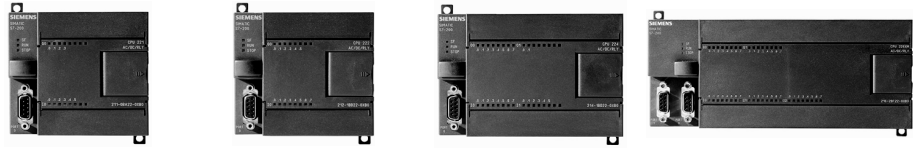


CPU selection chart

(Use this quick selection guide to help choose the proper CPU for your application).

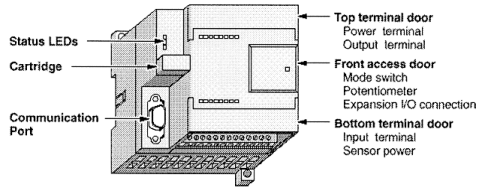


Feature	CPU 221	CPU 222	CPU 224	CPU 226 (XM)
Physical size of unit memory	90 mm x 80 mm x 62 mm	90 mm x 80 mm x 62 mm	120.5 mm x 80 mm x 62 mm	190 mm x 80 mm x 62 mm
Program	2048 words	2048 words	4096 words	4096 words (8192)
User data	1024 words	1024 words	2560 words	2560 words (5120)
User program storage type	EEPROM	EEPROM	EEPROM	EEPROM
Data backup (super capacitor) (optional battery)	50 hours typical 200 days typical	50 hours typical 200 days typical	190 hours typical 200 days typical	190 hours typical 200 days typical
Local I/O				
Local I/O	6 In/4 Out	8 In/6 Out	14 In/10 Out	24 In/16 Out
Number of expansion modules	none	2 modules	7 modules	7 modules
Total I/O				
Digital I/O image size	256 (128 In/128 Out)	256 (128 In/128 Out)	256 (128 In/128 Out)	256 (128 In/128 Out)
Analog I/O image size	none	16 In/16 Out	32 In/32 Out	32 In/32 Out
Actual I/O count that can be realized with each CPU may be limited by image register size, module count, 5V power, and the physical number of I/O points on each product. Refer to the User Manual for detailed information.				
Instructions				
Boolean execution speed	0.37 μ s/ instruction	0.37 μ s/ instruction	0.37 μ s/ instruction	0.37 μ s/ instruction
I/O Image Register	128 I and 128 Q	128 I and 128 Q	128 I and 128 Q	128 I and 128 Q
Internal relays	256	256	256	256
Counters/Timers	256/256	256/256	256/256	256/256
Word In / Word Out	None	16/16	32/32	32/32
Sequential control relays	256	256	256	256
For/Next loops	Yes	Yes	Yes	Yes
Integer math (+ - * /)	Yes	Yes	Yes	Yes
Real math (+ - * /)	Yes	Yes	Yes	Yes
Enhanced features				
Built-in high-speed counter	4 H/W (20 KHz)	4 H/W (20 KHz)	6 H/W (20 KHz)	6 H/W (20 KHz)
Analog adjustments	1	1	2	2
Pulse outputs	2 (20 KHz, DC only)	2 (20 KHz, DC only)	2 (20 KHz, DC only)	2 (20 KHz, DC only)
Communication interrupts	1 transmit/ 2 receive	1 transmit/ 2 receive	1 transmit/ 2 receive	2 transmit/ 4 receive
Timed interrupts	2 (1 ms to 255 ms)	2 (1 ms to 255 ms)	2 (1 ms to 255 ms)	2 (1 ms to 255 ms)
Hardware input interrupts	4, input filter	4, input filter	4, input filter	4, input filter
Real-time clock	Yes (cartridge)	Yes (cartridge)	Yes (built-in)	Yes (built-in)
Password protection	Yes	Yes	Yes	Yes
Communications				
Number of comm ports: PPI, DP/T Baud rate Freeport Baud rate	1 (RS485) up to 187.5Kbaud up to 38.4Kbaud	1 (RS485) up to 187.5Kbaud up to 38.4Kbaud	1 (RS485) up to 187.5Kbaud up to 38.4Kbaud	2 (RS485) up to 187.5Kbaud up to 38.4Kbaud
Protocols supported Port 0: Port 1:	PPI, DP/T, Freeport N/A	PPI, DP/T, Freeport N/A	PPI, DP/T, Freeport N/A	PPI, DP/T, Freeport PPI, DP/T, Freeport
Peer-to-peer	Yes, NETR/NETW	Yes, NETR/NETW	Yes, NETR/NETW	Yes, NETR/NETW

General

CPU 221, 222, 224, 226, 226 XM

CPU technical specification



Environmental conditions

Storage environment	-40° to +70°C, 25° to 55°C 95% humidity
Ambient operating Environment	0° to 55° C horizontal mounting 0° to 45° C vertical mounting 95% non-condensing humidity, no corrosive gas
Mechanical shock	15 G, 11 ms pulse, 6 shocks in each of 3 axis
Sinusoidal vibration	0.30 mm peak-to-peak 10 to 57 Hz; 2 G panel mount, 1 G DIN rail mount, 57 Hz to 150 Hz; 10 sweeps each axis, 1 octave/minute

