

SIMATIC S7-1200



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Brochures

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

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

SIMATIC S7-1200

Introduction

S7-1200

Overview



- The new modular miniature controller from the SIMATIC S7 family
- Comprising:
 - Controller with integrated PROFINET IO controller interface for communication between SIMATIC controllers, HMI, programming device or other automation components
 - Communication module with PROFIBUS DP master interface
 - Communication module PROFIBUS DP slave interface
 - GPRS module for connection to GSM/GPRS mobile phone networks
 - Integrated web server with standard and user-specific web pages
 - Data logging functionality for archiving of data at runtime from the user program
 - Powerful, integrated technology functions such as counting, measuring, closed-loop control, and motion control
 - Integrated digital and analog inputs/outputs
 - Signal boards for direct use in a controller
 - Signal modules for expansion of controllers by input/output channels
 - Communication modules for expansion of controllers with additional communications interfaces
 - Accessories, e.g. power supply, switch module or SIMATIC Memory Card
- The miniature controller that offers maximum automation at minimum cost.
- Extremely simple installation, programming and operation.
- Large-scale integration, space-saving, powerful.
- Suitable for small to medium-size automation engineering applications.
- Can be used both for simple controls and for complex automation tasks.
- All CPUs can be used in stand-alone mode, in networks and within distributed structures.
- Suitable for applications where programmable controllers would not have been economically viable in the past.
- With exceptional real-time performance and powerful communication options.

Technical specifications

General technical specifications SIMATIC S7-1200

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

Technical specifications (continued)**General technical specifications SIPLUS S7-1200**

Ambient temperature range	-25 ... +55/70 °C
Conformal coating	Coating of the PCB and the electronic components
Technical specifications	The technical specifications of the standard product apply except for the ambient conditions.

Ambient conditions

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

- 1) ISA –S71.04 severity level GX: long-term load: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
limit value (max 30 min): SO₂ < 17.8 ppm; H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O₃ < 1.0 ppm; NOX < 10.4 ppm
- 2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

SIMATIC S7-1200

Central processing units

CPU 1211C

Overview



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

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Technical specifications

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

Technical specifications (continued)

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

SIMATIC S7-1200

Central processing units

CPU 1211C

Technical specifications (continued)

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

Technical specifications (continued)

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

SIMATIC S7-1200

Central processing units

CPU 1211C

Technical specifications (continued)

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

Technical specifications (continued)

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

SIMATIC S7-1200

Central processing units

CPU 1211C

Technical specifications (continued)

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

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

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

SIMATIC S7-1200

Central processing units

CPU 1211C

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Ordering data

Order No.

Order No.

Front flap set (spare part)

for CPU 1211C/1212C

6ES7 291-1AA30-0XA0

S7-1200 automation system, system manual

For SIMATIC S7-1200 and STEP 7 Basic

German

K

6ES7 298-8FA30-8AH0

English

K

6ES7 298-8FA30-8BH0

French

K

6ES7 298-8FA30-8CH0

Spanish

K

6ES7 298-8FA30-8DH0

Italian

K

6ES7 298-8FA30-8EH0

Chinese

K

6ES7 298-8FA30-8KH0

S7-1200 automation system, Easy Book

Brief instructions

German

K

6ES7 298-8FA30-8AQ0

English

K

6ES7 298-8FA30-8BQ0

French

K

6ES7 298-8FA30-8CQ0

Spanish

K

6ES7 298-8FA30-8DQ0

Italian

K

6ES7 298-8FA30-8EQ0

Chinese

K

6ES7 298-8FA30-8KQ0

STEP 7 Basic V11 engineering software

Target system:

SIMATIC S7-1200 controllers and the associated I/O.

Requirements:

Windows XP Home SP3, Windows XP Professional SP3 (32 bit),

Windows 7 Home Premium, Windows 7 Professional (32 bit), Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit),

Microsoft Server 2008 Std. SP2 (32 bit)

Type of delivery:

German, English, Chinese, Italian, French, Spanish

Single license

6ES7 822-0AA01-0YA0

Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license

6ES7 822-0AA01-0YE0

Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license

6ES7 822-1AA01-0YC5

STEP 7 Basic V11, trial license

6ES7 822-0AA01-0YA7

STEP 7 Basic Software Update Service, 1 year

D

6ES7 822-0AA00-0YL0

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

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

Overview



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

Technical specifications

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

SIMATIC S7-1200

Central processing units

CPU 1212C

Technical specifications (continued)

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

Technical specifications (continued)

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

SIMATIC S7-1200

Central processing units

CPU 1212C

Technical specifications (continued)

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

Technical specifications (continued)

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

SIMATIC S7-1200

Central processing units

CPU 1212C

Technical specifications (continued)

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

Technical specifications (continued)

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

SIMATIC S7-1200

Central processing units

CPU 1212C

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

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

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

Ordering data	Order No.	Order No.
Terminal block (spare part) for CPU 1211C/1212C		
For DI, with 14 screws, tin-plated; I 4 units	6ES7 292-1AH30-0XA0	
For DO, with 8 screws, tin-plated; I 4 units	6ES7 292-1AP30-0XA0	
For AI, with 3 screws, tin-plated; I 4 units	6ES7 292-1BC30-0XA0	
Front flap set (spare part) for CPU 1211C/1212C	6ES7 291-1AA30-0XA0	
S7-1200 automation system, system manual For SIMATIC S7-1200 and STEP 7 Basic		
German K	6ES7 298-8FA30-8AH0	
English K	6ES7 298-8FA30-8BH0	
French K	6ES7 298-8FA30-8CH0	
Spanish K	6ES7 298-8FA30-8DH0	
Italian K	6ES7 298-8FA30-8EH0	
Chinese K	6ES7 298-8FA30-8KH0	
S7-1200 automation system, Easy Book Brief instructions		
German K	6ES7 298-8FA30-8AQ0	
English K	6ES7 298-8FA30-8BQ0	
French K	6ES7 298-8FA30-8CQ0	
Spanish K	6ES7 298-8FA30-8DQ0	
Italian K	6ES7 298-8FA30-8EQ0	
Chinese K	6ES7 298-8FA30-8KQ0	
		STEP 7 Basic V11 engineering software
		Target system: SIMATIC S7-1200 controllers and the associated I/O.
		Requirements: Windows XP Home SP3, Windows XP Professional SP3 (32 bit), Windows 7 Home Premium, Windows 7 Professional (32 bit), Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit), Microsoft Server 2008 Std. SP2 (32 bit)
		Type of delivery: German, English, Chinese, Italian, French, Spanish
		Single license
		Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license
		Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license
		STEP 7 Basic V11, trial license
		STEP 7 Basic Software Update D Service, 1 year
		6ES7 822-0AA01-0YA0
		6ES7 822-0AA01-0YE0
		6ES7 822-1AA01-0YC5
		6ES7 822-0AA01-0YA7
		6ES7 822-0AA00-0YL0

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

SIMATIC S7-1200

Central processing units

CPU 1214C

Overview



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

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Technical specifications

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

Technical specifications (continued)

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

SIMATIC S7-1200

Central processing units

CPU 1214C

Technical specifications (continued)

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

Technical specifications (continued)

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

SIMATIC S7-1200

Central processing units

CPU 1214C

Technical specifications (continued)

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

Technical specifications (continued)

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

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Central processing units

CPU 1214C

Technical specifications (continued)

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

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

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

SIMATIC S7-1200

Central processing units

CPU 1214C

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Ordering data	Order No.	Order No.
Front flap set (spare part) for CPU 1214C	6ES7 291-1AB30-0XA0	
S7-1200 automation system, system manual For SIMATIC S7-1200 and STEP 7 Basic		
German K	6ES7 298-8FA30-8AH0	
English K	6ES7 298-8FA30-8BH0	
French K	6ES7 298-8FA30-8CH0	
Spanish K	6ES7 298-8FA30-8DH0	
Italian K	6ES7 298-8FA30-8EH0	
Chinese K	6ES7 298-8FA30-8KH0	
S7-1200 automation system, Easy Book Brief instructions		
German K	6ES7 298-8FA30-8AQ0	
English K	6ES7 298-8FA30-8BQ0	
French K	6ES7 298-8FA30-8CQ0	
Spanish K	6ES7 298-8FA30-8DQ0	
Italian K	6ES7 298-8FA30-8EQ0	
Chinese K	6ES7 298-8FA30-8KQ0	
		STEP 7 Basic V11 engineering software
		Target system: SIMATIC S7-1200 controllers and the associated I/O.
		Requirements: Windows XP Home SP3, Windows XP Professional SP3 (32 bit), Windows 7 Home Premium, Windows 7 Professional (32 bit), Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit), Microsoft Server 2008 Std. SP2 (32 bit)
		Type of delivery: German, English, Chinese, Italian, French, Spanish
		Single license
		Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license
		Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license
		STEP 7 Basic V11, trial license
		STEP 7 Basic Software Update Service, 1 year
		6ES7 822-0AA01-0YA0
		6ES7 822-0AA01-0YE0
		6ES7 822-1AA01-0YC5
		6ES7 822-0AA01-0YA7
		6ES7 822-0AA00-0YL0

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

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

Overview



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

Note:

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

SIPLUS CPU 1211C DC/DC/DC

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

SIPLUS CPU 1211C AC/DC/RLY

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

SIPLUS CPU 1211C DC/DC/RLY

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

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

SIMATIC S7-1200

SIPLUS central processing units

SIPLUS CPU 1211C

Overview (continued)

Ambient conditions

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

- 1) ISA-S71.04 severity level GX: Long-term load: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O₃ < 1.0 ppm; NOX < 10.4 ppm
- 2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

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

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Ordering data

SIPLUS CPU 1211C compact CPU, AC/DC/relay

(extended temperature range and medial exposure)

Integrated program and data memory of 25 KB, load memory of 1 MB;
wide-range alternating voltage supply 85 ... 264 V AC;
Boolean execution times of 0.1 μs per operation;
6 digital inputs, 4 digital outputs (relay), 2 analog inputs;
expandable with up to 3 communication modules and 1 signal board;
digital inputs usable as HSC with 100 kHz

- Suitable for areas with extraordinary medial exposure (conformal coating) H
- Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +55 °C; without restrictions; SB module can be used I
- Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +70 °C; from +60 ... +70 °C number of simultaneously controllable inputs and outputs max. 50%; no SB module possible I

Order No.

6AG1 212-1BD30-4XB0

6AG1 212-1BD30-5XB0

6AG1 212-1BD30-2XB0

Order No.

SIPLUS CPU 1211C compact CPU, DC/DC/DC

(extended temperature range and medial exposure)

Integrated program and data memory of 25 KB, load memory of 1 MB;
power supply 24 V DC;
boolean execution times of 0.1 μs per operation;
6 digital inputs, 4 digital outputs, 2 analog inputs;
expandable with up to 3 communication modules and 1 signal board;
digital inputs usable as HSC with 100 kHz,
24 V DC digital outputs usable as pulse outputs (PTO) or pulse-width-modulated outputs (PWM) with 100 kHz

- Suitable for areas with extraordinary medial exposure (conformal coating) H **6AG1 212-1AD30-4XB0**
- Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +55 °C; without restrictions; SB module can be used I **6AG1 212-1AD30-5XB0**
- Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +70 °C; from +60 ... +70 °C number of simultaneously controllable inputs and outputs max. 50%; no SB module possible I **6AG1 212-1AD30-2XB0**

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

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

Ordering data	Order No.	Ordering data	Order No.
SIPLUS CPU 1211C compact CPU, DC/DC/relay (extended temperature range and medial exposure) Integrated program and data memory of 25 KB, load memory of 1 MB; power supply 24 V DC; Boolean execution times of 0.1 µs per operation; 6 digital inputs, 4 digital outputs (relay), 2 analog inputs; expandable with up to 3 communication modules and 1 signal board; digital inputs usable as HSC with 100 kHz		Accessories	see SIMATIC S7-1200 CPU 1211C, page 4/11
<ul style="list-style-type: none"> • Suitable for areas with extraordinary medial exposure (conformal coating) H 	6AG1 211-1HD30-4XB0		
<ul style="list-style-type: none"> • Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +55 °C; without restrictions; SB module can be used I 	6AG1 211-1HD30-5XB0		
<ul style="list-style-type: none"> • Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +70 °C; from +60 ... +70 °C number of simultaneously controllable inputs and outputs max. 50%; no SB module possible I 	6AG1 212-1HD30-2XB0		

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

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

SIMATIC S7-1200

SIPLUS central processing units

SIPLUS CPU 1212C

Overview



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

Note:

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

SIPLUS CPU 1212C DC/DC/DC

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

SIPLUS CPU 1212C AC/DC/RLY

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

SIPLUS CPU 1212C DC/DC/RLY

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

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

Overview (continued)

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

- 1) ISA-S71.04 severity level GX: Long-term load: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O₃ < 1.0 ppm; NOX < 10.4 ppm
- 2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

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

Ordering data

SIPLUS CPU 1212C compact CPU, AC/DC/relay

(extended temperature range and medial exposure)

Integrated program and data memory of 25 KB, load memory of 1 MB;
wide-range alternating voltage supply 85 ... 264 V AC;
Boolean execution times of 0.1 μs per operation;
8 digital inputs, 6 digital outputs (relay), 2 analog inputs;
expandable with up to 3 communication modules, 2 signal modules, and 1 signal board;
digital inputs usable as HSC with 100 kHz

- Suitable for areas with extraordinary medial exposure (conformal coating) H
- Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +55 °C; without restrictions; SB module can be used I
- Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +70 °C; from +60 ... +70 °C number of simultaneously controllable inputs and outputs max. 50%; no SB module possible I

Order No.

6AG1 212-1BD30-4XB0

6AG1 212-1BD30-5XB0

6AG1 212-1BD30-2XB0

Order No.

SIPLUS CPU 1212C compact CPU, DC/DC/DC

(extended temperature range and medial exposure)

Integrated program and data memory of 25 kbyte, load memory of 1 MB;
power supply 24 V DC;
Boolean execution times of 0.1 μs per operation;
8 digital inputs, 6 digital outputs, 2 analog inputs;
expandable with up to 3 communication modules, 2 signal modules and 1 signal board;
digital inputs usable as HSC with 100 kHz;
24 V DC digital outputs usable as pulse outputs (PTO) or pulse-width-modulated outputs (PWM) with 100 kHz

- Suitable for areas with extraordinary medial exposure (conformal coating) H
- Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +55 °C; without restrictions; SB module can be used I
- Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +70 °C; from +60 ... +70 °C number of simultaneously controllable inputs and outputs max. 50%; no SB module possible I

6AG1 212-1AD30-4XB0

6AG1 212-1AD30-5XB0

6AG1 212-1AD30-2XB0

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

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

SIMATIC S7-1200

SIPLUS central processing units

SIPLUS CPU 1212C

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Ordering data	Order No.	Accessories	Order No.
<p>SIPLUS CPU 1212C compact CPU, DC/DC/relay</p> <p>(extended temperature range and medial exposure)</p> <p>Integrated program and data memory of 25 KB, load memory of 1 MB; power supply 24 V DC; Boolean execution times of 0.1 µs per operation; 8 digital inputs, 6 digital outputs (relay), 2 analog inputs; expandable with up to 3 communication modules, 2 signal modules and 1 signal board; digital inputs usable as HSC with 100 kHz</p> <ul style="list-style-type: none"> • Suitable for areas with extraordinary medial exposure (conformal coating) H • Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +55 °C; without restrictions; SB module can be used I • Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +70 °C; from +60 ... +70 °C number of simultaneously controllable inputs and outputs max. 50%; no SB module possible I 	<p>6AG1 212-1HD30-4XB0</p> <p>6AG1 212-1HD30-5XB0</p> <p>6AG1 212-1HD30-2XB0</p>	<p>Accessories</p>	<p>See SIMATIC S7-1200 CPU 1212C, page 4/20</p>

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

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

Overview



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

Note:

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

SIPLUS CPU 1214C DC/DC/DC

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

SIPLUS CPU 1214C AC/DC/RLY

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

SIPLUS CPU 1214C DC/DC/RLY

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

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

SIMATIC S7-1200

SIPLUS central processing units

SIPLUS CPU 1214C

Overview (continued)

Ambient conditions

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

- ISA-S71.04 severity level GX: Long-term load: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH₃ < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH₃ < 247 ppm; O₃ < 1.0 ppm; NOX < 10.4 ppm
- The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

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

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Ordering data

SIPLUS CPU 1214C compact CPU, AC/DC/relay

(extended temperature range and medial exposure)

Integrated program and data memory of 50 kbyte, load memory of 2 MB;
wide-range alternating voltage supply 85 ... 264 V AC;
Boolean execution times of 0.1 μs per operation;
14 digital inputs, 10 digital outputs (relay), 2 analog inputs; expandable with up to 3 communication modules, 8 signal modules, and 1 signal board;
digital inputs usable as HSC with 100 kHz

- Suitable for areas with extraordinary medial exposure (conformal coating) H **6AG1 214-1BE30-4XB0**
- Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +55 °C; without restrictions; SB module can be used I **6AG1 214-1BE30-5XB0**
- Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +70 °C; from +60 ... +70 °C number of simultaneously controllable inputs and outputs max. 50%; no SB module possible H **6AG1 214-1BE30-2XB0**

Order No.

