SIMATIC S7-1200 – Micro Controller for Totally Integrated Automation

Catalog ST 70 N · April 2009

SIMATIC

Answers for industry.

SIEMENS

Related Catalogs

SIMATIC NET IK PI
Industrial Communication

E86060-K6710-A101-B6-7600

SIMATIC HMI ST 80
Human Machine
Interface Systems

E86060-K4680-A101-B6-7600

Embedded Automation ST PC
Embedded and
PC-based Automation

E86060-K4670-B101-B9-7600

SIMATIC sensors FS 10
Sensors for
Factory Automation

E86060-K8310-A101-A5-7600

SITRAIN ITC
Training for Automation and
Industrial Solutions

E86060-K6850-A101-B9 (in German)

Products for
Automation and Drives CA 01
Interactive catalog

E86060-D4001-A510-C7-7600

The Industry-Mall
Information and Ordering Platform
in the Internet:
www.siemens.com/automation/mall

SIMATIC

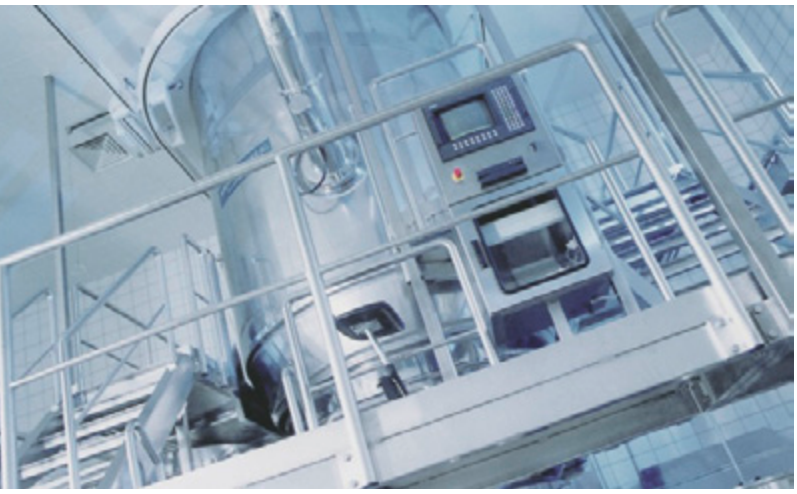
SIMATIC S7-1200 – Micro Controller for Totally Integrated Automation

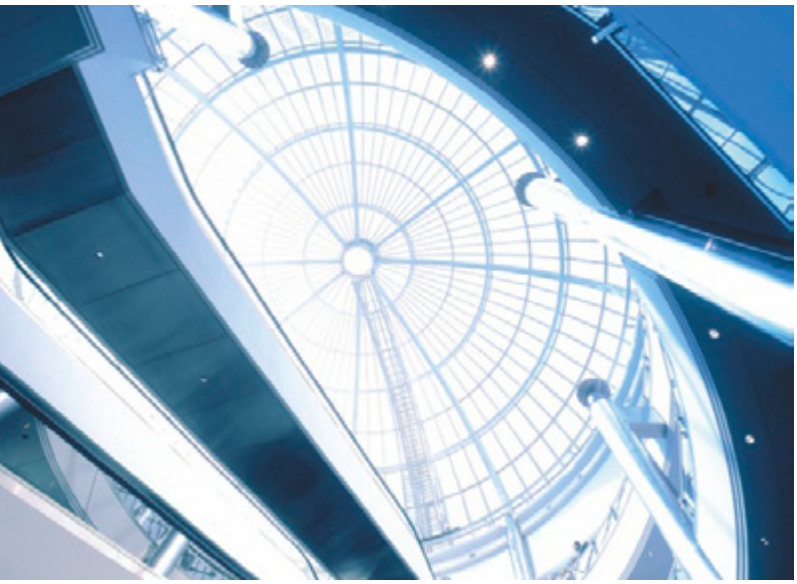
Catalog ST 70 N · April 2009

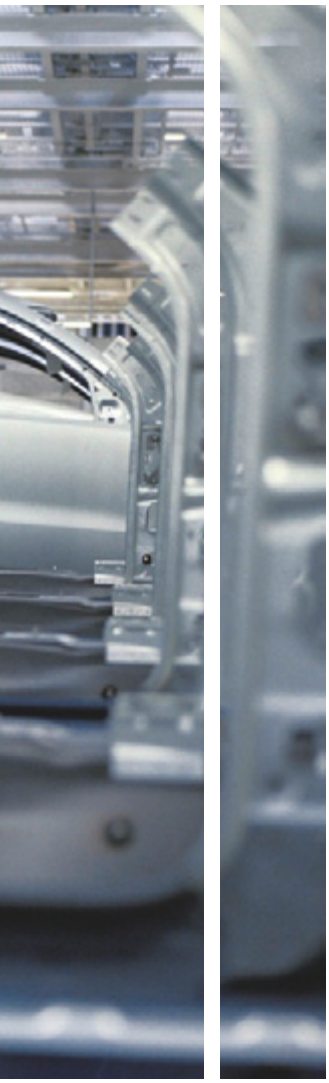
The products and systems described in this catalog are manufactured/distributed under application of a certified quality management system in accordance with DIN EN ISO 9001 (Certified Registration No. 1323-QM).
The certificate is recognized by all IQNet countries.

The products contained in this catalog can also be found in the e-Catalog CA 01.
Order No.:
E86060-D4001-A510-C7-7600 (DVD)

Please contact
your local
Siemens branch







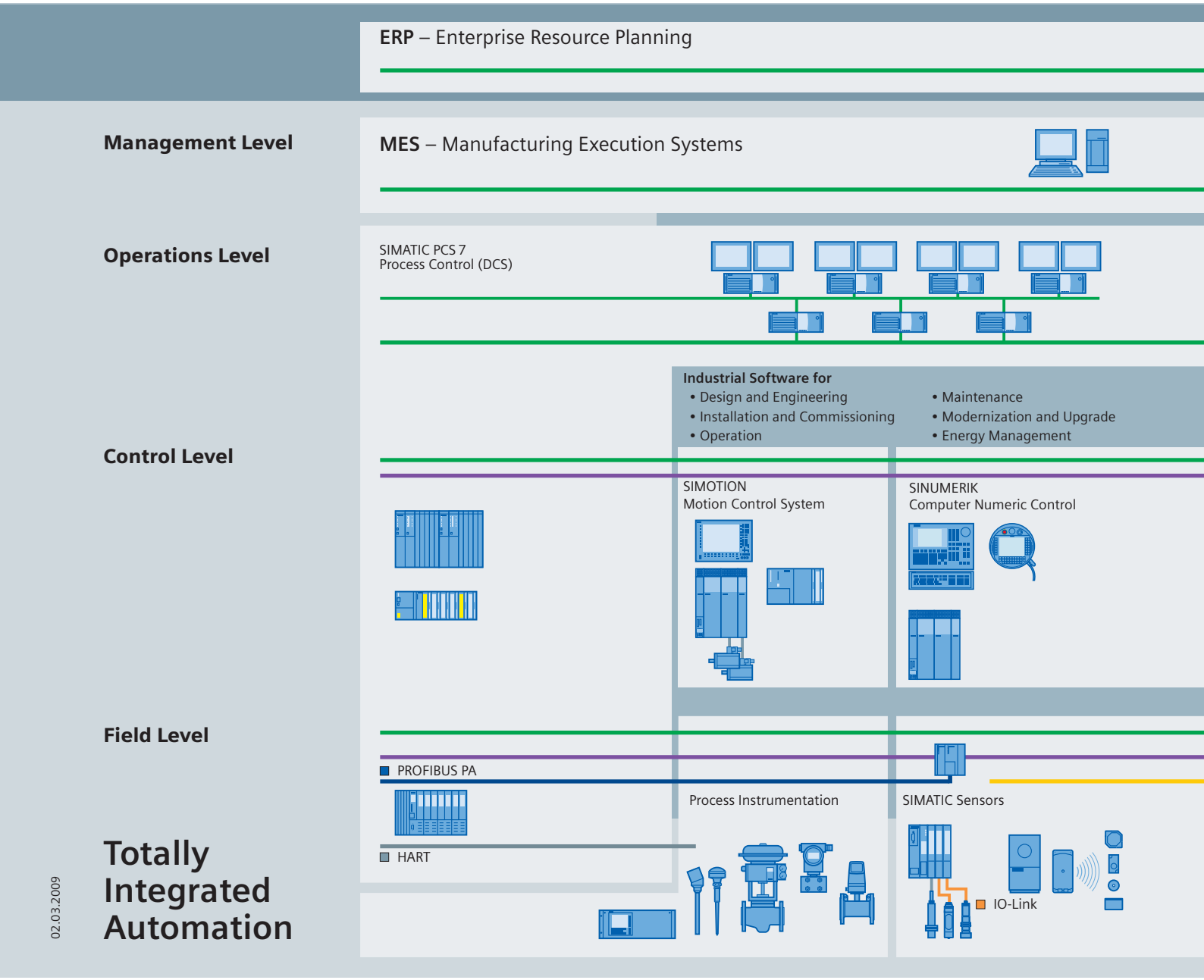
Answers for industry.

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

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

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

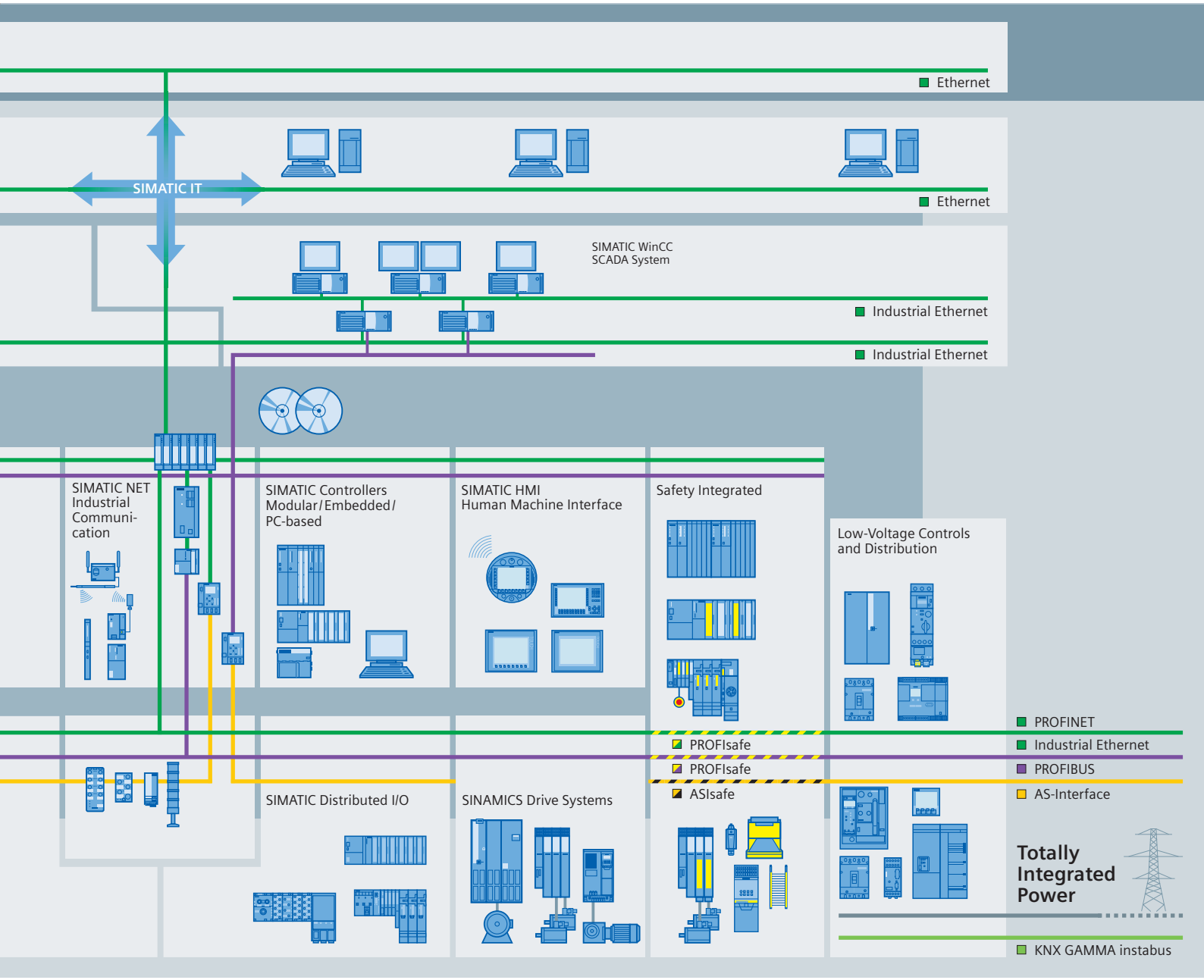
Check out the opportunities our automation and drive solutions provide. And discover how you can sustainably enhance your competitive edge with us.



Setting standards in productivity and competitiveness.

Totally Integrated Automation.

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



TIA is characterized by its unique continuity.

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

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

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

Introduction

The new dimension in simplified automation – Micro Automation and more

Perfect interaction between micro controllers, HMI panels and engineering – all from a single source

Engineering and commissioning are the main cost factors for machine builders and system integrators today:

- Increasing levels of integration and complexity of the automation tasks lead to errors and ineffective program design.
- Growing decentralization also demands wider distribution of intelligence.
- Ever growing staff requirements in projects increase synchronization efforts.

Short retooling times and fast upgrades demand a high level of modularity and reusability of the engineering data.

This is exactly where the new SIMATIC S7-1200 series of products with SIMATIC STEP 7 Basic V10.5 comes into its own. It creates a solution in the micro controller segment that provides comprehensive answers to the challenges described above:

- High flexibility for smart solutions.
- Simple networking.
- Intuitive and fast engineering during programming and commissioning.

During the development of the micro controller particular attention was paid to seamless integration and perfect interaction between controller, HMI and software.

In precise terms, this means:

- Finely scalable hardware allows a solution to be created that precisely fits the automation task.
  In this way it is possible to keep the level of investment to a minimum and implement subsequent expansions without excessive expense.
- Powerful, coordinated communication options permit the simple networking of engineering system, controllers and HMI. This keeps the expenditure on decentralization within narrow limits.
- A precisely coordinated range of high-performance HMI panels facilitate visualization at minimum expense.
- The innovative engineering system combines all necessary functions for controllers and visualization, from planning to commissioning and expansion. The previously known boundaries between the individual software products are removed. The uniform look and feel and intelligent editors provide additional support to the user. This provides an ideal basis for all project personnel, from the project engineer to the service personnel.

SIMATIC S7-1200 – the modular micro controller

SIMATIC S7-1200 is characterized by its versatile and flexible design concept while offering high performance and extremely compact dimensions.

Main characteristics of the micro controllers:

- New design concept:
  A host of modules and new signal boards considerably increase the degree of scalability and flexibility.
- Powerful communication:
  The integrated PROFINET interface ensures low-cost communication during programming, HMI connection and CPU-CPU communication. An Ethernet switch is available for networking several devices with one another.
  Expansion by means of communication modules also allows serial communication.
- Integrated technology functions:
  High-performance functions for counting, measuring, closed-loop control and for motion control open up new areas of application for the micro controller.

This offers the user immediate advantages:

- Perfect adaptation to the respective automation requirements and flexible modification options at any time.
- Simple networking between controllers, HMI panels and engineering components.
- Smart options for demanding solutions in the technology sector.

Introduction

Perfect interaction between micro controllers, HMI panels and engineering

**SIMATIC HMI Basic Panels –
concentrating on essentials**

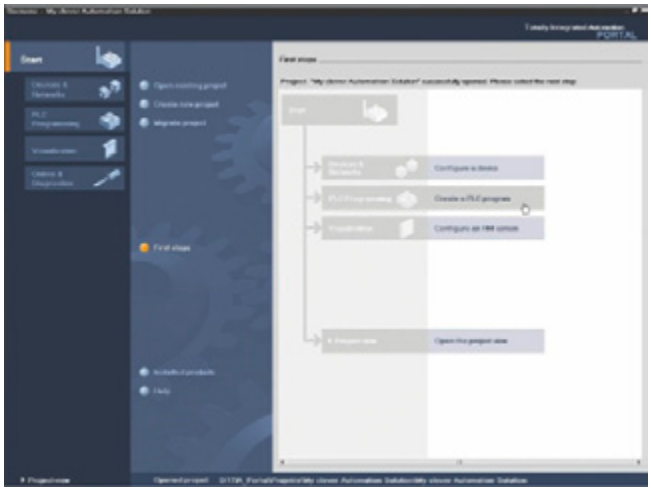
SIMATIC HMI Basic Panels are the ideal HMI devices for small machines and applications. They are ideal for use in connection with SIMATIC S7-1200, thanks to their equipment and functionality.

- Extensive product range:
  Pixel graphics displays ranging from 4" to 15" with intuitive operation by means of touchscreen and tactile function keys for use in tough industrial environments (IP65).
- Integrated functionality across all display sizes:
  Signalling system, recipe management, graph plotting, vector graphics and language switchover.
- Powerful communication:
  The integrated PROFINET interface permits the adapted integration of the panels into the automation system.

The use of SIMATIC HMI Basic Panels offers clear advantages:

- Economical, yet powerful visualization on site
- Flexible adaptation to the machine due to high level of scalability of the product range
- Simple networking and integrated communication
- Ideally adapted for use with SIMATIC S7-1200

**SIMATIC STEP 7 Basic –
Integrated engineering system for controllers and HMI**



The new SIMATIC STEP 7 Basic engineering system allows integrated engineering for the S7-1200 micro controllers and SIMATIC HMI Basic Panels. It includes all necessary functions and tools for hardware and network configuration, programming, diagnostics etc.

The innovative engineering system ensures a quantum leap in integration, efficiency and user-friendliness and provides the foundation for perfect interaction.

- Integrated engineering system:
  In addition to the software for SIMATIC S7-1200, it also includes WinCC Basic for SIMATIC HMI Basic Panels.
- Task-oriented, intelligent and intuitive editors:
  The user is ideally supported with context-sensitive help in every situation.
- Maximum data transparency and convenient reusability:
  Repeated inputs are no longer necessary; once created, function blocks can be managed in libraries and used again easily when required.

The benefit for the user is immediately clear:

- Intuitive operation makes it considerably easier to learn how to use and operate the system.
- The efficiency of the engineering is significantly increased and the time spent on implementing automation projects is reduced.
- The use of the latest software technologies also guarantees a stable basis for future innovations, giving the system a secured future.

SIMATIC S7-1200

SIMATIC S7-1200

Overview

- The new modular miniature controller from the SIMATIC S7 family
- Consisting of:
  - controller with integrated PROFINET interface for communication with programming device, HMI or other SIMATIC controllers
  - powerful, integrated technology functions such as counting, measuring, closed-loop control, and motion control
  - integrated digital and analog inputs/outputs
  - signal boards for direct use in a controller
  - signal modules for expansion of controllers by input/output channels
  - communication modules for expansion of controllers by communications interfaces
  - accessories, e.g. power supply, switch module or SIMATIC Memory Card
- The miniature controller that offers maximum automation at minimum cost
- Extremely simple installation, programming and operation
- Large-scale integration, space-saving, powerful
- Suitable for small to medium-size automation engineering applications
- Can be used both for simple controls and for complex automation tasks
- All CPUs can be used in stand-alone mode, in networks and within distributed structures
- Suitable for applications where programmable controllers would not have been economically viable in the past
- With exceptional real-time performance and powerful communication options

Application

The SIMATIC S7-1200 is the controller for open-loop and closed-loop control tasks in mechanical equipment manufacture and plant construction. It combines maximum automation and minimum cost.

Due to the compact modular design with a high performance at the same time, the SIMATIC S7-1200 is suitable for a wide variety of automation applications. Its range of use extends from the replacement of relays and contactors up to complex automation tasks in networks and within distributed structures.

The S7-1200 also increasingly opens up areas for which special electronics was previously developed for economical reasons.

Application examples include, for example:

- Placement systems
- Conveyor systems
- Elevators and escalators
- Material transportation equipment
- Metalworking machinery
- Packaging machines
- Printing machines
- Textile machines
- Mixing systems
- Freshwater treatment plants
- Wastewater treatment plants
- External displays
- Electricity distribution stations
- Room temperature control
- Heating/cooling system control
- Energy management
- Fire protection systems
- Air conditioning
- Lighting control
- Pump control
- Security/access control systems

Design

The SIMATIC S7-1200 family consists of the following modules:

- 3 compact controllers with graded performances in different versions as wide-range AC or DC controllers
- 2 signal boards (analog and digital) for low-cost modular controller expansion directly on the CPU, with retention of the mounting space
- 13 different digital and analog signal modules
- 2 communication modules (RS232/RS485) for communication via point-to-point connection
- Ethernet switch with 4 ports for implementation of many different network topologies
- PS 1207 stabilized power supply units, line voltage 115/230 V AC, rated voltage 24 V DC

Mechanical features

- Rugged, compact plastic enclosure
- Easily accessible connection and control elements, protected by front flaps
- Removable connection terminals, also for analog or digital expansion modules

Device features

- International standards:
  SIMATIC S7-1200 complies with the standards according to VDE, UL, CSA and FM (Class I, Category 2; Danger zone groups A, B, C and D, T4A). The quality management system used during production is certified according to ISO 9001.

Design (continued)

Communication

The SIMATIC S7-1200 is equipped with different communication mechanisms:

- Integral PROFINET interface
- Point-to-point connection via communication modules

PROFINET interface

The integral PROFINET interface permits communication with:

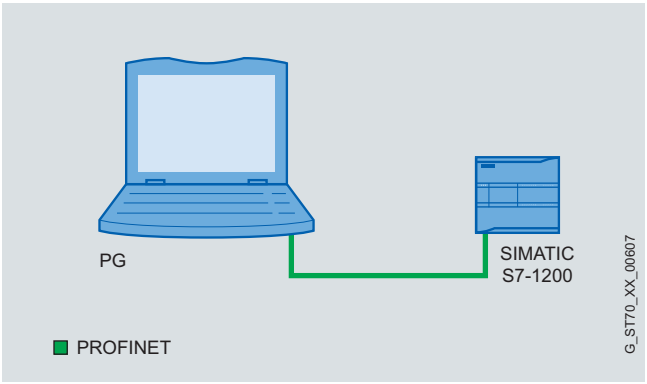
- Programming device
- HMI devices
- Other SIMATIC controllers

The following protocols are supported:

- TCP/IP
- ISO-on-TCP
- S7 communication

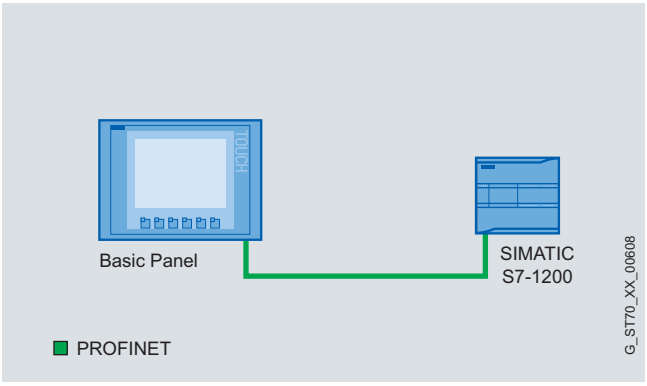
The following can be connected:

Field PG programming device and PCs via standard CAT5 cable.



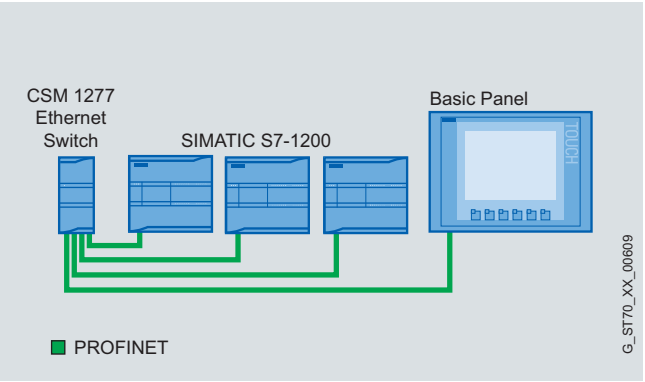
Connection between PG and CPU of SIMATIC S7-1200

- SIMATIC HMI Basic Panels



Connection between Basic Panel and CPU of SIMATIC S7-1200

- Further SIMATIC S7-1200 controllers

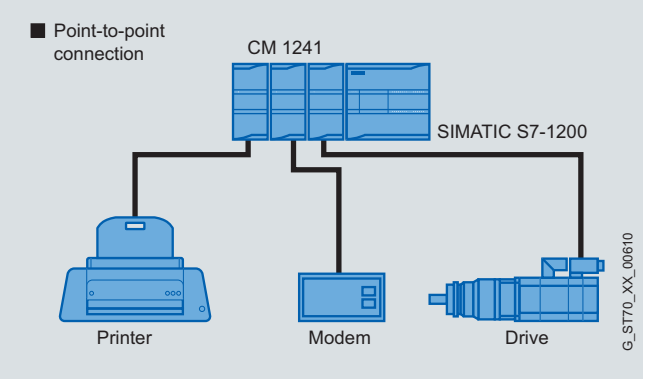


Connection of several devices via CSM 1277 Ethernet switch

Point-to-point interface, freely-programmable interface mode

Communication modules permit communication via point-to-point connections. The RS232 and RS485 physical transmission media are used. Data transmission is carried out in the "Freeport" mode of the CPU. A user-specific, bit-oriented communication protocol is used (e.g. ASCII protocol, USS, or MODBUS).

Any terminal equipment with a serial interface can be connected, e.g. drives, printers, bar code readers, modems, etc.



Point-to-point connection via CM 1241 in programmable interface mode

SIMATIC S7-1200

Function

The S7-1200 is characterized by:

- Extremely simple starter solution:
  Special starter packages and introductions facilitate familiarization.
- Uncomplicated operation:
  Powerful standard commands which are simple to use, together with the user-friendly programming software, reduce the programming overhead to a minimum.
- Exceptional real-time characteristics:
  Special interrupt functions, fast counters, and pulse outputs permit use even with time-critical processes.
- Powerful communication options:
  Particularly with the optional PROFIBUS DP connection, the S7-1200 can fully utilize its performance capability for distributed automation solutions.

The SIMATIC S7-1200 meets national and international standards:

- UL 508
- CSA C22.2 No. 142
- FM Class I, div. 2, group A, B, C, D; T4A Class I, Zone 2, IIC, T4
- VDE 0160
- EN 61131-2
- Requirements of the EMC directive in accordance with EN 50081-1, 50081-2 and 50082-2

Technical specifications

General technical specifications

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

More information

Brochures

Information material for downloading can be found in the Internet:

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

Overview

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

Design

The compact CPU 1211C has:

- 3 device versions with different power supply and control voltages.
- Integrated power supply either as wide-range AC or DC power supply (85 to 264 V AC or 24 V DC)
- Integrated 24 V encoder/load current supply:
  For direct connection of sensors and encoders. With 300 mA output current also for use as load power supply.
- 6 integrated digital inputs 24 V DC (current sinking/current sourcing (IEC type 1 current sinking)).
- 4 integrated digital outputs, either 24 V DC or relay.
- 2 integrated analog inputs 0 to 10 V.
- 2 pulse outputs (PTO) with a frequency of up to 100 kHz.
- Pulse-width modulated outputs (PWM) with a frequency of up to 100 kHz.
- Integrated Ethernet interface (TCP/IP native, ISO-on-TCP)
- 3 fast counters (100 kHz), with parameterizable enable and reset inputs, can be used simultaneously as up and down counters with separate inputs or for connecting incremental encoders.
- Expansion by additional communication interfaces, e.g. RS485 or RS232
- Expansion by analog or digital signals directly on the CPU via signal board (with retention of CPU mounting dimensions)
- Expansion by a wide range of analog and digital input and output signals via signal modules
- Optional memory expansion (SIMATIC Memory Card)
- PID controller with auto-tuning functionality
- Integral real-time clock
- Interrupt inputs:
  For extremely fast response to rising or falling edges of process signals.
- Removable terminals on all modules
- Simulator (optional):
  For simulating the integrated inputs and for testing the user program.

Device versions

Version	Supply voltage	Input voltage DI	Output voltage DO	Output current
• DC/DC/DC	24 V DC	24 V DC	24 V DC	0.5 A, transistor
• DC/DC/relay	24 V DC	24 V DC	5 … 30 V DC / 5 … 250 V AC	2 A; 30 W DC / 200 W AC
• AC/DC/relay	85 … 264 V AC	24 V DC	5 … 30 V DC / 5 … 250 V AC	2 A; 30 W DC / 200 W AC

CPU 1211C

Function

- Comprehensive instruction set:
  A wide range of operations facilitate programming:
  - basic operations such as binary logic operations, result allocation, save, count, create times, load, transfer, compare, shift, rotate, create complement, call subprogram (with local variables)
  - integral communication commands (e.g. USS protocol, Modbus RTU, S7 communication "T-Send/T-Receive" or Freeport)
  - user-friendly functions such as pulse-width modulation, pulse sequence function, arithmetic functions, floating point arithmetic, PID closed-loop control, jump functions, loop functions and code conversions
  - mathematical functions, e.g. SIN, COS, TAN, LN, EXP
- Counting:
  User-friendly counting functions in conjunction with the integrated counters and special commands for high-speed counters open up new application areas for the user
- Interrupt processing:
  - edge-triggered interrupts (activated by rising or falling edges of process signals on interrupt inputs) support a rapid response to process events
  - time-triggered interrupts
  - counter interrupts can be triggered when a setpoint is reached or when the direction of counting changes
  - communication interrupts allow the rapid and easy exchange of information with peripheral devices such as printers or bar code readers
- Password protection
- Test and diagnostics functions:
  Easy-to-use functions support testing and diagnostics, e.g. online/offline diagnostics
- "Forcing" of inputs and outputs during testing and diagnostics:
  Inputs and outputs can be set independently of cycle and thus permanently, for example, to test the user program
- Motion Control in accordance with PLCopen for simple movements
- Library functionality

Programming

The STEP 7 Basic programming package permits complete programming of all S7-1200 controllers and the associated I/O.

