

### Overview



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

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### Design

The compact CPU 1211C has:

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

#### Device versions

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

# SIMATIC S7-1200

## Central processing units

### CPU 1211C

#### Function

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

#### Programming

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

#### Technical specifications

	6ES7 211-1BD30-0XB0	6ES7 211-1AD30-0XB0	6ES7 211-1HD30-0XB0
Product name	CPU 1211C AC/DC/relay	CPU 1211C DC/DC/DC	CPU 1211C DC/DC/relay
<b>Product version</b>			
Associated programming package	STEP 7 Basic V 10.5	STEP 7 Basic V 10.5	STEP 7 Basic V 10.5
<b>Supply voltages</b>			
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		
<b>Load voltage L+</b>			
• Rated value (DC)		24 V	24 V
• Lower limit of permissible range (DC)		20.4 V	20.4 V
• Upper limit of permissible range (DC)		28.8 V	28.8 V

**Technical specifications** (continued)

	6ES7 211-1BD30-0XB0	6ES7 211-1AD30-0XB0	6ES7 211-1HD30-0XB0
Product name	CPU 1211C AC/DC/relay	CPU 1211C DC/DC/DC	CPU 1211C DC/DC/relay
<b>Current consumption</b>			
Current consumption (rated value)	60 mA at 120 V AC 30 mA at 240 V AC	300 mA; typically	300 mA; typically
Current consumption, max.	180 mA at 120 V AC 90 mA at 240 V AC	0.9 A; 24 V DC	0.9 A; 24 V DC
Max. starting current	20 A; at 264 V	12 A; at 28.8 V	12 A; at 28.8 V
Current output at backplane bus (5 V DC), max.	750 mA; max. 5 V DC for SM and CM	750 mA; max. 5 V DC for SM and CM	750 mA; max. 5 V DC for SM and CM
<b>Current consumption/power loss</b>			
Power loss, typ.	10 W	8 W	8 W
<b>Memory</b>			
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
<b>CPU/execution times</b>			
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
<b>Data areas and their retentivity</b>			
Total retentive data area (including timers, counters, bit memories), max.	2048 byte	2048 byte	2048 byte
<b>Address range</b>			
I/O address range			
• Total I/O address range	1024 byte for inputs/ 1024 byte for outputs	1024 byte for inputs/ 1024 byte for outputs	1024 byte for inputs/ 1024 byte for outputs
• Inputs	1024 byte	1024 byte	1024 byte
• Outputs	1024 byte	1024 byte	1024 byte
Digital channels			
• Integrated channels (DI)	6	6	6
• Integrated channels (DO)	4	4	4
Analog channels			
• Integrated channels (AI)	2	2	2

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## Central processing units

### CPU 1211C

#### Technical specifications (continued)

	6ES7 211-1BD30-0XB0	6ES7 211-1AD30-0XB0	6ES7 211-1HD30-0XB0
Product name	CPU 1211C AC/DC/relay	CPU 1211C DC/DC/DC	CPU 1211C DC/DC/relay
<b>Hardware configuration</b>			
Number of modules per system, max.	3 communication modules, 1 signal board	3 communication modules, 1 signal board	3 communication modules, 1 signal board
<b>Time</b>			
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
<b>Test and startup functions</b>			
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
<b>Communications functions</b>			
S7 communication			
• Supported	Yes	Yes	Yes
• As server	Yes	Yes	Yes
• As client	Yes	Yes	Yes
Open IE communication			
• TCP/IP	Yes	Yes	Yes
• ISO-on-TCP (RFC1006)	Yes	Yes	Yes
Number of connections			
• Total	16	16; dynamic	16
<b>1st interface</b>			
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
<b>CPU/programming</b>			
Configuring software			
• STEP 7	STEP 7 Basic V 10.5	STEP 7 Basic V 10.5	STEP 7 Basic V 10.5
Programming language			
• LAD	Yes	Yes	Yes
• FBD	Yes	Yes	Yes
• STL			
Cycle time monitoring			
• Configurable	Yes	Yes	Yes

### Technical specifications (continued)

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

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## Central processing units

### CPU 1211C

#### Technical specifications (continued)

	6ES7 211-1BD30-0XB0	6ES7 211-1AD30-0XB0	6ES7 211-1HD30-0XB0
Product name	CPU 1211C AC/DC/relay	CPU 1211C DC/DC/DC	CPU 1211C DC/DC/relay
Output delay with ohmic load			
• "0" to "1", max.	10 ms; max.	1 µs; max.	10 ms; max.
• "1" to "0", max.	10 ms; max.	5 µs; max.	10 ms; max.
Wiring 2 outputs in parallel			
• for performance increase	No		No
Switching frequency			
• of pulse outputs, with ohmic load, max.	1 Hz	100 kHz	1 Hz
Cable length			
• Max. cable length, shielded	500 m	500 m	500 m
• Max. cable length, unshielded	150 m	150 m	150 m
<b>Relay outputs</b>			
Number of relay outputs	4		4
Number of operating cycles	Mechanically 10 million, with rated load voltage 100000		Mechanically 10 million, with rated load voltage 100000
<b>Analog inputs</b>			
Number of analog inputs	2	2	2
Number of analog inputs with voltage/current measurement	2		2
Max. cable length, shielded	10 m; twisted and shielded	10 m; twisted and shielded	10 m; twisted and shielded
Input ranges			
• Voltage	Yes	Yes	Yes
Input ranges (rated values), voltages			
• 0 ... +10 V	Yes	Yes	Yes
• Input resistance (0 ... 10 V)	≥100 kOhm	≥100 kOhm	≥100 kOhm
<b>Analog value generation</b>			
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
<b>Analog value generation (in isochronous mode)</b>			
Cable length			
• Max. cable length, shielded	10 m; twisted	10 m; twisted	10 m; twisted
<b>Encoder supply</b>			
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
<b>Encoders</b>			
Connectable encoders			
• 2-wire BEROs	Yes	Yes	Yes