SIPLUS CPU 1214C compact CPU, DC/DC/DC

(extended temperature range and medial exposure)

Integrated program and data memory of 50 kbyte, load memory of 2 MB;
voltage supply 24 V DC;
Boolean execution times of 0.1 μs per operation;
14 digital inputs, 10 digital outputs, 2 analog inputs; expandable with up to 3 communication modules, 8 signal modules and 1 signal board;
digital inputs usable as HSC with 100 kHz;
24 V DC digital outputs usable as pulse outputs (PTO) or pulse-width-modulated outputs (PWM) with 100 kHz

- Suitable for areas with extraordinary medial exposure (conformal coating) H **6AG1 214-1AE30-4XB0**
- Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +55 °C; without restrictions; SB module can be used I **6AG1 214-1AE30-5XB0**
- Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +70 °C; from +60 ... +70 °C number of simultaneously controllable inputs and outputs max. 50%; no SB module possible H **6AG1 214-1AE30-2XB0**

Order No.

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

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

SIMATIC S7-1200

SIPLUS central processing units

SIPLUS CPU 1214C

Ordering data	Order No.	Ordering data	Order No.
SIPLUS CPU 1214C compact CPU, DC/DC/relay (extended temperature range and medial exposure) Integrated program and data memory of 50 KB, load memory of 2 MB; power supply 24 V DC; Boolean execution times of 0.1 µs per operation; 14 digital inputs, 10 digital outputs (relay), 2 analog inputs; expandable with up to 3 communication modules, 8 signal modules and 1 signal board; digital inputs usable as HSC with 100 kHz		Accessories	See SIMATIC S7-1200 CPU 1214C, page 4/29
<ul style="list-style-type: none"> • Suitable for areas with extraordinary medial exposure (conformal coating) H 	6AG1 214-1HE30-4XB0		
<ul style="list-style-type: none"> • Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +55 °C; without restrictions; SB module can be used I 	6AG1 214-1HE30-5XB0		
<ul style="list-style-type: none"> • Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +70 °C; from +60 ... +70 °C number of simultaneously controllable inputs and outputs max. 50%; no SB module possible H 	6AG1 214-1HE30-2XB0		

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

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

SIMATIC S7-1200

Digital modules

SM 1221 digital input module

Overview



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

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Technical specifications

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

Technical specifications (continued)

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

SIMATIC S7-1200

Digital modules

SM 1221 digital input module

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Ordering data	Order No.	Ordering data	Order No.
SM 1221 digital input signal module		S7-1200 automation system, Easy Book	
8 inputs, 24 V DC, isolated, current sourcing/sinking	I 6ES7 221-1BF30-0XB0	Brief instructions	
16 inputs, 24 V DC, isolated, current sourcing/sinking	I 6ES7 221-1BH30-0XB0	German	K 6ES7 298-8FA30-8AQ0
Extension cable for two-tier configuration	I 6ES7 290-6AA30-0XA0	English	K 6ES7 298-8FA30-8BQ0
for connecting digital/analog signal modules; length 2 m		French	K 6ES7 298-8FA30-8CQ0
Terminal block (spare part)		Spanish	K 6ES7 298-8FA30-8DQ0
for 8/16-channel digital signal modules		Italian	K 6ES7 298-8FA30-8EQ0
with 7 screws, zinc-plated; 4 units	I 6ES7 292-1AG30-0XA0	Chinese	K 6ES7 298-8FA30-8KQ0
Front flap set (spare part)		STEP 7 Basic V11 engineering software	
for 8/16-channel signal modules	I 6ES7 291-1BA30-0XA0	Target system:	
S7-1200 automation system, system manual		SIMATIC S7-1200 controllers and the associated I/O.	
For SIMATIC S7-1200 and STEP 7 Basic		Requirements:	
German	K 6ES7 298-8FA30-8AH0	Windows XP Home SP3, Windows XP Professional SP3 (32 bit),	
English	K 6ES7 298-8FA30-8BH0	Windows 7 Home Premium, Windows 7 Professional (32 bit),	
French	K 6ES7 298-8FA30-8CH0	Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit),	
Spanish	K 6ES7 298-8FA30-8DH0	Microsoft Server 2003 R2 Std. SP2 (32 bit),	
Italian	K 6ES7 298-8FA30-8EH0	Microsoft Server 2008 Std. SP2 (32 bit)	
Chinese	K 6ES7 298-8FA30-8KH0	Type of delivery:	
		German, English, Chinese, Italian, French, Spanish	
		Single license	6ES7 822-0AA01-0YA0
		Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license	6ES7 822-0AA01-0YE0
		Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license	6ES7 822-1AA01-0YC5
		STEP 7 Basic V11, trial license	6ES7 822-0AA01-0YA7
		STEP 7 Basic Software Update Service, 1 year	D 6ES7 822-0AA00-0YL0

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

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

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

Overview



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

Technical specifications

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

SIMATIC S7-1200

Digital modules

SB 1221 digital input module

Technical specifications (continued)

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

Ordering data	Order No.	Order No.
SB 1221 signal board digital input modules		
4 inputs, 5 V DC, 200 kHz	I 6ES7 221-3AD30-0XB0	
4 inputs, 24 V DC, 200 kHz	I 6ES7 221-3BD30-0XB0	
Terminal block (spare part)		
for Signal Board		
with 6 screws, gold-plated; 4 units	I 6ES7 292-1BF30-0XA0	
S7-1200 automation system, system manual		
For SIMATIC S7-1200 and STEP 7 Basic		
German	K 6ES7 298-8FA30-8AH0	
English	K 6ES7 298-8FA30-8BH0	
French	K 6ES7 298-8FA30-8CH0	
Spanish	K 6ES7 298-8FA30-8DH0	
Italian	K 6ES7 298-8FA30-8EH0	
Chinese	K 6ES7 298-8FA30-8KH0	
S7-1200 automation system, Easy Book		
Brief instructions		
German	K 6ES7 298-8FA30-8AQ0	
English	K 6ES7 298-8FA30-8BQ0	
French	K 6ES7 298-8FA30-8CQ0	
Spanish	K 6ES7 298-8FA30-8DQ0	
Italian	K 6ES7 298-8FA30-8EQ0	
Chinese	K 6ES7 298-8FA30-8KQ0	
		STEP 7 Basic V11 engineering software
		Target system: SIMATIC S7-1200 controllers and the associated I/O.
		Requirements: Windows XP Home SP3, Windows XP Professional SP3 (32 bit), Windows 7 Home Premium, Windows 7 Professional (32 bit), Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit), Microsoft Server 2008 Std. SP2 (32 bit)
		Type of delivery: German, English, Chinese, Italian, French, Spanish
		Single license
		Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license
		Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license
		STEP 7 Basic V11, trial license
		STEP 7 Basic Software Update Service, 1 year
		6ES7 822-0AA01-0YA0
		6ES7 822-0AA01-0YE0
		6ES7 822-1AA01-0YC5
		6ES7 822-0AA01-0YA7
		6ES7 822-0AA00-0YL0

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

SIMATIC S7-1200

Digital modules

SM 1222 digital output module

Overview



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

4

Technical specifications

	6ES7 222-1BF30-0XB0	6ES7 222-1BH30-0XB0	6ES7 222-1HF30-0XB0	6ES7 222-1HH30-0XB0
Product type designation	SM1222 DQ 8x24 V DC	SM1222 DQ 16x24 V DC	SM 1222 DQ 8xRelay	SM1222 DQ 16xRelay
Supply voltages				
Rated value				
• permissible range, lower limit (DC)	20.4 V	20.4 V	5 V	5 V
• permissible range, upper limit (DC)	28.8 V	28.8 V	30 V	30 V
Current consumption				
from backplane bus 5 V DC, max.	120 mA	140 mA	120 mA	135 mA
Digital inputs				
• from load voltage L+ (without load), max.			11 mA / relay coil	11 mA / relay coil
Power losses				
Power loss, typ.	1.5 W	2.5 W	4.5 W	8.5 W
Connection method				
required front connector	Yes	Yes	Yes	Yes
Digital inputs				
Number of digital inputs	0	0	0	0
Digital outputs				
Number of digital outputs	8	16	8	16
• in groups of	1	1	2	1
Short-circuit protection	No; to be provided externally	No; to be provided externally	No; to be provided externally	No; to be provided externally
Limitation of inductive shutdown voltage to	typ. (L+) -48 V	typ. (L+) -48 V		
Switching capacity of the outputs				
• with resistive load, max.	0.5 A	0.5 A	2 A	2 A
• on lamp load, max.	5 W	5 W	30 W DC ; 200 W AC	30 W DC ; 200 W AC
Output voltage				
• Rated value (AC)			5 to 250 V AC	5 to 250 V AC
• Rated value (DC)	24 V	24 V	5 to 30 V DC	5 to 30 V DC
• for signal "0" (DC), max.	0.1 V; with 10 kOhm load	0.1 V; with 10 kOhm load		
• for signal "1", min.	20 V DC	20 V DC		

Technical specifications (continued)

	6ES7 222-1BF30-0XB0	6ES7 222-1BH30-0XB0	6ES7 222-1HF30-0XB0	6ES7 222-1HH30-0XB0
Output current				
• for signal "1" rated value	0.5 A	0.5 A	2 A	2 A
• for signal "1" permissible range, max.				
• for signal "0" residual current, max.	10 µA	10 µA		
Output delay with resistive load				
• 0 to "1", max.	50 µs	50 µs	10 ms	10 ms
• 1 to "0", max.	200 µs	200 µs	10 ms	10 ms
Aggregate current of outputs (per group)				
• horizontal installation - up to 50 °C, max.	4 A; Current per mass	8 A; Current per mass	10 A; Current per mass	10 A; Current per mass
Cable length				
• Cable length, shielded, max.	500 m	500 m	500 m	500 m
• Cable length unshielded, max.	150 m	150 m	150 m	150 m
Relay outputs				
Number of relay outputs			8	16
Rated input voltage of relay L+ (DC)			24 V	24 V
Number of operating cycles			mechanically 10 million, at rated load voltage 100,000	mechanically 10 million, at rated load voltage 100,000
Switching capacity of contacts				
• with inductive load, max.	0.5 A	0.5 A	2 A	2 A
• on lamp load, max.	5 W	5 W	30 W DC ; 200 W AC	30 W DC ; 200 W AC
• with resistive load, max.	0.5 A	0.5 A	2 A	2 A
Alarms/diagnostics/status information				
Alarms				
• Alarms	Yes	Yes	Yes	Yes
• Diagnostic alarm	Yes	Yes	Yes	Yes
Diagnostics				
• Diagnostic functions	Yes	Yes	Yes	Yes
Diagnostic indication LED				
• For status of the outputs	Yes	Yes	Yes	Yes
• for maintenance	Yes	Yes	Yes	Yes
• Status indicator digital output (green)	Yes	Yes	Yes	Yes
Galvanic isolation				
Galvanic isolation digital outputs				
• between the channels			Relays	Relays
• between the channels, in groups of	1	1	2	4
• between the channels and the backplane bus	500 V AC	500 V AC	1500 V AC for 1 minute	1500 V AC for 1 minute

SIMATIC S7-1200

Digital modules

SM 1222 digital output module

Technical specifications (continued)

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

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

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

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

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

SIMATIC S7-1200

Digital modules

SB 1222 digital output module

Overview



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

4

Technical specifications

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

Technical specifications (continued)

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

SIMATIC S7-1200

Digital modules

SB 1222 digital output module

Ordering data

Order No.

Order No.

SB 1222 signal board digital output modules

4 outputs, 5 V DC, 0.1 A, 200 kHz I

6ES7 222-1AD30-0XB0

4 outputs, 24 V DC, 0.1 A, 200 kHz

6ES7 222-1BD30-0XB0**Terminal block (spare part)**

for Signal Board

with 6 screws, gold-plated; 4 units I

6ES7 292-1BF30-0XA0**S7-1200 automation system, system manual**

For SIMATIC S7-1200 and STEP 7 Basic

German

K

6ES7 298-8FA30-8AH0

English

K

6ES7 298-8FA30-8BH0

French

K

6ES7 298-8FA30-8CH0

Spanish

K

6ES7 298-8FA30-8DH0

Italian

K

6ES7 298-8FA30-8EH0

Chinese

K

6ES7 298-8FA30-8KH0**S7-1200 automation system, Easy Book**

Brief instructions

German

K

6ES7 298-8FA30-8AQ0

English

K

6ES7 298-8FA30-8BQ0

French

K

6ES7 298-8FA30-8CQ0

Spanish

K

6ES7 298-8FA30-8DQ0

Italian

K

6ES7 298-8FA30-8EQ0

Chinese

K

6ES7 298-8FA30-8KQ0**STEP 7 Basic V11 engineering software**

Target system:

SIMATIC S7-1200 controllers and the associated I/O.

Requirements:

Windows XP Home SP3, Windows XP Professional SP3 (32 bit),

Windows 7 Home Premium,

Windows 7 Professional (32 bit),

Windows 7 Enterprise (32 bit),

Windows 7 Ultimate (32 bit),

Microsoft Server 2003 R2 Std.

SP2 (32 bit),

Microsoft Server 2008 Std. SP2

(32 bit)

Type of delivery:

German, English, Chinese, Italian,

French, Spanish

Single license

6ES7 822-0AA01-0YA0

Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license

6ES7 822-0AA01-0YE0

Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11,

floating license

6ES7 822-1AA01-0YC5

STEP 7 Basic V11, trial license

6ES7 822-0AA01-0YA7

STEP 7 Basic

D

6ES7 822-0AA00-0YL0

Software Update Service, 1 year

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

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

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

Overview



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

Technical specifications

	6ES7 223-1BH30-0XB0	6ES7 223-1BL30-0XB0	6ES7 223-1PH30-0XB0	6ES7 223-1PL30-0XB0	6ES7 223-1QH30-0XB0
Product type designation	SM 1223 DI 8x24 V DC, DQ 8x24 V DC	SM 1223 DI 16x24 V DC, DQ 16x24 V DC	SM 1223 DI 8x24 V DC, DQ 8xRelay	SM 1223 DI 16x24 V DC, DQ 16xRelay	120/230 V AC SM223 DIx8/DQx8 RLY
Supply voltages					
Rated value					
• 24 V DC	Yes	Yes	Yes	Yes	Yes
• permissible range, lower limit (DC)	20.4 V	20.4 V	20.4 V	20.4 V	20.4 V
• permissible range, upper limit (DC)	28.8 V	28.8 V	28.8 V	28.8 V	28.8 V
Power supply to the transmitters					
• present	Yes	Yes	Yes	Yes	Yes
Current consumption					
from backplane bus 5 V DC, max.	145 mA	185 mA	145 mA	180 mA	120 mA
Digital inputs					
• from load voltage L+ (without load), max.	4 mA; per channel	4 mA; per channel			
Power losses					
Power loss, typ.	2.5 W	4.5 W	5.5 W	10 W	
Connection method					
required front connector	Yes	Yes	Yes	Yes	Yes
Digital inputs					
Number of digital inputs	8	16	8	16	8
• in groups of	2	2	2	2	4
Number of simultaneously controllable inputs					
• all mounting positions					
- Concurrently controllable inputs, up to 40 °C	8	16	8	16	8
• horizontal installation					
- up to 40 °C, max.	8	16	8	16	8
- up to 50 °C, max.	8	16	8	16	8
• vertical installation					
- up to 40 °C, max.	8	16	8	16	8

SIMATIC S7-1200

Digital modules

SM 1223 digital input/output module

Technical specifications (continued)

	6ES7 223-1BH30-0XB0	6ES7 223-1BL30-0XB0	6ES7 223-1PH30-0XB0	6ES7 223-1PL30-0XB0	6ES7 223-1QH30-0XB0
Input characteristic curve acc. to IEC 1131, Type 1	Yes	Yes	Yes	Yes	Yes
Input voltage <ul style="list-style-type: none"> Rated value, AC Rated value, DC for signal "0" for signal "1" 	24 V 5 V DC at 1 mA 15 V DC at 2.5 mA	24 V 5 V DC at 1 mA 15 V DC at 2.5 mA	24 V 5 V DC at 1 mA 15 V DC at 2.5 mA	24 V 5 V DC at 1 mA 15 V DC at 2.5 mA	230 V 20 V AC at 1 mA 79 V AC at 2.5 mA
Input current <ul style="list-style-type: none"> for signal "0", max. (permissible quiescent current) for signal "1", min. for signal "1", typ. 	1 mA 2.5 mA 4 mA; typical	1 mA 2.5 mA 4 mA; typical	1 mA 2.5 mA 4 mA; typical	1 mA 2.5 mA 4 mA; typical	1 mA 2.5 mA 9 mA; typical
Input delay (for rated value of input voltage) <ul style="list-style-type: none"> for standard inputs - parameterizable for interrupt inputs - parameterizable 	Yes; 0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four Yes	Yes; 0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four Yes	Yes; 0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four Yes	Yes; 0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four Yes	Yes; 0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four Yes
Cable length <ul style="list-style-type: none"> Cable length, shielded, max. Cable length unshielded, max. 	500 m 300 m	500 m 300 m	500 m 300 m	500 m 300 m	500 m 300 m
Digital outputs					
Number of digital outputs <ul style="list-style-type: none"> in groups of 	8 1	16 1	8 2	16 4	8 2
Short-circuit protection	No; to be provided externally	No; to be provided externally	No; to be provided externally	No; to be provided externally	No; to be provided externally
Limitation of inductive shutdown voltage to	L+ (-48 V)	L+ (-48 V)			
Switching capacity of the outputs <ul style="list-style-type: none"> with resistive load, max. on lamp load, max. 	0.5 A 5 W	0.5 A 5 W	2 A 30 W DC ; 200 W AC	2 A 30 W DC ; 200 W AC	2 A 30 W DC ; 200 W AC
Output voltage <ul style="list-style-type: none"> Rated value (AC) Rated value (DC) for signal "0" (DC), max. for signal "1", min. 	24 V 0.1 V; with 10 kOhm load 20 V DC	24 V 0.1 V; with 10 kOhm load 20 V DC	5 to 250 V AC 5 to 30 V AC	5 to 250 V AC 5 to 30 V AC	5 to 250 V AC 5 to 30 V DC
Output current <ul style="list-style-type: none"> for signal "1" permissible range, max. for signal "0" residual current, max. 	0.5 A 10 µA	0.5 A 10 µA	2 A	2 A	2 A
Output delay with resistive load <ul style="list-style-type: none"> 0 to "1", max. 1 to "0", max. 	50 µs 200 µs	50 µs 200 µs	10 ms 10 ms	10 ms 10 ms	10 ms 10 ms