Technical specifications

	6ES7 211-1BD30-0XB0	6ES7 211-1AD30-0XB0	6ES7 211-1HD30-0XB0
Product name	**CPU 1211C AC/DC/relay**	**CPU 1211C DC/DC/DC**	**CPU 1211C DC/DC/relay**
Product version			
Associated programming package	STEP 7 Basic V 10.5	STEP 7 Basic V 10.5	STEP 7 Basic V 10.5
Supply voltages			
Rated value			
• 24 V DC		Yes	Yes
• 120 V AC	Yes		
• 230 V AC	Yes		
• Lower limit of permissible range (DC)		20.4 V	20.4 V
• Upper limit of permissible range (DC)		28.8 V	28.8 V
• Lower limit of permissible range (AC)	85 V		
• Upper limit of permissible range (AC)	264 V		
• Lower limit of permissible frequency range	47 Hz		
• Upper limit of permissible frequency range	63 Hz		
Load voltage L+			
• Rated value (DC)		24 V	24 V
• Lower limit of permissible range (DC)		20.4 V	20.4 V
• Upper limit of permissible range (DC)		28.8 V	28.8 V

Technical specifications (continued)

	6ES7 211-1BD30-0XB0	6ES7 211-1AD30-0XB0	6ES7 211-1HD30-0XB0
Product name	**CPU 1211C AC/DC/relay**	**CPU 1211C DC/DC/DC**	**CPU 1211C DC/DC/relay**
Current consumption			
Current consumption (rated value)	60 mA at 120 V AC 30 mA at 240 V AC	300 mA; typically	300 mA; typically
Current consumption, max.	180 mA at 120 V AC 90 mA at 240 V AC	0.9 A; 24 V DC	0.9 A; 24 V DC
Max. starting current	20 A; at 264 V	12 A; at 28.8 V	12 A; at 28.8 V
Current output at backplane bus (5 V DC), max.	750 mA; max. 5 V DC for SM and CM	750 mA; max. 5 V DC for SM and CM	750 mA; max. 5 V DC for SM and CM
Current consumption/power loss			
Power loss, typ.	10 W	8 W	8 W
Memory			
Usable memory for application data	25 KB	25 KB	25 KB
Work memory			
• Integrated	25 KB	25 KB	25 KB
• Expandable	No	No	No
Load memory			
• Integrated	1 MB; load memory expandable using SIEMENS Memory Card	1 MB; load memory expandable using SIEMENS Memory Card	1 MB; load memory expandable using SIEMENS Memory Card
• Expandable, max.	24 MB; with SIEMENS Memory Card	24 MB; with SIEMENS Memory Card	24 MB; with SIEMENS Memory Card
Buffering			
• Available	Yes; complete project maintenance-free in the integral EEPROM	Yes; complete project maintenance-free in the integral EEPROM	Yes; complete project maintenance-free in the integral EEPROM
• without battery	Yes	Yes	Yes
CPU/execution times			
For bit operations, min.	0.1 µs; per operation	0.1 µs; per operation	0.1 µs; per operation
For word operations, min.	12 µs; per operation	12 µs; per operation	12 µs; per operation
For floating-point arithmetic, min.	18 µs; per operation	18 µs; per operation	18 µs; per operation
Data areas and their retentivity			
Total retentive data area (including timers, counters, bit memories), max.	2048 byte	2048 byte	2048 byte
Address range			
I/O address range			
• Total I/O address range	1024 byte for inputs/ 1024 byte for outputs	1024 byte for inputs/ 1024 byte for outputs	1024 byte for inputs/ 1024 byte for outputs
• Inputs	1024 byte	1024 byte	1024 byte
• Outputs	1024 byte	1024 byte	1024 byte
Digital channels			
• Integrated channels (DI)	6	6	6
• Integrated channels (DO)	4	4	4
Analog channels			
• Integrated channels (AI)	2	2	2

Technical specifications (continued)

	6ES7 211-1BD30-0XB0	6ES7 211-1AD30-0XB0	6ES7 211-1HD30-0XB0
Product name	**CPU 1211C AC/DC/relay**	**CPU 1211C DC/DC/DC**	**CPU 1211C DC/DC/relay**
Hardware configuration			
Number of modules per system, max.	3 communication modules, 1 signal board	3 communication modules, 1 signal board	3 communication modules, 1 signal board
Time			
Clock			
• Hardware clock (real-time clock)	Yes	Yes	Yes
• Buffered period	240 h; typically	240 h; typically	240 h; typically
• Deviation per day, max.	60 s/month at 25 °C	60 s/month at 25 °C	60 s/month at 25 °C
Test and startup functions			
Status/control			
• Status/modify variable	Yes	Yes	Yes
• Tags	Inputs/outputs, bit memories, DBs, distributed inputs/outputs, timers, counters	Inputs/outputs, bit memories, DBs, distributed inputs/outputs, timers, counters	Inputs/outputs, bit memories, DBs, distributed inputs/outputs, timers, counters
Forcing			
• Forcing	Yes	Yes	Yes
Communications functions			
S7 communication			
• Supported	Yes	Yes	Yes
• As server	Yes	Yes	Yes
• As client	Yes	Yes	Yes
Open IE communication			
• TCP/IP	Yes	Yes	Yes
• ISO-on-TCP (RFC1006)	Yes	Yes	Yes
Number of connections			
• Total	16	16; dynamic	16
1st interface			
Type of interface	PROFINET	PROFINET	PROFINET
Physics	Ethernet	Ethernet	Ethernet
Isolated	Yes	Yes	Yes
Automatic determination of transfer rate	Yes	Yes	Yes
Autonegotiation	Yes	Yes	Yes
Autocrossover	Yes	Yes	Yes
CPU/programming			
Configuring software			
• STEP 7	STEP 7 Basic V 10.5	STEP 7 Basic V 10.5	STEP 7 Basic V 10.5
Programming language			
• LAD	Yes	Yes	Yes
• FBD	Yes	Yes	Yes
• STL			
Cycle time monitoring			
• Configurable	Yes	Yes	Yes

Technical specifications (continued)

	6ES7 211-1BD30-0XB0	6ES7 211-1AD30-0XB0	6ES7 211-1HD30-0XB0
Product name	**CPU 1211C AC/DC/relay**	**CPU 1211C DC/DC/DC**	**CPU 1211C DC/DC/relay**
Digital inputs			
Number of digital inputs	6; integrated	6; integrated	6; integrated
• Inputs which can be used for technological functions	3; HSC (high-speed counting)	3; HSC (high-speed counting)	3; HSC (high-speed counting)
Current sourcing/sinking	Yes	Yes	Yes
Concurrently controllable inputs			
• All mounting positions			
- concurrently controllable inputs, up to 40 °C	6	6	6
Input voltage			
• Rated value, DC	24 V	24 V	24 V
• for "0" signal	5 V DC at 1 mA	5 V DC at 1 mA	5 V DC at 1 mA
• for "1" signal	15 V DC at 2.5 mA	15 V DC at 2.5 mA	15 V DC at 2.5 mA
Input current			
• for "1" signal, typ.	1 mA	1 mA	1 mA
Input delay (at rated value of input voltage)			
• for standard inputs			
- programmable	0.2, 0.4, 0.8, 1.6, 3.2, 6.4 and 12.8 ms, selectable in groups of 4	0.2, 0.4, 0.8, 1.6, 3.2, 6.4 and 12.8 ms, selectable in groups of 4	0.2, 0.4, 0.8, 1.6, 3.2, 6.4 and 12.8 ms, selectable in groups of 4
- for "0" to "1", min.	0.2 ms	0.2 ms	0.2 ms
- for "0" to "1", max.	12.8 ms	12.8 ms	12.8 ms
• for alarm inputs			
- programmable	Yes	Yes	Yes
• for counter/technological functions			
- programmable	Single-phase: 3 at 100 KHz Differential: 3 at 80 KHz	Single-phase: 3 at 100 KHz Differential: 3 at 80 KHz	Single-phase: 3 at 100 KHz Differential: 3 at 80 KHz
Cable length			
• Max. cable length, shielded	500 m; 50 m for technological functions	500 m; 50 m for technological functions	500 m; 50 m for technological functions
• Max. cable length, unshielded	300 m; for technological functions: No	300 m; for technological functions: No	300 m; for technological functions: No
Digital outputs			
Number of digital outputs	4; relays	4	4; relays
• of those as fast outputs		2; 100 kHz pulse train output	
Short-circuit protection	No; to be provided externally	No; to be provided externally	No; to be provided externally
Voltage induced on current interruption limited to		L+ (-48 V)	
Switching capacity of outputs			
• with ohmic load, max.	2 A	0.5 A	2 A
• with lamp load, max.	30 W DC; 200 W AC	5 W	30 W DC; 200 W AC
Output voltage			
• for "0" signal (DC), max.		0.1 V; with 10 kOhm load	
• for "1" signal, min.		20 V	
Output current			
• for "1" signal, rated value		0.5 A	
• for "0" signal, residual current, max.		0.1 mA	

Technical specifications (continued)

	6ES7 211-1BD30-0XB0	6ES7 211-1AD30-0XB0	6ES7 211-1HD30-0XB0
Product name	**CPU 1211C AC/DC/relay**	**CPU 1211C DC/DC/DC**	**CPU 1211C DC/DC/relay**
Output delay with ohmic load			
• "0" to "1", max.	10 ms; max.	1 µs; max.	10 ms; max.
• "1" to "0", max.	10 ms; max.	5 µs; max.	10 ms; max.
Wiring 2 outputs in parallel			
• for performance increase	No		No
Switching frequency			
• of pulse outputs, with ohmic load, max.	1 Hz	100 kHz	1 Hz
Cable length			
• Max. cable length, shielded	500 m	500 m	500 m
• Max. cable length, unshielded	150 m	150 m	150 m
Relay outputs			
Number of relay outputs	4		4
Number of operating cycles	Mechanically 10 million, with rated load voltage 100000		Mechanically 10 million, with rated load voltage 100000
Analog inputs			
Number of analog inputs	2	2	2
Number of analog inputs with voltage/current measurement	2		2
Max. cable length, shielded	10 m; twisted and shielded	10 m; twisted and shielded	10 m; twisted and shielded
Input ranges			
• Voltage	Yes	Yes	Yes
Input ranges (rated values), voltages			
• 0 … +10 V	Yes	Yes	Yes
• Input resistance (0 … 10 V)	≥100 kOhm	≥100 kOhm	≥100 kOhm
Analog value generation			
Integration and conversion time/resolution per channel			
• Resolution with overrange (bits including sign), max.	10 bit	10 bit	10 bit
• Integration time can be parameterized	Yes	Yes	Yes
• Conversion time (per channel)	625 µs	625 µs	625 µs
Analog value generation (in isochronous mode)			
Cable length			
• Max. cable length, shielded	10 m; twisted	10 m; twisted	10 m; twisted
Encoder supply			
24 V encoder supply			
• 24 V	Permissible range: 20.4 … 28.8 V	Permissible range: 20.4 … 28.8 V	Permissible range: 20.4 … 28.8 V
Encoders			
Connectable encoders			
• 2-wire BEROs	Yes	Yes	Yes

Technical specifications (continued)

	6ES7 211-1BD30-0XB0	6ES7 211-1AD30-0XB0	6ES7 211-1HD30-0XB0
Product name	**CPU 1211C AC/DC/relay**	**CPU 1211C DC/DC/DC**	**CPU 1211C DC/DC/relay**
Integrated functions			
Number of counters	3	3	3
Max. counter frequency	100 kHz	100 kHz	100 kHz
Frequency meters	Yes	Yes	Yes
Controlled positioning	Yes	Yes	Yes
PID controllers	Yes	Yes	Yes
Number of alarm inputs	4	4	4
Number of pulse outputs		2	
Limit frequency (pulse)		100 kHz	
Operator control and monitoring			
Display			
• Integrated	No	No	No
Galvanic isolation			
Galvanic isolation of digital inputs			
• Galvanic isolation of digital inputs	500 V AC for 1 minute	500 V AC for 1 minute	500 V AC for 1 minute
• Between the channels, in groups of	1	1	1
Isolation of digital outputs			
• Isolation of digital outputs	Yes; relays	Yes	Relays
• Between the channels	No	No	No
• Between the channels, in groups of	1	1	1
Permissible potential difference			
Between different circuits	500 V DC between 24 V DC and 5 V DC	500 V DC between 24 V DC and 5 V DC	500 V DC between 24 V DC and 5 V DC
EMC			
Immunity to static discharge			
• Immunity to static discharge in accordance with IEC 61000-4-2	Yes	Yes	Yes
- test voltage with air discharge	8 kV	8 kV	8 kV
- test voltage with contact discharge	6 kV	6 kV	6 kV
Immunity to conducted interference			
• On the supply lines in accordance with IEC 61000-4-4	Yes	Yes	Yes
• Immunity on supply lines in accordance with IEC 61000-4-4	Yes	Yes	Yes
Immunity to surge voltages			
• On the supply lines in accordance with IEC 61000-4-5	Yes	Yes	Yes
Immunity to conducted interference, induced by high-frequency fields			
• Immunity to high-frequency irradiation in accordance with IEC 61000-4-6	Yes	Yes	Yes
Emission of radio interference in accordance with EN 55 011			
• Emission of radio interference in accordance with EN 55 011 (limit class A)	Yes; Group 1	Yes; Group 1	Yes; Group 1

Technical specifications (continued)

	6ES7 211-1BD30-0XB0	6ES7 211-1AD30-0XB0	6ES7 211-1HD30-0XB0
Product name	**CPU 1211C AC/DC/relay**	**CPU 1211C DC/DC/DC**	**CPU 1211C DC/DC/relay**
Climatic and mechanical conditions for storage and transport			
Climatic conditions for storage and transport			
• Free fall			
- max. height of fall (in packaging)	0.3 m; five times, in transport packaging	0.3 m; five times, in transport packaging	0.3 m; five times, in transport packaging
• Temperature			
- permissible temperature range	-40 °C ... +70 °C	-40 °C ... +70 °C	-40 °C ... +70 °C
• Relative humidity			
- permissible range (without condensation) at 25 °C	95%	95%	95%
Mechanical and climatic conditions in operation			
Climatic conditions in operation			
• Temperature			
- permissible temperature range	0 °C ... 55 °C horizontal mounting; 0 °C ... 45 °C vertical mounting	0 °C ... 55 °C horizontal mounting; 0 °C ... 45 °C vertical mounting	0 °C ... 55 °C horizontal mounting; 0 °C ... 45 °C vertical mounting
- permissible temperature change	5 °C ... 55 °C, 3 °C/minute	5 °C ... 55 °C, 3 °C/minute	5 °C ... 55 °C, 3 °C/minute
• Atmospheric pressure acc. to IEC 60068-2-13			
- permissible atmospheric pressure	1080 ... 795 hPa	1080 ... 795 hPa	1080 ... 795 hPa
- permissible operating altitude	-1000 m … 2000 m	-1000 m … 2000 m	-1000 m … 2000 m
• Concentration of pollutants			
- SO_2 at RH < 60% without condensation	$S0_2$: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% without condensation	$S0_2$: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% without condensation	$S0_2$: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% without condensation
Environmental requirements			
Operating temperature			
• Min.	0 °C	0 °C	0 °C
• Max.	55 °C	55 °C	55 °C
• Vertical installation, min.	0 °C	0 °C	0 °C
• Vertical installation, max.	45 °C	45 °C	45 °C
• Horizontal installation, min.	0 °C	0 °C	0 °C
• Horizontal installation, max.	55 °C	55 °C	55 °C
Storage/transport temperature			
• Min.	-40 °C	-40 °C	-40 °C
• Max.	+70 °C	+70 °C	+70 °C
Atmospheric pressure			
• Operation, min.	795 hPa	795 hPa	795 hPa
• Operation, max.	1080 hPa	1080 hPa	1080 hPa
• Storage/transport, min.	660 hPa	660 hPa	660 hPa
• Storage/transport, max.	1080 hPa	1080 hPa	1080 hPa
Relative humidity			
• Operation, max.	95%; no condensation	95%; no condensation	95%; no condensation
Vibrations			
• Vibrations	2 g (mounting in switchboard), 1 g (mounted on DIN rail)	2 g (mounting in switchboard), 1 g (mounted on DIN rail)	2 g (mounting in switchboard), 1 g (mounted on DIN rail)
• In operation, tested according to IEC 60068-2-6	Yes	Yes	Yes

Technical specifications (continued)

	6ES7 211-1BD30-0XB0	6ES7 211-1AD30-0XB0	6ES7 211-1HD30-0XB0
Product name	**CPU 1211C AC/DC/relay**	**CPU 1211C DC/DC/DC**	**CPU 1211C DC/DC/relay**
Shock test			
• Tested in accordance with IEC 60068-2-27	Yes; magnitude of shock 15 g (peak value), duration 11 ms, 6 shocks in each of the three mutually perpendicular axes	Yes; magnitude of shock 15 g (peak value), duration 11 ms, 6 shocks in each of the three mutually perpendicular axes	Yes; magnitude of shock 15 g (peak value), duration 11 ms, 6 shocks in each of the three mutually perpendicular axes
Degree of protection			
IP20	Yes	Yes	Yes
Standards, approvals, certificates			
CE mark	Yes	Yes	Yes
C-TICK	Yes	Yes	Yes
cULus	Yes	Yes	Yes
FM approval	Yes	Yes	Yes
Dimensions and weight			
Dimensions and weight			
• Width	90 mm	90 mm	90 mm
• Height	100 mm	100 mm	100 mm
• Depth	75 mm	75 mm	75 mm
Weight			
• Approx. weight	420 g	370 g	380 g

CPU 1211C

Ordering data

		Order No.
CPU 1211C		
Compact CPU, AC/DC/relay; integral program/data memory 25 KB, load memory 1 MB; wide-range power supply 85 ... 264 V AC; Boolean execution times 0.1 µs per operation; 6 digital inputs, 4 digital outputs (relays), 2 analog inputs; expandable by up to 3 communication modules and 1 signal board; digital inputs can be used as HSC at 100 kHz	C	**6ES7 211-1BD30-0XB0**
Compact CPU, DC/DC/DC; integral program/data memory 25 KB, load memory 1 MB; power supply 24 V DC; Boolean execution times 0.1 µs per operation; 6 digital inputs, 4 digital outputs (relays), 2 analog inputs; expandable by up to 3 communication modules and 1 signal board; digital inputs can be used as HSC at 100 kHz, 24 V DC digital outputs can be used as pulse outputs (PTO) or pulse-width modulated outputs (PWM) with 100 kHz	C	**6ES7 211-1AD30-0XB0**
Compact CPU, DC/DC/relay; integral program/data memory 25 KB, load memory 1 MB; power supply 24 V DC; Boolean execution times 0.1 µs per operation; 6 digital inputs, 4 digital outputs, 2 analog inputs; expandable by up to 3 communication modules and 1 signal board; digital inputs can be used as HSC at 100 kHz	C	**6ES7 211-1HD30-0XB0**

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

		Order No.
SB 1223 signal board	C	**6ES7 223-0BD30-0XB0**
2 inputs, 24 V DC, IEC type 1 current sinking; two 24 V DC transistor outputs, 0.5 A, 5 W; can be used as HSC at up to 30 kHz		
SB 1232 signal board	C	**6ES7 232-4HA30-0XB0**
1 analog output, ±10 V with 12 bit or 0 … 20 mA with 11 bit		
Simulator (optional)	C	**6ES7 274-1XF30-0XA0**
8 input switches, for CPU 1211C / CPU 1212C		
SIMATIC Memory Card (optional)		
2 MB	C	**6ES7 954 -8LB00-0AA0**
24 MB	C	**6ES7 954 -8LF00-0AA0**
S7-1200 automation system, System Manual		
for SIMATIC S7-1200 and STEP 7 Basic		
German		**6ES7 298-8FA30-8AH0**
English		**6ES7 298-8FA30-8BH0**
STEP 7 Basic engineering software		
Target system: SIMATIC S7-1200 controllers and the associated I/O. The WinCC Basic which is included permits configuration of the SIMATIC Basic Panels *Requirement:* MS Windows XP SP3 / MS Windows Vista SP1 *Type of delivery:* German, English, with online documentation		
Single license	D	**6ES7 822-0AA00-0YA0**
STEP 7 Basic Software Update Service, 1 year	D	**6ES7 822-0AA00-0YL0**

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

More information

Brochures

Information material for downloading can be found in the Internet:

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

Overview

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

Design

The compact CPU 1212C has:

- 3 device versions with different power supply and control voltages
- Integrated power supply either as wide-range AC or DC power supply (85 to 264 V AC or 24 V DC)
- Integrated 24 V encoder/load current supply:
  For direct connection of sensors and encoders. With 300 mA output current also for use as load power supply
- 8 integrated digital inputs 24 V DC (current sinking/current sourcing (IEC type 1 current sinking))
- 6 integrated digital outputs, either 24 V DC or relay
- 2 integrated analog inputs 0 to 10 V
- 2 pulse outputs (PTO) with a frequency of up to 100 kHz
- Pulse-width modulated outputs (PWM) with a frequency of up to 100 kHz
- Integrated Ethernet interface (TCP/IP native, ISO-on-TCP)
- 4 fast counters (3 with max. 100 kHz; 1 with max. 30 kHz), with parameterizable enable and reset inputs, can be used simultaneously as up and down counters with 2 separate inputs or for connecting incremental encoders
- Expansion by additional communication interfaces, e.g. RS485 or RS232
- Expansion by analog or digital signals directly on the CPU via signal board (with retention of CPU mounting dimensions)
- Expansion by a wide range of analog and digital input and output signals via signal modules
- Optional memory expansion (SIMATIC Memory Card)
- PID controller with auto-tuning functionality
- Integral real-time clock
- Interrupt inputs:
  For extremely fast response to rising or falling edges of process signals
- Removable terminals on all modules
- Simulator (optional):
  For simulating the integrated inputs and for testing the user program

Device versions

Version	Supply voltage	Input voltage DI	Output voltage DO	Output current
• DC/DC/DC	24 V DC	24 V DC	24 V DC	0.5 A, transistor
• DC/DC/relay	24 V DC	24 V DC	5 … 30 V DC / 5 … 250 V AC	2 A; 30 W DC / 200 W AC
• AC/DC/relay	85 … 264 V AC	24 V DC	5 … 30 V DC / 5 … 250 V AC	2 A; 30 W DC / 200 W AC

CPU 1212C

Function

- Comprehensive instruction set:
  A wide range of operations facilitate programming:
  - basic operations such as binary logic operations, result allocation, save, count, create times, load, transfer, compare, shift, rotate, create complement, call subprogram (with local variables)
  - integral communication commands (e.g. USS protocol, Modbus RTU, S7 communication "T-Send/T-Receive" or Freeport)
  - user-friendly functions such as pulse-width modulation, pulse sequence function, arithmetic functions, floating point arithmetic, PID closed-loop control, jump functions, loop functions and code conversions
  - mathematical functions, e.g. SIN, COS, TAN, LN, EXP
- Counting:
  User-friendly counting functions in conjunction with the integrated counters and special commands for high-speed counters open up new application areas for the user
- Interrupt processing:
  - edge-triggered interrupts (activated by rising or falling edges of process signals on interrupt inputs) support a rapid response to process events.
  - time-triggered interrupts.
  - counter interrupts can be triggered when a setpoint is reached or when the direction of counting changes.
  - communication interrupts allow the rapid and easy exchange of information with peripheral devices such as printers or bar code readers
- Password protection
- Test and diagnostics functions:
  Easy-to-use functions support testing and diagnostics, e.g. online/offline diagnostics
- "Forcing" of inputs and outputs during testing and diagnostics:
  Inputs and outputs can be set independently of cycle and thus permanently, for example, to test the user program
- Motion Control in accordance with PLCopen for simple movements
- Library functionality

Programming

The STEP 7 Basic programming package permits complete programming of all S7-1200 controllers and the associated I/O.

Technical specifications

	6ES7 212-1BD30-0XB0	6ES7 212-1AD30-0XB0	6ES7 212-1HD30-0XB0
Product name	**CPU 1212C AC/DC/relay**	**CPU 1212C DC/DC/DC**	**CPU 1212C DC/DC/relay**
Product version			
Associated programming package	STEP 7 Basic V 10.5	STEP 7 Basic V 10.5	STEP 7 Basic V 10.5
Supply voltages			
Rated value			
• 24 V DC		Yes	Yes
• 120 V AC	Yes		
• 230 V AC	Yes		
• Lower limit of permissible range (DC)		20.4 V	20.4 V
• Upper limit of permissible range (DC)		28.8 V	28.8 V
• Lower limit of permissible range (AC)	85 V		
• Upper limit of permissible range (AC)	264 V		
• Lower limit of permissible frequency range	47 Hz		
• Upper limit of permissible frequency range	63 Hz		
Load voltage L+			
• Rated value (DC)	24 V	24 V	24 V
• Lower limit of permissible range (DC)	5 V	20.4 V	5 V
• Upper limit of permissible range (DC)	250 V	28.8 V	250 V

Technical specifications (continued)

	6ES7 212-1BD30-0XB0	6ES7 212-1AD30-0XB0	6ES7 212-1HD30-0XB0
Product name	**CPU 1212C AC/DC/relay**	**CPU 1212C DC/DC/DC**	**CPU 1212C DC/DC/relay**
Current consumption			
Current consumption (rated value)	80 mA at 120 V AC 40 mA at 240 V AC		175 mA; typically
Current consumption, max.	240 mA at 120 V AC 120 mA at 240 V AC	1.2 A; 24 V DC	1.2 A; 24 V DC
Max. starting current	20 A; at 264 V	12 A; 28.8 V DC	12 A; at 28.8 V
Current output at backplane bus (5 V DC), max.	1000 mA; max. 5 V DC for SM and CM	1000 mA; max. 5 V DC for SM and CM	1000 mA; max. 5 V DC for SM and CM
Current consumption/power loss			
Power loss, typ.	11 W	9 W	9 W
Memory			
Usable memory for application data	25 KB	25 KB	25 KB
Work memory			
• Integrated	25 KB	25 KB	25 KB
• Expandable	No	No	No
Load memory			
• Integrated	1 MB; load memory expandable using SIEMENS Memory Card	1 MB; load memory expandable using SIEMENS Memory Card	1 MB; load memory expandable using SIEMENS Memory Card
• Expandable, max.	24 MB; with SIEMENS Memory Card	24 MB; with SIEMENS Memory Card	24 MB; with SIEMENS Memory Card
Buffering			
• Available	Yes; complete project maintenance-free in the integral EEPROM	Yes; complete project maintenance-free in the integral EEPROM	Yes; complete project maintenance-free in the integral EEPROM
• Without battery	Yes	Yes	Yes
CPU/execution times			
for bit operations, min.	0.1 µs; per operation	0.1 µs; per operation	0.1 µs; per operation
for word operations, min.	12 µs; per operation	12 µs; per operation	12 µs; per operation
for floating-point arithmetic, min.	18 µs; per operation	18 µs; per operation	18 µs; per operation
Data areas and their retentivity			
Total retentive data area (including timers, counters, bit memories), max.	2048 byte	2048 byte	2048 byte
Address range			
I/O address range			
• Total I/O address range	1024 byte for inputs/ 1024 byte for outputs	1024 byte for inputs/ 1024 byte for outputs	1024 byte for inputs/ 1024 byte for outputs
• Inputs	1024 byte	1024 byte	1024 byte
• Outputs	1024 byte	1024 byte	1024 byte
Digital channels			
• Integrated channels (DI)	8	8	8
• Integrated channels (DO)	6	6	6
Analog channels			
• Integrated channels (AI)	2	2	2

Technical specifications (continued)

	6ES7 212-1BD30-0XB0	6ES7 212-1AD30-0XB0	6ES7 212-1HD30-0XB0
Product name	**CPU 1212C AC/DC/relay**	**CPU 1212C DC/DC/DC**	**CPU 1212C DC/DC/relay**
Hardware configuration			
Number of modules per system, max.	3 communication modules, 1 signal board, 2 signal modules	3 communication modules, 1 signal board, 2 signal modules	3 communication modules, 1 signal board, 2 signal modules
Time			
Clock			
• Hardware clock (real-time clock)	Yes	Yes	Yes
• Buffered period	240 h; typically	240 h; typically	240 h; typically
• Deviation per day, max.	60 s/month at 25 °C	60 s/month at 25 °C	60 s/month at 25 °C
Test and startup functions			
Status/control			
• Status/modify variable	Yes	Yes	Yes
• Tags	Inputs/outputs, bit memories, DBs, distributed inputs/outputs, timers, counters	Inputs/outputs, bit memories, DBs, distributed inputs/outputs, timers, counters	Inputs/outputs, bit memories, DBs, distributed inputs/outputs, timers, counters
Forcing			
• Forcing	Yes	Yes	Yes
Communications functions			
S7 communication			
• Supported	Yes	Yes	Yes
• As server	Yes	Yes	Yes
• As client	Yes	Yes	Yes
Open IE communication			
• TCP/IP	Yes	Yes	Yes
• ISO-on-TCP (RFC1006)	Yes	Yes	Yes
Number of connections			
• Total	16; dynamic	16; dynamic	16; dynamic
1st interface			
Type of interface	PROFINET	PROFINET	PROFINET
Physics	Ethernet	Ethernet	Ethernet
Isolated	Yes	Yes	Yes
Automatic determination of transfer rate	Yes	Yes	Yes
Autonegotiation	Yes	Yes	Yes
Autocrossover	Yes	Yes	Yes
CPU/programming			
Configuring software			
• STEP 7	STEP 7 Basic V 10.5	STEP 7 Basic V 10.5	STEP 7 Basic V 10.5
Programming language			
• LAD	Yes	Yes	Yes
• FBD	Yes	Yes	Yes
Cycle time monitoring			
• Configurable	Yes	Yes	Yes

Technical specifications (continued)

	6ES7 212-1BD30-0XB0	6ES7 212-1AD30-0XB0	6ES7 212-1HD30-0XB0
Product name	**CPU 1212C AC/DC/relay**	**CPU 1212C DC/DC/DC**	**CPU 1212C DC/DC/relay**
Digital inputs			
Number of digital inputs	8; integrated	8; integrated	8; integrated
• Inputs which can be used for technological functions	4; HSC (high-speed counting)	4; HSC (high-speed counting)	4; HSC (high-speed counting)
Current sourcing/sinking	Yes	Yes	Yes
Concurrently controllable inputs			
• All mounting positions			
- concurrently controllable inputs, up to 40 °C	8	8	8
Input voltage			
• Rated value, DC	24 V	24 V	24 V
• for "0" signal	5 V DC at 1 mA	5 V DC at 1 mA	5 V DC at 1 mA
• for "1" signal	15 V DC at 2.5 mA	15 V DC at 2.5 mA	15 V DC at 2.5 mA
Input current			
• for "1" signal, typ.	1 mA	1 mA	1 mA
Input delay (at rated value of input voltage)			
• for standard inputs			
- programmable	0.2, 0.4, 0.8, 1.6, 3.2, 6.4 and 12.8 ms, selectable in groups of 4	0.2, 0.4, 0.8, 1.6, 3.2, 6.4 and 12.8 ms, selectable in groups of 4	0.2, 0.4, 0.8, 1.6, 3.2, 6.4 and 12.8 ms, selectable in groups of 4
- for "0" to "1", min.	0.2 ms	0.2 ms	0.2 ms
- for "0" to "1", max.	12.8 ms	12.8 ms	12.8 ms
• For alarm inputs			
- programmable	Yes	Yes	Yes
• For counter/technological functions			
- programmable	Single-phase: 3 at 100 kHz, 1 at 30 kHz Differential: 3 at 80 kHz, 1 at 30 kHz	Single-phase: 3 at 100 kHz, 1 at 30 kHz Differential: 3 at 80 kHz, 1 at 30 kHz	Single-phase: 3 at 100 kHz, 1 at 30 kHz Differential: 3 at 80 kHz, 1 at 30 kHz
Cable length			
• Max. cable length, shielded	500 m; 50 m for technological functions	500 m; 50 m for technological functions	500 m; 50 m for technological functions
• Max. cable length, unshielded	300 m; for technological functions: No	300 m; for technological functions: No	300 m; for technological functions: No
Digital outputs			
Number of digital outputs	6; relays	6; relays	6; relays
• of those as fast outputs		2; 100 kHz pulse train output	
Short-circuit protection	No; to be provided externally	No; to be provided externally	No; to be provided externally
Voltage induced on current interruption limited to		L+ (-48 V)	
Switching capacity of outputs			
• with ohmic load, max.	2 A	0.5 A	2 A
• with lamp load, max.	30 W DC; 200 W AC	5 W	30 W DC; 200 W AC
Output voltage			
• for "0" signal (DC), max.		0.1 V; with 10 kOhm load	
• for "1" signal, min.		20 V	
Output current			
• for "1" signal, rated value		0.5 A	
• for "0" signal, residual current, max.		0.1 mA	

Technical specifications (continued)

	6ES7 212-1BD30-0XB0	6ES7 212-1AD30-0XB0	6ES7 212-1HD30-0XB0
Product name	**CPU 1212C AC/DC/relay**	**CPU 1212C DC/DC/DC**	**CPU 1212C DC/DC/relay**
Output delay with ohmic load			
• "0" to "1", max.	10 ms; max.	1 µs	10 ms; max.
• "1" to "0", max.	10 ms; max.	5 µs	10 ms; max.
Switching frequency			
• of pulse outputs, with ohmic load, max.	1 Hz	100 kHz	1 Hz
Cable length			
• Max. cable length, shielded	500 m	500 m	500 m
• Max. cable length, unshielded	150 m	150 m	150 m
Relay outputs			
Number of relay outputs	6		6
Number of operating cycles	Mechanically 10 million, with rated load voltage 100000		Mechanically 10 million, with rated load voltage 100000
Analog inputs			
Number of analog inputs	2	2	2
Max. cable length, shielded	10 m; twisted and shielded	10 m; twisted and shielded	10 m; twisted and shielded
Input ranges			
• Voltage	Yes	Yes	Yes
Input ranges (rated values), voltages			
• 0 … +10 V	Yes	Yes	Yes
• Input resistance (0 … 10 V)	≥100 kOhm	≥100 kOhm	≥100 kOhm
Analog value generation			
Integration and conversion time/ resolution per channel			
• Resolution with overrange (bits including sign), max.	10 bit	10 bit	10 bit
• Integration time can be parameter-ized	Yes	Yes	Yes
• Conversion time (per channel)	625 µs	625 µs	625 µs
Analog value generation (in isochronous mode)			
Cable length			
• Max. cable length, shielded	10 m; twisted	10 m; twisted	10 m; twisted
Encoder supply			
24 V encoder supply			
• 24 V	Permissible range: 20.4 … 28.8 V	Permissible range: 20.4 … 28.8 V	Permissible range: 20.4 … 28.8 V
Encoders			
Connectable encoders			
• 2-wire BEROs	Yes	Yes	Yes

Technical specifications (continued)

	6ES7 212-1BD30-0XB0	6ES7 212-1AD30-0XB0	6ES7 212-1HD30-0XB0
Product name	**CPU 1212C AC/DC/relay**	**CPU 1212C DC/DC/DC**	**CPU 1212C DC/DC/relay**
Integrated functions			
Number of counters	4	4	4
Max. counter frequency	100	100	100
Frequency meters	Yes	Yes	Yes
Controlled positioning	Yes	Yes	Yes
PID controllers	Yes	Yes	Yes
Number of alarm inputs	4	4	4
Number of pulse outputs		2	
Limit frequency (pulse)		100 kHz	
Operator control and monitoring			
Display			
• Integrated	No	No	No
Galvanic isolation			
Galvanic isolation of digital inputs			
• Galvanic isolation of digital inputs	500 V AC for 1 minute	500 V AC for 1 minute	500 V AC for 1 minute
• Between the channels, in groups of	1	1	1
Isolation of digital outputs			
• Isolation of digital outputs	Yes; relays	Yes	Relays
• Between the channels	No	No	No
• Between the channels, in groups of	2	2	1
Permissible potential difference			
Between different circuits	500 V DC between 24 V DC and 5 V DC	500 V DC between 24 V DC and 5 V DC	500 V DC between 24 V DC and 5 V DC
EMC			
Immunity to static discharge			
• Immunity to static discharge in accordance with IEC 61000-4-2	Yes	Yes	Yes
- test voltage with air discharge	8 kV	8 kV	8 kV
- test voltage with contact discharge	6 kV	6 kV	6 kV
Immunity to conducted interference			
• on the supply lines in accordance with IEC 61000-4-4	Yes	Yes	Yes
• Immunity on supply lines in accordance with IEC 61000-4-4	Yes	Yes	Yes
Immunity to surge voltages			
• on the supply lines in accordance with IEC 61000-4-5	Yes	Yes	Yes
Immunity to conducted interference, induced by high-frequency fields			
• Immunity to high-frequency irradiation in accordance with IEC 61000-4-6	Yes	Yes	Yes
Emission of radio interference in accordance with EN 55 011			
• Emission of radio interference in accordance with EN 55 011 (limit class A)	Yes; Group 1	Yes; Group 1	Yes; Group 1

