
• At "1" signal	-	11 to 30 V
• At "0" signal	-	-3 to +5 V
Input current at "1" signal, typ.	-	11.5 mA
Cable lengths		
• Shielded	-	1000 m
Counter frequency, max.	-	10 kHz

	C7-634 DP	C7-634/P
Counters, max.	-	3 (UE1, UE2, UE3)
• Principle	-	counting slopes;
• Counting range UI1, UI2	-	Forwards: 0 to 65535, reverse: 65535 to 0
• Counting range UI3	-	Forwards: 0 to 16777215, reverse: 16777215 to 0
• Limit value (setpoint) specification	-	One counter per value
• Count interrupt up counter	-	On reaching the limit value
• Count interrupt down counter	-	On reaching "0"
• Enable	-	in the program
Period duration counter, max.	-	1 (UE3)
• Principle	-	Counting fixed time units between two positive slopes
• Counting range	-	0 to 16777214
• Period duration, max.	-	8.38 s or 0.12 Hz
Frequency counter, max.	-	1 (UE3)
Principle	-	Counting pulses within a time period
Counting range	-	0 to 16777215
Gate width	-	0.1 s; 1 s; 10 s (programmable)
External gate counter		3
• Principle	-	Counting edges within a gate time using an external pin
• Counting range UI1, UI2	-	0 to 65535
• Counting range UI3	-	0 to 16777215
Analog inputs		**4**
Input ranges/ input resistance (programmable)	-	-10 to 10 V/50 k Ω -20 to 20 mA/105.5 Ω 4 to 20 mA/105.5 Ω
Permissible input voltage for voltage input, max.	-	30 V
Permissible input current for current input, max.	-	30 mA
Electrical isolation	-	Yes, shared with AA
Cycle time (all channels)	-	2 ms
Conversion time per channel	-	0.5 ms
Resolution	-	12 bit incl. sign

Technical specifications (continued)

	C7-634 DP	C7-634/P
Operational limit (in the entire temperature range, referred to input range)		
• Voltage	-	+/-0.8%
• Current	-	+/-0.8%
Basic error limit (operating error limit at 25 °C, referred to the input range)		
• Voltage	-	+/-0.6%
• Current	-	+/-0.6%
Interrupts		
• Limit value interrupt	-	-
• Diagnostics interrupt	-	Measuring range violation, wire break detection at 4 to 20 mA per software
• Alarm cycle	-	Yes (settable)
Analog outputs	**-**	**4**
Output ranges		
• Voltage output	-	-10 to 10 V
• Current output	-	-20 to 20 mA, 4 to 20 mA
Load resistor		
• For voltage outputs, min.	-	2 kΩ
• For current outputs, max.	-	0.5 kΩ
• For capacitive load, max.	-	1 µF
• For inductive loads, max.	-	1 mH
Voltage output		
• Short-circuit protection	-	Yes
• Short-circuit current, max.	-	25 mA
Current output		
Open-circuit voltage, max.	-	+/-16 V
Electrical isolation	-	Yes, shared with AE
Operating cycle time (all channels) typ./max.	-	2 / 4 ms
Resolution	-	12 bit incl. sign
Transient recovery time		
• For resistive load, max.	-	0.1 ms
• For capacitive load, max.	-	3.3 ms
• For inductive load, max.	-	0.5 ms
Substitute values assignable	-	Yes, parameterizable
Operating error limit (0 to 60°C, referred to the output range)		
• Voltage	-	+/-0.8%
• Current	-	+/-1%

	C7-634 DP	C7-634/P
Basic error threshold (operating error threshold at 25 °C, with reference to output range)		
• Voltage	-	+/-0.5%
• Current	-	+/-0.6%
Interrupts		
• Diagnostics interrupt	-	Yes, parameterizable for parameter errors
Cable length, shielded	-	200 m
Programming, planning, configuring		
Programming software	STEP 7, STEP 7-Lite	STEP 7, STEP 7-Lite
Configuring HMI	ProTool/Lite, ProTool, ProTool/Pro	ProTool/Lite, ProTool, ProTool/Pro
Suitable software		
Software controllers	16 loops	16 loops
Process diagnostics	Yes (C7-CPU)	Yes (C7-CPU)
S7-GRAPH	Yes	Yes
S7-HiGraph	Yes	Yes
S7-SCL	Yes	Yes
CFC	Yes	Yes
Human machine interface		
Display	LC display, LED backlit	LC display, LED backlit
Service life of the backlighting, approx.	100.000 h (approx. 11 years)	100.000 h (approx. 11 years)
Number of lines x characters per line	4 x 20 / 8 x 40	4 x 20 / 8 x 40
Character height	11 / 6 mm	11 / 6 mm
Resolution	-	-
Active screen surface (W x D) in mm	-	-
Number of soft keys/function keys	8/16	8/16
User memory, permanently integrated	256 KB flash	256 KB flash
RAM (dyn.)	-	-
Operating messages, max.	999	999
Operating message buffer, max.	256 entries	256 entries
Scroll operating messages, max.	256	256
Fault messages, max.	999	999
Fault signal buffers, max.	256 entries	256 entries
Number of variables in message text, max.	8	8
Number of pictures	99	99
Entries per picture	99	99
Pixel graphics	8	-
Semi graphics	99	Within the bounds of the character set
Symbols/fonts	1	1

Technical specifications (continued)

	C7-634 DP	C7-634/P
Dynamic objects	Input, output, input/output fields, date/time-of-day fields, symbolic input/output fields	Input, output, input/output fields, date/time-of-day fields, symbolic input/output fields
Recipes, max.	99	99
Recipe data memory	20 KB	20 KB

	C7-634 DP	C7-634/P
Data records per recipe, max.	99	99
Entries per data record, max.	99	99
Online languages	3	3
Password levels	9	9
Clock	Real-time clock (hardware clock)	Real-time clock (hardware clock)
Printer interface	RS232	RS232

6

Ordering data

	Order No.
C7-634 DP control system 64 KB RAM (PLC), with PROFIBUS DP interface, without onboard I/O; 256 KB flash EPROM for HMI data, LED backlit LCD (4 lines, 20 characters/line, 8 mm character height or 8 lines, 40 characters/line, 6 mm character height); with installation accessories, 24 V DC connector and backup battery	**6ES7 634-2BF02-0AE3**
C7-634/P control system 48 KB RAM (PLC), 16 DI, 16 DO, 4 AI, 4 AO, 4 UI onboard; 256 KB flash EPROM for HMI data, LED backlit LCD (4 lines, 20 characters/line, 8 mm character height or 8 lines, 40 characters/line, 6 mm character height); with mounting accessories and backup battery	**6ES7 634-1DF02-0AE3**
C7-633, C7-634 documentation package comprising C7-633, C7-634 manual, S7-300 manual, OP7, OP17 manual	
German	**6ES7 633-1AF01-8AA0**
English	**6ES7 633-1AF01-8BA0**
French	**6ES7 633-1AF01-8CA0**
Spanish	**6ES7 633-1AF01-8DA0**
Italian	**6ES7 633-1AF01-8EA0**
Manual "Communication for SIMATIC S7-300/-400"	
German	**6ES7 398-8EA00-8AA0**
English	**6ES7 398-8EA00-8BA0**
French	**6ES7 398-8EA00-8CA0**
Spanish	**6ES7 398-8EA00-8DA0**
Italian	**6ES7 398-8EA00-8EA0**

	Order No.
Technical overview "From SIMATIC S5 to SIMATIC S7"	
German	**6ES7 398-8AA01-8AB0**
English	**6ES7 398-8AA01-8BB0**
French	**6ES7 398-8AA01-8CB0**
Spanish	**6ES7 398-8AA01-8DB0**
Italian	**6ES7 398-8AA01-8EB0**
SIMATIC Manual Collection	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection updating service for 1 year	**6ES7 998-8XC01-8YE2**
Accessories	
FEPROM memory card	
16 KB	**6ES7 951-0KD00-0AA0**
32 KB	**6ES7 951-0KE00-0AA0**
64 KB	**6ES7 951-0KF00-0AA0**
128 KB	**6ES7 951-0KG00-0AA0**
512 KB	**6ES7 951-0KJ00-0AA0**
SIMATIC C7 simulator for all SIMATIC C7s, with 16 onboard DIs and 16 onboard DOs; with switches and LEDs for simulating 16 DIs and 16 DOs	**6ES7 620-0AA00-4AA0**
Connector set for I/O and power supply	**6ES7 623-1AE01-4AA0**
Backup battery 3.6 V; 1.5 Ah	**6ES7 623-1AE01-5AA0**
PROFIBUS DP bus connector; PROFIBUS bus components	See page 4/33
Spare parts	
Service package Seal, 4 clamps, 2 connectors; for all SIMATIC C7s	**6ES7 623-1AE00-3AA0**

Overview



- The Control Systems for high-performance applications
- With integated I/O for implementation directly at the machine
- With integrated PROFIBUS DP connection for distributed structures
- Version with context-sensitive Touch functionality
- Graphical visualization and operator support for particularly convenient use

A micro memory card and connector set are necessary for operating the C7, .

Technical specifications

General technical specifications	
Degree of protection	Front: IP 65 acc. to IEC 529 Housing: IP 20 acc. to IEC 529
Ambient temperature	
• Horizontal mounting position	0 to 40 °C (0 to 40 °C for 45° mounting angle)
• Vertical installation	0 to 50 °C
Relative humidity	5 to 95%, no condensation (RH severity level 2 in accordance with IEC 1131-2)
Atmospheric pressure	795 to 1080 hPa
Ambient conditions	Not suitable for operation outdoors
Isolation	
• 24 V DC circuits	Insulation test voltage 500 V DC
Electromagnetic compatibility	Requirements of German EMC Legislation per EN 50082-2 (noise immunity), testing per : IEC 801-2, ENV 50140, IEC 801-4, ENV 50141, IEC 801-5; Emitted interference acc. to EN 50081-2, Testing acc. to EN 55011, Class A, Group 1
Mechanical stress	
• Vibration, tested per/with	IEC 68, Part 2-6/10 to 58 Hz; constant amplitude 0.075 mm; 58 to 150 Hz; constant acceleration 1 g; Duration of vibrations: 10 frequency progressions per axis in each direction of the three mutually perpendicular axes
• Impact, tested per/with	IEC 68, Part 2-27/semisinusoidal: impact 15 g (peak value), duration 11 ms
Voltages, currents	
Supply voltage	
• Rated value	24 V DC
• Permissible range	20.4 to 28.8 V
Current consumption typ.	350 mA no-load operation
Inrush current, max.	1.0 A
Power losses, typ.	14 W

Dimensions	
Dimensions (H x W x D) in mm	260 x 199 x 79
Mounting dimensions (W x H) in mm	231 x 183
Weight, approx.	1380 g (Touch), 1450 g (Keys)
CPU	
Memory	
RAM	
• Integrated	64 KB for program and data
• Expandable	No
Load memory	
• Integrated	-
• Upgradable FEPROM	With micro memory card (MMC) up to 4 MB
Backup	Performed by MMC (maintenance free)
• With battery	-
• Without battery	Program and data
Execution times	
Processing times for	
• Bit operations, min.	0.1 µs to 0.2 µs
• Word operations, min.	0.5 µs
• Fixed-point addition, min.	1 µs
• Floating-point addition, min.	15 µs
Timers/counters and their retentivity	
S7 counters	256
• Retentivity selectable	From Z 0 to Z 256
• Counting range	1 to 999
IEC counters	Yes
• Type	SFB
S7 timers	256
• Retentivity selectable	von T 0 to T 256
• Range	10 ms to 9990 s
• IEC timers	Yes
• Type	SFB

Technical specifications (continued)

Data ranges and their retentivity	
Bit memories	2048
• Retentivity selectable	From MB 0 to MB 256
Blocks	
Max. block size	16 KB
Number of	
• Watchdog interrupts	1
• Process alarms	1
• Time-of-day interrupts	1
• Delay interrupts	1
Nesting depth	
• Per priority class	8
• Additional within an error OB	4
FBs, max.	128
FCs, max.	128
Data blocks, max.	127 (DB 0 reserved)
Programming	
Programming language	STEP 7 V5.1 SP3 (LAD, FBD, STL); STEP 7 Lite, SCL, CFC, GRAPH, HiGraph
Configuring HMI	Pro/Tool/Lite, Pro/Tool, ProTool/Pro
Nesting levels	8
User program protection	Password protection
Address areas (inputs/outputs)	
Total I/O address area	1024 / 1024 byte (freely addressable)
Process image	128 / 128 byte
Digital channels	Max. 992 / 992
Analog channels	Max. 248 / 124
Design	
Expansion of C7-635	Max. 2 flat Max. 4 deep
No. of modules per system	Max. 23
Number of DP masters	
• Integrated	1
• Using CP	1
Suitable modules (recommendation)	
• FMs	8
• CPs, point-to-point	4
• CPs, LAN	2
Time-of-day	
Clock	Yes
• Backed up	Yes
Hours counter	1
Time-of-day synchronization	Yes
Communication functions	
Total number of connections usable for	12
• Programming device communications	Yes
- reserved	1
- variable	1 to 11

Communication functions	
• OP communications	Yes
- reserved	1
- variable	1 to 11
• S7 basic communication	Yes
- reserved	8
- variable	0 to 8
• Routing	4
S7 message functions	
Number of stations that can be defined for message functions (e.g. OS)	7
Interfaces	
1st interface	
Functionality	
• MPI	Yes
• DP master	No
• DP slave	No
• Electrical isolation	No
MPI	
Cable length (without repeater)	50 m
Transmission rates	Up to 187.5 kbit/s
Number of connections	12
Services	
• Programming device/OP communication	Yes
• Global data communication	Yes
• Number of GD circuits	
- sender, max.	4
- receiver, max.	4
• Size of the GD packets, max.	22 byte
S7 standard communication	Yes
• User data per job, max.	76 byte
S7 communication	
• As server	Yes
• As client	No
• User data per job, max.	64 KB
2nd interface	
Functionality	
• MPI	No
• DP master	Yes
• DP slave	Yes
• Electrical isolation	Yes
DP master	
Number of connections	12 for PG/OP communication
• Of these reserved	1 for PG, 1 for OP
Services	
• Programming device/OP communication	Yes
• Support for internode traffic	Yes
• Clock synchronism	Yes
• SYNC/FREEZE	Yes
• Global data communication	No
• S7 basic communication	No

Technical specifications (continued)

Services	
• S7 communication	
- as server	No
- as client	No
Transmission rates	Up to 12 Mbit/s
Number of DP slaves, max.	32
Address range max. (I/O)	1024 / 1024 byte
User data per DP slave, max. (I/O)	244 / 244 byte
On-board digital inputs	
Number of inputs	24
Input voltage	
• Rated value	24 V DC
• At "1" signal	15 to 30 V
• At "0" signal	-3 to +5 V
Isolation	Yes
• In groups of	16
Input current	
• At "1" signal, typ.	8 mA
Input delay (at rated value of the input voltage)	
• For standard inputs, typ./max.	0.1/0.3/3/15 ms
• For process-related functions	8 µs
Connection of 2-wire BERO	
• Acceptable quiescent current	1.5 mA
Cable lengths	
• Unshielded	600 m
• Shielded	1000 m (100 m for process-related functions)
Integral digital outputs	
Number of inputs	16
Rated load voltage L+/L1	24 V DC
• Permissible range	20.4 to 28.8 V
Output voltage	
• At "1" signal, max.	L+ - 0.8 V
Isolation	Yes
• In groups of	8
Maximum output current	
• At "1" signal	
- rated value at 40 °C	0.5 A
- rated value at 60 °C	0.5 A
- min. current	5 mA
• At "0" signal, max.	0.5 mA
Total load capability	
• At 40 °C	100%
• At 60 °C	50%
Switching frequency of outputs	
• For resistive load	100 Hz
• For inductive load	0.5 Hz
Voltage induced on circuit interruption limited to	Type (L+) –48V
Short-circuit protection	Electronic clocked

Cable lengths	
• Unshielded	600 m
• Shielded	1000 m
Integrated analog inputs (for current / voltage)	
• Number of inputs	4
• Voltage	±10 V, 0 to 10 V
• Current	±20 mA, 0/4 to 20 mA
Isolation	Common for analog I/O
Bipolar resolution	11 bit +sign
Integration time (adjustable)	
• Per channel	2.5 / 16.6 / 20ms
Basic error threshold (operating error threshold at 25°C, referred to input range)	±0.7%
Integrated analog inputs (for resistance / temperature)	
• Number of inputs	1
• Resistance	0 to 600 Ω, Pt 100
Isolation	Common for analog I/O
Bipolar resolution	11 bit +sign
Integration time (adjustable)	
• Per channel	2.5 / 16.6 / 20ms
Basic error threshold (operating error threshold at 25°C, referred to input range)	±3%
Integrated analog outputs	
Number of inputs	2
Output ranges (rated values)	
• Voltage	±10 V, 0 to 10 V
• Current	±20 mA, 0/4 to 20 mA
Isolation	Common for analog I/O
Conversion time per channel	1ms
Basic error (operational limit at 25 °C, referred to output range), max.	±0.7%
Integrated functions	
Counters	4
• Counting speed max.	60 kHz
Pulse outputs	4
• Switching frequency max.	2.5 kHz
Frequency measurement	Yes
Open-loop positioning	Yes
Integral "Closed loop control" function blocks	PID
Touch Panel	
Display	STN, CCFL backlit
• MTBF display and backlighting at 25 °C	Approx. 50.000 h
• Resolution (pixels)	320 x 240
• Display area	5.7" Blue Mode (4 shades of blue)

C7-635

Technical specifications (continued)

Keyboard	Touch (resistive/analog)
• Keys	14 softkeys 10 function keys
• Make-break operations	1 million
Processor	32-bit RISC/66 MHz
Operating system	Windows CE
User memory	512 KB flash
Compact flash card	Yes (optional)
• Printers	Yes, serial
• Log. connections (also in a network)	Max. 4 (1 fixed to integral CPU)
Clock	Yes
Functionality	The capacity of the user memory is designed for small and medium configurations (typ. for TP170B: 50 process displays, 50 graphics, 200 messages, 200 buttons, 10 bar displays, 5 curve displays, 50 fixed texts, dynamic response, etc. and approx. 200 variables)

• Displays	Yes
• Variables	Yes
• Text elements	Yes
• Graphical objects	Yes
• Variables per display, max.	50
• Recipes/records/entries	Yes
• Alarm messages	Yes (no buffer)
• Status messages	Yes (no buffer)
• Info texts	Yes
• Password levels	9
• Online languages	3
Configuring	SIMATIC ProTool/Lite, SIMATIC ProTool or SIMATIC ProTool/Pro Configuration Version 6.0 Service Pack 1 upwards.

Ordering data

	Order No.
C7-635 Keys control system 64 KB RAM (PLC), 24 DI, 16 DO, 5 AI, 2 AO onboard; with integral operator panel: 512 KB flash EPROM for HMI data, STN LCD, CCFL backlit (320 x 240 pixels); with mounting accessories and set of connectors	**6ES7 635-2EC00-0AE3**
C7-635 Touch control system 64 KB RAM (PLC), 24 DI, 16 DO, 5 AI, 2 AO onboard; with integral touch panel: 512 KB flash EPROM for HMI data, STN LCD, CCFL backlit (320 x 240 pixels); with mounting accessories and set of connectors	**6ES7 635-2EB00-0AE3**
Micro memory card absolutely necessary for operation	
64 KB	**6ES7 953-8LF00-0AA0**
128 KB	**6ES7 953-8LG00-0AA0**
512 KB	**6ES7 953-8LJ00-0AA0**
2 MB	**6ES7 953-8LL00-0AA0**
4 MB	**6ES7 953-8LM00-0AA0**
8 MB	**6ES7 953-8LP10-0AA0**
Connector set for I/O and power supply	
With screw-type terminals	**6ES7 635-0AA00-4AA0**
With spring-loaded terminals	**6ES7 635-0AA00-4BA0**
CF card, 16 MB	**6AV6 574-2AC00-2AA0**
C7-635 manual package comprising C7-635 manual, S7-300 manual and OP 170B manual	
German	**6ES7 635-1EA00-8AA0**
English	**6ES7 635-1EA00-8BA0**
French	**6ES7 635-1EA00-8CA0**
Spanish	**6ES7 635-1EA00-8DA0**
Italian	**6ES7 635-1EA00-8EA0**

	Order No.
C7-635 manual	
German	**6ES7 635-1AA00-8AA0**
English	**6ES7 635-1AA00-8BA0**
French	**6ES7 635-1AA00-8CA0**
Spanish	**6ES7 635-1AA00-8DA0**
Italian	**6ES7 635-1AA00-8EA0**
Accessories	
I/O set for expansion of C7-613/C7-635 by max. 4 modules; assembly onto rear of system	
For 2 modules, flat mounting	**6ES7 635-0AA00-6AA0**
For 4 modules, deep mounting	**6ES7 635-0AA00-6BA0**
I/O expansion cable for external expansion of SIMATIC C7-621 by max. 4 modules; 1.5 m long	**6ES7 635-0AA00-6CA0**
SIMATIC Manual Collection Electronic manuals on CD-ROM, multi-language	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection updating service for 1 year Current S7 Manual Collection CD as well as the three following updates	**6ES7 998-8XC01-8YE2**
Spare parts	
Service package 3 seals, 10 clamps, for all SIMATIC C7-613 and C7-635	**6ES7 635-0AA00-3AA0**
Grounding rail with shield terminals for analog I/O	**6ES7 635-0AA00-6EA0**

Overview



- SIMATIC C7-626/P: the control system for complex applications
- SIMATIC C7-626/P DP: the control system for complex applications that also demand distributed structures
- With large program memory and powerful HMI functions
- Graphical visualization and operator support for particularly convenient use

Technical specifications

	C7-626/P	C7-626/P DP
General		
Degree of protection	Front: IP 65 acc. to IEC 529, Housing: IP 20 acc. to IEC 529	
Ambient temperature		
• Vertical operation	0 to 45 °C	
• At 45° angle of installation	0 to 30 °C, with forced ventilation and horizontal mounting max. 45°C possible	
Relative humidity	5 to 95 % (RH severity level 2 in accordance with IEC 1131-2)	
Atmospheric pressure	795 to 1080 hPa	
Isolation		
• 24 V DC circuit	500 V DC	
Electromagnetic compatibility	Radio interference: Class A / EN55022; conducted interference: IEC 1000-4-4, IEC 1000-4-5; noise immunity: IEC 1000-4-2, IEC 1000-4-3, IEC 1000-4-4, IEC 1000-4-6, EN50140	
Mechanical rating		
• Vibrations tested with	IEC 68, Part 2-6 10 to 58 Hz; Amplitude 0.075 mm; 58 to 500 Hz: constant acceleration 9.8m/s^2;	
• Shock tested with	IEC 68, Part 2-29 half-sine: 100 m/s^2 (10 g), 16 ms; 100 shocks	
Supply voltage		
• Rated value	24 V DC	
• Permitted range	20.4 to 30.2 V	
Current consumption, typ./ max.	700 mA/2 A	
Power losses, typically	17 W	
Acceptance, certification	EN 61131-2 (IEC 1131-2); UL Listing UL 508; Canadian Standard Association (CSA) to Standard C22.2 Number 142; FM permit, FM-Standards No. 3611, 3600, 3810 Class I, Div. 2 Group A, B, C, D; DIN/ISO 9001 certification of manufacturing and development	

	C7-626/P	C7-626/P DP
Dimensions		
• Device (W x H x D) in mm	240 x 168 x 69	
• Cutout dimensions (W x H) in mm	231 x 159	
Weight	1780 g	
PLC		
Memory (1 statement corresponds to an average of 3 byte)	96 KB RAM/ 32 K statements (integrated)	128 KB RAM/ 42 K statements (integrated)
Load memory		
• Integral (for data)	180 KB RAM, 512 KB FEPROM	260 KB RAM, 512 KB FEPROM
• Pluggable, max.	-	-
Data backup		
• With battery	All data	
• Without battery, max.	4736 byte, parameterizable for bit memories, timers, counters, data	
Real-time clock	Yes	
Program organization	Linear, structured	
Types of blocks	• Organization blocks (OBs) • Function blocks (FBs) • Functions (FC) • Data blocks (DBs) • System functions (SFCs)	
Number of blocks, max.	192 FC, 192 FB, 255 DB	
Program execution	• Restart (OB 100) • Free cycle (OB 1) • Real-time controlled (OB 10) • Time-driven (OB 35) • Interrupt controlled (OB 40) • Error handling (OB 80, 81, 82, 85, 86, 87, 121, 122)	
System functions (SFCs)	Interrupt masking, data copying, clock functions, diagnostic functions, fault and error handling, module parameter assignment	
Block nesting depth	8 for each program execution level	
Nesting levels	8	

Technical specifications (continued)

	C7-626/P	C7-626/P DP
User program protection	Password protection	
Instruction set	Binary logic, parenthesis commands, result assignment, save, count, load, transfer, compare, shift, rotate, generate complement, call up blocks, fixed-point and floating point arithmetic functions, jump functions	
Processing times for		
• Bit operations	0.3 to 0.6 µs	
• Word operations	1 µs	
• Timer-/counter operations	12 µs	
• Fixed-point addition	2 µs	
• Floating-point addition	50 µs	
Cycle time monitoring	150 ms (default); programmable 1 to 6000 ms	
Bit memories	2048	
• Of these retentive with battery	0 to 2047, settable	
• Of these retentive without battery	0 to 2047, settable	
Counter	64	
• Of these retentive with battery	0 to 63, settable	
• Of these retentive without battery	0 to 63, settable	
• Counting range	1 to 999	
Timers	128	
• Of these retentive with battery	0 to 127, settable	
• Of these retentive without battery	0 to 127, settable	
• Range	10 ms to 9990 s	
Expansion with S7-300 modules	Max. 3-line	
S7-300 expansion modules	Max. 24	
I/O expansion		
• Digital inputs/outputs, max.	768	
• Analog inputs/outputs, max.	192	
Onboard interface module	IM 360	
Suitable modules		
FMs	8	
CP, point-to-point	4	
CPs, LAN	2	
Total address areas I/O	1024/1024 byte	
Process image I/O	128/128 byte	
Communication		
Communication functions		
• Programming device/ OP communications	Yes	
• Global data communication	Yes	
• Basic communication	Yes	

	C7-626/P	C7-626/P DP
Communication functions		
• Extended communications	Yes (server)	
• S5-compatible communications	Yes	
• Standard communication	Yes, occupies 2 nodes per unit (1x CPU, 1x OP)	
• Number of connections - static/dynamic	4/8	
MPI (multipoint interface)	Yes	
• No. of stations, max.	32; PG/PC, OP, C7, S7-300/400, M7;	
• Transmission rate, max.	187.5 kbit/s	
• Distance between 2 adjacent nodes	Without repeaters 50 m with 2 repeaters: 1100 m with 10 repeaters in series: 9100 m via fiber-optic cables: 23.8 km (with star couplers or OLMs)	
Suitable programming devices	SIMATIC PG/PC, Standard-PC	
PROFIBUS DP interface	-	1
• Transmission procedure	-	PROFIBUS-DP to DIN 19245 Part 3, DP master, DP slave
• Data transmission rate		12 Mbit/s
• Number of DP lines per C7 (integral interface/ CP 342-5)	-/1	1/1
• Number of DP stations per master C7 (integral interface/ CP 342-5)	-/32	64/32
• Address area per DP station	122 byte	122 byte
Number of modules per ET200M	8	8
• DP connection (master/ slave)	1 (CP 342-5)	1 (integral, master/ slave) 1 (CP 342-5)
Integrated AS master interface	-	-
Digital inputs	**16**	
Input voltage		
• Rated value	24 V DC	24 V DC
• At "1" signal	15 to 30 V	11 to 30 V
• At "0" signal	-3 to +5 V	-3 to +5 V
Electrical isolation	Yes	
• In groups of	16	
Input delay, typ./max.	3/4.8 ms	
Input current at "1" signal, max.	11.5 mA	
Connection of two-wire BEROs		
• Permissible quiescent current, max.	2 mA	
Cable lengths		
• Unshielded	600 m	
• Shielded	1000 m	

Technical specifications (continued)

	C7-626/P	C7-626/P DP
Digital outputs	**16**	
Rated load voltage	24 V DC	
• Permitted range	20.4 to 28.8 V	
Output voltage		
• At "1" signal, max.	L+ > U > L+ - 0.8 V	
Electrical isolation	Yes; via optocouplers	
• In groups of	2 groups of 8	
Output current		
• At "1" signal		
- rated value	0.5 A	
- Min. current	5 mA	
• At "0" signal, max.	0.5 mA	
Total current per group of 8		
• At 20 °C	4 A	
• At 40 °C	2 A	
Lamp load, max.	5 W	
Switching frequency		
• For resistive load	100 Hz	
• For inductive load	0.5 Hz	
Voltage induced on circuit interruption limited to	48 V	
Short-circuit protection	Yes, electronic clocked	
Cable lengths		
• Unshielded	600 m	
• Shielded	1000 m	
Universal inputs	**4**	
Can be used as	UI1 digital/interrupt input. 24V DC or up/down counter UI2 digital/interrupt input. 24V DC or up/down counter UI3 digital/interrupt input 24V DC or up/down counter or frequency/period duration counter UE4 digital/alarm input 24 V DC	
Electrical isolation	No	
Input voltage		
• Rated value	24 V DC	
• At "1" signal	11 to 30 V	
• At "0" signal	-3 to +5 V	
Input current at "1" signal, typ.	11.5 mA	
Cable lengths		
• Shielded	1000 m	
Counter frequency, max.	10 kHz	
Counters, max.	3 (UE1, UE2, UE3)	
• Principle	Counting slopes;	
• Counting range UI1, UI2	Forwards: 0 to 65535, reverse: 65535 to 0	
• Counting range UI3	Forwards: 0 to 16777215, reverse: 16777215 to 0	
• Limit value (setpoint) specification	One counter per value	

	C7-626/P	C7-626/P DP
Counters, max.	3 (UE1, UE2, UE3)	
• Count interrupt up counter	On reaching the limit value	
• Count interrupt down counter	On reaching "0"	
• Enable	In the program	
Period duration counter, max.	1 (UE3)	
• Principle	Counting fixed time units between two positive slopes	
• Counting range	0 to 16777214	
• Period duration, max.	8.38 s bzw. 0.12 Hz	
• Frequency counter, max.	1 (UE3)	
• Principle	Counting pulses within a time period	
• Counting range	0 to 16777215	
• Gate width	0.1 s; 1 s; 10 s (programmable)	
Analog inputs	**4**	
Input ranges/input resistance (programmable)	-10 to 10 V/50 kΩ -20 to 20 mA/ 105.5Ω 4 to 20 mA/ 105.5 Ω	
Permissible input voltage for voltage input, max.	30 V	
Permissible input current for current input, max.	30 mA	
Electrical isolation	Yes, shared with AO	
Cycle time (all channels)	2 ms	
Conversion time per channel	0.5 ms	
Resolution	12 bit incl. sign	
Operational limit (in the entire temperature range, referred to input range)		
Voltage	+/-0.8%	
Current	+/-0.8%	
Basic error threshold (operating error threshold at 25°C, with reference to output range)		
Voltage	+/-0.6%	
Current	+/-0.6%	
• Interrupts		
• Limit value interrupt	-	
• Diagnostics interrupt	Measuring range violation, wire break detection at 4 to 20 mA per software	
• Alarm cycle	Yes (programmable)	
Analog outputs	**4**	
Output ranges		
• Voltage output	-10 to 10 V	
• Current output	-20 to 20 mA, 4 to 20 mA	
Load impedance		
• For voltage outputs, min.	2 kΩ	
• For current outputs, max.	0.5 kΩ	
• For capacitive load, max.	1 µF	
• For inductive loads, max.	1 mH	

Technical specifications (continued)

	C7-626/P	C7-626/P DP
Voltage output		
• Short-circuit protection	Yes	
• Short-circuit current	25 mA	
Current output		
• Open-circuit voltage, max.	+/-16 V	
Electrical isolation	Yes, shared with AI	
Operating cycle time (all channels) typ./max.	2 / 4 ms	
Resolution	12 bit incl. sign	
Transient recovery time		
• For resistive load, max.	0.1 ms	
• For capacitive load, max.	3.3 ms	
• For inductive load, max.	0.5 ms	
Substitute values assignable	Yes, parameterizable	
Operating error limit (0 to 60°C, referred to the output range)		
• Voltage	+/-0.8	
• Current	+/-1	
Basic error threshold (operating error threshold at 25 °C, with reference to output range)		
• Voltage	+/-0.5%	
• Current	+/-0.6%	
Interrupts		
• Diagnostics interrupt	Yes, programmable for parameter errors	
Cable length, shielded	200 m	
Programming, planning, configuring		
Programming software	STEP 7, STEP 7-Lite	
Configuring HMI	ProTool, ProTool/Pro	
Suitable software		
Software controllers	16 loops	
Process diagnostics	Yes (C7-CPU and C7-OP)	
S7-GRAPH	Yes	
S7-HiGraph	Yes	
S7-SCL	Yes	
CFC	Yes	

	C7-626/P	C7-626/P DP
Human machine interface		
Display	LC Display, CCFL backlit, passive b/w	
Service life of the back-lighting, approx.	20.000 h (approx. 2.2 years)	
Number of lines x characters per line	-	
Character height	-	
Resolution	320 x 240 pixels	
Active screen surface (W x D) in mm	105 x 79	
Number of soft keys/function keys	14/10	
User memory, permanently integrated	1 MB flash for firmware and user data	
RAM (dyn.)	2 MB	
Operating messages, max.	2000 (depending on user memory)	
Operating message buffer, max.	512 entries in cyclic buffer	
Scroll operating messages, max.	512	
Fault messages, max.	2000 (depending on user memory)	
Fault signal buffers, max.	512 entries in cyclic buffer	
Max. variables in message text	8	
Number of pictures	Depends on user memory	
Entries per picture	-	
Pixel graphics	Yes, access to external editors	
Semi graphics	Yes	
Symbol/character sets	4	
Dynamic objects	Input, output, input/output fields, date/time fields, symbolic input/output fields, bars, curves, figure output etc.	
Human machine interface		
Recipes, max.	255	
Recipe data memory	64 KB	
Data records per recipe, max.	500	
Entries per data record, max.	500	
Online languages	3	
Password levels	9	
Clock	Real-time clock (hardware clock)	
Printer interface	RS232	

Ordering data	Order No.
C7-626/P control system 96 KB RAM (PLC), 16 DI, 16 DO, 4 AI, 4 AO, 4 UI onboard; 1 MB flash EPROM for HMI data, CCFL backlit LCD (320 x 240 pixels); with installation accessories, connector set, backup battery and one set of labeling strips	**6ES7 626-1DG04-0AE3**
C7-626/P DP control system 128 KB RAM (PLC), with PROFIBUS DP interface; 16 DI, 16 DO, 4 AI, 4 AO, 4 UI onboard; 1 MB flash EPROM for HMI data, CCFL backlit LCD (320 x 240 pixels); with installation accessories, connector set, backup battery and one set of labeling strips	**6ES7 626-2DG04-0AE3**
C7-626 manual	
German	**6ES7 626-1AG00-8AA0**
English	**6ES7 626-1AG00-8BA0**
French	**6ES7 626-1AG00-8CA0**
Spanish	**6ES7 626-1AG00-8DA0**
Italian	**6ES7 626-1AG00-8EA0**
Technical overview "From SIMATIC S5 to SIMATIC S7"	
German	**6ES7 398-8AA01-8AB0**
English	**6ES7 398-8AA01-8BB0**
French	**6ES7 398-8AA01-8CB0**
Spanish	**6ES7 398-8AA01-8DB0**
Italian	**6ES7 398-8AA01-8EB0**

	Order No.
SIMATIC Manual Collection	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection updating service for 1 year	**6ES7 998-8XC01-8YE2**
Accessories	
SIMATIC C7 simulator for all SIMATIC C7s, with 16 onboard DIs and 16 onboard DOs; with switches and LEDs for simulating 16 DIs and 16 DOs	**6ES7 620-0AA00-4AA0**
Connector set for I/O and power supply	**6ES7 623-1AE01-4AA0**
Backup battery 3.6 V; 1.5 Ah	**6ES7 623-1AE01-5AA0**
PROFIBUS DP bus connector; PROFIBUS bus components	See page 4/33
Spare parts	
Labeling strips 5 pages for C7-623 to C7-626	**6ES7 623-1AE00-1AA0**
Service package Seal, 4 clamps, 2 connectors; for all SIMATIC C7s	**6ES7 623-1AE00-3AA0**

Customized design

Overview



- Custom design for the SIMATIC C7
- Free choice of company logo, selectable color specifications for the unit front panel and keyboard labeling
- For control systems to be integrated into customers' plants

Ordering data

Ordering data	Order No.
Company logo in two colors	On request
Company logo in two colors and a special membrane color	On request
Company logo in two colors, special membrane color, and specific key labeling	On request

	Order No.
Additional color (for logo or key labeling)	On request
Bezel in special color (extra charge per unit)	On request

SIMATIC C7 I/O module

Overview



- For expanding the onboard I/O directly on the SIMATIC C7 control system (not C7-621) with an additional 16 DI, 16 DO, 4 AI, 4 AO and 4 UI.

Technical specifications

Technical specifications for 16 DI, 16 DO, 4 AI, 4 AO, 4 UI	See under C7-633/P

Dimensions when installed (B x H x T)	230 x 158 x 56

Ordering data

Ordering data	Order No.
SIMATIC C7 input/output module 16 DI, 16 DO, 4 AI, 4 AO, 4 UI, for use on the SIMATIC C7; incl. bus connecting cable, connector set	**6ES7 630-0DA00-0AB0**

IM 621 interface module

Overview



- For expanding the SIMATIC C7-621 with up to 4 SIMATIC S7-300 modules
- Can be plugged into the S7-300 subrack

Technical specifications

nterfaces per C7-621, max.	1	Dimensions (W x H x D) in mm	40 x 125 x 120
Supply voltage (external)	--	Weight, approx.	220 g

Ordering data

	Order No.		Order No.
IM 621 interface module ▶ for expansion of SIMATIC C7-621 by max. 4 modules (1 ER); incl. connecting cable	**6ES7 621-1AD00-6AE3**		

SIMATIC S7-300 I/O modules

Overview

SIMATIC S7-300 I/O modules are available for expansion of the SIMATIC S7.

For further information about these modules, see Section 4.

SIMATIC Machine Vision

7



7/2 **Introduction**

7/2 **SIMATIC VS 110vision sensor**

7/4 **SIMATIC VS 110vision sensor**
7/4 Vision sensor
7/5 Protective housing for SIMATIC VS 710
7/5 Operating unit for SIMATIC VS 710
7/6 Optical lenses
7/7 Lighting equipment



Machine Vision

Overview

The SIMATIC Machine Vision image analysis systems are systems for automatic optical visual inspection and parts identification in manufacturing.

- For use in quality assurance to reduce the number of rejects
- For use in manufacturing for the automatic identification of parts
- Suitable for operation at high clock-pulse rates

VS 110 vision sensor

Overview



- Vision sensor for the visual inspection of small parts
- The solution for monitoring components in the infeed
- For monitoring object type, position and lack of damage or correct processing
- Easy start-up thanks to special teach-in procedure; no time-consuming programming is necessary

Technical specifications

Sensor head	
Image acquisition	CCD chip ¼", 640 x 480 square pixels; full frame shutter with automatic exposure
Image data transfer	58 images/s, digital image data transfer
Supplied versions	Two versions each with a fixed lens system for different object sizes and mounting positions
• "'Large objects"	For objects ranging in size from 7 to 59 x 7 to 45 x 1 to 20 (width x height x depth in mm)
• "Small objects"	For objects ranging in size from 4 to 35 x 4 to 25 x 1 to 10 (width x height x depth in mm)
Housing	Extruded aluminium housing, black anodized
Dimensions (W x H x D) in mm	42 x 42 x 100
Degree of protection	IP 65 to DIN 40050
Ambient temperature	0 to 50 °C
Mechanical stress	
• Vibration	1 g (60 to 500 Hz)
• Shock	70 g (6 ms, 3 shocks)
Lighting	
Lighting equipment	LED, wavelength 880 nm (NIR), designed as flash of 20 to 300 µs duration, diffuse
Housing	Metal with plastic scatter disk

Dimensions (W x H x D) in mm	155.5 x 130 x ca. 39, active lamp surface 116 x 93, with multiple fixing possibilities
Degree of protection	IP 40 acc. to DIN 40050
Ambient temperature	0 to 50 °C
Mechanical stress	
• Vibration	1 g (60 to 500 Hz)
• Shock	70 g (6 ms, 3 shocks)
Analyzer unit	
Operator prompting	4-line text display and 6 operator buttons
Learning new types (teach-in)	New learning technique with automatic threshold generation
Number of types saved	15 different types each in two angles selectable using operator buttons or digital inputs, stored powerfail-proof
Test triggering	Externally (with digital input) or automatically
Permissible speed of parts	25 to 5 parts/s for object widths of 4/7 to 35/59mm
Maximum permissible conveyor speed	250 mm/s (corresponds to 15 m/min)
Infeed direction of the parts	
• For external triggering	Any
• For automatic triggering	From left to right or right to left

Technical specifications (continued)

Start-up software	PC set-up software for displaying the sensor image when mounting and adjusting the sensor head and lighting on the accompanying CD
Housing	Plastic, all cables of plug-in type, suitable for installation outside the control cabinet
Dimensions (W x H x D) in mm	170 x 140 x 76
Degree of protection	IP 40 to DIN 40050
Ambient temperature	0 to 60 °C
Mechanical stress	
• Vibration	1 g (60 to 500 Hz)
• Shock	70 g (6 ms, 3 shocks)

Interfaces on the analyzer unit	
• Digital inputs for 24 V DC	8; of which one interrupt-capable trigger input for standard binary sensors, 7 additional PLC-compatible control inputs
• Digital outputs for 24 V DC	6; of which 3 quality outputs 0.5 A for the direct activation of pneumatic valves (15-pin Sub-D socket for inputs/outputs)
• Integrated interface	RS 232 (9-pin Sub-D, pins) for start-up support
• Lighting control	4-pin circular connector (socket) for power supply and for triggering the flash
• Sensor head interface	Digital interface (26-pin Sub-D socket) for connecting the VS110 sensor head
Supply voltage	
• Rated value	24 V DC
• Permissible range	20 to 30 V DC
Maximum current consumption	2.5 A, of which up to 1.5 A for supplying the pneumatic valves that can be connected

Ordering data

	Order No.
SIMATIC VS 110 vision sensor	
Complete package for examining the shape of objects; comprises sensor head, transparent lighting, evaluation unit and all cables; incl. documentation package for SIMATIC VS 110	
For objects up to 35 x 25 mm (W x H)	**6GF1 012-1AA**
For objects up to 59 x 45 mm (W x H)	**6GF1 011-1AA**

	Order No.
Documentation package for SIMATIC VS 110 on CD-ROM	**6GF7 011-1AA**
Connecting cable for HMI adapter and PC/TS adapter RS 232 cable, 5 m	**6ES7 901-1BF00-0XA0**

VS 710 vision sensor

Overview



- Vision sensor SIMATIC VS 710: the compact, stand-alone image processing system for automatic inspection, production monitoring and parts recognition
- Examples of applications are in automatic assembly machines, filling plants, packaging machines, conveyors and hoists
- Uses PROFIBUS DP interface for simple integration in automation systems
- Compact design for operation even in a cramped environment
- Easy operation and parameterization with the ProVision programming environment

Technical specifications

Camera	
Image capture	CCD chip, 1/2", 768 x 580 quadratic pixels; full frame shutter with 1/50 to 1/10,000 s exposure time, half frame and full frame modes
Lens mount	Standard C-mount
Additional features	Progressive scan, integrated flash control
CPU	
Image processor	80486 (AMD), 100 MHz, with direct image memory access
Program memory	16 MB DRAM module 16 MB IDE FLASH disk 256 KB FLASH EPROM as BIOS memory
Image memory	2 MB
Format	380 x 280 to 768 x 512, parameterizable
Operating system	MS-DOS with 32-bit DOS extender

Interfaces	
Integrated interfaces	1 x RS 232 (9-pin Sub-D, male connector) 1 x PROFIBUS DP (9-pin Sub-D, female connector)
Digital inputs for 24 V DC	2; 1 with interrupt logic (12-pin circular connector for inputs/outputs)
Digital outputs for 24 V DC	4; 0.5 A 1 with flash control (12-pin circular connector for inputs/outputs)
Monitor connector	1 SVGA (15-pin Sub-D, socket, 3-tier)
General specifications	
Supply voltage	
• Rated value	24 V DC
• Permissible range	20 to 30 V DC
Current consumption	450 mA
Degree of protection	IP 40 acc. to DIN 40050
Mechanical strength	
• Vibration	1 g (60 to 500 Hz)
• Shock	70 g
Ambient temperature	0 to 50 °C
Dimensions (W x H x D) in mm	65 x 80 x 150

Ordering data

	Order No.
SIMATIC VS 710 vision sensor	
Stand-alone image processing system	
• Basic version	**6GF1 710-3AA**
• OEM version, MS-DOS operating system	**6GF1 710-2AA**
SIMATIC ProVision V2.1 configuring software for programming the VS 710; executes on PC under Windows 95/98/NT/Me/2000	**6GF8 007-1AA21**
SIMATIC ProVision C V2.1 configuring software Version with reduced functions for configuring existing test programs	**6GF8 007-1AC21**

	Order No.
OCR digit recognition for reading/verifying 14 learnable examples; 3.5" diskette; incl. documentation in German/English	**6GF8 007-2AA01**
OEM development kit for software generation on VS 710 OEM version; CD-ROM	**6GF8 007-0AA21**
Cable for power supply 1 free end, camera end preassembled, 10 m	**6GF9 002-1CA**
Cable for digital inputs/outputs 1 free end, camera end preassembled, 10 m	**6GF9 002-1CB**
Connecting cable for HMI adapter and PC/TS adapter RS 232 cable, 5 m	**6ES7 901-1BF00-0XA0**

Protective housing for SIMATIC VS 710

Overview



- Protective housing for vision sensor VS 710
- For protection against dust and splashing water (IP 64), mechanical damage and unauthorized manipulations
- Optimized heat dissipation thanks to enlarged cooling surface

Ordering data

	Order No.
IP 64 protective housing for SIMATIC VS 710 Aluminium; with 3 mm thick glass pane; PG36 gland with seal insert	**6GF9 002-1CC**

	Order No.
Cable for power supply 1 free end, camera end preassembled, 10 m	**6GF9 002-1CA**
Cable for digital inputs/outputs 1 free end, camera end preassembled, 10 m	**6GF9 002-1CB**

Operating unit for SIMATIC VS 710

Overview



- Operating unit for connection to the RS232 serial interface of the VS 710 vision sensor
- For selection of different programs when using ProVision
- For operating mode selection, setting of windows and teach-in of character patterns in number recognition (OCR/OCV)

Ordering data

	Order No.
Operating unit for SIMATIC VS 710 for connection to SIMATIC VS 710; for operation of VS 710 with OCR/OCV applications	**6GF9 002-1CD**

	Order No.
Cable for power supply 1 free end, camera end preassembled, 10 m	**6GF9 002-1CA**

Optical lenses

Overview

- Optical lens system for VS 710
- For various image fields and working distances
- Can be mechanically screwed on directly using C-Mount

Technical specifications

Working distance for image field (mm)									Lens type	Order designation
37.5 x 25	50 x 33.3	75 x 50	112 x 75	150 x 100	200 x 135	300 x 200	400 x 260	600 x 400		
1)	1)	1)	1)	180	250	380	1)	1)	Cinegon 1.4/8mm	6GF9001-1AE
60	80	120	210	275	385	570	770	1200	Cinegon 1.4/12mm	6GF9001-1AJ
90	120	180	280	395	540	800	1100	1600	Xenoplan 1.4/17mm	6GF9001-1AK
115	165	245	370	510	700	1100	1400	2200	Xenoplan 1.4/23mm	6GF9001-1AL
1)	285	415	620	900	1200	1800	2400	3600	Xenoplan 1.9/35mm	6GF9001-1AF
320	435	640	850	1)	1)	1)	1)	1)	Componon 2.8/50mm	6GF9001-1AN
1)	1)	1)	1)	180	240	360	1)	1)	Mini- 1.3/8mm	6GF9001-1BE
1)	1)	1)	270	375	510	750	1100	1500	Mini-1.6/16mm	6GF9001-1BF
1)	1)	290	435	595	880	1200	1800	2400	Mini- 1.6/25mm	6GF9001-1BG
		645	1000	1300	2000	2600	4000	5200	Compact- 2.8/50mm	6GF9001-1AH

1) Adjustment not recommended

Ordering data

	Order No.
Lenses	
Cinegon 1.4/8 mm	**6GF9 001-1AE**
Cinegon 1.4/12 mm	**6GF9 001-1AJ**
Xenoplan 1.4/17 mm	**6GF9 001-1AK**
Xenoplan 1.4/23 mm	**6GF9 001-1AL**
Xenoplan 1.9/35 mm	**6GF9 001-1AF**

	Order No.
Lenses (continued)	
Componon 2.8/50 mm	**6GF9 001-1AN**
Mini-lens 1.3/8 mm	**6GF9 001-1BE**
Mini-lens 1.6/16 mm	**6GF9 001-1BF**
Mini-lens 1.6/25 mm	**6GF9 001-1BG**
Compact lens 2.8/50 mm	**6GF9 001-1AH**

Overview

- Systems for the constant and homogenous lighting of an image field
- For achieving reproducible image analysis results
- The following can be used: fluorescent lamps, LEDs, halogen radiators, fiber-optic lighting systems, for example

Ordering data

	Order No.
OSRAM lamps	
SILUZET lamps IP 50, with smooth white trough	**5LJ2 247...**
LUMILUX BRIK EL IP 54, external lamp 13 W	**5PG5 345-2G**
DULUX BRIK EL IP 54, external lamp 11 W	**OSR 74125**
Specially shaped lamps	
HF ring lamp with white illuminant	**6GF9 004-1AU**
Inspection lamp for image fields up to approximately 100 x 70 mm	**6GF9 004-1AX**
Filament lamps	
Halogen spotlight 20 W Rotatable and inclinable, with mounting foot	**6GF9 004-1AM**
Projection lamp 100 W for working distances between 500 and 1000 mm	**6GF9 004-1AP**

	Order No.
Fiber optics	
Full ring light for illuminating a circular area with incident light	**6GF9 004-1AE**
Swan's neck for punctiform incident light illumination	**6GF9 004-1AF**
Shape converter for linear incident light illumination	**6GF9 004-1AG**
Light plate for transparent lighting	**6GF9 004-1AQ**
Cold light source 150 W, DC regulated	**6GF9 004-1AS**
Industrial stroboscope for max. 60 flashes/s	**6GF9 004-1AR**
LED lights	
Illumination field 24 x 38 mm, red 660 nm	**6GF9 004-1AJ**
Illumination field 46 x 56 mm, red 660 nm	**6GF9 004-1AN**

SIMATIC Industrial Software

8



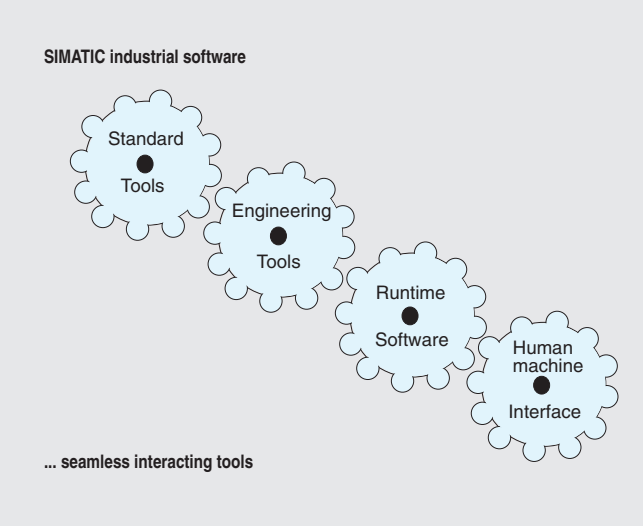


8/2	**Introduction**
8/2	**Standard tools**
8/2	STEP 7
8/6	STEP 7 Professional
8/7	STEP 7 Lite
8/8	STEP 7 Micro/WIN
8/9	STEP 7 Micro/WIN command library
8/9	TP-Designer for TP070
8/11	**Engineering tools**
8/11	S7-SCL
8/12	S7-GRAPH
8/13	S7-HiGraph
8/14	CFC
8/15	S7-PDIAG
8/16	S7-PLCSIM
8/17	TeleService
8/18	DOCPRO
8/19	SIMATIC MicroComputing
8/20	SIMATIC iMap
8/22	D7-SYS
8/23	Engineering System Drive ES
8/25	Distributed Safety Software
8/28	**Runtime software**
8/28	Standard PID Control
8/29	Modular PID Control
8/32	PID self tuner
8/33	Fuzzy Control++
8/34	NeuroSystems
8/35	Loadable drivers for CP 341 and CP 441-2
8/37	Software redundancy
8/38	PRODAVE MPI
8/39	Easy Motion Control
8/42	**HMI software**
8/42	SIMATIC ProTool/Lite, SIMATIC ProTool
8/44	SIMATIC ProTool/Pro
8/47	SIMATIC WinCC
8/51	SIMATIC ProAgent
8/53	**Supplementary components**
8/53	SIMATIC A&D Data Management
8/54	ServiceLab diagnostic software
8/54	Technical product specifications for CAX applications

Software for SIMATIC S7/C7/WinAC

Overview

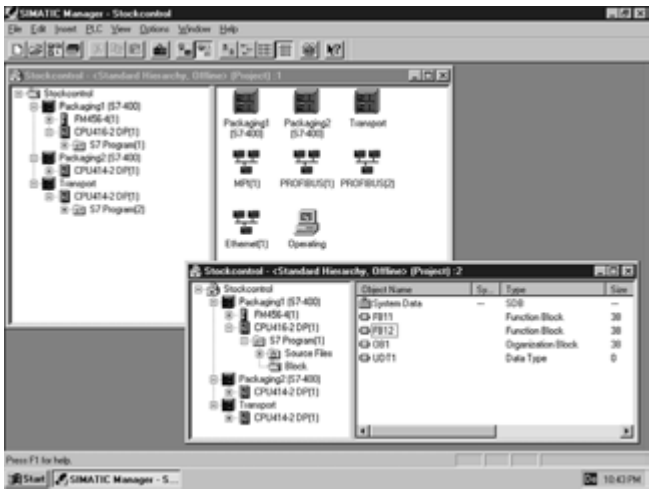
- The SIMATIC industrial software is a system of closely linked software tools for SIMATIC S7 and SIMATIC C7 PLCs and for PC-based control with SIMATIC WinAC.
- It provides convenient functions for all phases of an automation project
- Includes:
  - Standard Tools: Basis for programming the SIMATIC Hardware
  - Engineering tools: High-level programming languages and technology-based software
  - Runtime software: Ready-to-use runtime software for the production process
  - Human Machine Interface (HMI): Software specifically for operator control and visualization



STEP 7

Overview

- The basic STEP 7 software is the standard tool for the automation systems SIMATIC S7, SIMATIC C7 and SIMATIC WinAC.
- It allows the user to use the performance of these systems
- STEP 7 has user-friendly functions for all phases of an automation project:
  - Configuration and parameterization of hardware
  - Definition of communication
  - Programming
  - Testing, starting up, and servicing
  - Documentation, archiving
  - Operating/diagnostic functions



Components for connecting the PC to MPI and PROFIBUS

PC adapter

- For connecting a PC without a vacant slot (such as Laptop or Notebook) to the SIMATIC-S7 automation system by means of commercially available RS 232 cables (null modem cables; Recommendation: RS 232 cable to CE industry standard)
- With same functionality as MPI connection via CP
- Scope of supply: PC adapter and Product Brief (handling, technical specifications)

Technical specifications PC adapter

Data transmission rate to the PC	19.2/38.4 kbit/s
Data transmission rate to S7/C7 (RS485, MPI/DP)	19.2 kbit/s to 1.5 Mbit/s
RS 232/RS 485 connector	9-pin connector (male)
Power supply	24 V DC and 5 V DC from MPI/DP interface
Degree of protection	IP 20

The PC modules described below enable in conjunction with STEP 7 the connection of programming devices and AT-PCs or Notebooks to PROFIBUS and to the multi-point interface of SIMATIC S7.

