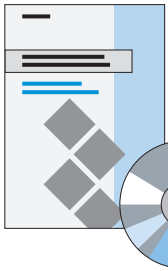


# SIEMENS

## SIMATIC

### Micro PLC SIMATIC S7-200

Extract from Catalog ST 70  
Edition May 1999



The products listed in this catalog are also available from the CD-ROM Catalog CA 01.

Order No.:  
E86060-D4001-A100-A9-7600

For further information contact your local Siemens representative.

The products and systems described in this catalog are sold under application of a quality management system certified by DQS in accordance with DIN EN ISO 9001 (Certificate registration No.: 1323-03). The DQS Certificate is recognized in all EQ Net countries (Reg. No.: 1323).



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# SIMATIC S7-200

## General

### Overview



- The micro PLC that offers maximum automation at minimum cost
- Can be used both for simple controls and for complex automation tasks
- In stand-alone mode, in networks and within distributed structures
- Suitable for applications where programmable controllers would not have been viable in the past
- With outstanding real-time performance and powerful communications (PPI, PROFIBUS-DP, AS-Interface)
- Extremely simple installation, programming and operation

### Application

The SIMATIC S7-200 is a micro PLC for open-loop and close-loop control tasks in mechanical engineering and plant engineering. It combines maximum automation with minimum cost.

SIMATIC S7-200 applications extend from replacing relays and contactors right through to complex automation tasks in stand-alone mode, in networks and within distributed structures.

The S7-200 is increasingly being employed in areas where previously special electronics have been developed to save costs.

Applications include:

- Baling presses
- Plaster and cement mixers
- Suction plants
- Centralized/flange lubricating systems
- Woodworking machinery
- Gate controls
- Hydraulic lifts
- Conveyor systems
- Food and beverages industry
- Laboratories
- Modem applications (remote monitoring)
- Electrical installations

The S7-200 is characterized by:

- Easy entry, facilitated by special starter packages and manuals

- Uncomplicated operation; powerful, easy-to-use standard instructions and user-friendly programming software reduce programming to a minimum
- Unequaled real-time characteristics; interrupt functions, high-speed counters and pulse outputs permit application in time-critical processes
- Powerful communication possibilities; the integrated PROFIBUS-DP interface in particular allows the S7-200 to fully utilize its performance in distributed automation solutions

### Design

The SIMATIC S7-200 family consists of the following modules:

- 7 different basic units in different variants
- 25 digital and analog expansion modules
- 2 communications modules for connecting to PROFIBUS and AS-Interface

### Mechanical features

- Rugged, compact plastic housing
- Easily accessible wiring and operator control elements protected by front covers

### Design features

- International standards; the SIMATIC S7-200 meets the requirements through compliance with VDE, UL,

CSA and FM (Class I, Category 2, hazard area groups A, B, C and D, T4A) standards. The quality management system used during manufacturing has ISO 9001 certification.

### Note:

For the CPUs of the 22x series the above certifications have been applied for

### Communication

The SIMATIC S7-200 offers various communication possibilities:

- Point-to-point interface; can be operated in PPI mode and in user-programmable interface mode
- AS-Interface connection; as master via the CP 242-2 communication processor
- Connection to PROFIBUS-DP as slave; with the CPU 215 via the integral interface and the CP 242-8 communications processor

### PPI network

PPI is the communications system integrated in every S7-200 CPU. Connections for programming or for human machine interface functionality can be established over a shared twisted-pair cable. The CPUs can communicate with several other CPUs, TDs or OPs simultaneously. The data transfer rate is 9.6 and 19.2 kbit/s (CPU 22x also 187.5 kbit/s).

The following units can be connected:

- PG 702, PG 720P, PG 740 and PG 760 programming devices
- PCs (AT-compatible), via PC/PPI cable
- TD 200 text display; SIMATIC OP3 operator panel
- SIMATIC S7-200; up to 31 S7-200s can be operated on a shared data bus with a programming device, PC, TD 200 or OP. Direct data exchange between S7-200 controllers with CPU 214, CPU 215 and CPU 216 (in each case as a master) with the NETR and NETW commands

### MPI-network

The CPU 214, 215 and 216 as well as all CPU 22x can be connected to an MPI network (19.2/187.5 kbit/s) via the integral interface and can then communicate with SIMATIC S7-300s/S7-400s. The S7-200 CPUs are slaves in the MPI network and cannot communicate with each other.

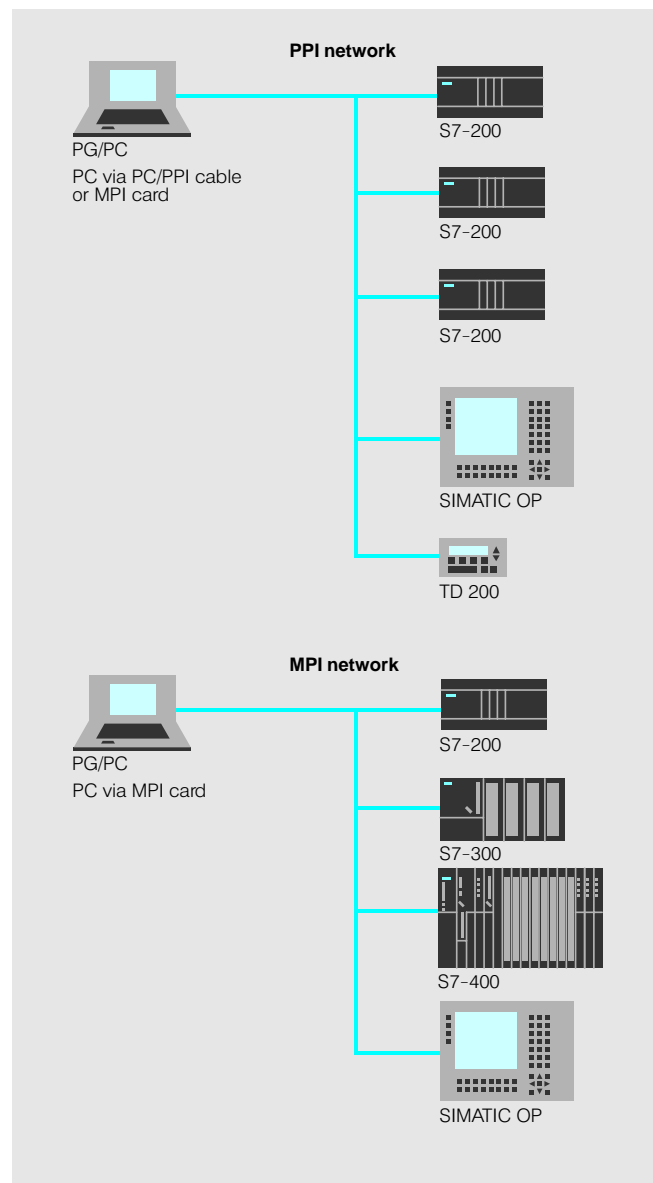


Fig. 1 Communications in the PPI and MPI networks

# SIMATIC S7-200

## General

### Communication (cont.)

#### Point-to-point interface, user-programmable interface mode

Data exchange takes place using a user-specific, bit-oriented communications protocol (e.g. ASCII protocol or Modbus).

Connection to the RS 232 interface via PC/PPI cable. Maximum data transmission rate 38.4 kbit/s (adjustable). Point-to-point connections are possible to the following units:

- Any data terminal equipment which has a serial interface, e.g. printers, bar-code readers
- S7-200 micro PLC; e.g. for simple data exchange between two CPUs

#### AS-Interface (CPU 212, 214, 215, 216)

The SIMATIC S7-200 is connected to the AS-Interface as a master via the CP 242-2 or CP 242-8. This appreciably increases the number of inputs and outputs:

- Up to 31 AS-Interface slaves with up to 248 binary elements

#### PROFIBUS-DP slave (CPU 215)

PROFIBUS-DP guarantees integrated and uniform communication between all SIMATIC system components while at the same time maintaining openness to the external world. On the CPU 215, PROFIBUS-DP's high data transfer rate (up to 12 Mbit/s) over the integral interface allows the S7-200's real-time characteristics to be used to the full within a distributed system structure. Response times in the millisecond range enable the following, for example:

- Motor synchronization
- Interrupt-oriented applications
- Coordination of high-speed counting processes

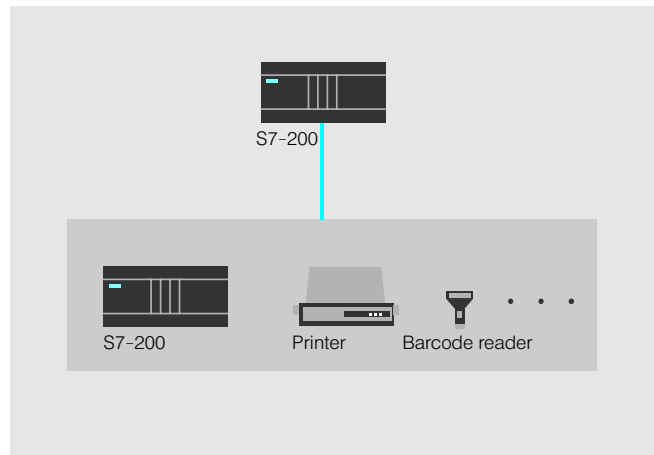


Fig. 2 Communication in user-programmable interface mode

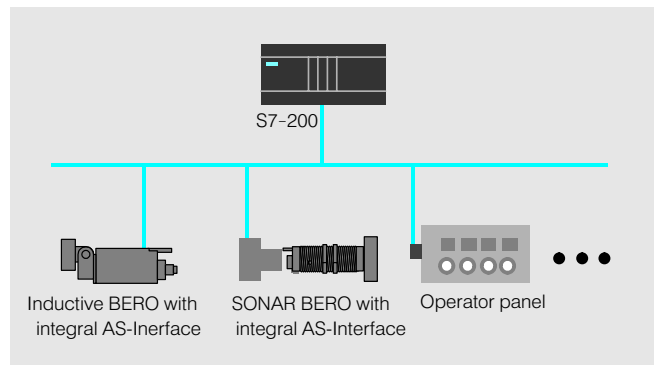


Fig. 3 Communication via AS-Interface

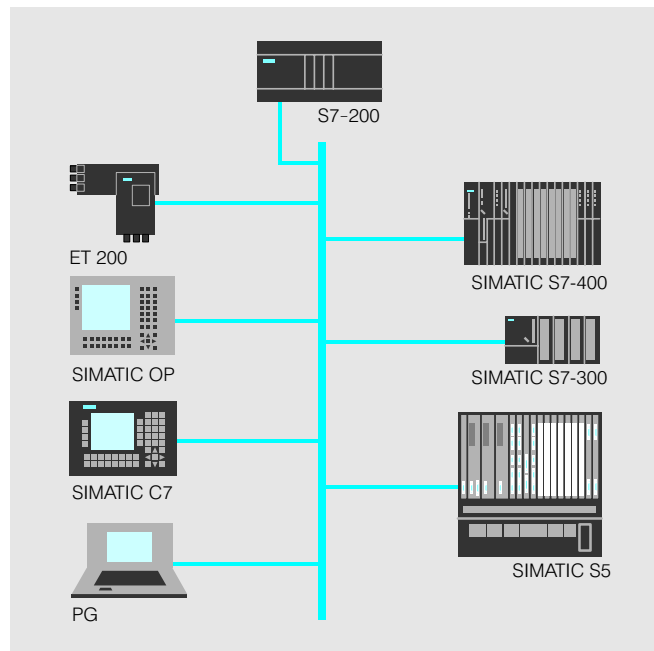


Fig. 4 Communication via PROFIBUS-DP

# SIMATIC S7-200 CPUs

## Overview

- 7 different basic units
- Graded performance for a variety of applications

## Application

- CPU 221; The complete micro-PLC at a mini-price, also for demanding tasks with many integrated functions
- CPU 212 and CPU 222; The low-cost entry into the product family; a wide range of connectable expansion modules not only opens up the world of analog value processing, but also makes these CPUs real all-rounders
- CPU 214 and CPU 224; The CPU with more inputs and outputs and a larger memory
- CPU 215; With optimum communications capabilities with other devices of the family through the PPI and PROFIBUS interfaces and maximum real-time performance; for safe control of fastest processes, in particular, in the PROFIBUS-DP network (data transmission rate: 12 Mbit/s), as well as for simple preprocessing
- CPU 216; With two PPI interfaces and 40 inputs/outputs; for reliable control also of larger machine and plant sections. Moreover, the second PPI interface can be used, for example, for simultaneous connection of modems, printers or barcode readers

## Design

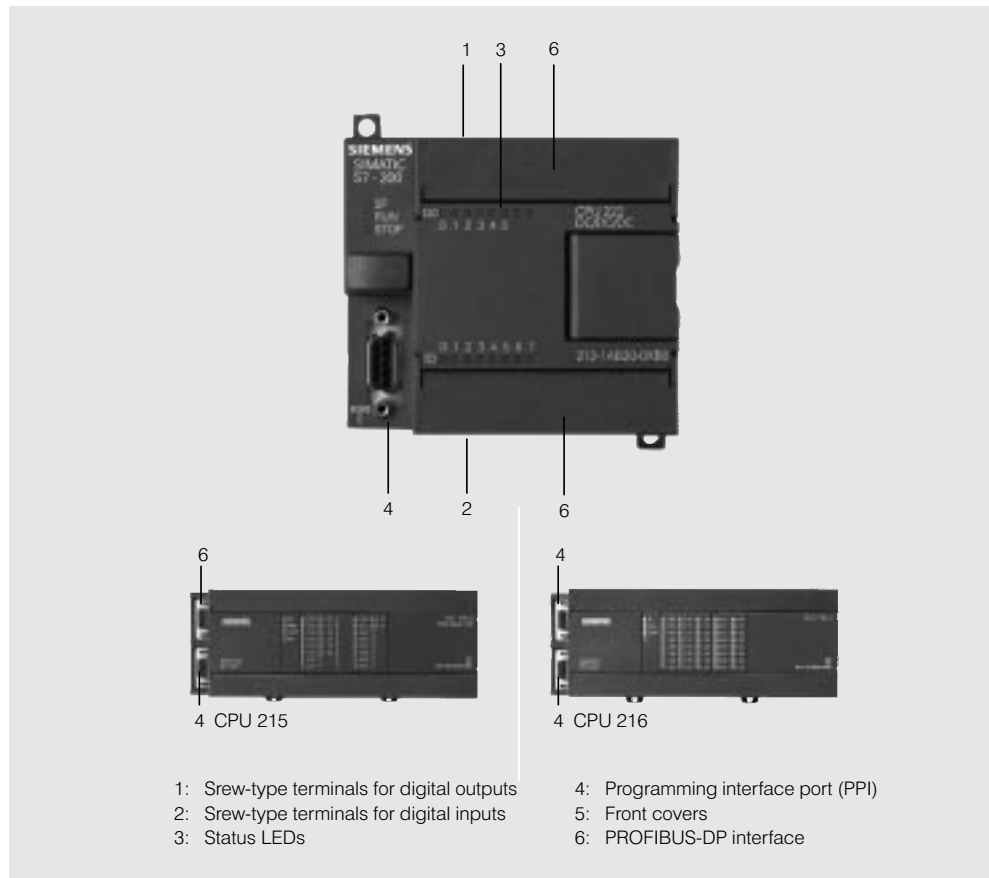


Fig. 5 Configuration of the SIMATIC S7-200 (CPU 222, CPU 215, CPU 216)

### Mechanical features

- Horizontal or vertical assembly on standard rail or direct installation in cubicle with integrated holes (not horizontal)
- Terminal block as permanent wiring assembly (with CPU 224; with all other CPUs optional)

# SIMATIC S7-200

## CPUs

### Design (cont.)

All CPUs have the following:

- Integrated 24 V transmitter/load power supply; for the direct connection of sensors and transmitters. With 180 mA (CPU 212, 221, 222), 280 mA (CPU 214, 224) or 400 mA (CPU 215, 216) it can also be used as a load power supply (see page 49 for further power supply modules)
- Different device variants;
  - CPU 221: 2 device variants
  - CPU 212: 7 device variants
  - CPU 222: 2 device variants
  - CPU 214: 6 device variants
  - CPU 224: 2 device variants
  - CPU 215/216: 2 device variants; with different supply and control voltages
- On-board digital inputs/outputs;
  - CPU 221: 6 inputs and 4 outputs
  - CPU 212/222: 8 inputs and 6 outputs
  - CPU 214/215/224: 14 inputs and 10 outputs
  - CPU 216: 24 inputs and 16 outputs
- Interrupt input; allows the PLC to react with extremely high speed to the rising edges of process signals
- High-speed counters;
  - CPU 212: 1 high-speed counter (2 kHz), which can be used as an up or down counter

#### CPU 221/222:

4 high-speed counters (30 KHz), with parameterizable enable and reset input, simultaneously as forward and reverse counters with 2 independent inputs and useable for the connection of incremental encoders with 2 pulse sequences with 90° offset

#### CPU 214/215/216:

1 high-speed counter (2 kHz), which can be used as an up or down counter; 2 high-speed counters (7 kHz each), with parameterizable enable and reset input, can be used as a simultaneous up and down counter with 2 separate inputs for connecting incremental encoders with 2 90° offset pulse trains

#### CPU 224:

6 high-speed counters (30 KHz), with parameterizable enable and reset input, simultaneously as forward and reverse counters with 2 independent inputs and useable for the connection of incremental encoders with 2 pulse sequences with 90° offset

- CPU 212/222/214/224/215/216:

Trouble-free expandability through digital and analog expansion modules (EM's, optional, see page 31)

- CPU 212/222/214/222/215/216:

Simulator (optional); for the simulation of integrated inputs and the testing of user programs

- Analog-Potentiometer; CPU 212/221/222:

1 analog potentiometer

#### CPU 214/224/215/216:

2 analog potentiometers; can be used as a user-friendly setpoint adjuster in everyday operation, eg. for setting timings

- CPU 221/222/214/224/215/216: Pulse outputs; 2 high-frequency pulse outputs (max. 20 kHz); For use in positioning tasks and the control of frequency-regulated motors and stepper motors via power circuits

- CPU 221/222/214/224/215/216:

Real-time clock; e.g. for adding time stamps to messages, for registering machine running times or for the time-control of processes for CPU 221/222 as a pluggable module (optional)

- CPU 221/222/214/224/215/216:

EEPROM-submodule (optional); allows rapid program change (even without a programming unit) and additional program archiving

- CPU 221/222/224/214/215/216:

Battery module for long-duration battery backup; To increase holding time to typically 200 days (10 years "shelf life"). Without the battery module, user data (e.g. flag statuses, data blocks, times, counters) are saved by an internal high-performance capacitor for around 5 days. The battery module is inserted into the memory submodule port

## Design (cont.)

### Device variants

	Variants	Supply voltage	Input voltage	Output voltage	output current
<b>CPU 221</b>	DC outputs, DC inputs	24 V DC	24 V DC	24 V DC	0.75 A, transistor
	Relay outputs, DC inputs	85 to 264 V AC	24 V DC	24 V DC 24 to 230 V AC	2 A, relay
<b>CPU 212, CPU 214</b>	DC outputs	24 V DC	24 V DC	24 V DC	0.5 A, transistor
	Relay outputs, sink output	120 to 230 V AC	24 V DC, sink output	24 V DC 24 to 230 V AC	2 A, relay
	Relay outputs, source output	120 to 230 V AC	24 V DC, source output	24 V DC 24 to 230 V AC	2 A, relay
	AC outputs, 24 V AC inputs	120 to 230 V AC	24 V AC	120 to 230 V AC	1 A, triacs
	AC outputs, 120 V AC inputs	120 to 230 V AC	120 V AC	120 to 230 V AC	1 A, triacs
	Relay outputs 120 V AC inputs	120 to 230 V AC	120 V AC	24 V DC 24 to 230 V AC	2 A, relay
	Relay outputs, sink output 24 V AC supply	24 V AC	24 V DC, sink output	24 V DC 24 to 230 V AC	2 A, relay
<b>CPU 222 CPU 224</b>	DC outputs	24 V DC	24 V DC	24 V DC	0.75 A transistor
	Relay outputs	85 to 264 V AC	24 V DC	24 V DC 24 to 230 V AC	2 A, relay
<b>CPU 215 CPU 216</b>	DC outputs	24 V DC	24 V DC	24 V DC	0.5 A, additionally 1 A transistor
	Relay outputs	120 to 230 V AC	24 V DC	24 V DC 24 to 230 V AC	2 A, relay

## Functions

- Extensive command set; A multiplicity of [basic operations](#) such as binary logic operations, result allocation, save, count, create times, load, transfer compare, shift, rotate, create complement, call sub-program, integrated communication commands (eg. NETR, NETW<sup>1)</sup>, RECEIVE-Freeport) and [enhanced functions](#) such as pulse-duration modulation, pulse sequence function, arithmetic functions, floating point arithmetic, PID closed-loop control, jump functions, iteration functions and code conversions simplify the programming task
  - Counting; user-friendly counting functions in conjunction with the integrated counters open up new application areas for the user
  - Alarm processing; [slope-controlled alarms](#) (triggered by increasing or falling process signal slopes at alarm inputs) allow extremely rapid reactions to process events
  - [Time-controlled alarms](#) can be set in at 1 ms increments from 5 ms to 255 ms.
- [Counter alarms](#) can be triggered when a specified value is reached or if the counter direction changes.
- [Communication alarms](#) allow the rapid and easy exchange of information with peripheral devices such as printers or barcode readers
- Direct interrogation and control of inputs/outputs; Inputs and outputs can also be interrogated and set independently of the cycle. Thus the controller can react quickly to process events (e.g. direct reset of outputs in the case of an alarm event)

1) Not with CPU 212

# SIMATIC S7-200

## CPUs

<p><b>Functions</b> (cont.)</p>	<ul style="list-style-type: none"> <li>• Password protection; The three-level password protection concept allows efficient protection of know-how. The protection concept has the following options for access to the user program:               <p><b>Full access:</b> The program can be altered as desired.</p> <p><b>Read only:</b> The program is protected against unauthorized alteration. Testing, adjustment of system parameters and copying of the program is allowed.</p> </li> </ul>	<p><b>Complete protection:</b> The program is protected against alteration and unauthorized readout and copying. Adjustment of parameters is allowed</p> <ul style="list-style-type: none"> <li>• Test and diagnostic functions; User-friendly functions support testing and diagnostics: the complete program is run over a predetermined number of cycles and analyzed. Internal parameters such as flags, times or counters are logged at the same time</li> </ul>	<ul style="list-style-type: none"> <li>• "Forcing" of inputs and outputs during test and diagnostic operation; Inputs and outputs can be set independently of cycle and thus permanently, for example to test the user program</li> </ul>
<p><b>Programming</b> CPU 212/214/216</p>	<p>For programming the CPU 212/214/216, the STEP 7-Micro/DOS V1.3, STEP 7-Micro/WIN16 V2.6, or STEP 7 Micro/WIN32 V3.0 programming software is available. You can use these programming software packages to program all CPU functions.</p>	<p>The PC/PPI cable is necessary, if you want to use the PG/PC serial interface for programming.</p>	<p>You can also use the SIMATIC CP 5511 or CP 5611 for programming when you use the STEP 7 Micro/WIN32 V3.0 programming software. Communication speeds of up to 19.2 kbit/s are then possible.</p>
<p>CPU 221/222/224</p>	<p>The programming software STEP 7-Micro/WIN32 V3.0 is available exclusively for the comprehensive programming of all of the CPU 221/222/224's functions. The STEP 7-Micro/WIN16 V2.6 software package can also be used, but it only supports the programming of those functions which are also present in the S7-21x series.</p>	<p>The CPU 221/222/224 cannot be programmed with STEP 7-Micro/DOS . If programming is to take place via the serial interface of the PU/PC, the PC/PPI cable is also required.</p>	<p>If the STEP 7-Micro/WIN32 V3.0 programming software is used, programming can also be carried out via the SIMATIC CPs CP 511 or CP 5611. In this case communication speeds of up to 187 kbit/s are possible.</p>
<p>CPU 215</p>	<p><b>Using the PPI interface for programming</b> To use the PPI interface to program the CPU 215, the STEP 7 Micro/Dos V1.3, STEP 7 Micro/WIN16 V2.1, or the STEP 7 Micro/WIN32 V3.0 programming software is available. This software can be used to program all CPU functions.</p>	<p>You need the PC/PPI cable if you use the programmer/PC serial interface for programming. You can use the CP5511 or CP5611 SIMATIC CP for programming when you use the STEP 7 Micro/WIN32 V3.0 programming software. Data transmission rates up to 19.2 kbit/s are then possible.</p>	<p><b>Using the PROFIBUS DP for programming:</b> You can use the PROFIBUS DP to program the CPU 215 when you use the STEP 7 Micro/WIN32 V3.0 programming software and the CP 5511 or CP 5611 SIMATIC CP. Data transmission speeds up to 12 Mbit/s are possible.</p>



## Technical specifications CPU 221

Program memory	4 kbytes / typically 1.3 K instructions	Integrated high-speed functions (cont.)	
Data memory	1024 words	• Counters	4 high-speed counters (each 30 kHz), 32 bit (inc. sign), useable as forwards/reverse counters or for interfacing 2 incremental transmitters with 2 pulse sequences offset by 90°; Parameterizable enable and reset input; Interrupt options (inc. calling a sub-program with any content) on reaching a specified value; Reversal of counting direction etc.
Memory submodule (optional)	1 pluggable memory submodule; content identical to the integrated EEPROM		
Program backup	Entire program maintenance-free in the integrated EEPROM	• Pulse outputs	2 high-speed outputs, 20 kHz with interrupt option; pulse width and frequency modulation possible
Data backup	<ul style="list-style-type: none"> <li>Entire DB 1 loaded from PU/PC maintenance-free in integrated EEPROM</li> <li>Current DB 1 values in RAM, remanent flags, times, counters etc. maintenance-free through high power capacitor; optional battery for long duration backup</li> </ul>	Interfaces	1 RS 485 communication interface, optionally: <ul style="list-style-type: none"> <li>as PPI interface with PPI protocol for CPU functions, HMI functions (TD 200, OP), S7-200 internal CPU/CPU communication; Transmission rates 9.6/19.2/187.5 kbit/s</li> <li>or as MPI slave for data exchange with MPI masters (S7-300/S7-400 CPUs, OPs, TDs, push-button panels); S7-200 internal CPU/CPU communication is not possible on the MPI network; Baud rates 19.2/187.5 kbit/s</li> <li>or as freely programmable interface with interrupt option for serial data exchange with external devices, e.g. using ASCII protocol; Baud rates 0.3/0.6/1.2/2.4/4.8/9.6/19.2/38.4 kbit/s at 1.2 to 38.4 kbit/s the PC/PPI cable can be used as an RS232/RS458 converter</li> </ul>
Backup time (typical)	50 h (min. 8 h at 40 °C); 200 days (typ.) with optional battery module	Connectable programming units/PC	PG 720P, PG 740 PII, PG 760 PII, PC(AT)
Charge time for high power capacitor	typ. 20 min. (to 60% capacity)	Integrated inputs/outputs	No
Programming language	Ladder diagram, SFC and STL	• Pluggable I/O terminals	6; of which 4 channels can be used as process alarms and 6 for high-speed functions
Program organization	1 Organizational block (which can contain sub-programs)	• Digital inputs	4, of which 2 channels can be used for integrated functions
Program execution	<ul style="list-style-type: none"> <li>free cycle (OB 1)</li> <li>alarm controlled</li> <li>time controlled (1 to 255 ms)</li> </ul>	• Digital outputs	1 Analog potentiometer, 8 bit resolution
Sub-program levels	8	• Analog potentiometer	
User program protection	3-level password protection	Connectable I/O	
Operation set		• digital inputs/outputs	max. 6 inputs and 4 outputs (integ. input/outputs)
• Basic operations	Binary logic operations, result allocations, save, count, load, transfer, compare, shift, rotate, created complement, call sub-programs with parameter passing	• analog inputs/outputs	—
• Enhanced functions	Pulse duration modulation, pulse sequence commands, jump commands, iteration commands, code conversions, mathematical functions (addition, subtraction, multiplication, division, square-root), fixed and floating point arithmetic	• AS interface	—
Processing times for bit operations	0.37 µs	inputs/outputs	max. —
Cycle time monitoring	300 ms (retriggerable)	Expansion	max. —
Flags	256	Degree of protection	IP 20 according to IEC 529
• of which remanent	0 to 112 in EEPROM, adjustable; 0 to 256, via high power capacitor or battery, adjustabl	Ambient temperature	
Counters	256	• with horizontal installation	0 to 55 °C
• of which remanent	256, via high power capacitor or battery, adjustable	• with vertical installation	0 to 45 °C
• Counting range	0 to 32 767	Relative humidity	5 to 95% (RH stress level 2 according to IEC 1131-2)
Timings	256	Air pressure	860 to 1080 hPa
• of which remanent	256, via high power capacitor or battery, adjustable	Other environmental conditions	see "S7-200 automation system, system manual"
• Timing range	4 timings, 1 ms to 30 s 16 timings, 10 ms to 5 min 236 timings, 100 ms to 54 min		
Integrated high-speed functions			
• Alarm inputs	4 (with positive and/or negative input slope, programmable alarm reaction)		