Technical specifications (continued)

	6ES7 212-1BD30-0XB0	6ES7 212-1AD30-0XB0	6ES7 212-1HD30-0XB0
Product name	**CPU 1212C AC/DC/relay**	**CPU 1212C DC/DC/DC**	**CPU 1212C DC/DC/relay**
Climatic and mechanical conditions for storage and transport			
Climatic conditions for storage and transport			
• Free fall			
- max. height of fall (in packaging)	0.3 m; five times, in transport packaging	0.3 m; five times, in transport packaging	0.3 m; five times, in transport packaging
• Temperature			
- permissible temperature range	-40 °C ... +70 °C	-40 °C ... +70 °C	-40 °C ... +70 °C
• Relative humidity			
- permissible range (without condensation) at 25 °C	95%	95%	95%
Mechanical and climatic conditions in operation			
Climatic conditions in operation			
• Temperature			
- permissible temperature range	0 °C ... 55 °C horizontal mounting; 0 °C ... 45 °C vertical mounting	0 °C ... 55 °C horizontal mounting; 0 °C ... 45 °C vertical mounting	0 °C ... 55 °C horizontal mounting; 0 °C ... 45 °C vertical mounting
- permissible temperature change	5 °C ... 55 °C, 3 °C/minute	5 °C ... 55 °C, 3 °C/minute	5 °C ... 55 °C, 3 °C/minute
• Atmospheric pressure acc. to IEC 60068-2-13			
- permissible atmospheric pressure	1080 ... 795 hPa	1080 ... 795 hPa	1080 ... 795 hPa
- permissible operating altitude	-1000 m … 2000 m	-1000 m … 2000 m	-1000 m … 2000 m
• Concentration of pollutants			
- SO_2 at RH < 60% without condensation	$S0_2$: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% without condensation	$S0_2$: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% without condensation	$S0_2$: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% without condensation
Environmental requirements			
Operating temperature			
• Min.	0 °C	0 °C	0 °C
• Max.	55 °C	55 °C	55 °C
• Vertical installation, min.	0 °C	0 °C	0 °C
• Vertical installation, max.	45 °C	45 °C	45 °C
• Horizontal installation, min.	0 °C	0 °C	0 °C
• Horizontal installation, max.	55 °C	55 °C	55 °C
Storage/transport temperature			
• Min.	-40 °C	-40 °C	-40 °C
• Max.	+70 °C	+70 °C	+70 °C
Atmospheric pressure			
• Operation, min.	795 hPa	795 hPa	795 hPa
• Operation, max.	1080 hPa	1080 hPa	1080 hPa
• Storage/transport, min.	660 hPa	660 hPa	660 hPa
• Storage/transport, max.	1080 hPa	1080 hPa	1080 hPa
Relative humidity			
• Operation, max.	95%; no condensation	95%; no condensation	95%; no condensation
Vibrations			
• Vibrations	2 g (mounting in switchboard), 1 g (mounted on DIN rail)	2 g (mounting in switchboard), 1 g (mounted on DIN rail)	2 g (mounting in switchboard), 1 g (mounted on DIN rail)
• in operation, tested according to IEC 60068-2-6	Yes	Yes	Yes

Technical specifications (continued)

	6ES7 212-1BD30-0XB0	6ES7 212-1AD30-0XB0	6ES7 212-1HD30-0XB0
Product name	**CPU 1212C AC/DC/relay**	**CPU 1212C DC/DC/DC**	**CPU 1212C DC/DC/relay**
Shock test			
• Tested in accordance with IEC 60068-2-27	Yes; magnitude of shock 15 g (peak value), duration 11 ms, 6 shocks in each of the three mutually perpendicular axes	Yes; magnitude of shock 15 g (peak value), duration 11 ms, 6 shocks in each of the three mutually perpendicular axes	Yes; magnitude of shock 15 g (peak value), duration 11 ms, 6 shocks in each of the three mutually perpendicular axes
Degree of protection			
IP20	Yes	Yes	Yes
Standards, approvals, certificates			
CE mark	Yes	Yes	Yes
C-TICK	Yes	Yes	Yes
cULus	Yes	Yes	Yes
FM approval	Yes	Yes	Yes
Dimensions and weight			
Dimensions and weight			
• Width	90 mm	90 mm	90 mm
• Height	100 mm	100 mm	100 mm
• Depth	75 mm	75 mm	75 mm
Weight			
• Approx. weight	425 g	370 g	385 g

CPU 1212C

Ordering data

		Order No.
CPU 1212C		
Compact CPU, AC/DC/relay; integral program/data memory 25 KB, load memory 1 MB; wide-range power supply 85 ... 264 V AC; Boolean execution times 0.1 µs per operation; 8 digital inputs, 6 digital outputs (relays), 2 analog inputs; expandable by up to 3 communication modules, 2 signal modules and 1 signal board; digital inputs can be used as HSC at 100 kHz	C	**6ES7 212-1BD30-0XB0**
Compact CPU, DC/DC/DC; integral program/data memory 25 KB, load memory 1 MB; power supply 24 V DC; Boolean execution times 0.1 µs per operation; 8 digital inputs, 6 digital outputs (relays), 2 analog inputs; expandable by up to 3 communication modules, 2 signal modules and 1 signal board; digital inputs can be used as HSC at 100 kHz, 24 V DC digital outputs can be used as pulse outputs (PTO) or pulse-width modulated outputs (PWM) with 100 kHz	C	**6ES7 212-1AD30-0XB0**
Compact CPU, DC/DC/relay; integral program/data memory 25 KB, load memory 1 MB; power supply 24 V DC; Boolean execution times 0.1 µs per operation; 8 digital inputs, 6 digital outputs, 2 analog inputs; expandable by up to 3 communication modules, 2 signal modules and 1 signal board; digital inputs can be used as HSC at 100 kHz	C	**6ES7 212-1HD30-0XB0**

		Order No.
SB 1223 signal board 2 inputs, 24 V DC, IEC type 1 current sinking; two 24 V DC transistor outputs, 0.5 A, 5 W; can be used as HSC at up to 30 kHz	C	**6ES7 223-0BD30-0XB0**
SB 1232 signal board 1 analog output, ±10 V with 12 bit or 0 … 20 mA with 11 bit	C	**6ES7 232-4HA30-0XB0**
Simulator (optional) 8 input switches, for CPU 1211C / CPU 1212C	C	**6ES7 274-1XF30-0XA0**
SIMATIC Memory Card (optional)		
2 MB	C	**6ES7 954 -8LB00-0AA0**
24 MB	C	**6ES7 954 -8LF00-0AA0**
Starter box CPU 1212C AC/DC/relay Complete offer SIMATIC S7-1200, starter box, comprising: CPU 1212C AC/DC/relay, simulator, STEP 7 BASIC CD, manual CD, info material, in Systainer	E	**6ES7 212-1BD30-4YB0**
S7-1200 automation system, System Manual for SIMATIC S7-1200 and STEP 7 Basic		
German		**6ES7 298-8FA30-8AH0**
English		**6ES7 298-8FA30-8BH0**
STEP 7 Basic engineering software *Target system:* SIMATIC S7-1200 controllers and the associated I/O. The WinCC Basic which is included permits configuration of the SIMATIC Basic Panels *Requirement:* MS Windows XP SP3 / MS Windows Vista SP1 *Type of delivery:* German, English, with online documentation		
Single license	D	**6ES7 822-0AA00-0YA0**
STEP 7 Basic Software Update Service, 1 year	D	**6ES7 822-0AA00-0YL0**

C: Subject to export regulations: AL: N and ECCN: EAR99H
D: Subject to export regulations: AL: N and ECCN: EAR99S
E: Subject to export regulations: AL: N and ECCN: EAR99T

More information

Brochures

Information material for downloading can be found in the Internet:

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

Overview

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

Design

The compact CPU 1214C has:

- 3 device versions with different power supply and control voltages
- Integrated power supply either as wide-range AC or DC power supply (85 to 264 V AC or 24 V DC)
- Integrated 24 V encoder/load current supply:
  For direct connection of sensors and encoders. With 400 mA, the output current can also be used as load power supply
- 14 integrated digital inputs 24 V DC (current sinking/current sourcing (IEC type 1 current sinking))
- 10 integrated digital outputs, either 24 V DC or relay
- 2 integrated analog inputs 0 to 10 V
- 2 pulse outputs (PTO) with a frequency of up to 100 kHz
- Pulse-width modulated outputs (PWM) with a frequency of up to 100 kHz
- Integrated Ethernet interface (TCP/IP native, ISO-on-TCP)
- 6 fast counters (3 with max. 100 kHz; 3 with max. 30 kHz), with parameterizable enable and reset inputs, can be used simultaneously as up and down counters with 2 separate inputs or for connecting incremental encoders
- Expansion by additional communication interfaces, e.g. RS485 or RS232
- Expansion by analog or digital signals directly on the CPU via signal board (with retention of CPU mounting dimensions)
- Expansion by a wide range of analog and digital input and output signals via signal modules
- Optional memory expansion (SIMATIC Memory Card)
- PID controller with auto-tuning functionality
- Integral real-time clock
- Interrupt inputs:
  For extremely fast response to rising or falling edges of process signals
- Removable terminals on all modules
- Simulator (optional):
  For simulating the integrated inputs and for testing the user program

Device versions

Version	Supply voltage	Input voltage DI	Output voltage DO	Output current
• DC/DC/DC	24 V DC	24 V DC	24 V DC	0,5 A, Transistor
• DC/DC/relay	24 V DC	24 V DC	5 … 30 V DC / 5 … 250 V AC	2 A; 30 Watt DC / 200 Watt AC
• AC/DC/relay	85 … 264 V AC	24 V DC	5 … 30 V DC / 5 … 250 V AC	2 A; 30 Watt DC / 200 Watt AC

CPU 1214C

Function

- Comprehensive instruction set:
  A wide range of operations facilitate programming:
  - basic operations such as binary logic operations, result allocation, save, count, create times, load, transfer, compare, shift, rotate, create complement, call subprogram (with local variables)
  - integral communication commands (e.g. USS protocol, Modbus RTU, S7 communication "T-Send/T-Receive" or Freeport)
  - user-friendly functions such as pulse-width modulation, pulse sequence function, arithmetic functions, floating point arithmetic, PID closed-loop control, jump functions, loop functions and code conversions
  - mathematical functions, e.g. SIN, COS, TAN, LN, EXP
- Counting:
  User-friendly counting functions in conjunction with the integrated counters and special commands for high-speed counters open up new application areas for the user
- Interrupt processing:
  - edge-triggered interrupts (activated by rising or falling edges of process signals on interrupt inputs) support a rapid response to process events
  - time-triggered interrupts
  - counter interrupts can be triggered when a setpoint is reached or when the direction of counting changes
  - communication interrupts allow the rapid and easy exchange of information with peripheral devices such as printers or bar code readers
- Password protection
- Test and diagnostics functions:
  Easy-to-use functions support testing and diagnostics, e.g. online/offline diagnostics
- "Forcing" of inputs and outputs during testing and diagnostics:
  Inputs and outputs can be set independently of cycle and thus permanently, for example, to test the user program
- Motion Control in accordance with PLCopen for simple movements
- Library functionality

Programming

The STEP 7 Basic programming package permits complete programming of all S7-1200 controllers and the associated I/O.

Technical specifications

	6ES7 214-1BE30-0XB0	6ES7 214-1AE30-0XB0	6ES7 214-1HE30-0XB0
Product name	**CPU 1214C AC/DC/relay**	**CPU 1214C DC/DC/DC**	**CPU 1214C DC/DC/relay**
Product version			
Associated programming package	STEP 7 Basic V 10.5	STEP 7 Basic V 10.5	STEP 7 Basic V 10.5
Supply voltages			
Rated value			
• 24 V DC		Yes	Yes
• 120 V AC	Yes		
• 230 V AC	Yes		
• Lower limit of permissible range (DC)		20.4 V	20.4 V
• Upper limit of permissible range (DC)		28.8 V	28.8 V
• Lower limit of permissible range (AC)	85 V		
• Upper limit of permissible range (AC)	264 V		
• Lower limit of permissible frequency range	47 Hz		
• Upper limit of permissible frequency range	63 Hz		
Load voltage L+			
• Rated value (DC)	24 V	24 V	24 V
• Lower limit of permissible range (DC)	5 V	20.4 V	5 V
• Upper limit of permissible range (DC)	250 V	28.8 V	250 V

Technical specifications (continued)

	6ES7 214-1BE30-0XB0	6ES7 214-1AE30-0XB0	6ES7 214-1HE30-0XB0
Product name	**CPU 1214C AC/DC/relay**	**CPU 1214C DC/DC/DC**	**CPU 1214C DC/DC/relay**
Current consumption			
Current consumption (rated value)	100 mA at 120 V AC 50 mA at 240 V AC		500 mA; typically
Current consumption, max.	300 mA at 120 V AC 150 mA at 240 V AC	1,5 A; 24 V DC	1,2 A; 24 V DC
Max. starting current	20 A; at 264 V	12 A; at 28,8 V	12 A; at 28,8 V
Current output at backplane bus (5 V DC), max.	1600 mA; max. 5 V DC for SM and CM	1600 mA; max. 5 V DC for SM and CM	1600 mA; max. 5 V DC for SM and CM
Current consumption/power loss			
Power loss, typ.	14 W	12 W	12 W
Memory			
Usable memory for application data	50 kbyte	50 kbyte	50 kbyte
Work memory			
• Integrated	50 kbyte	50 kbyte	50 kbyte
• Expandable	No	No	No
Load memory			
• Integrated	2 Mbyte; load memory expandable using SIEMENS Memory Card	2 Mbyte; load memory expandable using SIEMENS Memory Card	2 Mbyte; load memory expandable using SIEMENS Memory Card
• Expandable, max.	24 Mbyte; with SIEMENS Memory Card	24 Mbyte; with SIEMENS Memory Card	24 Mbyte; with SIEMENS Memory Card
Buffering			
• Available	Yes; complete project maintenance-free in the integral EEPROM	Yes; complete project maintenance-free in the integral EEPROM	Yes; complete project maintenance-free in the integral EEPROM
• Without battery	Yes	Yes	Yes
CPU/execution times			
for bit operations, min.	0.1 µs; per operation	0.1 µs; per operation	0.1 µs; per operation
for word operations, min.	12 µs; per operation	12 µs; per operation	12 µs; per operation
for floating-point arithmetic, min.	18 µs; per operation	18 µs; per operation	18 µs; per operation
Data areas and their retentivity			
Total retentive data area (including timers, counters, bit memories), max.	2048 byte	2048 byte	2048 byte
Address range			
I/O address range			
• Total I/O address range	1024 byte for inputs/ 1024 byte for outputs	1024 byte for inputs/ 1024 byte for outputs	1024 byte for inputs/ 1024 byte for outputs
• Inputs	1024 byte	1024 byte	1024 byte
• Outputs	1024 byte	1024 byte	1024 byte
Digital channels			
• Integrated channels (DI)	14	14	14
• Integrated channels (DO)	10	10	10
Analog channels			
• Integrated channels (AI)	2	2	2

Technical specifications (continued)

	6ES7 214-1BE30-0XB0	6ES7 214-1AE30-0XB0	6ES7 214-1HE30-0XB0
Product name	**CPU 1214C AC/DC/relay**	**CPU 1214C DC/DC/DC**	**CPU 1214C DC/DC/relay**
Hardware configuration			
Number of modules per system, max.	3 communication modules, 1 signal board, 8 signal modules	3 communication modules, 1 signal board, 8 signal modules	3 communication modules, 1 signal board, 8 signal modules
Time			
Clock			
• Hardware clock (real-time clock)	Yes	Yes	Yes
• Buffered period	240 h; typically	240 h; typically	240 h; typically
• Deviation per day, max.	60 s/month at 25°C	60 s/month at 25°C	60 s/month at 25°C
Test and startup functions			
Status/control			
• Status/modify variable	Yes	Yes	Yes
• Tags	Inputs/outputs, bit memories, DBs, distributed inputs/outputs, timers, counters	Inputs/outputs, bit memories, DBs, distributed inputs/outputs, timers, counters	Inputs/outputs, bit memories, DBs, distributed inputs/outputs, timers, counters
Forcing			
• Forcing	Yes	Yes	Yes
Communications functions			
S7 communication			
• Supported	Yes	Yes	Yes
• As server	Yes	Yes	Yes
• As client	Yes	Yes	Yes
Open IE communication			
• TCP/IP	Yes	Yes	Yes
- data length, max.			
• ISO-on-TCP (RFC1006)	Yes	Yes	Yes
Number of connections			
• Total	16; dynamic	16; dynamic	16; dynamic
1st interface			
Type of interface	PROFINET	PROFINET	PROFINET
Physics	Ethernet	Ethernet	Ethernet
Isolated	Yes	Yes	Yes
Automatic determination of transfer rate	Yes	Yes	Yes
Autonegotiation	Yes	Yes	Yes
Autocrossover	Yes	Yes	Yes
CPU/programming			
Configuring software			
• STEP 7	STEP 7 Basic V 10.5	STEP 7 Basic V 10.5	STEP 7 Basic V 10.5
Programming language			
• KOP	Yes	Yes	Yes
• FUP	Yes	Yes	Yes
Cycle time monitoring			
• Configurable	Yes	Yes	Yes

Technical specifications (continued)

	6ES7 214-1BE30-0XB0	6ES7 214-1AE30-0XB0	6ES7 214-1HE30-0XB0
Product name	**CPU 1214C AC/DC/relay**	**CPU 1214C DC/DC/DC**	**CPU 1214C DC/DC/relay**
Digital inputs			
Number of digital inputs	14; integrated	14; integrated	14; integrated
• Inputs which can be used for technological functions	6; HSC (high-speed counting)	6; HSC (high-speed counting)	6; HSC (high-speed counting)
Current sourcing/sinking	Yes	Yes	Yes
Concurrently controllable inputs			
• All mounting positions			
- concurrently controllable inputs, up to 40 °C	14	14	14
Input voltage			
• Rated value, DC	24 V	24 V	24 V
• for "0" signal	5 V DC at 1 mA	5 V DC at 1 mA	5 V DC at 1 mA
• for "1" signal	15 V DC at 2.5 mA	15 V DC at 2.5 mA	15 V DC at 2.5 mA
Input current			
• for "1" signal, typ.	1 mA	1 mA	1 mA
Input delay (at rated value of input voltage)			
• for standard inputs			
- programmable	0.2, 0.4, 0.8, 1.6, 3.2, 6.4 and 12.8 ms, selectable in groups of 4	0.2, 0.4, 0.8, 1.6, 3.2, 6.4 and 12.8 ms, selectable in groups of 4	0.2, 0.4, 0.8, 1.6, 3.2, 6.4 and 12.8 ms, selectable in groups of 4
- for "0" to "1", min.	0.2 ms	0.2 ms	0.2 ms
- for "0" to "1", max.	12.8 ms	12.8 ms	12.8 ms
• for alarm inputs			
- programmable	Yes	Yes	Yes
• for counter/technological functions			
- programmable	Single-phase: 3 at 100 kHz, 3 at 30 kHz Differential: 3 at 80 kHz, 3 at 30 kHz	Single-phase: 3 at 100 kHz, 3 at 30 kHz Differential: 3 at 80 kHz, 3 at 30 kHz	Single-phase: 3 at 100 kHz, 3 at 30 kHz Differential: 3 at 80 kHz, 3 at 30 kHz
Cable length			
• Max. cable length, shielded	500 m; 50 m for technological functions	500 m; 50 m for technological functions	500 m; 50 m for technological functions
• Max. cable length, unshielded	300 m; for technological functions: No	300 m; for technological functions: No	300 m; for technological functions: No
Digital outputs			
Number of digital outputs	10; relays	10; relays	10; relays
• of those as fast outputs		2; 100 KHz pulse train output	
Short-circuit protection	No; to be provided externally	No; to be provided externally	No; to be provided externally
Voltage induced on current interruption limited to		L+ (-48 V)	
Switching capacity of outputs			
• with ohmic load, max.	2 A	0.5 A	2 A
• with lamp load, max.	30 W DC; 200 W AC	5 W	30 W DC; 200 W AC
Output voltage			
• for "1" signal, min.		20 V	
Output current			
• for "1" signal, rated value		0.5 A	
• for "0" signal, residual current, max.		0.1 mA	

Technical specifications (continued)

	6ES7 214-1BE30-0XB0	6ES7 214-1AE30-0XB0	6ES7 214-1HE30-0XB0
Product name	**CPU 1214C AC/DC/relay**	**CPU 1214C DC/DC/DC**	**CPU 1214C DC/DC/relay**
Output delay with ohmic load			
• "0" to "1", max.	10 ms; max.	1 µs	10 ms; max.
• "1" to "0", max.	10 ms; max.	5 µs	10 ms; max.
Switching frequency			
• of pulse outputs, with ohmic load, max.	1 Hz	100 kHz	1 Hz
Cable length			
• Max. cable length, shielded	500 m	500 m	500 m
• Max. cable length, unshielded	150 m	150 m	150 m
Relay outputs			
Number of relay outputs	10		10
Number of operating cycles	Mechanically 10 million, with rated load voltage 100000		Mechanically 10 million, with rated load voltage 100000
Analog inputs			
Number of analog inputs	2	2	2
Max. cable length, shielded	10 m; twisted and shielded	10 m; twisted and shielded	10 m; twisted and shielded
Input ranges			
• Voltage	Yes	Yes	Yes
Input ranges (rated values), voltages			
• 0 … +10 V	Yes	Yes	Yes
• Input resistance (0 … 10 V)	≥100 kOhm	≥100 kOhm	≥100 kOhm
Analog value generation			
Integration and conversion time/resolution per channel			
• Resolution with overrange (bits including sign), max.	10 bit	10 bit	10 bit
• Integration time can be parameterized	Yes	Yes	Yes
• Conversion time (per channel)	625 µs	625 µs	625 µs
Analog value generation (in isochronous mode)			
Cable length			
• Max. cable length, shielded	10 m; twisted	10 m; twisted	10 m; twisted
Encoder supply			
24 V encoder supply			
• 24 V	Permissible range: 20.4 … 28.8 V	Permissible range: 20.4 … 28.8 V	Permissible range: 20.4 … 28.8 V
Encoders			
Connectable encoders			
• 2-wire BEROs	Yes	Yes	Yes

Technical specifications (continued)

	6ES7 214-1BE30-0XB0	6ES7 214-1AE30-0XB0	6ES7 214-1HE30-0XB0
Product name	**CPU 1214C AC/DC/relay**	**CPU 1214C DC/DC/DC**	**CPU 1214C DC/DC/relay**
Integrated functions			
Number of counters	6	6	6
Max. counter frequency	100 kHz	100 kHz	100 kHz
Frequency meters	Yes	Yes	Yes
Controlled positioning	Yes	Yes	Yes
PID controllers	Yes	Yes	Yes
Number of alarm inputs	4	4	4
Number of pulse outputs		2	
Limit frequency (pulse)		100 kHz	
Operator control and monitoring			
Display			
• Integrated	No	No	No
Galvanic isolation			
Galvanic isolation of digital inputs			
• Galvanic isolation of digital inputs	500 V AC for 1 minute	500 V AC for 1 minute	500 V AC for 1 minute
• Between the channels, in groups of	1	1	1
Isolation of digital outputs			
• Isolation of digital outputs	Relays	Yes	Relays
• Between the channels	No	No	No
• Between the channels, in groups of	2	2	1
Permissible potential difference			
Between different circuits	500 V DC between 24 V DC and 5 V DC	500 V DC between 24 V DC and 5 V DC	500 V DC between 24 V DC and 5 V DC
EMC			
Immunity to static discharge			
• Immunity to static discharge in accordance with IEC 61000-4-2	Yes	Yes	Yes
- test voltage with air discharge	8 kV	8 kV	8 kV
- test voltage with contact discharge	6 kV	6 kV	6 kV
Immunity to conducted interference			
• on the supply lines in accordance with IEC 61000-4-4	Yes	Yes	Yes
• Immunity on supply lines in accordance with IEC 61000-4-4	Yes	Yes	Yes
Immunity to surge voltages			
• on the supply lines in accordance with IEC 61000-4-5	Yes	Yes	Yes
Immunity to conducted interference, induced by high-frequency fields			
• Immunity to high-frequency irradiation in accordance with IEC 61000-4-6	Yes	Yes	Yes
Emission of radio interference in accordance with EN 55 011			
• Emission of radio interference in accordance with EN 55 011 (limit class A)	Yes; Group 1	Yes; Group 1	Yes; Group 1

Technical specifications (continued)

	6ES7 214-1BE30-0XB0	6ES7 214-1AE30-0XB0	6ES7 214-1HE30-0XB0
Product name	**CPU 1214C AC/DC/relay**	**CPU 1214C DC/DC/DC**	**CPU 1214C DC/DC/relay**
Climatic and mechanical conditions for storage and transport			
Climatic conditions for storage and transport			
• Free fall			
- max. height of fall (in packaging)	0.3 m; five times, in transport packaging	0.3 m; five times, in transport packaging	0.3 m; five times, in transport packaging
• Temperature			
- permissible temperature range	-40° C ... +70° C	-40° C ... +70° C	-40° C ... +70° C
• Relative humidity			
- permissible range (without condensation) at 25 °C	95%	95%	95%
Mechanical and climatic conditions in operation			
Climatic conditions in operation			
• Temperature			
- permissible temperature range	0° C ... 55° C horizontal mounting; 0° C .. 45° C vertical mounting	0° C ... 55° C horizontal mounting; 0° C .. 45° C vertical mounting	0° C ... 55° C horizontal mounting; 0° C .. 45° C vertical mounting
- permissible temperature change	5° C ... 55°, 3 °C/min	5° C ... 55°, 3 °C/min	5° C ... 55°, 3 °C/min
• Atmospheric pressure acc. to IEC 60068-2-13			
- permissible atmospheric pressure	1080 ... 795 hPa	1080 ... 795 hPa	1080 ... 795 hPa
- permissible operating altitude	-1000 m … 2000 m	-1000 m … 2000 m	-1000 m … 2000 m
• Concentration of pollutants			
- SO_2 at RH < 60% without condensation	$S0_2$: < 0.5 ppm; H_2S: < 0.1 ppm; RH < 60% without condensation	$S0_2$: < 0.5 ppm; H_2S: < 0.1 ppm; RH < 60% without condensation	$S0_2$: < 0.5 ppm; H_2S: < 0.1 ppm; RH < 60% without condensation
Environmental requirements			
Operating temperature			
• Min.	0 °C	0 °C	0 °C
• Max.	55 °C	55 °C	55 °C
• Vertical installation, min.	0 °C	0 °C	0 °C
• Vertical installation, max.	45 °C	45 °C	45 °C
• Horizontal installation, min.	0 °C	0 °C	0 °C
• Horizontal installation, max.	55 °C	55 °C	55 °C
Storage/transport temperature			
• Min.	-40 °C	-40 °C	-40 °C
• Max.	70 °C	+70 °C	70 °C
Atmospheric pressure			
• Operation, min.	795 hPa	795 hPa	795 hPa
• Operation, max.	1080 hPa	1080 hPa	1080 hPa
• Storage/transport, min.	660 hPa	660 hPa	660 hPa
• Storage/transport, max.	1080 hPa	1080 hPa	1080 hPa
Relative humidity			
• Operation, max.	95 %; no condensation	95 %; no condensation	95 %; no condensation
Vibrations			
• Vibrations	2 g (mounting in switchboard), 1 g (mounted on DIN rail)	2 g (mounting in switchboard), 1 g (mounted on DIN rail)	2 g (mounting in switchboard), 1 g (mounted on DIN rail)
• In operation, tested according to IEC 60068-2-6	Yes	Yes	Yes

Technical specifications (continued)

	6ES7 214-1BE30-0XB0	6ES7 214-1AE30-0XB0	6ES7 214-1HE30-0XB0
Product name	**CPU 1214C AC/DC/relay**	**CPU 1214C DC/DC/DC**	**CPU 1214C DC/DC/relay**
Shock test			
• Tested in accordance with IEC 60068-2-27	Yes; magnitude of shock 15 g (peak value), duration 11 ms, 6 shocks in each of the three mutually perpendicular axes	Yes; magnitude of shock 15 g (peak value), duration 11 ms, 6 shocks in each of the three mutually perpendicular axes	Yes; magnitude of shock 15 g (peak value), duration 11 ms, 6 shocks in each of the three mutually perpendicular axes
Degree of protection			
IP20	Yes	Yes	Yes
Standards, approvals, certificates			
CE mark	Yes	Yes	Yes
C-TICK	Yes	Yes	Yes
cULus	Yes	Yes	Yes
FM approval	Yes	Yes	Yes
Dimensions and weight			
Dimensions and weight			
• Width	110 mm	110 mm	110 mm
• Height	100 mm	100 mm	100 mm
• Depth	75 mm	75 mm	75 mm
Weight			
• Approx. weight	455 g	415 g	435 g

CPU 1214C

Ordering data

		Order No.
CPU 1214C		
Compact CPU, AC/DC/relay; integral program/data memory 50 KB, load memory 2 MB; wide-range power supply 85 ... 264 V AC; Boolean execution times 0.1 µs per operation; 14 digital inputs, 10 digital outputs (relays), 2 analog inputs; expandable by up to 3 communication modules, 8 signal modules and 1 signal board; digital inputs can be used as HSC at 100 kHz	C	**6ES7 214-1BE30-0XB0**
Compact CPU, DC/DC/DC; integral program/data memory 50 KB, load memory 2 MB; power supply 24 V DC; Boolean execution times 0.1 µs per operation; 14 digital inputs, 10 digital outputs (relays), 2 analog inputs; expandable by up to 3 communication modules, 8 signal modules and 1 signal board; digital inputs can be used as HSC at 100 kHz, 24 V DC digital outputs can be used as pulse outputs (PTO) or pulse-width modulated outputs (PWM) with 100 kHz	C	**6ES7 214-1AE30-0XB0**
Compact CPU, DC/DC/relay; integral program/data memory 50 KB, load memory 2 MB; power supply 24 V DC; Boolean execution times 0.1 µs per operation; 14 digital inputs, 10 digital outputs, 2 analog inputs; expandable by up to 3 communication modules, 8 signal modules and 1 signal board; digital inputs can be used as HSC at 100 kHz	C	**6ES7 214-1HE30-0XB0**
SB 1223 signal board 2 inputs, 24 V DC, IEC type 1 current sinking; two 24 V DC transistor outputs, 0.5 A, 5 W; can be used as HSC at up to 30 kHz	C	**6ES7 223-0BD30-0XB0**
SB 1232 signal board 1 analog output, ±10 V with 12 bit or 0 … 20 mA with 11 bit	C	**6ES7 232-4HA30-0XB0**
Simulator (optional) 14 input switches, for CPU 1214C	C	**6ES7 274-1XH30-0XA0**
SIMATIC Memory Card (optional)		
2 MB	C	**6ES7 954-8LB00-0AA0**
24 MB	C	**6ES7 954-8LF00-0AA0**
S7-1200 automation system, System Manual for SIMATIC S7-1200 and STEP 7 Basic		
German		**6ES7 298-8FA30-8AH0**
English		**6ES7 298-8FA30-8BH0**
STEP 7 Basic engineering software *Target system:* SIMATIC S7-1200 controllers and the associated I/O. The WinCC Basic which is included permits configuration of the SIMATIC Basic Panels *Requirement:* MS Windows XP SP3 / MS Windows Vista SP1 *Type of delivery:* German, English, with online documentation		
Single license	D	**6ES7 822-0AA00-0YA0**
STEP 7 Basic Software Update Service, 1 year	D	**6ES7 822-0AA00-0YL0**

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

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

More information

Brochures

Information material for downloading can be found in the Internet:

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

Overview

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

Application

Digital input modules allow the connection of the controller to digital signals of the process.

This provides users with the following advantages:

- Optimum adaptation:
  With signal modules which can be mixed as desired, users can adapt their controllers exactly to the relevant task. This avoids superfluous investments. Modules with 8, 16 and 32 input/output channels are available.
- Flexibility:
  If the task is expanded subsequently, the controller can be upgraded. Updating of the user program is extremely simple.

