

SIMATIC S7-1200

Central processing units

CPU 1212C

Function

- Comprehensive instruction set:
A wide range of operations facilitate programming:
 - basic operations such as binary logic operations, result allocation, save, count, create times, load, transfer, compare, shift, rotate, create complement, call subprogram (with local variables)
 - integral communication commands (e.g. USS protocol, Modbus RTU, S7 communication "T-Send/T-Receive" or Freepport)
 - user-friendly functions such as pulse-width modulation, pulse sequence function, arithmetic functions, floating point arithmetic, PID closed-loop control, jump functions, loop functions and code conversions
 - mathematical functions, e.g. SIN, COS, TAN, LN, EXP
- Counting:
User-friendly counting functions in conjunction with the integrated counters and special commands for high-speed counters open up new application areas for the user
- Interrupt processing:
 - edge-triggered interrupts (activated by rising or falling edges of process signals on interrupt inputs) support a rapid response to process events.

- time-triggered interrupts.
- counter interrupts can be triggered when a setpoint is reached or when the direction of counting changes.
- communication interrupts allow the rapid and easy exchange of information with peripheral devices such as printers or bar code readers
- Password protection
- Test and diagnostics functions:
Easy-to-use functions support testing and diagnostics, e.g. online/offline diagnostics
- "Forcing" of inputs and outputs during testing and diagnostics:
Inputs and outputs can be set independently of cycle and thus permanently, for example, to test the user program
- Motion Control in accordance with PLCopen for simple movements
- Library functionality

Programming

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

Technical specifications

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

Technical specifications (continued)

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

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Technical specifications (continued)

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

Technical specifications (continued)

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

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Technical specifications (continued)

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

Technical specifications (continued)

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

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Technical specifications (continued)

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

Technical specifications (continued)

	6ES7 212-1BD30-0XB0	6ES7 212-1AD30-0XB0	6ES7 212-1HD30-0XB0
Product name	CPU 1212C AC/DC/relay	CPU 1212C DC/DC/DC	CPU 1212C DC/DC/relay
Shock test			
<ul style="list-style-type: none"> Tested in accordance with IEC 60068-2-27 	Yes; magnitude of shock 15 g (peak value), duration 11 ms, 6 shocks in each of the three mutually perpendicular axes	Yes; magnitude of shock 15 g (peak value), duration 11 ms, 6 shocks in each of the three mutually perpendicular axes	Yes; magnitude of shock 15 g (peak value), duration 11 ms, 6 shocks in each of the three mutually perpendicular axes
Degree of protection			
IP20	Yes	Yes	Yes
Standards, approvals, certificates			
CE mark	Yes	Yes	Yes
C-TICK	Yes	Yes	Yes
cULus	Yes	Yes	Yes
FM approval	Yes	Yes	Yes
Dimensions and weight			
Dimensions and weight			
<ul style="list-style-type: none"> Width 	90 mm	90 mm	90 mm
<ul style="list-style-type: none"> Height 	100 mm	100 mm	100 mm
<ul style="list-style-type: none"> Depth 	75 mm	75 mm	75 mm
Weight			
<ul style="list-style-type: none"> Approx. weight 	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; C integral program/data memory 25 KB, load memory 1 MB; wide-range power supply 85 ... 264 V AC; Boolean execution times 0.1 µs per operation; 8 digital inputs, 6 digital outputs (relays), 2 analog inputs; expandable by up to 3 communication modules, 2 signal modules and 1 signal board; digital inputs can be used as HSC at 100 kHz	6ES7 212-1BD30-0XB0	SB 1223 signal board C 2 inputs, 24 V DC, IEC type 1 current sinking; two 24 V DC transistor outputs, 0.5 A, 5 W; can be used as HSC at up to 30 kHz
Compact CPU, DC/DC/DC; C integral program/data memory 25 KB, load memory 1 MB; power supply 24 V DC; Boolean execution times 0.1 µs per operation; 8 digital inputs, 6 digital outputs (relays), 2 analog inputs; expandable by up to 3 communication modules, 2 signal modules and 1 signal board; digital inputs can be used as HSC at 100 kHz, 24 V DC digital outputs can be used as pulse outputs (PTO) or pulse-width modulated outputs (PWM) with 100 kHz	6ES7 212-1AD30-0XB0	SB 1232 signal board C 1 analog output, ±10 V with 12 bit or 0 ... 20 mA with 11 bit
Compact CPU, DC/DC/relay; C integral program/data memory 25 KB, load memory 1 MB; power supply 24 V DC; Boolean execution times 0.1 µs per operation; 8 digital inputs, 6 digital outputs, 2 analog inputs; expandable by up to 3 communication modules, 2 signal modules and 1 signal board; digital inputs can be used as HSC at 100 kHz	6ES7 212-1HD30-0XB0	Simulator (optional) C 8 input switches, for CPU 1211C / CPU 1212C 6ES7 274-1XF30-0XA0
		SIMATIC Memory Card (optional) 2 MB C 6ES7 954 -8LB00-0AA0 24 MB C 6ES7 954 -8LF00-0AA0
		Starter box CPU 1212C AC/DC/relay E 6ES7 212-1BD30-4YB0 Complete offer SIMATIC S7-1200, starter box, comprising: CPU 1212C AC/DC/relay, simula- tor, STEP 7 BASIC CD, manual CD, info material, in Systainer
		S7-1200 automation system, System Manual for SIMATIC S7-1200 and STEP 7 Basic German 6ES7 298-8FA30-8AH0 English 6ES7 298-8FA30-8BH0
		STEP 7 Basic engineering soft- ware <i>Target system:</i> SIMATIC S7-1200 controllers and the associated I/O. The WinCC Basic which is included permits configuration of the SIMATIC Basic Panels <i>Requirement:</i> MS Windows XP SP3 / MS Windows Vista SP1 <i>Type of delivery:</i> German, English, with online documentation Single license D 6ES7 822-0AA00-0YAO STEP 7 Basic Software Update Service, 1 year D 6ES7 822-0AA00-0YLO

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

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

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

More information

Brochures

Information material for downloading can be found in the Internet:

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