# SIMATIC S7-200 CPUs

## Technical specifications CPU 221 (cont.)

Supply:	24 V DC	100 to 230 V AC	Supply:	24 V DC	100 to 230 V AC
Inputs:	24 V DC	24 V DC	Inputs:	24 V DC	24 V DC
Outputs:	24 V DC	Relay	Outputs:	24 V DC	Relay
Supply voltage L+/L1			<b>Integrated outputs</b>	<b>4 (transistor)</b>	<b>4 (relay)</b>
• nominal value	24 V DC	100 to 230 V AC	Nominal load voltage L+/L1	24 V DC	24 V DC/ 24 to 230 V AC
• permissible range	20.4 to 28.8 V	85 to 264 V AC (47 to 63 Hz)	• permissible range	20.4 to 28.8 V DC	5 to 30 V DC/ 5 to 250 V AC
Input current			Output voltage		
• Starting current inrush typ.	10 A at 28.8 V	20 A at 264 V	• with signal "1" min.	18.6 V DC	L+/L1
• Current consumption max.	70 to 600 mA	25 to 180 mA	Isolation	Optocoupler	Relay
Output voltage for sensors and transmitters			• in groups of	4	1 and 3
• nominal value	L+ (24 V DC)	24 V DC	Output current, max.		
• permissible range	15.4 to 28.8 V	20.4 V to 28.8 V	• with signal "1"		
Output current for sensors (24 V DC)			nominal value at 40 °C	0.75 A	2 A
• nominal value	180 mA	180 mA	nominal value at 55 °C	0.75 A	2 A
• short-circuit protection	electronic at 600 mA, non-latching	electronic at 600 mA, non-latching	Minimum current	—	—
Output current for expansion modules (5 V DC)	—	—	• with signal "0"	10 µA	0 mA
<b>Integrated inputs</b>	<b>6</b>	<b>6</b>	Sum of all output currents (horizontal installation)		
• type	optionally p- and m-reading per group	optionally p- and m-reading per group	• at 40 °C max.	3.0 A	6.0 A
Input voltage			• at 55 °C max.	3.0 A	6.0 A
• nominal value	24 V DC	24 V DC	Pickup delay		
• with signal "1"	(15 to 35 V)	(15 to 35 V)	• standard outputs max.	(Q0.2 to Q0.3) 15 µs	(all outputs) 10 ms
• with signal "0"	0 to 5 V	0 to 5 V	• pulse outputs max.	(Q0.0 to Q0.1) 2 µs	—
Isolation	Optocoupler	Optocoupler	Tripping delay		
• in groups of	2 and 4	2 and 4	• standard outputs max.	(Q0.2 to Q0.3) 100 µs	(all outputs) 10 ms
Input current			• pulse outputs max.	(Q0.0 to Q0.1) 10 µs	—
• with signal "1" max.	4 mA	4 mA	Operating frequency of pulse outputs	Q0.0 to Q0.1	Q0.0 to Q0.1
Input delay (at nominal input voltage)			• with ohmic load	20 kHz	—
• for standard inputs	all 0.2 to 12.8 ms (adjustable)	all 0.2 to 12.8 ms (adjustable)	Switching capacity of outputs		
• for alarm inputs	(10.0 to 10.3) 0.2 to 12.8 ms (adjustable)	(10.0 to 10.3) 0.2 to 12.8 ms (adjustable)	• with ohmic load	0.75 A	2 A
• for high-speed counter max.	(10.0 to 10.5) 30 kHz	(10.0 to 10.5) 30 kHz	• with lamp load	5 W	30/200 W (DC/AC)
Connection of 2-wire BERO			Lifespan of contacts (number of operating cycles acc. to VDE 0660, part 200)		
• permissible closed-circuit current max.	1 mA	1 mA	• mechanical	—	10.000.000
Cable lengths			• at nominal load voltage	—	100.000
• Unscreened (not for high-speed signals)	300 m	300 m	Limiting of voltage induced on circuit interruption max.	1 W	—
• screened	500 m	500 m	Short-circuit protection	to be provided externally	to be provided externally
standard input (alarm inputs, high-speed counters)			Cable lengths		
			• unscreened	150 m	150 m
			• screened	500 m	500 m
			Isolation		
			• betw. 24 V DC and 24 V DC	500 V DC	500 V DC
			• betw. 24 V DC and 230 V AC	—	1500 V AC
			Dimensions (W x H x D) in mm	90 x 80 x 62	90 x 80 x 62
			Weight approx.	270 g	310 g

## Technical specifications CPU 212

Program memory	1 kbyte /typ. 185 statements on built-in EEPROM (non-volatile)	Integrated high-speed functions (cont.)	
Data memory	512 words	• Counters	1 up or down counter; counting rate up to 2 kHz; 32 bits (incl. sign); interrupt capability (incl. calling of a subroutine with random contents) on reaching a setpoint
Memory submodule (optional)	—	• Pulse outputs	—
Data backup	Maintenance-free • 200 bytes (DB 1), stored on built-in EEPROM • data, retentive bit memories, etc. backed up by heavy-duty capacitor	Interfaces	RS 485 communication interface; either: • PPI mode for programming and connecting programming devices, PCs (via PC/PPI cable), TD 200, or operator panels (9.6 and 19.2 kbit/s) • User-programmable interface mode with interrupt capability for serial data exchange with devices from other vendors (0.3 to 19.2 kbit/s) (CPU 212, e.g. with ASCII protocol; PC/PPI cable can be used as a RS 232/RS 485 converter (from 0.6 kbit/s)
Backup time	typ. 50 h (min. 8 h at 40 °C)	Connectable programming units/PC	Backplane bus: • Connection of expansion modules (EM) <sup>1)</sup> PG 720, PG 740, PG 760, PC(AT)
Charging time for heavy-duty capacitor	typ. 20 min (to 60% capacity)	Integrated inputs/outputs	—
Programming language	STL and LAD	• Pluggable I/O terminals	8; incl. 1 channel for use as a process interrupt or for high-speed functions
Program organization	One organization block (subroutines contained in it are supported)	• Digital inputs	6
Program scanning	• free-cycle (OB 1) • interrupt-controlled • time-controlled (85 to 255 ms)	• Digital outputs	1 analog potentiometer; resolution 1/200
Subroutine levels	8	• Analog potentiometer	
User program protection	3-level password protection	Connectable I/O	Max. 40 inputs and 38 outputs (incl. on-board inputs/outputs)
Instruction set		• digital inputs/outputs	6 inputs and/or 4 outputs; max. 8 altogether
• Basic operations	Binary logic operations, result assignments, save, count, load, transfer, compare, shift, rotate, form complement, call subroutines	• analog inputs/outputs	
• User-friendly functions	Pulse length modulation, pulse train instructions, jump instructions, loop instructions, code conversions, arithmetic functions, (addition, subtraction, multiplication, division, square root)	• AS-interface inputs/outputs	max. 248
Execution times for bit operations	1.2 µs	Expansion	max. 2 expansion modules <sup>1)</sup> (digital and analog)
Scan time monitoring	300 ms (retriggerable)	Degree of protection	IP 20 to IEC 529
Flags	128	Ambient temperature	
• of which remanent	0 to 127, selectable	• with horizontal installation	0 to 55 °C
Counters	64	• with vertical installation	0 to 45 °C
• of which remanent	0 to 63, selectable	Relative humidity	5 to 95% (RH severity level 2 to IEC 1131-2)
• Counting range	0 to 32 767	Air pressure	860 to 1080 hPa
Timers	64	Other environmental conditions	See "S7-200 Programmable Controller, System Manual"
• of which remanent	32, selectable		
• Timing range	2 timers, 1 ms to 30 s 8 timers, 10 ms to 5 min 54 timers, 100 ms to 54 min		
Integrated high-speed functions			
• Alarm inputs	1 (on positive and/or negative input signal edge, programmable interrupt response)		

1) Only expansion modules from the S7-21x series.

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

# SIMATIC S7-200

## CPUs

### Technical specifications CPU 212 (cont.)

Supply:	24 V DC,	120-230 V AC,	120-230 V AC,	120-230V AC,	120-230V AC,	120-230V AC,	24 V AC,
Inputs:	24 V DC,	24 V DC (sink I),	24 V DC (srce I),	24 V AC,	120 V AC,	120 V AC,	24 V DC (sink I),
Outputs:	24 V DC	relay	relay	120-230 V AC	120-230 V AC	relay	relay
Supply voltage L+/L1							
• nominal value	24 V DC	120 to 230 V AC	120 to 230 V AC	120 to 230 V AC			
• permissible range	20.4 to 28.8 V	85 to 264 V AC (47 to 63 Hz)	85 to 264 V AC (47 to 63 Hz)	85 to 264 V AC (47 to 63 Hz)			
Input current	typ. 60 mA	4 VA	4 VA	4 VA	4 VA	4 VA	4 VA
Starting current inrush	typ. 10 A	20 A	20 A	20 A	20 A	20 A	20 A
Current consumption	typ. 5 W	6 W	6 W	7 W	7 W	7 W	7 W
Output voltage for sensors and transmitters							
• nominal value	L+ (24 V DC)	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC
• permissible range	L+ - max 4 V	20.4 V to 28.8 V	20.4 V to 28.8 V	20.4 V to 28.8 V	20.4 V to 28.8 V	20.4 V to 28.8 V	20.4 V to 28.8 V
Output current for sensors (24 V DC)							
• nominal value	180 mA						
• short-circuit protection	elektronik, non-latching						
Output current for expansion modules <sup>1)</sup> (5 V DC)	340 mA	340 mA	340 mA	280 mA	280 mA	340 mA	340 mA
<b>Integrated inputs</b>	<b>8</b>						
Input voltage							
• nominal value	24 V DC	24 V DC	24 V DC	24 V AC	120 V AC	24 V AC	24 V AC
• with signal "1"	15 to 35 V	15 to 35 V	-15 to -30 V	15 to 30 V	79 to 135 V	15 to 30 V	15 to 30 V
• with signal "0"	0 to 5 V	0 to 5 V	0 to -5 V	0 to 5 V	0 to 5 V	0 to 5 V	0 to 5 V
Isolation	Optocoupler	Optocoupler	Optocoupler	Optocoupler	Optocoupler	Optocoupler	Optocoupler
• in groups of	4	4	4	8	8	8	8
Input current							
• with signal "1"	7 mA	7 mA	7 mA	7 mA	7 mA	7 mA	7 mA
Input delay (at nominal input voltage)							
• for standard inputs	(10.0 to 10.7)	(10.0 to 10.7)		(10.0 to 10.7)			(10.0 to 10.7)
max.	0.3 ms	0.3 ms	0.3 ms	15 ms	15 ms	15 ms	0.3 ms
• for alarm inputs	(10.0)	(10.0)		(10.0)			(10.0)
max.	30/70 µs	30/70 µs		15 ms			30/70 µs
• for high-speed counter 0	(10.0)	(10.0)		(10.0)			(10.0)
typ./max.	30/70 µs	30/70 µs		15 ms			30/70 µs
• for high-speed counters 1, 2	—	—		—			—
Connection of 2-wire BERO							
• permissible closed-circuit current	max. 1 mA	1 mA	1 mA	—	—	—	—
Cable lengths							
• Unscreened (not for high-speed signals)	300 m	300 m	300 m	300 m	300 m	300 m	300 m
• screened							
standard input	500 m	500 m	500 m	500 m	500 m	500 m	500 m
(alarm inputs, high-speed counters)	50 m	50 m	50 m	50 m	50 m	50 m	50 m
<b>Integrated outputs</b>	<b>6 (transistor)</b>	<b>6 (relay)</b>	<b>6 (relay)</b>	<b>6 (triacs)</b>	<b>6 (triacs)</b>	<b>6 (relay)</b>	<b>6 (relay)</b>
Nominal load voltage L+/L1	24 V DC	24 V DC/ 24 to 230 V AC	24 V DC/ 24 to 230 V AC	24 to 230 V AC	24 to 230 V AC	24 V DC/ 24 to 230 V AC	24 V DC/ 24 to 230 V AC
• permissible range	20.4 to 28.8 V DC	5 to 30 V DC/ 20 to 250 V AC		20 to 264 V AC	20 to 264 V AC	5 to 30 V DC/ 20 to 250 V AC	5 to 30 V DC/ 20 to 250 V AC

1) Because of the limited output current, the use of expansion modules can be subject to restrictions. For further information see Catalog ST70, Part Configuring

## Technical specifications CPU 212 (cont.)

Supply:	24 V DC,	120-230 V AC,	120-230 V AC,	120-230V AC,	120-230V AC,	120-230V AC,	24 V AC,
Inputs:	24 V DC,	24 V DC (sink I),	24 V DC (srce I),	24 V AC,	120 V AC,	120 V AC,	24 V DC (sink I),
Outputs:	24 V DC	relay	relay	120-230 V AC	120-230 V AC	relay	relay
Integrated outputs (cont.)	6 (transistor)	6 (relay)	6 (relay)	6 (triacs)	6 (triacs)	6 (relay)	6 (relay)
Output voltage							
• with signal "1"	min. L+ - 1.8 V	L+/L1	L+/L1	L1 - 1.5 V	L1 - 1.5 V	L+/L1	L+/L1
Isolation	Optocoupler	Relay	Relay	Optocoupler	Optocoupler	Relay	Relay
• in groups of	6	3	3	3	3	3	3
Output current, max.							
• with signal "1"							
nominal value at 40 °C	0.75 A	2 A	2 A	1.2 A	1.2 A	2 A	2 A
nominal value at 55 °C	0.5 A	2 A	2 A	1.0 A	1.0 A	2 A	2 A
Minimum current	—	—	—	10 mA	10 mA	—	—
• with signal "0"	0.1 mA	0 mA	0.1 mA	2.0 mA (at 240 V)	2.0 mA (at 240 V)	0 mA	0 mA
Sum of all output currents							
• at 40 °C	max.						
• at 55 °C	max.	2.25 A	12 A	12 A	3.5 A	3.5 A	12 A
(horizontal installation)		1.75 A	12 A	12 A	2.5 A	2.5 A	12 A
Sum of the current from two adjacent outputs							
• at 40 °C	max.	1.0 A	4.0 A	4.0 A	1.5 A	1.5 A	4.0 A
• at 55 °C	max.	0.75 A	4.0 A	4.0 A	1.25 A	1.25 A	4.0 A
(horizontal installation)							
Switching capacity of outputs <sup>1)</sup>							
• for resistive load	0.75 A	2 A	2 A	1.2 A	1.2 A	2 A	2 A
• for inductive load	0.75 A	2 A	2 A	1.2 A <sup>2)</sup>	1.2 A <sup>2)</sup>	2 A	2 A
• for lamp load	5 W	30/200 W (DC/AC)	30/200 W (DC/AC)	125 W	125 W	30/200 W (DC/AC)	30/200 W (DC/AC)
Lifespan of contacts (number of operating cycles acc. to VDE 0660, part 200)							
• mechanical	—	10.000.000	10.000.000	—	—	10.000.000	10.000.000
• at nominal load voltage	—	100.000	100.000	—	—	100.000	100.000
Limiting of voltage induced on circuit interruption	min. -30 V	to be provided externally <sup>3)</sup>	to be provided externally <sup>3)</sup>	380 V	380 V	to be provided externally <sup>3)</sup>	to be provided externally <sup>3)</sup>
Short-circuit protection	to be provided externally	to be provided externally	to be provided externally	to be provided externally	to be provided externally	to be provided externally	to be provided externally
Cable lengths							
• unscreened	150 m	150 m	150 m	150 m	150 m	150 m	150 m
• screened	500 m	500 m	500 m	500 m	500 m	500 m	500 m
Isolation							
• between 24 V DC and 24 V DC	500 V DC	500 V DC	500 V DC	500 V DC	500 V DC	500 V DC	500 V DC
• between 24 V DC and 230 V AC	1500 V AC	1500 V AC	1500 V AC	1500 V AC	1500 V AC	1500 V AC	1500 V AC
Dimensions (W x H x D) in mm	160 x 80 x 62	160 x 80 x 62	160 x 80 x 62	160 x 80 x 62	160 x 80 x 62	160 x 80 x 62	160 x 80 x 62
Weight	approx. 310 g	390 g	390 g	390 g	390 g	390 g	390 g

1) 1 output up to 40 °C

2) According to IEC 947-5-1

3) See "S7-200 Programmable Controller, System Manual"

# SIMATIC S7-200 CPUs

## Technical specifications CPU 222

Program memory	4 kbytes / typically 1.3 K instructions	Integrated high-speed functions (cont.)	
Data memory	1024 words	• Counters	4 high-speed counters (each 30 kHz), 32 bit (inc. sign), useable as forwards/reverse counters or for interfacing 2 incremental transmitters with 2 pulse sequences offset by 90°; Parameterizable enable and reset input; Interrupt options (inc. calling a sub-program with any content) on reaching a specified value; Reversal of counting direction etc.
Memory submodule (optional)	1 pluggable memory submodule; content identical to the integrated EEPROM	• Pulse outputs	2 high-speed outputs, 20 kHz with interrupt option; pulse width and frequency modulation possible
Program backup	Entire program maintenance-free in the integrated EEPROM	Interfaces	1 RS 485 communication interface, optionally: <ul style="list-style-type: none"> <li>• as PPI interface with PPI protocol for PU functions, HMI functions (TD 200, OP), S7-200 internal CPU/CPU communication Baud rates 9.6/19.2/187.5 kbit/s</li> <li>• or as MPI slave for data exchange with MPI masters (S7-300/S7-400 CPU's, OP's, TDs, push-button panels); S7-200 internal CPU/CPU communication is not possible on the MPI network Baud rates 19.2/187.5 kbit/s</li> <li>• or as freely programmable interface with interrupt option for serial data exchange with external devices, e.g. using ASCII protocol Baud rates 0.3/0.6/1.2/2.4/4.8/9.6/19.2/38.4 kbit/s at 1.2 to 38.4 kbit/s the PC/PPI cable can be used as an RS232/RS458 converter</li> </ul> Backplane bus: <ul style="list-style-type: none"> <li>• connection of expansion modules (EMs)<sup>1)</sup></li> </ul>
Data backup	<ul style="list-style-type: none"> <li>• Entire DB 1 maintenance-free in the integrated EEPROM</li> <li>• Current DB 1 values in RAM, remanent flags, times, counters etc. maintenance-free through high power capacitor; optional battery for long duration backup</li> </ul> 50 h (min. 8 h at 40 °C); 200 days (typ.) with optional battery module	Connectable programming units/PC	PG 720P, PG 740 PII, PG 760 PII, PC(AT)
Backup time (typical)		Integrated inputs/outputs	No
Charge time for high power capacitor	typ. 20 min (to 60% capacity)	• Pluggable I/O terminals	8; of which 4 channels can be used as process alarms and 6 for high-speed functions
Programming language	Ladder diagram, SFC and STL	• Digital inputs	6, of which 2 channels can be used for integrated functions
Program organization	1 organizational block (which can contain sub-programs)	• Digital outputs	1 Analog potentiometer; 8 bit resolution
Program execution	<ul style="list-style-type: none"> <li>• free cycle (OB 1)</li> <li>• alarm controlled</li> <li>• time controlled (1 to 255 ms)</li> </ul>	• Analog potentiometer	max. 24 inputs and 22 outputs (including integrated input/output); further expansion using 16DI/16DO expansion modules in preparation
Sub-program levels	8	Connectable I/O	6 inputs and/or 4 outputs; max. 8 in total currently no IM interface expansion modules available
User program protection	3-level password protection	• digital inputs/outputs	2 expansion modules <sup>1)</sup> .
Operation set		• analog inputs/outputs	max.
• Basic operations	Binary logic operations, result allocations, save, count, load, transfer, compare, shift, rotate, created complement, call sub-programs with parameter passing	• AS interface inputs/outputs	max.
• Enhanced functions	Pulse duration modulation, pulse sequence commands, jump commands, iteration commands, code conversions, mathematical functions (addition, subtraction, multiplication, division, square-root), fixed and floating point arithmetic	Expansion	max.
Processing times for bit operations	0.37 µs	Degree of protection	IP 20 according to IEC 529
Cycle time monitoring	300 ms (retriggerable)	Ambient temperature	
Flags	256	• with horizontal installation	0 to 55 °C
• of which remanent	0 to 112 in EEPROM, adjustable; 0 to 256, via high power capacitor or battery, adjustable	• with vertical installation	0 to 45 °C
Counters	256	Relative humidity	5 to 95% (RH stress level 2 according to IEC 1131-2)
• of which remanent	256, via high power capacitor or battery, adjustable	Air pressure	860 to 1080 hPa
• Counting range	0 to 32 767	Other environmental conditions	see "S7-200 automation system, system manual"
Timings	256		
• of which remanent	256, via high power capacitor or battery, adjustable		
• Timing range	4 timings, 1 ms to 30 s 16 timings, 10 ms to 5 min 236 timings, 100 ms to 54 min		
Integrated high-speed functions			
• Alarm inputs	4 (with positive and/or negative input slope, programmable alarm reaction)		

1) Only EMs from the S7-22x series may be used. Because of the limited output current, the use of expansion modules can be subject to restrictions.

## Technical specifications CPU 222 (cont.)

	24 V DC	100 to 230 V AC
Supply:	24 V DC	100 to 230 V AC
Inputs:	24 V DC	24 V DC
Outputs:	24 V DC	Relay
Supply voltage L+/L1		
• nominal value	24 V DC	100 to 230 V AC
• permissible range	20.4 to 28.8 V	85 to 64 V AC (47 to 63 Hz)
Input current	—	—
• Starting current inrush typ.	10 A at 28.8 V	20 A at 264 V
• Current consumption max.	70 to 600 mA	25 to 180 mA
Output voltage for sensors and transmitters		
• nominal value	L+ (24 V DC)	24 V DC
• permissible range	16.4 to 28.8 V	20.4 V to 28.8 V
Output current for sensors (24 V DC)		
• nominal value	180 mA	180 mA
• short-circuit protection	electronic at 600 mA, non-latching	electronic at 600 mA, non-latching
Output current for expansion modules (5 V DC)	340 mA	340 mA
<b>Integrated inputs</b>	<b>8</b>	<b>8</b>
• type	optionally p- and m-reading per group	optionally p- and m-reading per group
Input voltage		
• nominal value	24 V DC	24 V DC
• with signal "1"	(15 to 35 V)	(15 to 35 V)
• with signal "0"	0 to 5 V	0 to 5 V
Isolation	Optocoupler	Optocoupler
• in groups of	4	4
Input current		
• with signal "1" max.	4 mA	4 mA
Input delay (at nominal input voltage)		
• for standard inputs	all inputs 0.2 to 12.8 ms, (adjustable)	all inputs 0.2 to 12.8 ms, (adjustable)
• for alarm inputs	(10.0 to 10.3) 0.2 to 12.8 ms, (adjustable)	(10.0 to 10.3) 0.2 to 12.8 ms, (adjustable)
• for high-speed counter max.	(10.0 to 10.5) 30 kHz	(10.0 to 10.5) 30 kHz
Connection of 2-wire BERO		
• permissible closed-circuit current max.	1 mA	1 mA
Cable lengths		
• Unscreened (not for high-speed signals)	300 m	300 m
• screened standard input (alarm inputs, high-speed counters)	500 m	500 m

	24 V DC	100 to 230 V AC
Supply:	24 V DC	100 to 230 V AC
Inputs:	24 V DC	24 V DC
Outputs:	24 V DC	Relay
<b>Integrated outputs</b>	<b>6 (transistor)</b>	<b>6 (relay)</b>
Nominal load voltage L+/L1	24 V DC	24 V DC/ 24 to 230 V AC
• permissible range	20.4 to 28.8 V DC	5 to 30 V DC/ 5 to 250 V AC
Output voltage		
• with signal "1" min.	18.6 V DC	L+/L1
Isolation	Optocoupler	Relay
• in groups of	6	3
Output current, max.		
• with signal "1"		
nominal value at 40 °C	0.75 A	2 A
nominal value at 55 °C	0.75 A	2 A
Minimum current	—	—
• with signal "0"	10 µA	0 mA
Sum of all output currents (horizontal installation)		
• at 40 °C max.	4.5 A	6.0 A
• at 55 °C max.	4.5 A	6.0 A
Pickup delay		
• standard outputs max.	(Q0.2 to Q0.5) 15 µs	(all outputs) 10 ms
• pulse outputs max.	(Q0.0 to Q0.1) 2 µs	—
Tripping delay		
• standard outputs max.	(Q0.2 to Q0.5) 100 µs	(all outputs) 10 ms
• pulse outputs max.	(Q0.0 to Q0.1) 10 µs	—
Operating frequency of pulse outputs	Q0.0 to Q0.1	Q0.0 to Q0.1
• with ohmic load	20 kHz	—
Switching capacity of outputs		
• with ohmic load	0.75 A	2 A
• with lamp load	5 W	30/200 W (DC/AC)
Lifespan of contacts (number of operating cycles acc. to VDE 0660, part 200)		
• mechanical	—	10.000.000
• at nominal load voltage	—	100.000
Limiting of voltage induced on circuit interruption max.	1 W	—
Short-circuit protection	to be provided externally	to be provided externally
Cable lengths		
• unscreened	150 m	150 m
• screened	500 m	500 m
Isolation		
• betw. 24 V DC and 24 V DC	500 V DC	500 V DC
• betw. 24 V DC and 230 V AC	—	1500 V AC
Dimensions (W x H x D) in mm	90 x 80 x 62	90 x 80 x 62
Weight approx.	270 g	310 g

# SIMATIC S7-200 CPUs

## Technical specifications CPU 214

Program memory	4 kbyte /typ. 2 K statements on built-in EEPROM (non-volatile)	Integrated high-speed functions	
Data memory	2048 words	• Alarm inputs	4 (on positive and/or negative input signal edge, programmable interrupt response)
Memory submodule (optional)	1 plug-in memory submodule (EEPROM); contents identical with integral EEPROM	• Counters	1 up or down counter (see CPU 212) 2 high-speed counters (7 kHz each), 32 bits (incl. sign), which can be used as an up or down counter or for connecting incremental encoders with 2 90°-offset pulse trains; with parameterizable enable and reset inputs; interrupt capability (incl. calling a subroutine with random contents) on reaching a setpoint; reversal of direction of counting etc.
Data backup	Maintenance-free (without optional battery) <ul style="list-style-type: none"> <li>• 1024 bytes (DB1), stored on built-in EEPROM</li> <li>• data, retentive memory bits, etc. backed up by heavy-duty capacitor; optional battery for long-term backup</li> </ul>	• Pulse outputs	2 high-speed outputs with interrupt capability (up to 4 kHz); pulse length and frequency modulation
Backup time	typ. 190 h (min. 120 h at 40 °C) 200 days with optional battery module	Interfaces	One RS 485 communication interface; either: <ul style="list-style-type: none"> <li>• PPI mode for programming and connecting programming devices, PCs (via PC/PPI cable), TD 200, or operator panels (9.6 and 19.2 kbit/s)</li> <li>• MPI mode for programming and connecting programming devices, PCs, operator panels and S7-300s and S7-400s. Baud rate: 19.2 kbit/s</li> <li>• user-programmable interface mode with interrupt capability for serial data exchange with devices of other vendors (0.3 to 38.4 kbit/s), e.g. with ASCII protocol; PC/PPI cable can be used as an RS 232/RS 485 converter (from 0.6 kbit/s)</li> </ul>
Charging time for heavy-duty capacitor	typ. 7 h (to 60% capacity)	Connectable programming units/PC	PG 720P, PG 740, PG 760, PC(AT)
Programming language	STL and LAD	Integrated inputs/outputs	No
Program organization	One organization block (subroutines supported)	• Pluggable I/O terminals	14; incl. 4 channels as process interrupt and 8 channels for high-speed functions
Program scanning	<ul style="list-style-type: none"> <li>• free-cycle (OB 1)</li> <li>• interrupt-controlled</li> <li>• time-controlled (5 to 255 ms)</li> </ul>	• Digital inputs	10; incl. 2 channels for on-board functions
Subroutine levels	8	• Analog potentiometer	2 analog potentiometers; resolution 1/200
User program protection	3-level password protection	Connectable I/O	
Instruction set		• digital inputs/outputs	max. 62 inputs and 58 outputs (incl. on-board inputs/outputs)
• Basic operations	Binary logic operations, result assignments, save, count, load, transfer, compare, shift, rotate, form complement, call subroutines, integrated communications commands (for example, NETR, NETW, RECEIVE-Freepoint)	• analog inputs/outputs	12 inputs and/or 14 outputs; max. total of 22
• User-friendly functions	Pulse duration modulation, pulse train instructions, jump instructions, loop instructions, code conversions, arithmetic functions, (addition, subtraction, multiplication, division, square root), fixed-point arithmetic, floating-point arithmetic, PID control	• AS interface	
Execution times for bit operations	0.8 µs	inputs/outputs	max. 496
Scan time monitoring	300 ms (retriggerable)	Expansion	max. 7 expansion modules (digital and analog). <sup>1)</sup>
Flags	256	Degree of protection	IP 20 to IEC 529
• of which remanent	0 to 255, selectable	Ambient temperature	
Counters	128	• with horizontal installation	0 to 55 °C
• of which remanent	0 to 127, selectable	• with vertical installation	0 to 45 °C
• Counting range	0 to 32 767	Relative humidity	5 to 95% (RH severity level 2 to IEC 1131-2)
Timers	128	Air pressure	860 to 1080 hPa
• of which remanent	64 selectable	Other environmental conditions	See "S7-200 Programmable Controller, System Manual"
• Timing range	4 timers, 1 ms to 30 s 16 timers, 10 ms to 5 min 108 timers, 100 ms to 54 min		

1) Only EMs from the S7-22x series may be used. Because of the limited output current, the use of expansion modules can be subject to restrictions.