Function

The SM 1221 digital input signal modules convert the level of the external digital signals from the process into the internal signal level of the S7-1200.

Technical specifications

	6ES7 221-1BF30-0XB0	6ES7 221-1BH30-0XB0
Product name	**SM 1221 DI 8 x 24 V DC**	**SM 1221 DI 16 x 24 V DC**
Supply voltages		
Rated value		
• 24 V DC	Yes	Yes
• Upper limit of permissible range (DC)	28.8 V	28.8 V
Transmitter power supply		
• Available	Yes	Yes
Current consumption		
from 5 V DC backplane bus, max.	105 mA	130 mA
Digital inputs		
• from load voltage L+ (no load), max.	4 mA; per channel	4 mA; per channel
Current consumption/power loss		
Power loss, typ.	1.5 W	2.5 W
Connection system		
Required front connector	Yes	Yes
Digital inputs		
Number of digital inputs	8	16
• in groups of	2	4
Concurrently controllable inputs		
• All mounting positions		
- concurrently controllable inputs, up to 40 °C	8	16
• Horizontal mounting position		
- up to 40 °C	8	16
- up to 50 °C	8	16

Technical specifications (continued)

	6ES7 221-1BF30-0XB0	6ES7 221-1BH30-0XB0
Product name	**SM 1221 DI 8 x 24 V DC**	**SM 1221 DI 16 x 24 V DC**
Concurrently controllable inputs (continued)		
• Vertical mounting position		
- up to 40 °C	8	16
Input characteristic according to IEC 1131, Type 1	Yes	Yes
Input voltage		
• Rated value, DC	24 V	24 V
• for "0" signal	5 V DC at 1 mA	5 V DC at 1 mA
• for "1" signal	15 V DC at 2.5 mA	15 V DC at 2.5 mA
Input current		
• for "0" signal, max. (permissible quiescent current)	1 mA	1 mA
• for "1" signal, min.	2.5 mA	2.5 mA
• for "1" signal, typ.	4 mA; typically	4 mA; typically
Input delay (at rated value of input voltage)		
• for standard inputs		
- programmable	Yes; 0.2, 0.4, 0.8, 1.6, 3.2, 6.4 and 12.8 ms, selectable in groups of 4	Yes; 0.2, 0.4, 0.8, 1.6, 3.2, 6.4 and 12.8 ms, selectable in groups of 4
• for alarm inputs		
- programmable	Yes	Yes
Cable length		
• Max. cable length, shielded	500 m	500 m
• Max. cable length, unshielded	300 m	300 m
Interrupts/diagnostics/status information		
Interrupts		
• Interrupts	Yes	Yes
• Diagnostic interrupt	Yes	Yes
Diagnostics		
• Diagnostic functions	Yes	Yes
• Monitoring of the supply voltage of the electronics	Yes	Yes
Diagnostics LEDs		
• for status of inputs	Yes	Yes
• for maintenance	Yes	Yes
• Digital input status indicator (green)	Yes	Yes
Galvanic isolation		
Galvanic isolation of digital inputs		
• between the channels, in groups of	2	4
Climatic and mechanical conditions for storage and transport		
Climatic conditions for storage and transport		
• Free fall		
- max. height of fall (in packaging)	0.3 m; five times, in transport packaging	0.3 m; five times, in transport packaging
• Temperature		
- permissible temperature range	-40° C ... +70° C	-40° C ... +70° C
• Atmospheric pressure acc. to IEC 60068-2-13		
- permissible atmospheric pressure	1080 ... 660hPa	1080 ... 660hPa
• Relative humidity		
- permissible range (without condensation) at 25 °C	95%	95%

Technical specifications (continued)

	6ES7 221-1BF30-0XB0	6ES7 221-1BH30-0XB0
Product name	**SM 1221 DI 8 x 24 V DC**	**SM 1221 DI 16 x 24 V DC**
Mechanical and climatic conditions in operation		
Climatic conditions in operation		
• Temperature		
- permissible temperature range	0° C ... 55° C horizontal mounting 0° C ... 45° C vertical mounting	0° C ... 55° C horizontal mounting 0° C ... 45° C vertical mounting
- permissible temperature change	5° C ... 55°, 3 °C/min	5° C ... 55°, 3 °C/min
Degree of protection		
IP20	Yes	Yes
Standards, approvals, certificates		
CE mark	Yes	Yes
C-TICK	Yes	Yes
FM approval	Yes	Yes
Mechanical system		
Enclosure type (front)		
• Plastic	Yes	Yes
Dimensions and weight		
Dimensions and weight		
• Width	45 mm	45 mm
• Height	100 mm	100 mm
• Depth	75 mm	75 mm
Weight		
• Approx. weight	170 g	210 g

Ordering data

		Order No.
SM 1221 digital input signal module		
8 inputs, 24 V DC, isolated, current sourcing/sinking	C	**6ES7 221-1BF30-0XB0**
16 inputs, 24 V DC, isolated, current sourcing/sinking	C	**6ES7 221-1BH30-0XB0**
S7-1200 automation system, System Manual		
for SIMATIC S7-1200 and STEP 7 Basic		
German		**6ES7 298-8FA30-8AH0**
English		**6ES7 298-8FA30-8BH0**
STEP 7 Basic engineering software		
Target system: SIMATIC S7-1200 controllers and the associated I/O. The WinCC Basic which is included permits configuration of the SIMATIC Basic Panels *Requirement:* MS Windows XP SP3 / MS Windows Vista SP1 *Type of delivery:* German, English, with online documentation		
Single license	D	**6ES7 822-0AA00-0YA0**
STEP 7 Basic Software Update Service, 1 year	D	**6ES7 822-0AA00-0YL0**

C: Subject to export regulations: AL: N and ECCN: EAR99H
D: Subject to export regulations: AL: N and ECCN: EAR99S

More information

Brochures

Information material for downloading can be found in the Internet:

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

SM 1222 digital output module

Overview

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

Application

Digital output modules permit the output of digital signals from the controller to the process.

This provides users with the following advantages:

- Optimum adaptation:
  With signal modules which can be mixed as desired, users can adapt their controllers exactly to the relevant task. This avoids superfluous investments. Modules with 8, 16 and 32 input/output channels are available.
- Flexibility:
  If the task is expanded subsequently, the controller can be upgraded. Updating of the user program is extremely simple.

Function

The SM 1222 digital output signal modules convert the internal signal level of the SIMATIC S7-1200 into the external signal level required by the process.

Technical specifications

	6ES7 222-1BF30-0XB0	6ES7 222-1BH30-0XB0	6ES7 222-1HF30-0XB0	6ES7 222-1HH30-0XB0
Product name	**SM 1222 DQ 8 x 24 V DC**	**SM 1222 DQ 16 x 24 V DC**	**SM 1222 DQ 8 x relay**	**SM1222 DQ 16 x relay**
Current consumption				
from 5 V DC backplane bus, max.	120 mA	140 mA	120 mA	135 mA
Digital inputs				
• from load voltage L+ (no load), max.			11 mA / for relay coil	11 mA / for relay coil
Current consumption/ power loss				
Power loss, typ.	1.5 W	2.5 W	4.5 W	8.5 W
Connection system				
Required front connector	Yes	Yes	Yes	Yes
Digital outputs				
Number of digital outputs	8	16	8	16
• in groups of	1	1	2	1
Short-circuit protection	No; to be provided externally	No; to be provided externally	No; to be provided externally	No; to be provided externally
Voltage induced on current interruption limited to	Typ. (L+) -48 V	Typ. (L+) -48 V		
Switching capacity of outputs				
• with ohmic load, max.	0.5 A	0.5 A	2 A	2 A
• with lamp load, max.	5 W	5 W	30 W DC; 200 W AC	30 W DC; 200 W AC
Output voltage				
• Rated value (AC)				5 … 250 V AC
• Rated value (DC)	24 V	24 V	5 … 250 V AC	5 … 30 V DC
• for "0" signal (DC), max.	0.1 V; at 10 kOhm	0.1 V; at 10 kOhm	5 ... 30 V DC	
• for "1" signal, min.	20 V DC	20 V DC		

Technical specifications (continued)

	6ES7 222-1BF30-0XB0	6ES7 222-1BH30-0XB0	6ES7 222-1HF30-0XB0	6ES7 222-1HH30-0XB0
Product name	**SM 1222 DQ 8 x 24 V DC**	**SM 1222 DQ 16 x 24 V DC**	**SM 1222 DQ 8 x relay**	**SM1222 DQ 16 x relay**
Output current				
• for "1" signal, rated value	0.5 A	0.5 A	2 A	2 A
• for "0" signal, residual current, max.	10 µA	10 µA		
Output delay with ohmic load				
• "0" to "1", max.	50 µs	50 µs	10 ms	10 ms
• "1" to "0", max.	200 µs	200 µs	10 ms	10 ms
Aggregate current of outputs (per group)				
• Horizontal mounting position				
- up to 50 °C	4 A; current per ground	8 A; current per ground	10 A; current per ground	10 A; current per ground
Cable length				
• Max. cable length, shielded	500 m	500 m	500 m	500 m
• Max. cable length, unshielded	150 m	150 m	150 m	150 m
Relay outputs				
Number of relay outputs			8	16
Rated power supply L+ to the relays (DC)			24 V	24 V
Number of operating cycles			Mechanically 10 million, with rated load voltage 100000	Mechanically 10 million, with rated load voltage 100000
Switching capacity of contacts				
• with inductive load, max.	0.5 A	0.5 A	2 A	2 A
• with lamp load, max.	5 W	5 W	30 W DC; 200 W AC	30 W DC; 200 W AC
• with ohmic load, max.	0.5 A	0.5 A	2 A	2 A
Interrupts/diagnostics/ status information				
Interrupts				
• Interrupts	Yes	Yes	Yes	Yes
• Diagnostic interrupt	Yes	Yes	Yes	Yes
Diagnostics				
• Diagnostic functions	Yes	Yes	Yes	Yes
• Monitoring of the supply voltage of the electronics	Yes	Yes	Yes	Yes
Diagnostics LEDs				
• for status of the outputs	Yes	Yes	Yes	Yes
• for maintenance	Yes	Yes	Yes	Yes
• Digital output status indicator (green)	Yes	Yes	Yes	Yes
Galvanic isolation				
Isolation of digital outputs				
• between the channels			Relay, dry contact	Relay, dry contact
• between the channels, in groups of	1	1	2	4
• between channels and the backplane bus	500 V AC	500 V AC	1500 V AC for 1 minute	1500 V AC for 1 minute

Technical specifications (continued)

	6ES7 222-1BF30-0XB0	6ES7 222-1BH30-0XB0	6ES7 222-1HF30-0XB0	6ES7 222-1HH30-0XB0
Product name	**SM 1222 DQ 8 x 24 V DC**	**SM 1222 DQ 16 x 24 V DC**	**SM 1222 DQ 8 x relay**	**SM1222 DQ 16 x relay**
Permissible potential difference				
Between different circuits			750 V AC for 1 minute	750 V AC for 1 minute
Climatic and mechanical conditions for storage and transport				
Climatic conditions for storage and transport				
• Free fall				
- max. height of fall (in packaging)	0.3 m; five times, in transport packaging	0.3 m; five times, in transport packaging	0.3 m; five times, in transport packaging	0.3 m; five times, in transport packaging
• Temperature				
- permissible temperature range	-40° C ... +70° C	-40° C ... +70° C	-40° C ... +70° C	-40° C ... +70° C
• Atmospheric pressure acc. to IEC 60068-2-13				
- permissible atmospheric pressure	1080 ... 660 hPa	1080 ... 660 hPa	1080 ... 660 hPa	1080 ... 660 hPa
• Relative humidity				
- permissible range (without condensation) at 25 °C	95%	95%	95%	95%
Mechanical and climatic conditions in operation				
Climatic conditions in operation				
• Temperature				
- permissible temperature range	0° C ... 55° C (horizontal mounting) 0° C ... 45° C (vertical mounting)	0° C ... 55° C (horizontal mounting) 0° C ... 45° C (vertical mounting)	0° C ... 55° C (horizontal mounting) 0° C ... 45° C (vertical mounting)	0° C ... 55° C (horizontal mounting) 0° C ... 45° C (vertical mounting)
- permissible temperature change	5° C ... 55°, 3 °C/min	5° C ... 55°, 3 °C/min	5° C ... 55°, 3 °C/min	5° C ... 55°, 3 °C/min
Degree of protection				
IP20	Yes	Yes	Yes	Yes
Standards, approvals, certificates				
CE mark	Yes	Yes	Yes	Yes
C-TICK	Yes	Yes	Yes	Yes
FM approval	Yes	Yes	Yes	Yes
Mechanical system				
Enclosure type (front)				
• Plastic	Yes	Yes	Yes	Yes
Dimensions and weight				
Dimensions and weight				
• Width	45 mm	45 mm	45 mm	45 mm
• Height	100 mm	100 mm	100 mm	100 mm
• Depth	75 mm	75 mm	75 mm	75 mm
Weight				
• Approx. weight	180 g	220 g	190 g	260 g

Ordering data

		Order No.
SM 1222 digital output signal module		
8 outputs, 24 V DC; 0.5 A, 5 W, isolated	C	**6ES7 222-1BF30-0XB0**
16 outputs, 24 V DC; 0.5 A, 5 W, isolated	C	**6ES7 222-1BH30-0XB0**
8 relay outputs, 5 ... 30 V DC/5 ... 250 V AC, 2 A, 30 W DC/200 W AC	C	**6ES7 222-1HF30-0XB0**
16 relay outputs, 5 ... 30 V DC/5 ... 250 V AC, 2 A, 30 W DC/200 W AC	C	**6ES7 222-1HH30-0XB0**
S7-1200 automation system, System Manual		
for SIMATIC S7-1200 and STEP 7 Basic		
German		**6ES7 298-8FA30-8AH0**
English		**6ES7 298-8FA30-8BH0**
STEP 7 Basic engineering software		
Target system: SIMATIC S7-1200 controllers and the associated I/O. The WinCC Basic which is included permits configuration of the SIMATIC Basic Panels *Requirement:* MS Windows XP SP3 / MS Windows Vista SP1 *Type of delivery:* German, English, with online documentation		
Single license	D	**6ES7 822-0AA00-0YA0**
STEP 7 Basic Software Update Service, 1 year	D	**6ES7 822-0AA00-0YL0**

C: Subject to export regulations: AL: N and ECCN: EAR99H
D: Subject to export regulations: AL: N and ECCN: EAR99S

More information

Brochures

Information material for downloading can be found in the Internet:

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

2

SM 1223 digital input/output module

Overview

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

Application

Digital input/output modules permit:

- Connection of the controller to digital signals of the process
- Output of digital signals from the controller to the process

This provides users with the following advantages:

- Optimum adaptation:
  With signal modules which can be mixed as desired, users can adapt their controllers exactly to the relevant task. This avoids superfluous investments. Modules with 8, 16, and 32 input/output channels are available.
- Flexibility:
  If the task is expanded subsequently, the controller can be upgraded. Updating of the user program is extremely simple

Function

The SM 1223 digital input/output signal modules convert

- the level of the external digital signals from the process into the internal signal level of the S7-1200 and
- the internal signal level of the S7-1200 into the external signal level required by the process.

Technical specifications

	6ES7 223-1BH30-0XB0	6ES7 223-1BL30-0XB0	6ES7 223-1PH30-0XB0	6ES7 223-1PL30-0XB0
Product name	**SM 1223 DI 8 x 24 V DC, DQ 8 x 24 V DC**	**SM 1223 DI 16 x 24 V DC, DQ 16 x 24 V DC**	**SM 1223 DI 8 x 24 V DC, DQ 8 x relay**	**SM 1223 DI 16 x 24 V DC, DQ 16 x relay**
Supply voltages				
Rated value				
• 24 V DC	Yes	Yes	Yes	Yes
• Upper limit of permissible range (DC)	28.8 V	28.8 V	28.8 V	28.8 V
Transmitter power supply				
• Available	Yes	Yes	Yes	Yes
Current consumption				
from 5 V DC backplane bus, max.	145 mA	185 mA	145 mA	180 mA
Digital inputs				
• from load voltage L+ (no load), max.	4 mA; per channel	4 mA; per channel	4 mA / input 11 mA / relay	4 mA / input 11 mA / relay
Current consumption/ power loss				
Power loss, typ.	2.5 W	4.5 W	5.5 W	10 W
Connection system				
Required front connector	Yes	Yes	Yes	Yes
Digital inputs				
Number of digital inputs	8	16	8	16
• In groups of	2	2	2	2

Technical specifications (continued)

	6ES7 223-1BH30-0XB0	6ES7 223-1BL30-0XB0	6ES7 223-1PH30-0XB0	6ES7 223-1PL30-0XB0
Product name	**SM 1223 DI 8 x 24 V DC, DQ 8 x 24 V DC**	**SM 1223 DI 16 x 24 V DC, DQ 16 x 24 V DC**	**SM 1223 DI 8 x 24 V DC, DQ 8 x relay**	**SM 1223 DI 16 x 24 V DC, DQ 16 x relay**
Concurrently controllable inputs				
• All mounting positions				
- concurrently controllable inputs, up to 40 °C	8	16	8	16
• Horizontal mounting position				
- up to 40 °C	8	16	8	16
- up to 50 °C	8	16	8	16
• Vertical mounting position				
- up to 40 °C	8	16	8	16
Input characteristic acc. to IEC 1131, Type 1	Yes	Yes	Yes	Yes
Input voltage				
• Rated value, DC	24 V	24 V	24 V	24 V
• For "0" signal	5 V DC at 1 mA	5 V DC at 1 mA	5 V DC at 1 mA	5 V DC at 1 mA
• For "1" signal	15 V DC at 2,5 mA	15 V DC at 2,5 mA	15 V DC at 2,5 mA	15 V DC at 2,5 mA
Input current				
• for "0" signal, max. (permissible quiescent current)	1 mA	1 mA	1 mA	1 mA
• for "1" signal, min.	2.5 mA	2.5 mA	2.5 mA	2.5 mA
• for "1" signal, typ.	4 mA; typically	4 mA; typically	4 mA; typically	4 mA; typically
Input delay (at rated value of input voltage)				
• for standard inputs				
- programmable	Yes; 0.2, 0.4, 0.8, 1.6, 3.2, 6.4 and 12.8 ms, selectable in groups of 4	Yes; 0.2, 0.4, 0.8, 1.6, 3.2, 6.4 and 12.8 ms, selectable in groups of 4	Yes; 0.2, 0.4, 0.8, 1.6, 3.2, 6.4 and 12.8 ms, selectable in groups of 4	Yes; 0.2, 0.4, 0.8, 1.6, 3.2, 6.4 and 12.8 ms, selectable in groups of 4
• For alarm inputs				
- programmable	Yes	Yes	Yes	Yes
Cable length				
• Max. cable length, shielded	500 m	500 m	500 m	500 m
• Max. cable length, unshielded	300 m	300 m	300 m	300 m
Digital outputs				
Number of digital outputs	8	16	8	16
• in groups of	1	1	2	4
Short-circuit protection	No; to be provided externally	No; to be provided externally	No; to be provided externally	No; to be provided externally
Voltage induced on current interruption limited to	L+ (-48 V)	L+ (-48 V)		
Switching capacity of outputs				
• with ohmic load, max.	0.5 A	0.5 A	2 A	2 A
• with lamp load, max.	5 W	5 W	30 W DC; 200 W AC	30 W DC; 200 W AC
Output voltage				
• Rated value (AC)				5 … 250 V AC
• Rated value (DC)	24 V	24 V	5 … 250 V AC	5 … 30 V DC
• for "0" signal (DC), max.	0.1 V; with 10 kOhm load	0.1 V; with 10 kOhm load	5 ... 30 V DC	
• for "1" signal, min.	20 V DC	20 V DC		

Technical specifications (continued)

	6ES7 223-1BH30-0XB0	6ES7 223-1BL30-0XB0	6ES7 223-1PH30-0XB0	6ES7 223-1PL30-0XB0
Product name	**SM 1223 DI 8 x 24 V DC, DQ 8 x 24 V DC**	**SM 1223 DI 16 x 24 V DC, DQ 16 x 24 V DC**	**SM 1223 DI 8 x 24 V DC, DQ 8 x relay**	**SM 1223 DI 16 x 24 V DC, DQ 16 x relay**
Output current				
• Max. permissible range for signal "1"	0.5 A	0.5 A	2 A	2 A
• for "0" signal, residual current, max.	10 µA	10 µA		
Output delay with ohmic load				
• "0" to "1", max.	50 µs	50 µs	10 ms	10 ms
• "1" to "0", max.	200 µs	200 µs	10 ms	10 ms
Aggregate current of outputs (per group)				
• Horizontal mounting position				
- up to 50 °C	4 A; current per ground	8 A; current per ground	10 A; current per ground	8 A; current per ground
Cable length				
• Max. cable length, shielded	500 m	500 m	500 m	500 m
• Max. cable length, unshielded	150 m	150 m	150 m	150 m
Relay outputs				
Number of relay outputs			8	16
Rated power supply L+ to the relays (DC)			24 V	24 V
Number of operating cycles			Mechanically 10 million, with rated load voltage 100000	Mechanically 10 million, with rated load voltage 100000
Switching capacity of contacts				
• with inductive load, max.	0.5 A	0.5 A	2 A	2 A
• with lamp load, max.	5 W	5 W	30 W DC; 200 W AC	30 W DC; 200 W AC
• with ohmic load, max.	0.5 A	0.5 A	2 A	2 A
Interrupts/diagnostics/ status information				
Interrupts				
• Interrupts	Yes	Yes	Yes	Yes
• Diagnostic interrupt	Yes	Yes	Yes	Yes
Diagnostics				
• Diagnostic functions	Yes	Yes	Yes	Yes
• Monitoring of the supply voltage of the electronics	Yes	Yes	Yes	Yes
Diagnostics LEDs				
• for status of inputs	Yes	Yes	Yes	Yes
• for status of the outputs	Yes	Yes	Yes	Yes
• for maintenance	Yes	Yes	Yes	Yes
• Digital output status indicator (green)	Yes	Yes	Yes	Yes
• Digital input status indicator (green)	Yes	Yes	Yes	Yes
Galvanic isolation				
Galvanic isolation of digital inputs				
• between the channels, in groups of	2	2	2	2

Technical specifications (continued)

	6ES7 223-1BH30-0XB0	6ES7 223-1BL30-0XB0	6ES7 223-1PH30-0XB0	6ES7 223-1PL30-0XB0
Product name	**SM 1223 DI 8 x 24 V DC, DQ 8 x 24 V DC**	**SM 1223 DI 16 x 24 V DC, DQ 16 x 24 V DC**	**SM 1223 DI 8 x 24 V DC, DQ 8 x relay**	**SM 1223 DI 16 x 24 V DC, DQ 16 x relay**
Isolation of digital outputs				
• between the channels			Relays	Relays
• between the channels, in groups of	1	1	2	4
• between channels and the backplane bus	500 V AC	500 V AC	1500 V AC for 1 minute	1500 V AC for 1 minute
Permissible potential difference				
Between different circuits			750 V AC for 1 minute	750 V AC for 1 minute
Climatic and mechanical conditions for storage and transport				
Climatic conditions for storage and transport				
• Free fall				
- max. height of fall (in packaging)	0.3 m; five times, in transport packaging	0.3 m; five times, in transport packaging	0.3 m; five times, in transport packaging	0.3 m; five times, in transport packaging
• Temperature				
- permissible temperature range	-40° C ... +70° C	-40° C ... +70° C	-40° C ... +70° C	-40° C ... +70° C
• Atmospheric pressure acc. to IEC 60068-2-13				
- permissible atmospheric pressure	1080 ... 660hPa	1080 ... 660hPa	1080 ... 660hPa	1080 ... 660hPa
• Relative humidity				
- permissible range (without condensation) at 25 °C	95%	95%	95%	95%
Mechanical and climatic conditions in operation				
Climatic conditions in operation				
• Temperature				
- permissible temperature range	0° C ... 55° C horizontal mounting 0° C ... 45° C vertical mounting	0° C ... 55° C horizontal mounting 0° C ... 45° C vertical mounting	0° C ... 55° C horizontal mounting 0° C ... 45° C vertical mounting	0° C ... 55° C horizontal mounting 0° C ... 45° C vertical mounting
- permissible temperature change	5° C ... 55°, 3 °C/min	5° C ... 55°, 3 °C/min	5° C ... 55°, 3 °C/min	5° C ... 55°, 3 °C/min
Degree of protection				
IP20	Yes	Yes	Yes	Yes
Standards, approvals, certificates				
CE mark	Yes	Yes	Yes	Yes
C-TICK	Yes	Yes	Yes	Yes
FM approval	Yes	Yes	Yes	Yes
Mechanical system				
Enclosure type (front)				
• Plastic	Yes	Yes	Yes	Yes
• Approx. weight	210 g	310 g	230 g	350 g

SM 1223 digital input/output module

Technical specifications (continued)

	6ES7 223-1BH30-0XB0	6ES7 223-1BL30-0XB0	6ES7 223-1PH30-0XB0	6ES7 223-1PL30-0XB0
Product name	**SM 1223 DI 8 x 24 V DC, DQ 8 x 24 V DC**	**SM 1223 DI 16 x 24 V DC, DQ 16 x 24 V DC**	**SM 1223 DI 8 x 24 V DC, DQ 8 x relay**	**SM 1223 DI 16 x 24 V DC, DQ 16 x relay**
Dimensions and weight				
Dimensions and weight				
• Width	45 mm	70 mm	45 mm	70 mm
• Height	100 mm	100 mm	100 mm	100 mm
• Depth	75 mm	75 mm	75 mm	75 mm
Weight				
• Approx. weight	210 g	310 g	230 g	350 g

Ordering data

		Order No.
SM 1223 digital input/output signal module		
8 inputs, 24 V DC, IEC type 1 current sinking; eight 24 V DC transistor outputs, 0.5 A, 5 W	C	**6ES7 223-1BH30-0XB0**
16 inputs, 24 V DC, IEC type 1 current sinking; sixteen 24 V DC transistor outputs, 0.5 A, 5 W	C	**6ES7 223-1BL30-0XB0**
8 inputs, 24 V DC, IEC type 1 current sinking; 8 relay outputs, 5 ... 30 V DC/5 ... 250 V AC, 2 A, 30 W DC/200 W AC	C	**6ES7 223-1PH30-0XB0**
16 inputs, 24 V DC, IEC type 1 current sinking; 16 relay outputs, 5 ... 30 V DC/5 ... 250 V AC, 2 A, 30 W DC/200 W AC	C	**6ES7 223-1PL30-0XB0**
S7-1200 automation system, System Manual		
for SIMATIC S7-1200 and STEP 7 Basic		
German		**6ES7 298-8FA30-8AH0**
English		**6ES7 298-8FA30-8BH0**
STEP 7 Basic engineering software		
Target system: SIMATIC S7-1200 controllers and the associated I/O. The WinCC Basic which is included permits configuration of the SIMATIC Basic Panels *Requirement:* MS Windows XP SP3 / MS Windows Vista SP1 *Type of delivery:* German, English, with online documentation		
Single license	D	**6ES7 822-0AA00-0YA0**
STEP 7 Basic Software Update Service, 1 year	D	**6ES7 822-0AA00-0YL0**

C: Subject to export regulations: AL: N and ECCN: EAR99H
D: Subject to export regulations: AL: N and ECCN: EAR99S

More information

Brochures

Information material for downloading can be found in the Internet:

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

SB 1223 digital input/output module

Overview

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

Application

The SB 1223 digital input/output signal module permits:

- Connection of the controller to digital signals of the process
- Output of digital signals from the controller to the process.

Design

The signal boards are plugged directly into the receptacle on the front of each S7-1200 CPU.

- Mounting:
  Signal boards are plugged directly into the SIMATIC S7-1200 CPU and are thus electrically and mechanically connected to the CPU
- The CPU mounting dimensions remain unchanged
- All signal boards are easy to replace thanks to removable connecting terminals ("independent wiring")

Function

The SB 1223 digital input/output signal board converts

- the level of the external digital signals from the process into the internal signal level of the S7-1200 and
- the internal signal level of the S7-1200 into the external signal level required by the process

Technical specifications

	6ES7 223-0BD30-0XB0
Product name	**SB 1223 DI 2 x 24 V DC, DQ 2 x 24 V**
Supply voltages	
Transmitter power supply	
• Supply current, max.	4 mA; per channel
Current consumption	
from 5 V DC backplane bus, typ.	50 mA
Current consumption/power loss	
Power loss, typ.	1 W
Digital inputs	
Number of digital inputs	2
• in groups of	1
Concurrently controllable inputs	
• All mounting positions	
- concurrently controllable inputs, up to 40 °C	2
Input characteristic according to IEC 1131, Type 1	Yes
Input voltage	
• Rated value, DC	24
• for "0" signal	0 ... 5 V
• for "1" signal	15 ... 30 V
Input current	
• for "0" signal, max. (permissible quiescent current)	1 mA
• for "1" signal, typ.	0.5 A
Input delay (at rated value of input voltage)	
• for standard inputs	
- programmable	Yes; 0.2, 0.4, 0.8, 1.6, 3.2, 6.4 and 12.8 ms, selectable in groups of 4
- for "0" to "1", max.	2 µs
- for "1" to "0", max.	10 µs
• for alarm inputs	
- programmable	Yes
• for counter/technological functions	
- programmable	Yes
Cable length	
• Max. cable length, shielded	500 m
• Max. cable length, unshielded	300 m
Digital outputs	
Number of digital outputs	2
• in groups of	1
Short-circuit protection	No
Switching capacity of outputs	
• with ohmic load, max.	0.5 A
• with lamp load, max.	5 W
Output voltage	
• Rated value (DC)	24
• for "0" signal (DC), max.	0.1 V; with 10 kOhm load
• for "1" signal, min.	20 V

SB 1223 digital input/output module

Technical specifications (continued)

	6ES7 223-0BD30-0XB0
Product name	**SB 1223 DI 2 x 24 V DC, DQ 2 x 24 V**
Output current	
• for "1" signal, rated value	0.5 A
• for "0" signal, residual current, max.	10 µA
Load resistance range	
• Upper limit	0.6 Ohm
Cable length	
• Max. cable length, shielded	500 m
• Max. cable length, unshielded	150 m
Interrupts/diagnostics/ status information	
Interrupts	
• Interrupts	Yes
Diagnostics	
• Diagnostic functions	Yes
Diagnostics LEDs	
• for status of inputs	Yes
• for status of the outputs	Yes
Climatic and mechanical conditions for storage and transport	
Climatic conditions for storage and transport	
• Free fall	
- max. height of fall (in packaging)	0.3 m; five times, in transport packaging
• Atmospheric pressure acc. to IEC 60068-2-13	
- permissible atmospheric pressure	1080 ... 660 hPa
• Relative humidity	
- permissible range (without condensation) at 25 °C	95%
Mechanical and climatic conditions in operation	
Climatic conditions in operation	
• Temperature	
- permissible temperature range	0° C ... 55° C horizontal mounting 0° C ... 45° C vertical mounting
Degree of protection	
IP20	Yes
Mechanical system	
Enclosure type (front)	
• Plastic	Yes
Dimensions and weight	
Dimensions and weight	
• Width	38 mm
• Height	62 mm
• Depth	21 mm
Weight	
• Approx. weight	40 g

Ordering data

		Order No.
SB 1223 digital input/output signal board		
2 inputs, 24 V DC, IEC type 1 current sinking; two 24 V DC transistor outputs, 0.5 A, 5 W; can be used as HSC at up to 30 kHz	C	**6ES7 223-0BD30-0XB0**
S7-1200 automation system, System Manual		
for SIMATIC S7-1200 and STEP 7 Basic		
German		**6ES7 298-8FA30-8AH0**
English		**6ES7 298-8FA30-8BH0**
STEP 7 Basic engineering software		
Target system: SIMATIC S7-1200 controllers and the associated I/O. The WinCC Basic which is included permits configuration of the SIMATIC Basic Panels *Requirement:* MS Windows XP SP3 / MS Windows Vista SP1 *Type of delivery:* German, English, with online documentation		
Single license	D	**6ES7 822-0AA00-0YA0**
STEP 7 Basic Software Update Service, 1 year	D	**6ES7 822-0AA00-0YL0**

C: Subject to export regulations: AL: N and ECCN: EAR99H
D: Subject to export regulations: AL: N and ECCN: EAR99S

More information

Brochures

Information material for downloading can be found in the Internet:

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

Overview

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

Application

The SM 1231 analog input signal modules allow the connection of the controller to analog signals of the process.

This provides users with the following advantages:

- Optimal adaptation:
  With analog signal modules, users can optimally adapt their controllers even to more complex tasks
- Direct connection of sensors:
  Up to 14 bit resolution and different input ranges permit the connection of sensors without additional amplifier
- Flexibility:
  If the task is expanded subsequently, the controller can be upgraded. Updating of the user program is extremely simple

Design

The signal modules have the same design features as the basic devices.

- Installation on DIN rails:
  The modules are snapped onto the rail next to the CPU on the right and are electrically and mechanically connected to each other and to the CPU by the integral slide mechanism.
- Direct installation:
  Horizontal or vertical mounting on DIN rail or direct mounting in the cabinet using integral lugs.