**Technical specifications** (continued)

	6ES7 211-1BD30-0XB0	6ES7 211-1AD30-0XB0	6ES7 211-1HD30-0XB0
Product name	CPU 1211C AC/DC/relay	CPU 1211C DC/DC/DC	CPU 1211C DC/DC/relay
<b>Integrated functions</b>			
Number of counters	3	3	3
Max. counter frequency	100 kHz	100 kHz	100 kHz
Frequency meters	Yes	Yes	Yes
Controlled positioning	Yes	Yes	Yes
PID controllers	Yes	Yes	Yes
Number of alarm inputs	4	4	4
Number of pulse outputs		2	
Limit frequency (pulse)		100 kHz	
<b>Operator control and monitoring</b>			
Display			
• Integrated	No	No	No
<b>Galvanic isolation</b>			
Galvanic isolation of digital inputs			
• Galvanic isolation of digital inputs	500 V AC for 1 minute	500 V AC for 1 minute	500 V AC for 1 minute
• Between the channels, in groups of	1	1	1
Isolation of digital outputs			
• Isolation of digital outputs	Yes; relays	Yes	Relays
• Between the channels	No	No	No
• Between the channels, in groups of	1	1	1
<b>Permissible potential difference</b>			
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
<b>EMC</b>			
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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## Central processing units

### CPU 1211C

#### Technical specifications (continued)

	6ES7 211-1BD30-0XB0	6ES7 211-1AD30-0XB0	6ES7 211-1HD30-0XB0
Product name	CPU 1211C AC/DC/relay	CPU 1211C DC/DC/DC	CPU 1211C DC/DC/relay
<b>Climatic and mechanical conditions for storage and transport</b>			
Climatic conditions for storage and transport			
<ul style="list-style-type: none"> <li>Free fall               <ul style="list-style-type: none"> <li>- max. height of fall (in packaging)</li> </ul> </li> </ul>			
	0.3 m; five times, in transport packaging	0.3 m; five times, in transport packaging	0.3 m; five times, in transport packaging
<ul style="list-style-type: none"> <li>Temperature               <ul style="list-style-type: none"> <li>- permissible temperature range</li> </ul> </li> </ul>			
	-40 °C ... +70 °C	-40 °C ... +70 °C	-40 °C ... +70 °C
<ul style="list-style-type: none"> <li>Relative humidity               <ul style="list-style-type: none"> <li>- permissible range (without condensation) at 25 °C</li> </ul> </li> </ul>			
	95%	95%	95%
<b>Mechanical and climatic conditions in operation</b>			
Climatic conditions in operation			
<ul style="list-style-type: none"> <li>Temperature               <ul style="list-style-type: none"> <li>- permissible temperature range</li> </ul> </li> </ul>			
	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
<ul style="list-style-type: none"> <li>- permissible temperature change</li> </ul>			
	5 °C ... 55 °C, 3 °C/minute	5 °C ... 55 °C, 3 °C/minute	5 °C ... 55 °C, 3 °C/minute
<ul style="list-style-type: none"> <li>Atmospheric pressure acc. to IEC 60068-2-13               <ul style="list-style-type: none"> <li>- permissible atmospheric pressure</li> </ul> </li> </ul>			
	1080 ... 795 hPa	1080 ... 795 hPa	1080 ... 795 hPa
<ul style="list-style-type: none"> <li>- permissible operating altitude</li> </ul>			
	-1000 m ... 2000 m	-1000 m ... 2000 m	-1000 m ... 2000 m
<ul style="list-style-type: none"> <li>Concentration of pollutants               <ul style="list-style-type: none"> <li>- SO<sub>2</sub> at RH &lt; 60% without condensation</li> </ul> </li> </ul>			
	SO <sub>2</sub> : < 0.5 ppm; H <sub>2</sub> S: < 0.1 ppm; RH < 60% without condensation	SO <sub>2</sub> : < 0.5 ppm; H <sub>2</sub> S: < 0.1 ppm; RH < 60% without condensation	SO <sub>2</sub> : < 0.5 ppm; H <sub>2</sub> S: < 0.1 ppm; RH < 60% without condensation
<b>Environmental requirements</b>			
Operating temperature			
<ul style="list-style-type: none"> <li>Min.</li> </ul>			
	0 °C	0 °C	0 °C
<ul style="list-style-type: none"> <li>Max.</li> </ul>			
	55 °C	55 °C	55 °C
<ul style="list-style-type: none"> <li>Vertical installation, min.</li> </ul>			
	0 °C	0 °C	0 °C
<ul style="list-style-type: none"> <li>Vertical installation, max.</li> </ul>			
	45 °C	45 °C	45 °C
<ul style="list-style-type: none"> <li>Horizontal installation, min.</li> </ul>			
	0 °C	0 °C	0 °C
<ul style="list-style-type: none"> <li>Horizontal installation, max.</li> </ul>			
	55 °C	55 °C	55 °C
Storage/transport temperature			
<ul style="list-style-type: none"> <li>Min.</li> </ul>			
	-40 °C	-40 °C	-40 °C
<ul style="list-style-type: none"> <li>Max.</li> </ul>			
	+70 °C	+70 °C	+70 °C
Atmospheric pressure			
<ul style="list-style-type: none"> <li>Operation, min.</li> </ul>			
	795 hPa	795 hPa	795 hPa
<ul style="list-style-type: none"> <li>Operation, max.</li> </ul>			
	1080 hPa	1080 hPa	1080 hPa
<ul style="list-style-type: none"> <li>Storage/transport, min.</li> </ul>			
	660 hPa	660 hPa	660 hPa
<ul style="list-style-type: none"> <li>Storage/transport, max.</li> </ul>			
	1080 hPa	1080 hPa	1080 hPa
Relative humidity			
<ul style="list-style-type: none"> <li>Operation, max.</li> </ul>			
	95%; no condensation	95%; no condensation	95%; no condensation
Vibrations			
<ul style="list-style-type: none"> <li>Vibrations</li> </ul>			
	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)
<ul style="list-style-type: none"> <li>In operation, tested according to IEC 60068-2-6</li> </ul>			
	Yes	Yes	Yes