## Technical specifications CPU 214 (cont.)

Supply:	24 V DC	120 to 230 V AC	120 to 230 V AC	120 to 230 V AC	120 to 230 V AC	120 to 230 V AC
Inputs:	24 V DC	24 V DC (sink I)	24 V DC (srce I)	24 V AC	120 V AC	120 V AC
Outputs:	24 V DC	24 V DC (sink I) relay	24 V DC (srce I) relay	120 to 230 V AC	120 to 230 V AC	120 to 230 V AC relay
Supply voltage L+/L1						
• nominal value	24 V DC	120 to 230 V AC	120 to 230 V AC	120 to 230 V AC	120 to 230 V AC	120 to 230 V AC
• permissible range	20.4 to 28.8 V	85 to 264 V AC (47 to 63 Hz)	85 to 264 V AC (47 to 63 Hz)	85 to 264 V AC (47 to 63 Hz)	85 to 264 V AC (47 to 63 Hz)	85 to 264 V AC (47 to 63 Hz)
Input current	typ. 85 mA	4 VA	4 VA	4 VA	4 VA	4 VA
Starting current inrush	typ. 10 A	20 A	20 A	20 A	20 A	20 A
Current consumption	typ. 8 W	9 W	9 W	11 W	11 W	11 W
Output voltage for sensors and transmitters						
• nominal value	L+ (24 V DC)	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC
• permissible range	L+ - max 4 V	20.4 V to 28.8 V	20.4 V to 28.8 V	20.4 V to 28.8 V	20.4 V to 28.8 V	20.4 V to 28.8 V
Output current for sensors (24 V DC)						
• nominal value	280 mA	280 mA	280 mA	280 mA	280 mA	280 mA
• short-circuit protection	elektronic, non-latching	elektronic, non-latching	elektronic, non-latching	elektronic, non-latching	elektronic, non-latching	elektronic, non-latching
Output current for expansion modules	660 mA	660 mA	660 mA	560 mA	560 mA	560 mA
<b>Integrated Outputs</b>	<b>14</b>					
Input voltage						
• nominal value	24 V DC	24 V DC	24 V DC	24 V AC	120 V AC	120 V AC
• with signal "1"	15 to 35 V	15 to 35 V	-15 to -35 V	15 to 35 V	79 to 135 V	79 to 135 V
• with signal "0"	0 to 5 V	0 to 5 V	0 to -5 V	0 to 5 V	0 to 5 V	0 to 5 V
Isolation	Optocoupler	Optocoupler	Optocoupler	Optocoupler	Optocoupler	Optocoupler
• in groups of	8 and 6	8 and 6	8 and 6	14	14	14
Input current						
• with signal "1"	7 mA	7 mA	7 mA	7 mA	7 mA	7 mA
Input delay (at nominal input voltage)						
• for standard inputs	(I0.4 to I1.5) max. 0.2 ms	(I0.4 to I1.5) 0.2 ms	(I0.4 to I1.5) 0.2 ms	(I0.4 to I1.5) 15 ms	(I0.4 to I1.5) 15 ms	(I0.4 to I1.5) 15 ms
• for alarm inputs	(I0.0 to I0.3) max. 0.16/0.2 ms	(I0.0 to I0.3) 0.16/0.2 ms	(I0.0 to I0.3) 0.16/0.2 ms	(I0.0 to I0.3) 15 ms	(I0.0 to I0.3) 15 ms	(I0.0 to I0.3) 15 ms
• for high-speed counter 0	(I0.0) typ./max. 0.16/0.2 ms	(I0.0) 0.16/0.2 ms	(I0.0) 0.16/0.2 ms	(I0.0) 15 ms	(I0.0) 15 ms	(I0.0) 15 ms
• for high-speed counters 1, 2	(I0.4 to I1.5) 30/70 µs (if programmed)	(I0.4 to I1.5) 30/70 µs (if programmed)	(I0.4 to I1.5) 30/70 µs (if programmed)	(I0.4 to I1.5) 10/15 ms	(I0.4 to I1.5) 10/15 ms	(I0.4 to I1.5) 10/15 ms
Connection of 2-wire BERO						
• permissible closed-circuit current	max. 1 mA	1 mA	1 mA	—	—	—
Cable lengths						
• Unscreened (not for high- speed signals)	300 m	300 m	300 m	300 m	300 m	300 m
• screened standard input (alarm inputs, high-speed counters)	500 m 50 m	500 m 50 m	500 m 50 m	500 m 50 m	500 m 50 m	500 m 50 m

# SIMATIC S7-200

## CPUs

### Technical specifications CPU 214 (cont.)

Supply:	24 V DC	120 to 230 V AC	120 to 230 V AC	120 to 230 V AC	120 to 230 V AC	120 to 230 V AC
Inputs:	24 V DC	24 V DC (sink I)	24 V DC (srce I)	24 V AC	120 V AC	120 V AC
Outputs:	24 V DC	24 V DC relay	24 V DC relay	120 to 230 V AC	120 to 230 V AC	120 to 230 V AC relay
Integrated outputs	10 (transistor)	10 (relay)	10 (relay)	10 (triacs)	10 (triacs)	10 (relay)
Nominal load voltage L+/L1	24 V DC	24 V DC/ 24 to 230 V AC	24 V DC/ 24 to 230 V AC	24 to 230 V AC	24 to 230 V AC	24 V DC/ 24 to 230 V AC
• permissible range	20.4 to 28.8 V DC	5 to 30 V DC/ 20 to 250 V AC	5 to 30 V DC/ 20 to 250 V AC	20 to 264 V AC	20 to 264 V AC	5 to 30 V DC/ 20 to 250 V AC
Output voltage						
• with signal "1" min.	L+ - 1.8 V	L+/L1	L+/L1	L1 - 1.5 V	L1 - 1.5 V	L+/L1
Isolation	Optocoupler	Relay	Relay	Optocoupler	Optocoupler	Relay
• in groups of	5	4 and 3	4 and 3	3 and 2	3 and 2	4 and 3
Output current, max.						
• with signal "1"						
nominal value at 40 °C	0.75 A	2 A	2 A	1.2 A	1.2 A	2 A
nominal value at 55 °C	0.5 A	2 A	2 A	1.0 A	1.0 A	2 A
Minimum current	—	—	—	10 mA	10 mA	—
• with signal "0"	0.1 mA	0 mA	0 mA	2.0 mA (at 240 V)	2.0 mA (at 240 V)	0 mA
Sum of all output currents						
• at 40 °C max.						
• at 55 °C max.	4.0 A	20 A	20 A	6.0 A	6.0 A	20 A
(horizontal installation)	3.0 A	20 A	20 A	4.25 A	4.25 A	20 A
Sum of the current from two adjacent outputs						
• at 40 °C max.	1.0 A	4.0 A	4.0 A	1.5 A	1.5 A	4.0 A
• at 55 °C max.	0.75 A	4.0 A	4.0 A	1.25 A	1.25 A	4.0 A
(horizontal installation)						
Switching capacity of outputs <sup>1)</sup>	0.75 A	2 A	2 A	1.2 A	1.2 A	2 A
• for resistive load	0.75 A	2 A	2 A	1.2 A <sup>2)</sup>	1.2 A <sup>2)</sup>	2 A
• for inductive load	5 W	30/200 W (DC/AC)	30/200 W (DC/AC)	125 W	125 W	30/200 W (DC/AC)
• for lamp load						
Lifespan of contacts (number of operating cycles acc. to VDE 0660, part 200)						
• mechanical	—	10.000.000	10.000.000	—	—	10.000.000
• at nominal load voltage	—	100.000	100.000	—	—	100.000
Limiting of voltage induced on circuit interruption min.	-30 V	to be provided externally <sup>3)</sup>	to be provided externally <sup>3)</sup>	380 V	380 V	to be provided externally <sup>3)</sup>
Short-circuit protection	to be provided externally	to be provided externally	to be provided externally	to be provided externally	to be provided externally	to be provided externally
Cable lengths						
• unscreened	150 m	150 m	150 m	150 m	150 m	150 m
• screened	500 m	500 m	500 m	500 m	500 m	500 m
Isolation						
• between 24 V DC and 24 V DC	500 V DC	500 V DC	500 V DC	500 V DC	500 V DC	500 V DC
• between 24 V DC and 230 V AC	1500 V AC	1500 V AC	1500 V AC	1500 V AC	1500 V AC	1500 V AC
Dimensions (W x H x D) in mm	197 x 80 x 62	197 x 80 x 62	197 x 80 x 62	197 x 80 x 62	197 x 80 x 62	197 x 80 x 62
Weight approx.	390 g	490 g	490 g	490 g	490 g	490 g

1) 1 output up to 40 °C

2) According to IEC 947-5-1

3) See „S7-200 Programmable Controller System Manual“

## Technical specifications CPU 224

Program memory	8 kbytes / typically 2.6 K instructions	Integrated high-speed functions (cont.)	
Data memory	2.5 k words	• Counters	6 high-speed counters (each 30 kHz), 32 bit (inc. sign), useable as forwards/reverse counters or for interfacing 4 incremental transmitters with 2 pulse sequences offset by 90°; Parameterizable enable and reset input; Interrupt options (inc. calling a sub-program with any content) on reaching a specified value; Reversal of counting direction etc.
Memory submodule (optional)	1 pluggable memory submodule; content identical to the integrated EEPROM	• Pulse outputs	2 high-speed outputs, 20 kHz with interrupt option; pulse width and frequency modulation possible
Program backup	Entire program maintenance-free in the integrated EEPROM	Interfaces	1 RS 485 communication interface, optionally: <ul style="list-style-type: none"> <li>• as PPI interface with PPI protocol for PU functions, HMI functions (TD 200, OP), S7-200 internal CPU/CPU communication Baud rates 9.6/19.2/187.5 kbit/s</li> <li>• or as MPI slave for data exchange with MPI masters (S7-300/S7-400 CPUs, OP's, TDs, push-button panels); S7-200 internal CPU/CPU communication is not possible on the MPI network Baud rates 19.2/187.5 kbit/s</li> <li>• or as freely programmable interface with interrupt option for serial data exchange with external devices, e.g. using ASCII protocol Baud rates 0.3/0.6/1.2/2.4/4.8/9.6/19.2/38.4 kbit/s at 1.2 to 38.4 kbit/s the PC/PPI cable can be used as an RS232/RS458 converter</li> </ul>
Data backup	<ul style="list-style-type: none"> <li>• Entire DB 1 maintenance-free in the integrated EEPROM</li> <li>• Current DB 1 values in RAM, remanent flags, times, counters etc. maintenance-free through high power capacitor; optional battery for long duration backup</li> </ul>	Connectable programming units/PC	PG 720P, PG 740 PII, PG 760 PII, PC(AT)
Backup time (typical)	50 h (min. 8 h at 40 °C); 200 days (typ.) with optional battery module	Integrated inputs/outputs	Yes
Charge time for high power capacitor	typ. 20 min (to 60% capacity)	• Pluggable I/O terminals	14; of which 4 channels can be used as process alarms and 14 for high-speed functions
Programming language	Ladder diagram, SFC and STL	• Digital inputs	10, of which 2 channels can be used for integrated functions
Program organization	1 organizational block (which can contain sub-programs)	• Digital outputs	2 analog potentiometer; 8 bit resolution
Program execution	<ul style="list-style-type: none"> <li>• free cycle (OB 1)</li> <li>• alarm controlled</li> <li>• time controlled (1 to 255 ms)</li> </ul>	Connectable I/O	max. 62 inputs and 58 outputs (including integrated input/output); further expansion using 16DI/16DO expansion modules in preparation
Sub-program levels	8	• digital inputs/outputs	12 inputs and/or 14 outputs; max. 22 in total currently no AS interface expansion modules available
User program protection	3-level password protection	• analog inputs/outputs	7 expansion modules <sup>1)</sup> .
Operation set		• AS interface inputs/outputs	max.
• Basic operations	Binary logic operations, result allocations, save, count, load, transfer, compare, shift, rotate, created complement, call sub-programs with parameter passing	Expansion	max.
• Enhanced functions	Pulse duration modulation, pulse sequence commands, jump commands, iteration commands, code conversions, mathematical functions (addition, subtraction, multiplication, division, square-root), fixed and floating point arithmetic	Degree of protection	IP 20 according to IEC 529
Processing times for bit operations	0.37 µs	Ambient temperature	
Cycle time monitoring	300 ms (retriggerable)	• with horizontal installation	0 to 55 °C
Flags	256	• with vertical installation	0 to 45 °C
• of which remanent	0 to 112 in EEPROM, adjustable; 0 to 256, via high power capacitor or battery, adjustable	Relative humidity	5 to 95% (RH stress level 2 according to IEC 1131-2)
Counters	256	Air pressure	860 to 1080 hPa
• of which remanent	256, via high power capacitor or battery, adjustable	Other environmental conditions	see "S7-200 automation system, system manual"
• Counting range	0 to 32 767		
Timings	256		
• of which remanent	256, via high power capacitor or battery, adjustable		
• Timing range	4 timings, 1 ms to 30 s 16 timings, 10 ms to 5 min 236 timings, 100 ms to 54 min		
Integrated high-speed functions			
• Alarm inputs	4 (with positive and/or negative input slope, programmable alarm reaction)		

1) Only EMs from the S7-22x series may be used. Because of the limited output current, the use of expansion modules can be subject to restrictions.

# SIMATIC S7-200 CPUs

## Technical specifications CPU 224 (cont.)

Supply:	24 V DC	100 to 230 V AC	Supply:	24 V DC	100 to 230 V AC
Inputs:	24 V DC	24 V DC	Inputs:	24 V DC	24 V DC
Outputs:	24 V DC	Relay	Outputs:	24 V DC	Relay
Supply voltage L+/L1			<b>Integrated outputs</b>	<b>10 (transistor)</b>	<b>6 (relay)</b>
• nominal value	24 V DC	100 to 230 V AC	Nominal load voltage L+/L1	24 V DC	24 V DC/ 24 to 230 V AC
• permissible range	20.4 to 28.8 V	85 to 264 V AC (47 to 63 Hz)	• permissible range	20.4 to 28.8 V DC	5 to 30 V DC/ 20 to 250 V AC
Input current	—	—	Output voltage		
• Starting current inrush typ.	10 A at 28.8 V	20 A at 264 V	• with signal "1" min.	18.6 V DC	L+/L1
• Current consumption max.	120 to 900 mA	35 to 220 mA	Isolation	Optocoupler	Relay
Output voltage for sensors and transmitters			• in groups of	5	3 and 4
• nominal value	L+ (24 V DC)	24 V DC	Output current, max.		
• permissible range	15.4 to 28.8 V	20.4 V to 28.8 V	• with signal "1"		
Output current for sensors (24 V DC)			nominal value at 40 °C	0.75 A	2 A
• nominal value	280 mA	280 mA	nominal value at 55 °C	0.75 A	2 A
• short-circuit protection	electronic at 600 mA, non-latching	electronic at 600 mA, non-latching	Minimum current	—	—
Output current for expansion modules (5 V DC)	660 mA	660 mA	• with signal "0"	10 µA	0 mA
<b>Integrated inputs</b>	<b>14</b>	<b>14</b>	Sum of all output currents (horizontal installation)		
• type	optionally p- and m-reading per group	optionally p- and m-reading per group	• at 40 °C max.	3.75 A	8.0 A
Input voltage			• at 55 °C max.	3.75 A	8.0 A
• nominal value	24 V DC	24 V DC	Pickup delay		
• with "1" signal	(15 to 35 V)	(15 to 35 V)	• standard outputs max.	(Q0.2 to Q1.1) 15 µs	(all outputs) 10 ms
• with "0" signal	0 to 5 V	0 to 5 V	• pulse outputs max.	(Q0.0 to Q0.1) 2 µs	—
Isolation	Optocoupler	Optocoupler	Tripping delay		
• in groups of	6 and 8	6 and 8	• standard outputs max.	(Q0.2 to Q1.5) 100 µs	(all outputs) 10 ms
Input current			• pulse outputs max.	(Q0.0 to Q0.1) 10 µs	—
• with "1" signal max.	4 mA	4 mA	Operating frequency of pulse outputs	Q0.0 to Q0.1	Q0.0 to Q0.1
Input delay (at nominal input voltage)			• with ohmic load	20 kHz	—
• for standard inputs	all inputs 0.2 to 12.8 ms, (adjustable)	all inputs 0.2 to 12.8 ms, (adjustable)	Switching capacity of outputs		
• for alarm inputs	(10.0 to 10.3) 0.2 to 12.8 ms, (adjustable)	(10.0 to 10.3) 0.2 to 12.8 ms, (adjustable)	• with ohmic load	0.75 A	2 A
• for high-speed counter max.	(10.0 to 10.5) 30 kHz	(10.0 to 10.5) 30 kHz	• with lamp load	5 W	30/200 W (DC/AC)
Connection of 2-wire BERO			Lifespan of contacts (number of operating cycles acc. to VDE 0660, part 200)		
• permissible closed-circuit current max.	1 mA	1 mA	• mechanical	—	10.000.000
Cable lengths			• at nominal load voltage	—	100.000
• Unscreened (not for high-speed signals)	300 m	300 m	Limiting of voltage induced on circuit interruption max.	1 W	—
• screened standard input (alarm inputs, high-speed counters)	500 m	500 m	Short-circuit protection	to be provided externally	to be provided externally
			Cable lengths		
			• unscreened	150 m	150 m
			• screened	500 m	500 m
			Isolation		
			• betw. 24 V DC and 24 V DC	500 V DC	500 V DC
			• betw. 24 V DC and 230 V AC	—	1500 V AC
			Dimensions (W x H x D) in mm	120.5 x 80 x 62	120.5 x 80 x 62
			Weight approx.	360 g	410 g

## Technical specifications CPU 215, 216

	CPU 215	CPU 216
Program memory	8 kbyte /typ. 4 K statements on built-in EEPROM (non-volatile)	8 kbyte /typ. 4 K statements on built-in EEPROM (non-volatile)
Data memory	2.5 k words	2.5 k words
Memory submodule (optional)	1 plug-in memory submodule (EEPROM); contents identical with integral EEPROM	1 plug-in memory submodule (EEPROM); contents identical with integral EEPROM
Data backup	Maintenance-free (without optional battery) <ul style="list-style-type: none"> <li>• 5 kbytes (DB1), stored on built-in EEPROM</li> <li>• data, retentive memory bits, etc. backed up by heavy-duty capacitor; optional battery for long-term backup</li> </ul>	Maintenance-free (without optional battery) <ul style="list-style-type: none"> <li>• 5 kbytes (DB1), stored on built-in EEPROM</li> <li>• data, retentive memory bits, etc. backed up by heavy-duty capacitor; optional battery for long-term backup</li> </ul>
Backup time	typ. 190 h (min. 120 h at 40 °C) 200 days with optional battery module	190 h (min. 120 h at 40 °C) 200 days with optional battery module
Charging time for heavy-duty capacitor	typ. 7 h (to 60% capacity) STL and LAD	7 h (to 60% capacity) STL and LAD
Programming language	One organization block (subroutines supported)	One organization block (subroutines supported)
Program organization	<ul style="list-style-type: none"> <li>• free-cycle (OB 1)</li> <li>• interrupt-controlled</li> <li>• time-controlled (5 to 255 ms)</li> </ul>	<ul style="list-style-type: none"> <li>• free-cycle (OB 1)</li> <li>• interrupt-controlled</li> <li>• time-controlled (5 to 255 ms)</li> </ul>
Program scanning	8	8
Subroutine levels	3-level password protection	3-level password protection
User program protection		
Instruction set	Binary logic operations, result assignments, save, count, load, transfer, compare, shift, rotate, form complement, call subroutines	Binary logic operations, result assignments, save, count, load, transfer, compare, shift, rotate, form complement, call subroutines
• Basic operations		
• User-friendly functions	Pulse duration modulation, pulse train instructions, jump instructions, loop instructions, code conversions, arithmetic functions, (addition, subtraction, multiplication, division, square root), fixed-point arithmetic, floating-point arithmetic, PID control	Pulse duration modulation, pulse train instructions, jump instructions, loop instructions, code conversions, arithmetic functions, (addition, subtraction, multiplication, division, square root), fixed-point arithmetic, floating-point arithmetic, PID control
Execution times for bit operations	0.8 µs	0.8 µs
Scan time monitoring	300 ms (retriggerable)	300 ms (retriggerable)
Flags	256	256
Flags	0 to 255, selectable	0 to 255, selectable
• of which remanent	128	128
Counters	0 to 127, selectable	0 to 127, selectable
• of which remanent	0 to 32 767	0 to 32 767
• Counting range	256	256
Timers	64 selectable	64 selectable
• of which remanent	4 timers, 1 ms to 30 s	4 timers, 1 ms to 30 s
• Timing range	16 timers, 10 ms to 5 min 108 timers, 100 ms to 54 min	16 timers, 10 ms to 5 min 108 timers, 100 ms to 54 min

# SIMATIC S7-200

## CPUs

### Technical specifications CPU 215, 216 (cont.)

	CPU 215	CPU 216
Integrated high-speed functions		
• Alarm inputs	4 (on positive and/or negative input signal edge, programmable interrupt response)	4 (on positive and/or negative input signal edge, programmable interrupt response)
• Counters	1 up or down counter (see CPU 212) 2 high-speed counters (20 kHz each), 32 bits (incl. sign), which can be used as an up or down counter or for connecting incremental encoders with 2 90°-offset pulse trains; with parameterizable enable and reset inputs; interrupt capability (incl. calling a subroutine with random contents) on reaching a setpoint; reversal of direction of counting etc.	1 up or down counter (see CPU 212) 2 high-speed counters (20 kHz each), 32 bits (incl. sign), which can be used as an up or down counter or for connecting incremental encoders with 2 90°-offset pulse trains; with parameterizable enable and reset inputs; interrupt capability (incl. calling a subroutine with random contents) on reaching a setpoint; reversal of direction of counting etc.
• Pulse outputs	2 high-speed outputs with interrupt capability (up to 4 kHz); pulse length and frequency modulation	2 high-speed outputs with interrupt capability (up to 4 kHz); pulse length and frequency modulation
Interfaces	<p>2 RS 485 communication interface</p> <p>Interface 0: optionally</p> <ul style="list-style-type: none"> <li>• PPI mode for programming and connecting programming devices, PCs (via PC/PPI cable), TD 200s, OPs (9.6 or 19.2 kbit/s)</li> <li>• user-programmable interface mode with interrupt capability for serial data exchange with devices of other vendors (0.3 to 38.4 kbit/s), e.g. with ASCII protocol; PC/PPI cable can be used as an RS 232/RS 485 converter (from 0.6 kbit/s)</li> </ul> <p>PROFIBUS-DP slave interface:</p> <ul style="list-style-type: none"> <li>• up to 12 Mbit/s</li> </ul> <p>Backplane bus:</p> <ul style="list-style-type: none"> <li>• connection of expansion modules (EM)<sup>1)</sup></li> </ul>	<p>2 RS 485 communication interface</p> <p>Interface 0: optionally</p> <ul style="list-style-type: none"> <li>• PPI mode for programming and connecting programming devices, PCs (via PC/PPI cable), TD 200s, OPs (9.6 or 19.2 kbit/s)</li> <li>• user-programmable interface mode with interrupt capability for serial data exchange with devices of other vendors (0.3 to 38.4 kbit/s), e.g. with ASCII protocol; PC/PPI cable can be used as an RS 232/RS 485 converter (from 0.6 kbit/s)</li> </ul> <p>Interface 1:</p> <ul style="list-style-type: none"> <li>• PPI mode for programming and connecting programming devices, PCs (via PC/PPI cable), TD 200s, OPs (9.6 or 19.2 kbit/s)</li> </ul> <p>Backplane bus:</p> <ul style="list-style-type: none"> <li>• connection of expansion modules (EM)<sup>1)</sup></li> </ul>
Connectable programming units/PC	PG 720P, PG 740, PG 760, PC(AT)	PG 720P, PG 740, PG 760, PC(AT)
Integrated inputs/outputs		
• Pluggable I/O terminals	No	No
• Digital inputs	14; incl. 4 channels as process interrupt and 8 channels for high-speed functions	14; incl. 4 channels as process interrupt and 8 channels for high-speed functions
• Digital outputs	10; incl. 2 channels for on-board functions	16; incl. 2 channels for on-board functions
• Analog potentiometer	2 analog potentiometers; resolution 1/200	2 analog potentiometers; resolution 1/200
Connectable I/O		
• digital inputs/outputs	max. 62 inputs and 58 outputs (incl. on-board inputs/outputs)	max. 64 inputs and 64 outputs (incl. on-board inputs/outputs)
• analog inputs/outputs	12 inputs and/or 14 outputs; max. total of 22	12 inputs and/or 14 outputs; max. total of 22
• AS interface inputs/outputs	max. 496	496
Expansion	max. 7 expansion modules (digital and analog). <sup>1)</sup>	7 expansion modules (digital and analog). <sup>1)</sup>
Degree of protection	IP 20 to IEC 529	IP 20 to IEC 529
Ambient temperature		
• with horizontal installation	0 to 55 °C	0 to 55 °C
• with vertical installation	0 to 45 °C	0 to 45 °C
Relative humidity	5 to 95% (RH severity level 2 to IEC 1131-2)	5 to 95% (RH severity level 2 to IEC 1131-2)
Air pressure	860 to 1080 hPa	860 to 1080 hPa
Other environmental conditions	See "S7-200 Programmable Controller, System Manual"	See "S7-200 Programmable Controller, System Manual"

1) Only EMs from the S7-21x series may be used. Because of the limited output current, the use of expansion modules can be subject to restrictions.