Function

The SM 1231 analog input signal modules convert analog signals from the process into digital signals for internal processing by the SIMATIC S7-1200.

Technical specifications

	6ES7 231-4HD30-0XB0
Product name	**SM 1231 AI 4 x 13 bit**
Supply voltages	
Rated value	
• 24 V DC	Yes
Current consumption	
Current consumption, typ.	45 mA
from 5 V DC backplane bus, typ.	80 mA
Current consumption/power loss	
Power loss, typ.	1,5 W
Connection system	
Required front connector	Yes
Analog inputs	
Number of analog inputs	4; current or voltage, differential inputs
Permissible input voltage at current input (destruction limit), max.	± 35 V
Permissible input current at voltage input (destruction limit), max.	40 mA
Cycle time (all channels), max.	625 µs
Input ranges	
• Voltage	Yes; ± 10 V, ± 5 V, ± 2.5 V
• Current	Yes; 0 ... 20 mA
Input ranges (rated values), voltages	
• -10 … +10 V	Yes
• Input resistance (-10 … +10 V)	≥ 9 MOhm
• -2.5 … +2.5 V	Yes
• Input resistance (-2.5 … +2.5 V)	≥ 9 MOhm
• -5 … +5 V	Yes
• Input resistance (-5 … +5 V)	≥ 9 MOhm
Input ranges (rated values), currents	
• 0 … 20 mA	Yes
• Input resistance (0 to 20 mA)	≥ 250 Ohm
Voltage input	
• Permissible input voltage at voltage input (destruction limit), max.	35 V
Current input	
• Permissible input current at current input (destruction limit), max.	40 mA
Temperature compensation	
• Programmable	No

Technical specifications (continued)

	6ES7 231-4HD30-0XB0
Product name	**SM 1231 AI 4 x 13 bit**
Analog value generation	
Integration and conversion time/resolution per channel	
• Resolution with overrange (bits including sign), max.	12 bit; + sign
• Integration time can be parameterized	Yes
• Noise suppression at interference frequency f1 in Hz	40 dB, up to 60 V DC for interference frequency 50 / 60 Hz
Measured value smoothing	
• Programmable	Yes
• Step: None	Yes
• Step: Low	Yes
• Step: Medium	Yes
• Step: High	Yes
Error/accuracy	
Temperature error (relative to input range)	25 °C ± 0,1% up to 55°C ± 0,2% of entire measuring range
Basic error limit (operational limit at 25 °C)	
• Voltage, related to the input range	0,1 +/- %
• Current, related to the input range	0,1 +/- %
Interference voltage suppression for f = n x (fl +/- 1%), fl = interference frequency	
• Common mode voltage, max.	12 V
Interrupts/diagnostics/status information	
Interrupts	
• Interrupts	Yes
• Diagnostic interrupt	Yes
Diagnostics	
• Diagnostic functions	Yes
• Monitoring of the supply voltage of the electronics	Yes
• Wire break	No
Diagnostics LEDs	
• for status of inputs	Yes
• for maintenance	Yes
Galvanic isolation	
Galvanic isolation of analog outputs	
• between channels and electronics power supply	No

	6ES7 231-4HD30-0XB0
Product name	**SM 1231 AI 4 x 13 bit**
Climatic and mechanical conditions for storage and transport	
Climatic conditions for storage and transport	
• Free fall	
- max. height of fall (in packaging)	0.3 m; five times, in transport packaging
• Temperature	
- permissible temperature range	-40° C ... +70° C
• Atmospheric pressure acc. to IEC 60068-2-13	
- permissible atmospheric pressure	1080 ... 660hPa
• Relative humidity	
- permissible range (without condensation) at 25 °C	95%
Mechanical and climatic conditions in operation	
Climatic conditions in operation	
• Temperature	
- permissible temperature range	0° C ... 55° C horizontal mounting 0° C ... 45° C vertical mounting
• Atmospheric pressure acc. to IEC 60068-2-13	
- permissible atmospheric pressure	1080 ... 795 hPa
• Concentration of pollutants	
- SO_2 at RH < 60% without condensation	$S0_2$: < 0.5 ppm; H_2S: < 0.1 ppm; RH < 60% without condensation
Degree of protection	
IP20	Yes
Standards, approvals, certificates	
CE mark	Yes
C-TICK	Yes
FM approval	Yes
Mechanical system	
Enclosure type (front)	
• Plastic	Yes
Dimensions and weight	
Dimensions and weight	
• Width	45 mm
• Height	100 mm
• Depth	75 mm
Weight	
• Approx. weight	180 g

Ordering data

		Order No.
SM 1231 analog input signal module		
4 analog inputs ± 10 V, ± 5 V, ± 2.5 V or 0 ... 20 mA 12 bit + sign	C	**6ES7 231-4HD30-0XB0**
S7-1200 automation system, System Manual		
for SIMATIC S7-1200 and STEP 7 Basic		
German		**6ES7 298-8FA30-8AH0**
English		**6ES7 298-8FA30-8BH0**
STEP 7 Basic engineering software		
Target system: SIMATIC S7-1200 controllers and the associated I/O. The WinCC Basic which is included permits configuration of the SIMATIC Basic Panels *Requirement:* MS Windows XP SP3 / MS Windows Vista SP1 *Type of delivery:* German, English, with online documentation		
Single license	D	**6ES7 822-0AA00-0YA0**
STEP 7 Basic Software Update Service, 1 year	D	**6ES7 822-0AA00-0YL0**

C: Subject to export regulations: AL: N and ECCN: EAR99H
D: Subject to export regulations: AL: N and ECCN: EAR99S

More information

Brochures

Information material for downloading can be found in the Internet:

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

SM 1232 analog output module

Overview

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

Application

SM 1232 analog output signal modules permit the use of analog outputs.

This provides users with the following advantages:

- Optimal adaptation:
  With analog signal modules, users can optimally adapt their controllers even to more complex tasks
- Direct connection of actuators:
  Up to 14 bit resolution permit the connection of actuators without an additional amplifier
- Flexibility:
  If the task is expanded subsequently, the controller can be upgraded. Updating of the user program is extremely simple

Design

The signal modules have the same design features as the basic devices.

- Installation on DIN rails:
  The modules are snapped onto the rail next to the CPU on the right and are electrically and mechanically connected to each other and to the CPU by the integral slide mechanism.
- Direct installation:
  Horizontal or vertical mounting on DIN rail or direct mounting in the cabinet using integral lugs.

Function

SM 1232 analog output signal modules convert digital signals of the SIMATIC S7-1200 into signals for controlling the respective process.

Technical specifications

	6ES7 232-4HB30-0XB0
Product name	**SM 1232 AQ 2 x 14 bit**
Supply voltages	
Rated value	
• 24 V DC	Yes
Current consumption	
Current consumption, typ.	45 mA
from 5 V DC backplane bus, typ.	80 mA
Current consumption/power loss	
Power loss, typ.	1.5 W
Connection system	
Required front connector	Yes
Analog inputs	
Temperature compensation	
• Programmable	No
Analog outputs	
Number of analog outputs	2; current or voltage
Output ranges, voltage	
• -10 … +10 V	Yes
Output ranges, current	
• 0 … 20 mA	Yes
Load impedance (in the nominal range of the output)	
• at voltage outputs, min.	1000 Ohm
• at current outputs, max.	600 Ohm
Analog value generation	
Measuring principle	Differential
Integration and conversion time/resolution per channel	
• Resolution (including overrange)	Voltage: 14 bit Current: 13 bit
• Integration time can be parameterized	Yes
• Noise suppression at interference frequency f1 in Hz	40 dB, up to 60 V DC for interference frequency 50 / 60 Hz
Error/accuracy	
Temperature error (relative to output range)	25°C ± 0,3% up to 55 °C ± 0.6% of entire measuring range
Basic error limit (operational limit at 25 °C)	
• Voltage, related to the output range	0,3 +/- %
• Current, related to the output range	0,3 +/- %
Interference voltage suppression for f = n x (fl +/- 1%), fl = interference frequency	
• Common mode voltage, max.	12 V
Interrupts/diagnostics/status information	
Interrupts	
• Interrupts	Yes
• Diagnostic interrupt	Yes

Technical specifications (continued)

	6ES7 232-4HB30-0XB0
Product name	**SM 1232 AQ 2 x 14 bit**
Diagnostics	
• Diagnostic functions	Yes
• Monitoring of the supply voltage of the electronics	Yes
• Wire break	Yes
• Short circuit	Yes
Diagnostics LEDs	
• for status of the outputs	Yes
• for maintenance	Yes
Climatic and mechanical conditions for storage and transport	
Climatic conditions for storage and transport	
• Free fall	
- max. height of fall (in packaging)	0.3 m; five times, in transport packaging
• Temperature	
- permissible temperature range	-40° C ... +70° C
• Atmospheric pressure acc. to IEC 60068-2-13	
- permissible atmospheric pressure	1080 ... 660hPa
• Relative humidity	
- permissible range (without condensation) at 25 °C	95%
Mechanical and climatic conditions in operation	
Climatic conditions in operation	
• Temperature	
- permissible temperature range	0° C ... 55° C horizontal mounting 0° C ... 45° C vertical mounting
• Atmospheric pressure acc. to IEC 60068-2-13	
- permissible atmospheric pressure	1080 ... 795 hPa
• Concentration of pollutants	
- SO_2 at RH < 60% without condensation	$S0_2$: < 0,5 ppm; H_2S: < 0,1 ppm; RH < 60% without condensation
Degree of protection	
IP20	Yes
Standards, approvals, certificates	
CE mark	Yes
C-TICK	Yes
FM approval	Yes
Mechanical system	
Enclosure type (front)	
• Plastic	Yes
Dimensions and weight	
Dimensions and weight	
• Width	45 mm
• Height	100 mm
• Depth	75 mm
Weight	
• Approx. weight	180 g

Ordering data

		Order No.
SM 1232 analog output signal module		
2 analog outputs, ± 10 V with 14 bit or 0 ... 20 mA with 13 bit	C	**6ES7 232-4HB30-0XB0**
S7-1200 automation system, System Manual		
for SIMATIC S7-1200 and STEP 7 Basic		
German		**6ES7 298-8FA30-8AH0**
English		**6ES7 298-8FA30-8BH0**
STEP 7 Basic engineering software		
Target system: SIMATIC S7-1200 controllers and the associated I/O. The WinCC Basic which is included permits configuration of the SIMATIC Basic Panels *Requirement:* MS Windows XP SP3 / MS Windows Vista SP1 *Type of delivery:* German, English, with online documentation		
Single license	D	**6ES7 822-0AA00-0YA0**
STEP 7 Basic Software Update Service, 1 year	D	**6ES7 822-0AA00-0YL0**

C: Subject to export regulations: AL: N and ECCN: EAR99H
D: Subject to export regulations: AL: N and ECCN: EAR99S

More information

Brochures

Information material for downloading can be found in the Internet:

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

SM 1234 analog input/output module

Overview

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

Application

SM 1234 analog input/outputs permit the use of analog inputs/outputs.

This provides users with the following advantages:

- Optimal adaptation:
  With analog and digital expansion modules, users can optimally match their controllers even to more complex tasks
- Direct connection of sensors and actuators:
  Up to 14 bit resolution plus sign and different input/output ranges permit the connection of sensors and actuators without an additional amplifier
- Flexibility:
  If the task is expanded subsequently, the controller can be upgraded. Updating of the user program is extremely simple

Design

The SM 1234 analog input/output signal modules have the same design features as the basic devices.

- Installation on DIN rails:
  The modules are snapped onto the rail next to the CPU on the right and are electrically and mechanically connected to each other and to the CPU by the integral slide mechanism.
- Direct installation:
  Horizontal or vertical mounting on DIN rail or direct mounting in the cabinet using integral lugs.

Function

The SM 1234 analog input/output signal modules

- convert analog signals from the process into digital signals for internal processing by the SIMATIC S7-1200.
- convert digital signals of the SIMATIC S7-1200 into signals for controlling the respective process.

Technical specifications

	6ES7 234-4HE30-0XB0
Product name	**SM 1234 AI 4 x 13 bit AQ 2 x 14 bit**
Supply voltages	
Rated value	
• 24 V DC	Yes
Current consumption	
Current consumption, typ.	60 mA
from 5 V DC backplane bus, typ.	80 mA
Current consumption/power loss	
Power loss, typ.	2 W
Connection system	
Required front connector	Yes
Analog inputs	
Number of analog inputs	4; current or voltage, differential inputs
Permissible input voltage at current input (destruction limit), max.	± 35 V
Permissible input current at voltage input (destruction limit), max.	40 mA
Cycle time (all channels), max.	625 µs
Input ranges	
• Voltage	Yes; ± 10 V, ± 5 V, ± 2.5 V
• Current	Yes; 0 ... 20 mA
Input ranges (rated values), voltages	
• -10 … +10 V	Yes
• Input resistance (-10 … +10 V)	≥ 9 MOhm
• -2.5 … +2.5 V	Yes
• Input resistance (-2.5 … +2.5 V)	≥ 9 MOhm
• -5 … +5 V	Yes
• Input resistance (-5 … +5 V)	≥ 9 MOhm
Input ranges (rated values), currents	
• 0 … 20 mA	Yes
• Input resistance (0 … 20 mA)	≥ 250 Ohm
Input ranges (rated values), resistance thermometer	
Voltage input	
• Permissible input voltage at voltage input (destruction limit), max.	35 V
Current input	
• Permissible input current at current input (destruction limit), max.	40 mA
Temperature compensation	
• Programmable	No

Technical specifications (continued)

	6ES7 234-4HE30-0XB0
Product name	**SM 1234 AI 4 x 13 bit AQ 2 x 14 bit**
Analog outputs	
Number of analog outputs	2; current or voltage
Output ranges, voltage	
• -10 … +10 V	Yes
Output ranges, current	
• 0 … 20 mA	Yes
Wiring the actuators	
• at current output with 4-wire connection	
Load impedance (in the nominal range of the output)	
• at voltage outputs, min.	1000 Ohm
• at current outputs, max.	600 Ohm
Analog value generation	
Measuring principle	Differential
Integration and conversion time/resolution per channel	
• Resolution (including overrange)	Voltage: 14 bit; current: 13 bit
• Resolution with overrange (bits including sign), max.	12 bit; + sign
• Integration time can be parameterized	Yes
• Noise suppression at interference frequency f1 in Hz	40 dB, up to 60 V DC for interference frequency 50 / 60 Hz
Measured value smoothing	
• Programmable	Yes
• Step: None	Yes
• Step: Low	Yes
• Step: Medium	Yes
• Step: High	Yes
Error/accuracy	
Temperature error (relative to input range)	25°C ± 0.1% up to 55 °C ± 0.2% of entire measuring range
Temperature error (relative to output range)	25 °C ± 0.3% up to 55 °C ± 0.6% of entire measuring range
Basic error limit (operational limit at 25 °C)	
• Voltage, related to the input range	0.1 +/- %
• Current, related to the input range	0.1 +/- %
• Voltage, related to the output range	0.3 +/- %
• Current, related to the output range	0.3 +/- %
Interference voltage suppression for f = n x (fl +/- 1%), fl = interference frequency	
• Common mode voltage, max.	12 V

	6ES7 234-4HE30-0XB0
Product name	**SM 1234 AI 4 x 13 bit AQ 2 x 14 bit**
Interrupts/diagnostics/status information	
Interrupts	
• Interrupts	Yes
• Diagnostic interrupt	Yes
Diagnostics	
• Diagnostic functions	Yes
• Monitoring of the supply voltage of the electronics	Yes
• Wire break	Yes
• Short circuit	Yes
Diagnostics LEDs	
• For status of inputs	Yes
• For status of the outputs	Yes
• For maintenance	Yes
Galvanic isolation	
Galvanic isolation of analog outputs	
• Between channels and electronics power supply	No
Climatic and mechanical conditions for storage and transport	
Climatic conditions for storage and transport	
• Free fall	
- max. height of fall (in packaging)	0.3 m; five times, in transport packaging
• Temperature	
- permissible temperature range	-40 °C ... +70 °C
• Atmospheric pressure acc. to IEC 60068-2-13	
- permissible atmospheric pressure	1080 ... 660hPa
• Relative humidity	
- permissible range (without condensation) at 25 °C	95%
Mechanical and climatic conditions in operation	
Climatic conditions in operation	
• Temperature	
- permissible temperature range	0° C ... 55° C horizontal mounting 0° C ... 45° C vertical mounting
• Atmospheric pressure acc. to IEC 60068-2-13	
- permissible atmospheric pressure	1080 ... 795 hPa
• Concentration of pollutants	
- SO_2 at RH < 60% without condensation	$S0_2$: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% without condensation

Technical specifications (continued)

	6ES7 234-4HE30-0XB0
Product name	**SM 1234 AI 4 x 13 bit AQ 2 x 14 bit**
Degree of protection	
IP20	Yes
Standards, approvals, certificates	
CE mark	Yes
C-TICK	Yes
FM approval	Yes
Mechanical system	
Enclosure type (front)	
• Plastic	Yes
Dimensions and weight	
Dimensions and weight	
• Width	45 mm
• Height	100 mm
• Depth	75 mm
Weight	
• Approx. weight	220 g

Ordering data

		Order No.
SM 1234 analog input/output signal module		
4 analog inputs, ± 10 V, ± 5 V, ± 2.5 V or 0 ... 20 mA, 12 bit + sign; 2 analog outputs, ± 10 V with 14 bit or 0 ... 20 mA with 13 bit	C	**6ES7 234-4HE30-0XB0**
S7-1200 automation system, System Manual		
for SIMATIC S7-1200 and STEP 7 Basic		
German		**6ES7 298-8FA30-8AH0**
English		**6ES7 298-8FA30-8BH0**
STEP 7 Basic engineering software		
Target system: SIMATIC S7-1200 controllers and the associated I/O. The WinCC Basic which is included permits configuration of the SIMATIC Basic Panels *Requirement:* MS Windows XP SP3 / MS Windows Vista SP1 *Type of delivery:* German, English, with online documentation		
Single license	D	**6ES7 822-0AA00-0YA0**
STEP 7 Basic Software Update Service, 1 year	D	**6ES7 822-0AA00-0YL0**

C: Subject to export regulations: AL: N and ECCN: EAR99H
D: Subject to export regulations: AL: N and ECCN: EAR99S

More information

Brochures

Information material for downloading can be found in the Internet:

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

Overview

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

Application

The SB 1232 analog output signal board permits the use of analog outputs.

This provides users with the following advantages:

- Optimal adaptation:
  Signal boards can be used where space is limited or if only a few additional inputs/outputs are required. Each S7-1200 CPU can be modularly expanded by a signal board. This does not increase the mounting space required for the controller.
- Direct connection of sensors and actuators:
  Up to 14 bit resolution and different output ranges permit the connection of actuators without additional amplifier.
- Flexibility:
  If the task is expanded subsequently, the controller can be upgraded. Updating of the user program is extremely simple.

Design

The signal boards are plugged directly into the receptacle on the front of each S7-1200 CPU.

- Mounting:
  Signal boards are plugged directly into the SIMATIC S7-1200 CPU and are thus electrically and mechanically connected to the CPU.
- The CPU mounting dimensions remain unchanged.
- All signal boards are easy to replace thanks to removable connecting terminals ("independent wiring").

Function

The SB 1232 analog output signal board converts digital signals of the S7-1200 into analog signals for the process.

Technical specifications

	6ES7 232-4HA30-0XB0
Product name	**SB 1232 1 x AI**
Supply voltages	
Transmitter power supply	
• Supply current, max.	25 mA
Current consumption	
from 5 V DC backplane bus, typ.	15 mA
Current consumption/power loss	
Power loss, typ.	1.5 W
Analog inputs	
Input ranges (rated values), voltages	
• -10 … +10 V	Yes
• Input resistance (-10 … +10 V)	1000 ohm
Analog outputs	
Number of analog outputs	1
Cycle time (all channels), max.	Voltage: 300 µs (R), 750 µs (1 µF) Current: 600 µs (1 mH), 2 ms (10 mH)
Output ranges, voltage	
• -10 … +10 V	Yes
Output ranges, current	
• 0 … 20 mA	Yes
Load impedance (in the nominal range of the output)	
• at voltage outputs, min.	1000 ohm
• at current outputs, max.	600 ohm
Analog value generation	
Measuring principle	Differential
Integration and conversion time/resolution per channel	
• Resolution (including overrange)	U / 12 bit, I / 11 bit
Measured value smoothing	
• Programmable	Yes
Analog value generation (in isochronous mode)	
Cable length	
• Max. cable length, shielded	10 m; twisted
Error/accuracy	
Temperature error (relative to output range)	25°C ± 0.5% to 55°C ± 1%
Interrupts/diagnostics/status information	
Interrupts	
• Interrupts	Yes
Diagnostics	
• Diagnostic functions	Yes
Diagnostics LEDs	
• For status of the outputs	Yes

SB 1232 analog output module

Technical specifications (continued)

	6ES7 232-4HA30-0XB0
Product name	**SB 1232 1 x AI**
Climatic and mechanical conditions for storage and transport	
Climatic conditions for storage and transport	
• Free fall	
- max. height of fall (in packaging)	0.3 m; five times, in transport packaging
• Atmospheric pressure acc. to IEC 60068-2-13	
- permissible atmospheric pressure	1080 ... 660hPa
• Relative humidity	
- permissible range (without condensation) at 25 °C	95%
Mechanical and climatic conditions in operation	
Climatic conditions in operation	
• Temperature	
- permissible temperature range	0° C ... 55° C horizontal mounting 0° C ... 45° C vertical mounting
Degree of protection	
IP20	Yes
Mechanical system	
Enclosure type (front)	
• Plastic	Yes
Dimensions and weight	
Dimensions and weight	
• Width	38 mm
• Height	62 mm
• Depth	21 mm
Weight	
• Approx. weight	40 g

Ordering data

		Order No.
SB 1232 analog output signal board		
1 analog output, ± 10 V with 12 bit C or 0 ... 20 mA with 11 bit		**6ES7 232-4HA30-0XB0**
S7-1200 automation system, System Manual		
for SIMATIC S7-1200 and STEP 7 Basic		
German		**6ES7 298-8FA30-8AH0**
English		**6ES7 298-8FA30-8BH0**
STEP 7 Basic engineering software		
Target system: SIMATIC S7-1200 controllers and the associated I/O. The WinCC Basic which is included permits configuration of the SIMATIC Basic Panels *Requirement:* MS Windows XP SP3 / MS Windows Vista SP1 *Type of delivery:* German, English, with online documentation		
Single license	D	**6ES7 822-0AA00-0YA0**
STEP 7 Basic Software Update Service, 1 year	D	**6ES7 822-0AA00-0YL0**

C: Subject to export regulations: AL: N and ECCN: EAR99H
D: Subject to export regulations: AL: N and ECCN: EAR99S

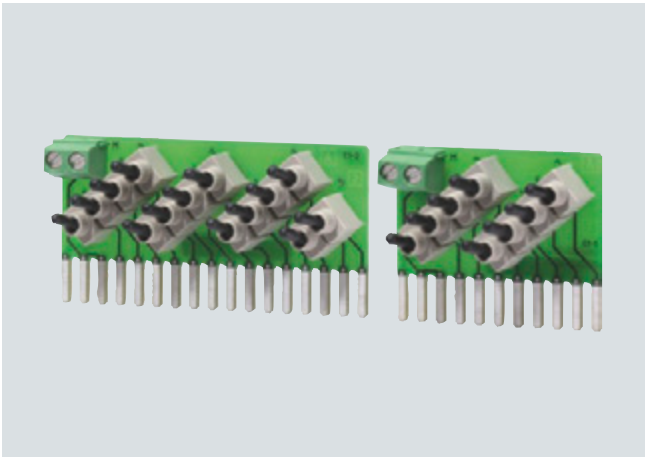
More information

Brochures

Information material for downloading can be found in the Internet:

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

Overview



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

Application

The SM 1274 simulator modules for SIMATIC S7-1200 provide users with the opportunity for testing user programs during commissioning and ongoing operation.

Design

The input simulators are mounted on the terminal block instead of the digital inputs.

The front of the module contains:

- Input status selector switch
- Connecting brackets for secure connection with the terminal block

Function

Program execution can be specifically influenced by setting the inputs.
The CPU reads the set input signal statuses, and processes them in the user program. The subsequent response of the controller allows conclusions to be drawn concerning program execution.

Technical specifications

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

Ordering data

		Order No.
Digital input simulator SIM 1274 simulator module (optional)		
with 14 input switches, for CPU 1214C	C	**6ES7 274-1XH30-0XA0**
with 8 input switches, for CPU 1211C, CPU 1212C	C	**6ES7 274-1XF30-0XA0**
S7-1200 automation system, System Manual		
for SIMATIC S7-1200 and STEP 7 Basic		
German		**6ES7 298-8FA30-8AH0**
English		**6ES7 298-8FA30-8BH0**
STEP 7 Basic engineering software		
Target system: SIMATIC S7-1200 controllers and the associated I/O. The WinCC Basic which is included permits configuration of the SIMATIC Basic Panels *Requirement:* MS Windows XP SP3 / MS Windows Vista SP1 *Type of delivery:* German, English, with online documentation		
Single License	D	**6ES7 822-0AA00-0YA0**
STEP 7 Basic Software Update Service, 1 year	D	**6ES7 822-0AA00-0YL0**

C: Subject to export regulations: AL: N and ECCN: EAR99H
D: Subject to export regulations: AL: N and ECCN: EAR99S

More information

Brochures

Information material for downloading can be found in the Internet:

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

PM 1207 power supply

Overview

- Stabilized power supply for SIMATIC S7-1200
- In S7-1200 design
- Input 120/230 V AC, output 24 V DC/2.5 A

Technical specifications

	PM 1207 power supply
Order No.	6EP1 332-1SH71
Input voltage, rated value	120/230 V AC (autoranging)
• Range	85…132 V/176...264 V AC
Mains buffering	> 20 ms (at 93/187 V)
Line frequency, rated value	50/60 Hz
• Range	47… 63 Hz
Input current, rated value	1.2/0.67 A
• Switch-on current (25 °C)	< 13 A
• Recommended miniature circuit-breaker	16 A characteristic B, 10 A characteristic C
Output voltage, rated value	24 V DC
• Tolerance	± 3%
• Residual ripple	< 150 mVpp
• Adjustment range	No
Output current, rated value	2.5 A
Approx. efficiency at rated values	83%
Connectable in parallel	Yes, 2 units
Electronic short-circuit protection	Yes, automatic restart
Radio suppression level (EN 55022)	Class B
Status display	Green LED for "24 V OK"
Line harmonic limitation (EN 61000-3-2)	Not applicable
Degree of protection (EN 60529)	IP20
Safety class	Class 1
Galvanic isolation	SELV acc. to EN 60950 and EN 50178
Ambient temperature	0 … +60 °C
Transport/storage temperature	-25 … +85 °C
Mounting	Standard mounting rail EN 60715 35x7.5/15
Dimensions (W x H x D) in mm	70 x 100 x 75
Approx. weight	0.3 kg
Certification	CE, cULus

Ordering data

	Order No.
PM 1207 power supply Input 120/230 V AC, output 24 V DC/2.5 A	**6EP1 332-1SH71**

Communication

3

Overview

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

Application

The CM 1241 communication modules are used for quick, high-performance serial data exchange via point-to-point connection.

Point-to-point connection is possible to, e.g.:

- SIMATIC S7 automation systems and the systems of many other manufacturers
- Printers
- Robot controls
- Modems
- Scanners
- Bar code readers, etc.

Design

The CM 1241 communication modules have the same design features as the basic devices.

- Installation on DIN rails:
  The modules are snapped onto the rail next to the CPU on the right and are electrically and mechanically connected to each other and to the CPU by the integral slide mechanism.
- Direct installation:
  Horizontal or vertical mounting on DIN rail or direct mounting in the cabinet using integral lugs.

The communication modules are equipped with the following:

- Status LEDs for indicating “Send”, “Receive” and “Error”
- Communication interfaces:
  Available for the RS232 and RS485 physical transmission media

Function

The following standard protocols are available on the CM 1241 communication modules:

- ASCII:
  For interfacing to third-party systems with simple transmission protocols, e.g. protocols with start and end characters or with block check characters. The interface handshake signals can be called and controlled via the user program.
- MODBUS:
  For communication according to the MODBUS protocol with RTU format:
  - MODBUS master:
    Master-slave interfacing with SIMATIC S7 as master.
  - MODBUS slave:
    Master-slave interfacing with SIMATIC S7 as slave; message frame traffic from slave to slave not possible.
- USS drive protocol:
  Instructions for connection of USS protocol drives are especially supported. In this case, drives exchange data over RS485. It is then possible to control these drives, and to read and write parameters.

Further drivers for downloading are also available.

Parameterization

Parameterization of the CM 1241 communication module is particularly user-friendly and simple with STEP 7 Basic:

- The user assigns the module characteristics via a parameterization environment integrated in STEP 7 Basic, e.g.:
  - the implemented protocol drivers that are used.
  - the driver-specific characteristics that are used.

Technical specifications

	6ES7 241-1CH30-0XB0	6ES7 241-1AH30-0XB0
Product name	**CM 1241 RS485**	**CM 1241 RS232**
Supply voltages		
Rated value		
• 24 V DC	Yes	Yes
• Lower limit of permissible range (DC)	20.4 V	20.4 V
• Upper limit of permissible range (DC)	28.8 V	28.8 V
Current consumption		
Current consumption, max.	220 mA; from L5+; logic	220 mA; from L5+; logic
Current consumption/ power loss		
Power loss, typ.	1.1 W	1.1 W
Interfaces		
Number of interfaces	1	1
Interface physics, RS 232C (V.24)	Yes	Yes

Technical specifications (continued)

	6ES7 241-1CH30-0XB0	6ES7 241-1AH30-0XB0
Product name	**CM 1241 RS485**	**CM 1241 RS232**
Point-to-point		
Cable length, max.	1000 m	10 m
Integral protocol drivers		
• ASCII	Yes; available as library function	
• USS	Yes; available as library function	
Climatic and mechanical conditions for storage and transport		
Climatic conditions for storage and transport		
• Free fall		
- max. height of fall (in packaging)	0.3 m; five times, in transport packaging	0.3 m; five times, in transport packaging
• Temperature		
- permissible temperature range	-40° C ... +70° C	-40° C ... +70° C
• Atmospheric pressure acc. to IEC 60068-2-13		
- permissible atmospheric pressure	1080 ... 660hPa	1080 ... 660hPa
• Relative humidity		
- permissible range (without condensation) at 25 °C	95%	95%
Mechanical and climatic conditions in operation		
Climatic conditions in operation		
• Temperature		
- permissible temperature range	0° C ... 55° C horizontal mounting 0° C ... 45° C vertical mounting	0° C ... 55° C horizontal mounting 0° C ... 45° C vertical mounting
- permissible temperature change	5 °C ... 55 °C, 3 °C/minute	5 °C ... 55 °C, 3 °C/minute
• Atmospheric pressure acc. to IEC 60068-2-13		
- permissible atmospheric pressure	1080 ... 795 hPa	1080 ... 795 hPa
Software		
Runtime software		
• Target system		
- S7-1200	Yes	Yes
Dimensions and weight		
Dimensions and weight		
• Width	30 mm	30 mm
• Height	100 mm	100 mm
• Depth	75 mm	75 mm
Weight		
• Approx. weight	150 g	150 g

Ordering data

		Order No.
CM 1241 communication module		
Communication module for point-to-point connection, with one RS485 interface	C	**6ES7 241-1CH30-0XB0**
Communication module for point-to-point connection, with one RS232 interface	C	**6ES7 241-1AH30-0XB0**
S7-1200 automation system, System Manual		
for SIMATIC S7-1200 and STEP 7 Basic		
German		**6ES7 298-8FA30-8AH0**
English		**6ES7 298-8FA30-8BH0**
STEP 7 Basic engineering software		
Target system: SIMATIC S7-1200 controllers and the associated I/O. The WinCC Basic which is included permits configuration of the SIMATIC Basic Panels *Requirement:* MS Windows XP SP3 / MS Windows Vista SP1 *Type of delivery:* German, English, with online documentation		
Single license	D	**6ES7 822-0AA00-0YA0**
STEP 7 Basic Software Update Service, 1 year	D	**6ES7 822-0AA00-0YL0**

C: Subject to export regulations: AL: N and ECCN: EAR99H
D: Subject to export regulations: AL: N and ECCN: EAR99S

More information

Brochures

Information material for downloading can be found in the Internet:

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

CSM 1277 unmanaged

Overview

- For connecting a SIMATIC S7-1200 to an Industrial Ethernet network with a line, tree or star topology
- Up to three further nodes can be connected
- Simple, space-saving mounting on the SIMATIC S7-1200 mounting rail
- Low-cost solution for implementing small, local Ethernet networks
- Rugged, industry-standard node connections with RJ45 connectors
- Simple and fast status display via LEDs on the device
- Integral autocrossover function permits use of uncrossed connecting cables

Benefits

get Designed for Industry

- Reduction in assembly costs and mounting space compared to use of external network components
- Multiplication of Ethernet interfaces on a SIMATIC S7-1200 for additional connection of programming devices, operator controls, and further Ethernet nodes
- Lowest-cost solution for implementing small, local Ethernet networks with a SIMATIC S7-1200

Application

The CSM 1277 is an Industrial Ethernet switch of compact and modular design for use in the SIMATIC S7-1200. The CSM 1277 can be used to multiply the Ethernet interface of the SIMATIC S7-1200 in order to allow simultaneous communication with operator panels, programming devices, other controllers, or the office world.