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## Central processing units

CPU 1211C

### Technical specifications (continued)

	6ES7 211-1BD30-0XB0	6ES7 211-1AD30-0XB0	6ES7 211-1HD30-0XB0
Product name	CPU 1211C AC/DC/relay	CPU 1211C DC/DC/DC	CPU 1211C DC/DC/relay
Shock test			
<ul style="list-style-type: none"> <li>Tested in accordance with IEC 60068-2-27</li> </ul>	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
<b>Degree of protection</b>			
IP20	Yes	Yes	Yes
<b>Standards, approvals, certificates</b>			
CE mark	Yes	Yes	Yes
C-TICK	Yes	Yes	Yes
cULus	Yes	Yes	Yes
FM approval	Yes	Yes	Yes
<b>Dimensions and weight</b>			
Dimensions and weight			
<ul style="list-style-type: none"> <li>Width</li> </ul>	90 mm	90 mm	90 mm
<ul style="list-style-type: none"> <li>Height</li> </ul>	100 mm	100 mm	100 mm
<ul style="list-style-type: none"> <li>Depth</li> </ul>	75 mm	75 mm	75 mm
Weight			
<ul style="list-style-type: none"> <li>Approx. weight</li> </ul>	420 g	370 g	380 g

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# SIMATIC S7-1200

## Central processing units

### CPU 1211C

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Ordering data	Order No.	Order No.
<b>CPU 1211C</b>		
<b>Compact CPU, AC/DC/relay;</b> 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; 6 digital inputs, 4 digital outputs (relays), 2 analog inputs; expandable by up to 3 communication modules and 1 signal board; digital inputs can be used as HSC at 100 kHz	<b>6ES7 211-1BD30-0XB0</b>	<b>SB 1223 signal board</b> 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
<b>Compact CPU, DC/DC/DC;</b> C integral program/data memory 25 KB, load memory 1 MB; power supply 24 V DC; Boolean execution times 0.1 µs per operation; 6 digital inputs, 4 digital outputs (relays), 2 analog inputs; expandable by up to 3 communication modules and 1 signal board; digital inputs can be used as HSC at 100 kHz, 24 V DC digital outputs can be used as pulse outputs (PTO) or pulse-width modulated outputs (PWM) with 100 kHz	<b>6ES7 211-1AD30-0XB0</b>	<b>SB 1232 signal board</b> C 1 analog output, ±10 V with 12 bit or 0 ... 20 mA with 11 bit
<b>Compact CPU, DC/DC/relay;</b> C integral program/data memory 25 KB, load memory 1 MB; power supply 24 V DC; Boolean execution times 0.1 µs per operation; 6 digital inputs, 4 digital outputs, 2 analog inputs; expandable by up to 3 communication modules and 1 signal board; digital inputs can be used as HSC at 100 kHz	<b>6ES7 211-1HD30-0XB0</b>	<b>Simulator (optional)</b> C 8 input switches, for CPU 1211C / CPU 1212C
		<b>SIMATIC Memory Card (optional)</b> 2 MB C <b>6ES7 954 -8LB00-0AA0</b> 24 MB C <b>6ES7 954 -8LF00-0AA0</b>
		<b>S7-1200 automation system, System Manual</b> for SIMATIC S7-1200 and STEP 7 Basic German <b>6ES7 298-8FA30-8AH0</b> English <b>6ES7 298-8FA30-8BH0</b>
		<b>STEP 7 Basic engineering software</b> <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 <b>6ES7 822-0AA00-0YA0</b> STEP 7 Basic Software Update Service, 1 year D <b>6ES7 822-0AA00-0YL0</b>

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

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

### More information

#### Brochures

Information material for downloading can be found in the Internet:

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

### Overview



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

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### Design

The compact CPU 1212C has:

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

#### Device versions

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

# 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 Freepoint)
  - 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
<b>Product version</b>			
Associated programming package	STEP 7 Basic V 10.5	STEP 7 Basic V 10.5	STEP 7 Basic V 10.5
<b>Supply voltages</b>			
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		
<b>Load voltage L+</b>			
• 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
<b>Current consumption</b>			
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
<b>Current consumption/power loss</b>			
Power loss, typ.	11 W	9 W	9 W
<b>Memory</b>			
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
<b>CPU/execution times</b>			
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
<b>Data areas and their retentivity</b>			
Total retentive data area (including timers, counters, bit memories), max.	2048 byte	2048 byte	2048 byte
<b>Address range</b>			
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

# SIMATIC S7-1200

## Central processing units

### CPU 1212C

#### 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
<b>Hardware configuration</b>			
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
<b>Time</b>			
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
<b>Test and startup functions</b>			
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
<b>Communications functions</b>			
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
<b>1st interface</b>			
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
<b>CPU/programming</b>			
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
<b>Digital inputs</b>			
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
<b>Digital outputs</b>			
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	

# SIMATIC S7-1200

## Central processing units

### CPU 1212C

#### 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
<b>Relay outputs</b>			
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
<b>Analog inputs</b>			
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
<b>Analog value generation</b>			
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
<b>Analog value generation (in isochronous mode)</b>			
Cable length			
• Max. cable length, shielded	10 m; twisted	10 m; twisted	10 m; twisted
<b>Encoder supply</b>			
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
<b>Encoders</b>			
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
<b>Integrated functions</b>			
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	
<b>Operator control and monitoring</b>			
Display			
• Integrated	No	No	No
<b>Galvanic isolation</b>			
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
<b>Permissible potential difference</b>			
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
<b>EMC</b>			
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