## Technical specifications CPU 215, 216 (cont.)

	CPU 215		CPU 216	
Supply:	24 V DC	120 to 230 V AC	24 V DC	120 to 230 V AC
Inputs:	24 V DC	24 V DC	24 V DC	24 V DC
Outputs:	24 V DC	relay	24 V DC	relay
Supply voltage L+/L1				
• Rated value	24 V DC	120 to 230 V AC	24 V DC	120 to 230 V AC
• Permissible range	20.4 to 28.8 V	85 to 264 V AC (47 to 63 Hz)	20.4 to 28.8 V	85 to 264 V AC (47 to 63 Hz)
Input current				
• CPU only	typ. 120 mA	6 VA	120 mA	6 VA
• incl. load	max. 1.3 A	50 VA	1.2 A	50 VA
Inrush current	typ. 10 A	20 A	10 A	20 A
Power consumption	typ. 8 W	9 W	8 W	9 W
Output voltage for sensors and actuators				
• Rated value	L+ (24 V DC)	24 V DC	L+ (24 V DC)	24 V DC
• Permissible range	L+ - max 4 V	19.2 V to 28.8 V	L+ - max 4 V	19.2 V to 28.8 V
Output current for sensors				
• Rated value	400 mA	400 mA	400 mA	400 mA
• Short-circuit protection	Elektronic <sup>1)</sup>	Elektronic <sup>1)</sup>	Elektronic <sup>1)</sup>	Elektronic <sup>1)</sup>
Output current for expansion modules	1000 mA	1000 mA	1000 mA	1000 mA
<b>Integrated inputs</b>	<b>14</b>	<b>14</b>	<b>24</b>	<b>24</b>
Input voltage				
• Rated value	± 24 V DC	± 24 V DC	± 24 V DC	± 24 V DC
• for "1" signal	± (15 to 35 V)	± (15 to 35 V)	± (15 to 35 V)	± (15 to 35 V)
• for "0" signal	-5 to 5 V	-5 to 5 V	-5 to 5 V	-5 to 5 V
Isolation	Optocoupler	Optocoupler	Optocoupler	Optocoupler
• in groups of	8 and 6	8 and 6	13 and 11	13 and 11
Input current				
• for "1" signal	max. 7 mA	7 mA	7 mA	7 mA
• for "0" signal	max. 1 mA	1 mA	1 mA	1 mA
Input delay (at rated input voltage)				
• for standard inputs	(10.0 to 11.5) 0.2 to 8.7 ms (selectable)	(10.0 to 11.5) 0.2 to 8.7 ms (selectable)	(10.0 to 11.5) 0.2 to 8.7 ms (selectable)	(10.0 to 11.5) 0.2 to 8.7 ms (selectable)
• for interrupt inputs	(10.0 to 11.5) 0.2 to 8.7 ms (selectable)	(10.0 to 11.5) 0.2 to 8.7 ms (selectable)	(10.0 to 11.5) 0.2 to 8.7 ms (selectable)	(10.0 to 11.5) 0.2 to 8.7 ms (selectable)
• for high-speed counters 1, 2 (if programmed)	(10.6 to 11.5) 6 µs ON/30 µs OFF	(10.6 to 11.5) 6 µs ON/30 µs OFF	(10.6 to 11.5) 6 µs ON/30 µs OFF	(10.6 to 11.5) 6 µs ON/30 µs OFF
• 11.6 to 12.7	—	—	—	—
Connection of 2-conductor BERO sensors				
• Permissible quiescent current	max. 1 mA	1 mA	1 mA	1 mA
Cable lengths				
• Unshielded (not for high-speed-signals)	300 m	300 m	300 m	300 m
• Shielded				
standard input	500 m	500 m	500 m	500 m
(interrupt input, high-speed counter)	50 m	50 m	50 m	50 m

1) De-energized cooling period required following short-circuit

# SIMATIC S7-200

## CPUs

### Technical specifications CPU 215, 216 (cont.)

	CPU 215		CPU 216	
Supply:	24 V DC	120 to 230 V AC	24 V DC	120 to 230 V AC
Inputs:	24 V DC	24 V DC	24 V DC	24 V DC
Outputs:	24 V DC	relay	24 V DC	relay
Integrated outputs	10 (transistor)	10 (relay)	16 (transistor)	16 (relay)
Rated load voltage L+/L1	24 V DC	24 V DC/ 24 to 230 V AC	24 V DC	24 V DC/ 24 to 230 V AC
• Permissible range	20.4 to 28.8 V DC	5 to 30 V DC/ 20 to 250 V AC	20.4 to 28.8 V DC	5 to 30 V DC/ 20 to 250 V AC
Output voltage				
• for "1" signal	min. L+ - 1.8 V	L+/L1	L+ - 1.8 V	L+/L1
Isolation	Optocoupler	Relay	Optocoupler	Relay
• in groups of	8 and 2	3, 2, 2, 1, 1 and 1	8 and 8	7, 5 and 4
Maximum output current				
• for "1" signal				
Rated value at 55 °C	0.5 A (Q1.0 and 1.1: 1.0 A)	2 A	0.5 A	2 A
• for "0" signal	0.2 mA	0 mA	0.2 mA	0 mA
Sum of all output currents (horizontal installation)				
• at 55 °C	max. 6.0 A	20 A	8.0 A	10 A per group
Switching capacity of outputs	see output current		see output current	
• for resistive load		2 A		2 A
• for inductive load		2 A		2 A
• for lamp load		30/200 W (DC/AC)		30/200 W (DC/AC)
Service life of contacts (number of switching cycles) to VDE 0660, Part 200				
• AC 15	—	2)	—	2)
• DC 13	—		—	
Voltage induced in circuit inter- ruption limited to	min. V <sub>CC</sub> -65V	Provide externally <sup>2)</sup>	V <sub>CC</sub> -65V	Provide externally <sup>2)</sup>
Short-circuit protection	Elektronic <sup>1)</sup>	Provide externally	Elektronic <sup>1)</sup>	Provide externally
Cable lengths				
• Unshielded	150 m	150 m	150 m	150 m
• Shielded	500 m	500 m	500 m	500 m
Isolation				
• bet. 24 V DC and 24 V DC	500 V DC	500 V DC	500 V DC	500 V DC
• bet. 24 V DC and 230 V AC	1500 V AC	1500 V AC	1500 V AC	1500 V AC
Dimensions (W x H x D) in mm	218 x 80 x 62	218 x 80 x 62	218 x 80 x 62	218 x 80 x 62
Weight	approx. 500 g	600 g	500 g	600 g

1) De-energized cooling period required following short-circuit

2) On request; at cos φ = 0,4: approximately 10<sup>5</sup> switching operations



Ordering data	Order No.	Order No.
<b>CPU 221</b> <ul style="list-style-type: none"> <li>• 24 V DC supply, 24 V DC inputs, 24 V DC outputs</li> <li>• 100 to 230 V AC supply, 24 V DC inputs, relay outputs</li> </ul>	<b>6ES7 211-0AA20-0XB0</b>	<b>CPU 215</b> <ul style="list-style-type: none"> <li>• 24 V DC supply, 24 V DC inputs, 24 V DC outputs</li> <li>• 120 to 230 V AC supply, 24 V DC inputs, relay outputs</li> </ul>
<b>CPU 212</b> <ul style="list-style-type: none"> <li>• 24 V DC supply, 24 V DC inputs, 24 V DC outputs</li> <li>• 120 to 230 V AC supply, 24 V DC inputs (sink inputs), relay outputs</li> <li>• 120 to 230 V AC supply, 24 V DC inputs (source inputs), relay outputs</li> <li>• 120 to 230 V AC supply, 24 V AC inputs, 120 to 230 V AC outputs</li> <li>• 120 to 230 V AC supply, 120 V AC inputs, 120 to 230 V AC outputs</li> <li>• 120 to 230 V AC supply, 120 V AC inputs, relay outputs</li> <li>• 24 V AC supply, 24 V DC inputs (sink inputs), relay outputs</li> </ul>	<b>6ES7 211-0BA20-0XB0</b>  <b>6ES7 212-1AA01-0XB0</b>  <b>6ES7 212-1BA01-0XB0</b>  <b>6ES7 212-1BA10-0XB0</b>  <b>6ES7 212-1DA01-0XB0</b>  <b>6ES7 212-1CA01-0XB0</b>  <b>6ES7 212-1GA01-0XB0</b>  <b>6ES7 212-1FA01-0XB0</b>	<b>CPU 216</b> <ul style="list-style-type: none"> <li>• 24 V DC supply, 24 V DC inputs, 24 V DC outputs</li> <li>• 120 to 230 V AC supply, 24 V DC inputs, relay outputs</li> </ul>
<b>CPU 222</b> <ul style="list-style-type: none"> <li>• 24 V DC supply, 24 V DC inputs, 24 V DC outputs</li> <li>• 100 to 230 V AC supply, 24 V DC inputs, relay outputs</li> </ul>	<b>6ES7 212-1AB20-0XB0</b>	<b>MC 291 memory submodule, EEPROM</b> for CPU 214, 8 Kbytes for CPU 215/216, 16 Kbytes for CPU 221/222/224
<b>CPU 214</b> <ul style="list-style-type: none"> <li>• 24 V DC supply, 24 V DC inputs, 24 V DC outputs</li> <li>• 120 to 230 V AC supply, 24 V DC inputs (sink inputs), relay outputs</li> <li>• 120 to 230 V AC supply, 24 V DC inputs (source inputs), relay outputs</li> <li>• 120 to 230 V AC supply, 24 V AC inputs, 120 to 230 V AC outputs</li> <li>• 120 to 230 V AC supply, 120 V AC inputs, 120 to 230 V AC outputs</li> <li>• 120 to 230 V AC supply, 120 V AC inputs, relay outputs</li> </ul>	<b>6ES7 212-1BB20-0XB0</b>  <b>6ES7 214-1AC01-0XB0</b>  <b>6ES7 214-1BC01-0XB0</b>  <b>6ES7 214-1BC10-0XB0</b>  <b>6ES7 214-1DC01-0XB0</b>  <b>6ES7 214-1CC01-0XB0</b>  <b>6ES7 214-1GC01-0XB0</b>	<b>Ground terminals</b> 10 pcs.
<b>CPU 214</b> <ul style="list-style-type: none"> <li>• 24 V DC supply, 24 V DC inputs, 24 V DC outputs</li> <li>• 100 to 230 V AC supply, 24 V DC inputs, relay outputs</li> </ul>	<b>6ES7 214-1AD20-0XB0</b>	<b>SIM274 simulator</b> <ul style="list-style-type: none"> <li>• for CPU 214<sup>1)</sup>/224<sup>1)</sup></li> <li>• for CPU 221<sup>1)</sup>/212<sup>1)</sup>/222<sup>1)</sup></li> <li>• for CPU 215<sup>1)</sup>/216<sup>1)</sup></li> </ul>
<b>CPU 224</b> <ul style="list-style-type: none"> <li>• 24 V DC supply, 24 V DC inputs, 24 V DC outputs</li> <li>• 100 to 230 V AC supply, 24 V DC inputs, relay outputs</li> </ul>	<b>6ES7 214-1BD20-0XB0</b>	<b>Terminal block</b> <ul style="list-style-type: none"> <li>• 12-pin, for CPU 221/212/222, outputs of the CPU 215/216 and EMs from the 21x-series with 32 I/O, 10 pcs.</li> <li>• 14-pin, for inputs of the CPU 215/216 and EMs from the 21x-series mit 8/16 digital I/O or analog I/O, 10 pcs.</li> <li>• 18-pin for CPU 214/224, 10 pcs.</li> </ul>
		<b>Pluggable I/O screw-type terminals</b> <ul style="list-style-type: none"> <li>• with 18 connections (for CPU 224)</li> </ul>
		<b>PC/PPI cable<sup>2)</sup></b> 5 m; with built-in RS 232C/RS 485 converter, between S7-200 and PC or DTEs such as printers and barcode readers; isolation via optocouplers
		<b>Backplane bus expansion cable</b> for connecting the two tiers in 2-tier configuration <ul style="list-style-type: none"> <li>• for CPU 212/214/215/216</li> <li>• for CPU 221/222/224</li> </ul>
		<b>Labelling strips</b> for CPU 212, CPU 214 and EMs from the 21x series (24 pcs., spare part)
		<b>6ES7 215-2AD00-0XB0</b>  <b>6ES7 215-2BD00-0XB0</b>  <b>6ES7 216-2AD00-0XB0</b>  <b>6ES7 216-2BD00-0XB0</b>  <b>6ES7 291-8GC00-0XA0</b> <b>6ES7 291-8GD00-0XA0</b> <b>6ES7 291-8GE20-0XA0</b>  <b>6ES5 728-8MA11</b>  <b>6ES7 274-1XH00-0XA0</b> <b>6ES7 274-1XF00-0XA0</b> <b>6ES7 274-1XK00-0XA0</b>  <b>6ES7 290-2AA00-0XA0</b>  <b>6ES7 290-2CA00-0XA0</b>  <b>6ES7 290-2BA00-0XA0</b>  <b>6ES7 292-1AG20-0AA0</b>  <b>6ES7 901-3BF20-0XA0</b>  <b>6ES7 290-6BC50-0XA0</b> <b>6ES7 290-6AA20-0XA0</b> <b>6ES7 292-2AA00-0XA0</b>

1) For DC and relay variants

2) If the 9-pin interface (mouse port) is occupied, a serial adapter (9-pin/25-pin) is required

# SIMATIC S7-200 CPUs

## Ordering data (cont.)

- Optional battery module**
- for CPU 214/215/216
  - for CPU 221/222/224

**Optional combination clock and battery module**  
only for CPU 221/222

**S7-200 Programmable Controller, System Manual**

for CPU 212/214/215/216 and STEP 7-Micro/WIN16 V2.1

German  
Englisch  
French  
Spanish  
Italian

Order No.

**6ES7 291-8BA00-0XA0**  
**6ES7 291-8BA20-0XA0**

**6ES7 297-1AA20-0XA0**

**6ES7 298-8FA01-8AH0**  
**6ES7 298-8FA01-8BH0**  
**6ES7 298-8FA01-8CH0**  
**6ES7 298-8FA01-8DH0**  
**6ES7 298-8FA01-8EH0**

**S7-200 Programmable Controller, System Manual**

for CPU 221/222/224 and STEP 7-Micro/WIN32 V3.0

German  
Englisch  
French  
Spanish  
Italian

**STEP 7-Micro/WIN programming software**

**STEP 7-Micro/DOS programming software**

**PROFIBUS-bus connector IP 20**

- anthracite, without programming device port
- anthracite, with programming device port

**PROFIBUS bus components**  
for connection to PPI

Order No.

**6ES7 298-8FA20-8AH0**  
**6ES7 298-8FA20-8BH0**  
**6ES7 298-8FA20-8CH0**  
**6ES7 298-8FA20-8DH0**  
**6ES7 298-8FA20-8EH0**

see ST 70,  
Section 9

see ST 70,  
Section 9

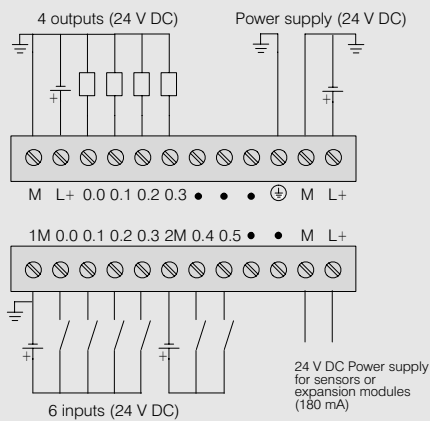
**6ES7 972-0BA11-0XA0**

**6ES7 972-0BB11-0XA0**

see ST 70,  
Section 14

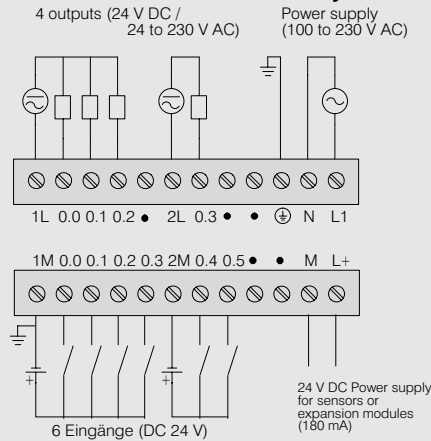
## CPU 221

### 24 V DC / 24 V DC / 24 V DC



6ES7 211-0AA20-0XB0

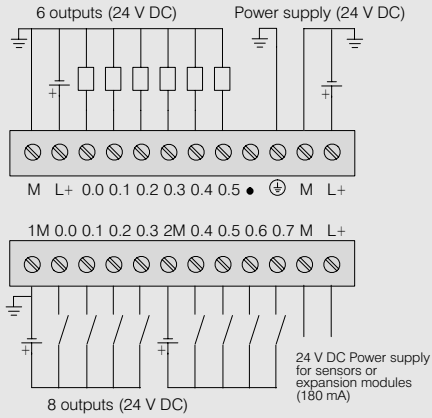
### 100 to 230 V AC/24 V DC/relay



6ES7 211-0BA20-0XB0

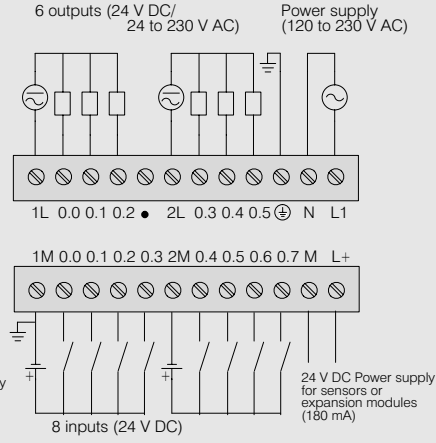
## CPU 212

### 24 V DC/24 V DC/24 V DC



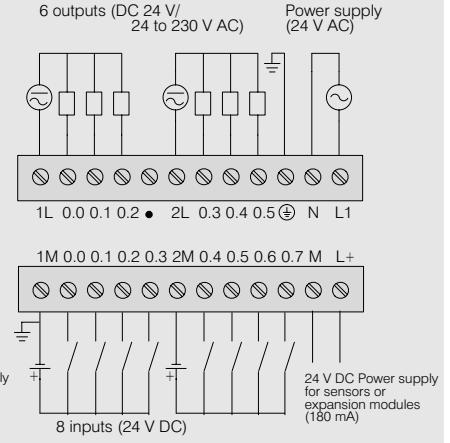
6ES7 212-1AA01-0XB0

### 230 V AC/24 V DC (sink input)/relay



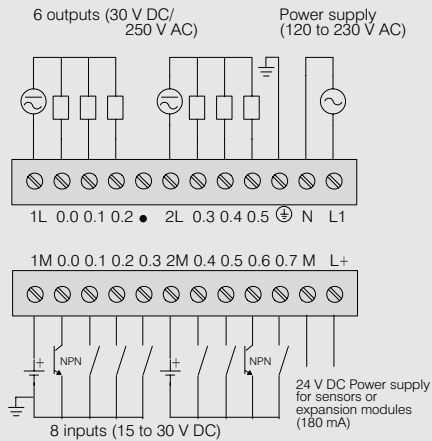
6ES7 212-1BA01-0XB0

### 24 V AC/24 V DC (sink input)/relay

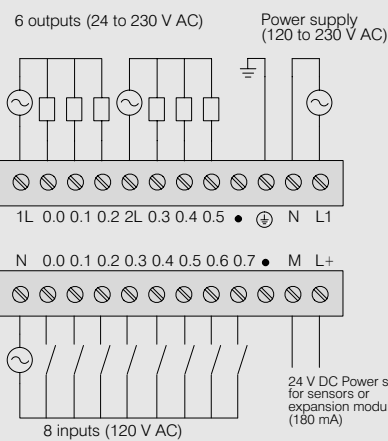


6ES7 212-1FA01-0XB0

### 230 V AC/24 V DC (source input)/relay 230 V AC/120 V AC/230 V AC

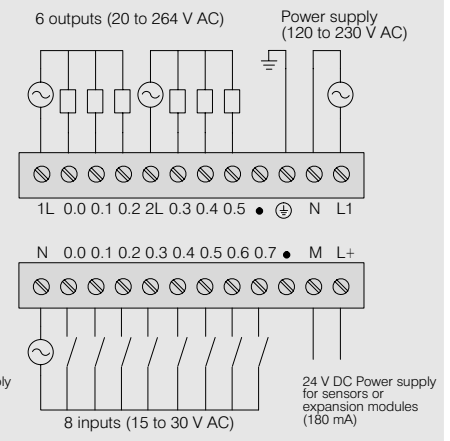


6ES7 212-1BA10-0XB0



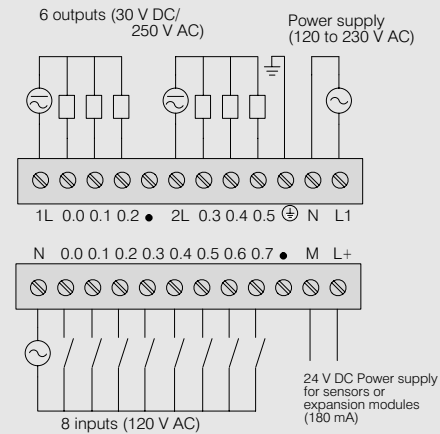
6ES7 212-1CA01-0XB0

### 230 V AC/24 V AC/230 V AC



6ES7 212-1DA01-0XB0

### 230 V AC/120 V AC/relay

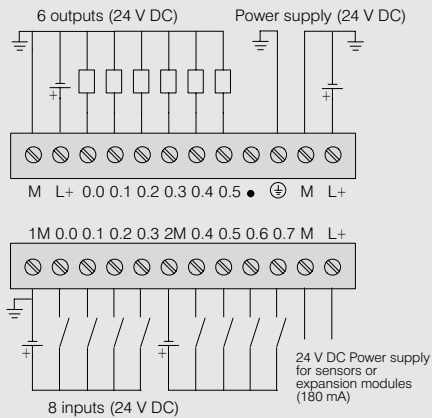


6ES7 212-1GA01-0XB0

# SIMATIC S7-200 CPUs

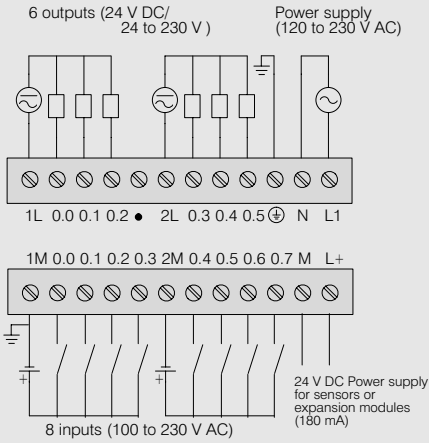
## CPU 222

### 24 V DC/24 V DC/24 V DC



6ES7 212-1AB20-0XB0

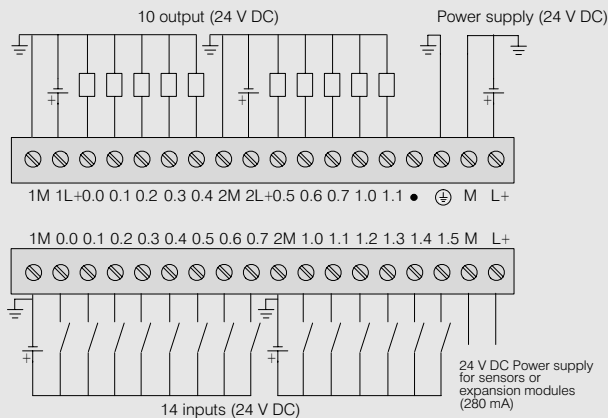
### 100 to 230 V AC/24 V DC/relay



6ES7 212-1BB20-0XB0

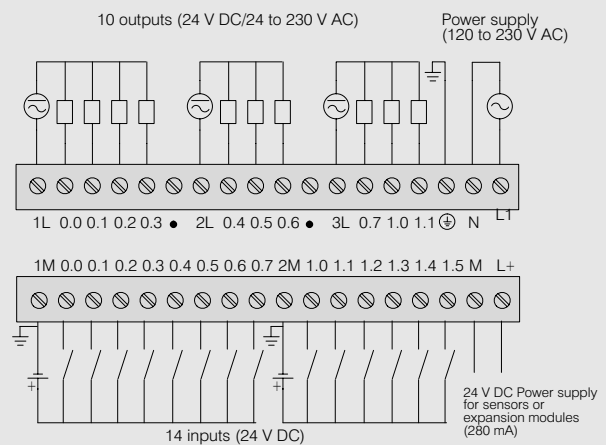
## CPU 214

### DC



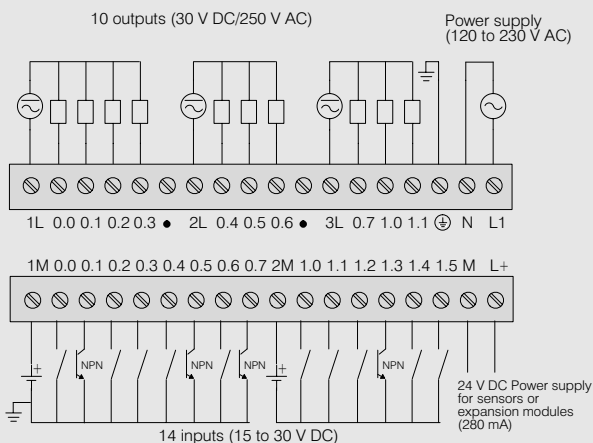
6ES7 214-1AC01-0XB0

### Relays (sink input)



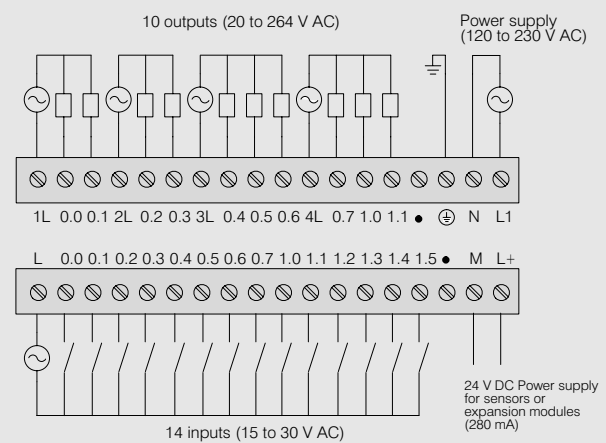
6ES7 214-1BC01-0XB0

### Relays (source input)



6ES7 214-1BC10-0XB0

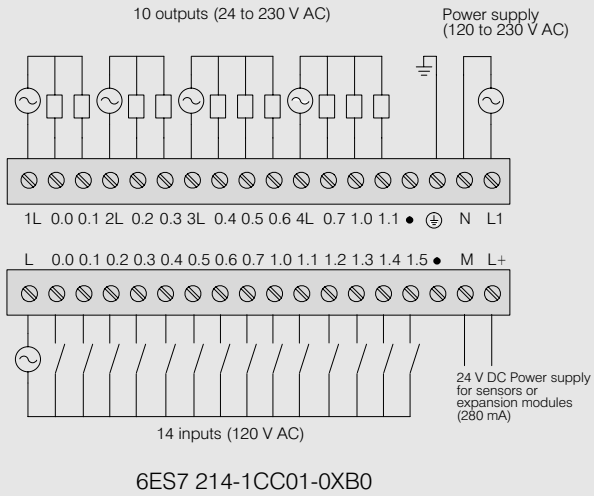
### AC (24 V AC inputs)



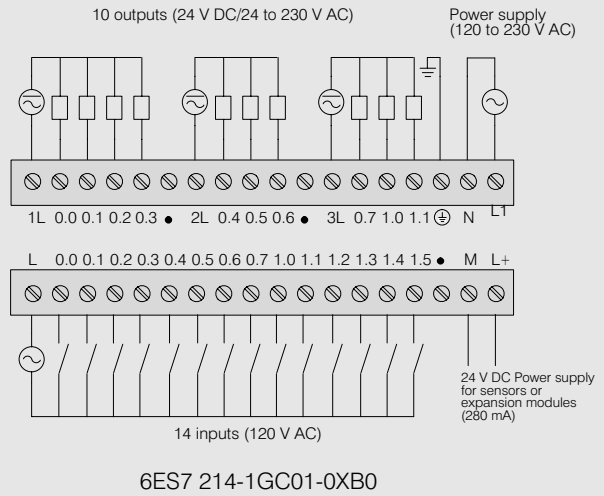
6ES7 214-1DC01-0XB0

## CPU 214(cont.)

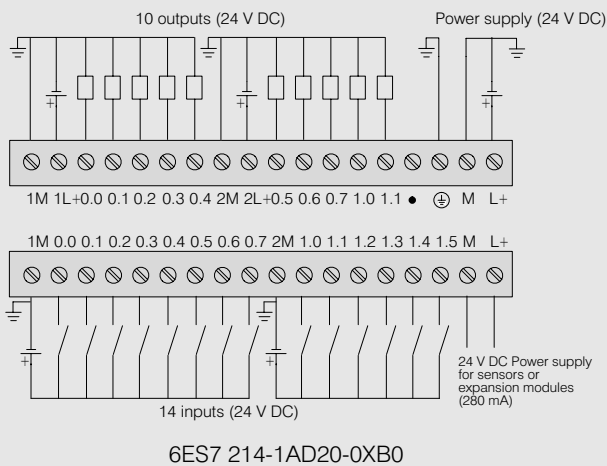
### AC (120 V AC inputs)



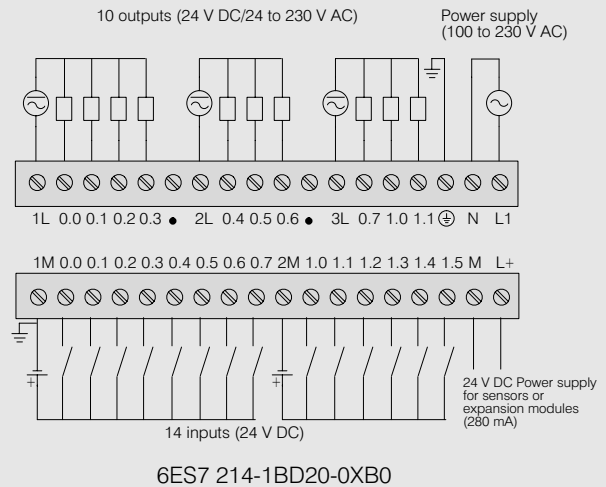
### AC (120 V AC inputs, relays (sink input))



## CPU 224 DC

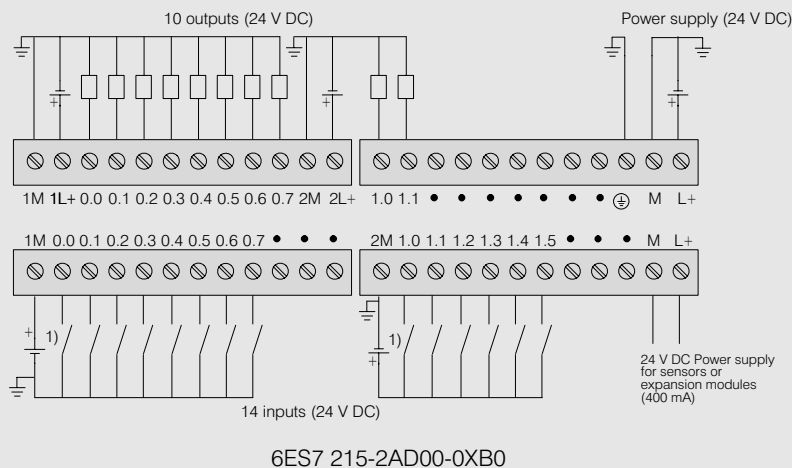


### 100 to 230 V AC/24 V DC/ relays



## CPU 215

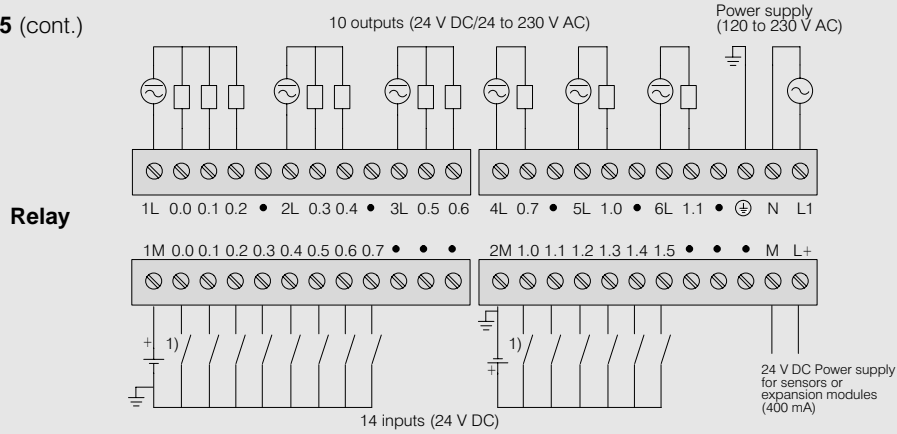
### DC



1) The inputs can be operated as sink inputs or as source inputs per group

# SIMATIC S7-200 CPUs

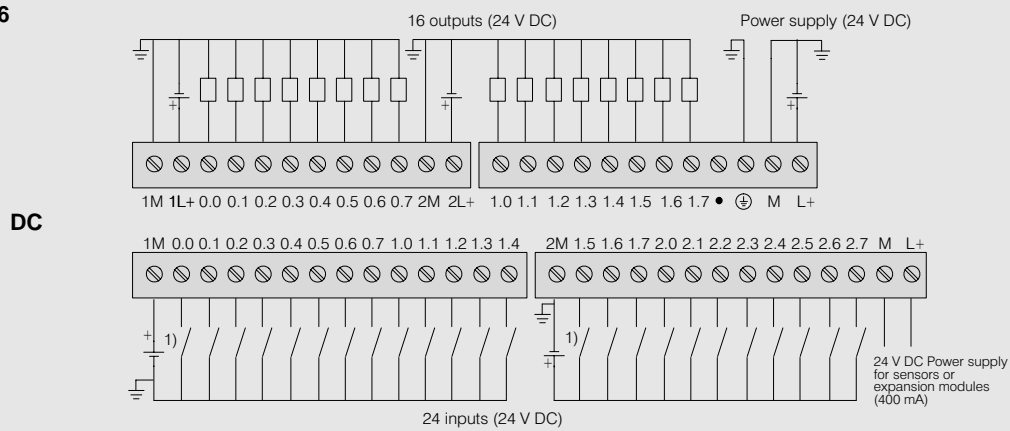
## CPU 215 (cont.)