CP 5511

- For PGs/PCs/Notebooks with PCMCIA slot
- PCMCIA card type II (16 bit)
- Incl. adapter with 9-pin sub D connector for connecting to PROFIBUS

CP 5512
(in preparation for Windows 2000Pro and Windows XP Pro)

- For PGs/PCs/Notebooks with PCMCIA slot
- PCMCIA card type II (32 bit cardbus)
- Incl. adapter with RJ45 connector for connecting to Industrial Ethernet

CP 5611 and CP 5611-MPI

- For PGs/PCs with PCI slot
- Short PCI card (32 bit)
- CP 5611-MPI incl. MPI cable

Components for connecting the PC to Industrial Ethernet

CP 1512

- For PGs/PCs/Notebooks with PCMCIA slot
- PCMCIA card type II (32 bit cardbus); 10/100 Mbit/s
- Incl. adapter with RJ45 socket connector for connecting to Industrial Ethernet

CP 1612

- For PGs/PCs with PCI slot
- Short PCI card (32 bit); 10/100 Mbit/s
- With RJ45 connector for connecting to Industrial Ethernet

For technical details of versions and supported operating systems, please refer to the catalog data of the respective products.

Further information regarding the online connection of PCs and SIMATIC S7/C7 controls see Catalogs IK PI, CA 01 or have a look in the A&D Mall.

STEP 7

Ordering data	Order No.
STEP 7 Version 5.1	
Target system: SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC Prerequisites: Windows 95/98/NT/Me/2000 Prof. Supplied: German, English, French, Spanish, Italian; including 3.5" authorization diskette, without documentation	
Single license on CD[1)]	**6ES7 810-4CC05-0YX0**
Software updating service on CD[1)]	**6ES7 810-4BC01-0YX2**
Upgrade single license V2.x/3.x/4.x/5.0 to V5.1 on CD[1)]	**6ES7 810-4CC05-0YX4**
Demo version, trial license	**6ES7 810-4CC05-8YT8**
STEP 7 basic information documentation package	
consisting of Getting Started, hardware configuration manual, programming manual, converter manual	
German	**6ES7 810-4CA05-8AA0**
English	**6ES7 810-4CA05-8BA0**
French	**6ES7 810-4CA05-8CA0**
Spanish	**6ES7 810-4CA05-8DA0**
Italian	**6ES7 810-4CA05-8EA0**
STEP 7 reference manuals	
consisting of the STL, LAD and FBD manuals and a reference manual for the standard and system functions for the SIMATIC S7-300/-400	
German	**6ES7 810-4CA05-8AR0**
English	**6ES7 810-4CA05-8BR0**
French	**6ES7 810-4CA05-8CR0**
Spanish	**6ES7 810-4CA05-8DR0**
Italian	**6ES7 810-4CA05-8ER0**
SIMATIC Manual Collection	**6ES7 998-8XC01-8YE0**
Electronic manuals on CD-ROM, in 5 languages: S7-200/-300/-400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	
SIMATIC Manual Collection updating service for 1 year	**6ES7 998-8XC01-8YE2**
Current Manual Collection CD as well as the three following updates	

1) For further information regarding software licenses, see Section 14

	Order No.
EPROM programming device USB prommer	**6ES7 792-0AA00-0XA0**
for connecting SIMATIC S7 and CP via MPI (5 m)	
MPI cable	**6ES7 901-0BF00-0AA0**
for connecting SIMATIC S7 and CP via MPI (5 m)	
Components for connecting the PC to MPI and PROFIBUS	
• For PC with vacant ISA slot:	
CP 5611	**6GK1 561-1AA00**
CP 5611 MPI	**6GK1 561-1AM00**
incl. MPI cable (5 m)	
• For PC with vacant PCMCIA slot:	
CP 5511	**6GK1 551-1AA00**
CP 5512	**6GK1 551-2AA00**
for Windows XP Professional	
• For PC without vacant ISA slot:	
PC adapter	**6ES7 972-0CA23-0XA0**
RS 232, 9-contact, male; with RS 232/MPI converter max. 38.4 kbit/s	
RS 232 cable (zero modem cable)	**6ES7 901-1BF00-0XA0**
9-pin female connector/9-pin female connector	
Components for connecting the PC to Industrial Ethernet	
• For PC with vacant ISA slot:	
CP 1612	**6GK1 161-2AA00**
• For PC with vacant PCMCIA slot:	
CP 1512	**6GK1 151-2AA00**
SOFTNET-PG V6.1	**6GK1 704-1PW61-3AA0**

Selection guide STEP 7

	STEP 7 Lite	STEP 7	STEP 7 Professional
Configuration			
Target systems	S7-300 / C7	S7-300 / S7-400 / C7 / WinAC	
Modules	digital, analog I/O, IFM central only	digital, analog I/O, IFM, FM, CP central and distributed (DP)	
Networking/Communication	No	Zeitgesteuerte, zyklische Datenübertragung zwischen Automatisierungskomponenten; MPI, PROFIBUS oder Industrial Ethernet	
Distributed I/O	No	Yes	
Message configuration (HMI display)	No	Yes	
Write, read to / from MMC	Yes, in CPU only	Yes, in CPU and directly on PG/PC (update of AS operating system possible)	
Export / Import	Program , symbols	Program, symbols, HW configuring	
Documentation function	supplied	supplied – for norm suitable documentation of the S7 project option DOCPRO	
Multi-language project documentatiion	Yes	Yes	
Multi User Engineering	No	Yes	
Programming			
Languages	LAD / FBD / STL	LAD / FBD / STL and STL source	similar to STEP 7 S7-GRAPH in addition(sequencer) / S7-SCL (text-based high-level-language)
Structured / symbolic prog.	Yes / Yes	Yes / Yes	
Testing / produce prog. consistency	Yes / Yes	Yes / Yes	
Standard / user library	Yes / No	Yes / Yes	
Online functions			
Online access	MPI	MPI, PROFIBUS, Option: Industrial Ethernet	
Test functions	Beobachten, Steuern, Forcen	Beobachten, Steuern, Forcen, Einzelschritt (Debug)	
Comparison function off- / online	Program, HW configuring	Program	
Diagnostics	System diagnostics	System diagnostics, system error reporting, integrated process error diagnostics for S7-GRAPH	
Optional packages			
Optional programming languages	keine	S7-GRAPH, S7-SCL, S7-HiGraph, CFC	S7-HiGraph, CFC
Options for simulation, documentation, diagnostics and remote maintenance	S7-PLCSIM, S7-Teleservice	S7-PLCSIM, S7-DOCPRO, TeleService, S7-PDiag	DOCPRO, TeleService, S7-PDiag (S7-PLCSIM contained in scope of supply)

STEP 7 Professional

Overview

STEP 7 Professional supports all IEC languages.

In addition to the languages recognized by STEP 7

- LAD,
- FBD and
- STL

the following are also available:

- "Sequential function chart" and
- "Structured text".

An offline simulation of programs created with these languages is included. STEP 7 Professional thus replaces the combination of the individual packages STEP 7, S7-GRAPH, S7-SCL and S7-PLCSIM.

A POWERPACK is offered to customers who already use STEP 7 and wish to change. A valid STEP 7 license is required for purchasing the POWERPACK. A separate update service is available for STEP 7 Professional.

Ordering data

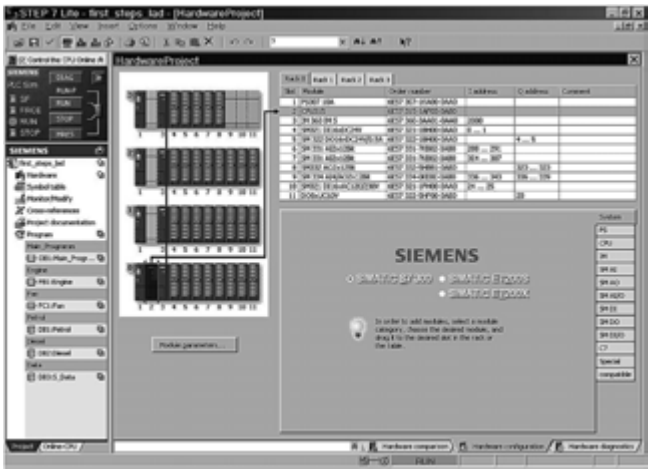
	Order No.
STEP 7 Professional	
Target system: SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC Prerequisites: Windows 95/98/NT/Me/2000 Prof. Supplied: German, English, French, Spanish, Italian; including 3.5" authorization diskette, without documentation	
Single license[1]	**6ES7 810-5CC06-0YE0**
Software updating service[1]	**6ES7 810-5CC04-0YE2**
Upgrade of single license to edition 08/2001[1]	**6ES7 810-5CC06-0YE4**
Powerpack single license for converting from STEP 7 to STEP 7 Professional	**6ES7 810-5CC06-0YE5**
STEP 7 basic information documentation package	
consisting of Getting Started, hardware configuration manual, programming manual, converter manual	
German	**6ES7 810-4CA05-8AA0**
English	**6ES7 810-4CA05-8BA0**
French	**6ES7 810-4CA05-8CA0**
Spanish	**6ES7 810-4CA05-8DA0**
Italian	**6ES7 810-4CA05-8EA0**
STEP 7 reference manuals	
consisting of the STL, LAD and FBD manuals and a reference manual for the standard and system functions for the SIMATIC S7-300/-400	
German	**6ES7 810-4CA05-8AR0**
English	**6ES7 810-4CA05-8BR0**
French	**6ES7 810-4CA05-8CR0**
Spanish	**6ES7 810-4CA05-8DR0**
Italian	**6ES7 810-4CA05-8ER0**

1) For further information regarding software licenses, see Section 14

	Order No.
S7-GRAPH V5.1 manual	
German	**6ES7 811-0CC04-8AA0**
English	**6ES7 811-0CC04-8BA0**
French	**6ES7 811-0CC04-8CA0**
S7-SCL V5.1 manual	
German	**6ES7 811-1CC04-8AA0**
English	**6ES7 811-1CC04-8BA0**
French	**6ES7 811-1CC04-8CA0**
Spanish	**6ES7 811-1CC04-8DA0**
Italian	**6ES7 811-1CC04-8EA0**
SIMATIC Manual Collection	**6ES7 998-8XC01-8YE0**
Electronic manuals on CD-ROM, in 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	
SIMATIC Manual Collection updating service for 1 year	**6ES7 998-8XC01-8YE2**
Current Manual Collection CD as well as the three following updates	
EPROM programming device USB prommer	**6ES7 792-0AA00-0XA0**
for connecting SIMATIC S7 and CP via MPI (5 m)	
MPI cable	**6ES7 901-0BF00-0AA0**
for connecting SIMATIC S7 and CP via MPI (5 m)	
Components for connecting the PC to MPI and PROFIBUS	See "STEP 7", page 8/4
Components for connecting the PC to Industrial Ethernet	See "STEP 7", page 8/4

Overview

- Programming software for implementing non-networked solutions with SIMATIC S7-300, SIMATIC C7, ET 200S and ET 200X
- Simple and intuitive operation
- Projects created with STEP 7/STEP 7 Professional can be reused



Ordering data

	Order No.
STEP 7 Lite V2.0	
Target system: SIMATIC S7-300, SIMATIC C7, ET 200S, ET 200X Prerequisites: Windows 95/98/NT/Me/2000 Prof./ XP Home/XP Prof. Supplied: German, English, French, Spanish, Italian; including 3.5" authorization diskette"	
Single license[1]	**6ES7 810-3CC06-0YE0**
Software updating service[1]	**6ES7 810-3BC01-0YX2**
Powerpack single license for converting from STEP 7 Mini to STEP 7 Lite V2.0	**6ES7 810-3CC06-0YE4**
STEP 7 Lite Getting Started documentation package	
German	**6ES7 810-3CC01-8AG0**
English	**6ES7 810-3CC01-8BG0**
French	**6ES7 810-3CC01-8CG0**
Spanish	**6ES7 810-3CC01-8DG0**
Italian	**6ES7 810-3CC01-8EG0**
SIMATIC Manual Collection	**6ES7 998-8XC01-8YE0**
Electronic manuals on CD-ROM, in 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	
SIMATIC Manual Collection updating service for 1 year	**6ES7 998-8XC01-8YE2**
Current Manual Collection CD as well as the three following updates	

1) For further information regarding software licenses, see Section 14

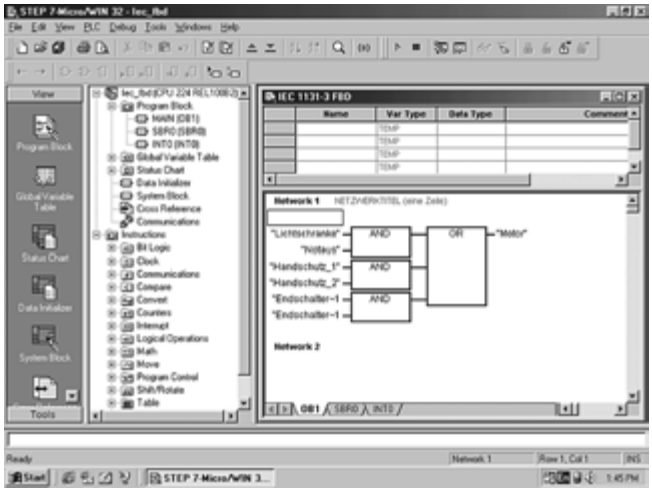
	Order No.
EPROM programming device USB prommer	**6ES7 792-0AA00-0XA0**
for connecting SIMATIC S7 and CP via MPI (5 m)	
MPI cable	**6ES7 901-0BF00-0AA0**
for connecting SIMATIC S7 and CP via MPI (5 m)	
Components for connecting the PC to MPI	
• For PC with vacant ISA slot:	
CP 5611	**6GK1 561-1AA00**
CP 5611 MPI	**6GK1 561-1AM00**
incl. MPI cable (5 m)	
• For PC with vacant PCMCIA slot:	
CP 5511	**6GK1 551-1AA00**
CP 5512 for Windows XP Professional	**6GK1 551-2AA00**
• For PC without vacant ISA slot:	
PC adapter	**6ES7 972-0CA23-0XA0**
RS 232, 9-contact, male; with RS 232/MPI converter max. 38.4 kbit/s	
RS 232 cable (zero modem cable)	**6ES7 901-1BF00-0XA0**
9-pin female connector/9-pin female connector	

8

STEP 7 Micro / WIN

Overview

- The simple, easy-to-learn programming software under Windows 95/98/Me/NT/2000 for the SIMATIC S7-200
- For solving even difficult automation tasks
- For fast entry and time-saving programming
- With extensive functionality
- Based on standard Windows software (familiar from a wide range of standard applications such as Word for Windows, Outlook)



- Working in the LAD, FBD and STL standard editors; the editor can be freely selected at any time

Ordering data

	Order No.
STEP 7-Micro/WIN32 V3.2 programming software	
Target system: All SIMATIC S7-200 CPUs Prerequisites: Windows 95/98/NT/2000 on PG or PC with 80486 or Pentium processor Supplied: German, English, French, Spanish, Italian; with online documentation	
Single license[2]	**6ES7 810-2BC02-0YX0**
Upgrade single license[1)2)]	**6ES7 810-2BC02-0YX3**

	Order No.
To be ordered separately:	
PC-to-PPI cable with RS 232C/PPI converter; for max. 19.2 (PPI) or 38.4 (Freeport) kbit/s for connecting the CPU to the serial PC interface; 5 m long	**6ES7 901-3BF21-0XA0**
System manual for S7-22x CPUs	
German	**6ES7 298-8FA22-8AH0**
English	**6ES7 298-8FA22-8BH0**
French	**6ES7 298-8FA22-8CH0**
Spanish	**6ES7 298-8FA22-8DH0**
Italian	**6ES7 298-8FA22-8EH0**
Components for connecting the PC to MPI	See "STEP 7 Lite", page 4/6

1) Upgrade for all previous STEP 7-Micro/WIN and STEP 7-Micro/DOS versions
2) For further information regarding software licenses, see Section 14

STEP 7-Micro/WIN command library

Overview

- Additional command libraries for STEP 7 Micro/WIN V3.2:
  - USS protocol library
  - MODBUS protocol library

Ordering data

	Order No.		Order No.
STEP 7-Micro/Win command library V1.1 Protocol libraries for USS and MODBUS protocols; can be used with STEP 7-Micro/Win32 V3.2; including documentation, on CD-ROM	**6ES7 830-2BC00-0YX0**		

TP-Designer for TP070

Overview

- For configuration and parameterization of the low-cost TP070 touch panel for the S7-200 system



Ordering data

	Order No.		Order No.
TP designer for TP070 V1.0 for configuration and parameterization of the TP070; including documentation, on CD-ROM	**6ES7 850-2BC00-0YX0**		

Technical specifications

Technical specifications standard tools

Standard Tool	STEP 7 Professional	STEP 7	STEP 7 Lite	STEP 7- Micro/WIN
License form	Single license	Single license	Single license	Single license
Software class	A	A	A	A
Current version	Edition 08/2001	V 5.1	V 2.0	V 3.2
Target system	SIMATIC S7-300 SIMATIC S7-400 SIMATIC C7 SIMATIC WinAC	SIMATIC S7-300 SIMATIC S7-400 SIMATIC C7 SIMATIC WinAC	SIMATIC S7-300 SIMATIC C7 SIMATIC ET 200S SIMATIC ET 200X	SIMATIC S7-200
Operating system	Windows 95 Windows 98 Windows Me Windows NT 4.0 Windows 2000 Professional	Windows 95 Windows 98 Windows Me Windows NT 4.0 Windows 2000 Professional	Windows 98 SE Windows Me Windows XP Home Windows 2000 Professional Windows XP Professional	Windows 95 Windows 98 Windows Me Windows NT 4.0 Windows 2000
Main memory in PG/PC, min.	Dependent on Microsoft Windows operating system used. Recommendation: 256 MB	Dependent on Microsoft Windows operating system used. Recommendation: 256 MB	Dependent on Microsoft Windows operating system used. Recommendation: 256 MB	32 MB
Disk storage requirement in PG/PC	Acc. to size of installation 200 to 430 MB	Acc. to size of installation 200 to 380 MB	Acc. to size of installation 90 to 250 MB	50 MB
Size of user program in the CPU	Approx. factor 1.5 compared with STEP 5 for STL, LAD, FBD	Approx. factor 1.5 compared with STEP 5 for STL, LAD, FBD	Approx. factor 1.5 compared with STEP 5 for STL, LAD, FBD	Approx. factor 1.0 compared with STEP 5 for STL, LAD
Note	Contains all 5 IEC programming languages LAD; FBD; STL, SCL, GRAPH and the PLC simulation software S7-PLCSIM	-	For non-networked applications with centralized I/O.	

Overview



- PASCAL-type high-level language
- Optimized for programming programmable controllers
- With PLCopen Base Level certificate
- For use in SIMATIC S7-300 (recommended for CPU 314 and CPU 312C and higher), S7-400, C7 and WinAC



Ordering data

	Order No.
SIMATIC S7-SCL, Version 5.1	
Task: High-level language programming Target system: SIMATIC S7-300 (CPU 314 or better), SIMATIC S7-400, SIMATIC C7, SIMATIC WinAC Prerequisites: STEP 7 V5.1 Supplied: on CD; German, English, French, Spanish, Italian; including authorization diskette, with electronic documentation	
Single license[1]	**6ES7 811-1CC04-0YX0**
Software updating service[1]	**6ES7 811-1CA01-0YX2**
Upgrade of single license to V5.1[1]	**6ES7 811-1CC04-0YX4**

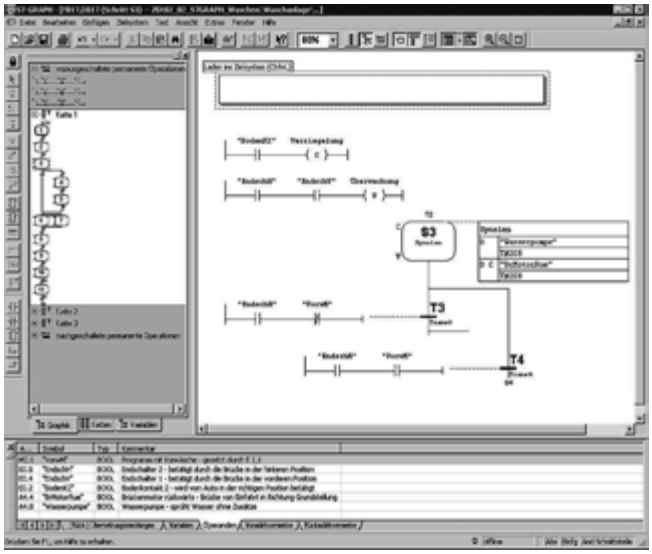
	Order No.
S7-SCL manual	
German	**6ES7 811-1CC04-8AA0**
English	**6ES7 811-1CC04-8BA0**
French	**6ES7 811-1CC04-8CA0**
Spanish	**6ES7 811-1CC04-8DA0**
Italian	**6ES7 811-1CC04-8EA0**
SIMATIC Manual Collection Electronic manuals on CD-ROM, in 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection updating service for 1 year Current Manual Collection CD as well as the three following updates	**6ES7 998-8XC01-8YE2**

1) For further information regarding software licenses, see Section 14

S7-GRAPH

Overview

- For configuring and programming sequential processes using sequencers
- Standardized representation to DIN EN 1131-3
- Clearly comprehensible program thanks to structuring of the process into separate steps
- With extensive diagnostic functions; linked into the SIMATIC diagnostic concept
- With PLCopen Base Level certificate
- For use in SIMATIC S7-300 (recommended for CPU 315 and CPU 312C and higher), S7-400, C7 and WinAC



Ordering data

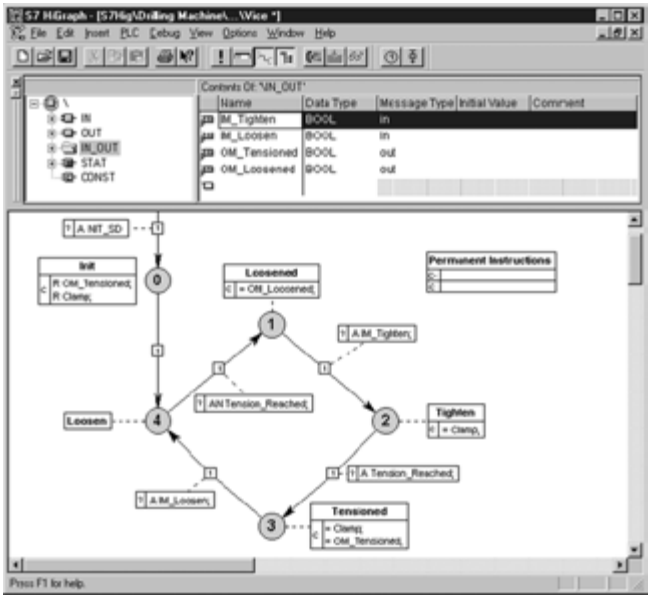
	Order No.
SIMATIC S7-GRAPH, Version 5.1 Task: Configuring and programming of sequence cascades Target system: SIMATIC S7-300, SIMATIC S7-400, SIMATIC C7, SIMATIC WinAC Prerequisites: STEP 7 V5.1 Supplied: on CD; German, English, French, Spanish, Italian; including authorization diskette, with electronic documentation	
Single license[1)]	**6ES7 811-0CC04-0YX0**
Software updating service[1)]	**6ES7 811-0CA01-0YX2**
Upgrade of single license to V5.1[1)]	**6ES7 811-0CC04-0YX4**

1) For further information regarding software licenses, see Section 14

	Order No.
S7-GRAPH manual	
German	**6ES7 811-0CC04-8AA0**
English	**6ES7 811-0CC03-8BA0**
French	**6ES7 811-0CC03-8CA0**
SIMATIC Manual Collection Electronic manuals on CD-ROM, in 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection updating service for 1 year Current Manual Collection CD as well as the three following updates	**6ES7 998-8XC01-8YE2**

Overview

- For the graphical description of non-synchronous processes using status graphs
- Especially suitable for machine designers (engineers), commissioning personnel and service engineers
- Extremely flexible thanks to freely positionable graphical elements
- With integrated monitoring and signaling functions
- For use in SIMATIC S7-300 (recommended for CPU 315 and CPU 312C and higher), S7-400, C7 (recommended for C7-626 and higher) and WinAC



Ordering data

	Order No.
SIMATIC S7-HiGraph, Version 5.0 Task: Programming state diagrams Target system: SIMATIC S7-300, SIMATIC S7-400, SIMATIC C7, SIMATIC WinAC Prerequisites: STEP 7 V4.x Supplied: on CD; German, English, French, Spanish, Italian; including authorization diskette, with electronic documentation	
Single license[1)]	**6ES7 811-3CC03-0YE0**
Software updating service[1)]	**6ES7 811-3BA01-0YX2**
Upgrade of single license from V2.x/V4.x to V5.0[1)]	**6ES7 811-3CC03-0YE4**

1) For further information regarding software licenses, see Section 14

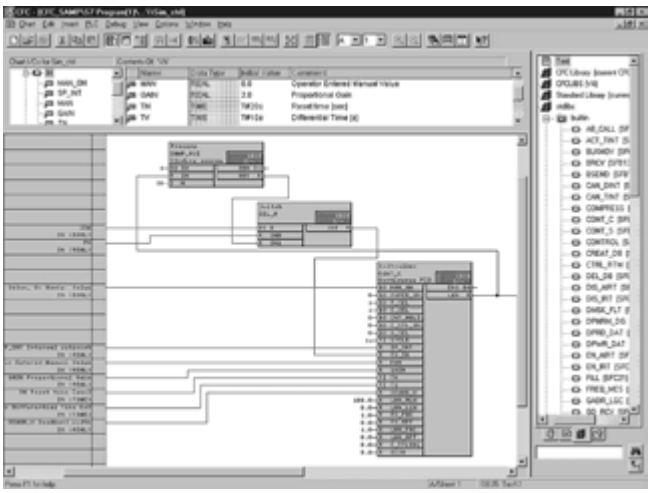
	Order No.
SIMATIC Manual Collection Electronic manuals on CD-ROM, in 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection updating service for 1 year Current Manual Collection CD as well as the three following updates	**6ES7 998-8XC01-8YE2**

8

CFC

Overview

- For creating automation programs by drawing a function chart
- With extensive libraries of prefabricated function blocks to which function blocks created by the user can be added
- Reduced costs and fewer mistakes by simply interconnecting read-to-use function blocks
- Optimized integration in the world of automation, for example, through guaranteed compatibility with all STEP 7 tools
- Can be used for SIMATIC S7-300 (recommended for CPU 316 or CPU 314C and higher), SIMATIC S7-400, SIMATIC WinAC and D7-SYS



Ordering data

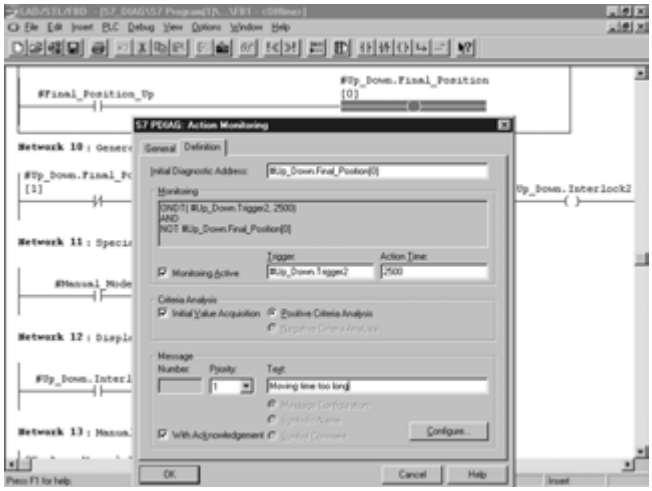
	Order No.
CFC, Version 5.2	
Task: Graphic configuring and programming of automation applications in the form of technology-oriented diagrams Target system: SIMATIC S7-300/-400, SIMATIC WinAC, D7-SYS Prerequisites: STEP 7 V5.0 or later, in addition S7-SCL V5.0 or later Supplied: on CD; German, English, French, Spanish, Italian; including authorization diskette, with electronic documentation	
Single license[1)]	**6ES7 813-0CC05-0YX0**
Software updating service[1)]	**6ES7 813-0CA01-0YX2**
Upgrade of single license to V5.2[1)]	**6ES7 813-0CC05-0YX4**

1) For further information regarding software licenses, see Section 14

CFC manual	
German	**6ES7 813-0CC05-8AA0**
English	**6ES7 813-0CC05-8BA0**
French	**6ES7 813-0CC05-8CA0**
SIMATIC Manual Collection Electronic manuals on CD-ROM, in 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection updating service for 1 year Current Manual Collection CD as well as the three following updates	**6ES7 998-8XC01-8YE2**

Overview

- For configuring process diagnostics in SIMATIC S7
- Increases the availability of machines and production plants and supports fault analysis and correction on-site
- For use in SIMATIC S7-300 (CPU 314 and higher) and S7-400



Ordering data

	Order No.
S7-PDIAG, Version 5	
Task: Configuring of process diagnostics for LAD/FBD/STL Target system: SIMATIC S7-300 (CPU 314 or better); SIMATIC S7-400 Prerequisites: STEP 7 V3.2 or better Supplied: on CD; German, English, French, Spanish, Italian; including authorization diskette, with electronic documentation	
Single license[1]	**6ES7 840-0CC02-0YE0**
Software updating service[1]	**6ES7 840-0CA01-0YX2**
Upgrade of single license to V5[1]	**6ES7 840-0CC02-0YE4**

1) For further information regarding software, see Section 14

	Order No.
SIMATIC Manual Collection	**6ES7 998-8XC01-8YE0**
Electronic manuals on CD-ROM, in 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	
SIMATIC Manual Collection updating service for 1 year	**6ES7 998-8XC01-8YE2**
Current Manual Collection CD as well as the three following updates	

S7-PLCSIM

Overview

- For function testing of the created SIMATIC S7 user blocks on the PG/PC, regardless of the availability of the target hardware
- To conduct program debugging in an early development phase
- For faster, cheaper initial start-up and higher program quality
- Can be used for: LAD, FBD, STL, S7-GRAPH, S7-SCL, S7-HiGraph, CFC, WinCC (installed locally), S7-PDIAG



Ordering data

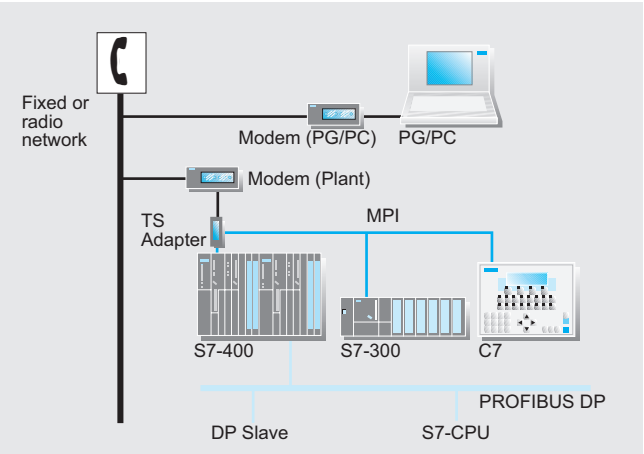
	Order No.
S7-PLCSIM, Version 5.0	
Task: Functional testing of SIMATIC S7 user blocks on PG/PC Target system: SIMATIC S7-300, SIMATIC S7-400, SIMATIC C7 Prerequisites: STEP 7 V3.1 or later Supplied: on CD; German, English, French, Spanish, Italian; including authorization diskette, with electronic documentation	
Single license[1)]	**6ES7 841-0CC02-0YE0**
Software updating service[1)]	**6ES7 841-0CA01-0YX2**
Upgrade of single license to V4[1)]	**6ES7 841-0CC02-0YE4**

1) For further information regarding software, see Section 14

	Order No.
SIMATIC Manual Collection	**6ES7 998-8XC01-8YE0**
Electronic manuals on CD-ROM, in 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	
SIMATIC Manual Collection updating service for 1 year	**6ES7 998-8XC01-8YE2**
Current Manual Collection CD as well as the three following updates	

Overview

- For remote maintenance of SIMATIC S7/C7 automation systems over a fixed or radio network
- With the familiar functionality of STEP 7 and the Engineering Tools
- Functions:
  - Cost-effective provision of technical services from a central location
  - Process data is exchanged with the PG/PC using a program-controlled remote link (FB call)
- For use in SIMATIC S7-300, S7-400, C7



Ordering data

	Order No.
TeleService, Version 5.1 Task: Remote maintenance of SIMATIC S7/C7 by means of fixed or radio network Target system: SIMATIC S7-300, SIMATIC S7-400, SIMATIC C7 Prerequisites: STEP 7 V3.1 or later; TS adapter® required Supplied: on CD; German, English, French, Spanish, Italian; including authorization diskette, with electronic documentation	
Single license[1)]	**6ES7 842-0CC02-0YE0**
Software updating service[1)]	**6ES7 842-0CA01-0YX2**
Upgrade of single license from V3 to V5.0[1)]	**6ES7 842-0CC02-0YE4**

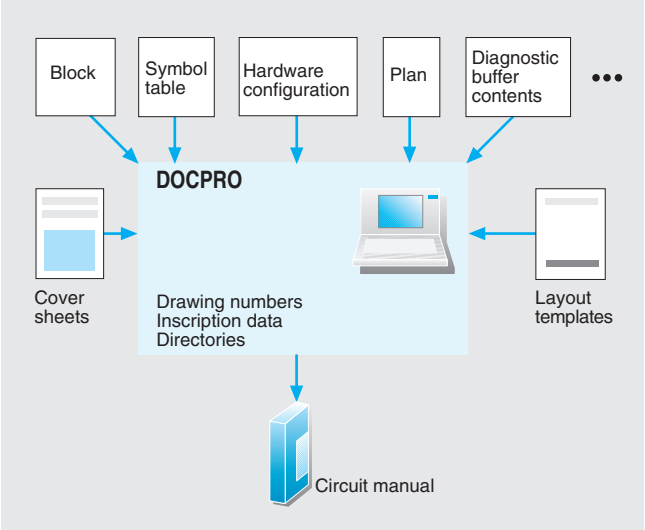
	Order No.
TS adapter with MPI connection and RS 232; 9-pin, male (modem side)	**6ES7 972-0CA33-0XA0**
RS 232 cable Zero modem cable for adapter parameterization; 9-pin female connector/9-pin female connector	**6ES7 901-1BF00-0XA0**
SIMATIC Manual Collection Electronic manuals on CD-ROM, in 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection updating service for 1 year Current Manual Collection CD as well as the three following updates	**6ES7 998-8XC01-8YE2**

1) For further information regarding software, see Section 14

DOCPRO

Overview

- For creating and managing plant documentation
- Permits structuring of project data, the preparation in the form of wiring manuals, and the printout in a unified print image.
- For use in SIMATIC S7-300, S7-400 and C7



Ordering data

	Order No.
DOCPRO, Version 5.1	
Task: Creation of circuit manuals for system document management Target system: SIMATIC S7-300, SIMATIC S7-400, SIMATIC C7 Prerequisites: STEP 7 V3.2 or later; Supplied: on CD; German, English, French, Spanish, Italian; including authorization diskette, with electronic documentation	
Single license[1)]	**6ES7 803-0CC02-0YE0**
Software updating service[1)]	**6ES7 803-0CA01-0YX2**
Upgrade of single license to V5.1[1)]	**6ES7 803-0CC02-0YE4**

1) For further information regarding software licenses, see Section 14

	Order No.
SIMATIC Manual Collection Electronic manuals on CD-ROM, in 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection updating service for 1 year Current Manual Collection CD as well as the three following updates	**6ES7 998-8XC01-8YE2**

Overview

- The bridge between the SIMATIC S7-200 and the PC world
- For processing and visualizing data from the S7-200 with standard Windows applications
- Database applications, human/machine interfaces (HMIs), tools for statistical evaluations with Excel, for instance, or calculation modules for complex requirements are examples of what can be created.



Ordering data

	Order No.
SIMATIC MicroComputing V1.0 Target system: SIMATIC S7-22x Prerequisites: Windows 95/98/Me/2000 Prof., Windows NT (not with PC/PPI cable); on PG or PC with 80486 or Pentium processor; STEP 7-Micro/Win32 V3.1 Supplied: German, English, French, Spanish, Italian; including authorization diskette, with electronic documentation	
Unlimited edition (with full scope of functions), single license[1)]	**6ES7 810-2MU00-0YX0**
Limited edition (with limited scope of functions), single license[1)]	**6ES7 810-2ML00-0YX0**
SIMATIC S7-200 OPC Server V1.0 single license[1)]	**6ES7 810-2MS00-0YX0**

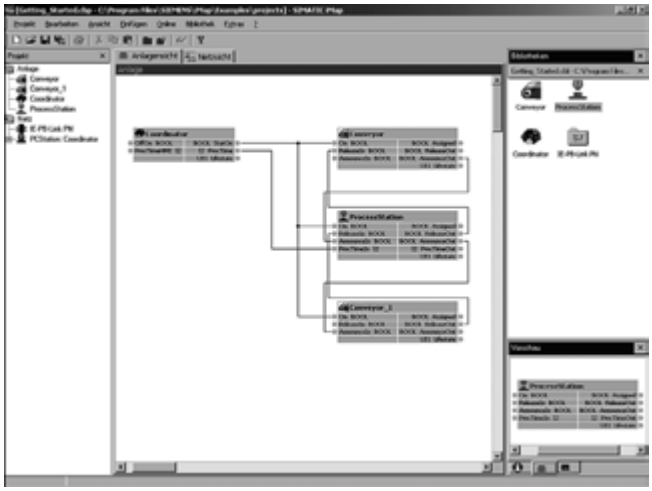
1) For further information regarding software licenses, see Section 14

	Order No.
PC-to-PPI cable for connection of S7-200 to the serial PC port; 5 m	**6ES7 901-3BF21-0XA0**
CP 5511 PCMCIA card for connecting a PC notebook to the CPU port or PROFIBUS DP module (187.5 kbit/s or 12 Mbit/s) using MPI cable	**6GK1 551-1AA00**
CP 5611 PCI card for connecting a PC notebook to the CPU port or PROFIBUS DP module (187.5 Kbit/s or 12 Mbit/s) using MPI cable	**6GK1 561-1AA00**

SIMATIC iMap

Overview

- Component-based software tool for configuring communication in distributed automaton solutions
- Based on the PROFInet standard
- For simple graphic configuration of communication between system modules
- Manufacturer-independent



Technical specifications

Current version	V1.1
Software category	A
Applications	
Keyword	SIMATIC iMap is an engineering tool for configuring communication between intelligent automation and field devices in distributed automation solutions.
Marketing message	"Save time and money in modular machine and systems engineering with component-based automation."
Advantages	• An easy way for intelligent automation devices and field devices to communicate on PROFIBUS DP and on Ethernet. • A neutral component-based engineering tool in accordance with the PROFInet standard (PROFInet connection editor) • Graphic configuring of communication on PROFIBUS DP and on Ethernet • Software components can be used many times over (technological modules) • Graphic structuring of the system using the "diagram-in-diagram" function • Ease of navigation in the project tree • Technological libraries that are easy to create and structure • Address parameterization on PROFIBUS and Ethernet in the network view • Downloading and testing directly on Ethernet speed up the commissioning process (also PROFIBUS slaves) • Online display of the values of the technological modules on the interfaces • Communication diagnostics in the diagnostics window
Sectors	• Automotive industry (in particular in assembly, conveying and painting applications) • More complex food processing and packaging machines • Conveying systems based on PROFIBUS DP • Production lines with several machines connected on a network
Target systems	• SIMATIC WinAC PN (can be used as a deputy – proxy – for all the devices in a PROFIBUS segment) • SIMATIC NET IE/PB Link (can be used as a deputy – proxy – for all the devices in a PROFIBUS segment) • SIMATIC NET CP 343-1 PN (for connecting SIMATIC S7-300 to Ethernet) • Distributed I/O devices with dedicated CPU (all intelligent field devices on PROFIBUS, e.g. SIMATIC CPU 313C-2DP, CPU 314C-2DP, CPU 315-2DP, CPU 316-2DP), SIMATIC ET 200X, ET 200S, • PROFInet OPC Server (for access from PC applications to data in PROFInet devices) • SIMATIC ProTool/Pro (for use in PROFInet applications)
System requirements	
Operating system	Windows 2000 with Service Pack 1; administrator rights are required for installation
PG/PC hardware	Pentium processor, minimum 500 MHz (800 MHz recommended)
Recommended memory configuration on PG/PC	Minimum 128 MB RAM (256 MB recommended)

Technical specifications (continued)

Hard disk space requirement in PG/PC	Approx. 44 MB
Required software	• STEP 7 V5.1 or later, Service Pack 2 including NCM • SIMATIC NET IE SOFTNET-PG V6.0 or later • PN OPC Server V6.0 or later The following software, which is supplied with iMap, must be installed before installing iMap: • MS Internet Explorer V5.5 or later, Service Pack 1 • MS Data Access Components (MDAC) V2.6 • MS XML Parser V3.0 Service Pack 1 • Adobe Acrobat Reader V5.0

Form supplied	
Available languages	German and English
Single license (SL)	Yes
Upgrade license (UG)	No
Printed manuals	No
Authorization/licenses	
Authorization	No
Single license (SL)	Yes
Upgrade license (UG)	No
Software update service	Yes
Unlock copy license	No

Ordering data

	Order No.
SIMATIC iMap V1.1	
Target system: SIMATIC WinAC PN, SIMATIC NET IE/PB Link, SIMATIC NET CP 343-1 PN, distributed I/Os with own CPU, PROFInet OPC Server, SIMATIC ProTool/Pro Prerequisites: Windows 2000 SP 1; on PG or PC with Pentium processor, min. 500 MHz; STEP 7 V5.1 SP 2 incl. NCM, SIMATIC NET IE SOFTNET-PG V6.0 or later, PN OPC-Server V6.0 or later Supplied: German, English, with electronic documentation	
Single license[1)]	**6ES7 820-0CC01-0YX0**
Software updating service[1)]	**6ES7 820-0CC01-0YX2**

1) For further information regarding software licenses, see Section 14

8

D7-SYS

Overview

- Add-on for STEP 7/CFC/SFC for configuring control and automation tasks with T400, FM 458, SIMADYN D or SIMATIC TDC
- Contains function blocks for every possible application
- For customers who do not have STEP 7 software: D7-ES, consting of D7-SYS, STEP 7, CFC and optional SFC
- D7-FB-Gen, function block-generator for creating proprietary function blocks.

Ordering data

	Order No.
SIMATIC D7-SYS V5.2	
Task: Function block library for configuration of control and automation tasks Target system: SIMATIC S7-400/FM 458 Prerequisites: Windows 95/98/Me/NT/2000 Supplied: on CD, German, English, with electronic documentation	
Single license[1)]	**6DD1 801-5DA6**
Upgrade from V4.x onwards[1)]	**6DD1 807-5DA6**
SIMATIC D7-SYS-SFC V5.2	
Task: Function block library for configuration of control and automation tasks; incl. sequence generator Target system: SIMATICS7-400/FM 458 Prerequisites: Windows 95/98/Me/NT/2000 Supplied: on CD, German, English, with electronic documentation	
Single license[1)]	**6DD1 801-7DA6**

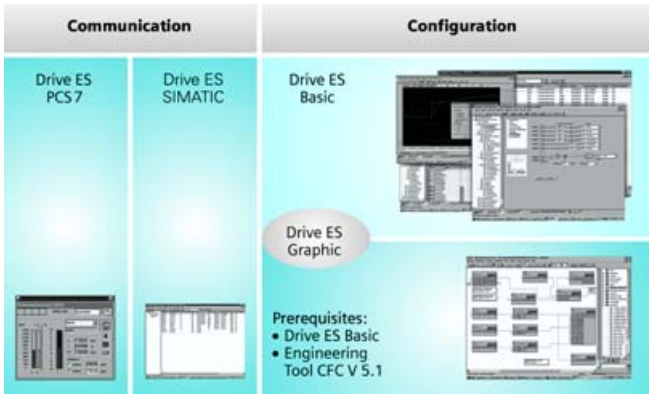
	Order No.
SIMATIC D7-ES V5.2	
Complete package consisting of STEP 7, CFC and D7-SYS	
Single license[1)]	**6DD1 801-4DA6**
SIMATIC D7-ES-SFC V5.2	
Complete package consisting of STEP 7, CFC, D7-SYS and SFC	
Single license[1)]	**6DD1 801-6DA6**
SIMATIC D7-FB-Gen V2.1	**6DD1 805-5DA0**
Function block generator	
SIMATIC Manual Collection	**6ES7 998-8XC01-8YE0**
Electronic manuals on CD-ROM, in 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	
SIMATIC Manual Collection updating service for 1 year	**6ES7 998-8XC01-8YE2**
Current Manual Collection CD as well as the three following updates	

1) For further information regarding software licenses, see Section 14

Overview

Drive ES is the Engineering System with which the drive technology from Siemens is integrated quickly, economically and easily into the SIMATIC automation world covering such aspects as communication, configuring and data management. The user interface of the STEP 7 Manager forms the basis for this. A variety of software packages is available:

- Drive ES Basic;
  for entry into the world of Totally Integrated Automation and the option to use routing beyond the network boundaries and to use the SIMATIC Teleservice.
  Drive ES Basic is the basic software for parameterizing all drives on- and offline and the prerequisite for the Software Drive ES Graphic.
  Drive ES Basic is used for processing drive and automation data at the SIMATIC Manager user interface.
  Drive ES Basic is the starting point for shared data archiving from complete projects and for using the SIMATIC Teleservice for drives, too. Drive ES Basic provides the configuring tools for the new Motion Control functionalities direct slave-to-slave traffic, equidistance and isochrone mode with PROFIBUS DP.



- Drive ES Graphic;
  for user-friendly configuring of free drive functions for SIMOVERT MASTERDRIVES and SIMOREG® DC Master.
  Drive ES Graphic is the software for graphical online and offline configuration of BICO function blocks. Drive ES Basic and SIMATIC CFC V5.1 or higher must be installed (see page 8/14).
- Drive ES SIMATIC;
  for easy configuring of the STEP 7 communications program rather than programming. Drive ES SIMATIC requires STEP 7 to be installed. It comes with a SIMATIC function block library and thus makes simple and safe programming of the PROFIBUS interface in the SIMATIC CPU for drives possible.
- Drive ES PCS 7;
  links the drives with PROFIBUS interfaces to the SIMATIC PCS 7. Drive ES requires SIMATIC PCS 7 version V5.0 or higher to be installed. Drive ES PCS 7 provides a function block library with function blocks for drives and the respective faceplates for the operator station. Thus operating the drives from the PCS 7 process control system is possible.