# SIMATIC S7-1200

## Central processing units

### CPU 1212C

#### 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
<b>Climatic and mechanical conditions for storage and transport</b>			
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%
<b>Mechanical and climatic conditions in operation</b>			
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 <sub>2</sub> at RH < 60% without condensation	SO <sub>2</sub> : < 0.5 ppm; H <sub>2</sub> S: < 0.1 ppm; RH < 60% without condensation	SO <sub>2</sub> : < 0.5 ppm; H <sub>2</sub> S: < 0.1 ppm; RH < 60% without condensation	SO <sub>2</sub> : < 0.5 ppm; H <sub>2</sub> S: < 0.1 ppm; RH < 60% without condensation
<b>Environmental requirements</b>			
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"> <li>Tested in accordance with IEC 60068-2-27</li> </ul>	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
<b>Degree of protection</b>			
IP20	Yes	Yes	Yes
<b>Standards, approvals, certificates</b>			
CE mark	Yes	Yes	Yes
C-TICK	Yes	Yes	Yes
cULus	Yes	Yes	Yes
FM approval	Yes	Yes	Yes
<b>Dimensions and weight</b>			
Dimensions and weight			
<ul style="list-style-type: none"> <li>Width</li> </ul>	90 mm	90 mm	90 mm
<ul style="list-style-type: none"> <li>Height</li> </ul>	100 mm	100 mm	100 mm
<ul style="list-style-type: none"> <li>Depth</li> </ul>	75 mm	75 mm	75 mm
Weight			
<ul style="list-style-type: none"> <li>Approx. weight</li> </ul>	425 g	370 g	385 g

# SIMATIC S7-1200

## Central processing units

### CPU 1212C

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Ordering data	Order No.	Order No.
<b>CPU 1212C</b>		
<b>Compact CPU, AC/DC/relay;</b> 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	<b>6ES7 212-1BD30-0XB0</b>	<b>SB 1223 signal board</b> 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
<b>Compact CPU, DC/DC/DC;</b> 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	<b>6ES7 212-1AD30-0XB0</b>	<b>SB 1232 signal board</b> C 1 analog output, ±10 V with 12 bit or 0 ... 20 mA with 11 bit
<b>Compact CPU, DC/DC/relay;</b> 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	<b>6ES7 212-1HD30-0XB0</b>	<b>Simulator (optional)</b> C 8 input switches, for CPU 1211C / CPU 1212C <b>SIMATIC Memory Card            (optional)</b> 2 MB C <b>6ES7 954 -8LB00-0AA0</b> 24 MB C <b>6ES7 954 -8LF00-0AA0</b> <b>Starter box CPU 1212C            AC/DC/relay</b> E <b>6ES7 212-1BD30-4YB0</b> 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 <b>S7-1200 automation system,            System Manual</b> for SIMATIC S7-1200 and STEP 7 Basic German <b>6ES7 298-8FA30-8AH0</b> English <b>6ES7 298-8FA30-8BH0</b> <b>STEP 7 Basic engineering soft-            ware</b> <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 <b>6ES7 822-0AA00-0YA0</b> STEP 7 Basic Software Update D <b>6ES7 822-0AA00-0YL0</b> Service, 1 year

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

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

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

### More information

#### Brochures

Information material for downloading can be found in the Internet:

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

### Overview



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

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### Design

The compact CPU 1214C has:

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

#### Device versions

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

# SIMATIC S7-1200

## Central processing units

### CPU 1214C

#### Function

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

#### Programming

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

#### Technical specifications

	6ES7 214-1BE30-0XB0	6ES7 214-1AE30-0XB0	6ES7 214-1HE30-0XB0
Product name	CPU 1214C AC/DC/relay	CPU 1214C DC/DC/DC	CPU 1214C DC/DC/relay
<b>Product version</b>			
Associated programming package	STEP 7 Basic V 10.5	STEP 7 Basic V 10.5	STEP 7 Basic V 10.5
<b>Supply voltages</b>			
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		
<b>Load voltage L+</b>			
• Rated value (DC)	24 V	24 V	24 V
• Lower limit of permissible range (DC)	5 V	20.4 V	5 V
• Upper limit of permissible range (DC)	250 V	28.8 V	250 V

### Technical specifications (continued)

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

# SIMATIC S7-1200

## Central processing units

### CPU 1214C

#### Technical specifications (continued)

	6ES7 214-1BE30-0XB0	6ES7 214-1AE30-0XB0	6ES7 214-1HE30-0XB0
Product name	CPU 1214C AC/DC/relay	CPU 1214C DC/DC/DC	CPU 1214C DC/DC/relay
<b>Hardware configuration</b>			
Number of modules per system, max.	3 communication modules, 1 signal board, 8 signal modules	3 communication modules, 1 signal board, 8 signal modules	3 communication modules, 1 signal board, 8 signal modules
<b>Time</b>			
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
<b>Test and startup functions</b>			
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
<b>Communications functions</b>			
S7 communication			
• Supported	Yes	Yes	Yes
• As server	Yes	Yes	Yes
• As client	Yes	Yes	Yes
Open IE communication			
• TCP/IP	Yes	Yes	Yes
- data length, max.			
• ISO-on-TCP (RFC1006)	Yes	Yes	Yes
Number of connections			
• Total	16; dynamic	16; dynamic	16; dynamic
<b>1st interface</b>			
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
<b>CPU/programming</b>			
Configuring software			
• STEP 7	STEP 7 Basic V 10.5	STEP 7 Basic V 10.5	STEP 7 Basic V 10.5
Programming language			
• KOP	Yes	Yes	Yes
• FUP	Yes	Yes	Yes
Cycle time monitoring			
• Configurable	Yes	Yes	Yes