Technical specifications (continued)

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

SIMATIC S7-1200

Digital modules

SM 1223 digital input/output module

Technical specifications (continued)

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

Ordering data	Order No.	Order No.
SM 1223 digital input/output signal module		
8 inputs, 24 V DC, IEC type 1 current sinking; 8 24 V DC transistor outputs, 0.5 A, 5 W	I 6ES7 223-1BH30-0XB0	
16 inputs, 24 V DC, IEC type 1 current sinking; 16 24 V DC transistor outputs, 0.5 A, 5 W	I 6ES7 223-1BL30-0XB0	
8 inputs, 24 V DC, IEC type 1 current sinking; 8 relay outputs, 5 ... 30 V DC/ 5 ... 250 V AC, 2 A, 30 W DC/ 200 W AC	I 6ES7 223-1PH30-0XB0	
16 inputs, 24 V DC, IEC type 1 current sinking; 16 relay outputs, 5 ... 30 V DC/ 5 ... 250 V AC, 2 A, 30 W DC/ 200 W AC	I 6ES7 223-1PL30-0XB0	
8 inputs, 120/230 V AC; 8 relay outputs, 5 ... 30 V DC/ 5 ... 250 V AC, 2 A, 30 W DC/ 200 W AC	I 6ES7 223-1QH30-0XB0	
Extension cable for two-tier configuration	I 6ES7 290-6AA30-0XA0	
for connecting digital/analog signal modules; length 2 m		
Terminal block (spare part)		
for 8/16-channel digital signal modules		
with 7 screws, zinc-plated; 4 units	I 6ES7 292-1AG30-0XA0	
Terminal block (spare part)		
for 8/16-channel signal modules	I 6ES7 291-1BA30-0XA0	
for 32-channel signal modules	I 6ES7 291-1BB30-0XA0	
S7-1200 automation system, system manual		
For SIMATIC S7-1200 and STEP 7 Basic		
German	K 6ES7 298-8FA30-8AH0	
English	K 6ES7 298-8FA30-8BH0	
French	K 6ES7 298-8FA30-8CH0	
Spanish	K 6ES7 298-8FA30-8DH0	
Italian	K 6ES7 298-8FA30-8EH0	
Chinese	K 6ES7 298-8FA30-8KH0	
		S7-1200 automation system, Easy Book
		Brief instructions
		German K 6ES7 298-8FA30-8AQ0
		English K 6ES7 298-8FA30-8BQ0
		French K 6ES7 298-8FA30-8CQ0
		Spanish K 6ES7 298-8FA30-8DQ0
		Italian K 6ES7 298-8FA30-8EQ0
		Chinese K 6ES7 298-8FA30-8KQ0
		STEP 7 Basic V11 engineering software
		Target system: SIMATIC S7-1200 controllers and the associated I/O.
		Requirements: Windows XP Home SP3, Windows XP Professional SP3 (32 bit), Windows 7 Home Premium, Windows 7 Professional (32 bit), Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit), Microsoft Server 2008 Std. SP2 (32 bit)
		Type of delivery: German, English, Chinese, Italian, French, Spanish
		Single license 6ES7 822-0AA01-0YA0
		Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license 6ES7 822-0AA01-0YE0
		Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license 6ES7 822-1AA01-0YC5
		STEP 7 Basic V11, trial license 6ES7 822-0AA01-0YA7
		STEP 7 Basic D 6ES7 822-0AA00-0YL0
		Software Update Service, 1 year

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

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

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

SIMATIC S7-1200

Digital modules

SB 1223 digital input/output module

Overview



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

4

Technical specifications

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

Technical specifications (continued)

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

SIMATIC S7-1200

Digital modules

SB 1223 digital input/output module

Technical specifications (continued)

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

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

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

SIMATIC S7-1200

SIPLUS digital modules

SIPLUS SM 1221 digital input module

Overview



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

Note:

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

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

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

Ambient conditions

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

¹⁾ ISA-S71.04 severity level GX: Long-term load: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O₃ < 1.0 ppm; NOX < 10.4 ppm

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

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

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

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

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

Overview



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

Note:

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

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

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

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

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

SIMATIC S7-1200

SIPLUS digital modules

SIPLUS SM 1222 digital output module

Overview (continued)

Ambient conditions

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

- 1) ISA-S71.04 severity level GX: Long-term load: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH₃ < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH₃ < 247 ppm; O₃ < 1.0 ppm; NOX < 10.4 ppm
- 2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

4

Ordering data

Digital output SIPLUS SM 1222 signal module

(extended temperature range and medial exposure)

8 outputs, 24 V DC; 0.5 A, 5 W, isolated

- Suitable for areas with extraordinary medial exposure (conformal coating)

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

16 outputs, 24 V DC; 0.5 A, 5 W, isolated

- Suitable for areas with extraordinary medial exposure (conformal coating)

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

Order No.

H **6AG1 222-1BF30-4XB0**

I **6AG1 222-1BF30-2XB0**

H **6AG1 222-1BH30-4XB0**

I **6AG1 222-1BH30-2XB0**

Order No.

8 relay outputs, 5 ... 30 V DC/
5 ... 250 V AC, 2 A, 30 W DC/
200 W AC

- Suitable for areas with extraordinary medial exposure (conformal coating)
- -25 ... +70 °C, from +60 ... +70°C number of simultaneously controllable inputs and outputs max. 50 %

16 relay outputs, 5 ... 30 V DC/
5 ... 250 V AC, 2 A, 30 W DC/
200 W AC

- Suitable for areas with extraordinary medial exposure (conformal coating)
- -25 ... +70 °C, from +60 ... +70°C number of simultaneously controllable inputs and outputs max. 50 %

Accessories

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

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

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

Overview



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

Note:

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

SIPLUS SM 1223

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

SIPLUS SM 1223

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

SIPLUS SM 1223

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

SIPLUS SM 1223

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

SIMATIC S7-1200

SIPLUS digital modules

SIPLUS SM 1223 digital input/output module

Overview (continued)

Ambient conditions

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

- 1) ISA-S71.04 severity level GX: Long-term load: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O₃ < 1.0 ppm; NOX < 10.4 ppm
- 2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

4

Ordering data

Digital input/output SIPLUS SM 1223 signal module

(extended temperature range and medial exposure)

8 inputs, 24 V DC, IEC type 1 current sinking;
8 transistor outputs, 24 V DC, 0.5 A, 5 W

- Suitable for areas with extraordinary medial exposure (conformal coating) H
- -25 ... +70 °C, from +60 ... +70 °C number of simultaneously controllable inputs and outputs max. 50 % I

Order No.

6AG1 223-1BH30-4XB0

6AG1 223-1BH30-2XB0

16 inputs, 24 V DC, IEC type 1 current sinking;
16 transistor outputs, 24 V DC, 0.5 A, 5 W

- Suitable for areas with extraordinary medial exposure (conformal coating) H
- -25 ... +70 °C, from +60 ... +70 °C number of simultaneously controllable inputs and outputs max. 50 % I

6AG1 223-1BL30-4XB0

6AG1 223-1BL30-2XB0

Order No.

8 inputs, 24 V DC, IEC type 1 current sinking;
8 relay outputs, 5 ... 30 V DC / 5 ... 250 V AC, 2 A, 30 W DC / 200 W AC

- Suitable for areas with extraordinary medial exposure (conformal coating) H
- -25 ... +70 °C, from +60 ... +70 °C number of simultaneously controllable inputs and outputs max. 50 % I

6AG1 223-1PH30-4XB0

6AG1 223-1PH30-2XB0

16 inputs, 24 V DC, IEC type 1 current sinking;
16 relay outputs, 5 ... 30 V DC / 5 ... 250 V AC, 2 A, 30 W DC / 200 W AC

- Suitable for areas with extraordinary medial exposure (conformal coating) H
- -25 ... +70 °C, from +60 ... +70 °C number of simultaneously controllable inputs and outputs max. 50 % I

6AG1 223-1PL30-4XB0

6AG1 223-1PL30-2XB0

Accessories

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

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

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

Overview



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

Note:

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

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

¹⁾ ISA-S71.04 severity level GX: Long-term load: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O₃ < 1.0 ppm; NOX < 10.4 ppm

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

Ordering data	Order No.	Ordering data	Order No.
Digital input/output SIPLUS SM 1223 signal board (extended temperature range and medial exposure) 2 inputs, 24 V DC, IEC type 1 current sinking; 2 transistor outputs, 24 V DC, 0.5 A, 5 W; usable as HSC up to 30 kHz • Suitable for areas with extraordinary medial exposure (conformal coating) • Ambient temperature -25 ... +55 °C	H 6AG1 223-0BD30-4XB0 I 6AG1 223-0BD30-5XB0	Accessories	See SIMATIC S7-1200 SB 1223 digital input/output, page 4/61

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

SIMATIC S7-1200

Analog modules

SM 1231 analog input module

Overview



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

4

Technical specifications

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

Technical specifications (continued)

	6ES7 231-4HD30-0XB0	6ES7 231-4HF30-0XB0
Current input		
• permissible input current for current input (destruction limit), max.	40 mA	40 mA
Temperature compensation		
• Temperature compensation parameterizable	No	No
Analog outputs		
Number of analog outputs	0	0
Analog value creation		
Integrations and conversion time/ resolution per channel		
• Resolution with overrange (bit including sign), max.	12 bit; + sign	12 bit; + sign
• Integration time, parameterizable	Yes	Yes
• Interference voltage suppression for interference frequency f_1 in Hz	40 dB, DC to 60 V for interference frequency 50 / 60 Hz	40 dB, DC to 60 V for interference frequency 50 / 60 Hz
Smoothing of measured values		
• Parameterizable	Yes	Yes
• Step: None	Yes	Yes
• Step: Low	Yes	Yes
• Step: Medium	Yes	Yes
• Step: High	Yes	Yes
Errors/accuracies		
Temperature error (relative to input area)	25°C ±0.1% to 55°C ±0.2% total measurement range	25°C ±0.1% to 55°C ±0.2% total measurement range
Basic error limit (operational limit at 25 °C)		
• Voltage, relative to input area	+/- 0.1 %	+/- 0.1 %
• Current, relative to input area	+/- 0.1 %	+/- 0.1 %
Interference voltage suppression for $f = n \times (f_1 \pm 1\%)$, f_1 = interference frequency		
• Common mode voltage, max.	12 V	12 V
Alarms/diagnostics/status information		
Alarms		
• Alarms	Yes	Yes
• Diagnostic alarm	Yes	Yes
Diagnostics		
• Diagnostic functions	Yes	Yes
• Monitoring the supply voltage to the electronics	Yes	Yes
• Wire break	No	No
Diagnostic indication LED		
• for status of the inputs	Yes	Yes
• for maintenance	Yes	Yes
Galvanic isolation		
Galvanic isolation analog outputs		
• between the channels and the power supply of the electronics	No	No
Climatic and mechanical conditions for storage and transport		
Climatic conditions for storage and transport		
• Free fall		
- Drop height, max. (in packaging)	0.3 m; five times, in dispatch package	0.3 m; five times, in dispatch package
• Temperature		
- Permissible temperature range	-40 °C to +70 °C	-40 °C to +70 °C
• Air pressure acc. to IEC 60068-2-13		
- Permissible air pressure	1080 to 660 hPa	1080 to 660 hPa
• Relative humidity		
- Permissible range (without condensation) at 25 °C	95%	95%

SIMATIC S7-1200

Analog modules

SM 1231 analog input module

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

Ordering data	Order No.	Ordering data	Order No.
SM 1231 analog input signal module		S7-1200 automation system, Easy Book	
4 analog inputs ±10 V, ±5 V, ±2.5 V, or 0 ... 20 mA 12 bit + sign	6ES7 231-4HD30-0XB0	Brief instructions	
8 analog inputs ±10 V, ±5 V, ±2.5 V, or 0 ... 20 mA 12 bit + sign	6ES7 231-4HF30-0XB0	German	K 6ES7 298-8FA30-8AQ0
Extension cable for two-tier configuration	6ES7 290-6AA30-0XA0	English	K 6ES7 298-8FA30-8BQ0
for connecting digital/analog signal modules; length 2 m		French	K 6ES7 298-8FA30-8CQ0
Terminal block (spare part)		Spanish	K 6ES7 298-8FA30-8DQ0
for 8/16-channel analog signal modules		Italian	K 6ES7 298-8FA30-8EQ0
with 7 screws, gold-plated; 4 units	6ES7 292-1BG30-0XA0	Chinese	K 6ES7 298-8FA30-8KQ0
Front flap set (spare part)		STEP 7 Basic V11 engineering software	
for 8/16-channel signal modules	6ES7 291-1BA30-0XA0	Single license	6ES7 822-0AA01-0YA0
S7-1200 automation system, system manual		Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license	6ES7 822-0AA01-0YE0
For SIMATIC S7-1200 and STEP 7 Basic		Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license	6ES7 822-1AA01-0YC5
German	K 6ES7 298-8FA30-8AH0	STEP 7 Basic V11, trial license	6ES7 822-0AA01-0YA7
English	K 6ES7 298-8FA30-8BH0	STEP 7 Basic	D 6ES7 822-0AA00-0YL0
French	K 6ES7 298-8FA30-8CH0	Software Update Service, 1 year	
Spanish	K 6ES7 298-8FA30-8DH0		
Italian	K 6ES7 298-8FA30-8EH0		
Chinese	K 6ES7 298-8FA30-8KH0		

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

Overview

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

Technical specifications

Product type designation	6ES7 231-4HA30-0XB0 SB1231 AI 1x12 BIT
Supply voltages	
Rated value	
• 24 V DC	Yes
Connection method	
required front connector	Yes
Analog inputs	
Number of analog inputs	1; Current or voltage differential inputs
permissible input frequency for current input (destruction limit), max.	± 35 V
Cycle time (all channels) max.	156.25 µs; 400 Hz suppression
Input ranges	
• Voltage	Yes; ± 10 V, ± 5 V, ± 2.5 V
• Current	Yes; 0 to 20 mA
• Thermocouple	No
• Resistance thermometer	No
• Resistance	No
Input ranges (rated values), voltages	
• -10 V to +10 V	Yes
• Input resistance (-10 V to +10 V)	≥ 9 MOhm
• -2.5 V to +2.5 V	Yes
• Input resistance (-2.5 V to +2.5 V)	≥ 9 MOhm
• -5 V to +5 V	Yes
• Input resistance (-5 V to +5 V)	≥ 9 MOhm
Input ranges (rated values), currents	
• 0 to 20 mA	Yes
• Input resistance (0 to 20 mA)	≥ 250 Ohm
Voltage input	
• permissible input voltage for voltage input (destruction limit), max.	35 V
Cable length	
• Cable length, shielded, max.	Twisted and shielded in pairs

Product type designation	6ES7 231-4HA30-0XB0 SB1231 AI 1x12 BIT
Analog value creation	
Measurement principle	Integrating
Integrations and conversion time/ resolution per channel	
• Resolution with overrange (bit including sign), max.	11 bit; + sign
• Integration time, parameterizable	Yes
• Interference voltage suppression for interference frequency f1 in Hz	40 dB, DC to 60 Hz
Smoothing of measured values	
• parameterizable	Yes
• Step: None	Yes
• Step: Low	Yes
• Step: Medium	Yes
• Step: High	Yes
Errors/accuracies	
Temperature error (relative to input area)	25 °C ± 0.3% to 55 °C ± 0.6% total measurement range
Alarms/diagnostics/status information	
Alarms	
• Alarms	Yes
• Diagnostic alarm	Yes
Diagnostics	
• Diagnostic functions	Yes
• Wire break	No
Diagnostic indication LED	
• for status of the inputs	Yes
• for maintenance	Yes
Climatic and mechanical conditions for storage and transport	
Climatic conditions for storage and transport	
• Free fall	
- Drop height, max. (in packaging)	0.3 m; five times, in dispatch package
• Temperature	
- Permissible temperature range	-40 °C to +70 °C
• Air pressure acc. to IEC 60068-2-13	
- Permissible air pressure	1080 to 660 hPa
• Relative humidity	
- Permissible range (without condensation) at 25 °C	95%
Mechanical and climatic conditions during operation	
Climatic conditions in operation	
• Air pressure acc. to IEC 60068-2-13	
- Permissible air pressure	1080 to 795 hPa
• Pollutant concentrations	
- SO ₂ at RH < 60% without condensation	SO ₂ : < 0.5 ppm; H ₂ S: < 0.1 ppm; RH < 60% condensation-free

SIMATIC S7-1200

Analog modules

SB 1231 analog input module

Technical specifications (continued)

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

Ordering data

Order No.