Mechanical protection	IP 20
Agency approvals	UL, CSA, FM, CE

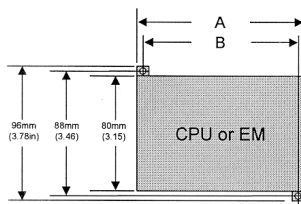
Input power supply 24V DC power 115/230V AC power

Line voltage-permissible range	20.4 - 28.8 VDC	85 - 264 VAC, 47 - 63 Hz
Input current CPU only/ max load	80/900 mA at 24 VDC	15/60 mA at 240 VAC 30/120 mA at 120 VAC
In rush current (max)	10 A at 28.8 VDC	20 A at 264 VAC
Isolation (input power to logic)	Not isolated	1500 VAC 80 ms at 240 VAC, 20 ms at 120 VAC
Hold up time (after power loss)	10 ms at 24 VDC	
Internal fuse, not replaceable	2 A, 250 V, slow blow	2 A, 250 V, slow blow

24 VDC sensor power output

Voltage range	15.4 - 28.8 VDC	20.4 - 28.8 VDC
Maximum current	180 mA	180 mA
Ripple noise	Same as input line	Less than 1 V p-p max.
Current limit	600 mA	600 mA
Isolation (sensor power to logic)	Non-isolated	Non-isolated

Installation dimensions



Note:
Panel mount or DIN rail possible (DIN EN50 022, 35mm).
Unit height is always 62mm (2.45in). Allow 75mm (3 in) from surface for clearance.

Product	A	B	Product	A	B
CPU221	90 mm (3.54 in)	82 mm (3.23 in)	16pt	71.2 mm (2.80 in)	63.2 mm (2.49 in)
CPU222	90 mm (3.54 in)	82 mm (3.23 in)	4pt, 4/4pt	46 mm (1.81 in)	63.2 mm (2.49 in)
CPU224	120.5 mm (4.74 in)	112.5 mm (4.43 in)	Ethernet, Modem	71.2 mm (2.80 in)	63.2 mm (2.49 in)
CPU226 (XM)	196 mm (7.84 in)	188 mm (7.52 in)	RTD, TC, Profibus, AS-I	71.2 mm (2.80 in)	63.2 mm (2.49 in)
8pt	46 mm (1.81 in)	38 mm (1.5 in)	Analog In., Combo	71.2 mm (2.80 in)	63.2 mm (2.49 in)
8/8pt	71.2 mm (2.80 in)	63.2 mm (2.49 in)	Analog output	46 mm (1.81 in)	38 mm (1.5 in)
16/16pt	137.3 mm (5.41 in)	129.3 mm (5.09 in)	Position, IT	71.2 mm (2.80 in)	63.2 mm (2.49 in)

DC input features

Input type	Sink/source (IEC type 1 sink)
Input Voltage	
Maximum continuous	30 VDC
Surge	35 VDC for 0.5 s
Rated value	24 VDC at 4 mA, nominal
Logic 1 signal (minimum)	15 VDC at 2.5 mA, minimum
Logic 0 signal (maximum)	5 VDC at 1 mA, maximum
Isolation (field side to logic)	
Optical isolation (galvanic)	500 VAC for 1 minute
Input delay & HSC rate	0.2 to 12.8 ms, user-selectable
Filtered inputs and interrupts	20 kHz
Single phase HSC	30 kHz
Logic 1 level = 15 to 30 VDC	
Logic 1 level = 15 to 26 VDC-Quadrature HSC	
Logic 1 level = 15 to 30 VDC	10 kHz
Logic 1 level = 15 to 26 VDC	20 kHz
2-Wire prox. leakage	1 mA, maximum

Output specifications DC output Relay output

General		
Output type	Solid State-MOSFET	Relay, dry contact
Permissible range	20.4 to 28.8 VDC	5-30VDC or 5-250VAC
Rated value	24 VDC	-
Logic 1 signal at max. current	20 VDC, minimum	-
Logic 0 signal with 10 K W load	0.1 VDC, maximum	-

Output Current

Logic 1 signal	0.75 A	2.00 A
Max. current per common/group		
CPU221	3.0 A	6.0 A
CPU222	4.5 A	6.0 A
CPU224	3.75 A	8.0 A
CPU226	6.0 A	10.0 A

Lamp load

ON state resistance (contact)	0.3 Ω	0.2 Ω, max. when new
Leakage current per point	10 μA, maximum	-
Surge current	8 A for 100 ms, max.	7 A w/ contacts closed
Overload protection	No	No

Isolation

Optical isolation (galvanic)	500 VAC for 1 min.	-
Isolation resistance	-	100 M Ω, min. when new
Isolation coil to contact	-	1500 VAC for 1 min.
Isolation between open contacts	-	750 VAC for 1 min.