Additional information:

- Catalog for the respective drive range
- Internet:
  http://www.siemens.com/drivesolutions

The table provides a detailed overview regarding which Drive ES functionality is available for which drive:

	Drive ES Basic 5.1	Drive ES Graphic 5.1	Drive ES SIMATIC 5.1	Drive ES PCS7 5.1
SIMOVERT® MASTERDRIVES	Yes	Yes	Yes	Yes
SIMOREG DC-MASTER	Yes	Yes	Yes	Yes
SIMODRIVE 611 universal	Yes		Yes	
SIMODRIVE POSMO A	Yes		Yes	
SIMODRIVE POSMO CD/CA	Yes		Yes	
SIMODRIVE POSMO SI	Yes		Yes	
SIMODRIVE MV	Yes		Yes	
MICROMASTER/MIDIMASTER/ COMBIMASTER	Yes		Yes	Yes
MICROMASTER 4xx	Yes		Yes	Yes

Engineering System Drive ES

Ordering data	Order No.
Drive ES Basic V5.1	
Task: Configuration software for integration of drives in Totally Integrated Automation Prerequisites: STEP 7 V5.1 or later Supplied: on CD, German, English, French, Spanish, Italian with electronic documentation	
Single license[1]	**6SW1 700-5JA00-1AA0**
Copy license 60 units[1]	**6SW1 700-5JA00-1AA1**
Updating service for single license[1]	**6SW1 700-0JA00-0AB2**
Updating service for copy license[1]	**6SW1 700-0JA00-1AB2**
Upgrade from V5.0 to V5.1[1]	**6SW1 700-5JA00-1AA4**
Drive ES Graphic V5.1	
Task: Supplement to Drive ES Basic for user-friendly configuring of optional drive functions for drives with BICO technology Prerequisites: Drive ES Basic V5.1, CFC V5.1 or later Supplied: on CD, German, English, French, Spanish, Italian with electronic documentation	
Single license[1]	**6SW1 700-5JB00-1AA0**
Updating service for single license[1]	**6SW1 700-0JB00-0AB2**
Upgrade from V5.0 to V5.1[1]	**6SW1 700-5JB00-1AA4**

	Order No.
Drive ES SIMATIC V5.1	
Task: Block library for SIMATIC for parameterization of communication with the drives Prerequisites: STEP 7 V5.1 or later Supplied: on CD, German, English, French, Spanish, Italian with electronic documentation	
Single license incl. 1 runtime license[1]	**6SW1 700-5JC00-1AA0**
Runtime license[1]	**6SW1 700-5JC00-1AC0**
Updating service for single license[1]	**6SW1 700-0JC00-0AB2**
Upgrade from V5.0 to V5.1[1]	**6SW1 700-5JC00-1AA4**
Drive ES PCS 7 V5.1	
Task: Block library for PCS 7 for incorporation of drives Prerequisites: PCS 7 V5.0 or later Supplied: on CD, German, English, French, Spanish, Italian with electronic documentation	
Single license incl. 1 runtime license[1]	**6SW1 700-5JD00-1AA0**
Runtime license[1]	**6SW1 700-5JD00-1AC0**
Updating service for single license[1]	**6SW1 700-0JD00-0AB2**

1) Further information regarding software licenses on request

Distributed Safety Software

Overview

- For creating safety-related automation applications with SIMATIC S7 in LAD or FBD (STEP 7 required)
- Implementing safety functions by simply connecting function blocks
- With off-the-shelf block library
- Generation of proprietary blocks possible
- Optimum embedding in the automation world through guaranteed uniformity with STEP 7 tools
- Scope of supply:
  - Distributed Safety Editor
  - Code Generator
  - Debugger
  - Standard block libraries

Ordering data

	Order No.
Programming tool Distributed Safety V5.1 Task: Software for configuring fail-safe applications for SIMATIC S7-300F Prerequisites: STEP 7 V5.1 or later	**6ES7 833-1FC00-0YX0**

	Order No.
Documentation for S7-300F System description, configuring and programming, PROFIsafe fail-safe modules	
German	**6ES7 988-8FB10-8AA0**
English	**6ES7 988-8FB10-8BA0**
French	**6ES7 988-8FB10-8CA0**

Technical specifications

8

Technical specifications

Engineering Tool	S7-SCL	S7-GRAPH	S7-HiGraph	CFC
Current version	V5.1 + SP3	V5.1 + SP1	V5.0 + SP2	V5.2 + SP1 + HF1
Software class	A	A	A	A
Areas of application				
Suitable for	Textual high-level language programming of simple and complex calculations, CASE, loop, branch and compare functions	Graphical programming of sequence controls and sequencers	Graphical and flexible status description of function units and coordination functions	Graphical generation, interconnection and parameterization of (off-the-shelf) blocks and functions
Marketing message	Programming of algorithms and calculations made easy!	Fast and elegant way to program sequential processes simply and transparently!	A common language for the technologist, programmer, commissioning engineer, operator and maintenance technician!	Connection and parameterization instead of programming!
Advantages	• Easy to read and transparent programs • Functional module-oriented programming • CASE statement replaces a number of branch and compare functions • Simple switchover for PLC programmers, since the programming philosophy of LAD/FBD/STL is retained • Simple switchover for PC programmers to PLC programming • Exchangability (portability) of subroutines acc. to IEC 61131-3 • Savings in time on engineering effort compared with LAD/FBD/STL: up to 20% on simple programs; at least 50% on demanding program structures	• Can already be optimally used at the draft phase • Reduced configuring effort through graphical structuring and programming • Fast and simple familiarization • Exact error localization through uniform diagnostics in combination with ProAgent® for ProTool/Pro and WinCC • Savings in time on engineering effort compared with LAD/FBD/STL: approx. 40 to 70%	• Can already be optimally used at the draft phase • Simple overview of the mechanical functions • Reduced configuring effort through graphical programming • High degree of re-use of existing functions, such as the behavior of valves, motors, clamping devices, ... • Fast and simple familiarization • Short program runtimes • Exact error localization through uniform diagnostics in combination with ProAgent for ProTool/Pro • Savings in time on engineering effort compared with LAD/FBD/STL: approx. 50%	• Can already be optimally used at the draft phase • Reduced configuring effort through graphical interconnection • High degree of re-use of existing drawings • Fast and simple familiarization • Fast and transparent connection of off-the-shelf functions • Technological generation of the total program • Transparent representation of control structures • Short startup time • High system availability • Savings in time on engineering effort compared with LAD/FBD/STL: approx. 50%

Technical specifications

Technical specifications (continued)

Engineering Tool	S7-SCL	S7-GRAPH	S7-HiGraph	CFC
Sectors	• Labeling machines • Chemical plants (e.g. oxygen production, evaluation of measured values) • Rubber and plastics machines • Wood processing machines • Warehousing and logistics • Paper and printing machines • Punching and cutting machines • Water treatment • Winding machines	• Automobile industry (e.g. body in white, final assembly) • Electrical equipment manufacture • Rubber and plastics machines • Handling machines • Wood processing machines • Metal-working machines • Paper and printing machines • Testers • Rolling mills • Winding machines • Sport and entertainment facilities	• Automobile industry (e.g. motor assembly, axle production, gearbox production) • Chemical plants (e.g. oxygen production) • Rubber and plastics machines • Machines for the food and beverages industry • Packaging machines • Machine tools • Winding machines • Special machines	• Automobile industry (e.g. temperature controllers, sequences in tire production) • Chemicals • Power engineering and distribution • Rubber and plastics machines • Metal-working machines • Machines for the food and beverages industry • Petrochemicals • Rolling mills • Water treatment • Winding machines
Target systems				
Suitable for use in	S7-300 (recommended from CPU 313 and from CPU 312C) S7-400 C7 (recommended from C7-626) WinAC	S7-300 (recommended from CPU 314 and from CPU 312C) S7-400 C7 (recommended from C7-626) WinAC	S7-300 (recommended from CPU 315 and from CPU 312C) S7-400 C7 (recommended from C7-626) WinAC	S7-300 (recommended from CPU 316 and from CPU 314C) S7-400 F/H systems WinAC
System requirements				
Operating system	Windows 95/98, NT, 2000 or Me	Windows 95/98, NT, 2000 or Me	Windows 95/98, NT, 2000 or Me	Windows 95/98, NT, 2000 or Me
PG/PC hardware	Pentium	Pentium	Pentium	Pentium
Recommended main memory in the PG/PC	64 MB	64 MB	64 MB	128 MB
Hard disk capacity required in the PG/PC ca.	8 MB	15 MB	10 MB	51 MB
Required software	STEP 7 V5.0 or V5.1	STEP 7, V5.0 or V5.1	STEP 7 V4.0, V5.0 or V5.1	STEP 7 V5.0 or V5.1
Characteristics				
Monitor variables	Yes	Yes	Yes	Yes
Control variables	Yes	Yes	Yes	Yes
Single step processing	Yes	Yes	-	-
Linked into CFC	Yes	-	Yes	Yes
Program runtimes				
For S7-300 (typical)	Similar to LAD/FBD/STL	3 ms per block + 1 ms per active step	0.1 ms per graph group + 0.1 ms per status graph	Dependent on connected blocks
For S7-400 (typical)	Similar to LAD/FBD/STL	0.4 ms per block + 0.06 ms per active step	0.1 ms per graph group + 0.1 ms per statusgraph	Dependent on connected blocks
Diagnostics				
Linking of the diagnostics data in ProAgent	-	Yes	Yes	-
Linking of the diagnostics data in ProTool/Pro	-	Using ProAgent	Using ProAgent	-
Linking of the diagnostics data in WinCC	-	Using ProAgent	Using ProAgent (available soon)	-
Standards supported				
IEC 61131-3	PLCopen certification • Base Level ST available • Conformity and Reusability Level ST (available soon)	PLCopen certification • Base Level SFC available	Compatible extension of the IEC standard	Based on IEC standard

Technical specifications (continued)

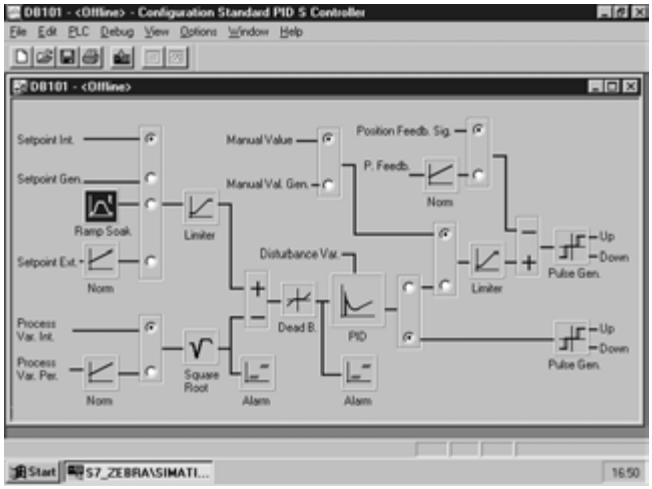
Engineering Tool	S7-SCL	S7-GRAPH	S7-HiGraph	CFC
Status of the PLCopen activities	Test profile for Conformity and Reusability Level ST available	-	-	-
Order versions/Licenses				
Single license (SL)	CD-ROM with • Tool • Electronic manual • Getting started and • Examples Authorization diskette Software product note Product information	CD-ROM with • Tool • Electronic manual • Getting started and • Examples Authorization diskette Software product note Product information	CD-ROM with • Tool • Electronic manual • Getting started and • Examples Authorization diskette Software product note Product information	CD-ROM with • Tool • Electronic manual • Getting started and • Examples Authorization diskette Software product note Product information
Order No.	6ES7 811-1CC04-0YX0	6ES7 811-0CC04-0YX0	6ES7 811-3CC03-0YE0	6ES7 813-0CC05-0YX0
Upgrade license (UG)	CD-ROM with • Tool • Electronic manual • Getting started and • Examples Authorization diskette Software product note Product information	CD-ROM with • Tool • Electronic manual • Getting started and • Examples Authorization diskette Software product note Product information	CD-ROM with • Tool • Electronic manual • Getting started and • Examples Authorization diskette Software product note Product information	CD-ROM with • Tool • Electronic manual • Getting started and • Examples Authorization diskette Software product note Product information
Order No.	6ES7 811-1CC04-0YX4	6ES7 811-0CC04-0YX4	6ES7 811-3CC03-0YE4	6ES7 813-0CC05-0YX4
Software Update Service (SUS)				
Order No.	6ES7 811-1CA01-0YX2	6ES7 811-0CA01-0YX2	6ES7 811-3BA01-0YX2	6ES7 813-0CA01-0YX2
Paper manuals	in 5 languages (Ger., Eng., Fr., Sp., It.)	in 3 languages (Ger., Eng., Fr.)	-	in 3 languages (Ger., Eng., Fr.)
Also part of				
STEP 7 Professional	Yes	Yes	-	-
S7 Trainer Package	Yes	Yes	Yes	-
PCS 7	Yes	-	-	Yes
D7-SYS	-	-	-	Yes

Engineering Tool	S7-PDIAG	S7-PLCSIM	TeleService	DOCPRO
License forms	Single license Upgrade	Single license Upgrade	Single license	Single license
Software class	A	A	A	A
Current version	V5.0	V5.0	V5.1	V5.1
Target system (recommended)	SIMATIC S7-300 (from CPU 314) SIMATIC S7-400	SIMATIC S7-300 SIMATIC S7-400 SIMATIC C7	SIMATIC S7-300/400 SIMATIC C7	SIMATIC S7-300/400 SIMATIC C7
Operating system	Windows 95/98, Windows NT/2000	Windows 95/98/Me, Windows NT/2000	Windows 95/98, Windows NT/2000	Windows 95/98/Me, Windows NT/2000
Required software packages	• from STEP 7 V3.2	• from STEP 7 V3.1	• from STEP 7 V3.1	• from STEP 7 V3.2
Recommended main memory in PG/PC	32 MB	32 MB	32 MB	32 MB
Disk storage requirement in PG/PC	6 MB	5 MB	2 MB	5 MB

Standard PID Control

Overview

- For integrating continuous PID controllers, pulse controllers and step controllers in the application program
- Reduces engineering costs thanks to space-saving parameterization and optimization of the controller
- For use in SIMATIC S7-300 (CPU 313 and higher), S7-400 and C7



Technical specifications

Data parameterizing tool	
Requirements	STEP 7 V4.0 or higher
Main memory capacity	16 MB

Data parameterizing tool	
Processor, min.	486
Windows swap file (swap range), approx.	20 MB (largest possible)

Standard function blocks	PID_CP (FB 1)		PID_ES (FB 2)		LP_SCHED (FC 1)	
Memory requirements	Load memory	RAM	Load memory	RAM	Load memory	RAM
• FB length in memory	8572 byte	7448 byte	8588 byte	7498 byte	1064 byte	976 byte
• DB length in the memory	1154 byte	510 byte	1100 byte	480 byte	184 byte[2)]	100 byte[2)]
Runtimes						
• In S7-300/C7[1)]	3.84 – 8.4 ms		4.32 – 8.4 ms		0.28 - 0.40 ms	
• In S7-400[1)]	0.16 – 0.35 ms		0.18 - 0.35 ms		0.03 - 0.08 ms	
Target system	SIMATIC S7-300 (CPU 313 or later), S7-400, C7					

1) Depending on CPU

2) With 5 control loops

Ordering data

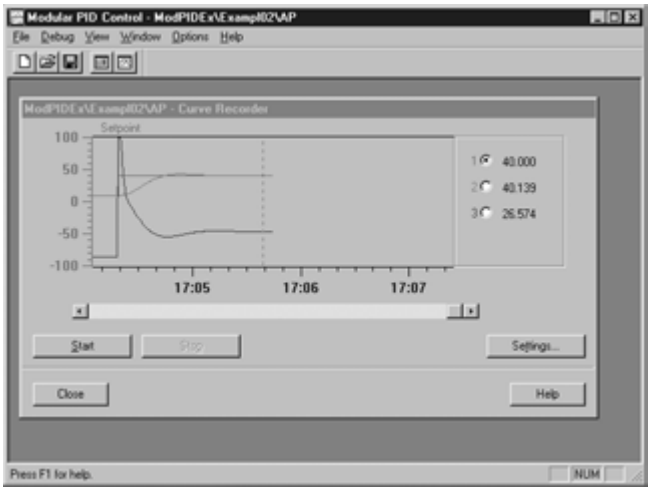
	Order No.
Parameterization tool Standard PID Control, V5	
Task: Parameterization tool for standard controls Prerequisites: STEP 7 V4.0 or later Supplied: with electronic manual/Getting Started in German, English; incl. authorization diskette	
Single license[1)]	**6ES7 830-2AA21-0YX0**
Software updating service[1)]	**6ES7 830-2AA00-0YX2**
Upgrade of single license from V2.x/4.0 to V5[1)]	**6ES7 830-2AA21-0YX4**

	Order No.
Standard function blocks Standard PID Control, V5	
Task: Standard function blocks for standard controls Target system: SIMATIC S7-300 (CPU 313 or better), S7-400, C7 Supplied: with electronic manual/Getting Started in German, English; incl. authorization diskette	
Single license[1)]	**6ES7 860-2AA21-0YX0**
Runtime license[1)]	**6ES7 860-2AA21-0YX1**
Upgrade of single license from V2.x/4.0 to V5[1)]	**6ES7 860-2AA21-0YX4**
Manual	
for parameterization tool and standard function blocks	
German	**6ES7 830-2AA21-8AG0**
English	**6ES7 830-2AA21-8BG0**
SIMATIC Manual Collection	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection updating service for 1 year	**6ES7 998-8XC01-8YE2**

1) For further information regarding software licenses, see Section 14

Overview

- For creating complex closed-loop control structures
- Preferred for implementation in closed-loop control equipment in mid-range and high-end applications and in process engineering
- For use in SIMATIC S7-300 (CPU 313 and higher), S7-400 and C7



Technical specifications

Startup Tool	
Requirements	From STEP 7 V3.1
Main memory capacity	16 MB

Startup Tool	
Processor, min.	486
Windows swap file (swap range), approx.	20 MB (largest possible)

Standard function blocks	A_DEAD_B		CRP_IN		CRP_OUT	
Memory requirements	Load memory	RAM	Load memory	RAM	Load memory	RAM
• FB length in memory	898 byte	692 byte	182 byte	70 byte	206 byte	96 byte
• DB length in the memory	186 byte	44 byte	122 byte	20 byte	114 byte	14 byte
Runtimes in S7-300/C7	0.13 to 0.17 ms		0.06 ms		0.18 to 0.22 ms	
Runtimes in S7-400	0.01 to 0.03 ms		0.01 to 0.02 m		0.01 to 0.04 ms	
Target system	SIMATIC S7-300 (from CPU 313), S7-400, C7		SIMATIC S7-300 (from CPU 313), S7-400, C7		SIMATIC S7-300 (from CPU 313), S7-400, C7	

Standard function blocks	DEAD_T		DEAD_BAND		DIF	
Memory requirements	Load memory	RAM	Load memory	RAM	Load memory	RAM
• FB length in memory	532 byte	394 byte	232 byte	120 byte	410 byte	268 byte
• DB length in the memory	142 byte	22 byte	114 byte	16 byte	158 byte	30 byte
Runtimes in S7-300/C7	0.26 to 0.33 ms		0.16 to 0.21 ms		0.55 to 0.71 ms	
Runtimes in S7-400	0.02 to 0.06 m		0.01 to 0.03 ms		0.03 to 0.09 ms	
Target system	SIMATIC S7-300 (from CPU 313), S7-400, C7		SIMATIC S7-300 (from CPU 313), S7-400, C7		SIMATIC S7-300 (from CPU 313), S7-400, C7	

Standard function blocks	ERR_MON		INTEG		LAG1ST	
Memory requirements	Load memory	RAM	Load memory	RAM	Load memory	RAM
• FB length in memory	558 byte	360 byte	488 byte	314 byte	534 byte	368 byte
• DB length in the memory	206 byte	52 byte	168 byte	36 byte	156 byte	30 byte
Runtimes in S7-300/C7	0.27 to 0.35 ms		0.40 to 0.51 ms		0.52 to 0.67 ms	
Runtimes in S7-400	0.01 to 0.05 ms		0.02 to 0.07 ms		0.03 to 0.09 ms	
Target system	SIMATIC S7-300 (from CPU 313), S7-400, C7		SIMATIC S7-300 (from CPU 313), S7-400, C7		SIMATIC S7-300 (from CPU 313), S7-400, C7	

Technical specifications (continued)

Standard function blocks	LAG2ND		LIMALARM		LIMITER	
Memory requirements	Load memory	RAM	Load memory	RAM	Load memory	RAM
• FB length in memory	690 byte	516 byte	390 byte	240 byte	262 byte	140 byte
• DB length in the memory	190 byte	46 byte	152 byte	28 byte	124 byte	20 byte
Runtimes in S7-300/C7	0.88 to 1.14 ms		0.47 to 0.61 ms		0.14 to 0.17 ms	
Runtimes in S7-400	0.04 to 0.16 ms		0.02 to 0.07 ms		0.03 to 0.01 ms	
Target system	SIMATIC S7-300 (from CPU 313), S7-400, C7		SIMATIC S7-300 (from CPU 313), S7-400, C7		Load memory	

Standard function blocks	LMNGEN_C		LMNGEN_S		NONLIN	
Memory requirements	Load memory	RAM	Load memory	RAM	Load memory	RAM
• FB length in memory	1576 byte	1280 byte	2578 byte	2152 byte	826 byte	672 byte
• DB length in the memory	276 byte	80 byte	360 byte	110 byte	138 byte	18 byte
Runtimes in S7-300/C7	0.32 to 0.41 ms		1.16 to 1.47 ms		0.32 to 0.41 ms	
Runtimes in S7-400	0.02 to 0.06 ms		0.06 to 0.18 ms		0.02 to 0.07 ms	
Target system	SIMATIC S7-300 (from CPU 313), S7-400, C7		SIMATIC S7-300 (from CPU 313), S7-400, C7		SIMATIC S7-300 (from CPU 313), S7-400, C7	

Standard function blocks	NORM		OVERRIDE		PARA_CTL	
Memory requirements	Load memory	RAM	Load memory	RAM	Load memory	RAM
• FB length in memory	234 byte	122 byte	362 byte	214 byte	406 byte	232 byte
• DB length in the memory	130 byte	24 byte	146 byte	28 byte	234 byte	82 byte
Runtimes in S7-300/C7	0.33 to 0.43 ms		0.15 to 0.18 ms		0.12 to 0.15 ms	
Runtimes in S7-400	0.02 to 0.07 ms		0.01 to 0.04 ms		0.01 to 0.03 ms	
Target system	SIMATIC S7-300 (from CPU 313), S7-400, C7		SIMATIC S7-300 (from CPU 313), S7-400, C7		SIMATIC S7-300 (from CPU 313), S7-400, C7	

Standard function blocks	PID		PULSEGEN		RMP_SOAK	
Memory requirements	Load memory	RAM	Load memory	RAM	Load memory	RAM
• FB length in memory	1560 byte	1242 byte	1110 byte	872 byte	1706 byte	1500 byte
• DB length in the memory	340 byte	98 byte	190 byte	34 byte	212 byte	62 byte
Runtimes in S7-300/C7	1.15 to 1.46 ms		0.17 to 0.20 ms		0.16 to 0.20 ms	
Runtimes in S7-400	0.06 to 0.18 ms		0.01 to 0.05 ms		0.01 to 0.04 ms	
Target system	SIMATIC S7-300 (from CPU 313), S7-400, C7		SIMATIC S7-300 (from CPU 313), 7-400, C7		SIMATIC S7-300 (from CPU 313), S7-400, C7	

Standard function blocks	ROC_LIM		SCALE		SP_GEN	
Memory requirements	Load memory	RAM	Load memory	RAM	Load memory	RAM
• FB length in memory	1242 byte	980 byte	136 byte	32 byte	658 byte	484 byte
• DB length in the memory	222 byte	50 byte	114 byte	16 byte	164 byte	40 byte
Runtimes in S7-300/C7	0.53 to 0.68 ms		0.10 to 0.13 ms		0.27 to 0.35 ms	
Runtimes in S7-400	0.02 to 0.09 ms		0.01 to 0.02 ms		0.02 to 0.06 ms	
Target system	SIMATIC S7-300 (from CPU 313), S7-400, C7		SIMATIC S7-300 (from CPU 313), S7-400, C7		SIMATIC S7-300 (from CPU 313), S7-400, C7	

Technical specifications (continued)

Standard function blocks	SPLT_RAN		SWITCH		LP_SCHED	
Memory requirements	Load memory	RAM	Load memory	RAM	Load memory	RAM
• FB length in memory	304 byte	180 byte	238 byte	116 byte	1104 byte	972 byte[1)]
• DB length in the memory	138 byte	28 byte	118 byte	18 byte	234 byte	64 byte[1)]
Runtimes in S7-300/C7	0.09 to 0.11 ms		0.07 to 0.09 ms		0.28 to 0.34 ms	
Runtimes in S7-400	0.01 to 0.02 ms		0.01 to 0.03 ms		0.03 to 0.08 ms	
Target system	SIMATIC S7-300 (from CPU 313), S7-400, C7		SIMATIC S7-300 (from CPU 313), S7-400, C7		SIMATIC S7-300 (from CPU 313), S7-400, C7	

1) With 5 control loops

Ordering data

	Order No.
Commissioning tool Modular PID Control, V4.0 for SIMATIC S7 and C7	
Task: Commissioning tool for modular PID controls Prerequisites: STEP 7 V3.1 or later Supplied: with electronic manual in German, English; incl. authorization diskette	
Single license[1)]	**6ES7 830-1AA10-0YX0**
Software updating service[1)]	**6ES7 830-1AA00-0YX2**
Standard function blocks Modular PID Control, V4.1	
Task: Standard function blocks for modular PID controls Target system: SIMATIC S7-300 (CPU 313 or better), S7-400, C7 Supplied: German, English; including authorization diskette, with electronic manual	
Single license[1)]	**6ES7 860-1AA10-0YX0**
Single license, without software or documentation[1)]	**6ES7 860-1AA10-0YX1**

1) For further information regarding software licenses, see Section 14

	Order No.
Manual	
for commissioning tool and standard function blocks	
German	**6ES7 830-1AA10-8AG0**
English	**6ES7 830-1AA10-8BG0**
SIMATIC Manual Collection	**6ES7 998-8XC01-8YE0**
Electronic manuals on CD-ROM, in 5 languages: S7-200/-300/-400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	
SIMATIC Manual Collection updating service for 1 year	**6ES7 998-8XC01-8YE2**
Current Manual Collection CD as well as the three following updates	

8

PID Self Tuner

Overview

- PID Self Tuner:
  For extending existing PID controllers into self-setting PI or PID controllers.
- Optimization of PI or PID controllers with 3-step action (HEATING – OFF – COOLING)
- Convenient on-line initial setting and on-line adaptation during operation.
- Ideal application is in temperature controllers but also suitable for level and flow controllers
- Used with SIMATIC S7-300 (CPU 313 upwards), SIMATIC S7-400 and SIMATIC C7; in combination with PID Control (integrated in STEP 7), standard PID Control, modular PID Control, FM 355, FM 455 as well as with any PID algorithm

Technical specifications

PID Self-Tuner	TUN_EC		TUN_ES	
Memory requirements	Load memory	RAM	Load memory	RAM
• FB length in memory	Approx. 6542 byte	Approx. 5956 byte	6332 byte	5714 byte
• DB length in the memory	644 byte	294 byte	638 byte	288 byte
Runtimes				
• In S7-300, C7	1.0 to 1.5 ms[1)]		1.0 to 1.5 ms[1)]	
• In S7-400	0.6 to 0.9 ms[1)]		0.06 to 0.19 ms[1)]	

1) Depending on the selected CPU

Ordering data

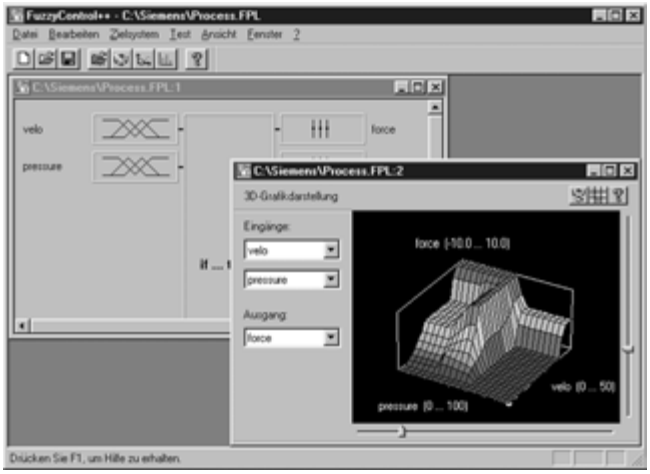
	Order No.
PID Self Tuner V5.0 Task: Online optimization for PID controllers Target system: SIMATIC S7-300 (CPU 313 or better), S7-400, C7 Supplied: Standard function blocks, electronic manual and Getting Started in German/English	
Single license[1)]	**6ES7 860-4AA01-0YX0**
Single license, without software or documentation[1)]	**6ES7 860-4AA01-0YX1**

1) For further information regarding software licenses, see Section 14

	Order No.
SIMATIC Manual Collection Electronic manuals on CD-ROM, in 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection updating service for 1 year Current Manual Collection CD as well as the three following updates	**6ES7 998-8XC01-8YE2**

Overview

- For creating Fuzzy systems for SIMATIC S7 and SIMATIC WinCC
- For use at all levels of automation from the stand-alone controller through to plant optimization
- Can be combined with classical PID controllers to utilize the advantages of both systems for optimized closed-loop control



Technical specifications

Technical specifications for the configuring tool	
Processor	PC or PG with 80486 processor (or higher)
Main memory, min.	16 MB RAM

Technical specifications for the configuring tool	
Hard disk	5 MB free storage space on the hard disk
Operating system	Windows 95 or Windows NT 4.0

Technical specifications Standard-Funktionsbausteine

	FUZZY_4K (FB 30)	FUZZY_20K (FB 31)	FUZZY_WinCC
Target system	SIMATIC S7-300 from CPU 314, SIMATIC S7-400	SIMATIC S7-400	SIMATIC WinCC
Communication between PC/PG and S7	MPI bus, SOFTNET® S7 for PROFIBUS	MPI bus, SOFTNET® S7 for PROFIBUS	Not required
Runtimes	Depending on the number of rules, inputs and outputs: 13 to 180 ms (S7-300) 1.8 to 22 ms (S7-400)	Depending on the number of rules, inputs and outputs: 1.8 to 150 ms (S7-400)	Not measurable
Memory requirements			
• FB	1524 byte	1524 byte	Not measurable
• DB	4228 byte	20612 byte	
Number of inputs	8 with up to 7 membership functions each	8 with up to 7 membership functions each	8 with up to 7 membership functions each
Number of outputs	4 with up to 9 membership functions each	4 with up to 9 membership functions each	4 with up to 9 membership functions each
Number of rules, max.	200	2000	2000

Ordering data

	Order No.
Fuzzy Control++ configuration tool	
Function blocks for S7-300/400 with CPU 314 or better	
Including SmartObject for SIMATIC WinCC, manual; Single license[1)]	
German	**6AT4 820-0BA05-0AA0**
English	**6AT4 820-0BA05-0BA0**
Upgrade from Fuzzy Control; German	**6AT4 810-2BA05-0AA0**
Upgrade from Fuzzy Control; English	**6AT4 810-2BA05-0BA0**
Function block copy license[1)]	**6AT4 810-0CA00-4XA0**

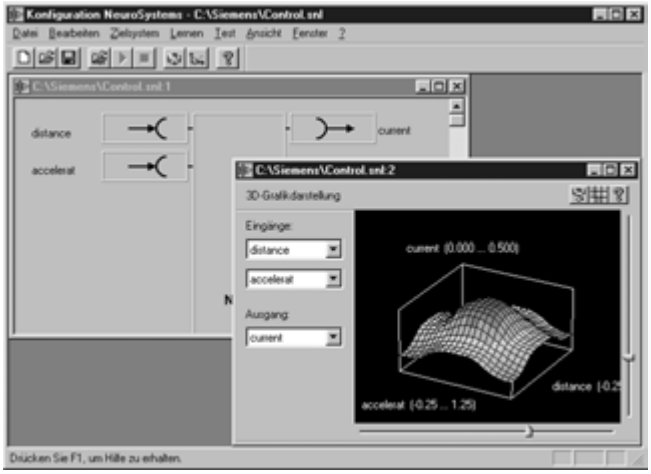
1) Further information regarding software licenses on request

	Order No.
SIMATIC Manual Collection	**6ES7 998-8XC01-8YE0**
Electronic manuals on CD-ROM, in 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	
SIMATIC Manual Collection updating service for 1 year	**6ES7 998-8XC01-8YE2**
Current Manual Collection CD as well as the three following updates	

NeuroSystems

Overview

- For creating and teaching neuronal networks
- For use with problems whose structure and solution are only partially known
- Applications:
  - Data-based optimization
  - Identification of characteristics or processes
  - Filtering of data
  - Data evaluation and interpretation
  - Non-linear single and multiple-variable closed-loop control
  - Pattern recognition and diagnostics



Technical specifications

Configuration tool	Requirements
Processor	PC or PG with 80486 processor (or higher)
Main memory, min.	16 MB RAM

Configuration tool	Requirements
Hard disk	5 MB free storage space on the hard disk
Operating system	Windows 95 or Windows NT 4.0

Function blocks	NEURO_4K (FB 100)	NEURO_20K (FB 101)	NEURO_WinCC
Target system	SIMATIC S7-300 from CPU 314, SIMATIC S7-400	SIMATIC S7-400	SIMATIC WinCC
Communication PC/PG – S7	MPI bus, SOFTNET® S7 for PROFIBUS	MPI bus, SOFTNET® S7 for PROFIBUS	Not required
Runtimes	Depending on the number of inputs,outputs and neurons: 6.5 to 270 ms (S7-300) 3.3 to 140 ms (S7-400)	Depending on the number of rules, inputs and outputs: 3.3 to 260 ms (S7-400)	Not measurable
Memory requirements			
• FB	2246 byte	2210 byte	Not measurable
• DB	4278 byte	20612 byte	
Number of inputs, max.	4	100	10
Number of outputs, max.	4	10	10
Types of network	MLP, RBF, Neuro-fuzzy	MLP, RBF, Neuro-fuzzy	MLP, RBF, Neuro-fuzzy

Ordering data

	Order No.
NeuroSystems configuration tool	
Function blocks for S7-300/-400 with CPU 314 or better	
Including SmartObject for SIMATIC, single license[1]	
German	**6AT4 821-0BA05-0AA0**
English	**6AT4 821-0BA05-0BA0**
Function block copy license[1]	**6AT4 811-0CA00-4XA0**

	Order No.
SIMATIC Manual Collection Electronic manuals on CD-ROM, in 5 languages: S7-200/-300/-400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection updating service for 1 year Current Manual Collection CD as well as the three following updates	**6ES7 998-8XC01-8YE2**

1) Further information regarding software licenses on request

Overview

- Driver for MODBUS protocol with RTU message format; Communication as master or slave
- Driver for full-duplex protocol for Data Highway Asynchronous Link from Allen Bradley
- Loadable on CP 341 and CP 441-2 (6ES7 441-2AA02-0AE0)

Technical specifications available drivers

MODBUS Master	
	• MODBUS protocol with RTU format • Master-slave link: SIMATIC S7 is master • Implemented function codes: 01, 02, 03, 04, 05, 06, 07, 08, 11,12,15,16 • No V.24 control and signal lines • CRC polynomial: X16 + x15 + x2 +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 multiples • Broadcast message possible
Settable parameters	• Transmission speed 300 bit/s up to 76800 bit/s; (TTY to 19200 bit/s) • Character frame • with/without RS 485 mode for 2-wire connections • with/without modem mode (ignore scratch characters) • Response monitoring time 100 ms to 25.5 s in 100 ms raster • Factor for character delay time 1-10 • Default of the receive line when using the X.27 interface module
MODBUS Slave	
	• MODBUS protocol with RTU format • Master-slave link: SIMATIC S7 is slave • Implemented function codes: 01, 02, 03, 04, 05, 06, 08, 15, 16 • No V.24 control and signal line • CRC polynomial X16 + x15 + x2 + 1 • Interfaces: TTY (20 mA), V.24 (RS 232C), X.27 (RS 422/485) 2-wire or 4-wire • Communication FB 180, Instance DB 180 (use of a multiinstance)

MODBUS Slave	
	• Conversion of the MODBUS data address to S7 data areas. Editable data areas: DB, bit memories, outputs, inputs, timers, counters • Character delay time 3.5 characters or multiples
Settable parameters	• Transmission speed 300 bit/s up to 76800 bit/s; (TTY to 19200 bit/s) • Character frame • Slave address of the CP (1 to 255) • with/without RS 485 mode for 2-wire connections • with/without modem mode (ignore scratch characters) • Factor for character delay time 1-10 • Number of the working DB (for FB processing) • Enabling of the memory areas that can receive data from the master • Default of the receive line when using the X.27 interface module • Conversion of the MODBUS data address to S7 data areas
Data Highway	
	• Data Highway Full Duplex (DF1) protocol • Interfaces: TTY (20 mA), V.24 (RS 232C), RS 422/485 (4-wire) • No "embedded responses"
Settable parameters	• Transmission speed 300 bit/s up to 76800 bit/s; (TTY to 19200 bit/s) • Character frame: 7/8 bit; 1/2 stop bit; even/odd/no paritiy • Receive mailbox DB and data word • Timeout for acknowledgement characters: 30 ms to 10 s • Repeat number for NAK: 0 to 5 • No of ENQ requests: 0 to 5 • Duplicate message transmission detection: On or Off • Acknowledgement of the CP immediately after receipt or after transfer to the CPU

Loadable drivers for CP 441-2 and CP 341

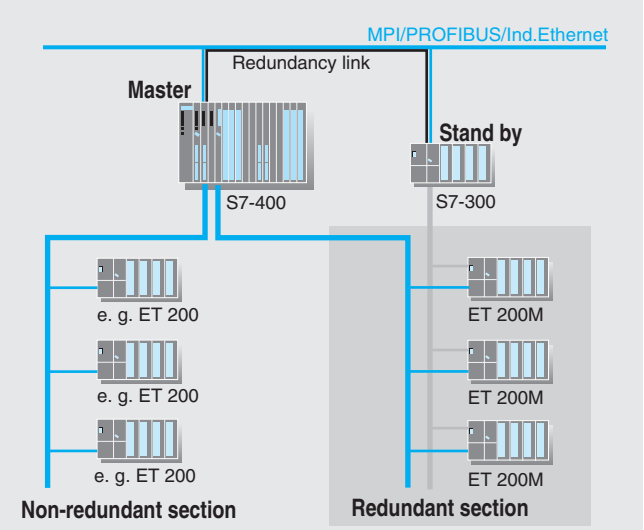
Ordering data	Order No.
MODBUS Master	
Task: Communication using MODBUS protocol with RTU format, SIMATIC S7 as the master Prerequisites: CP 341 or CP 441-2 Supplied: Driver program/documentation, German, English, French	
Single license[1]	**6ES7 870-1AA01-0YA0**
Single license, without software or documentation[1]	**6ES7 870-1AA01-0YA1**
MODBUS Slave	
Task: Communication using MODBUS protocol with RTU format, SIMATIC S7 as the slave Prerequisites: CP 341 or CP 441-2 Supplied: Driver program/documentation, German, English, French	
Single license[1]	**6ES7 870-1AB01-0YA0**
Single license, without software or documentation[1]	**6ES7 870-1AB01-0YA1**

1) For further information regarding software licenses, see Section 14

	Order No.
Data Highway	
Task: Communication over data highway asynchronous link with DF1 protocol Prerequisites: CP 341 or CP 441-2 Supplied: Driver program/documentation, German, English, French	
Single license[1]	**6ES7 870-1AE00-0YA0**
Single license, without software or documentation[1]	**6ES7 870-1AE00-0YA1**
SIMATIC Manual Collection Electronic manuals on CD-ROM, in 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection updating service for 1 year Current Manual Collection CD as well as the three following updates	**6ES7 998-8XC01-8YE2**

Overview

- Software package for assembling fault-tolerant control systems based on software
- Designed for control systems with single-channel distributed I/O
- For use in applications with low demands for changeover speed, such as the control of hydroelectric power plants, cooling circuits, traffic flows, regulation of levels, measured data acquisition
- Inexpensive thanks to the use of standard S7-300 and S7-400 components
- I/O linking with PROFIBUS DP in redundant configuration
- Optional control via WinCC operator station



Technical specifications

Hardware requirements	
CPU	S7-300: from CPU 315-2 DP, S7-400: all CPUs
Redundancy link of the CPUs	MPI, PROFIBUS, Industrial Ethernet; existing connections can also be used.
Suitable modules for ET 200M	IM 153-2, all DI/O, AI/O for ET 200M, counter module FM 350-1 and CP 341

Software requirements	
Configuring/programming	STEP 7 V4.0
Communications configuration for redundant PROFIBUS DP	NCM S7 for PROFIBUS

Ordering data

	Order No.
Program package Software redundancy V1.1 Task: To configure a redundant control Target system: SIMATIC S7-300, S7-400 Prerequisites: STEP 7 V4.0, NCM S7 for PROFIBUS Supplied: including electronic documentation (German, English, French, Spanish, Italian), 4 application examples and picture block for WinCC, on CD-ROM	
Single license (for 2 CPUs)[1]	**6ES7 862-0AC00-0YA0**
Single license, without software or documentation[1]	**6ES7 862-0AC00-0YA1**

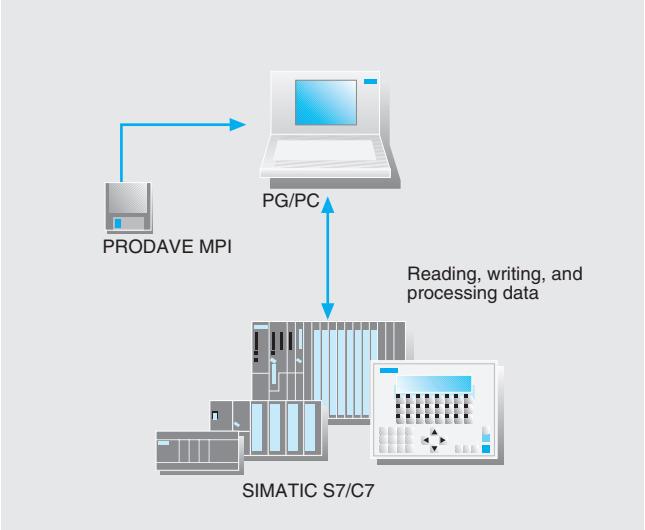
	Order No.
SIMATIC Manual Collection Electronic manuals on CD-ROM, in 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection updating service for 1 year Current Manual Collection CD as well as the three following updates	**6ES7 998-8XC01-8YE2**

1) For further information regarding software licenses, see Section 14

PRODAVE MPI

Overview

- The toolbox for process data traffic between SIMATIC S7, SIMATIC C7 and PG/PC
- For autonomous handling of data traffic via MPI/PPI



Ordering data

	Order No.
PRODAVE MPI V5.5 for Windows 95/98/NT 4.0 Task: Data link between PG/PC and SIMATIC S7/C7 with MPI (S7-200 with PPI) Prerequisites: Windows 95/98/NT 4.0/2000 Prof.; CP 5611, integral MPI or PC adapter Supplied: including documentation (German, English)	
Single license[1]	**6ES7 807-4BA00-0YA0**
Single license, without software or documentation[1]	**6ES7 807-4BA00-0YA1**
PRODAVE MPI Mini V5.5 for Windows 95/98/NT 4.0 Task: Data link between PG/PC and SIMATIC S7/C7 with MPI (S7-200 with PPI); with reduced scope of functions) Prerequisites: Windows 95/98/NT 4.0/2000 Prof.; CP 5611, integral MPI or PC adapter Supplied: including documentation (German, English)	
Single license[1]	**6ES7 807-3BA00-0YA0**
Single license, without software or documentation[1]	**6ES7 807-3BA00-0YA1**

1) For further information regarding software licenses, see Section 14

	Order No.
SIMATIC Manual Collection Electronic manuals on CD-ROM, in 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection updating service for 1 year Current Manual Collection CD as well as the three following updates	**6ES7 998-8XC01-8YE2**

Overview

- Low-price package for easy position controlled positioning.
- For use with every standard drive with adjustable speed, such as e.g. frequency converters, servo drive.
- For incremental and absolute sensor

Technical specifications

Supported hardware:

Easy Motion Control can be executed on the following CPUs:

- S7-300 with CPU 314C or higher
- S7-400
- C7 from C7-633 upwards
- WinAC

Supported modules for actual value acquisition:

- ET 200S 1 Count 5V/500 kHz,
- ET 200S 1 Count 24V/100kHz
- ET 200S 1SSI
- SM 338
- FM 350-1, FM 450-1
- SIMODRIVE sensor with PROFIBUS DP
- Other modules for actual value acquisition (using free driver)

Supported modules for setpoint output:

- ET 200S 2AO U
- SM 332
- SM 432
- Other modules for setpoint output (using free driver)

Required RAM in byte

Module	RAM required per module	Additional RAM required per instance
MoveInit	1034	-
MoveAbsolut	4214	198
MoveRelative	3278	186
MoveJog	3458	156
MoveHome	2838	144
MoveStop	1078	74

Required RAM in byte

Module	RAM required per module	Additional RAM required per instance
MoveControl	1592	62
MoveSimulation	426	72
Input driver	1552 - 2556	106 - 136
Output driver	366 - 450	58 - 68
Axle data block	-	294

Typical module execution times in µs

Module	CPU 316-2 DP 6ES7 316-2AG00-0AB0	CPU 314C 6ES7 314-6CF00-0AB0	CPU 416-2 6ES7 4162XK020AB0	Win LC auf P III, 450 MHz
MoveInit	1749	771	44	81
MoveAbsolut [1)]	2534	1115	72	102
MoveRelative [1)]	2562	1089	73	101
MoveJog [1)]	1797	834	56	93
MoveHome [1)]	313	169	17	38
MoveStop [1)]	635	290	23	37
MoveControl	698	343	27	60
MoveSimulation	796	295	32	44
Input driver	1447	832	54	421
Output driver	496	317	23	154

1) The marked travel blocks require a longer execution time when a travel motion is started. You will find further information on this subject in the manual.

Ordering data

	Order No.
Easy Motion Control V1.0 Task: Position-controlled positioning with variable-speed standard drives Prerequisites: Windows 95/98/NT 4.0/2000 Prof.; Supplied: including documentation (German, English)	
Single license[1)]	**6ES7 864-0AA00-0YX0**
Single license, without software or documentation[1)]	**6ES7 864-0AA00-0YX1**

1) For further information regarding software licenses, see Section 14

Technical specifications

Technical specifications

Parameterization software	Standard PID control	Modular PID Control	PID Self-Tuner
License form	Single license	Single license	-
Software class	A	A	-
Current version	V 5.0	V 4.0	-
Target system	SIMATIC S7-300 (CPU 313 and higher) SIMATIC S7-400 SIMATIC C7-620	SIMATIC S7-300 (CPU 313 and higher) SIMATIC S7-400 SIMATIC C7-620	-
Operating system	Windows 95 / NT	Windows 95 / NT	-
Required software package	STEP 7 V4.0 or higher	STEP 7 V3.1/V3.2 or higher	-
Memory configuration in PG/PC	16 MB	16 MB	-
Disk storage requirement in PG/PC	1.85 MB	1.85 MB	-
Standard FBs			**-**
Required libraries	Standard PID Control FBs V5.0	Modular PID Control FBs V4.0	PID Self-Tuner FBs V4.0
License forms	Single license und 1 runtime license;1 runtime license	Single license und 1 runtime license;1 runtime license	-
Software class	A	A	A
Current version	V 5.0	V4.1	V4.0
Target system	SIMATIC S7-300 (CPU 313 and higher) SIMATIC S7-400 SIMATIC C7-620	SIMATIC S7-300 (CPU 313 and higher) SIMATIC S7-400 SIMATIC C7-620	SIMATIC S7-300 (CPU 313 and higher) SIMATIC S7-400 SIMATIC C7-620
Operating system	Windows 95 / NT	Windows 95 / NT	STEP 7 V3.2 or higher
Required software package	STEP 7 V4.0 or higher	STEP 7 V3.1/V3.2 or higher	-
Memory configuration in PG/PC	16 MB	16 MB	-
Disk storage requirement in PG/PC	1.85 MB	1.85 MB	

Parameterization software	Fuzzy Control++	Neuro systems	Loadable drivers for CP 441-2 and CP 341
License form	Single license	Single license	Single license, copy license
Software class			
Current version			
Target system	SIMATIC S7-300 (CPU 314 and higher), SIMATIC S7-400	SIMATIC S7-300 (CPU 314 and higher), SIMATIC S7-400	SIMATIC CP 341 SIMATIC CP 441-2
Operating system	Windows 95 / NT	Windows 95 / NT	
Required software package			
Memory configuration in PG/PC	16 MB	16 MB	
Disk storage requirement in PG/PC	5 MB	5 MB	
Standard FBs			
Required libraries	Fuzzy Control++ FBs	Neuro systems FBs	
License forms	Single license	Single license	
Software class	A		
Current version	V4.0		
Target system	SIMATIC S7-300 (CPU 314 and higher), SIMATIC S7-400	SIMATIC S7-300 (CPU 314 and higher), SIMATIC S7-400	
Operating system	Windows 95 / NT	Windows 95 / NT	
Required software package			
Memory configuration in PG/PC	16 MB on PG/PC	16 MB on PG/PC	
Disk storage requirement in PG/PC	5 MB	5 MB	

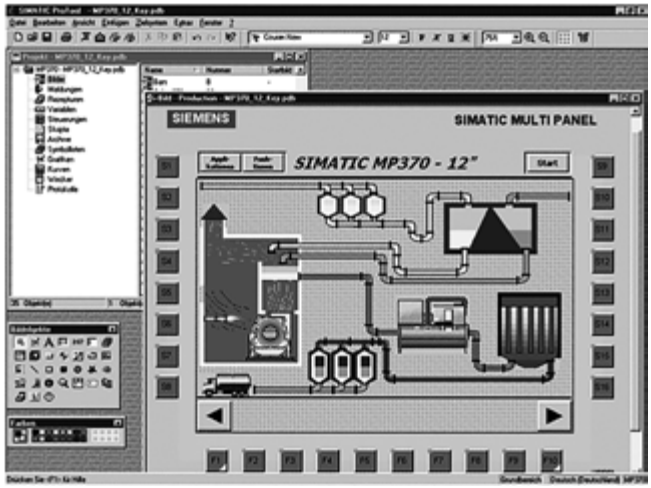
Technical specifications (continued)

Parameterization software	**Loadable drivers for CP 441-2 and CP 341**	**Software redundancy**	**PRODAVE MPI**
License form	Single license, copy license	Single license, copy license	Single license, copy license
Software class			A
Current version			V4.x
Target system	SIMATIC CP 341 SIMATIC CP 441-2	SIMATIC S7-300 (CPU 315-2 DP only) SIMATIC S7-400	SIMATIC S7-200 SIMATIC S7-300 SIMATIC S7-400 SIMATIC C7
Operating system			Windows 95/Windows NT
Required software package		STEP 7 V4.0	-
Memory configuration in target system			8 MB on PG/PC
Disk storage requirement in PG/PC			2 MB
Standard FBs			
Required libraries			-

SIMATIC ProTool/Lite and SIMATIC ProTool

Overview

- Consistent **configuration software** for all SIMATIC panels and for the HMI part of the SIMATIC C7
- Executable under Windows 98 SE/ME and Windows NT 4.0/2000
- Integration in STEP 7 Management of HMI projects with SIMATIC manager within STEP 7 projects and shared use of the symbol lists and communication parameters
- Efficient configuration; For example through standard Windows operator input mechanisms, validity controls, integrated online Help with direct help and cross-project copying of configuration data
- Easily modified configuration; through symbolic data management and cross-reference lists



Additional features available with graphics-oriented display operator and touch panels:

- Use of standard graphics editors; e.g. MS Paint for graphics imports or linking through OLE
- Library management for structured storage of reusable graphics objects
- Asian pictographic languages
- Pixel-graphics printout of process diagrams

Additional information:

http://www.siemens.com/protool

Technical specifications

Version	SIMATIC ProTool V6.0
Application	Configuring software for • TD17 text display • OP3, OP7, OP17 and OP 170B operator panels • OP27 and OP37 operator panels • OP 270 operator panels • TP 170A, TP 170B, TP27 and TP37 touch panels • TP 270 touch panels • MP 270B and MP 370 multi panels • SIMATIC C7-621,-623, -624, -626, -633, -634,-635
Delivery unit	CD-ROM
Languages	German English French Italian Spanish
Operating system	Windows 98 SE/ME; Windows NT/2000

Version	SIMATIC ProTool/Lite V6.0
Application	Configuring software for • TD17 text display • OP3, OP7, OP17 and OP 170B operator panels • Touch Panels TP 170A, TP 170B • SIMATIC C7-621, -623, -624, -633, -634, -635
Delivery unit	CD-ROM
Languages	German English French Italian Spanish Chinese (simplified) Chinese (traditional) Korean Japanese
Operating system	Windows 98 SE/ME; Windows NT/2000

Ordering data

	Order No.
Configuration software SIMATIC ProTool V6.0 + SP1A with ProAgent V6.0 + SP1A [1] (ProAgent for OP; ProAgent/MP) including native drivers on CD-ROM; electronic documentation (.pdf/.chm) in German, English, French, Spanish, Italian on CD-ROM	**6AV6 581-3BX06-0YX0**
Configuration software SIMATIC ProTool/Lite V6.0 + SP1A including native drivers on CD-ROM; electronic documentation (.pdf/.chm) in German, English, French, Spanish, Italian on CD-ROM	**6AV6 580-3BX06-0YX0**
Configuration software SIMATIC ProTool/Lite V6.0 + SP1A China/Taiwan/Korea/Japan including native drivers on CD-ROM; electronic documentation (.pdf/.chm) in English, Chinese (traditional and simplified), Korean and Japanese on CD-ROM	**6AV6 580-3BX06-0YV0**
Standard function blocks V3.32 for SIMATIC S5 for linking TD17, OP7, OP17, OP27, OP37, TP27, TP37; executes on SIMATIC S5-90U to -155U, on 3.5" diskettes (MS-DOS)	**6AV3 980-1AA21-0AX0**

	Order No.
Software update service	
SIMATIC ProTool [2] **Software update service**	**6AV6 581-3AX00-0AX2**
SIMATIC ProTool /Lite [2] **Software update service**	**6AV6 580-3AX00-0AX2**
Powerpack	
ProTool/Lite to ProTool V6.0 + SP1A including ProAgent V6.0 + SP1A	**6AV6 571-3AB06-0YX0**
Upgrade	
ProTool/Lite to ProTool/Lite V6.0 + SP1A	**6AV6 580-3BX06-0YX4**
ProTool to ProTool V6.0 + SP1A including ProAgent V6.0 + SP1A	**6AV6 581-3BX06-0YX4**
Documentation	
ProTool user manual, configure line-oriented displays	**6AV6 594-1AA06-0A 0**
ProTool user manual, configure graphic displays	**6AV6 594-1BA06-0A 0**
ProTool user manual, configure Windows-based systems	**6AV6 594-1MA06-0A 0**
Communication manual	
Description of TD/OP/TP connection to the controller	**6AV3 991-1BC05-1A 0**
Description of connection of Windows-based systems to the controller	**6AV6 596-1MA06-0A 0**
German	**A**
English	**B**
French	**C**
Italian	**D**
Spanish	**E**

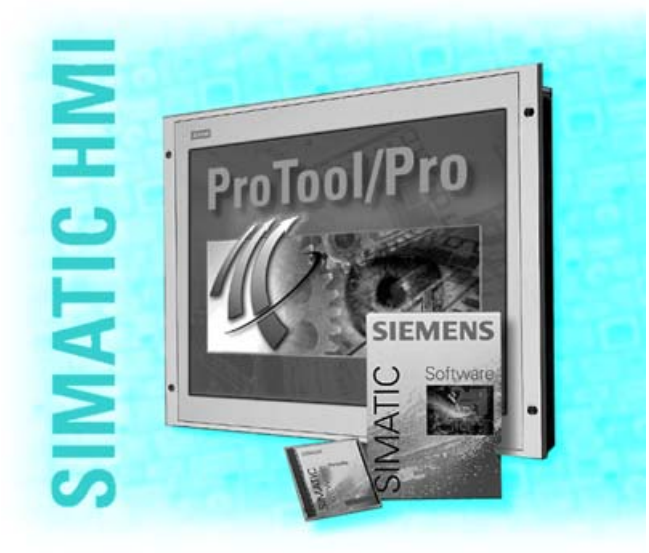
1) Runtime licenses for ProAgent must be ordered separately

2) For a period of 12 months and for a fixed price, the customer is automatically provided with all upgrades and service packs per installed ProTool or ProTool/Lite package. The contract is automatically extended by a further year unless cancelled 12 weeks prior to expiration.

SIMATIC ProTool/Pro

Overview

- SIMATIC ProTool/Pro® is the **PC-based HMI solution** in the machine sector
- SIMATIC ProTool/Pro consists of:
  - SIMATIC ProTool/Pro RT runtime software for PC-based systems
  - SIMATIC ProTool/Pro Configuration (CS) software
- For Windows 98 SE/ME and Windows NT4.0/2000
- SIMATIC ProTool/Pro CS supports configuration of SIMATIC Panels as well as the configuration of PC-based systems (see configuration software)



Additional information:

http://www.siemens.com/protoolpro

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Technical specifications

Type	SIMATIC ProTool/Pro Runtime
	The specifications are maximum values
Operating system	MS Windows 98 SE/ME, MS Windows NT 4.0/2000
Messages	4000
• Message text (number of characters)	70
• Message buffer size	1024
• Pending message events	500
Archives (number)	100
• Archivable data	Process values (max. 100), Messages
• Max. number of entries per archive (incl. sequential archive)	500,000
• Archive types	Polling archives, sequential archives (max. 40 per archive)
• Data storage format	CSV (**C**omma-**s**eparated **v**alues) and connection to ODBC database (database not included in delivery)
Recipes	1000
• Entries per recipe	2000 3)
• Data records	5000 2)
Diagrams	300
• Fields per diagram	400
• Variables per diagram	400
• Static text	30.000
• Graphics objects	2000
• Complex objects per picture (e.g. bars)	40

Type	SIMATIC ProTool/Pro Runtime
• Diagrams	300
• Trend curves	800
• Graphics lists 1)	500
• Text lists 1)	500
Number of entries in symbol lists	3.500
Variables	2048 3)
Password protection	
• Password levels	10 (0 - 9)
• Number of passwords	50
Visual Basic scripts	50
• Number of lines	100
Online languages, max.	5
Communication	
SIMATIC S7 MPI interface/ PROFIBUS DP interface	
• Number of connectable partners, max.	ProTool/Pro permits up to 8 connections, depending on the scope of configuration (communication)
SIMATIC S7 PPI interface	
• Number of connectable partners, max.	1 for ProTool/Pro
SIMATIC S5 loop-through arrangement	No
SIMATIC S5 PROFIBUS DP interface	
• Number of connectable partners, max.	1 for ProTool/Pro

1) Only 500 text and graphics lists in total.
2) Depends on the storage medium used
3) Depends on the number of licensed PowerTags.