SB 1231 signal board analog input module		
1 analog input, ±10 V with 12 bit or 0 ... 20 mA with 11 bit	I	6ES7 231-4HA30-0XB0
Terminal block (spare part)		
for signal board		
with 6 screws, gold-plated; 4 units	I	6ES7 292-1BF30-0XA0
S7-1200 automation system, system manual		
For SIMATIC S7-1200 and STEP 7 Basic		
German	K	6ES7 298-8FA30-8AH0
English	K	6ES7 298-8FA30-8BH0
French	K	6ES7 298-8FA30-8CH0
Spanish	K	6ES7 298-8FA30-8DH0
Italian	K	6ES7 298-8FA30-8EH0
Chinese	K	6ES7 298-8FA30-8KH0
S7-1200 automation system, Easy Book		
Brief instructions		
German	K	6ES7 298-8FA30-8AQ0
English	K	6ES7 298-8FA30-8BQ0
French	K	6ES7 298-8FA30-8CQ0
Spanish	K	6ES7 298-8FA30-8DQ0
Italian	K	6ES7 298-8FA30-8EQ0
Chinese	K	6ES7 298-8FA30-8KQ0
STEP 7 Basic V11 engineering software		
Target system: SIMATIC S7-1200 controllers and the associated I/O.		
Requirements: Windows XP Home SP3, Windows XP Professional SP3 (32 bit), Windows 7 Home Premium, Windows 7 Professional (32 bit), Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit), Microsoft Server 2008 Std. SP2 (32 bit)		
Type of delivery: German, English, Chinese, Italian, French, Spanish		
Single license		6ES7 822-0AA01-0YA0
Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license		6ES7 822-0AA01-0YE0
Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license		6ES7 822-1AA01-0YC5
STEP 7 Basic V11, trial license		6ES7 822-0AA01-0YA7
STEP 7 Basic Software Update Service, 1 year	D	6ES7 822-0AA00-0YL0

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

Overview



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

Technical specifications

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

SIMATIC S7-1200

Analog modules

SM 1232 analog output module

Technical specifications (continued)

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

Ordering data	Order No.	Order No.
SM 1232 analog output signal module		
2 analog outputs, ±10 V with 14 bit or 0 ... 20 mA with 13 bit	I 6ES7 232-4HB30-0XB0	
4 analog outputs, ±10 V with 14 bit or 0 ... 20 mA with 13 bit	I 6ES7 232-4HD30-0XB0	
Extension cable for two-tier configuration	I 6ES7 290-6AA30-0XA0	
for connecting digital/analog signal modules; length 2 m		
Terminal block (spare part)		
for 8/16-channel analog signal modules		
with 7 screws, gold-plated; 4 units	I 6ES7 292-1BG30-0XA0	
S7-1200 automation system, system manual		
For SIMATIC S7-1200 and STEP 7 Basic		
German	K 6ES7 298-8FA30-8AH0	
English	K 6ES7 298-8FA30-8BH0	
French	K 6ES7 298-8FA30-8CH0	
Spanish	K 6ES7 298-8FA30-8DH0	
Italian	K 6ES7 298-8FA30-8EH0	
Chinese	K 6ES7 298-8FA30-8KH0	
S7-1200 automation system, Easy Book		
Brief instructions		
German	K 6ES7 298-8FA30-8AQ0	
English	K 6ES7 298-8FA30-8BQ0	
French	K 6ES7 298-8FA30-8CQ0	
Spanish	K 6ES7 298-8FA30-8DQ0	
Italian	K 6ES7 298-8FA30-8EQ0	
Chinese	K 6ES7 298-8FA30-8KQ0	
		STEP 7 Basic V11 engineering software
		Target system: SIMATIC S7-1200 controllers and the associated I/O.
		Requirements: Windows XP Home SP3, Windows XP Professional SP3 (32 bit), Windows 7 Home Premium, Windows 7 Professional (32 bit), Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit), Microsoft Server 2008 Std. SP2 (32 bit)
		Type of delivery: German, English, Chinese, Italian, French, Spanish
		Single license
		6ES7 822-0AA01-0YA0
		Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license
		6ES7 822-0AA01-0YE0
		Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license
		6ES7 822-1AA01-0YC5
		STEP 7 Basic V11, trial license
		6ES7 822-0AA01-0YA7
		STEP 7 Basic Software Update Service, 1 year
		6ES7 822-0AA00-0YL0

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

SIMATIC S7-1200

Analog modules

SB 1232 analog output module

Overview



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

Technical specifications

6ES7 232-4HA30-0XB0	
Product type designation	SB 1232 1x AO
Supply voltages Power supply to the transmitters	
• Supply current, max.	25 mA
Current consumption from backplane bus 5 V DC, typ.	15 mA
Power losses Power loss, typ.	1.5 W
Analog outputs Number of analog outputs	1
Cycle time (all channels) max.	Voltage: 300 μ S (R), 750 μ S (1 μ F) Current: 600 ms (1 mH); 2 ms (10 mH)
Output ranges, voltage	
• -10 to +10 V	Yes
Output ranges, current	
• 0 to 20 mA	Yes
Load impedance (in rated range of output)	
• with voltage outputs, min.	1 000 Ω
• with current outputs, max.	600 Ω
Cable length	
• Cable length, shielded, max.	Shielded, twisted wire pair
Analog value creation Measurement principle	Differential
Integrations and conversion time/ resolution per channel	
• Resolution (incl. overrange)	U / 12 bit, I / 11 bit
Smoothing of measured values	
• parameterizable	Yes
Errors/accuracies Temperature error (relative to output area)	25°C \pm 0.5% bis 55°C \pm 1%
Alarms/diagnostics/status information Alarms	
• Alarms	Yes
Diagnostics	
• Diagnostic functions	Yes
Diagnostic indication LED	
• For status of the outputs	Yes
Climatic and mechanical conditions for storage and transport Climatic conditions for storage and transport	
• Free fall	
- Drop height, max. (in packaging)	0.3 m; five times, in dispatch package
• Temperature	
- Permissible temperature range	-40 °C to +70 °C
• Air pressure acc. to IEC 60068-2-13	
- Permissible air pressure	1080 to 660 hPa
• Relative humidity	
- Permissible range (without condensation) at 25 °C	95%

Technical specifications (continued)

6ES7 232-4HA30-0XB0	
Mechanical and climatic conditions during operation	
Climatic conditions in operation	
• Pollutant concentrations	
- SO ₂ at RH < 60% without condensation	SO ₂ : < 0.5 ppm; H ₂ S: < 0.1 ppm; RH < 60% condensation-free
Degree of protection	
IP20	Yes
Standards, approvals, certificates	
CE mark	Yes
C-TICK	Yes
FM approval	Yes
Mechanics/material	
Type of housing (front)	
• Plastic	Yes
Dimensions and weight	
Dimensions	
• Width	38 mm
• Height	62 mm
• Depth	21 mm
Weight	
• Weight, approx.	40 g

Ordering data

Order No.

SB 1232 analog output signal board		
1 analog output, ±10 V with 12 bit or 0 ... 20 mA with 11 bit	I	6ES7 232-4HA30-0XB0
Terminal block (spare part)		
for signal board		
with 6 screws, gold-plated; 4 units	I	6ES7 292-1BF30-0XA0
S7-1200 automation system, system manual		
For SIMATIC S7-1200 and STEP 7 Basic		
German	K	6ES7 298-8FA30-8AH0
English	K	6ES7 298-8FA30-8BH0
French	K	6ES7 298-8FA30-8CH0
Spanish	K	6ES7 298-8FA30-8DH0
Italian	K	6ES7 298-8FA30-8EH0
Chinese	K	6ES7 298-8FA30-8KH0
S7-1200 automation system, Easy Book		
Brief instructions		
German	K	6ES7 298-8FA30-8AQ0
English	K	6ES7 298-8FA30-8BQ0
French	K	6ES7 298-8FA30-8CQ0
Spanish	K	6ES7 298-8FA30-8DQ0
Italian	K	6ES7 298-8FA30-8EQ0
Chinese	K	6ES7 298-8FA30-8KQ0
STEP 7 Basic V11 engineering software		
Target system: SIMATIC S7-1200 controllers and the associated I/O.		
Requirements: Windows XP Home SP3, Windows XP Professional SP3 (32 bit), Windows 7 Home Premium, Windows 7 Professional (32 bit), Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit), Microsoft Server 2008 Std. SP2 (32 bit)		
Type of delivery: German, English, Chinese, Italian, French, Spanish		
Single license		6ES7 822-0AA01-0YA0
Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license		6ES7 822-0AA01-0YE0
Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license		6ES7 822-1AA01-0YC5
STEP 7 Basic V11, trial license		6ES7 822-0AA01-0YA7
STEP 7 Basic Software Update Service, 1 year	D	6ES7 822-0AA00-0YL0

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

SIMATIC S7-1200

Analog modules

SM 1234 analog input/output module

Overview



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

Technical specifications

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

Technical specifications (continued)

6ES7 234-4HE30-0XB0	
Analog outputs	
Number of analog outputs	2; current or voltage
Output ranges, voltage • -10 to +10 V	Yes
Output ranges, current • 0 to 20 mA	Yes
Load impedance (in rated range of output) • with voltage outputs, min. • with current outputs, max.	1 000 Ω 600 Ω
Analog value creation	
Measurement principle	Differential
Integrations and conversion time/ resolution per channel • Resolution (incl. overrange) • Resolution with overrange (bit including sign), max. • Integration time, parameterizable • Interference voltage suppression for interference frequency f1 in Hz	Voltage: 14 bit; Current : 13 bit 12 bit; + sign Yes 40 dB, DC to 60 V for interference frequency 50 / 60 Hz
Smoothing of measured values • Parameterizable • Step: None • Step: Low • Step: Medium • Step: High	Yes Yes Yes Yes Yes
Errors/accuracies	
Temperature error (relative to input area)	25°C ±0.1% to 55°C ±0.2% total measurement range
Temperature error (relative to output area)	25°C ±0.3% to 55°C ±0.6% total measurement range
Basic error limit (operational limit at 25 °C) • Voltage, relative to input area • Current, relative to input area • Voltage, relative to output area • Current, relative to output area	+/- 0,1 % +/- 0,1 % +/- 0,3 % +/- 0,3 %
Interference voltage suppression for f = n x (fl +/- 1%), fl = interference frequency • common mode voltage, max.	12 V
Alarms/diagnostics/status infor- mation	
Alarms • Alarms • Diagnostic alarm	Yes Yes
Diagnostics • Diagnostic functions • Monitoring the supply voltage to the electronics • Wire break • Short circuit	Yes Yes Yes Yes
Diagnostic indication LED • for status of the inputs • For status of the outputs • for maintenance	Yes Yes Yes

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

SIMATIC S7-1200

Analog modules

SM 1234 analog input/output module

4

Ordering data	Order No.	Order No.
SM 1234 analog input/output signal module 4 analog inputs, ± 10 V, ± 5 V, ± 2.5 V, or 0 ... 20 mA, 12 bit + sign; 2 analog outputs, ± 10 V with 14 bit or 0 ... 20 mA with 13 bit	6ES7 234-4HE30-0XB0	STEP 7 Basic V11 engineering software Target system: SIMATIC S7-1200 controllers and the associated I/O. Requirements: Windows XP Home SP3, Windows XP Professional SP3 (32 bit), Windows 7 Home Premium, Windows 7 Professional (32 bit), Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit), Microsoft Server 2008 Std. SP2 (32 bit) Type of delivery: German, English, Chinese, Italian, French, Spanish Single license Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license STEP 7 Basic V11, trial license STEP 7 Basic Software Update Service, 1 year
Extension cable for two-tier configuration for connecting digital/analog signal modules; length 2 m	6ES7 290-6AA30-0XA0	
Terminal block (spare part) for 8/16-channel analog signal modules with 7 screws, gold-plated; 4 units	6ES7 292-1BG30-0XA0	
Front flap set (spare part) for 8/16-channel signal modules	6ES7 291-1BA30-0XA0	
S7-1200 automation system, system manual For SIMATIC S7-1200 and STEP 7 Basic		
German	K 6ES7 298-8FA30-8AH0	
English	K 6ES7 298-8FA30-8BH0	
French	K 6ES7 298-8FA30-8CH0	
Spanish	K 6ES7 298-8FA30-8DH0	
Italian	K 6ES7 298-8FA30-8EH0	
Chinese	K 6ES7 298-8FA30-8KH0	
S7-1200 automation system, Easy Book Brief instructions		
German	K 6ES7 298-8FA30-8AQ0	
English	K 6ES7 298-8FA30-8BQ0	
French	K 6ES7 298-8FA30-8CQ0	
Spanish	K 6ES7 298-8FA30-8DQ0	
Italian	K 6ES7 298-8FA30-8EQ0	
Chinese	K 6ES7 298-8FA30-8KQ0	

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

Overview

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

Technical specifications

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

SIMATIC S7-1200

Analog modules

SM 1231 thermocouple module

Technical specifications (continued)

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

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

Ordering data	Order No.	Ordering data	Order No.
SM 1231 thermocouple module		STEP 7 Basic V11 engineering software	
4 inputs +/- 80 mV, resolution 15 bit + sign, thermocouple types J, K, S, T, R, E, N	6ES7 231-5QD30-0XB0	Target system: SIMATIC S7-1200 controllers and the associated I/O.	
8 inputs +/- 80 mV, resolution 15 bit + sign, thermocouple types J, K, T, E, R, S, N, C, TXK/XK(L)	6ES7 231-5QF30-0XB0	Requirements: Windows XP Home SP3, Windows XP Professional SP3 (32 bit), Windows 7 Home Premium, Windows 7 Professional (32 bit), Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit), Microsoft Server 2008 Std. SP2 (32 bit)	
Accessories		Type of delivery: German, English, Chinese, Italian, French, Spanish	
Terminal block (spare part)		Single license	6ES7 822-0AA01-0YA0
for 8/16-channel analog signal modules		Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license	6ES7 822-0AA01-0YE0
with 7 screws, gold-plated; 4 units	6ES7 292-1BG30-0XA0	Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license	6ES7 822-1AA01-0YC5
Front flap set (spare part)		STEP 7 Basic V11, trial license	6ES7 822-0AA01-0YA7
for 8/16-channel signal modules	6ES7 291-1BA30-0XA0	STEP 7 Basic Software Update Service, 1 year	6ES7 822-0AA00-0YL0
S7-1200 automation system, system manual			
For SIMATIC S7-1200 and STEP 7 Basic			
German	K 6ES7 298-8FA30-8AH0		
English	K 6ES7 298-8FA30-8BH0		
French	K 6ES7 298-8FA30-8CH0		
Spanish	K 6ES7 298-8FA30-8DH0		
Italian	K 6ES7 298-8FA30-8EH0		
Chinese	K 6ES7 298-8FA30-8KH0		
S7-1200 automation system, Easy Book			
Brief instructions			
German	K 6ES7 298-8FA30-8AQ0		
English	K 6ES7 298-8FA30-8BQ0		
French	K 6ES7 298-8FA30-8CQ0		
Spanish	K 6ES7 298-8FA30-8DQ0		
Italian	K 6ES7 298-8FA30-8EQ0		
Chinese	K 6ES7 298-8FA30-8KQ0		

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

SIMATIC S7-1200

Analog modules

SB 1231 thermocouple signal board

Overview

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

Technical specifications

6ES7 231-5QA30-0XB0	
SB1231 AI 1xTC	
Product type designation	6ES7 231-5QA30-0XB0 SB1231 AI 1xTC
Supply voltages	
Rated value	
• 24 V DC	Yes
Current consumption	
Current consumption, typ.	5 mA
Connection method	
required front connector	Yes
Analog inputs	
Number of analog inputs	1; Thermocouples
Permissible input frequency for current input (destruction limit), max.	± 35 V
Technical unit for temperature measurement adjustable	Degrees Celsius/degrees Fahrenheit
Input ranges	
• Thermocouple	Yes; J, K; voltage range ± 80 MV
Input ranges (rated values), voltages	
• -80 mV to +80 mV	Yes
• Input resistance (-80 mV to +80 mV)	≥ 1 MOhm
Input ranges (rated values), thermoelements	
• Type J	Yes
• Input resistance (type J)	1200°C
• Type K	Yes
• Input resistance (Type K)	1372°C
Thermocouple (TC)	
• Permissible input voltage for voltage input (destruction limit), max.	+35V
Temperature compensation	
• Temperature compensation parameterizable	No
Analog value creation	
Measurement principle	Integrating
Integrations and conversion time/resolution per channel	
• Resolution with overrange (bit including sign), max.	15 bit; + sign
• Integration time, parameterizable	No
• Interference voltage suppression for interference frequency f_1 in Hz	85 dB at 10 / 50 / 60 / 400 Hz