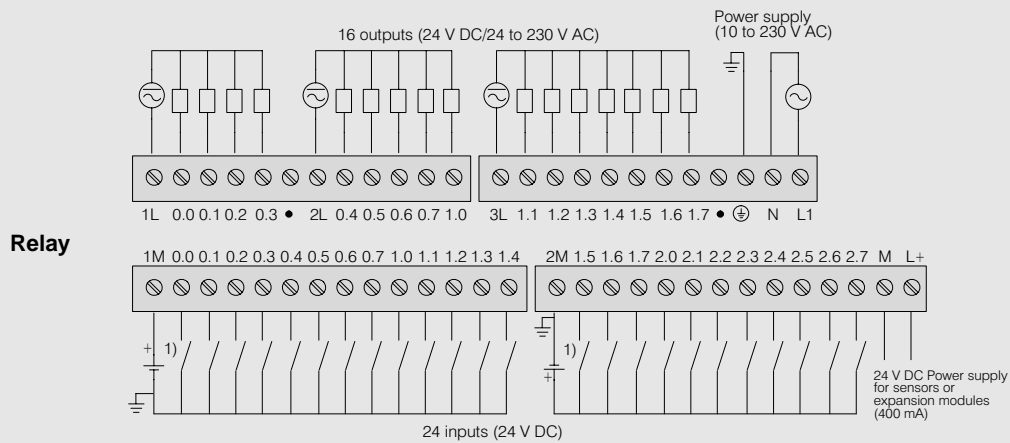
6ES7 215-2BD00-0XB0

1) The inputs can be operated as sink inputs or as source inputs per group

## CPU 216



6ES7 216-2AD00-0XB0



6ES7 216-2BD00-0XB0

1) The inputs can be operated as sink inputs or as source inputs per group

# SIMATIC S7-200

## Digital expansion modules

### Overview



- Digital inputs and outputs to supplement the integrated I/Os of the CPU
- For flexible adaptation of the controller to the task at hand
- For expanding a system at a later date with additional inputs and outputs

### Application

Digital expansion modules provide additional digital inputs/outputs beyond the existing on-board digital inputs/outputs. Advantages for the user include the following:

- Optimum adaptation:  
The user can configure the PLC with any combination of expansion modules to meet the precise needs of the application. This eliminates unnecessary investments. Modules are available with 8, 16 and 32 inputs/outputs
- Flexibility:  
The PLC can be upgraded as the scope of the application increases. Here, integration of the user program is very simple

#### Note:

There are expansion modules available for the S7-21x and S7-22x series. CPUs of the S7-21x series can only be expanded with expansion modules of the S7-21x series. CPUs of the S7-22x series can only be expanded with expansion modules of the S7-22x series. Mixed use of the series is not possible.

### Design

The expansion modules have the same design features as the basic units.

- Assembly on standard DIN rail:  
The modules are snapped on to the rail to the right of the CPU and connected with one another and the CPU with bus connectors
- Direct wall-mounting:  
Integrated holes also permit direct attachment to the walls. This method is recommended for applications subject to vibration

# SIMATIC S7-200

## Digital expansion modules

### Technical specifications, EM 221 digital input modules

EM 221 digital input modules	DC	DC	DC	24 V AC	120 V AC
Connectable to	CPU 21x	CPU 21x	CPU 22x	CPU 21x	CPU 21x
Pluggable I/O terminals	No	No	Yes	No	No
Number of inputs	8	8	8	8	8
• Type	sink input	source input	choice of sink input or source input	—	—
Input voltage					
• rated value	24 V DC	24 V DC	24 V DC	24 V AC	120 V AC
• for "1" signal	15 to 35 V	-15 to -35 V	15 to 30 V	15 to 30 V	79 to 135 V
• for "0" signal	0 to 5 V	0 to -5 V	0 to 5 V	0 to 5 V	0 to 20 V
Isolation	Optocoupler	Optocoupler	Optocoupler	Optocoupler	Optocoupler
• in groups of	4	4	4	8	8
Input current					
• for "1" signal	7 mA	4 mA	4 mA	7 mA	7 mA
Input delay					
• at rated input voltage value	4.5 ms	4.5 ms	4.5 ms	15 ms (max.)	15 ms (max.)
Connection of 2-wire BERO					
• acceptable quiescent current	1 mA	1 mA	1 mA	1 mA	1 mA
Cable length					
• unshielded	300 m	300 m	300 m	300 m	300 m
• shielded	500 m	500 m	500 m	500 m	500 m
Power consumption					
• from backplane (DC 5 V)	60 mA	60 mA	30 mA	70 mA	70 mA
• from sensor power supply or external power supply (24 V DC)	—	—	—	—	—
Power loss	typ. 2 W	2 W	2 W	2 W	2 W
Dimensions (W x H x D) in mm	90x80x62	90x80x62	46 x 80 x 62	90x80x62	90x80x62
Weight	200 g	200 g	150 g	200 g	200 g

### Technical specifications, EM 222 digital output modules

EM 222 digital output modules	DC	DC	Relay	Relay	AC
Connectable to	CPU 21x	CPU 22x	CPU 21x	CPU 22x	CPU 21x
Connectable I/O terminals	No	Yes	No	Yes	No
Number of outputs	8	8	8	8	8
Rated load voltage L+/L1	24 V DC	24 V DC	24 V DC/ 24 V to 230 V AC	24 V DC/ 24 V to 230 V AC	24 to 230 V AC
• Permissible range	20.4 to 28.8 V DC	20.4 to 28.8 V DC	5 to 30 V DC 20 V to 250 V AC	5 to 30 V DC, 20 to 250 V AC	20 to 264 V AC
Output voltage					
• for "1" signal	min. L+ - 1.8 V	18.6 V	L+/L1	—	L1 - 1.5 V
Isolation	Optocoupler	Optocoupler	Relay	Relay	Optocoupler
• in groups of	4	4	4	4	2
Output current max.					
• for "1" signal					
Rated value at 40 °C	0.75 A	0.75 A	2.0 A	2.0 A	1.2 A
Rated value at 55 °C	0.5 A	0.75 A	2.0 A	2.0 A	1.0 A
Minimum current	—	—	—	—	10 mA
• for "0" signal	0.1 mA	10 µA	0 mA	0 mA	2 mA (bei 240 V)
Sum of all output currents					
• at 40 °C					
• at 55 °C	4.0 A	3.0 A	16 A	8 A	4.8 A
(horizontal installation)	3.0 A	3.0 A	16 A	8 A	4.0 A



# SIMATIC S7-200

## Digital expansion modules

### Technical specifications, EM 222 digital output modules (cont.)

EM 222 digital output modules	DC	DC	Relais	Relais	AC
Connectable to	CPU 21x	CPU 22x	CPU 21x	CPU 22x	CPU 21x
Sum of the currents from 2 adjacent outputs					
• at 40 °C	1.0 A	0.75 A	4 A	4 A	1.5 A
• at 55 °C (horizontal installation)	0.75 A	0.75 A	4 A	4 A	1.25 A
Switching capacity of contacts <sup>3)</sup>					
• for resistive load	0.75 A	0.75 A	2 A	2 A	1.2 A
• for inductive load	0.75 A	0.75 A	2 A	2 A	1.2 A <sup>1)</sup>
• for lamp load	5 W	5 W	30/200 W (DC/AC)	30/200 W (DC/AC)	125 W
Service life of the contacts					
• mechanical	—	—	10 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>	—
• at rated load voltage	—	—	100.000	100.000	—
Voltage induced on circuit interruption limited (internally) to	-30 V	L+ -48 V	To be provided externally <sup>2)</sup>	To be provided externally <sup>2)</sup>	380 V
Short-circuit protection	To be provided externally	To be provided externally	To be provided externally	To be provided externally	To be provided externally
Cable length					
• Unshielded	150 m	150 m	150 m	150 m	150 m
• Shielded	500 m	500 m	500 m	500 m	500 m
Power consumption					
• from backplane bus (5 V DC)	80 mA	50 mA	80 mA	40 mA	120 mA
• from sensor power supply or external power supply (24 V DC)	—	—	85 mA	72 mA	—
Power loss typ.	4 W	2 W	3 W	2 W	5 W
Dimensions (W x H x D) in mm	90 x 80 x 62	45 x 80 x 62	90 x 80 x 62	45 x 80 x 62	90 x 80 x 62
Weight	180 g	150 g	200 g	170 g	200 g

1) According to IEC 947-1

2) See Manual „S7-200 Hardware description“

3) 1 output up to 40 °C

# SIMATIC S7-200

## Digital expansion modules

### Technical specifications, EM 223 digital input/output modules

	8 I/O	16 I/O	32 I/O	8 I/O	16 I/O	32 I/O	8 I/O
Inputs:	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	120 V AC
Outputs:	24 V DC	24 V DC	24 V DC	Relay	Relay	Relay	24 to 230 V AC
Connectable to	CPU 21x	CPU 21x	CPU 21x	CPU 21x	CPU 21x	CPU 21x	CPU 21x
Plug-in I/O terminals	No	No	No	No	No	No	No
Inputs	4	8	16	4	8	16	4
Input voltage							
• Rated value	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	120 V AC
• for "1" signal	15 to 30 V DC	15 to 30 V DC	15 to 30 V DC	15 to 30 V DC	± (15 to 30 V DC)	± (15 to 30 V DC)	79 to 135 V AC
• for "0" signal	0 to 5 V	-5 to 5 V	-5 to 5 V	0 to 5 V	-5 to +5 V	-5 to +5 V	0 to 20 V
Isolation	Optocoupler	Optocoupler	Optocoupler	Optocoupler	Optocoupler	Optocoupler	Optocoupler
• in groups of	4	4	8	4	4	8	4
Input current							
• at "1" signal	7 mA	7 mA	7 mA	7 mA	7 mA	7 mA	7 mA
Input delay							
• at rated input voltage value	3.5 ms	3.5 ms	3.5 ms	3.5 ms	4.5 ms	4.5 ms	15 ms
Connection of 2-wire BERO							
• acceptable quiescent current	1 mA	1 mA	1 mA	1 mA	1 mA	1 mA	1 mA
Outputs	4	8	16	4	8	16	4
Rated load voltage L+/L1	24 V DC	24 V DC	24 V DC	24 V DC 24 to 230 V AC	24 V DC 24 to 230 V AC	24 V DC 24 to 230 V AC	24 V to 230 V AC
• Permissible range	20.4 V DC to 28.8 V DC	20.4 V DC to 28.8 V DC	20.4 V DC to 28.8 V DC	5 V DC to 30 V DC, 20 V AC to 250 V AC	5 V DC to 30 V DC, 20 V AC to 250 V AC	5 V DC to 30 V DC, 20 V AC to 250 V AC	70 V AC to 264 V AC
Output voltage							
• at "1" signal min.	L+ - 1.8 V	L+ - 0.2 V	L+ - 0.2 V	L+/L1	L+/L1	L+/L1	L <sub>1</sub> - 1.5 V
Isolation	Optocoupler	Optocoupler	Optocoupler	Optocoupler	Relay	Relay	Optocoupler
• in groups of	4	4	4 and 8	4	4	4	4
Output current max.							
• at "1" signal							
Rated value at 40 °C	2.5 A	0.5 A	0.5 A	2.0 A	2.0 A	2.0 A	2.4 A
Rated value at 55 °C	2.0 A	0.5 A	0.5 A	2.0 A	2.0 A	2.0	2.0 A
Minimum current	—	—	—	—	—	—	—
• for "0" signal	—	200 µA	200 µA	—	—	—	10 mA
Sum of all output currents							
• at 40 °C	4.0 A	4.0 A	8.0 A	—	—	—	4.0 A
• at 55 °C	3.0 A	4.0 A	8.0 A	—	—	—	3.0 A
(horizontal installation)							
Sum of the currents from 2 adjacent outputs							
• at 40 °C	3.75 A	1.0 A	1.0 A	—	—	—	—
• at 55 °C	3.0 A	1.0 A	1.0 A	—	—	—	—
(horizontal installation)							
Switching capacity of contacts <sup>1)</sup>							
• for resistive load	2.5 A	0.5 A	0.5 A	2 A	2 A	2 A	1.2 A
• for inductive load	2 A	0.5 A	0.5 A	2 A	2 A	2 A	1.2 A
• for lamp load	1 W	12 W	12 W	30/200 W (AC/DC)	30/200 W (AC/DC)	30/200 W (AC/DC)	1.25 W
Power loss max.	1 µA	200 µA	200 µA	1 µA	1 µA	1 µA	4 µA
Switching delay							
• "1" signal max.	25 µs	150 µs	150 µs	—	—	—	—
• "0" signal max.	120 µs	400 µs	400 µs	10 ms	10 ms	10 ms	1/2 cycle

1) 1 output up to 40 °C; for several outputs and higher temperatures on request

# SIMATIC S7-200

## Digital expansion modules

### Technical specifications, EM 223 digital input/output modules (cont.)

	8 I/O	16 I/O	32 I/O	8 I/O	16 I/O	32 I/O	8 I/O
Inputs:	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	20 V AC
Outputs:	24 V DC	24 V DC	24 V DC	Relay	Relay	Relay	24 to 230 V AC
Connectable to	CPU 21x	CPU 21x	CPU 21x	CPU 21x	CPU 21x	CPU 21x	CPU 21x
<b>Outputs (cont.)</b>							
Service life of the contacts (number of switching cycles to VDE 0660, Part 200)							
• 15 V AC	—	—	—	3)	3)	3)	—
• 13 V DC	—	—	—	3)	3)	3)	—
Voltage induced on circuit interruption limited (internally) to	- 30 V	- 65 V	- 65 V	—	—	—	380 V
<b>General</b>							
Short-circuit protection	To be provided externally	0.7 to 1.9 A/channel	0.7 to 1.9 A/channel	To be provided externally	To be provided externally	To be provided externally	To be provided externally
Cable length							
• Unshielded	150 m	150 m	150 m	150 m	150 m	150 m	150 m
• Shielded	500 m	500 m	500 m	500 m	500 m	500 m	500 m
Power consumption							
• from backplane bus	80 mA	120 mA	210 mA	80 mA	100 mA	160 mA	100 mA
• from 24 V DC (sensor current)	30 mA	60 mA	120 mA	30 mA	60 mA	120 mA	30 mA
• from 24 V DC (coil current)	—	—	—	35 mA	65 mA	130 mA	—
Power loss typ.	3.5 W	3.0 W	5.5 W	2 W	3.5 W	7 W	5.5 W
Isolation tested for							
• coil to contact	—	—	—	1500 V AC	1500 V AC	1500 V AC	—
• contact to contact	500 V AC	500 V AC	500 V AC	500 V AC	500 V AC	500 V AC	1500 V AC
Dimensions (W x H x D) in mm	90 x 80 x 62	90 x 80 x 62	160 x 80 x 62	90 x 80 x 62	90 x 80 x 62	160 x 80 x 62	90 x 80 x 62
Weight approx.	200 g	200 g	400 g	200 g	300 g	300 g	200 g

3) On request; at  $\cos \phi = 0.4$ : approximately  $10^5$  switching operations

### Technical specifications, EM 223 digital input/output modules (cont.)

	16 I/O	16 I/O		16 I/O	16 I/O
Inputs:	24 V DC	24 V DC	Inputs:	24 V DC	24 V DC
Outputs:	24 V DC	Relay	Outputs:	24 V DC	Relay
Connectable to	CPU 22x	CPU 22x	Connectable to	CPU 22x	CPU 22x
Plug-in I/O terminals	Yes	Yes	<b>Outputs</b>	<b>8</b>	<b>8</b>
<b>Inputs</b>	<b>8</b>	<b>8</b>	Rated load voltage L+/L1	24 V DC	24 V DC
• Type	either sink input or source input per group	either sink input or source input per group	• Permissible range	20.4 V to 28.8 V DC	24 to 230 V AC
Input voltage			Output voltage		5 V DC to 30 V DC, 5 V AC to 250 V AC
• Rated value	24 V DC	24 V DC	• at "1" signal min.	18.6 V	—
• for "1" signal	15 to 30 V DC	15 to 30 V DC	Isolation	Optocoupler	Relay
• for "0" signal	0 to 5 V	0 to 5 V	• in groups of	4	4
Isolation	Optocoupler	Optocoupler	Output current max.		
• in groups of	4	4	• at "1" signal		
Input current			Rated value at 40 °C	0.75 A	2.0 A
• at "1" signal	4 mA	4 mA	Rated value at 55 °C	0.75 A	2.0 A
Input delay			Minimum current	—	—
• at rated input voltage value	4.5 ms	4.5 ms	• for "0" signal	10 $\mu$ A	0 mA
Connection of 2-wire BERO			Sum of all output currents		
• acceptable quiescent current	1 mA	1 mA	• at 40 °C	2.0 A	8 A
			• at 55 °C	2.0 A	8 A
			(horizontal installation)		

# SIMATIC S7-200

## Digital expansion modules

### Technical specifications, EM 223 digital input/output modules (cont.)

	16 I/O	16 I/O		16 I/O	16 I/O
Inputs:	24 V DC	24 V DC	Inputs:	24 V DC	24 V DC
Outputs:	24 V DC	Relay	Outputs:	24 V DC	Relay
Connectable to	CPU 22x	CPU 22x	Connectable to	CPU 22x	CPU 22x
<b>Outputs (cont.)</b>	<b>8</b>	<b>8</b>	<b>General</b>		
Sum of the currents from 2 adjacent outputs			Short-circuit protection	To be provided externally	To be provided externally
• at 40 °C	0.75 A	4.0 A	Cable length		
• at 55 °C	0.75 A	4.0 A	• Unshielded	150 m	150 m
(horizontal installation)			• Shielded	500 m	500 m
Switching capacity of contacts <sup>1)</sup>			Power consumption		
• for resistive load	0.75 A	2.0 A	• from backplane bus (5 V DC)	100 mA	80 mA
• for inductive load	0.75 A	2.0 A	• from sensor power supply or external power supply (24 V DC)	—	72 mA
• for lamp load	5 W	30/200 W (DC/AC)	Power loss typ.	3 W	3 W
Service life of the contacts (number of switching cycles to VDE 0660, Part 200)			Dimensions (W x H x D) in mm	71.2 x 80 x 62	71.2 x 80 x 62
• mechanical	—	10.000.000	Weight	200 g	300 g
• at rated load voltage	—	100.000			
Voltage induced on circuit interruption limited (internally) to	L+ -48 V	—			

1) 1 output up to 40 °C; for several outputs and higher temperatures on request

### Ordering data

Order No.

Order No.

#### EM 221 digital input modules

incl. BC 290 bus connector  
for CPU 212/214/215/216

- 8 inputs, 24 V DC, sink input
- 8 inputs, 24 V DC, source input
- 8 inputs, 24 V AC
- 8 inputs, 120 V AC

for CPU 222/224

- 8 inputs, 24 V DC, sink and source input

#### EM 222 digital output modules

incl. BC 290 bus connector  
for CPU 212/214/215/216

- 8 outputs, 24 V DC
- 8 outputs, Relay
- 8 outputs, 24 to 230 V AC

for CPU 222/224

- 8 outputs, 24 V DC
- 8 outputs, Relay

#### EM 223 digital input/output modules

incl. BC 290 bus connector  
for CPU 212/214/215/216

- 4 inputs, 24 V DC
- 4 outputs, 24 V DC
- 8 inputs, 24 V DC
- 8 outputs, 24 V DC
- 16 inputs, 24 V DC
- 16 outputs, 24 V DC
- 4 inputs, 24 V DC
- 4 outputs, Relay
- 8 inputs, 24 V DC
- 8 outputs, Relay
- 16 inputs, 24 V DC
- 16 outputs, Relay
- 4 inputs, 120 V AC
- 4 outputs, 24 to 230 V AC

**6ES7 221-1BF00-0XA0**  
**6ES7 221-1BF10-0XA0**  
**6ES7 221-1JF00-0XA0**  
**6ES7 221-1EF00-0XA0**

**6ES7 221-1BF20-0XA0**

**6ES7 222-1BF00-0XA0**  
**6ES7 222-1HF00-0XA0**  
**6ES7 222-1EF00-0XA0**

**6ES7 222-1BF20-0XA0**  
**6ES7 222-1HF20-0XA0**

**6ES7 223-1BF00-0XA0**

**6ES7 223-1BH00-0XA0**

**6ES7 223-1BL00-0XA0**

**6ES7 223-1HF00-0XA0**

**6ES7 223-1PH00-0XA0**

**6ES7 223-1PL00-0XA0**

**6ES7 223-1EF00-0XA0**

#### EM 223 digital input/output modules

incl. BC 290 bus connector  
for CPU 222/224

- 8 inputs, 24 V DC
- 8 outputs, 24 V DC
- 8 inputs, 24 V DC
- 8 outputs, Relay

#### Pluggable I/O screw-type terminal

- with 7 connections (for EM 221/222)
- with 12 connections (for EM 223)

#### Terminal block

- 12-pin, for CPU 221/212/222, outputs of the CPU 215/216 and EMs from the 21x series with 32 I/O, 10 pcs.
- 14-pin, for inputs of the CPU 215/216 and EMs from the 21x series mit 8/16 digital I/O or analog I/O, 10 pcs.

#### BC 290 bus connector

for EM from the 21x series  
10 pcs. (spare part)

#### Labelling strips

for CPU 212, CPU 214 and EMs from the 21x series  
(24 pcs., spare part)

**6ES7 223-1BH20-0XA0**

**6ES7 223-1PH20-0XA0**

**6ES7 292-1AD20-0AA0**

**6ES7 292-1AE20-0AA0**

**6ES7 290-2AA00-0XA0**

**6ES7 290-2CA00-0XA0**

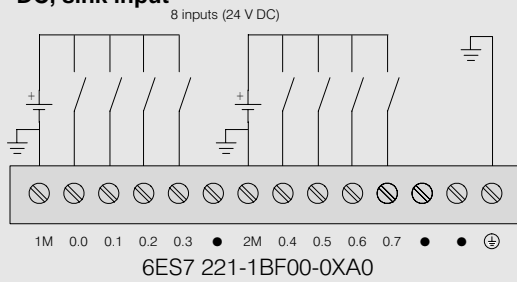
**6ES7 290-0AA00-0XA0**

**6ES7 292-2AA00-0XA0**

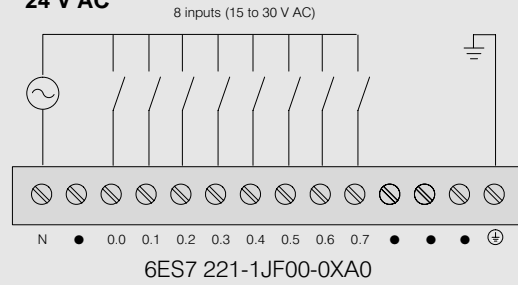
# SIMATIC S7-200

## Digital expansion modules

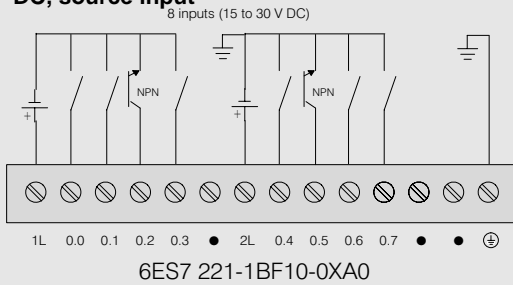
### DC, sink input



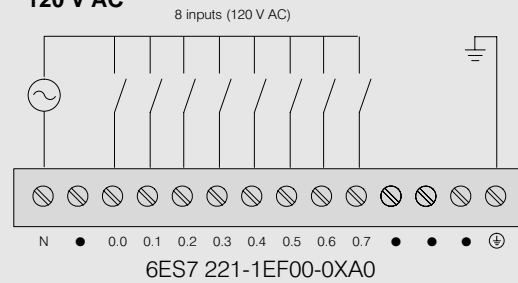
### 24 V AC



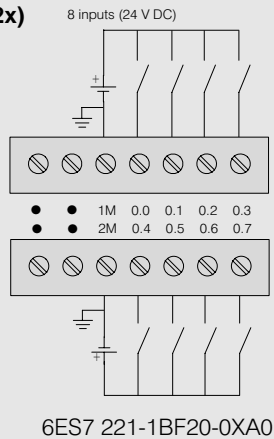
### DC, source input



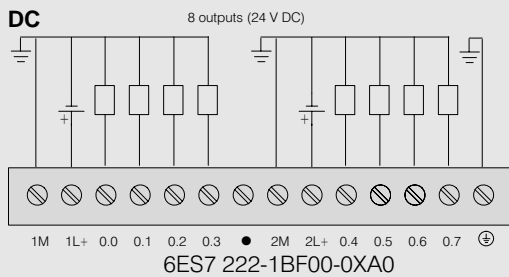
### 120 V AC



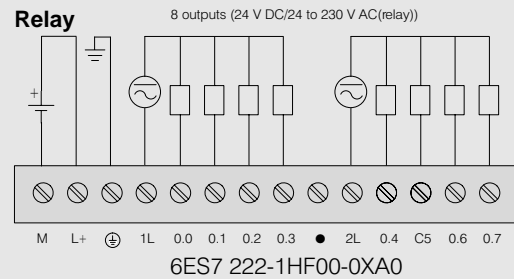
### DC (for CPU 22x)