Inductive Load Clamping

Repetitive Energy dissipation	1 W, all channels	-
	0.5 L I ² x switch. rate	
Clamp voltage limits	L+ minus 48 V	-

Output Delay & Frequency

Off to On (Q0.0 & Q0.1)	2 μs, maximum	-
On to Off (Q0.0 & Q0.1)	10 μs, maximum	-
Off to On (Q0.2 & Q0.3)	15 μs, maximum	-
On to Off (Q0.2 & Q0.3)	100 μs, maximum	-
Pulse Train Output (Q0.0 & Q0.1)	20 kHz, maximum	1 Hz, maximum

Relay Life

Switching delay	-	10 ms, maximum
Lifetime mechanical (no load)	-	10,000,000 open/close
Lifetime contacts at rated Load	-	100,000 open/close

Expansion I/O modules

The S7-200 Micro PLC system can be expanded to cover applications up to 256 I/O points by adding I/O expansion modules. There are several types of expansion modules:

- Discrete Input / Output
- Discrete Input / Output Combination
- Analog Input / Output
- Analog Input / Output combination
- RTD / Thermocouple input
- PROFIBUS-DP slave
- AS-Interface master

- Ethernet
- Internet
- Modem
- Positioning

Modules can be added directly next to the CPU, or in an extended arrangement with a 0.8m Expansion Cable, either with panel mounting or standard DIN rail mounting.

Maximum Configurations

As shown in the CPU selection guide, there is a maximum number of expansion modules that can be connected to any given CPU. Another item to consider is the available power budget. Each expansion module consumes +5V DC power from the CPU I/O bus, so this can determine the maximum I/O configuration as well. The tables show the power budget and maximum I/O configurations for the S7-200 Micro PLC system.

CPU 22x 5 VDC Current	Expansion module 5 VDC Current Consumption - ma	
CPU 222	340	EM 221 DO18 x DC24V
CPU 224	660	EM 222 DO8 x DC24V
CPU 226	1000	EM 222 DO8 x Rly
		EM 222 DI4/DO4 x DC24V
		EM 223 DI4/DO4 x DC24V/Rly
		EM 223 DI8/DO8 x DC24V
		EM 223 DI8/DO8 x DC24V/Rly
		EM 223 DO16/DO16 x DC24V
		EM 223 DI16/DO16 x DC24V/Rly
		EM 231 AI4 x 12 Bit
		EM 231 AI4 x Thermocouple
		EM 231 AI4 x RTD
		EM 232 AQ2 x 12 Bit
		EM 235 AI4/AQ1 x 12 Bit
		EM 277 PROFIBUS-DP

Module	5V ma	Digital Inputs	Digital Outputs	Analog Inputs	Analog Outputs
CPU 221	No expansion possible				
CPU 222	No expansion possible				
Max Digital In / Out					
CPU	+340	8	6		
2 x EM 223 DI16 / DO16 x DC24V	-320	32	32		
or	-300				
2 x EM 223 DI16 / DO16 x DC24V / Rly	>0	40	38		
Total =					
Max Analog In					
CPU	+340	8	6		
2 x EM 235 AI4 / AQ1	-60			8	2
Total =	>0	8	6	8	2
Max Analog Out					
CPU	+340	8	6		
2 x EM 232 AQ2	-40			0	4
Total =	>0	8	6	0	4
CPU 224	No expansion possible				
Max Digital In / Rly Out					
CPU	+660	14	10		
4 x EM 223 DI16 / DO16 x DC24V / Rly	-600	64	64		
2 x EM 221 DI8 x DC24V	-60	16			
Total =	=0	94	74		
Max Digital In / DC Out					
CPU	+660	14	10		
4 x EM 223 DI16 / DO16 x DC24V	-640	64	64		
Total =	>0	78	74		
Digital In / Max Rly Out					
CPU	+660	14	10		
4 x EM 223 DI16 / DO16 x DC24V/Rly	-600	64	64		
1 x EM 222 DO8 x Rly	-40		8		
Total =	>0	78	82		
CPU 226 (XM)	No expansion possible				
Max Digital In / Rly Out					
CPU	+1000	24	16		
6 x EM 223 DI16 / DO16 x DC24V / Rly	-900	96	96		
1 x EM 223 DI8 / DO8 x DC24V / Rly	-80	8	8		
Total =	>0	128	120		
Max Digital In / DC Out					
CPU	+1000	24	16		
6 x EM 223 DI16 / DO16 x DC24V	-960	96	96		
1 x EM 221 DI8 x DC24V	-30	8			
Total =	>0	128	112		
CPU 224 or CPU 226 (XM)	No expansion possible				
Max Analog In					
CPU	>660	14 (24)	10 (16)		
7 x EM 235 AI4 / AQ1	-210			28	7
Total =	>0	14 (24)	10 (16)	28	7
Max Analog Out					
CPU	>660	14 (24)	10 (16)		
7 EM 232 AQ2	-140			0	14
Total =	>0	14 (24)	10 (16)	0	14