6ES7 231-5QA30-0XB0	
SB1231 AI 1xTC	
Product type designation	6ES7 231-5QA30-0XB0 SB1231 AI 1xTC
Analog value generation (in isochronous mode)	
Smoothing of measured values	
• parameterizable	Yes
Errors/accuracies	
Temperature error (relative to input area)	25°C $\pm 0.1\%$ to 55°C $\pm 0.2\%$ total measurement range
Interference voltage suppression for $f = n \times (f_1 \pm 1\%)$, $f_1 =$ interference frequency	
• Common mode interference, min.	120 dB
Alarms/diagnostics/status information	
Alarms	
• Alarms	Yes
• Diagnostic alarm	Yes
Diagnostics	
• Diagnostic functions	Yes; Can be read out
• Wire break	Yes
Diagnostic indication LED	
• for status of the inputs	Yes
• for maintenance	Yes
Climatic and mechanical conditions for storage and transport	
Climatic conditions for storage and transport	
• Free fall	
- Drop height, max. (in packaging)	0.3 m; Five times, in dispatch package
• Temperature	
- Permissible temperature range	-40°C to +70°C
• Air pressure acc. to IEC 60068-2-13	
- Permissible air pressure	1080 to 660 hPa
• Relative humidity	
- Permissible range (without condensation) at 25 °C	95%
Mechanical and climatic conditions during operation	
Climatic conditions in operation	
• Temperature	
- Permissible temperature range	0°C to 55°C horizontal mounting, 0°C to 45°C vertical mounting
• Air pressure acc. to IEC 60068-2-13	
- Permissible air pressure	1080 to 795 hPa
• Pollutant concentrations	
- SO ₂ at RH < 60% without condensation	SO ₂ : < 0.5 ppm; H ₂ S: < 0.1 ppm; RH < 60% condensation-free

Technical specifications (continued)		Ordering data	Order No.
Product type designation	6ES7 231-5QA30-0XB0 SB1231 AI 1xTC	SB 1231 thermocouple signal board	6ES7 231-5QA30-0XB0
Degree of protection	IP20	1 input +/- 80 mV, resolution 15 bit + sign, thermocouples type J, K	
Standards, approvals, certificates		Accessories	
CE mark	Yes	Terminal block (spare part)	
C-TICK	Yes	for signal board	
FM approval	Yes	with 6 screws, gold-plated; 4 units	6ES7 292-1BF30-0XA0
Mechanics/material		S7-1200 automation system, system manual	
Type of housing (front)		For SIMATIC S7-1200 and STEP 7 Basic	
• Plastic	Yes	German	K 6ES7 298-8FA30-8AH0
Dimensions and weight		English	K 6ES7 298-8FA30-8BH0
Dimensions		French	K 6ES7 298-8FA30-8CH0
• Width	38 mm	Spanish	K 6ES7 298-8FA30-8DH0
• Height	62 mm	Italian	K 6ES7 298-8FA30-8EH0
• Depth	21 mm	Chinese	K 6ES7 298-8FA30-8KH0
Weight		S7-1200 automation system, Easy Book	
• Weight, approx.	35 g	Brief instructions	
		German	K 6ES7 298-8FA30-8AQ0
		English	K 6ES7 298-8FA30-8BQ0
		French	K 6ES7 298-8FA30-8CQ0
		Spanish	K 6ES7 298-8FA30-8DQ0
		Italian	K 6ES7 298-8FA30-8EQ0
		Chinese	K 6ES7 298-8FA30-8KQ0
		STEP 7 Basic V11 engineering software	
		Target system:	
		SIMATIC S7-1200 controllers and the associated I/O.	
		Requirements:	
		Windows XP Home SP3, Windows XP Professional SP3 (32 bit), Windows 7 Home Premium, Windows 7 Professional (32 bit), Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit), Microsoft Server 2008 Std. SP2 (32 bit)	
		Type of delivery:	
		German, English, Chinese, Italian, French, Spanish	
		Single license	6ES7 822-0AA01-0YA0
		Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license	6ES7 822-0AA01-0YE0
		Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license	6ES7 822-1AA01-0YC5
		STEP 7 Basic V11, trial license	6ES7 822-0AA01-0YA7
		STEP 7 Basic Software Update Service, 1 year	D 6ES7 822-0AA00-0YL0
		D: Subject to export regulations AL: N and ECCN: 5D992 I: Subject to export regulations AL: N and ECCN: EAR99H K: Subject to export regulations AL: N and ECCN: EAR99T	

SIMATIC S7-1200

Analog modules

SM 1231 RTD signal module

Overview

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

Technical specifications

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

Technical specifications (continued)

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

SIMATIC S7-1200

Analog modules

SM 1231 RTD signal module

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

Ordering data	Order No.	Ordering data	Order No.
SM 1231 RTD signal module		S7-1200 automation system, Easy Book	
4 inputs for resistance temperature detectors Pt10/50/100/200/500/1000, Ni100/120/200/500/1000, Cu10/50/100, LG-Ni1000; resistance 150/300/600 Ohm, resolution 15 bit + sign	6ES7 231-5PD30-0XB0	Brief instructions	
8 inputs for resistance temperature detectors Pt10/50/100/200/500/1000, Ni100/120/200/500/1000, Cu10/50/100, LG-Ni1000; resistance 150/300/600 Ohm, resolution 15 bit + sign	6ES7 231-5PF30-0XB0	German	K 6ES7 298-8FA30-8AQ0
Accessories		English	K 6ES7 298-8FA30-8BQ0
Terminal block (spare part)		French	K 6ES7 298-8FA30-8CQ0
for 8/16-channel analog signal modules		Spanish	K 6ES7 298-8FA30-8DQ0
with 7 screws, gold-plated; 4 units	6ES7 292-1BG30-0XA0	Italian	K 6ES7 298-8FA30-8EQ0
Front flap set (spare part)		Chinese	K 6ES7 298-8FA30-8KQ0
for 8/16-channel signal modules	6ES7 291-1BA30-0XA0	STEP 7 Basic V11 engineering software	
S7-1200 automation system, system manual		Target system:	
For SIMATIC S7-1200 and STEP 7 Basic		SIMATIC S7-1200 controllers and the associated I/O.	
German	K 6ES7 298-8FA30-8AH0	Requirements:	
English	K 6ES7 298-8FA30-8BH0	Windows XP Home SP3, Windows XP Professional SP3 (32 bit),	
French	K 6ES7 298-8FA30-8CH0	Windows 7 Home Premium, Windows 7 Professional (32 bit),	
Spanish	K 6ES7 298-8FA30-8DH0	Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit),	
Italian	K 6ES7 298-8FA30-8EH0	Microsoft Server 2003 R2 Std. SP2 (32 bit),	
Chinese	K 6ES7 298-8FA30-8KH0	Microsoft Server 2008 Std. SP2 (32 bit)	
		Type of delivery:	
		German, English, Chinese, Italian, French, Spanish	
		Single license	6ES7 822-0AA01-0YA0
		Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license	6ES7 822-0AA01-0YE0
		Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license	6ES7 822-1AA01-0YC5
		STEP 7 Basic V11, trial license	6ES7 822-0AA01-0YA7
		STEP 7 Basic Software Update Service, 1 year	D 6ES7 822-0AA00-0YL0

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

Overview

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

Technical specifications

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

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

SIMATIC S7-1200

Analog modules

SB 1231 RTD signal board

Technical specifications (continued)

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

Ordering data

Order No.

SB 1231 RTD signal board	I	6ES7 231-5PA30-0XB0
1 input for resistance temperature sensors Pt 100, Pt 200, Pt 500, Pt 1000, resolution 15 bit + sign		
Accessories		
Terminal block (spare part)		
for signal board		
with 6 screws, gold-plated; 4 units	I	6ES7 292-1BF30-0XA0
S7-1200 automation system, system manual		
For SIMATIC S7-1200 and STEP 7 Basic		
German	K	6ES7 298-8FA30-8AH0
English	K	6ES7 298-8FA30-8BH0
French	K	6ES7 298-8FA30-8CH0
Spanish	K	6ES7 298-8FA30-8DH0
Italian	K	6ES7 298-8FA30-8EH0
Chinese	K	6ES7 298-8FA30-8KH0
S7-1200 automation system, Easy Book		
Brief instructions		
German	K	6ES7 298-8FA30-8AQ0
English	K	6ES7 298-8FA30-8BQ0
French	K	6ES7 298-8FA30-8CQ0
Spanish	K	6ES7 298-8FA30-8DQ0
Italian	K	6ES7 298-8FA30-8EQ0
Chinese	K	6ES7 298-8FA30-8KQ0
STEP 7 Basic V11 engineering software		
Target system: SIMATIC S7-1200 controllers and the associated I/O.		
Requirements: Windows XP Home SP3, Windows XP Professional SP3 (32 bit), Windows 7 Home Premium, Windows 7 Professional (32 bit), Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit), Microsoft Server 2008 Std. SP2 (32 bit)		
Type of delivery: German, English, Chinese, Italian, French, Spanish		
Single license		6ES7 822-0AA01-0YA0
Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license		6ES7 822-0AA01-0YE0
Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license		6ES7 822-1AA01-0YC5
STEP 7 Basic V11, trial license		6ES7 822-0AA01-0YA7
STEP 7 Basic Software Update Service, 1 year	D	6ES7 822-0AA00-0YL0

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

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

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

SIMATIC S7-1200

SIPLUS analog modules

SIPLUS SM 1231 analog input module

Overview



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

Note:

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

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

SIPLUS SM 1231

Ambient conditions

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

- 1) SA-S71.04 severity level GX: Long-term load: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O₃ < 1.0 ppm; NOX < 10.4 ppm
- 2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

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

Ordering data

Order No.

SIPLUS SM 1231 analog input signal module

(extended temperature range and medial exposure)

Ambient temperature range

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

4 analog inputs ±10 V,
±5 V, ±2.5 V, or 0 ... 20 mA;
12 bit + sign

I **6AG1 231-4HD30-2XB0**

Ambient temperature range

0 ... +55 °C
4 analog inputs ±10 V,
±5 V, ±2.5 V, or 0 ... 20 mA;
12 bit + sign

H **6AG1 231-4HD30-4XB0**

Accessories

See SIMATIC S7-1200 SM 1231 analog input, page 4/70

H: Subject to export regulations AL: 9199 and ECCN: EAR99H

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

SIMATIC S7-1200

SIPLUS analog modules

SIPLUS SM 1232 analog output module

Overview



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

Note:

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

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

SIPLUS SM 1232

Ambient conditions

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

- 1) ISA-S71.04 severity level GX: Long-term load: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O₃ < 1.0 ppm; NOX < 10.4 ppm
- 2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

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

Ordering data

Order No.

SIPLUS SM 1232 analog output signal modules

(extended temperature range and medial exposure)

Ambient temperature range
25 ... +70 °C,

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

2 analog outputs, ± 10 V with 14 bit or 0 ... 20 mA with 13 bit

I **6AG1 232-4HB30-2XB0**

Ambient temperature range
0 ... +55 °C

2 analog outputs, ± 10 V with 14 bit or 0 ... 20 mA with 13 bit

H **6AG1 232-4HB30-4XB0**

Accessories

See SIMATIC S7-1200 SM 1232 analog output, page 4/75

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

SIMATIC S7-1200

SIPLUS analog modules

SIPLUS SB 1232 analog output module

Overview



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

Note:

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

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

SIPLUS SB 1232

Ambient conditions

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

- 1) ISA-S71.04 severity level GX: Long-term load: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O₃ < 1.0 ppm; NOX < 10.4 ppm
- 2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

Ordering data

Order No.

SIPLUS SB 1232 analog output signal board (extended temperature range and medial exposure) <u>Ambient temperature range -25 ... +55 °C</u> 1 analog output, ±10 V with 12 bit or 0 ... 20 mA with 11 bit <u>Ambient temperature range 0 ... +55 °C</u> 1 analog output, ±10 V with 12 bit or 0 ... 20 mA with 11 bit	I	6AG1 232-4HA30-5XB0
	H	6AG1 232-4HA30-4XB0
Accessories		See SIMATIC S7-1200 SB 1232 analog output, page 4/77

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

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

SIMATIC S7-1200

SIPLUS analog modules

SIPLUS SM 1234 analog input/output module

Overview



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

Note:

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

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

SIPLUS SM 1231

Ambient conditions

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

- 1) ISA-S71.04 severity level GX: Long-term load: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O₃ < 1.0 ppm; NOX < 10.4 ppm
- 2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

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

Ordering data

Order No.

SIPLUS SM 1234 analog input/output signal modules

(extended temperature range and medial exposure)

Ambient temperature range

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

4 analog inputs, ±10 V, ±5 V, ±2.5 V, or 0 ... 20 mA, 12 bit + sign;
2 analog outputs, ±10 V with 14 bit or 0 ... 20 mA with 13 bit

I **6AG1 234-4HE30-2XB0**

Ambient temperature range

0 ... +55 °C
4 analog inputs, ±10 V, ±5 V, ±2.5 V, or 0 ... 20 mA, 12 bit + sign;
2 analog outputs, ±10 V with 14 bit or 0 ... 20 mA with 13 bit

H **6AG1 234-4HE30-4XB0**

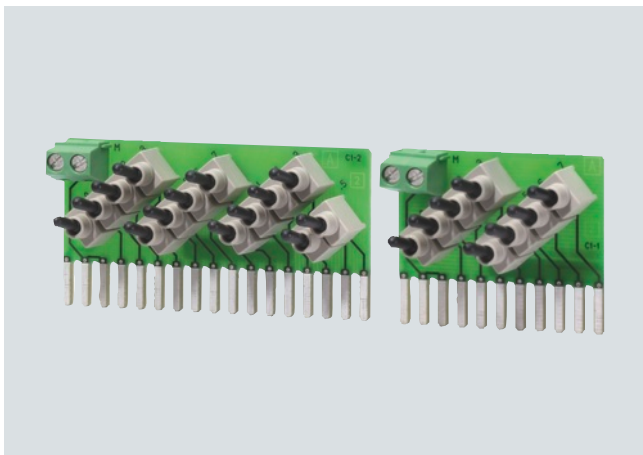
Accessories

See SIMATIC S7-1200 SM 1234 analog input/output, page 4/80

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

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

Overview



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

Technical specifications

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

Ordering data

Order No.

Digital input simulator SIM 1274 simulator module (optional)

with 14 input switches, for CPU 1214C

I **6ES7 274-1XH30-0XA0**

with 8 input switches, for CPU 1211C, CPU 1212C

I **6ES7 274-1XF30-0XA0**

Accessories

S7-1200 automation system, system manual

For SIMATIC S7-1200 and STEP 7 Basic

German

K **6ES7 298-8FA30-8AH0**

English

K **6ES7 298-8FA30-8BH0**

French

K **6ES7 298-8FA30-8CH0**

Spanish

K **6ES7 298-8FA30-8DH0**

Italian

K **6ES7 298-8FA30-8EH0**

Chinese

K **6ES7 298-8FA30-8KH0**

S7-1200 automation system, Easy Book

Brief instructions

German

K **6ES7 298-8FA30-8AQ0**

English

K **6ES7 298-8FA30-8BQ0**

French

K **6ES7 298-8FA30-8CQ0**

Spanish

K **6ES7 298-8FA30-8DQ0**

Italian

K **6ES7 298-8FA30-8EQ0**

Chinese

K **6ES7 298-8FA30-8KQ0**

STEP 7 Basic V11 engineering software

Target system:

SIMATIC S7-1200 controllers and the associated I/O.