Technical specifications (continued)

System requirements for	ProTool/Pro Runtime software	Configuration software ProTool
Operating system		
• Minimum	Windows 98 SE, Windows ME	
• Recommended	Windows NT 4.0 SP 6a, Windows 2000 SP2, for multi-language configurations Windows 2000 SP2 MUI	
Processor		
• Minimum	Pentium II, 233 MHz	
• Recommended	>= Pentium III, 500 MHz	
Graphics		
• Minimum	VGA	SVGA
• Recommended	SVGA with hardware acceleration	SVGA with hardware acceleration
Resolution		
• Minimum	640 x 480	800 x 600 [4]
• Recommended	800 x 600	
RAM [4]		
• Minimum	64 MB	
• Recommended	>= 128 MB	
Hard disk (free memory) [2]	>= 100 MB	>= 300 MB for ProTool + 40 MB for each additional language
Diskette drive [3]	3.5"/1.44 MB	-
CD-ROM	For software installation	

1) The RAM required depends in particular on the size of the graphics used.
2) Without taking archives into account.
In addition to ProTool/Pro, Windows also needs free hard disk space, for example for virtual memory (the swapfile). You can use the following formula as a guideline: Size of the swapfile = 3 x available RAM. For further information, please refer to your Windows documentation.
3) For authorization of the runtime software.
4) ProTool/Lite also 640 x 480

Ordering data

	Order No.
SIMATIC ProTool/Pro Configuration V6.0 + SP1A with ProAgent V6.0 + SP1A comprising: • ProTool/Pro Configuration (CS) V6.0 + SP1A • Simulation software for TP170A/B, OP170B, TP270, OP270, MP270®, MP270B, MP370 and ProTool/Pro Runtime • Native drivers • Electronic documentation (.pdf/.chm) in German, English, French, Spanish, Italian	**6AV6 582-2BX06-0YX0**
SIMATIC ProTool/Pro Runtime V6.0 + SP1 for PC systems, on CD-ROM, with license for:	
• 128 PowerTags (RT 128)	**6AV6 584-1AB06-0BX0**
• 256 PowerTags (RT 256)	**6AV6 584-1AC06-0BX0**
• 512 PowerTags (RT 512)	**6AV6 584-1AD06-0BX0**
• 2048 PowerTags (RT 2048)	**6AV6 584-1AF06-0BX0**
Upgrade	
Upgrade of SIMATIC ProTool/Pro to SIMATIC ProTool/Pro V6.0 + SP1A	**6AV6 582-2BX06-0YX4**

	Order No.
Powerpacks	
SIMATIC ProTool/Pro RT PowerTags from	
• 128 to 256 PowerTags	**6AV6 570-1BC00-0AX0**
• 128 to 512 PowerTags	**6AV6 570-1BD00-0AX0**
• 128 to 2048 PowerTags	**6AV6 570-1BF00-0AX0**
• 256 to 512 PowerTags	**6AV6 570-1CD00-0AX0**
• 256 to 2048 PowerTags	**6AV6 570-1CF00-0AX0**
• 512 to 2048 PowerTags	**6AV6 570-1DF00-0AX0**
Powerpack SIMATIC ProTool/Lite to ProTool/Pro 6.0 + SP1A including ProAgent V6.0 + SP1A	**6AV6 571-2AC06-0YX0**
Powerpack SIMATIC ProTool to ProTool/Pro V6.0 + SP1A including ProAgent V6.0 + SP1A	**6AV6 571-2BC06-0YX0**
Software update service	
SIMATIC ProTool/Pro software update service For a period of 12 months and for a fixed price, the customer is automatically provided with all upgrades and service packs per installed ProTool/Pro package. The contract is automatically extended by a further year unless cancelled 12 weeks prior to expiration.	**6AV6 582-3AX00-0AX2**

SIMATIC ProTool/Pro

Ordering data (continued)

	Order No.
Versions for China/Taiwan/Korea/Japan	
SIMATIC ProTool/Pro Configuration V6.0 + SP1A comprising: • ProTool/Pro Configuration (CS) V6.0 + SP1A • Simulation software for TP170A/B, OP170B, TP270, OP270, MP270, MP270B, MP370 and ProTool/Pro Runtime • Electronic documentation (.pdf/.chm) in English, Chinese (traditional and simplified), Korean and Japanese	**6AV6 582-2BX06-0YV0**
SIMATIC ProTool/Pro Runtime V6.0 + SP1 for PC systems, on CD-ROM, with single license for:	
• 128 PowerTags (RT 128)	**6AV6 584-1AB06-0BV0**
• 256 PowerTags (RT 256)	**6AV6 584-1AC06-0BV0**
• 512 PowerTags (RT 512)	**6AV6 584-1AD06-0BV0**
• 2048 PowerTags (RT 2048)	**6AV6 584-1AF06-0BV0**
Communications processors for PC	
CP 5511[1] PCMCIA card (16 bit) for connecting a PG or notebook to PROFIBUS or MPI	**6GK1 551-1AA00**
CP 5512 PCMCIA card (card bus, 32 bit) for connecting a PG or notebook to PROFIBUS or MPI under 32 bit Windows XP Professional	**6GK1 551-2AA00**
CP 5611[1] PCI card (32 bit) for connecting a PG or AT-PC to PROFIBUS or MPI	**6GK1 561-1AA00**
CP 5611 MPI[1] comprising CP 5611 and MPI cable (5 m)	**6GK1 561-1AM00**
CP 5613®[1] [2] [3] PCI card for connection of a PG or AT-PC to PROFIBUS	**6GK1 561-3AA00**
CP 5614®[1] PCI card for master and slave connection of a PG or AT-PC to PROFIBUS or MPI	**6GK1 561-4AA00**
Associated with CP 5613/5614: **S7-5613 communication software**	**6GK1 713-5CB60-3AA0**
Documentation (must be ordered separately)	
ProTool/Pro Runtime commissioning instructions	**6AV6 594-1CA06-0A■0**
ProTool user manual, configure Windows-based systems	**6AV6 594-1MA06-0A■0**
ProTool user manual, configure line-oriented displays	**6AV6 594-1AA06-0A■0**
ProTool user manual, configure graphic displays	**6AV6 594-1BA06-0A■0**
User manual, communication for Windows-based systems	**6AV6 596-1MA06-0A■0**
German	**A**
English	**B**
French	**C**
Italian	**D**
Spanish	**E**

1) For detailed description, see Catalog IK PI
2) CP 5613 with ProTool/Pro only released for communication with SIMATIC S7
3) Configuration download with CP 5613 is not possible with ProTool/Lite, ProTool and ProTool/Pro on line OPs, graphic OPs or touch panels

Overview

SIMATIC WinCC is the PC-based human machine interface, which in the current Version 5.1 runs under the Microsoft Windows NT4.0 and Windows 2000 operating systems.

SIMATIC WinCC offers a wide range of features for implementing automation solutions:

- Client–server structures with simple installation
- Safety in process operation and data integrity through redundancy
- Limitless function expansions through integration of ActiveX elements
- Open communication through OPC (OLE for Process Control)
- Simple and quick configuration through integration with SIMATIC STEP 7



The basic system configuration includes functions meeting industrial requirements for signaling of events, archiving of measured values, logging of all process and configuration data, user administration and visualization.

Additional information:

http://www.siemens.com/wincc

Technical specifications

Operating system	Windows NT4.0 Windows 2000
Hardware requirements for PC	
Processor	
• Minimum	>= Pentium II, 400 MHz
• Recommended	>= Pentium III, 400 MHz
RAM	
• Minimum	>= 128/256 MB (single-user/ server)[4], >= 128 MB (client) [4]
• Recommended	>= 256 MB (single-user/ server)[4]), >= 256 MB (client) [4]
Graphics	
• Minimum	SVGA (4 MB)
• Recommended	XGA (8 MB)
Hard disk	
• Minimum	> 3 GByte
• Recommended	> 3 GByte
• Hard disk (free disk space for installation)	
- minimum	650 MB
- recommended	>= 650 MB
CD-ROM	For software installation

Resolution	
• Minimum	800 x 600
• Recommended	1024 x 768
Functionality/quantity framework	
Messages (number)	50,000
• Message text (number of characters)	10 x 256
• Message archive	> 500.000 messages [2]
• Process values per message	10
Archives (number)	Determined by system [2]
• Archive types	Polling archives, sequential archives
• File format	Sybase SQL 7 or Dbase III [3]
User archives	
• Archive (recipes)	500
• Data records	65.536
• Fields per data record	500
Graphics system	
• No. of diagrams	Determined by system [2]
• No. of objects per picture	Determined by system [2]
• No. of operator-controllable fields per picture	Determined by system [2]

2) Depends on the storage medium used
3) DBase III only with tag-logging polling archives
4) At least 32 MB more when using online configuration.

SIMATIC WinCC

Technical specifications (continued)

Process variables	64 K [1]
Trend curves	
• Trend curves per picture	120
• Curve frame per picture	8
• Trend curves per curve frame	15
• Measured values on the hard disk (cyclic)	9.999.999
User administration	
• User groups	28
• No. of users	128
• Authorization groups	999
Runtime languages	> 9 per project
Configuration languages	5 European (GE/EN/FR/IT/ES), 4 Asian (PRC, TW, KR, JP)

Protocols	
• Signal sequence protocols (simultaneous)	1
• Message archive reports (concurrent)	1
• Application reports	Determined by system [2]
- report lines per body	72
- variables per report	64.000
C-scripts (Ansi-C)	Determined by system [2]
• No. of characters per script	32 KB (incl. header and spaces)
Multi-user system	
• Clients for server with operator terminal	3
• Clients for server without operator terminal	16

1) Depends on the number of licensed PowerTags.
2) Depends on the storage medium used.

3) DBase III only with tag-logging polling archives

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Ordering data

	Order No.
SIMATIC WinCC system software V4.02 + SP3	
Runtime packages on CD-ROM	
with license for:	
128 PowerTags (RT 128)	**6AV6 381-1BC04-0EX0**
256 PowerTags (RT 256)	**6AV6 381-1BD04-0EX0**
1024 PowerTags (RT 1024)	**6AV6 381-1BE04-0EX0**
64k PowerTags (RT Max)	**6AV6 381-1BF04-0EX0**
Complete packages on CD-ROM	
with license for:	
128 PowerTags (RC 128)	**6AV6 381-1BM04-0EX0**
256 PowerTags (RC 256)	**6AV6 381-1BN04-0EX0**
1024 PowerTags (RC 1024)	**6AV6 381-1BP04-0EX0**
64k PowerTags (RC Max)	**6AV6 381-1BQ04-0EX0**
WinCC V4.02 + SP1 versions for China/Taiwan/Korea/Japan	
Runtime packages on CD-ROM	
with license for:	
128 PowerTags (RT 128)	**6AV6 381-1BC04-0CV0**
256 PowerTags (RT 256)	**6AV6 381-1BD04-0CV0**
1024 PowerTags (RT 1024)	**6AV6 381-1BE04-0CV0**
64k PowerTags (RT Max)	**6AV6 381-1BF04-0CV0**
Complete packages on CD-ROM	
with license for:	
128 PowerTags (RC 128)	**6AV6 381-1BM04-0CV0**
256 PowerTags (RC 256)	**6AV6 381-1BN04-0CV0**
1024 PowerTags (RC 1024)	**6AV6 381-1BP04-0CV0**
64k PowerTags (RC Max)	**6AV6 381-1BQ04-0CV0**

	Order No.
SIMATIC WinCC system software V5.1	
Runtime packages on CD-ROM	
with license for:	
128 PowerTags (RT 128)	**6AV6 381-1BC05-1AX0**
256 PowerTags (RT 256)	**6AV6 381-1BD05-1AX0**
1024 PowerTags (RT 1024)	**6AV6 381-1BE05-1AX0**
64k PowerTags (RT Max)	**6AV6 381-1BF05-1AX0**
Complete packages on CD-ROM	
with license for:	
128 PowerTags (RC 128)	**6AV6 381-1BM05-1AX0**
256 PowerTags (RC 256)	**6AV6 381-1BN05-1AX0**
1024 PowerTags (RC 1024)	**6AV6 381-1BP05-1AX0**
64k PowerTags (RC Max)	**6AV6 381-1BQ05-1AX0**
WinCC V5.1 versions for China/Taiwan/Korea/Japan	
Runtime packages on CD-ROM	
with license for:	
128 PowerTags (RT 128)	**6AV6 381-1BC05-1AV0**
256 PowerTags (RT 256)	**6AV6 381-1BD05-1AV0**
1024 PowerTags (RT 1024)	**6AV6 381-1BE05-1AV0**
64k PowerTags (RT Max)	**6AV6 381-1BF05-1AV0**
Complete packages on CD-ROM	
with license for:	
128 PowerTags (RC 128)	**6AV6 381-1BM05-1AV0**
256 PowerTags (RC 256)	**6AV6 381-1BN05-1AV0**
1024 PowerTags (RC 1024)	**6AV6 381-1BP05-1AV0**
64k PowerTags (RC Max)	**6AV6 381-1BQ05-1AV0**

Ordering data (continued)

	Order No.
SIMATIC WinCC Powerpack	
for upgrading the maximum number of PowerTags of RT or RC system software packages and stations	
WinCC V4.02, for upgrading:	
Runtime packages	
128 to 256 PowerTags	**6AV6 371-1BD00-0BX6**
128 to 1024 PowerTags	**6AV6 371-1BE00-0BX6**
128 to 64k PowerTags	**6AV6 371-1BF00-0BX6**
256 to 1024 PowerTags	**6AV6 371-1BG00-0BX6**
256 to 64k PowerTags	**6AV6 371-1BH00-0BX6**
1024 to 64k PowerTags	**6AV6 371-1BJ00-0BX6**
Complete packages	
128 to 256 PowerTags	**6AV6 371-1BD10-0BX6**
128 to 1024 PowerTags	**6AV6 371-1BE10-0BX6**
128 to 64k PowerTags	**6AV6 371-1BF10-0BX6**
256 to 1024 PowerTags	**6AV6 371-1BG10-0BX6**
256 to 64k PowerTags	**6AV6 371-1BH10-0BX6**
1024 to 64k PowerTags	**6AV6 371-1BJ10-0BX6**
WinCC V5.0, for upgrading:	
Runtime packages	
128 to 256 PowerTags	**6AV6 371-1BD05-0AX0**
128 to 1024 PowerTags	**6AV6 371-1BE05-0AX0**
128 to 64k PowerTags	**6AV6 371-1BF05-0AX0**
256 to 1024 PowerTags	**6AV6 371-1BG05-0AX0**
256 to 64k PowerTags	**6AV6 371-1BH05-0AX0**
1024 to 64k PowerTags	**6AV6 371-1BJ05-0AX0**
Complete packages	
128 to 256 PowerTags	**6AV6 371-1BD15-0AX0**
128 to 1024 PowerTags	**6AV6 371-1BE15-0AX0**
128 to 64k PowerTags	**6AV6 371-1BF15-0AX0**
256 to 1024 PowerTags	**6AV6 371-1BG15-0AX0**
256 to 64k PowerTags	**6AV6 371-1BH15-0AX0**
1024 to 64k PowerTags	**6AV6 371-1BJ15-0AX0**
SIMATIC WinCC Upgrade/ Comprehensive Support[2]	
SIMATIC WinCC Upgrade	
for upgrading of RT and RC software packages or stations to the newest version	
V3.x to V4.02 + SP3 ▶	**6AV6 381-1AA04-0EX4**
V4 to V5.1 ▶	**6AV6 381-1AA05-1AX4**
V5.x to V5.1 ▶	**6AV6 381-1AA05-1AX3**
WinCC/Comprehensive Support[1]	**6AV6 381-1AA00-0AX5**
comprising • Current WinCC updates/ upgrades • WinCC Knowledge Base CD	

1) Comprehensive Support runs for one year. The contract is automatically extended by a further year unless cancelled 3 months prior to expiration.
2) According to the license conditions, 1 Upgrade or 1 Comprehensive Support package must be ordered for each WinCC station.

	Order No.
SIMATIC WinCC options	
Modular function expansions for all areas of the core system (e.g. archiving, graphics system, communication, operator prompting)	
WinCC V4.02	
• WinCC/User Archives[3]	**6AV6 371-1CB04-0AX7**
• WinCC/Server[3]	**6AV6 371-1CA04-0AX6**
• WinCC/CDK[4][5]	**6AV6 371-1EE04-0AX0**
• WinCC/ODK[4][5]	**6AV6 371-1CC04-0AX0**
• ODK upgrade package (from ODK V3 to ODK V4)	**6AV6 371-1CC04-0AX4**
• WinCC/Redundancy	**6AV6 371-1EF04-0AX6**
• WinCC/ProAgent	**6AV6 371-1DG04-5BX0**
• WinCC/Messenger&Guardian	**6AV6 371-1EJ04-0AX0**
• WinCC/Basic Process Control[3]	**6ES7 652-0XX01-2YA0**
• WinCC/Advanced Process Control[3]	**6ES7 652-0XX01-2YB0**
• WinCC/Storage	**6ES7 652-0XX01-2YC0**
WinCC V5.1	
• WinCC/User Archives	**6AV6 371-1CB05-0AX0**
• WinCC/Server	**6AV6 371-1CA05-0AX0**
• WinCC/CDK[4][5]	**6AV6 371-1EE05-0AX0**
• WinCC/ODK V5 SP1[4][5]	**6AV6 371-1CC05-0AX0**
• ODK upgrade package (from ODK V4 to ODK V5 SP1)	**6AV6 371-1CC05-0AX4**
• WinCC/Redundancy	**6AV6 371-1CF05-0AX0**
• WinCC/ProAgent V5.6	**6AV6 371-1DG05-6AX0**
• WinCC/ProAgent upgrade to V5.6	**6AV6 371-1DG05-6AX4**
• WinCC/Messenger V2.0 + SP1	**6AV6 371-1EJ05-0DX0**
• WinCC/Guardian Single User Edition V2.0 + SP1	**6AV6 371-1EJ05-0EX0**
• WinCC/Guardian Network Edition V2.0 + SP1	**6AV6 371-1EJ05-0FX0**
• WinCC/IndustrialX	**6AV6 371-1EL15-0AX0**
• WinCC/IndustrialX upgrade from V1 to V1.1	**6AV6 371-1EL15-0AX4**
• WinCC/Basic Process Control V5.2	**6ES7 652-0XX05-2YA0**
• WinCC/Storage V5.2	**6ES7 652-0XX05-2YC0**
• WinCC/Web Navigator	
- Base Pack (3 client licenses)	**6AV6 371-1DH05-1AX0**
- 10 client licenses	**6AV6 371-1DH05-1BX0**
- 25 client licenses	**6AV6 371-1DH05-1CX0**
- 50 client licenses	**6AV6 371-1DH05-1DX0**
• WinCC/Web Navigator Powerpacks	
- From 3 to 10 clients ▶	**6AV6 371-1DH05-0AB0**
- From 3 to 25 clients ▶	**6AV6 371-1DH05-0AC0**
- From 3 to 50 clients ▶	**6AV6 371-1DH05-0AD0**
- From 10 to 25 clients ▶	**6AV6 371-1DH05-0BC0**
- From 10 to 50 clients ▶	**6AV6 371-1DH05-0BD0**
- From 25 to 50 clients ▶	**6AV6 371-1DH05-0CD0**
• WinCC/Web Navigator	
- Diagnostics for client ▶	**6AV6 371-1DH05-1EX0**
- Diagnostics for server ▶	**6AV6 371-1DH05-1FX0**

3) Only for Windows NT
4) Incl. 1 day support; with CDK, 15 h telephone support in addition
5) Separate products – no license required

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SIMATIC WinCC

Ordering data (continued)

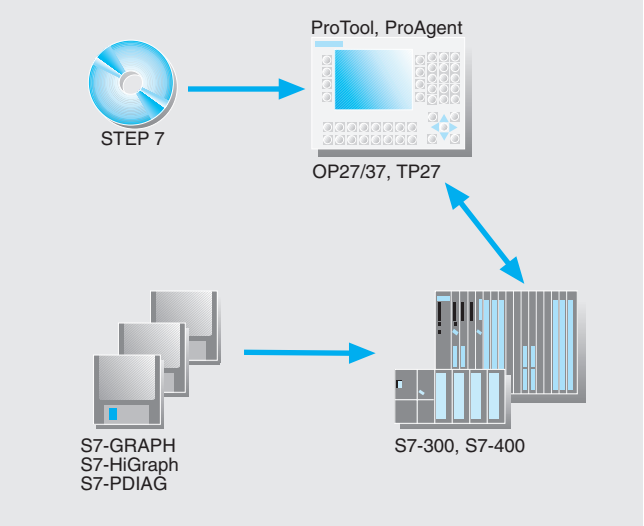
	Order No.
New WinCC options starting with WinCC V5.1	
• WinCC/Advanced User Administrator Extended user administration for SIMATIC WinCC V4.02 and V5.1	
- Engineering license for 1 project including 1 runtime license for an operator station, electronic documentation in German and English on CD-ROM	**6DL5 401-8AX00-0XX0**
- Runtime license for an operator station	**6DL5 401-8AX00-0XX1**
• SIMATIC IT PDA	
- SIMATIC IT PDA V4.2 (Process Data Archive) incl. 1 fat client	**6BQ3 073-2NA10-0AA0**
- Expansion by 5 PDA lean clients	**6BQ3 073-2NA20-0AA0**
• SIMATIC IT PPA	
- SIMATIC IT PPA V4.2 (Process Performance Analyzer) incl. 1 fat client	**6BQ3 073-2NA30-0AA0**
- Expansion by 5 PPA lean clients	**6BQ3 073-2NA40-0AA0**
• SIMATIC IT WinBDE machine management	
- Workstation License for connection of:	
1 machine/unit	**6BQ3 090-2AB10-0BA0**
8 machines/units	**6BQ3 090-2AB20-0BA0**
32 machines/units	**6BQ3 090-2AB30-0BA0**
- Supervisor License for connection of:	
64 machines/units	**6BQ3 090-2AB90-0BA0**
Contents of single licenses of WinBDE on CD-ROM: standard configuration; online customizing; user interfaces in Ge, En, Fr, Sp, It; electronic documentation in Ge, En	
Hardware for SIMATIC WinCC Control system options	
DCF77 receiver	
for time synchronization	
• DCF77 (Europe)	**2XV9 450-1AR14**
• GPS (worldwide)	**2XV9 450-1AR13**
Multi-VGA[1]	
• 2 screens	**6ES7 652-0XX02-1XE0**
• 4 screens	**6ES7 652-0XX02-1XE1**
Chipcard reader	**6ES7 652-0XX01-1XC0**
Chipcard for chipcard reader	**6ES7 652-0XX05-1XD1**
(pack of 10)	

1) Only executes with Basic Process Control option

	Order No.
SIMATIC WinCC documentation	
To be ordered separately	
SIMATIC WinCC basic documentation V4.0 in a slipcase	
comprising: WinCC manual (3 volumes) and software protection description	
German	**6AV6 392-1XA04-0AA0**
English	**6AV6 392-1XA04-0AB0**
French	**6AV6 392-1XA04-0AC0**
SIMATIC WinCC configuration manual V4.02	
comprising: configuration manual + CD with examples, Getting Started	
German	**6AV6 392-1CA04-0BA0**
English	**6AV6 392-1CA04-0BB0**
French	**6AV6 392-1CA04-0BC0**
SIMATIC WinCC basic documentation V5.0 in a slipcase	
comprising: WinCC manual and software protection description	
German	**6AV6 392-1XA05-0AA0**
English	**6AV6 392-1XA05-0AB0**
French	**6AV6 392-1XA05-0AC0**
SIMATIC WinCC configuration & communication manuals V5.0	
comprising: configuration manual + CD with examples, communication manual, Getting Started	
German	**6AV6 392-1CA05-0AA0**
English	**6AV6 392-1CA05-0AB0**
French	**6AV6 392-1CA05-0AC0**
WinCC options V5 manual	
comprising: User archives, client server, redundancy	
German	**6AV6 392-1DA05-0AA0**
English	**6AV6 392-1DA05-0AB0**
French	**6AV6 392-1DA05-0AC0**
WinCC manual Web Navigator V1.1	
with Getting Started	
German	**6AV6 392-1DC01-1AA0**
English	**6AV6 392-1DC01-1AB0**
French	**6AV6 392-1DC01-1AC0**

Overview

- Precise and rapid process fault diagnostics in plants and machines for SIMATIC S7 and SIMATIC HMI
- A standardized diagnostics concept for various SIMATIC components
- No further configuration for diagnostics functionality
- Reduces PLC memory and processor usage



Technical specifications

	ProAgent for OP	ProAgent/MP	ProAgent/PC	ProAgent/WinCC
Interfaces				
• Can be used in conjunction with the following automation equipment:	SIMATIC S7: S7-300/S7-400	SIMATIC S7: S7-300/S7-400	SIMATIC S7: S7-300/S7-400, WinAC	SIMATIC S7: S7-300/S7-400; WinAC
• Types of interface	SIMATIC S7 Protocol Suite: MPI, PROFIBUS DP	SIMATIC S7 Protocol Suite: MPI, PROFIBUS DP	SIMATIC S7 Protocol Suite: MPI, PROFIBUS DP	SIMATIC S7 Protocol Suite: MPI, PROFIBUS DP, Industrial Ethernet, TCP/IP
Displays				
Standard diagrams for:				
• Device/resolution in pixels/ presentation	OP27/320 x 240/ monochrom; OP27/320 x 240/ color; OP37/640 x 480/ color; TP27-6/320 x 240/ monochrom; TP27-6/320 x 240/ color; TP27-10/640 x 480/ color; TP37/640 x 480/ color; C7-626/320 x 240/ monochrom	TP 270/OP 270, 6" MP 270, 10" keys/ touch MP 370, keys/ touch	PC/1024 x 768 PC/800 x 600 Panel PC 670/870 15"/ 1024 x 768, keys/touch Panel PC 670/870 12"/800 x 600, keys/touch Panel PC 670, 10"/640 x 480 Panel PC IL70 12"/ 15" touch FI45/1024 x 768	PC/1024 x 768 PC/800 x 600 Panel PC 670/870 15"/1024 x 768, keys/touch Panel PC 670/870 12"/800 x 600, keys/touch Panel PC IL70 12"/ 15" touch (available soon) FI45/1024 x 768
No. of languages for online language selection	3 (G/E/F)	3 (G/E/F)	3 (G/E/F)	3 (G/E/F)
Functions				
• Overview diagram	Yes	Yes	Yes	Yes
• Message diagram	Yes	Yes	Yes	Yes
• Sequencer operating diagram	No	Yes	Yes	Yes
• Diagnostic detail diagram	Yes	Yes	Yes	Yes
- display STL/LAD/signal list	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
- display with operands with symbol and comment	OP27, C7-626, TP27-6: default setting symbols	Yes	Yes	Yes
• Criteria analysis	When fault occurs/current status	When fault occurs/current status	When fault occurs/current status	When fault occurs/current status
Motion diagram				
• No. of representable motions	OP27, C7-626, TP27-6: 4; OP37, TP27-10, TP37: 5;	6	6	6
• Directions of motion	2	2	2	2
• No. of representable end postions per movement	8	16	16	16

SIMATIC ProAgent

Technical specifications (continued)

	ProAgent for OP	ProAgent/MP	ProAgent/PC	ProAgent/WinCC
Documentation				
• In electronic form	G/E/F/I/S; incl. in delivery	G/E/F/I/S; incl. in delivery	G/E/F/I/S; incl. in delivery	G/E/F; incl. in delivery
Prerequisites				
• HMI software	ProTool V6.0	ProTool V6.0	ProTool/Pro V6.0	WinCC V5.1
• Operating system, configuration	Windows 98SE/ME, Windows NT+SP6, Windows 2000+SP2	Windows 98SE/ME, Windows NT+SP6, Windows 2000+SP2	Windows 98SE/ ME, Windows NT+SP6, Windows 2000+SP2	Windows NT+ SP6, Windows 2000+SP2
• Operating system, runtime	Runtime Operator Panel	Windows CE 3.0	Windows NT+ SP6, Windows 2000+SP2	Windows NT+ SP6, Windows 2000+SP2
• STEP 7				
- S7-GRAPH	Yes	Yes	Yes	Yes
- S7-PDIAG	Yes	Yes	Yes	Yes
- S7-HiGraph	No	Yes	Yes	No
Type of delivery (a license is required for each target hardware)	Licence verification	Runtime license	Runtime license	CD-ROM/ Runtime license

Ordering data

	Order No.
SIMATIC ProAgent for OP Runtime license Software option package for process diagnostics on basis of S7-GRAPH V4 or later and S7-PDIAG V4 or later, can be loaded with SIMATIC ProTool configuration software V6.0 or later[1] • Functions and standard screen forms for use on an OP27/OP37, TP27/TP37[2] or C7-626 in Ge, En, Fr, Sp, It • Functional expansion for ProTool • Electronic documentation in Ge, En, Fr, Sp, It	**6AV3 681-1AB06-0AX0**
SIMATIC ProAgent/MP Runtime license Software option package for process diagnostics on basis of S7-GRAPH V4 or later and S7-PDIAG V4 or later, can be loaded with SIMATIC ProTool configuration software V6.0 or later[1] • Functions and standard screen forms for use on an OP/TP270 and MP270/MP370 in Ge, En, Fr, Sp, It • Functional expansion for ProTool • Electronic documentation in Ge, En, Fr, Sp, It	**6AV3 681-1CB06-0AX0**
SIMATIC ProAgent/PC Runtime license Software option package for process diagnostics on basis of S7-GRAPH V4 or later and S7-PDIAG V4 or later, can be loaded with SIMATIC ProTool configuration software V6.0 or later[1] • Functions and standard screen forms for use on a Panel PC 670/ 870, 10", 12" and 15" keys, FI45, PC (resolution 640 x 480 pixels, 800 x 600 pixels and 1024 x 768 pixels) in Ge, En, Fr, Sp, It • Functional expansion for ProTool/Pro • Electronic documentation in Ge, En, Fr, Sp, It	**6AV3 681-1BB06-0AX0**

	Order No.
SIMATIC ProAgent/WinCC Runtime license Software option package for process diagnostics on basis of S7-GRAPH V4 or later and S7-PDIAG V4 or later, executes with SIMATIC WinCC • Functions and standard screen forms for use on an FI45, PC (resolution 800 x 600 pixels and 1024 x 768 pixels) and Panel PC 670/870 15" in Ge, En, Fr • Functional expansion for WinCC • Electronic documentation in Ge, En, Fr	
WinCC version:	
• V4.02 (ProAgent V4.5 + SP1)	**6AV6 371-1DG04-5BX0**
• V5 (ProAgent V5)	**6AV6 371-1DG05-6AX0**
Upgrades SIMATIC WinCC/ProAgent upgrade to V5.6	**6AV6 371-1DG05-6AX4**

1) Configuration software included on ProTool CD 6.0.
2) TP27, TP27-10 and TP37 with ProTool V5.1 or later

Overview

Automation and Drives Data Management (ADDM) gives you full control over the PLC – around the clock and regardless of program version. This new data management system guarantees comprehensive safety and transparency: whether for data access, security or comparison, for updates, version management or client server architecture.

Advantages:

- Reliable backup of all system and configuring data.
  Automatic backup with time control or manual
- Full transparency and overview: practice-oriented structure, ideal also for highly complex controllers – with uniform operator interface for all file types and formats
- Minimum downtimes also when exchanging hardware. System reset through feedback of all relevant data
- Optimum availability: Data in client-server and online systems can be reliably stored – for distributed customized control concepts
- Complete archiving: Machine daten can be completely versionized, archived and retrieved at any time
- Simple handling: programming knowledge unnecessary – saves on special training

Additional information:

http://www.siemens.de/automation/industrial-it

Ordering data

	Order No.
A&D Data Management V5.0	
Task: Data management system for control components and data Prerequisites: STEP 7 V5.1, Windows 95/98/NT 4.0 (client), Windows NT 4.0 (server), Ghost V5.1 from SYMANTEC Supplied: on CD, German, English; with online documentation	
Server (unlimited number of users)	**6BQ3 030-1AA00-3AB0**
Client	**6BQ3 030-1AA10-0AB0**
Single-user	**6BQ3 030-1AA30-3AB0**
Test license	**6BQ3 030-1AA70-3AB0**

	Order No.
Upgrade from V4.x to V5.0	
Serve	**6BQ3 030-1AA50-3AB0**
Client	**6BQ3 030-1AA40-3AB0**
Single-user	**6BQ3 030-1AA60-3AB0**
Software update service	
Server	**6BQ3 030-1AB00-8AB0**
Client	**6BQ3 030-1AA80-8AB0**

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Supplementary components

ServiceLab diagnostic software

Overview



- The intelligent multi-channel recorder for SIMATIC S5/S7 and SIPART-DR closed-loop controllers
- For the acquisition, visualization, analysis and archiving of system and machine data
- In conjunction with Teleservice, a powerful tool for remote system monitoring and troubleshooting by modem

Additional information:

http://www.siemens.de/automation/servicelab

Ordering data	Order No.		Order No.
ServiceLab diagnostics software Task: Intelligent multi-channel recorder for SIMATIC S5/S7 and SIPART DR controllers Prerequisites: Windows 95/98/NT 4.0/2000 Prof. Supplied: on CD, with manual in German			
Single license	**6ES5 886-8SL11**		

Technical product data for CAx applications

Overview

- Technical product data for S7-300, S7-400 and ET 200
- For in use in CAD/CAE applications
- Consists of:
  - Component data as per ECAD component standard
  - Dimensioned drawings for CAD/CAE systems
  - Macros/Macro libraries

Ordering data	Order No.		Order No.
Technical product data for CAx applications Task: Product data for use in CAD/CAE applications			
One off license	**6ES7 991-0CC00-0YX0**		
Software update service	**6ES7 991-0CC00-0YX2**		

EPROM programming device USB prommer

Overview

- External EPROM programming device
- For programming SIMATIC Memory Cards, SIMATIC Micro Memory Cards as well as SIMATIC EPROM and EEPROM modules
- Connection to the PC is made by means of the USB interface

For additional information see Section 9 „SIMATIC Programming devices“.

SIMATIC
Programming Devices

9



9/2 **Programming devices**
9/2 Field PG
9/5 Power PG

9/8 **Accessories**
9/8 EPROM programming device USB prommer
9/8 Trolley for Field PG and Power PG
9/9 UD 700 update device
9/10 CP 5613
9/12 CP 5613 FO
9/14 CP 5614
9/16 CP 5614 FO
9/18 CP 5511
9/19 CP 5512
9/20 CP 5611
9/21 CP 1613
9/23 CP 1612
9/24 CP 1512



Field PG

Overview



- The mobile, industry-standard PG
- Used mainly for commissioning, maintenance and service
- Ideal for mobile on-site use, even when space is at a premium or when traveling
- With the physical dimensions of a Notebook PC
- Suitable for immediate use with preinstalled software and all integrated interfaces
- Optical USB wheel mouse

Note:

The hardware components of the SIMATIC programming devices are subject to a continuous development cycle. Information about current products can be obtained from

- Your Siemens contact partner or
- The A&D Mall http://www.siemens.com/automation/mall

Technical specifications

General features	
Design	Notebook
Processor	Mobile Intel Celeron 900 MHz incl. 128 KB 2nd level cache; Optional Mobile Intel Pentium III 1 GHz incl. 256 KB 2nd level cache
Main memory	128 MB; expandable to 512 MB
Free expansion slots	PC card (PCMCIA): One type III or two type II
Graphics	Internal direct AGP Grafic with dynamic video memory; Max. 1600 x 1200 external monitor
Display	14.1 " (36 cm) TFT display, resolution 1024 x 768
Loudspeaker	16-bit stereo
Pointing device	Touch Pad
Operating system	Windows 2000 Professional or Windows NT
Power supply	External wide-range power supply unit, lithium-ion battery
Connection to theft protection	Kensington lock
Warranty	24 months on hardware components
Disk drives	
Hard disk	20 GB; 40 GB optional 2.5"
DVD-ROM/CD-ROM/CD-RW	8/24 speed DVD-ROM/CD-ROM drive optional 8/8/24 speed DVD-ROM/CD-RW drive
Diskette drive	1.44 MB; 3.5"
SuperDisk LS 240	240/120 MB Super Disks or 1.44 MB; 3.5"
Interfaces	
PROFIBUS DP/MPI	12 Mbit/s (CP 5611-compatible)
Ethernet	10/100 Mbit/s (CP 1411-compatible)
USB	1 x high power, 1 x low power
Serial	COM1 (V.24(RS 232 C)/TTY)
Application programmer interface	For memory cards, micro memory cards and SIMATIC S5 EPROM modules using an adapter
PC card (PCMCIA)	One type III or two type II
VGA	1 x
Headset	1 x (stereo)
Microphone	1 x (stereo)
Ambient conditions	
Degree of protection as per EN 60529	Front IP 30 when device is closed
Vibrations	Checked as per DIN IEC 68-2-6
• Operation	10 to 58 Hz: 0.01875 mm, 58 to 500 Hz: 4.9 m/s^2
• Transport	5 to 9 Hz: 3.5 mm; 9 to 500 Hz: 9.8 m/s^2
Resistance to shocks	Tested to DIN IEC 68-2-29
• Operation	50 m/s^2, 30 ms, 100 shocks
• Storage/Transport	250 m/s^2, 6 ms, 1000 shocks
Electromagnetic compatibility (EMC)	
• Noise emission	EN 55022 Class B
• Immunity to line-borne interference in power supply lines	± 2 kV (as per IEC 1000-4-4; 1995; burst) ± 1 kV (as per IEC 1000-4-5; 1995; symm. surge) ± 2 kV (as per IEC 1000-4-5; 1995; unsymm. surge)
• Immunity to signal line interference	± 1 kV (as per IEC 1000-4-4; 1995; burst; length < 3 m) ± 2 kV (as per IEC 1000-4-4; 1995; burst; length > 3 m) ± 1 kV (as per IEC 1000-4-4; 1995; symm. surge; length > 3 m) ± 2 kV (as per IEC 1000-4-4; 1995; asymm. surge, length > 3 m)

Technical specifications (continued)

Electromagnetic compability EMC	
• Immunity to static discharge interference	± 4 kV contact discharge (as per IEC 1000-4-2: 1995) ± 8 kV air discharge (as per IEC 1000-4-2: 1995)
• Immunity to high-frequency irradiated interference	10 V/m; 80 to 1000 MHz; 80% AM (as per ENV 50140: 1993) 10 V/m; 900 MHz 50% ED (to ENV 50204: 1995)
• Immunity to high-frequency current	10 V; 9 kHz to 80 MHz
• Immunity to magnetic field interference	30 A/m; 50 Hz
Temperature	Tested acc. to DIN IEC 60068-2-2 1994, DIN IEC 68-2-1, DIN IEC 68-2-14
• Operation[1]	+ 5 to + 40 °C
• Storage/Transport	- 20 to + 60 °C
• Gradient, max.	10 °C/h (no condensation)

1) Batteries can be charged only up to a temperature of 35°C (controlled with a charge controller)

Relative humidity	Tested acc. to DIN IEC 68-2-3, DIN IEC 68-2-30, DIN IEC 68-2-56
• Operation	5% to 80% at 25 °C (no condensation)
• Storage/Transport	5% to 95% at 25 °C (no condensation)
Weights and dimensions	
Dimensions (W x H x D) in mm	328 x 294 x 52
Weight, approx.	3.9 kg

Ordering data

Field PG programming device	Order No. 6ES7 710- A - 3
CPU	
• Celeron 900 MHz, 128 KB 2nd level cache	4
• Pentium III 1 GHz, 256 KB 2nd level cache	5
Installed software	
• Upgrade installation	A
• STEP 7, STEP 7 Micro/WIN	B
• STEP 5, STEP 7, STEP 7 Micro/WIN	C
• STEP 5, STEP 7 Professional, STEP 7 Micro/WIN	D
Main memory	
• 128 MB RAM (1x128 MB SDRAM)	1
• 256 MB RAM (1x256 MB SDRAM)	3
• 512 MB RAM (2x256 MB SDRAM)	5
Hard disk drive	
• 20 GB EIDE	4
• 40 GB EIDE	5
Drives	
• DVD/CD-ROM drive, 1.44 MB diskette drive	3
• DVD-ROM/CD-RW drive, 1.44 MB diskette drive	4

Field PG programming device	Order No. 6ES7 710- A - 3
Operating system	
• Windows 2000 MUI G,E,F,S,I	F
• Windows 2000 German	G
• Windows 2000 French	H
• Windows 2000 Spanish	J
• Windows 2000 Italian	K
• Windows NT V4.0 German	R
• Windows NT V4.0 English	S
Power supply cable (essential)	
• For Germany, France, The Netherlands, Spain, Belgium, Austria, Sweden, Finland	B
• For Great Britain	C
• For Switzerland	D
• For USA, Japan	E
• For Italy	F
• For Germany, France, the Netherlands, Spain, Belgium, Austria, Sweden, Finland; keyboard with country-specific inscriptions for France, Belgium, Switzerland	G
• For Switzerland; keyboard with country-specific inscriptions for France, Belgium, Switzerland	H

Field PG

Ordering data (continued)	Order No.
Memory upgrade	
64 MB	**6ES7 791-0KR00-0XA0**
128 MB	**6ES7 791-0KS00-0XA0**
256 MB	**6ES7 791-0KT00-0XA0**
USB mouse (PS/2-compatible)	**6ES7 790-0AA01-0XA0**
AC/DC power supply unit	**6ES7 798-0GA00-0XA0**
Power supply cable	
For Germany, France, the Netherlands, Spain, Belgium, Austria, Sweden, Finland	**6ES7 900-5AA00-0XA0**
For Great Britain	**6ES7 900-5BA00-0XA0**
For Switzerland	**6ES7 900-5CA00-0XA0**
For U.S.A., Japan	**6ES7 900-5DA00-0XA0**
For Italy	**6ES7 900-5EA00-0XA0**
Spare battery (Li-ions, 6 Ah)	**6ES7 798-0AA04-0XA0**
MPI cable	**6ES7 901-0BF00-0AA0**
for connecting PG and SIMATIC S7 via MPI; 5 m	
EPROM programming adapter	**6ES7 798-0CA00-0XA0**
for SIMATIC S5 EPROM programming using the Field PG	

	Order No.
Rucksack for Field PG	**6ES7 798-0DA00-0XA0**
Trolley for Field PG	**6ES7 798-0FA00-0XA0**
Rucksack with wheels and telescopic handle	
Parallel interface	
PC card (PCMCIA) with 25-pin Sub-D interface and associated software drivers	
• For use with Windows 98/Me/2000	**9AC1 001-1AB01-0AA0**
• For use with Windows 98/Me/2000	**9AC1 001-1AB02-0AA0**
Dual boot system	
for parallel operation of Windows NT 4.0 and Windows 98 SE; including parallel interface on PC card	
• For Field PG with Windows NT 4.0; German	**9AC1 001-1AB03-0AA0**
• For Field PG with Windows NT 4.0; English	**9AC1 001-1AB03-0BA0**
• For Field PG with Windows Me/2000; German	**9AC1 001-1AB04-0AA0**
• For Field PG with Windows Me/2000; English	**9AC1 001-1AB04-0BA0**

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Overview



- High-performance programming workstation
- Main focus of implementation: configuration, programming and simulation
- Ideal for use in the office as a replacement desktop PC thanks to flexible mounting and the wireless full keyboard
- High-end PC performance (e.g. 15" TFT display ...) as well as expansion capability with 2 PCI slots
- Includes pre-installed software and various integrated interfaces ready to be used.

Note:

The hardware components of the SIMATIC programming devices are subject to a continuous development cycle. Information about current products can be obtained from

- Your Siemens contact partner or
- The A&D Mall: http://www.siemens.com/automation/mall

Technical specifications

General features	
Design	Mobile computer
Processor	Intel Pentium III 1.26 GHz incl. 512 KB 2nd level cache
Main memory	128 MB; expandable to 512 MB
Graphics	ATI Rage Mobility with 8 MB video memory; external monitor with a resolution of up to 1600 x 1200
Display	15" (38 cm) TFT display, 1024 x 768 resolution
PC expansion slots	2 PCI (1 long; 1 short)
PC card slots	2 PC cards (PCMCIA): One type III or two type II
Loudspeaker	16-bit stereo
Pointing device	Touch Pad
Operating system	Windows 2000 Professional or Windows NT
Power supply	Internal wide-range power supply unit
Connection to theft protection	Kensington lock
Warranty	24 months on hardware components
Disk drives	
Hard disk	40 GB 3.5"
DVD-ROM/CD-ROM/CD-RW	8/24 speed DVD-ROM/CD-ROM drive Optional 8/8/24 speed DVD-ROM/CD-RW drive
Diskette drive	1.44 MB; 3.5"
SuperDisk LS 240	240/120 MB Super Disks or 1.44 MB; 3.5"
Interfaces	
PROFIBUS DP/MPI	12 Mbit/s (CP 5611-compatible)
Ethernet	10/100 Mbit/s (CP 1411-compatible)
USB	1 x high power, 1 x low power
Serial	COM1 (V.24(RS 232 C)/TTY)
Application programmer interface	For memory cards, micro memory cards and SIMATIC S5 EPROM modules using an adapter
LPT	1 x (Centronics; 25-pin)
VGA	1 x
Headset	1 x (stereo)
Microphone	1 x (stereo)
Ambient conditions	
Degree of protection as per EN 60529	Front IP 30 when device is closed
Vibrations	Checked as per DIN IEC 68-2-6
• Operation	10 to 58 Hz: 0.01875 mm, 58 to 500 Hz: 4.9 m/s^2
• Transport	5 to 9 Hz: 3.5 mm; 9 to 500 Hz: 9.8 m/s^2
Resistance to shocks	Tested acc. to DIN IEC 68-2-29
• Operation	50 m/s^2, 30 ms, 100 shocks
• Storage/Transport	250 m/s^2, 6 ms, 1000 shocks
Electromagnetic compatibility (EMC)	
• Noise emission	EN 55022 Class B
• Immunity to line-borne interference in power supply lines	± 2 kV (as per IEC 1000-4-4; 1995; burst) ± 1 kV (as per IEC 1000-4-5; 1995; symm. surge) ± 2 kV (as per IEC 1000-4-5; 1995; unsymm. surge)
• Immunity to signal line interference	± 1 kV (as per IEC 1000-4-4; 1995; burst; length < 3 m) ± 2 kV (as per IEC 1000-4-4; 1995; burst; length > 3 m) ± 1 kV (as per IEC 1000-4-4; 1995; symm. surge; length > 3 m) ± 2 kV (as per IEC 1000-4-4; 1995; unsymm. surge, length > 3 m)
• Immunity to static discharge interference	± 4 kV contact (as per IEC 1000-4-2; 1995 ± 8 kV air (as per IEC 1000-4-2; 1995

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Power PG

Technical specifications

• Electromagnetic compability (EMC)	
• Immunity to static discharge interference	10 V/m; 80 to 1000 MHz; 80% AM (as per ENV 50140: 1993) 10 V/m; 900 MHz 50% ED (as per ENV 50204: 1995)
• Immunity to high-frequency current	10 V; 9 kHz to 80 MHz
• Immunity to magnetic field interference	30 A/m; 50 Hz
Temperature	Tested acc. to DIN IEC 60068-2-2 1994, DIN IEC 68-2-1, DIN IEC 68-2-14
• Operation	+ 5 to + 40 °C
• Storage/Transport	- 20 to + 60 °C
• Gradient, max.	10 °C/h (no condensation)

Relative humidity	Tested acc. to DIN IEC 68-2-3, DIN IEC 68-2-30, DIN IEC 68-2-56
• Operation	5% to 80% at 25 °C (no condensation)
• Storage/Transport	5% to 95% at 25 °C (no condensation)
Weights and dimensions	
Dimensions (W x H x D) in mm	392 x 325 x 135
Weight, approx.	7 kg

Ordering data

Power PG programming device	Order No. **6ES7 750-□□A□□-□□□3**
CPU	
• Pentium I 1.26 GHz, 512 KB 2nd level cache	**2**
Installed software	
• Upgrade installation	**A**
• STEP 7, STEP 7 Micro/WIN	**B**
• STEP 5, STEP 7, STEP 7 Micro/WIN	**C**
• STEP 5, STEP 7 Professional, STEP 7 Micro/WIN	**D**
Main memory	
• 128 MB RAM (1x128 MB SDRAM)	**1**
• 256 MB RAM (1x256 MB SDRAM)	**3**
• 512 MB RAM (2x256 MB SDRAM)	**5**
Hard disk drive	
• 40 GB EIDE	**1**
Drives	
• DVD/CD-ROM drive, 1.44 MB diskette drive	**3**
• DVD-ROM/CD-RW drive, 1.44 MB diskette drive	**4**

Power PG programming device	Order No. **6ES7 750-□□A□□-□□□3**
Operating system	
• Windows 2000 MUI G,E,F,S,I	**F**
• Windows 2000 German	**G**
• Windows 2000 French	**H**
• Windows 2000 Spanish	**J**
• Windows 2000 Italian	**K**
• Windows NT V4.0 German	**R**
• Windows NT V4.0 English	**S**
Power supply cable (essential)	
• For Germany, France, the Netherlands, Spain, Belgium, Austria, Sweden, Finland	**B**
• For Great Britain	**C**
• For Switzerland	**D**
• For U.S.A., Japan	**E**
• For Italy	**F**
• For Germany, France, The Netherlands, Spain, Belgium, Austria, Sweden, Finland; keyboard with country-specific inscriptions for France, Belgium, Switzerland	**G**
• For Switzerland; keyboard with country-specific inscriptions for France, Belgium, Switzerland	**H**

Ordering data (continued)	Order No.
Memory upgrade	
128 MB	**6ES7 791-0LS00-0XA0**
256 MB	**6ES7 791-0LT00-0XA0**
USB mouse (PS/2-compatible)	**6ES7 790-0AA01-0XA0**
Power supply cable	
For Germany, France, The Netherlands, Spain, Belgium, Austria, Sweden, Finland	**6ES7 900-0AA00-0XA0**
For Great Britain	**6ES7 900-0BA00-0XA0**
For Switzerland	**6ES7 900-0CA00-0XA0**
For U.S.A., Japan	**6ES7 900-0DA00-0XA0**
For Italy	**6ES7 900-0EA00-0XA0**
MPI cable	**6ES7 901-0BF00-0AA0**
for connecting PG and SIMATIC S7 via MPI; 5 m	
EPROM programming adapter	**6ES7 798-0CA00-0XA0**
for SIMATIC S5 EPROM programming using the Power PG	

	Order No.
Rucksack for Power PG	**6ES7 798-0EA00-0XA0**
Trolley for Power PG	**6ES7 798-0FA00-0XA0**
Rucksack with wheels and telescopic handle	
Dual boot system	
for parallel operation of Windows NT 4.0 and Windows 98 SE	
• For Power PG with Windows NT 4.0; German	**9AC1 001-2AB03-0AA0**
• For Power PG with Windows NT 4.0; English	**9AC1 001-2AB03-0BA0**
• For Power PG with Windows Me/2000; German	**9AC1 001-2AB04-0AA0**
• For Power PG with Windows Me/2000; English	**9AC1 001-2AB04-0BA0**

EPROM programming device USB prommer

Overview



- External EPROM programming device
- For programming SIMATIC Memory Cards, SIMATIC Micro Memory Cards as well as SIMATIC EPROM and EEPROM modules
- For connection to the PC via the USB interface

Technical specifications

Supply voltage	90 to 264 V; 47 to 63 Hz; wide-range power supply unit
Ambient temperature	+5 °C to +40 °C
Transport and storage temperature	-20 °C to +60 °C
Dimensions (W x H x D) in mm	172 x 40 x 121
Weight, approx.	400 g

Ordering data

	Order No.
EPROM programming device USB prommer for programming SIMATIC memory cards and EPROM modules	**6ES7 792-0AA00-0XA0**

Trolley for Field PG and Power PG

Overview



- Trolley (carry case with telescopic handle and integral rollers) for the Field PG and Power PG

Technical specifications

Dimensions (W x H x D) in mm	380 x 510 x 250
Weight, approx.	1.5 kg

Ordering data

	Order No.
Trolley for Power PG Rucksack with wheels and telescopic handle	**6ES7 798-0FA00-0XA0**

UD 700 update device

Overview



- The service partner for simplified program updating
- For saving programs and configuration data
- With operator prompting on the display

Technical specifications

Degree of protection	Front: IP 65; Housing: IP 20
Ambient temperature	
• Operation	0 to 45 °C
• Storage and transport	-20 to +70 °C
Relative humidity	5 to 95% at 25 °C (no condensation), tested in accordance with DIN IEC 68-2--3
Electromagnetic compatibility	
• Emitted interference	Class B to EN 55022 = CISPR 22
• Immunity to interference on signal lines	+/-2 kV (acc. to IEC 1000-4-4; burst)
• Immunity to discharges of static electricity	+/-6 kV contact; +/-8 kV air (acc. to IEC 1000-4-2; ESD)
Mechanical strength	
• Vibration tested at	IEC 68, Part 2-6 10 to 58 Hz; constant amplitude 0.075 mm; 58 to 150 Hz; acceleration 9.8 m/s2
• Shock tested with	IEC 68, Part 2-27/29 half-sine 100 m/s2 (10 g), 16 ms

Dimensions (W x H x D) in mm	144 x 72 x 27
Weight, approx.	250 g (without cable)
Supply voltage	
• Rated value	24 V DC
• Permitted range	15 to 30 V
Current consumption, typ./ max.	80 mA/160 mA
Acceptance, certification	EN 61131-2 (IEC 1131-2)
	UL Listing UL 1950, E11 5352
	UL Listing Can. Standard C22.2 No. 950
	CSA to Standard C22.2 o. 950 or C22.2 No. 220, Report LR81690
	FM Approval, FM Standards No. 3611, Class I, Div. 2, Group A, B, C, D
	DIN/ISO 9001 Certification
Interfaces	
• to C7, S7-300	MPI (RS 485)

Ordering data

	Order No.
UD 700 update device for transferring configuration data from SIMATIC C7-62x, SIMATIC S7-300 (CPU 312 IFM/314 IFM); with connecting cable from UD to C7/S7, adapter for RS 232 cable, and manual in German/English	**6ES7 700-0AL00-0YA0**

	Order No.
RS 232 cable (zero modem cable) 9-pin female connector/9-pin female connector	**6ES7 901-1BF00-0XA0**
Power pack (accessory) for power supply if not connected to C7/S7	
240 V AC	**6ES7 705-0AA00-1AA0**
120 V AC	**6ES7 705-0AA00-1BA0**

CP 5613

Overview



- PCI card with microprocessor for system interfacing for PCs and SIMATIC programming devices/PC to PROFIBUS up to 12 Mbit/s
- Communication services:
  - PROFIBUS DP master according to IEC 61158/ EN 50170
  - PG/OP communication with STEP 5 and STEP 7.
  - S7 communication
  - S5-compatible communication (SEND/RECEIVE) on the basis of the FDL interface
  - PROFIBUS FMS according to IEC 61158/ EN 50170
- Extensive diagnostic facilities for installation, commissioning and operation of the module
- High performance through direct dual port RAM-access
- Event and filter mechanism for relieving the host CPU
- OPC servers are supplied with the communications software

Diagnostics

Extensive diagnostic tools are available (for installation, commissioning and operation) for the module itself and for the PROFIBUS network.