### Technical specifications (continued)

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

# SIMATIC S7-1200

## Central processing units

### CPU 1214C

#### Technical specifications (continued)

	6ES7 214-1BE30-0XB0	6ES7 214-1AE30-0XB0	6ES7 214-1HE30-0XB0
Product name	CPU 1214C AC/DC/relay	CPU 1214C DC/DC/DC	CPU 1214C DC/DC/relay
Output delay with ohmic load			
• "0" to "1", max.	10 ms; max.	1 µs	10 ms; max.
• "1" to "0", max.	10 ms; max.	5 µs	10 ms; max.
Switching frequency			
• of pulse outputs, with ohmic load, max.	1 Hz	100 kHz	1 Hz
Cable length			
• Max. cable length, shielded	500 m	500 m	500 m
• Max. cable length, unshielded	150 m	150 m	150 m
<b>Relay outputs</b>			
Number of relay outputs	10		10
Number of operating cycles	Mechanically 10 million, with rated load voltage 100000		Mechanically 10 million, with rated load voltage 100000
<b>Analog inputs</b>			
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
<b>Analog value generation</b>			
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
<b>Analog value generation (in isochronous mode)</b>			
Cable length			
• Max. cable length, shielded	10 m; twisted	10 m; twisted	10 m; twisted
<b>Encoder supply</b>			
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
<b>Encoders</b>			
Connectable encoders			
• 2-wire BEROs	Yes	Yes	Yes

### Technical specifications (continued)

	6ES7 214-1BE30-0XB0	6ES7 214-1AE30-0XB0	6ES7 214-1HE30-0XB0
Product name	CPU 1214C AC/DC/relay	CPU 1214C DC/DC/DC	CPU 1214C DC/DC/relay
<b>Integrated functions</b>			
Number of counters	6	6	6
Max. counter frequency	100 kHz	100 kHz	100 kHz
Frequency meters	Yes	Yes	Yes
Controlled positioning	Yes	Yes	Yes
PID controllers	Yes	Yes	Yes
Number of alarm inputs	4	4	4
Number of pulse outputs		2	
Limit frequency (pulse)		100 kHz	
<b>Operator control and monitoring</b>			
Display			
• Integrated	No	No	No
<b>Galvanic isolation</b>			
Galvanic isolation of digital inputs			
• Galvanic isolation of digital inputs	500 V AC for 1 minute	500 V AC for 1 minute	500 V AC for 1 minute
• Between the channels, in groups of	1	1	1
Isolation of digital outputs			
• Isolation of digital outputs	Relays	Yes	Relays
• Between the channels	No	No	No
• Between the channels, in groups of	2	2	1
<b>Permissible potential difference</b>			
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
<b>EMC</b>			
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

# SIMATIC S7-1200

## Central processing units

### CPU 1214C

#### Technical specifications (continued)

	6ES7 214-1BE30-0XB0	6ES7 214-1AE30-0XB0	6ES7 214-1HE30-0XB0
Product name	CPU 1214C AC/DC/relay	CPU 1214C DC/DC/DC	CPU 1214C DC/DC/relay
<b>Climatic and mechanical conditions for storage and transport</b>			
Climatic conditions for storage and transport			
<ul style="list-style-type: none"> <li>Free fall           <ul style="list-style-type: none"> <li>- max. height of fall (in packaging)</li> </ul> </li> </ul>			
	0.3 m; five times, in transport packaging	0.3 m; five times, in transport packaging	0.3 m; five times, in transport packaging
<ul style="list-style-type: none"> <li>Temperature           <ul style="list-style-type: none"> <li>- permissible temperature range</li> </ul> </li> </ul>			
	-40° C ... +70° C	-40° C ... +70° C	-40° C ... +70° C
<ul style="list-style-type: none"> <li>Relative humidity           <ul style="list-style-type: none"> <li>- permissible range (without condensation) at 25 °C</li> </ul> </li> </ul>			
	95%	95%	95%
<b>Mechanical and climatic conditions in operation</b>			
Climatic conditions in operation			
<ul style="list-style-type: none"> <li>Temperature           <ul style="list-style-type: none"> <li>- permissible temperature range</li> </ul> </li> </ul>			
	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
<ul style="list-style-type: none"> <li>- permissible temperature change</li> </ul>			
	5° C ... 55°, 3 °C/min	5° C ... 55°, 3 °C/min	5° C ... 55°, 3 °C/min
<ul style="list-style-type: none"> <li>Atmospheric pressure acc. to IEC 60068-2-13           <ul style="list-style-type: none"> <li>- permissible atmospheric pressure</li> </ul> </li> </ul>			
	1080 ... 795 hPa	1080 ... 795 hPa	1080 ... 795 hPa
<ul style="list-style-type: none"> <li>- permissible operating altitude</li> </ul>			
	-1000 m ... 2000 m	-1000 m ... 2000 m	-1000 m ... 2000 m
<ul style="list-style-type: none"> <li>Concentration of pollutants           <ul style="list-style-type: none"> <li>- SO<sub>2</sub> at RH &lt; 60% without condensation</li> </ul> </li> </ul>			
	SO <sub>2</sub> : < 0.5 ppm; H <sub>2</sub> S: < 0.1 ppm; RH < 60% without condensation	SO <sub>2</sub> : < 0.5 ppm; H <sub>2</sub> S: < 0.1 ppm; RH < 60% without condensation	SO <sub>2</sub> : < 0.5 ppm; H <sub>2</sub> S: < 0.1 ppm; RH < 60% without condensation
<b>Environmental requirements</b>			
Operating temperature			
<ul style="list-style-type: none"> <li>Min.</li> </ul>			
	0 °C	0 °C	0 °C
<ul style="list-style-type: none"> <li>Max.</li> </ul>			
	55 °C	55 °C	55 °C
<ul style="list-style-type: none"> <li>Vertical installation, min.</li> </ul>			
	0 °C	0 °C	0 °C
<ul style="list-style-type: none"> <li>Vertical installation, max.</li> </ul>			
	45 °C	45 °C	45 °C
<ul style="list-style-type: none"> <li>Horizontal installation, min.</li> </ul>			
	0 °C	0 °C	0 °C
<ul style="list-style-type: none"> <li>Horizontal installation, max.</li> </ul>			
	55 °C	55 °C	55 °C
Storage/transport temperature			
<ul style="list-style-type: none"> <li>Min.</li> </ul>			
	-40 °C	-40 °C	-40 °C
<ul style="list-style-type: none"> <li>Max.</li> </ul>			
	70 °C	+70 °C	70 °C
Atmospheric pressure			
<ul style="list-style-type: none"> <li>Operation, min.</li> </ul>			
	795 hPa	795 hPa	795 hPa
<ul style="list-style-type: none"> <li>Operation, max.</li> </ul>			
	1080 hPa	1080 hPa	1080 hPa
<ul style="list-style-type: none"> <li>Storage/transport, min.</li> </ul>			
	660 hPa	660 hPa	660 hPa
<ul style="list-style-type: none"> <li>Storage/transport, max.</li> </ul>			
	1080 hPa	1080 hPa	1080 hPa
Relative humidity			
<ul style="list-style-type: none"> <li>Operation, max.</li> </ul>			
	95 %; no condensation	95 %; no condensation	95 %; no condensation
Vibrations			
<ul style="list-style-type: none"> <li>Vibrations</li> </ul>			
	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)
<ul style="list-style-type: none"> <li>In operation, tested according to IEC 60068-2-6</li> </ul>			
	Yes	Yes	Yes