Requirements:

Windows XP Home SP3, Windows XP Professional SP3 (32 bit), Windows 7 Home Premium, Windows 7 Professional (32 bit), Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit), Microsoft Server 2008 Std. SP2 (32 bit)

Type of delivery:

German, English, Chinese, Italian, French, Spanish

Single license

6ES7 822-0AA01-0YAO

Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license

6ES7 822-0AA01-0YE0

Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license

6ES7 822-1AA01-0YC5

STEP 7 Basic V11, trial license

6ES7 822-0AA01-0YA7

STEP 7 Basic Software Update Service, 1 year

D **6ES7 822-0AA00-0YL0**

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

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

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

SIMATIC S7-1200

Communication

CM 1241 communication module

Overview



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

4

Technical specifications

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

Technical specifications (continued)

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

Ordering data	Order No.	Ordering data	Order No.
CM 1241 communication module		STEP 7 Basic V11 engineering software	
Communication module for point-to-point connection, with one RS485 interface	6ES7 241-1CH30-0XB0	Target system: SIMATIC S7-1200 controllers and the associated I/O.	
Communication module for point-to-point connection, with one RS232 interface	6ES7 241-1AH30-0XB0	Requirements: Windows XP Home SP3, Windows XP Professional SP3 (32 bit), Windows 7 Home Premium, Windows 7 Professional (32 bit), Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit), Microsoft Server 2008 Std. SP2 (32 bit)	
Accessories		Type of delivery: German, English, Chinese, Italian, French, Spanish	
S7-1200 automation system, system manual		Single license	6ES7 822-0AA01-0YA0
For SIMATIC S7-1200 and STEP 7 Basic		Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license	6ES7 822-0AA01-0YE0
German	K 6ES7 298-8FA30-8AH0	Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license	6ES7 822-1AA01-0YC5
English	K 6ES7 298-8FA30-8BH0	STEP 7 Basic V11, trial license	6ES7 822-0AA01-0YA7
French	K 6ES7 298-8FA30-8CH0	STEP 7 Basic Software Update Service, 1 year	6ES7 822-0AA00-0YL0
Spanish	K 6ES7 298-8FA30-8DH0		
Italian	K 6ES7 298-8FA30-8EH0		
Chinese	K 6ES7 298-8FA30-8KH0		
S7-1200 automation system, Easy Book			
Brief instructions			
German	K 6ES7 298-8FA30-8AQ0		
English	K 6ES7 298-8FA30-8BQ0		
French	K 6ES7 298-8FA30-8CQ0		
Spanish	K 6ES7 298-8FA30-8DQ0		
Italian	K 6ES7 298-8FA30-8EQ0		
Chinese	K 6ES7 298-8FA30-8KQ0		

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

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

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

SIMATIC S7-1200

Communication

RS485 CB 1241 communication board

Overview

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

Technical specifications

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

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

Ordering data	Order No.	Order No.
RS485 CB 1241 communication board for point-to-point connection, with 1 RS485 interface	6ES7 241-1CH30-1XB0	
Accessories		
Terminal block (spare part) for signal board with 6 screws, gold-plated; 4 units	6ES7 292-1BF30-0XA0	
S7-1200 automation system, system manual		
For SIMATIC S7-1200 and STEP 7 Basic		
German	K 6ES7 298-8FA30-8AH0	
English	K 6ES7 298-8FA30-8BH0	
French	K 6ES7 298-8FA30-8CH0	
Spanish	K 6ES7 298-8FA30-8DH0	
Italian	K 6ES7 298-8FA30-8EH0	
Chinese	K 6ES7 298-8FA30-8KH0	
S7-1200 automation system, Easy Book		
Brief instructions		
German	K 6ES7 298-8FA30-8AQ0	
English	K 6ES7 298-8FA30-8BQ0	
French	K 6ES7 298-8FA30-8CQ0	
Spanish	K 6ES7 298-8FA30-8DQ0	
Italian	K 6ES7 298-8FA30-8EQ0	
Chinese	K 6ES7 298-8FA30-8KQ0	
		STEP 7 Basic V11 engineering software Target system: SIMATIC S7-1200 controllers and the associated I/O. Requirements: Windows XP Home SP3, Windows XP Professional SP3 (32 bit), Windows 7 Home Premium, Windows 7 Professional (32 bit), Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit), Microsoft Server 2008 Std. SP2 (32 bit) Type of delivery: German, English, Chinese, Italian, French, Spanish Single license Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license STEP 7 Basic V11, trial license STEP 7 Basic Software Update Service, 1 year
		6ES7 822-0AA01-0YA0
		6ES7 822-0AA01-0YE0
		6ES7 822-1AA01-0YC5
		6ES7 822-0AA01-0YA7
		6ES7 822-0AA00-0YL0

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

SIMATIC S7-1200

Communication

CM 1242-5

Overview



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

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

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

Technical specifications

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

Technical specifications (continued)		Ordering data	Order No.
Order No.	6GK7 242-5DX30-0XE0	CM 1242-5 communication module	
Product properties, functions, components in general		Communication module for electrical connection of SIMATIC S7-1200 to PROFIBUS as a DPV1 slave	6GK7 242-5DX30-0XE0
Maximum number of modules per CPU	3		
Number of modules - Note	-		
Performance data		Accessories	
<u>Performance data open communication</u>		RS485 PROFIBUS FastConnect connector	
Number of possible connections for open communication by means of SEND/RECEIVE blocks, maximum	-	With 90° cable outlet; insulation displacement technology, max. transmission rate 12 Mbit/s	
Data volume as user data per connection for open communication by means of SEND/RECEIVE blocks, maximum	-	<ul style="list-style-type: none"> • Without PG interface • With PG interface 	6ES7 972-0BA52-0XA0 6ES7 972-0BB52-0XA0
<u>Performance data PROFIBUS DP</u>		PROFIBUS FC standard cable	
Service as DP master DPV0	-	2-core bus cable, shielded, special design for fast mounting, delivery unit: max. 1000 m, minimum order 20 m, sold by the meter	6XV1 830-0EH10
Number of DP slaves that can be operated on DP master	-		
Data volume		PROFIBUS FastConnect stripping tool	
• of address area of the inputs as DP master, total	-	Stripping tool for fast stripping of the PROFIBUS FastConnect bus cable	6GK1 905-6AA00
• of address area of the outputs as DP master, total	-		
• of address area of the inputs per DP slave	-	12M PROFIBUS bus terminal	
• of address area of the outputs per DP slave	-	Bus terminal for connection of PROFIBUS nodes at up to 12 Mbit/s with connecting cable	6GK1 500-0AA10
• of address area of the diagnostic data per DP slave	-		
Service as DP slave			
• DPV0	-		
• DPV1	Yes		
Data volume			
• of address area of the inputs as DP slave, total	240 byte		
• of address area of the outputs as DP slave, total	240 byte		
<u>Performance data S7 communication</u>			
Number of possible connections for S7 communication			
• Maximum	-		
• For PG connections, maximum	-		
• Maximum with PG/OP connections	-		
• Note	-		
<u>Performance data multiprotocol operation</u>			
Number of active connections in multiprotocol mode			
• Maximum without DP	-		
• Maximum with DP	-		
Product functions Management, configuration, programming			
Configuration software required	STEP 7 Basic V11.0 or higher		

SIMATIC S7-1200

Communication

CM 1243-5

Overview



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

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

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

Technical specifications

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

Technical specifications (continued)		Ordering data	Order No.
Order No.	6GK7 243-5DX30-0XE0	CM 1243-5 communication module	
Product properties, functions, components in general		Communication module for electrical connection of SIMATIC S7-1200 to PROFIBUS as a DPV1 master	6GK7 243-5DX30-0XE0
Number of modules			
• Per CPU, maximum	1		
• Note	-		
Performance data		Accessories	
<u>Performance data open communication</u>		RS485 PROFIBUS FastConnect connector	
Number of possible connections for open communication by means of SEND/RECEIVE blocks, maximum	-	With 90° cable outlet; insulation displacement technology, max. transmission rate 12 Mbit/s	
Data volume as user data per connection for open communication by means of SEND/RECEIVE blocks, maximum	-	• Without PG interface	6ES7 972-0BA52-0XA0
		• With PG interface	6ES7 972-0BB52-0XA0
<u>Performance data PROFIBUS DP</u>		PROFIBUS FC standard cable	
Service as DP master DPV0	-	2-core bus cable, shielded, special design for fast mounting, delivery unit: max. 1000 m, minimum order 20 m, sold by the meter	6XV1 830-0EH10
Number of DP slaves that can be operated on DP master	16		
Data volume		PROFIBUS FastConnect stripping tool	
• of address area of the inputs as DP master, total	512 byte	Stripping tool for fast stripping of the PROFIBUS FastConnect bus cable	6GK1 905-6AA00
• of address area of the outputs as DP master, total	512 byte		
• of address area of the inputs per DP slave	244 byte	12M PROFIBUS bus terminal	
• of address area of the outputs per DP slave	244 byte	Bus terminal for connection of PROFIBUS nodes at up to 12 Mbit/s with connecting cable	6GK1 500-0AA10
• of address area of the diagnostic data per DP slave	240 byte		
Service as DP slave			
• DPV0	-		
• DPV1	-		
Data volume			
• of address area of the inputs as DP slave, total	-		
• of address area of the outputs as DP slave, total	-		
<u>Performance data S7 communication</u>			
Number of possible connections for S7 communication			
• Maximum	8		
• For PG connections, maximum	1		
• For PG/OP connections, maximum	3		
• Note	max. 4 connections to other S7 stations		
<u>Performance data multiprotocol operation</u>			
Number of active connections in multiprotocol mode			
• Maximum without DP	8		
• Maximum with DP	8		
Product functions Management, configuration, programming			
Configuration software required	STEP 7 Basic V11.0 or higher		

SIMATIC S7-1200

Communication

CSM 1277 unmanaged

Overview



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

Technical specifications

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

Technical specifications (continued)		Ordering data	Order No.
Order number	6GK7 277-1AA00-0AA0	CSM 1277 compact switch module	6GK7 277-1AA10-0AA0
Product properties, functions, components in general		Unmanaged switch for connecting a SIMATIC S7-1200 and up to three further nodes to Industrial Ethernet with 10/100 Mbit/s; 4 x RJ45 ports; external 24 V DC power supply, diagnostics on LEDs, S7-1200 module including electronic manual on CD-ROM	
Cascading with star topology	-	Accessories	
Product function: switch-managed	No	IE TP Cord RJ45/RJ45	6XV1 870-3QE50 6XV1 870-3QH10 6XV1 870-3QH20 6XV1 870-3QH60 6XV1 870-3QN10
Standards, specifications, approvals		TP cable 4 x 2 with 2 RJ45 connectors	
Standard		<ul style="list-style-type: none"> • 0.5 m • 1 m • 2 m • 6 m • 10 m 	
• For EMC from FM	FM3611: Class 1, Division 2, Group A, B, C, D / T., CL. 1, Zone 2, GP. IIC, T., Ta	IE FC Outlet RJ45	6GK1 901-1FC00 0AA0
• For Ex zone	EN 600079-15:2005, EN 600079-0:2006, II 3 G Ex nA II T4, KEMA 08 ATEX 0003 X	For connecting Industrial Ethernet FC cables and TP cords; graduated prices for 10 and 50 units or more	
• For CSA and UL safety	UL 508, CSA C22.2 No. 142		
• For Ex zone of CSA and UL	-		
• For emitted interference	EN 61000-6-4 (Class A)		
• For noise immunity	EN 61000-6-2		
Certificate of suitability	EN 61000-6-2, EN 61000-6-4		
• CE mark	Yes		
• C-Tick	Yes		

SIMATIC S7-1200

Communication

SIPLUS NET CSM 1277

Overview



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

Note:

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

SIPLUS NET CSM 1277

Order number	6AG1 277-1AA00-4AA0
Order number based on	6GK7 277-1AA00-0AA0
Ambient temperature range	0 ... +55 °C
Ambient conditions	Suitable for exceptional medial exposure (e.g. in sulfur chloride atmosphere).
Technical data	The technical data of the standard product applies except for the ambient conditions.

Ambient conditions

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

1) ISA-S71.04 severity level GX: Long-term load: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NO_x < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 14.8 ppm; H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O₃ < 1.0 ppm; NO_x < 10.4 ppm

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

For further technical documentation on SIPLUS, see:

www.siemens.com/siplus-extreme

Ordering data

SIPLUS NET CSM 1277 compact switch module

(extended temperature range and medial exposure)

Unmanaged switch for connection of SIPLUS S7-1200 and up to three further nodes to Industrial Ethernet with 10/100 Mbit/s;

4 x RJ45 ports; external 24 V DC power supply, LED diagnostics, S7-1200 module including electronic Manual on CD-ROM

Order No.

6AG1 277-1AA00-4AA0

Order No.

Accessories

See CSM 1277 unmanaged, page 4/105

Overview



The CP 1242-7 communication processor is used to connect a SIMATIC S7-1200 to the globally widespread GSM/GPRS mobile radio network and has the following characteristics:

- Worldwide wireless exchange of data between S7-1200 controllers and/or between S7-1200 controllers and control centers with an Internet connection
- Communication based on the GPRS (General Packet Radio Service) mobile wireless service with data transmission speeds of up to 86 Kbit/s in the downlink and 43 Kbit/s in the uplink
- GPRS mode with fixed IP addresses and dynamic IP addresses with standard mobile phone contract
- Time synchronization on the basis of NTP (Network Time Protocol)
- On-demand connection buildup via voice call or text message
- Sending and receiving of text messages
- Clearly laid out LED signaling for fast and easy diagnostics
- Compact industrial enclosure in S7-1200 design for mounting on a standard mounting rail
- Fast commissioning thanks to easy configuration using STEP 7

In conjunction with the "Telecontrol Server Basic" software, the CP 1242-7 forms a telecontrol system with further properties:

- Connection of up to 5000 telecontrol stations to the control center via an OPC interface
- Data buffering in the substations in the event of connection failures
- Central status monitoring of the substations
- No special provider services required for fixed IP addresses
- Teleservice access with STEP 7 to the substations via Internet

Technical specifications

Order No.	6GK7 242-7KX30-0XE0
Product type designation	
Transmission rate	
Transmission rate for GPRS transmission on uplink	
• Minimum	-
• Maximum	43 Kbit/s
Transmission rate for GPRS transmission on downlink	
• Minimum	-
• Maximum	86 Kbit/s
Wireless technology	
Type of mobile wireless service supported	
• SMS	Yes
• GPRS	Yes
Type of mobile wireless network supported	
• GSM	Yes
• UMTS	-
Type of mobile wireless service - note	
	GPRS (Multislot Class 10)
Operating frequency	
• 850 MHz	Yes
• 900 MHz	Yes
• 1800 MHz	Yes
• 1900 MHz	Yes
Transmit power	
• At operating frequency 850 MHz	2 W
• At operating frequency 900 MHz	2 W
• At operating frequency 1800 MHz	1 W
• At operating frequency 1900 MHz	1 W
Interfaces	
Number of electrical connections	
• for external antenna(s)	1
• for power supply	1
Number of slots for SIM cards	
	1
Design of electrical connection	
• for external antenna(s)	SMA socket (50 Ohm)
• for power supply	3-pin terminal strip
Design of SIM card slot	
	Slot under front flap
Supply voltage, current consumption, power loss	
Type of power supply	
External power supply	DC
Relative positive tolerance at 24 V DC	24 V
Relative negative tolerance at 24 V DC	20%
Current input from external power supply at 24 V DC	20 %
• Typical	0.1 A
• Maximum	0.22 A
Effective power loss	2.5 W

SIMATIC S7-1200

Communication

CP 1242-7

Technical specifications (continued)

Order No.	6GK7 242-7KX30-0XE0
Permitted ambient conditions	
Ambient temperature	
• For vertical installation	
- During operation	0 ... 45 °C
• For horizontal installation	
- During operation	0 ... 55 °C
• During storage	-40 ... +70 °C
• During transport	-40 ... +70 °C
• Note	-
Relative humidity at 25 °C without condensation during operating phase, maximum	95 %
IP degree of protection	IP 20
Design, dimensions and weights	
Module format	S7-1200 compact module, single width
Width	30 mm
Height	100 mm
Depth	75 mm
Net weight	0.14 kg
Product properties, functions, components in general	
Maximum number of modules per CPU	3
Number of modules - Note	-
Performance data	
<u>Performance data open communication</u>	
Number of possible connections for open communication by means of TC blocks, maximum	4
Data volume as user data per send call, maximum	2 048 byte
<u>Performance data S7 communication</u>	
Number of possible connections for S7 communication	
• Maximum	-
• For PG connections, maximum	-
• For PG/OP connections, maximum	-
• Note	-

Order No.	6GK7 242-7KX30-0XE0
<u>Performance data Telecontrol</u>	
Connection to the control center	Telecontrol Server Basic
• Note	Connection to Scada system by means of OPC interface is supported
• with automatic connection buildup	is supported
• with connection buildup as required	is supported
Protocol is supported	
• DNP3	No
• IEC 60870-5	No
Product function: data buffering if connection is aborted	Yes
• Note	up to 1000 message frames
Data volume as user data per station in telecontrol mode, maximum	1 024 byte
<u>Performance data Teleservice</u>	
Diagnostics function: online diagnostics with SIMATIC STEP 7	Yes
Product function: program download with SIMATIC STEP 7	Yes
Product function: remote firmware update	No
Product functions Management, configuration, programming	
Configuration software required	STEP 7 Basic V11.0 or higher
Product functions Security	
Product function: password protection for teleservice access	Yes
Product function: encrypted data transmission	Yes

Ordering data

CP 1242-7 communication processor

Communication processor for connecting SIMATIC S7-1200 to GSM/GPRS mobile wireless network

Order No.

6GK7 242-7KX30-0XE0

Accessories

Telecontrol Server Basic

Software for

- License for up to 8 stations J **6NH9 910-0AA20-0AA0**
- License for up to 64 stations J **6NH9 910-0AA20-0AB0**
- License for up to 256 stations J **6NH9 910-0AA20-0AC0**
- License for up to 1000 stations J **6NH9 910-0AA20-0AD0**
- License for up to 5000 stations J **6NH9 910-0AA20-0AE0**

Order No.