Therefore a PROFIBUS network can be started up quickly and easily with a CP 5613.

Technical specifications

Data transmission rates	9.6 kbit/s to 12 Mbit/s
Interfaces	
• Connection to PROFIBUS	9-pin Sub-D socket
• Connection to PG/PC	PCI (32 bit)
Supply voltage (from PCI)	5 V DC ±5%
Power consumption from 5 V	1.3 A
Power loss	6.5 W
Perm. ambient conditions	
• Operating temperature	
- without fan	+5 °C to +40 °C
- with fan (air current 0.5 m/s)	+5 °C to +60 °C
• Transport/storage temperature	-40 °C to +70 °C
• Relative humidity	max. 95% at +25 °C

Design	
• Module format	PCI card
• Dimensions (W x H) in mm	107 x 168
• Weight	Approx. 250 g
• Space required	1 x PCI slot
DP master	DP-V0, DP-V2
Performance data Single protocol mode	
• No. of connectable DP slaves	Max. 122
• No. of parallel FDL tasks to be processed	Max. 120
• No. of PG/OP and S7 connections	Max. 50 [1]
• No. of FMS connections	Max. 40 [2]

1) For credit = 1; PDU size ≤ 480 byte
2) For credit = 1

Ordering data

	Order No.
CP 5613 communications processor PCI card (32 bit) for connection to PROFIBUS, including DP-Base software with NCM PC; DP-RAM interface for DP master, including PG and FDL protocols; single license for one installation, runtime software, software and electronic manual on CD-ROM, class A, for 32-bit Windows NT 4.0 WS Server; 2000 Professional/Server; Windows XP Professional (available soon) German/English	**6GK1 561-3AA00**
DK-5613 development kit Software development kit for CP 5613/CP 5614/CP 5613 FO/ CP 5614 FO for linking into other operating system environments on systems with PCI slot You can find the DK-5613 on the Internet at: http://www.siemens.de/ simatic-net/dk5613	
DP-5613 V6.1 Software for DP, including PG and FDL protocols, OPC server and NCM PC; single license for one installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, class A, for 32-bit Windows XP Professional; including V6.0 for 32-bit Windows NT 4.0 WS/Server, 2000 Professional/Server, for CP 5613, CP 5613 FO, CP 5614, CP 5614 FO German/English	**6GK1 713-5DB61-3AA0**
S7-5613 V6.1 Software for S7 communication, including PG and FDL protocols, OPC server and NCM PC; single license for one installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, class A, for 32-bit Windows XP Professional; including V6.0 for 32-bit Windows NT 4.0 WS/Server, 2000 Professional/Server, for CP 5613, CP 5613 FO, CP 5614, CP 5614 FO German/English	**6GK1 713-5CB61-3AA0**

	Order No.
FMS-5613/Windows V6.0 Software for FMS protocol including PG/OP communication, FDL, FMS-OPC server; NCM PC under MS-Windows (32 bit): NT 4.0 WS, Server; 2000 Pro, Server; for CP 5613/CP 5614/CP 5613 FO/CP 5614 FO; single license for one installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, class A; German/English	**6GK1 713-5FB60-3AA0**
Manual "CP 5613/CP 5614 and SOFTNET for PROFIBUS" Paper version containing: description of interfaces (FMS, DP, S7, FDL), OPC server, configuring tools	
German	**6GK1 971-5DA00-0AA0**
English	**6GK1 971-5DA00-0AA1**
PROFIBUS FastConnect bus connector RS 485 Plug 180 with 180° outgoing feeder cable	**6GK1 500-0FC00**
PROFIBUS 12M bus terminal Bus terminal for connection of PROFIBUS stations up to 12 Mbit/s with connecting cable	**6GK1 500-0AA10**
SIMATIC NET software update service for Industrial Ethernet, PROFIBUS, OPC server, for one year of updates including manuals on CD-ROM, prerequisite: SIMATIC NET PC/Windows products German/English	**6GK1 704-0AA00-3AA2**

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CP 5613 FO

Overview



- PCI card with microprocessor for system interfacing for PCs and SIMATIC PGs/PC to the optical PROFIBUS with integrated interface up to 12 Mbit/s
- Integrated FOC interface for direct FO connection
- Communication services:
  - PROFIBUS DP master according to IEC 61158/ EN 50170
  - PG/OP communication with STEP 5 and STEP 7.
  - S7 communication
  - S5-compatible communication (SEND/RECEIVE) on the basis of the FDL interface
  - PROFIBUS FMS according to IEC 61158/EN 50170
- Extensive diagnostic facilities for installation, commissioning and operation of the module
- High performance through direct dual port RAM access
- Event and filter mechanism for relieving the host CPU
- Multiple protocol operation and parallel operation of up to 4 CPs
- OPC servers are supplied with the communication software

Diagnostics

Extensive diagnostic tools are available (for installation, commissioning and operation) for the module itself and for the PROFIBUS network.

Therefore a PROFIBUS network can be started up quickly and easily with a CP 5613 FO.

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Technical specifications

Data transmission rates	9.6 kbit/s to 12 Mbit/s
Interfaces	
• Connection to PROFIBUS	2 x duplex sockets (FO)
• Connection to PG/PC	PCI (32bit)
• External power supply (optical) via standard external power supply	Low voltage socket 3.5 mm/1.3 mm
Supply voltage from PCI	5 V DC +/- 5 % 12 V DC +/- 5 %
Current consumption	
• From 5 V DC	1.4 A
• From 12 V DC	0.3 A
Power loss	7 W
Supply voltage (optional)	DC 9 – 12 V
• Current consumption	0.4 A
• Power loss	3.6 –4.8 W

Perm. ambient conditions	
• Operating temperature	
- without a fan	+5 °C to +40 °C
- with fan (air current 0.5 m/s)	+5 °C to +60 °C
• Transport/storage temperature	-40 °C to +70 °C
• Relative humidity	max. 95% at +25 °C
Design	
• Module format	PCI card
• Dimensions (W x H) in mm	107 x 168
• Weight	Approx. 250 g
• Space required	1 x PCI slot
DP master	DP-V0, DP-V2
Performance data Single protocol mode	
• Number of connectable DP slaves	Max. 122
• Number of parallel FDL tasks to be processed	Max. 120
• Number of PG/OP and S7 connections	Max. 50 [1]
• Number of FMS connections	Max. 40 [2]

1) For credit = 1; PDU size ≤ 480 byte
2) For credit = 1

Ordering data	Order No.
CP 5613 FO communications processor PCI card (32 bit) for connection to optical PROFIBUS, including DP-Base software with NCM PC; DP-RAM interface for DP master, including PG and FDL protocols, single license for one installation, runtime software, software and electronic manual on CD-ROM, class A, for 32-bit Windows NT 4.0 WS Server; 2000 Professional/Server; Windows XP Professional (available soon) German/English	**6GK1 561-3FA00**
DK-5613 development kit Software development kit for CP 5613/CP 5614/CP 5613 FO/ CP 5614 FO for linking into other operating system environments on systems with PCI slot You can find the DK-5613 on the Internet at: http://www.siemens.de/ simatic-net/dk5613	
DP-5613 V6.1 Software for DP, including PG and FDL protocols, OPC server and NCM PC; single license for one installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, class A, for 32-bit Windows XP Professional; including V6.0 for 32-bit Windows NT 4.0 WS/Ser ver, 2000 Professional/Server, for CP 5613, CP 5613 FO, CP 5614, CP 5614 FO German/English	**6GK1 713-5DB61-3AA0**
S7-5613 V6.1 Software for S7 communication, including PG and FDL protocols, OPC server and NCM PC; single license for one installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, class A, for 32-bit Windows XP Professional; including V6.0 for 32-bit Windows NT 4.0 WS/Server, 2000 Professional/Server, for CP 5613, CP 5613 FO, CP 5614, CP 5614 FO German/English	**6GK1 713-5CB61-3AA0**

	Order No.
FMS-5613/Windows V6.0 Software for FMS protocol including PG/OP communication, FDL, FMS-OPC server; NCM PC under MS-Windows (32 bit): NT 4.0 WS, Server; 2000 Pro, Server; for CP 5613/CP 5614/ CP 5613 FO/CP 5614 FO; single license for one installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, class A; German/English	**6GK1 713-5FB60-3AA0**
Manual "CP 5613/CP 5614 and SOFTNET for PROFIBUS" Paper version containing: description of interfaces (FMS, DP, S7, FDL), OPC server, config- uring tools	
German	**6GK1 971-5DA00-0AA0**
English	**6GK1 971-5DA00-0AA1**
SIMATIC NET software update service for Industrial Ethernet, PROFIBUS, OPC server, for one year of updates including manuals on CD-ROM, prerequisite: SIMATIC NET PC/Windows prod- ucts German/English	**6GK1 704-0AA00-3AA2**

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CP 5614

Overview



- PCI card with microprocessor for system interfacing for PCs and SIMATIC programming devices/IPC to PROFIBUS up to 12 Mbit/s
- Communication services:
  - PROFIBUS-DP master interface according to IEC 61 158/EN 50 170 on a PCI card
  - PROFIBUS-DP slave interface according to IEC 61 158/EN 50 170 on a PCI card
  - PG/OP communication with STEP 5 and STEP 7.
  - S7 communication
  - S5-compatible communication (SEND/RECEIVE) on the basis of the FDL interface
  - PROFIBUS-FMS according to IEC 61 158/EN 50 170
- High performance through direct dual port RAM-access
- Event and filter mechanism for relieving the host CPU
- OPC servers are supplied with the communication software
- Can also be used in high temperature industrial environments

Diagnostics

Extensive diagnostic tools are available (for installation, commissioning and operation) for the module itself and for the PROFIBUS network.

- Therefore a PROFIBUS network can be started up quickly and easily with a CP 5614 FO.

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Technical specifications

Data transmission rates	9.6 kbit/s to 12 Mbit/s
Interfaces	
• Connection to PROFIBUS DP master	9-pin Sub-D socket
• Connection to PROFIBUS DP slave	9-pin Sub-D socket
• Connection to PG/PC	PCI (32 bit)
Supply voltage (from PCI)	5 V DC, ±/-5 %
Current consumption from 5 V DC	Approx. 1.6 A
Power loss	Approx. 8.0 W
Perm. ambient conditions	
• Operating temperature	
- without fan	+5 °C to +40 °C
- with fan (air current 0.5 m/s)	+5 °C to +60 °C
• Transport/storage temperature	-40 °C to +70 °C
• Relative humidity	Max. 95 % at + 25 °C

Design	
• Module format	PCI card
• Dimensions (W x H) in mm	107 x 168
• Weight	Approx. 300 g
• Space required	1 x PCI slot
DP-Master	DP-V0, DP-V1, DP-V2
DP-Slave	DP-V0, DP-V1
Performance data Single Protocol mode	
• No. of connectable DP slaves	Max. 122
• Data area of slave interface: input data, output data, diagnostics data	244 byte each
• No. of parallel FDL tasks to be processed	Max. 120
• No. of PG/OP and S7 connections	Max. 50 [1]
• No. of FMS connections	Max. 40 [2]

1) For credit = 1; PDU size ≤ 480 byte
2) For credit = 1

Ordering data	Order No.
CP 5614 communications processor PCI card (32 bit) for master and slave connection to PROFIBUS, including DP-Base software with NCM PC; DP-RAM interface for DP master, including PG and FDL protocols, single license for one installation, runtime software, software and electronic manual on CD-ROM, class A, for 32-bit Windows NT 4.0 WS Server; 2000 Professional/Server; Windows XP Professional (available soon) German/English	**6GK1 561-4AA00**
DK-5613 development kit Software development kit for CP 5613/CP 5614/CP 5613 FO/ CP 5614 FO for linking into other operating system environments on systems with PCI slot You can find the DK-5613 on the Internet at: http://www.siemens.de/ simatic-net/dk5613	
DP-5613 V6.1 Software for DP, including PG and FDL protocols, OPC server and NCM PC; single license for one installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, class A, for 32-bit Windows XP Professional; including V6.0 for 32-bit Windows NT 4.0 WS/Server, 2000 Professional/Server, for CP 5613, CP 5613 FO, CP 5614, CP 5614 FO German/English	**6GK1 713-5DB61-3AA0**
S7-5613 V6.1 Software for S7 communication, including PG and FDL protocols, OPC server and NCM PC; single license for one installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, class A, for 32-bit Windows XP Professional; including V6.0 for 32-bit Windows NT 4.0 WS/Server, 2000 Professional/Server, for CP 5613, CP 5613 FO, CP 5614, CP 5614 FO German/English	**6GK1 713-5CB61-3AA0**

	Order No.
FMS-5613/Windows V6.0 Software for FMS protocol including PG/OP communication, FDL, FMS-OPC server; NCM PC under MS-Windows (32 bit): NT 4.0 WS, Server; 2000 Pro, Server; for CP 5613/CP 5614/CP 5613 FO/CP 5614 FO; single license for one installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, class A; German/English	**6GK1 713-5FB60-3AA0**
Manual "CP 5613/CP 5614 and SOFTNET for PROFIBUS" Paper version containing: description of interfaces (FMS, DP, S7, FDL), OPC server, configuring tools	
German	**6GK1 971-5DA00-0AA0**
English	**6GK1 971-5DA00-0AA1**
PROFIBUS FastConnect bus connector RS 485 Plug 180 with 180° outgoing feeder cable	**6GK1 500-0FC00**
PROFIBUS 12M bus terminal Bus terminal for connection of PROFIBUS stations up to 12 Mbit/s with connecting cable	**6GK1 500-0AA10**
SIMATIC NET software update service for Industrial Ethernet, PROFIBUS, OPC server, for one year of updates including manuals on CD-ROM, prerequisite: SIMATIC NET PC/Windows products German/English	**6GK1 704-0AA00-3AA2**

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CP 5614 FO

Overview



- PCI card with microprocessor for system interfacing for PCs and SIMATIC PG/PC to the optical PROFIBUS with integrated interface up to 12 Mbit/s
- Integrated FOC interface for direct FO connection
- Communication services:
  - PROFIBUS DP master interface according to IEC 61158/EN 50170 on a PCI card
  - PROFIBUS DP slave interface according to IEC 61158/EN 50170 on a PCI card
  - PG/OP communication with STEP 5 and STEP 7.
  - S7 communication
  - S5-compatible communication (SEND/RECEIVE) based on the FDL interface
  - PROFIBUS-FMS according to IEC 61158/EN 50170
- High performance through direct dual port RAM access
- Event and filter mechanism for relieving the host CPU
- Multiple protocol operation and parallel operation of up to 4 CPs
- OPC servers are supplied with the communication software

Diagnostics

Extensive diagnostic tools are available (for installation, commissioning and operation) for the module itself and for the PROFIBUS network.

Therefore a PROFIBUS network can be started up quickly and easily with a CP 5614 FO.

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Technical specifications

Data transmission rates	9.6 kbit/s to 12 Mbit/s
Basic interface setting	
• PROFIBUS master	2 x duplex sockets (FO)
• PROFIBUS slave	9-pin Sub-D socket
Interfaces switchable through software call	
• PROFIBUS master	9-pin Sub-D socket
• PROFIBUS slave	2 x duplex sockets (FO)
• Connection to PG/PC	PCI (32 bit)
• External power supply (optional) through standard external power supply	Low voltage socket 3.5 mm/1.3 mm
Supply voltage (from PCI)	5 V DC +/- 5 %
	12 V DC+/- 5 %
Current consumption	
• From 5 V DC	1.6 A
• From 12 V DC	0.3 A
Power loss	8 W
Supply voltage (optional) external power supply	9 – 12 V DC
• Current consumption	0.4 A
• Power loss	3.6 –4.8 W

Perm. ambient conditions	
• Operating temperature	
- without fan	+5 °C to +40 °C
- with fan (air current 0.5 m/s)	+5 °C to +60 °C
• Transport/storage temperature	- 40 °C to +70 °C
• Relative humidity	Max. 95% at +25 °C
Design	
• Module format	PCI card
• Dimensions (W x H) in mm	107 x 168
• Weight	Approx. 300 g
• Space required	1 x PCI slot
DP-Master	DP-V0, DP-V2
DP-Slave	DP-V0, DP-V1
Performance data Single protocol mode	
• No. of connectable DP slaves	Max. 122
• Data area of slave interface: input data, output data, diagnostics data	244 byte each
• No. of parallel FDL tasks to be processed	Max. 120
• No. of PG/OP and S7 connections	Max. 50 [1]
• No. of FMS connections	Max. 40 [2]

1) For credit = 1; PDU size ≤ 480 byte
2) For credit = 1

Ordering data	Order No.
CP 5614 FO communications processor PCI card (32 bit) for master and slave connection to optical/ electrical PROFIBUS, including DP-Base software with NCM PC; DP-RAM interface for DP master, including PG and FDL protocols, single license for one installation, runtime software, software and electronic manual on CD-ROM, class A, for 32-bit Windows NT 4.0 WS Server; 2000 Professional/Server; Windows XP Professional (available soon) German/English	**6GK1 561-4FA00**
DK-5613 development kit Software development kit for CP 5613/CP 5614/CP 5613 FO/ CP 5614 FO for linking into other operating system environments on systems with PCI slot You can find the DK-5613 in the Internet at: http://www.siemens.de/ simatic-net/dk5613	
DP-5613 V6.1 Software for DP, including PG and FDL protocols, OPC server and NCM PC; single license for one installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, class A, for 32-bit Windows XP Professional; including V6.0 for 32-bit Windows NT 4.0 WS/Server, 2000 Professional/Server, for CP 5613, CP 5613 FO, CP 5614, CP 5614 FO German/English	**6GK1 713-5DB61-3AA0**
S7-5613 V6.1 Software for S7 communication, including PG and FDL protocols, OPC server and NCM PC; single license for one installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, class A, for 32-bit Windows XP Professional; including V6.0 for 32-bit Windows NT 4.0 WS/Server, 2000 Professional/Server, for CP 5613, CP 5613 FO, CP 5614, CP 5614 FO, German/English	**6GK1 713-5CB61-3AA0**

	Order No.
FMS-5613/Windows V6.0 Software for FMS protocol including PG/OP communication, FDL, FMS-OPC server; NCM PC under MS-Windows (32 bit): NT 4.0 WS, Server; 2000 Pro, Server; for CP 5613/CP 5614/CP 5613 FO/CP 5614 FO; single license for one installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, class A; German/English	**6GK1 713-5FB60-3AA0**
PROFIBUS FastConnect bus connector RS 485 Plug 180 with 180° outgoing feeder cable	**6GK1 500-0FC00**
PROFIBUS 12M bus terminal Bus terminal for connection of PROFIBUS stations up to 12 Mbit/s with connecting cable	**6GK1 500-0AA10**
PROFIBUS Plastic Fiber Optic, simplex plug/polishing kit	**6GK1 901-0FB00-0AA0**
PROFIBUS Plastic Fiber Optic, stripping tool set	**6GK1 905-6PA10**
Plug adapter 50 units	**6ES7 195-1BE00-0XA0**
Manual "CP 5613/CP 5614 and SOFTNET for PROFIBUS" Paper version containing: description of interfaces (FMS, DP, S7, FDL), OPC server, configuring tools	
German	**6GK1 971-5DA00-0AA0**
English	**6GK1 971-5DA00-0AA1**
SIMATIC NET software update service for Industrial Ethernet, PROFIBUS, OPC server, for one year of updates including manuals on CD-ROM, prerequisite: SIMATIC NET PC/Windows products German/English	**6GK1 704-0AA00-3AA2**

CP 5511

Overview



- For connecting PG/PCs and notebooks with PCMCIA slot to PROFIBUS and MPI of the SIMATIC S7
- Communication services:
  - PROFIBUS DP master class 1 including acyclic DP expansions with SOFTNET DP
  - PROFIBUS DP master class 2 including acyclic DP expansions with SOFTNET DP
  - PROFIBUS DP slave with SOFTNET DP slave
  - PG/OP communication
  - S7 communication with SOFTNET S7
  - S5-compatible communication (SEND/RECEIVE on the basis of the FDL interface) with SOFTNET DP or SOFTNET S7
- PCMCIA card type II; for PG/PCs with PCMCIA slot and notebooks
- Used with:
  - STEP 7, ProTool®, NCM PC, Micro/Win, ProTool/Pro®, SIMATIC PDM (for PG/OP communication)
  - COM PROFIBUS
  - SOFTNET-S7 (for S7 communication).
  - SOFTNET DP, (for DP)
- OPC servers are supplied with the communication software

Technical specifications

Data transmission rates	9.6 kbit/s bis 12 Mbit/s
Interfaces	
• Connection to PROFIBUS	9-pin Sub-D socket
• Connection to PG/PC	PCMCIA slot type II (16 bit)
Supply voltage	+5 V DC +/- 5%
Current consumption	Typ. 270 mA, max. 360 mA
Power loss	1.8 W
Perm. ambient conditions	
• Operating temperature	+5 °C at +40 °C
• Transport/storage temperature	-20 °C at +60 °C
• Relative humidity	Max. 95% at +25 °C

Design	
• Module format	PCMCIA type II
• Dimensions (W x H x D) in mm	54 x 85 x 5
• Weight	
- without adapter	30 g
- with adapter	130 g
• Space required	1 x PCMCIA slot type II
DP-Master	DP-V0
DP-Slave	DP-V0

Ordering data

	Order No.
CP 5511 communications processor PCMCIA card (16 bit) for connection of a PG or PC to PROFIBUS or MPI	**6GK1 551-1AA00**
SOFTNET-S7 V6.1 Software for S7 communication, incl. FDL protocol, OPC server and NCM PC; single license for one installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, class A, for Windows XP Prof. for CP 5511/5512/5611; incl. V6.0 for Windows NT 4.0 WS/ Server, 2000 Prof./Server for CP 5511/5611; German/English	**6GK1 704-5CW61-3AA0**
SOFTNET-DP V6.1 SW for DP protocol (Master Class 1 and 2), incl. FDL protocol, OPC server, NCM PC; single license for one installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, class A, for Windows XP Prof. for CP 5511/5512/5611; incl. V6.0 for Windows NT 4.0 WS/ Server, 2000 Prof./Server for CP 5511/5611; German/English	**6GK1 704-5DW61-3AA0**

	Order No.
SOFTNET-DP Slave V6.1 Software for DP slave, including OPC server, NCM PC; single license for one installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, class A, for Windows XP Prof. for CP 5511/ 5512/5611; including V6.0 for Windows NT 4.0 WS/Server, 2000 Prof./Server for CP 5511/5611; German/English	**6GK1 704-5SW61-3AA0**
PROFIBUS FastConnect bus connector RS 485 Plug 180 with 180° outgoing feeder cable	**6GK1 500-0FC00**
Manual "CP 5613/CP 5614 and SOFTNET for PROFIBUS"	See page 9/17
SIMATIC NET software update service	See page 9/17

Overview



- For connecting PG/PCs and notebooks with PCMCIA slot for Cardbus (32 bit) to PROFIBUS and MPI of the SIMATIC S7
- PCMCIA card type II for Cardbus (32 bit); for PG/PC with PCMCIA slot and notebooks
- Communication services:
  - PROFIBUS DP master class 1 including acyclic DP expansions with SOFTNET DP
  - PROFIBUS DP master class 2 including acyclic DP expansions with SOFTNET DP
  - PROFIBUS DP slave with SOFTNET DP slave
  - PG/OP communication
  - S7 communication with SOFTNET S7
  - S5-compatible communication (SEND/RECEIVE on the basis of the FDL interface) with SOFTNET DP or SOFTNET S7
- Used with:
  - STEP 7 ProTool, NCM PC, Micro/Win, ProTool/Pro, SIMATIC PDM (for PG/OP communication)
  - COM PROFIBUS
  - SOFTNET-S7 (for S7 communication)
  - SOFTNET-DP (for DP)
- OPC servers are supplied with the communication software

Technical specifications

Data transmission rate	9.6 kbit/s to 12 Mbit/s
Interfaces	
• Connection to PROFIBUS	9-pin Sub-D socket
• Connection to PG/PC	PCMCIA slot type II for Cardbus (32 bit)
Supply voltage	3.0 to 3.6 V DC
Current consumption	Typ. 520 mA
Power loss	1.8 W
Perm. ambient conditions	
• Operating temperature	+5 °C to +40 °C
• Transport/storage temperature	-20 °C to +60 °C
• Relative humidity	Max. 95% at +25 °C

Design	
• Module format	PCMCIA Typ II for Cardbus (32 bit)
• Dimensions (W x H x D) in mm	54 x 85 x 5
• Weight	
- without adapter	Approx. 30 g
- with adapter	Approx. 130 g
• Space required	1 x PCMCIA slot type II for Cardbus (32 bit)
DP-Master	DP-V0, DP-V1
DP-Slave	DP-V0, DP-V1

Ordering data

	Order No.
CP 5512 communications processor PCMCIA card (card bus, 32 bit) for connecting a PG or notebook to PROFIBUS or MPI, under 32 bit Windows XP Professional, executes under 32 bit Windows 2000 Professional and Windows XP Professional in conjunction with STEP 7 V5.2; German/English	**6GK1 551-2AA00**
SOFTNET-S7 V6.1	See page 9/18
SOFTNET-DP V6.1	See page 9/18

	Order No.
SOFTNET-DP Slave V6.1	See page 9/18
PROFIBUS FastConnect bus connector RS 485 Plug 180 with 180° outgoing feeder cable	**6GK1 500-0FC00**
Manual "CP 5613/CP 5614 and SOFTNET for PROFIBUS"	See page 9/17
SIMATIC NET software update service	See page 9/17

CP 5611

Overview



- For connecting PG/PC to PROFIBUS and MPI of the SIMATIC S7
- Communication services:
  - PROFIBUS DP master class 1 with SOFTNET-DP.
  - PROFIBUS DP master class 2 including acyclic DP expansions with SOFTNET-DP.
  - PROFIBUS DP slave with SOFTNET-DP slave
  - PG/OP communication
  - S7 communication with SOFTNET S7.
  - S5-compatible communication (SEND/RECEIVE on the basis of the FDL interface) with SOFTNET-DP or SOFTNET-S7
- Short PCI card for programming device/PC with PCI slot
- Used with:
  - STEP 7, STEP 7-Micro/Win, SIMATIC NCM PC, ProTool, ProTool/Pro, SIMATIC PDM (for PG/OP communication)
  - COM PROFIBUS
  - SOFTNET-S7 (for S7 communication).
  - SOFTNET DP (for DP)
- OPC servers are supplied with the communication software

Technical specifications

Data transmission rate	9.6 kbit/s to 12 Mbit/s
Interfaces	
• Connection to PROFIBUS	9-pin Sub-D socket
• Connection to PG/PC	PCI (32 bit)
Supply voltage	+5 V DC ±5%
Current consumption	0.5 A
Power loss	2.0 W
Perm. ambient conditions	
• Operating temperature	+5 °C to +40 °C
• Transport/storage temperature	-20 °C to +60 °C
• Relative humidity	Max. 95% at +25 °C

Design	
• Module format	PCI card
• Dimensions (H x D) in mm	102 x 130
• Weight	Approx. 100 g
• Space required	1 x PCI slot
DP-Master	DP-V0
DP-Slave	DP-V0

Ordering data

	Order No.
CP 5611 communications processor PCI card (32 bit) for connection of a PG or PC to PROFIBUS	**6GK1 561-1AA00**
CP 5611 MPI communications processor comprising PCI card (32 bit), CP 5611 and MPI cable, 5 m	**6GK1 561-1AM00**
SOFTNET-S7 V6.1	See page 9/18
SOFTNET-DP V6.1	See page 9/18
SOFTNET-DP Slave V6.1	See page 9/18

	Order No.
PROFIBUS FastConnect bus connector RS 485 Plug 180 with 180° outgoing feeder cable	**6GK1 500-0FC00**
PROFIBUS 12M bus terminal Bus terminal for connection of PROFIBUS stations up to 12 Mbit/s with connecting cable	**6GK1 500-0AA10**
Manual "CP 5613/CP 5614 and SOFTNET for PROFIBUS"	See page 9/17
SIMATIC NET software update service	See page 9/17

Overview



- PCI card with microprocessor for connecting PG/PC to Industrial Ethernet with 10/100 Mbit/s autosensing
- Communication services through
  - ISO or TCP/IP transport protocols
  - PG/OP communication
  - S7 communication
  - S5-compatible communication (SEND/RECEIVE)
  - TF protocol
- Delivery of the communication software includes the OPC servers (except PN OPC server and SNMP OPC server)
- 15-pin AUI/ITP
- RJ45 connection
- ISO and TCP/IP transport protocol onboard
- Large quantity framework

Technical specifications

Data transmission rate	10/100 Mbit/s
Interfaces Connection to Industrial Ethernet	
• AUI (10 Mbit/s) Half Duplex	15-pin Sub-D socket
• ITP (10/100 Mbit/s) Half Duplex Full Duplex	RJ45
• Connection to PG/PC	PCI (32 bit)
Supply voltage	5 V DC ±5% 12 V DC ±5%
Current consumption	
• From 5 V DC	600 mA
• From 12 V DC	500 mA
Power loss	4 W
Perm. ambient conditions	
• Operating temperature	+5 °C to +40 °C
• Transport/storage temperature	–20 °C to +60 °C
• Relative humidity	Max. 95% at +25 °C

Design	
• Module format	PCI card
• Dimensions (W x D) in mm	107 x 167
• Weight	Approx. 200 g
• Space required	1 x PCI slot
Performance data **Single protocol mode**	
S7 and PG/OP communication	
• No. of usable connections	
- ISO	Max. 120
- TCP/IP	Max. 120
S5-compatible communication (SEND/RECEIVE):	
• No. of usable connections	
- ISO	Max. 120
- TCP/IP	Max. 120
Sum of all configurable connections per PC station	Max. 207

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CP 1613

Ordering data	Order No.
CP 1613® communications processor PCI card for connection to Industrial Ethernet (10/100 Mbit/s) with AUI/ITP and RJ45 connections via S7-1613, TF-1613, PG-1613 and S7-REDCONNECT, including drivers for 32-bit Windows NT 4.0 WS/Server; 2000 Professional/Server, Windows XP (available soon)	**6GK1 161-3AA00**
S7-1613 V6.1 Software for S7 and S5 communication, including PG/OP communication, OPC server and NCM PC; up to 120 connections, single license for one installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, class A, for 32-bit Windows XP Professional; including V6.0 for 32-bit Windows NT 4.0 WS/Server, 2000 Professional/Server, for CP 1613; German/English	**6GK1 716-1CB61-3AA0**
TF-1613/Windows V6.0 Software for TF protocol, S5-compatible communication, including OPC, PG/OP communication under 32-bit Windows NT 4.0 WS/Server; Windows 2000 Professional/Server; for CP 1613, single license for one installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, class A German/English	**6GK1 716-1TB60-3AA0**
PG-1613/Windows V6.0 Software for PG/OP communication, NCM PC, under 32-bit Windows NT 4.0 WS/Server; Windows 2000 Professional/Server; for CP 1613, single license for one installation, runtime software, software and electronic manual on CD-ROM, class A; German/English	**6GK1 716-1PB60-3AA0**

	Order No.
S7-REDCONNECT V6.1 Software for fail-safe S7 communication via redundant networks, including S7 OPC server, S7-1613 V6.1, single license for one installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, class A, for 32-bit Windows XP Professional; including V6.0 for 32-bit Windows NT 4.0 WS/Server, 2000 Professional/Server, for CP 1613; German/English	**6GK1 716-0HB61-3AA0**
S7-REDCONNECT upgrade V6.1 for expansion of S7-1613 V6.1 to S7-REDCONNECT V6.1, including S7 OPC server, S7-1613 V6.1, single license for one installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, class A, for 32-bit Windows XP Professional; including V6.0 for 32-bit Windows NT 4.0 WS/Server, 2000 Professional/Server, for CP 1613; German/English	**6GK1 716-0HB61-3AA4**
Manual "CP 1613 and SOFTNET for Industrial Ethernet" Paper version: comprising description of interfaces (S7, TF, S5-compatible communication), OPC server, configuration tool for CP 1613	
German	**6GK1 971-1GA00-0AA0**
English	**6GK1 971-1GA00-0AA1**
SIMATIC NET software update service for Industrial Ethernet, PROFIBUS, OPC server, for one year of updates including manuals on CD-ROM, prerequisite: SIMATIC NET PC/Windows products German/English	**6GK1 704-0AA00-3AA2**

Overview



- For connection of PG/PC with PCI slot to Industrial Ethernet with 10/100 Mbit/s
- Communication services through ISO or TCP/IP transport protocols
  - PG/OP communication
  - S7 communication
  - S5-compatible communication (SEND/RECEIVE)
- Designed for use in industrial environments.
- PCI card
- Interfaces:
- RJ45 (Twisted Pair)
- Plug&Play
- Delivery of the communication software includes the OPC servers (except PN OPC server and SNMP OPC server)

Technical specifications

Data transmission rate	10/100 Mbit/s
Interfaces	
• Connection to Industrial Ethernet (10BaseT, 100BaseTX) Half Duplex Full Duplex	RJ45
• Connection to PG/PC	PCI (32 bit)
Supply voltage	+5 V DC ± 5%,12 V

Perm. ambient conditions	
• Operating temperature	0 °C to +50 °C
• Transport/storage temperature	–25 °C to +55 °C
• Relative humidity	Max. 95% at +25 °C
Design	
• Module format	PCI card
• Dimensions (H x D in mm)	50 x 120
• Weight	Approx. 100 g
• Space required	1 x PCI slot

Ordering data

	Order No.
CP 1612 communications processor PCI card (32 bit) for connecting a PG/PC to Industrial Ethernet (10/100 Mbit/s), with RJ45 connection, including drivers for 32-bit Windows 98, Me, NT 4.0, WS/Server, 2000 Pro/Server	**6GK1 161-2AA00**
SOFTNET-S7 V6.1 for Industrial Ethernet Software for S7- and S5-compatible communication, including OPC server, PG/OP communication, NCM PC, up to 64 connections; single license for one installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, class A, for 32-bit Windows XP Professional; including V6.0 for 32-bit Windows NT 4.0 WS/Server, 2000 Professional/Server, for CP 1512, CP 1612; German/English	**6GK1 704-1CW61-3AA0**

	Order No.
SOFTNET-PG V6.1 for Industrial Ethernet Software for PG/OP communication, single license for one installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, class A, for 32-bit Windows XP Professional; including V6.0 for 32-bit Windows NT 4.0 WS/Server, 2000 Professional/Server, for CP 1512, CP 1612; German/English	**6GK1 704-1PW61-3AA0**
SOFTNET-PG/Windows V3.3 for Industrial Ethernet Software for PG/OP communication, NCM PC, under MS-Windows (32 bit) 98, Me, NT 4.0 WS/Server, 2000 Professional; for CP 1411®/CP 1511/CP 1612/CP 1512, single license for one installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, class A; German/English	**6GK1 704-1PW33-3AA0**
Manual "CP 1613 and SOFTNET for Industrial Ethernet"	See page 9/22
SIMATIC NET software update service	See page 9/22

CP 1512

Overview



- For connection of PG/notebooks with PCMCIA slot (CardBus interface 32 bit) to Industrial Ethernet with 10/100 Mbit/s
- Communication services through ISO or TCP/IP transport protocols
  - PG/OP communication
  - S7 communication
  - S5-compatible communication (SEND/RECEIVE)
- Designed for use in industrial environments.
- PCMCIA card type II
- Interfaces: RJ45 (Twisted Pair)
- Plug&Play
- Delivery of the communication software includes the OPC servers (except PN OPC server and SNMP OPC server)

Technical specifications

Data transmission rate	10/100 Mbit/s
Interfaces	
• Connection to Industrial Ethernet (10BaseT, 100BaseTX) Half Duplex Full Duplex	RJ 45
• Connection to PG/PC	PCMCIA slot type II or type III (CardBus 32 bit)
Supply voltage	+3.3 V DC ± 5%
Operating mode	
• Full Duplex	At 10/100 Mbit/s
• Half Duplex	At 10/100 Mbit/s

Perm. ambient conditions	
• Operating temperature	0 °C to +60 °C
• Transport/storage temperature	-20 °C to +70 °C
• Relative humidity	Max. 90% at +25 °C
Design CP 1512	
• Module format	PCMCIA type II
• Dimensions (H x D in mm)	85.6 x 54 x 3
• Weight	30 g
• Space required	1 x PCMCIA slot type II
Design RJ 45-Adapter	
• Dimensions (H x W x D) in mm, approx.	40 x 22 x 20
• Weight, approx.	40 g
• Line length, approx.	20 cm

Ordering data

	Order No.
CP 1512 communications processor PCMCIA card (32-bit card bus) for connecting a PG/notebook to Industrial Ethernet, including 2 adapters for Industrial Twisted Pair and RJ45, including drivers for 32-bit Windows 98, Me, NT 4.0 WS/Server (system prerequisite: Cardwizard system software 5.2), 2000 Pro/Server; Windows XP Professional available soon	**6GK1 151-2AA00**
SOFTNET-S7 V6.1 for Industrial Ethernet Software for S7- and S5-compatible communication, including OPC server, PG/OP communication, NCM PC, up to 64 connections; single license for one installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, class A, for 32-bit Windows XP Professional; including V6.0 for 32-bit Windows NT 4.0 WS/Server, 2000 Professional/Server, for CP 1512, CP 1612; German/English	**6GK1 704-1CW61-3AA0**

	Order No.
SOFTNET-PG V6.1 for Industrial Ethernet Software for PG/OP communication, single license for one installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, class A, for 32-bit Windows XP Professional; including V6.0 for 32-bit Windows NT 4.0 WS/Server, 2000 Professional/Server, for CP 1512, CP 1612; German/English	**6GK1 704-1PW61-3AA0**
SOFTNET-PG/Windows V3.3 for Industrial Ethernet Software for PG/OP communication, NCM PC, under MS-Windows (32 bit) 98, Me, NT 4.0 WS/Server, 2000 Professional; for CP 1411/CP 1511/CP 1612/ CP 1512, single license for one installation, runtime software, software and electronic manual on CD-ROM, license key on diskette, class A; German/English	**6GK1 704-1PW33-3AA0**
SIMATIC NET software update service	See page 9/22

SIMATIC
PC-based Automation

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10/2 **Introduction**

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10/9 **SIMATIC Embedded Control**
10/9 SIMATIC WinAC MP
10/10 SIMATIC MP 370



Introduction

PC based Automation

Overview

Siemens has developed a broad palette of perfectly interacting hardware and software components for PC-based Automation.

The hub: **SIMATIC PC-based Control** with SIMATIC WinAC, the integration platform for technology functions to fulfill every requirement.

On the PC, all the tasks involved in automation, such as open-loop and closed-loop control, operator control and visualization and motion control can be implemented on the same platform. Whenever PC applications have to be implemented in addition to the classical PLC applications, PC-based Automation is the first choice.

New: **SIMATIC Embedded Control**. The product spectrum of SIMATIC PC-based Automation has been expanded with SIMATIC WinAC MP that transfers the advantages of PC-based Automation in processing large quantities of data and demanding visualization tasks to the rugged SIMATIC MP 370 platform for installation at the machine.

Additional information is available in the Internet at:

http://
www.pcbasedautomation.de

SIMATIC WinAC

Overview

- Extends the SIMATIC S7 controller family with PC-based controllers
- Can be used when various tasks such as data processing, communication, visualization and technology have to be integrated on a PC
- Available in two basic versions:
  - SIMATIC WinAC Software PLCs
    for tasks that demand high flexibility and integration capability.
  - SIMATIC WinAC Slot PLCs
    for tasks in which PC-independent operation, availability and high operating safety are paramount



Properties:

- Executable on standard PCs under Windows NT or Windows 2000
- Code-compatible to SIMATIC S7;
  Programming with the same tools, programs once created can also be used for SIMATIC S7
- Use of standard interfaces for integration in the office world
- Open interfaces for integrating specific technology hardware and software

Overview



SIMATIC software-based PLCs are optimized for applications requiring a high level of flexibility and integration

SIMATIC WinAC software PLCs comprise the following products

- WinAC Basis
- WinAC RTX
- WinAC PN

WinAC Basis:

- The low-cost PC-based control solution
- Can be run on Windows NT and Windows 2000
- For the cost-effective solution of non-deterministic processes in connection with a wide range of PC-tasks

WinAC RTX:

- The software solution for tasks with demanding real-time requirements
- With enhanced real-time for Windows NT, to ensure deterministic response for the control section

WinAC PN:

- The first SIMATIC CPU for Component-based Automation with PROFInet
- Based on WinAC Basis, expanded with PROFInet functionality

Scope of supply:

- Software PLC
- Computing with OPC interface and ActiveX components
- Driver for PROFIBUS CPs, including integrated PROFIBUS interface of the SIMATIC PCs (only WinAC Basis and WinAC PN)
- VenturCom RTX real-time core (only WinAC RTX)

Optional:

CP for connection to PROFIBUS DP

- CP 5611 (WinAC Basis and WinAC PN only)
- Integrated PROFIBUS interface of the SIMATIC PC (WinAC Basis and WinAC PN only)
- CP 5613

Open Development Kit WinAC Basis ODK or WinAC RTX ODK

- For integration of C/C++ - Code in WinAC Basis, WinAC PN or WinAC RTX
- Integration of external software (technological programs) or PC components (e.g. scanners, PC cards for measured value acquisition)
- WinAC Basis ODK is used for WinAC Basis and WinAC PN; WinAC RTX ODK is used for WinAC RTX.

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Technical specifications

	WinAC Basis V3.0	WinAC PN V1.1	WinAC RTX V3.1
General technical specifications			
RAM	PC working memory fully usable	PC working memory fully usable	PC working memory fully usable
Load memory	PC working memory fully usable	PC working memory fully usable	PC working memory fully usable
Block size	64 KB	64 KB	64 KB
Bit memories	2 KB	2 KB	2 KB
• Of these retentive	MB 0 to MB 255	MB 0 to MB 255	MB 0 to MB 255
Counter	512	512	512
• Of these retentive	From 0 to 63	From 0 to 63	From 0 to 63
Timers	512	512	512
• Of these retentive	From 0 to 127	From 0 to 127	From 0 to 127
Real-time clock	Yes	Yes	Yes
Number of FB/FC, DB blocks	Max. 2500	Max. 2500	Max. 2500
Execution time (for 800 MHz Pentium PC)			
Bit operations	0.2 µs (typ)	0.2 µs (typ)	0.2 µs (typ)
IEEE floating-point operations	0.1 µs (typ)	0.1 µs (typ)	0.1 µs (typ)

Technical specifications (continued)

	WinAC Basis V3.0	WinAC PN V1.1	WinAC RTX V3.1
Connection of the I/O			
Addressable I/O range	16 KB inputs/ 16 KB outputs	16 KB inputs/ 16 KB outputs	16 KB inputs/ 16 KB outputs
Total of digital I/O	1024/1024 byte	1024/1024 byte	1024/1024 byte
Process image I/O	512/512 byte or 1024/1024 byte, selectable	512/512 byte or 1024/1024 byte, selectable	512/512 byte or 1024/1024 byte, selectable
DP interface module (option)	CP 5611 or CP 5613	CP 5611 or CP 5613	CP5613
Transmission rate, max.	Up to 12 Mbit/s	Up to 12 Mbit/s	Up to 12 Mbit/s
No. of stations, max.	CP 5611: 32 slaves	CP 5611: 32 slaves	CP 5613: 125 slaves
	CP 5613: 125 slaves	CP 5613: 125 slaves	
Clock synchronized mode	No	No	Yes
Technology			
SIMATIC FMs	FM 350/351/352 (on request)	FM 350/351/352 (on request)	FM 350/351/352 (on request)
Easy Motion Control	Yes	Yes	Yes
• With C/C++	Yes, with WinAC Basis ODK	Yes, with WinAC Basis ODK	Yes, with WinAC RTX ODK
Characteristics for Component-based Automation			
Central download via network limits	-	Yes	-
• Number of connections	-	-	-
- total, max.	-	1500	-
- per PROFInet component, max.	-	100 inputs / 100 outputs	-
Number of PROFInet devices that can be connected to WinLC PN:	-	Max. 60 DP slaves	-
Frequency of transfer (characteristic of circuit connection in SIMATIC iMap)	-	Multiple of 10 ms	-
Max. response time before substitute values are connected	-	2 x frequency of transfer x ping factor (the default setting for the ping factor is 10)	-
System requirements			
Processor min.	Intel Pentium 200 MHz	Intel Pentium 200 MHz	Intel Pentium 200 MHz
Main memory min.	64 MB RAM	64 MB RAM	64 MB RAM
Operating system	Windows NT 4.0 Workstation, SP5 or higher		Windows NT 4.0 Workstation, SP6 or higher
	Windows 2000 Professional Multilanguage, SP1 or higher	Windows 2000 Professional Multilanguage, SP2 or higher	
	3 languages (English, German, French)	3 languages (English, German, French)	3 languages (English, German, French)
Hard disk	5 MB spare memory, also 1 MB spare memory on drive C for setup program (deleted following installation)	5 MB spare memory, also 1 MB spare memory on drive C for setup program (deleted following installation)	5 MB spare memory, also 1 MB spare memory on drive C for setup program (deleted following installation)
Programming/ configuring software	STEP 7, V5.0 upwards, SP3, Engineering Tools (optional)	STEP 7, V5.1 upwards, SP3, Engineering Tools (optional)	STEP 7, V5.1 upwards, Engineering Tools (optional)
		SIMATIC iMap V1.1 and higher	
Accessories	Color monitor, keyboard, mouse or pointer device for Windows	Color monitor, keyboard, mouse or pointer device for Windows	Color monitor, keyboard, mouse or pointer device for Windows

Ordering data	Order No.
SIMATIC WinAC Basis V3.0	
Software-based PC based Control System under Windows NT 4.0/2000; CD-ROM with electronic documentation G, E, F	
Single license[1)]	**6ES7 671-0CC01-0YX0**
SIMATIC WinAC RTX V3.1	
Software-based PC based Control System under Windows NT 4.0/VCI RTX for tasks requiring time precision; CD-ROM with electronic documentation G, E, F	
Single license[1)]	**6ES7 671-0RC02-0YX0**
SIMATIC WinAC PN V1.1	
Software-based PC based Control System under Windows 2000 for use in Component based Automation; CD-ROM with electronic documentation G, E, F	
Single license[1)]	**6ES7 671-0VC02-0YX0**
SIMATIC WinAC Basis ODK V3.0	
for incorporating C/C++ code in WinAC Basis, WinAC PN, executes under Windows NT 4.0/ 2000; CD-ROM with electronic documentation G, E, F	
Single license[1)]	**6ES7 806-1CC00-0YE0**
SIMATIC WinAC RTX ODK V3.1	
for incorporating C/C++ code in WinAC RTX, executes under Windows NT 4.0/VCI RTX; CD-ROM with electronic manual, English	
Development license without key-disk	**6ES7 806-1RC01-0YE0**

1) For further information regarding software licenses, see Section 14

	Order No.
IndustrialDataBridge	
Software for data exchange between various systems using standards (e.g. OPC);	
for connection of:	
100 data points	**2XV9 450-1DB00**
500 data points	**2XV9 450-1DB01**
2000 data points	**2XV9 450-1DB02**
10000 data points	**2XV9 450-1DB03**
CP 5613 communications processor	**6GK1 561-3AA00**
PCI card (32 bit) for connection to PROFIBUS, including DP-Base software with NCM PC; DP-RAM interface for DP master, including PG and FDL protocols; single license for one installation, runtime software, software and electronic manual on CD-ROM, class A, for 32-bit Windows NT 4.0 WS Server; 2000 Professional/Server; Windows XP Professional (available soon) German/English	
CP 5613 FO communications processor	**6GK1 561-3FA00**
PCI card (32 bit) for connection to optical PROFIBUS, including DP-Base software with NCM PC; DP-RAM interface for DP master, including PG and FDL protocols, single license for one installation, runtime software, software and electronic manual on CD-ROM, class A, for 32-bit Windows NT 4.0 WS Server; 2000 Professional/Server; Windows XP Professional (available soon) German/English	
CP 5611 communications processor	**6GK1 561-1AA00**
PCI card (32 bit) for connection of a PG or PC to PROFIBUS	

SIMATIC WinAC Slot PLC

Overview



- WinAC Slot 412/416: Slot PLCs for PC-based applications that require strict real-time requirements, availability and high operating safety

Products

- WinAC Slot 412
  - PC-based PLC as PCI board based on CPU 412-2 PCI
  - PROFIBUS DP and PROFIBUS DP/MPI interface onboard
- WinAC Slot 416
  - PC-based PLC as PCI board based on CPU 416-2 PCI
  - PROFIBUS DP and PROFIBUS DP/MPI interface onboard
- PS Extension Board
  - The PS extension board provides additional safety for the operation of WinAC slot 412/416 and allows operation even in the event of PC failure
  - External 24V power supply and battery backup
- WinAC Slot T-Kit
  - Technology interfaces (dual-port RAM) for WinAC slot 412/416 for integrating technological applications on the PC or accessing PC hardware
  - High-speed data exchange via C++ program (DLL)

Technical specifications

	WinAC Slot 412	WinAC Slot 416
User memory, integrated	128 KB code + 128 KB data	1.6 MB code + 1.6 MB data
Load memory		
• Integrated	256 KB	256 KB
• Expandable up to	64 MB (Memory Card)	64 MB (Memory Card)
Address space, max.	4 KB	16 KB
I/O expansion, max.		
• Digital inputs/outputs	32768	131072
• Analog inputs/outputs	2048	8192
Number of blocks		
• FB, max.	256	2048
• FC, max.	256	2048
• DB, max.	511	4095
Processing time		
• 1 K binary instructions	0.2 ms	0.08 ms
• 1 K word instructions	0.2 ms	0.08 ms
Bit memories/cycle memories	32768	131072
Counters	256	512
Timers	256	512
Number of communications links	16 in total	64 in total
• Of these MPI/DP, max.	16	44
• Of these DP, max.	16	32
• Of these integrated PC interface, max.	16	64
MPI/DP interface (MPI-configured)		
• Transmission rate	19.2 kbit/s to 12 Mbit/s	19.2 kbit/s to 12 Mbit/s
• Number of stations	32	32

	WinAC Slot 412	WinAC Slot 416
MPI/DP interface (PROFIBUS DP configured)		
• Transmission rate	9.6 kbit/s to 12 Mbit/s	9.6 kbit/s to 12 Mbit/s
• Number of stations	32	32
• Useful data inputs/outputs	2/2 KB	2/2 KB
• Useful data per station	244 byte	244 byte
PROFIBUS DP interface		
• Transmission rate	9.6 kbit/s to 12 Mbit/s	9.6 kbit/s to 12 Mbit/s
• Number of stations	64	125
• Useful data inputs/outputs	4/4 KB	8/8 KB
• Useful data per station	244 byte	244 byte
Current consumption (from PCI bus)		
• Without extension board, max.	1.5 A	1.5 A
• With extension board, max.	0.3 A	0.3 A
Power loss, max.	12 W	12 W
Dimensions	PCI slot card ¾ length (288 x 98 mm)	PCI slot card ¾ length (288 x 98 mm)
Number of PCI slots in standard configuration	1	1
Computing	OPC Server, ActiveX Controls in scope of supply	OPC Server, ActiveX Controls in scope of supply

Technical specifications

	WinAC Slot 412	WinAC Slot 416
Communication	With PG, OS, CPU (configured PLC-to-PLC communication) via MPI, PROFIBUS DP or Industrial Ethernet	With PG, OS, CPU (configured PLC-to-PLC communication) via MPI, PROFIBUS DP or Industrial Ethernet
• CPs that can be used	CP 1413®, CP 1613, 3Com, CP 5613, CP 5611	CP 1413, CP 1613, 3Com, CP 5613, CP 5611

For further technical specifications, please refer to the manual.