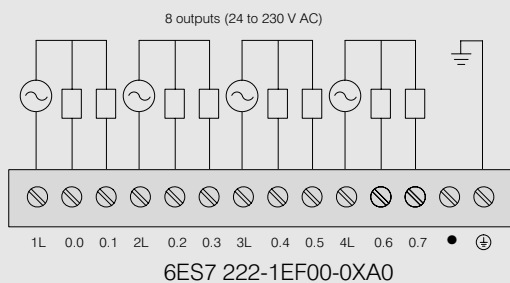
### DC



### Relay



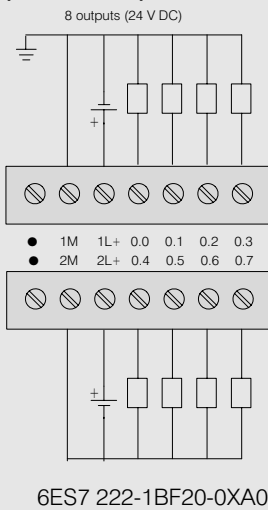
### AC



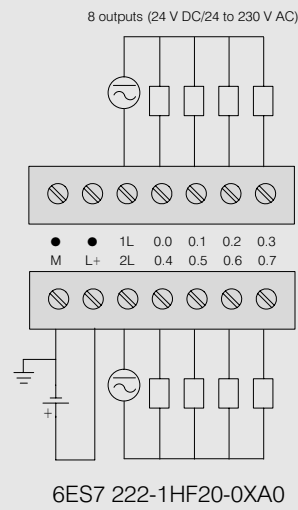
# SIMATIC S7-200

## Digital expansion modules

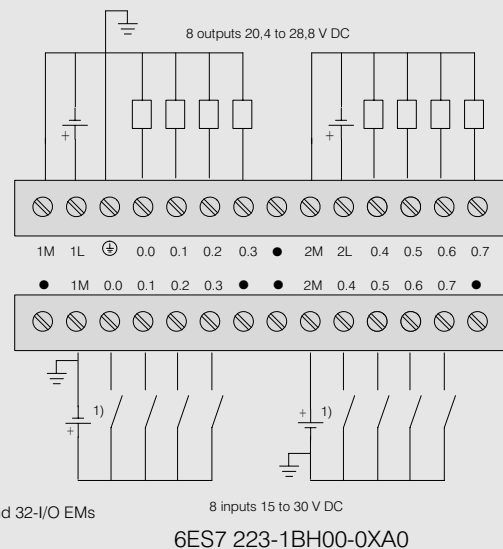
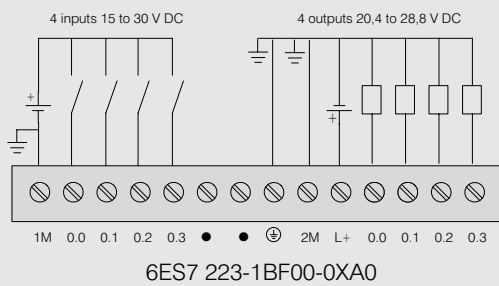
### DC (for CPU 22x)



### Relay (for CPU 22x)

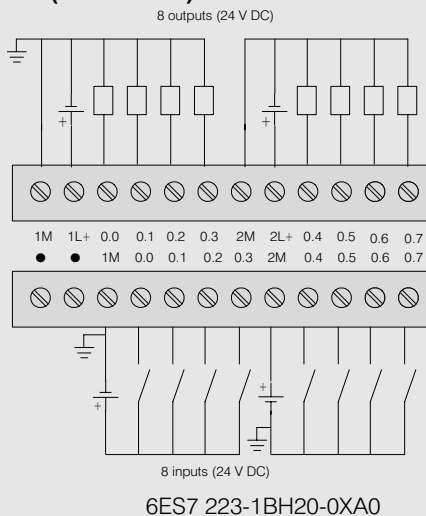


### DC

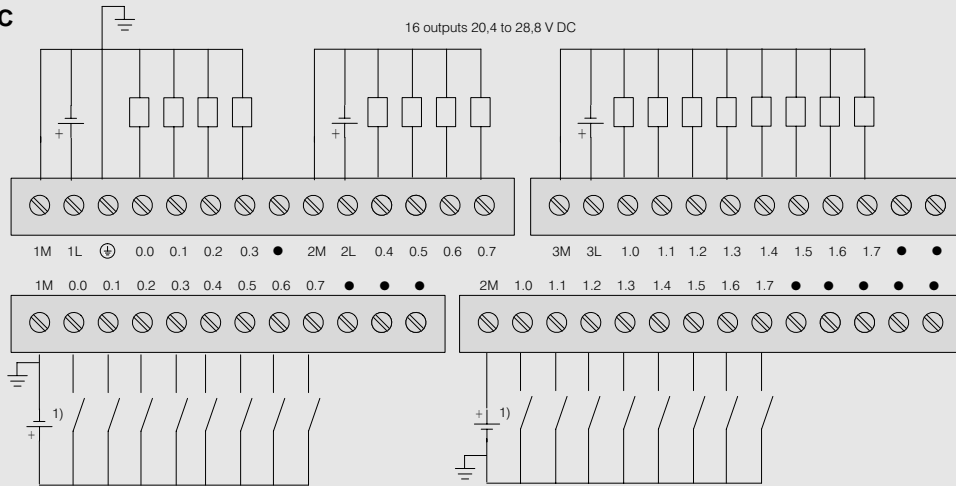


1) These inputs can be operated as sink inputs or as source inputs per group in the case of 16- and 32-I/O EMs

### DC (for CPU 22x)

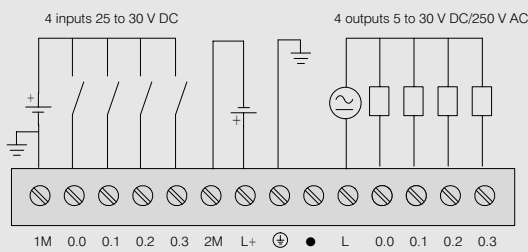


### AC

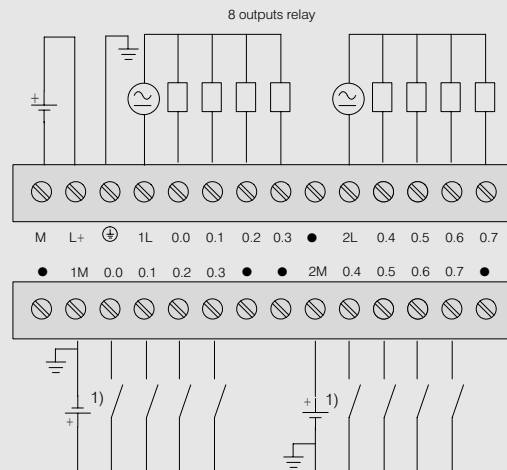


16 inputs 15 to 30 V DC  
6ES7 223-1BL00-0XA0

### Relay



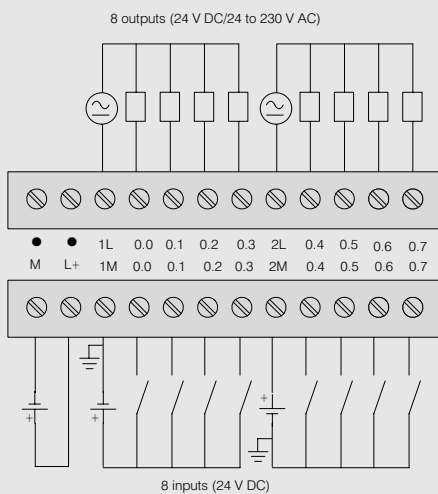
6ES7 223-1HF00-0XA0



8 inputs  
6ES7 223-1PH00-0XA0

1) These inputs can be operated as sink inputs or as source inputs per group in the case of 16- and 32-I/O EMs

### Relay (for CPU 22x)

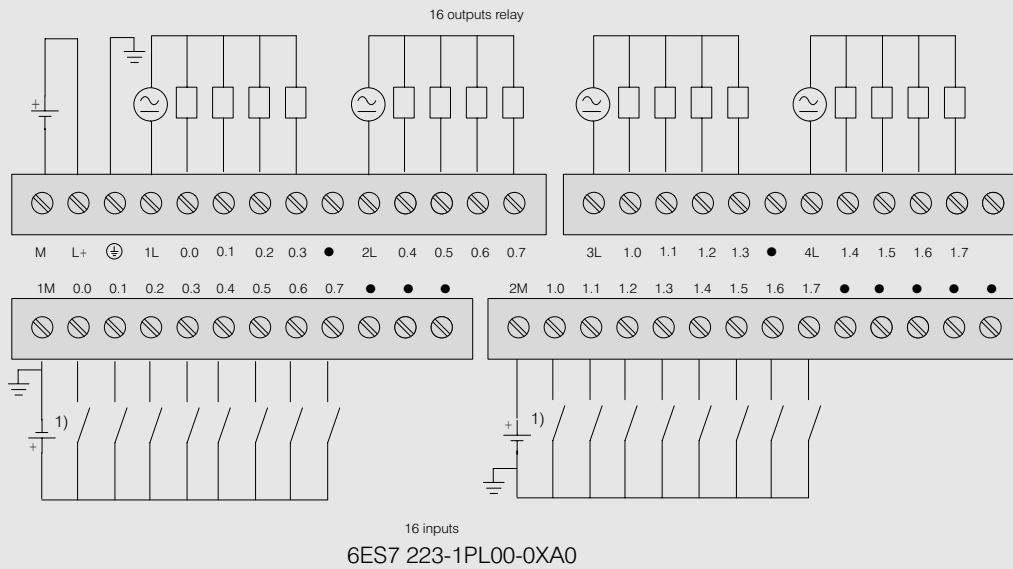


6ES7 223-1PH20-0XA0

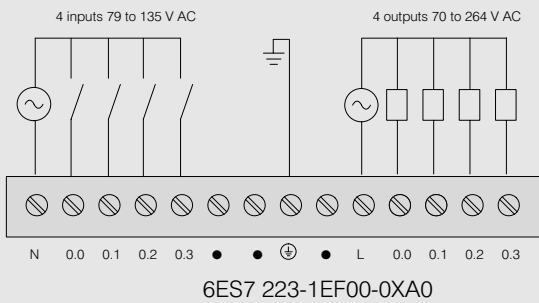
# SIMATIC S7-200

## Digital expansion modules

### Relay



### AC



1) These inputs can be operated as sink inputs or as source inputs per group in the case of 16- and 32-I/O EMs



# SIMATIC S7-200

## Analog expansion modules

### Overview



- Analog inputs and outputs for the SIMATIC S7-200
- With extremely short conversion times
- For connecting analog sensors and actuators without an additional amplifier
- For performing even complex automation tasks

### Application

Analog expansion modules provide a means of using analog input/output modules. The advantages for the user include the following:

- Optimum adaptation; using analog and digital expansion modules the user can adapt the controller even to complex tasks.

- Direct connection of sensors and actuators; 12-bit resolution and different input/output ranges permit connection of sensors and actuators without additional amplifiers
- Flexibility; the controller can be upgraded as the scope of the application grows. Modifying the user program is extremely easy.

#### Note:

There are expansion modules for the S7-21x and the S7-22x series. You can use only expansion modules of the S7-21x series to expand S7-21x series CPUs. You can use only expansion modules of the S7-22x series to expand S7-22x series CPUs. You cannot have a mixed series application.

### Design

The expansion modules have the same design features as the basic units.

- Assembly on a standard DIN rail; the modules are snapped onto the rail to the right of the CPU and are connected to each other and to the CPU by means of bus connectors
- Direct wall mounting; integrated mounting holes also facilitate direct screw attachment to walls. This mounting method is recommended for applications subject to high vibration levels.

# SIMATIC S7-200

## Analog expansion modules

### Technical specifications EM 231 analog input modules

Connectable to	CPU 21x
Pluggable I/O terminals	No
Number of inputs	3, differential
Polarity reversal protection	No
Input ranges/ input resistance	0 to 5 V/10 M $\Omega$ 0 to 10 V/10 M $\Omega$ 0 to 20 mA/10 M $\Omega$
Permissible input voltage for voltage input	max. 30 V
Permissible input current for current input	max. 32 mA
Isolation	No
Analog-digital conversion time	250 $\mu$ s
Resolution	12 bits + sign
Noise suppression for noise frequency	40 dB 50/60 Hz
Common-mode voltage	max. 12 V

Connectable to	CPU 21x
Operational limits (over the entire temperature range, referred to input range)	max. $\pm 1.2\%$
Displayable range of conver- sion values	
• unipolar signals	0 to 32.000
• bipolar signals	-
Characteristic linearization	No
Temperature compensation	No
Diagnostics	LED, EXTF
Power consumption	
• from backplane bus (5 V DC)	70 mA
• from sensor power supply or external power supply (24 V DC)	60 mA
Power loss	typ. 2 W
Dimensions (W x H x D) in mm	90 x 80 x 62
Weight	200 g

### Technical specifications EM 232 analog output modules

Connectable to	CPU 21x
Pluggable I/O terminals	No
Number of outputs	2
Output ranges	
• voltage outputs	-10 to +10 V
• current outputs	4 to 20 mA
Load impedance	
• for voltage outputs	min. 5 k $\Omega$
• for current outputs	max. 0.5 k $\Omega$
Voltage output	
• short-circuit protection	Yes
• short-circuit current	max. 11 mA
Current output	
• open-circuit voltage	max. 15 V
Isolation	No
Resolution	
• for voltage output	12 Bit (5 mV/counter)
• for current output	11 Bit (10 $\mu$ A/counter)
Setting time	
• for voltage output	100 $\mu$ s
• for current output	2 ms

Connectable to	CPU 21x
Displayable range of conver- sion values	
• unipolar signals	0 to 32.000
• bipolar signals	-32.000 to +32.000
Operational limits (0 to 55 °C, referred to output range)	
• voltage	$\pm 2.0\%$
• current	$\pm 2.0\%$
Basic error limits (operational limits at 25 °C, re- ferred to output range)	
• voltage	$\pm 0.5\%$
• current	$\pm 0.5\%$
Power consumption	
• from backplane bus (5 V DC)	70 mA
• from sensor power supply or external power supply (24 V DC)	60 mA
Power loss	typ. 2.0 W
Dimensions (W x H x D) in mm	90 x 80 x 62
Weight	200 g

# SIMATIC S7-200

## Analog expansion modules

### Technical specifications EM 235 analog input/output modules

Connectable to	CPU 21x	Connectable to	CPU 21x
Pluggable I/O terminals	No	Number of outputs	1
Number of inputs	3, differential	Output ranges	
Polarity reversal protection	No	• voltage outputs	-10 to +10 V
Input voltage	30 V	• current outputs	0 to 20 mA
Input ranges/ input resistance	0 to 50 mV/10 M $\Omega$ 0 to 100 mV/10 M $\Omega$ 0 to 500 mV/10 M $\Omega$ 0 to 1 V/10 M $\Omega$ 0 to 5 V/10 M $\Omega$ 0 to 10 V/10 M $\Omega$ 0 to 20 mA/10 M $\Omega$ $\pm 25$ mV/10 M $\Omega$ $\pm 50$ mV/10 M $\Omega$ $\pm 100$ mV/10 M $\Omega$ $\pm 250$ mV/10 M $\Omega$ $\pm 500$ mV/10 M $\Omega$ $\pm 1$ V/10 M $\Omega$ $\pm 2.5$ V/10 M $\Omega$ $\pm 5$ V/10 M $\Omega$ $\pm 10$ V/10 M $\Omega$	Operational limits	
Permissible input voltage for voltage input	max. 30 V	• for voltage outputs	min. 5 k $\Omega$
Permissible input current for current input	max. 32 mA	• for current outputs	max. 0.5 k $\Omega$
Isolation	No	Voltage output	
Response time (all channels)	10 $\mu$ s	• short-circuit protection	Yes
Analog-digital conversion time	25 $\mu$ s	• short-circuit current	max. 11 mA
Resolution	12 bits + sign	Current output	
Noise suppression	40 dB	• open-circuit voltage	max. 15 V
for noise frequency	50/60 Hz	Isolation	No
Common-mode voltage	max. 12 V	Resolution	
Displayable range of conversion values		• for voltage output	12 bits (5 mV/counter)
• unipolar signals	0 to 32.000	• for current output	11 bits (10 $\mu$ A/counter)
• bipolar signals	-32.000 to +32.000	Setting time	
Characteristic linearization	No	• for voltage output	100 $\mu$ s
Temperature compensation	No	• for current output	2 ms
Diagnostics	LED, EXTF	Displayable range of conver- sion values	
		• unipolar signals	0 to 32.000
		• bipolar signals	-32.000 to +32.000
		Operational limits (0 to 60 °C, referred to output range)	
		• voltage	$\pm 2.0$ %
		• current	$\pm 2.0$ %
		Basic error limits (operational limits at 25 °C, re- ferred to output range)	
		• voltage	$\pm 0.5$ %
		• current	$\pm 0.5$ %
		Power consumption	
		• from backplane bus	70 mA
		(5 V DC)	
		• from sensor power supply or external power supply (24 V DC)	60 mA
		Power loss	typ. 2.0 W
		Dimensions (W x H x D) in mm	90 x 80 x 62
		Weight	200 g

### Ordering data

#### EM 231 analog input module

incl. BC 290 bus connector  
for CPU 212/214/215/216  
3 inputs

Order No.

**6ES7 231-0HC00-0XA0**

#### EM 232 analog input module

incl. BC 290 bus connector  
for CPU 212/214/215/216  
2 outputs

**6ES7 232-0HB00-0XA0**

#### EM 235 analog input/output mod- ule

incl. BC 290 bus connector  
for CPU 212/214/215/216  
3 inputs, 1 output

**6ES7 235-0KD00-0XA0**

#### Terminal block

14-pin, for inputs of the  
CPU 215/216 and EMs from the  
21x series with 8/16 I/O or analog  
I/O, 10 pcs.

Order No.

**6ES7 290-2CA00-0XA0**

#### BC 290 bus connector

for EMs from the 21x series  
10 pcs. (spare part)

**6ES7 290-0AA00-0XA0**

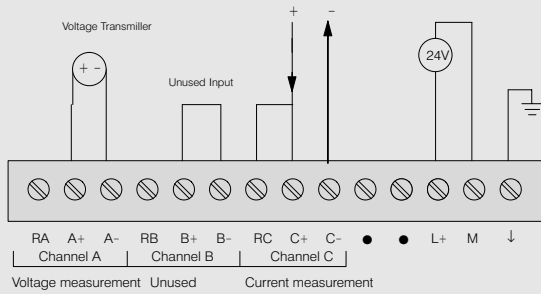
#### Labelling strips

for CPU 212, CPU 214 and EMs  
from the 21x series;  
24 pcs. (spare part)

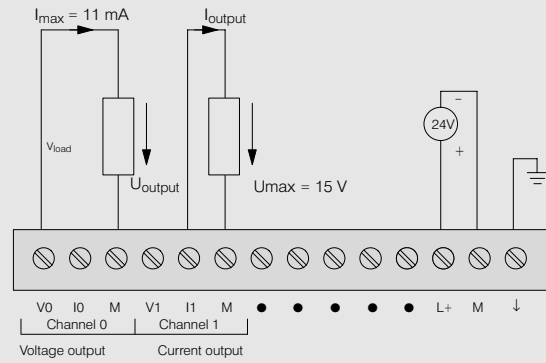
**6ES7 292-2AA00-0XA0**

# SIMATIC S7-200

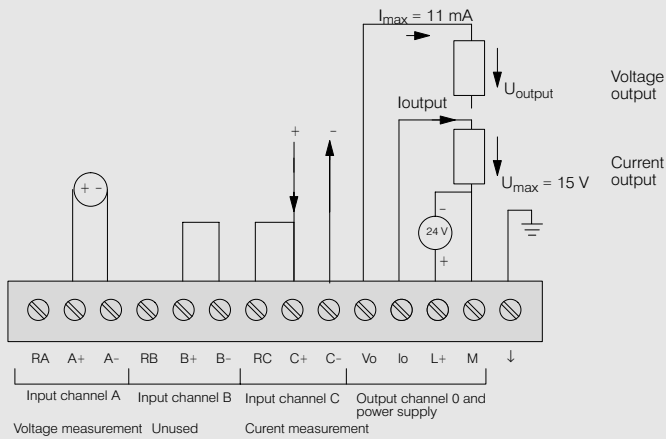
## Analog expansion modules



6ES7 231-0HC00-0XA0



6ES7 232-0HB00-0XA0



6ES7 235-0KD00-0XA0

# SIMATIC S7-200 Communications processors

CP 242-2

## Overview



- The SIMATIC S7-200's master connection to the AS-Interface
- Significant increase in the number of inputs/outputs of the S7-200
- Simple operation in the I/O address area of the SIMATIC S7-200
- No configuring required
- Monitoring of the supply voltage on the AS-Interface shaped cable

## Application

The SIMATIC S7-200 can be connected as a master to the AS-Interface via the CP 242-2. Up to 248 binary elements can be controlled via 31 AS-interface slaves, thus significantly increasing the number of S7-200 inputs/outputs.

**Note:**  
There are expansion modules for the S7-21x and the S7-22x series. You can use only expansion modules of the S7-21x series to expand S7-21x series CPUs.

You can use only expansion modules of the S7-22x series to expand S7-22x series CPUs. You cannot have a mixed series application.

## Design

The CP 242-2 is connected to the S7-200 like an expansion module. It has the following:

- Terminal block; for direct connection of the AS-Interface cable

- Indicator LEDs in the front panel; for indicating the operating states as well as the connected and activated slaves and their availability.

- Pushbuttons; for changing the operating state and the status/slave indication as well as accepting the existing configuration.

## Principle of operation

The CP 242-2 handles all communications between the SIMATIC S7-200 and the AS-interface.

It occupies 8 analog and 8 digital inputs/outputs in the I/O address area of the S7-200.

It is not necessary to configure the CP.

## Function

The CP 242-2 controls up to 31 AS-Interface slaves in accordance with the AS-Interface specification. Up to 248 binary elements can be controlled with the use of bidirectional slaves.

The CP 242-2 can be used in two operating modes:

- Standard mode:  
Up to 124 input and output bits of the AS-Interface slaves can be addressed via the 8AI/AO area.

- Extended mode; access to master calls is possible in accordance with the AS-Interface specification (for example, writing parameters).

# SIMATIC S7-200

## Communications processors

### CP 242-2 (continued)

#### Technical specifications

Master profile	M0/M1	Power loss	2 W
Bus cycle time	5 ms with 31 slaves	Permissible ambient conditions	
Interfaces		• operating temperature	0 to 60 °C
• Address area assignment in the PLC	corresponds to 2 I/O modules (8 DI/8 DO and 8 AI/8 AO)	• transportation and storage temperature	-40 to +70 °C
• Connection of AS-Interface	Terminal connection	• relative humidity	95% at 25 °C
Supply voltage	5 V DC via backplane bus	Construction	
Current consumption		• Dimensions (W x H x D) in mm	90 x 80 x 60
• via backplane bus	typ. 200 mA at 5 V DC	• Weight	approx. 200 g
• via AS-Interface shaped cables	max. 100 mA		

#### Ordering data

##### CP 242-2

for connecting the SIMATIC S7-200 CPUs from the 21x series to the AS-Interface; with bus connector

##### BC 290 bus connector

10 pcs. (spare part)

Order No.

**6GK7 242-2AX00-0XA0**

**6ES7 290-0AA00-0XA0**

##### CP 242-2 manual

incl. examples  
German  
English  
French  
Italian

Order No.

**6GK7 242-2AX00-8AA0**  
**6GK7 242-2AX00-8BA0**  
**6GK7 242-2AX00-8CA0**  
**6GK7 242-2AX00-8EA0**

# SIMATIC S7-200 Communications processors

CP 242-8

## Overview



- PROFIBUS-DP slave/AS-Interface master in one module for the SIMATIC S7-200
- Significant increase in inputs and outputs of the S7-200
- Simple operation in the I/O address area of the SIMATIC S7-200
- No configuring required
- Monitoring of the supply voltage on the AS-Interface shaped cable

## Application

The SIMATIC S7-200 can be connected via the CP 242-8

- to the AS-Interface as master (M1)
- to PROFIBUS-DP as DP slave (in accordance with EN 50170).

Up to 248 binary elements can be controlled via 31 AS-Interface slaves. Up to 56 Kbytes of data can be transferred via PROFIBUS-DP.

This significantly increases the number of inputs/outputs of the S7-200.

### Note:

There are expansion modules for the S7-21x and the S7-22x series. You can use only expansion modules of the S7-21x series to expand S7-21x series CPUs.

You can use only expansion modules of the S7-22x series to expand S7-22x series CPUs.

You cannot have a mixed series application.

## Design

The CP 242-8 is connected to the S7-200 like an expansion module. It is equipped with the following for the AS-Interface:

- Terminal block; for direct connection of the AS-Interface cable
- Indicator LEDs in the front panel; for indicating the operating states as well as the connected and activated slaves and their availability
- Pushbuttons; for changing the operating states and the indicators as well as accepting the existing configuration

For PROFIBUS-DP, it is equipped with:

- 9-pin sub-D connector for connecting to PROFIBUS-DP
- Indicators; for PROFIBUS-DP slave address, bus error and diagnostics
- Pushbuttons; for setting the PROFIBUS-DP slave address

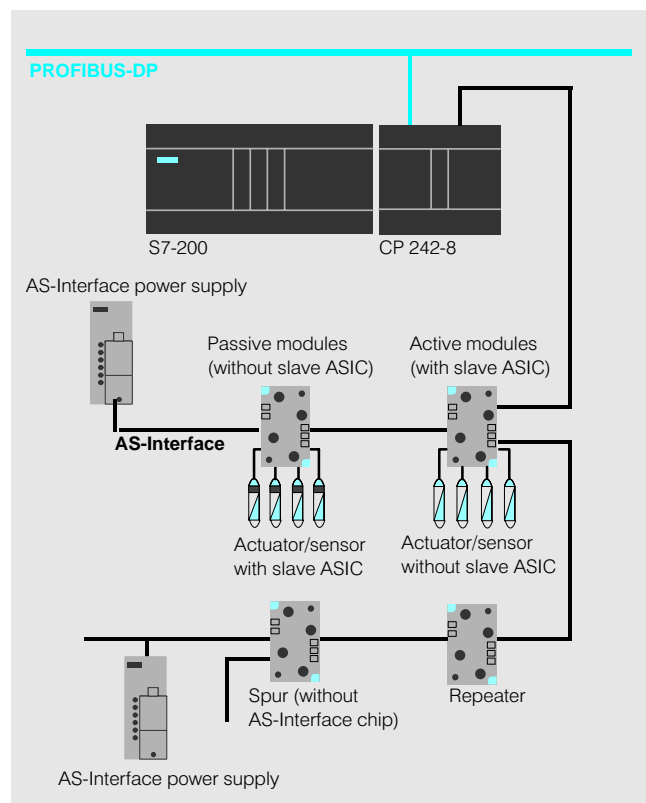


Fig. 6 Connection of the S7-200 with CP 242-8

# SIMATIC S7-200

## Communications processors

### CP 242-8 (continued)

#### Principle of operation

The CP 242-8 handles all communication between the SIMATIC S7-200 and the AS-Interface or PROFIBUS-DP.

It uses 8 analog and 8 digital inputs/outputs in the I/O address area of the S7-200.

Configuring of the CP is not necessary.

#### Function

The CP 242-8 enables simultaneous connection to the AS-Interface and to PROFIBUS-DP. Both networks are operated independently of each other so that signals can be responded to quickly and higher-level coordination and monitoring can be carried out.

The CP 242-8 can be used in two operating modes:

- Standard mode; up to 124 input/output bits of the AS-Interface slave can be addressed via the 8AI/AO area.

- Extended mode; access to master calls in accordance with AS-Interface specification is possible (e.g. write parameters)

#### Configuring

The CP 242-8 is supported by STEP 7 (from V5.0) and COM PROFIBUS (from V4.0). In addition, the type and GSD files are included with the manual.

No special configuring is required for the AS-Interface. It is also possible to start up the AS-Interface without PROFIBUS.

#### Technical specifications

Supported AS-Interface master profiles	M0/M1	5 V DC load capacity on PROFIBUS connection	max. 90 mA
PROFIBUS transmission ratio	max. 12 Mbit/s	Power loss	3.7 W
Bus cycle time	5 ms with 31 slaves	Permissible ambient conditions	
Interfaces		• operating temperature	0 to 60 °C
• Address area assignment in the PLC	corresponding to 2 I/O modules (8 DI/8 DO and 8 AI/8 AO)	horizontal installation	0 to 45 °C
• AS-Interface connection and external supply 24 V DC	7-pin terminal block	vertical installation	-40 to +70 °C
• PROFIBUS-DP connection	9-pin sub D socket	• transportation and storage temperature	95% at 25 °C
Supply voltage		• relative humidity	
• via backplane bus		Construction	
• external supply	5 V DC	• Dimensions (W x H x D) in mm	90 x 80 x 60
• via AS-Interface shaped cables	24 V DC in accordance with AS-Interface specification	• Weight	approx. 200 g
Current consumption			
• via backplane bus (5 V)	max. 340 mA		
• external supply or sensor power supply	max. 60 mA		
• via AS-Interface shaped cables	max. 100 mA		

#### Ordering data

Order No.

Order No.

##### CP 242-8

For connection of SIMATIC S7-200 CPUs of the 21x series to AS-Interface (master) and PROFIBUS-DP (slave); with bus connector

**6GK7 242-8DP00-0XA0**

##### CP 242-8 manual

incl. examples, type and GSD files

German  
English  
French  
Italian

**6GK7 242-8DP00-8AA0**  
**6GK7 242-8DP00-8BA0**  
**6GK7 242-8DP00-8CA0**  
**6GK7 242-8DP00-8EA0**

##### BC 290 bus connector

10 pcs. (spare part)

**6ES7 290-0AA00-0XA0**



# SIMATIC S7-200 Power supplies

## SITOP power 24 V/3.5 A load power supply

### Overview



- The stabilized load power supply for the SIMATIC S7-200
- Matched in design and functionality, problem-free integration into PLC network
- For reliable supply of PLC, encoders and sensors with 24 V DC; 3.5 A
- Flexible in use, whether in industry or in the domestic system

### Application

The SITOP power 24 V/3.5 A load power supply is specially designed for the SIMATIC S7-200.