### Technical specifications (continued)

	6ES7 214-1BE30-0XB0	6ES7 214-1AE30-0XB0	6ES7 214-1HE30-0XB0
Product name	CPU 1214C AC/DC/relay	CPU 1214C DC/DC/DC	CPU 1214C DC/DC/relay
Shock test			
<ul style="list-style-type: none"> <li>Tested in accordance with IEC 60068-2-27</li> </ul>	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
<b>Degree of protection</b>			
IP20	Yes	Yes	Yes
<b>Standards, approvals, certificates</b>			
CE mark	Yes	Yes	Yes
C-TICK	Yes	Yes	Yes
cULus	Yes	Yes	Yes
FM approval	Yes	Yes	Yes
<b>Dimensions and weight</b>			
Dimensions and weight			
<ul style="list-style-type: none"> <li>Width</li> </ul>	110 mm	110 mm	110 mm
<ul style="list-style-type: none"> <li>Height</li> </ul>	100 mm	100 mm	100 mm
<ul style="list-style-type: none"> <li>Depth</li> </ul>	75 mm	75 mm	75 mm
Weight			
<ul style="list-style-type: none"> <li>Approx. weight</li> </ul>	455 g	415 g	435 g



# Communication

## CSM 1277 unmanaged

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### Overview



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

### Benefits



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

### Application

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

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

### Design

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

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

### Function

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

### Network topology and configuration

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

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

### Configuration

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

### Diagnostics

The following information is displayed on LEDs on the device:

- Power
- Port status
- Data traffic

### Technical specifications

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

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

### Ordering data

	Order No.
<b>CSM 1277 compact switch module</b> 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	<b>6GK7 277-1AA00-0AA0</b>
<b>Accessories</b> <b>IE TP Cord RJ45/RJ45</b> TP cable 4 x 2 with 2 RJ45 connectors • 0.5 m	<b>6XV1 870-3QE50</b>
<b>IE FC TP Standard Cable GP 2 x 2 (Type A)</b> 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 Plug; PROFINET-compatible; with UL approval; sold by the meter; max. length 1000 m, minimum order quantity 20 m	<b>6XV1 840-2AH10</b>
<b>FC TP Trailing Cable 2 x 2 (Type C)</b> 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 Plug 180/90 for use as trailing cable; PROFINET-compatible; with UL approval; sold by the meter; max. length 1000 m, minimum order quantity 20 m	<b>6XV1 840-3AH10</b>

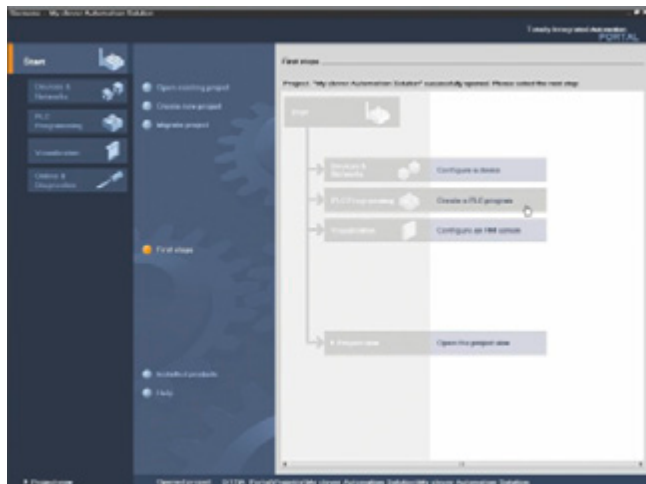
	Order No.
<b>IE FC RJ45 Plug 180</b> RJ45 plug-in connector for Industrial Ethernet with rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface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