PS Extension Board (optional)	
Input voltage, rated value	24 V DC (connection cable in scope of delivery)
Input current, rated value	1 A
Backup battery	3.6 V DC lithium (included)
Dimensions (W x H x D) in mm	180 x 98 x 13.5 mm
Functions	• External data retention on Power Off/On • Warm start/command-based restart following Power On • Redundant power supply operational independent of PC • Mains buffering • Redundant fan connection
Mounting	Can be plugged into CPU 412-2 PCI/ 416-2 PCI (screwed in place) Spare slot required next to CPU (no PCI)

WinAC Slot T-Kit (Optional)	
Dual-port RAM size	4 KB inputs 4 KB outputs
Addressing of PLC program	Load/transfer commands
Addressing of PLC program	Library functions (see documentation)
Supported data types	BOOL, BYTE, WORD, DWORD, INT, DINT, REAL, S5TIME, TIME, DATE, TIME_OF_DAY, CHAR, STRING
Tested development environment	Microsoft Visual Developers Studio C++, V6.0, SP3
Other system requirements	WinAC Slot 41x, version 3.2 STEP 7, V5.1, SP2 or higher

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Ordering data

	Order No.
SIMATIC WinAC Slot 412 PC based Control System with Slot PLC CPU 412-2 PCI, 256 KB RAM; under Windows NT 4.0/2000; with electronic documentation (G, E, F) and software on CD-ROM; single license[1)]	**6ES7 673-2CC00-0YX0**
SIMATIC WinAC Slot 416 PC based Control System with Slot PLC CPU 416-2 PCI, 3.2 MB RAM; under Windows NT 4.0/2000; with electronic documentation (G, E, F) and software on CD-ROM; single license[1)]	**6ES7 673-6CC20-0YX0**

1) For further information regarding software licenses, see Section 14

	Order No.
SIMATIC WinAC PS extension board with Slot PLC power supply (24 V DC external, 12 V DC internal)	**6ES7 678-1RA00-0XB0**
SIMATIC WinAC Slot T-Kit Engineering interface for integration of engineering applications on the PC, or access to PC hardware; can be used with WinAC Slot 41x; executes under Windows NT 4.0/2000; with electronic documentation (G, E,) and software on CD-ROM; single license[1)]	**6ES7 673-0CC00-2YX0**
Backup battery for Slot 412/416	**6ES7 971-2BA00-0AA0**

SIMATIC WinAC Packages

Overview

- Packages consisting of WinAC components and a SIMATIC Panel PC
- The low-cost version for implementing a PC based automation system

Delivery

It is possible initially to freely select the configuration of the Panel PC hardware – according to individual demands on the display and system performance (for Ordering data, see Catalog ST 80, Ordering Catalog PC based Automation, Catalog CA 01 or the A&D Mall).

An additional order item can be selected from the Ordering data for the WinAC Package.

Both ordering items will be delivered together. The customer is responsible for installation of both components.

Ordering data

	Order No.
SIMATIC WinAC Package SIMATIC WinAC Basis V3.0 Software-based PC based Control System under Windows NT 4.0/2000; CD-ROM with electronic documentation G, E, F, single license[1] Can only be ordered together with a SIMATIC Panel PC IL 70, 670 or 870; For ordering data, see Catalog ST 80, CA 01, ordering document for PC based Automation, or in the A&D Mall	**6ES7 671-0CC01-0YX1**
SIMATIC WinAC Package SIMATIC WinAC RTX V3.1 Software-based PC based Control System under Windows NT 4.0/VCI RTX for tasks requiring time precision; CD-ROM with electronic documentation G, E, F; single license[1] Can only be ordered together with a SIMATIC Panel PC IL 70, 670 or 870; For ordering data, see Catalog ST 80, CA 01, ordering document for PC based Automation, or in the A&D Mall	**6ES7 671-0CC01-0YX1**

	Order No.
SIMATIC WinAC Package SIMATIC WinAC Slot 412 PC based Control System with Slot PLC CPU 412-2 PCI, 256 KB RAM; under Windows NT 4.0/2000; with electronic documentation (G, E, F) and software on CD-ROM; single license[1] Can only be ordered together with a SIMATIC Panel PC IL 70, 670 or 870; For ordering data, see Catalog ST 80, CA 01, ordering document for PC based Automation, or in the A&D Mall	**6ES7 673-2CC00-0YX1**
SIMATIC WinAC Package SIMATIC WinAC Slot 416 PC based Control System with Slot PLC CPU 416-2 PCI, 3.2 MB RAM; under Windows NT 4.0/2000; with electronic documentation (G, E, F) and software on CD-ROM; single license[1] Can only be ordered together with a SIMATIC Panel PC IL 70, 670 or 870; For ordering data, see Catalog ST 80, CA 01, ordering document for PC based Automation, or in the A&D Mall	**6ES7 673-6CC20-0YX1**

1) For further information regarding software licenses, see Section 14

SIMATIC Embedded Control

Overview

SIMATIC Embedded Control expands the SIMATIC product spectrum with a new class of devices for controlling at the machine and visualization on the same platform

- **SIMATIC WinAC MP** is the Soft-PLC for Windows CE that is executable on the multi-functional platform MP 370. WinAC MP is the cost-optimized solution for deterministic processes in conjunction with a rugged hardware platform. At the same time it is ideal for applications in which large amounts of data are processed.
- The **SIMATIC MP 370** also provides the cost-optimized rugged hardware platform and the visualization software. Similar to operator panels and programmable controllers, it is constructed without a fan or hard disk and is realtime-capable and deterministic.

SIMATIC WinAC MP

Overview



- The Software PLC for Windows CE, executable on the multifunctional platform MP 370
- The cost-optimized solution for deterministic processes in conjunction with a rugged hardware platform. At the same time it is ideal for applications in which large amounts of data are processed.
- Ideal for tasks directly at the machine when a user-friendly user interface is extremely important or the control task demand large programs and extensive data memory

Technical specifications

User memory	
• Flash memory (integrated)	3 MB
• Working memory (integrated)	1 MB
• Load memory (integrated)	1 MB
• Flags	2 KB
• Counters	512
• Timers	512
• Retentive data	Yes, with USV
Number of blocks	
• FB/FC/OB/DB/SDB	Max. 2500
I/O	
• I/O address space	Each 16 KB I/O
• Number of inputs/outputs	Each 1 KB I/O
• Connection of the I/O	PROFIBUS DP up to 12 Mbit/s (MP 370 on board)
• Number of PROFIBUS DP slaves	32

Execution times	
• Bit operations (typ.)	0.4 µs
• Mathematical operationen (typ.)	0.3 µs
Technology	
• SIMATIC FMs	FM 350, FM 351
• Easy Motion Control	Yes
System requirements	
• Hardware	MP 370 Touch 12" or MP 370 Keys 12"
• Operating system	Windows CE 3.0
• PLC programming software	STEP 7, version 5.1 SP2 and higher
• Configuration software for visualization	ProTool version 6.0, SP1 and higher
• Communication software for Industrial Ethernet (required on the programming device only)	SOFTNET PG for IE

Ordering data

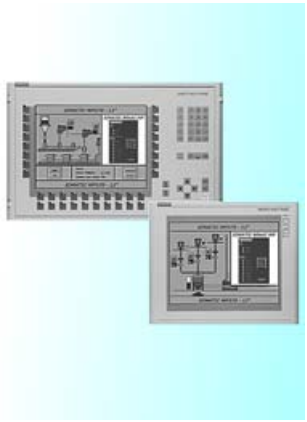
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SIMATIC WinAC MP V3.0	
Software-based PC based Control System under Windows CE; CD-ROM with electronic documentation G, E, F	
Single license[1]	**6ES7 671-0EC01-0YX0**

1) For further information regarding software licenses, see Section 14

	Order No.

SIMATIC MP 370

Overview



- Using Windows CE, these multi-functional platforms combine the ruggedness of the operator panels with the flexibility of the PC.
- **SIMATIC multi panels (MPs)** can be used just like the operator panels for operating and monitoring machines locally.
- In addition to visualization, the MPs can be expanded with further software functions based on the Windows CE Standard, such as Microsoft Pocket Internet Explorer.
- For additional control functions, software options such as the soft PLC "WinAC MP", or the "ThinClient/MP" option for use as terminal client, are offered.
- The multi panels can be fully integrated with the range of graphics-capable operator panels.

Technical specifications

	MP 370 12“ Keys	MP 370 12" Touch
Display	TFT Liquid Crystal Display (LCD)	
• Size	12.1"	12.1"
• Resolution (pixels)	800 x 600	800 x 600
• Colors	256 colors	256 colors
• MTBF of display and background lighting at 25 °C	Approx. 50.000 hours	Approx. 50.000 hours
Control elements	Membrane keyboard	Touch screen
• Function keys, programmable	36 function keys, 36 with LEDs, of which 36 softkeys	No
• Numeric/alphanumeric input	Yes / yes	
• External mouse, keyboard, bar code reader	USB / USB / USB	
Processor	AMD 300 MHz	
Operating system	Win CE	
Memory		
• Type	Flash / RAM	
• Memory available for user data	7168 KB	
Interfaces	1 x TTY, 2 x RS232, 1 x RS422, 1 x RS485	
• PC card slot	1 x PC card slot	
• CF card slot	1 x CF card slot	
• USB	1 x USB	
• Ethernet	1 x Ethernet	

	MP 370 12“ Keys	MP 370 12" Touch
Interface with PLC	S5, S7-200, S7-300/400, 505, WinAC, SIMOTION, SINUMERIK, PC (Ethernet), Allen Bradley (DF1), Mitsubishi (FX), Telemecanique (ADJUST) Modicon (Modbus), other third-party operators	
Supply voltage	24 V DC	
• Rated voltage	24 V	
• Permitted range	+ 18 to + 30 V DC	
• Current input, normally	1.15 A	1.15 A
Backup battery	Optional, 3.6 V	
Clock	Hardware clock, with back-up	
Degree of protection		
• Front	IP 65, NEMA 12, NEMA 4x, NEMA 4	
• Rear	IP 20	
Certification	FM, UL, CSA, hazardous zone 2, hazardous zone 22, CE	FM, UL, CSA, hazardous zone 2, hazardous zone 22, CE
Dimensions		
• Front (w x h in mm)	483 x 310	335 x 275
• Mounting cutout/depth (W x H x D in mm)	450 x 290 x 65	310 x 248 x 59
Weight (kg)	9	7
Ambient conditions		
• Mounting position		
- max. permissible angle of inclination without assisted ventilation	35 °	

Technical specifications (continued)

	MP 370 12“ Keys	MP 370 12" Touch
Ambient conditions		
• Temperature		
- operation (vertical installation)	0 to +50 °C	
- operation (max. inclination)	0 to +35 °C	
- transport, storage	-20 to +60 °C	
• Relative humidity	95 %	95 %
Expansion for process operation		
• DP direct control keys (LEDs as A peripherals)	S1 ... S16 F1 ... F20	No
• DP direct control keys (buttons and keys as E peripherals)	S1 ... S16 F1 ... F20	5 byte or encoded
Peripherals	Printer, barcode reader	
Application	Soft SPS, Internet Explorer, ProAgent	Thin Client Soft SPS, Internet Explorer, ProAgent
Functionality		
Message system		
• Operating messages	2000	
• Fault messages	2000	
• Message length (lines x characters)	1 x 70	
• Number of process values per message	8	
• Message buffer	Circulating buffer, 1024 entries each	
Recipes	500	
• Records per recipe	1000	
• Entries per record	1000	
• Recipe memory	128 KB integrated flash, expandable	
Process diagrams	300	
• Text objects	30,000 text elements	
• Variables per diagram	400	
• Entries per diagram	400	
• Graphics objects	Bitmaps, icons, background images, vector graphics	
• Dynamic objects	Trend curves, bars, slides, invisible buttons	
- directories	Yes	

	MP 370 12“ Keys	MP 370 12" Touch
Variables	2048	
Archiving		
• Number of archives per project	50	
• Number of measuring points per project	50	
• Archive types	Polling archive, sequential archives, message archive, process value archive	
• Storage location	PC-Card, CF-Card, Ethernet	
• Data storage format	Readable i.e. with Excel, Access	
• External evaluation	Yes	
• Archive size	Dependent on the free memory capacity on the PC-/CF card or on the amount of free capacity on the hard disk through the network drive	
• Online evaluation	Through trend curves	
Password protection (levels)	10	
Visual Basic Scripts		
• Number	50	
• No. of lines per script	100	
Printer functions	Hardcopy, messages, shift log	
Online languages	5	
• Standard languages	Chinese, Czech, Danish, Dutch, German, English, Finnish, French, Greek, Hungarian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, Turkish	
Character set	Tahoma, Arial, pictographic languages; freely scalable	
Help text	Yes	
PG functions (STATUS/ CONTROL)	For SIMATIC S5/S7	
Timer	Yes	
Configuration	ProTool from version 5.2 SP3, executable under Windows 98 SE/ ME/NT/2000 (must be ordered separately)	ProTool from version 5.2 SP3, executable under Windows 98 SE/ ME/NT/2000 (must be ordered separately)
• Configuration transfer	Serial / MPI / PROFIBUS DP / USB / Ethernet	

Ordering data

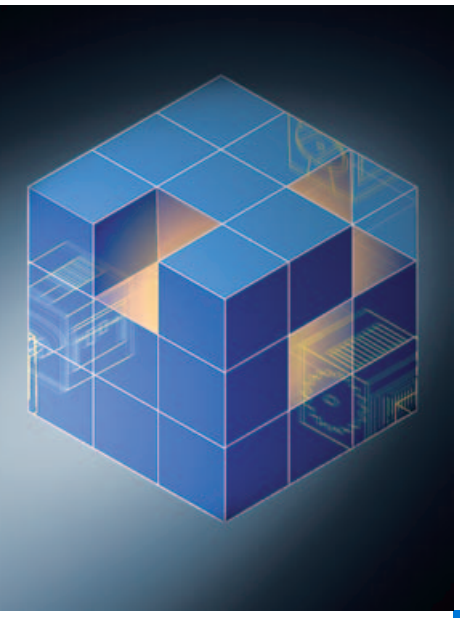
	Order No.
SIMATIC MP 370	
with 5 integral interfaces, capacitor backup (battery as option) and electronic fuse; with installation accessories	
With 12" color TFT display Touch	**6AV6 545-0DA10-0AX0**
With 12" color TFT display Keys	**6AV6 542-0DA10-0AX0**
SIMATIC ProTool V6.0	**6AV6 581-3BX06-0CX0**
Configuration software including native drivers on CD-ROM	

1) For further information regarding software licenses, see Section 14

	Order No.
MP 370 manual	
German	**6AV6 591-1DB10-1AA0**
English	**6AV6 591-1DB10-1AB0**
French	**6AV6 591-1DB10-1AC0**
Italian	**6AV6 591-1DB10-1AD0**
Spanish	**6AV6 591-1DB10-1AE0**
Configuration cable	**6ES7 901-1BF00-0XA0**
between PG/PC and MP; 5 m	

Component based automation

11



11/1 **Introduction**

11/2 **Software**
11/3 SIMATIC iMap
11/4 PN OPC server
11/5 SIMATIC ProTool/Pro

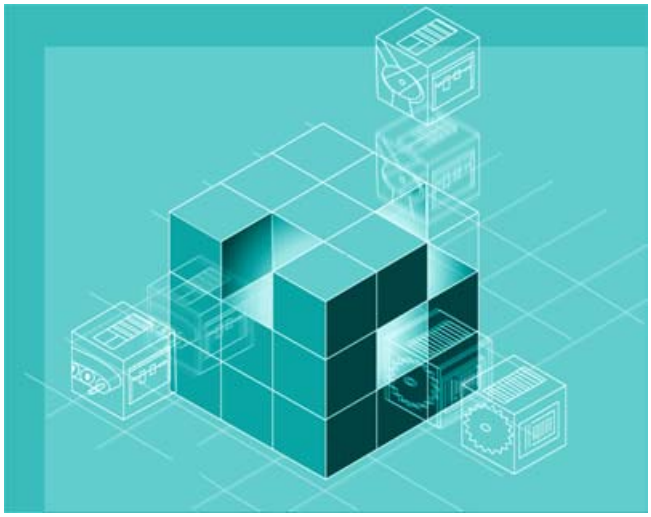
11/7 **Controller/Distributed I/O for Industrial Ethernet**
11/7 SIMATIC WinAC Software PLC
11/9 CP 343-1 PN

11/10 **Controller/Distributed I/O for PROFIBUS**
11/10 SIMATIC S7-300 CPUs
11/13 IM 151-7 CPU interface module
11/15 BM 147/CPU intelligent basic module

11/17 **Network transitions**
11/17 IE/PB Link

Component based Automation

Overview



- Automation concept for setting up applications with "distributed intelligence"
- Modular structures can be applied easily to machines and systems by means of simple data exchange between intelligent devices
- Central, system-wide engineering simplifies configuration and communication
- Integration of Ethernet and fieldbus
- Supports vertical integration using IT standards in automation
- Uses the PROFInet Ethernet standard developed by the PROFIBUS User Organization (PNO):
  Non-conforming devices produced by different manufacturers can be integrated without problems

Design

Component-based automation comprises:

- Bus systems:
  - Industrial Ethernet (obligatory)
  - PROFIBUS, e.g. for real-time tasks (optional)
- Industrial Ethernet devices
- PROFIBUS devices

The Industrial Ethernet devices require PROFInet communication mechanisms. The following Ethernet devices and software products are available:

- PC-based control SIMATIC WinAC PN with software PLC
- PROFInet-compatible CP 343-1 PN for connecting the S7-300 to Ethernet
- PROFInet OPC Server for access to data on PROFInet devices from PC applications and visualization systems
- Visualization via OPC
  Any visualization product, which can function as an OPC client, e.g. SIMATIC ProTool/Pro, SIMATIC WinCC, external HMI, can be used. SIMATIC ProTool/Pro is supplied as an integral component of SIMATIC iMap.

A PROFInet proxy is used to connect the PROFIBUS segments to Industrial Ethernet. These devices function as masters on PROFIBUS. They are available as:

- PC-based control SIMATIC WinAC PN with software PLC
- SIMATIC NET IE/PB Link, a compact gateway between Industrial Ethernet and PROFIBUS

The following devices can be used as PROFIBUS devices:

- SIMATIC ET 200X and ET 200S with dedicated CPU as intelligent field devices on PROFIBUS
- S7-300 CPUs with integrated DP interface as intelligent slaves on PROFIBUS, e.g. compact CPUs CPU313C-2 DP and CPU314-2 DP
- All current standard slaves with GSD file to the PROFIBUS-DP standard

Other system parts networked with PROFIBUS can be integrated into component-based automation systems. To do this, an Industrial Ethernet interface with PROFInet function must be added to the PROFIBUS master.

Overview

- Component-based software tool for configuring communication in distributed automaton solutions
- Based on the PROFInet standard
- For simple graphic configuration of communication between system modules
- Manufacturer-independent

For technical specifications see page 8/21.

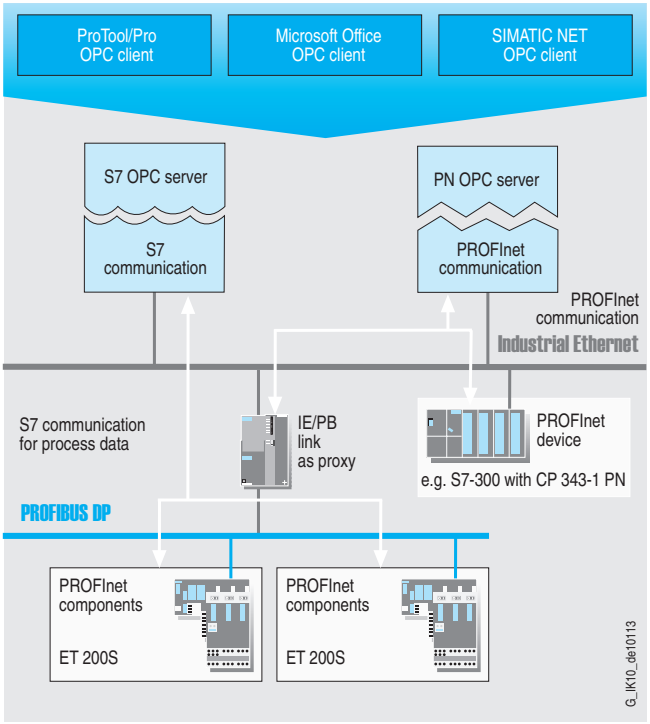
Ordering data

	Order No.
SIMATIC iMap V1.1	
Target system: SIMATIC WinAC PN, SIMATIC NET IE/PB Link, SIMATIC NET CP 343-1 PN, distributed I/Os with own CPU, PROFInet OPC Server, SIMATIC ProTool/Pro Prerequisites: Windows 2000 SP 1; on PG or PC with Pentium processor, min. 500 MHz; STEP 7 V5.1 SP 2 incl. NCM, SIMATIC NET IE SOFTNET-PG V6.0 or later, PN OPC-Server V6.0 or later Supplied: German, English, with electronic documentation	
Single license[1)]	**6ES7 820-0CC01-0YX0**
Software update service[1)]	**6ES7 820-0CC01-0YX2**

1) For further information regarding software licenses, see Section 14

PN OPC server

Overview



- Access through the OPC interface to variables in PROFInet components, which are needed for communication.
- Use of objects and symbols defined with the PROFInet engineering tool SIMATIC iMap and STEP 7.
- Expandability of existing installations through addition of PROFInet functionality. Operation parallel to other communication protocols such as S7 communication with SOFTNET S7 for Industrial Ethernet is thus possible.
- OPC Scout as OPC client with browser functionality on all variables of the PROFInet components.

Technical specifications

Programming	• Open and standardized • Synchronous and asynchronous reading and writing of variables • Monitoring of variables throught the OPC server with alarm to the client in the event of change • Use of quantity operations; this enables a large volume of data to be processed in a short period of time

Interfaces	• Custom interface (C++) • Automation interface (Visual Basic, Excel, Access,...) • OPC data control
Protocols	• DCOM protocol
Operating systems	• Windows NT 4.0, 2000 • Windows NT 4.0 WS, server, Windows 2000Pro, server
Configuration	Configuration software for PROFInet SIMATIC iMap

Ordering data

	Order No.
PN OPC-Server/Windows V6.1 PROFInet OPC server for CBA; single license for one installation, runtime software, software and electronic manual on CD-ROM; license key on diskette, class A; for 32-bit Windows XP Professional; including V6.0 for 32-bit Windows NT 4.0 WS/Server; 2000 Professional/Server; for CP 1512 and CP 1612, German/English	**6GK1 706-0HB61-3AA0**

	Order No.
SIMATIC iMap V1.1	See page 11/2
SIMATIC NET software update service for Industrial Ethernet, PROFIBUS, OPC server, for one year of updates including manuals on CD-ROM, prerequisite: SIMATIC NET PC/ Windows products German/English	**6GK1 704-0AA00-3AA2**

Overview

- SIMATIC ProTool/Pro® is the **PC-based HMI solution** in the machine sector
- SIMATIC ProTool/Pro consists of:
  - SIMATIC ProTool/Pro RT runtime software for PC-based systems
  - SIMATIC ProTool/Pro Configuration (CS) software)
- For Windows 98 SE/ME and Windows NT4.0/2000
- SIMATIC ProTool/Pro CS supports configuration of SIMATIC Panels as well as the configuration of PC-based systems (see configuration software)



Additional information:
http://
www.siemens.com/protoolpro

For technical specifications see page 8/44.

Ordering data

	Order No.
SIMATIC ProTool/Pro Configuration V6.0 + SP1A with ProAgent V6.0 + SP1A comprising: • ProTool/Pro Configuration (CS) V6.0 + SP1A • Simulation software for TP170A/B, OP170B, TP270, OP270, MP270®, MP270B, MP370 and ProTool/Pro Runtime • Native drivers • Electronic documentation (.pdf/.chm) in German, English, French, Spanish, Italian	**6AV6 582-2BX06-0YX0**
SIMATIC ProTool/Pro Runtime V6.0 + SP1 for PC systems, on CD-ROM, with license for:	
• 128 PowerTags (RT 128)	**6AV6 584-1AB06-0BX0**
• 256 PowerTags (RT 256)	**6AV6 584-1AC06-0BX0**
• 512 PowerTags (RT 512)	**6AV6 584-1AD06-0BX0**
• 2048 PowerTags (RT 2048)	**6AV6 584-1AF06-0BX0**
Upgrade	
Upgrade of SIMATIC ProTool/Pro to SIMATIC ProTool/Pro V6.0 + SP1A	**6AV6 582-2BX06-0YX4**

	Order No.
Powerpacks	
SIMATIC ProTool/Pro RT PowerTags from	
• 128 to 256 PowerTags	**6AV6 570-1BC00-0AX0**
• 128 to 512 PowerTags	**6AV6 570-1BD00-0AX0**
• 128 to 2048 PowerTags	**6AV6 570-1BF00-0AX0**
• 256 to 512 PowerTags	**6AV6 570-1CD00-0AX0**
• 256 to 2048 PowerTags	**6AV6 570-1CF00-0AX0**
• 512 to 2048 PowerTags	**6AV6 570-1DF00-0AX0**
Powerpack SIMATIC ProTool/Lite to ProTool/Pro 6.0 + SP1A including ProAgent V6.0 + SP1A	**6AV6 571-2AC06-0YX0**
Powerpack SIMATIC ProTool to ProTool/Pro V6.0 + SP1A including ProAgent V6.0 + SP1A	**6AV6 571-2BC06-0YX0**
Software update service	
SIMATIC ProTool/Pro software update service For a period of 12 months and for a fixed price, the customer is automatically provided with all upgrades and service packs per installed ProTool/Pro package. The contract is automatically extended by a further year unless cancelled 12 weeks prior to expiration.	**6AV6 582-3AX00-0AX2**

Ordering data (continued)	Order No.
Versions for China/Taiwan/Korea/Japan	
SIMATIC ProTool/Pro Configuration V6.0 + SP1A comprising: • ProTool/Pro Configuration (CS) V6.0 + SP1A • Simulation software for TP170A/B, OP170B, TP270, OP270, MP270, MP270B, MP370 and ProTool/Pro Runtime • Electronic documentation (.pdf/ .chm) in English, Chinese (traditional and simplified), Korean and Japanese	**6AV6 582-2BX06-0YV0**
SIMATIC ProTool/Pro Runtime V6.0 + SP1 for PC systems, on CD-ROM, with single license for:	
• 128 PowerTags (RT 128)	**6AV6 584-1AB06-0BV0**
• 256 PowerTags (RT 256)	**6AV6 584-1AC06-0BV0**
• 512 PowerTags (RT 512)	**6AV6 584-1AD06-0BV0**
• 2048 PowerTags (RT 2048)	**6AV6 584-1AF06-0BV0**
Communications processors for PC	
CP 5511[1] PCMCIA card (16 bit) for connection of a PG or notebook to PROFIBUS or MPI	**6GK1 551-1AA00**
CP 5512 PCMCIA card (32-bit card bus) for connection of a PG or notebook to PROFIBUS or MPI, under 32-bit Windows XP Professional	**6GK1 551-2AA00**
CP 5611[1] PCI card (32 bit) for connection of a PG or AT-PC to PROFIBUS or MPI	**6GK1 561-1AA00**
CP 5611 MPI[1] comprising CP 5611 and MPI cable (5 m)	**6GK1 561-1AM00**
CP 5613[1] [2] [3] PCI card (32 bit) for connection of a PG to PROFIBUS	**6GK1 561-3AA00**
CP 5614[1] PCI card (32 bit) for the master and slave connections of a PG to PROFIBUS or MPI	**6GK1 561-4AA00**
Associated with CP 5613/5614: **S7-5613 V6.1 communication software**	**6GK1 713-5CB61-3AA0**
Documentation (must be ordered separately)	
ProTool/Pro Runtime commissioning instructions	**6AV6 594-1CA06-0A 0**
ProTool user manual, configure Windows-based systems	**6AV6 594-1MA06-0A 0**
ProTool user manual, configure line-oriented displays	**6AV6 594-1AA06-0A 0**
ProTool user manual, configure graphic displays	**6AV6 594-1BA06-0A 0**
User manual, communication for Windows-based systems	**6AV6 596-1MA06-0A 0**
German	**A**
English	**B**
French	**C**
Italian	**D**
Spanish	**E**

1) For detailed description, see Catalog IK PI
2) CP 5613 with ProTool/Pro only released for communication with SIMATIC S7
3) Configuration download with CP 5613 is not possible with ProTool/Lite, ProTool and ProTool/Pro on line OPs, graphic OPs or touch panels

Overview



SIMATIC software-based PLCs are optimized for applications requiring a high level of flexibility and integration

SIMATIC WinAC software PLCs comprise the following products

- WinAC Basis
- WinAC RTX
- WinAC PN

WinAC Basis:

- The low-cost PC-based control solution
- Can be run on Windows NT and Windows 2000
- For the cost-effective solution of non-deterministic processes in connection with a wide range of PC-tasks

WinAC RTX:

- The software solution for tasks with demanding real-time requirements
- With enhanced real-time for Windows NT, to ensure deterministic response for the control section

WinAC PN:

- The first SIMATIC CPU for Component-based Automation with PROFInet
- Based on WinAC Basis, expanded with PROFInet functionality

Scope of supply

- Software PLC
- Computing with OPC interface and ActiveX components
- Driver for PROFIBUS CPs, including integrated PROFIBUS interface of the SIMATIC PCs (only WinAC Basis and WinAC PN)
- VenturCom RTX real-time core (only WinAC RTX)

Optional:

CP for connection to PROFIBUS DP

- CP 5611 (WinAC Basis and WinAC PN only)
- Integrated PROFIBUS interface of the SIMATIC PC (WinAC Basis and WinAC PN only)
- CP 5613

Open Development Kit *WinAC Basis ODK* or *WinAC RTX ODK*

- For integration of C/C++ - Code in WinAC Basis, WinAC PN or WinAC RTX
- Integration of external software (technological programs) or PC components (e.g. scanners, PC cards for measured value acquisition)
- WinAC Basis ODK is used for WinAC Basis and WinAC PN; WinAC RTX ODK is used for WinAC RTX.

For technical specifications see page 10/3.

SIMATIC WinAC Software PLC

Ordering data	Order No.
SIMATIC WinAC Basis V3.0	
Software-based PC based Control System under Windows NT 4.0/2000; CD-ROM with electronic documentation G, E, F	
Single license[1]	**6ES7 671-0CC01-0YX0**
SIMATIC WinAC RTX V3.1	
Software-based PC based Control System under Windows NT 4.0/VCI RTX for tasks requiring time precision; CD-ROM with electronic documentation G, E, F	
Single license[1]	**6ES7 671-0RC02-0YX0**
SIMATIC WinAC PN V1.1	
Software-based PC based Control System under Windows 2000 for use in Component based Automation; CD-ROM with electronic documentation G, E, F	
Single license[1]	**6ES7 671-0VC02-0YX0**
SIMATIC WinAC Basis ODK V3.0	
for incorporating C/C++ code in WinAC Basis, WinAC PN, executes under Windows NT 4.0/2000; CD-ROM with electronic documentation G, E, F	
Single license[1]	**6ES7 806-1CC00-0YE0**
SIMATIC WinAC RTX ODK V3.1	
for incorporating C/C++ code in WinAC RTX, executes under Windows NT 4.0/VCI RTX; CD-ROM with electronic manual, English	
Development license without key-disk	**6ES7 806-1RC01-0YE0**

1) For further information regarding software licenses, see Section 14

	Order No.
IndustrialDataBridge	
Software for data exchange between various systems using standards (e.g. OPC);	
for connection of:	
100 data points	**2XV9 450-1DB00**
500 data points	**2XV9 450-1DB01**
2000 data points	**2XV9 450-1DB02**
10000 data points	**2XV9 450-1DB03**
CP 5613 communications processor	**6GK1 561-3AA00**
PCI card (32 bit) for connection to PROFIBUS, including DP-Base software with NCM PC; DP-RAM interface for DP master, including PG and FDL protocols; single license for one installation, runtime software, software and electronic manual on CD-ROM, class A, for 32-bit Windows NT 4.0 WS Server; 2000 Professional/Server; Windows XP Professional (available soon) German/English	
CP 5613 FO communications processor	**6GK1 561-3FA00**
PCI card (32 bit) for connection to optical PROFIBUS, including DP-Base software with NCM PC; DP-RAM interface for DP master, including PG and FDL protocols, single license for one installation, runtime software, software and electronic manual on CD-ROM, class A, for 32-bit Windows NT 4.0 WS Server; 2000 Professional/Server; Windows XP Professional (available soon) German/English	
CP 5611 communications processor	**6GK1 561-1AA00**
PCI card (32 bit) for connection of a PG or PC to PROFIBUS	

Overview



- The CP 343-1 PN enables connection of SIMATIC S7-300 to Industrial Ethernet
  - 10/100 Mbit/s full/half duplex connection with autosensing for automatic switching
  - Universal connection options for ITP, RJ45 and AUI
  - Adjustable Keep Alive function
  - TCP/UDP transport protocol
- PROFInet communications standards. PROFInet defines an engineering model for distributed automation solutions and a model for system-wide communication through PROFIBUS and Industrial Ethernet with IT standards
- Additional communications services:
  - PG/OP communication
  - S7 communication
  - S5-compatible communication
  - Multicast at UDP
- Remote programming and commissioning through the network
- or S5-compatible communication

For technical specifications see page 4/113.

Ordering data

	Order No.
CP 343-1 PN communications processor for connecting SIMATIC S7-300 to Industrial Ethernet with PROFInet function, TCP/IP, S7 communication, FETCH/WRITE, SEND/ RECEIVE, with/without RFC 1006, 10/100 Mbit/s, with electronic manual on CD-ROM	**6GK7 343-1HX00-0XE0**

	Order No.
NCM S7 configuration software for Industrial Ethernet	Delivered with STEP 7 V5 onwards
NCM S7 manual for Industrial Ethernet	See CP 343-1
SIMATIC iMap V1.1 Linking editor for configuring of communication with Component based Automation	
Single license	**6ES7 820-0CC01-0YX0**
Software update service	**6ES7 820-0CC01-0YX0**

S7-300 CPUs

Overview
CPU 313C-2 DP



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

Micro memory card is required to operate the CPU.

For technical specifications see page 4/9.

Overview
CPU 314C-2 DP



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

Micro memory card is required to operate the CPU.

For technical specifications see page 4/9.

Overview
CPU 315-2 DP new



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

Micro memory card is required to operate the CPU.

For technical specifications see page 4/16.

Overview
CPU 316-2 DP



- The CPU 316-2 DP with lots of program memory
- For extensive I/O configurations
- With PROFIBUS DP master/slave interface
- Is used in plants that contain both distributed and centralized I/O configurations

For technical specifications see page 4/21.

Overview

CPU 318-2 DP



- The CPU with lots of program memory and PROFIBUS-DP master/slave interface
- For extensive I/O configurations
- For setting up distributed I/O structures

For technical specifications see page 4/29.

Ordering data

	Order No.
CPU 313C-2 DP Compact CPU, main memory 32 KB, power supply 24 V DC, 16 DI/ 16 DO integrated, integrated functions, MPI, PROFIBUS DP master/slave interface; MMC required	**6ES7 313-6CE00-0AB0**
CPU 314C-2 DP Compact CPU, main memory 48 KB, power supply 24 V DC, 24DI/ 16DO/4AI/2AO integrated, integrated functions, MPI, PROFIBUS DP master/slave interface; MMC required	**6ES7 314-6CF00-0AB0**
CPU 315-2 DP new Main memory 128 KB, power supply 24 V DC, MPI, PROFIBUS DP master/slave interface; MMC required	**6ES7 315-2AG10-0AB0**
CPU 316-2 DP Main memory 128 KB, power supply 24 V DC, PROFIBUS DP master/slave interface, MPI, slot for memory card, compartment for backup battery; including slot number labels and 2 keys	**6ES7 316-2AG00-0AB0**
CPU 318-2 DP Main memory 512 KB, power supply 24 V DC, PROFIBUS DP master/slave interface, MPI, slot for memory card, compartment for backup battery; including slot number labels and 2 keys	**6ES7 318-2AJ00-0AB0**

	Order No.
FEPROM memory card	
For standard and outdoor CPUs as well as CPU 318-2 DP	
16 KB	**6ES7 951-0KD00-0AA0**
32 KB	**6ES7 951-0KE00-0AA0**
64 KB	**6ES7 951-0KF00-0AA0**
128 KB	**6ES7 951-0KG00-0AA0**
256 KB	**6ES7 951-1KH00-0AA0**
512 KB	**6ES7 951-0KJ00-0AA0**
1 MB	**6ES7 951-1KK00-0AA0**
2 MB	**6ES7 951-1KL00-0AA0**
4 MB	**6ES7 951-1KM00-0AA0**
For outdoor CPUs	
16 KB, ext. temperature range	**6ES7 951-0KD80-0AA0**
32 KB, ext. temperature range	**6ES7 951-0KE80-0AA0**
64 KB, ext. temperature range	**6ES7 951-0KF80-0AA0**
RAM memory card	
for CPU 318-2 DP	
128 KB	**6ES7 951-0AG00-0AA0**
256 KB	**6ES7 951-1AH00-0AA0**
512 KB	**6ES7 951-1AJ00-0AA0**
1 MB	**6ES7 951-1AK00-0AA0**
2 MB	**6ES7 951-1AL00-0AA0**
Micro memory card	
for compact CPUs, innovated standard CPUs and CPU 315F-2 DP	
64 KB	**6ES7 953-8LF00-0AA0**
128 KB	**6ES7 953-8LG00-0AA0**
512 KB	**6ES7 953-8LJ00-0AA0**
2 MB	**6ES7 953-8LL00-0AA0**
4 MB	**6ES7 953-8LM00-0AA0**
8 MB	**6ES7 953-8LP00-0AA0**
Programming adapter for micro memory cards for PG 720 and PG 740	**6ES7 798-0BA00-0XA0**
MPI cable for connecting SIMATIC S7 and PG via MPI; 5 m long	**6ES7 901-0BF00-0AA0**

Ordering data (continued)	Order No.
CPU 318-2 DP	**6ES7 318-2AJ00-0AB0**
Point-to-point connecting cable	
for connection to CPU 31xC-2 PtP; 5 m long	
5 m	**6ES7 902-3AB00-0AA0**
10 m	**6ES7 902-3AC00-0AA0**
50 m	**6ES7 902-3AG00-0AA0**
Backup battery	**6ES7 971-1AA00-0AA0**
for standard CPUs, outdoor CPUs and CPU 318-2 DP; 3.6 V, 850 mA	
Front connector (1 unit)	
For compact CPUs, CPU 314 IFM (2 units required here) and CPU 315F-2 DP 40-pin, with screw-type terminals	
• 1 unit	**6ES7 392-1AM00-0AA0**
• 100 units	**6ES7 392-1AM00-1AB0**
40-pin, with spring-loaded terminals	**6ES7 392-1BM01-0AA0**
Spare keys for CPU	**6ES7 911-0AA00-0AA0**
2 units (spare part)	
Slot number labels	**6ES7 912-0AA00-0AA0**
S7-300 manual	
Design, CPU data, module data, instruction list	
German	**6ES7 398-8FA10-8AA0**
English	**6ES7 398-8FA10-8BA0**
French	**6ES7 398-8FA10-8CA0**
Spanish	**6ES7 398-8FA10-8DA0**
Italian	**6ES7 398-8FA10-8EA0**
Instruction list	
For standard and outdoor CPUs as well as CPU 318-2 DP	
German	**6ES7 398-8AA03-8AN0**
English	**6ES7 398-8AA03-8BN0**
French	**6ES7 398-8AA03-8CN0**
Spanish	**6ES7 398-8AA03-8DN0**
Italian	**6ES7 398-8AA03-8EN0**
Instruction list	
for compact CPUs, innovated standard CPUs and CPU 315F-2 DP	
German	**6ES7 398-8AA10-8AN0**
English	**6ES7 398-8AA10-8BN0**
French	**6ES7 398-8AA10-8CN0**
Spanish	**6ES7 398-8AA10-8DN0**
Italian	**6ES7 398-8AA10-8EN0**
SIMATIC Manual Collection	**6ES7 998-8XC01-8YE0**
Electronic manuals on CD-ROM, in 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	
SIMATIC Manual Collection updating service for 1 year	**6ES7 998-8XC01-8YE2**
Current Manual Collection CD as well as the three following updates	

	Order No.
Technical overview "S7-300 programmable controller - design and application"	
German	**6ES7 031-0AA00-8AB0**
English	**6ES7 031-0AA00-8BB0**
French	**6ES7 031-0AA00-8CB0**
Spanish	**6ES7 031-0AA00-8DB0**
Italian	**6ES7 031-0AA00-8EB0**
Technical overview "From SIMATIC S5 to SIMATIC S7"	
German	**6ES7 398-8AA01-8AB0**
English	**6ES7 398-8AA01-8BB0**
French	**6ES7 398-8AA01-8CB0**
Spanish	**6ES7 398-8AA01-8DB0**
Italian	**6ES7 398-8AA01-8EB0**
Manual "Communication for SIMATIC S7-300/-400"	
German	**6ES7 398-8EA00-8AA0**
English	**6ES7 398-8EA00-8BA0**
French	**6ES7 398-8EA00-8CA0**
Spanish	**6ES7 398-8EA00-8DA0**
Italian	**6ES7 398-8EA00-8EA0**
SIMATIC S7 demonstration case	**6ES7 910-3AA00-0XA0**
with components for mounting S7-200 and S7-300	
Rechargeable battery for real-time clock	**6ES7 971-5BB00-0AA0**
for backup of real-time clock in CPU 314 or better	
Power supply plug	**6ES7 391-1AA00-0AA0**
for compact CPUs, innovated standard CPUs and CPU 315F-2 DP (10 units, spare part)	
Labelling strips	
For compact CPUs, innovated standard CPUs, CPU 312 IFM Outdoor, CPU 314 IFM Outdoor and CPU 315F-2 DP (10 units, spare part)	**6ES7 392-2XX00-0AA0**
Labelling cover	**6ES7 392-2XY00-0AA0**
For compact CPUs, innovated standard CPUs, CPU 312 IFM Outdoor, CPU 314 IFM Outdoor and CPU 315F-2 DP (10 units, spare part)	
S7-SmartLabel	**2XV9 450-1SL00-0YX0**
Software for machine labelling of modules directly from the STEP 7 project	
Labelling sheets for machine labelling	See page 4/123
PROFIBUS DP RS 485 bus connector	See page 4/33
PROFIBUS FastConnect bus cable	See page 4/33
RS 485 repeater for PROFIBUS	See page 4/33
PROFIBUS bus components	See Catalogs IK PI, CA 01
for configuring MPI/PROFIBUS communication	

IM 151-7 CPU interface module

Overview



- Interface module with integrated CPU for SIMATIC ET 200S
- Enhances the effective system availability of plants and machines
- Programming through PROFIBUS DP
- Features the new SIMATIC Micro Memory Card (MMC)
- Maintenance-free because no battery
- Integrated 12 Mbit/s PROFIBUS DP slave interface for Cu or FO conductors;
  FO cable version (48K) in preparation
- Integrated CPU based on the CPU S7-314

Note:
IM 151/F-CPU PROFIsafe in preparation.

Technical specifications

Dimensions W x H x D (in mm)	
• Individual device	134 x 110 x 55
• Hole pitch	107 x 110 x 55
Data transmission rates	9.6/19.2/93.75/187.5/500 kbit/s, 1.5/3/6/12 Mbit/s
Direct data exchange	Sender
Data consistency	byte, word, total
Number of suitable expansion modules, max.	7
• Of these motor starters/frequency converters, max.	6
• Of these pneumatic interfaces, max.	6
Rated supply voltage for the electronics 1L+	24 V DC
• Permissible current, max.	1 A up to 40 °C, 0.8 A up to 55 °C
• Polarity reversal protection	Yes
• Short-circuit protection	Yes, electronic
Rated load voltage 2L+	24 V DC
• Polarity reversal protection	No
Current consumption from supply voltage 1L+	Max. 160 mA
Power losses of the module	Typ. 1.6 W
RAM (integrated) (1 statement corresponds to an average of 3 byte)	24 KB
Load memory	
• Integrated	40 KB RAM, 40 KB flash (programmable in the CPU part)
• Expandable with memory card	No
Programming language	STEP 7
Program organization	Linear, structured
Types of blocks	Organization blocks (OBs) Function blocks (FBs) Functions (FC) Data blocks (DBs) System functions (SFBs, SFCs)
Number of blocks, max.	128 FCs, 128 FBs, 128 DBs
Program execution	• Free cycle (OB 1)
Error responses (OB 86, OB 122)	Interrupt-driven (OB 40, OB 82) restart (OB 100)

Block nesting depth	8 for each program execution level
Nesting levels	8
Operation set	Binary logic, parenthesis commands, result assignment, save, count, load, transfer, compare, shift, rotate, generate complement, call up blocks, fixed-point and floating-point arithmetic functions, jump functions
System functions (SFCs)	Interrupt handling and error processing, copy data, diagnostics functions, module parameterization
Process image	
• Digital inputs	I 0.0 to I 31.7
• Digital outputs	Q 0.0 to Q 31.7
• Analog inputs	IW 256 to 367
• Analog outputs	QW 256 to 367
DP address area (interface), max.	32 byte input and output data
• Size and consistency	Selectable
Speed, approx.	1 ms per 1000 binary instructions
Bit memories	2048
• Of these retentive	0 to 2048 (M0.0 to M255.7, selectable)
Counter	64
• Of these retentive	0 to 63, programmable
Timers	128
• Of these retentive	0 to 127, programmable
Retentive data area	1 DB, max. 72 byte
Clock	Software clock
MPI communication through PROFIBUS DP	
• Guaranteed PG connections	1
• Free connections for PG/OP/ program-controlled communication	1
Interrupts	Diagnostic interrupt
Diagnostics	System fault display, bus monitoring, monitoring of supply voltage, monitoring of load voltage

IM 151-7 CPU interface module

Ordering data	Order No.
IM 151/CPU interface module including termination submodule	**6ES7 151-7AA10-0AB0**
IM 151/CPU FO interface module including termination submodule	**6ES7 151-7AB00-0AB0**
Micro memory card	
64 KB	**6ES7 953-8LF00-0AA0**
128 KB	**6ES7 953-8LG00-0AA0**
512 KB	**6ES7 953-8LJ00-0AA0**
2 MB	**6ES7 953-8LL00-0AA0**
4 MB	**6ES7 953-8LM00-0AA0**
ET 200S manual	
German	**6ES7 151-1AA00-8AA0**
English	**6ES7 151-1AA00-8BA0**
French	**6ES7 151-1AA00-8CA0**

	Order No.
DIN A4 inscription sheet	
Petrol	**6ES7 193-4BH00-0AA0**
Red	**6ES7 193-4BD00-0AA0**
Yellow	**6ES7 193-4BB00-0AA0**
Light beige	**6ES7 193-4BA00-0AA0**
MMC adapter for PG memory card slot (not required with Field PG, Power PG)	**6ES7 798-0BA00-0XA0**
EPROM programming device USB prommer for programming SIMATIC memory cards and EPROM modules	**6ES7 792-0AA00-0XA0**
Termination submodule for ET 200S; spare part	**6ES7 193-4JA00-0AA0**

BM 147/CPU intelligent basic module

Overview



- Basic module for processing communications between ET 200X and superordinate masters through PROFIBUS DP
- With simple programmable controller functionality (subset S7-300), i.e. distributed intelligence for preprocessing
- Reduces the load on the central controller
- Stand-alone mode without a higher-level master is possible; processing can continue even following a bus failure
- Fast, simple and integrated programming of a system with modular programs through STEP 7
- With greatly reduced response times to critical signals locally

Technical specifications

Dimensions W x H x D (in mm)	
• Individual device	134 x 110 x 55
• Hole pitch	107 x 110 x 55
Data transmission rates	9.6/19.2/93.75/187.5/500 kbit/s, 1.5/3/6/12 Mbit/s
Direct data exchange	Sender
Data consistency	Byte, word, total
Number of suitable expansion modules, max.	7
• Of these motor starters/frequency converters, max.	6
• Of these pneumatic interfaces, max.	6
Rated supply voltage for the electronics 1L+	24 V DC
• Permissible current, max.	1 A up to 40 °C, 0.8 A up to 55 °C
• Polarity reversal protection	Yes
• Short-circuit protection	Yes, electronic
Rated load voltage 2L+	24 V DC
• Polarity reversal protection	No
Current consumption from supply voltage 1L+	Max. 160 mA
Power losses of the module	Typ. 1.6 W
RAM (integrated) (1 statement corresponds to an average of 3 byte)	24 KB
Load memory	
• Integrated	40 KB RAM, 40 KB flash (programmable in the CPU part)
• Expandable with memory card	No
Programming language	STEP 7
Program organization	Linear, structured
Types of blocks	Organization blocks (OBs) Function blocks (FBs) Functions (FC) Data blocks (DBs) System functions (SFBs, SFCs)
Program execution	128 FC, 128 FB, 128 DB
Error responses (OB 86, OB 122)	• Free cycle (OB 1)
Block nesting depth	Interrupt-driven (OB 40, OB 82) restart (OB 100)

Nesting levels	8 for each program execution level
Operation set	8
System functions (SFCs)	Binary logic, parenthesis commands, result assignment, save, count, load, transfer, compare, shift, rotate, generate complement, call up blocks, fixed-point and floating-point arithmetic functions, jump functions
Process image	Interrupt handling and error processing, copy data, diagnostics functions, module parameterization
• Digital inputs	
• Digital outputs	I 0.0 to I 31.7
• Analog inputs	Q 0.0 to Q 31.7
• Analog outputs	IW 256 to 367
Nesting levels	QW 256 to 367
DP address area (interface), max.	32 byte input and output data
• Size and consistency	Selectable
Speed, approx.	1 ms per 1000 binary instructions
Bit memories	2048
• Of these retentive	0 to 2048 (M0.0 to M255.7, selectable)
Counter	64
• Of these retentive	0 to 63, programmable
Timers	128
• Of these retentive	0 to 127, programmable
Retentive data area	1 DB, max. 72 byte
Clock	Software clock
MPI communication through PROFIBUS DP	
• Guaranteed PG connections	1
• Free connections for PG/OP/ program-controlled communication	1
Interrupts	Diagnostic interrupt
Diagnostics	System fault display, bus monitoring, monitoring of supply voltage, monitoring of load voltage

BM 147/CPU intelligent basic module

Ordering data	Order No.
BM 147/CPU basic module	**6ES7 147-1AA01-0XB0**
with integral PLC functionality	
ET 200X manual	
German	**6ES7 198-8FA01-8AA0**
English	**6ES7 198-8FA01-8BA0**
French	**6ES7 198-8FA01-8CA0**
Cover plates for ET 200X basic modules	**6ES7 194-1JB00-0XA0**
Protective cover for bus and power supply connections (10 units)	
Single mounting rail for SIMATIC ET 200X (narrow)	
400 mm long for basic module + 3 expansion modules (60 mm)	**6ES7 194-1GA00-0XA0**
640 mm long for basic module + 7 expansion modules (60 mm)	**6ES7 194-1GA10-0XA0**
2000 mm long for customized lengths	**6ES7 194-1GA20-0XA0**
Double mounting rail for SIMATIC ET 200X (wide)	
520 mm long for basic module + 1 expansion module (60 mm) + 2 motor starters/frequency converters	**6ES7 194-1GB00-0XA0**
1000 mm long for basic module + 1 expansion module (60 mm) + 6 motor starters/frequency converters	**6ES7 194-1GB10-0XA0**

	Order No.
Mounting screws	**6ES7 194-1KC00-0XA0**
M5 x 20, 1 pack = 100 units	
Connector for PROFIBUS DP	**6ES7 194-1AA01-0XA0**
Control and supply voltages (including 2 PG screwed glands and 1 blanking plug); 3 connectors required per basic module	
Cable	
5-core, not preassembled, for bus signals, power supply: oil-resistant, conditionally welding-proof, trailing possible, PUR sheath	**6ES7 194-1LY10-0AA0** Specify length in m
5-core, not preassembled, for bus signals, power supply: standard, PVC sheath	**6ES7 194-1LY00-0AA0** Specify length in m

11

Overview



- Compact network transition between Industrial Ethernet and PROFIBUS
- Connection to Industrial Ethernet at 10/100 Mbit/s full/half duplex with autosensing for automatic switchover
- Connection to PROFIBUS with transmission speeds of 9.6 kbit/s to 12 Mbit/s incl. 45.45 kbit/s for PROFIBUS-PA.
- PROFInet standard version V1.0.
- The IE/PB link supports the PROFInet communications services for data exchange between PROFInet devices and is proxy for PROFIBUS field devices
- PROFInet defines an engineering model for distributed automation solutions and a model for system-wide communication through PROFIBUS and Industrial Ethernet with IT standards
- PG/OP communication between networks through S7 routing, i.e.all S7 stations can be remotely programmed from the PG on Industrial Ethernet or PROFIBUS.