Applications of preference are:

- Supply of loads with high power requirements; the standard power supply of the CPU is insufficient
- Use of the CPUs with 24 V DC supply voltage

Using the SITOP power 24 V/3.5 A load power supply brings the following advantages:

- Extension of the service life of connected loads; through special protection against network fluctuations and noise
- Low heat buildup in the switching cabinet; thanks to the high efficiency of the load power supply

- Easy installation; thanks to light weight and installation methods familiar from the S7-200
- Low investment; thanks to low price and the possibility of using the low-cost CPUs with 24 V DC supply voltage

### Design

The SITOP power 24 V/3.5 A has the following:

- Rugged plastic housing in S7-200 design

- Easily accessible connection and operator elements

- User-friendly installation on standard DIN rail or direct in the cabinet via integrated screw holes

### Technical specifications

#### Input

Input voltage		
• Rated value		120/230 V
• Permissible range		93 to 132 V AC/187 to 264 V
Mains buffering	min.	20 ms
System frequency		
• Rated value		50/60 Hz
• Permissible range		47 to 63 Hz
Input current		
• Rated value at 230 V		0.95 A
• Rated value at 120 V		1.65 A
Inrush current	max.	33 A

#### Output

Output voltage		
• Rated value		24 V DC
• Permissible range		24 V $\pm$ 5%
Output current		
• Rated value		3.5 A
Short-circuit protection		Electronic, non-saving

#### General data

Protection class (IEC 536)		I
Degree of effectivity	min.	84%
Power loss	max.	16 W
Dimensions (W x H x D) in mm		160 x 80 x 62
Panel cutout		
• Input L, N, PE finely stranded/single core		0.5 to 1.0 mm <sup>2</sup> each/ 1.5 mm <sup>2</sup>
• Output L+		1 terminal for 0.5 to 1.0 mm <sup>2</sup>
• Output M		2 terminals for 0.5 to 1.0 mm <sup>2</sup>

### Ordering data

**SITOP power 24 V/3.5 A load power supply**  
120/230 V AC; 24 V/3.5 A DC

Order No.

**6EP1 332-1SH31**

Order No.

# SIMATIC S7-200

## Human-machine interface

### TD 200 text display

#### Overview



- The user-friendly text display for the S7-200
- For human machine interface functionality: Display of message texts, intervention in the control program, setting inputs and outputs
- Connection to PPI interface
- No separate power supply required
- No separate parameterization software required
- Customized design optional

#### Application

The TD 200 text display is the optimal solution to all SIMATIC S7-200 operator interface problems.

It is easily connected to the PPI interface of the S7-200 via the connecting cable supplied with it. There is no need for a separate power supply. It is also possible to connect several TD 200s to one S7-200.

The TD 200 can be used for the following tasks:

- Displaying messages
- Taking corrective action in the control program, e.g. changing setpoints
- Setting inputs and outputs, e.g. for starting and stopping a motor

#### Design

The TD 200 features:

- A rugged plastic casing with IP 65 degree of protection (front)
- An installed depth of 27 mm; the TD 200 can be installed without mounting accessories in cabinets or panels, or used as a handheld device.

- Backlit LC display; easy to read even under adverse lighting conditions
- Ergonomically designed input keys; among these are programmable function keys
- Built-in interface for the connecting cable

- Connection for power section; required if there is more than 2.5 m between the TD 200 and the S7-200. PROFIBUS-DP bus cables are then available in place of the connecting cables (see catalog ST 70).
- Customized design (optional)

#### Function

The TD 200 is used for the following:

- Display of message texts; up to 80 message texts with up to 4 variables can be displayed to indicate operating states with optional acknowledgment. System texts in English, German, French, Spanish and Italian are stored in the unit. Messages can also be displayed in Japanese character set (Katakana).
- Display and modification of process parameters; process parameters appear in the display and can be modified with the input keys, e.g. for temperature settings or speed changes.

- Setting of inputs and outputs; a memory bit is assigned to each of the eight programmable function keys. These can then be set, for instance, during system start-up, testing and for diagnostic purposes. This makes it possible, for instance, to control motors without having to install additional operator elements.

Additional functions and features; for example, processing of floating-point numbers, symbols for bar chart representation, increased processing speed, different data blocks for operating several TD 200s, password protection for the user program, integral SETUP menu.

# SIMATIC S7-200

## Human-machine interface

### TD 200 text display (continued)

#### Programming

The TD 200 is programmed with the STEP 7-Micro/WIN or STEP 7-Micro/DOS programming software. No additional parameter assignment software is needed.

Special data areas are reserved in the CPU of the S7-200 for exchanging data with the TD 200.

The TD 200 accesses the necessary functions of the CPU direct by way of these data areas.

#### Technical specifications

Display	Backlit LCD, 2 lines with 20 chars./line, character height 5 mm	Ambient temperature	0 to 45 °C
Interfaces	1 PPI (RS 485); to set up a network with max. 32 stations (S7-200, OP, TP, TBP, prog. dev./PC); Data transfer rates 9.6 and 19.2 kbit/s	Transportation and storage temperature	-40 to +70 °C
Power supply	24 V DC, 120 mA; powered from S7-200 communication interface or optional external power pack. Sensor power supply (24 V DC) of CPU is not affected	Degree of protection	IP 65 front panel
		Dimensions (W x H x D) in mm	144 x 72 x 27
		Panel cutout (standard cutout) in mm	138 x 68
		Cabinet/control panel thickness in mm	4
		Weight	250 g

#### Ordering data

**TD 200 text display**  
for connection to SIMATIC S7-200; incl. Connecting cable to CPU for power supply and data exchange (2.5 m)

**TD 200 text display with customized design**

**TD 200 manual**

German  
English  
French  
Spanish  
Italian

Order No.

**6ES7 272-0AA00-0YA0**

on request

**6ES7 272-0AA00-8AA0**  
**6ES7 272-0AA00-8BA0**  
**6ES7 272-0AA00-8CA0**  
**6ES7 272-0AA00-8DA0**  
**6ES7 272-0AA00-8EA0**

**PROFIBUS bus cables**

**Power section for TD 200**  
for power supply using connecting cable longer than 2.5 m

- 230 V AC
- 120 V AC

Order No.

See catalog ST 70, section 14

**6ES7 705-0AA00-1AA0**  
**6ES7 705-0AA00-1BA0**

# SIMATIC S7-200

## SIMATIC industrial software

### STEP 7-Micro/WIN

#### Overview

- The simple, easy-to-learn programming software under Windows for the SIMATIC S7-200
- For solving even difficult automation task
- For fast entry and time-saving programming
- With extensive functionality
- Based on standard Windows software (familiar from a wide range of standard applications such as Winword, Outlook)

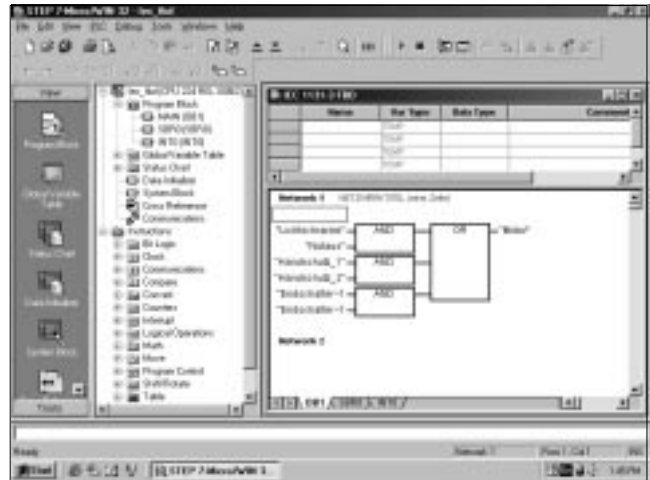


Fig. 7 STEP 7-Micro/WIN

#### Application

STEP 7-Micro/WIN is the simple, easy-to-learn programming software under Windows for the SIMATIC S7-200.

With its extensive functionality, it can be used to solve even difficult automation tasks.

It is especially user-friendly thanks to fast entry and time-saving programming.

#### Design

STEP 7-Micro/WIN is available in two versions:

- STEP 7-Micro/WIN16 V2.1; for Windows 3.1, Windows 3.11, Windows 95, Windows 98 or Windows NT; memory requirement 10 MB
- STEP 7-Micro/WIN32 V3.0; for Windows 95, Windows 98 or Windows NT; memory requirement 35 MB

#### STEP 7-Micro/WIN16 V2.1:

All functions of the CPUs of the S7-21x series (CPU 212/214/215/216) can be programmed with STEP 7-Micro/WIN16 V2.1. The additional functions of the S7-22x series (CPU 221/222/224) cannot be programmed.

The CPU is connected to the PG/PC via the PC/PPI cable. The SIMATIC CPs CP5511/5611 are not supported.

Under Windows 3.1 and Windows 3.11, multimaster mode is possible with the PC/PPI cable (a network comprising several CPUs, TD 200s and PGs/PCs can be programmed).

#### STEP 7-Micro/WIN32 V3.0

All the functions of the S7-200 CPUs can be programmed with STEP 7-Micro/WIN32 V3.0.

The CPU is connected to the PG/PC via the PC/PPI cable or via the SIMATIC CPs CP 5511 or CP 5611 that are plugged into the PG/PC. When using a programming device, the integral communications interface is also sufficient.

Multimaster mode is possible under Windows 95 and Windows 98 with the PC/PPI cable (a network comprising several CPUs, TD 200s and PGs/PCs can be programmed).

#### Functions

- Simple program structure; a single main program to which the subroutines or interrupt programs are simply appended, ensures a lean and clearly structured program. Additionally, a data block can be created. Programming with synonyms is possible
- Programming in the LAD and STL methods of representations
- Symbolic programming possible. Assignment of symbolic and absolute addresses via a symbol table. Printout with symbolic or absolute addresses
- Easy-to-learn instruction set; the instructions consist of meaningful, easy-to-remember abbreviations. The same instructions can be used with slight modifications for different functions (e.g. the instruction MOVE in various versions, depending on the transmission mode)

#### Functions (cont.)

- Wizards for particularly easy configuring of the
  - TD200 text display,
  - PID controllers,
  - Communication functions for data transfer from CPU to CPU,
  - High-speed counters and for the CPU hardware settings, e.g.
  - expansion module configuration,
  - Delay of the inputs,
  - Real-time clock settings,
  - Password allocation,
  - Configuration of the retentive CPU areas,
  - The network addresses of the communication system or
  - The last CPU error status if applicable

The following functions are available:

- Binary operations
- Byte-serial increments, shift, rotate, invert, AND, OR, XOR
- Pulse-edge evaluation
- Subroutine calls
- Counters, timers
- Fast counter functions
- 16- and 32-bit integer arithmetic
- Floating point arithmetic (not CPU 212)
- Comparison instructions
- PID control (not CPU 212)
- Number conversions
- Table processing
- Loop programming
- Access to the freely programmable communications interface from the user program

- Online and offline programming
- All functions can also be edited via keyboard shortcuts
- Cut, paste and insert functions for statements and networks
- Undo function for the last operation
- Search functions in the user program for text and operation (e.g. comparison or subroutine calls)
- Preselection of
  - Method of representation (STL, LAD),
  - Mnemonics (SIMATIC, international),
  - Language (German, English, French, Spanish, Italian),
  - Opening of the last user screen setting at restart
- CPU online functions; e.g. B.RUN/STOP, load user program from CPU to PG/PC, write user program from PG/PC to CPU
- Comparison of program currently being processed with STEP 7-Micro/WIN with the program on a connected CPU
- Support of S7-200 remote programming via modem
- Testing and troubleshooting: execute individual cycles, force and status
- Network node table
- Freely editable variable status table
- Simultaneous display of signal status and status table using several simultaneously opened windows
- Cross-references
- Import and export of files in the STEP 7-Micro/DOS format
- Printer setup under Windows and printing on any Windows printer

STEP 7-Micro/WIN32 V3.0 also supports the following functions:

- Additional FBD method of representation
- Operation of LAD and FBD optionally in IEC 1131-3 mode or S7-200 mode
- CPUs of the S7-22x series: Use of local variables in subroutines
- CPUs of the S7-22x series: Parameter transfer and checkback to/from subroutines; enables the creation of reusable subroutines analogously to FBs of the rest of the SIMATIC world
- Can be integrated into STEP 7 V4.x and STEP5.x
- Supports the S7-200 protocol for CP 5511, CP 5611
- Programming of the CPU 215 at 12 Mbits/s
- Parameterization of the PG/PC interface analogously to STEP 7
- Online and offline calls from the SIMATIC STEP 7 Manager
- Project management and instruction browser in the style of Windows Explorer
- Dragging and dropping of statements from the instruction browser to the worksheet
- All project data stored in one file
- Multiple start facility of STEP 7-Micro/WIN. This allows problem-free transfer of statements and networks from one project to another
- Significantly improved print function including print preview

# SIMATIC S7-200

## SIMATIC industrial software

### STEP 7-Micro/WIN (continued)

#### Ordering Data

Order No.

Order No.

#### STEP 7-Micro/WIN 16 V2.1 (16 bit-version)

##### Target system:

SIMATIC S7-21x- series (new functions of the S7-22x series will not be supported)

##### Prerequisite:

Windows 3.1 or higher on PG 7xx or PC mit 80386-, 80486- or Pentium processor

##### Supplied:

on 3.5" diskettes;  
German, English, French, Spanish, Italian; without documentation  
Single licence  
Upgrade<sup>1)</sup>

**6ES7 810-2AA01-0YX0**  
**6ES7 810-2AA01-0YX3**

#### STEP 7-Micro/WIN 32 V3.0 (32 bit-version)

##### Target system:

All CPUs of the SIMATIC S7-200

##### Prerequisite:

Windows 95, 98 or NT on PG 7xx or PC with 80486- or Pentium processor

##### Supplied:

German, English, French, Spanish, Italian; without documentation  
Single licence  
on 3.5" diskettes  
on CD-ROM  
Upgrade<sup>1)</sup>  
on 3.5" diskettes  
on CD-ROM

**6ES7 810-2BA00-0YX0**  
**6ES7 810-2BC00-0YX0**

**6ES7 810-2BA00-0YX3**  
**6ES7 810-2BC00-0YX3**

To be ordered separately:

#### PC/PPI cable

with RS 232C/PPI converter;  
for 9,6/19,2/38,4 Kbits/s;  
5 m

#### S7-200 automation system manual

for S7-21x series and  
STEP 7-Micro/WIN16 V2.1

German

English

French

Spanish

Italian

for S7-22x series and  
STEP 7-Micro/WIN32 V3.0

German

English

French

Spanish

Italian

**6ES7 901-3BF20-0XA0**

**6ES7 298-8FA01-8AH0**

**6ES7 298-8FA01-8BH0**

**6ES7 298-8FA01-8CH0**

**6ES7 298-8FA01-8DH0**

**6ES7 298-8FA01-8EH0**

**6ES7 298-8FA20-8AH0**

**6ES7 298-8FA20-8BH0**

**6ES7 298-8FA20-8CH0**

**6ES7 298-8FA20-8DH0**

**6ES7 298-8FA20-8EH0**

1) Upgrade for all previous STEP 7-Micro/WIN and STEP 7-Micro/DOS-versions

# SIMATIC S7-200 SIMATIC industrial software

STEP 7-Micro/DOS

## Overview

- The programming software under MS-DOS for the SIMATIC S7-200
- For fast entry and time-saving programming on PCs of lower performance power
- For complete programming of all functions of the S7-21x series

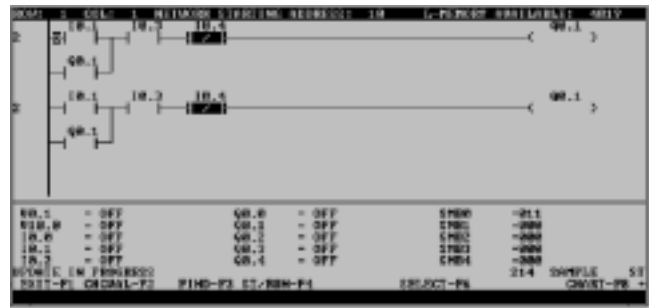


Fig. 8 STEP 7-Micro/DOS

## Application

STEP 7-Micro/DOS V1.3 has been developed with the aim to provide a programming software which can also be used on PCs of lower performance. STEP 7-Micro/DOS runs under MS DOS 5.0 on PCs with a 80286, 80386, 80486 or Pentium processor, 640 KB main memory and 5 MB free hard disk memory; in a DOS window, it can also be executed under Windows 3.1, 3.11 or Windows 95

Use of STEP 7-Micro/DOS on PCs and PLCs requires the PC/PPI cable. All functions of the CPUs of the S7-21x series (CPU 212/214/215/216) can be programmed with STEP 7-Micro/DOS V1.3. The additional functions of the S7-22x series (CPU 221/222/224) cannot be programmed. The following features characterize STEP 7-Micro/DOS V1.3:

- Simplified block structure: A single block contains the entire user program. The program can be structured with subprograms
- Adapted instruction set: The instruction set has a number of special features, e.g., invocation instructions for integrated functions.

## Functions

- Powerful set of instructions; STEP 7-Micro/DOS has instructions of binary operations, edge evaluation, subroutine invocation, counters, timers, high-speed counter functions, 16 and 32-bit integer arithmetic, comparison functions, number conversion, spreadsheet, data transfer, loop programming, parameterization of the TD 200, networks (NETR, NETW, RECEIVE-Freeport), Network node table, PID control and parameterization of the input delay time
- Extensive test functions: The following test functions can be selected:
  - Variable status: The values of variables are updated either once only or continuously.
  - Control: The values of up to 8 variables can be defined (controlled) either once only or continuously.
- Force: Variables defined by the user are kept to specified values by the CPU. Unlike controlled values, forced values are retained even after interruption of the online connection.
- Single cycle: The CPU stops after a specified number of program cycles have been executed. Critical variables can be displayed.

## Ordering data

### STEP 7-Micro/DOS V1.3

#### Target system:

SIMATIC S7-21x series (new functions of the S7-22x series will not be supported)

#### Prerequisite:

MS-DOS 5.0 or higher on PG 7xx or PC with 80286-, 80386-, 80486- or Pentium processor

#### Supplied:

on 3.5" diskettes; German, English, French, Spanish, Italian; without documentation  
Single licence

Order No.

**6ES7 810-2DA00-0YX0**

To be ordered separately:

#### PC/PPI cable

with RS 232C/PPI converter; for 9,6/19,2/38,4 kbits/s; 5 m

#### STEP 7-Micro/DOS user manual

German  
English  
French  
Spanish  
Italian

Order No.

**6ES7 901-3BF00-0XA0**

**6ES7 810-2DA10-8AA0**  
**6ES7 810-2DA10-8BA0**  
**6ES7 810-2DA10-8CA0**  
**6ES7 810-2DA10-8DA0**  
**6ES7 810-2DA10-8EA0**

# SIMATIC S7-200 Programming devices

## PG 702

### Overview



- The universal “screwdriver” for the SIMATIC CPUs from the S7-21x series
- Ideal for maintenance and service
- Compact format for mobile use
- Can also be installed in cabinets right by the PLC
- Can not be used with CPUs from the 22x series

### Application

The PG 702 is the universal “screwdriver” for the SIMATIC CPUs from the 21x series. Maximum ease of use and optimized functions make it the ideal tool for maintenance and service

Its compact pocket calculator dimensions and light weight make it handy to take along to any work site. It can also be installed permanently in a cabinet right by the programmable controller itself.

The PG 702 can only be used on-line. It is also possible to copy complete user programs from one PLC to another.

### Design

The PG 702 has:

- Backlit LC display; 2 lines with 20 characters per line for displaying STEP 7 programs in STL-200

- Membrane keyboard with 33 keys
- Interface ports: PPI with 9.6 and 19.2 Kbit/s

The PG 702 receives its power supply from the S7-200. Alternatively a plug-in power supply unit can be used.

### Functions

The PG 702 is equipped with the software for programming the S7-21x.

You can use it to perform the following functions:

- Writing programs; You can write programs quickly and easily in Statement List (STL-200)

- Testing programs; Numerous tools simplify the job of program testing and debugging: e.g. Modifying I/Os, Modifying variables, Setting trigger points, Block Status, etc.

### Technical specifications

Display	Backlit LC display, 2 lines, 20 characters/line	Ambient temperature	0 °C to +40 °C
Power supply	Via PPI or plug-in power supply unit (24 V DC, 100 mA)	Transport/storage temperature	-20 °C to +60 °C
Keyboard	Membrane keyboard, 33 keys	Degree of protection	IP 30
		Dimensions (W x H x D) in mm	144 x 72 x 27
		Weight	Approx. 230 g

### Ordering data

**PG 702 programming device**  
for programming the SIMATIC S7-21x in STL-200; without manual; Including connecting cable (3 m); 5 languages: English, German, French, Spanish, Italian

**Plug-in power supply unit for PG 702 and TD 200**  
230 V AC  
120 V AC

Order No.

**6ES7 702-0AA01-0YA0**

**6ES7 705-0AA00-1AA0**  
**6ES7 705-0AA00-1BA0**

**Manual package:**  
“programming with the PG 702”

English  
German  
French  
Spanish  
Italian

Order No.

**6ES7 702-0AA01-8BA0**  
**6ES7 702-0AA01-8AA0**  
**6ES7 702-0AA01-8CA0**  
**6ES7 702-0AA01-8DA0**  
**6ES7 702-0AA01-8EA0**



### CPU 212

Item	Accessories (see below)	System configuration			Modules		Price	
					Current consumption from backplane bus mA	Current consumption from 24 V DC mA	Unit	Total
		0	1	2				
CPU 212, 24 V DC supply, 24 V DC inputs, 24 V DC outputs	Order No. 6ES7 212-1AA01-0XB0	1,2,3			-340	60 <sup>1)</sup>		
CPU 212, 120-230 V AC supply, 24 V DC inputs (sink input), relay outputs	6ES7 212-1BA01-0XB0	1,2,3			-340	60 <sup>1)</sup>		
CPU 212, 120-230 V AC supply, 24 V DC inputs (source input), relay outputs	6ES7 212-1BA10-0XB0	1,2,3			-340	60		
CPU 212, 120-230 V AC supply, 24 V AC inputs, 120-230 V AC outputs	6ES7 212-1DA01-0XB0	2,3			-280	—		
CPU 212, 120-230 V AC supply, 120 V AC inputs, 120-230 V AC outputs	6ES7 212-1CA01-0XB0	2,3			-280	—		
CPU 212, 120-230 V AC supply, 120 V AC inputs, relay outputs	6ES7 212-1GA01-0XB0	2,3			-340	—		
CPU 212, 24 V AC supply, 24 V DC inputs (sink input), relay outputs	6ES7 212-1FA01-0XB0	2,3			-340	—		
EM 221 digital input modules: 8 x 24 V DC, sink input	6ES7 221-1BF00-0XA0	2,4			60	60 <sup>1)</sup>		
8 x 24 V DC, source output	6ES7 221-1BF10-0XA0	2,4			60	60		
8 x 24 V AC	6ES7 221-1JF00-0XA0	2,4			70	—		
8 x 120 V AC	6ES7 221-1EF00-0XA0	2,4			70	—		
EM 222 digital output modules: 8 x 24 V DC	6ES7 222-1BF00-0XA0	2,4			80	—		
8 x relay	6ES7 222-1HF00-0XA0	2,4			80	85 <sup>2)</sup>		
8 x 24 to 230 V AC	6ES7 222-1EF00-0XA0	2,4			120	—		
EM 223 digital I/O modules: 4 inputs at 24 V DC, 4 outputs at 24 V DC	6ES7 223-1BF00-0XA0	2,4			80	30		
8 inputs at 24 V DC, 8 outputs at 24 V DC <sup>3)</sup>	6ES7 223-1BH00-0XA0	2,4			120	60		
16 inputs at 24 V DC, 16 outputs at 24 V DC	6ES7 223-1BL00-0XA0	2,3,4			210	120		
4 inputs at 24 V DC, 4 relay outputs	6ES7 223-1HF00-0XA0	2,4			80	65		
8 inputs at 24 V DC, 8 relay outputs	6ES7 223-1PH00-0XA0	2,4			100	125		
16 inputs at 24 V DC, 16 relay outputs <sup>4)</sup>	6ES7 223-1PL00-0XA0	2,3,4			160	250		
4 inputs at 120 V AC, 4 outputs at 120-230 V AC	6ES7 223-1EF00-0XA0	2,4			100	30		
EM 231 analog input module: 3 inputs, 12 bits + sign	6ES7 231-0HC00-0XA0	2,4			70	60		
EM 232 analog output module: 3 inputs, 12 bits + sign	6ES7 232-0HB00-0XA0	2,4			70	60		
EM 235 analog I/O module: 3 inputs, 1 output, 12 bits	6ES7 235-0KD00-0XA0	2,4			70	80		
CP 242-2 communications processor <sup>3)</sup>	6GK7 242-2AX00-0XA0				200	—		
CP 242-8 communications processor <sup>3)/4)</sup>	6GK7 242-8DP00-0XA0				340	60		

1) Total input current of all inputs  
 2) Power supply for relay coils  
 3) Only 1 module can be used  
 4) Cannot be used with 6ES7 212-1DA01-0XA0/6ES7 212-1CA01-0XA0

Item	Order No.	No.	Price Unit	Total	Item	Order No.	No.	Price Unit	Total
1	SIM 274 simulator for CPU 212				3	Terminal block, 12-pin, 10 pieces	6ES7 290-2AA00-0XA0		
2	Ground terminals (10 pieces)				4	Terminal block, 14-pin, 10 pieces	6ES7 290-2CA00-0XA0		
	Labeling strips, 24 pieces								
				Total					

Max. 180 mA; an additional 24 V DC power supply is required if this figure is exceeded

+  =   
 Total price



### CPU 214

Item	Accessories (see below)	System configuration							Modules		Price	
		Order No.							No.	Σ mA	Unit	Total
		0	1	2	3	4	5	6				
CPU 214, 24 V DC supply, 24 V DC inputs, 24 V DC outputs	1, 2, 3, 4	6ES7 214-1AC01-0XB0								105 <sup>1)</sup>		
CPU 214, 120-230 V AC supply, 24 V DC inputs (sink input), relay outputs	1, 2, 3, 4	6ES7 214-1BC01-0XB0								105 <sup>1)</sup>		
CPU 214, 120-230 V AC supply, 24 V DC inputs (source input), relay outputs	1, 2, 3, 4	6ES7 214-1BC10-0XB0								105		
CPU 214, 120-230 V AC supply, 24 V AC inputs, 120-230 V AC outputs	1, 2, 4	6ES7 214-1DC01-0XB0								—		
CPU 214, 120-230 V AC supply, 120 V AC inputs, 120-230 V AC outputs	1, 2, 4	6ES7 214-1CC01-0XB0								—		
CPU 214, 120-230 V AC supply, 120 V AC inputs, relay outputs	1, 2, 4	6ES7 214-1GC01-0XB0								—		
EM 221 digital input modules: 8 x 24 V DC, sink input	3, 5	6ES7 221-1BF00-0XA0							60	60 <sup>1)</sup>		
8 x 24 V DC, source input	3, 5	6ES7 221-1BF10-0XA0							60	60		
8 x 24 V AC	3, 5	6ES7 221-1JF00-0XA0							70	—		
8 x 120 V AC	3, 5	6ES7 221-1EF00-0XA0							70	—		
EM 222 digital output modules: 8 x 24 V DC	3, 5	6ES7 222-1BF00-0XA0							80	—		
8 x relay	3, 5	6ES7 222-1HF00-0XA0							80	85 <sup>2)</sup>		
8 x 24 to 230 V AC	3, 5	6ES7 222-1EF00-0XA0							120	—		
EM 223 digital I/O modules: 4 inputs at 24 V DC, 4 outputs at 24 V DC	3, 5	6ES7 223-1BF00-0XA0							80	30		
8 outputs at 24 V DC, 8 outputs at 24 V DC	3, 5	6ES7 223-1BH00-0XA0							120	60		
16 inputs at 24 V DC, 16 outputs at 24 V DC	3, 5, 6	6ES7 223-1BL00-0XA0							210	120		
4 inputs at 24 V DC, 4 relay outputs	3, 5	6ES7 223-1HF00-0XA0							80	65		
8 inputs at 24 V DC, 8 relay outputs	3, 5	6ES7 223-1PH00-0XA0							100	125		
16 inputs at 24 V DC, 16 relay outputs	3, 5, 6	6ES7 223-1PL00-0XA0							160	250		
4 inputs at 120 V AC, 4 outputs at 120-230 V AC	3, 5	6ES7 223-1EF00-0XA0							100	30		
EM 231 analog input module: 3 inputs, 12 bits + sign	3, 5	6ES7 231-0HC00-0XA0							70	60		
EM 232 analog output module: 3 inputs, 12 bits + sign	3, 5	6ES7 232-0HB00-0XA0							70	60		
EM 235 analog I/O module: 3 inputs, 1 output, 12 bits	3, 5	6ES7 235-0KD00-0XA0							70	80		
CP 242-2 communications processor		6GK7 242-2AX00-0XA0							200	—		
CP 242-8 communications processor		6GK7 242-8DP00-0XA0							340	60		

