### CPU selection chart

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

<table>
<thead>
<tr>
<th>Feature</th>
<th>CPU 221</th>
<th>CPU 222</th>
<th>CPU 224</th>
<th>CPU 226 (XM)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physical size of unit memory</strong></td>
<td>90 mm x 80 mm x 62 mm</td>
<td>90 mm x 80 mm x 62 mm</td>
<td>120.5 mm x 80 mm x 62 mm</td>
<td>190 mm x 80 mm x 62 mm</td>
</tr>
<tr>
<td>Program</td>
<td>2048 words</td>
<td>2048 words</td>
<td>4096 words</td>
<td>4096 words (8192)</td>
</tr>
<tr>
<td>User data</td>
<td>1024 words</td>
<td>1024 words</td>
<td>2560 words</td>
<td>2560 words (5120)</td>
</tr>
<tr>
<td>User program storage type</td>
<td>EEPROM</td>
<td>EEPROM</td>
<td>EEPROM</td>
<td>EEPROM</td>
</tr>
<tr>
<td>Data backup (super capacitor)</td>
<td>50 hours typical</td>
<td>50 hours typical</td>
<td>190 hours typical</td>
<td>190 hours typical</td>
</tr>
<tr>
<td>(optional battery)</td>
<td>200 hours typical</td>
<td>200 hours typical</td>
<td>200 hours typical</td>
<td>200 hours typical</td>
</tr>
<tr>
<td><strong>Local I/O</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local I/O</td>
<td>6 In/4 Out</td>
<td>8 In/6 Out</td>
<td>14 In/10 Out</td>
<td>24 In/16 Out</td>
</tr>
<tr>
<td>Number of expansion modules</td>
<td>none</td>
<td>2 modules</td>
<td>7 modules</td>
<td>7 modules</td>
</tr>
<tr>
<td><strong>Total I/O</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital I/O (image size)</td>
<td>256 (128 In/128 Out)</td>
<td>256 (128 In/128 Out)</td>
<td>256 (128 In/128 Out)</td>
<td>256 (128 In/128 Out)</td>
</tr>
<tr>
<td>Analog I/O (image size)</td>
<td>none</td>
<td>16 In/16 Out</td>
<td>32 In/32 Out</td>
<td>32 In/32 Out</td>
</tr>
<tr>
<td>Actual I/O count</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instructions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boolean execution speed</td>
<td>0.37 μs/instruction</td>
<td>0.37 μs/instruction</td>
<td>0.37 μs/instruction</td>
<td>0.37 μs/instruction</td>
</tr>
<tr>
<td>I/O Image Register</td>
<td>128 I and 128 Q</td>
<td>128 I and 128 Q</td>
<td>128 I and 128 Q</td>
<td>128 I and 128 Q</td>
</tr>
<tr>
<td>Internal relays</td>
<td>256</td>
<td>256</td>
<td>256</td>
<td>256</td>
</tr>
<tr>
<td>Counters/Timers</td>
<td>256/256</td>
<td>256/256</td>
<td>256/256</td>
<td>256/256</td>
</tr>
<tr>
<td>Word In / Word Out</td>
<td>None</td>
<td>16/16</td>
<td>32/32</td>
<td>32/32</td>
</tr>
<tr>
<td>Sequential control relays</td>
<td>256</td>
<td>256</td>
<td>256</td>
<td>256</td>
</tr>
<tr>
<td>For/Next loops</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Integer math (+ - *)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Real math (+ - *)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Enhanced features</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Built-in high-speed counter</td>
<td>4 (16 I)</td>
<td>4 (16 I)</td>
<td>6 (16 I)</td>
<td>6 (16 I)</td>
</tr>
<tr>
<td>Analog adjustments</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Pulse outputs</td>
<td>2 (20 kHz, DC only)</td>
<td>2 (20 kHz, DC only)</td>
<td>2 (20 kHz, DC only)</td>
<td>2 (20 kHz, DC only)</td>
</tr>
<tr>
<td>Communication interrupts</td>
<td>1 transmit/2 receive</td>
<td>1 transmit/2 receive</td>
<td>1 transmit/2 receive</td>
<td>2 transmit/4 receive</td>
</tr>
<tr>
<td>Timed interrupts</td>
<td>2 (1 ms to 255 ms)</td>
<td>2 (1 ms to 255 ms)</td>
<td>2 (1 ms to 255 ms)</td>
<td>2 (1 ms to 255 ms)</td>
</tr>
<tr>
<td>Hardware input interrupts</td>
<td>4, input filter</td>
<td>4, input filter</td>
<td>4, input filter</td>
<td>4, input filter</td>
</tr>
<tr>
<td>Real-time clock</td>
<td>Yes (cartridge)</td>
<td>Yes (cartridge)</td>
<td>Yes (built-in)</td>
<td>Yes (built-in)</td>
</tr>
<tr>
<td>Password protection</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Communications</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of comm ports</td>
<td>1 (RS485) up to 187.5Kbaud up to 38.4Kbaud</td>
<td>1 (RS485) up to 187.5Kbaud up to 38.4Kbaud</td>
<td>1 (RS485) up to 187.5Kbaud up to 38.4Kbaud</td>
<td>2 (RS485) up to 187.5Kbaud up to 38.4Kbaud</td>
</tr>
<tr>
<td>Protocols supported</td>
<td>PPI, DP/T, Freeport</td>
<td>PPI, DP/T, Freeport</td>
<td>PPI, DP/T, Freeport</td>
<td>PPI, DP/T, Freeport</td>
</tr>
<tr>
<td>Port 1</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Peer-to-peer</td>
<td>Yes, NETR/NETW</td>
<td>Yes, NETR/NETW</td>
<td>Yes, NETR/NETW</td>
<td>Yes, NETR/NETW</td>
</tr>
</tbody>
</table>
## SIMATIC S7 - 200 Micro PLC