Technical specifications

Data transmission rates	
• Industrial Ethernet	10/100 Mbit/s autosensing
• PROFIBUS	9.6 kbit/s to 12 Mbit/s 45.45 kbit/s (PROFIBUS PA)
Interfaces	
• Connection for Industrial Ethernet	
- AUI/industrial twisted pair	15-pin Sub-D socket with slide catch (automatic switchover between AUI and twisted pair)
- twisted pair (10BaseT/100BaseT)	RJ45 socket
• Connection for PROFIBUS	9-pin Sub-D socket
• Connection for supply voltage	4-pin terminal block
Supply voltage	24 V DC (+/- 5%)
Current consumption (at rated voltage)	
• From external 24 V DC	Max. 600 mA

Power loss	Approx. 10 W
Perm. ambient conditions	
• Operating temperature	0 °C to + 60 °C
• Transport/storage temperature	- 40 °C to + 70 °C
• Relative humidity	Max. 95 % at + 25 °C
Design	
• Module format	S7-300 design
• Dimensions (W x H x D) in mm	80 x 125 x 120
• Weight	Approx. 600 g
Degree of protection	IP 20
Configuration	
Configuring software for PROFInet	Option package SIMATIC iMap
Configuring software for additional services	NCM S7 in STEP 7 V5.1 SP2 or higher

Ordering data

	Order No.
IE/PB link Gateway between Industrial Ethernet and PROFIBUS, including 5-language manual on CD-ROM	**6GK1 411-5AA00**
S7-300 DIN rail [1]	**6ES7 390-1AB60-0AA0**
PS 307 load power supply unit for S7-300[2] 24 V DC, 2 A	**6ES7 307-1BA00-0AA0**
NCM S7 configuration software for Industrial Ethernet	Delivered with STEP 7 V5

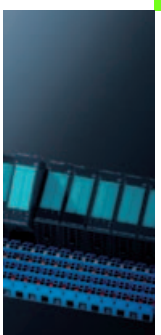
	Order No.
Manual for TP and fiber-optic networks[3] Paper version; network architecture, components, configurations, installation guidelines	
German	**6GK1 970-1BA10-0AA0**
English	**6GK1 970-1BA10-0AA1**
Manual for PROFIBUS networks[3] Paper version; network architecture, configuring, network components, installation	
German	**6GK1 970-5CA20-0AA0**
English	**6GK1 970-5CA20-0AA1**
SIMATIC iMap	See page 11/2

1) For further lengths, see page 4/123
2) For further power supplies, see page 4/120
3) For further language versions and manuals, refer to the respective products at http://www.siemens.com/automation/csi/net

Overviews

12





This Section provides brief overviews of products and systems used together with SIMATIC; their detailed descriptions can be found in other catalogs.

12/2 **SIMATIC DP**
12/2 General
12/3 Distributed I/O devices
SIMATIC ET 200

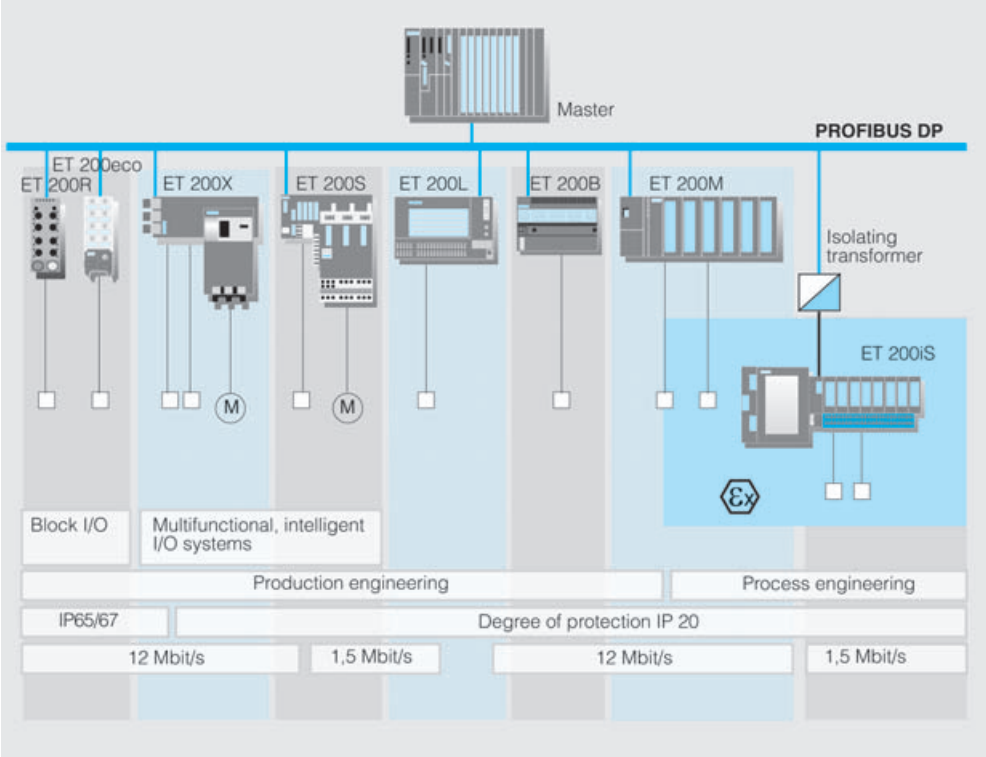
12/6 **SIMATIC PC**
12/7 SIMATIC Box PC
12/7 SIMATIC Rack PC
12/8 SIMATIC Panel PC

12/11 **SIMATIC PCS 7**

12/13 **SIMATIC HMI**
12/13 General
12/14 SIMATIC TP 270
12/14 SIMATIC OP 270
12/15 SIMATIC MP 270B

12/16 **SIMATIC NET**
12/16 General
12/17 New products for PROFIBUS
12/18 New products for Industrial Ethernet
12/19 New products for gateways
12/20 New products for industrial mobile communication

General



- Distributed I/O for the SIMATIC ET 200: For connection to sensors and actuators on site
- Signal transmission to higher-level controller or control system over the PROFIBUS DP fieldbus; resulting in coniderable saving on wiring overhead
- Optimum integration of the SIMATIC ET 200 devices in Totally Integrated Automation
- Can be operated easily on external masters

New:

- ET 200eco: economical block I/O in degree of protection IP 65/67
- ET 200S PROFIsafe with fail-safe signal modules for processing safety oriented signals; optimum connection to SIMATIC S7-300F

Application

SIMATIC ET 200 offers a suitable, distributed solution for all sectors and applications:

- Can be used in both production engineering and process engineering
- Degree of protection IP 20 or IP 65/67
- Low-cost to high-feature
- Design compact to bit-modular
- Integrated fiber-optic ports
- From simple I/O modules to multifunction systems®
- Motor starter, frequency converters, pneumatic components, technology modules, security functions or even distributed intelligence (CPU) can be integrated (depending on device)

Configuration, parameterization

The SIMATIC ET 200 I/O devices are configured by means of STEP 7 or COM PROFIBUS. As standardized PROFIBUS slaves, however, they can also be integrated into master devices from other manufacturers and their configuration tools by means of a GSD file.

For process engineering purposes, the relevant devices can also be integrated with SIMATIC PDM, which means that they can be parameterized and diagnosed in a user-friendly manner. Communication is likewise performed.

General

Diagnostics

The ET 200 I/O devices provide the higher-level controller with different items of diagnostic information over the bus cable - for example, device diagnostics and error messages in plain text. LEDs for the device, module or even channel can be added.

Troubleshooting can be performed quickly as a result, so that systems and machines are available.

Other components such as the BT 200 test unit or the diagnostics package for PROFIBUS DP support system diagnostics during start-up or during operation.

SIMATIC ET 200iS

Overview



- Intrinsically safe distributed I/O device for hazardous areas (Zones 1 and 2) in degree of protection IP 30
- Sensors anc actuators can also be in Zone 0
- Bit-modular design for adjustment to the task in hand
- Independent wiring permits prewiring without the electronic modules already being installed
- Optimum integration with control systems such as SIMATIC PCS 7 and others
- Parameterization by means of SIMATIC PDM
- HART-transparent
- Connection to PROFIBUS DP by means of isolating transformer
- Transmission rate up to 1.5 Mbit/s
- Replacement of modules during operation (“Hot Swapping”)
- Channel-specific diagnostics for high availability
- Type of protection to
  - CENELEC EEx ia/ib IIC T4
  - CSA standard
  - FM class I div 1 group A-D
- Screw/spring-loaded terminals

Additional information

- Catalogs IK PI, CA 01
- Internet: http://www.siemens.de/simatic-dp

SIMATIC ET 200S

Overview



- Highly compact distributed I/O system in degree of protection IP 20, which necessitates only a low wiring overhead
- Highly bit-modular design for exact adjustment to the automation task concerned
- Can be combined from digital and analog input and output modules, technology modules and motor starters
- Use as a mini programmable controller on PROFIBUS DP when using the integrated CPU
- Replacement of modules during operation (“Hot Swapping”)
- Accurate channel diagnostics for fault tolerance
- Integrated fiber-optic port optional
- Transmission rate up to 12 Mbit/s
- FAST CONNECT through-insulation-piercing connection terminals
- Ex approval for Cat. 3 to ATEX 100a
- Hard wired
- Integration of safety engineering:
  - conventional with SIGUARD
  - using bus with fail-safe PROFIsafe intelligent modules

Additional information

- Catalogs IK PI, CA 01
- Internet: http://www.siemens.de/simatic-dp

SIMATIC ET 200eco

Overview



- Compact, low-cost I/O for processing digital signals
- Cabinet-free design with degree of protection IP 65/67 with flexible and fast connection system
- Comprising basic module and various connection blocks for implementation matched to application
  - ECOFAST®: 2 x RS 458 hybrid fieldbus interface module with identification plug for PROFIBUS address setting
  - M12: 2 x M12 and 2 x 7/8" with 2 decoding switches for PROFIBUS address assignment
  - Connection block with T-function for PROFIBUS DP and power supply permitting hot swapping of modules on the PROFIBUS during startup or servicing
- Possible modules: 8DI, 16DI, 8DI/8DO, 8DO

Additional information

- Catalogs IK PI, CA 01
- Internet: http://www.siemens.de/simatic-dp

SIMATIC ET 200X

Overview



Distributed I/O device in degree of protection IP 65/67 for maschine-oriented complete solutions without cabinets

- Modular design for exact adjustment to the automation task concerned
- Combination of digital and analog input and output modules, motor starters, frequency converters, pneumatic components, and integarted CPU
- Connection of AS-Interface slaves using the corresponding module
- DESINA-compliant modules available (parameterizable I/O)
- Integrated fiber-optic port optional
- Transmission rate up to 12 Mbit/s
- Basismodule mit ECOFAST-Anschluss (RS 485, LWL)
- MOBY®-Erweiterungsmodule verfügbar

Additional information

- Catalogs IK PI, CA 01
- Internet: http://www.siemens.de/simatic-dp

SIMATIC ET 200R

Overview



- Distributed I/O with degree of protection IP 65
- Die-cast aluminium housing
- Integral repeater
- Parameterizable inputs/outputs: 8DI/8DO to 16DI
- Plug connector at rear for analog signals for welding transformers
- Connection via hybrid cable to 17-pin M23 plug

Additional information

- Catalogs IK PI, CA 01
- Internet: http://www.siemens.de/simatic-dp

SIMATIC ET 200L

Overview



- Small, low-cost I/O device in degree of protection IP 20 for the lower performance range
- Consists of terminal block and an electronics block
- Available in 2 versions:
  - ET 200L block I/O (not expandable)
  - ET 200L-SC modular I/O expandable with TB 16 SC terminal block of the SIMATIC Smart Connect (SC). It can be expanded in a bit-modular manner as a result with not more than 16 digital and analog input/output channels
- Transmission rate up to 1.5 Mbit/s

Additional information

- Catalogs IK PI, CA 01
- Internet: http://www.siemens.de/simatic-dp

SIMATIC ET 200M

Overview



- Modular I/O device in degree of protection IP 20, which is particularly suitable for specific and complex automation tasks
- Expandable with the signal and function modules of the S7-300 automation system
- Insertion of analog input and output modules for hazardous areas with HART optimizes the ET 200M for use in process engineering
- Suitable for use in redundant and security-oriented systems (S7-400H, S7-400F/FH)
- Consisting of a PROFIBUS DP IM 153 interface module, up to 8 I/O modules of the S7-300 automation system (design with bus connectors or active bus modules) and a power supply, if required
- Module replacement during routine operation with active bus modules
- Integrated fiber-optic port optional
- Transmission rate up to 12 Mbit/s

Additional information

- Catalogs IK PI, CA 01
- Internet: http://www.siemens.de/simatic-dp

SIMATIC ET 200B

Overview



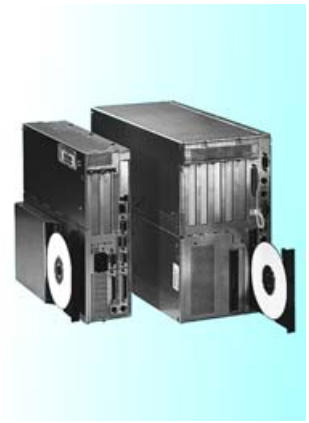
- Small and compact I/O device with small mounting depth in degree of protection IP 20. It can be housed in an extremely small space
- Consists of a terminal block and an electronics block with integrated PROFIBUS DP interface module
- Numerous analog and digital electronics blocks available
- Transmission rate up to 12 Mbits/s

Additional information

- Catalogs IK PI, CA 01
- Internet: http://www.siemens.de/simatic-dp

SIMATIC Box PC

Overview



- Thanks to their compact, rugged design, the SIMATIC Box PCs are ideal for installing on machinery, in cabinets and consoles. In view of their small size, they can be integrated even when space is at a premium.
- Typical applications are:
  - Measurement, open-loop and closed-loop control of process and machine data (e.g. automatic washing machines, robot controls)
  - Operation/visualization tasks with separate display/monitor (info terminals, large-screen displays for automobile manufacture)
  - Data acquisition and processing (e.g. production data acquisition, distributed process control)

SIMATIC Rack PC

Overview



- The SIMATIC Rack PCs are rugged industrial PCs for installation in 19" control cabinets and consoles. Their high system performance and their flexible expansion facilities make them suitable for all industrial sectors.
- SIMATIC PCs with basic or high industrial suitability are available for the various industrial demands.
- Typical applications are:
  - Measurement, open-loop and closed-loop control of process and machine data
  - Visualization of production sequences
  - Image processing for quality inspection tasks
  - Data acquisition and management, e.g. for recipe management or Internet applications

SIMATIC Panel PC

Overview



- SIMATIC Panel PCs are suitable for use in standard control cabinets, desks and panels.
- Typical applications can be found in both production and process automation.
- A SIMATIC Panel PC is the ideal platform for PC-based Automation:
  - PC-based visualization at machine level on site using SIMATIC ProTool/Pro
  - More complex solutions using the SIMATIC WinCC process visualization system
  - PC-based Control with SIMATIC WinAC - whether as software PLC or as hardware slot PLC
- Two different categories of device are available for different requirements:
  - SIMATIC Panel PC 670 and SIMATIC Panel PC 870
  - SIMATIC Panel PC Industrial Lite 70 (IL 70)

SIMATIC Panel PC 670 and PC 870

- The rugged design of the SIMATIC Panel PCs 670 and PC 870 means that they can resist even extreme mechanical stresses
- They are operationally reliable everywhere
- They offer an extremely high investment security, and are characterized by a fast integration capability

SIMATIC Panel PC Industrial Lite 70 (IL 70)

- The SIMATIC Panel PCs Industrial Lite 70 (IL 70) satisfy all basic demands for industrial suitability
- The CPUs offer maximum performance. Yet the Panel PCs IL 70 cost surprisingly little

SIMATIC Box PC 620

Overview



- Service-friendly compact PC with Celeron or Pentium CPU for installation in control cabinets, boxes, desks, panels, or directly in the machine
- 64 Mbyte main memory configuration; upgrading possible to max. 512 Mbyte
- Optional SIMATIC ports (PROFIBUS, MPI and TTY)
- Integral 10/100 Mbit/s Ethernet port
- USB port
- 2 Mbyte AGP graphics onboard
- 2 vacant slots for PC modules
- Integral monitoring functions (watchdog, temperature)
- High industrial compatibility (temperature, vibration, shock)
- Control of LCDs, monitors via LVDS, VGA
- CD-RW/DVD-R combined drive as option

Additional information

- Ordering document for PC based Automation
- Internet: http://www.siemens.de/simatic-pc

SIMATIC Box PC 840

Overview



- Service-friendly compact PC with Celeron or Pentium (Intel embedded line) CPU for installation in control cabinets, boxes, desks, panels, or directly in the machine
- 64 Mbyte main memory configuration; upgrading possible to max. 512 Mbyte
- Optional SIMATIC ports (PROFIBUS DP/MPI and TTY)
- Integral 10/100 Mbit/s Ethernet port
- 2 x USB ports
- 8 Mbyte AGP graphics onboard
- 5 vacant slots for PC modules
- Integral monitoring functions (watchdog, temperature)
- High industrial compatibility (temperature, vibration, EMC)
- Control of LCDs, monitors via LVDS, VGA

Additional information

- Ordering document for PC based Automation
- Internet: http://www.siemens.de/simatic-pc

SIMATIC Rack PC IL 40

Overview



- 4 HU industrial rack PC for installation in 19" rack systems
- High-performance, innovative Intel PC architecture
- Low-cost starter solution of SIMATIC rack PC range
- Overpressure ventilation using thermostatically-controlled fan and dust filter
- Lockable front panel
- Card holding assemblies
- Prepared for installation on telescopic rails

Additional information

- Ordering document for PC based Automation
- Internet: http://www.siemens.de/simatic-pc

SIMATIC Rack PC 840

Overview



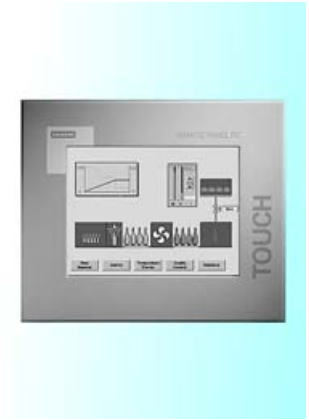
- 4 HU industrial rack PC for installation in 19" rack systems
- Intel embedded PC architecture with long availability
- Flexibility for PC expansions
- Overpressure ventilation using thermostatically-controlled fan (replaceable from front) and dust filter
- Service-friendly, simple opening of housing cover
- Lockable front panel prevents unauthorized access
- High reserves against shock and vibration as result of special drive and card holding assemblies
- Prepared for installation on telescopic rails

Additional information

- Ordering document for PC based Automation
- Internet: http://www.siemens.de/simatic-pc

SIMATIC Panel PC IL 70

Overview



Design

- Intel Celeron 800 MHz
  Intel Pentium III 933 MHz
- 128 Mbyte main memory configuration
- ≥ 20 Gbyte hard disk
- 3.5" 1.44 Mbyte diskette drive
- CD-ROM drive
- AGP graphics onboard
- Ethernet port onboard
- Vacant slots for expansions: 3 x PCI long, 1 x AGP
- USB port at rear
- Wide-range 110/230 V AC 50/60 Hz power supply
- Windows 2000 Professional multi-language operating system[2] or without operating system

Optional additional equipment

- Main memory upgrading to max. 256 Mbyte

Additional information

- Ordering document for PC based Automation
- Internet: http://www.siemens.com/panel-pc

12

Technical specifications

	12“ TOUCH	15“ TOUCH
Front versions	Yes	Yes
Display		
• Size	12.1“	15.1“
• Resolution	800x600 pixel TFT	1024x768 pixel TFT
• MTBF background illumination	Typ. 50,000 h[1]	typ. 50,000 h[1]

	12“ TOUCH	15“ TOUCH
Control elements		
• Touchscreen analog resistive	Yes	Yes
Degree of protection		
• Front	IP 65	IP 65

1) With 24-h continuous operation, depends on temperature
2) Multi-language: G, E, F, I, S, traditional Chinese, simplified Chinese, Korean, Japanese

Overview



Design

- Intel Celeron 1.2 GHz, Intel Pentium III 1.26 GHz
- 128 Mbyte main memory configuration (8 - 32 Mbyte shared graphics memory configurable using BIOS)
- ≥ 20 Gbyte hard disk
- 3.5" 1.44 Mbyte diskette drive
- AGP graphics onboard
- Ethernet port onboard
- Integral, electrically isolated PROFIBUS DP/MPI port
- Vacant slots for expansions: 1 x PCI, 1 x ISA/PCI shared (slots for card holding assemblies), 1 x cardbus slot type III (PCMCIA)
- USB ports at front[2] and rear
- Operating system: without, Windows 98 SE, Windows NT 4.0, Windows 2000 Professional multi-language[3] , Windows XP Professional multi-language[3]

Optional additional equipment

- Main memory upgrading to max. 256 or 512 Mbyte
- ≥ 40 Gbyte hard disk
- CD-ROM drive
- CD-RW, DVD drive
- Distributed design
- Direct key module

Additional information

- Ordering document for PC based Automation
- Internet: http://www.siemens.com/panel-pc

Technical specifications

	10“	12“ TOUCH	12“	15“ TOUCH	15“
Design					
• Central design	Yes	Yes	Yes	Yes	Yes
• Distributed design	No	Yes	Yes	Yes	Yes
Display					
• Size	10.4“	12.1“	12.1“	15.1“	15.1“
• Resolution (pixels)	640 x 480 TFT	800 x 600 TFT	800 x 6000 TFT	1024 x 768 TFT	1024 x 768 TFT
• MTBF background illumination	Typ. 60.000 h[1]	Typ. 60.000 h[1]	Typ. 60.000 h[1]	Typ. 60.000 h[1]	Typ. 60.000 h[1]
Control elements					
• Membrane keyboard	Yes	No	Yes	No	Yes
• 36 function keys with LEDs	Yes	No	Yes	No	Yes
• Touchscreen analog resistive	No	Yes	No	Yes	No
• Mouse at front	Yes	No	Yes	No	Yes
• Alphanumeric input	Yes	No	Yes	No	Yes
• Status LEDs (power/temperature)	Yes	Yes	Yes	Yes	Yes
Degree of protection					
• Front[2]	IP 65	IP 65	IP 65	IP 65	IP 65

1) With 24-h continuous operation, depends on temperature
2) The touch versions of the Panel PC are optionally available without a front USB port (and thus comply with the NEMA4 requirements)
3) Multi-language: G, E, F, I, S, traditional Chinese, simplified Chinese, Korean, Japanese

SIMATIC Panel PC 870

Overview



Design

- Celeron 1.2 GHz, Intel Pentium III, 1.26 GHz
- 128 Mbyte main memory configuration
- ≥ 20 Gbyte hard disk
- 3.5" 1.44 Mbyte diskette drive
- AGP graphics onboard
- Ethernet port onboard
- Integral, electrically isolated PROFIBUS DP/MPI port
- Vacant slots for expansions: 2 x PCI, 2 x ISA/PCI shared, 1 x ISA (slots for card holding assemblies)
- USB ports at front[2] and rear
- Operating system: without, Windows NT 4.0, Windows 2000 Professional multi-language[3], Windows XP Pro[3]

Optional additional equipment

- Main memory upgrading to max. 256 or 512 Mbyte
- ≥ 40 Gbyte hard disk
- CD-ROM drive
- CD-RW, DVD drive
- Distributed design
- Direct key module

Additional information

- Ordering document for PC based Automation
- Internet: http://www.siemens.com/panel-pc

Technical specifications

	12" TOUCH	12"	15" TOUCH	15"
Design				
• Central design	No	Yes	Yes	Yes
• Distributed design	Yes	Yes	Yes	Yes
Display				
• Size	12.1"	12.1"	15.1"	15.1"
• Resolution (pixels)	800 x 600 TFT	800 x 600 TFT	1024 x 768 TFT	1024 x 768 TFT
• MTBF background illumination	Typ. 60,000 h[1]	Typ. 60,000 h[1]	Typ. 60,000 h[1]	Typ. 60,000 h[1]
Control elements				
• Membrane keyboard	No	Yes	No	Yes
• 36 function keys with LEDs	No	Yes	No	Yes
• Touchscreen analog resistive	Yes	No	Yes	No
• Mouse at front	No	Yes	No	Yes
• Alphanumeric input	No	Yes	No	Yes
• Status LEDs (power/temperature)	Yes	Yes	Yes	Yes
Degree of protection				
• Front[2]	IP 65	IP 65	IP 65	IP 65

1) With 24-h continuous operation, depends on temperature
2) The touch versions of the Panel PC are optionally available without a front USB port (and thus comply with the NEMA4 requirements)
3) Multi-language: G, E, F, I, S, traditional Chinese, simplified Chinese, Korean, Japanese

SIMATIC PCS 7 – the process control system of Totally Integrated Automation

The SIMATIC PCS 7 process control system offers an open platform for up-to-date, future-oriented and economical automation solutions for all sectors of the production and process industries.

SIMATIC PCS 7's pioneering design and modern architecture permit the cost-effective design and economical operation of a plant throughout all life cycles: including planning, engineering, commissioning, training, operation and maintenance, up to future extensions and renovations.

SIMATIC PCS 7 contains SIMATIC state-of-the-art technology, and exceeds the requirements for performance, reliability, simplicity and safe operation of a control plant – with ease.

SIMATIC PCS 7, as the process control system of Totally Integrated Automation (TIA®), uses standard hardware and software components from the TIA range and, together with the system partners (HMI systems, controllers, distributed I/O, drives/field devices), offers integration for data storage, communication and configuring.

Integrated in Totally Integrated Automation, SIMATIC PCS 7 can handle standard process control tasks as well as the complete automation of all upstream and downstream processes (such as material supply or packaging) at a production location. By linking of the automation level to the IT environment, the process data are made available throughout the company for evaluation, planning, coordination and optimization of production and business processes.

In addition to the advantages resulting from the common usage of standard SIMATIC components (such as high quality and stability, low hardware costs, short delivery times and worldwide availability), reference should be made to the particular advantages of Totally Integrated Automation with the SIMATIC PCS 7 process control system: readily-calculated development, implementation and life cycle costs, minimization of engineering requirements, facilities for process optimization, as well as adaptability to changing customer requirements.

Uniform and homogeneous total system

As a modern process control system, SIMATIC PCS 7 forms an integrated, homogeneous total system. Its system properties ranging from engineering up to operating ensure that the demands typical for a process control system are comprehensively fulfilled:

- Simple and safe process control
- Convenient operation and visualization
- Fast and uniform system-wide engineering
- Comprehensive integration of fieldbus
- Flexible solutions for batch processes
- System openness
- Direct connection to the IT environment

Examples of SIMATIC PCS 7 functionalities:

- Operating strategy with technological view of plant
- I & C alarm concept
- Access protection/control and operating privileges
- Life-beat monitoring and diagnostics system
- Time synchronization
- Integration of safety-oriented applications
- Full redundancy from the field level up to operation and monitoring
- Comprehensive libraries with ready-made control system blocks and plans, faceplates and symbols
- Import and export functions for project data to and from CAD/CAE systems
- Software package for batch processes (BATCH *flexible*, complies with ISA S88.01)

Horizontal integration

On the one hand, the horizontal integration of engineering processes with subsidiary processes is based on the fact that SIMATIC PCS 7 uses the same standard SIMATIC components, in particular the SIMATIC controllers which are suitable for both open-loop control tasks and I & C functions.

For the first time, a process control system combines all advantages otherwise only encountered in the successful SIMATIC automation systems manufactured in large quantities:

- Low hardware costs
- Proven quality and stability
- Simple, fast definition and selection of system components
- Short delivery times for spare parts and when expanding the system
- Worldwide availability of components

On the other hand, different approaches can be combined in SIMATIC PCS 7 thanks to Totally Integrated Automation, e.g. systems engineering or OEM equipment based on SIMATIC components.

Furthermore, SIMATIC PCS 7 can be extended by a wide range of different components from the extensive product range of Siemens Automation and Drives.

Vertical integration

Vertical integration of the system in the company environment comprises two aspects:

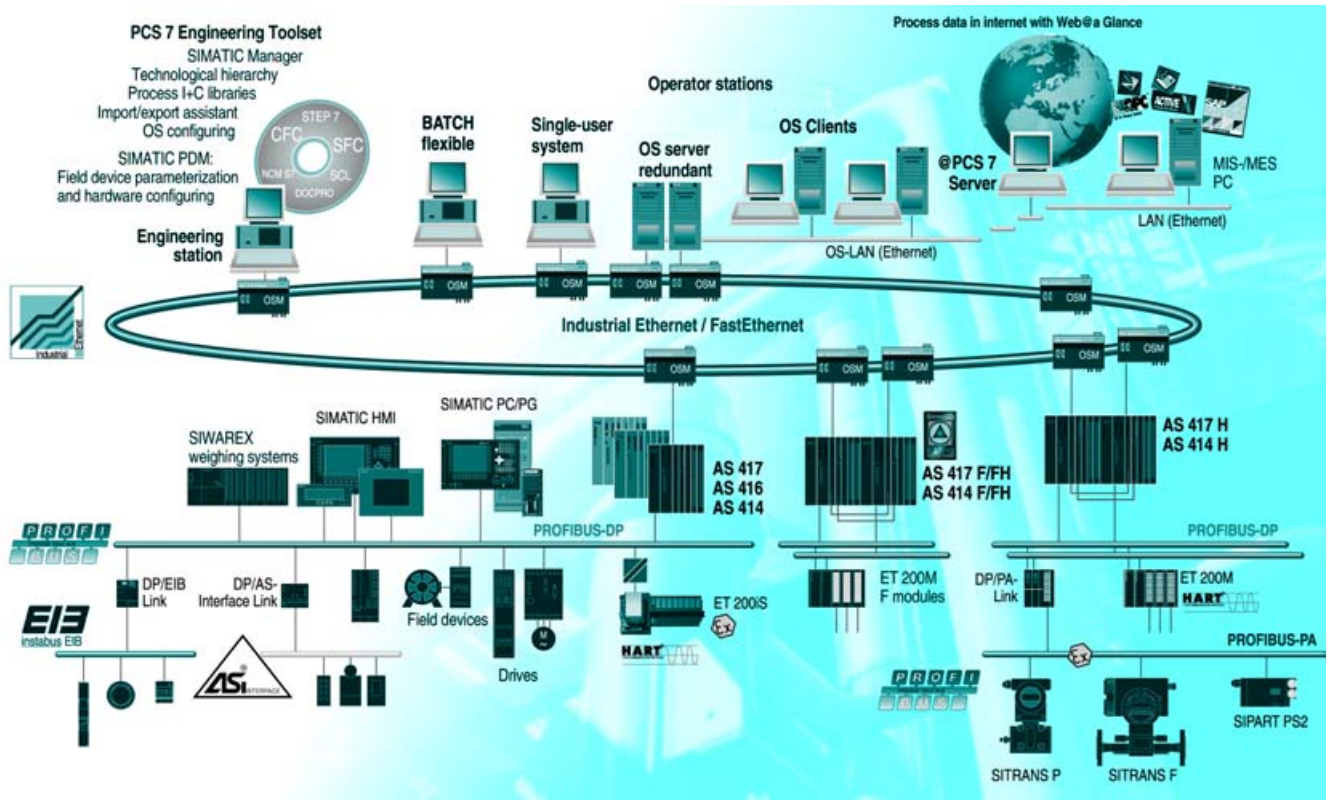
- Integration into the company-wide information network
- Integration of field systems.

The consistent observation of international industrial standards for data exchange with the operations management level, such as Ethernet, TCP/IP, OPC, @aGlance or SAP R3/PP-PI, permits seamless linking of the SIMATIC PCS 7 process control system into the company-wide information network.

Company-wide availability of process data is thus guaranteed at all times and all locations for a wide range of applications such as

- MIS (Management Information System),
- MES (Manufacturing Execution System),
- ERP (Enterprise Resource Planning),
- Advanced Process Control.

SIMATIC PCS 7



An SAP-certified interface SAP R3i-PI is available for linking to the PP-PI module of SAP/R3. This interface connects SAP/R3 to the PCS 7 software package BATCH *flexible* for recipe-controlled automation of batch processes.

The @PCS 7 Server and the corresponding Web@aGlance/IT client mean that processes can be monitored online and worldwide via intranet or Internet. This means that higher-level information systems possessing an @aGlance interface can be connected to SIMATIC PCS 7.

SIMATIC PCS 7 thus provides access to the IT environment in a simple manner.

Integration of field systems

SIMATIC PCS 7 is particularly suitable for integration of field systems into the process control system. It is unimportant whether the plant is equipped with classical or intelligent field devices. Intelligent field devices can be connected via HART communication and direct PROFIBUS communication.

The bus-based field devices are connected on the basis of the PROFIBUS DP/PA – an international standard to IEC 61158 – and can also be redundant.

PROFIBUS PA also permits incorporation of field devices in the Ex zone. With PROFIBUS DP, an isolating transformer is used for distributed I/Os in the hazardous area. The incorporation in the Ex zone is also possible for classical field devices and HART field devices.

The SIMATIC PDM (process device manager) permits central parameterization from the engineering system of field devices with PROFIBUS DP/PA or HART interfaces throughout the plant.

Communication standards such as PROFIBUS and HART open up the system for components from other vendors. In addition, simple actuators and sensors can be linked into the system via AS-Interface, or building automation components using *EIB instabus*.

The configuration of automation functions can be set via a generic driver so that a function can be operated with conventional I/O or with field devices when necessary.

Scaleability, flexibility and openness

In addition to its software specific to process control systems, SIMATIC PCS 7 is based on selected standard SIMATIC components.

You can

- select from various, powerful automation systems depending on the project and plant requirements,
- incorporate distributed and central I/Os step-by-step,
- extend operation and monitoring from a single-user starter system up to a distributed multi-user system with client/server architecture, and
- specifically extend the functionality of the operator stations by adding various software and hardware functions.

This means: the fine scaleability and the wide variety of possible extensions enable SIMATIC PCS 7 to be adapted to the plant functionalities and requirements in the best possible manner, and also at low cost.

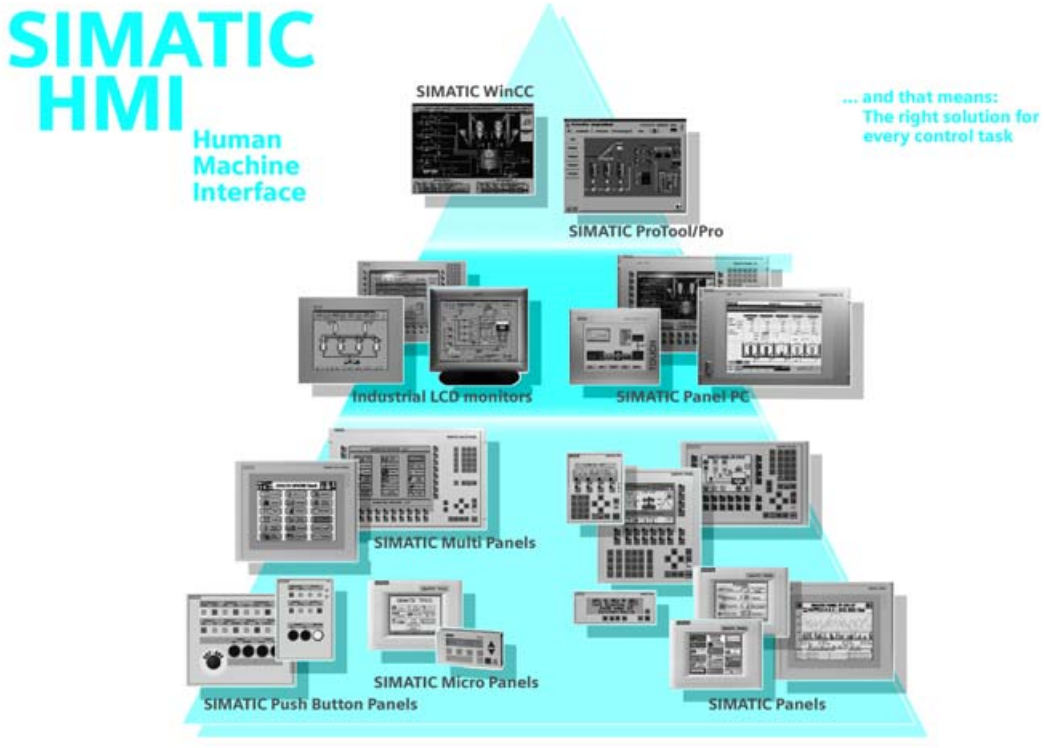
Attractively priced starter licenses are available for the introduction to process automation with SIMATIC PCS 7, and can be extended in line with increased requirements.

The openness of SIMATIC PCS 7 covers all levels. These include the programming and data transfer interface for application programs as well as facilities for importing and exporting graphics, text and data, e.g. from CAD/CAE applications.

Additional information:

- Catalog ST PCS 7
- Internet: http://www.siemens.de/simatic-pcs7

Overview



SIMATIC HMI Human Machine Interface

The interface between man and machine – the Human Machine Interface, abbreviated to HMI – links the automation world to the individual requirements of operators. Operation and monitoring of a process means that machines and plants must run optimally with the associated availability, productivity etc.

Shaping the future

Processes are becoming increasingly complex, associated with increasing demands for machine and plant functionalities.

To make this increasing complexity increasingly simpler is our incentive for every HMI innovation. Open, standardized hardware and software interfaces permit worldwide application. In addition to the automated process, SIMATIC HMI is an integral component of the company-wide IT landscape.

All advantages of Totally Integrated Automation

As a component of Totally Integrated Automation, SIMATIC HMI uses the same configuration tools, accesses the same data, and communicates in a uniform manner. The result is saving of up to 50% of the engineering costs for an automation solution.

SIMATIC HMI – everything for operation and monitoring

SIMATIC HMI offers a complete range from simple operator panels up to process visualization systems for the numerous operation and monitoring requirements, including customized solutions.

SIMATIC TP 270

Overview



The TP 270 touch panels satisfy all expectations placed on HMI devices:

- High performance
- Rugged and compact
- Comprehensive functionality for demanding machine visualization

- Standard hardware and software interfaces
- Secure future resulting from the innovative Windows CE standard operating system

The TP 270 touch panels are the innovative successors to the SIMATIC TP27 touch panels:

- Mounting depth only 59 mm
- Degree of protection at front IP 65 (or NEMA 4/NEMA 12)
- High EMC, and extremely resistant to vibration
- 64-bit RISC CPU
- Ports:
  - RS 232/RS 485/RS 422 port for process connections (MPI, PROFIBUS DP etc.)
  - Serial RS 232 port (printer, download/upload)
  - USB for mouse, keyboard, printer and download/ upload of configuration
- Slot for compact flash card

TP 270 6"

- 5.7" STN color display, 256 colors, MTBF 40,000 hours
- Resolution 320 x 240 pixels
- Rugged plastic housing

TP 270 10"

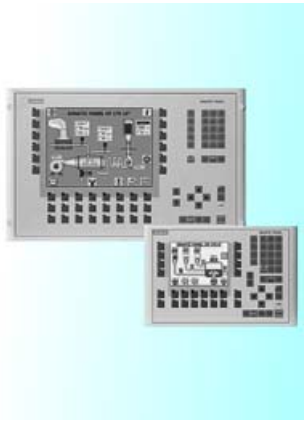
- 10.4" STN color display, 256 colors, MTBF 60,000 hours
- Resolution 640 x 480 pixels
- Rugged die-cast aluminium housing

Additional information

- Catalog ST 80
- Internet: http://www.siemens.com/panels

SIMATIC OP 270

Overview



The OP 270 operator panels satisfy all expectations placed on HMI devices:

- High performance
- Rugged and compact
- Comprehensive functionality for demanding machine visualization

- Standard hardware and software interfaces
- Secure future resulting from the innovative Windows CE standard operating system

The OP 270 operator panels are the innovative successors to SIMATIC OP27 operator panels:

- Mounting depth only 55 or 59 mm
- Degree of protection at front IP 65 (or NEMA 4/NEMA 12)
- High EMC, and extremely resistant to vibration
- 64-bit RISC CPU
- Ports:
  - RS 232/RS 485/RS 422 port for process connections (MPI, PROFIBUS DP etc.)
  - Serial RS 232 port (printer, download/upload)
  - USB for mouse, keyboard, printer and download/ upload of configuration
- Slot for compact flash card

OP 270 6"

- 5.7" STN color display, 256 colors, MTBF 40,000 hours
- Resolution 320 x 240 pixels
- Rugged plastic housing
- 24 keys for free inscription, some with LEDs, 14 of them as softkeys

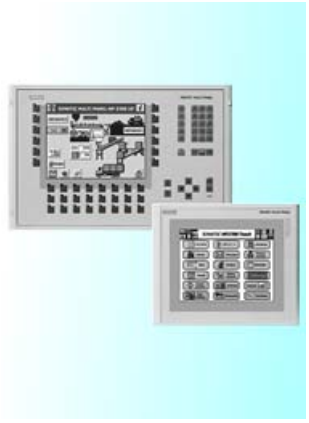
OP 270 10"

- 10.4" STN color display, 256 colors, MTBF 60,000 hours
- Resolution 640 x 480 pixels
- Rugged die-cast aluminium housing
- 36 keys for free inscription, some with LEDs, 20 of them as softkeys

Additional information

- Catalog ST 80
- Internet: http://www.siemens.com/panels

Overview



The MP 270B multi panels are powerful, multi-function platforms with which visualization tasks at machine level can be solved on an industry-compatible Windows CE platform. Two slots (PC card and CF card) offer appropriate expansion if required, e.g. for archiving and recipes.

The integral USB port allows connection of an external printer or keyboard, a mouse or a barcode reader.

In addition, all multi panels have an Ethernet port (TCP/IP) for data exchange with the host PC and for connecting a network printer.

Major features:

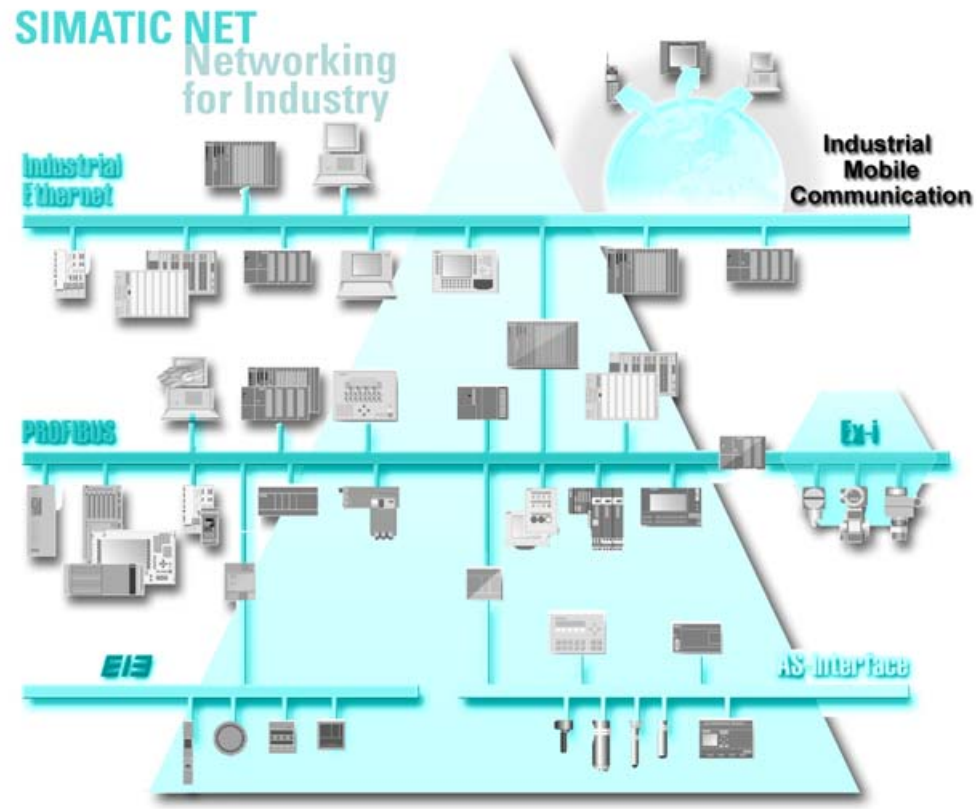
- Low mounting depth: only 55 or 59 mm
- Degree of protection at front IP 65 (or NEMA 4/NEMA 12)
- 10" TFT displays with a resolution of 640 x 480 pixels, 256 colors
- Touch or key versions
- CCFL (cold cathode fluorescence lamps) backlighting with average service life up to 50,000 hours

Additional information

- Catalog ST 80
- Internet: http://www.siemens.com/mp

General

Overview



SIMATIC NET stands for industrial communication. Its products enable solutions for an integrated flow of data and information from the field level up to the company management level.

Particular importance is paid to the networks as the backbone of a comprehensive automation solution. Commonly used industrial standards open up the system to all sides. The individual networks satisfy many different performance and application requirements: They can exchange data on different bus systems, between different plant components, or between different automation stations using either wireless or wired connections.

Networks in all important sectors of industry with thousands of nodes confirm the success of SIMATIC NET. One of the reasons for this is that SIMATIC NET has been consistently based on standards right from the beginning. Siemens has been a member of the commission working towards international standards for industrial communication right from the start.

Summary of networks supported by SIMATIC NET:

- Industrial Ethernet (IEEE 802.3, IEEE 802.3u) - the international standard for the networking of areas and cells, including the field area.
- PROFIBUS (IEC 61158/EN 50 170) - the international standard for the field area, and the cell network for few stations.
- AS-Interface (EN 50 295) - for communication with sensors and actuators.
- EIB (CEN TC247), the network for building installations.
- Wireless networks, e.g. WLAN (IEEE 802.11b), GSM, UMTS, the international standards for radio networks.

SIMATIC NET offers products for cross-company data transmission using local networks, intranet, Internet or radio networks.

In addition to the previous wired solutions, wireless communication is being increasingly used in industry. Industrial mobile communication (IMC) is becoming increasingly significant:

IMC stands for the industrial mobile communication products of SIMATIC NET (e.g. MOBIC®) which use wireless communication. These are based on worldwide networks such as WLAN (according to IEEE 802.11b), UMTS or GSM.

General

Overview (continued)

All SIMATIC NET components also have uniform system interfaces and are perfectly matched to one another.

For you, this means long-term investment security; thanks to the carefully graded performances, you can implement company-wide communication using SIMATIC NET - from the simplest device up to a complex system.

New products for PROFIBUS

Overview



ECOFAST cables

ECOFAST (Energy and Communication Field Installation System) is a system solution for distribution without using control cubicles. It sets new standards for equipping machines and plants with automation, switchgear and drive technology.

A distributed, modular design of the installation is the basis, together with comprehensive diagnostics down to the component level.

Modern fieldbus and power bus technologies open up new possibilities for machine and plant builders.

Distributed systems can be flexibly adapted to the different requirements of industrial automation.

The bus cables for ECOFAST are used for common transmission of data and power supply, and are designed as hybrid cables.

Data transmission with ECOFAST is carried out on copper conductors; four additional copper conductors permit transmission of the 24 V DC power supply.

The ECOFAST hybrid cables can be bought by the meter, or are available in preassembled lengths.

Additional information:

- Catalog IK PI
- Catalog CA 01



CP 5512

- For connecting PG/PC and notebooks with PCMCIA slot for cardbus (32 bit) to PROFIBUS and MPI of the SIMATIC S7
- PCMCIA card type II for cardbus (32 bit); for PG/PC with PCMCIA slot and notebooks
- Communications services:
  - PROFIBUS DP master class 1 including acyclic DP expansions with SOFTNET-DP
  - PROFIBUS DP master class 2 including acyclic DP expansions with SOFTNET-DP
  - PROFIBUS DP slave with SOFTNET-DP slave
  - PG/OP communication
  - S7 communication with SOFTNET S7
  - S5-compatible communication (SEND/RECEIVE on basis of FDL interface) with SOFTNET-DP or SOFTNET S7
- Can be used with:
  - STEP 7 ProTool, NCM PC, Micro/Win, ProTool/Pro, SIMATIC PDM (for PG/OP communication)
  - COM PROFIBUS
  - SOFTNET-S7 (for S7 communication)
  - SOFTNET-DP (for DP)

OPC servers are included in the delivery of the communication software

Additional information:

- Catalog IK PI
- Catalog CA 01

12

New products for Industrial Ethernet

Overview



ELS electrical lean switch

- The ELS TP40 / ELS TP40M electrical lean switches are optimized for the design of Industrial Ethernet networks with 10/100 Mbit/s and a linear structure
- The ELS TP40 switches are connected to one another using Industrial Ethernet FastConnect Twisted Pair (FC TP) cables (Cat5E) and integral barrel contacts
- Two stations, or one station and one programming device, are connected using two RJ45 female connectors
- ELS TP40M with additional Web server and SNMP access for remote diagnostics over the network
- The ELS TP80 electrical lean switch permits the design of star networks with up to 8 stations using RJ45 female connectors or expansion of the number of ports with OSM®/ESM applications
- Simple connections are possible using integral FastConnect elements

Additional information:

- Catalog IK PI
- Catalog CA 01



CP 243-1

- Connection for Industrial Ethernet with
  - 10/100 Mbit/s
  - Half-duplex/full-duplex
  - RJ45 female connector
  - TCP/IP
- Configuring, remote programming and servicing with STEP 7-Micro/WIN possible over Industrial Ethernet (program upload/ download, status)
- CPU/CPU communication possible over Industrial Ethernet (clients + server, 8 connections)
- Further processing of PLC data in PC applications by incorporation into S7-OPC
- Module replacement possible without PG

Additional information:

- Catalog IK PI
- Catalog CA 01



CP 343-1 PN

The CP 343-1 PN communications processor enables connection of SIMATIC S7-300 to Industrial Ethernet with PROFInet communication standards. PROFInet defines an engineering model for distributed automation solutions, and a further model for integrated communication over PROFIBUS and Industrial Ethernet using IT standards.

The CP 343-1 PN offers the following functions:

- 10/100 Mbit/s full-duplex/ half-duplex connection with autosensing for automatic switchover
- Universal connection facilities for ITP, RJ45 and AUI
- Keep-alive function can be set
- TCP/UDP transport protocol
- Additional communication services:
  - PG/OP communication
  - S7 communication
  - S5-compatible communication
- Multicast with UDP
- Remote programming and initial startup over the network

Additional information:

- Catalog IK PI
- Catalog CA 01

New products for Industrial Ethernet

Overview



CP 1512

The CP 1512 communications processor is used to connect PG/notebooks with PCMCIA slot (32-bit cardbus interface) to Industrial Ethernet with 10/100 Mbit/s.

It offers the following functions:

- Communication services using ISO or TCP/IP transport protocols
  - PG communication
  - S7 communication
  - S5-compatible communication (SEND/RECEIVE)
- Designed for use in industrial environments
- PCMCIA card type II
- Ports: RJ45 (twisted pair)
- Plug&Play
- OPC servers are included in the delivery of the communication software

Additional information:

- Catalog IK PI
- Catalog CA 01



CP 1612

The CP 1612 communications processor is used to connect PG/PC with PCI slot to Industrial Ethernet with 10/100 Mbit/s.

The CP 1612 offers the following functions:

- Communication services using ISO or TCP/IP transport protocols
  - PG/OP communication
  - S7 communication
  - S5-compatible communication (SEND/RECEIVE)
- Designed for use in industrial environments
- PCI card
- Ports: RJ45 (twisted pair)
- Plug&Play
- OPC servers are included in the delivery of the communication software

Additional information:

- Catalog IK PI
- Catalog CA 01

New products for gateways

Overview



IE/PB link

The IE/PB link is a compact gateway between Industrial Ethernet and PROFIBUS, and provides the connection to Industrial Ethernet with 10/100 Mbit/s full-duplex/half-duplex with autosensing for the automatic switchover.

The IE/PB link offers the following functions:

- Connection to PROFIBUS with data transfer rates from 9.6 kbit/s to 12 Mbit/s, including 45.45 kbit/s for PROFIBUS PA
- The IE/PB link supports the PROFInet communication services (PROFInet standard version V1.0.) for data exchange between the PROFInet devices, and is the proxy for PROFIBUS field devices
- PROFInet defines an engineering model for distributed automation solutions, and a further model for integrated communication over PROFIBUS and Industrial Ethernet using IT standards
- Cross-network PG/OP communication by means of S7 routing, i.e. all S7 stations can be remote programmed from the PG on the Industrial Ethernet or PROFIBUS.

Additional information:

- Catalog IK PI
- Catalog CA 01

New products for Ind. Mobile Communication

Overview



Industrial Ethernet RLM (radio link module)

The RLM (radio link module) is used to design a wireless network, or to connect mobile stations to a stationary Industrial Ethernet network. One or more RLMs with integral PCMCIA cards (CP 1515) are used for this. The RLM serves as the access point between the wireless and wire-based networks.

The RLM offers the following functions:

- Data communication in the 2.4 GHz ISM band without registration and free of charge
- Standardized radio technology to IEEE 802.11b
- High data throughput with transmission rates up to 11 Mbit/s
- Worldwide use with comprehensive radiotransmission approvals (country-specific operating regulations must be observed)
- Simple integration of mobile stations into production structures
- Simple installation thanks to comprehensive installation tools
- Reliable data transmission with 128-bit encoding algorithm

Additional information:

- Catalog IK PI
- Catalog CA 01



CP 1515

The CP 1515 is a PCMCIA card of type II, and is used as a radio interface in both the RLM and in mobile stations (e.g. MOBIC T8 with integral driver for CP 1515).

One or more RLMs (radio link modules) with integral PCMCIA cards are used to design a wireless network, or to connect mobile stations to a stationary Industrial Ethernet network.

