### Motion Control: Software Functions

<table>
<thead>
<tr>
<th>Function</th>
<th>S7-1200</th>
<th>S7-1500 UFP incl. S7-1500F</th>
<th>S7-1500 Compact</th>
<th>S7-1500 CPU incl. S7-1500F</th>
<th>Technology modules ET 200MP</th>
<th>Technology modules ET 200MP</th>
<th>Technology modules ET 200SP</th>
<th>Technology modules ET 200SP</th>
<th>Technology modules ET 200S</th>
<th>Technology modules ET 200S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual axes</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td>✓</td>
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<tr>
<td>Open-loop speed control</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>External encoder</td>
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<td>✓</td>
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<td>✓</td>
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<tr>
<td>Measuring inputs</td>
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<td>✓</td>
<td>✓</td>
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<tr>
<td>Output cams, output cam tracks</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Torque functions</td>
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<td>✓</td>
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<td>✓</td>
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<tr>
<td>Synchronous operation</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Synchronization with actual value coupling</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Cam disks</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Kinematic functions</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Cyclic setpoint (MotionIO)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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</tbody>
</table>

### Motion Control: Onboard Drive Interface

<table>
<thead>
<tr>
<th>Feature</th>
<th>S7-1200</th>
<th>S7-1500 UFP incl. S7-1500F</th>
<th>S7-1500 Compact</th>
<th>S7-1500 CPU incl. S7-1500F</th>
<th>Technology modules ET 200MP</th>
<th>Technology modules ET 200MP</th>
<th>Technology modules ET 200SP</th>
<th>Technology modules ET 200SP</th>
<th>Technology modules ET 200S</th>
<th>Technology modules ET 200S</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROFdrive</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>PROFdrive isochronous</td>
<td>✓</td>
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<td>✓</td>
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<tr>
<td>Analog</td>
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<td>✓</td>
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<td>✓</td>
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<tr>
<td>Switch/directional (PTO) (e.g. stepper motor)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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### Position Detection for Motion Control

<table>
<thead>
<tr>
<th>Feature</th>
<th>S7-1200</th>
<th>S7-1500 UFP incl. S7-1500F</th>
<th>S7-1500 Compact</th>
<th>S7-1500 CPU incl. S7-1500F</th>
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<th>Technology modules ET 200MP</th>
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<th>Technology modules ET 200SP</th>
<th>Technology modules ET 200S</th>
<th>Technology modules ET 200S</th>
</tr>
</thead>
<tbody>
<tr>
<td>24V Incremental encoder</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>5V Incremental encoder (RS422)</td>
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<td>✓</td>
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<td>✓</td>
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<tr>
<td>SSI-Absolute value encoder (single + multi turn)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Via cyclical drive telegram and motor encoder</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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### Counting

<table>
<thead>
<tr>
<th>Feature</th>
<th>S7-1200</th>
<th>S7-1500 UFP incl. S7-1500F</th>
<th>S7-1500 Compact</th>
<th>S7-1500 CPU incl. S7-1500F</th>
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<th>Technology modules ET 200MP</th>
<th>Technology modules ET 200SP</th>
<th>Technology modules ET 200SP</th>
<th>Technology modules ET 200S</th>
<th>Technology modules ET 200S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max frequency in kHz</td>
<td>20-500</td>
<td>100</td>
<td>200</td>
<td>1000</td>
<td>50</td>
<td>200</td>
<td>1000</td>
<td>150</td>
<td>10</td>
<td>10</td>
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<tr>
<td>Forward/backward</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Supported by technology object TO HSC</td>
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<tr>
<td>Fast reaction with Onboard-DQ</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td>✓</td>
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<tr>
<td>DI for HW-Gate</td>
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<tr>
<td>DI for synchronization</td>
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<tr>
<td>DI for capture</td>
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<td>✓</td>
<td>✓</td>
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<td>✓</td>
</tr>
</tbody>
</table>

Caption:
- Suitable hardware for function: ✓
- Available: ✓
- Not relevant: Blank field

*) Requires the system function isochronous mode
A Output signals in 24V, RS-422 and 5V asymmetrical available
B With technology object speed axis
C Only CPU 1217 DC/DC/DC
D Only CU250S-2 und CU250D-2
### Technology Integrated (CPU)

- **S7-1200**
- **S7-1500 (SP) incl. S7-1500F**
- **S7-1500 (MP) incl. S7-1500F**
- **S7-1500 Compact**
- **S7-1500 T-CPU incl. S7-1500TF**
- **S7-1500 Open Controller**
- **Technology modules S7-1500 / ET 200MP**
  - TM Count 2x24V
  - TM PosInput 2
  - TM Timer DIDQ 16x24V
  - TM PTO 4
- **Technology modules ET 200SP**
  - TM Count 1x24V
  - TM PosInput 1
  - TM Timer DIDQ 10x24V
  - TM Pulse 2x24V
- **Peripheral modules S7-1500 / ET 200MP**
  - DI 32x24VDC HF
  - DI 16x24VDC HF
  - DQ 8x24VDC/2A HF
  - AI 8xU/I HS
  - AI 8xU/R/RTD/TC HF
  - AQ 8xU/I HS
- **Peripheral modules ET 200SP**
  - DI 8x24VDC HS
  - DQ 4x24VDC/2A HS
  - AI 2xU/I 2-/4-wire HF
  - AI 4xRTD/TC 2-/3-/4-wire HF
  - AI 8xRTD/TC 2-wire HF
  - AI 2xU/I 2-/4-wire HS
  - AI 2xSG 4-/6-wire HS
  - AI Energy Meter
- **I/O modules S7-1200**
  - SM 1238 Energy Meter
- **I/O modules ET 200AL**
  - DIQ 16x24VDC

### Drives

- **SINAMICS G (depends on the CPU)**
- **SINAMICS V90**
- **SINAMICS V90 PN**
- **SINAMICS S120**
- **SINAMICS S210**

### Pulse outputs

- **Pulse width modulation (PWM)**
- **PTO – pulse/direction**
- **PTO – forward/backward**
- **Incremental encoder simulation**
- **Frequency output**

### Time critical applications

- **Timebased (I/O) (*)**
- **Inputs for measuring input**
- **Oversampling (*)**

### System function

- **Isochronous mode**
- **PID Control**
- **Temperature controller**
- **Compact controller**
- **Step controller**
- **Basic functions**
- **Support functions**

### Measurement

- **Frequency**
- **Period duration**
- **Speed measurement**
- **Strain gauge (DMS)**
- **Energy**

### Measured value processing

- **Measurement scaling**
- **Measuring range adjustment**
- **“Scalable temperature measuring range”**

---

**Caption:**

<table>
<thead>
<tr>
<th>Suitable hardware for function</th>
<th>Available</th>
<th>Not relevant</th>
<th>Blank field</th>
</tr>
</thead>
<tbody>
<tr>
<td>(*) Requires the system function isochronous mode</td>
<td>A Output signals in 24V, RS-422 and 5V asymmetrical available</td>
<td>B With technology object speed axis</td>
<td>C Only CPU 1217C DC/DC/DC</td>
</tr>
</tbody>
</table>

**siemens.com/simatic-technology**

**Status 02/2019**

Subject to changes and errors. The information given in this document only contains general descriptions and/or performance features which may not always specifically reflect those described, or which may undergo modification in the course of further development of the products. The requested performance features are binding only when they are expressly agreed upon in the concluded contract.