The CSM 1277 and the SIMATIC S7-1200 controller can be used to implement simple automation networks at low cost.

Design

The CSM 1277 compact switch module offers all advantages of the SIMATIC S7-1200 design:

- Compact design;
  the rugged plastic enclosure contains:
  - 4 x RJ45 sockets for connecting to Industrial Ethernet
  - 3-pole plug-in terminal strip for connection of the external 24 V DC supply on the top
  - LEDs for diagnostics and for status display of the Industrial Ethernet ports
- Simple mounting on the mounting rail of the S7-1200
- Fanless and therefore low-maintenance design
- The module can be replaced without using a programming device

Function

- Multiplication of Ethernet interfaces of the SIMATIC S7-1200
- Design of a small, local Industrial Ethernet network with three further nodes
- Automatic detection of data transfer rate by means of autosensing and autocrossover functions
- Secure, industry-standard plug-in connections
- LEDs for diagnostics and for status display

Network topology and configuration

Various network topologies can be implemented using the CSM 1277 compact switch module:

- Connection of SIMATIC S7-1200 in linear topology:
  At least one RJ45 connection of the SIMATIC S7-1200 remains vacant, e.g. for connecting a programming device (PG)
- Connection of SIMATIC S7-1200 to a higher-level network in a tree/star topology:
  At least two RJ45 connections of the SIMATIC S7-1200 remain vacant, e.g. for connecting a programming device/operator panel (PG/OP)
- Design of a small, local network with a SIMATIC S7-1200 and three further Ethernet nodes

Configuration

The CSM 1277 compact switch module is an unmanaged switch and need not be configured.

Diagnostics

The following information is displayed on LEDs on the device:

- Power
- Port status
- Data traffic

Technical specifications

	6GK7 277-1AA00-0AA0
Product name	**CSM 1277**
Transfer rate 1	10 Mbit/s
Transfer rate 2	100 Mbit/s
Number of electrical connections	
• for signaling contact	-
• for network components or terminals	4
• for power supply	1
Electrical connection version	
• for signaling contact	-
• for network components or terminals	RJ45 socket
• for power supply	3-pole terminal block
Power supply	24 V DC
• maximum	28.2 V
• minimum	19.2 V

	6GK7 277-1AA00-0AA0
Product name	**CSM 1277**
Input current	70 mA
Effective power loss	1.1 W
• at 24 V DC	1.6 W
• maximum	-
Ambient temperature	
• during operation	0 °C ... +60 °C
• during storage	-40 °C ... +70 °C
• during transport	-40 °C ... +70 °C
Maximum relative humidity at 25 °C during operation	95%
Construction type	SIMATIC S7-1200 device design
Width	45 mm
Height	100 mm
Depth	76 mm
Net weight	150 g
Type of fixing	S7-1200 mounting rail, wall mounting
IP degree of protection	IP20

Ordering data

	Order No.
CSM 1277 compact switch module	
Unmanaged switch for connecting a SIMATIC S7-1200 and up to three further nodes to Industrial Ethernet with 10/100 Mbit/s; 4 x RJ45 ports; external 24 V DC power supply, diagnostics on LEDs, S7-1200 module including electronic manual on CD-ROM	**6GK7 277-1AA00-0AA0**
Accessories	
IE TP Cord RJ45/RJ45	
TP cable 4 x 2 with 2 RJ45 connectors	
• 0.5 m	**6XV1 870-3QE50**
IE FC TP Standard Cable GP 2 x 2 (Type A)	
4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug; PROFINET-compatible; with UL approval; sold by the meter; max. length 1000 m, minimum order quantity 20 m	**6XV1 840-2AH10**
FC TP Trailing Cable 2 x 2 (Type C)	**6XV1 840-3AH10**
4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug 180/90 for use as trailing cable; PROFINET-compatible; with UL approval; sold by the meter; max. length 1000 m, minimum order quantity 20 m	

	Order No.
IE FC RJ45 Plug 180	
RJ45 plug-in connector for Industrial Ethernet with rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1 901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1 901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1 901-1BB10-2AE0**
IE FC stripping tool	**6GK1 901-1GA00**
Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	
IE FC Outlet RJ45	**6GK1 901-1FC00 0AA0**
For connecting Industrial Ethernet FC cables and TP cords; graduated prices for 10 and 50 units or more	
SIMATIC NET Manual Collection	**6GK1 975-1AA00-3AA0**
Electronic manuals on communications systems, protocols, products; on DVD; German/English	

Overview

- The ideal entry level series of 3.8" to 15" for operating and monitoring simple machines and plants
- Clear process representation thanks to use of pixel-graphics displays
- Intuitive operation using Touch and tactile function keys
- Equipped with all the necessary basic functions such as alarm logging, recipe management, plots, vector graphics, and language switching
- Simple connection to the controller via integral Ethernet interface or separate version with RS485/422
- Flexible scalability within the HMI family thanks to configuring with WinCC flexible

Benefits

- Integral component of Totally Integrated Automation (TIA): Increased productivity, minimum engineering overhead, reduction in life-cycle costs
  - Can be used even where installation space is restricted thanks to vertical configuring (4" and 6" devices)
  - Short configuring and commissioning times
  - Service-friendly thanks to maintenance-free design and long service life of the backlighting display
- Simple and user-friendly representation of process values thanks to, for example, input/output fields, vector graphics, trend curves, bar charts, text and bitmaps
- Graphics library available with off-the-shelf picture objects
- Can be used worldwide:
  - 32 languages can be configured (incl. Asian and Cyrillic character sets)
  - You can switch between up to 5 languages online
  - Language-dependent texts and graphics

Application

The SIMATIC HMI Basic Panels can be used wherever simple machines and plants are controlled and monitored locally - in production, process and building automation alike. They are used in the most diverse sectors and applications.

Design

The SIMATIC HMI Basic Panels are installation-compatible with the existing touch devices of the product family of Panels and Multi Panels.

- KTP400 Basic mono
  3.8" STN mono
  1 Ethernet interface (TCP/IP)
  Touch screen and 4 tactile function keys
- KTP600 Basic mono
  5.7" STN mono
  1 Ethernet interface (TCP/IP)
  Touch screen and 6 tactile function keys
- KTP600 Basic color
  5.7" TFT with 256 colors
  1 Ethernet interface (TCP/IP) or 1 RS 485/422 interface (separate version)
  Touch screen and 6 tactile function keys
- KTP1000 Basic color
  10.4" TFT with 256 colors
  1 Ethernet interface (TCP/IP) or 1 RS 485/422 interface (separate version)
  Touch screen and 8 tactile function keys
- TP1500 Basic color
  15.1" TFT with 256 colors
  1 Ethernet interface (TCP/IP)
  Touch screen
- No slot for SD/CF/MultiMedia Card, no USB interface

Function

- Permanent window and template concept for creating screen templates
- Input/output fields
  for displaying and modifying process parameters
- Buttons
  are used for direct triggering of functions and actions. Up to 16 functions can be configured simultaneously on buttons.
- Graphics
  can be used as icons instead of text to "label" function keys or buttons. They can also be used as full-screen background images.
  The configuration tool contains a library with extensive graphics and diverse objects. All editors with an OLE interface can be used as graphics editors, e.g. PaintShop, Designer or CorelDraw, etc.
- Vector graphics
  Simple geometric basic forms (line, circle and rectangle) can be created direct in the configuring tool
- Fixed texts
  for labeling function keys, process images and process values in different font sizes
- Curve functions and bars
  are used for graphical display of dynamic values
- Language switching:
  - 5 online languages, 32 configuration languages including Asian and Cyrillic character sets
  - Language-dependent texts and graphics
- User administration (security) in accordance with the requirements of the different sectors
  - Authentication with user ID and password
  - User-group-specific rights

Function (continued)

- Signaling system
  - Discrete alarms
  - Analog messages
  - Freely definable message classes (e.g. status/fault messages) for defining acknowledgment response and displaying message events
  - Message history
- Recipe management
- Help texts
  for process screens, messages and variables
- Arithmetic functions
- Limit value monitoring
  for reliable process control of inputs and outputs
- Indicator light
  for indicating machine and plant statuses
- Task planner for cyclic execution of functions
- Template concept
- Creation of picture templates (picture elements configured in the template appear in every image)
- Simple maintenance and configuration thanks to:
  - Backup/restore of configuration, operating system and firmware on a PC using ProSave
  - Configuration download via MPI/PROFIBUS DP or Ethernet
  - Automatic transfer identification
  - Individual contrast setting and calibration
  - Clean screen
  - No battery required

Configuration

The configuration is implemented using the engineering software SIMATIC WinCC flexible 2008 Compact.

Integration

The Basic Panels can be connected to:

- SIMATIC S7 controllers
- Non-Siemens controllers (applies for DP devices)
  - Allen Bradley DF1
  - Modicon Modbus

Note:
Further information can be found under "System interfaces".

Technical specifications

	6AV6 647-0AA11-3AX0	6AV6 647-0AB11-3AX0	6AV6 647-0AD11-3AX0	6AV6 647-0AF11-3AX0	6AV6 647-0AG11-3AX0
Product name	**SIMATIC KTP400 Basic mono PN**	**SIMATIC KTP600 Basic mono PN**	**SIMATIC KTP600 Basic color PN**	**SIMATIC KTP1000 Basic color PN**	**SIMATIC TP1500 Basic color PN**
Supply voltage					
Supply voltage	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC
permissible range	+19.2 V to +28.8 V DC	+19.2 V to +28.8 V DC	+19.2 V to +28.8 V DC	+19.2 V to +28.8 V DC	+19.2 V to +28.8 V DC
Rated current	0.07 A	0.24 A	0.35 A	0.6 A	0.24 A
Memory					
Type of storage					
Type	Flash / RAM	Flash / RAM	Flash / RAM	Flash / RAM	Flash / RAM
Memory usable for project data/Options	512 KB usable memory for user data	512 KB usable memory for user data	512 KB usable memory for user data	1024 KB usable memory for user data	1024 KB usable memory for user data
Time					
Clock					
• Type	Software clock, not battery backed	Software clock, not battery backed	Software clock, not battery backed	Software clock, not battery backed	Software clock, not battery backed
Protocols					
Protocols (terminal link)					
• Sm@rtAccess	No	No	No	No	No
Configuration					
Configuration tool	WinCC flexible Compact Version 2008 or higher (to be ordered separately)	WinCC flexible Compact Version 2008 or higher (to be ordered separately)	WinCC flexible Compact Version 2008 or higher (to be ordered separately)	WinCC flexible Compact Version 2008 or higher (to be ordered separately)	WinCC flexible Compact Version 2008 or higher (to be ordered separately)
Display					
Display type	STN, gray scales	STN, gray scales	TFT, 256 colors	TFT, 256 colors	TFT, 256 colors
Size	3.8"	5.7"	5.7"	10.4"	15"
Resolution (W x H in pixel)	320 x 240	320 x 240	320 x 240	640 x 480	1024 x 768
• MTBF backlighting (at 25 °C)	about 30,000 h	about 50,000 h	about 50,000 h	about 50,000 h	about 50,000 h

Technical specifications (continued)

	6AV6 647-0AA11-3AX0	6AV6 647-0AB11-3AX0	6AV6 647-0AD11-3AX0	6AV6 647-0AF11-3AX0	6AV6 647-0AG11-3AX0
Product name	**SIMATIC KTP400 Basic mono PN**	**SIMATIC KTP600 Basic mono PN**	**SIMATIC KTP600 Basic color PN**	**SIMATIC KTP1000 Basic color PN**	**SIMATIC TP1500 Basic color PN**
Operating mode					
Operating elements	Membrane keyboard	Membrane keyboard	Membrane keyboard	Membrane keyboard	Touchscreen
Function keys, programmable	4 function keys	6 function keys	6 function keys	8 function keys	none
Connection for mouse/keyboard/barcode reader	- / - / -	- / - / -	- / - / -	- / - / -	- / - / -
• Touchscreen	analog, resistive	analog, resistive	analog, resistive	analog, resistive	analog, resistive
• Numeric/alphabetical input	Yes / Yes	Yes / Yes	Yes / Yes	Yes / Yes	Yes / Yes
Ambient conditions					
Mounting position	vertical	vertical	vertical	vertical	vertical
maximum permissible angle of incliniation without external ventilation	+/- 35 °	+/- 35 °	+/- 35 °	+/- 35 °	+/- 35 °
max. relative humidity (in %)	90%	90%	90%	90%	90%
Temperature					
• Operation (vertical installation)	0 °C to +50 °C	0 °C to +50 °C	0 °C to +50 °C	0 °C to +50 °C	0 °C to +50 °C
• Operation (max. tilt angle)	0 °C to +40 °C	0 °C to +40 °C	0 °C to +40 °C	0 °C to +40 °C	0 °C to +40 °C
• Transport, storage	-20 °C to +60 °C	-20 °C to +60 °C	-20 °C to +60 °C	-20 °C to +60 °C	-20 °C to +60 °C
Degree of protection					
Front	IP65, NEMA 4, NEMA 4x, NEMA 12 (when installed)	IP65, NEMA 4, NEMA 4x, NEMA 12 (when installed)	IP65, NEMA 4, NEMA 4x, NEMA 12 (when installed)	IP65, NEMA 4x, NEMA 12 (when installed)	IP65, NEMA 4x, NEMA 12 (when installed)
Rear	IP20	IP20	IP20	IP20	IP20
Certifications & Standards					
Certifications	CE, UL, cULus, NEMA 4, NEMA 4x, NEMA 12	CE, UL, cULus, NEMA 4, NEMA 4x, NEMA 12	CE, UL, cULus, NEMA 4, NEMA 4x, NEMA 12	CE, UL, cULus, NEMA 4x, NEMA 12	CE, UL, cULus, NEMA 4x, NEMA 12
I/O/Options					
I/O devices	None	None	None	None	None
Type of output					
LED colors	None	None	None	None	None
Acoustics	Sound signal	Sound signal	Sound signal	Sound signal	Sound signal
Interfaces					
Interfaces	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)
PC card slot	No	No	No	No	No
CF card slot	No	No	No	No	No
Multi Media Card slot	No	No	No	No	No
USB	No	No	No	No	No
Ethernet	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)
Operating systems					
Operating system				LINUX	LINUX
Processor					
Processor	RISC 32 bit, 75	RISC 32 bit, 75 MHz	RISC 32 bit, 75 MHz	RISC 32 bit	RISC 32 bit, 200
Functionality under WinCC flexible					
Applications/options	None	None	None	None	None
Number of Visual Basic scripts	Not possible	Not possible	Not possible	Not possible	Not possible
Task planner	Yes	Yes	Yes	Yes	Yes

Technical specifications (continued)

	6AV6 647-0AA11-3AX0	6AV6 647-0AB11-3AX0	6AV6 647-0AD11-3AX0	6AV6 647-0AF11-3AX0	6AV6 647-0AG11-3AX0
Product name	**SIMATIC KTP400 Basic mono PN**	**SIMATIC KTP600 Basic mono PN**	**SIMATIC KTP600 Basic color PN**	**SIMATIC KTP1000 Basic color PN**	**SIMATIC TP1500 Basic color PN**
Help system	Yes	Yes	Yes	Yes	Yes
Status/control	Not possible	Not possible	Not possible	Not possible	Not possible
Message system					
• Number of messages	200	200	200	200	200
• Bit messages	Yes	Yes	Yes	Yes	Yes
• Analog messages	Yes	Yes	Yes	Yes	Yes
• Message buffer	Message buffer (n x 256 entries), non-retentive	Message buffer (n x 256 entries), non-retentive	Message buffer (n x 256 entries), non-retentive	Message buffer (n x 256 entries), non-retentive	Message buffer (n x 256 entries), non-retentive
Recipes					
• Recipes	5	5	5	5	5
• Data records per recipe	20	20	20	20	20
• Entries per data record	20	20	20	20	20
• Recipe memory	40 kB integrated Flash	40 kB integrated Flash	40 kB integrated Flash	32 kB integrated Flash	32 kB integrated Flash
Number of process images					
• Process images	50	50	50	50	50
• Variables	128	128	128	256	256
• Limit values	Yes	Yes	Yes	Yes	Yes
• Multiplexing	Yes	Yes	Yes	Yes	Yes
Image elements					
• Graphics object	Bit maps, icons, icon (full-screen), vector graphics	Bit maps, icons, icon (full-screen), vector graphics	Bit maps, icons, icon (full-screen), vector graphics	Bit maps, icons, icon (full-screen), vector graphics	Bit maps, icons, icon (full-screen), vector graphics
• dynamic objects	Diagrams	Diagrams	Diagrams	Diagrams	Diagrams
Lists					
• Text lists	150	150	150	150	150
• Graphics list	100	100	100	100	100
• Libraries	Yes	Yes	Yes	Yes	Yes
Security					
• Number of user groups	50	50	50	50	50
• Passwords exportable	No	No	No	No	No
• Number of user rights	32	32	32	32	32
Data medium support					
• PC card	No	No	No	No	No
• CF card	No	No	No	No	No
• Multi Media Card	No	No	No	No	No
Recording					
• Recording/Printing	PROFINET	PROFINET	PROFINET	PROFINET	PROFINET
Fonts					
• Keyboard fonts	US American (English)	US American (English)	US American (English)	US American (English)	US American (English)

Technical specifications (continued)

	6AV6 647-0AA11-3AX0	6AV6 647-0AB11-3AX0	6AV6 647-0AD11-3AX0	6AV6 647-0AF11-3AX0	6AV6 647-0AG11-3AX0
Product name	**SIMATIC KTP400 Basic mono PN**	**SIMATIC KTP600 Basic mono PN**	**SIMATIC KTP600 Basic color PN**	**SIMATIC KTP1000 Basic color PN**	**SIMATIC TP1500 Basic color PN**
Languages					
• Online languages	5	5	5	5	5
• Configuration languages	D, GB, F, I, E, CHN "traditional", CHN "simplified", DK, FIN, GR, J, KP / ROK, NL, N, PL, P, RUS, S, CZ / SK, TR, H	D, GB, F, I, E, CHN "traditional", CHN "simplified", DK, FIN, GR, J, KP / ROK, NL, N, PL, P, RUS, S, CZ / SK, TR, H	D, GB, F, I, E, CHN "traditional", CHN "simplified", DK, FIN, GR, J, KP / ROK, NL, N, PL, P, RUS, S, CZ / SK, TR, H	D, GB, F, I, E, CHN "traditional", CHN "simplified", DK, FIN, GR, J, KP / ROK, NL, N, PL, P, RUS, S, CZ / SK, TR, H	D, GB, F, I, E, CHN "traditional", CHN "simplified", DK, FIN, GR, J, KP / ROK, NL, N, PL, P, RUS, S, CZ / SK, TR, H
• Fonts	WinCC flexible Standard, symbol languages	WinCC flexible Standard, symbol languages	WinCC flexible Standard, symbol languages	WinCC flexible Standard, symbol languages	WinCC flexible Standard, symbol languages
Transfer (Upload/Download)					
• Transfer of configuration	Ethernet, automatic transfer recognition	Ethernet, automatic transfer recognition	Ethernet, automatic transfer recognition	Ethernet, automatic transfer recognition	Ethernet, automatic transfer recognition
Process coupling					
• Connection to controller	S7-200, S7- 300/400, WinAC, PC (TCP/IP) see Catalog ST 80	S7-200, S7- 300/400, WinAC, PC (TCP/IP) see Catalog ST 80	S7-200, S7- 300/400, WinAC, PC (TCP/IP) see Catalog ST 80	S7-200, S7- 300/400, WinAC, PC (TCP/IP) see Catalog ST 80	S7-200, S7- 300/400, WinAC, PC (TCP/IP) see Catalog ST 80
Expandability/openness					
• Open Platform Program	No	No	No	No	No
Dimensions					
Front of enclosure (W x H)	140 mm x 116 mm	214 mm x 158 mm	214 mm x 158 mm	335 mm x 275 mm	400 mm x 310 mm
Mounting cutout/Device depth (W x H/D) in mm	123 mm x 99 mm / 40 mm device depth	197 mm x 141 mm / 44 mm device depth	197 mm x 141 mm / 44 mm device depth	310 mm x 248 mm / 60 mm device depth	367 mm x 289 mm / 60 mm device depth
Dimensions and weight					
Weight					
• Weight	0.33 kg	1.1 kg	1.1 kg	2.5 kg	4.2 kg

Ordering data		Order No.
SIMATIC KTP400 Basic mono PN	E	**6AV6 647-0AA11-3AX0**
Starter kit for SIMATIC KTP400 Basic mono PN	A	**6AV6 652-7AA01-3AA0**
SIMATIC KTP600 Basic mono PN	E	**6AV6 647-0AB11-3AX0**
Starter kit for SIMATIC KTP600 Basic mono PN	A	**6AV6 652-7BA01-3AA0**
SIMATIC KTP600 Basic color PN	E	**6AV6 647-0AD11-3AX0**
Starter kit for SIMATIC KTP600 Basic color PN	A	**6AV6 652-7DA01-3AA0**
SIMATIC KTP1000 Basic color PN	E	**6AV6 647-0AF11-3AX0**
Starter kit for SIMATIC KTP1000 Basic color PN	A	**6AV6 652-7FA01-3AA0**
SIMATIC TP1500 Basic color PN	E	**6AV6 647-0AG11-3AX0**
Starter kits consist of: • the relevant SIMATIC KTP Basic Panel • SIMATIC WinCC flexible Compact engineering software • SIMATIC HMI Manual Collection (DVD), 5 languages (English, French, German, Italian, Spanish), comprising: all currently available user manuals, manuals and communication manuals for SIMATIC HMI • Ethernet cable on PN devices • MPI cable on DP devices (for download and test purposes only) • Voucher for Software Update Service for 1 year		

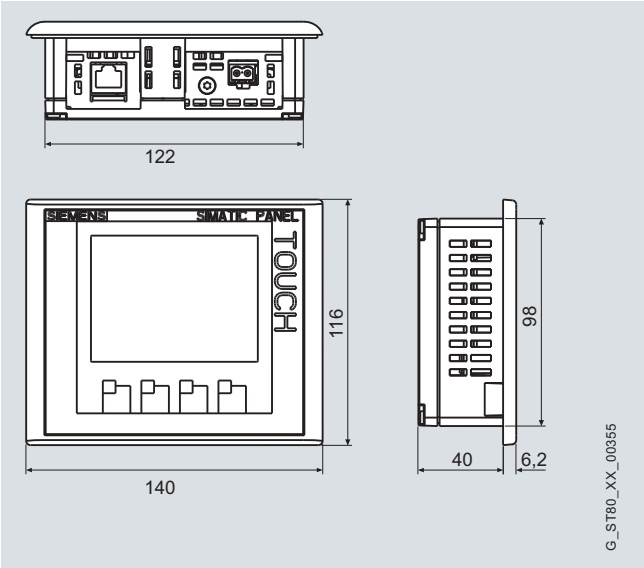
A: Subject to export regulations: AL: N and ECCN: 5D992
D: Subject to export regulations: AL: N and ECCN: EAR99S

	Order No.
Configuration	
• with SIMATIC WinCC flexible Compact	See Catalog ST 80
Documentation (to be ordered separately)	
You can find the manual for the Basic Panels on the Internet at http://support.automation.siemens.com	
User Manual WinCC flexible Compact/Standard/Advanced	
• German	**6AV6 691-1AB01-3AA0**
• English	**6AV6 691-1AB01-3AB0**
• French	**6AV6 691-1AB01-3AC0**
• Italian	**6AV6 691-1AB01-3AD0**
• Spanish	**6AV6 691-1AB01-3AE0**
User Manual WinCC flexible Communication	
• German	**6AV6 691-1CA01-3AA0**
• English	**6AV6 691-1CA01-3AB0**
• French	**6AV6 691-1CA01-3AC0**
• Italian	**6AV6 691-1CA01-3AD0**
• Spanish	**6AV6 691-1CA01-3AE0**
SIMATIC HMI Manual Collection D	**6AV6 691-1SA01-0AX0**
Electronic documentation, on DVD 5 languages (English, French, German, Italian and Spanish); contains: all currently available user manuals, manuals and communication manuals for SIMATIC HMI	
Accessories	
Accessories for supplementary ordering	See Catalog ST 80

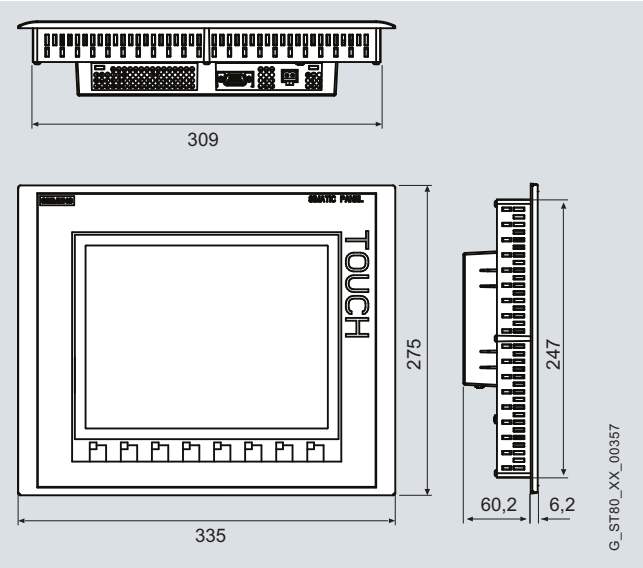
E: Subject to export regulations: AL: N and ECCN: EAR99T

Dimensional drawings

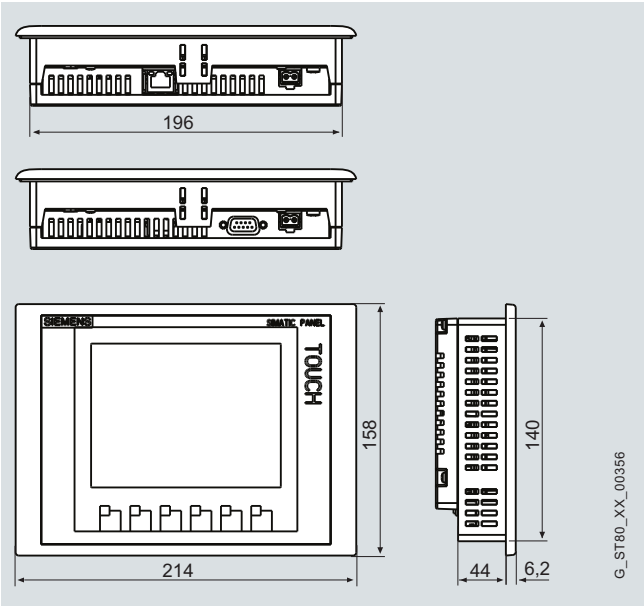
All dimensions in mm.



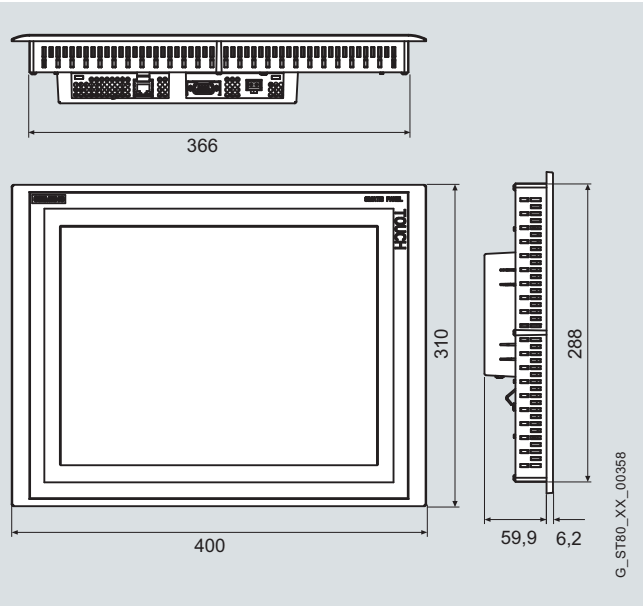
KTP400 Basic



KTP1000 Basic



KTP600 Basic



TP1500 Basic

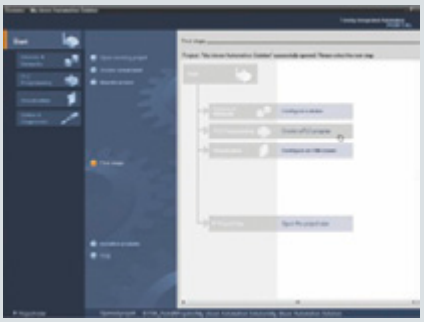
More information

Additional information is available in the Internet under:

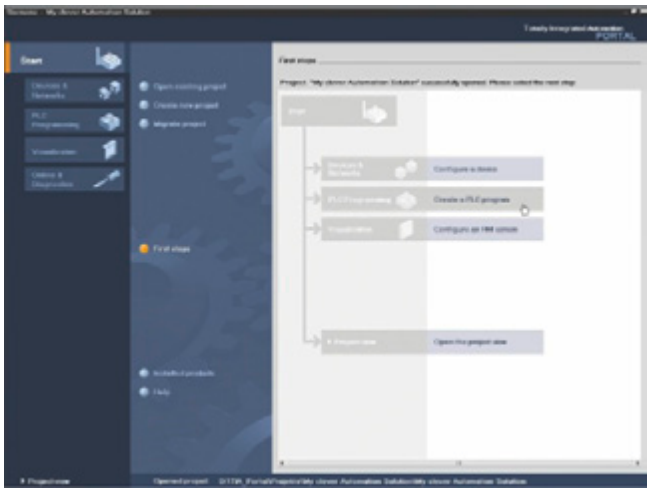
http://www.siemens.com/panels

Note:

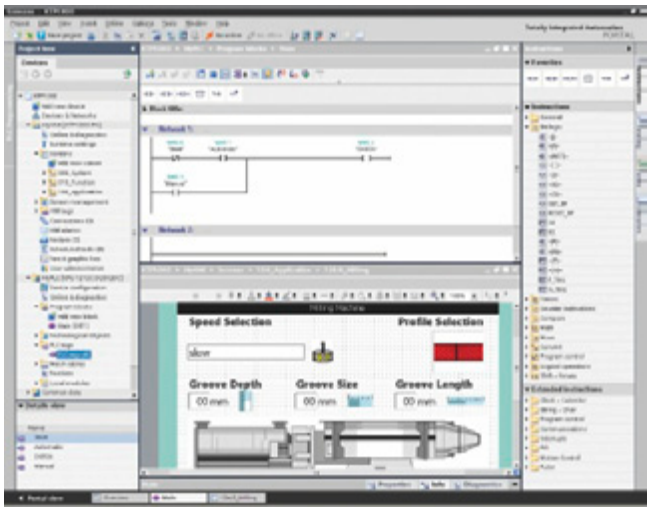
Do you require a specific modification to or supplement for the products described here? Look in the catalog ST 80 under "Customized products". We provide information there about additional and generally available sector products, and about the customer-specific modification and adaptation options.



Overview



STEP 7 Basic, portal view



STEP 7 Basic, project view

The STEP 7 Basic software is the engineering system for programming the SIMATIC S7-1200. The WinCC Basic engineering system included in the package additionally allows configuration of SIMATIC HMI Basic Panels on the S7-1200.

STEP 7 Basic thus provides support in all phases of the automation project:

- Configuring and parameterizing the hardware
- Specifying the communication
- Programming in LAD (Ladder Diagram) and FBD (Function Block Diagram)
- Configuration of the visualization
- Test, commissioning, and service

Benefits

Optimized interaction of controller and HMI engineering

Efficient solving of complete automation task through:

- Integrated handling of controller programming and HMI configuration in one engineering framework
- Common data management
- Integral WinCC Basic configuration environment; the application can be supplemented seamlessly by SIMATIC HMI Basic Panels.

Fast startup using the portal view

The portal view facilitates navigation:

- It is also possible for beginners to access each task rapidly and specifically.
- In the event of maintenance, fast access to the online views directly in the portal overview; previous downloading of a project is unnecessary.

Intuitive user interface

Use of STEP 7 Basic is extremely intuitive:

- Editors matched to the tasks and sequence
- Use of the latest Windows technologies

Application

STEP 7 Basic is the engineering system for automation systems with SIMATIC S7-1200. In addition to programming of the controller, it permits configuration of the connected SIMATIC HMI Basic Panels in association with the integral WinCC Basic. It is thus possible to use the full performance of these systems simply and conveniently with just one tool.

STEP 7 Basic can be used for:

- Programming of the SIMATIC S7-1200 controller family: CPU 1211C, CPU 1212C, CPU 1214C
- Configuration of the PROFINET-based SIMATIC HMI Basic Panels:
  KTP400 Basic, KTP600 Basic mono and KTP600 Basic color, KTP1000 Basic, TP1500 Basic;
  KTP400 Basic and KTP600 Basic can also be configured for upright mounting.