ANT794-4MR antenna

GSM quad band antenna

6NH9 860-1AA00

ANT794-3M antenna

GSM quad band antenna

6NH9 870-1AA00

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

Overview



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

Note:

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

SIPLUS CM 1241		
Order number	6AG1 241-1AH30-2XB0	6AG1 241-1AH30-4XB0
Order No. based on	6ES7 241-1AH30-0XB0	
Ambient temperature range	-25 ... +70 °C	0 ... +55 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	

SIPLUS CM 1241		
Order number	6AG1 241-1CH30-2XB0	6AG1 241-1CH30-4XB0
Order No. based on	6ES7 241-1CH30-0XB0	
Ambient temperature range	-25 ... +70 °C	0 ... +55 °C
Conformal coating	Coating of the printed circuit boards and the electronic components	
Technical data	The technical data of the standard product applies except for the ambient conditions.	

Ambient conditions

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

- 1) ISA-S71.04 severity level GX: Long-term load: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O₃ < 1.0 ppm; NOX < 10.4 ppm

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

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

Ordering data	Order No.
SIPLUS CM 1241 communication module (extended temperature range and medial exposure)	
Ambient temperature 25 ... +70 °C	
Communication module for point-to-point connection, with one RS485 interface	6AG1 241-1CH30-2XB0
Communication module for point-to-point connection, with one RS232 interface	6AG1 241-1AH30-2XB0
Suitable for areas with extraordinary medial exposure (conformal coating)	
Communication module for point-to-point connection, with one RS485 interface	6AG1 241-1CH30-4XB0
Communication module for point-to-point connection, with one RS232 interface	6AG1 241-1AH30-4XB0
Accessories	See SIMATIC S7-1200 CM 1241 communication module, page 4/97

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

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

SIMATIC S7-1200

Power supplies

SIMATIC S7-1200 PM 1207

Overview



The power supply PM1207 (Power Module) is optimized for the new SIMATIC S7-1200 controllers in terms of design and functionality and serves as an external supply for the inputs and outputs which, to prevent an imbalance, must not be drawn from the CPU encoder supply.

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Technical specifications

Power supply, type	2.5 A
Order number	6EP1 332-1SH71 ¹⁾
Input	
Rated voltage value $U_{in \text{ rated}}$	120/230 V AC Automatic range switchover
Voltage range	85 ... 132 V/176 ... 264 V
Overvoltage strength	$2.3 \times U_{in \text{ rated}}$, 1.3 ms
Mains buffering at $I_{out \text{ rated}}$	> 20 ms at $U_{in} = 93/187 \text{ V}$
Rated line frequency, rated line-frequency range	50/60 Hz; 47 ... 63 Hz
Rated current $I_{in \text{ rated}}$	1.2/0.67 A
Switch-on current limitation (+25 °C)	< 13 A, < 3 ms ($U_{in} = 230 \text{ V}$)
βt	< 0.5 A ² s
Built-in incoming fuse	T 3.15 A/250 V (not accessible)
Recommended miniature circuit breaker (IEC 898) in the mains power input	16 A, characteristic B; 10 A, characteristic C
Output	
Rated voltage $U_{out \text{ rated}}$	24 V DC
Total tolerance	±3 %
• Static line smoothing	Approx. ±0.1 %
• Static load smoothing	Approx. ±0.2 %
Residual ripple	< 150 mV _{pp}
Spikes (bandwidth: 20 MHz)	< 240 mV _{pp}
Adjustment range	-
Status indicator	24 V OK = green LED
On/Off behavior	No overshoot of U_{out} (soft start)
Startup delay/voltage rise	< 2 (6) s at 230 (120) V/typ. 10 ms
Rated current $I_{out \text{ rated}}$	2.5 A

Power supply, type	2.5 A
Order number	6EP1 332-1SH71 ¹⁾
Current range	
• Up to +60 °C	0 ... 2.5 A
• Derating	-
Dynamic overcurrent on	
• Power-up on short-circuit	Typ. 6 A for 100 ms
• Short-circuit during operation	Typ. 6 A for 100 ms
Parallel switching for enhanced performance	Yes, two units
Efficiency	
Efficiency at $U_{out \text{ rated}}, I_{out \text{ rated}}$	Approx. 83%
Power loss at $U_{out \text{ rated}}, I_{out \text{ rated}}$	Approx. 12 W
Closed-loop control	
Dyn. mains compensation ($U_{in \text{ rated}} \pm 15\%$)	Typ. ±0.3 % U_{out}
Dynamic load smoothing ($I_{out}: 50/100/50 \%$)	Typ. ±3% U_{out}
Load step settling time	
• 50 to 100 %	< 5 ms
• 100 to 50%	< 5 ms
Protection and monitoring	
Output overvoltage protection	< 33 V
Current limitation	2.65 A
Short-circuit protection	Constant current characteristic
Sustained short-circuit current rms value	-
Overload/short-circuit indicator	-

Technical specifications (continued)

Power supply, type	2.5 A
Order number	6EP1 332-1SH71¹⁾
Safety	
Primary/secondary isolation	Yes, safety extra low output voltage according to EN 60950-1 and EN 50178
Protection class	Class I
Leakage current	< 3.5 mA
Safety test	Yes
CE marking	Yes
UL/cUL (CSA) approval	cULus-listed (UL 508, CSA C22.2 No. 107.1) File E197259; cULus-recognized (UL 60950-1, CSA C22.2 No. 60950-1), File E151273
Protection against explosion	ATEX (available soon)
FM approval	-
Marine approval	GL, ABS, DNV, NK
Degree of protection (EN 60529)	IP20
EMC	
Emitted interference	EN 55022 Class B
Supply harmonics limitation	Not applicable
Noise immunity	EN 61000-6-2
Operating data	
Ambient temperature range	0 ... +60 °C with natural convection
Transport and storage temperature range	-40 ... +85°C
Humidity class	Climate class 3K3 according to EN 60721, no condensation
Mechanics	
Connections	
• Supply input L, N, PE	One screw-type terminal each for 0.5 ... 2.5 mm ²
• Output +	2 screw-type terminals each for 0.5 ... 2.5 mm ²
• Output -	2 screw-type terminals each for 0.5 ... 2.5 mm ²
Dimensions (W x H x D) in mm	70 x 100 x 75
Weight, approx.	0.3 kg
Mounting	Can be snapped onto standard mounting rail EN 60715 DC 35x7.5/15, wall mounting

¹⁾ SIPLUS module 6AG1 332-1SH71-7AA0 for extended temperature range -25 °C to +70 °C, derating from +55 °C to +70 °C to 1.5 A output current. Suitable for use under medial load (e.g. sulfur chloride atmosphere).

Ordering data**Order No.**

SIMATIC S7-1200 PM 1207		6EP1 332-1SH71
Input 120/230 V AC, output 24 V DC/2.5 A		
SIMATIC S7-1200 PM 1207	L	6AG1 332-1SH71-7AA0
(Extended temperature range and medial exposure, -25 ... +70°C)		

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

Further information

The perfectly matched, complete SITOP range includes different switch mode power supply series in addition to a unique range of add-on modules, which can be used to additionally protect the 24 V power supply against faults on the primary and secondary side - all the way to complete protection:

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

More information can be found in the KT 10.1 Catalog and in the Internet at

www.siemens.com/sitop

SIMATIC S7-1200

SIPLUS power supplies

SIPLUS PM 1207 power supplies

Overview



- Stabilized power supply for SIPLUS S7-1200
- In the S7-1200 design
- Input 120/230 V AC, output 24 V DC, 2.5 A (derating: 1.5 A from 60 °C)

Note:

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

SIPLUS power supply PM 1207	
Order number	6AG1 332-1SH71-4AA0 6AG1 332-1SH71-7AA0
Order No. based on	6EP1 332-1SH71
Ambient temperature range	0 ... +60° C -25 ... +70° C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions.

SIPLUS power supply PM 1207

Ambient conditions

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

- 1) ISA-S71.04 severity level GX: Long-term load: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O₃ < 1.0 ppm; NOX < 10.4 ppm
- 2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

Ordering data

Order No.

SIPLUS PM 1207 power supply

(extended temperature range and medial exposure)

Input 120/230 V AC, output 24 V DC, 2.5 A; derating from + 55 °C to + 70 °C to 1.2 A output current

Ambient temperature -25 ... +70 °C

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

Ambient temperature 0 ... +60 °C

6AG1 332-1SH71- 4AA0

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

SIMATIC S7-1200

Operator control and monitoring

Basic panels - Standard

Overview



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

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Technical specifications

	6AV6 647-0AA11-3AX0	6AV6 647-0AB11-3AX0	6AV6 647-0AC11-3AX0	6AV6 647-0AD11-3AX0
Product type designation	SIMATIC HMI KTP400 Basic mono PN	SIMATIC HMI KTP600 Basic mono PN	SIMATIC HMI KTP600 Basic color DP	SIMATIC HMI KTP600 Basic color PN
Supply voltage				
Supply voltage	24 V DC	24 V DC	24 V DC	24 V DC
Permissible range	+19.2 V to +28.8 V DC	+19.2 V to +28.8 V DC	+19.2 V to +28.8 V DC	+19.2 V to +28.8 V DC
Rated current	0.07 A	0.24 A	0.35 A	0.35 A
Memory				
Type	Flash / RAM	Flash / RAM	Flash / RAM	Flash / RAM
Usable memory for user data	512 kbyte usable memory for user data	512 kbyte usable memory for user data	512 kbyte usable memory for user data	512 kbyte usable memory for user data
Protocols				
Protocols (terminal link)				
• Sm@rtAccess	No	No	No	No
Configuration				
Configuration tool	WinCC flexible Compact Version 2008 SP1 or higher (to be ordered separately)	WinCC flexible Compact Version 2008 SP1 or higher (to be ordered separately)	WinCC flexible Compact Version 2008 SP1 or higher (to be ordered separately)	WinCC flexible Compact Version 2008 SP1 or higher (to be ordered separately)
Display				
Display type	STN, gray scales	STN, gray scales	TFT, 256 Farben	TFT, 256 Farben
Size	3.8" (76.8 mm x 57.6 mm)	5.7" (115.2 mm x 86.4 mm)	5.7" (115.2 mm x 86.4 mm)	5.7" (115.2 mm x 86.4 mm)
Resolution (WxH in pixel)	320 x 240	320 x 240	320 x 240	320 x 240
Backlighting				
• MTBF backlighting (at 25 °C)	Approx. 30000 hours	about 50,000 hours	about 50,000 hours	about 50,000 hours
Operating mode				
Control elements	Membrane keyboard	Membrane keyboard	Membrane keyboard	Membrane keyboard
Function keys, program- mable	4 function keys	6 function keys	6 function keys	6 function keys
Connection for mouse/ keyboard/barcode reader	- / - / -	- / - / -	- / - / -	- / - / -

SIMATIC S7-1200

Operator control and monitoring

Basic panels - Standard

Technical specifications (continued)

	6AV6 647-0AA11-3AX0	6AV6 647-0AB11-3AX0	6AV6 647-0AC11-3AX0	6AV6 647-0AD11-3AX0
Touch operation				
• Touch screen	analog, resistive	analog, resistive	analog, resistive	analog, resistive
• Numeric/alphabetical input	Yes (on-screen keyboard) / Yes (on-screen keyboard)	Yes (on-screen keyboard) / Yes (on-screen keyboard)	Yes (on-screen keyboard) / Yes (on-screen keyboard)	Yes (on-screen keyboard) / Yes (on-screen keyboard)
Ambient conditions				
Mounting position	vertical	vertical	vertical	vertical
Maximum permissible angle of inclination without external ventilation	+/- 35 °	+/- 35 °	+/- 35 °	+/- 35 °
Max. relative humidity	90 %	90 %	90 %	90 %
Temperature				
• Operation (vertical installation)	0 °C to +50 °C	0 °C to +50 °C	0 °C to +50 °C	0 °C to +50 °C
• Operation (max. tilt angle)	0 °C to +40 °C	0 °C to +40 °C	0 °C to +40 °C	0 °C to +40 °C
• Transport, storage	-20 °C to +60 °C	-20 °C to +60 °C	-20 °C to +60 °C	-20 °C to +60 °C
Degree of protection				
Front	IP65, NEMA 4, NEMA 4x, NEMA 12 (when installed)	IP65, NEMA 4, NEMA 4x, NEMA 12 (when installed)	IP65, NEMA 4, NEMA 4x, NEMA 12 (when installed)	IP65, NEMA 4, NEMA 4x, NEMA 12 (when installed)
Rear	IP20	IP20	IP20	IP20
Certifications & standards				
Certifications	CE, UL, cULus, NEMA 4, NEMA 4x, NEMA 12	CE, UL, cULus, NEMA 4, NEMA 4x, NEMA 12	CE, UL, cULus, NEMA 4, NEMA 4x, NEMA 12	CE, UL, cULus, NEMA 4, NEMA 4x, NEMA 12
I/O				
I/O devices	None	None	None	None
Type of output				
LED colors	None	None	None	None
Acoustics	Sound signal	Sound signal	Sound signal	Sound signal
Interfaces				
Interfaces	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	1 x RS422, 1 x RS485 (max. 12 Mbit/s)	1 x Ethernet (RJ45)
PC card slot	No	No	No	No
CF card slot	No	No	No	No
Multi Media Card slot	No	No	No	No
USB port	No	No	No	No
Industrial Ethernet interface	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)	No	1 x Ethernet (RJ45)
Processor				
Processor	RISC 32 bit, 75 MHz	RISC 32 bit, 75 MHz	RISC 32 bit, 75 MHz	RISC 32 bit, 75 MHz
Functionality under WinCC flexible/WinCC Basic				
Applications/options	None	None	None	None
Number of Visual Basic Scripts	Not possible	Not possible	Not possible	Not possible
Task planner	Yes	Yes	Yes	Yes
Help system	Yes	Yes	Yes	Yes
Status/control	Not possible	Not possible	Not possible	Not possible
With alarm logging system (incl. buffer and acknowledgment)				
• Number of messages	200	200	200	200
• Bit messages	Yes	Yes	Yes	Yes
• Analog messages	Yes	Yes	Yes	Yes
• Message buffer	Ring buffer (n x 256 entries), retentive, maintenance-free	Ring buffer (n x 256 entries), retentive, maintenance-free	Ring buffer (n x 256 entries), retentive, maintenance-free	Ring buffer (n x 256 entries), retentive, maintenance-free

Technical specifications (continued)

	6AV6 647-0AA11-3AX0	6AV6 647-0AB11-3AX0	6AV6 647-0AC11-3AX0	6AV6 647-0AD11-3AX0
Recipes				
• Recipes	5	5	5	5
• Data records per recipe	20	20	20	20
• Entries per data record	20	20	20	20
• Recipe memory	40 kbyte integrated Flash	40 kbyte integrated Flash	40 kbyte integrated Flash	40 kbyte integrated Flash
Number of process images				
• Process images	50	50	50	50
• Variables	250	500	500	500
• Limit values	Yes	Yes	Yes	Yes
• Multiplexing	Yes	Yes	Yes	Yes
Image elements				
• Text objects	500 text elements	500 text elements	500 text elements	500 text elements
• Graphics object	Bit maps, icons, icon (full-screen), vector graphics	Bit maps, icons, icon (full-screen), vector graphics	Bit maps, icons, icon (full-screen), vector graphics	Bit maps, icons, icon (full-screen), vector graphics
• dynamic objects	Diagrams, bar graphs	Diagrams, bar graphs	Diagrams, bar graphs	Diagrams, bar graphs
Lists				
• Text lists	150	150	150	150
• Graphics list	100	100	100	100
• Libraries	Yes	Yes	Yes	Yes
Security				
• Number of user groups	50	50	50	50
• Passwords exportable	No	No	No	No
• Number of user rights	32	32	32	32
Data carrier support				
• PC card	No	No	No	No
• CF card	No	No	No	No
• Multi Media Card	No	No	No	No
Recording				
• Recording/Printing	-	-	-	-
Fonts				
• Keyboard fonts	US American (English)	US American (English)	US American (English)	US American (English)
Languages				
• Online languages	5	5	5	5
• Configuration languages	D, GB, F, I, E, CHN "traditional", CHN "simplified", DK, FIN, GR, J, KP / ROK, NL, N, PL, P, RUS, S, CZ / SK, TR, H	D, GB, F, I, E, CHN "traditional", CHN "simplified", DK, FIN, GR, J, KP / ROK, NL, N, PL, P, RUS, S, CZ / SK, TR, H	D, GB, F, I, E, CHN "traditional", CHN "simplified", DK, FIN, GR, J, KP / ROK, NL, N, PL, P, RUS, S, CZ / SK, TR, H	D, GB, F, I, E, CHN "traditional", CHN "simplified", DK, FIN, GR, J, KP / ROK, NL, N, PL, P, RUS, S, CZ / SK, TR, H
• Character sets	Tahoma, WinCC flexible Standard, symbol languages	Tahoma, WinCC flexible Standard, symbol languages	Tahoma, WinCC flexible Standard, symbol languages	Tahoma, WinCC flexible Standard, symbol languages
Transfer (upload/download)				
• Transfer of configuration	Ethernet, automatic transfer recognition	Ethernet, automatic transfer recognition	MPI/PROFIBUS DP, serial, automatic transfer recognition	Ethernet, automatic transfer recognition
Process coupling				
• Connection to controller	S7-200, S7-300/400, Modicon (Modbus) see chapter "System interfaces"	S7-200, S7-300/400, Modicon (Modbus) see chapter "System interfaces"	S7-200, S7-300/400, Allen Bradley (DF1), Mitsubishi (FX), OMRON (LINK/Multilink), Modicon (Modbus) see section on "System interfaces"	S7-200, S7-300/400, Modicon (Modbus) see chapter "System interfaces"
Expandability/openness				
• Open Platform Program	No	No	No	No
Dimensions				
Front of enclosure (W x H)	140 mm x 116 mm	214 mm x 158 mm	214 mm x 158 mm	214 mm x 158 mm
Mounting cutout/device depth (W x H)	123 mm x 99 mm/40 mm device depth	197 mm x 141 mm/44 mm device depth	197 mm x 141 mm/44 mm device depth	197 mm x 141 mm/44 mm device depth
Dimensions and weight				
Weight				
• Weight	0.32 kg	1.07 kg	1.07 kg	1.07 kg

