

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"> Entire DB 1 loaded from PU/PC maintenance-free in integrated EEPROM Current DB 1 values in RAM, remanent flags, times, counters etc. maintenance-free through high power capacitor; optional battery for long duration backup 	Interfaces	1 RS 485 communication interface, optionally: <ul style="list-style-type: none"> 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 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 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
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"> free cycle (OB 1) alarm controlled time controlled (1 to 255 ms) 	• Digital outputs	1 Analog potentiometer, 8 bit resolution
Sub-program levels	8	• Analog potentiometer	
User program protection	3-level password protection	Connectable I/O	max. 6 inputs and 4 outputs (integ. input/outputs)
Operation set		• digital inputs/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	max. —
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			Integrated outputs	4 (transistor)	4 (relay)
• 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
Integrated inputs	6	6	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) (I0.0 to I0.3)	all 0.2 to 12.8 ms (adjustable) (I0.0 to I0.3)	Switching capacity of outputs		
• for alarm inputs	0.2 to 12.8 ms (adjustable) (I0.0 to I0.5)	0.2 to 12.8 ms (adjustable) (I0.0 to I0.5)	• with ohmic load	0.75 A	2 A
• for high-speed counter max.	(I0.0 to I0.5) 30 kHz	(I0.0 to I0.5) 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) ¹⁾ 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 ¹⁾ (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.