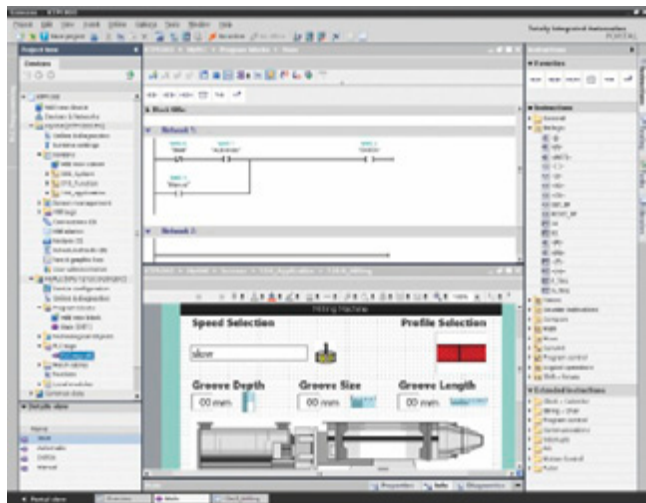
# Software

## STEP 7 Basic

### Overview



STEP 7 Basic, portal view



STEP 7 Basic, project view

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

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

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

### Benefits

#### *Optimized interaction of controller and HMI engineering*

Efficient solving of complete automation task through:

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

#### *Fast startup using the portal view*

The portal view facilitates navigation:

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

#### *Intuitive user interface*

Use of STEP 7 Basic is extremely intuitive:

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

### Application

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

STEP 7 Basic can be used for:

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

### Function

#### Device & network configuration

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

#### Controller programming

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

#### Visualization

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

#### Integration

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

#### Online diagnostics

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

### Technical specifications

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

### Ordering data

#### Order No.

#### STEP 7 Basic V10.5

*Target system:*  
SIMATIC S7-1200,  
SIMATIC HMI Basic Panels

*Requirement:*  
Windows XP SP3,  
Vista Ultimate SP1,  
Vista Business SP1,  
Home Premium SP1

*Type of delivery:*  
German, English

STEP 7 Basic V10.5 on DVD     D     **6ES7 822 -0AA00-0YAO**

Software Update Service  
(requires current software version)     D     **6ES7 822 -0AA00-0YL0**

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

### More information

#### Brochures

Information material for downloading can be found in the Internet:

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

# SIMATIC S7-1200

## Power supplies

### PM 1207 power supply

#### Overview



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

#### Technical specifications

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

#### Ordering data

#### Order No.

#### PM 1207 power supply

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

**6EP1 332-1SH71**

# Operator control and monitoring

## Basic Panels

### Overview



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

### Benefits

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

### Application

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

### Design

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

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

### Function

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

# Operator control and monitoring

## Basic Panels

### Function (continued)

- Signaling system
  - Discrete alarms
  - Analog messages
  - Freely definable message classes (e.g. status/fault messages) for defining acknowledgment response and displaying message events
  - Message history
- Recipe management
- Help texts for process screens, messages and variables
- Arithmetic functions
- Limit value monitoring for reliable process control of inputs and outputs
- Indicator light for indicating machine and plant statuses
- Task planner for cyclic execution of functions
- Template concept
- Creation of picture templates (picture elements configured in the template appear in every image)
- Simple maintenance and configuration thanks to:

- Backup/restore of configuration, operating system and firmware on a PC using ProSave
- Configuration download via MPI/PROFIBUS DP or Ethernet
- Automatic transfer identification
- Individual contrast setting and calibration
- Clean screen
- No battery required

### Configuration

The configuration is implemented using the engineering software SIMATIC WinCC flexible 2008 Compact or WinCC Basic V10.5, which is part of STEP 7 Basic V10.5 (for PROFINET-based devices only).

### Integration

The Basic Panels can be connected to:

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

Note:

Further information can be found under "System interfaces".

### Technical specifications

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

# Operator control and monitoring

## Basic Panels

### Technical specifications (continued)

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

# Operator control and monitoring

## Basic Panels

### Technical specifications (continued)

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



# Operator control and monitoring

## Basic Panels

### Technical specifications (continued)

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



# Operator control and monitoring

## Basic Panels

Ordering data		Order No.	Order No.
<b>SIMATIC KTP400 Basic mono PN</b>	E	<b>6AV6 647-0AA11-3AX0</b>	<b>Configuration</b> <ul style="list-style-type: none"> <li>all devices: with SIMATIC WinCC flexible Compact</li> <li>PROFINET-based devices: with WinCC Basic V10.5 (part of STEP 7 Basic V10.5)</li> </ul>
<b>Starter kit for SIMATIC KTP400 Basic mono PN</b>	A	<b>6AV6 652-7AA01-3AA0</b>	
<b>SIMATIC KTP600 Basic mono PN</b>	E	<b>6AV6 647-0AB11-3AX0</b>	<b>Documentation (to be ordered separately)</b> You can find the manual for the Basic Panels on the Internet at <a href="http://support.automation.siemens.com">http://support.automation.siemens.com</a>
<b>Starter kit for SIMATIC KTP600 Basic mono PN</b>	A	<b>6AV6 652-7BA01-3AA0</b>	
<b>SIMATIC KTP600 Basic color PN</b>	E	<b>6AV6 647-0AD11-3AX0</b>	<b>User Manual WinCC flexible Compact/Standard/Advanced</b> <ul style="list-style-type: none"> <li>German</li> <li>English</li> <li>French</li> <li>Italian</li> <li>Spanish</li> </ul>
<b>Starter kit for SIMATIC KTP600 Basic color PN</b>	A	<b>6AV6 652-7DA01-3AA0</b>	
<b>SIMATIC KTP1000 Basic color PN</b>	E	<b>6AV6 647-0AF11-3AX0</b>	<b>User Manual WinCC flexible Communication</b> <ul style="list-style-type: none"> <li>German</li> <li>English</li> <li>French</li> <li>Italian</li> <li>Spanish</li> </ul>
<b>Starter kit for SIMATIC KTP1000 Basic color PN</b>	A	<b>6AV6 652-7FA01-3AA0</b>	
<b>SIMATIC TP1500 Basic color PN</b>	E	<b>6AV6 647-0AG11-3AX0</b>	<b>SIMATIC HMI Manual Collection D</b> <b>Electronic documentation, on DVD</b> 5 languages (English, French, German, Italian and Spanish); contains: all currently available user manuals, manuals and communication manuals for SIMATIC HMI
Starter kits consist of: <ul style="list-style-type: none"> <li>the relevant SIMATIC KTP Basic Panel</li> <li>SIMATIC WinCC flexible Compact engineering software</li> <li>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</li> <li>Ethernet cable on PN devices</li> <li>MPI cable on DP devices (for download and test purposes only)</li> <li>Voucher for Software Update Service for 1 year</li> </ul>			
			<b>Accessories</b> <b>Accessories for supplementary ordering</b>
			See Catalog ST 80