- Total input current of all inputs for relay coils
- Power supply for relay coils

Max. 280 mA; an additional 24 V DC power supply is required if this figure is exceeded

Item	Order No.	No.	Price Unit	Item	Order No.	No.	Price Unit
1	MC 291 memory submodule			3	Labeling strips, 24 pieces	6ES7 292-2AA00-0XA0	
	EEPROM 8 Kbytes			4	Terminal block, 18-pin, 10 pieces	6ES7 290-2BA00-0XA0	
2	SIM 274 simulator for CPU 214			5	Terminal block, 14-pin, 10 pieces	6ES7 290-2CA00-0XA0	
3	Ground terminals (10 pieces)			6	Terminal block, 12-pin, 10 pieces	6ES7 290-2AA00-0XA0	
Total				Total			
				+ =			
				Total price			



### CPU 215

Item	Accessories (see below)	System configuration							Modules		Price		
									Current consumption from backplane bus	Current consumption from 24 V DC	Unit	Total	
		0	1	2	3	4	5	6					7
CPU 215, DC outputs	Order No. 6ES7 215-2DA00-0XB0	1,2,3,4,5									105 <sup>1)</sup>		
CPU 215, relay outputs	Order No. 6ES7 215-2BD00-0XB0	1,2,3,4,5									105 <sup>1)</sup>		
EM 221 digital input modules: 8 x 24 V DC, sink input 8 x 24 V DC, source input 8 x 24 V AC 8 x 120 V AC	Order No. 6ES7 221-1BF00-0XA0	3,5								60	60 <sup>1)</sup>		
	Order No. 6ES7 221-1BF10-0XA0	3,5								60	60		
	Order No. 6ES7 221-1JF00-0XA0	3,5								70	—		
	Order No. 6ES7 221-1EF00-0XA0	3,5								70	—		
EM 222 digital output modules: 8 x 24 V DC 8 x relay 8 x AC 24 to 230 V	Order No. 6ES7 222-1BF00-0XA0	3,5								80	—		
	Order No. 6ES7 222-1HF00-0XA0	3,5								80	85 <sup>2)</sup>		
	Order No. 6ES7 222-1EF00-0XA0	3,5								120	—		
EM 223 digital I/O modules: 4 inputs at 24 V DC, 4 outputs at 24 V DC 8 inputs at 24 V DC, 8 outputs at 24 V DC 16 inputs at 24 V DC, 16 outputs at 24 V DC 4 inputs at 24 V DC, 4 relay outputs 8 inputs at 24 V DC, 8 relay outputs 16 inputs at 24 V DC, 16 relay outputs 4 inputs at 120 V AC, 4 outputs at 120-230 V AC	Order No. 6ES7 223-1BF00-0XA0	3,5								80	30		
	Order No. 6ES7 223-1BH00-0XA0	3,5								120	60		
	Order No. 6ES7 223-1BL00-0XA0	3,4,5								210	120		
	Order No. 6ES7 223-1HF00-0XA0	3,5								80	65		
	Order No. 6ES7 223-1PH00-0XA0	3,5								100	125		
	Order No. 6ES7 223-1PL00-0XA0	3,4,5								160	250		
EM 231 analog input module: 3 inputs, 12 bits + sign	Order No. 6ES7 231-0HC00-0XA0	3,5								100	30		
	Order No. 6ES7 231-0HB00-0XA0	3,5								70	60		
	Order No. 6ES7 231-0KD00-0XA0	3,5								70	80		
CP 242-2 communications processor	Order No. 6GK7 242-2AX00-0XA0									200	—		
CP 242-8 communications processor	Order No. 6GK7 242-8DP00-0XA0									340	60		

- 1) Total input current of all inputs  
2) Power supply for relay coils

□

□

Max. 400 mA; an additional 24 V DC power supply is required if this figure is exceeded

Accessories	Item	Order No.	No.	Price Unit	Total	Item	Order No.	No.	Price Unit	Total
1	MC 291 memory submodule					3	Labeling strips, 24 pieces	6ES7 292-2AA00-0XA0		
	EEPROM 16 Kbytes	6ES7 291-8GD00-0XA0				4	Terminal block, 12-pin, 10 pieces	6ES7 290-2AA00-0XA0		
2	SIM 274 simulator for CPU 215	6ES7 274-1XK00-0XA0				5	Terminal block, 14-pin, 10 pieces	6ES7 290-2CA00-0XA0		
3	Ground terminals (10 pieces)	6ES5 728-8MA11								
Total						Total				
						+ =				
						Total price				



2

### Input assignment

All inputs of the CPU 212, CPU 214, CPU 215 and CPU 214 can be used as standard inputs.

When the integrated functions are in use, certain inputs are assigned and are no longer available for standard tasks or other integrated functions.

The following tables specify which inputs are assigned in each case and the functions they perform.

#### CPU 212

Input	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7
<b>Interrupt processing (INT)</b>		<b>INT 0</b>						
Function of input	fF/sF	—	—	—	—	—	—	—
<b>High-speed counters (HSC)</b>		<b>HSC 0</b>						
Signals	Up/down	—	—	—	—	—	—	—

2

#### CPU 214/215/216

Input	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	1.0	1.1	1.2	1.3	1.4	1.5	
<b>Interrupt processing (INT)</b>		<b>INT 0/1</b>		<b>INT 2/3</b>		<b>INT 4/5</b>		<b>INT 6/7</b>							
Signals	sF/fF	sF/fF	sF/fF	sF/fF	—	—	—	—	—	—	—	—	—	—	
<b>High-speed counters (HSC)</b>		<b>HSC 0</b>						<b>HSC 1</b>				<b>HSC 2</b>			
Signals	Mode 0	Up/dn.	—	—	—	—	—	Up/dn.	—	—	—	Up/dn.	—	—	
	Mode 1	—	—	—	—	—	—	Up/dn.	—	Reset	—	Up/dn.	—	Reset	
	Mode 2	—	—	—	—	—	—	Up/dn.	—	Reset	Enab.	Up/dn.	—	Reset	
	Mode 3	—	—	—	—	—	—	Up/dn.	Direct.	—	—	Up/dn.	Direct.	—	
	Mode 4	—	—	—	—	—	—	Up/dn.	Direct.	Reset	—	Up/dn.	Direct.	Reset	
	Mode 5	—	—	—	—	—	—	Up/dn.	Direct.	Reset	Enab.	Up/dn.	Direct.	Reset	
	Mode 6	—	—	—	—	—	—	Up	Down	—	—	Up	Down	—	
	Mode 7	—	—	—	—	—	—	Up	Down	Reset	—	Up	Down	Reset	
	Mode 8	—	—	—	—	—	—	Up	Down	Reset	Enab.	Up	Down	Reset	
	Mode 9	—	—	—	—	—	—	A	B	—	—	A	B	—	
	Mode 10	—	—	—	—	—	—	A	B	Reset	—	A	B	Reset	
	Mode 11	—	—	—	—	—	—	A	B	Reset	Enab.	A	B	Reset	

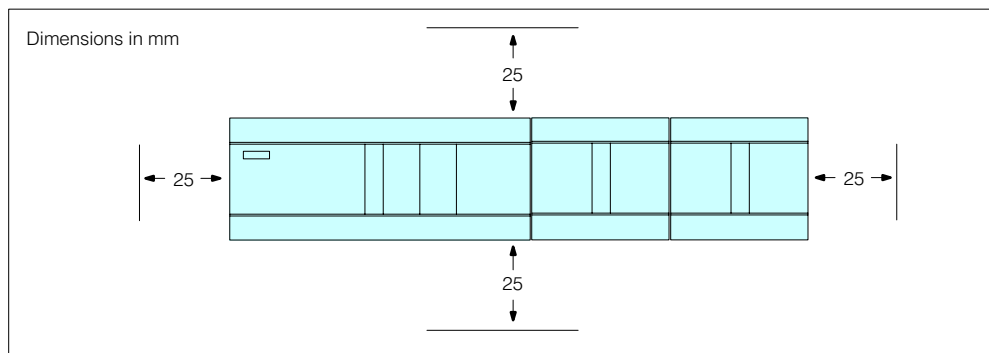
Legend:

INT: Interrupt  
HSC: High-speed counter  
—: Input not assigned  
fF: Detection of falling signal edge  
sF: Detection of rising signal edge  
Up: Pulse input for incremental counting  
Down: Pulse input for decremental counting

Enab.: Count enable input  
Reset: Reset input (hardware reset)  
Direct.: Counting direction input  
A: Signal 1 for 90° phase-shifted counter  
B: Signal 2 for 90° phase-shifted counter

## Dimensional diagrams

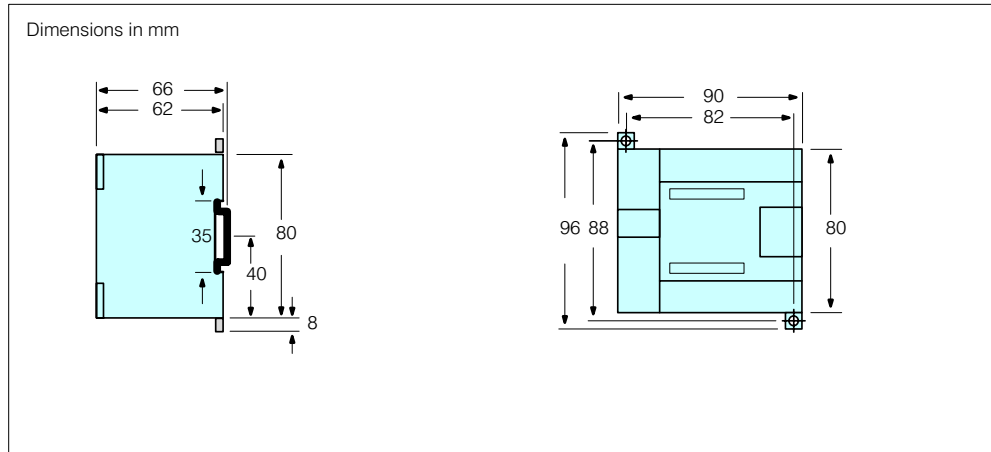
### Minimum clearance for installation



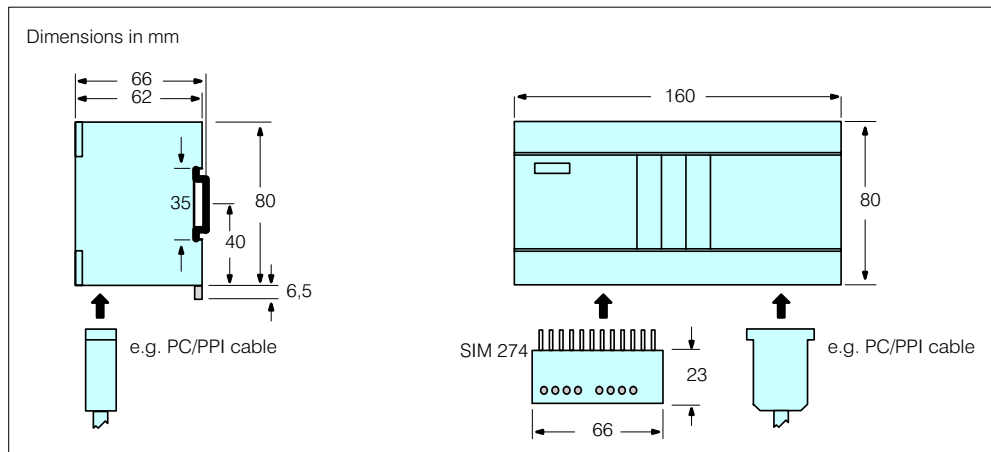
# SIMATIC S7-200 Configuring

## Dimensional diagrams (continued)

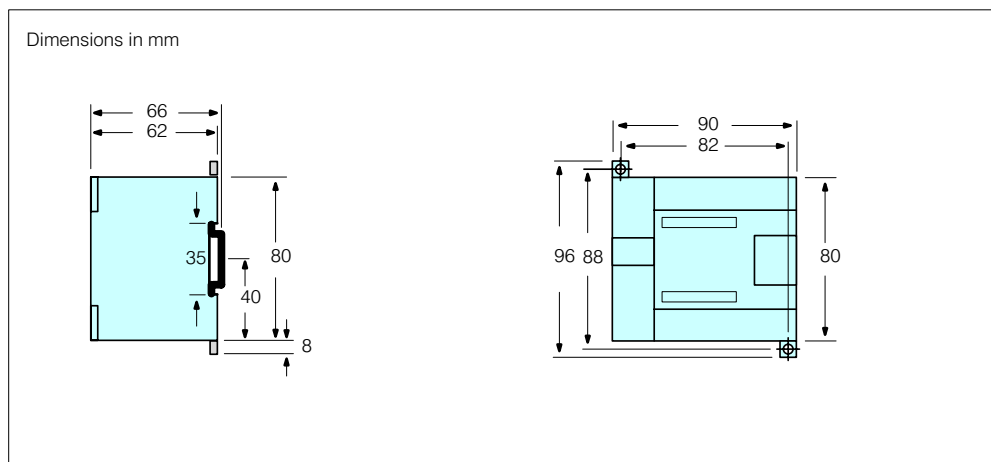
### CPU 221



### CPU 212



### CPU 222

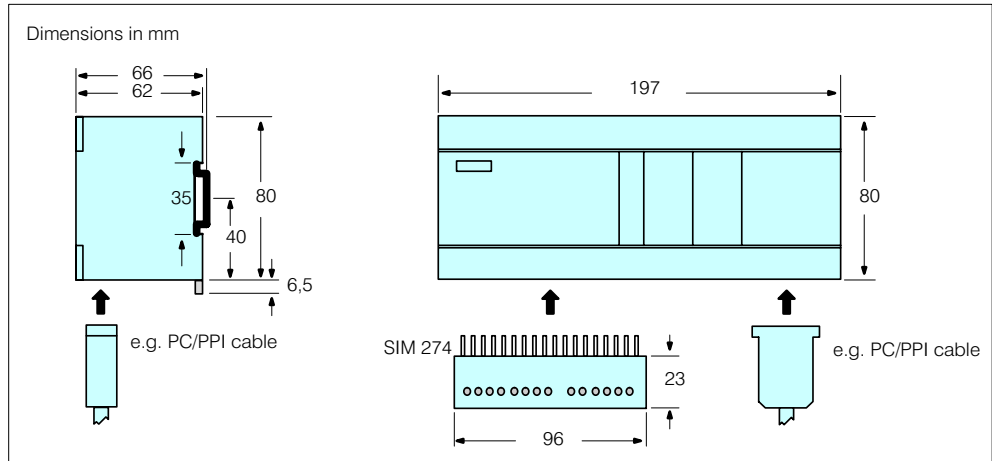




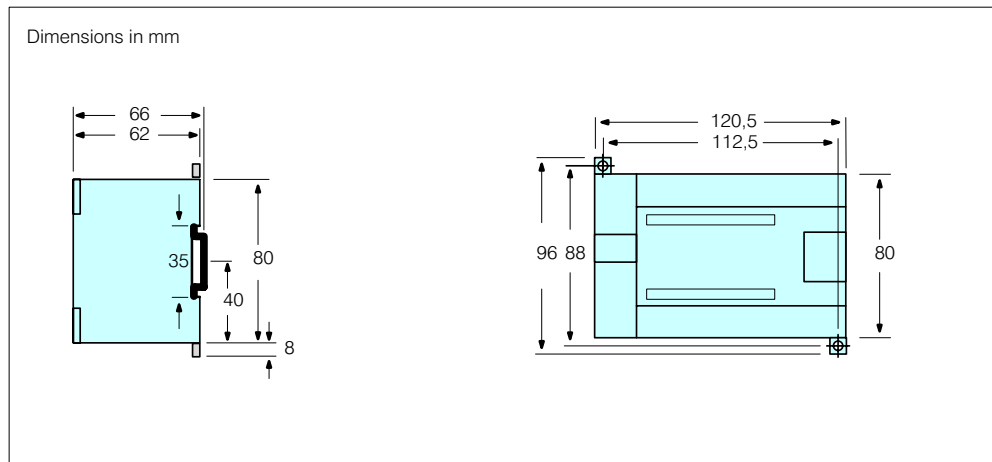
# SIMATIC S7-200 Configuring

## Dimensional diagrams (continued)

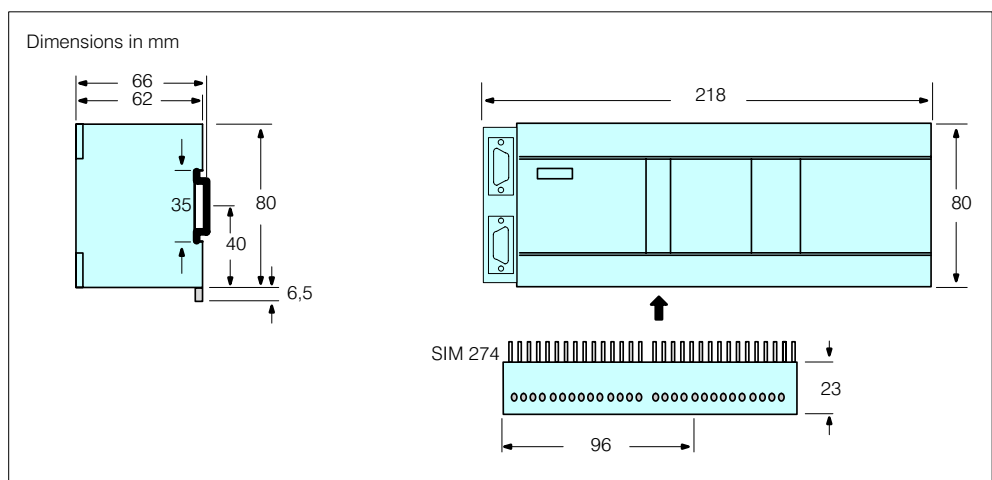
### CPU 214



### CPU 224



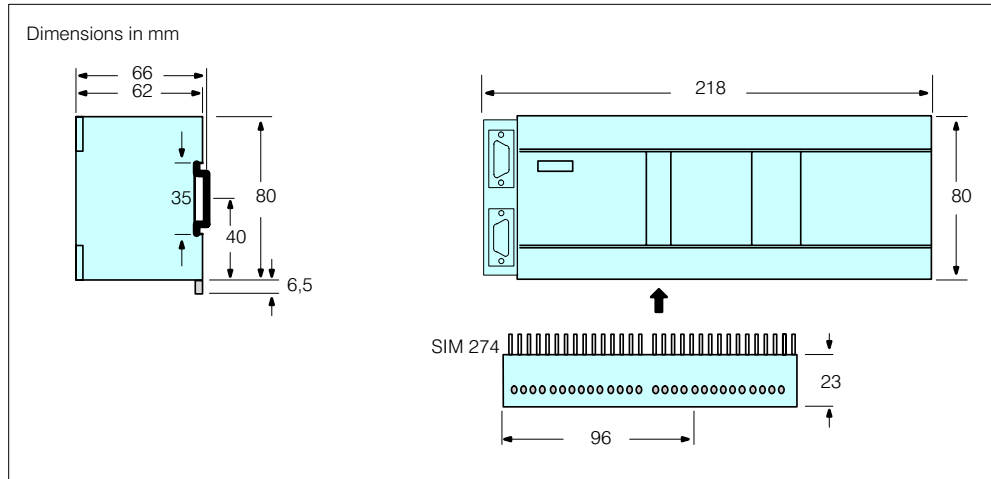
### CPU 215



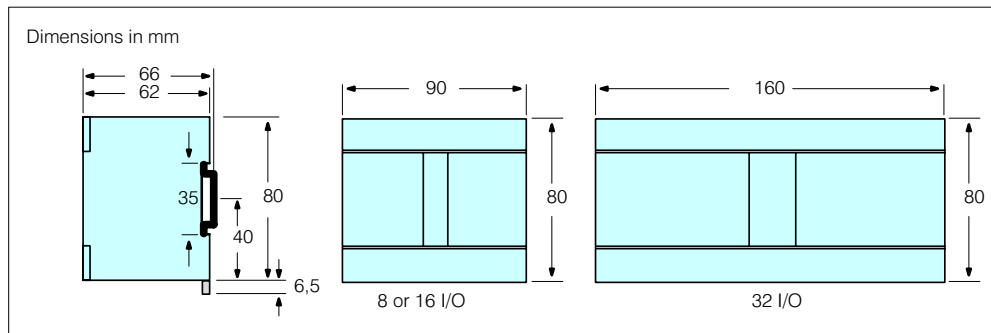
# SIMATIC S7-200 Configuring

## Dimensional diagrams (continued)

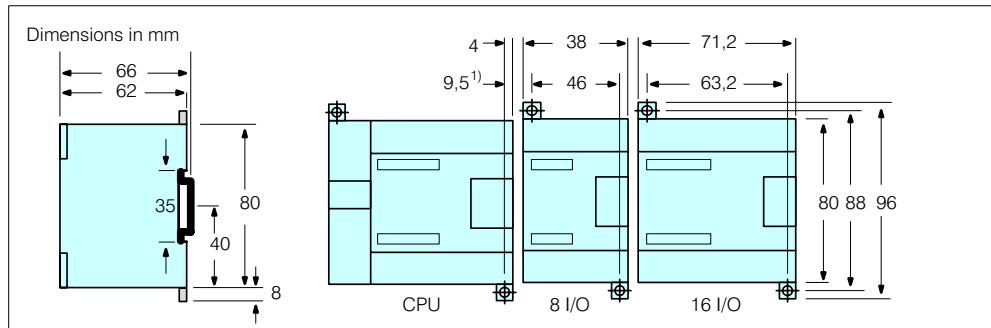
### CPU 216



### EMs from the S7-21x series

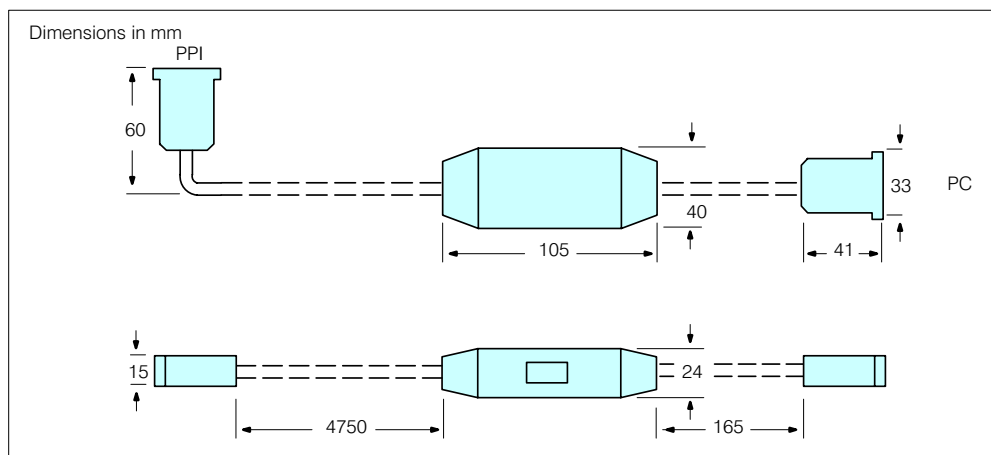


### EMs from the S7-22x series



1) Minimum distance between the modules when mounting in switch gear cabinet with M4 type screws

### PC/PPI cable



#### CE marking



The electronic products described in this catalog meet the requirements and aims of protection of the following EU guidelines and correspond to the harmonized European standards (EN) which were announced for programmable controllers in the gazettes of the European Union:

- 89/336/EEG "Electromagnetic Compatibility" (EMC guideline)
- 73/23/EEG "Electrical equipment for the application within certain voltage limits" (Low-voltage guideline)

The EU declarations of conformity are held at the disposal of the competent authorities at the address below:

**SIMATIC, SIMATIC NET, SIMATIC PC:**

Siemens Aktiengesellschaft,  
Automation Group  
Abteilung A&D AS E4  
P.O Box 1963  
D-92209 Amberg  
Germany

**SIPAC, SITOP:**

Siemens Aktiengesellschaft  
Automation Group  
Systems Engineering Division  
Abteilung A&D SE V2  
P.O Box 2355  
D-90713 Fürth  
Germany

The SIMATIC products have been designed for use in the industrial area and meet the following requirements:

Emitted interference:  
EN 50081-2: 1993  
Immunity:  
EN 50082-2: 1995

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

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

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

When installing and operating the products described in this catalog, the installation guidelines described in the manuals must be observed. The latter include the relevant guidelines for installation in cabinets and use of shielded cables.

#### Notes for machine manufacturers

The SIMATIC automation system is not a machine as defined by the EU Machines Directive. There is therefore no Certificate of Conformity for SIMATIC regarding the EU Machines Directive 89/392/EEC.

The EU Machines Directive 89/392/EEC regulates the requirements of a machine. "Machine" is understood to be the totality of connected parts or equipment (see also EN 292-1, Paragraph 3.1).

The SIMATIC is a part of the electronic equipment of a machine and must therefore be included by the machine manufacturer in the procedure for the Conformity Declaration.

The standard EN 60204-1 (Safety of machines, general requirements of electrical equipment of machines) applies for the electrical equipment of machines.

The table below is designed to help you with the Conformity Declaration and shows which criteria apply for SIMATIC in accordance with EN 60204-1 (June 1993):

EN 60204-1	Topic/Criterion	Remark
Paragraph 4	General requirements	Requirements are met if the devices are assembled/installed in accordance with the installation guidelines. Please also observe the information in the manuals in this regard.
Paragraph 11.2 Paragraph 12.3	Digital input/output interfaces Programmable equipment	Requirements are met Requirements are met if the devices are installed in lockable cabinets for protection against memory modification by unauthorized personnel.
Paragraph 20.4	Voltage checks	Requirements are met

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## Warning



### WARNING

**Hazardous voltage**

**Can cause loss of life, severe personal injury, or substantial property damage.**

Information contained in this catalog is for reference purposes only. Consult your technical manual for specific connection and other technical requirements.

Only qualified personnel should install or maintain the products described in this catalog after becoming thoroughly familiar with all warnings, safety notices, and maintenance

procedures contained in the appropriate technical manual. The successful and safe operation of this equipment is dependent upon proper handling, installation, operation and maintenance.

Definitions of the terms as applicable in our appropriate technical documentation:

#### Qualified person

One who is familiar with the installation, construction, and operation of the products described in this catalog and the hazards involved. In addition, the person should have the following qualifications:

- Be trained and authorized to use and tag circuits and equipment in accordance with established safety practices.
- Be trained in the proper care and use of protective equipment in accordance with established safety practices.
- Be trained in rendering first aid.

#### DANGER

Indicates loss of life, severe personal injury, or substantial property damage will result if proper precautions are not taken

#### WARNING

Indicates loss of life, severe personal injury, or substantial property damage can result if proper precautions are not taken

#### CAUTION

Indicates minor personal injury or property damage can result if proper precautions are not taken

# Appendix Conditions of sale and delivery, year 2000

## Conditions of sale and delivery

Subject to the General Conditions of Sale and Delivery for Products and Services of the Electrical and Electronics Industry.

The technical data, dimensions and weights are subject to change unless otherwise stated on the individual pages of this catalog.

The illustrations are for reference only.

We reserve the right to adjust prices and shall charge the prices applying on the date of delivery.

The Automation Group's General Conditions for the Use of Software Products Against Once-Only Payment shall apply to all Software products.

### Export

Subject to the General Conditions of Sale and Delivery for Products and Services of the Electrical and Electronics Industry and to any other conditions agreed upon with the recipients of catalogs.

### Export regulations

The products listed in this catalog may be subject to national or U.S. export regulations.

Any export requires approval by responsible authorities. Information thereon can be obtained from our acknowledgements, delivery notes and invoices.

Export approval may be required due to the purpose of use and final destination of the products.

AD/ST/a7.97

The data change at the end of the millennium will affect not only DP systems but also products, systems and installations being used in the field of [automation and drive technology](#).

Apart from the hardware and software components, the application programs which process the date will especially be affected by the changeover.

For our [automation products and systems](#), we in the Siemens Automation & Drives Group have given top priority to finding ways of smoothing the way into the next millennium.

We are making detailed investigations into the behavior of our products, applying the internationally recognized [test profiles of the British Standards Institution](#).



## Year 2000

The results of these investigations can be found in our Year 2000 product data base under the following internet address:

<http://www.ad.siemens.de/year2000>.

Defects in the function of individual products, systems or [the whole plant](#) may occur as a result of the changeover. These can be due to constellations resulting from a specific combination of products and systems and from individual adaptation and/or expansion of the products and systems.

If you have any questions on this matter, please contact your local Siemens office.