Function

Device & network configuration

- Clear configuration of network and device functionalities in specialized views of the editor
- Device view
  - photorealistic representation and configuration of the hardware modules
  - clipboard for modules; for simple intermediate storage of respective module parameters
  - catalog; includes all panels, CPUs, and modules with firmware versions
- Network view
  - clear total view of all devices and network components used
  - intelligent drag&drop function for generation of connections

Controller programming

- Powerful editors for programming the S7-1200 in LAD and FBP
  - comprehensive catalog of instructions
  - configurable favorites area for frequently used instructions
  - table-based editor for configuration of block interfaces
  - intellisense for support during selection of tags
  - simple reuse of instructions or networks within a project
- Motion and technology functionalities
  - system support for integrated technology functions such as "Speed-controlled axis" and "Positioning axis"
  - PID controller with self-optimization (autotuning)

Visualization

- Powerful editors for configuration of Basic Panel functionalities
  - operating screens with touch/key operation and trend/vector graphics
  - bit and analog alarms
  - recipe management
- Multi-language (up to 5 languages online)
- Graphics library with off-the-shelf picture objects
- Intelligent drag&drop for efficient configuration of standard functionalities

Integration

- Integrated symbolic programming
- Direct use of control variables in the HMI to avoid multiple inputs
- Common cross-reference list for configuration objects (tags, blocks, etc.) for system-based project analysis or trouble-shooting
- Automatic generation of connections when using the control variables in the HMI
- Global and local libraries for simple repeated use of preconfigured elements
- Intelligent drag&drop for importing and interconnecting data from different editors

Online diagnostics

- Clear representation of module diagnostics information
- Monitoring tables with "Force" and "Control" facilities
- Automatic display of all nodes accessible in the network
- Detailed comparison between online and offline projects

Technical specifications

	STEP 7 Basic
Licensing form	Single License
Software class	A
Current version	V10.5
Target system	SIMATIC S7-1200
Operating system	Windows XP Professional SP3 (32 bit) Windows Vista Ultimate SP1 (32 bit) Windows Vista Business SP1 (32 bit) Windows Vista Home Premium SP1 (32 bit)
Main memory size in programming device/PC, min.	1 GB
Disk memory requirement in programming device/PC	2 GB
Remark	Includes the IEC programming languages LAD and FBP

Ordering data

		Order No.
STEP 7 Basic V10.5		
Target system: SIMATIC S7-1200, SIMATIC HMI Basic Panels *Requirement:* Windows XP SP3, Vista Ultimate SP1, Vista Business SP1, Home Premium SP1 *Type of delivery:* German, English		
STEP 7 Basic V10.5 on DVD	D	**6ES7 822 -0AA00-0YA0**
Software Update Service (requires current software version)	D	**6ES7 822 -0AA00-0YL0**

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

More information

Brochures

Information material for downloading can be found in the Internet:

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

SIPLUS S7-1200

6

SIPLUS CPU 1211C, CPU 1212C, CPU 1214C

Overview SIPLUS CPU 1211C

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

	SIPLUS CPU 1211C		
Order No.	**6AG1 211-1BD30-2XB0**	**6AG1 211-1AD30-2XB0**	**6AG1 211-1HD30-2XB0**
Order No. based on	**6ES7 211-1BD30-0XB0**	**6ES7 211-1AD30-0XB0**	**6ES7 211-1HD30-0XB0**
Ambient temperature range	-25 ... +70 °C; condensation permitted		
Environmental conditions	With conformal coating. Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere)		
Technical specifications	The technical data are identical with those of the based-on modules.		

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

Overview SIPLUS CPU 1212C

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

	SIPLUS CPU 1212C		
Order No.	**6AG1 212-1BD30-2XB0**	**6AG1 212-1AD30-2XB0**	**6AG1 212-1HD30-2XB0**
Order No. based on	**6ES7 212-1BD30-0XB0**	**6ES7 212-1AD30-0XB0**	**6ES7 212-1HD30-0XB0**
Ambient temperature range	-25 ... +70 °C; condensation permitted		
Environmental conditions	With conformal coating. Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere)		
Technical specifications	The technical data are identical with those of the based-on modules.		

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

Overview SIPLUS CPU 1214C

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

	SIPLUS CPU 1214C		
Order No.	**6AG1 214-1BE30-2XB0**	**6AG1 214-1AE30-2XB0**	**6AG1 214-1HE30-2XB0**
Order No. based on	**6ES7 214-1BE30-0XB0**	**6ES7 214-1AE30-0XB0**	**6ES7 214-1HE30-0XB0**
Ambient temperature range	-25 ... +70 °C; condensation permitted		
Environmental conditions	With conformal coating. Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere)		
Technical specifications	The technical data are identical with those of the based-on modules.		

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

Ordering data

		Order No.
SIPLUS CPU 1211C (extended temperature range and medium exposure)		
Compact CPU, AC/DC/relay; Integral program/data memory 25 KB, load memory 1 MB; wide-range power supply 85 ... 264 V AC; Boolean execution times 0.1 ms per operation; 6 digital inputs, 4 digital outputs (relays), 2 analog inputs; expandable by up to 3 communication modules and 1 signal board; digital inputs can be used as HSC at 100 kHz	C	**6AG1 211-1BD30-2XB0**
Compact CPU, DC/DC/DC; integral program/data memory 25 KB, load memory 1 MB; power supply 24 V DC; Boolean execution times 0.1 ms per operation; 6 digital inputs, 4 digital outputs (relays), 2 analog inputs; expandable by up to 3 communication modules and 1 signal board; digital inputs can be used as HSC at 100 kHz, 24 V DC digital outputs can be used as pulse outputs (PTO) or pulse-width modulated outputs (PWM) with 100 kHz	C	**6AG1 211-1AD30-2XB0**

		Order No.
SIPLUS CPU 1211C (cont.) (extended temperature range and medium exposure)		
Compact CPU, DC/DC/relay; integral program/data memory 25 KB, load memory 1 MB; power supply 24 V DC; Boolean execution times 0.1 ms per operation; 6 digital inputs, 4 digital outputs, 2 analog inputs; expandable by up to 3 communication modules and 1 signal board; digital inputs can be used as HSC at 100 kHz	C	**6AG1 211-1HD30-2XB0**

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

6

SIPLUS CPU 1211C, CPU 1212C, CPU 1214C

Ordering data		Order No.
SIPLUS CPU 1212C		
(extended temperature range and medium exposure)		
Compact CPU, AC/DC/relay; integral program/data memory 25 KB, load memory 1 MB; wide-range power supply 85 ... 264 V AC; Boolean execution times 0.1 ms per operation; 8 digital inputs, 6 digital outputs (relays), 2 analog inputs; expandable by up to 3 communication modules, 2 signal modules and 1 signal board; digital inputs can be used as HSC at 100 kHz	C	**6AG1 212-1BD30-2XB0**
Compact CPU, DC/DC/DC; integral program/data memory 25 KB, load memory 1 MB; power supply 24 V DC; Boolean execution times 0.1 ms per operation; 8 digital inputs, 6 digital outputs (relays), 2 analog inputs; expandable by up to 3 communication modules, 2 signal modules and 1 signal board; digital inputs can be used as HSC at 100 kHz, 24 V DC digital outputs can be used as pulse outputs (PTO) or pulse-width modulated outputs (PWM) with 100 kHz	C	**6AG1 212-1AD30-2XB0**
Compact CPU, DC/DC/relay; integral program/data memory 25 KB, load memory 1 MB; power supply 24 V DC; Boolean execution times 0.1 ms per operation; 8 digital inputs, 6 digital outputs, 2 analog inputs; expandable by up to 3 communication modules, 2 signal modules and 1 signal board; digital inputs can be used as HSC at 100 kHz	C	**6AG1 212-1HD30-2XB0**
SIPLUS CPU 1214C		
(extended temperature range and medium exposure)		
Compact CPU, AC/DC/relay; integral program/data memory 50 KB, load memory 2 MB; wide-range power supply 85 ... 264 V AC; Boolean execution times 0.1 ms per operation; 14 digital inputs, 10 digital outputs (relays), 2 analog inputs; expandable by up to 3 communication modules, 8 signal modules and 1 signal board; digital inputs can be used as HSC at 100 kHz	C	**6AG1 214-1BE30-2XB0**
Compact CPU, DC/DC/DC; integral program/data memory 50 KB, load memory 2 MB; power supply 24 V DC; Boolean execution times 0.1 ms per operation; 14 digital inputs, 10 digital outputs (relays), 2 analog inputs; expandable by up to 3 communication modules, 8 signal modules and 1 signal board; digital inputs can be used as HSC at 100 kHz, 24 V DC digital outputs can be used as pulse outputs (PTO) or pulse-width modulated outputs (PWM) with 100 kHz	C	**6AG1 214-1AE30-2XB0**
Compact CPU, DC/DC/relay; integral program/data memory 50 KB, load memory 2 MB; power supply 24 V DC; Boolean execution times 0.1 ms per operation; 14 digital inputs, 10 digital outputs, 2 analog inputs; expandable by up to 3 communication modules, 8 signal modules and 1 signal board; digital inputs can be used as HSC at 100 kHz	C	**6AG1 214-1HE30-2XB0**
Accessories		see S7-1200 CPUs, pages 2/14, 2/24, 2/34

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

Overview SIPLUS SM 1221 digital input module

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

	SIPLUS SM 1221	
Order No.	**6AG1 221-1BF30-2XB0**	**6AG1 221-1BH30-2XB0**
Order No. based on	**6ES7 221-1BF30-0XB0**	**6ES7 221-1BH30-0XB0**
Ambient temperature range	-25 ... +70 °C; condensation permitted	
Environmental conditions	With conformal coating. Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere)	
Technical specifications	The technical data are identical with those of the based-on modules.	

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

Overview SIPLUS SM 1222 digital output module

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

	SIPLUS SM 1222			
Order No.	**6AG1 222-1BF30-2XB0**	**6AG1 222-1HF30-2XB0**	**6AG1 222-1BH30-2XB0**	**6AG1 222-1HH30-2XB0**
Order No. based on	**6ES7 222-1BF30-0XB0**	**6ES7 222-1HF30-0XB0**	**6ES7 222-1BH30-0XB0**	**6ES7 222-1HH30-0XB0**
Ambient temperature range	-25 ... +70 °C; condensation permitted			
Environmental conditions	With conformal coating. Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere)			
Technical specifications	The technical data are identical with those of the based-on modules.			

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

SIPLUS SM 1221, SM 1222, SM 1223

Overview SIPLUS SM 1223 digital input/output modules

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

	SIPLUS SM 1223			
Order No.	**6AG1 223-1BH30-2XB0**	**6AG1 223-1PH30-2XB0**	**6AG1 223-1BL30-2XB0**	**6AG1 223-1PL30-2XB0**
Order No. based on	**6ES7 223-1BH30-0XB0**	**6ES7 223-1PH30-0XB0**	**6ES7 223-1BL30-0XB0**	**6ES7 223-1PL30-0XB0**
Ambient temperature range	-25 ... +70 °C; condensation permitted			
Environmental conditions	With conformal coating. Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere)			
Technical specifications	The technical data are identical with those of the based-on modules.			

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

Ordering data

		Order No.
SIPLUS SM 1221 digital input signal module		
(extended temperature range and medium exposure)		
8 inputs, 24 V DC, isolated, current sourcing/sinking	C	**6AG1 221-1BF30-2XB0**
16 inputs, 24 V DC, isolated, current sourcing/sinking	C	**6AG1 221-1BH30-2XB0**
SIPLUS SM 1222 digital output signal module		
(extended temperature range and medium exposure)		
8 outputs, 24 V DC; 0.5 A, 5 W, isolated	C	**6AG1 222-1BF30-2XB0**
16 outputs, 24 V DC; 0.5 A, 5 W, isolated	C	**6AG1 222-1BH30-2XB0**
8 relay outputs, 5 ... 30 V DC/ 5 ... 250 V AC, 2 A, 30 W DC/ 200 W AC	C	**6AG1 222-1HF30-2XB0**
16 relay outputs, 5 ... 30 V DC/ 5 ... 250 V AC, 2 A, 30 W DC/ 200 W AC	C	**6AG1 222-1HH30-2XB0**

		Order No.
SIPLUS SM 1223 digital input/output signal module		
(extended temperature range and medium exposure)		
8 inputs, 24 V DC, IEC type 1 current sinking; 8 24 V DC transistor outputs, 0.5 A, 5 W	C	**6AG1 223-1BH30-2XB0**
16 inputs, 24 V DC, IEC type 1 current sinking; 16 24 V DC transistor outputs, 0.5 A, 5 W	C	**6AG1 223-1BL30-2XB0**
8 inputs, 24 V DC, IEC type 1 current sinking; 8 relay outputs, 5 ... 30 V DC/ 5 ... 250 V AC, 2 A, 30 W DC/ 200 W AC	C	**6AG1 223-1PH30-2XB0**
16 inputs, 24 V DC, IEC type 1 current sinking; 16 relay outputs, 5 ... 30 V DC/ 5 ... 250 V AC, 2 A, 30 W DC/ 200 W AC	C	**6AG1 223-1PL30-2XB0**
Accessories		See S7-1200-digital modules, pages 2/37, 2/41, 2/46

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

Overview SIPLUS SB 1223 digital input/output module

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

	SIPLUS SB 1223
Order No.	**6AG1 223-0BD30-2XB0**
Order No. based on	**6ES7 223-0BD30-0XB0**
Ambient temperature range	-25 ... +70 °C; condensation permitted
Environmental conditions	With conformal coating. Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere)
Technical specifications	The technical data are identical with those of the based-on modules.

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

Ordering data

		Order No.
SIPLUS SB 1223 digital input/output signal board		
(extended temperature range and medium exposure)		
2 inputs, 24 V DC, IEC type 1 current sinking; two 24 V DC transistor outputs, 0.5 A, 5 W; can be used as HSC at up to 30 kHz	C	**6AG1 223-0BD30-2XB0**
Accessories		See S7-1200 digital modules, page 2/48

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

SIPLUS SM 1231, SM 1232, SM 1234

Overview SM 1231 analog input module

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

	SIPLUS SM 1231
Order No.	**6AG1 231-4HD30-2XB0**
Order No. based on	**6ES7 231-4HD30-0XB0**
Ambient temperature range	-25 ... +70 °C; condensation permitted
Environmental conditions	With conformal coating. Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere)
Technical specifications	The technical data are identical with those of the based-on modules.

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

Overview SIPLUS SM 1232 analog output module

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

	SIPLUS SM 1232
Order No.	**6AG1 232-4HB30-2XB0**
Order No. based on	**6ES7 232-4HB30-0XB0**
Ambient temperature range	-25 ... +70 °C; condensation permitted
Environmental conditions	With conformal coating. Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere)
Technical specifications	The technical data are identical with those of the based-on modules.

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

Overview SIPLUS SM 1234 analog input/output module

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

	SIPLUS SM 1234
Order No.	**6AG1 234-4HE30-2XB0**
Order No. based on	**6ES7 234-4HE30-0XB0**
Ambient temperature range	-25 ... +70 °C; condensation permitted
Environmental conditions	With conformal coating. Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere)
Technical specifications	The technical data are identical with those of the based-on modules.

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

Ordering data

		Order No.
SIPLUS SM 1231 analog input signal module		
(extended temperature range and medium exposure)		
4 analog inputs ± 10 V, ± 5 V, ± 2.5 V, or 0 ... 20 mA 12 bit + sign	C	**6AG1 231-4HD30-2XB0**
SIPLUS SM 1232 analog output signal module		
(extended temperature range and medium exposure)		
2 analog outputs, ± 10 V with 14 bit or 0 ... 20 mA with 13 bit	C	**6AG1 232-4HB30-2XB0**
SIPLUS SM 1234 analog input/output signal module		
(extended temperature range and medium exposure)		
4 analog inputs, ± 10 V, ± 5 V, ± 2.5 V, or 0 ... 20 mA, 12 bit + sign; 2 analog outputs, ± 10 V with 14 bit or 0 ... 20 mA with 13 bit	C	**6AG1 234-4HE30-2XB0**
Accessories		See S7-1200 analog modules, pages 2/51, 2/53, 2/56

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

SIPLUS SB 1232

Overview SIPLUS SB 1232 analog output module

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

	SIPLUS SB 1232
Order No.	**6AG1 232-4HA30-2XB0**
Order No. based on	**6ES7 232-4HA30-0XB0**
Ambient temperature range	-25 ... +70 °C; condensation permitted
Environmental conditions	With conformal coating. Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere)
Technical specifications	The technical data are identical with those of the based-on modules.

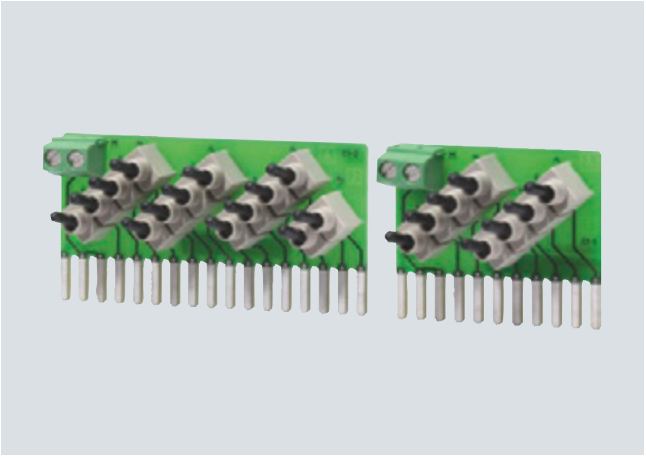
For further technical documentation on SIPLUS, see:
http://www.siemens.com/siplus-techdoku

Ordering data

		Order No.
SIPLUS SB 1232 analog output signal board		
(extended temperature range and medium exposure)		
1 analog output, ± 10 V with 12 bit or 0 ... 20 mA with 11 bit	C	**6AG1 232-4HA30-2XB0**
Accessories		See S7-1200 analog modules, page 2/58

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

Overview



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

	SIPLUS SIM 1274	
Order No.	**6AG1 274-1XH30-2XA0**	**6AG1 274-1XF30-2XA0**
Order No. based on	**6ES7 274-1XH30-0XA0**	**6ES7 274-1XF30-0XA0**
Ambient temperature range	-25 ... +70 °C; condensation permitted	
Environmental conditions	With conformal coating. Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere)	
Technical specifications	The technical data are identical with those of the based-on modules.	

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

Ordering data

		Order No.
Digital input simulator SIPLUS SIM 1274 simulator module (optional)		
(extended temperature range and medium exposure)		
with 14 input switches, for CPU 1214C	C	**6AG1 274-1XH30-2XA0**
with 8 input switches, for CPU 1211C, CPU 1212C	C	**6AG1 274-1XF30-2XA0**
Accessories		See S7-1200 special modules, page 2/59

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

SIPLUS CM 1241 communication module

Overview

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

	SIPLUS CM 1241	
Order No.	**6AG1 241-1CH30-2XB0**	**6AG1 241-1AH30-2XB0**
Order No. based on	**6ES7 241-1CH30-0XB0**	**6ES7 241-1AH30-0XB0**
Ambient temperature range	-25 ... +70 °C; condensation permitted	
Environmental conditions	With conformal coating. Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere)	
Technical specifications	The technical data are identical with those of the based-on modules.	

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

Ordering data

		Order No.
SIPLUS CM 1241 communication module		
(extended temperature range and medium exposure)		
Communication module for point-to-point connection, with one RS485 interface	C	**6AG1 241-1CH30-2XB0**
Communication module for point-to-point connection, with one RS232 interface	C	**6AG1 241-1AH30-2XB0**
Accessories		See CM 1241 communication module, page 3/3

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

6

Training

7

Introduction

Faster and more applicable know-how: Hands-on training from the manufacturer

SITRAIN® – the Siemens Training for Automation and Industrial Solutions – provides you with comprehensive support in solving your tasks.

Training by the market leader in automation and plant engineering enables you to make independent decisions with confidence. Especially where the optimum and efficient use of products and plants are concerned. You can eliminate deficiencies in existing plants, and exclude expensive faulty planning right from the beginning.

First-class know-how directly pays for itself: In shorter startup times, high-quality end products, faster troubleshooting and reduced downtimes. In other words, increased profits and lower costs.

Achieve more with SITRAIN

- Shorter times for startup, maintenance and servicing
- Optimized production operations
- Reliable configuration and startup
- Minimization of plant downtimes
- Flexible plant adaptation to market requirements
- Compliance with quality standards in production
- Increased employee satisfaction and motivation
- Shorter familiarization times following changes in technology and staff

SITRAIN highlights

Top trainers

Our trainers are skilled teachers with direct practical experience. Course developers have close contact with product development, and directly pass on their knowledge to the trainers.

Practical experience

The practical experience of our trainers enables them to teach theory effectively. But since theory can be pretty drab, we attach great importance to practical exercises which can comprise up to half of of the course time. You can therefore immediately implement your new knowledge in practice. We train you on state-of-the-art methodically/didactically designed training equipment. This training approach will give you all the confidence you need.

Wide variety

With a total of about 300 local attendance courses, we train the complete range of Siemens Industry products as well as interaction of the products in systems.

Tailor-made training

We are only a short distance away. You can find us at more than 50 locations in Germany, and in 62 countries worldwide. You wish to have individual training instead of one of our 300 courses? Our solution: We will provide a program tailored exactly to your personal requirements. Training can be carried out in our Training Centers or at your company.

The right mixture: Blended learning

"Blended learning" means a combination of various training media and sequences. For example, a local attendance course in a Training Center can be optimally supplemented by a teach-yourself program as preparation or follow-up. Additional effect: Reduced traveling costs and periods of absence.

That is new at SITRAIN

With the product launch of SIMATIC S7-1200 SITRAIN offers a course for operating and programming the SIMATIC S7-1200!

This training imparts knowledge about the essential basics of the automation system SIMATIC S7-1200 and the engineering system SIMATIC STEP 7 Basic. During the training all topics are deepened by practical exercises with the automation system SIMATIC S7-1200, a Basis Panel and a conveyer belt model. So you are able to stabilize your theoretically know how.

After finishing the course you may use your new automation system of Siemens, the SIMATIC S7-1200, effectively and you may implement your programs faster. So you save time and optimize your working input.

Content of the training

- Presentation SIMATIC S7-1200 and SIMATIC STEP 7 Basic
- Configuration of devices and networks
- Working with symbol list
- Working with program blocks
- Data management with data blocks
- Programming organization blocks
- Working with tools for trouble shooting
- Presentation of human machine interface system
- Saving and documenting programs

This training is optimal for you if you are part of one of the following target groups:

- Programmer
- Commissioning engineers, configuring engineers
- Service personnel
- Operators, users
- Maintenance personnel

Contact

Visit our site on the Internet at:

www.siemens.com/sitrain

or please contact our central Customer Care Center in Nuremberg, Germany:

Phone:+49 (0) 911 / 895 3200

Fax:+49 (0) 911 / 895 3275

(0.14 €/min. from a German landline network, mobile telephone prices may vary)

E-Mail: sitrain.nbg.aud@siemens.com

SITRAIN Certification Programs: Siemens Certified Service Technician Level 1

Siemens Certified Service Technician Level 1

The Siemens Certified Service Technician Level 1 is based on basic know how of SIMATIC PLC service training.

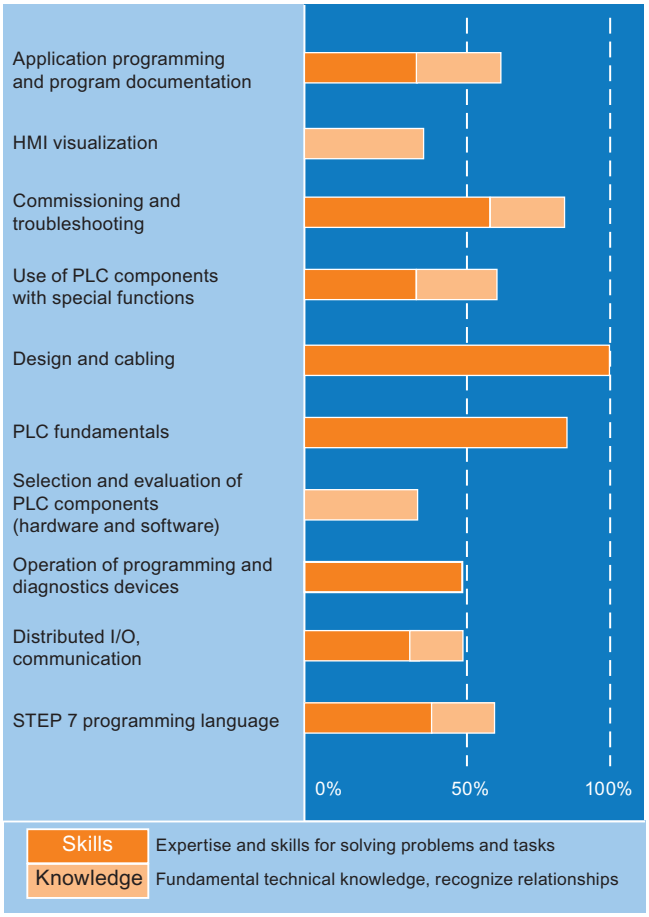
Requirements profile

Tasks

Professional assembly, connection of programmable logic controls, program changes, error diagnostics.

Capabilities of a Siemens Certified Service Technician Level 1

- You know the assembly and functionality of a PLC and the basic operations of the respective program language
- You know who to assemble and connect programmable logic devices, how to control in- and outputs and – with tutorial help – how to realize startups



Content

Basic terms of programmable logic control
- Signal transmitter, process image
- Handling the program
- Actuators
- Tasks and application area of programmable logic control systems

Hardware components
- Module rack
- Power supply
- Central processing unit
- I/O devices (digital and analogue)
- Addressing I/O devices
- Connecting sensors and actuators
- Centralized and decentralized control system

Software of a programmable logic control
- Application program
- Eradication of application program
- Cycle time, cycle time controlling
- Reaction time

Programming of a programmable logic control: overview
- Program languages acc. To IEC 1131: AWL (Anwendungsliste), KOP (contact plan), FUP (function plan)
- Assembly of a command
- Addressing of I/O devices
- Logical conjunctions of input signals
- Bit, Byte and word processing
- Marker and their functions
- Memory functionality
- Counter, time element, comparators
- Exporting of results on output

Program devices
- Realize, test and document programs
- Program devices on PC basis
- PC working environment

Program languages and illustration possibilities
- Programming in KOP (contact plan), FUP (function plan) and AWL (Anweisungsliste)
  - Logical conjunctions of input signals
  - Basic operations
  - Illustration of elements and modules
  - Test of programs with simulator
- Realizing a simple PC program
  - Analysis of assignment of a task
  - Structure of a program
  - Program draft with logic and sequence control
  - Data modules
  - Function modules
  - Documentation of hardware and software
- Safety circuit acc. To IEC 204 (DIN(VDE 0113 T1)
  - Programming safe against wire breakages

Assembly
- Assembly guidelines for programmable controllers (PLCs)

Startup and troubleshooting with a real control
- Systematical approach for startup, hardware test and functional test
- Diagnostic possibilities for detection of hardware and software defaults

Part of praxis
Minimum 40 % of total time of training.

SITRAIN Certification Programs: Siemens Certified Service Technician Level 2

Siemens Certified Service Technician Level 2

The Siemens Certified Service TechnicianLevel 2 is based on know how of Siemens Certified Service Technician Level 1 (Factory Automation).

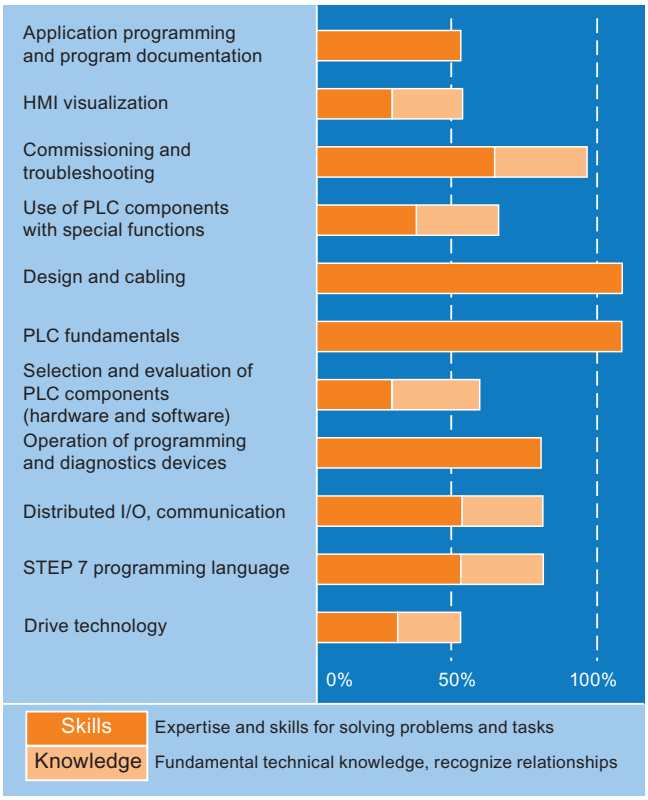
Requirements profile

Tasks

- Professional assembly, connection of programmable logic controls, program changes, troubleshooting
- Startup of Distributed I/O
- Startup of a drive
- Startup of human machine interface devices

Capabilities of a Siemens Certified Service Technician Level 2

- You know the assembly and functionality of a PLC and the basic operations of the respective program language
- You know who to assemble and connect programmable logic devices, how to control in- and outputs and how to realize startups



Expertise and skills for solving problems and tasks
Fundamental technical knowledge, recognize relationships

Content

Based on content of Siemens Certified Service Technician Level 1 (Factory Automation)::

Assembly

- Assembly guidelines for programmable controllers (PLCs)
- Wiring

Startup of the hardware of a PLC and the components of Totally Integrated Automation

- CPU
- I/O modules (digital and analog) and their addressing
- Configuring the distributed I/O, a drive and human machine interface devices

Software of a PLC

- Operating system of the PLC
- User program
- Sequence of the user program

Creation and startup of a simple PLC program

- Design and structuring of a program
- Logic operations with inputs/outputs and bit memories
- Memory functions, timer functions and counter functions
- Data blocks, organization blocks and function blocks, functions and system functions
- Hardware and software troubleshooting

Part of praxis
Minimum 40 % of total time of training.

Siemens Certified Programmer

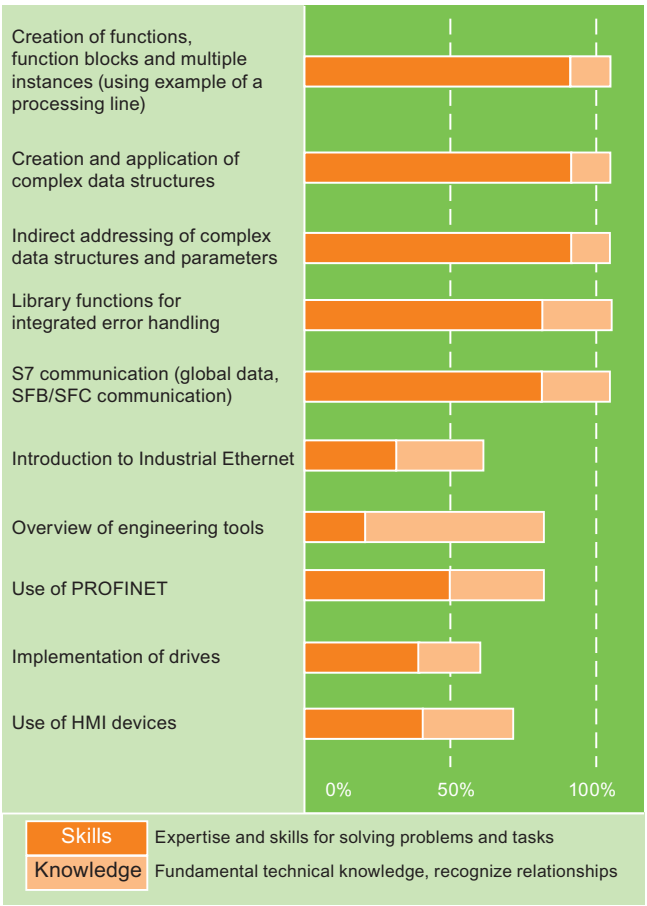
Requirements profile

Tasks

- Engineer-like tasks with need of complex programming possibilities with SIMATIC S7
- Use of distributed I/O (PROFIBUS DP, PROFINET)
- Use of drives
- Use of human machine interface devices (WinCC flexible)

Capabilities of a Siemens Certified Programmer

- You know the assembly and functionality of a PLC and the basic and complex operations of the respective program language
- You know who to use this know how for complex tasks



Content

Startup of PLC hardware and components of Totally Integrated Automation

- Parameterization of the CPU
- Configuration of the distributed I/O
- Configuration of a drive
- Programming of a human machine interface device

Realize and startup of a complex PLC program

- Analysis of assignment of task
- Structuring of a program using a structure charts
- Implementation of the program taking account of re-usability through the use of:
  - Functions, function blocks and multi-instances
  - Complex data structures
  - Indirect addressing of complex data structures
  - Library functions for integrated error handling
  - IEC-compliant system functions and function blocks
- Use of distributed I/O
- Use of Industrial Ethernet
- Use of human machine interface device
- Implementation of a drive

Appendix

8

Technical books for automation engineering

Overview

Technical books provide sound knowledge in the various sectors of automation engineering. Textbooks, reference books and dictionaries are available, for example.