The CP 1515 offers the following functions:

- Data communication in the 2.4 GHz ISM band without registration and free of charge
- Standardized radio technology to IEEE 802.11b
- High data throughput with transmission rates up to 11 Mbit/s
- Worldwide use with comprehensive radio transmission approvals (country-specific operating regulations must be observed)
- Simple integration of mobile stations into production structures
- Simple installation thanks to comprehensive installation tools
- Reliable data transmission with 128-bit encoding algorithm
- Design of a radio network with the RLM (radio link module), or as a radio interface in mobile stations (e.g. MOBIC)

Additional information:

- Catalog IK PI
- Catalog CA 01
- Internet: http://www.siemens.de/automation/net/katalog
- SIMATIC NET home page on the Internet: http://www.siemens.de/automation/simatic-net

Supplementary Components

13





13/2 Drive systems
13/2 SIMODRIVE
13/2 SIMOREG 6RA70
13/2 SIMOVERT MASTERDRIVES

13/3 RF identification systems
13/3 MOBY

13/4 Interface and monitoring systems
13/4 SIMIREL

13/4 Measuring systems
13/4 SIMODRIVE sensor

13/5 CNC control systems
13/5 SINUMERIK

13/6 Time synchronization systems
13/6 SICLOCK

13/6 Power supplies
13/6 SITOP power

13/7 System cabling
13/7 SIMATIC TOP connect

13/7 Encoders and sensors
13/7 BERO proximity switches

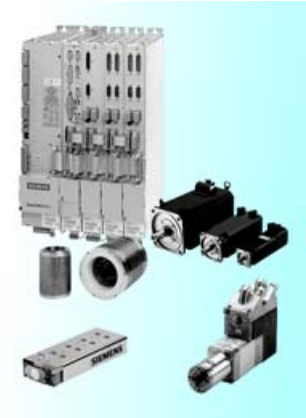
13/8 Telecontrol components
13/8 SINAUT ST7

13/8 Telecontrol and station control systems
13/8 SICAM SAS station control system
13/9 SICAM RTU telecontrol unit
13/9 SICAM miniRTU telecontrol unit
13/9 SICAM microRTU telecontrol unit

13/10 Function module for SIMATIC S7-400
13/10 SICAM DI 32 digital input module
13/10 SICAM CO digital output module
13/10 SICAM AI analoginput module
13/11 SICAM MCP time synchronization module
13/11 SICAM PS power supply module

SIMODRIVE

Overview



- Drive system for connection to machine tools, robots, special-purpose machines, manipulators and production machines
- Consists of SIMODRIVE 611 converter system with analog and digital closed-loop control plug-in modules and the SIMODRIVE 611 universal for operating three-phase servomotors, linear motors, three-phase main spindle motors and standard asynchronous motors
- SIMODRIVE 611 universal, SIMODRIVE POSMO A, POSMO CD/CA, POSMO SI with PROFIBUS DP connection enable simple integration into the SIMATIC using the STEP 7 programming software
- SIMODRIVE POSMO A is an intelligent positioning motor with an integrated converter power section, motor control, positioning control and program memory
- SIMODRIVE POSMO CD/CA are complete converter and control units for a distributed drive system. Suitable for installation directly at a wide range of motors
- SIMODRIVE POSMO SI is a single-axis servo drive for a distributed servo drive system, consisting of a fully functional mechatronic unit

Drive ES engineering system:
see Section 8, Engineering tools.

Additional information:

- Catalog NC 60/DA 65.4
- Internet: http://www.siemens.com/drivesolutions

SIMOREG 6RA70

Overview



- All-digital compact units for three-phase connection
- For armature and field supply of variable-speed DC drives
- Principal applications:
  - Main drive for sheet-fed and rotary printing presses
  - Travel and hoist drives in the hoisting gear industry
  - Lift and aerial ropeway drives
  - Rolling mill drives
  - Paper-making machines etc.
- Power range from 15 A to 2200 A
- With parallel connection up to 13 200 A

Additional information:

- Catalog DA 21.1
- Internet: http://www.siemens.com/automation

SIMOVERT MASTERDRIVES

Overview



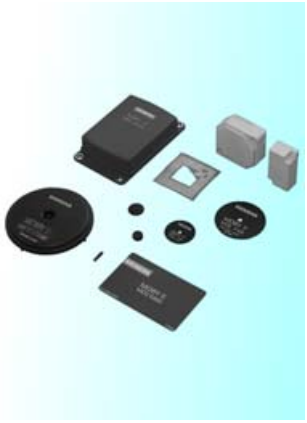
- AC frequency converter, all-digital design with isolated gate bipolar thyristor power sections
- Can be used for single-motor and multi-motor drives
- Types of design: compact plus, compact, chassis and cabinet units
- Unit characteristics:
  - Vector control for high-performance and economic drive solutions in all sectors of industry and for all applications. Voltages from 200 V to 690 V, 50/60 Hz; power from 0.55 kW to 1500 kW, and 6000 kW in the case of parallel connection
  - Motion control for all applications related to servo engineering, even with most demanding technological requirements. Voltages from 380 V to 480 V; 50/60 Hz; power from 0.55 kW to 250 kW
- Design with active front end possible for non-interacting and stable drive engineering
- Connection to PROFIBUS DP possible via communications processor
- Comprehensive range of accessories and system components

Drive ES engineering system:
see Section 8, Engineering tools.

Additional information:

- Catalogs DA 65.10/DA 65.11
- Internet: http://www.siemens.com/drivesolutions

Overview



- Contactless RF identification systems for controlling and optimizing material flows in production, manufacture and logistics
- Wide range of data registers (tag/transponder) and read/write devices with interface to SIMATIC and PROFIBUS DP
- High reliability even with contamination and fluctuations in temperature

Principal applications include:

- Assembly lines (identification e.g. of workpiece holders)
- Logistics and distribution (identification e.g. of pallets, load holders, containers, or as 'delivery note')
- Main assembly lines in the automotive industry (shell, paint shop, final assembly)

Additional information:

- Catalog KT 21
- Internet: http://www.siemens.de/moby
- E-mail: moby@fthw.siemens.de
- Tel.: +49 (0)911 750 4447

MOBY brief overview

Identification system	Frequency	Range (max.)	Memory (max.)	Temperature (max.)	Special features	Approvals
MOBY F	125 kHz	0.4 m	192 byte EEPROM	130 °C	-	EN 300 330 (Europe)
MOBY D	13.56 MHz	0.8 m	48 byte EEPROM	+85 °C to + 220 °C	Smart Labels on basis of ISO 15693, e.g. Tagit/Icode	EN 300 330 (Europe)
MOBY E	13.56 MHz	0.1 m	752 byte EEPROM	+150 °C	Mifare	EN 300 330 (Europe) FCC Part 15 (USA) UL/CSA
MOBY I	1.81 MHz	0.15 m	32 KB FRAM	+85 °C to + 220 °C cyclic	Data memory without battery backup	EN 300 330 (Europe) FCC Part 15 (USA) UL/CSA
MOBY V	433 MHz	0.7 m	32 KB RAM	+85 °C	-	EN 300 220 (Europe)
MOBY U	2.45 GHz	3.0 m	32 KB RAM	+85 °C to + 220 °C cyclic	Frequency hopping	I-ETS 300 440 (Europe) FCC Part 15 (USA) UL/CSA

SIMIREL

Overview



- Interface converter/ isolating amplifier/ transmitter 3RS17; for electrical isolation, conversion, amplification of 0 to 10 V and 0/4 to 20 mA analog signals, for interference suppression and overvoltage protection with analog modules. Advantages: narrow width of 6.2 mm upwards, extremely easy adjustment from the side, exceptional price/performance ratio
- Interface relay 3TX70 and plug-in relay LZX; for voltage conversion, electrical isolation, signal amplification, contact multiplexing and for overvoltage and EMC protection of digital inputs. A comprehensive range is available with relay and semiconductor outputs as well as various supply voltages
- Temperature relay 3RS10/ 11; for monitoring closed-loop controls, and for controlling temperatures. PT100/1000, KTY83/84 and NTC, as well as thermocouples of types J, K, T, E, N can be connected. In addition to the good price/performance ratio, one of the main advantages is simple operation, especially with the digital devices
- Time, monitoring and power relays round of the range

Additional information:

- Catalog NSK, Section 7
- SIMIREL product document
- Internet: http://www.siemens.de/simirel

SIMODRIVE sensor

Overview



- Measuring systems for the acquisition of paths, angles of rotation, and speeds
- Suitable for use on machines in different industries, e.g. production machines, manipulators, machine tools and special-purpose machines
- Suitable for connection to SIMATIC, SINUMERIK, SIMOTION and SIMODRIVE
- For SIMODRIVE sensors, the available accessories include couplings, installation materials, cable connectors and completely assembled signal leads
- Externally mounted SIMODRIVE sensors can be supplied as incremental encoders and absolute encoders
- Incremental encoders:
  - RS 422 (TTL) interfaces, 1 V_{pp} and HTL
  - 5 V DC or 10 to 30 V DC working voltage
- Absolute encoders:
  - All absolute encoders can be delivered in Singleturn and Multiturn versions
  - SSI (Synchronous Serial Interface) or connection for EnDat or PROFIBUS DP
  - Sensors with PROFIBUS DP support Class 1 and Class 2 profiles and application-specific additional functions. They are designed to be programmable
- All measuring systems can be delivered as synchro flange and clamped flange designs

Additional information:

- Catalog NC 60
- Catalog NC Z
- Catalog CA 01
- Internet: http://www.siemens.de/automation

Overview



SINUMERIK 840C with analog or digital SIMODRIVE 611

- High-performance control with digital or analog drives
- Especially suitable for sophisticated stand-alone machine tools or machines in integrated systems
- Operation as slave or master possible on PROFIBUS DP with IM 308-C interface module

SINUMERIK 802S, C, D

- CNC family for simple applications
- SINUMERIK 802S with stepper drives for small and very small machines. Easy to install, no need for any measuring systems
- SINUMERIK 802C with analog drives for greater dynamic response and performance. Retrofitting is not a problem, standard drives ±10 V, universally applicable thanks to simple operation and proven technology
- SINUMERIK 802D with digital drives for series machines. Easy commissioning, PROFIBUS for all components

SINUMERIK 810D with digital SIMODRIVE 611

- The low-cost start to the future-oriented CNC and drives world for machine tools
- Compact design
- In addition to user-friendly CNC functions, contains 5 digital drive controls of the SIMODRIVE 611 and 2 or 3 SIMODRIVE 611 power sections
- Standard version with optional PROFIBUS DP interface module (master/slave)

SINUMERIK 840Di

- Fully PC-integrated NC control. Openness of hardware and software
- Areas of application include simple motion control tasks (positioning and linear interpolation), wood machining, handling, assembly, machine tools and machine tool-related tasks
- Consists of an industrial PC, the MCI board and the system software
- Drive and I/O are connected using the PROFIBUS DP interface on the MCI board
- The following HMI modules can be ordered as options: the HMI programming package, the HMI configuring package, and the HMI-Advanced standard user interface for machine tools

SINUMERIK 840D with digital SIMODRIVE 611 (SINUMERIK powerline)

- The digital system that satisfies the most demanding requirements
- Can be used in mold making and tool manufacture, complex mass production, and job-shop manufacture
- With up to 10 CNC channels and 31 axes per NCU module. This means it is also suitable for use in the revolving machine and "cyclic machine" sector (presses, packaging and printing machines)
- Several NCU modules and suitable software available for high CNC functionality
- Special technological functions (e.g. laser processing, manipulation) available as extended NCU system software on PC cards. This means optimum adaptation to the machines and equipment of universal machine series is possible
- All NCUs with optional PROFIBUS DP interface module (master/slave)

Additional information:

- Catalog NC 60
- Internet: http://www.siemens.de/sinumerik

SICLOCK

Overview



- Modular time of day distribution system for process synchronization including radio receiver for GPS and DCF 77
- Suitable for use for synchronization of individual PCs up to large systems with multiple redundancy
- Suitable for connection to SIMATIC S7, S5, PCS 7, PC, computers etc. via Ethernet (SIMATIC NET or NTP)
- Individual connections with asynchronous data transfer, pulses and fiber-optic connections
- Consisting of a SICLOCK TM main clock, radio synchronization devices, pulse converters and driver software for receiving message frames



SICLOCK TM and TS

- Main clock for process synchronization
- Simple, fast adaptation to the process by assignment of parameters to interfaces and message frame contents with LCD on device
- Radio synchronization via GPS or DCF77
- Process synchronization via LAN (AUI, ITP, Cheaper Net and twisted pair) and 8 outputs (TTY, RS 232, RS 485 and levels of 0 to 18 V) with message frames, DCF77 simulation and pulses, IRIG A and B

Additional information:

- Siemens AG,
  Dept. I&S ITPS IP32,
  Tel.: +49 (0)9131-743160,
  Fax: +49 (0)9131-722977,
  E-mail: info@siclock.de
- Internet:
  http://www.siclock.de
  http://www.siclock.com

SITOP power

Overview



- High efficiency of approx. 90%
- Easy assembly
- Modest space requirements
- Precise output voltage of 24 V DC
- Low residual ripple
- Integral short-circuit protection
- Safe electrical isolation
- Complies with national and international standards
- New modular concept: two basic devices and buffer module permit problem-free configuration
- Diagnostics module guarantees selective protection and fast fault diagnostics of 24-V feeders



Additional information:

- Catalog KT 10.1
- Internet:
  http://www.siemens.de/sitop

SIMATIC TOP connect

Overview



- System cables for SIMATIC S5/S7
- Three versions: fully modular, semi-modular and flexible connection (modular connection only for SIMATIC S5)
- Time-saving: instead of separate wires, standardized link elements are plugged in
- Error reducing: individual cores can no longer be confused
- Neat and tidy: easily traceable cable runs
- Operator-friendly: "plug and go"

Additional information:

- Catalog KT 10.2
- Internet: http://www.siemens.de/simatic_tc

BERO proximity switches

Overview



- Complete family, consisting of inductive, capacitive, ultrasonic and optical sensors
- The right sensor for every application
- Applications include mechanical engineering, handling systems, and printing and food industries
- More than 30 years' experience in sensors - a guarantee of product quality
- Unbeatable prices and engineering

Additional information:

- Catalog NS BERO 2001
- Internet: http://www.siemens.de/bero

SINAUT ST7

Overview



- Station control system for fully automatic monitoring and control of process stations interconnected over a wide area network (WAN)
- Based on the SIMATIC S7-300 or S7-400, upgraded by special hardware and software components
- Enables change-proven transfer of process data between individual CPUs: connection and CPU failures are indicated. Automatic data updating following troubleshooting or startup
- Teleservice, PG routing/ remote programming and remote diagnostics over the customer's telecontrol network
- Different WANs can be used
- Dedicated circuits (private or leased, copper or fiber-optic cables)
- Private radio networks (radio or radial relay)
- Analog telephone network
- Digital ISDN
- GSM (e.g. D1 or D2))

Hardware components for a SINAUT ST7 system

- TIM transmission modules; for handling data traffic, together with a modem module
  - Storage capability; data that must not be lost in the event of the connection failing are stored on the TIM module (max. 1 Mbyte)
  - Priority; data can be assigned different priorities. For high priority, a switched connection is established immediately. For low priority, the data are initially stored, and transmitted later during the next routine connection
- MD modem modules; for connecting to the transmission networks
- GSM kit TC35; for connecting to the GSM network
- RSM fiber-optic cable modules; for configuring fiber-optic transmission networks
- LTOP overvoltage protection modules; for protection against damage resulting from overvoltages on the supply system
- Connecting cables for connecting the individual components

Software components for a SINAUT ST7 system

- SINAUT TD7 library; contains blocks for the S7 CPU
- SINAUT ST7 configuration tools; for configuration of the system on a programming device or PC (integrated into STEP 7)
- SINAUT ST7 WAN driver; for the TIM modules

SINAUT ST7cc control center

- The ideal centralized control system, based on SIMATIC WinCC
- For managing and processing process data transferred on the SINAUT ST7, including time stamp
- Single system or redundant system based on WinCC redundancy

Additional information:

- Internet: http://www.sinautst.de or http://www.sinautst.com

SICAM SAS station control system

Overview



- Can be used in power transmission and distribution for the automation of medium-voltage and high-voltage plant
- For monitoring and controlling distributed processes
- Meets high voltage strength and electromagnetic compatibility requirements
- Allows communication with other control systems by means of telecontrol protocols (IEC 60870-5-101, IEC 60870-5-104, SINAUT 8-FW, DNP V3.0, Telegyr 800, Telegyr 8979)
- Operation and visualization of the energy process with SICAM WinCC (technological characteristics)
- Central component of the SICAM SAS station control system: SICAM SC station control unit
  - All functions and properties of the SICAM RTU
  - Connection of up to 96 SIPROTEC 4 field devices by means of PROFIBUS-FMS
  - Connection of up to 96 items of protection gear, transformer controls and digital transmitters (SIMEAS T) according to IEC 60870-5-103; medium: FO cable, RS232, RS485
  - Connection of additional power engineering field devices, e.g. via PROFIBUS DP (SIMEAS Q, SIMEAS P, SIMOCODE, SU200) and DNP V3.0
- Time synchronization of the complete system (SICAM SC station control unit, field devices, SICAM WinCC) with DCF77, GPS or IEC 60870-5-101 message frame
- User-friendly configuration of energy process with SICAM plusTOOLS for SAS
- Graphical configuration of energy process automation (system inhibition, sequences of operations, automatic functions) with CFC

Additional information:

- Catalog SICAM 3.1.1
- Internet: http://www.ptd.siemens.de

SICAM RTU telecontrol unit

Overview



- Telecontrol unit based on SIMATIC S7-400
- For secure data communications on noisy transmission channels on the basis of the IEC 60870-5-101 and IEC 60870-5-104 standard telecontrol protocols as well as SINAUT 8-FW, DNP V3.0, Telegyr 800, Telegyr 8979
- Real-time acquisition with 1 ms resolution
- All-round isolation with 2.5 kV and enhanced noise immunity with regard to EMC stressing
- Self-monitoring inputs, secure command outputs
- User-friendly configuration of telecontrol with SICAM plusTOOLS for RTU
- Extensions by means of the SICAM RTU API (application program interface) possible in STL
- Technical specifications:
  - 2.5 kV isolation
  - 5 kV impulse voltage
  - System capacity 2048 inputs/outputs
  - Wide-range inputs: 24 to 60 V DC, 110 to 125 V DC
- Tested to IEC 255-5

Additional information:

- Catalog SICAM 2.1.1
- Internet: http://www.ptd.siemens.de

SICAM miniRTU telecontrol unit

Overview



- For secure data communications on noisy transmission channels on the basis of the IEC 60870-5-101 standard telecontrol protocol and DNP V3.0
- Communication with host control center using analog telephone network, ISDN and GSM
- Modular, high-performance miniature telecontrol unit with a range of functions up to 300 process inputs/outputs
- Real-time acquisition with 10 ms resolution
- Connection of protection equipment using IEC 60870-5-103 and MODBUS RTU
- Freely programmable automation functions with STEP 7-micro
- Functions:
  - One-state indications and two-state indications; transfer with or without time in message frame
  - Processing of metering pulses (max. 20 Hz)
  - Processing of measured values, thresholds
  - Command output as pulse commands with 1-out-of-n monitoring and command termination
  - Analog setpoint output
  - Time-of-day management with synchronization by means of message frame from the control center
  - Transmission rate adjustable between 300 and 9600 bit/s

Additional information:

- Catalog SICAM 2.2.1
- Internet: http://www.ptd.siemens.de

SICAM microRTU telecontrol unit

Overview



- Miniature telecontrol unit for processing process information and for communicating with the system control center using a secure IEC 60870-5-101 telecontrol protocol
- Max. 50 process inputs/outputs for:
  - One-state indications
  - Two-state indications
  - Measured values
  - Single commands
  - Double commands
  - Counting pulses
- Event acquisition with 10 ms resolution
- Functions:
  - Max. 24 one-state indications
  - Max. 4 metering pulses (max. 20 Hz)
  - Max. 16 measured values
  - Max. 16 command outputs as pulse or persistent command; configurable output times
  - IEC 60870-5-101 protocol, unbalanced mode
  - Transmission rate: 300 to 9600 bit/s

Additional information:

- Catalog SICAM 2.3.1
- Internet: http://www.ptd.siemens.de

SICAM DI 32 digital input module

Overview



- Digital input module with interrupt capability for acquisition of time-critical events
- Real-time resolution 1 ms
- Precision +/- 2 ms
- Buffer on the module for 200 changes of state with time
- Enhanced protection against EMC effects (e.g. lightning strikes or overvoltages)

- Technical specifications:
  - 1 ms time resolution
  - 2.5 kV isolation
  - 5 kV impulse voltage
  - 32 inputs
  - 19 to 72 V or 110 to 125 V input voltage
- Configuration by means of SICAM plusTOOLS

Additional information:

- Catalog SICAM 5.2.1
- Internet: http://www.ptd.siemens.de

SICAM CO digital output module

Overview



- Electrically isolated digital output module for reliable output of commands
- Relay output
- Output of pulse commands or continuous output, transformer stage commands and digital setpoints
- Configurable output times
- Single-pole or double-pole output

- Reliable command output by 1-out-of-n control
- Technical specifications:
  - 2.5 kV isolation
  - 5 kV impulse voltage
  - 32 outputs
  - rating 60 V AC, 5 A; 60 V DC, 1 A
- Configuration by means of SICAM plusTOOLS

Additional information:

- Catalog SICAM 5.3.1
- Internet: http://www.ptd.siemens.de

SICAM AI analog input module

Overview



- Electrically isolated analog input module with interrupt capability for acquisition of measured values from transmitters
- 12 bit + sign resolution
- Configurable measuring ranges
- Conversion time 30 ms, network frequency effects are suppressed

- Technical specifications:
  - 2.5 kV isolation
  - 5 kV impulse voltage
  - 32 channels
  - current inputs: 0.5 to 24 mA DC
  - voltage inputs: 0.5 V to 10 V DC
- Configuration by means of SICAM plusTOOLS

Additional information:

- Catalog SICAM 5.2.2
- Internet: http://www.ptd.siemens.de

SICAM MCP time synchronization module

Overview



- For synchronization of the time on an S7-400
- Synchronization of the CPU and the SICAM function modules
- Setting performed with DCF77 or GPS time signal receiver

- Usage:
  event message acquisition system together with SICAM DI 32 digital input module, for example
- Consists of SICAM MCP module and example FBs for SIMATIC S7-400
- Configuration by means of SICAM plusTOOLS

Additional information:

- Internet:
  http://www.ptd.siemens.de

SICAM PS power supply module

Overview



- System power supply with higher requirement for availability and noise immunity
- Wide-range input
- 20 A short-circuit-proof
- 20 ms stored energy time upon interruption of power supply

- Technical specifications:
  - 2.5 kV isolation
  - 5 kV impulse voltage
  - 24 to 60 V DC or 110 to 230 V AC/DC
- Configuration by means of SICAM plusTOOLS

Additional information:

- Catalog SICAM 5.1.1
- Internet:
  http://www.ptd.siemens.de

Appendix

14



14/2	**Software licenses**
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Software types

All software requiring a license is assigned to a type.

Following software types are defined:

- Engineering software
- Runtime software

Engineering software

This category includes all software products for the creation (engineering) of user software, e.g. configuration, programming, parameterization, testing, commissioning or service.

Data or executable programs created with the engineering software for your own use or for use by third parties can be duplicated without charge.

Runtime software

This category includes all software products required for the operation of plants/ machinery, e.g. the operating system, basic system, system expansions, drivers.

The runtime software or executable files created with the runtime software for your own use or for use by third parties can be duplicated at a charge.

Details of license fees payable according to use are listed in the ordering data (e.g. catalog). Software use is differentiated, for example, according to use per CPU, per installation, per channel, per instance, per axis, per control circuit, per variable etc.

If extended rights result for parameterization/configuration tools forming part of the scope of delivery for the runtime software, these rights will be noted in the Read Me file supplied with the software.

License types

License types

Siemens Automation & Drives offers different types of license for software:

- Floating license
- Single license
- Rental license
- Trial license

Floating license

Installation of the software is permitted on any number of the licensee's devices for internal use.

Only the concurrent user is licensed. The concurrent user is the person using a program. Use begins when the software is started.
A license is required for each concurrent user.

Single license

Unlike the floating license, the software is allowed to be installed only once. The type of use requiring the license is specified in the ordering data and on the certificate of license (CoL).

Differentiation is drawn, for example, between use per device, per axis, per channel etc.

A single license is required per defined use.

Rental license

The rental license supports the "sporadic use" of engineering software.

After the licence code is installed, the software can be used for a defined number of hours, which can be interrupted any number of times. One licence per installation of the software is required.

Trial license

The trial license supports the "short-term use" of the software in a non-productive application, e.g. use for test and evaluation purposes.
It can be converted into a different license.

Downgrading

The licensee is entitled to use the software or an earlier version/release of the software, assuming the licensee has such an earlier version/ release and the technical and the technical means for its use.

Delivery versions

Software is subject to continuous further development. The delivery version

- PowerPack
- Upgrade

provides access to these further developments.

Remedial measures are also provided through the Delivery Version ServicePack.

PowerPack

PowerPacks are packs for switching to more powerful software

Together with the PowerPack the licensee receives a new license agreement incl. certificate of license (CoL).
This CoL and the CoL of the original product form the confirmation of license for the new software.

Depending on the original license of the software being replaced it may be necessary to purchase an independent PowerPack.

Upgrade

An upgrade permits the use of a newer, available version of the software providing that a license was previously acquired for an earlier version.

Together with the Upgrade the licensee receives a new license agreement incl. CoL. This CoL and the CoL of the previous product form the confirmation of license for the new version.

Depending on the original license of the software being updated it may be necessary to purchase an independent upgrade.

ServicePack

Available remedial measures are made available in ServicePacks. ServicePacks may be duplicated for the specified purpose according to the number of original licenses acquired.

Information on license conditions can be found in the publication "Terms of Business of Siemens AG“
or at:

http://www.siemens.com/automation/mall
(A&D Mall
Online Help System)

License code

Siemens Automation & Drives offers software products both with and without a license code.

The license code acts as an electronic license stamp and is simultaneously a "switch" for the software's behavior (floating license, rental license, ...).

In the case of software requiring a license code, complete installation requires the program (software) to be licensed and the license key (the representative of the license).

Certificate of License

The Certificate of License (CoL) is proof for the licensee that use of the software has been licensed by Siemens.
A CoL has to be assigned to each case of use and kept in a safe place.

Information and ordering in the Internet and on CD-ROM

A & D in WWW

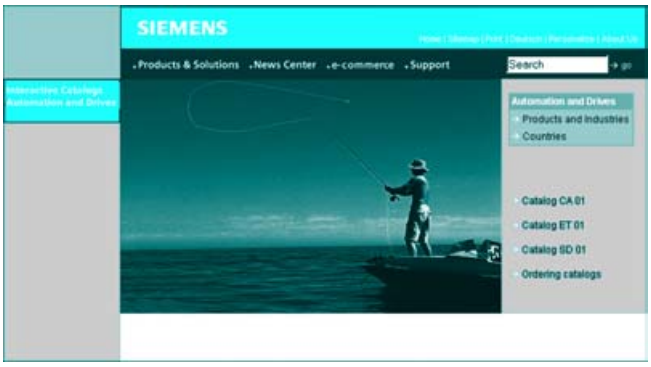


A detailed knowledge of the range of products and services available is essential when planning and configuring automation systems. It goes without saying that this information must always be fully up-to-date.

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

Under the address
http://www.siemens.com/automation
you will find everything you need to know about products, systems and services.

Product selection using interactive catalogs



Detailed information together with convenient interactive functions:

The interactive catalogs CA 01 and ET 01 cover more than 80,000 products and thus provide a full summary of the Siemens Automation and Drives product base.

Here you will find everything that you need to solve tasks in the fields of automation, switchgear, installation and drives. All information is linked into a user interface which is easy to work with and intuitive.

After selecting the product of your choice you can order at the press of a button, by fax or by online link.

Information on the interactive catalogs can be found in the Internet under
http://www.siemens.com/automation/ca01

or on CD-ROM:

Automation and Drives, CA 01
Order No.:
E86060-D4001-A110-B7-7600

Electrical installation technology, ET 01
Order No.:(German)
E86060-D8200-A107-A3

Easy shopping with the A&D Mall



The A&D Mall is the virtual department store of Siemens AG in the Internet. Here you have access to a huge range of products presented in electronic catalogs in an informative and attractive way.

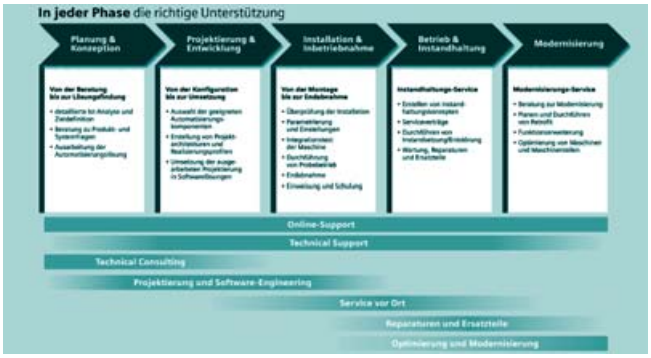
Data transfer using EDIFACT allows the whole procedure from selection through ordering to tracking of the order to be carried out online by means of the Internet.

Numerous functions are available to support you.

For example, powerful search functions make it easy to find the required products, which can be immediately checked for availability. Customer-specific discounts and preparation of quotes can be carried out online as well as order tracking and tracing.

Please visit the A&D Mall in the Internet under:
http://www.siemens.com/automation/mall

Services at every project phase



In the face of harsh competition you need optimum conditions to keep ahead all the time: A strong starting position, a sophisticated strategy and team for the necessary support - in every phase.

Service & Support from Siemens provides this support with a complete range of different services for automation and drives.

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

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

Online support



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

http://www.siemens.com/automation/service&support

Technical support



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

Tel.: **+49 (0)180 50 50 222**

Fax: **+49 (0)180 50 50 223**

E-Mail:
adsupport@siemens.com

Technical consulting



Support in the planning and designing of your project from detailed actual-state analysis, target definition and consulting on product and system questions right to the creation of the automation solution. [1)]

Configuration and software engineering



Support in configuring and developing with customer-oriented services from actual configuration to implementation of the automation project.[1)]

Service on site



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

In Germany
Tel.: **0180 50 50 444** [2)]

Repairs and spare parts



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

In Germany
Tel.: **0180 50 50 448** [2)]

Optimization and upgrading



To enhance productivity and save costs in your project we offer high-quality services in optimization and upgrading.[1)]

1) Get in touch with the sales contact in your region for questions about these services. Our Helpline (tel.: +49 (0) 180 50 50 111) will also put you through to the right contact or just visit our Internet site.
2) For country-specific telephone numbers go to our Internet site at: http://www.siemens.com/automation/service&support

Customer Support

Knowledge Base on CD-ROM



For locations without online connections to the Internet there are excerpts of the free part of the information sources available on CD-ROM (Service & Support Knowledge Base). This CD-ROM contains all the latest product information at the time of production (FAQs, Downloads, Tips and Tricks, Updates) as well as general information on Service and Technical Support.

The CD-ROM also includes a full-text search and our Knowledge Manager for targeted searches for solutions. The CD-ROM will be updated every 4 months.

Just the same as our online offer in the Internet, the Service & Support Knowledge Base on CD comes complete in 5 languages (German, English, French, Italian, Spanish).

You can order the **Service und Support Knowledge Base** from your Siemens contact partners.

Order No.
6ZB5310-0EP30-0BA2

Orders via the Internet (with Automation Value Card or credit card) at:

http://www.siemens.com/automation/service&support

in the shop domain.

Automation Value Card



Small card - great support

The Automation Value Card is an integral component of the comprehensive service concept with which Siemens Automation and Drives will accompany you in each phase of your automation project.

It doesn't matter whether you want just specific services from our Technical Support or want to purchase high-quality Support Tools in our Online Shop, you can always pay with your Automation Value Card. No invoicing, transparent and safe. With your personal card number and associated PIN you can view the state of your account and all transactions at any time.

Services on card. This is how it's done.

Card number and PIN are on the back of the Automation Value Card. When delivered, the PIN is covered by a scratch field, guaranteeing that the full credit is on the card.

By entering the card number and PIN you have full access to the Service & Support services being offered. The charge for the services procured is debited from the credits on your Automation Value Card.

All the services offered are marked in currency-neutral credits, so you can use the Automation Value Card worldwide.

Automation Value Card Order Nos.	
Credits	Order No.
200	**6ES7 997-0BA00-0XA0**
500	**6ES7 997-0BB00-0XA0**
1000	**6ES7 997-0BC00-0XA0**
10000	**6ES7 997-0BG00-0XA0**

Detailed information on services offered is available on our Internet site at:

http://www.siemens.com/automation/service&support

Service & Support à la Card:

Examples

Technical Support	
„Priority“	Priority processing for urgent cases
„24 h“	Availability round the clock
„Extended“	Technical consulting for complex questions
Support Tools in the Support Shop	
„System Utilities“	Tools that can be used directly for configuration, analysis and testing
„Applications“	Complete topic solutions including ready-tested software
„Functions & Samples“	Adaptable blocks for accelerating your developments

Up-to-date and first-hand information

There is one major advantage to having knowledge and information from the market leader:

You receive directly and from first hand the latest trends and innovations on all aspects of automation and drive technology.

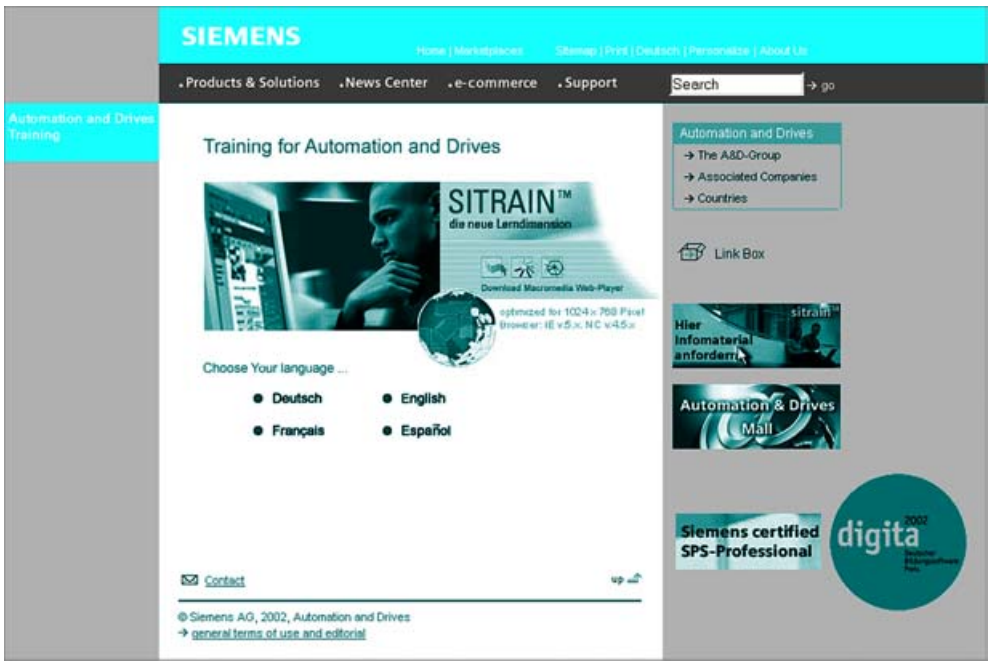
At the same time we naturally know as innovative trendsetter what the future demands of the industry are and can tune our range of training courses to suit the requirements exactly. This means that you receive today the solution concepts of tomorrow.

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Infoline: **+49 (0)1805 / 23 56 11**

SIMATIC training

SIMATIC S7 training

Automation components and systems can only be economical if the people using and operating them are properly trained for the job. This is particularly the case where such powerful and highly complex systems as SIMATIC are concerned. Here, qualifications have become one of the most important production factors.

SIMATIC training means the following for you:

- Your personnel can aquire the necessary qualifications both quickly and at a reasonalbe cost.
- They gain an in-depth knowledge of the system, to take advantage of its vast potential.
- They learn how to arrive at possible solutions for individual problems.

SIMATIC training courses are already being held at 54 locations in Germany and 200 other locations worldwide. SIMATIC S7 is based on the Windows industrial standard. To allow you, too, to make effective use of this standard, our Training Cebters also offer courses on Windows and related topics.

SIMATIC S7 courses

Course	Target group	Duration (days)	Course code
S7-200 system course		2	ST-7MICRO
Service training 1		5	ST-7SERV1
Service training 2		5	ST-7SERV2
Advanced course for service and maintenance		5	ST-7SERV++
Advanced course for programming and service		5	ST-PRSERV
Upgrade S5 -> S7 for service		5	ST-UPSERV
Programming 1		5	ST-7PRO1
Programming 2		5	ST-7PRO2
Component based Automation		2	ST-7CBA
PC-based Control with SIMATIC WinAC		2	ST-7WINAC
Counting and Positioning with FM		3	NC-7FMPOS
Drives/Positioning System Course		3	NC-ANPOS
HiGraph Programming for SIMATIC S7		3	NC-ZSG

System configuration engineers, programmers and system startup engineers

Installation and maintenance personnel, operators

Field proven quality

Our business group is certified to DIN ISO 9001 by the DQS (Deutsche Gesellschaft zur Zertifizierung von Qualitätssicherungssystemen - German Society for the Certification of Quality Assurance Systems). This means that your wishes will be taken into account and acted upon at the course design stage.

All courses are developed and taught in strict conformity with the terms of our quality assurance system, which means that training certified under DIN ISO 9001 also fully meets the quality standards you expect for the continuing education of your personnel.

It also means there is no need for you to have this training certified separately; youcan simply present our certificate instead. You can also rest assured that your personnel - your human capital and one of your major resources - receives training of consistently high quality, tailored to your own individual requirements.

Any questions?



You can find detailed information abiut any course and additional courses by consulting our catalog ITC "SITRAIN™ Information and Training".

If you want to know more about courses specially tailored to your requirements, or are interested in our training program in general, we're always glad to answer your questions personally. Please contact your nearest regional training center or write, phone or fax us at the following address:

Product marketing for automation systems
A&D PT 41
Mr. Seese
P.O. Box 4848
D-90327 Nuremberg
Tel:+49 (0)911/895-3225
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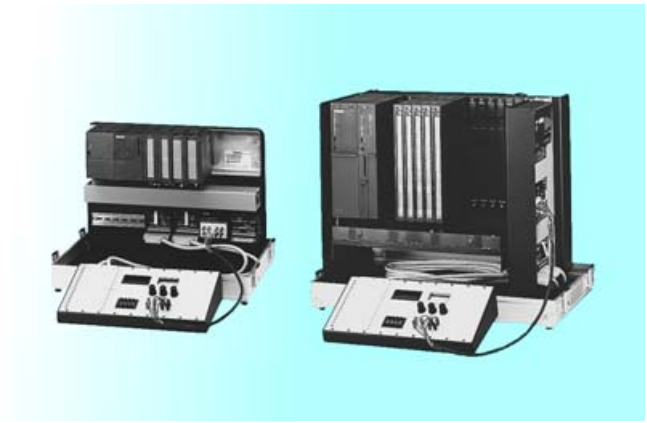
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You will find everything you need to know about distance learning and online courses.

SITRAIN™
Training for automation and drives



Application



These training devices are used for practical training in programming, operating and startup of SIMATIC S7 automation systems.

Design

The training devices consist of a SIMATIC S7-300 or S7-400 automation system and a simulator. The automation system is mounted in a carrying case for portability.

Technical specifications

SIMATIC S7-300 training device	
Degree of protection	IP 00
Permissible ambient temperature	0 to 60 °C
Dimensions (W x H x D) in mm	520 x 410 x 350
Weight, approx.	15 kg

SIMATIC S7-400 training device	
Degree of protection	IP 00
Permissible ambient temperature	0 to 60 °C
Dimensions (W x H x D) in mm	565 x 565 x 385
Weight, approx.	30 kg

Ordering data

	Order No.
S7-300 training device with CPU 314 consisting of: DIN rail, PS 307, CPU 314, SM 321-1BL00, SM 322-1BL00, SM 323-1BH00, SM 331-7KF01, 3 terminal blocks digital signals, 1 terminal/connecting block analog signal, SIMATIC simulator, carrying straps for assembly line and OP 15	**6ZB2 310-0BF01**
S7-300 training device with CPU 315-2 DP with CPU 315-2 DP, otherwise as above	**6ZB2 310-0BM00**

	Order No.
S7-400 training device with CPU 412 consisting of: mounting rack, cable duct, PS 407-0RA00, CPU 412, memory card, 2 x SM 421-1BL00, 2 x SM 422-1BL00, SM 431-1KF00, SITOP Power (5 A), 3 terminal blocks digital signals, 1 terminal/connecting block analog signal, SIMATIC simulator, carrying straps for assembly line	**6ZB2 310-0BL01**
S7-400 with CPU 412-2 DP with CPU 412-2 DP, otherwise as above	**6ZB2 310-0BN01**

Reference documentation, Solution Provider

SIMATIC Manual Collection

SIMATIC Manual Collection

The SIMATIC manual collection brings together the manuals of Totally Integrated Automation in the smallest possible package. It is eminently suitable for startup and service, replaces the space-consuming paper version in the office and provides fast access to the information.

The manual collection contains manuals in 5 languages for

- LOGO!
- SIMATIC S7-200, TD 200
- SIMATIC S7-300, C7
- SIMATIC S7-400
- STEP 7, Engineering Tools, Runtime Software
- SIMATIC DP (Distributed I/O)
- SIMATIC HMI (Human Machine Interface)
- SIMATIC NET (Industrial Communication)

Manuals that are not yet available in all 5 languages will at least be included in English and German. There is an update contract for the SIMATIC Manual Collection that encompasses supply of the up-to-date collection and three subsequent updates which is valid for one year. If the update contract is not cancelled, it is automatically extended and the list price will be charged to the customer.

Ordering data

	Order No.
SIMATIC Manual Collection Electronic manuals on CD-ROM, multi language: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, Engineering Software, Runtime Software, PCS 7, SIMATIC HMI, SIMATIC NET	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year current manual collection on CD as well as three subsequent updates	**6ES7 998-8XC01-8YE2**

Siemens Automation Solution Provider

Automation solutions are becoming increasingly more complex as the requirements which need to be met continue to grow.

We will help you to find competent partners who – through a combination of industrial expertise, experience and extensive know-how in automation solutions – will deliver an outstanding and reliable solution.

The Siemens Automation Solution Provider Program sets new standards with regard to the special fields of competence offered by the companies involved and to the world-wide network of partners. Through careful selection and continuous training of our solution providers there are always competent contacts right at hand with the latest state of the art.

Internet:
www.siemens.com/automation/solution-provider
E-Mail:
SSPinfo@nbgm.siemens.de

The program

- You are looking for automation solutions for specific applications?
- For professional advice and support?
- For industry specialists?
- For a leading edge on the market?

If so, our Siemens Automation Solution Providers are exactly what you want!

Our partner companies have the know-how to develop reliable, economical and future-proof solutions – for all sectors and all automation components: from all SIMATIC components, SIMATIC HMI visualization systems, communication networks through SIMATIC PCS 7, microsystems and motion control systems to products for the vertical integration of industrial automation and the office world.

Your advantages

- Tailor-made, economical and future-proof solutions
- Considerable advantages in terms of speed, efficiency and proximity of location
- Special industry know-how of the solution providers
- Current state of the art and knowledge of the latest developments guaranteed

Certificates

The solution providers receive continuous instruction in order to keep abreast of the state of the art. They attend a special certification scheme where they have to prove their high expertise in handling automation tools from Siemens.
We can thus guarantee a special standard of quality which is successively reinforced through training on new components and participation in special solution provider workshops.

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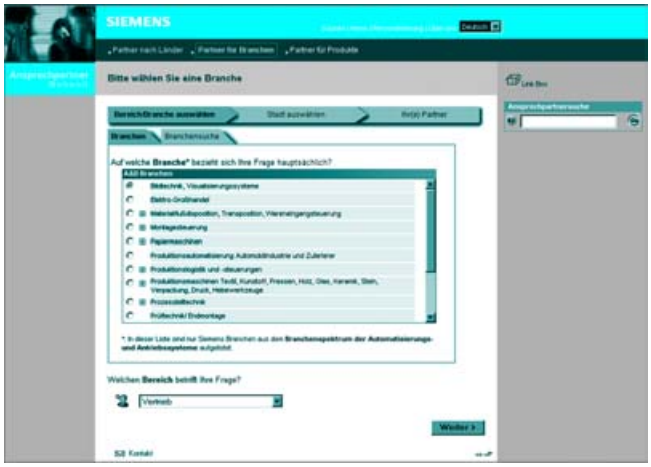
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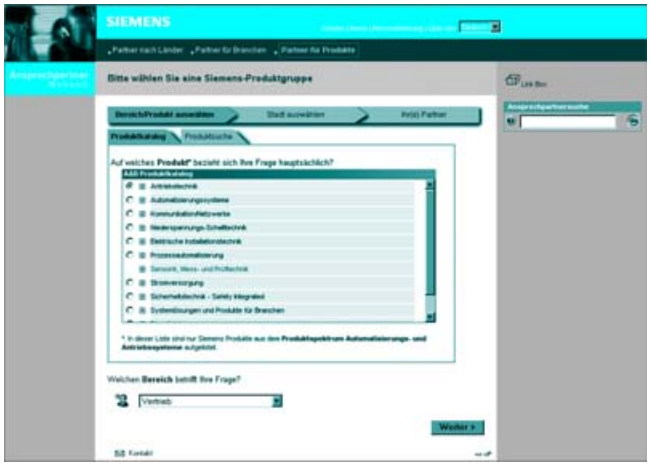
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Date

Signature



The quality management system of our A&D division complies with the international standard ISO 9001.

The products and systems described in this catalog are manufactured under application of a quality management system certified by DQS in accordance with DIN EN ISO 9001.

The DQS certificate is recognized in all EQ Net countries.

DQS certificate nos.:

Siemens AG
Automation and Drives Technology

- Division Industrial Automation Systems
  1323-05 (Reg. No: 1323)

Certificates

An overview of the certificates available for SIMATIC NET products (CE, UL, CSA, FM, shipping authorizations) and classification figures (MTBF) can be found in the Internet at http://www.siemens.com/automation/simatic.

It is continuously updated. The data for products which have not yet been included in the overview is continuously collected and prepared for the subsequent edition.

CE mark



The electronic products described in this catalog comply with the requirements and protection objectives of the following EU guidelines and with the harmonized European standards (EN) which have been published for programmable controllersin the Official Journal of the European Union:

- 89/336/EWG “Electromagnetic Compatibility” (EMC guideline)
- 73/23/EWG “Electrical Equipment for Use Within Specific Voltage Limits” (low voltage guideline)

The EU conformity declaration is available for examination by the appropriate authorites at:

SIMATIC, SIMATIC NET, SIMATIC PC:
Siemens AG,
Automation and Drives Group,
Dept. A&D AS RD4
P.O. Box 1963
D-92209 Amberg
Federal Republic of Germany

WF modules:
Siemens AG,
Automation and Drives Group,
Motion Control Systems,
Dept. A&D MC MT1
P.O. Box 3180
D-91050 Erlangen
Federal Republic of Germany

SIPAC, SITOP:
Siemens AG
Automation and Drives Group
Division Systems Engineering
Dept. A&D SE PS
P.O. Box 2355
D-90713 Fuerth
Federal Republic of Germany

SIMATIC HMI:
Siemens AG
Automation and Drives Group
Dept. A&D PT 1 BD
P.O. Box 4848
D-90475 Nuremberg
Federal Republic of Germany

The SIMATIC products are designed for operation in industrial environments and comply with the following requirements:

Noise emissions:
EN 50081-2: 1993
Noise immunity:
EN 50082-2:1995

The products can also be used in the domestic environment (household, business and trade area, small plants) with individual approval:

Emitted interference:
Individual approval
Immunity:
EN 50082-1: 1992

For household use an individual approval from the respective national authority or testing body is required as far as emitted interference is concerned. In Germany this approval is issued by the Federal Post and Telecommunications Office and its subsidaries.

For the installation and operation of the products described in this catalog, the installation guidelines described in the manuals and the important notes concerning installation in cabinets and concerning the use of shielded cable must be complied with.

CE mark

Notes for machine manufacturers

The SIMATIC automation system is not a machine within the context of the EU machine guidelines. For SIMATIC, a conformity declaration with respect to the EU machine guidelines 89/392/EMC is not available.

The EU guideline for machines 89/392/EMC specifies the requirements for a machine. A machine is understood for the purposes of this guideline to be a combination of interconnected parts or mechanisms (see also EN 292-1, Paragraph 3.1).

SIMATIC is part of the electrical equipment of a machine and must therefore be included in the conformity declaration procedure by the machine manufacturer.

The EN 60204-1 standard (safety of machines, general requirements for the electrical equipment of machines) is applicable to the electrical equipment of machines.

The following table should be of assistance with the conformiy declaraton and shows which criteria of EN 60204-1 (as of June 1993) apply for SIMATIC:

EN 60204-1	Topic/criterion	Notes
Paragraph 4	General requirements	The requirements are met when the equipment is assembled/installed in accordance with the installation guidelines. Please note the relevant information in the manuals.
Paragraph 11.2	Digital input/output interfaces	The requiremnets are met
Paragraph 12.3	Programmable equipment	The requirements are met when the equipment is installed in lockable cabinets to protect against alteration of the memory contents by unauthorized persons
Paragraph 20.4	Voltage tests	The requirements are met

Overview

The information listed here is mainly of a fundamental nature and applies regardless of the type and vendor of the electronic control system.

Reliability

The reliability of devices and components is being driven as high as possible by employing extensive and cost-effective measures in development and production.

This includes

- Selection of high-quality components
- Worst-case design calculation of all circuits
- Systematic and computer-controlled testing of all subcontracted components
- Burn-in of all large-scale integrated circuits (e.g. processors, memories etc.)
- Measures to prevent static charging when working at or with MOS circuits
- Visual checks at various stages of production
- In-circuit testing of all modules, i.e. computer-aided testing of all components and their interaction in the circuit
- Hot endurance run at high ambient temperature over several days
- Meticulous computer-controlled final testing
- Statistical evaluation of all returns for immediate introduction of remedial actions.

These measures are regarded a basic measures in safety engineering. They prevent or keep control of the majority of potential faults.

Risks

Wherever faults are liable to cause injury to persons or damage to property it is necessary to introduce measures aimed in particular at the safety of the plant and, therefore, of the control system.

Special, plan-specific directives exist for these applications and need to be taken into account when configuring the control system

In the case of safety-relevant electronic control systems the measures needing to be taken to prevent or keep control of faults are aimed at the risk presented by the plant.

In such a case the basic measures listed above are no longer sufficient above a certain level of hazard potential. Additional measures have to be implemented and certified (e.g. dual-channel arrangements, tests, checksums etc.) for the control system.

Division into a safe and a non-safe zone

In practically all plants there are parts which perform safety-related functions (e.g. emergency stop pushbuttons, mesh guards, two-hand controls).

In order not to have to consider the complete control system in terms of safety engineering it is customary to divide the control system into a safe and a non-safe zone. No special requirements are imposed on the safety of the control system in the non-safe zone because there would be no impact on the safety of the plant if the electronics failed in this case.

In the safe zone, on the other hand, you are only allowed to use control systems and/or circuits which satisfy the directives in question.

The following zonal divisions are customary in practice:

- Control systems with little safety engineering, e.g. machine control systems.
- Control systems with balanced zones, e.g. chemical plants, aerial ropeways.
- Control systems with mainly safety engineering, e.g. incineration plants

Important

Even if a maximum of design-based safety is achieved in the configuration of an electronic control systems – e.g. through multi-edge configuration – it is still essential to closely follow the instructions in the operating manuals as otherwise wrong actions may suspend precautions for preventing potential faults or may create additional sources of danger.

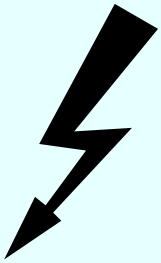
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Warning



WARNING

Hazardous voltage

Can cause loss of life, severe personal injury, or substantial property damage

Information contained in this catalog is for reference purposes only. Consult your technical manual for specific connection and other technical requirements.

Only qualified personnel should install or maintain the products described in this catalog after becoming thoroughly familiar with all warnings, safety notices, and maintenance procedures contained in the appropriate technical manual.

The successful and safe operation of this equipment is dependent upon proper handling, installation, operation and maintenance.

Definitions of the terms as applicable in our appropriate technical documentation:

Qualified person

One who is familiar with the installation, construction, and operation of the products described in this catalog and the hazards involved. In addition, the person should have the following qualifications:

- Be trained and authorized to use and tag circuits and equipment in accordance with established safety practices.
- Be trained in the proper care and use of protective equipment in accordance with established safety practices.
- Be trained in rendering first aid.

DANGER

Indicates loss of life, severe personal injury, or substantial property damage will result if proper precautions are not taken.

WARNING

Indicates loss of life, severe personal injury, or substantial property damage can result if proper precautions are not taken.

CAUTION

Indicates minor personal injury or property damage can result if proper precautions are not taken.

Appendix
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Terms and Conditions of Sale and Delivery

in the Federal Republic of Germany

By using this catalog you can acquire hardware and software products described therein from the Siemens AG subject to the following terms. Please note! The scope, the quality and the conditions for supplies and services, including software products, by any Siemens entity having a registered office outside the Federal Republic of Germany, shall be subject exclusively to the General Terms and Conditions of the respective Siemens entity.

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In addition to the prices of products which include silver and/or copper, surcharges may be calculated if the respective limits of the notes are exceeded.

Prices are subject to change without prior notice. We will debit the prices valid at the time of delivery.

The dimensions are in mm. Illustrations are not binding.

Insofar as there are no remarks on the corresponding pages, - especially with regard to data, dimensions and weights given - these are subject to change without prior notice.

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or download them from the Internet

www.siemens.com/automation/mall
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ECCN	Export Control Classification Number. Products marked other than "N" are subject to a reexport license to specific countries. In the case of software products, the export designations of the relevant data medium must also be generally adhered to. Goods labeled with an "ECCN not equal to N" are subject to a US re-export authorization.

Even without a label or with an "AL: N" or "ECCN: N", authorization may be required due to the final destination and purpose for which the goods are to be used.

The deciding factors are the AL or ECCN export authorization indicated on order confirmations, delivery notes and invoices.

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Industrial Automation Systems
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Federal Republic of Germany

Order No.: E86060-K4670-A111-A8-7600
KG K 1202 50.0 PV 472 En / 301144 / IWI: TST J
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