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

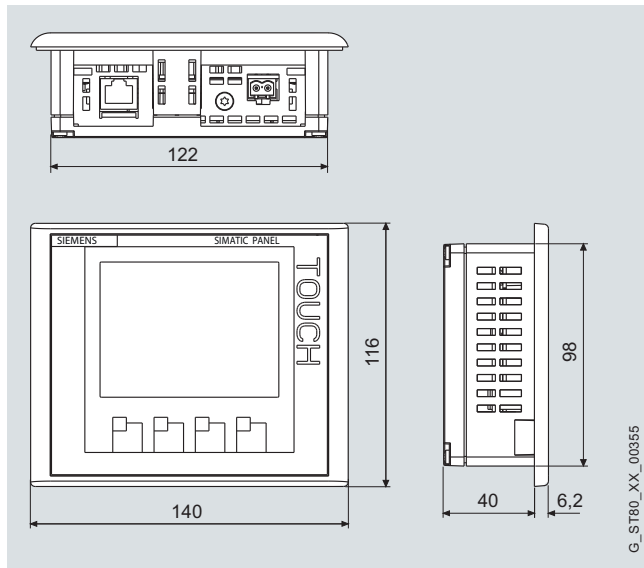
E: Subject to export regulations: AL: N and ECCN: EAR99T

# Operator control and monitoring

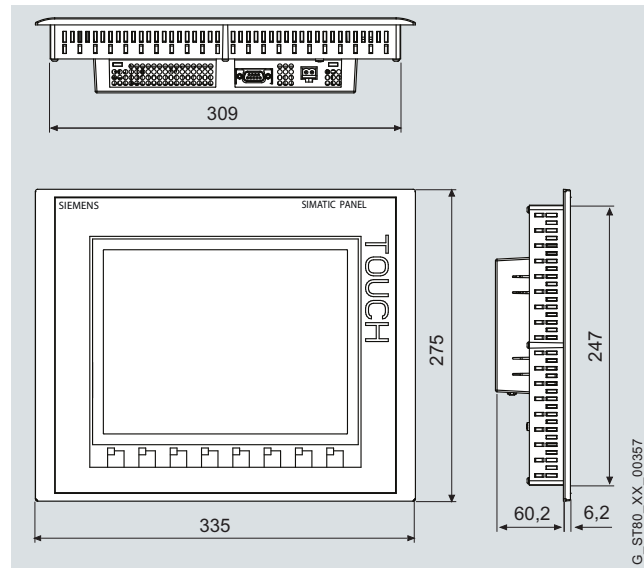
## Basic Panels

### Dimensional drawings

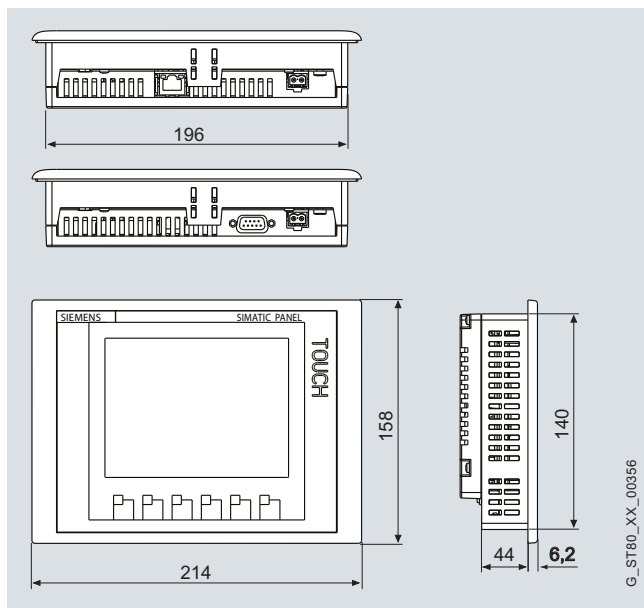
All dimensions in mm.



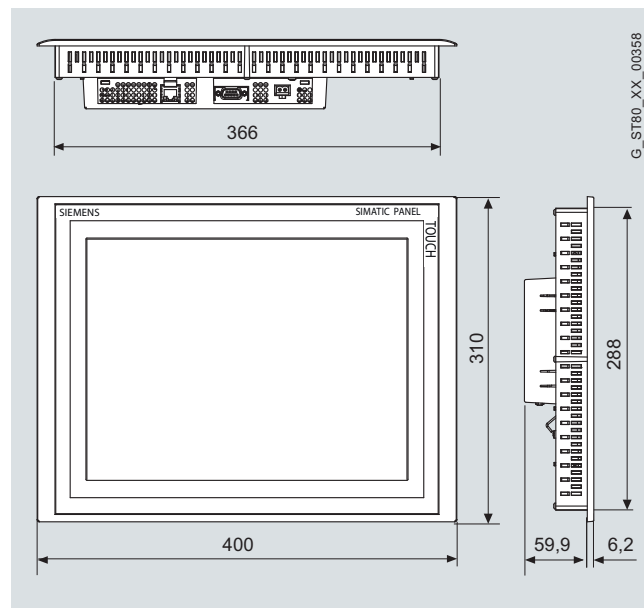
KTP400 Basic



KTP1000 Basic



KTP600 Basic



TP1500 Basic

### More information

Additional information is available in the Internet under:

<http://www.siemens.com/panels>

### Note:

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