You can use them to specifically increase your knowledge or to become acquainted with special areas.

Ordering data

	Order No.
Milestones in Automation	
Easy to read and creatively designed, the book offers technicians, engineers and managers a profound look into the development history and possibilities for use of a technology which left its mark like no other on industrial processes and a huge range of technical systems.	
German	**6ZB3 500-0AQ01-0AA0**
English	**6ZB3 500-0AQ02-0AA0**
Automating with SIMATIC	
The book is highly suitable for all those who have no extensive previous experience and who wish to become rapidly acquainted with the field of programmable controllers.	
German	**6ZB3 500-0AE01-0AA0**
English	**6ZB3 500-0AE02-0AA0**
Automating with STEP 7 in STL and SCL	
Now in its fifth edition, this book presents the most recent version of the STEP 7 programming software. It is intended for all users of SIMATIC S7 controllers.	
German	**6ZB3 500-0AA01-0AA0**
English	**6ZB3 500-0AA02-0AA0**
Automating with STEP 7 in LAD and FBD	
The book describes elements and applications of the graphic-oriented programming languages LAD (ladder diagram) and FBD (function block diagram) for SIMATIC S7-300/400. It is aimed at all users of SIMATIC S7 controllers.	
German	**6ZB3 500-0AB01-0AA0**
English	**6ZB3 500-0AB02-0AA0**
Controlling with SIMATIC	
This book discusses the practical aspects of control engineering as a subdomain of automation and control using as example the SIMATIC S7 control system.	
German	**6ZB3 500-0AD01-0AA0**
English	**6ZB3 500-0AD02-0AA0**
Decentralization with PROFIBUS-DP/DPV1	
With its practical orientation the book is ideal for PROFIBUS planners, configuration experts and programmers. Its comprehensive description of the fundamentals involved also makes it interesting for students and docents alike.	
German	**6ZB3 500-0AC01-0AA0**
English	**6ZB3 500-0AC02-0AA0**
Automating with PROFINET	
This book serves as an introduction to PROFINET technology. Decision-makers and plant planners, pupils and students are given a compact overview of the concept and the fundamentals. Configuring engineers, commissioning engineers and technicians are provided with the comprehensive knowledge they need to solve their own PROFINET-based automation tasks.	
German	**6ZB3 500-0AP01-0AA0**
English	**6ZB3 500-0AP02-0AA0**
Electrical Feed Drives in Automation	
This book provides a comprehensive introduction to the physical and technical fundamentals of control and drive technology. Particular attention is given to the computation and measurement of electric feed drives in automation technology.	
German	**6ZB3 500-0AF01-0AA0**
English	**6ZB3 500-0AF02-0AA0**
Industrial Ethernet in industrial automation	
This book provides plant planners, programmers and commissioning engineers with the necessary basics and terms to use Ethernet LAN technologies in industrial automation using SIMATIC.	
German	**6ZB3 500-0AM01-0AA0**
Electrical feed drives in production/automation engineering	
This book describes individual and up-to-date components for feed drives such as motors and mechanical transfer elements in a practical context.	
German	**6ZB3 500-0BC01-0AA0**

Technical books for automation engineering

Ordering data (continued)	Order No.
Dictionary of Drive Technology and Mechatronics	
The dictionary offers a comprehensive collection of terms from the fields of drives and automation and related fields, completed by entries from business administration, marketing, advertising and technical training.	
German/English	**6ZB3 500-0AG01-0AA0**
German/English, on CD-ROM	**6ZB3 500-0AH01-0AA0**

	Order No.
Dictionary of Electrical Engineering, Power Engineering and Automation	
This dictionary is the standard work for all those requiring a comprehensive and reliable compilation of terms from the fields of power generation, transmission and distribution, drive engineering, automation, switchgear and installation engineering, power electronics as well as measurement, analysis and test engineering.	
German-English	**6ZB3 500-0AJ01-0AA0**
English-German	**6ZB3 500-0AJ02-0AA0**
German-English/ English-German; on CD-ROM	**6ZB3 500-0AJ03-0AA0**

SIMATIC Manual Collection

Overview

The SIMATIC manual collection brings together the manuals of Totally Integrated Automation in the smallest possible package. It is eminently suitable for startup and service, replaces the space-consuming paper version in the office and provides fast access to the information.

The manual collection contains manuals in 5 languages for

- LOGO!
- SIMATIC S7-200, TD 200
- SIMATIC S7-300, C7
- SIMATIC S7-400
- STEP 7, Engineering Tools, Runtime Software
- SIMATIC DP (Distributed I/O)
- SIMATIC HMI (Human Machine Interface)
- SIMATIC NET (Industrial Communication)
- Machine Vision
- PCS 7 Process Control System

Manuals that are not yet available in all 5 languages will at least be included in English and German.

There is an update contract for the SIMATIC Manual Collection that encompasses supply of the up-to-date collection and three subsequent updates which is valid for one year. If the update contract is not cancelled, it is automatically extended and the list price will be charged to the customer.

Ordering data		Order No.
SIMATIC Manual Collection	D	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, in 5 languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET		
SIMATIC Manual Collection update service for 1 year	D	**6ES7 998-8XC01-8YE2**
Current Manual Collection DVD as well as the three following updates		

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

CE marking

Overview

The electronic products described in this catalog comply with the requirements and protection objectives of the following EU guidelines and with the harmonized European standards (EN) which have been published for programmable controllers in the official Journal of the European Union:

- 89/336/EWG “Electromagnetic Compatibility” (EMC guideline).
- 73/23/EWG “Electrical Equipment for Use Within Specific Voltage Limits” (low voltage guideline).

We have declarations of conformity available for the responsible authorities.

The SIMATIC products are designed for operation in industrial environments and comply with the following requirements:

Noise emissions: EN 50081-2: 1993
Noise immunity: EN 50082-2: 1995

The products can also be used in the domestic environment (household, business and trade area, small plants) with individual approval:

Emitted interference: Individual approval
Immunity: EN 50082-1: 1992

For household use an individual approval from the respective national authority or testing body is required as far as emitted-interference is concerned. In Germany this approval is issued by the Federal Post and Telecommunications Office and its subsidaries.

For the installation and operation of the products described in this catalog, the installation guidelines described in the manuals and the important notes concerning installation in cabinets and concerning the use of shielded cable must be complied with.

Notes for machine manufacturers

The SIMATIC automation system is not a machine within the context of the EU machine guidelines. Therefore a declaration of conformity with regard to the EU machine directive 89/392/EEC or 2006/42/EU (new edition, applicable from end of 2009) may not be provided for SIMATIC.

The EU machine directive regulates the requirements placed on a machine or a part thereof. A machine is understood for the purposes of this guideline to be a combination of interconnected parts or mechanisms (see also EN 292-1, Paragraph 3.1).

SIMATIC is part of the electrical equipment of a machine, and must therefore be integrated into the evaluation of the complete machine by the machine manufacturer.

As electrical equipment, SIMATIC is subject to the low-voltage directive which, as a "total safety directive", covers all dangers just like the machine directive.

The EN 60204-1 standard (safety of machines, general requirements for the electrical equipment of machines) is applicable to the electrical equipment of machines.

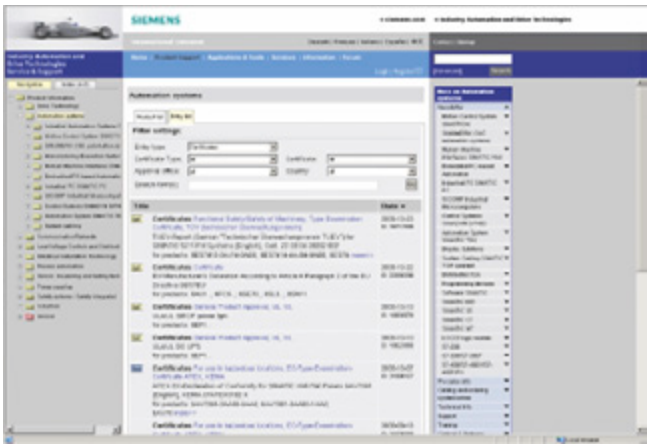
The following table will help you in the provision of your declaration of conformity, and shows which criteria according to EN 60204-1 (2006-06) apply to SIMATIC. You can obtain further information from the enclosed declaration of conformity according to the low-voltage and EMC directives (with list of included standards).

EN 60204-1	Topic/criterion	Notes
Paragraph 4	General requirements	The requirements are met when the equipment is assembled/ installed in accordance with the installation guidelines. Please note the relevant information in the manuals.
Paragraph 11.2	Digital input/output interfaces	The requirements are met
Paragraph 12.3	Programmable equipment	The requirements are met when the equipment is installed in lockable cabinets to protect against alteration of the memory contents by unauthorized persons
Paragraph 20.4	Voltage tests	The requirements are met

Certificates, authorizations, approbations, declarations of conformity

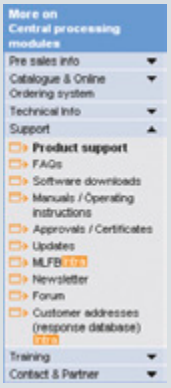
An overview of the certificates available for SIMATIC products (CE, UL, CSA, FM, shipping authorizations) can be found in the internet at

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



The lists are continously updated. The data for products which have not yet been included in the overview is continously collected and prepared for the subsequent edition.

You can also find certificates, approbations, verification certificates or characteristic curves by going directly to the Link Box:



Quality management

The quality management system of our A&D division complies with the international standard ISO 9001.

The products and systems described in this catalog are manufactured under application of a quality management system certified by DQS in accordance with DIN EN ISO 9001.

The DQS certificate is recognized in all EQ Net countries.

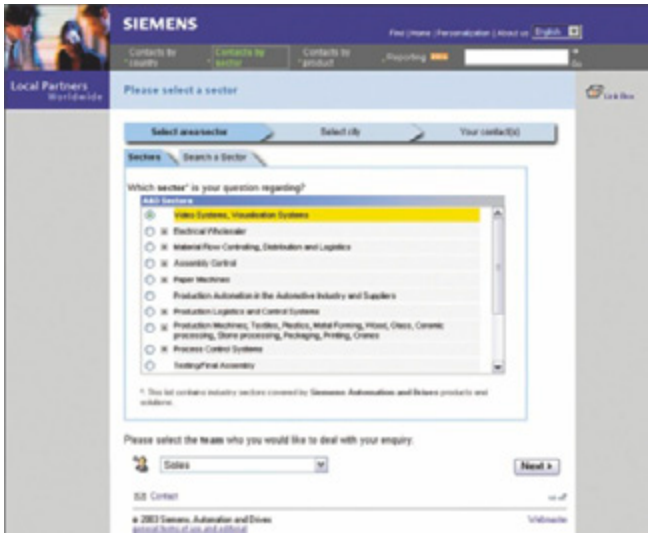
DQS certificate nos.:

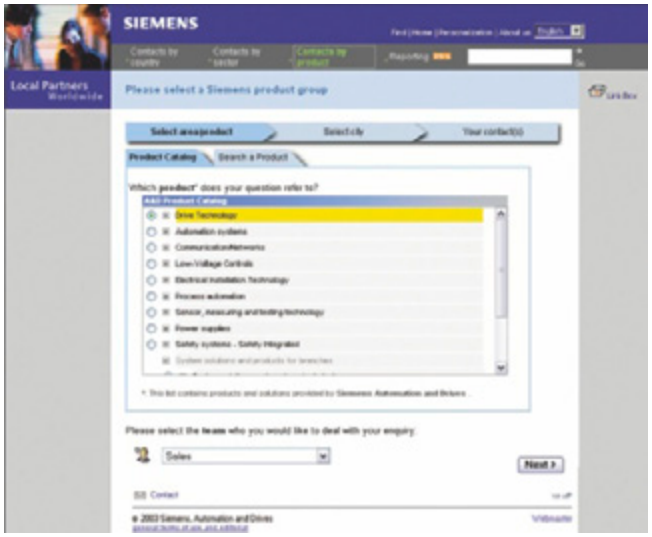
Siemens AG
Automation and Drives

- Industrial Automation Systems
  Reg. No.: 001323 QM

Siemens contacts worldwide

Overview





At

http://www.siemens.com/automation/partner

you can find details of Siemens contact partners worldwide responsible for particular technologies.

You can obtain in most cases a contact partner for

- Technical Support,
- Spare parts/repairs,
- Service,
- Training,
- Sales or
- Consultation/engineering.

You start by selecting a

- Country,
- Product or
- Sector.

By further specifying the remaining criteria you will find exactly the right contact partner with his/her respective expertise.

Overview

Siemens Solution Partner is the name used to identify selected system integrators as suppliers of solutions for the Siemens portfolio in the automation, power distribution and product lifecycle management (PLM) sectors in accordance with globally uniform qualification procedures.

In the context of the Siemens Solution Partner program, our strengths merge with the competences of our Solution Partners. Our product and system expertise works together with the comprehensive application and sector expertise of our partners to always produce perfect solutions for every application.

The number of Solution Partners has increased extremely rapidly, and now more than 850 certified Solution Partners are able to provide pioneering, tailored solutions in more than 45 countries.

The Solution Partner Finder, available to you on the Internet, is a comprehensive database in which all Solution Partners, together with their performance profiles, present themselves.

In addition to the search criteria Technology, Sector and Country, you can also search by Company and ZIP Code. From there it is only a small step to making the first contact.

Call up the Solution Partner Finder as follows:

- CA 01 on DVD:
  On the start page via "Contacts & Partners;
  Siemens Solution Partner Automation, Power Distribution and PLM"
- CA 01 online:
  Go directly to the Solution Partner Finder:
  www.siemens.com/automation/partnerfinder

Additional information about the Siemens Solution Partner Program is available in the Internet at:

www.siemens.com/automation/solutionpartner

Information and Ordering in the Internet and on CD-ROM

Siemens Industry Automation and Drive Technologies in the WWW

A detailed knowledge of the range of products and services available is essential when planning and configuring automation systems. It goes without saying that this information must always be fully up-to-date.

Siemens Industry Automation and Drive Technologies has therefore built up a comprehensive range of information in the World Wide Web, which offers quick and easy access to all data required.

Under the address

http://www.siemens.com/automation

you will find everything you need to know about products, systems and services.

Product Selection Using the Offline Mall of Industry

Detailed information together with convenient interactive functions:
The Offline Mall CA 01 covers more than 80,000 products and thus provides a full summary of the Siemens Industry Automation and Drive Technologies product base.

Here you will find everything that you need to solve tasks in the fields of automation, switchgear, installation and drives.
All information is linked into a user interface which is easy to work with and intuitive.

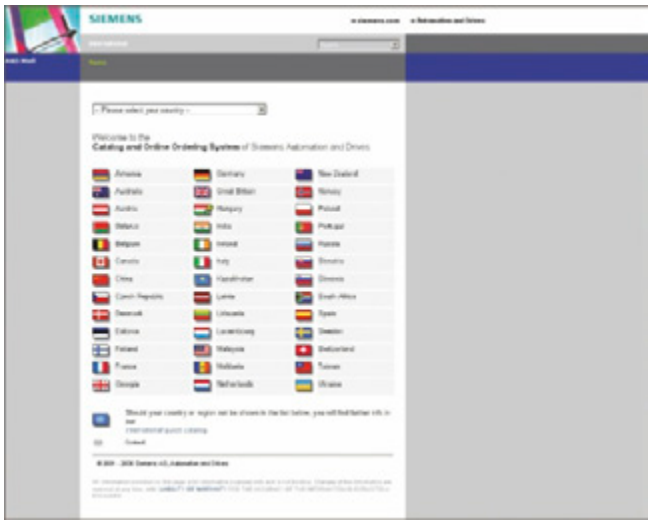
After selecting the product of your choice you can order at the press of a button, by fax or by online link.

Information on the Offline Mall CA 01 can be found in the Internet under

http://www.siemens.com/automation/ca01

or on DVD.

Easy Shopping with the Industry Mall



The Industry Mall is the virtual department store of Siemens AG in the Internet. Here you have access to a huge range of products presented in electronic catalogs in an informative and attractive way.

Data transfer via EDIFACT allows the whole procedure from selection through ordering to tracking of the order to be carried out online via the Internet.

Numerous functions are available to support you.

For example, powerful search functions make it easy to find the required products, which can be immediately checked for availability. Customer-specific discounts and preparation of quotes can be carried out online as well as order tracking and tracing.

Please visit the Industry Mall on the Internet under:

http://www.siemens.com/automation/mall

Our Services for Every Phase of Your Project

In the face of harsh competition you need optimum conditions to keep ahead all the time:
A strong starting position. A sophisticated strategy and team for the necessary support - in every phase.
Service & Support from Siemens provides this support with a complete range of different services for automation and drives.

In every phase: from planning and startup to maintenance and upgrading.

Our specialists know when and where to act to keep the productivity and cost-effectiveness of your system running in top form.

Online Support

The comprehensive information system available round the clock via Internet ranging from Product Support and Service & Support services to Support Tools in the Shop.

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
(€ 0.14 /min. from a German landline network, mobile telephone prices may vary)
http://www.siemens.com/automation/support-request

Technical Consulting

Support in the planning and designing of your project from detailed actual-state analysis, target definition and consulting on product and system questions right to the creation of the automation solution.[1)]

Configuration and Software Engineering

Support in configuring and developing with customer-oriented services from actual configuration to implementation of the automation project.[1)]

Service On Site

With Service On Site we offer services for startup and maintenance, essential for ensuring system availability.
In Germany
0180 50 50 444[1)]
(€ 0.14 /min. from a German landline network, mobile telephone prices may vary)

Repairs and Spare Parts

In the operating phase of a machine or automation system we provide a comprehensive repair and spare parts service ensuring the highest degree of operating safety and reliability.
In Germany
0180 50 50 446[1)]
(€ 0.14 /min. from a German landline network, mobile telephone prices may vary)

Optimization and Upgrading

To enhance productivity and save costs in your project we offer high-quality services in optimization and upgrading.[1)]

1) For country-specific telephone numbers go to our Internet site at:
http://www.siemens.com/automation/service&support

Knowledge Base on CD-ROM Automation Value Card

Knowledge Base on CD-ROM

For locations without online connections to the Internet there are excerpts of the free part of the information sources available on CD-ROM (Service & Support Knowledge Base). This CD-ROM contains all the latest product information at the time of production (FAQs, Downloads, Tips and Tricks, Updates) as well as general information on Service and Technical Support.

The CD-ROM also includes a full-text search and our Knowledge Manager for targeted searches for solutions. The CD-ROM will be updated every 4 months.

Just the same as our online offer in the Internet, the Service & Support Knowledge Base on CD comes complete in 5 languages (German, English, French, Italian, Spanish).

You can order the **Service & Support Knowledge Base** CD from your Siemens contact.

Order no. **6ZB5310-0EP30-0BA2**

Orders via the Internet
(with Automation Value Card or credit card) at:

http://www.siemens.com/automation/service&support

in the Shop domain.

Automation Value Card

Small card - great support

The Automation Value Card is an integral component of the comprehensive service concept with which Siemens Automation and Drives will accompany you in each phase of your automation project.

It doesn't matter whether you want just specific services from our Technical Support or want to purchase high-quality Support Tools in our Online Shop, you can always pay with your Automation Value Card. No invoicing, transparent and safe. With your personal card number and associated PIN you can view the state of your account and all transactions at any time.

Services on card. This is how it's done.

Card number and PIN are on the back of the Automation Value Card. When delivered, the PIN is covered by a scratch field, guaranteeing that the full credit is on the card.

By entering the card number and PIN you have full access to the Service & Support services being offered. The charge for the services procured is debited from the credits on your Automation Value Card.

All the services offered are marked in currency-neutral credits, so you can use the Automation Value Card worldwide.

Automation Value Card order numbers		
Credits		Order no.
200	C	**6ES7 997-0BA00-0XA0**
500	C	**6ES7 997-0BB00-0XA0**
1000	C	**6ES7 997-0BC00-0XA0**
10000	C	**6ES7 997-0BG00-0XA0**

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

Detailed information on the services offered is available on our Internet site at:

http://www.siemens.com/automation/service&support

Service & Support à la Card: Examples

Technical Support	
"Priority"	Priority processing for urgent cases
"24 h"	Availability round the clock
„Extended"	Technical consulting for complex questions
Support Tools in the Support Shop	
"System Utilities"	Tools that can be used directly for configuration, analysis and testing
"Applications"	Complete topic solutions including ready-tested software
"Functions & Samples"	Adaptable blocks for accelerating your developments

Overview

Software types

Software requiring a license is categorized into types.
The following software types have been defined:

- Engineering software
- Runtime software

Engineering software

This includes all software products for creating (engineering) user software, e.g. for configuring, programming, parameterizing, testing, commissioning or servicing.

Data generated with engineering software and executable programs can be duplicated for your own use or for use by third-parties free-of-charge.

Runtime software

This includes all software products required for plant/machine operation, e.g. operating system, basic system, system expansions, drivers, etc.

The duplication of the runtime software and executable programs created with the runtime software for your own use or for use by third-parties is subject to a charge.

You can find information about license fees according to use in the ordering data (e.g. in the catalog). Examples of categories of use include per CPU, per installation, per channel, per instance, per axis, per control loop, per variable, etc.

Information about extended rights of use for parameterization/configuration tools supplied as integral components of the scope of delivery can be found in the readme file supplied with the relevant product(s).

License types

Siemens Industry offers various types of software license:

- Floating license
- Single license
- Rental license
- Trial license

Floating license

The software may be installed for internal use on any number of devices by the licensee. Only the concurrent user is licensed. The concurrent user is the person using the program. Use begins when the software is started.
A license is required for each concurrent user.

Single license

Unlike the floating license, a single license permits only one installation of the software.

The type of use licensed is specified in the ordering data and in the Certificate of License (CoL). Types of use include for example per device, per axis, per channel, etc.

One single license is required for each type of use defined.

Rental license

A rental license supports the "sporadic use" of engineering software. Once the license key has been installed, the software can be used for a specific number of hours (the operating hours do not have to be consecutive).
One license is required for each installation of the software.

Trial license

A trial license supports "short-term use" of the software in a non-productive context, e.g. for testing and evaluation purposes. It can be transferred to another license.

Factory license

With the Factory License the user has the right to install and use the software at one permanent establishment only. The permanent establishment is defined by one address only.The number of hardware devices on which the software may be installed results from the order data or the Certificate of License (CoL).

Certificate of license

The Certificate of License (CoL) is the licensee's proof that the use of the software has been licensed by Siemens. A CoL is required for every type of use and must be kept in a safe place.

Downgrading

The licensee is permitted to use the software or an earlier version/release of the software, provided that the licensee owns such a version/release and its use is technically feasible.

Delivery versions

Software is constantly being updated.
The following delivery versions

- PowerPack
- Upgrade

can be used to access updates.

Existing bug fixes are supplied with the ServicePack version.

PowerPack

PowerPacks can be used to upgrade to more powerful software. The licensee receives a new license agreement and CoL (Certificate of License) with the PowerPack. This CoL, together with the CoL for the original product, proves that the new software is licensed.
A separate PowerPack must be purchased for each original license of the software to be replaced.

Upgrade

An upgrade permits the use of a new version of the software on the condition that a license for a previous version of the product is already held.
The licensee receives a new license agreement and CoL with the upgrade. This CoL, together with the CoL for the previous product, proves that the new version is licensed.
A separate upgrade must be purchased for each original license of the software to be upgraded.

ServicePack

ServicePacks are used to debug existing products.
ServicePacks may be duplicated for use as prescribed according to the number of existing original licenses.

License key

Siemens Industry supplies software products with and without license keys.

The license key serves as an electronic license stamp and is also the "switch" for activating the software (floating license, rental license, etc.).

The complete installation of software products requiring license keys includes the program to be licensed (the software) and the license key (which represents the license).

Detailed explanations concerning license conditions can be found in the "Terms and Conditions of Siemens AG" or under
http://www.siemens.com/automation/mall
(Industry Mall Online-Help System)

I IA&DT/Software licenses/En 03.08.06

Appendix
Index, ordering data summary

Index

Ordering data summary

Fax form

To

Siemens AG
I IA SE ITS PRI 1
ST 70 - 2009/ Mr. Fregien
Gleiwitzer Str. 555
90475 Nürnberg

Fax: +49 (911) 895-4837

E-mail: dirk.fregien@siemens.com

Your adress

Name

Job

Company/Department

Street/No.

Postal code/City

Tel. No./Fax

E-mail address

Your opinion is important to us!

Our catalog should be an important and frequently used document. For this reason we are continuously endeavoring to improve it.

A small request on our part to you:
Please take time to fill in the following form and fax it to us.

Thank You!

We invite you to grade our catalog on a point system from 1 (= good) to 6 (= poor):

Do the contents of the catalog live up to your expectations?	☐	Do the technical details meet your expectations?	☐
Is the information easy to find?	☐	How would you assess the graphics and tables?	☐
Can the texts be readily understood?	☐		

Did you find any printing errors?

Notes

Notes

Conditions of sale and delivery, export regulations

Terms and Conditions of Sale and Delivery

By using this catalog you can acquire hardware and software products described therein from Siemens AG subject to the following terms. Please note! The scope, the quality and the conditions for supplies and services, including software products, by any Siemens entity having a registered office outside of Germany, shall be subject exclusively to the General Terms and Conditions of the respective Siemens entity. The following terms apply exclusively for orders placed with Siemens AG.

For customers with a seat or registered office in Germany

The "General Terms of Payment" as well as the "General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry" shall apply.

For software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or registered Office in Germany" shall apply.

For customers with a seat or registered office outside of Germany

The "General Terms of Payment" as well as the "General Conditions for Supplies of Siemens, Automation and Drives for Customers with a Seat or registered Office outside of Germany" shall apply.

For software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or registered Office outside of Germany" shall apply.

General

The dimensions are in mm. In Germany, according to the German law on units in measuring technology, data in inches only apply to devices for export.

Illustrations are not binding.

Insofar as there are no remarks on the corresponding pages, - especially with regard to data, dimensions and weights given - these are subject to change without prior notice.

The prices are in € (Euro) ex works, exclusive packaging.

The sales tax (value added tax) is not included in the prices. It shall be debited separately at the respective rate according to the applicable legal regulations.

Prices are subject to change without prior notice. We will debit the prices valid at the time of delivery.

Surcharges will be added to the prices of products that contain silver, copper, aluminum, lead and/or gold if the respective basic official prices for these metals are exceeded. These surcharges will be determined based on the official price and the metal factor of the respective product.

The surcharge will be calculated on the basis of the official price on the day prior to receipt of the order or prior to the release order.
The metal factor determines the official price as of which the metal surcharges are charged and the calculation method used. The metal factor, provided it is relevant, is included with the price information of the respective products.

An exact explanation of the metal factor and the text of the Comprehensive Terms and Conditions of Sale and Delivery are available free of charge from your local Siemens business office under the following Order Nos.:

- 6ZB5310-0KR30-0BA1
  (for customers based in Germany)
- 6ZB5310-0KS53-0BA1
  (for customers based outside Germany)

or download them from the Internet
http://www.siemens.com/automation/mall
(Germany: Industry Mall Online-Help System)

Export regulations

The products listed in this catalog / price list may be subject to European / German and/or US export regulations.

Therefore, any export requiring a license is subject to approval by the competent authorities.

According to current provisions, the following export regulations must be observed with respect to the products featured in this catalog / price list:

AL	Number of the German Export List Products marked other than "N" require an export license. In the case of software products, the export designations of the relevant data medium must also be generally adhered to. Goods labeled with an "AL" not equal to "N" are subject to a European or German export authorization when being exported out of the EU.
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.

Errors excepted and subject to change without prior notice.

I IA/VuL_ohne MZ/En 12.05.09

Catalogs

Industry Automation, Drive Technologies and Electrical Installation Technology

Further information can be obtained from our branch offices listed in the appendix or at www.siemens.com/automation/partner

Interactive catalog on DVD	*Catalog*
for Industry Automation, Drive Technologies and Electrical Installation Technology	**CA 01**

Drive Systems

Variable-Speed Drives	
SINAMICS G110/SINAMICS G120 Inverter Chassis Units SINAMICS G120D Distributed Frequency Inverters	D 11.1
SINAMICS G130 Drive Converter Chassis Units, SINAMICS G150 Drive Converter Cabinet Units	D 11
SINAMICS GM150/SINAMICS SM150 Medium-Voltage Converters	D 12
SINAMICS S150 Drive Converter Cabinet Units	D 21.3
Asynchronous Motors Standardline	D 86.1
Synchronous Motors with Permanent-Magnet Technology, HT-direct	D 86.2
DC Motors	DA 12
SIMOREG DC MASTER 6RA70 Digital Chassis Converters	DA 21.1
SIMOREG K 6RA22 Analog Chassis Converters	DA 21.2
PDF: SIMOREG DC MASTER 6RM70 Digital Converter Cabinet Units	*DA 22*
SIMOVERT PM Modular Converter Systems	DA 45
SIEMOSYN Motors	DA 48
MICROMASTER 420/430/440 Inverters	DA 51.2
MICROMASTER 411/COMBIMASTER 411	DA 51.3
SIMOVERT MASTERDRIVES Vector Control	DA 65.10
SIMOVERT MASTERDRIVES Motion Control	DA 65.11
Synchronous and asynchronous servomotors for SIMOVERT MASTERDRIVES	DA 65.3
SIMODRIVE 611 universal and POSMO	DA 65.4
SIMOTION, SINAMICS S120 and Motors for Production Machines	PM 21
SINAMICS S110 The Basic Positioning Drive	PM 22
Low-Voltage Three-Phase-Motors	
IEC Squirrel-Cage Motors	D 81.1
MOTOX Geared Motors	D 87.1
Automation Systems for Machine Tools SIMODRIVE	NC 60
• Motors	
• Converter Systems SIMODRIVE 611/POSMO	
Automation Systems for Machine Tools SINAMICS	NC 61
• Motors	
• Drive System SINAMICS S120	
Drive and Control Components for Hoisting Equipment	HE 1
Mechanical Driving Machines	
Flender Standard Couplings	MD 10.1

Electrical Installation Technology

PDF: ALPHA Distribution Boards and Terminal Blocks	*ET A1*
PDF: ALPHA 8HP Molded-Plastic Distribution System	*ET A3*
PDF: BETA Low-Voltage Circuit Protection	*ET B1*
PDF: DELTA Switches and Socket Outlets	*ET D1*
PDF: GAMMA Building Management Systems	*ET G1*

PDF: These catalogs are only available as pdf files.

Motion Control

	Catalog
SINUMERIK & SIMODRIVE Automation Systems for Machine Tools	NC 60
SINUMERIK & SINAMICS Automation Systems for Machine Tools	NC 61
SIMOTION, SINAMICS S120 and Motors for Production Machines	PM 21
SINAMICS S110 The Basic Positioning Drive	PM 22

Low-Voltage

Controls and Distribution – SIRIUS, SENTRON, SIVACON	LV 1
Controls and Distribution – Technical Information SIRIUS, SENTRON, SIVACON	LV 1 T
SIDAC Reactors and Filters	LV 60
SIVENT Fans	LV 65
SIVACON 8PS Busbar Trunking Systems	LV 70

Process Instrumentation and Analytics

Field Instruments for Process Automation	FI 01
PDF: Indicators for panel mounting	*MP 12*
SIREC Recorders and Accessories	MP 20
SIPART, Controllers and Software	MP 31
PDF: Products for Weighing Technology	*WT 10*
Process Analytical Instruments	PA 01
PDF: Process Analytics, Components for the System Integration	*PA 11*

SIMATIC HMI

Human Machine Interface Systems	ST 80

SIMATIC Industrial Automation Systems

Products for Totally Integrated Automation and Micro Automation	ST 70
SIMATIC PCS 7 Process Control System	ST PCS 7
Add-ons for the SIMATIC PCS 7 Process Control System	ST PCS 7.1
Migration solutions with the SIMATIC PCS 7 Process Control System	ST PCS 7.2
pc-based Automation	ST PC
SIMATIC Control Systems	ST DA

SIMATIC NET

Industrial Communication	IK PI

SIMATIC Sensors

Sensors for Factory Automation	FS 10

Systems Engineering

Power supplies SITOP power and LOGO! Power	KT 10.1
System cabling SIMATIC TOP connect	KT 10.2

System Solutions

Applications and Products for Industry are part of the interactive catalog CA 01

TELEPERM M Process Control System

PDF: AS 488/TM automation systems	*PLT 112*

Siemens AG
Industry Sector
Industrial Automation Systems
Postfach 48 48
90026 NÜRNBERG
GERMANY

Subject to change without prior notice
Order No. E86060-K4670-A151-A4-7600
3P.8101.02.05 / Dispo 07900
KG 0609 15. S 120 En / IWI TSTJ
Printed in Germany

www.siemens.com/automation