### CPU 221, 222, 224, 226, 226 XM

#### CPU technical specification

![Diagram of CPU]

**Environmental conditions**

- **Storage environment:** -40° to +70°C, 25% to 55% 95% humidity
- **Ambient operating environment:** 0° to 55°C (horizontal mounting), 0° to 45°C (vertical mounting), 90% non-condensing humidity, no corrosive gas
- **Mechanical shock:** 15 G, 11 ms pulse, 6 shocks in each of 3 axes
- **Sinusoidal vibration:** 0.30 mm peak-to-peak 10 to 57 Hz, 2 G panel mount, 1 G Diff. 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

**24 V DC power**

- **115/230V AC power**
- **Line voltage-permissible range:** 20.4 - 28.8 VDC
- **Input current CPU only/maximum:** 80/900 mA at 24 VDC, 15/60 mA at 240 VAC
- **Inrush current (max):** 10 A at 28.8 VDC
- **Isolation (input power to logic):** Not isolated
- **Isolation time:** 10 ms at 24 VDC
- **Internal fuse:** 2 A, 250 V, slow blow

**24 VDC sensor power output**

- **Voltage range:** 10.4 - 28.8 VDC
- **Maximum current:** 180 mA
- **Ripple noise:** Same as input line
- **Current limit:** 600 mA
- **Isolation (sensor power to logic):** Non-isolated

#### Installation dimensions

![Diagram of installation dimensions]

#### 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
  - Logic 1 level = 15 to 26 VDC
- 2-Wire prox. leakage: 1 mA, maximum

**Output specifications**

**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 maximum current**

- 20 VDC, minimum

**Logic 0 signal with 10 KΩ load**

- 0.1 VDC, maximum

**Output Current**

- Logic 1 signal: 0.75 A
- Max. current per common/group: 2.00 A
- Overload protection: No

**Lamp load**

- 5.0 W
- 30 W DC/200 W AC

**Leakage current per point**

- 10 µA, maximum
- 30 VDC or 0.5 s
- 7 A w/ contacts closed

**Inductive Load Clamping**

- Repetitive: Energy dissipation 1 W, all channels
- 0.5 Lpf 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, minimum
- On to Off (Q0.2 & Q0.3): 15 µs, maximum
- Off to On (Q0.2 & Q0.3): 100 µs, maximum
- Pulse Train Output (Q0.0 & Q0.1): 20 kHz, maximum

**Relay Life**

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

<table>
<thead>
<tr>
<th>Module</th>
<th>5V ma</th>
<th>Digital Inputs</th>
<th>Digital Outputs</th>
<th>Analog Inputs</th>
<th>Analog Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU 221</strong></td>
<td>No expansion possible</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CPU 222</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Max Digital In / Out CPU</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 x EM 223 DI16 / DO16 x DC24V or 2 x EM 223 DI16 / DO16 x DC24V / Rly</td>
<td>8</td>
<td>6</td>
<td>32</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>+340</td>
<td>-320</td>
<td>8</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Max Analog In</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 x EM 235 AI4 / AO1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>+340</td>
<td>-320</td>
<td>8</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Max Analog Out</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>2 x EM 232 AQ2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>+340</td>
<td>-320</td>
<td>8</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td><strong>CPU 224</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max Digital In / Rly Out CPU</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 x EM 223 DI16 / DO16 x DC24V or 2 x EM 221 DI8 x DC24V</td>
<td>14</td>
<td>10</td>
<td>64</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>+660</td>
<td>-640</td>
<td>14</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Max Analog In</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 x EM 223 DI16 / DO16 x DC24V and 1 x EM 222 DO8 x Rly</td>
<td>14</td>
<td>10</td>
<td>64</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>+660</td>
<td>-640</td>
<td>14</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td><strong>CPU 226 (XM)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max Digital In / DC Out CPU</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 x EM 223 DI16 / DO16 x DC24V and 1 x EM 222 DI8 x DC24V</td>
<td>24</td>
<td>16</td>
<td>96</td>
<td>96</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>+1000</td>
<td>-960</td>
<td>24</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Max Analog In</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 x EM 235 AI4 / AO1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>+1000</td>
<td>-960</td>
<td>24</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Max Analog Out</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 EM 232 AQ2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>+1000</td>
<td>-960</td>
<td>24</td>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>