SIMATIC S7-1200

Operator control and monitoring

Basic panels - Standard

Technical specifications (continued)

	6AV6 647-0AE11-3AX0	6AV6 647-0AF11-3AX0	6AV6 647-0AG11-3AX0
Product type designation	SIMATIC HMI KTP1000 Basic color DP	SIMATIC HMI KTP1000 Basic color PN	SIMATIC HMI TP1500 Basic color PN
Supply voltage			
Supply voltage	24 V DC	24 V DC	24 V DC
Permissible range	+19.2 V to +28.8 V DC	+19.2 V to +28.8 V DC	+19.2 V to +28.8 V DC
Rated current	0.6 A	0.6 A	0.8 A
Memory			
Type	Flash / RAM	Flash / RAM	Flash / RAM
Usable memory for user data	1024 kbyte usable memory for user data	1024 kbyte usable memory for user data	1024 kbyte usable memory for user data
Protocols			
Protocols (terminal link)			
• Sm@rtAccess	No	No	No
Configuration			
Configuration tool	WinCC flexible Compact Version 2008 or higher (to be ordered separately)	WinCC flexible Compact Version 2008 or higher (to be ordered separately)	WinCC flexible Compact Version 2008 or higher (to be ordered separately)
Display			
Display type	TFT, 256 colors	TFT, 256 colors	TFT, 256 colors
Size	10.4" (211.2 mm x 158.4 mm)	10.4" (211.2 mm x 158.4 mm)	15" (304.1 mm x 228.1 mm)
Resolution (WxH in pixel)	640 x 480	640 x 480	1024 x 768
Backlighting			
• MTBF backlighting (at 25 °C)	about 50,000 hours	about 50,000 hours	about 50,000 hours
Operating mode			
Control elements	Membrane keyboard	Membrane keyboard	Touch screen
Function keys, programmable	8 function keys	8 function keys	None
Connection for mouse/keyboard/ barcode reader	- / - / -	- / - / -	- / - / -
Touch operation			
• Touch screen	analog, resistive	analog, resistive	analog, resistive
• Numeric/alphabetical input	Yes (on-screen keyboard) / Yes (on-screen keyboard)	Yes (on-screen keyboard) / Yes (on-screen keyboard)	Yes (on-screen keyboard) / Yes (on-screen keyboard)
Ambient conditions			
Mounting position	vertical	vertical	vertical
Maximum permissible angle of inclination without external ventilation	+/- 35 °	+/- 35 °	+/- 35 °
Max. relative humidity	90 %	90 %	90 %
Temperature			
• Operation (vertical installation)	0 °C to +50 °C	0 °C to +50 °C	0 °C to +50 °C
• Operation (max. tilt angle)	0 °C to +40 °C	0 °C to +40 °C	0 °C to +40 °C
• Transport, storage	-20 °C to +60 °C	-20 °C to +60 °C	-20 °C to +60 °C
Degree of protection			
Front	IP65, NEMA 4, NEMA 4x, NEMA 12 (when installed)	IP65, NEMA 4, NEMA 4x, NEMA 12 (when installed)	IP65, NEMA 4, NEMA 4x, NEMA 12 (when installed)
Rear	IP20	IP20	IP20

Technical specifications (continued)

	6AV6 647-0AE11-3AX0	6AV6 647-0AF11-3AX0	6AV6 647-0AG11-3AX0
Certifications & standards			
Certifications	CE, UL, cULus, NEMA 4, NEMA 4x, NEMA 12	CE, UL, cULus, NEMA 4, NEMA 4x, NEMA 12	CE, UL, cULus, NEMA 4, NEMA 4x, NEMA 12
I/O			
I/O devices	None	None	None
Type of output			
LED colors	None	None	None
Acoustics	Sound signal	Sound signal	Sound signal
Interfaces			
Interfaces	1 x RS422, 1 x RS485 (max. 12 Mbit/s)	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)
PC card slot	No	No	No
CF card slot	No	No	No
Multi Media Card slot	No	No	No
USB port	No	No	No
Industrial Ethernet interface	No	1 x Ethernet (RJ45)	1 x Ethernet (RJ45)
Processor			
Processor	RISC 32 bit, 200 MHz	RISC 32 bit, 200 MHz	RISC 32 bit, 200 MHz
Functionality under WinCC flexible/WinCC Basic			
Applications/options	None	None	None
Number of Visual Basic Scripts	Not possible	Not possible	Not possible
Task planner	Yes	Yes	Yes
Help system	Yes	Yes	Yes
Status/control	Not possible	Not possible	Not possible
With alarm logging system (incl. buffer and acknowledgment)			
• Number of messages	200	200	200
• Bit messages	Yes	Yes	Yes
• Analog messages	Yes	Yes	Yes
• Message buffer	Ring buffer (n x 256 entries), retentive, maintenance-free	Ring buffer (n x 256 entries), retentive, maintenance-free	Ring buffer (n x 256 entries), retentive, maintenance-free
Recipes			
• Recipes	5	5	5
• Data records per recipe	20	20	20
• Entries per data record	20	20	20
• Recipe memory	40 kbyte integrated Flash	40 kbyte integrated Flash	40 kbyte integrated Flash
Number of process images			
• Process images	50	50	50
• Variables	500	500	500
• Limit values	Yes	Yes	Yes
• Multiplexing	Yes	Yes	Yes
Image elements			
• Text objects	500 text elements	500 text elements	500 text elements
• Graphics object	Bit maps, icons, icon (full-screen), vector graphics	Bit maps, icons, icon (full-screen), vector graphics	Bit maps, icons, icon (full-screen), vector graphics
• Dynamic objects	Diagrams, bar graphs	Diagrams, bar graphs	Diagrams, bar graphs
Lists			
• Text lists	150	150	150
• Graphics list	100	100	100
• Libraries	Yes	Yes	Yes
Security			
• Number of user groups	50	50	50
• Passwords exportable	No	No	No
• Number of user rights	32	32	32

SIMATIC S7-1200

Operator control and monitoring

Basic panels - Standard

Technical specifications (continued)

	6AV6 647-0AE11-3AX0	6AV6 647-0AF11-3AX0	6AV6 647-0AG11-3AX0
Data carrier support			
• PC card	No	No	No
• CF card	No	No	No
• Multi Media Card	No	No	No
Recording			
• Recording/Printing	-	-	-
Fonts			
• Keyboard fonts	US American (English)	US American (English)	US American (English)
Languages			
• Online languages	5	5	5
• Configuration languages	D, GB, F, I, E, CHN "traditional", CHN "simplified", DK, FIN, GR, J, KP / ROK, NL, N, PL, P, RUS, S, CZ / SK, TR, H	D, GB, F, I, E, CHN "traditional", CHN "simplified", DK, FIN, GR, J, KP / ROK, NL, N, PL, P, RUS, S, CZ / SK, TR, H	D, GB, F, I, E, CHN "traditional", CHN "simplified", DK, FIN, GR, J, KP / ROK, NL, N, PL, P, RUS, S, CZ / SK, TR, H
• Character sets	Tahoma, WinCC flexible Standard, symbol languages	Tahoma, WinCC flexible Standard, symbol languages	Tahoma, WinCC flexible Standard, symbol languages
Transfer (upload/download)			
• Transfer of configuration	MPI/PROFIBUS DP, serial, automatic transfer recognition	Ethernet, automatic transfer recognition	Ethernet, automatic transfer recognition
Process coupling			
• Connection to controller	S7-200, S7- 300/400, Allen Bradley (DF1), Mitsubishi (FX), OMRON (LINK/Multilink), Modicon (Modbus) see section on "System interfaces"	S7-200, S7-300/400, Modicon (Modbus) see chapter "System interfaces"	S7-200, S7-300/400, Modicon (Modbus) see chapter "System interfaces"
Expandability/openness			
• Open Platform Program	No	No	No
Dimensions			
Front of enclosure (W x H)	335 mm x 275 mm	335 mm x 275 mm	400 mm x 310 mm
Mounting cutout/device depth (W x H)	310 mm x 248 mm / 60 mm device depth	310 mm x 248 mm / 60 mm device depth	367 mm x 289 mm / 60 mm device depth
Dimensions and weight			
Weight			
• Weight	2.65 kg	2.65 kg	4.2 kg

Ordering data	Order No.	Order No.
SIMATIC HMI KTP300 Basic mono PN	I 6AV6 647-0AH11-3AX0	Starter kit SIMATIC S7-1200 + KTP600 Basic D 6AV6 651-7DA01-3AA0 consisting of: • SIMATIC HMI KTP600 Basic color PN • SIMATIC S7-1200 CPU 1212C AC/DC/Rly • SIMATIC S7-1200 SIM 1274 simulator module • SIMATIC STEP 7 BASIC CD • SIMATIC S7-1200 HMI Manual Collection CD • Ethernet CAT5 cable, 2 m Configuration • All device versions: with SIMATIC WinCC V11, configurable Documentation (to be ordered separately) You can find the manual for the Basic Panels on the Internet at http://support.automation.siemens.com WinCC flexible Compact/Standard/Advanced user manual • German 6AV6 691-1AB01-3AA0 • English 6AV6 691-1AB01-3AB0 • French 6AV6 691-1AB01-3AC0 • Italian 6AV6 691-1AB01-3AD0 • Spanish 6AV6 691-1AB01-3AE0 WinCC flexible Communication user manual • German 6AV6 691-1CA01-3AA0 • English 6AV6 691-1CA01-3AB0 • French 6AV6 691-1CA01-3AC0 • Italian 6AV6 691-1CA01-3AD0 • Spanish 6AV6 691-1CA01-3AE0 SIMATIC HMI manual collection J 6AV6 691-1SA01-0AX0 Electronic documentation, on DVD 5 languages (English, French, German, Italian and Spanish); contains: all currently available user manuals, manuals and communication manuals for SIMATIC HMI
SIMATIC HMI KTP400 Basic mono PN	I 6AV6 647-0AA11-3AX0	
Starter kit for SIMATIC HMI KTP400 Basic mono PN	D 6AV6 652-7AA01-3AA0	
SIMATIC HMI KTP600 Basic mono PN	I 6AV6 647-0AB11-3AX0	
Starter kit for SIMATIC HMI KTP600 Basic mono PN	D 6AV6 652-7BA01-3AA0	
SIMATIC HMI KTP600 Basic color DP	I 6AV6 647-0AC11-3AX0	
Starter kit for SIMATIC HMI KTP600 Basic color DP	D 6AV6 652-7CA01-3AA0	
SIMATIC HMI KTP600 Basic color PN	I 6AV6 647-0AD11-3AX0	
Starter kit for SIMATIC HMI KTP600 Basic color PN	D 6AV6 652-7DA01-3AA0	
SIMATIC HMI KTP1000 Basic color DP	I 6AV6 647-0AE11-3AX0	
Starter kit for SIMATIC HMI KTP1000 Basic color DP	D 6AV6 652-7EA01-3AA0	
SIMATIC HMI KTP1000 Basic color PN	I 6AV6 647-0AF11-3AX0	
Starter kit for SIMATIC HMI KTP1000 Basic color PN	D 6AV6 652-7FA01-3AA0	
SIMATIC HMI TP1500 Basic color PN	I 6AV6 647-0AG11-3AX0	
Starter kits consist of: • the relevant SIMATIC KTP Basic Panel • SIMATIC WinCC flexible Compact engineering software • SIMATIC HMI Manual Collection (DVD), 5 languages (English, French, German, Italian, Spanish), comprising: all currently available user manuals, manuals and communication manuals for SIMATIC HMI • Ethernet cable on PN devices • MPI cable on DP devices (for download and test purposes only)		
Starter kit SIMATIC S7-1200 + KTP400 Basic	D 6AV6 651-7AA01-3AA0	
consisting of: • SIMATIC HMI KTP400 Basic mono PN • SIMATIC S7-1200 CPU 1212C AC/DC/Rly • SIMATIC S7-1200 Simulator Module SIM 1274 • SIMATIC STEP 7 BASIC CD • SIMATIC S7-1200 HMI Manual Collection CD • Ethernet CAT5 cable, 2 m		

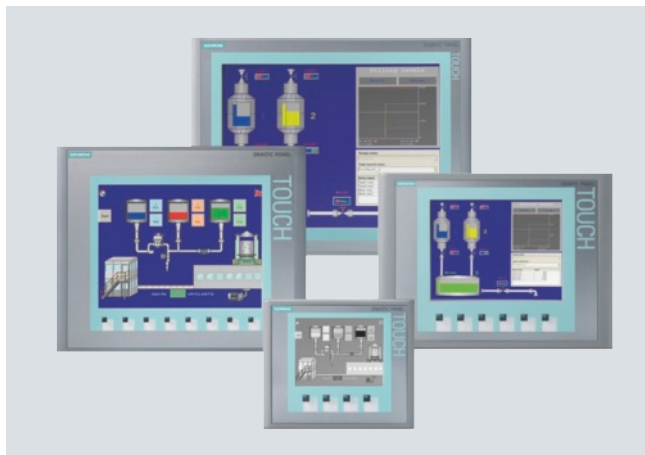
D: Subject to export regulations AL: N and ECCN: 5D992
I: Subject to export regulations AL: N and ECCN: EAR99H
J: Subject to export regulations AL: N and ECCN: EAR99S

SIMATIC S7-1200

SIPLUS operator control and monitoring

SIPLUS basic panels

Overview



- Ideal entry-level series of 3.8 inches to 15 inches for operating and monitoring compact machines and systems
- Clear process representation through the use of full-graphic displays
- Intuitive operation via touch and tactile function keys
- Equipped with all the necessary basic functions such as reporting, recipe management, curve representation, vector graphics, and language selection
- Easy connection to the controller via integrated Ethernet interface or a separate version with RS485/422

Note:

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

	SIPLUS HMI KTP 400 BASIC MONO PN	SIPLUS HMI KTP 600 BASIC COLOR PN	SIPLUS HMI KTP 1000 BASIC COLOR DP	SIPLUS HMI KTP 1000 BASIC COLOR PN	SIPLUS HMI TP 1500 BASIC COLOR PN
Order No.	6AG1647-0AA11-2AX0	6AG1647-0AD11-2AX0	6AG1647-0AE11-4AX0	6AG1647-0AF11-4AX0	6AG1647-0AG11-4AX0
Order No. based on	6AV6647-0AA11-3AX0	6AV6647-0AD11-3AX0	6AV6647-0AE11-3AX0	6AV6647-0AF11-3AX0	6AV6647-0AG11-3AX0
Ambient temperature range	-10 ... +60 °C	-25 ... +60 °C	0 ... +50 °C	0 ... +50 °C	0 ... +50 °C
Conformal coating	Coating of the printed circuit boards and the electronic components				
Technical data	The technical data of the standard product applies except for ambient conditions.				
Ambient conditions					
Relative humidity	5 ... 100 % Condensation permissible				
Biologically active substances	Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)				
Chemically active substances	Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA-S71.04 severity level G1; G2; G3; GX ^{1) 2)}				
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust ²⁾				
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K				

¹⁾ ISA-S71.04 severity level GX: Long-term load: SO₂ < 4.8 ppm; H₂S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O₃ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO₂ < 17.8 ppm; H₂S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O₃ < 1.0 ppm; NOX < 10.4 ppm

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

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

SIMATIC S7-1200

SIPLUS operator control and monitoring

SIPLUS basic panels

Ordering data	Order No.	Order No.
SIPLUS HMI KTP400 Basic mono PN Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -10 ... +60 °C	6AG1 647-0AA11-2AX0	SIPLUS HMI KTP 1000 Basic Color PN Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature 0 ... +50 °C
SIPLUS HMI KTP 600 Basic color PN H Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature -25 ... +60 °C	6AG1 647-0AD11-2AX0	SIPLUS HMI TP 1500 Basic Color PN I Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature 0 ... +50 °C
SIPLUS HMI KTP 1000 Basic Color DP I Suitable for areas with extraordinary medial exposure (conformal coating); ambient temperature 0 ... +50 °C	6AG1 647-0AE11-4AX0	Accessories See SIMATIC basic panels, page 4/119

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

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

SIMATIC S7-1200

Software

Software

Overview

- Software for the SIMATIC S7-1200
- Functions for all phases of the automation project:
 - configuring and parameterizing the hardware
 - specifying the communication
 - programming in LAD (Ladder Diagram) and FBD (Function Block Diagram)
 - configuration of the visualization
 - test, commissioning, and service

The following is available:

- STEP 7 Professional/Basic V11

For further information see chapter 11.